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A Revision of the Endodontidae of the Hawaiian Islands

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ABSTRACT.—This study reviewed the taxonomy of Endodontidae snails in the Hawaiian Islands based on approximately 16,374 specimens from 401 localities in 1,100 lots from the islands of Midway, Nihoa, Niihau, Kauai, Oahu, Molokai, Lanai, Maui, Kahoolawe, and Hawaii. A total of 183 endodontid species are considered endemic to the Hawaiian Islands including 150 species described herein as new. For the 33 previously described species, extant type specimens are confirmed for 22, and one lectotype and ten neotypes are newly designated for the remaining eleven. Those original 33 species are redescribed in the same format used for newly proposed species. In addition, 12 new endodontid genera are described, raising the total recorded for the Hawaiian Islands to 16. Nine of those genera are allocated to a new subfamily endemic to the Hawaiian Islands. Oahu is shown to have the greatest diversity with 76 species and 11 genera. An 8,000-year history in dated stratigraphy of the snail fauna in a pit fall cave illustrates the effect of local climate change and volcanism on habitat, species composition, and extinction.

Key Words: Endemicity, diversity, extinction, Endodontinae Pilsbry 1895, Nesophilinae Severns (new subfamily).

INTRODUCTION

Speciation in the Hawaiian archipelago is driven by the isolation of the islands in the center of the Pacific Ocean and the myriad microhabitats of the mountainous terrain. The percentage of endemism is unmatched by any other land mass of equivalent size. Prior to the arrival of humans, roughly 90% of all plant species (Robert Hobdy, pers. comm.), 100% of forest bird species (Olsen and James, 1982), approximately 99% of insect species (Zimmerman, 1948), and 99% or more of land snail species were endemic (E.A. Kay, pers. comm. 1982). Among the land snails, three remarkable radiations accounted for 89.6% of the 763 recognized species (Cowie et al., 1995): the family Achatinellidae with 231 endemic species (Severns, 2011), the family Amastridae with 293 endemic species (Severns, 2011), and 160 endemic species of Endodontidae as estimated by Solem (1976: 210).

Endodontidae Pilsbry, 1895 is a family of tropical land snails found on isolated oceanic islands of the central Pacific Ocean. It is notable for species-rich radiations on different islands and conchological variability. This revision is restricted to the Endodontidae of the Hawaiian Islands which includes the nominal genera *Endodonta* Albers, 1850, *Nesophila* Pilsbry, 1893, *Cookeconcha* Solem, 1976 and *Protoendodonta* Solem, 1977, plus the 12 new genera proposed herein.

The oldest fossil Endodontidae from Hawaii were deposited in unlithified and partly lithified sediments resting on limestone 35.3 m to 39.6 m deep from the Reef Bore Hole at Midway. The Reef Bore Hole went on to penetrate Midway's limestone cap at 384.3 m, reaching Late Miocene lava approximately 10.4 to 5 million years old (Ladd, 1967). If the low range of the date of the Midway core is correct, Endodontidae may have lived on Midway when 4-million-year-old Kauai, the oldest of the windward

islands, was forming. Of that ancient snail fauna of the leeward islands, a single species still exists. Described by Hayes et al. (2020) as *Endodonta christenseni* and transferred here to the newly erected monospecific genus *Nihoaia*, this species persists on Nihoa, a 25.5 hectare island which, at the end of the last glaciation (ca. 25,000 years ago), was roughly the size of Lanai.

With canoes, then ships, and finally airplanes, came a silent mass extinction of invertebrates due to habitat loss and introduced predators that is still on going. Zimmerman (1948) documented the occurrence of introduced swarming ants, *Pheidole megacephala* (Fabricius 1793), and the disappearance of endemic snails and insects. Solem (1976, 1990) observed the concordance between the presence of swarming ants and the absence of endemic insect and snail species, especially among Endodontidae.

The introduction of *Oxychilus alliarius* (J. S. Miller, 1822), an omnivorous snail that can subsist on vegetation but known as a voracious predator of other land snails when available, most likely occurred during the transport of cargo and goods to Hawaii from the United States (John Peak, pers. comm. 1982; Severns, 1984).

An additional 30 snail predators were intentionally introduced between 1952 and 1958 by the Hawaii State Department of Agriculture to combat infestations of the illegally introduced Giant African Snail *Lissachatina fulica* (Bowdich, 1822) sweeping the islands (Davis and Butler, 1963). Two of these predators were noticeably effective against *L. fulica*, the egg eating *Gonaxis kibweziensis* (E. A. Smith, 1894) released in 1952, and the carnivorous *Euglandina rosea* (A. Férussac, 1821) released in 1955. However, considering the damage done to the endodontids by 1960 (Solem, 1990), *E. rosea* and *G. kibweziensis* probably had a minimal effect on the further extinction of the group with only very few species persisting.

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There are approximately 12,000 specimens of Hawaiian endodontids held in the Academy of Natural Sciences of Philadelphia and about 25,000 specimens in the Bernice Pauahi Bishop Museum collection (Solem, 1976: 210). In addition, another ca. 9,000 specimens are in the author's collection. This estimate of more than 46,000 specimens in three collections suggests they were abundant and easy to find when collected. Though now almost completely extinct, their previous geographic distribution, exceptional diversity, and the numbers of individuals preserved in fossil sites and in collections suggest they were once a significant component of the biodiversity of the Hawaiian Islands.

Johann Albers defined the genus *Endodonta* in his 1850 publication on the "family Helicea." In 1860, he published a second edition in which E. von Martens designated the Hawaiian species *Helix lamellosa* Férussac, 1825 as the type of the genus *Endodonta*. However, subsequent Hawaiian species were described in the genus *Helix* Linnaeus, 1758 until *Pithys paucicostata* Pease, 1871a. It was not until *Endodonta apiculata* Ancey, 1889 that *Endodonta* was again used to describe a Hawaiian species, and in 1896 *Nesophila* Pilsbry, 1893 and *Thaumatodon* Pilsbry, 1893 were introduced as subgenera of *Endodonta*.

Henry Pilsbry (1895) revised the classification of the endodontids. He separated his new family Endodontidae from the families Selenitidae, Zonitidae and Helicidae by noting the shells of the Endodontidae are differentiated by the combination of being opaque, brown or flammulated, usually rib-striate with thin, unexpanded shells with indeterminate growth, and sharp apertural lip.

In his synopsis of the genera of Endodontidae, Pilsbry (1895) noted the distribution of the genus *Endodonta* Albers, 1850 as including Australasia and Polynesia. To create a checklist for *Endodonta*, he divided *Endodonta* into eight subgenera defining the subgenus *Endodonta* as characteristic of Polynesia, although he considered a few forms found to the west in New Zealand, New Caledonia and the Philippine Islands as part of the subgenus *Endodonta* as well.

The subgenus *Endodonta* was further divided by Pilsbry (1895) into five informal "sections." Three sections, *Endodonta*, *Nesophila* and *Thaumatodon*, were restricted to Hawaii, the Society Islands and Palau. The remaining two "sections", *Ptychodon* Ancey, 1888 and *Helenoconcha* Pilsbry, 1892, are currently treated as genera in the family Charopidae F. W. Hutton, 1884.

Solem (1976: 365) stated for *Nesophila*: "Described as a section of *Endodonta* to be used for all Polynesian species in which the columellar and palatal barriers were lost, *Nesophila*, is restricted here to a small complex from Kauai." He further demonstrated that *Endodonta* is a genus restricted to the Hawaiian Islands. Solem (1976) subdivided *Endodonta* by reassigning 17 *Endodonta* species to his new

genus *Cookeconcha* with *Helix setigera* Gould, 1844 as the type species. A year later he added *Cookeconcha antiqua* Solem, 1977 and introduced a fourth Hawaiian genus, the monospecific *Protoendodonta* with *Protoendodonta laddi* Solem, 1977. Both *C. antiqua* and *P. laddi* were described from fossils collected from core samples from Midway in 1967. Forty years after Solem's revisionary work, *Endodonta christenseni* Hayes et al., 2020 was described from Nihoa in the Leeward Hawaiian Islands.

The dramatic loss of appreciation of their taxonomy in the second half of the 20th century resulted in a stagnation of knowledge of the Hawaiian land snail diversity. This is shown by the estimate of Alan Solem that 199–205 Hawaiian punctoid species were represented in the Bishop Museum, whereas only 34 punctoid species had been described. Solem's 1976 review covered the described species of Hawaii but stayed away from working up the ample undescribed material available in Hawaiian collections (Hausdorf in Severns, 2011). To bridge this gap, the current study strives to untangle and document the overwhelming diversity of this fascinating aspect of the Hawaiian molluscan fauna.

MATERIAL AND METHODS

Material (including types) for all nominal taxa of Hawaiian Endodontidae was searched for examination in this study. Shells were categorized as Pleistocene fossils (specimens from sand dunes and lithified sand dunes, living ~160,000 to 10,000 years before present), Holocene fossils (specimens from all cave sites, living ~10,000 to 1,000 years before present with younger limit approximating the arrival of humans to Hawaii), or Extant (living when humans arrived ~1,000 years before present; dead collected specimens in this category often with periostracum). "Extant, presumed extinct" refers to species believed to have been alive when humans arrived in the islands and are now presumed extinct yet may be found alive. The status of each species (Pleistocene, Holocene or "extant, presumed extinct") was based on the youngest specimen observed with those found on the surface considered younger than those found below ground. Presently there is one confirmed extant species, *Endodonta christenseni* Hayes et al., 2020, on the island of Nihoa and an extant but unconfirmed species on Oahu (per. obs.).

Specimens of Nesophilinae were examined from the islands of Midway, Kauai, Oahu, Molokai, Lanai, Maui, Kahoolawe, and Hawaii. Approximately 4,850 specimens were examined from the Malacology Collection of the Academy of Natural Sciences of Philadelphia (ANSP) of extant, though presumed extinct, and Holocene fossil Nesophilinae. A total of 6,232 specimens were examined from the author's collection (abbreviated MS) including extant, though presumably extinct, and Holocene fossils. An

additional 354 specimens of Nesophilinae were examined from other institutions: Natural History Museum, London (NHMUK, previously BMNH), Bernice Pauahi Bishop Museum, Honolulu (BPBM), Field Museum of Natural History, Chicago (FMNH), Museum of Comparative Zoology, Harvard University, Cambridge (MCZ), Staatliches Museum für Naturkunde Stuttgart (SMNS), and US National Museum of Natural History (Smithsonian Institution), Washington DC (USNM). Museum codes follow Sabaj (2020). The total consisted of 806 lots containing approximately 11,436 specimens.

Specimens of Endodontinae were examined from the islands of Midway, Nihoa (via images), Niihau, Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii. Approximately 4,486 specimens were examined from the ANSP collection and 452 specimens from the author's collection including extant, though presumably extinct endodontins, and Holocene fossils. An additional six specimens of Endodontinae were examined from other institutions (BPBM, FMNH, MCZ, NHMUK and USNM). The total consisted of 303 lots containing approximately 4938 specimens.

The species descriptions, including those of previously described species, have been standardized for comparative purposes. The taxa are organized alphabetically by subfamily, then genus. Each generic account is followed by a plate of included species and a map showing their distribution. Species depicted in the plate are organized geographically by island (east to west): Hawaii (first), Maui, Lanai, Molokai, Oahu, Kauai, Niihau, Nihoa and Midway (last). The species accounts within each genus are ordered similarly.

More than 450 specimens were selected and photographed in four views: apertural, apical, umbilical and lateral, from which measurements, rib and whorl counts were taken. Except for the diameter of the shell measured under a binocular microscope for scale, all measurements were taken from images using a 0.1 mm grid overlayed on each photograph. These measurements included the shell height, spire protrusion, aperture height and width, and umbilicus diameter (see Fig. 1). Whorl descensions were measured using lateral-view images rotated to record the angle of late juvenile and body whorl descension of Nesophilinae and the aperture view of the body whorl descension in Endodontinae.

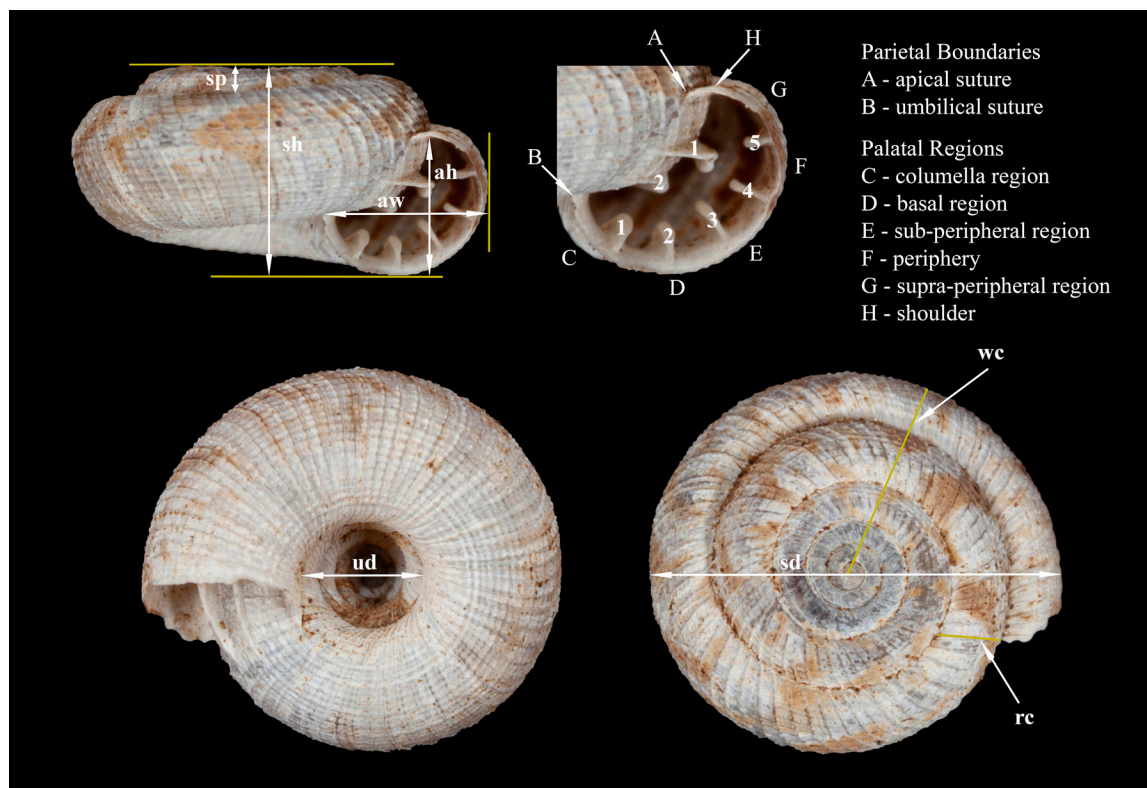


Fig. 1. *Christensenius boucheti* n. sp., illustrating measurements, barrier numbering, whorl count and axial rib count. Abbreviations are sh, shell height; sp, spire protrusion; aw aperture width; ah aperture height; ud, umbilical diameter; sd, shell diameter; wc, whorl count boundary; rc rib count begins here. Numbers are barrier orders, 1 & 2 are parietal barriers, 1 to 5 palatal barriers.

The alteration (Solem, 1976: 11) of the shell of Nesophilinae is a point in shell growth of abrupt change equated to sexual maturity. Post alteration irregularities appear in the height, thickness and spacing of the axial ribs, often making them difficult to count, and the irregular spacing of axial ribs causes the number of micro axial riblets to vary per interspace. For these reasons, micro axial riblet counts were taken prior to the alteration.

Figure 1 shows landmarks used for measurements, locations of parietal boundaries and palatal regions, and order of apertural barriers based on Solem (1976, Part 1: 52, fig. 36) and Sartori (2014: 91). Apertures are described generally as obstructed, partially obstructed or unobstructed referring to the obstruction created by the barriers (Fig. 2). The shoulder descends from the highest point of the dorsal aperture, joining the apical whorl to determine the apical suture. The apical suture is highly, moderately or slightly impressed depending on the intersection of the shoulder (Fig. 3).

The parietal barriers are numbered from the apical suture across the parietal callous to the umbilical suture. The palatal barriers are situated in six areas of the palatal region: columellar, basal, sub-peripheral, peripheral, supra peripheral and shoulder. These are numbered from the umbilical suture following the periphery of the peristome to the apical suture (Fig. 1). Barriers occurring irregularly but in the same location, regardless of their height, were counted as barriers. Randomly occurring barrier-like features were counted as variations.

TAXON DELIMITATION

The defining (diagnostic) features of each taxon recognized herein are the shell shape and apertural barriers. In general, the shell shape defines the subfamily whereas the barriers define the genera. Species are delimited by the arrangement (order), shape, and individual characteristics of the barriers.

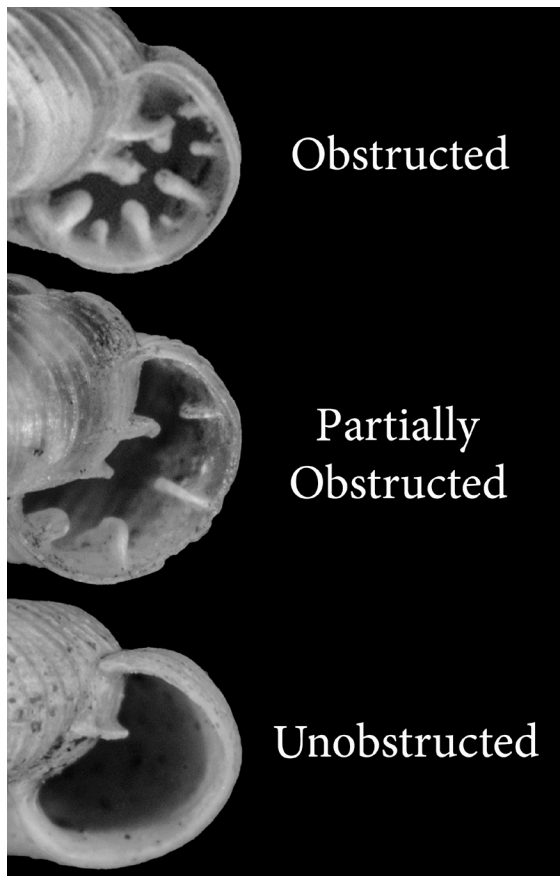


Fig. 2. Variation in aperture obstruction in Endodontidae.

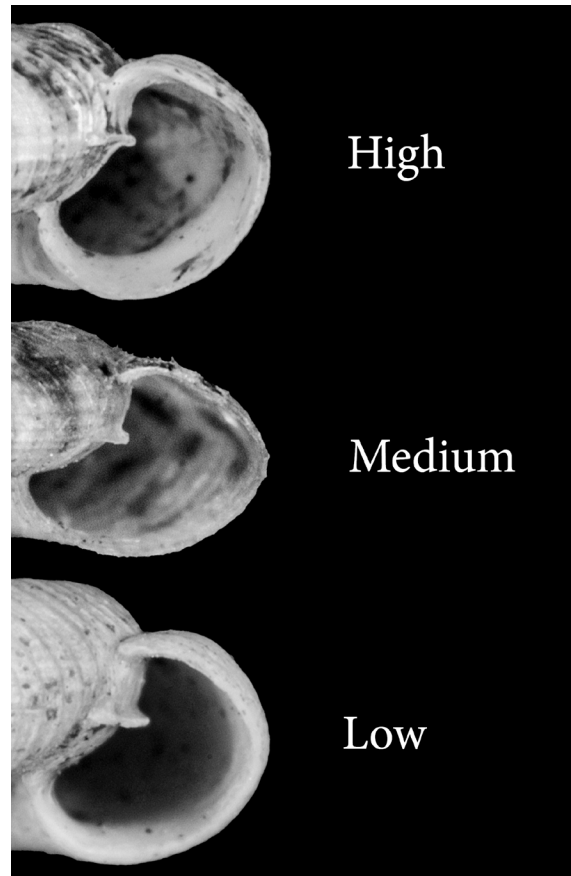


Fig. 3. Variation in shoulder development in Endodontidae.

Species descriptions include details on shell color (e.g., flammulated; counter shaded; patches usually reddish or yellowish brown), shape (e.g., height; spire height; aperture width and height), sculpture (e.g., expanded peripherally; keeled; sulcate; embryonic sculpture; apical sculpture; axial ribs; spiral cords; decussate; growth lines; growth) and other features such as number of whorls, degree of body whorl descension (compared to the penultimate whorl), peristome; apical suture; aperture shapes; parietal region; and palatal regions (columella, basal, sub-peripheral, peripheral, supra peripheral and shoulder). See Figs. 1–3 and Glossary for definitions of terms used herein.

Eight species were initially difficult to place because they had no columella barrier and produced, then reabsorbed, barriers as they matured. All eight species had a tall, distinctive basal palatal barrier, a second sub-peripheral barrier as diminutive, thin, low or absent and a third supra peripheral barrier as diminutive, low, callous-like or absent. This combination of characteristics was used to define the new genus *Solemius* with *Solemius luctiferus* (Pilsbry and Vanatta, 1905) as its type species.

All but four species recognized herein are endemic to a specific Hawaiian Island. Therefore, knowing the island of origin is extremely helpful to identifying an unknown species. In the taxonomic accounts, each genus is accompanied by a map showing the distribution of its constituent species and plate with scaled images of each species arranged per island.

Four species, all *Nesophilinae* n. subfam., in three genera have dispersed to more than one island:

Table 1. Index to taxa described in this work.

Endodontidae Pilsbry, 1895	
Endodontinae Pilsbry, 1895	5
<i>Endodonta</i> Albers, 1850	6
<i>Helenia</i> new genus	30
<i>Kobeia</i> new genus	49
<i>Nihoaia</i> new genus	57
<i>Protoendodonta</i> Solem, 1977	59
<i>Richlingia</i> new genus	61
<i>Starmeria</i> new genus	66
Nesophilinae new subfamily	69
<i>Christensenius</i> new genus	69
<i>Cookeconcha</i> Solem, 1976	88
<i>Gageia</i> new genus	101
<i>Hobdya</i> new genus	104
<i>Liiliiliconcha</i> new genus	114
<i>Nesophila</i> Pilsbry, 1893	125
<i>Oswaldius</i> new genus	130
<i>Randallius</i> new genus	149
<i>Solemius</i> new genus	171

Liiliiliconcha johnstarmeri n. gen. and sp. (Oahu, Molokai, Lanai, Maui), *Liiliiliconcha maui* n. gen. and sp. (Molokai, Maui, Kahoolawe), *Randallius fisheri* n. gen. and sp. (Oahu, Molokai, Maui) and *Cookeconcha davidpickelli* n. sp. (Molokai, Maui). Conchologically, the isolated populations remain within the expected variation of their respective species. None of these species are known to have dispersed to Kauai or the Island of Hawaii.

RESULTS

The Endodontidae of the Hawaiian Islands are determined to be endemic. Two species were shown not to be Hawaiian (see Discussion) lowering the number of previously described species to 33. Type specimens were located for all but 11 of the original descriptions, of those one lectotype and ten neotypes were assigned. Twelve new genera were described bringing the total to 16 genera of Hawaiian Endodontidae. Two endemic subfamilies were established, Endodontinae Pilsbry, 1895 with seven genera, five of which are described here, and Nesophilinae new subfamily with nine genera, seven of which are described here.

Snail specimens from dated stratigraphy (James et al., 1987) illustrated the tempo of prehistoric extinction, and occasional recolonization, of the snail fauna in Puu Naio Cave for the past 8,000 years.

Order **Pulmonata** Cuvier in Blainville, 1814

Suborder **Stylommatophora** Schmidt, 1855

Superfamily **Punctoidea** Morse, 1864

Family **Endodontidae** Pilsbry, 1895

Remarks: Endodontidae are a diverse family of pulmonate snails restricted to isolated Pacific islands of Polynesia and an outlying Micronesian genus *Aaadonta* Solem, 1976 on Palau. Shell characteristically small, peripherally expanded, open umbilicus, radial ribs, apertural barriers except in the genus *Nesophila* Pilsbry, 1893 and a remarkably constant flammulated color pattern.

Endodontinae Pilsbry, 1895

Description: Endodontinae is characterized by having an expanded periphery, a tendency to lose surface sculpture, a sub-rhomboid aperture, two parietal and five primary palatal barriers, and can increase the number of palatal barriers with the addition of peripheral plicae and sub-palatal barriers. The subfamily Endodontinae is endemic to the Hawaiian Islands.

Included genera (7): *Endodonta* Albers, 1850 (type genus), *Helenia* n. gen., *Kobeia* n. gen., *Nihoaia* n. gen., *Protoendodonta* Solem, 1977, *Richlingia* n. gen., *Starmeria* n. gen.

Endodonta Albers, 1850

Type species: *Endodonta lamellosa* (A. Férussac, 1825) (Fig. 4). **Diagnosis:** Shell keeled; suture margined, obtuse apex, surface sculpture of growth lines; rarely residual post-embryonic axial ribs; two parietals, five palatals, one or two peripheral plicae. **Includes:** 29 species (Fig. 6), five nominal plus 24 newly described herein; distributed on Maui (3 species), Lanai (3), Molokai (2), and Oahu (21) (Fig. 5).

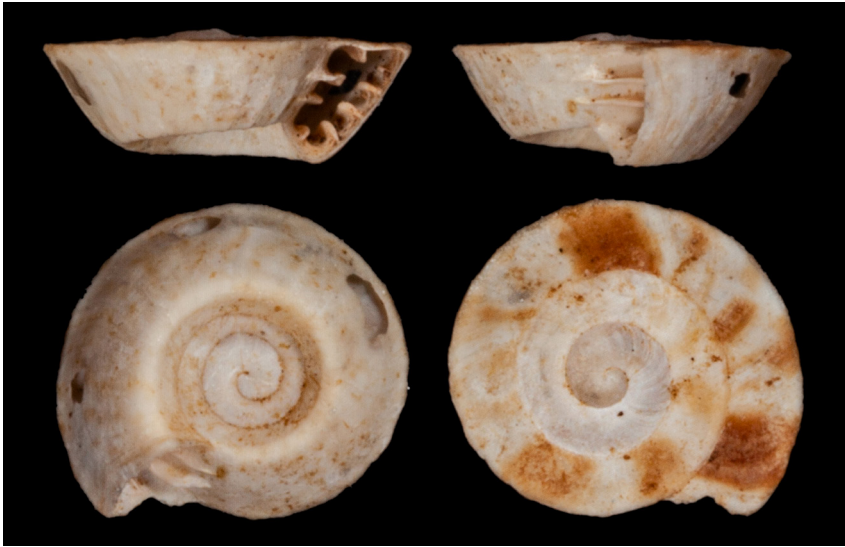


Fig. 4. *Endodonta lamellosa* (A. Férussac, 1825), type species of *Endodonta* Albers, 1850; 2.3 mm, ANSP 386182, Oahu, Manoa, Rocky Hill.

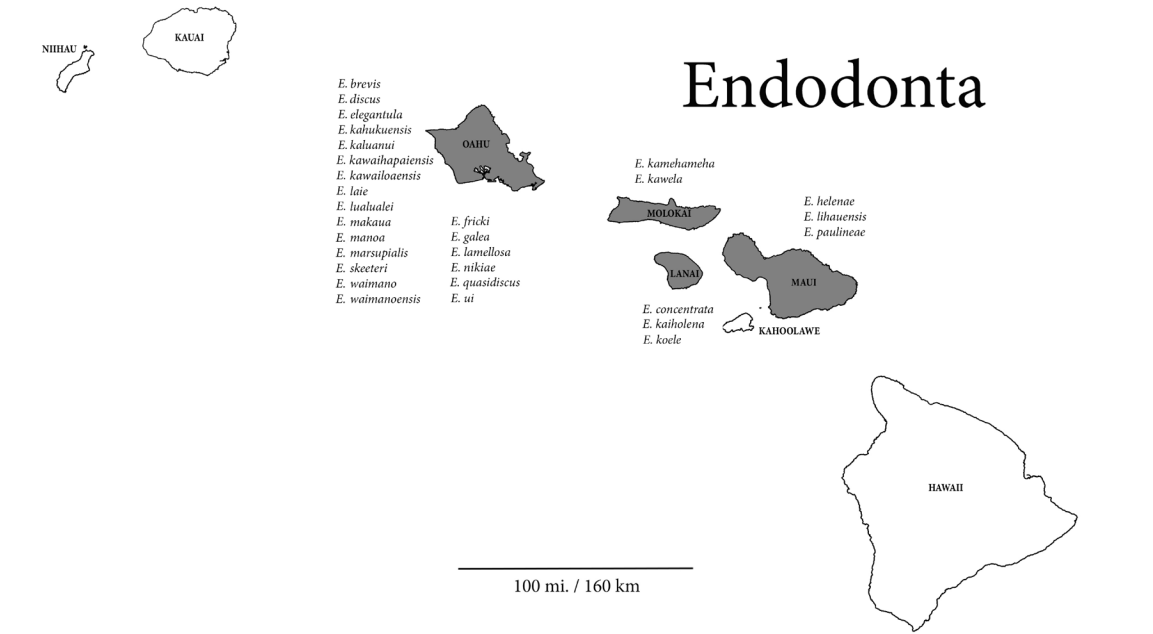


Fig. 5. Distributions of the species of *Endodonta* in the Hawaiian archipelago.

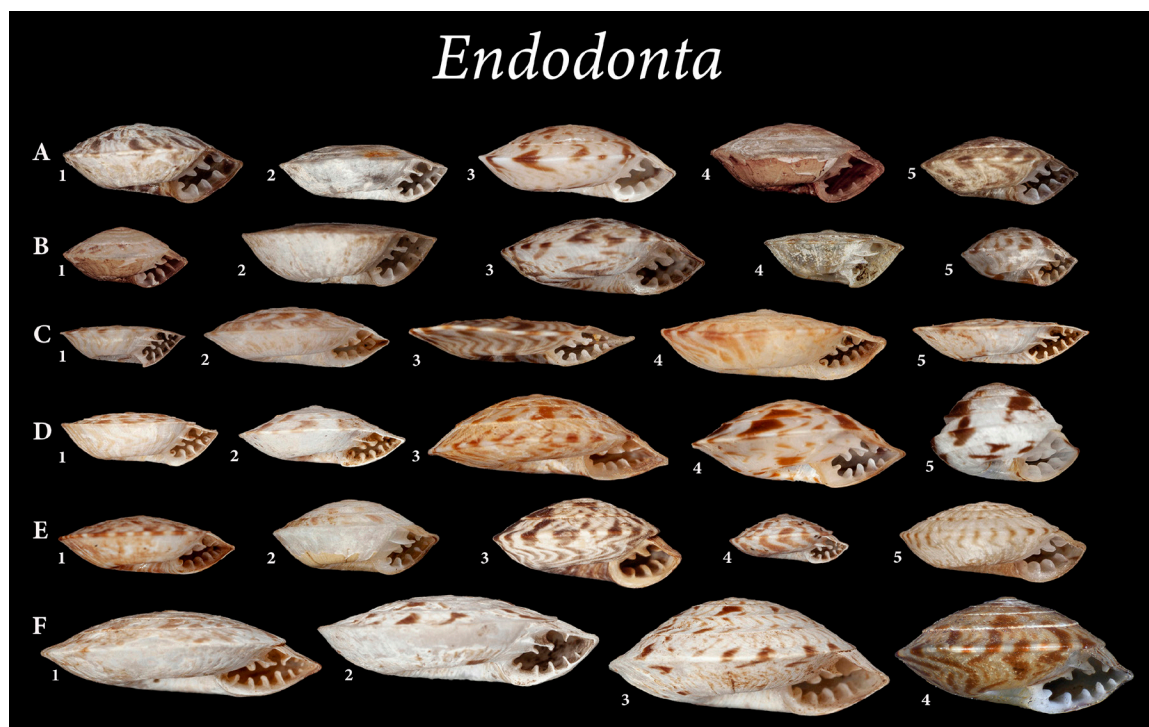


Fig. 6. Scaled images of specimens of the 29 species of the genus *Endodonta*.

Row A: Maui & Molokai

- (1) *Endodonta helenae*, 5.7 mm, ANSP 130529, Holotype, Maui
- (2) *Endodonta lihauensis*, 5.4 mm, ANSP 90138, Holotype, Maui
- (3) *Endodonta paulineae*, 6.3 mm, SMNS-ZI0157940 (ex MS 9708), Holotype, Maui
- (4) *Endodonta kamehameha*, 5.5 mm, ANSP 90140, Lectotype, Molokai
- (5) *Endodonta kawela*, 5.0 mm, ANSP 130527, Holotype, Molokai

Row B: Lanai & Oahu

- (1) *Endodonta concentrata*, 4.0 mm, ANSP 89241, Lectotype, Lanai
- (2) *Endodonta kaiholena*, 6.2 mm, ANSP 130528, Holotype, Lanai
- (3) *Endodonta koele*, 6.5 mm, ANSP 94505, Holotype, Lanai
- (4) *Endodonta lamellosa*, 4.5 mm, MNHN 22719, Syntype, Oahu
- (5) *Endodonta nikiae*, 3.7 mm, ANSP 380211, Oahu

Row C: Oahu

- (1) *Endodonta brevis*, 4.0 mm, ANSP 386208, Holotype
- (2) *Endodonta discus*, 5.9 mm, ANSP 130522, Holotype
- (3) *Endodonta elegantula*, 7.2 mm, ANSP 377801, Holotype
- (4) *Endodonta kahukuensis*, 7.2 mm, ANSP 117337, Holotype
- (5) *Endodonta kaluanui*, 5.6 mm, ANSP 379744, Holotype

Row D: Oahu

- (1) *Endodonta kawaihapaiensis*, 5.0 mm, ANSP 116969, Holotype
- (2) *Endodonta kawaihoaensis*, 5.3 mm, ANSP 379449, Holotype
- (3) *Endodonta laie*, 7.7 mm, ANSP 380210, Holotype
- (4) *Endodonta lualualei*, 6.8 mm, ANSP 377804, Holotype
- (5) *Endodonta galea*, 4.8 mm, ANSP 130513, Holotype

Row E: Oahu

- (1) *Endodonta manoa*, 6.5 mm, ANSP 380203, Holotype
- (2) *Endodonta waimano*, 5.3 mm, ANSP 108054, Holotype
- (3) *Endodonta fricki*, 6.0 mm, ANSP 109885, Neotype
- (4) *Endodonta makaua*, 3.8 mm, ANSP 377816, Holotype
- (5) *Endodonta ui*, 5.9 mm, ANSP 130515, Holotype

Row F: Oahu

- (1) *Endodonta waimanoensis*, 9.4 mm, ANSP 130524, Holotype
- (2) *Endodonta quasidiscus*, 10.0 mm, ANSP 383583, Holotype
- (3) *Endodonta skeeteri*, 9.0 mm, ANSP 383170, Holotype
- (4) *Endodonta marsupialis*, 7.6 mm, ANSP 58190, Holotype

Endodonta lihauensis n. sp.

(Fig. 7)

Type material: Holotype ANSP 90138; one paratype (ANSP 501727: 1); both leg. D. Thaanum.

Type locality: Mt. Lihau, Olowalu Ahupua'a, Lahaina Moku, Lahaina District, Maui.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 35.1% of shell diameter; bifid; primary palatal barrier height order, tall to low: 3rd, 4th, 2nd, 1st, 5th.

Description: Color: flammulated. Shell: sub-discoidal, plano-convex supra-peripherally, obversely conical, keeled; diameter 5.4 mm; 5.5 whorls; apex planar; spire protrusion 10.5% of shell height; shell height 35.2% of diameter; peristome evenly thickened, basally reflected; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 71.8% of width; umbilicus 35.1% of shell diameter, decoiling regularly. body whorl descension 1.2°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, reaching toward the 4th palatal barrier, 2nd low, blade-like extended toward the 3rd palatal; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, rapid ascension, 5th sub-peripheral, low, blade-like, one callous-like sub-palatal between the 1st and 2nd palatals, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 4th, 2nd, 1st, 5th.

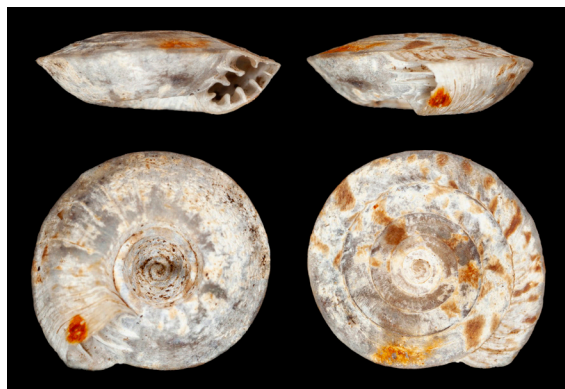


Fig. 7. *Endodonta lihauensis*, 5.4 mm, ANSP 90138, HOLOTYPE, Maui, Lihau.

Comparison: *Endodonta lihauensis* (Maui endemic) is distinguished from *E. kaihola* (Lanai endemic) by having a shell height of 34.2% of shell diameter (vs. 32.2% in *E.*

kaihola): spire protrusion 10.5% of shell height; (vs. 10%); aperture height 71.8% of aperture width (vs. 79%); one callous-like sub-palatal between the 1st and 2nd palatals; one sub-peripheral plica and one low supra-peripheral plica between the 5th primary palatal and the periphery (vs. one callous-like sub-peripheral plica between the 4th palatal and the periphery); umbilicus 35.1% of shell diameter (vs. 33.9%); body whorl descension 1.2° (vs. 9.9°); aperture height 71.8% of aperture width (vs. 79% of aperture width); primary palatal barrier height order, tall to low, 3rd, 4th, 2nd, 1st, 5th (vs. 3rd, 2nd, 5th, 4th, 1st).

Remarks: *Endodonta lihauensis* is known only from remnant forest near the summit of Mt. Lihau in West Maui.

Etymology: Named for the type locality, Mt. Lihau.

Endodonta lihauensis Holotype

Shell diameter: 5.4 mm

Shell height: 1.9 mm, 35.2% of shell diameter

Spire protrusion: 0.2 mm, 10.5% of shell height

Aperture height: 1.4 mm, 71.8% of aperture width

Aperture width: 1.95 mm

Peripheral plica(e): 2

Number of whorls: 5.5

Umbilicus diameter: 1.9 mm, 35.1% of shell diameter

Body whorl descension: 1.2°

Endodonta paulineae n. sp.

(Figs. 8, 236, 237)

Type material: Holotype SMNS-ZI0157940 (ex MS 9708), leg. M. Severns, May 1, 1982; nine paratypes (MS 8442: 1, MS 9706: 1, MS 8250: 1, MS 8242: 3, MS 8436: 3) all from Maui, Makawao District, Honuaula Moku, Puu Makua Cave, leg. H. James & M. Severns, Apr 11 & 20, 1988.

Type locality: Auwahi Cave, 1203.7 m, Kahikinui Moku, Hana District, Maui. 20°38'37.84"N, 156°19'56.28"W.

Other material studied: 887 specimens from Maui: Makawao District, Honuaula Moku, Puu Makua Cave 1350.6 m, leg. H. James & M. Severns Apr 11 & 20, 1988 (MS 8303: 14, MS 8455: 19, MS 8436: 3), Waihou Spring Cave 1247.2 m, leg. M. Severns, P. Fiene & S. Olson March 2, 1988 (MS 8443: 42). Hana District, Kahikinui Moku, Auwahi Cave, 1203.7 m, leg. M. Severns May 1, 1982 (MS 8469: 3, MS 9709: 396, MS 9710: 410).

Status and Distribution: Holocene fossil. Presumed extinct. Honuaula Moku, Makawao District, Puu Makua Cave 1350.6 m, Waihou Spring Cave 1247.2 m, and Auwahi Cave, Kahikinui Moku, Hana District, Maui.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 33.3% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 1st, 5th.

Description: Color: flammulated. Shell: sub-discoidal, plano-convex supra-peripherally, obversely conical, keeled; diameter 6.3 mm; 5.5 whorls; apex obtuse; spire protrusion 24% of shell height; shell height 39.7% of diameter; peristome evenly thickened, basally reflected; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, marginally obstructed; aperture height 68.1% of width; umbilicus 33.3% of shell diameter, decoiling regularly; body whorl descension 4.3°. Sculpture: embryonic sculpture absent; growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, blade-like rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, blade-like extended toward the 3rd palatal; five palatal barriers, 1st columellar, low, 2nd, 3rd and 4th basal, rapid ascension, 5th supra-peripheral, low, blade-like. Primary palatal barrier height order 3rd, 2nd, 4th, 1st, 5th.

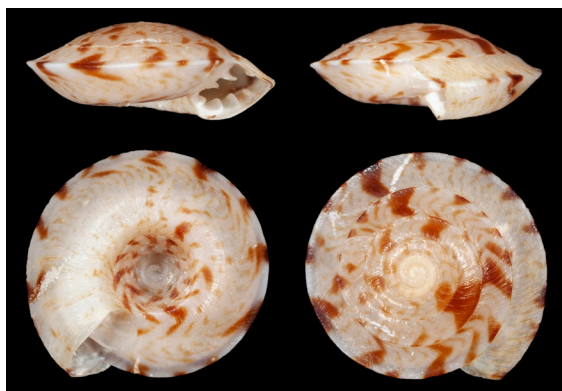


Fig. 8. *Endodonta paulineae*, 6.3 mm, SMNS-ZI0157940 (ex MS 9708), HOLOTYPE, Maui, Auwahi Cave.

Comparison: *Endodonta paulineae* is distinguished from *E. lihaensis* (both Maui endemics) by having a shell height 39.6% of shell diameter (vs. 34.2% in *E. lihaensis*); spire protrusion 24% of shell height (vs. 10.5%); aperture height 68.1% of width (vs. 71.8%); no peripheral plica (vs. *E. lihaensis* with a bifid 1st parietal barrier; a callous-like sub-palatal barrier between the 1st and 2nd palatals; 1 sub- and 1 supra-peripheral plica); body whorl descension 4.3° (vs. 1.2°); primary palatal barrier height order, tall to low, 3rd, 2nd, 4th, 1st, 5th (vs. 3rd, 2nd, 5th, 4th, 1st).

Remarks: Eight hundred and nine dead specimens were collected on the floor of a small cave in the presence of

a similar abundance of dead *Oxychilus alliarius* (Miller, 1822) by the author May 1, 1982.

Etymology: *Endodonta paulineae* is named for Pauline Fiene and her unwavering fascination for all living things Hawaiian.

Endodonta paulineae Holotype

Shell diameter: 6.3 mm
Shell height: 2.5 mm, 39.7% of shell diameter
Spire protrusion: 0.6 mm, 24% of shell height
Aperture height: 1.5 mm, 68.1% of aperture width
Aperture width 2.2 mm
Peripheral plica(e): 0
Number of whorls: 5.5
Umbilicus diameter: 2.1 mm, 33.3% of shell diameter
Body whorl descension: 4.3°

Endodonta helenae n. sp.

(Fig. 9)

Type material: Holotype ANSP 130529, ex coll. BPBM.

Type locality: Ukulele Camp, Haiku Ahupua'a, Hamakualoa Moku, Makawao District, Maui.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality. Ukulele was a ranch camp on the edge of the forest at 1585 m, on the old road to Haleakala from Olinda.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 29.8% of shell diameter; primary palatal barrier height order, tall to low: 2nd, 4th, 3rd, 5th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, plano-convex supra-peripherally, obversely conical, keeled; diameter 5.7 mm; 5.25 whorls; apex obtuse; spire protrusion 17.3% of shell height; shell height 45.6% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 75% of width; umbilicus 29.8% of shell diameter, decoiling regularly; body whorl descension 2.8°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers 1st tall, crescentic, extended toward the 4th palatal, rapid ascension, 2nd low, blade-like, extended toward the 3rd palatal; five palatal barriers, 1st columellar, low, blade-like, 2nd, 3rd, and 4th basal, close to equal height, rapid ascension, crescentic, 5th low, blade-like, ascends rapidly, supra-peripheral. Primary palatal barrier height order 2nd, 4th, 3rd, 5th, 1st.



Fig. 9. *Endodonta helenae*, 5.7 mm, ANSP 130529, HOLOTYPE, Maui, Ukulele Camp.

Comparison: *Endodonta helenae* is distinguished from *E. paulineae* (both Maui endemics) by having shell height 45.6% of shell diameter (vs. 39.6% in *E. paulineae*); spire protrusion 17.3% of shell height (vs. 24%); aperture height 75% of aperture width (vs. 68.1%); umbilicus diameter 29.8% of shell diameter (vs. 33.3%); body whorl descension 2.8° (vs. 4.3°); primary palatal barrier height order, tall to low, 2nd, 4th, 3rd, 5th, 1st (vs. 3rd, 2nd, 4th, 1st, 5th).

Etymology: Named to honor the spirit and fun of Helen Breeding (Poki) who traveled to Hawaii from England and became a cherished dive-boat crew member.

***Endodonta helenae* Holotype**

Shell diameter: 5.7 mm
 Shell height: 2.6 mm, 45.6% of shell diameter
 Spire protrusion: 0.45 mm, 17.3% of shell height
 Aperture height: 1.8 mm 75% of aperture width
 Aperture width: 2.4 mm
 Peripheral plica(e): 0
 Number of whorls: 5.25
 Umbilicus diameter: 1.7 mm, 29.8% of shell diameter
 Body whorl descension: 2.8°

***Endodonta concentrata* Pilsbry & Vanatta, 1906**
 (Fig. 10)

Endodonta concentrata Pilsbry & Vanatta, 1906: 785.

Type material: Lectotype ANSP 89241 [designation attributed to Baker, 1963: 232], leg. D. Thaanum.

Type locality: Lanai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 22.5% of shell diameter; bifid; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 5th, 1st.

Redescription: Color: flammulated. Shell: sub-discoidal, plano-convex supra-peripherally, obversely conical, keeled; diameter 4.0 mm; 5.5 whorls; apex obtuse; spire protrusion 0.55 mm, 28.2% of shell height; shell height 48.8% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 62.9% of width; umbilicus 22.5% of shell diameter, decoiling regularly; body whorl descension 3.2°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, crescentic; five palatal barriers, 1st columellar, 2nd, 3rd, and 4th basal, tall, rapid ascension, crescentic, 5th supra-peripheral, crescentic, of an even height, descends rapidly. Palatal barrier height order, tall to low, 3rd, 2nd, 4th, 5th, 1st.



Fig. 10. *Endodonta concentrata*, 4.0 mm, ANSP 89241, LECTOTYPE, Lanai.

Remarks: I modified Pilsbry and Vanatta's original description to facilitate comparisons to other species.

Etymology: Unknown.

***Endodonta concentrata* Lectotype**

Shell diameter: 4.0 mm
 Shell height: 1.95 mm, 48.8% of shell diameter
 Spire protrusion: 0.55 mm, 28.2 % of shell height
 Aperture height: 1.1 mm, 62.9% of aperture width
 Aperture width: 1.75 mm
 Peripheral plica(e): 0
 Number of whorls: 5.5
 Umbilicus diameter: 0.8 mm, 22.5% of shell diameter
 Body whorl descension: 3.2°

Endodonta kaiholena n. sp.
(Fig. 11)

Type material: Holotype ANSP 130528, ex coll. BPBM 20110.

Type locality: Kaiholena, Lanai, Territory of Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: discoidal, keeled; umbilicus 33.9% of shell diameter; bifid; primary palatal barrier height order, tall to low: 3rd, 2nd, 5th, 4th, 1st.

Description: Color: flammulated. Shell: discoidal, low, plano-convex supra-peripherally, obversely conical, keeled; diameter 6.2 mm; 5.25 whorls; apex planar; spire protrusion 10% of shell height; shell height 32.2% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 79.1% of width; umbilicus 33.9% of shell diameter, decoiling regularly; body whorl descension 9.9°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, blade-like, extended toward the 3rd palatal barrier; five primary palatal barriers, 1st columellar, crescentic, 2nd and 3rd basal, tall, rapid ascension, crescentic, 4th sub-peripheral, crescentic, 5th supra-peripheral, crescentic, ascends rapidly, one callous-like sub-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 5th, 4th, 1st.



Fig. 11. *Endodonta kaiholena*, 6.2 mm, ANSP 130528, HOLOTYPE, Lanai, Kaiholena.

Remarks: *Endodonta kaiholena* (Lanai endemic) is similar to *E. lihauensis* (Maui endemic), both being obverse conic with a low spire; see account for *E. lihauensis* for thorough comparison.

Etymology: Named for the type locality.

Endodonta kaiholena Holotype

Shell diameter: 6.2 mm
Shell height: 2.0 mm, 32.2% of shell diameter
Spire protrusion: 0.2 mm, 10% of shell height
Aperture height: 1.7 mm, 79.1% of aperture width
Aperture width: 2.15 mm
Peripheral plica(e): 1
Number of whorls: 5.25
Umbilicus diameter: 2.1 mm, 33.9% of shell diameter
Body whorl descension: 9.9°

Endodonta koele n. sp.
(Fig. 12)

Type material: Holotype ANSP 94505; three paratypes (ANSP 498366: 3); all leg. D. Thaanum.

Type locality: Koele Gulch, Lanai, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 29.2% of shell diameter; bifid; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 5th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, plano-convex supra-peripherally, obversely conical, keeled; diameter 6.5 mm; 5.25 whorls; apex obtuse; spire protrusion 12.1% of shell height; shell height 44.6% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 66.7% of width; umbilicus 29.2%

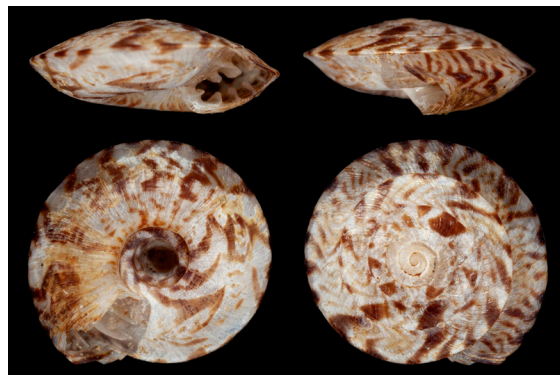


Fig. 12. *Endodonta koele*, 6.5 mm, ANSP 94505, HOLOTYPE, Lanai, Koele Gulch.

of shell diameter, decoiling regularly, carinate; body whorl descension 3°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, bifid, gradual ascension, extended toward the supra peripheral 5th primary palatal barrier, 2nd low, blade-like, extended toward the 2nd palatal barrier; five primary palatal barriers, 1st columellar, low, 2nd, 3rd, and 4th basal, tall, rapid ascension, crescentic, 5th supra-peripheral, crescentic, low; 1 sub-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.

Etymology: Named for the type locality.

Endodonta koele Holotype

Shell diameter: 6.5 mm

Shell height: 2.9 mm, 44.6% of shell diameter

Spire protrusion: 0.35 mm, 12.1% of shell height

Aperture height: 2.0 mm, 66.7% of aperture width

Aperture width: 3.0 mm

Peripheral plica(e): 1

Number of whorls: 5.25

Umbilicus diameter: 1.9 mm, 29.2% of shell diameter

Body whorl descension: 3°

Endodonta kamehameha Pilsbry & Vanatta, 1906
(Fig. 13)

Endodonta kamehameha Pilsbry & Vanatta, 1906: 784–785.

Type material: Lectotype ANSP 90140 [designation attributed to Baker, 1963: 232], leg. D. Thaanum.

Type locality: Wailua Pali, Mapulehu, Koolau Moku, Molokai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color of yellowish olive, often with the last whorl partly brown, with traces of darker brown maculations on the spire. Shell: sub-discoidal, keeled; umbilicus 27.2% of shell diameter; bifid; primary palatal barrier height order, tall to low: 3rd, 2nd, 1st, 4th, 5th.

Redescription: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.5 mm; 5.25 whorls; apex obtuse; spire protrusion 16% of shell height; shell height 45.5% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, open; aperture height 76.2% of width; umbilicus 27.2% of shell diameter, decoiling regularly; body whorl descension: 5°. Sculpture: growth lines, embryonic sculpture

absent. Barriers: two parietal barriers, 1st tall, bifid-like, thin, gradual ascension, extended toward the 4th palatal barrier, 2nd low, diminished; five primary palatal barriers; 1st columellar, ridged, 2nd and 3rd slightly crescentic, 4th basal, low, 5th supra-peripheral, one callous-like sub-peripheral plica. Primary palatal barrier height order, tall to low: 3rd, 2nd, 1st, 4th, 5th.

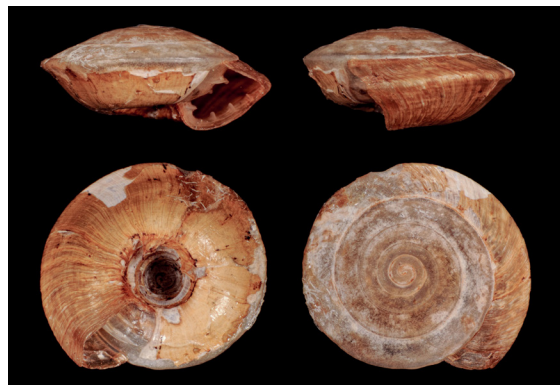


Fig. 13. *Endodonta kamehameha*, 5.5 mm, ANSP 90140, LECTOTYPE, Molokai, Wailua Pali, Mapulehu.

Comparison: *Endodonta kamehameha* is distinguished from *E. kawela* (both Molokai endemics) by having shell height 45.4% of shell diameter (vs. 46% in *E. kawela*); spire protrusion 16% of shell diameter (vs. 15.2 %); aperture height 76.2% of aperture width (vs. 73.7%); umbilicus diameter 27.2% of shell diameter (vs. 24%); body whorl descension 5° (vs. 3.3°); one callous-like sub-peripheral plica (vs. one blade-like sub-peripheral plica); primary palatal barrier height order, tall to low, 3rd, 2nd, 1st, 4th, 5th (vs. 2nd, 5th, 3rd, 1st, 4th).

Remarks: Both species have an obverse-conic shell with a low spire. The most striking difference are the barriers obstructing the aperture of *E. kawela* compared to the relatively unobstructed aperture of *E. kamehameha*.

Etymology: Named for the Hawaiian king Kamehameha the Great.

Endodonta kamehameha Lectotype

Shell diameter: 5.5 mm

Shell height: 2.5 mm, 45.5% of shell diameter

Spire protrusion: 0.4 mm, 16% of shell height

Aperture height: 1.6 mm, 76.2% of aperture width

Aperture width: 2.1 mm

Peripheral plica(e): 1

Number of whorls: 5.25

Umbilicus diameter: 1.5 mm, 27.2% of shell diameter

Body whorl descension: 5°

Endodonta kawela n. sp.
(Figs. 14, 238, 239)

Type material: Holotype ANSP 130527; two paratypes (ANSP 498364: 2); all ex coll. BPBM 24456.

Type locality: Kawela, Kona Moku, Molokai.

Other material studied: 18 specimens from Molokai: Kona Moku, Kumoku; ANSP 130526 (2), ex coll. BPBM 41529; Waihauau Gulch, leg. D. Thaanum, ANSP 108373 (16).

Status and Distribution: Extant. Presumed extinct. Known only from Molokai; Kawela, Kumoku, and Waihauau, Kona Moku.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 24% of shell diameter; bifid; primary palatal barrier height order, tall to low: 2nd, 3rd, 5th, 1st, 4th.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.0 mm; 5.25 whorls; apex planar; spire protrusion 15.2% of shell height; shell height 46% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 73.7% of width; umbilicus 24% of shell diameter, decoiling regularly.; body whorl descension: 3.3°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, blade-like extended toward the 3rd palatal; five primary palatal barriers, 1st columellar, 2nd, 3rd, and 4th basal, tall, rapid ascension, minimally crescentic, 5th supra-peripheral, blade-like, descends rapidly, angled toward 4th



Fig. 14. *Endodonta kawela*, 5.0 mm, ANSP 130527, HOLOTYPE, Molokai, Kawela.

palatal, one sub-peripheral plica. Primary palatal barrier height order, tall to low: 2nd, 3rd, 5th, 1st, 4th.

Remarks: See the description of *Endodonta kamehameha* for comparison to *E. kawela*.

Etymology: Named for the type locality.

Endodonta kawela Holotype

Shell diameter: 5.0 mm
Shell height: 2.3 mm, 46% of shell diameter
Spire protrusion: 0.35 mm, 15.2% of shell height
Aperture height: 1.4 mm, 73.7% of aperture width
Aperture width: 1.9 mm
Peripheral plica(e): 1
Number of whorls: 5.25
Umbilicus diameter: 1.2 mm, 24% of shell diameter
Body whorl descension: 3.3°

Endodonta brevis n. sp.
(Figs. 15, 240, 241)

Type material: Holotype ANSP 386208; one paratype (ANSP 501728: 1); all leg. O. Oswald, Apr 9, 1938.

Type locality: As described by Oswald; southerly along trail, ravine 5, division point 1st B. N. Gowen Trail, Pohakea Pass, Oahu. 21°26'N, 158°06'W.

Other material studied: Four specimens from Oahu: Waianae District, Pohakea Pass, southerly on Gowen Trail ravine 6, leg. O. Oswald, Apr 15, 1938 (ANSP 386232A: 1, ANSP 386224: 1), ravine 7, leg. O. Oswald, Apr 24, 1938 (ANSP 386245: 1), ravine 7, leg. O. Oswald, May 15, 1938 (ANSP 386243: 1).

Status and Distribution: Extant. Presumed extinct. Known from several ravines of the Gowen Trail, Pohakea Pass, Waianae District, Oahu.

Diagnosis: Color pattern flammulated, Shell: discoidal, keeled; umbilicus 42.5% of shell diameter; bifid; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 1st, 5th.

Description: Color: flammulated. Shell: discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 4.0 mm; 4.25 whorls; apex obtuse; spire protrusion 7.4% of shell height; shell height 33.8% of diameter; peristome evenly thickened; apical suture margined, canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 75% of width; umbilicus 42.5% of shell diameter, decoiling regularly, last coil constricted;

body whorl descension 1.7° . Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, crescentic, gradual ascension; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, tall, rapid ascension, marginally crescentic, 5th supra-peripheral, tall, curved toward 4th palatal, descends rapidly, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 4th, 1st, 5th.

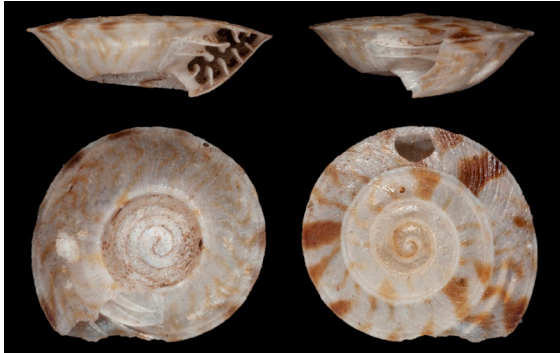


Fig. 15. *Endodonta brevis*, 4.0 mm, ANSP 386208, HOLOTYPE, Oahu, Pohakea Pass.

Etymology: Named for its small size and few whorls.

***Endodonta brevis* Holotype**

Shell diameter: 4.0 mm

Shell height: 1.35 mm, 33.8% of shell diameter

Spire protrusion: 0.1 mm, 7.4% of shell height

Aperture height: 1.2 mm, 75% of aperture width

Aperture width: 1.6 mm

Peripheral plica(e): 2

Number of whorls: 4.25

Umbilicus diameter: 1.7 mm, 42.5% of shell diameter

Body whorl descension: 1.7°

***Endodonta discus* n. sp.**

(Fig. 16)

Type material: Holotype ANSP 130522; two paratypes (ANSP 498355: 2); all ex coll. BPBM 35643.

Type locality: Kawaihapai, Wailua District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 35.6% of shell diameter; bifid; primary palatal barrier height order, tall to low: 5th, 4th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.9 mm; 6.25 whorls; apex obtuse; spire protrusion 21% of shell height; shell height 32.2% of diameter; peristome evenly thickened peripherally, greatly reflected basally; apical suture margined, canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 59.5% of width; umbilicus 35.6% of shell diameter, decoiling regularly, slightly constricted opening; body whorl descension 2.1° . Sculpture: faint radial ribs on the apical and post embryonic whorls, growth lines on the body whorls. Barriers: two parietal barriers, 1st thick, tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, thick, above the 2nd palatal barrier; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, tall, rapid descension, crescentic, 5th supra-peripheral, tall, thin curved toward the 1st parietal barrier, one sub and one supra-peripheral plica; Primary palatal barrier height order, tall to low, 5th, 4th, 3rd, 2nd, 1st.



Fig. 16. *Endodonta discus*, 5.9 mm, ANSP 130522, HOLOTYPE, Oahu, Kawaihapai.

Remarks: The original label for the type material reads “Kuwaihapai”, presumed misspelling of Kawaihapai.

Etymology: Named for its discus-like shape.

***Endodonta discus* Holotype**

Shell diameter: 5.9 mm

Shell height: 1.9 mm, 32.2% of shell diameter

Spire protrusion: 0.4 mm, 21% of shell height

Aperture height: 1.25 mm, 59.5% of aperture width

Aperture width: 2.1 mm

Peripheral plica(e): 2

Number of whorls: 6.25

Umbilicus diameter: 2.1 mm, 35.6% of shell diameter

Body whorl descension: 2.1°

Endodonta elegantula n. sp.
(Fig. 17)

Type material: Holotype ANSP 377801; one paratype (ANSP 498359: 1); both leg. O. Oswald, Oct 6, 1928.

Type locality: As described by Oswald; glen at right of prominent spur seaward of pass at top (of) glen, Lualualei, Oahu. 21°27'N, 158°10'W.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: discoidal, keeled; umbilicus 33.3% of shell diameter; bifid; primary palatal barrier height order, tall to low: 4th, 3rd, 2nd, 1st, 5th.

Description: Color: flammulated. Shell discoidal, low, expanded laterally, obversely conical, magnificently keeled; diameter 7.2 mm; 5.25 whorls; apex obtuse; spire protrusion 10.6% of shell height; shell height 22.2% of diameter; peristome evenly thickened, slightly reflected basally; apical suture margined, canaliculate, shallow; aperture a compressed sub-rhomboidal, dramatically expanded peripherally, obstructed; aperture height 44.8% of width; umbilicus 33.3% of shell diameter, decoiling regularly; body whorl descension 1.0°. Sculpture: post embryonic, faint radial ribs and growth lines. Barriers: two parietal barriers high on the parietal wall, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, curved, blade-like; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, low, rapid ascension, crescentic, 5th supra-peripheral, low, thick, two sub and two supra-peripheral plicae. Primary palatal barrier height order, tall to low: 4th, 3rd, 2nd, 1st, 5th.

Etymology: Named for its remarkably elegant appearance, for a snail.

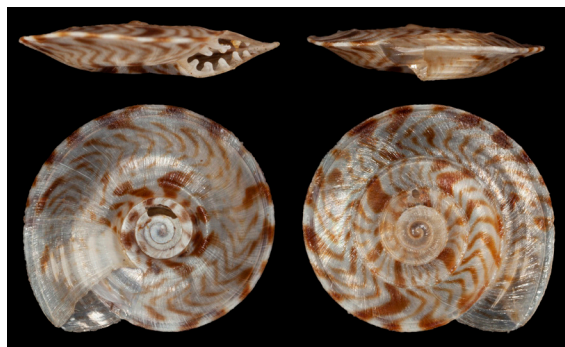


Fig. 17. *Endodonta elegantula*, 7.2 mm, ANSP 377801, HOLOTYPE, Oahu, Lualualei.

Endodonta elegantula Holotype

Shell diameter: 7.2 mm

Shell height: 1.6 mm, 22.2% of shell diameter

Spire protrusion: 0.17 mm, 10.6% of shell height

Aperture height: 1.3 mm, 44.8% of aperture width

Aperture width: 2.9 mm

Number plicae: 4

Number of whorls: 5.25

Umbilicus diameter: 2.4 mm, 33.3% of shell diameter

Body whorl descension: 1.0°

Endodonta fricki (Pfeiffer, 1858)
(Figs. 18, 242)

Helix fricki L. Pfeiffer, 1858: 21-22 — unaccepted > superseded combination.

Helix frickii [sic] — unaccepted > misspelling - incorrect subsequent spelling.

Endodonta frickii [sic] — unaccepted > misspelling - incorrect subsequent spelling.

Endodonta fricki (L. Pfeiffer, 1858) — Solem, 1976: 381-382.

Type material: Neotype ANSP 109885 [designated here], leg. H.A. Pilsbry.

Type locality: Oahu, Waianae Mts., Popouwela, West Ridge.

Other material studied: 22 specimens from Oahu: Waianae District, western ridge of Popouwela, leg. Pilsbry, ANSP 501729 (ex 109885: 23).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 28.3% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 1st.

Redescription: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; slight sulcus on the body whorl; diameter 6.0 mm; 5.5 whorls; apex blunt; spire protrusion 20.7% of shell height; shell height 48.3% of diameter; peristome evenly thickened, expanded and reflected basally; apical suture canaliculate, margined; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 72.7% of width; umbilicus 28.3% of shell diameter, decoiling regularly; body whorl descension 6.1°. Sculpture: radial ribs on post embryonic whorl becoming growth lines on the body whorls. Barriers: two parietal barriers, 1st tall, blade-like, rapid ascension, extended toward the supra-peripheral 4th palatal barrier, 2nd low, thick; four primary palatal barriers; 1st, 2nd and 3rd basal, thick,

crescentic, rapid ascension, 4th thick, ascends rapidly, supra-peripheral, angled toward the 3rd palatal, one sub-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 4th, 1st.



Fig. 18. *Endodonta fricki*, 6.0 mm, ANSP 109885, NEOTYPE, Oahu, Popouwela, western ridge.

Comparison: *Endodonta fricki* is distinguished from *E. lualualei* (both Oahu endemics) by having a shell height 48.3% of shell diameter (vs. 41.2% in *E. lualualei*); spire protrusion 20.7% of shell height (vs. 17.8%); aperture lunate (vs. rhomboid, expanded peripherally); aperture height 72.7% of width (vs. 71.4%); one sub-peripheral plica (vs. first parietal bifid; one tall sub- and one diminutive supra-peripheral plica); umbilicus 28.3% of shell diameter (vs. 26.5%); body whorl descension 6.1° (vs. 2.45°); apical suture impressed, margined (vs. apical suture, shallow, canaliculate); primary palatal barrier height order, tall to low, 3rd, 2nd, 4th, 1st (vs. 4th, 3rd, 5th, 2nd, 1st).

Remarks: Pfeiffer (1858: 20-23) described 11 new species from the H. Cuming Collection among which was *Helix fricki*. NHMUK purchased the H. Cuming Collection in 1866, which included two specimens labeled *Endodonta fricki* BMNH 1962716/1 and BMNH 1962716/2. A search of the literature associated with these specimens could not confirm their status as Pfeiffer types of *Helix fricki*.

Solem (1976: 381-382) designated BMNH 1962716/1 and BMNH 1962716/2 as the lectotype and paralectotype, respectively, of *Endodonta fricki* (Pfeiffer, 1858). However, these two specimens do not agree with Pfeiffer's original description by having a bifid 1st parietal barrier, a diagnostic feature certainly not overlooked by Pfeiffer in his description of *E. fricki*. They also lack the margined, canaliculate suture of *E. fricki* described by Pfeiffer. Therefore, Solem's (1976) type designations are considered here to be invalid. They are instead a similar species, *Endodonta lualualei*, a new species described herein.

Cooke (1928: 24) noted: "Taken together, Pfeiffer's description and figure [of *Helix fricki*] do not exactly fit any one of the geographic races represented in the collection at the Bishop Museum...In no specimens that I have examined has the columella fold been absent. In some individuals it is placed near the base of the columella, in others its position is about mid-way." And, somewhat conclusively, "None of the numerous specimens that have come under my observation has the suture margined, nor sub-excavated (canaliculate) as mentioned by Pfeiffer."

Henry Pilsbry of ANSP collected two specimens of *Endodonta* on West Popouwela Ridge, Waianae Mountains, Oahu, matching Pfeiffer's (1858) original description of *Helix fricki*. The first (ANSP 108905) is an immature specimen collected in January 1913, and has a thin non-reflected lip, a margined, canaliculate suture and a diminutive barrier on the columella. The second (ANSP 109885) is a mature specimen collected March 2, 1913, and has a reflected lip, margined, canaliculate suture and no columellar barrier.

Since there are no known types matching Pfeiffer's (1858) original description of *Helix fricki*, and there is a similar-looking congeneric species (*Endodonta lualualei* n. sp.) described herein from the Waianae Mountains, Oahu, ANSP 109885 is designated the neotype of *Helix fricki* L. Pfeiffer, 1858.

Etymology: Named for Dr. Frick of Honolulu.

Endodonta fricki Neotype

Shell diameter: 6.0 mm
Shell height: 2.9 mm, 48.3% of shell diameter
Spire protrusion: 0.6 mm, 20.7% of shell height
Aperture height: 1.6 mm, 72.7% of aperture width
Aperture width: 2.2 mm
Peripheral plica(e): 1
Number of whorls: 5.5
Umbilicus diameter: 1.7 mm, 28.3% of shell diameter
Body whorl descension: 6.1°

Endodonta galea n. sp. (Figs. 19, 243)

Type material: Holotype ANSP 130513; four paratypes (ANSP 501730: 4); all ex coll. BPBM 16965.

Type locality: Mauna Kapu, Waianae Mts. Oahu.

Other material studied: Four specimens from Oahu: Waianae District, Gowen trail, Pohakea Pass, southerly half of ravine 10, 21°26'N, 158°06'W, leg. O. Oswald, May 1, 1938 (ANSP 383582: 4).

Status and Distribution: Extant. Presumed extinct. Known from Mauna Kapu and Pohakea Pass, Waianae Mts. Oahu, Hawaii.

Diagnosis: Color pattern flammulated. Shell: galeatus, keeled; umbilicus 22.9% of shell diameter; bifid; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 1st, 5th.

Description: Color: flammulated. Shell: galeatus, domed ventrally, obversely conical, keeled; diameter 4.8 mm; 5.25 whorls; apex blunt; spire protrusion 29.7% of shell height; shell height 66.7% of diameter; peristome evenly thickened, reflected basally; apical suture margined, impressed; aperture axe-like, obstructed; aperture height 85% of width; umbilicus 22.9% of shell diameter, constricted; body whorl descension 4.3°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, solid, bifid, gradual ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, blade-like; five primary palatal barriers, 1st palatal columellar, 2nd, 3rd, and 4th basal, tall, rapid ascension, crescentic, 5th supra-peripheral, angled toward the 4th palatal, one low sub-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 4th, 1st, 5th.

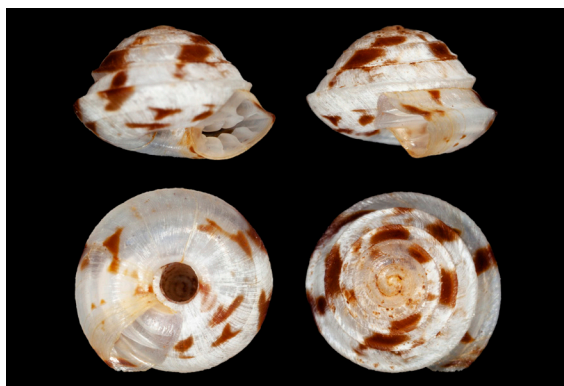


Fig. 19. *Endodonta galea*, 4.8 mm, ANSP 130513, HOLOTYPE, Oahu, Mauna Kapu.

Etymology: Helmeted.

***Endodonta galea* Holotype**

Shell diameter: 4.8 mm

Shell height: 3.2 mm, 66.7% of shell diameter

Spire protrusion: 0.95 mm, 29.7% of shell height

Aperture height: 1.7 mm, 85% of aperture width

Aperture width: 2.0 mm

Peripheral plica(e): 1

Number of whorls: 5.25

Umbilicus diameter: 1.1 mm, 22.9% of shell diameter

Body whorl descension: 4.3°

***Endodonta kahukuensis* n. sp.**
(Figs. 20, 244, 245)

Type material: Holotype ANSP 117337; 41 paratypes (ANSP 501731: 41); all leg. H. A. Pilsbry & C. M. Cooke, 1913.

Type locality: Coral bluff, 2.4 km, west of Kahuku, Koolauloa District, Oahu.

Other material studied: 48 specimens from Oahu: Koolauloa District, Kahuku Ahupua'a, Kahuku, coral bluff, 2.4 km west of Kahuku, leg. H. A. Pilsbry, 1920 (ANSP 128184: 5), coral uplift beside road, inland side, Kahuku Waialeale, leg. O. Oswald, Jan 10, 1937, ANSP 386194: 3), ex coll. BPBM 37766 (ANSP 130520: 2). Coral uplift cliffs inland of road, Waialeale-Kahuku, leg. O. Oswald, Aug 23, 1940 (ANSP 383931: 2), leg. O. Oswald, Jan 10, 1937 (ANSP 386193: 1). Laie Ahupua'a, Laie coral uplift near beach, opposite old pier, leg. O. Oswald, Jan 1, 1937 (ANSP 380205: 31, ANSP 505216: 4).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known from Kahuku, Waialeale and Laie, Koolauloa District, Oahu.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 34.7% of shell diameter; primary palatal barrier height order, tall to low: 5th, 4th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 7.2 mm; 6.25 whorls; apex obtuse; spire protrusion 20.5% of shell height; shell height 27.1% of diameter; peristome thickened, reflected basally; apical suture margined, canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 66.7% of width;



Fig. 20. *Endodonta kahukuensis*, 7.2 mm, ANSP 117337, HOLOTYPE, Oahu, Kahuku.

umbilicus 34.7% of shell diameter, decoiling regularly; body whorl descension: 2.6° . Sculpture: growth lines and a spiral margin following the suture. Barriers: two parietal barriers, 1st tall, bifid, thick, rapid ascension, curved toward the supra-peripheral 5th palatal barrier, 2nd low, thick; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, low, wide, rapid ascension, crescentic, 5th supra-peripheral, tall, blade-like, descends rapidly, two sub and two supra-peripheral plicae. Primary palatal barrier height order 5th, 4th, 3rd, 2nd, 1st.

Comparison: *Endodonta kahukuensis* is similar to *E. kaluanui* and both are endemic to Oahu. *Endodonta kahukuensis* is distinguished by having a shell height 27.1% of shell diameter (vs. 21.4% in *E. kaluanui*); spire protrusion 20.5% of shell height (vs. 8.3%); aperture height 66.7% of width (vs. 58.8%); umbilicus diameter 34.7% of shell diameter (vs. 37.5%); body whorl descension 2.6° (vs. 1.0°); four peripheral plica, 2 supra-peripheral and 2 sub-peripheral (vs. two plica, one sub- and one supra-peripheral), and primary palatal barrier height order, tall to low, 5th, 4th, 3rd, 2nd, 1st (vs. 4th, 5th, 3rd, 2nd, 1st).

Etymology: Named for the type locality.

***Endodonta kahukuensis* Holotype**

Shell diameter: 7.2 mm

Shell height: 1.95 mm, 27.1% of shell diameter

Spire protrusion: 0.4 mm, 20.5% of shell height

Aperture height: 1.4 mm, 66.7% of aperture width

Aperture width: 2.1 mm

Peripheral plica(e): 4

Number of whorls: 6.25

Umbilicus diameter: 2.5 mm, 34.7% of shell diameter

Body whorl descension: 2.6°

***Endodonta kaluanui* n. sp.**
(Fig. 21)

Type material: Holotype ANSP 379744; four paratypes (ANSP 498361: 4); all leg. O. Oswald, Mar 24, 1940.

Type locality: As described by Oswald; extreme left-hand glen, bottom of ravine, Kaluanui, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: discoidal, keeled; umbilicus 37.5% of shell diameter; primary palatal barrier height order, tall to low: 4th, 5th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.6 mm; 5.25 whorls; apex blunt; spire protrusion 8.3% of shell height; shell height 21.4% of diameter; peristome evenly thickened, minimally reflected basally; apical suture canaliculate, shallow; aperture sub-rhomboidal, greatly expanded peripherally, obstructed; aperture height 58.8% of width; umbilicus 37.5% of shell diameter, open, decoiling regularly; body whorl descension 1.0° . Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, bifid, gradual ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd tall, blade-like; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, tall, blade-like, rapid ascension, marginally crescentic, 5th supra-peripheral, blade-like, descends rapidly, one sub-peripheral and one supra peripheral plica. Primary palatal barrier height order 4th, 5th, 3rd, 2nd, 1st.



Fig. 21. *Endodonta kaluanui*, 5.6 mm, ANSP 379744, HOLOTYPE, Oahu, Kaluanui.

Remarks: *Endodonta kaluanui* differs from the geographically close *E. kahukuensis* by having fewer palatal barriers, smaller shell diameter and less spire height. See *E. kahukuensis* species account for additional comparisons.

Etymology: Named for the type locality.

***Endodonta kaluanui* Holotype**

Shell diameter: 5.6 mm

Shell height: 1.2 mm, 21.4% of shell diameter

Spire protrusion: 0.1 mm, 8.3% of shell height

Aperture height: 1.0 mm, 58.8% of aperture width

Aperture width: 1.7 mm

Number of whorls: 5.25

Umbilicus diameter: 2.1 mm, 37.5% of shell diameter

Body whorl descension: 1.0°

Endodonta kawaihapaiensis n. sp.
(Fig. 22)

Type material: Holotype ANSP 116969, leg. H. A. Pilsbry, 1913.

Type locality: Approximately 152.4 m, Kawaihapai bluff, Kawaihapai Ahupua'a, Wailua District, Oahu.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality, Kawaihapai, Oahu.

Diagnosis: Color pattern flammulated. Shell: discoidal, keeled; umbilicus 36% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 5th, 1st.

Description: Color: flammulated. Shell: discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.0 mm; 5.5 whorls; apex obtuse; spire protrusion 11.4% of shell height; shell height 35% of diameter; peristome thin, reflected basally; apical suture margined, canaliculate, deep; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 72.2% of width; umbilicus 36% of shell diameter, decoiling regularly; body whorl descension 3.2°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, bifid, thin, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, crescentic; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, wide, crescentic, rapid ascension, 5th supra-peripheral, tall, blade-like, ascends rapidly, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.

Etymology: Named for the type locality, Kawaihapai, Wailua District, Oahu.



Fig. 22. *Endodonta kawaihapaiensis*, 5.0 mm, ANSP 116969, HOLOTYPE, Oahu, Kawaihapai Bluff.

Endodonta kawaihapaiensis Holotype

Shell diameter: 5.0 mm

Shell height: 1.75 mm, 35% of shell diameter

Spire protrusion: 0.2 mm, 11.4% of shell height

Aperture height: 1.3 mm, 72.2% of aperture width

Aperture width: 1.8 mm

Peripheral plica(e): 2

Number of whorls: 5.5

Umbilicus diameter: 1.8 mm, 36% of shell diameter

Body whorl descension: 3.2°

Endodonta kawailoaensis n. sp.
(Figs. 23, 246, 247)

Type material: Holotype ANSP 379449; 18 paratypes (ANSP 501732: 18); all leg. O. Oswald, May 31, 1941.

Type locality: As described by Oswald; spur quarter of the way from ditch trail to stream, Kawailoa, Wailua District, Oahu, 21°35'N, 157°59'W.

Other material studied: 132 specimens from Oahu: Wailua District, Kawailoa Ahupua'a, inland of entrance to 1st and 2nd Kukui glens, left spur, ¼ way from the ditch trail to the stream, below ditch trail, leg. O. Oswald, Jun 14, 1941 (ANSP 379445: 78). Left spur between ditch and stream, leg. O. Oswald, Jun 7, 1941 (ANSP 379448: 54).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality, Kawailoa, Wailua District, Oahu.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 23.6% of shell diameter; primary palatal barrier height order, tall to low: 4th, 3rd, 2nd, 5th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.3 mm; 6.25 whorls; apex obtuse; spire protrusion 27.5% of shell height; shell height 37.7% of diameter; peristome thin, reflected basally; apical suture margined, canaliculate, deep; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 57.1% of width; umbilicus 23.6% of shell diameter, decoiling regularly; body whorl descension 1.35°. Sculpture: growth lines, a faint spiral margin follows the suture. Barriers: two parietal barriers, 1st tall, thin, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, thick, crescentic; five primary palatal barriers, 1st columellar, tall, thick, crescentic, 2nd, 3rd and 4th basal, strongly crescentic, rapid ascension, 5th supra-peripheral, tall, thin, crescentic, ascends rapidly, two sub and two supra-peripheral plicae. Primary palatal barrier height order 4th, 3rd, 2nd, 5th, 1st.



Fig. 23. *Endodonta kawailoensis*, 5.3 mm, ANSP 379449, HOLOTYPE, Oahu, Kawaiiola.

Etymology: Named for the type locality.

***Endodonta kawailoensis* Holotype**

Shell diameter: 5.3 mm
 Shell height: 2.0 mm, 37.7% of shell diameter
 Spire protrusion: 0.55 mm, 27.5% of shell height
 Aperture height: 1.2 mm, 57.1% of aperture width
 Aperture width: 2.1 mm
 Peripheral plica(e): 4
 Number of whorls: 6.25
 Umbilicus diameter: 1.25 mm, 23.6% of shell diameter
 Body whorl descension: 1.35°

***Endodonta laie* n. sp.**
 (Figs. 24, 248, 249)

Type material: Holotype ANSP 380210; two paratypes (ANSP 501733: 2); all leg. O. Oswald, Jan 1, 1937.

Type locality: As described by Oswald; coral uplift near beach, opposite old pier, Laie, Koolauloa District, Oahu. 21°39'N, 157°56'W.

Other Material Studied: 61 specimens from Oahu: Koolauloa District, Laie Ahupua'a, Laie coral uplift near beach, opposite old pier, leg. O. Oswald, Jan 1, 1937 (ANSP 380206: 21, ANSP 380207: 40).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 31.2% of shell diameter; primary palatal barrier height order, tall to low: 4th, 5th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal,

expanded laterally, plano-convex, obversely conical, keeled; diameter 7.7 mm; 6.5 whorls; apex obtuse; spire protrusion 29% of shell height, convex; shell height 35.7% of diameter; peristome evenly thickened; apical suture, canaliculate, impressed; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 46.4% of width; umbilicus 31.2% of shell diameter, decoiling regularly; body whorl descension 2.25°. Sculpture: growth lines. Barriers: two parietal barriers, 1st low, thick, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal, 2nd low, thick, gradual ascension; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th, basal, rapid ascension, marginally crescentic, 5th supra-peripheral, tall, crescentic, extended toward 1st parietal, descends rapidly, two sub and two supra-peripheral plicae. Primary palatal barrier height order 4th, 5th, 3rd, 2nd, 1st.

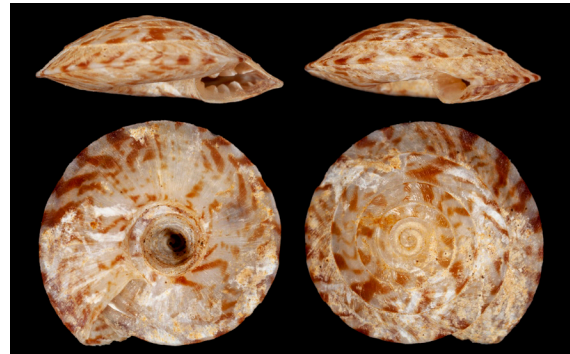


Fig. 24. *Endodonta laie*, 7.7 mm, ANSP 380210, HOLOTYPE, Oahu, Laie.

Etymology: Named for the type locality.

***Endodonta laie* Holotype**

Shell diameter: 7.7 mm
 Shell height: 2.75 mm, 35.7% of shell diameter
 Spire protrusion: 0.8 mm, 29% of shell height
 Aperture height: 1.3 mm, 46.4% of aperture width
 Aperture width: 2.8 mm
 Peripheral plica(e): 4
 Number of whorls: 6.5
 Umbilicus diameter: 2.4 mm, 31.2% of shell diameter
 Body whorl descension: 2.25°

***Endodonta lamellosa* (Férussac, 1825)**
 (Figs. 25, 250)

Helix (*Helicodonta*) *lamellosa* A. Férussac, 1821: 38 — unaccepted > nomen nudum.

Helix lamellosa A. Férussac, 1825 — unaccepted > superseded combination.

Endodonta lamellosa (A. Férussac, 1825) — Solem, 1976: 378–380.

Type material: Syntype MNHN 22719, leg. A. Férussac, 1825.

Type locality: Rocky Hill (21°19'N, 157°49'W), Manoa Valley, Kona Moku, Kona District, Oahu.

Other material studied: one specimen from Oahu; Manoa Valley, Rocky Hill, back of tanks, on seaward slope below top, 21°19'N, 157°49'W, leg. O. Oswald, Jan 9, 1929 (ANSP 386182: 1).

Status and Distribution: Extant. Presumed extinct. Known from Manoa Valley, Oahu.

Diagnosis: Color pattern flammulated. Shell: discoidal; umbilicus 33.3% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 1st, 5th.

Redescription: Color: flammulated. Shell discoidal, obversely conical, keeled; diameter 4.5 mm; 4.5 whorls; apex obtuse; spire protrusion 10.8% of shell height; shell height 41.1% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate, margined; aperture sub-rhomboidal, expanded peripherally, marginally obstructed; aperture height 75% of width; umbilicus 33.3% of shell diameter, constricted decoiling; body whorl descension 0.0°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, blade-like, gradual ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, blade-like projecting toward the 3rd palatal; five primary palatal barriers, 1st columellar, 2nd basal, 3rd and 4th sub-peripheral, tall, marginally crescentic, 5th supra-peripheral, blade-like,

descends rapidly, angled toward the 4th palatal. one sub-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 4th, 1st, 5th.

Remarks: The type specimens of *Endodonta lamellosa* (A. Férussac, 1825) and *Christensenius intercarinatus* (A. Férussac, 1825) new comb. were almost certainly collected at Rocky Hill, in Manoa Valley, while in Honolulu during a voyage of exploration between 1817 and 1820. Férussac's illustrations of both species were belatedly published together in 1832. For more information on Férussac's species, see Remarks for *Christensenius intercarinatus* (Mighels, 1845) new comb.

***Endodonta lamellosa* Syntype**

Shell diameter: 4.5 mm

Shell height: 1.85 mm, 41.1% of shell diameter

Spire protrusion 0.17 mm, 10.8% of shell height

Aperture height: 1.5 mm, 75% of aperture width

Aperture width: 2.0 mm

Peripheral plica(e): 1

Number of whorls: 4.5

Umbilicus diameter: 1.5 mm, 33.3% of shell diameter

Body whorl descension: 0.0°

***Endodonta lualualei* n. sp.**

(Figs. 26, 251–255)

Type material: Holotype ANSP 377804; five paratypes (ANSP 501734: 5); all leg. O. Oswald, Oct 14, 1928.

Type locality: As described by Oswald; glen at right of prominent spur seaward of pass 61 m, to right point ¾ way up middle glade near head of glen, Lualualei, Waianae District, Oahu, 21°27'N, 158°10'W.

Other material studied: 873 specimens from Oahu: Waianae District, Western Ridge of Popouwela (ANSP 130470:1), leg. Giles and Cooke, 1913; Makaleha, left (Banana Valley) one ½ hours from reservoir along creek bed, leg. O. Oswald, Apr 15, 1938 (ANSP 377796:5), left of banana grove, below cliffs, leg. O. Oswald, Sep 7, 1930 (ANSP 376431:19), right-hand branch 56 minutes up from reservoir, leg. O. Oswald, Aug 24, 1930 (ANSP 377797:5), right-hand branch head of valley at and within 45.7 m of falls, leg. O. Oswald, Aug 10, 1930 (ANSP 377798:10), Lualualei, leg. O. Oswald, Oct 11, 1928 (ANSP 377803:10), glen at right of prominent spur, seaward of pass, top of glen, leg. O. Oswald, Oct 6, 1928 (ANSP 377792:34), above glen at right of prominent spur seaward of pass head of right spur, leg. O. Oswald, Oct 13, 1928 (ANSP 377793:6, 376433: 7), to head of valley to left of prominent spur near center, near

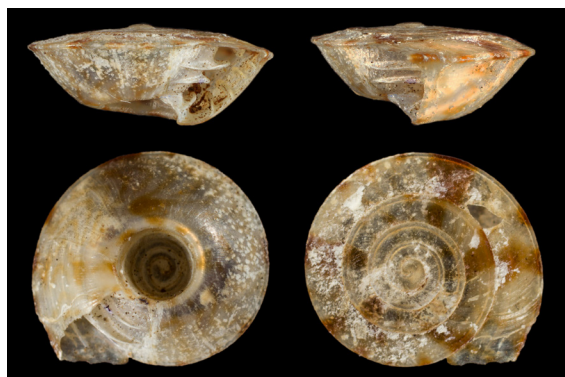


Fig. 25. *Endodonta lamellosa*, 4.5 mm, MNHN 22719, SYNTYPE, Oahu.

head of glen, leg. O. Oswald, Oct 3, 1928 (ANSP 378650:4), glen at right of prominent spur, seaward of pass $\frac{1}{2}$ way up middle glade near head of glen, leg. O. Oswald, Oct 14, 1928 (ANSP 378652:9), glen at right of prominent spur seaward of pass $\frac{1}{2}$ way up glen, leg. O. Oswald, Oct 6, 1928 (ANSP 377799:22, 377800:11), glen at right of prominent spur seaward of pass $\frac{3}{4}$ way up middle glade near head of glen, leg. O. Oswald Oct 14 -13, 1928 (ANSP 377805:17, 377806: 25, 377802: 29), glen at right of prominent spur seaward of pass middle glade near head of glen, left side near head of glade, leg. O. Oswald, Oct 14, 1928 (ANSP 377808A:1). Pohakea Pass, southerly along trail, ravine 5, division point "1st B. N.", Gowen trail, leg. O. Oswald, Apr 9, 1938 (ANSP 386212:1, 386211:19), southerly along trail, southerly from ravine 5, Gowen Trail, leg. O. Oswald, Apr 9, 1938 (ANSP 386222:15), southerly along trail, beginning of ravine six opposite end of road "route 4-5" Gowen Trail, leg. O. Oswald, Apr 15, 1938 (ANSP 386225:38, 386229: 1), southerly along trail, ravine 7, far out on northern spur, Gowen Trail, leg. O. Oswald Apr 17, 1938 (ANSP 386236:3, 386237:4), southerly, ravine 10, northerly spur being junction of trails, mile post 11.5, Mauna Kapu Trail and Gowen trail, leg. O. Oswald, Apr 24, 1938 (ANSP 386248:2), southerly along trail, ravine eight stream bed, Gowen Trail, leg. O. Oswald Apr 24, 1938 (ANSP 383578A:56), southerly along trail, ravine 9, stream bed, Gowen Trail, leg. O. Oswald, Apr 24, 1938 (ANSP 383577D:22), Ravine 7, southerly side of Gowen Trail, leg. O. Oswald, May 15, 1938 (ANSP 383580: 17), southerly along trail, ravine 7, stream bed of south half, Gowen Trail, leg. O. Oswald, Apr 24, 1938 (ANSP 383579: 1), southerly, ravine 11, mile post 13.5, Gowen Trail, leg. O. Oswald, May 1, 1938 (ANSP 383581:27), southerly along trail beginning at ravine 3, Gowen Trail, leg. O. Oswald, Apr 9, 1938 (ANSP 386207: 1), southerly along trail, ravine 5, Division Point "1st B. N.", Gowen Trail, leg. O. Oswald, Apr 9, 1938 (ANSP 386209:8), southerly along trail, south half of ravine at head of "Route 6" Road, along trail, Gowen Trail, leg. O. Oswald, Apr 2, 1938 (ANSP 386204:11), southerly along trail, ravine 7, far out on northerly spur, Gowen Trail, leg. O. Oswald, Apr 17, 1938 (ANSP 383930:53), southerly along trail, beginning of ravine six opposite end of road "Route 4-5", Gowen Trail, leg. O. Oswald, Apr 15, 1938 (ANSP 383928:45), ravine 6, north spur, 30.5 m, northerly of mile post 10.5, Gowen Trail, leg. O. Oswald, Jun 5, 1938 (ANSP 383929: 20), southerly, ravine 12, Gowen trail, leg. O. Oswald, May 15, 1938 (ANSP 386250:26), southerly, ravine 10, northerly spur being junction of trails, mile post 11.5, Mauna Kapu Trail and Gowen Trail, leg. O. Oswald, Apr 24, 1938 (ANSP 383576:58), southerly along trail, southerly from ravine 5, Gowen Trail, O. Oswald, Apr 9, 1938 (ANSP 383573:51), 3rd high point on eastern slope of Pohakea Pass, O. Oswald, Jun 7, 1931 (ANSP 383171: 16),

Palehua, ex coll. BPBM 33076 (ANSP 130514:5), southerly, southerly half of ravine 10, Gowen Trail, leg. O. Oswald, May 1, 1938 (ANSP 383582B: 44), Lihue, ex coll. BPBM 37188 (ANSP 130509: 1), ca. 152.4 m above plain, 1.2 km from sea, leg. Pilsbry and Cooke, Feb 14, 1913 (ANSP 109990: 108), Hawaiian Islands, leg. H. A. Pilsbry 1920 (ANSP 128263: 1), head of forest trail, Jun 6, 1929 (ANSP 378651: 1), Kaala, leg. O. Oswald, May 8, 1923 (ANSP 380199: 1), Hawaiian Islands, British Museum of Natural History (NHMUK 1962716.1, 1962716.2; see Remarks for *Endodonta fricki* (Pfeiffer, 1858)).

Status and Distribution: Extant. Presumed extinct. Known from Makaleha, Lualualei, Pohakea Pass, Waianae, Popouwela, Palehua, Lihue, Waianae District; Kawaihapai, Waialua District, Oahu. *Endodonta lualualei* was collected over the length of leeward Waianae from Palehua in the south Waianae District to Kawaihapai in the Waialua District in the north.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 26.5% of shell diameter; primary palatal barrier height order, tall to low: 4th, 3rd, 5th, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 6.8 mm; 6.25 whorls; apex obtuse; spire protrusion 17.8% of shell height; shell height 41.2% of diameter; peristome evenly thickened, reflected basally at the columella fold; apical suture margined, canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 71.4% of width; umbilicus 26.5% of shell diameter, decoiling regularly; body whorl descension 2.45°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, bifid, gracefully extended toward the

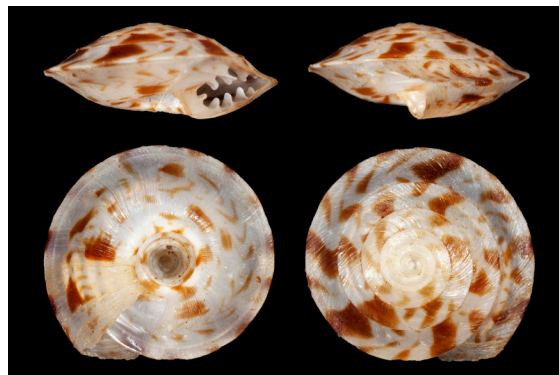


Fig. 26. *Endodonta lualualei*, 6.8 mm, ANSP 377804, HOLOTYPE, Oahu, Lualualei.

supra-peripheral 5th palatal barrier, rapid ascension, 2nd low, crescentic, extended toward the 2nd palatal barrier, gradual ascension; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, tall, rapid ascension, marginally crescentic, 5th supra-peripheral, tall, angled toward 4th, descends rapidly, one sub and one supra-peripheral plica. Primary palatal barrier height order 4th, 3rd, 5th, 2nd, 1st.

Remarks: A marginally variable species easily recognized by its graceful, bifid 1st parietal barrier. *Endodonta lualualei* shows variation in the number of peripheral plicae and the rare trifid 1st parietal barrier.

Etymology: Named for type locality.

***Endodonta lualualei* Holotype**

Shell diameter: 6.8 mm
Shell height: 2.8 mm, 41.2% of shell diameter
Spire protrusion: 0.5 mm, 17.8% of shell height
Aperture height: 2.0 mm, 71.4% of aperture width
Aperture width: 2.8 mm
Peripheral plica(e): 2 to 4
Number of whorls: 6.25
Umbilicus diameter: 1.8 mm, 26.5% of shell diameter
Body whorl descension: 2.45°

***Endodonta makaua* n. sp.**
(Figs. 27, 256)

Type material: Holotype ANSP 377816; 18 paratypes (ANSP 501735: 18); all leg. O. Oswald, Jun 2, 1928.

Type locality: As described by Oswald; in field of melons across road, Kaaawa (Makaua, opposite park), Koolauloa District, Oahu. 21°33'N, 157°51'W.

Other material studied: One specimen from Oahu: Koolauloa District, leg. O. Oswald, Jun 2, 1928 (ANSP 376434: 12).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 31.6% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 4th, 2nd, 5th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 3.8 mm; 5.25 whorls; apex obtuse; spire protrusion 25% of shell height, convex; shell height 42.1% of diameter; peristome evenly thickened, gradually

reflected toward the columella; apical suture margined, canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 64.3% of width; umbilicus 31.6% of shell diameter, decoiling irregularly; body whorl descension 2.5°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, rapid ascension, curved toward the supra-peripheral 5th palatal barrier, 2nd low, thick, curved toward the 2nd palatal barrier, gradual ascension; five primary palatal barriers, 1st columellar, 2nd, 3rd, and 4th basal, tall, rapid ascension, crescentic, 5th supra-peripheral, tall, thin, curved, descends rapidly, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 4th, 2nd, 5th, 1st.



Fig. 27. *Endodonta makaua*, 3.8 mm, ANSP 377816, HOLOTYPE, Oahu, Kaaawa (Makaua).

Etymology: Named for the type locality.

***Endodonta makaua* Holotype**

Shell diameter: 3.8 mm
Shell height: 1.6 mm, 42.1% of shell diameter
Spire protrusion: 0.4 mm, 25% of shell height
Aperture height: 0.9 mm, 64.3% of aperture width
Aperture width: 1.4 mm
Peripheral plica(e): 2
Number of whorls: 5.25
Umbilicus diameter: 1.2 mm, 31.6% of shell diameter
Body whorl descension: 2.5°

***Endodonta manoa* n. sp.**
(Figs. 28, 257–259)

Type material: Holotype ANSP 380203; 64 paratypes (ANSP 501736: 64); all leg. O. Oswald, Nov 19, 1936.

Type locality: As described by Oswald; first kukui (candlenut) glen, 45.7 m, directly below 2nd saddle, 3 m, from cliff, Palolo, Oahu, 21°18'N, 157°48'W.

Other material studied: 1030 specimens from Oahu: Kona District, Palolo, first kukui glen, 45.7 m, directly below 2nd saddle, 3 m, from cliff, 21°18'N, 157°48'W, leg. O. Oswald, Nov 19, 1936 (ANSP 380202: 62), near cliff, leg. O. Oswald, Nov 28, 1936 (ANSP 380201: 18), right, 1st kukui glen, leg. O. Oswald, Apr 27, 1940 (ANSP 379742: 2), right, 1st kukui glen, 61 m, below saddle, leg. O. Oswald, Apr 27, 1940 (ANSP 379740: 4), Palolo, 21°18' N, 157°48'W, leg. O. Oswald, (ANSP 383926: 1), right, 1st kukui glen, 15.2 m, inland and 23 m, elevation below 2nd low saddle in ridge, about 6.1 m, from cliff face, leg. O. Oswald, Nov 14, 1936 (ANSP 383927: 24), Manoa, right (Woodlawn) cave $\frac{3}{4}$ up cliffs, leg. O. Oswald, May 30, 1937 (ANSP 386195: 1), Rocky Hill, back of tanks on seaward slope below top, 29°19'N, 157°49'W, leg. O. Oswald, Jan 9, 1929 (ANSP 386185: 1, ANSP 386186: 6), leg. O. Oswald, (ANSP 386178: 1), right, first kukui glen just under top of ridge, leg. O. Oswald, Sep 3, 1939 (ANSP 379743: 54), Rocky Hill, ex coll. BPBM 38368 (ANSP 130511: 7, ANSP 128200: 803), Rocky Hill, leg. O. Oswald, (ANSP 383584: 46).

Status and Distribution: Extant. Presumed extinct. Known only from Palolo and Manoa Kona District, Oahu.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 29.2% of shell diameter; primary palatal barrier height order, tall to low: 4th, 5th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 6.5 mm; 6.5 whorls; apex blunt; spire protrusion 15.9% of shell height; shell height 33.8% of diameter; peristome thin, evenly thickened; apical suture faintly margined, canaliculate; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 65.2%



Fig. 28. *Endodonta manoa*, 6.5 mm, ANSP 380203, HOLOTYPE, Oahu, Palolo.

of width; umbilicus 29.2% of shell diameter, decoiling regularly; body whorl descension 2.7°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, bifid, gradual ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, crescentic, gradual ascension, positioned above the 2nd palatal barrier; five primary palatal barriers, 1st columellar, low, evenly thickened, 2nd, 3rd and 4th, basal, tall, rapid ascension, marginally crescentic, 5th supra-peripheral, tall, extended toward the 4th palatal barrier, descends gradually, two sub and two supra-peripheral plicae. Primary palatal barrier height order 4th, 5th, 3rd, 2nd, 1st.

Remarks: The peripheral plicae are variable in number, ranging from two to four.

Etymology: Named for Manoa Valley, Oahu.

***Endodonta manoa* Holotype**

Shell diameter: 6.5 mm
Shell height: 2.2 mm, 33.8% of shell diameter
Spire protrusion: 0.35 mm, 15.9% of shell height
Aperture height: 1.5 mm, 65.2% of aperture width
Aperture width: 2.3 mm
Peripheral plica(e): 2 to 4
Number of whorls: 6.5
Umbilicus diameter: 1.9 mm, 29.2% of shell diameter
Body whorl descension: 2.7°

***Endodonta marsupialis* Pilsbry & Vanatta, 1906**
(Figs. 29, 260)

Endodonta marsupialis Pilsbry & Vanatta, 1906: 784.

Type material: Lectotype ANSP 58190 [designation attributed to Baker, 1963: 232], 11 paralectotypes (ANSP 455281:11), leg. J.S. Phillips.

Type locality: Oahu.

Other material studied: 14 specimens from Oahu: Waianae District, Green Peak (Palikea), N. E. slope, leg. H. A. Pilsbry, 1920 (ANSP 74533: 14).

Status and Distribution: Extant. Presumed extinct. Known from Green Peak (Palikea), Waianae District, Oahu.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 15.8% of shell diameter; primary palatal barrier height order, tall to low: 2nd, 4th, 1st, 3rd, 5th.

Redescription: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally, plano-convex, obversely

conical, keeled; diameter 7.6 mm; 6.25 whorls; apex obtuse; spire protrusion 30.8% of shell height; shell height 42.8% of diameter; peristome evenly thin, reflected basally; apical suture canaliculate; aperture sub-rhomboidal, expanded peripherally, marginally obstructed; aperture height 64.3% of width; umbilicus 15.8% of shell diameter, umbilicus cavern-like with a small aperture; body whorl descension 5.0°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, thin, bifid, rapid ascension, extended toward the 5th palatal barrier, 2nd low, blade-like, extended between the 2nd and 3rd palatal barriers; five primary palatal barriers, 1st columellar, low, thin, marginally crescentic, 2nd and 3rd basal, rapid ascension, tall, crescentic, 4th sub-peripheral, blade-like, tall, marginally crescentic, 5th supra-peripheral, tall, blade-like, descends rapidly, one sub-peripheral and one supra-peripheral plica. Primary palatal barrier height order excluding the plicae, 2nd, 4th, 1st, 3rd, 5th.

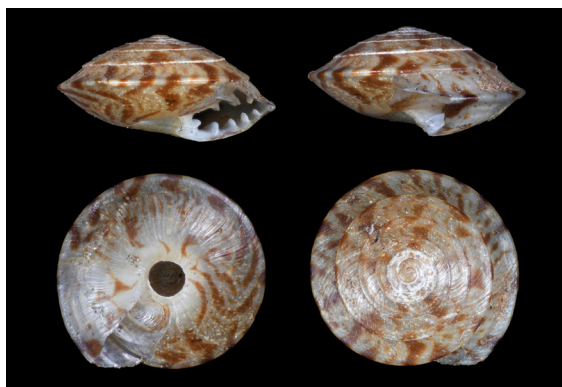


Fig. 29. *Endodonta marsupialis*, 7.6 mm, ANSP 58190, LECTOTYPE, Oahu.

Remarks: The lectotype of *E. marsupialis* (ANSP 58190) from J. S. Phillips was designated by Baker (1963: 232) who noted this specimen as “TOM” meaning either “type by original monotypy” or “type by original measurement” (Gary Rosenberg, pers. comm. 2024). In 2014, the 11 remaining specimens of ANSP 58190 were placed in ANSP 455281 as paralectotypes of *E. marsupialis*. Solem (1976: 379) incorrectly referred to ANSP 58190 as the holotype of *Endodonta marsupialis*.

Etymology: Named for its distinguishing cavernous umbilical brood chamber.

***Endodonta marsupialis* Lectotype**

Shell diameter: 7.6 mm
Shell height: 3.25 mm, 42.8% of shell diameter
Spire protrusion: 1.0 mm, 30.8% of shell height
Aperture height: 1.8 mm, 64.3% of aperture width

Aperture width: 2.8 mm
Peripheral plica(e): 2
Number of whorls: 6.25
Umbilicus diameter: 1.2 mm, 15.8% of shell diameter
Body whorl descension: 5.0°

***Endodonta nikiae* n. sp.**
(Figs. 30, 261)

Type material: Holotype (ANSP 380198: 1); leg. O. Oswald, May 6, 1923.

Type locality: Oahu, Waianae District, Nanakuli, 21° 24' N, 158° 08' W.

Other material studied: One juvenile specimen from Oahu: Waianae District, Nanakuli, 21° 24' N, 158° 08' W, leg. O. Oswald, (ANSP 380211:1).

Status and distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub globose, keeled; umbilicus 32.1% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 1st, 5th.

Description: Color: flammulated. Shell: sub globose, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.6 mm; 6.5 whorls; apex blunt: spire protrusion 42.3% of shell height; shell height 46.4% of diameter; peristome evenly thickened; apical suture margined, canaliculate, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 82% of width; umbilicus 32.1% of shell diameter, decoiling regularly; body whorl descension 2.8°. Sculpture: growth lines, embryonic sculpture absent. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension,

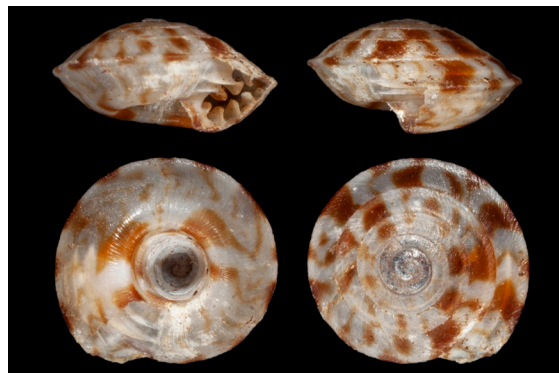


Fig. 30. *Endodonta nikiae*, 3.7 mm, ANSP 380211, Oahu, extended toward the supra-peripheral 5th palatal barrier, 2nd

low, blade-like, extended toward the 3rd palatal barrier; five primary palatal barriers, 1st palatal columellar, 2nd, 3rd basal, 4th sub-peripheral, rapid ascension, crescentic, 5th supra-peripheral, blade-like, angled toward the 4th palatal, descends rapidly, one low sub-peripheral plica. Primary palatal barrier height order, tall to low: 3rd, 2nd, 4th, 1st, 5th.

Etymology: Named for a wild bird that befriended me during the writing of this manuscript.

***Endodonta nikiae* Holotype**

Shell diameter: 5.6 mm

Shell height: 2.6 mm, 46.4% of shell diameter

Spire protrusion: 1.1 mm 42.3% of shell height

Aperture height: 1.8 mm, 82% of aperture width

Aperture width: 2.2 mm

Peripheral plica(e): 1

Number of whorls 6.5

Umbilicus diameter: 1.8 mm, 32.1% of shell diameter

Body whorl descension: 2.8°

***Endodonta quasidiscus* n. sp.**

(Fig. 31)

Type material: Holotype ANSP 383583; four paratypes (ANSP 498380: 4); all leg. O. Oswald, May 15, 1938.

Type locality: As described by Oswald; southerly (along trail), Ravine 12, Mile Post 14, Gowen Trail, Pohakea Pass, Oahu.

Other material studied: 76 specimens from Oahu: Waianae District, Gowen trail, Pohakea Pass, southerly (along trail), Ravine 12, Mile Post 14 (ANSP 503412: 76), leg. O. Oswald, May 15, 1938.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 31% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 4th, 2nd, 5th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 10.0 mm; 6.25 whorls; apex blunt; spire protrusion 15.2% of shell height; shell height 33% of diameter; peristome thin peripherally, thickened basally, columellar peristome reflected; apical suture canaliculate; aperture sub-rhomboidal, expanded peripherally, moderately obstructed; aperture height 58.3% of width; umbilicus 31% of shell diameter, decoiling regularly.; body whorl descension 2.2°.

Sculpture: growth lines. Barriers: two parietal barriers, centered on the parietal wall, 1st tall, bifid, gradual ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, blade-like; five primary palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, medium height, rapid ascension, crescentic, 5th supra-peripheral, blade-like, angled toward the 4th palatal barrier, descends rapidly; one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 4th, 2nd, 5th, 1st.



Fig. 31. *Endodonta quasidiscus*, 10.0 mm, ANSP 383583, HOLOTYPE, Oahu, Pohakea Pass.

Remarks: See Comparison for *E. waimanoensis*, a similar species.

Etymology: Named for the similarity in shell shape to *Endodonta discus*.

***Endodonta quasidiscus* Holotype**

Shell diameter: 10.0 mm

Shell height: 3.3 mm, 33% of shell diameter

Spire protrusion: 0.5 mm, 15.2% of shell height

Aperture height: 2.1 mm, 58.3% of aperture width

Aperture width: 3.6 mm

Peripheral plica(e): 2

Number of whorls: 6.25

Umbilicus diameter: 3.1 mm, 31% of shell diameter

Body whorl descension: 2.2°

***Endodonta skeeteri* n. sp.**

(Fig. 32)

Type material: Holotype ANSP 383170; 14 paratypes (ANSP 498383: 14); all leg. O. Oswald, Jun 11, 1938.

Type locality: As described by Oswald; first large kukui glen, Koko Head side, inland of heaped up coral reef opposite center of Waimanalo Beach lots, end of road, Waimanalo, (Koolaupoko District), Oahu. 21°22'N, 157°43'W.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality, Waimanalo, Koolau District, Oahu.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 26.7% of shell diameter; primary palatal barrier height order, tall to low: 5th, 4th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 9.0 mm; 6.25 whorls; apex obtuse; spire protrusion 31.2% of shell height; shell height 42.8% of diameter; peristome thin, reflected at the columella fold; apical suture margined, carinate above, shallow; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 55.6% of width; umbilicus 26.7% of shell diameter, narrow, decoiling regularly; body whorl descension 3.9°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, bifid, thin, gradual ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, slightly crescentic, gradual ascension; five primary palatal barriers, 1st columellar, tall, marginally crescentic, 2nd, 3rd and 4th basal, tall, moderately crescentic, rapid ascension, 5th supra-peripheral, tall, thin, curved, ascends gradually, one sub and one supra-peripheral plica. Primary palatal barrier height order 5th, 4th, 3rd, 2nd, 1st.



Fig. 32. *Endodonta skeeteri*, 9.0 mm, ANSP 383170, HOLOTYPE, Oahu, Waimanalo.

Etymology: Named for James “Skeeter” D. Preddy, Jr., friend to all and close friend of “Mo” Moller of Kahikinui, Maui.

***Endodonta skeeteri* Holotype**

Shell diameter: 9.0 mm
 Shell height: 3.85 mm, 42.8% of shell diameter
 Spire protrusion: 1.2 mm, 31.2% of shell height
 Aperture height: 2.0 mm, 55.6% of aperture width
 Aperture width: 3.6 mm
 Peripheral plica(e): 2
 Number of whorls: 6.25

Umbilicus diameter: 2.4 mm, 26.7% of shell diameter
 Body whorl descension: 3.9°

***Endodonta ui* n. sp.**
 (Fig. 33)

Type material: Holotype ANSP 130515; four paratypes (ANSP 498385: 4); all ex coll. BPBM.

Type locality: Waianae Mountains, Popouwela, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 30.5% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 2nd, 1st, 4th, 5th.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 5.9 mm; 5.5 whorls; apex planar; spire protrusion 23.1% of shell height; shell height 44.1% of diameter; peristome evenly thickened, reflected basally; apical suture margined, crenulated, shallow; aperture sub-rhomboidal, expanded peripherally, marginally obstructed; aperture height 68.2% of width; umbilicus 30.5% of shell diameter, decoiling regularly; body whorl descension 3.9°. Sculpture: radial ribs on embryonic whorls, growth lines on body whorls. Barriers: two parietal barriers, 1st tall, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, rounded; five primary palatal barriers, 1st palatal columellar, 2nd, 3rd and 4th basal, tall, rapid ascension, 5th tall, blade-like, angled toward 4th palatal, ascends rapidly, supra-peripheral, one callous-like, recessed sub-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.



Fig. 33. *Endodonta ui*, 5.9 mm, ANSP 130515, HOLOTYPE, Oahu, Popouwela.

Etymology: In the Hawaiian language *ui* means beautiful.

***Endodonta ui* Holotype**

Shell diameter: 5.9 mm
 Shell height: 2.6 mm, 44.1% of shell diameter
 Spire protrusion: 0.6 mm, 23.1% of shell height
 Aperture height: 1.5 mm, 68.2% of aperture width
 Aperture width: 2.2 mm
 Peripheral plica(e): 1
 Number of whorls: 5.5
 Umbilicus diameter: 1.8 mm, 30.5% of shell diameter
 Body whorl descension: 3.9°

***Endodonta waimano* n. sp.**
 (Fig. 34)

Type material: Holotype ANSP 108054; five paratypes (ANSP 498387: 5); all leg. H. A. Pilsbry & Spalding.

Type locality: North side of peak at summit of Waimano, Manana Ridge, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, keeled; umbilicus 30.2% of shell diameter; primary palatal barrier height order, tall to low: 2nd, 3rd, 5th, 4th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally, plano-convex, obversely conical, keeled; diameter 5.3 mm; 5.5 whorls; apex blunt; spire protrusion 20.8% of shell height; shell height 45.3% of diameter; peristome thickened, reflected at the columella; apical suture margined, canaliculate; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 70.5% of



Fig. 34. *Endodonta waimano*, 5.3 mm, ANSP 108054, HOLOTYPE, Oahu, Waimano.

width; umbilicus 30.2% of shell diameter, decoiling regularly, last coil expanded; body whorl descension 4.0°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, undulated, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, bifid, marginally crescentic, gradual ascension; five primary palatal barriers, 1st columellar, thin, low, marginally crescentic, 2nd and 3rd basal, thin, crescentic, 4th sub-peripheral, thin, broadly crescentic, 5th supra-peripheral, tall, blade-like rapid ascension, tall, extended toward the 4th palatal, one sub and one supra-peripheral plica. Primary palatal barrier height order 2nd, 3rd, 5th, 4th, 1st.

Etymology: Named for the type locality.

***Endodonta waimano* Holotype**

Shell diameter: 5.3 mm
 Shell height: 2.4 mm, 45.3% of shell diameter
 Spire protrusion: 0.5 mm, 20.8% of shell height
 Aperture height: 1.55 mm, 70.5% of aperture width
 Aperture width: 2.2 mm
 Peripheral plica(e): 2
 Number of whorls: 5.5
 Umbilicus diameter: 1.6 mm, 30.2% of shell diameter
 Body whorl descension: 4.0°

***Endodonta waimanoensis* n. sp.**
 (Fig. 35)

Type material: Holotype ANSP 130524; one paratype (ANSP 498389: 1); both ex coll. BPBM.

Type locality: Waimano, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: low, sub-discoidal, keeled; umbilicus 27.7% of shell diameter, primary palatal barrier height order, tall to low: 4th, 5th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, plano-convex, obversely conical, keeled; diameter 9.4 mm; 6.5 whorls; apex obtuse; spire protrusion 11.4% of shell height; shell height 37.2% of diameter; peristome evenly thickened, reflected basally; apical suture canaliculate; aperture sub-rhomboidal, greatly expanded peripherally, obstructed; aperture height 44.4% of width; umbilicus 27.7% of shell diameter, decoiling regularly, last coil expanding; body whorl descension 2.3°. Sculpture: growth lines. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, thick, crescentic, gradual ascension: five

primary palatal barriers, 1st columellar, thick, low, marginally crescentic, 2nd, 3rd, and 4th basal, crescentic ascend rapidly, 5th, supra-peripheral, tall, thin, crescentic, extended toward the 1st parietal and 4th palatal, rapid ascension, three or four peripheral plicae. Primary palatal barrier height order 4th, 5th, 3rd, 2nd, 1st.



Fig. 35. *Endodonta waimanoensis*, 9.4 mm, ANSP 130524, HOLOTYPE, Oahu, Waimano.

Comparison: *Endodonta waimanoensis* is distinguished from *E. quasidiscus*, both Oahu endemics, by having a height 37.2% of shell diameter (vs. 33% in *E. quasidiscus*); spire protrusion of 11.4% of shell height (vs. 15.1%); aperture sub-rhomboidal, greatly expanded peripherally, obstructed (vs. aperture sub-rhomboidal, expanded

peripherally, moderately obstructed); aperture height 44.4% of width; (vs. 58.3%); sub-peripheral palatal barriers crescentic, tall (vs. sub-peripheral palatal barriers medium height, rapid ascension, marginally crescentic); four plica, two sub- and two supra-peripheral (vs. two plica, sub- and supra-peripheral); umbilicus 27.7% of shell diameter (vs. 31%); body whorl descension 2.3° (vs. 2.2°); primary palatal barrier height order, tall to low, 4th, 5th, 3rd, 2nd, 1st (vs. 3rd, 4th, 2nd, 5th, 1st).

Remarks: The two species, *Endodonta waimanoensis* and *E. quasidiscus*, may be relics of a single dynamic population which may have periodically extended from Pohakea Pass in the Waianae Mountains across the Leilehua Plain to Waimano in the Koolau Mountains, Oahu.

Etymology: Named for the type locality.

***Endodonta waimanoensis* Holotype**

Shell diameter: 9.4 mm

Shell height: 3.5 mm, 37.2% of shell diameter

Spire protrusion: 0.4 mm, 11.4% of shell height

Aperture height: 1.6 mm, 44.4% of aperture width

Aperture width: 3.6 mm

Peripheral plica(e): 3 or 4

Number of whorls: 6.5

Umbilicus diameter: 2.6 mm, 27.7% of shell diameter

Body whorl descension: 2.3°

Helenia n. gen.

Type species: *Helenia laminata* (Pease, 1866), (Fig. 36). **Diagnosis:** Shell, sulcate, keeled; suture margined; low, broad radial ribs; decussate sub-peripherally; two parietals; five palatals, one or two peripheral plicae. **Includes:** 21 species (Fig. 38), 5 nominal species plus 16 newly described herein, distributed on Molokai (1), Oahu (14), Kauai (5), and Niihau (1) (Fig. 37). **Etymology:** *Helenia* is named to honor the ornithologist, Helen James.

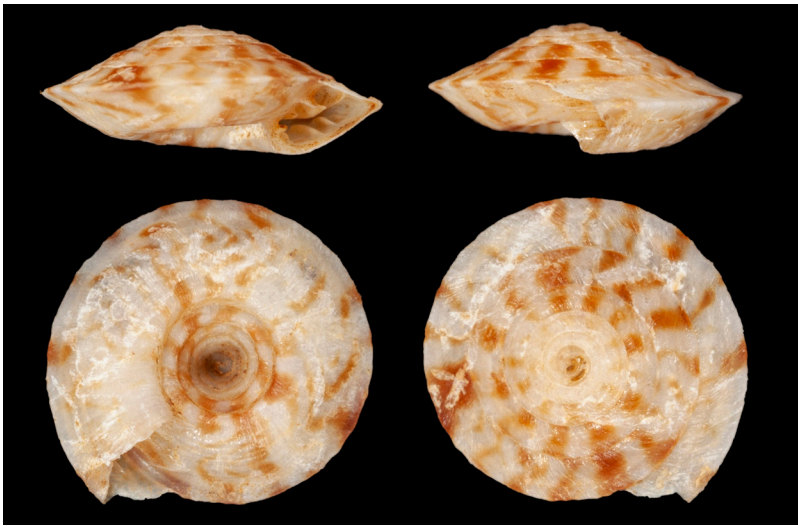


Fig. 36. *Helenia laminata* (Pease, 1866), type species of *Helenia* n. gen.; 6.0 mm, MS 8433, Kauai, Wailua.

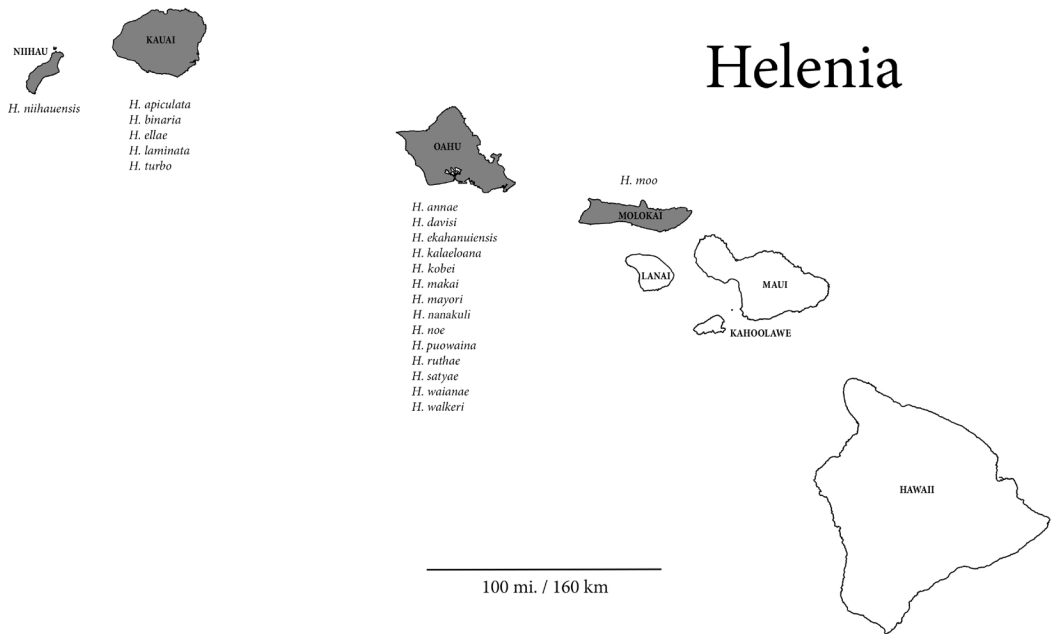


Fig. 37. Distributions of the species of *Helenia* in the Hawaiian archipelago.

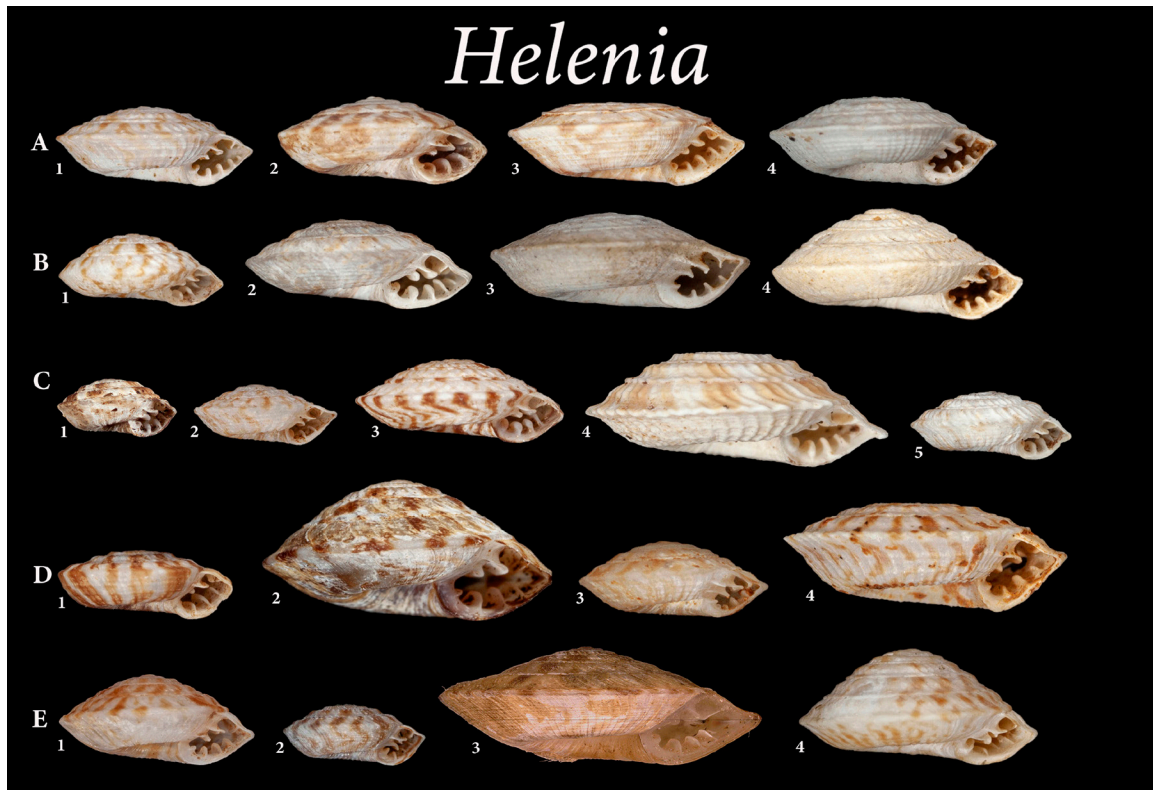


Fig. 38. Scaled images of specimens of the 21 species of the genus *Helenium*.

Row A: Molokai & Oahu

- (1) *Helenium moo*, 4.0 mm, ANSP 108738, Holotype, Molokai
- (2) *Helenium satyae*, 4.4 mm, ANSP 379444 Holotype, Oahu
- (3) *Helenium puowaina*, 5.0 mm, ANSP 127991, Holotype, Oahu
- (4) *Helenium ruthae*, 4.8 mm, ANSP 117342, Holotype, Oahu

Row B: Oahu

- (1) *Helenium annae*, 3.5 mm, ANSP 386207, Holotype
- (2) *Helenium davisii*, 4.8 mm, ANSP 378352, Holotype
- (3) *Helenium kalaaloana*, 6.5 mm, ANSP 130521
- (4) *Helenium makai*, 5.3 mm, ANSP 117339, Holotype.

Row C: Oahu

- (1) *Helenium ekahanuiensis*, 2.5 mm, FMNH 154483, Holotype
- (2) *Helenium walkeri*, 3.0 mm, (SMNS-ZI0157945 (ex MS 8461), Holotype
- (3) *Helenium kobei*, 4.4 mm, ANSP 383929A, Holotype
- (4) *Helenium mayori*, 6.4 mm, ANSP 130525, Holotype
- (5) *Helenium nanakuli*, 3.4 mm, ANSP 377810, Holotype

Row D: Oahu, Kauai & Niihau

- (1) *Helenium noe*, 3.7 mm, ANSP 379746, Holotype, Oahu
- (2) *Helenium waianaee*, 6.2 mm, ANSP 58132, Holotype, Oahu
- (3) *Helenium niihauensis*, 4.0 mm, ANSP 130500, Holotype, Niihau
- (4) *Helenium apiculata*, 6.0 mm, SMNS-ZI0157941 (ex MS 8429), Neotype, Kauai

Row E: Kauai

- (1) *Helenium binaria*, 4.1 mm, SMNS-ZI0157942 (ex MS 9312), Neotype
- (2) *Helenium ellae*, 3.0 mm, SMNS-ZI0157943 (ex MS 8472), Holotype
- (3) *Helenium laminata*, 6.5 mm, MCZ 17233, Lectotype
- (4) *Helenium turbo*, 5.0 mm, SMNS-ZI0157944 (ex MS 8446), Holotype

Helenia moo n. sp.
(Figs. 39, 262, 263)

Type material: Holotype ANSP 108738; 85 paratypes (ANSP 501737: 85); all leg. H. A. Pilsbry & C. M. Cook, 1913.

Type locality: Mauna Loa, Kaluakoi Moku, Molokai.

Other material studied: five specimens from Molokai: Koolau Moku, Moomomi, about 121.92 m, elevation, less than 0.4 km, inland in reddish sand draw, leg. Pilsbry and Cook, 1913 (ANSP 109988: 2), Moomomi Dunes, leg. Bob Hobdy, 1988 (MS 9186: 1, MS 9187: 1, MS 9188: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-turbinate, carinate; umbilicus 29.3% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 4th, 5th, 2nd, 1st.

Description: Color: flammulated. Shell: sub-turbinate, slightly expanded laterally, plano-convex supra-peripherally, obversely conical, carinate; diameter 4.1 mm; 5.25 whorls; apex blunt; spire protrusion 24.3% of shell height; shell height 45.1% of diameter; peristome evenly thickened, reflected at the columella; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 68.8% of width; umbilicus 29.3% of shell diameter, expanding, gradually deoiling; body whorl descension 3.8°. Sculpture: embryonic sculpture absent; oblique radial ribs on the post embryonic whorls transition to growth lines on the body whorl; four or five, thick sub-peripheral spiral cords; obversely decussate. Barriers: two parietal barriers, 1st tall, gradual ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd moderately tall, extended toward the 3rd palatal barrier, rapid ascension; five primary palatal barriers, 1st columellar, moderately thin, 2nd low, thick, basal, 3rd and 4th basal, tall, crescentic, 5th, supra-peripheral, thin, crescentic, gradual ascension, extended toward the 1st parietal barrier, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 4th, 5th, 2nd, 1st.

Etymology: The surface color and sculpture of *Helenia moo* is reminiscent of the skin of gecko *Lepidodactylus lugubris*, among the first land snail predators introduced to Hawaii with the arrival of man. Mo'o is gecko in Hawaiian.



Fig. 39. *Helenia moo*, 4.1 mm, ANSP 108738, HOLOTYPE, Molokai, Mauna Loa.

Helenia moo Holotype

Shell diameter: 4.1 mm
Shell height: 1.85 mm, 45.1% of shell diameter
Spire protrusion: 0.45 mm, 24.3% of shell height
Aperture height: 1.1 mm, 68.8% of aperture width
Aperture width: 1.6 mm
Peripheral plica(e): 2
Number of whorls: 5.25
Umbilicus diameter: 1.2 mm, 29.3% of shell diameter
Body whorl descension: 3.8°

Helenia annae n. sp.
(Figs. 40, 264, 265)

Type material: Holotype ANSP 386207A, leg. O. Oswald, Apr 9, 1938.

Type locality: As described by Oswald; southerly along trail, southerly from ravine five, Gowen Trail, Pohakea Pass, Waianae Mts., Waianae District, Oahu.

Other material studied: 15 specimens from Oahu; Waianae District, Pohakea Pass, Gowen Trail, leg. O. Oswald, Apr 9, 1938 (ANSP 386213A: 3), southerly along trail, south half of ravine at head of Gowen Trail, leg. O. Oswald, Apr 2, 1938 (ANSP 386202: 11), southerly along trail, beginning of ravine 3, Gowen trail, leg. O. Oswald, Apr 9, 1938 (ANSP 386220: 1).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-turbinate, carinate; umbilicus 34.3% of shell diameter; palatal barrier height order 2nd, 3rd, 5th, 4th, 1st.

Description: Color: flammulated. Shell: sub-turbinate, slightly expanded laterally, plano-convex supra-peripherally, obversely conical, carinate; diameter 3.5 mm; 5.5 whorls; apex blunt; spire protrusion 59% of shell height; shell height 41.1% of diameter; peristome thickens gradually from the periphery to the columellar region; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 70% of width; umbilicus 34.3% of shell diameter, evenly decoiling; body whorl descension 2°. Sculpture: embryonic sculpture absent; radial ribs on the post embryonic whorls transition to growth lines on the body whorl; six distinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, rapid ascension, 2nd low, extended between the 2nd and 3rd palatal barriers, gradual ascension; five palatal barriers, 1st columellar, callous-like, 2nd basal, tall, thick, crescentic, gradual ascension, 3rd basal, thick, crescentic, gradual ascension, 4th basal, low, thick, marginally crescentic, 5th, supra-peripheral, tall, blade-like, extended toward the 1st parietal, rapid ascension. Palatal barrier height order 2nd, 3rd, 5th, 4th, 1st.



Fig. 40. *Heleniumnae annae*, 3.5 mm, ANSP 386207A, HOLOTYPE, Oahu, Pohakea Pass.

Etymology: Named for Anne Proudly, tortoise lover and executive secretary for Pardee and Sumner Erdman of Ulupalakua Ranch. She is the key to the ranch and all the treasures it holds.

Remarks: Similar to *Heleniumnae davisii* but lacks the peripheral plicae of *H. davisii*.

***Heleniumnae annae* Holotype**

Shell diameter: 3.5 mm

Shell height: 1.44 mm, 41.1% of shell diameter

Spire protrusion: 0.85 mm, 59% of shell height

Aperture height: 0.7 mm, 70% of aperture width

Aperture width: 1.0 mm

Peripheral plica(e): 0

Number of whorls: 5.5

Umbilicus diameter: 1.2 mm, 34.3% of shell diameter

Body whorl descension: 2°

***Heleniumnae davisii* n. sp.**

(Figs. 41, 266–268)

Type material: Holotype ANSP 378352; one paratype (ANSP 501739: 1); both leg. O. Oswald, Oct 3, 1928.

Type locality: As described by Oswald; head of valley to left of prominent spur near center ½ way up watercourse, Lualualei, Waianae District, Oahu.

Other material studied: 279 specimens from Oahu: Waianae District, Lualualei, ex coll. BPBM 37147 (ANSP 130516: 3), leg. O. Oswald, Oct 11, 1928 (ANSP 377813: 1), to head of valley to left of prominent spur near center near head of glen, leg. O. Oswald, Oct 3, 1928 (ANSP 377814: 5), glen at right of prominent spur seaward of pass 61 m, to right point ¾ way up middle glade near head of glen, leg. O. Oswald, Oct 14, 1928 (ANSP 377807: 39), glen at right of prominent spur seaward of pass middle glade near head of glen, left side near head of glade, leg. O. Oswald, Oct 14, 1928 (ANSP 377808: 52), leg. O. Oswald (ANSP 377809: 3), glen at right of prominent spur seaward of pass middle glade near head, beginning of spur, leg. O. Oswald, Oct 14, 1928 (ANSP 377811: 8), glen at right of prominent spur, seaward of pass top of glen, leg. O. Oswald, Oct 6, 1928 (ANSP 377815: 81), above glen at right of prominent spur seaward of pass, 30.5 m, below head of glen at right of spur, leg. O. Oswald, Oct 13, 1928 (ANSP 376435: 4), Honouliuli Trail, southerly glen of Gowen Trail, in route to Palehua Trail down right about 23 m, leg. O. Oswald, Sep 25, 1935 (ANSP 379745: 1), Pohakea Pass, Gowen Trail, southerly, ravine 11, mile post 13.5, leg. O. Oswald, May 1, 1938 (ANSP 386249: 1), southerly along trail, ravine 8, streambed, leg. O. Oswald, Apr 24, 1938 (ANSP 383578C: 2), southerly along trail, beginning of ravine six opposite end of road “route 4-5”, leg. O. Oswald, Apr 15, 1938 (ANSP 386229A: 1), southerly along trail, beginning of ravine 3, leg. O. Oswald, Apr 9, 1938 (ANSP 386207C: 2), southerly along trail, beginning of ravine six opposite end of road “route 4-5”, leg. O. Oswald, Apr 15, 1938 (ANSP 386230: 1), southerly along trail, southerly from ravine 5, leg. O. Oswald, Apr 9, 1938 (ANSP 386219: 39, ANSP 386214: 8), southerly along trail, south half of ravine at head of “route 6”, along trail, leg. O. Oswald, Apr 2, 1938 (ANSP 386203: 4), southerly along trail, southerly from ravine 5, leg. O. Oswald, Apr 9, 1938 (ANSP 386213B: 1),

southerly along trail, ravine 8, streambed, Gowen Trail, O. Oswald, Apr 24, 1938 (ANSP 383578E: 2). Popouwela, leg. D. Thaanum, Pilsbry Expedition 1913 (ANSP 108365: 8), at or near foot of 3rd small ridge, east, leg. H. A. Pilsbry, 1913 (ANSP 48492: 1), leg. D. Thaanum, Pilsbry Expedition 1913 (ANSP 108364: 11), lower locality, in the bottom, east, leg. H. A. Pilsbry, Pilsbry Expedition 1913 (ANSP 130471: 1).

Status and Distribution: Extant. Presumed extinct. Known from Lualualei, Honouliuli Trail, Pohakea Pass and Popouwela, Waianae Mountains, Oahu. Appears to have been widespread and abundant.

Diagnosis: Color pattern flammulated. Shell; lenticular, carinate; umbilicus 31.3% of shell diameter; primary palatal barrier height order, tall to low: 4th, 5th, 3rd, 2nd, 1st.

Description: Color pattern flammulated. Shell lenticular, expanded laterally; plano-convex supra-peripherally, obversely conical, carinate; diameter 4.8 mm; 5.25 whorls; apex blunt; spire protrusion 18.4% of shell height; shell height 39.6% of diameter; peristome evenly thickened, reflected basally; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 66.7% of width; umbilicus 31.3% of shell diameter, expanding, regularly decoiling; body whorl descension 3.1°. Sculpture; embryonic sculpture present, radial ribs on embryonic and post embryonic whorls become indistinct, low, and lumpy on body whorl culminating in growth lines on body whorl, seven spiral cords sub-peripherally, obversely decussate. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, thick, extended between the 2nd and 3rd palatal barriers, rapid ascension; five primary palatal barriers, 1st columellar, low, thick, marginally crescentic, 2nd basal, tall, thick,

broadly crescentic, 3rd basal, thick, broadly crescentic, 4th basal, tall, thin, marginally crescentic, 5th supra-peripheral, tall, blade-like, extended toward the 1st parietal, rapid ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order 4th, 5th, 3rd, 2nd, 1st.

Etymology: Named for Richard (Dick) Davis of the Oahu Trail and Mountain Club who taught me how to hike alone on the forested mountain slopes and valleys of Oahu. Invaluable lessons in the West Maui Mountains, long before there were fences and trails.

Helenia davis Holotype

Shell diameter: 4.8 mm

Shell height: 1.9 mm, 39.6% of shell diameter

Spire protrusion: 0.35 mm, 18.4% of shell height

Aperture height: 1.2 mm, 66.7% of aperture width

Aperture width: 1.8 mm

Peripheral plica(e): 2

Number of whorls: 5.25

Umbilicus diameter: 1.5 mm, 31.3% of shell diameter

Body whorl descension: 3.1°

Helenia ekahanuiensis Solem, 1976

(Fig. 42)

Endodonta ekahanuiensis Solem 1976: 375-376.

Type material: Holotype FMNH 154483, leg. A. Solem.

Type locality: North branch, south Ekahanui Gulch, Waianae Mountains, Oahu (Loc. three [= W410C-6]).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 28% of shell diameter; primary palatal barrier height order, tall to low: 5th, 3rd, 4th, 2nd, 1st.

Redescription: Color: flammulated. Shell: lenticular, slightly expanded laterally, plano-convex whorls supra-peripherally, obversely conical, carinate; diameter 2.5 mm; 4.5 whorls; apex blunt; spire protrusion 15.4% of shell height; shell height 52% of diameter; peristome evenly thickened, reflected at the columella; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 80% of width; umbilicus 28% of shell diameter, closely decoiling initially, last coil expanding; body whorl descension 5.6°. Sculpture: embryonic sculpture absent; post embryonic whorls distinctly ribbed, body whorl radial ribs indistinct, lumpy; faint sub-peripheral spiral



Fig. 41. *Helenia davis*, 4.8 mm, ANSP 378352, HOLOTYPE, Oahu, Lualualei.

cords, not decussate. Barriers: two parietal barriers, 1st tall, marginally bifid, extended toward the supra-peripheral 5th palatal, gradual ascension, 2nd low, thick, extended between the 2nd and 3rd palatal barriers, gradual ascension; five primary palatal barriers, 1st columellar, low, crescentic, 2nd and 3rd basal, tall, broadly crescentic, 4th basal, low, evenly thickened, crescentic, recessed, 5th, low, evenly thickened, marginally crescentic, extended toward the 1st parietal, rapid ascension, one sub-peripheral plica. Primary palatal barrier height order 5th, 3rd, 4th, 2nd, 1st.



Fig. 42. *Helenia ekahanuiensis*, 2.5 mm, FMNH 154483, HOLOTYPE, Oahu, Kahanui.

Etymology: Named for the type locality.

***Helenia ekahanuiensis* Holotype**

Shell diameter: 2.5 mm
 Shell height: 1.3 mm, 52% of shell diameter
 Spire protrusion: 0.2 mm, 15.4% of shell height
 Aperture height: 0.8 mm, 80% of aperture width
 Aperture width: 1.0 mm
 Peripheral plica(e): 1
 Number of whorls: 4.5
 Umbilicus diameter: 0.7 mm, 28% of shell diameter
 Body whorl descension; 5.6°

***Helenia kalaeloana* (Christensen, 1982)**
 (Figs. 43, 269)

***Endodonta kalaeloana* Christensen, 1982: 135-136.**

Type material: Holotype BPBM 207190, leg. U.S. Department of the Army, Corps of Engineers, Pacific Ocean Division.

Type locality: Barber's Point (Kalaeloa), Honouliuli ahupua'a, Ewa District, Oahu.

Other Material Studied: two specimens from Oahu; Ewa District, coral plain below Ewa Mill, leg. C. M. Cooke, Jr. and C. N. Forbes, Feb 16, 1912, BPBM 35603 (ANSP 130521: 2).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from fossils from the Ewa plains. It appears to have been restricted to the lowland plains of Ewa.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 37.1% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 5th, 4th, 2nd, 1st.

Redescription: Color pattern flammulated. Shell: lenticular, plano-convex supra-peripherally, obversely conical, carinate; diameter 7.0 mm; 5.5 whorls; apex planar; spire protrusion 16.3% of shell height; shell height 37.6% of diameter; peristome thickened, reflected basally; apical suture margined, impressed, moderately crenulated; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 1.57 mm, 68.3% of width; umbilicus 37.1% of shell diameter, expanding, gradually decoiling; body whorl descension 2.4°. Sculpture: axial ribs on the embryonic and post embryonic whorls transition to growth lines after the alteration, seven distinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, slim, bifid, gradual ascension, extended toward the supra-peripheral 5th palatal, 2nd low, thin, extended between the 2nd and 3rd palatal barriers, gradual ascension; five primary palatal barriers, 1st columellar, low, truncate, 2nd basal, low, marginally crescentic, 3rd basal, tall, thick base, marginally crescentic, gradual ascension, 4th basal, low, thick base, gradual ascension, 5th supra-peripheral, thin, blade-like, extended toward the 4th palatal, rapid ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 5th, 4th, 2nd, 1st.



Fig. 43. *Helenia kalaeloana*, 7.0 mm, BPBM 207190, HOLOTYPE, Oahu, Barber's Point.

Etymology: The species name *kalaeloana* is derived from Kalaeloa, the Hawaiian name for Barber's Point, Oahu.

Helenia kalaeloana Holotype

Shell diameter: 7.0 mm

Shell height: 2.63 mm, 37.6% of shell diameter

Spire protrusion: 0.43 mm, 16.3% of shell height

Aperture height: 1.57 mm, 68.3% of aperture width

Aperture width: 2.3 mm

Peripheral plica(e): 2

Number of whorls: 5.5

Umbilicus diameter: 2.6 mm, 37.1% of shell diameter

Body whorl descension: 2.4°

Helenia kobei n. sp.

(Figs. 44, 270, 271)

Type material: Holotype ANSP 383929A; two paratypes (ANSP 501740: 2); all leg. O. Oswald, Jun 5, 1938.

Type locality: As described by Oswald; ravine six, north spur, 30.5 m, northerly of mile post 10.5, Gowen Trail, Pohakea Pass, Oahu.

Other material studied: 47 specimens from Oahu: Waianae District, Pohakea Pass, Gowen Trail, southerly along trail, beginning of ravine 6, opposite end of "route 4-5", leg. O. Oswald, Apr 15, 1938 (ANSP 386232B: 1, ANSP 386226: 25), southerly along trail, ravine 7, far out on northerly spur, leg. O. Oswald, Apr 17, 1938 (ANSP 386242: 4), southerly along trail, ravine 5, division point "1st B.N.", leg. O. Oswald, Apr 9, 1938 (ANSP 386210: 3), southerly along trail, southerly from ravine five, leg. O. Oswald, Apr 9, 1938 (ANSP 386221: 5), southerly along trail, south half of ravine at head of "route 6" road along trail, leg. O. Oswald, Apr 2, 1938 (ANSP 386201: 9).

Status and Distribution: Extant. Presumed extinct. Known only from along the Gowen Trail, Pohakea Pass, Waianae Mts., Oahu.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 36.4% of shell diameter; primary palatal barrier height order, tall to low: 4th, 5th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: lenticular, plano-convex supra-peripherally, obversely conical, carinate; diameter 4.4 mm; 5.75 whorls; apex blunt; spire protrusion 25.7% of shell height; shell height 39.8% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally,

obstructed; aperture height 64.5% of width; umbilicus 36.4% of shell diameter, expanding, regularly decoiling; body whorl descension 3.9°. Sculpture: embryonic sculpture absent; radial ribs on the post embryonic whorls transition to growth lines on the body whorls; ventrally six sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, bifid, extended toward the supra-peripheral 5th palatal barrier, gradual ascension, 2nd low, thick, extended toward the 3rd palatal, rapid ascension; five primary palatal barriers, 1st columellar/basal, crescentic, tall, 2nd and 3rd basal, tall, broadly crescentic, 4th basal, tall, slim, crescentic, 5th, supra-peripheral, tall, blade-like, extended toward the 1st parietal, rapid ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order 4th, 5th, 3rd, 2nd, 1st.



Fig. 44. *Helenia kobei*, 4.4 mm, ANSP 383929A, HOLOTYPE, Oahu, Pohakea Pass.

Remarks: This species has well developed basal palatals with broad crescentic crowns reminiscent of *Liliiliconcha rosenbergi*.

Etymology: Named for Kaupo-Kobe, a cattle-dog born on Kaupo Ranch. My friend.

Helenia kobei Holotype

Shell diameter: 4.4 mm

Shell height: 1.75 mm, 39.8% of shell diameter

Spire protrusion: 0.45 mm, 25.7% of shell height

Aperture height: 1.0 mm, 64.5% of aperture width

Aperture width: 1.55 mm

Peripheral plica(e): 2

Number of whorls: 5.75

Umbilicus diameter: 1.6 mm, 36.4% of shell diameter

Body whorl descension: 3.9°

Helenia makai n. sp.
(Figs. 45, 272)

Type material: Holotype ANSP 117339; four paratypes (ANSP 498391: 4); all leg. H. A. Pilsbry & C. M. Cooke, 1913.

Type locality: Limestone bluff, 2 m to 3.5 m, high, 0.4 km from shore, Oahu, Kaelepulu (Kailua).

Other material studied: 322 specimens from Oahu: Koolaupoko District, Kaelepulu (Kailua) limestone bluff 2 m to 3.5 m, high, 0.4 km from shore, leg. H. A. Pilsbry, February 9, 1913 (ANSP 501741 ex 117339: 312). Kailua, ex coll. BPBM 37771 (ANSP 130523: 5).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from Kailua, Oahu.

Diagnosis: Color pattern flammulated. Shell: trochoid, carinate; umbilicus 37.7% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 5th, 4th, 2nd, 1st.

Description: Color: flammulated. Shell: trochoid, tall, obversely conical, carinate; diameter 5.3 mm; 6.25 whorls; apex obtuse; spire protrusion 31.9% of shell height; shell height 44.3% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 75% of width; umbilicus 37.7% of shell diameter, deciling gradually, last whorls expanding; body whorl descension 2.1°. Sculpture: embryonic sculpture absent; relatively faint radial ribs on apical and ventral whorls, ventrally indistinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal, gradual ascension,



Fig. 45. *Helenia makai*, 5.3 mm, ANSP 117339, HOLOTYPE, Oahu, Kailua (Kaelepulu).

2nd low, thick, curved, rapid ascension; five primary palatal barriers, 1st columellar, low, 2nd basal tall, crescentic, 3rd basal, tall, thick, crescentic, 4th basal tall, evenly thickened, marginally crescentic, 5th supra-peripheral, tall, blade-like, extended toward the 1st parietal, rapid ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 5th, 4th, 2nd, 1st.

Etymology: Named for its low elevation habitat, in proximity to the sea.

Helenia makai Holotype

Shell diameter: 5.3 mm

Shell height: 2.35 mm, 44.3% of shell diameter

Spire protrusion: 0.75 mm, 31.9% of shell height

Aperture height: 1.2 mm, 75% of aperture width

Aperture width: 1.6 mm

Periphery plica: 2

Number of whorls: 6.25

Umbilicus diameter: 2.0 mm, 37.7% of shell diameter

Body whorl descension: 2.1°

Helenia mayori n. sp.
(Figs. 46, 273, 274)

Type material: Holotype ANSP 130525; five paratypes (ANSP 498393: 5); all ex coll. BPBM 41953.

Type locality: South Ridge of Makua, Waianae Mountains, Oahu.

Other material studied: Six specimens from Oahu. Waialua District, Kawaihapai, ca. 152.4 m, above plain, 0.4 km from sea, leg. Pilsbry & Cooke, Feb 14, 1913 (ANSP 109989: 2), in sand pocket mauka of road south of Kaena, Makua, leg. Layland Miyano, Feb 1996, (MS 8447: 1, MS 8468: 3).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known from Makua, Waianae District and Kawaihapai, Waialua District.

Diagnosis: Color pattern flammulated. Shell: sub-turbinate, carinate; umbilicus 35.9% of shell diameter, u-shaped; primary palatal barrier height order, tall to low: 3rd, 5th, 2nd, 4th, 1st.

Description: Color: flammulated. Shell: sub-turbinate, plano-convex supra-peripherally, obversely conical, carinate; diameter 6.4 mm; 6.25 whorls; apex planar; spire protrusion 26.5% of shell height; shell height 38.3% of diameter; peristome thick, evenly reflected basally; apical

suture margined, impressed, crenulated; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 63.6% of width; umbilicus 35.9% of shell diameter, u-shaped, expanding, gradually decoiling; body whorl descension 4.5°. Sculpture: embryonic sculpture absent; axial ribs crossed by three spiral cords apically on the body whorl and 11 spiral cords ventrally, obversely decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, gradual ascension, 2nd low, thick, gradual ascension: five primary palatal barriers, 1st columellar, low, marginally crescentic, 2nd, 3rd, 4th basal, tall, thick, crescentic, 5th supra-peripheral, thin, blade-like, extended toward the 1st parietal, gradual ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order tall to low 3rd, 5th, 2nd, 4th, 1st.



Fig. 46. *Helenia mayori*, 6.4 mm, ANSP 130525, HOLOTYPE, Oahu, Makua.

Comparison: *Helenia mayori* (Oahu endemic) is distinguished from *H. apiculata* (Kauai endemic) by having spire protrusion 26.5% of shell height (vs. 10.9% in *H. apiculata*); aperture height 63.6% of width (vs. 81.6%); umbilicus 35.9% of shell diameter (vs. 47.5%); body whorl descension 4.5° (vs. 2.6°); one sub-peripheral and one supra peripheral plica (vs. one callous-like peripheral plica); primary palatal barrier height order, tall to low, 3rd, 5th, 2nd, 4th, 1st. (vs. 3rd, 2nd, 4th, 5th, 1st in *H. apiculata*).

Etymology: Named for my long-time hiking partner, a sturdy black dog born in Kamuela and raised at my side in the forest and caves of three islands, on foot, in the jeep and in the front seat of many helicopters.

***Helenia mayori* Holotype**

Shell diameter: 6.4 mm

Shell height: 2.45 mm, 38.3% of shell diameter

Spire protrusion: 0.65 mm, 26.5% of shell height

Aperture height: 1.4 mm, 63.6% of aperture width

Aperture width: 2.2 mm

Peripheral plica(e): 2

Number of whorls: 6.25

Umbilicus diameter: 2.3 mm, 35.9% of shell diameter

Body whorl descension: 4.5°

***Helenia nanakuli* n. sp.**

(Figs. 47, 275)

Type material: Holotype ANSP 377810; two paratypes (ANSP 498394: 2); both leg. O. Oswald.

Type locality: Nanakuli, Waianae District, Oahu.

Other material studied: Four specimens from Oahu: Waianae District, Nanakuli, leg. O. Oswald (ANSP 377812: 4).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, carinate; umbilicus 35.3% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 2nd, 5th, 4th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, plano-convex supra-peripherally, obversely conical, carinate; umbilicate; diameter 3.4 mm; 5.25 whorls; apex blunt; spire protrusion 20% of shell height; shell height 44.1% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 66.7% of width; umbilicus 35.3% of shell diameter, regularly decoiling; body whorl descension 3.9°. Sculpture:



Fig. 47. *Helenia nanakuli*, 3.4 mm, ANSP 377810, HOLOTYPE, Oahu, Nanakuli.

embryonic sculpture absent; thickened axial ribs apically and ventrally into the umbilicus; six spiral cords ventrally, obversely decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal, rapid ascension, 2nd low, thick, extended between the 2nd and 3rd palatal, rapid ascension; five primary palatal barriers, 1st columellar, low, crescentic, 2nd basal tall, crescentic, 3rd basal, tall, crescentic, 4th basal low, blade-like, 5th, supra-peripheral, tall, blade-like, curves toward the 1st parietal, rapid ascension, one supra and one sub-peripheral plica. Primary palatal barrier height order 3rd, 2nd, 5th, 4th, 1st.

Etymology: Named for the type locality.

Helenia nanakuli Holotype

Shell diameter: 3.4 mm

Shell height: 1.5 mm, 44.1% of shell diameter

Spire protrusion: 0.3 mm, 20% of shell height

Aperture height: 0.8 mm, 66.7% of aperture width

Aperture width: 1.2 mm

Peripheral plica(e): 2

Number of whorls: 5.25

Umbilicus diameter: 1.2 mm, 35.3% of shell diameter

Body whorl descension: 3.9°

Helenia noe n. sp.

(Figs. 48, 276, 277)

Type material: Holotype ANSP 379746, leg. O. Oswald, Sep 3, 1939.

Type locality: As described by Oswald; right, 1st kukui glen, just under top of ridge, Manoa, Waikiki Moku, Kona District, Oahu.

Other material studied: Four specimens from Oahu: Kona District, Waikiki Moku, Manoa, right (Woodlawn) cave $\frac{3}{4}$ up cliffs, leg. O. Oswald, May 30, 1937 (ANSP 386197: 2); Round Top (Tantalus), ex coll. BPBM 39895 (ANSP 130517: 2).

Status and Distribution: Extant. Presumed extinct. Known only from the right side of Manoa Valley and Round Top, Oahu.

Diagnosis: Color pattern flammulated. Shell: discoidal, carinate; umbilicus 35.1% of shell diameter; palatal barrier height order 3rd, 5th, 4th, 2nd, 1st.

Description: Color: flammulated. Shell: discoidal, low, plano-convex supra-peripherally, obversely conical, carinate; umbilicate; diameter 3.7 mm; 5.25 whorls; apex blunt; spire

protrusion 12.9% of shell height; shell height 41.9% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, crenulated; aperture rhomboidal, moderately expanded peripherally, obstructed; aperture height 76.9% of width; umbilicus 35.1% of shell diameter, expanding, gradually decoiling; body whorl descension 3.7°. Sculpture: embryonic sculpture absent, post embryonic whorl sculpture of low, uneven indistinct radial ribs becoming growth lines on the body whorl; five distinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, gradual ascension, 2nd low, thick, extended between the 2nd and 3rd palatal barriers, rapid ascension; five palatal barriers, 1st columellar, low, truncate, 2nd basal low, marginally crescentic, 3rd basal, tall, thick, crescentic, 4th basal, low, crescentic, 5th, supra-peripheral, tall, blade-like, extended toward the 1st parietal, rapid ascension. Palatal barrier height order 3rd, 5th, 4th, 2nd, 1st.



Fig. 48. *Helenia noe*, 3.7 mm, ANSP 379746, HOLOTYPE, Oahu, Manoa.

Etymology: Noe in the Hawaiian language means misty rain reflecting the misty rains of the type locality.

Helenia noe Holotype

Shell diameter: 3.7 mm

Shell height: 1.55 mm, 41.9% of shell diameter

Spire protrusion: 0.2 mm, 12.9% of shell height

Aperture height: 1.0 mm, 76.9% of aperture width

Aperture width: 1.3 mm

Peripheral plica(e): 0

Number of whorls: 5.25

Umbilicus diameter: 1.3 mm, 35.1% of shell diameter

Body whorl descension: 3.7°

Helenia puowaina n. sp.
(Figs. 49, 278)

Type material: Holotype ANSP 127991; six paratypes (ANSP 498398: 6); all leg. H. A. Pilsbry, 1920.

Type locality: End of Perry St., West side of Punch Bowl, Honolulu Moku, Kona District, Oahu.

Other material studied: Two specimens from Oahu: Kona District, Honolulu Moku, Punch Bowl, ex coll. BPBM (ANSP 130512: 2).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: discoidal, carinate; umbilicus 36% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 5th, 4th, 2nd, 1st.

Description: Color: flammulated. Shell: discoidal, low, expanded laterally, plano-convex supra-peripherally, obversely conical, carinate, umbilicate; diameter 5.0 mm; 5.5 whorls; apex planar; spire protrusion 13.9% of shell height; shell height 36% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture impressed, canaliculate; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 72.2% of width; umbilicus 36% of shell diameter, u-shaped, slowly decolling; body whorl descension 3.1°. Sculpture: embryonic sculpture absent; sculpture of growth lines, seven distinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, gradual ascension, 2nd low, thick, extended between the 2nd and 3rd palatals, gradual ascension; five recessed, evenly thickened, marginally crescentic primary

palatal barriers, 1st columellar, truncate, low, 2nd basal, low, 3rd basal, tall, thick, 4th basal, tall, blade-like, 5th, supra-peripheral, tall, blade-like, extended toward the 1st parietal, rapid ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 5th, 4th, 2nd, 1st.

Remarks: *Helenia puowaina* is similar to *H. kalaeloana*. Both are low elevation species, have low spires and strong sub-peripheral spiral cords. It is possible they are the same species at the distal ends of a large range. Without evidence of a continuous population between the two species, and due to their obvious conchological differences in size, spire height, umbilical shape, and ratio of umbilical diameter to shell diameter, they are considered separate species.

Etymology: Puowaina is the Hawaiian name for Punch Bowl Crater.

Helenia puowaina Holotype

Shell diameter: 5.0 mm

Shell height: 1.8 mm, 36% of shell diameter

Spire protrusion: 0.25 mm, 13.9% of shell height

Aperture height: 1.3 mm, 72.2% of aperture width

Aperture width: 1.8 mm

Peripheral plica(e): 2

Number of whorls: 5.5

Umbilicus diameter: 1.8 mm, 36% of shell diameter

Body whorl descension: 3.1°

Helenia ruthae n. sp.

(Figs. 50, 279, 280)

Type material: Holotype ANSP 117342; seven paratypes (ANSP 501742: 7); all leg. H. A. Pilsbry and Bryan, 1913.

Type locality: Bank below lithified sand dunes left of road, Leahi (Diamond Head), Oahu.

Other material studied: 13 specimens from Oahu: Kona District, Waialae Moku, Diamond Head, road beyond light-house, leg. Pilsbry, 1913 (ANSP 117344: 2), Diamond Head, ex coll. BPBM 15094 (ANSP 130518: 2), ex coll. BPBM 15096 (ANSP 130519: 2), leg. Walker, Oct 1946 (MS 8467: 1, MS 9707: 6).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the vicinity of Diamond Head, Oahu.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 37.5% of shell diameter; primary palatal barrier height order, tall to low: 5th, 3rd, 4th, 2nd, 1st.



Fig. 49. *Helenia puowaina*, 5.0 mm, ANSP 127991, HOLOTYPE, Oahu, Punch Bowl.

Description: Color: flammulated. Shell: lenticular, expanded laterally; plano-convex supra-peripherally, obversely conical, carinate, umbilicate; diameter 4.8 mm; 5.25 whorls; apex obtuse; spire protrusion 15.8% of shell height; shell height 39.5% of diameter; peristome evenly thickened peripherally, reflected basally and at the base of the columella; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 70.6% of width; umbilicus 37.5% of shell diameter, expanding, gradually decoiling; body whorl descension 2.4° . Sculpture: distinct, low, wide axial ribs, sub-peripherally crossed by six sub-peripheral spiral cords creating a beaded look, obversely decussate. Barriers: two parietal barriers, 1st tall, bifid, extended toward the supra-peripheral 5th palatal barrier, rapid ascension, 2nd low, extended between the 2nd and 3rd palatals, gradual ascension; five primary palatal barriers, 1st columellar, thin, low, 2nd basal low, 3rd basal, tall, thick, crescentic and 4th basal, tall, crescentic, 5th, supra-peripheral, tall, blade-like, extended toward the 4th palatal, rapid ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order 5th, 3rd, 4th, 2nd, 1st.



Fig. 50. *Helenia ruthae*, 4.8 mm, ANSP 117342, HOLOTYPE, Oahu, Leahi (Diamond Head).

Comparison: *Helenia ruthae* (Oahu endemic) is similar in appearance to *H. moo* (Molokai endemic), differing in sculpture with distinct, low, wide axial ribs, sub-peripherally crossed by six spiral cords producing a beaded obversely decussate shell. *Helenia moo* has indistinct axial ribs sub-peripherally crossed by six spiral cords and proportionately smaller umbilicus diameter to shell diameter. *Helenia ruthae* is further distinguished from *H. moo* by having shell height 39.5% of shell diameter (vs. 45.1% in *H. moo*); aperture height 70.6% of width (vs. 68.8%); umbilicus diameter 37.5% of shell diameter (vs. 29.3%); body whorl descension 2.4° (vs. 3.8°); primary palatal barrier height order, tall to low, 5th, 3rd, 4th, 2nd, 1st (vs. 3rd, 4th, 5th, 2nd, 1st in *H. moo*).

Etymology: Named to honor Ruth Dyerly for her never wavering support in the early years of my search for Hawaiian fossil snails in Auwahi that led to the discovery of an assemblage of extinct flightless birds statewide.

***Helenia ruthae* Holotype**

Shell diameter: 4.8 mm
 Shell height: 1.9 mm, 39.5% of shell diameter
 Spire protrusion: 0.3 mm, 15.8% of shell height
 Aperture height: 1.2 mm, 70.6% of aperture width
 Aperture width: 1.7 mm
 Peripheral plica(e): 2
 Number of whorls: 5.25
 Umbilicus diameter: 1.8 mm, 37.5% of shell diameter
 Body whorl descension: 2.4°

***Helenia satyae* n. sp.**

(Figs. 51, 281)

Type material: Holotype ANSP 379444; 11 paratypes (ANSP 498399: 11); all leg. O. Oswald, Jun 14 & 15, 1941.

Type locality: As described by Oswald; inland of entrance to 1st and 2nd kukui glens, left spur $\frac{1}{4}$ way from ditch trail to stream, below ditch trail, Kawailoa, Kawailoa Moku, Waialua District, Oahu.

Other material studied: Six specimens from Oahu: Waialua District, Kawailoa Moku, Kawailoa, leg. O. Oswald, Jun 7 & 8, 1941 (ANSP 379447: 6).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 34% of shell diameter; palatal barrier height order 3rd, 4th, 5th, 2nd, 1st.

Description: Color: flammulated. Shell: lenticular, slightly expanded laterally, plano-convex supra-peripherally, obversely conical, carinate, umbilicate; diameter 4.4 mm; 5.0 whorls; apex obtuse; spire protrusion 18.9% of shell height; shell height 42% of diameter; peristome evenly thickened peripherally, marginally reflected basally; apical suture margined, impressed; aperture lunate, moderately expanded peripherally, obstructed; aperture height 68.8% of width; umbilicus 34% of shell diameter, gradually decoiling, last whorl expanding; body whorl descension 4.5° . Sculpture: embryonic sculpture absent; radiating ribs on the body whorl, growth lines on the body whorl, sub-peripherally four wide spiral cords followed by four narrow spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall,

extended toward the 4th palatal barrier, gradual ascension, 2nd low, thick, extended between the 2nd and 3rd palatals, gradual ascension; five palatal barriers, 1st columellar, small, 2nd basal, low, blade-like, marginally crescentic, 3rd basal, tall, thick, crescentic and 4th basal, tall, crescentic, 5th, supra-peripheral, low, marginally crescentic, extended between the 1st parietal and 4th palatal, rapid ascension. Palatal barrier height order 3rd, 4th, 5th, 2nd, 1st.



Fig. 51. *Helenia satyae*, 4.4 mm, ANSP 379444, HOLOTYPE, Oahu, Kawaiioa.

Etymology: Named for Satya Fisher, daughter of Scott Fisher.

***Helenia satyae* Holotype**

Shell diameter: 4.4 mm

Shell height: 1.85 mm, 42% of shell diameter

Spire protrusion: 0.35 mm, 18.9% of shell height

Aperture height: 1.1 mm, 68.8% of aperture width

Aperture width: 1.6 mm

Peripheral plica(e): 0

Number of whorls: 5.0

Umbilicus diameter: 1.5 mm, 34% of shell diameter

Body whorl descension: 4.5°

***Helenia waianae* n. sp.**

(Figs. 52, 282)

Type material: Holotype ANSP 58132; one paratype (ANSP 498401: 1); both leg. D. D. Baldwin.

Type locality: Waianae, Waianae District, Oahu.

Other material studied: one specimen from Oahu: Waianae District, Lualualei Moku, Lualualei, glen at right of prominent spur seaward of pass $\frac{3}{4}$ way up middle glade near head of glen, leg. O. Oswald, Oct 14, 1928 (ANSP 378656: 1).

Status and Distribution: Extant. Presumed extinct. Known from Lualualei and Waianae, Oahu.

Diagnosis: Color pattern flammulated. Shell: tall, trochoid, carinate; umbilicus 25.8% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 5th, 2nd, 4th, 1st.

Description: Color: flammulated. Shell: tall, trochoid, expanded laterally, plano-convex; obversely conical, carinate, umbilicate; diameter 6.2 mm; 6.25 whorls; apex obtuse; spire protrusion 26.6% of shell height; shell height 48.4% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed; aperture lunate, moderately expanded peripherally, obstructed; aperture height 68% of width; umbilicus 25.8% of shell diameter, narrow, expanding, gradually; body whorl descension: 2.9°. Sculpture; embryonic sculpture absent, post embryonic equidistant radial ribs present becoming low, lumpy, and indistinct on the body whorls, ventrally seven sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal, rapid ascension, 2nd low, thick, extended toward the 2nd palatal, rapid ascension; five primary palatal barriers, 1st columellar, low, marginally crescentic, 2nd basal, tall, crescentic, rapid ascension, 3rd basal, tall, crescentic, 4th basal, tall, evenly thickened, crescentic, 5th supra-peripheral, tall, thin, marginally crescentic, extended toward the 1st parietal, rapid ascension, one sub and one supra-peripheral plica. Primary palatal barrier height order 3rd, 5th, 2nd, 4th, 1st.

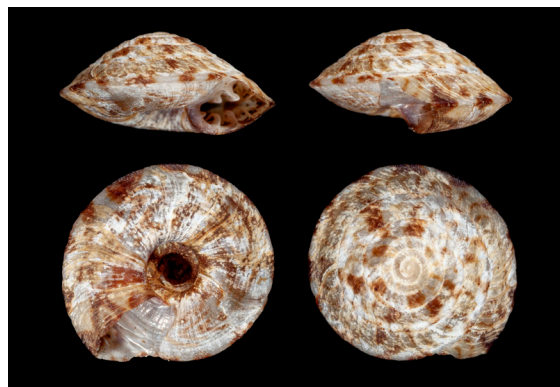


Fig. 52. *Helenia waianae*, 6.2 mm, ANSP 58132, HOLOTYPE, Oahu, Waianae.

Etymology: Named for the vicinity of the type locality.

***Helenia waianae* Holotype**

Shell diameter: 6.2 mm

Shell height: 3.0 mm, 48.4% of shell diameter

Spire protrusion: 0.8 mm, 26.6% of shell height

Aperture height: 1.7 mm, 68% of aperture width
 Aperture width: 2.5 mm
 Peripheral plica(e): 2
 Number of whorls: 6.25
 Umbilicus diameter: 1.6 mm, 25.8% of shell diameter
 Body whorl descension: 2.9°

Helenia walkeri n. sp.
 (Fig. 53)

Type material: Holotype SMNS-ZI0157945 (ex MS 8461); one paratype (MS 8466: 1); all leg. D. Walker, Jun 30, 1946.

Type locality: Kawaihapai, Waialua District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, carinate; umbilicus 33.3% of shell diameter; palatal barrier height order, tall to low: 2nd, 3rd, 5th, 4th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally, obversely conical, carinate; diameter 3.0 mm; 4.5 whorls; apex obtuse; spire protrusion 19.2% of shell height; shell height 43.3% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, crenulated; aperture oblique, sub-rhomboidal, expanded peripherally, obstructed; aperture height 72.7% of width; umbilicus 33.3% of shell diameter, expanding, regularly decoiling; body whorl descension 2.0°. Sculpture: embryonic sculpture absent; radial ribs on the post embryonic whorls become low, lumpy, and indistinct on the body whorls; three or four distinct sub-peripheral spiral cords, obversely

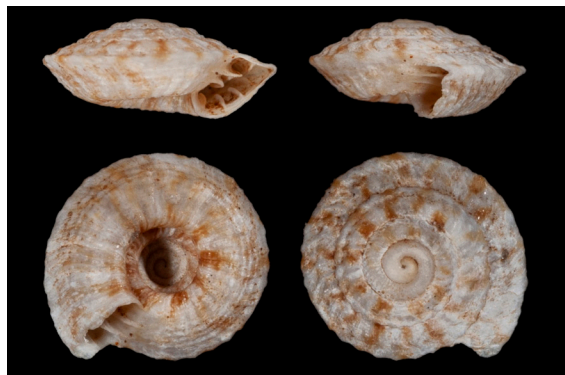


Fig. 53. *Helenia walkeri*, 3.0 mm, SMNS-ZI0157945 (ex MS 8461), HOLOTYPE, Oahu, Kawaihapai.

decussate. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, rapid ascension, 2nd low, thick, extended toward the 2nd palatal, rapid ascension; five palatal barriers, 1st columellar, truncate, crescentic, 2nd basal, tall, marginally crescentic, 3rd basal, tall, crescentic, 4th basal, recessed, low, blade-like, rapidly ascending, 5th, tall, blade-like, extends toward the 1st parietal, rapid ascension. Palatal barrier height order 2nd, 3rd, 5th, 4th, 1st.

Etymology: Named for the collector, David Walker, of the only specimens the author is aware of.

Helenia walkeri Holotype

Shell diameter: 3.0 mm
 Shell height: 1.3 mm, 43.3% of shell diameter
 Spire protrusion: 0.25 mm, 19.2% of shell height
 Aperture height: 0.8 mm, 72.7% of aperture width
 Aperture width: 1.1 mm
 Peripheral plica(e): 0
 Number of whorls: 4.5
 Umbilicus diameter: 1.0 mm, 33.3% of shell diameter
 Body whorl descension: 2.0°

Helenia apiculata (Ancey, 1889)
 (Fig. 54)

Endodonta apiculata Ancey, 1899: 188-189.

Type material: Neotype SMNS-ZI0157941 (ex MS 8429) [designated here].

Type locality: Waiopili, Mahaulepu ahupua'a, Kona Moku, Koloa District, Kauai.

Other Material Studied: 112 from Kauai: Kona District, Kona Moku, Mahaulepu Ahupua'a, Waiopili, in soil on fossil dunes, leg. P. Sutter, Jan 1997 (MS 8430: 8), Mahaulepu Valley, right side looking at lithified sand dunes under boulders in soil, leg. R. Gage and P. Sutter (MS 8438: 22), Mahaulepu in soil, leg. M. Severns (MS 8454: 2). Mahaulepu, in lithified sand dune on the coast, leg. P. Sutter, Apr 10, 1996 (MS 8287: 72), (MS 8437: 1), in lithified sand dune overlooking the sea where *Newcombia gagei* was discovered, leg. M. Severns & R. Gage Aug 16 & 17, 2011 (MS 8456: 5, MS 9011: 1, MS 9012: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, carinate; umbilicus 47.5% of shell diameter; palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.

Redescription: Color: flammulated. Shell: sub-discoidal, crenulated keel, obversely conical, carinate; diameter 6.0 mm; 6.5 whorls; planar apex; spire protrusion 10.9% of shell height; shell height 38.3% of diameter; peristome thickened, reflected at the columella; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderate peripheral expansion, obstructed; aperture height 81.6% of width; umbilicus 47.5% of shell diameter, decoiling regularly; body whorl descension 2.6°. Sculpture: embryonic sculpture absent; post embryonic radial ribs become oblique and irregular on the body whorl above the periphery but remain regular and distinct sub-peripherally; five spiral cords, two strong and three weak, obversely decussate. Barriers: two parietal barriers, 1st tall, extended, rapid ascension, facing the 4th palatal barrier, 2nd low, thick, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, 1st columellar, 2nd, 3rd and 4th basal, 2nd low and thin, 3rd truncate, 4th low and thin, 5th, low, thick, rapid ascension, supra-peripheral. One callous-like peripheral plica. Palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.



Fig. 54. *Helenia apiculata*, 6.0 mm, SMNS-ZI0157941 (ex MS 8429), NEOTYPE, Kauai, Waiopili.

Remarks: No specimens of Ancey's (1889) *Endodonta apiculata* could be located. Specimen SMNS-ZI0157941 (ex MS 8429) from Waiopili matches Ancey's description and Solem's (1976: 376 -377) short comments, and so designated the neotype.

Etymology: Presumably named for the irregular surface caused by raised features of the ribs and spiral cords.

***Helenia apiculata* Neotype**

Shell diameter: 6.0 mm

Shell height: 2.3 mm, 38.3% of shell diameter

Spire protrusion: 0.25 mm, 10.9% of shell height

Aperture height: 1.55 mm, 81.6% of aperture width

Aperture width: 1.9 mm

Peripheral plica(e): 1

Number of whorls: 6.5

Umbilicus diameter: 2.85 mm, 47.5% of shell diameter

Body whorl descension: 2.6°

***Helenia binaria* (Pfeiffer, 1856)**

(Fig. 55)

Helix binaria L. Pfeiffer, 1856: 33 — unaccepted > superseded combination.

Endodonta binaria (L. Pfeiffer, 1856) — Solem, 1976: 376.

Type material: Neotype SMNS-ZI0157942 (ex MS 9312) [designated here], leg. M. Severns, Gage & Van Der Merwe, Apr 8, 2019.

Type locality: Kipu Kai, Ahupua'a, Kipu Moku, Lihue District, Kauai. 21°54'47.45"N, 159°23'20.50"W.

Other Material Studied: 144 from Kauai: Puna District, Kipu Kai, in fossil deposits near the coast in sand mixed with soil at the base of fossil dunes. leg. M. Severns (MS 9240: 125, MS 9241:13, MS 9242:3, MS 9243:1, MS 9244:1).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-turbinate, carinate; umbilicus 28% of shell diameter; palatal barrier height order 3rd, 4th, 5th, 2nd, 1st.

Redescription: Color: flammulated. Shell: sub-turbinate, slightly expanded laterally, plano-convex supra-peripherally, obversely conical, carinate; diameter 4.1 mm; 5.5 whorls; apex obtuse; spire protrusion 23.7% of shell height; shell height 46.3% of diameter; peristome evenly thickened, reflected at the columella; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 68.8% of width; umbilicus 28% of shell diameter, expanding, evenly decoiling, last coil expanded; body whorl descension 3.7°. Sculpture: embryonic sculpture absent; oblique, indistinct, rounded, radial ribs, seven distinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd ¾ the height of the 1st parietal barrier, extended between the 2nd and 3rd palatal barriers, rapid ascension; five palatal barriers, 1st columellar, low, thick, 2nd, 3rd, and 4th basal,

tall, crescentic, 5th tall, thin, marginally crescentic, rapid ascension; 2 small plica, one sub and one supra peripheral. Palatal barrier height order 3rd, 4th, 5th, 2nd, 1st.



Fig. 55. *Helenia binaria*, 4.1 mm, SMNS-ZI0157942 (ex MS 9312), NEOTYPE, Kauai, Kipu Kai.

Comparison: *Helenia binaria* is distinguished from *H. apiculata* (both Kauai endemics) by having shell height 46.3% of shell diameter (vs. 38.3% in *H. apiculata*); aperture height 68.8% of width (vs. 81.6%); umbilicus 28% of shell diameter (vs. 47.5% of shell diameter); body whorl descension 3.7° (vs. 2.6°); two low, thin peripheral plica, one sub-peripheral and one supra-peripheral (vs. one low, callous-like peripheral plica); palatal barrier height order, tall to low, 3rd, 4th, 5th, 2nd, 1st (vs. 3rd, 2nd, 4th, 5th, 1st in *H. apiculata*).

Remarks: No type for Pfeiffer's (1856) *Helenia binaria* was located. SMNS-ZI0157942 (ex MS 9312) is designated the neotype because it matches the original description and agrees with Solem's (1976) analysis.

***Helenia binaria* Neotype**

Shell diameter: 4.1 mm
Shell height: 1.9 mm, 46.3% of shell diameter
Spire protrusion: 0.45 mm, 23.7% of shell height
Aperture height: 1.1 mm, 68.8% of aperture width
Aperture width: 1.6 mm
Peripheral plica(e): 2
Number of whorls: 5.5
Umbilicus diameter: 1.15 mm, 28% of shell diameter
Body whorl descension: 3.7°

***Helenia ellae* n. sp.**
(Figs. 56, 283)

Type material: Holotype SMNS-ZI0157943 (ex MS 8472); three paratypes (MS 8473: 3); all leg. R. Gage, 1996.

Type locality: Mahaulepu, Koloa District, Kauai. 21°53'58.51"N, 159°24'54.20"W.

Other Material Studied: 75 specimens from Kauai: Koloa District, Kona Moku, Mahaulepu Ahupua'a, Waiopili, leg. M. Severns, Aug 16, 2011 (MS 8769: 1), (MS 8766: 45, MS 8834: 26), fossil deposit where *Newcombia gagei* was discovered, leg. M. Severns, Aug 16, 2011 (MS 8432: 3).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 33.3% of shell diameter; palatal barrier height order 1st, 5th, 2nd, 3rd, 4th.

Description: Color: flammulated. Shell: lenticular, slightly expanded laterally, plano-convex supra-peripherally, obversely conical, carinate; diameter 3.0 mm; 5.25 whorls; apex blunt; spire protrusion 19.2% of shell height; shell height 43.3% of diameter; peristome evenly thickened; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 72.7% of width; umbilicus 33.3% of shell diameter, expanding, gradually decoiling; body whorl descension 1.9°. Sculpture: embryonic sculpture absent; thick, rounded radial ribs transition to growth lines on the body whorl, five distinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd equal in height to the 1st parietal barrier, extended down between the 2nd and 3rd palatal barriers, rapid ascension; five palatal barriers, 1st columellar, thick, tall, crescentic, 2nd basal, tall, crescentic, 3rd and 4th sub-peripheral, low, blade-like, 5th, tall, evenly thickened, extended toward 1st parietal, gradual ascension. Palatal barrier height order 1st, 5th, 2nd, 3rd, 4th.



Fig. 56. *Helenia ellae*, 3.0 mm, SMNS-ZI0157943 (ex MS 8472), HOLOTYPE, Kauai, Mahaulepu.

Remarks: *Helenia ellae* differs from *H. binaria* in having less spire protrusion at 19.2% of shell height (vs. 25% in *H. binaria*), greater umbilical to shell diameter at 33.3% (vs. 23%) and palatal barrier height order, tall to low, 1st, 5th, 2nd, 3rd, 4th (vs. 3rd, 4th, 5th, 2nd, 1st in *H. binaria*).

Etymology: This species is named for Ella Dagan, daughter of Dr. Scott Fischer and Colleen Fischer of Kula, Maui.

Helenia ellae Holotype

Shell diameter: 3.0 mm

Shell height: 1.3 mm, 43.3% of shell diameter

Spire protrusion: 0.25 mm, 19.2% of shell height

Aperture height: 0.8 mm, 72.7% of aperture width

Aperture width: 1.1 mm

Peripheral plica(e): 0

Number of whorls: 5.25

Umbilicus diameter: 1.0 mm, 33.3% of shell diameter

Body whorl descension: 1.9°

Helenia laminata (Pease, 1866)
(Figs. 57, 284)

Helix laminata Pease, 1866: 292 — unaccepted > superseded combination.

Endodonta laminata (Pease, 1866) — Solem, 1976: 377.

Type material: Lectotype MCZ 17233 [designated by Johnson, 1994: 16], leg. W. H. Pease, 1866.

Type locality: Kauai.

Other material studied: 14 specimens from Kauai: Lihue District, Wailua, Wailua Golf Course, leg. Paul Gephart, 1996 (MS 8294: 12, MS 8433: 1, MS 8434: 1).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality on Kauai.

Diagnosis: Color pattern flammulated. Shell: discoidal, decussate, keeled; umbilicus 30.8% of shell diameter; primary palatal barrier height order, tall to low: 5th, 2nd, 3rd, 4th, 1st.

Redescription: Color: flammulated. Shell: discoidal, expanded laterally, plano-convex supra-peripherally, obversely conical, keeled; diameter 6.5 mm; 6.5 whorls; apex blunt; spire protrusion 22% of shell height; shell height 38.5% of diameter; peristome thin, evenly thickened, reflected at the columella; apical suture clearly margined initially, canaliculate; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture

height 61.2% of width; umbilicus 30.8% of shell diameter, gradually decoiling; body whorl descension 3.5°. Sculpture: embryonic sculpture present; radial ribs on the post embryonic whorls transition to growth lines on the body whorls, 14 thin sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd low, marginally crescentic, extended between the 2nd and 3rd palatal barriers, rapid ascension; five primary palatal barriers, 1st columellar, low, evenly thickened, 2nd, 3rd, 4th, basal, tall, marginally crescentic, 5th, tall, blade-like, extended toward the 1st parietal, one sub and one supra-peripheral plica. Primary palatal barrier height order 5th, 2nd, 3rd, 4th, 1st.

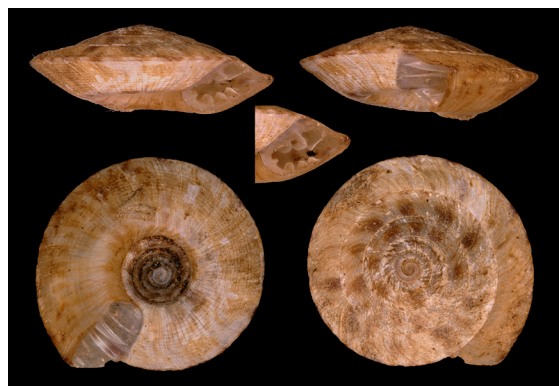


Fig. 57. *Helenia laminata*, 6.5 mm, MCZ 17233, LECTOTYPE, Kauai.

Remarks: The low, discoidal, and laterally expanded shell is suggestive of *Endodonta*, but the axial ribs on the initial apical whorls and dorsal body surface prior to the alteration form a decussate pattern characteristic of *Helenia* and absent in *Endodonta*.

Etymology: Species probably named for the many fine laminae of the ventral shell surface.

Helenia laminata Lectotype

Shell diameter: 6.5 mm

Shell height: 2.5 mm, 38.5% of shell diameter

Spire protrusion: 0.55 mm, 22% of shell height

Aperture height: 1.5 mm, 61.2% of aperture width

Aperture width: 2.45 mm

Peripheral plica(e): 2

Number of whorls: 6.5

Umbilicus diameter: 2.0 mm, 30.8% of shell diameter

Body whorl descension: 3.5°

Helenia turbo n. sp.
(Fig. 58)

Type material: Holotype SMNS-ZI0157944 (ex MS 8446); four paratypes (MS 8445: 4); all leg. P. Sutter, 1996.

Type locality: Mahaulepu Ahupua'a, Kona Moku, Koloa District, Kauai.

Other material studied: 452 specimens from Kauai: Koloa District, Kona Moku, Mahaulepu Ahupua'a, leg. M. Severns & R. Gage, Aug 16 & 17 (MS 8458: 180, MS 8474: 60, MS 8457: 1). In red lithified dune on the coast, leg. M. Severns and R. Gage, Aug 16 & 17, 2011 (MS 8474: 56, MS 8458:155).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: tall, turbate, carinate; bifid, umbilicus 36% of shell diameter; primary palatal barrier height order, tall to low: 5th, 1st, 4th, 2nd, 3rd.

Description: Color: flammulated. Shell: turbate, slightly expanded laterally, plano-convex supra-peripherally, obversely conical, carinate; diameter 5.0 mm; 6.25 whorls; apex obtuse; spire protrusion 40% of shell height; shell height 50% of diameter; peristome thickened, basally reflected; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 61.1% of width; umbilicus 36% of shell diameter, expanding, rapidly decoiling; body whorl descension 2.5°. Sculpture: embryonic sculpture absent; oblique radial ribs on the post embryonic whorls transition to growth lines on the body whorl; two distinct, sub-peripheral spiral cords. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-

peripheral 5th palatal barrier, 2nd almost equal in size to the 1st, angled toward the 2nd palatal barrier, rapid ascension; five primary palatal barriers, 1st columellar, high, thin, 2nd & 3rd low, blade-like, 4th low, thickened at the base, crescentic, 5th supra-peripheral, thin, tall, blade-like, rapid ascension, one sub and one callous-like supra-peripheral plica. Primary palatal barrier height order 5th, 1st, 4th, 2nd, 3rd.

Comparison: *Helenia turbo* (Kauai endemic) is distinguished from *H. waianae* (Oahu endemic) by having a shell height 50% of shell diameter (vs. 48.4% in *H. waianae*); spire protrusion 40% of the shell height (vs. 26.6%); aperture height 61.1% of aperture width (vs. 68%); one sub- and one callous-like supra-peripheral plica (vs. one sub- and one supra-peripheral plica); umbilicus 36% of shell diameter (vs. 25.8%); body whorl descension 2.5° (vs. 2.9°); primary palatal barrier height order, tall to low, 5th, 1st, 4th, 2nd, 3rd (vs. 3rd, 5th, 2nd, 4th, 1st in *H. waianae*).

Remarks: Distinguishing the two species, *H. turbo* has a bifid 1st parietal barrier and the supra peripheral plica is callous-like. *Helenia waianae* is not bifid, both sub and supra peripheral plica are well defined and a comparatively contracted umbilicus of 25.8% of shell diameter.

Etymology: Reminiscent of a turban.

Helenia turbo Holotype

Shell diameter: 5.0 mm

Shell height: 2.5 mm, 50% of shell diameter

Spire protrusion: 1.0 mm, 40% of shell height

Aperture height: 1.1 mm, 61.1% of aperture width

Aperture width: 1.8 mm

Peripheral plica(e): 2

Number of whorls: 6.25

Umbilicus diameter: 1.8 mm, 36% of shell diameter

Body whorl descension: 2.5°

Helenia niihauensis n. sp.
(Fig. 59)

Type material: Holotype ANSP 130500; two paratypes (ANSP 501738: 2); all ex coll. BPBM 32246.

Type locality: Kiekie, Niihau.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-turbinate, carinate; umbilicus 36.3% of shell diameter; primary palatal barrier height order, tall to low: 4th, 5th, 3rd, 2nd, 1st.



Fig. 58. *Helenia turbo*, 5.0 mm, SMNS-ZI0157944 (ex MS 8446), HOLOTYPE, Kauai, Mahaulepu Cave.

Description: Color: flammulated. Shell: sub-turbinate, slightly expanded laterally, plano-convex supra-peripherally, obversely conical, carinate; diameter 4.0 mm; 4.25 whorls; apex obtuse; spire protrusion 25% of shell height; shell height 40% of diameter; peristome evenly thickened, reflected at the columella; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 71.4% of width; umbilicus 36.3% of shell diameter, gradually decoiling, last coil constricting; body whorl descension 2.6°. Sculpture: embryonic sculpture absent; radial ribs on the post embryonic whorls transition to growth lines on the body whorl; distinct radial ribs sub-peripherally, five distinct sub-peripheral spiral cords, obversely decussate. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended toward the supra-peripheral 5th palatal barrier, 2nd tall, extends toward the 3rd palatal barrier, rapid ascension; five primary palatal barriers, 1st columellar, low, truncate, 2nd low, truncate, basal, 3rd and 4th basal, tall, of equal height, crescentic, 5th, supra-peripheral, tall, slim, crescentic, extended toward the 1st parietal, rapid ascension, one sub-palatal barrier, columellar, between the 1st and 2nd palatals. Primary palatal barrier height order 4th, 5th, 3rd, 2nd, 1st.

Remarks: Differs from *H. binaria* in its distribution and by the shell shape, height order of the palatal barriers, the addition of a sub-palatal at the base of the columellar region, number of spiral cords and decoiling of the umbilicus.



Fig. 59. *Helenia niuhauensis*, 4.0 mm, ANSP 130500, HOLOTYPE, Niihau, Kiekie.

Etymology: Named for the island of Niihau.

***Helenia niuhauensis* Holotype**

Shell diameter: 4.0 mm
 Shell height: 1.6 mm, 40% of shell diameter
 Spire protrusion: 0.4 mm, 25% of shell height
 Aperture height: 1.0 mm, 71.4% of aperture width
 Aperture width: 1.4 mm
 Peripheral plica(e): 0
 Number of whorls: 4.25
 Umbilicus diameter: 1.45 mm, 36.3% of shell diameter
 Body whorl descension: 2.6°

Kobeia n. gen.

Type species: *Kobeia rugata* (Pease, 1866) (Fig. 60). **Diagnosis:** Shell carinate, suture impressed, margined; sculpture of sub and supra-peripheral spiral cords and low, irregular radial ribs; two parietal and five low palatal barriers, one columella, three basal and one supra peripheral. **Includes:** 8 species, 1 nominal plus 7 newly described herein (Fig. 62), distributed on Hawaii (3), Maui (1), Molokai (2), and Oahu (2) (Fig. 61). **Etymology:** *Kobeia* is named for a cattle dog named Kobe who was always ready for a hike.



Fig. 60. *Kobeia rugata* (Pease, 1866), type species of *Kobeia* n. gen.; 3.5 mm, MS 9189, Maui, Puu Makua Cave.

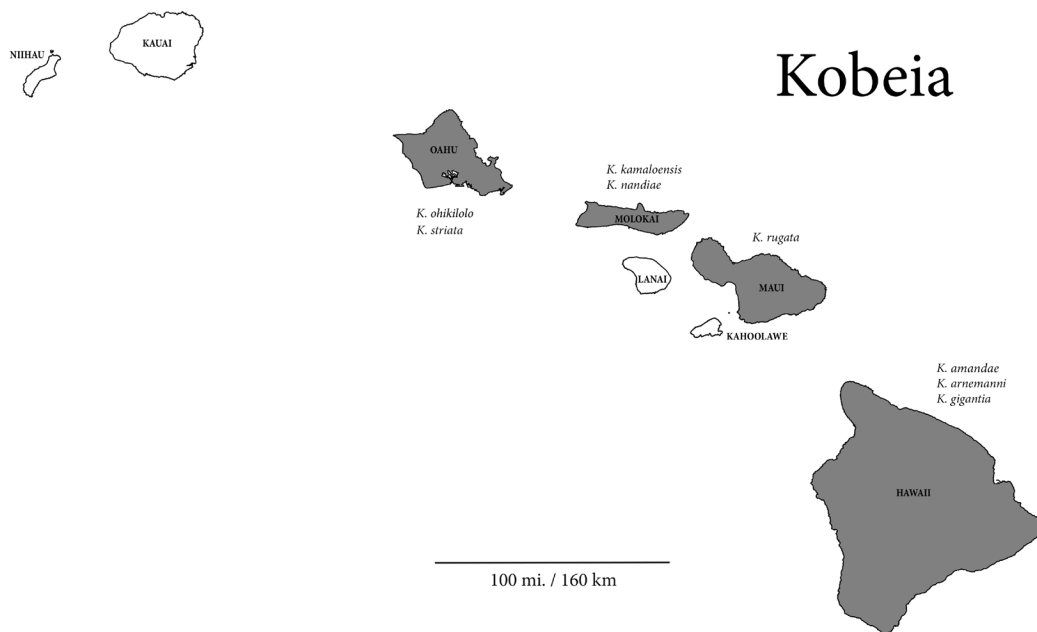


Fig. 61. Distributions of the species of *Kobeia* in the Hawaiian archipelago.

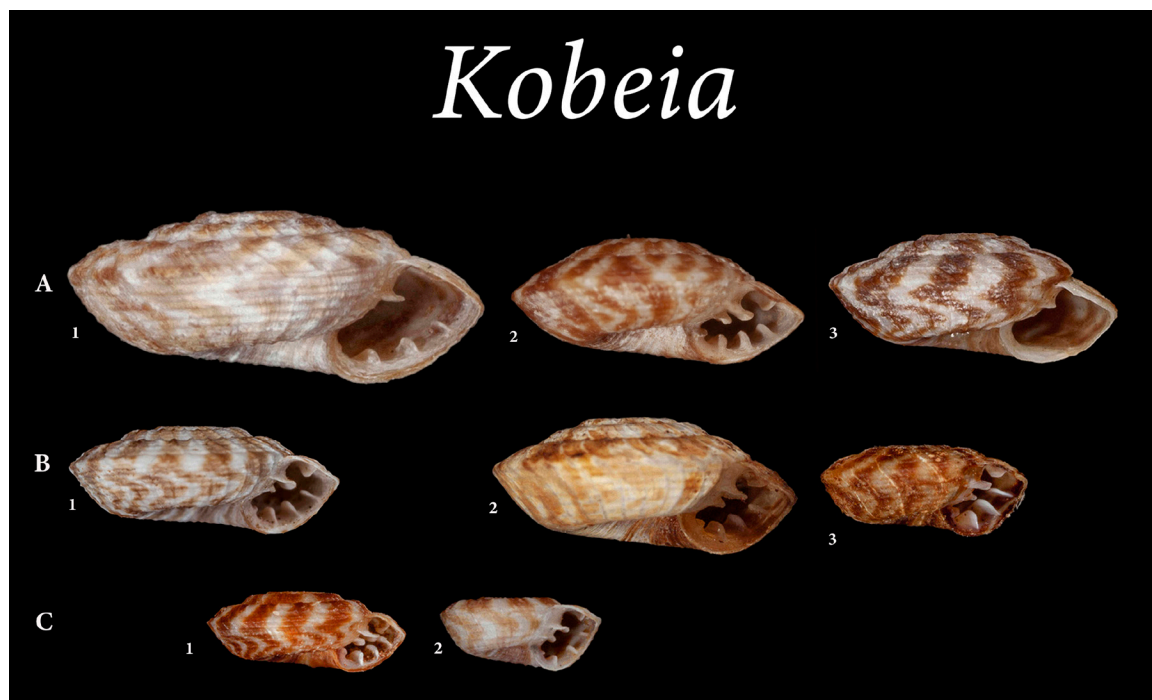


Fig. 62. Scaled images of specimens of the eight species of the genus *Kobeia*.

Row A: Hawaii

- (1) *Kobeia gigantea*, 6.4 mm, ANSP 130531, Holotype
- (2) *Kobeia amandae*, 4.5 mm, ANSP 130530, Holotype
- (3) *Kobeia arnemannii*, 4.5 mm, SMNS-ZI0157946 (ex MS 8873), Holotype

Row B: Maui & Molokai

- (1) *Kobeia rugata*, 4.1 mm, SMNS-ZI0157947 (ex MS 8121), Holotype, Maui
- (2) *Kobeia nandiae*, 4.6 mm, ANSP 95254, Holotype, Molokai
- (3) *Kobeia kamaloensis*, 3.2 mm, ANSP 117345, Holotype, Molokai

Row C: Oahu

- (1) *Kobeia ohikilolo*, 2.5 mm, SMNS-ZI0157948 (ex MS 8723), Holotype
- (2) *Kobeia striata*, 3.1 mm, ANSP 386229B, Holotype

Kobeia amandae n. sp.
(Fig. 63)

Type material: Holotype ANSP 130530; 3 paratypes (ANSP 498402: 3); all ex coll. BPBM 36648.

Type locality: Palihoukapapa, Hamakua District, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 27.8% of shell diameter; palatal barrier height order, tall to low: 3rd, 5th, 4th, 2nd, 1st.

Redescription: Color, flammulated. Shell: lenticular, plano-convex supra-peripherally, obversely conical, carinate; diameter 4.5 mm; 5.25 whorls; apex blunt; spire protrusion 15.8% of shell height; shell height 42.2% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 66.7% of width; umbilicus 27.8% of shell diameter, expanding, gradually decoiling; body whorl descension 4°. Sculpture: decussate, radial ribs on apical and embryonic whorls becoming indistinct on the body whorls, 3 distinct apical spiral cords, 8 sub-peripheral spiral cords that do not descend into the umbilicus. Barriers: 2 parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, gradual ascension, 2nd low, thin, extended toward the 2nd palatal, gradual ascension; 5 palatal barriers, 1st columellar, low, truncate, 2nd, 3rd and 4th basal, tall, thick, crescentic, 5th, supra-peripheral, tall, evenly thickened, extended toward the 4th palatal, rapid ascension. Palatal barrier height order: 3rd, 5th, 4th, 2nd, 1st.



Fig. 63. *Kobeia amandae*, 4.5 mm, ANSP 130530, HOLOTYPE, Hawaii, Palihoukapapa.

Etymology: Named for Amanda Sanders, lovely traveler, Kobe and my favorite hiking partner and a catalyst for wonderful memories.

Remarks: *Kobeia amandae* is found with *K. arnemanni*, and easily distinguished by having an obstructed aperture.

Kobeia amandae Holotype

Shell diameter: 4.5 mm
Shell height: 1.9 mm, 42.2% of shell diameter
Spire protrusion: 0.3 mm, 15.8% of shell height
Aperture height: 1.2 mm, 66.7% of aperture width
Aperture width: 1.8 mm
Peripheral plica(e): 0
Number of whorls: 5.25
Umbilicus diameter: 1.25 mm, 27.8% of shell diameter
Body whorl descension: 4°

Kobeia arnemanni n. sp.
(Figs. 64, 285, 286)

Type material: Holotype SMNS-ZI0157946 (ex MS 8873); two paratypes (MS 8872: 1, MS 8462: 1); all leg. Walker, Aug 27, 1946.

Type locality: Palihoukapapa, Hamakua District, Hawaii.

Other Material Examined: 99 specimens from Hawaii: Hamakua District, Palihoukapapa, leg. D. Thaanum (ANSP 94510: 12), leg. Walker, Aug 27, 1946 (MS 8463: 87).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 31.1% of shell diameter; palatal barrier height order 3rd, 4th, 2nd, 5th, 1st.

Description: Color: flammulated. Shell: lenticular, plano-convex, obversely conical, carinate; diameter 4.5 mm; 5.0 whorls; apex planar; spire protrusion 0.3 mm, 14.2% of shell height; shell height 46.7% of diameter; peristome evenly thickened peripherally, slightly reflected basally; apical suture margined, impressed, crenulated; aperture lunate, expanded peripherally, unobstructed; aperture height 77.8% of width; umbilicus 31.1% of shell diameter, regularly decoiling; body whorl descension 3.1°. Sculpture: remnant radial ribs on embryonic whorls becoming low and indistinct on the body whorls, four distinct apical spiral cords, 10 distinct sub-peripheral spiral cords descending into the umbilicus. Barriers: two parietal barriers, 1st tall, curved blade-like, gradual ascension, 2nd

low, thin, straight, rapid ascension; five palatal barriers, 1st columellar, callous-like, 2nd basal, callous-like, 3rd basal, slightly raised, and 4th sub-peripheral, slightly raised, 5th, supra-peripheral, long, thin, callous-like. Palatal barrier height order: 3rd, 4th, 2nd, 5th, 1st.



Fig. 64. *Kobeia arnemanni*, 4.5 mm, SMNS-ZI0157946 (ex MS 8873), HOLOTYPE, Hawaii, Palihoukapapa.

Etymology: Named to honor Mr. George Arnemann, kamaina, mountain hiker and land shell collector who spent hours showing me his land shell collection and shared his catalog, collecting locations and knowledge.

Remarks: This species is intermediate in size falling between the like species of *K. amandae* and *K. gigantea* and has a remarkably unobstructed aperture for the genus.

***Kobeia arnemanni* Holotype**

Shell diameter: 4.5 mm
 Shell height: 2.1 mm, 46.7% of shell diameter
 Spire protrusion: 0.3 mm, 14.2% of shell height
 Aperture height: 1.4 mm, 77.8% of aperture width
 Aperture width: 1.8 mm
 Peripheral plica(e): 0
 Number of whorls: 5.0
 Umbilicus diameter: 1.4 mm, 31.1% of shell diameter
 Body whorl descension: 3.1°

***Kobeia gigantea* n. sp.**
 (Fig. 65)

Type material: Holotype ANSP 130531; two paratypes (ANSP 498404: 2); all ex coll. BPBM 37828.

Type locality: Waikii, South Kohala District, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, carinate; umbilicus 31.3% of shell diameter; palatal barrier height order, tall to low: 3rd, 2nd, 4th, 5th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, plano-convex, obversely conical, carinate; diameter 6.4 mm; 5.25 whorls; apex planar; spire protrusion 14.8% of shell height; shell height 42.2% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, crenulated; aperture lunate, moderately expanded peripherally, marginally obstructed; aperture height 75% of width; umbilicus 31.3% of shell diameter, regularly decoiling; body whorl descension 5.2°. Sculpture: decussate, radial ribs of apex transition to remnant radial ribs on embryonic whorls and finally low, broad, and indistinct radial ribs on the body whorls, four distinct apical spiral cords, 14 distinct sub-peripheral spiral cords descending into the umbilicus. Barriers: two parietal barriers, 1st tall, extended toward the periphery, rapid ascension, 2nd parietal barrier in a linear callous. five palatal barriers, 1st columellar, low, callous-like, 2nd and 3rd basal, low, thick, pyramidal, 4th sub-peripheral, low, evenly thickened, 5th, supra-peripheral, slightly raised, thin, gradual ascension. Palatal barrier height order: 3rd, 2nd, 4th, 5th, 1st.



Fig. 65. *Kobeia gigantea*, 6.4 mm, ANSP 130531, HOLOTYPE, Hawaii, Waikii.

Etymology: Named *K. gigantea* as it is roughly two millimeters in diameter larger than any other species of the genus *Kobeia*.

***Kobeia gigantea* Holotype**

Shell diameter: 6.4 mm
 Shell height: 2.7 mm, 42.2% of shell diameter
 Spire protrusion: 0.4 mm, 14.8% of shell height
 Aperture height: 1.8 mm, 75% of aperture width
 Aperture width: 2.4 mm
 Peripheral plica(e): 0

Number of whorls: 5.25
 Umbilicus diameter: 2.0 mm, 31.3% of shell diameter
 Body whorl descension: 5.2°

Kobeia rugata (Pease, 1866)
 (Figs. 66, 287, 288)

Helix rugata Pease, 1866: 291 — unaccepted >
 superseded combination.

Endodonta rugata (Pease, 1866) — Solem, 1976: 377.

Type material: Neotype SMNS-ZI0157947 (ex MS 8121)
 [designated here], leg. M. Severns & H. James, Jun 13, 1988.

Type locality: Lua Lepo Cave Mauka, 825.1 m,
 Kahikinui Moku, Hana District, Maui. 20°37'48.51"N,
 156°19'50.07"W.

Other Material Examined: seven specimens from Maui:
 Makawao District, Honuaula Moku, Puu Makua Cave,
 1350.6 m, leg. M. Severns and H. James, Apr 11 - 20, 1988
 (MS 9182: 1, MS 9183: 1, MS 9185: 1, MS 9189: 1), leg. M.
 Severns, May, 1982 (MS 9184: 1, MS 9190: 1, MS 9191: 1).

Status and Distribution: Holocene fossil. Presumed
 extinct. Known only from Puu Makua Cave, 1350.6 m,
 Honuaula Moku, Makawao District and Auwahi Cave
 1203.7 m and Lua Lepo Cave Mauka, 825.1 m, Kahikinui
 Moku, Hana District, Maui.

Diagnosis: Color pattern flammulated. Shell: sub-
 discoidal, carinate; umbilicus 34.1% of shell diameter;
 palatal barrier height order, tall to low: 3rd, 2nd, 5th, 4th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, plano-
 convex, obversely conical, carinate; diameter 4.1 mm; 5 whorls;
 apex planar; spire protrusion 12.1% of shell height; shell height
 40.2% of diameter; peristome evenly thickened, marginally
 reflected; apical suture margined, impressed, crenulated;
 aperture sub-rhomboidal, moderately expanded peripherally,
 obstructed; aperture height 79.3% of width; umbilicus 34.1%
 of shell diameter, expanding, regularly decoiling; body whorl
 descension 2.8°. Sculpture: decussate, apically remnant, low
 and indistinct radial ribs crossed by three distinct spiral cords,
 10 sub-peripheral spiral cords. Barriers: two parietal barriers,
 1st tall, extended toward the supra-peripheral 5th palatal barrier,
 rapid ascension, 2nd low, thick, extended between the 2nd
 and 3rd palatals, gradual ascension; five palatal barriers, 1st
 columellar, low, truncate, 2nd and 3rd basal, tall, crescentic,
 4th sub-peripheral, tall, thin, marginally crescentic, 5th, supra-
 peripheral, tall, thin, marginally crescentic, rapid ascension.
 Palatal barrier height order: 3rd, 2nd, 5th, 4th, 1st.

Remarks: The lectotype of *Helix rugata* Pease, 1866,
 MCZ 17237, as designated and figured by Johnson (1994:
 22–23, fig. 3), does not match the type description and is
 not a Hawaiian species but maybe a *Gambiodonta* from
 the Gambier Islands. Specimen SMNS-ZI0157947 (ex MS
 8121) is here designated the neotype.



Fig. 66. *Kobeia rugata*, 4.1 mm, SMNS-ZI0157947 (ex MS 8121),
 NEOTYPE, Maui, Lua Lepo Cave.

Etymology: The specific epithet *rugata* refers to the
 wrinkled appearance of the shell sculpture.

Kobeia rugata Neotype

Shell diameter: 4.1 mm
 Shell height: 1.65 mm, 40.2% of shell diameter
 Spire protrusion: 0.2 mm, 12.1% of shell height
 Aperture height: 1.15 mm, 79.3% of aperture width
 Aperture width: 1.45 mm
 Peripheral plica(e): 0
 Number of whorls: 5
 Umbilicus diameter: 1.4 mm, 34.1% of shell diameter
 Body whorl descension: 2.8°

Kobeia kamaloensis n. sp.
 (Fig. 67)

Type material: Holotype ANSP 117345; three paratypes
 (ANSP 498406: 3); all leg. H. A. Pilsbry & C. M. Cooke, 1913.

Type locality: Western Ravine of Kamalo, Kona Moku,
 Molokai.

Status and Distribution: Extant. Presumed extinct.
 Known only from the type locality, Kamalo.

Diagnosis: Color pattern flammulated. Shell: sub-
 depressed, carinate; umbilicus 28.1% of shell diameter;
 palatal barrier height order, tall to low: 3rd, 2nd, 4th, 5th, 1st.

Description: Color: flammulated. Shell: sub-depressed, plano-convex supra-peripherally, obversely conical, carinate; diameter 3.2 mm; 4.5 whorls; apex planar; spire protrusion 10.7% of shell height; shell height 43.8% of diameter; peristome evenly thickened peripherally, marginally reflected basally; apical suture margined, impressed, crenulated; aperture rhomboidal, slightly expanded peripherally, obstructed; aperture height 85.7% of width; umbilicus 28.1% of shell diameter, regularly decoiling; body whorl descension 1.9°. Sculpture: decussate, embryonic and post embryonic radial ribs, radial ribs indistinct on body whorls, three distinct supra-peripheral spiral cords, six sub-peripheral spiral cords. Barriers: two parietal barriers, 1st tall, curved, extended toward the supra-peripheral 5th palatal barrier, rapid ascension, 2nd low, thin extended toward the 3rd palatal barrier, gradual ascension; five palatal barriers, 1st columellar, tall, 2nd and 3rd basal, tall, crescentic, 4th sub-peripheral, thin, tall, marginally crescentic, 5th, supra-peripheral, tall, thin, marginally crescentic, extended toward the 1st parietal, rapid ascension. Palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.



Fig. 67. *Kobeia kamaloensis*, 3.2 mm, ANSP 117345, HOLOTYPE, Molokai, Kamalo.

Etymology: Named for the type locality.

***Kobeia kamaloensis* Holotype**

Shell diameter: 3.2 mm
 Shell height: 1.4 mm, 43.8% of shell diameter
 Spire protrusion: 0.15 mm, 10.7% of shell height
 Aperture height: 1.2 mm, 85.7% of aperture width
 Aperture width: 1.4 mm
 Peripheral plica(e): 0
 Number of whorls: 4.5
 Umbilicus diameter: 0.9 mm, 28.1% of shell diameter
 Body whorl descension: 1.9°

***Kobeia nandiae* n. sp.**
 (Figs. 68, 289, 290)

Type material: Holotype ANSP 95254; 13 paratypes (ANSP 498408: 13); all leg. D. Thaanum, 1946.

Type locality: On the ground among dirt and leaves, Waikolu Gulch, Kona Moku, Molokai.

Other material studied: 89 specimens from Molokai, Palaa Moku, Molokai Head of Kalamaula, leg. D. Thaanum (ANSP 95255: 10), Kona Moku, Kalihi, Kaunakakai, leg. Pilsbry & Cooke, Jan 26, 1913 (ANSP 108626: 3), N. W. Ravine of Kamalo, leg. Pilsbry & Cooke (ANSP 108683: 10, ANSP 109965: 4), Jan 29, 1913 (ANSP 117341: 12), pipeline trail, upper Kaunakakai, leg. Pilsbry & Cooke, 1913 (ANSP 108879: 50),

Status and Distribution: Extant. Presumed extinct. Known from Palaa Moku, Kalamaula; Kona Moku, Kalihi, Kaunakakai and Kamalo, Molokai.

Diagnosis: Color pattern flammulated. Shell: sub-discoidal, carinate; umbilicus 32.5% of shell diameter; primary palatal barrier height order, tall to low: 1st, 5th, 2nd, 3rd, 4th.

Description: Color: flammulated. Shell: sub-discoidal, plano-convex supra-peripherally, obversely conical, carinate; diameter 4.6 mm; 5.5 whorls; apex planar; spire protrusion 16.7% of shell height; shell height 45.7% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 83.3% of width; umbilicus 32.5% of shell diameter, regularly decoiling; body whorl descension 5.2°. Sculpture: decussate, no sculpture on the embryonic



Fig. 68. *Kobeia nandiae*, 4.6 mm, ANSP 95254, HOLOTYPE, Molokai, Waikolu Gulch.

whorl, radial ribs on the post embryonic whorls becoming indistinct on the body whorls, two distinct apical spiral cords, five sub-peripheral spiral cords. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, rapid ascension, 2nd low, extended toward the 3rd palatal barrier, gradual ascension; five primary palatal barriers, 1st columellar, truncate, low, 2nd and 3rd basal, thick, crescentic, 4th sub-peripheral, thick, low, crescentic, 5th, supra-peripheral, tall, blade-like, extended toward the 1st parietal, rapid ascension, one sub-peripheral plica. Primary palatal barrier height order 1st, 5th, 2nd, 3rd, 4th.

Etymology: Named for Nandi Fischer of Kula, Maui.

Kobeia nandiae Holotype

Shell diameter: 4.6 mm

Shell height: 2.1 mm, 45.7% of shell diameter

Spire protrusion: 0.35 mm, 16.7% of shell height

Aperture height: 1.5 mm, 83.3% of aperture width

Aperture width: 1.8 mm

Peripheral plica(e): 1

Number of whorls: 5.5

Umbilicus diameter: 1.3 mm, 32.5% of shell diameter

Body whorl descension: 5.2°

Kobeia ohikilolo n. sp.

(Fig. 69)

Type material: Holotype SMNS-ZI0157948 (ex MS 8723), leg. Storrs Olson, Feb 16, 1994.

Type locality: Ohikilolo, Waianae District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: depressed, carinate; umbilicus 28% of shell diameter; palatal barrier height order, tall to low: 3rd, 2nd, 5th, 4th, 1st.

Description: Color: flammulated. Shell: depressed, plano-convex supra-peripherally, obversely conical, carinate; diameter 2.5 mm; 4 whorls; apex planar; spire protrusion, none; shell height 46% of diameter; peristome evenly thickened peripherally, marginally reflected basally; apical suture impressed, crenulated; aperture sub-rhomboidal, expanded peripherally, obstructed; aperture height 90.9% of width; umbilicus 28% of shell diameter, regularly decoiling; body whorl descension: 1.7°. Sculpture: decussate, radial ribs on the embryonic whorls become low and indistinct on the apical whorls, while remaining well defined ventrally,

four distinct apical spiral cords, nine sub-peripheral spiral cords descending into the umbilicus. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 4th palatal barrier, rapid ascension, 2nd low, thick, extended between the 2nd and 3rd palatals, gradual ascension: five palatal barriers, 1st columellar, low, truncate, 2nd and 3rd basal, tall, crescentic, 4th sub-peripheral, low, thick, 5th supra-peripheral, blade-like, rapid ascension. Palatal barrier height order 3rd, 2nd, 5th, 4th, 1st.



Fig. 69. *Kobeia ohikilolo*, 2.5 mm, SMNS-ZI0157948 (ex MS 8723), HOLOTYPE, Oahu, Ohikilolo.

Comparison: *Kobeia ohikilolo* (Oahu endemic) is distinguished from *K. kamaloensis* (Molokai endemic) by having a shell height of 46% of shell diameter (vs. 43.8% in *K. kamaloensis*); no spire protrusion (vs. 10.7% of shell diameter in *K. kamaloensis*); aperture height 90.9% aperture width (vs. 85.7%); umbilicus 28% of shell diameter (vs. 28.1%); body whorl descension 1.7° (vs. 1.9°); primary palatal barrier height order, tall to low 3rd, 2nd, 5th, 4th, 1st (vs. 3rd, 2nd, 4th, 5th, 1st in *K. kamaloensis*).

Remarks: *Kobeia ohikilolo* is based on a single juvenile specimen that clearly represents a species with an estimated 4.5 mm shell diameter when mature.

Etymology: For those who make a promise they cannot keep, Ohikilolo is “crazy promise” in the Hawaiian language.

Kobeia ohikilolo Holotype

Shell diameter: 2.5 mm

Shell height: 1.15 mm, 46% of shell diameter

Spire protrusion: none

Aperture height: 1.0 mm, 90.9% of aperture width

Aperture width: 1.1 mm

Peripheral plica(e): 0

Number of whorls: 4

Umbilicus diameter: 0.7 mm, 28% of shell diameter

Body whorl descension: 1.7°

***Kobeia striata* n. sp.**
(Figs. 70, 291, 292)

Type material: Holotype ANSP 386229B, leg. O. Oswald, Apr 15, 1938.

Type locality: As described by Oswald; southerly along trail, beginning of ravine six opposite end of road "route 4-5", Gowen Trail, Pohakea Pass, Waianae District, Oahu.

Other material studied: 32 specimens from Oahu: Waianae District, Pohakea Pass, leg. O. Oswald, southerly along trail, beginning of ravine 3, Gowen Trail, Apr 9, 1938 (ANSP 386207B: 2), (ANSP 386213B: 1), southerly along trail, beginning of ravine six opposite end of road "route 4-5", Gowen Trail, Apr 21, 1938 (ANSP 386228: 21), 15 April, 1938 (ANSP 386231: 5), southerly along trail, ravine 7, far out on northern spur, Gowen Trail, Apr 17, 1938 (ANSP 386234: 1), (ANSP 386240: 1), southerly along trail, ravine 8, stream bed, Gowen Trail, Apr 24, 1938 (ANSP 383578F: 1).

Status and Distribution: Extant. Presumed extinct. Known only from the Gowen Trail, Pohakea Pass, Waianae District, Oahu.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate, decussate; umbilicus 32.3% of shell diameter; palatal barrier height order, tall to low: 4th, 3rd, 2nd, 5th, 1st.

Description: Color: flammulated. Shell: lenticular, plano-convex supra-peripherally, obversely conical, carinate; diameter 3.1 mm; 5.25 whorls, spire protrusion 16% of shell height; shell height 40.3% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 81.8% of width; umbilicus 32.3% of shell diameter, regularly decoiling; body whorl descension 3°. Sculpture; decussate, radial ribs on embryonic whorls becoming low and indistinct on the body whorls; four distinct supra-

peripheral spiral cords, nine sub-peripheral spiral cords descending into the umbilicus. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, rapid ascension, 2nd low, extended toward the 2nd palatal, gradual ascension; five primary palatal barriers, 1st columellar, low, truncate crescentic, 2nd and 3rd basal, tall, crescentic, 4th sub-peripheral, tall, crescentic, 5th, supra-peripheral, tall, evenly thickened, marginally crescentic, extended toward the 1st parietal, rapid ascension, one sub-and one supra-peripheral plica. Primary palatal barrier height order 4th, 3rd, 2nd, 5th, 1st.



Fig. 70. *Kobeia striata*, 3.1 mm, ANSP 386229B, HOLOTYPE, Oahu, Pohakea Pass.

Etymology: Named for the strong radial and spiral striae.

***Kobeia striata* Holotype**

Shell diameter: 3.1 mm

Shell height: 1.25 mm, 40.3% of shell diameter

Spire protrusion: 0.2 mm, 16% of shell height

Aperture height: 0.9 mm, 81.8% of aperture width

Aperture width: 1.1 mm

Peripheral plica(e): 2

Number of whorls: 5.25

Umbilicus diameter: 1.0 mm, 32.3% of shell diameter

Body whorl descension: 3°

Nihoaia n. gen.

Type species: *Nihoaia christenseni* (Slapcinsky et al., 2020) (Fig. 71). **Diagnosis:** Shell carinate, canaliculate suture, spiral cords sub and supra-peripherally, 2 parietals, 5 palatals, 2 peripheral plicae. **Includes:** One nominal species endemic to Nihoa (Fig. 72). **Etymology:** The monospecific genus *Nihoaia* is named for the type location.

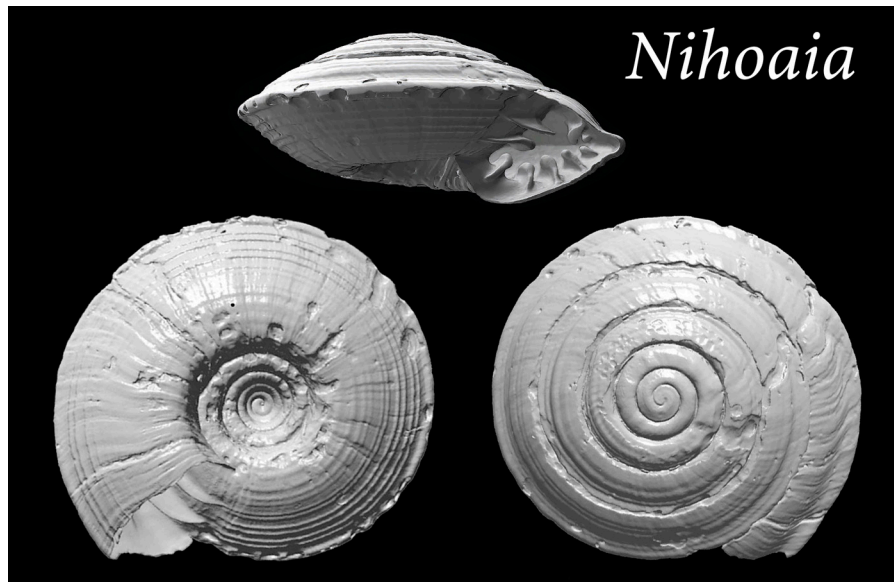


Fig. 71. *Nihoaia christenseni* Hayes et al., 2020, type species of *Nihoaia* n. gen.; 4.7 mm, BPBM 286681, HOLOTYPE, Nihoa.

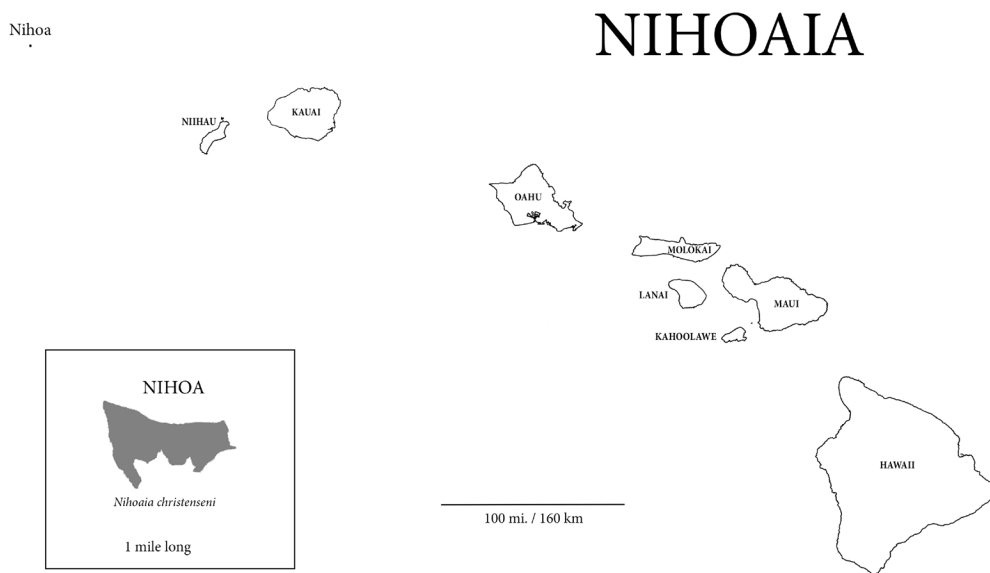


Fig. 72. Distribution of the species *Nihoaia christenseni* in the Hawaiian archipelago.

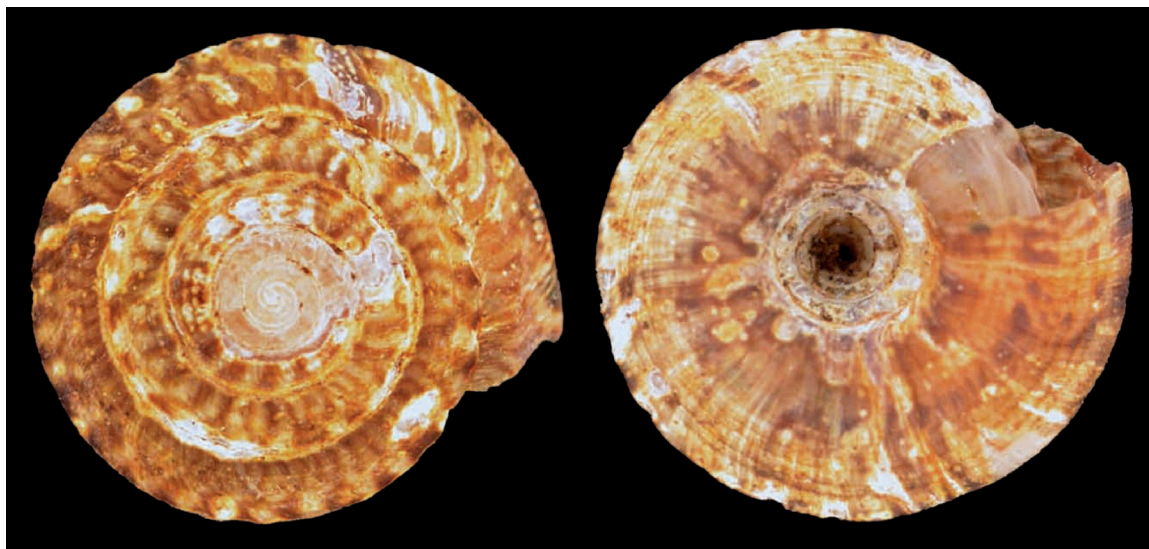


Fig. 73. *Nihoaia christenseni*, 4.7 mm, BPBM 286681, HOLOTYPE, Nihoa.

Nihoaia christenseni (Slapcinsky, Yeung & Hayes, 2020)
(Figs. 71, 73)

Type material: Holotype BPBM 286681.

Type locality: Nihoa, Northwest Hawaiian Islands.

Status and Distribution: Extant. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: lenticular, carinate; umbilicus 31.9% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 1st, 2nd, 5th, 4th.

Redescription: Color: flammulated. Shell: lenticular, plano-convex supra-peripherally, obversely conical, carinate; diameter 4.7 mm; six whorls; apex blunt; spire protrusion 21.4% of shell height; shell height 44.7% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed, aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 65% of width; umbilicus 31.9% of shell diameter, regularly deoiling; body whorl descension 6.2°. Sculpture: of growth lines, four distinct apical spiral cords and 10 sub-peripheral spiral cords. Barriers: two parietal barriers, 1st tall, extended toward the supra-peripheral 5th palatal barrier, rapid ascension, 2nd tall, crescentic, extended toward the

2nd palatal barrier, gradual ascension; five primary palatal barriers, 1st columellar, tall, crescentic, 2nd and 3rd basal, tall, crescentic 4th sub-peripheral, crescentic, 5th, supra-peripheral, tall, sinuous, extended toward the 1st parietal, rapid ascension, one sub-and one supra-peripheral plica. Primary palatal barrier height order 3rd, 1st, 2nd, 5th, 4th.

Remarks: Measurements for this description of *Nihoaia christenseni* are based solely on the imaged holotype in the description and scaled to the diameter of the shell for easy comparison with other species in this work. Without a lateral view, the body whorl descension was not clear. Shell shows signs of calcium predation, probably from young individuals of the species like that seen in arboreal *Partulina*.

Etymology: Named in honor of malacologist Dr. Carl Christensen.

***Nihoaia christenseni* Holotype**

Shell diameter: 4.7 mm
Shell height: 2.1 mm, 44.7% of shell diameter
Spire protrusion: 0.45 mm, 21.4% of shell height
Aperture height: 1.3 mm, 65% of aperture width
Aperture width: 2.0 mm
Peripheral plica(e): 2
Number of whorls: 6
Umbilicus diameter: 1.5 mm, 31.9% of shell diameter
Body whorl descension: 6.2°

Protoendodonta Solem, 1977

Type species: *Protoendodonta laddi* Solem, 1977 (Fig. 74). **Diagnosis:** Shell angled peripherally, suture canaliculate, strong spiral cords and fine axial ribs on the post embryonic whorls with 2 parietals, 5 palatals, 1 sub-peripheral plica. **Includes:** One nominal species endemic to Midway (Fig. 75).

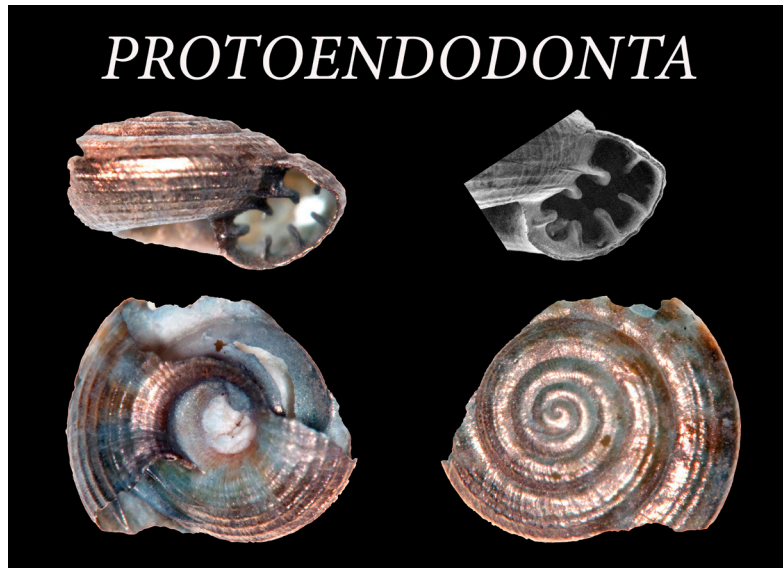


Fig. 74. *Protoendodonta laddi* Solem, 1977, 3.1 mm, USNM 214242, HOLOTYPE, Midway.

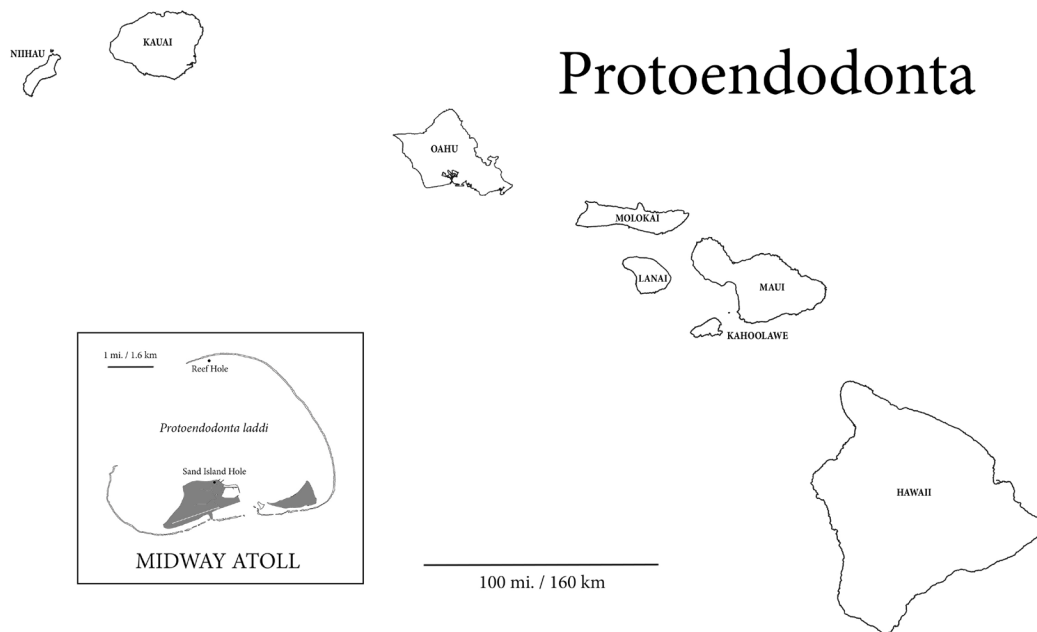


Fig. 75. Distribution of the species *Protoendodonta laddi* in the Hawaiian archipelago.

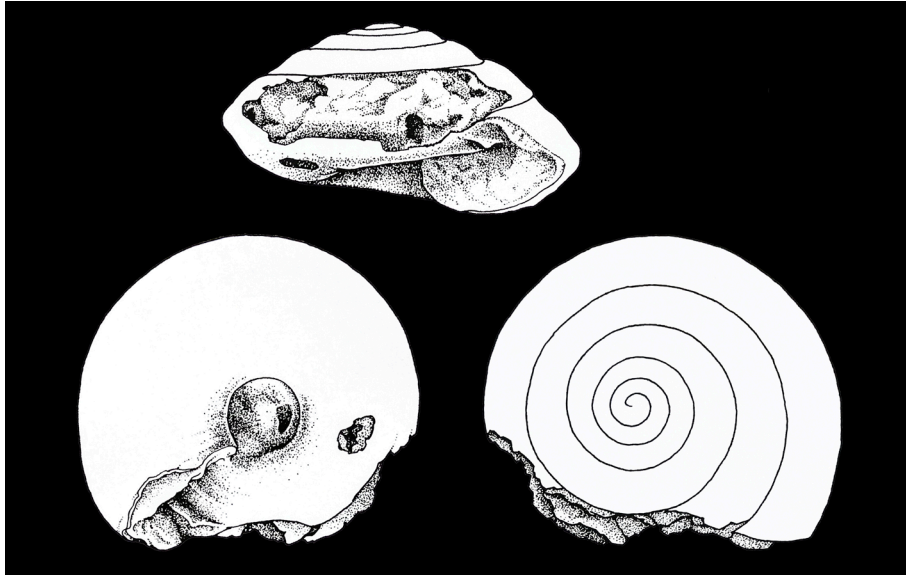


Fig. 76. *Protoendodonta laddi*, 5.0 mm, USNM 214238, PARATYPE, Midway (line drawing by Elizabeth Liebman).

***Protoendodonta laddi* Solem, 1977**
(Figs. 74, 76)

Type material: Holotype USNM 214242; one paratype (USNM 214238: 1); both leg. Ladd, Tracy & Gross, 1970.

Type locality: Sand Island Hole (S-22), 42.3 m depth, Midway Atoll, Northwest Hawaiian Islands.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the Sand Island Bore Hole at 42.3 m. and the Reef Hole at 35.4 m. to 39.6 m, Midway Atoll.

Diagnosis: Color pattern flammulated. Shell: lenticulate, sub-carinate; umbilicus 22% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 5th, 2nd, 4th, 1st.

Redescription: Color: flammulated. Shell: lenticulate, plano-convex supra-peripherally, obversely conical, sub-carinate; diameter 5.0 mm; 5.75 whorls; apex obtuse; spire protrusion 14.8% of shell height; shell height 54% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture margined, impressed; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 67.5% of width; umbilicus 22% of shell diameter, expanding gradually, finally contracting. body whorl descension 6.7°. Sculpture: radial ribs on embryonic whorls ending at the transition, followed by growth lines, four distinct apical spiral cords, six sub-peripheral spiral cords not descending into the umbilicus. Barriers: two

parietal barriers, 1st tall, slightly reflected downwards toward the 4th palatal barrier, gradual ascension, 2nd low, slightly reflected downward, gradual thread-like ascension; five primary palatal barriers, 1st columellar, tall, marginally crescentic, 2nd basal, tall, thick, crescentic, 3rd basal, tall, slim, crescentic, and 4th basal, tall, blade-like, 5th, supra-peripheral, tall, blade-like, rapid ascension, one recessed sub-peripheral plica. Primary palatal barrier height order 3rd, 5th, 2nd, 4th, 1st.

Etymology: Named for Harry S. Ladd "...who has contributed so greatly to our knowledge of Pacific Island mollusks and who graciously permitted study of this material" (Solem, 1976).

Remarks: Sculpture description and barrier height order were taken from the imaged holotype (USNM 214242); shell measurements were taken from a scaled drawing by Elizabeth Liebman of paratype USNM 214238. The images and the drawings are from Solem's original 1976 description.

***Protoendodonta laddi* Paratype**

Shell diameter: 5.0 mm

Shell height: 2.7 mm, 54% of shell diameter

Spire protrusion: 0.4 mm, 14.8% of shell height

Aperture height: 1.35 mm, 67.5% of aperture width

Aperture width: 2.0 mm

Peripheral plica(e): 1

Number of whorls: 5.75

Umbilicus diameter: 1.1 mm, 22% of shell diameter

Body whorl descension: 6.7°

Richlingia n. gen.

Type species: *Richlingia richlingae* n. sp. (Fig. 77). **Diagnosis:** Shell planar, sunken apex, wide umbilicus, sulcate, peripherally expanded, sub-rhomboid aperture, umbilicus shallow, prominent radial ribs, two parietals, first bifid, one peripheral plica. **Includes:** 4 species newly described herein (Fig. 79) and distributed on Oahu (1) and Kauai (3) (Fig. 78). **Etymology:** *Richlingia* is named to honor malacologist Ira Richling.



Fig. 77. *Richlingia richlingae* n. sp., type species of *Richlingia* n. gen., 4.4 mm, MS 9175, PARATYPE, Kauai, Mahaulepu.

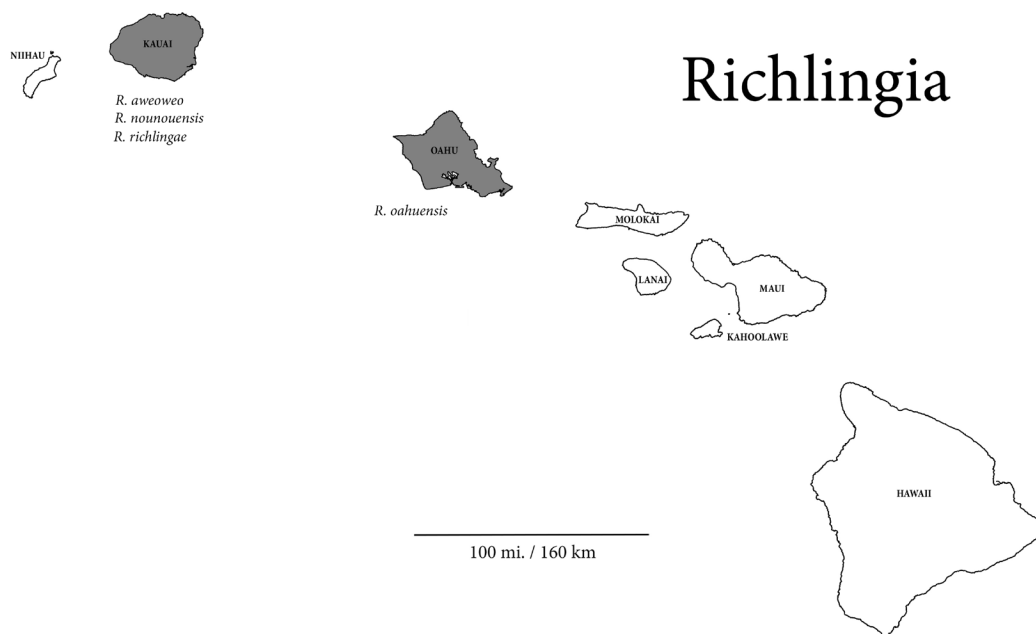


Fig. 78. Distributions of the species of *Richlingia* in the Hawaiian archipelago.



Fig. 79. Scaled images of specimens of the four species of the genus *Richlingia*.

Row A: Kauai

- (1) *Richlingia richlingae*, 3.7 mm, SMNS-ZI0157949 (ex MS 8797), Holotype
 (2) *Richlingia aweoweo*, 3.5 mm, SMNS-ZI0157950 (ex MS 8444), Holotype

Row B: Kauai

- (1) *Richlingia nounouensis*, 5.7 mm, ANSP 130503, Holotype.

Row C: Oahu

- (1) *Richlingia oahuensis*, 3.8 mm, ANSP 379446, Holotype.

***Richlingia oahuensis* n. sp.**
 (Figs. 80, 293)

Status and Distribution: Extant. Presumed extinct.
 Known only from the type locality.

Type material: Holotype ANSP 379446; five paratypes (ANSP 498412: 5); all leg. O. Oswald, Jun 7, 1941.

Type locality: As described by Oswald, left spur between ditch-trail and stream, Kawailoa, Wailua District, Oahu.

Other material studied: 18 specimens from Oahu: Wailua District, Kawailoa, inland of entrance to 1st and 2nd kukui Glens, left spur ¼ way from ditch trail to stream, below ditch trail, leg. O. Oswald, Jun 14, 1941 (ANSP 379443: 18).

Diagnosis: Color pattern flammulated. Shell: depressed, discoidal, carinate; umbilicus 44.7% of shell diameter; primary palatal barrier height order, tall to low: 3rd, 5th, 4th, 2nd, 1st.

Description: Color: flammulated. Shell: depressed, discoidal, planar supra-peripherally, obversely conical, carinate; diameter 3.8 mm; 5.25 whorls; apex planar; spire protrusion, none; shell height 36.8% of diameter; peristome evenly thickened peripherally, reflected basally; apical suture impressed, crenulated; aperture lunate, moderately

expanded peripherally, obstructed; aperture height 84.6% of width; umbilicus 44.7% of shell diameter, regularly decoiling, gradually expanding; body whorl descension 5.8°. Sculpture: embryonic sculpture absent, early juvenile whorls rib interspace less than axial rib width, late juvenile rib interspace greater than axial rib width, body rib interspaces irregular, two to three times axial rib width, axial rib count 42, three or four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, bifid, extending between the 4th and 5th palatal barriers, rapid ascension, 2nd low, thin, extending between the 2nd and 3rd palatal barriers, rapid ascension; five primary palatal barriers, 1st columellar, low, truncate, 2nd basal, low, thick, marginally crescentic, 3rd basal, tall, thick, marginally crescentic, 4th basal, tall, evenly thickened, angled toward the 1st parietal barrier, 5th, supra-peripheral, tall, thin, rapid ascension, one sub-peripheral plica. Primary palatal barrier height order 3rd, 5th, 4th, 2nd, 1st.

Comparison: *Richlingia oahuensis* (Oahu endemic) is distinguished from *R. nounouensis* (Kauai endemic) by having no spire protrusion (vs. spire protrusion 4.8% of shell height in *R. nounouensis*); aperture height 84.8% of width (vs. 94.4%); one peripheral plica (none in *R. nounouensis*); umbilicus diameter 44.7% of shell diameter (vs. 40.3%); body whorl descension 5.8° (vs. 2.8°). *Richlingia oahuensis*, at 3.8 mm, is a smaller species than *R. nounouensis*, at 5.7 mm, and the shell height to diameter is equal in both species at 36.8%; axial rib count effectively equal with *R. oahuensis* at 42 and *R. nounouensis* at 43 (and so visually similar).



Fig. 80. *Richlingia oahuensis*, 3.8 mm, ANSP 379446, HOLOTYPE, Oahu, Kawaihoa.

Etymology: Named after the island of Oahu. It is the only species of the genus known from that island.

***Richlingia oahuensis* Holotype**

Shell diameter: 3.8 mm

Shell height: 1.4 mm, 36.8% of shell diameter

Spire protrusion: none

Aperture height: 1.1 mm, 84.6% of aperture width

Aperture width: 1.3 mm

Peripheral plica(e): 1

Rib count: 42

Number of whorls: 5.25

Umbilicus diameter: 1.7 mm, 44.7% of shell diameter

Body whorl descension: 5.8°

***Richlingia aweoweo* n. sp.**

(Figs. 81, 294, 295)

Type material: Holotype SMNS-ZI0157950 (ex MS 8444); one paratype (MS 8736: 1); all leg. M. Severns and R. Gage, Mar 2016.

Type locality: Aweoweonui, Kona District, Kauai. 21°54'09.5"N, 159°23'54.3"W.

Other material studied: Eight specimens from Kauai: Koloa District, Mahaulepu, Aweoweonui, Haula Bay, leg. M. Severns and R. Gage, March 2016 (MS 8742: 1, MS 8739: 2, MS 8755: 5).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color: indiscernible pattern. Shell: sub-depressed, discoidal, carinate, umbilicus 45.7% of shell diameter, radial rib count 52, primary palatal barrier height order, tall to low: 3rd, 4th, 5th, 2nd, 1st.

Description: Color: indiscernible. Shell: sub-depressed, discoidal, planar supra-peripherally, obversely conical, carinate; diameter 3.5 mm; 4.25 whorls; apex planar; spire protrusion 16.7% of shell height; shell height 42.9% of diameter; peristome evenly thickened peripherally, marginally reflected basally; apical suture impressed, crenulated; aperture sub-rhomboidal, moderately expanded peripherally, obstructed; aperture height 80% of width; umbilicus 45.7% of shell diameter, regularly decoiling, gradually expanding; body whorl descension 2.3°. Sculpture: embryonic sculpture absent, early juvenile whorl axial rib interspaces less than axial rib widths, late juvenile rib interspaces equal axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 52, three riblet per rib interspace prior to alteration; sulcate. Barriers: two parietal barriers, 1st tall, extended toward the 4th palatal barrier, rapid ascension, 2nd low, thin, extended toward the 3rd palatal barrier, rapid ascension; five primary palatal barriers, 1st columellar, low, truncate, 2nd basal, low, evenly thickened, 3rd basal, tall, thick, crescentic, 4th basal, tall, extended toward the 1st parietal barrier, 5th, supra-peripheral,

low, evenly thickened, rapid ascension, one peripheral plica. Primary palatal barrier height order 3rd, 4th, 5th, 2nd, 1st.



Fig. 81. *Richlingia aweoweo*, 3.5 mm, SMNS-ZI0157950 (ex MS 8444), HOLOTYPE, Kauai, Mahaulepu Cave.

Etymology: The specific epithet, *aweoweo*, means stormy in the Hawaiian language describing the rough coast where it was found.

***Richlingia aweoweo* Holotype**

Shell diameter: 3.5 mm
 Shell height: 1.5 mm, 42.9% of shell diameter
 Spire protrusion: 0.25 mm, 16.7% of shell height
 Aperture height: 0.8 mm, 80% of aperture width
 Aperture width: 1.0 mm
 Peripheral plica(e): 1
 Rib count: 52
 Number of whorls: 4.25
 Umbilicus diameter: 1.6 mm, 45.7% of shell diameter
 Body whorl descension: 2.3°

***Richlingia nounouensis* n. sp.**
 (Figs. 82, 296)

Type material: Holotype ANSP 130503; one paratype (ANSP 498410: 1); both ex coll. BPBM.

Type locality: Nounou Mts., Puna District, Kauai.

Other material studied: Three specimens from Kauai. Puna District, Wailua (ANSP 130502: 3), leg. ex coll. BPBM.

Status and Distribution: Extant. Presumed extinct. Known only from the Nounou Mts. and Wailua, Puna District, Kauai.

Diagnosis: Color pattern flammulated. Shell: sub-depressed, discoidal, carinate; umbilicus 40.3% of shell diameter; radial rib count 43; palatal barrier height order, tall to low: 3rd, 2nd, 4th, 5th, 1st.

Description: Color: flammulated. Shell: sub-depressed, discoidal, obversely conical, carinate; diameter 5.7 mm; 6.25 whorls; apex sunken; spire protrusion 4.8% of shell height; shell height 36.8% of diameter; peristome evenly thickened; apical suture impressed, crenulated; aperture sub-rhomboidal, weak peripheral expansion, obstructed; aperture height 94.4% of width; umbilicus 40.3% of shell diameter, shallow, bifid, expanding rapidly while decoiling; body whorl descension 2.8°. Sculpture: embryonic sculpture absent, apical radial ribs continue sub-peripherally to the umbilicus, two crenulated, sub-peripheral spiral cords each straddled by parietal barriers, obversely decussate, axial rib count 43; three to four riblets per rib interspace prior to alteration; sulcate. Barriers: two parietal barriers, 1st, thin, bifid, straddling the upper crenulated sub-peripheral spiral cord, angled toward the supra-peripheral 5th palatal barrier, 2nd, low, thick, straddling the lower crenulated sub-peripheral spiral cord, extended toward the 3rd palatal; five palatal barriers, 1st columellar, low, thick, marginally crescentic, 2nd and 3rd basal, tall, thin, marginally crescentic, 4th sub-peripheral, tall, crescentic, 5th, supra-peripheral, tall, thin, extended toward the 1st parietal barrier, rapid ascension. Palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.



Fig. 82. *Richlingia nounouensis*, 5.7 mm, ANSP 130503, HOLOTYPE, Kauai, Nounou Mountains.

Etymology: Named for the type locality.

***Richlingia nounouensis* Holotype**

Shell diameter: 5.7 mm
 Shell height: 2.1 mm, 36.8% of shell diameter
 Spire protrusion: 0.1 mm, 4.8% of shell height
 Aperture height: 1.7 mm, 94.4% of aperture width
 Aperture width: 1.8 mm
 Peripheral plica(e): 0
 Radial rib count: 43
 Number of whorls: 6.25
 Umbilicus diameter: 2.3 mm, 40.3% of shell diameter
 Body whorl descension: 2.8°

***Richlingia richlingae* n. sp.**
(Figs. 83, 297, 298)

Type material: Holotype SMNS-ZI0157949 (ex MS 8797); four paratypes (MS 9176: 1, MS 9175: 1, MS 8803: 1, MS 8804: 1); all leg. M. Severns and R. Gage, Aug 17, 2011.

Type locality: Waiopili, Kona Moku, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W.

Other material studied: 29 specimens from Kauai: Koloa District, Makauwahi Sinkhole, leg. Sutter, 1996 (MS 8849: 2); Waiopili, leg. M. Severns and R. Gage, Aug 17, 2011 (MS 8453: 19, MS 8813: 6, MS 8850: 2). Puna District, Wailua, leg. M. Severns and R. Gage, Aug 17, 2011 (MS 8435: 1, MS 6434: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known from Mahaulepu, Waiopili, Makauwahi Sinkhole, Kona District and Wailua, Puna District, Kauai.

Diagnosis: Color pattern flammulated. Shell: sub-depressed, discoidal, carinate; umbilicus 45.9% of shell diameter; radial rib count 48, palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.

Description: Color: flammulated. Shell: sub-depressed, discoidal, plano-convex, obversely conical, carinate; diameter 3.7 mm; 5.25 whorls; apex planar; spire protrusion 13.3% of shell height; shell height 40.5% of diameter; peristome evenly thickened, reflected basally; apical suture impressed, crenulated, margined; aperture lunate, peripherally expanded, obstructed; aperture height 72% of width; umbilicus 45.9% of shell diameter, regularly decoiling; body whorl

descension 8.1°. Sculpture: embryonic sculpture absent, sulcate, oblique apical radial ribs continue sub-peripherally to the umbilicus, axial rib count 48; three to four riblet per rib interspace prior to alteration; sulcate. Barriers: two parietal barriers, 1st tall, bifid, curved, thin, extended toward the supra-peripheral 5th palatal barrier, reflecting downward, 2nd low, thin, marginally crescentic, extended toward the 2nd palatal; five palatal barriers, 1st columellar, low, evenly thickened, 2nd and 3rd basal, tall, thin, marginally crescentic, 4th sub-peripheral, low, marginally crescentic 5th, supra-peripheral, thin, crescentic, rapid ascension. Palatal barrier height order 3rd, 2nd, 4th, 5th, 1st.

Remarks: Rib counts were based on the crenulations of the periphery. Variation was noted in MS 9176 with an extra palatal crowding the 2nd palatal, and in MS 8444 with a single peripheral plica.

Etymology: *Richlingia richlingae* is named to honor Ira Richling, good friend, hiking partner and fearless deep diver who shared the deep resonate background sounds of tremors at 60 meters underwater while the sea floor danced from earthquakes to the delight of our nitrogen-saturated minds, a prelude to the impending 2019 eruption of Mt. Agung, Bali.

***Richlingia richlingae* Holotype**

Shell diameter: 3.7 mm

Shell height: 1.5 mm, 40.5% of shell diameter

Spire protrusion: 0.2 mm, 13.3% of shell height

Aperture height: 0.9 mm, 72% of aperture width

Aperture width: 1.25 mm

Peripheral plica(e): 0

Radial rib count: 48

Number of whorls: 5.25

Umbilicus diameter: 1.7 mm, 45.9% of shell diameter

Body whorl descension: 8.1°



Fig. 83. *Richlingia richlingae*, 3.7 mm, SMNS-ZI0157949 (ex MS 8797), HOLOTYPE, Kauai, Mahaulepu.

Starmeria n. gen.

Type species: *Starmeria pagoda* n. sp. (Fig. 84). **Diagnosis:** Shell sub-turbinate, marginally keeled, radial ribs, spiral cords sub-peripherally, two parietals, 2nd and 3rd primary palatal barriers crescentic, two peripheral plicae. **Includes:** 2 new species described herein (Fig. 86) and endemic to Kauai (Fig. 85). **Remarks:** *Starmeria* (2 species), *Nesophila* (4 species), and *Gageia* (1) are endemic to Kauai and may represent genera once found in the northwestern Hawaiian Islands. *Starmeria pagoda* shares some similarities with the monotypic genus *Nihoaia*. **Etymology:** *Starmeria* is named to honor zoologist John Starmer.



Fig. 84. *Starmeria pagoda* n. sp., type species of *Starmeria* n. gen.; 6.5 mm, MS 8459, Kauai, Polihale.

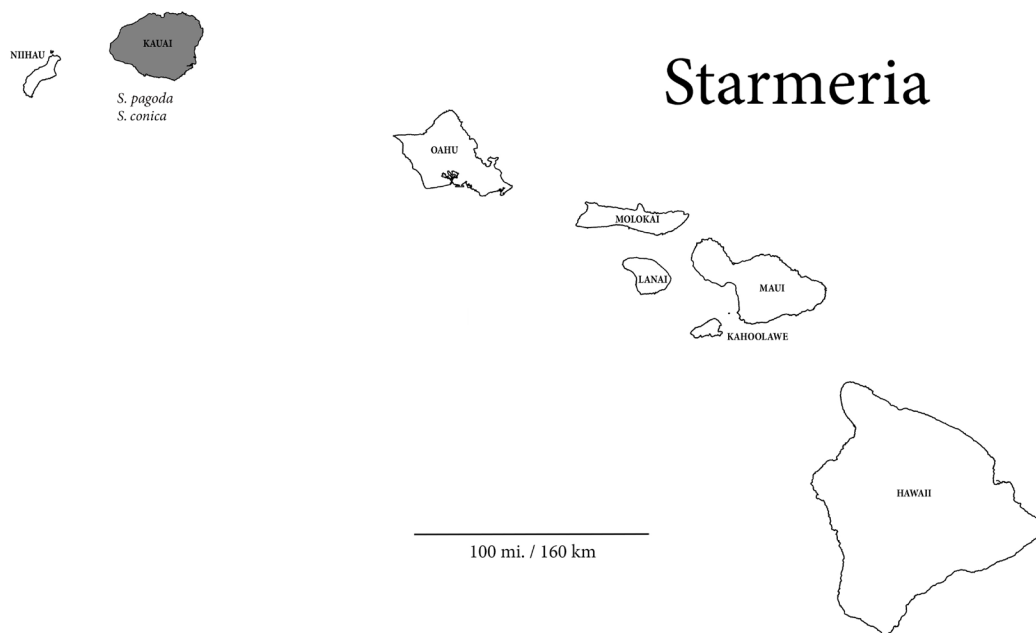


Fig. 85. Distributions of the species of *Starmeria* in the Hawaiian archipelago.



Fig. 86. Tightly coiled *Starmeria conica* (1) and laterally expanded *S. pagoda* (2) of the endemic Kauai genus *Starmeria*.

Kauai

(1) *Starmeria conica*, 5.5 mm, SMNS-ZI0157952 (ex MS 9712), Holotype

(2) *Starmeria pagoda*, 6.0 mm, SMNS-ZI0157951 (ex MS 8431), Holotype

Starmeria conica n. sp. (Figs. 87, 299)

Type material: Holotype SMNS-ZI0157952 (ex MS 9712); seven paratypes (MS 8452: 7); all leg. R. Gage & P. Sutter, Aug 24, 1996.

Type locality: Polihale, Ha'ele'ele Ahupua'a, Napali Moku, Waimea District, Kauai.

Other Material Studied: 35 specimens from Kauai: Waimea District, Napali Moku, Ha'ele'ele Ahupua'a, Polihale, in soil containing fossil snails 45.7 m, elevation between two large rocks, leg. P. Sutter, Jan 1997 (MS 8427: 1, MS 8428: 8), M. Severns and R. Gage, Aug 24, 2011 (MS 8440: 1, MS 8439: 25).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: turbate, carinate; umbilicus 20% of shell diameter; primary palatal barrier height order, tall to low: 5th, 4th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: turbate, tall, obversely conical sub-peripherally, carinate, umbilicate; diameter 5.5 mm; 7.25 whorls; apex obtuse; spire protrusion 34.3% of shell height; shell

height 63.6% of shell diameter; peristome evenly thickened peripherally, marginally reflected basally; apical suture margined, impressed, crenulated; aperture lunate, moderately expanded peripherally, obstructed; aperture height 70.8% of width; umbilicus 20% of shell diameter, slowly decoiling; body whorl descension 4.4°. Sculpture: sculpture absent on apical whorls, oblique radial ribs on post embryonic whorls becoming low and oblique on the body whorls, ventrally four distinct sub-peripheral spiral cords. Barriers: two parietal barriers, 1st tall, thin, extended toward the supra-peripheral 5th palatal barrier, marginally bifid, gradual ascension, 2nd



Fig. 87. *Starmeria conica*, 5.5 mm, SMNS-ZI0157952 (ex MS 9712), HOLOTYPE, Kauai, Polihale.

low, thin; five primary palatal barriers; 1st columellar, low, rising abruptly to a pointed crest, 2nd basal, thick, low, bifid, of an even height, recessed, 3rd basal, thick, low, bifid, recessed, 4th basal, low, gradual ascending, crescentic, recessed, 5th supra- peripheral, tall, of even thickness, crescentic distally, extended toward the 1st parietal, gradual ascension; one sub- and one supra- callous-like peripheral plicae. Primary palatal barrier height order 5th, 4th, 3rd, 2nd, 1st.

Etymology: Named for the turban-like shape of the shell.

***Starmeria conica* Holotype**

Shell diameter: 5.5 mm

Shell height: 3.5 mm, 63.6% of shell diameter

Spire protrusion: 1.2 mm, 34.3% of shell height

Aperture height: 1.7 mm, 70.8% of aperture width

Aperture width: 2.4 mm

Peripheral plica(e): 2

Number of whorls: 7.25

Umbilicus diameter: 1.1 mm, 20% of shell diameter

Body whorl descension: 4.4°

***Starmeria pagoda* n. sp.**
(Figs. 88, 300)

Type material: Holotype SMNS-ZI0157951 (ex MS 8431); 11 paratypes: (MS 8432: 11); all leg. P. Sutter, Jan, 1997.

Type locality: Polihale, Ha'ele'ele Ahupua'a, Napali Moku, Waimea District, Kauai.

Other Material Studied: 18 specimens from Kauai: Waimea District, Napali Moku, Ha'ele'ele Ahupua'a, Polihale, leg. P. Sutter 1996 (MS 8441: 15), in soil containing fossil snails 45.7 m, elevation between two large rocks, leg. P. Sutter, Jan 1997 (MS 8459: 1), leg. R. Gage Aug 24, 1996 (MS 9711: 1, MS 8460: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: sub-turbinate, carinate; umbilicus 30% of shell diameter; primary palatal barrier height order, tall to low: 5th, 4th, 3rd, 2nd, 1st.

Description: Color: flammulated. Shell: sub-turbinate, tall, obversely conical sub-peripherally, carinate; diameter 6.0 mm; 6.5 whorls; apex obtuse; spire protrusion 33.3% of shell height; shell height 45% of diameter; peristome evenly thickened peripherally, marginally reflected basally; apical suture margined, impressed, crenulated; aperture oblique

rhomboid, expanded peripherally, obstructed; aperture height 62.5% of width; umbilicus 30% of shell diameter, slowly decoliling; body whorl descension 3.2°. Sculpture: radial ribs on embryonic whorls become thick and rounded on post embryonic whorls and finally lumpy and indistinct on the body whorls, four distinct sub- peripheral spiral cords, decussate. Barriers: two parietal barriers, 1st tall, thin, extended toward the supra- peripheral 7th palatal barrier, marginally crescentic, rapid ascension, 2nd low, gradual ascension: five primary palatal barriers: 1st primary, columellar, thick based, rising abruptly, 2nd and 3rd primary, basal, tall, thick, bifid, 4th primary, basal, low, long, broadly crescentic, 7th primary palatal, supra- peripheral, extended toward the 1st parietal, two sub- palatal barriers; 3rd sub- palatal, basal, low, evenly thickened, moderately crescentic, recessed, 5th sub- palatal, basal, low, evenly thickened, moderately crescentic, recessed; one sub-peripheral and one supra-peripheral plica. Primary palatal barrier height order 5th, 4th, 3rd, 2nd, 1st.



Fig. 88. *Starmeria pagoda*, 6.0 mm, SMNS-ZI0157951 (ex MS 8431), HOLOTYPE, Kauai, Polihale.

Remarks: *Starmeria pagoda* is unique among species of Endodontinae in that the 2nd and 3rd palatals are bifid.

Etymology: Named for the pagoda-like, crenulated, and uplifted periphery of the holotype.

***Starmeria pagoda* Holotype**

Shell diameter: 6.0 mm

Shell height: 2.7 mm, 45% of shell diameter

Spire protrusion: 0.9 mm, 33.3% of shell height

Aperture height: 1.5 mm, 62.5% of aperture width

Aperture width: 2.4 mm

Sub-palatal barriers: 2

Peripheral plica(e): 2

Number of whorls: 6.5

Umbilicus diameter: 1.8 mm, 30% of shell diameter

Body whorl descension: 3.2°

Nesophilinae new subfamily

Description: Nesophilinae is characterized by having a rounded periphery, prominent radial ribs and spiral cords, and tendency to lose parietal and palatal barriers resulting in one-third of Nesophilinae species having no palatal barriers. Nesophilinae is endemic to the Hawaiian Islands. **Included genera (8):** *Christensenius* n. gen., *Cookeconcha* Solem, 1976, *Hobdya* n. gen., *Liliiliconcha* n. gen., *Nesophila* Pilsbry, 1893 (type genus), *Oswaldius* n. gen., *Randallius* n. gen., and *Solemius* n. gen.

Christensenius n. gen.

Type species: *Christensenius nudus* (Ancey, 1899) (Fig. 89). **Diagnosis:** Two parietal barriers, five palatal barriers. **Includes:** 20 species (Fig. 91) distributed on Hawaii (1), Maui (2), Oahu (7), Kauai (9) and Midway Atoll (1) (Fig. 90). **Etymology:** *Christensenius* is named to honor the esteemed malacologist, Carl Christensen.



Fig. 89. *Christensenius nudus* (Ancey, 1899), type species of *Christensenius* n. gen.; 3.2 mm, FMNH 46358, LECTOTYPE, Hawaii, Olaa.

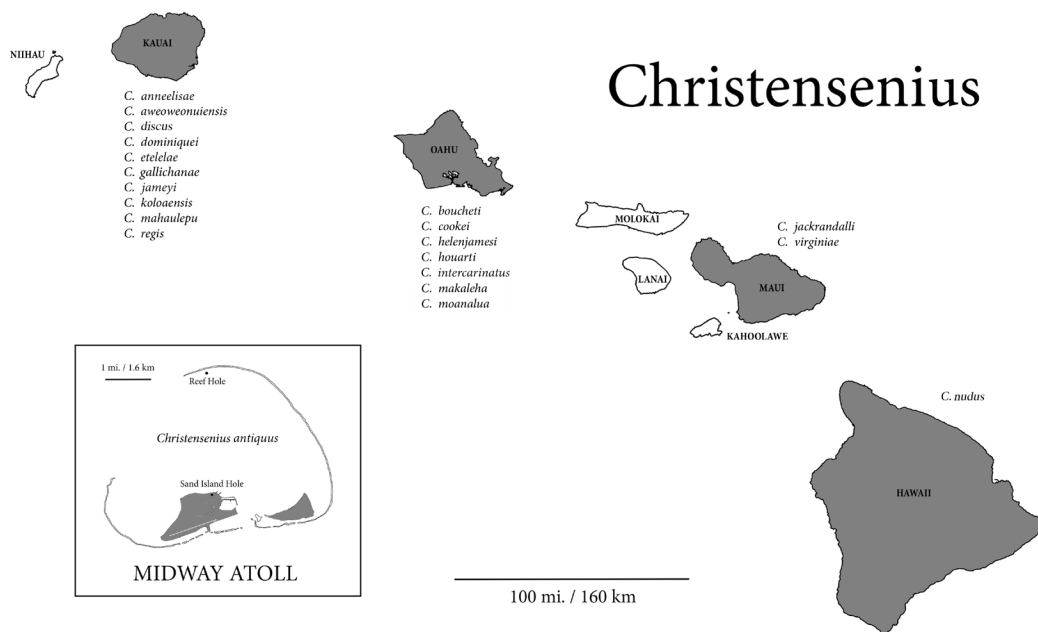


Fig. 90. Distributions of the species *Christensenius nudus* in the Hawaiian archipelago.



Fig. 91. Scaled images of specimens of the 20 species of the genus *Christensenius*.

Row A: Hawaii, Maui & Midway

- (1) *Christensenius nudus*, 3.2 mm, FMNH 46358, Lectotype, Hawaii
- (2) *Christensenius jackrandalli*, 4.0 mm, SMNS-ZI0157960 (ex MS 8676), Holotype, Maui
- (3) *Christensenius virginiae*, 2.5 mm, SMNS-ZI0157961 (ex MS 8989), Holotype, Maui
- (4) *Christensenius antiquus*, 1.7 mm, USNM 214243, Holotype, Midway

Rows B & C: Oahu

- (1) *Christensenius boucheti*, 3.6 mm, ANSP 377789, Holotype
- (2) *Christensenius makaleha*, 2.0 mm, ANSP 376758, Holotype
- (3) *Christensenius cookei*, 2.0 mm, ANSP 158823, Lectotype
- (4) *Christensenius helenjamesae*, 2.2 mm, ANSP 128217, Holotype
- (5) *Christensenius moanalua*, 5.3 mm, ANSP 384055, Holotype
- (6) *Christensenius houarti*, 4.0 mm, ANSP 380208, Holotype
- (7) *Christensenius intercarinatus*, 3.7 mm, ANSP 386184, Neotype

Rows D & E: Kauai

- (1) *Christensenius dominiquei*, 4.6 mm, SMNS-ZI0157956 (ex MS 8744), Holotype
- (2) *Christensenius aweoweonuiensis*, 4.5 mm, SMNS-ZI0157954 (ex MS 8733), Holotype
- (3) *Christensenius gallichanae*, 4.2 mm, NHMUK 1900.12.18.1369, Holotype
- (4) *Christensenius jameyi*, 3.5 mm, ANSP 130541, Holotype
- (5) *Christensenius discus*, 2.4 mm, SMNS-ZI0157955 (ex MS 9166), Holotype
- (6) *Christensenius koloaensis*, 5.0 mm, SMNS-ZI0157958 (ex MS 9010), Holotype
- (7) *Christensenius regis*, 5.0 mm, SMNS-ZI0157959 (ex MS 9226), Holotype
- (8) *Christensenius anneelisae*, 3.4 mm, SMNS-ZI0157953 (ex MS 8747), Holotype
- (9) *Christensenius etelelae*, 3.3 mm, SMNS-ZI0157957 (ex MS 8752), Holotype

Christensenius nudus (Ancey, 1899)
(Fig. 92)

Endodonta (*Thaumatodon*) *nuda* Ancey, 1899: 268–274
— unaccepted > superseded combination.
Cookeconcha nudus (Ancey, 1899) — Solem, 1976: 214.

Type material: Holotype FMNH 46358 (*sensu* Solem, 1976: 214), leg. G.K. Gude.

Type locality: Olaa, Puna District, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from Kaiwika at 762 m, Olaa, Hilo District, and Puna District, Hawaii.

Diagnosis: Color pattern flammulated; Shell: discoidal; umbilicus width 28.1% of shell diameter; axial rib count 88; palatal barrier height order, tall to low: 5th, 3rd, 1st, 2nd, 4th.

Redescription: Color: flammulated. Shell: discoidal, slightly compressed laterally; diameter 3.2 mm; 4.5 whorls; apex planar; spire protrusion 6.67% of shell height; shell height 46.9% of diameter; peristome evenly thickened, thin, reflected basally; high shoulder; apical suture crenulated, shallow; aperture reniform, slightly compressed supra-peripherally, obstructed; aperture height 96.2% of width; umbilicus 28.1% of shell diameter, constricted decoiling; late juvenile whorl descension 0.4°, body whorl descension 1.8°. Sculpture: embryonic whorl sculpted, early juvenile whorl rib interspaces equal axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, one to three times axial rib width; axial rib count 88; five riblets per rib interspace prior to alteration. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, bifid, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd low, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, thin at the base, not recessed, 1st columellar, tall, crescentic, rapid ascension, 2nd basal, slightly crescentic, tall, rapid ascension, 3rd basal, tall, strongly crescentic, gradual ascension, 4th sub-peripheral, tall, thin, slightly crescentic, gradual ascension, 5th supra-peripheral, crescentic, thin, low. Palatal barrier height order 5th, 3rd, 1st, 2nd, 4th.

Remarks: Solem (1976: 214) treated FMNH 46358 as the holotype of *Cookeconcha nudus* (Ancey, 1899). An additional lot of “*Endodonta nuda*” from Olaa, Hawaii, and attributed to collector H.E. Thaanum (ex Ancey Collection) is BPBM 18801.

Etymology: Apparently named for its hairless, clear periostracum.



Fig. 92. *Christensenius nudus*, 3.2 mm, FMNH 46358, LECTOTYPE, Hawaii, Olaa.

Christensenius nudus Holotype

Shell diameter: 3.2 mm
Shell height: 1.5 mm, 46.9% of shell diameter
Spire protrusion: 0.1 mm, 6.67% of shell height
Aperture height: 1.25 mm, 96.2% of aperture width
Aperture width: 1.3 mm
Rib count: 88
Riblets per rib interspace: 2
Number of whorls: 4.5
Umbilicus diameter: 0.9 mm, 28.1% of shell diameter
Late juvenile whorl descension: 0.4°
Body whorl descension: 1.8°

Christensenius jackrandalli n. sp.
(Figs. 93, 301, 302)

Type material: Holotype SMNS-ZI0157960 (ex MS 8676); five paratypes (MS 8882: 1, MS 8673: 1, MS 8588: 1, MS 8959: 1, MS 8679: 1); all leg. M. Severns & S. Olson Apr 16, 19, 22, 1988.

Type locality: Lua Lepo Cave, 825.1 m, Kahikinui Moku, Hana District, Maui. 20°37'48.51"N, 156°19'50.07"W.

Other material studied: 268 specimens from Maui: Hana District, Kahikinui Moku: Lua Lepo Cave, 825.1 m, leg. M. Severns & S. Olson Apr 21, 22, 1988 (MS 8961: 1, MS 8590: 1, MS 8574: 1, MS 8880: 1, MS 8695: 1, MS 8677: 14, MS 8978: 1, MS 8552: 14, MS 8585: 1, MS 8668: 13, MS 8661: 5, MS 8955: 1, MS 8674: 1, MS 8680: 70, MS 8682: 3, MS 8685: 6, MS 8688: 3, MS 8690: 14, MS 8691: 1, MS 8696: 1, MS 8699: 4, MS 8700: 1, MS 8715: 1, MS 8701: 3, MS 8704: 4, MS 8707: 1, MS 8708: 10, MS 8950: 1, MS 8711: 7, MS 8683: 1, MS 8917: 1, MS 8920: 22, MS 8660: 1, MS 8955: 1, MS 9151: 1, MS 8958: 1). Makawao District, Honuaula

Moku, Puu Makua Cave, 1350.6 m, leg. H. James, 20, 1988 (MS 8649: 13, MS 8966: 1, MS 8875: 1, MS 8980: 6, MS 8965: 1, MS 9148: 1), Waihou Spring Cave, 1247.2 m, leg. M. Severns, P. Fiene & S. Olson March 2, 1988 (MS 8642: 1, MS 8643: 4), Puu Naio Cave, 392.9 m, leg. M. Severns & S. Olson Apr 1988 (MS 8591: 1, MS 8666: 11, MS8316: 1, MS 6084: 5, MS 6612: 1, MS 8557: 3), Wailuku Moku, Wailuku District, Waihee Dunes, leg. M. Severns Aug 4, 2017 (MS 8963: 1), Waiehu Golf Course, leg. M. Severns Aug 30, 2011 (MS 8314: 1, MS 8825: 1, MS 6013: 2).

Status and Distribution: Holocene fossil. Presumed extinct. Only known from Puu Makua Cave, 1350.6 m, Puu Naio Cave, 392.9 m, Waihou Spring Cave, 1247.2 m, Honuaula Moku, Makawao District and Waihee Dunes and Waiehu Golf Course, Wailuku Moke, Wailuku District, Maui.

Diagnosis: Color pattern flammulated; shell sub-discoidal, depressed; umbilicus width 30% of shell diameter; axial rib count 43; palatal barrier height order, tall to low: 3rd, 2nd, 1st, 4th, 5th.

Description: Color: flammulated. Shell: sub-discoidal, depressed, slightly compressed laterally; diameter 4.0 mm; 4 whorls; apex sunken; spire protrusion 10.5% of shell height; shell height 47.5% of diameter; peristome thickened, reflected basally; low shoulder; apical suture crenulated, shallow; aperture lunate, depressed supra-peripherally, moderately obstructed; aperture height 87.5% of width; umbilicus width 30% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 2.6°, body whorl descension 7.7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile rib interspace 3.5 times axial rib width, body rib interspace irregular, four to six times axial rib width; axial rib count 43; two riblets per rib interspace prior to alteration; shallow sulcus-like depression on body whorl. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, thin, crescentic, gradual ascension, extended toward the 4th palatal barrier, 2nd low, thin, crenulated, gradual ascension, extended between the 2nd and 3rd palatal barriers; five palatal barriers, rapid ascension, recessed, 1st columellar, low, thick, rounded, 2nd basal, low, thin, crescentic, 3rd basal, tall, thin, crescentic, 4th sub-peripheral, low, thin, slightly crescentic, 5th supra-peripheral, low, thin, slightly crescentic. Palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.

Remarks: Exceptions include a single specimen (MS 8961) which has four parietal barriers, two of which are traces in the 3rd and 4th positions, and a second specimen (MS 8557) which has six palatal barriers.



Fig. 93. *Christensenius jackrandalli*, 4.0 mm, SMNS-ZI0157960 (ex MS 8676), HOLOTYPE, Maui, Lua Lepo Cave.

Etymology: Named to honor a good friend, wise console and dive companion of many decades, Ichthyologist Dr. John (Jack) Randall (1924–2020).

***Christensenius jackrandalli* Holotype**

Shell diameter: 4.0 mm
 Shell height: 1.9 mm, 47.5% of shell diameter
 Spire protrusion: 0.2 mm, 10.5% of shell height
 Aperture height: 1.4 mm, 87.5% of aperture width
 Aperture width: 1.6 mm
 Axial rib count: 43
 Riblets per rib interspace: 2
 Number of whorls: 4
 Umbilicus diameter: 1.2 mm, 30% of shell diameter
 Late juvenile whorl descension: 2.6°
 Body whorl descension: 7.7°

***Christensenius virginiae* n. sp.**
 (Figs. 94, 303–305)

Type material: Holotype SMNS-ZI0157961 (ex MS 8989); four paratypes (MS 8987: 1, MS 8984: 1, MS 8986: 1, MS 8991: 1); all leg. M. Severns, May, 1982.

Type locality: Auwahi Cave at 1203.7 m, Kahikinui Moku, Hana District, Maui. 20°38'37.84"N, 156°19'56.28"W.

Other material studied: 698 specimens from Maui: Hana District, Kahikinui Moku, Auwahi Cave, 1203.7 m, leg. M. Severns, May, 1982 (MS 8559: 739, MS 8990: 1, MS 8992: 1, MS 8993: 1, MS 8994: 1, MS 8995: 1, MS 8996: 1, MS 8997: 1, MS 8998: 1, MS 8999: 1, MS 8983: 1, MS 8988: 1, MS 8981: 1, MS 8982: 1, MS 8985: 1, MS 8560: 1, MS 9555: 1, MS 8553: 1, MS 8471: 11) Lua Lepo Cave, 825.1 m, leg. M. Severns & S. Olson, Apr 22, 1988 (MS 8902:

1, MS 8908: 2, MS 8930: 2, MS 8948: 2, MS 8949: 6, MS 8951: 3, MS 8952: 1, MS 8979: 2), leg. H. James Jul 20-21, 1990 (MS 6585: 3).

Status and Distribution: Holocene fossil. Presumed extinct. Known from Auwahi Cave, 1203.7 m, Lua Lepo Cave, 825.1 m, Kahikinui Moku, Hana District, and Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District, Maui.

Diagnosis: Color pattern flammulated; shell sub-discoidal, depressed; umbilicus width 36% of shell diameter; axial rib count 34; palatal barrier height order, tall to low: 3rd, 2nd, 1st, 5th, 4th.

Description: Color: flammulated. Shell: sub-discoidal, depressed; slightly expanded laterally; diameter 2.5 mm; 3.25 whorls; apex sunken; spire protrusion 15.8% of shell height; shell height 48% of diameter; peristome evenly thickened, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, slightly compressed peripherally, obstructed; aperture width 94.7% of height; umbilicus width 36% of shell diameter, gradual decoiling; late juvenile whorl descension 1.2°, body whorl descension 3°. Sculpture: embryonic sculpture absent, early juvenile whorls rib interspace less than axial rib width, late juvenile rib interspace three times axial rib width, body rib interspaces four to five times axial rib width; axial rib count 34; three riblets per rib interspace prior to alteration. Barriers: two tall, thin, crescentic parietal barriers, rapid ascension, of equal height, 1st extended toward the 4th palatal barrier, 2nd extended between the 2nd and 3rd palatal barriers; five palatal barriers, 1st columellar, evenly thickened, marginally crescentic, rapid ascension, 2nd basal, thick, crescentic, rapid ascension, 3rd sub-peripheral, thick, crescentic, rapid ascension, 4th peripheral, low, callous-like, 5th supra-peripheral, thin, crescentic, rapid ascension. Palatal barrier height order 3rd, 2nd, 1st, 5th, 4th.



Fig. 94. *Christensenius virginiae*, 2.5 mm, SMNS-ZI0157961 (ex MS 8989), HOLOTYPE, Maui, Auwahi Cave.

Remarks: *Christensenius virginiae* shows surprising variation. In some specimens the parietals shared the same base, in others the distal end of the body whorl was detached.

Etymology: Named to honor Virginie Héros, collection manager of mollusks at Muséum National d'Histoire Naturelle in Paris and friend to all.

***Christensenius virginiae* Holotype**

Shell diameter: 2.5 mm
Shell height: 1.2 mm, 48% of shell diameter
Spire protrusion: 1.9 mm, 15.8% of shell height
Aperture height: 0.95 mm
Aperture width: 0.9 mm, 94.7% of aperture height
Rib count: 34
Riblets per rib interspace: 3
Number of whorls: 3.25
Umbilicus diameter: 0.9 mm, 36% of shell diameter
Late juvenile whorl descension: 1.2°
Body whorl descension: 3°

***Christensenius boucheti* n. sp.**
(Figs. 95, 306, 307)

Type material: Holotype ANSP 377789; seven paratypes (ANSP 501744: 4, leg. O. Oswald, Dec 6, 1930; ANSP 378421: 3, leg. O. Oswald, Oct 3, 1928).

Type locality: As described by Oswald; first long kukui glen, about one mile southerly of Kolekole Pass, little glen at base of cliffs, 21°27'N, 158°10'W, Lualualei, Waianae District, Oahu.

Other material studied: 634 specimens from Oahu: Waianae District, Lualualei, leg. O. Oswald, Oct 3, 1928 (ANSP 378421: 3), Kona District, Manoa, leg. O. Oswald (ANSP 386181: 20, ANSP 386180: 2), leg. O. Oswald, May 30, 1937 (ANSP 386196: 16), leg. O. Oswald Sep 3, 1939 (384392: 6), leg. H. A. Pilsbry, 1920 (ANSP 128218: 587).

Status and Distribution: Extant. Presumed extinct. Known from Lualualei, Waianae District and Manoa, Kona District, Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal, depressed; umbilicus width 30.5% of shell diameter; axial rib count 60; palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.

Description: Color: flammulated. Shell: subdiscoidal, depressed, slightly compressed laterally; diameter 3.6 mm; 5.25 whorls; apex planar; spire protrusion 11.1% of shell height; shell height 50% of diameter; peristome thin, marginally reflected

basally; low shoulder; apical suture crenulated, impressed; aperture reniform, expanded peripherally, obstructed; aperture height 85.7% of width; umbilicus 30.5% of shell diameter, moderately constricted decoiling; early and late juvenile whorl descension 0°, body whorl descension 6°. Sculpture: decussate; embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace three times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 60; prominent spiral cords; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, bifid, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd thin, crescentic, gradual ascension, extended between the 2nd and 3rd palatal barriers; five palatal barriers, crescentic, thin at the base, rapid ascension, 1st columellar, crescentic; 2nd basal, crescentic; 3rd basal, tall, marginally crescentic; 4th sub-peripheral, moderately marginally, 5th supra-peripheral, low, crescentic. Palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.



Fig. 95. *Christensenius boucheti*, 3.6 mm, ANSP 377789, HOLOTYPE, Oahu, Lualualei.

Remarks: The distribution of *Christensenius boucheti* is assumed to be Lualualei based on five lots with 631 specimens. The collecting locality of ANSP 378421, with three specimens from Manoa, is considered an error.

Etymology: Named to honor Philippe Bouchet of Muséum National d'Histoire Naturelle in Paris placing him firmly on Hawaiian soil.

***Christensenius boucheti* Holotype**

Shell diameter: 3.6 mm
 Shell height: 1.8 mm, 50% of shell diameter
 Spire protrusion: 0.2 mm, 11.1% of shell height
 Aperture height: 1.2 mm, 85.7% of aperture width
 Aperture width: 1.4 mm
 Rib count: 60
 Riblets per rib interspace: 3

Number of whorls: 5.25

Umbilicus diameter: 1.1 mm, 30.5% of shell diameter

Juvenile whorl descension: 0°

Body whorl descension: 6°

***Christensenius cookei* (Cockerell, 1933)**

(Figs. 96, 308)

Endodonta (*Thaumatodon*) *cookei* T. D. A. Cockerell, 1933: 58 — unaccepted > superseded combination.

Cookeconcha cookei (T. D. A. Cockerell, 1933) — Solem, 1976: 213-214.

Type material: Lectotype ANSP 158823 [designation attributed to Baker, 1963: 232], leg. T. D. A. Cockerell, Jul 16, 1924; one paralectotype (MCZ 106309: 1).

Type locality: Slope of Mt. Tantalus, in a dead tree fern, Kona District, Oahu.

Other material studied: Four specimens from Oahu: Kona District, Manoa Valley, Rocky Hill; ex coll. R. Gage (MS 9662: 1, MS 9661: 3).

Status and Distribution: Extant. Presumed extinct. Known from the slopes of Mt. Tantalus and Rocky Hill in Manoa Valley, Kona District, Oahu.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 30% of shell diameter; axial rib count 56; palatal barrier height order, tall to low: 3rd, 4th, 1st, 2nd, 5th.

Redescription: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.0 mm: 3.25 whorls; apex raised; spire protrusion 17.9% of shell height; shell height 56% of diameter; peristome evenly thickened, reflected basally; low shoulder; apical suture crenulated, shallow; aperture reniform, thickened basally, obstructed; aperture height 92.9% of width; umbilicus 30% of shell diameter, gradual decoiling; early and late juvenile whorl descension 1°, body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 56; three riblet per rib interspace prior to alteration. Barriers: two equally tall, crescentic, parietal barriers, 1st extended between the 4th and 5th palatal barriers, 2nd extended toward the 3rd palatal barrier; five palatal barriers, recessed, crescentic, thin at the base, rapid ascension, 1st columellar, tall, thick, 2nd basal, low, thick; 3rd basal, tall, thick, 4th sub-peripheral, tall, thick, 5th supra-peripheral, low, evenly thickened. Palatal barrier height order 3rd, 4th, 1st, 2nd, 5th.



Fig. 96. *Christensenius cookei*, 2.0 mm, ANSP 158823, LECTOTYPE, Oahu, Tantalus.

Remarks: Cockerell (1933: 58) based his new species *Endodonta (Thaumatodon) cookei* on multiple specimens (syntypes) including “Type 158823” at ANSP, but did not specify whether the ANSP catalog number referred to one specimen or multiple specimens (i.e., as a lot number). The designation of ANSP 158823 as the lectotype of *E. cookei* Cockerell, 1933 is therefore attributed to Baker (1963: 232) (Gary Rosenberg, pers. comm. 2024).

Etymology: Named for Dr. C. M. Cooke of the Bernice P. Bishop Museum of Honolulu.

***Christensenius cookei* Lectotype**

Shell diameter: 2.0 mm
 Shell height: 1.12 mm, 56% of shell diameter
 Spire protrusion: 0.2 mm, 17.9% of shell height
 Aperture height: 0.7 mm
 Aperture width: 0.65 mm, 92.9% of aperture height
 Rib count: 56
 Riblets per rib interspace: 3
 Number of whorls: 3.25
 Umbilicus diameter: 0.6 mm, 30% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 7°

***Christensenius helenjamesae* n. sp.**
 (Fig. 97)

Type material: Holotype ANSP 128217; five paratypes (ANSP 501745: 5); all leg. H. A. Pilsbry, 1920.

Type locality: Rocky Hill, Manoa, Kona District, Oahu.

Other material studied: 215 specimens from Oahu: Kona District, Manoa, leg. H. A. Pilsbry, 1920 (ANSP 505229: 215).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 36.3% of shell diameter; axial rib count 72; palatal barrier height order 3rd, 2nd, 1st, 5th, 4th.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.2 mm; 4.2 whorls; apex planar; spire protrusion 18.2% of shell height; shell height 50% of diameter; peristome thickened, reflected basally to the peripherally; raised shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, constricted supra-peripherally, obstructed; aperture height 93.3% of width; umbilicus width 36.3% of shell diameter, open decoiling; late juvenile whorl descension 3.5°, body whorl descension 4.5°. Sculpture: embryonic sculpture absent, early juvenile whorls rib interspaces equal axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 72; three riblet per rib interspace prior to alteration. Barriers: two parietal barriers, equidistant on parietal wall, 1st thin, crescentic, rapid ascension, extended toward the 4th palatal barrier, 2nd thin, crescentic, rapid ascension, extended between the 2nd and 3rd palatal barriers; five palatal barriers, 1st columellar, thick, crescentic, rapid ascension, 2nd basal, thick, crescentic, rapid ascension, 3rd sub-peripheral, tall, thick, crescentic, rapid ascension, 4th sub-peripheral, low, thick, recessed, gradual ascension, 5th supra-peripheral, low, thick, crescentic, recessed, rapid ascension. Palatal barrier height order 3rd, 2nd, 1st, 5th, 4th.

Etymology: Named to honor the avian paleontologist, Helen James.



Fig. 97. *Christensenius helenjamesae*, 2.2 mm, ANSP 128217, HOLOTYPE, Oahu, Manoa.

Christensenius helenjamesae Holotype

Shell diameter: 2.2 mm

Shell height: 1.1 mm, 50% of shell diameter

Spire protrusion: 0.2 mm, 18.2% of shell height

Aperture height: 0.7 mm, 93.3% of aperture width

Aperture width: 0.75 mm

Rib count: 72

Riblets per rib interspace: 3

Number of whorls: 4.2

Umbilicus diameter: 0.8 mm, 36.3% of shell diameter

Late juvenile whorl descension: 3.5°

Body whorl descension: 4.5°

Christensenius houarti n. sp.

(Figs. 98, 309)

Type material: Holotype ANSP 380208; eight paratypes (ANSP 501746: 8); all leg. O. Oswald, Jan 1, 1937.

Type locality: As described by Oswald; coral uplift near beach, opposite old pier, 21°39'N, 157°56'W, Laie, Koolauloa District, Oahu.

Other material studied: 20 specimens from Oahu: Koolauloa District, Laie, leg. O. Oswald, Jan 1, 1937 (ANSP 502765 ex 380209: 12), ca. 152.4 m, above plain, 0.4 km from sea, leg. Pillsbury and Cooke, Feb 14, 1913 (ANSP 109990A: 8).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 37.5% of shell diameter; axial rib count 72; palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.

Description: Color pattern flammulated. Shell: sub-discoidal, expanded laterally; diameter 4.0 mm; 5.25 whorls; apex sunken; spire protrusion 12.5% of shell height; shell height 40% of diameter; peristome evenly thickened, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture lunate, expanded peripherally, slightly flattened supra-peripherally, obstructed; aperture height 88.8% of width; umbilicus width 37.5% of shell diameter, open decoiling; late juvenile whorl descension 1°, body whorl descension 3.6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace three times axial rib width, body rib interspace irregular, two to four times axial rib width; axial rib count 72; one riblet per rib interspace prior to alteration. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, thick, crescentic, rapid ascension, extended toward the 5th palatal barrier, 2nd blade-like, rapid ascension, extended toward the 3rd palatal barrier;

five palatal barriers, 1st columellar, low, evenly thickened, rapid ascension, 2nd basal, low, crescentic, evenly thickened, rapid ascension, 3rd sub-peripheral, thick, tall, crescentic, rapid ascension, 4th peripheral, low, blade-like, recessed, rapid ascension, 5th supra-peripheral, low, thick, ascension gradual. Palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.



Fig. 98. *Christensenius houarti*, 4.0 mm, ANSP 380208, HOLOTYPE, Oahu, Laie.

Etymology: Named for Dr. Roland Houart, publisher of Novapex and reviewer of the Muricidae subfamily Ergalataxinae for *Shells of the Hawaiian Islands* (Severns, 2011).

Christensenius houarti Holotype

Shell diameter: 4.0 mm

Shell height: 1.6 mm, 40% of shell diameter

Spire protrusion: 0.2 mm, 12.5% of shell height

Aperture height: 1.2 mm, 88.8% of aperture width

Aperture width: 1.35 mm

Rib count: 72

Riblets per rib interspace: 1

Number of whorls: 5.25

Umbilicus diameter: 1.5 mm, 37.5% of shell diameter

Late juvenile whorl descension: 1°

Body whorl descension: 3.6°

Christensenius intercarinatus (Mighels, 1845)

(Fig. 99)

Helix contorta A. Férussac, 1825 in Quoy & Gaimard 1824–1826: 469 — invalid: junior homonym of *Helix contorta* Linnaeus, 1758.

Helix intercarinata Mighels, 1845: 18–19 — unaccepted; superseded combination.

Cookeconcha contortus (A. Férussac, 1825) — Solem, 1976: 214–215. [unaccepted; based on an invalid original name.

Cookeconcha intercarinata (Mighels, 1845) — MolluscaBase eds., 2025 (accessed 30 June 2025).

Type material: Neotype ANSP 386184 [designated here], leg. O. Oswald, Jan 9, 1929.

Type locality: As described by Oswald; back of tanks, on seaward slope below top of Rocky Hill, 21°19'N, 157°49'W, Manoa, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 35.1% of shell diameter; axial rib count 60; palatal barrier height order, tall to low: 5th, 2nd, 1st, 3rd, 4th.

Redescription: Color: flammulated. Shell: depressed; diameter 3.7 mm; 4.5 whorls; apex sunken; spire protrusion 8.1% of shell height; shell height 50% of diameter; peristome thin, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, flattened supra-peripherally, obstructed; aperture height 86.7% of width; umbilicus 35.1% of shell diameter, decoiling moderately constricted; late juvenile whorl descension 1°, body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 60; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, thin, crescentic, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd thin, marginally crescentic, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, 1st columellar, low, rounded, recessed, 2nd basal, tall, evenly thickened, rapid ascension, 3rd sub-basal, tall, thin, crescentic, gradual ascension, 4th sub-peripheral, low, thin, crescentic, recessed, gradual ascension, 5th supra-peripheral, low, thin, blade-like, gradual ascension. Palatal barrier height order 5th, 2nd, 1st, 3rd, 4th.

Etymology: Unknown.

Remarks: Solem (1976: 214–215) placed *Helix intercarinata* Mighels (1845) in the synonymy of *Cookeconcha contortus* (Férussac, 1825). Férussac's original description of *Helix contorta* appears in Quoy and Gaimard's (1824–1826) "Zoologie" section of Freycinet's *Voyage au tour du monde...* A figure of Férussac's *Helix contorta* appears in a separate work, "Histoire naturelle générale et particulière des mollusques terrestres et fluviatiles" (Férussac, 1832: Pl. 51a, Fig. 2). However, *Helix contorta* Férussac, 1825 is invalid as junior homonym of *Helix contorta* Linnaeus, 1758. So, *Cookeconcha contortus* (Férussac, 1825) is the accepted name for Férussac's species.



Fig. 99. *Christensenius intercarinatus*, 3.7 mm, ANSP 386184, NEOTYPE, Oahu, Manoa.

Mighels (1845) described *Helix intercarinata* from the Hawaiian islands and his description agrees with both Férussac's 1825 description and the 1832 illustration of *Helix contorta*. Unfortunately, Mighels' type collection, including his type of *Helix intercarinata*, 1845, was destroyed in a fire on 8 January 1854 at the Portland Society of Natural History in Maine. A poor illustration of Mighels' *Helix intercarinata* appeared in the Systematisches Conchylien-Cabinet (Pfeiffer, 1850: Pl. 100, figs. 1–5) but does not agree with Férussac's or Mighels' descriptions, or the 1832 illustration. The color pattern is incorrect and the illustration is too small to see minute detail.

In 1929, Oswald collected two separate species that agree with the descriptions of *Helix contorta* A. Férussac, 1825 and *Helix lamellosa* Férussac, 1825, respectively. The collection was from Rocky Hill, a fossil site in Manoa Valley, Oahu, placing both of Férussac's species in Manoa Valley, in the Koolau mountain range. Oswald's specimen, ANSP 386184, is here designated as the neotype of *Christensenius intercarinata* (Mighels, 1845) new comb. and provides a geolocated type locality (21°19'N, 157°49'W) 200 years after Férussac described his specimens and 96 years after Oswald collected his specimens at Rocky Hill.

***Christensenius intercarinatus* Neotype**

Shell diameter: 3.7 mm
 Shell height: 1.85 mm, 50% of shell diameter
 Spire protrusion: 0.15 mm, 8.1% of shell height
 Aperture height: 1.3 mm, 86.7% of aperture width
 Aperture width: 1.5 mm
 Rib count: 60
 Riblets per rib interspace: 3
 Number of whorls: 4.5
 Umbilicus diameter: 1.3 mm, 35.1% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 7°

Christensenius makaleha n. sp.
(Fig. 100)

Type material: Holotype ANSP 376758, leg. O. Oswald, Sep 7, 1930.

Type locality: As described by Oswald; left (Banana Valley) 1½ hours from reservoir along creek bed, 21°35'N, 158°10'W, Makaleha, Waialua District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color flammulated; shell discoidal, depressed; umbilicus width 32.5% of shell diameter; axial rib count 36; palatal barrier height order 4th, 2nd, 1st, 5th, 3rd.

Description: Color: flammulated. Shell: discoidal, depressed, slightly compressed laterally; diameter 2.0 mm; 3.5 whorls; apex sunken; spire protrusion, none; shell height 47.5% of diameter; peristome evenly thickened, thin, basally reflected; low shoulder; apical suture crenulated, shallow; aperture reniform, expanded peripherally, slight constriction supra-peripherally, obstructed; aperture height 80% of width; umbilicus 32.5% of shell diameter, moderately constricted decoiling; early and late juvenile whorl descension 0°, body whorl descension 5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspaces less than axial rib width, late juvenile rib interspaces two to three times axial rib width, body rib interspace irregular, three to four times axial rib width; axial rib count 36; five riblets per rib interspace prior to alteration. Barriers: two equally tall parietal barriers, equidistant on parietal wall, 1st thin, bifid, thick base, rapid ascension, extended toward the 4th palatal barrier, 2nd evenly thickened, thick base, rapid ascension, extended toward

the 3rd palatal barrier; five palatal barriers; 1st columellar, crescentic, low, rapid ascension, 2nd basal, tall, crescentic, thin base, rapid ascension, 3rd sub-peripheral, tall, broadly crescentic, thin base, rapid ascension, 4th sub-peripheral, low, thin at the base, crescentic, gradual ascension, 5th supra-peripheral, tall, crescentic, thin base, rapid ascension. Palatal barrier height order 4th, 2nd, 1st, 5th, 3rd.

Etymology: Named for the type location.

Christensenius makaleha Holotype

Shell diameter: 2.0 mm

Shell height: 0.95 mm, 47.5% of shell diameter

Spire protrusion: none

Aperture height: 0.6 mm, 80% of aperture width

Aperture width: 0.75 mm

Rib count: 36

Riblets per rib interspace: 5

Number of whorls: 3.5

Umbilicus diameter: 0.65 mm, 32.5% of shell diameter

Late juvenile whorl descension: 0°

Body whorl descension: 5°

Christensenius moanalua n. sp.
(Fig. 101)

Type material: Holotype ANSP 384055, leg. O. Oswald, Sep 30, 1939.

Type locality: As described by Oswald; right, cliffs opposite Damon House up Valley, 1/3 up ridge in small cave, 20° 20'N, 157° 54'W, Moanalua, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern Indiscernible; shell discoidal, depressed; umbilicus width 36.8% of shell diameter; axial rib count 66; palatal barrier height order, tall to low: 5th, 4th, 1st, 3rd, 2nd.

Description: Color: indiscernible. Shell: discoidal, depressed, slightly compressed laterally; diameter 5.3 mm; 5.25 whorls; apex sunken; spire protrusion 6.9% of shell height; shell height 40.6% of diameter; peristome thin, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture reniform, expanded peripherally, slight constriction supra-peripherally, moderately obstructed; aperture height 94.4% of width; umbilicus 36.8% of shell diameter, open decoiling; late juvenile whorl descension 3°, body whorl descension 4°. Sculpture: embryonic sculpture of axial ribs; early

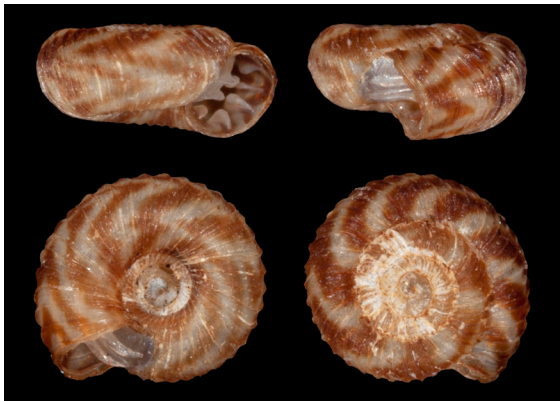


Fig. 100. *Christensenius makaleha*, 2.0 mm, ANSP 376758, HOLOTYPE, Oahu, Makaleha.

juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, three to four times axial rib width; axial rib count 66; five riblet per rib interspace prior to alteration. Barriers: two parietal barriers in the lower half of the parietal wall, 1st tall, thin, marginally crescentic, ascension gradual, extended toward the 4th palatal barrier, 2nd low, thin, ascension gradual, extended toward the 3rd palatal barrier; five palatal barriers, 1st columellar, low, recessed, callous-like, 2nd basal, low, thick, recessed, 3rd basal, tall, crescentic, thick base, rapid ascension, not recessed, 4th sub-peripheral, low, thin, marginally crescentic, recessed, rapid ascension, 5th supra-peripheral, low, blade-like, marginally crescentic, thin base, rapid ascension. Palatal barrier height order 5th, 4th, 1st, 3rd, 2nd.



Fig. 101. *Christensenius moanalua*, 5.3 mm, ANSP 384055, HOLOTYPE, Oahu, Moanalua.

Etymology: Named for the type locality.

***Christensenius moanalua* Holotype**

Shell diameter: 5.3 mm
 Shell height: 2.15 mm, 40.6% of shell diameter
 Spire protrusion: 0.15 mm, 6.9% of shell height
 Aperture height: 1.7 mm, 94.4% of aperture width
 Aperture width: 1.8 mm
 Rib count: 66
 Riblets per rib interspace: 5
 Number of whorls: 5.25
 Umbilicus diameter: 1.95 mm, 36.8% of shell diameter
 Late juvenile whorl descension: 3°
 Body whorl descension: 4°

***Christensenius anneelisae* n. sp.**
 (Fig. 102)

Type material: Holotype SMNS-ZI0157953 (ex MS 8747), leg. M. Severns & R. Gage, Aug 16, 2011.

Type locality: Waiopili, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 29.4% of shell diameter; axial rib count 71; palatal barrier height order, tall to low: 2nd, 3rd, 1st, 4th, 5th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 3.4 mm; 4.5 whorls; apex planar; spire protrusion 17.6% of shell height; shell height 50% of diameter; peristome thickened, reflected basally; low shoulder; apical suture crenulated, shallow; aperture reniform, expanded peripherally, obstructed; aperture height 84.6% of width; umbilicus width 29.4% of shell diameter, gradual decoiling; late juvenile whorl descension 2°, body whorl descension 4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace less than axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 71; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, equidistant, 1st tall, thick, bifid, rapid ascension, extended toward the 5th palatal barrier, 2nd low, evenly thickened, rapid ascension, extended toward the 3rd palatal barrier; five palatal barriers, 1st columellar, tall, thick, crescentic, rapid ascension, 2nd basal, low, crescentic, base thin, rapid ascension, 3rd basal, tall, crescentic, thin at the base, rapid ascension, 4th sub-peripheral, moderately crescentic, thin at the base, recessed, rapid ascension, 5th supra-peripheral, low, recessed, gradual ascension. Palatal barrier height order 2nd, 3rd, 1st, 4th, 5th.



Fig. 102. *Christensenius anneelisae*, 3.4 mm, SMNS-ZI0157953 (ex MS 8747), HOLOTYPE, Kauai, Waiopili.

Etymology: Named for Anne Elisa Murray, who was co-caretaker of Kipu Kai, Kauai with husband Jamey Van Der Merwe during our visit.

Christensenius anneelisae Holotype

Shell diameter: 3.4 mm
 Shell height: 1.7 mm, 50% of shell diameter
 Spire protrusion: 0.3 mm, 17.6% of shell height
 Aperture height: 1.1 mm, 84.6% of aperture width
 Aperture width: 1.3 mm
 Rib count: 71
 Riblets per rib interspace: 2
 Number of whorls: 4.5
 Umbilicus diameter: 1.0 mm, 29.4% of shell diameter
 Late juvenile whorl descension: 2°
 Body whorl descension: 4°

Christensenius aweoweonuiensis n. sp.
 (Figs. 103, 310)

Type material: Holotype SMNS-ZI0157954 (ex MS 8733); three paratypes (MS 9699: 1, MS 9700: 1, MS 9701: 1); all leg. M. Severns & R. Gage, Mar 2016.

Type locality: Aweoweonui, Koloa District, Kauai. 21°54'09.5"N, 159°23'54.3"W.

Other material studied: 128 specimens from Kauai: Koloa District, Aweoweonui, leg. M. Severns & R. Gage, March 2016 (MS 8773: 15, MS 8751: 49), Mahaulepu, leg. P. Sutter, Apr 10, 1996 (MS 8312: 1), leg. P. Sutter & R. Gage, Sep 1996 (MS 8599: 36), leg. M. Severns & R. Gage, Apr 17, 2011 (MS 9693: 4, MS 9694: 6, MS 8784: 10, MS 8787: 1), leg. P. Sutter & R. Gage, December 20, 1996 (MS 8609: 5).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from Aweoweonui and Mahaulepu, Koloa District, Kauai.

Diagnosis: Indiscernible color pattern; shell sub-discoidal; umbilicus width 33.3% of shell diameter; axial rib count 53; palatal barrier height order, tall to low: 3rd, 2nd, 1st, 4th, 5th.

Description: Color: indiscernible. Shell: sub-discoidal, slightly compressed laterally; diameter 4.5 mm; 5.25 whorls; apex raised; spire protrusion 13% of shell height; shell height 51.1% of diameter; peristome evenly thickened, reflected basally; low shoulder; apical suture crenulated, impressed; aperture reniform, expanded peripherally, moderately obstructed; aperture height 88.2% of width; umbilicus width 33.3% of shell diameter, gradual decoiling;

late juvenile whorl descension 3°, body whorl descension 4.5°; Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, three to four times axial rib width; axial rib count 53; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, bifid, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd low, marginally crescentic, gradual ascension, extended between the 3rd palatal barrier; five palatal barriers, 1st columellar, low, marginally crescentic, rapid ascension, 2nd basal, low, marginally crescentic, rapid ascension, 3rd basal, tall, thin, crescentic, gradual ascension, 4th sub-peripheral, thin, low, gradual ascension, 5th supra-peripheral, callous-like. Palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.



Fig. 103. *Christensenius aweoweonuiensis*, 4.5 mm, SMNS-ZI0157954 (ex MS 8733), HOLOTYPE, Kauai, Aweoweonui.

Etymology: Named for the type locality.

Christensenius aweoweonuiensis Holotype

Shell diameter: 4.5 mm
 Shell height: 2.3 mm, 51.1% of shell diameter
 Spire protrusion: 0.3 mm, 13% of shell height
 Aperture height: 1.5 mm, 88.2% of aperture width
 Aperture width: 1.7 mm
 Rib count: 53
 Riblets per rib interspace: 2
 Number of whorls: 5.25
 Umbilicus diameter: 1.5 mm, 33.3% of shell diameter
 Late juvenile whorl descension: 3°
 Body whorl descension: 4.5°

Christensenius discus n. sp.
 (Fig. 104)

Type material: Holotype SMNS-ZI0157955 (ex MS 9166), leg. M. Severns & R. Gage, Aug 16, 2011.

Type locality: Waiopili, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated. Shell: discoidal; umbilicus width 29.1% of shell diameter; axial rib count 69; palatal barrier height order, tall to low: 2nd, 3rd, 1st, 4th, 5th.

Description: Color: indiscernible color pattern. Shell: discoidal, slightly expanded laterally; diameter 2.4 mm; 4.25 whorls; apex planar; spire protrusion 3.3% of shell height; shell height 50% of diameter; peristome thin; low shoulder; apical suture crenulated; aperture reniform, evenly rounded, obstructed; aperture height equal to width; umbilicus U-shaped, umbilicus width 29.1% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 0°, body whorl descension 2°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace three times axial rib width; axial rib count 69; two riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd low, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, 1st columellar, thin base, crescentic, rapid ascension, 2nd basal, thin base, broadly crescentic, rapid ascension, 3rd basal, thin base, broadly crescentic, rapid ascension, 4th sub-peripheral, crescentic, recessed, gradual ascension, 5th supra-peripheral, thin base, crescentic, gradual ascension. Palatal barrier height order 2nd, 3rd, 1st, 4th, 5th.

Etymology: Named for the shell's disc-like shape.



Fig. 104. *Christensenius discus*, 2.4 mm, SMNS-ZI0157955 (ex MS 9166), HOLOTYPE, Kauai, Waiopili.

Remarks: The holotype was collected in the same small, isolated rust colored deposit as *Newcombia gagei* Severns, 2009.

***Christensenius discus* Holotype**

Shell diameter: 2.4 mm
Shell height: 1.2 mm, 50% of shell diameter
Spire protrusion: 0.04 mm, 3.3% of shell height
Aperture height: 0.9 mm, equal to width
Rib count: 69
Riblets per rib interspace: 2
Number of whorls: 4.25
Umbilicus diameter: 0.7 mm, 29.1% of shell diameter
Late juvenile whorl descension: 0°
Body whorl descension: 2°

***Christensenius dominiquei* n. sp.**
(Figs. 105, 311, 312)

Type material: Holotype SMNS-ZI0157956 (ex MS 8744); six paratypes (MS 8745: 1, MS 8844: 2, MS 8789: 3); all leg. M. Severns & R. Gage, Aug 16, 2011.

Type locality: Waiopili, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W.

Other material studied: 53 specimens from Kauai; Koloa District, Aweoweonui, 21°54'09.92"N, 159°23'50.70"W, leg. M. Severns & R. Gage, March 2016 (MS 8854: 1, MS 8735: 1, MS 8790: 4), Mahaulepu, leg. M. Severns & R. Gage Aug 17, 2011 (MS 9691: 15, MS 8821: 1, MS 8783: 4, MS 9690: 13, MS 8818: 3, MS 9695: 7, MS 8777: 1, MS 8819: 1, MS 8801: 1, MS 8290: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known from Waiopili, Aweoweonui and Mahaulepu, Koloa District, Kauai.

Diagnosis: Indiscernible color pattern. shell sub-discoidal; umbilicus width 26% of shell diameter; axial rib count 59; palatal barrier height order, tall to low: 2nd, 3rd, 1st, 4th, 5th.

Description: Color: flammulated. Shell: sub-discoidal; diameter 4.6 mm; 4.75 whorls; apex planar; spire protrusion 16.6% of shell height; shell height 52.2% of diameter; peristome moderately thick, basally and sub-peripherally reflected; low shoulder; apical suture crenulated, shallow; aperture reniform, expanded peripherally, slightly constricted sub-peripherally and supra-peripherally, obstructed; aperture height 85% of width; umbilicus width 26% of shell diameter, constricted decoiling; late juvenile whorl descension 4°, body whorl

descension 6°; Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace 2.5 times axial rib width, body rib interspace irregular, two to four times axial rib width; axial rib count 59; two riblets per rib interspace prior to alteration; prominent spiral cords. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, bifid, gradual ascension, extended between the 4th and 5th palatal barriers, 2nd low, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, recessed, 1st columellar, low, thick, weakly crescentic, rapid ascension, 2nd basal, rounded, thickened at the base, rapid ascension, 3rd basal, tall, crescentic, thin at the base, gradual ascension, 4th sub-peripheral, low, thin, gradual ascension, 5th supra-peripheral, low, thin, evenly thickened, rapid ascension. Palatal barrier height order 2nd, 3rd, 1st, 4th, 5th.



Fig. 105. *Christensenius dominiquei*, 4.6 mm, SMNS-ZI0157956 (ex MS 8744), HOLOTYPE, Kauai, Waiopili.

Remarks: Similar in outward appearance to *Christensenius anneelisae* found in the same general area, but with prominent spiral cords and fewer radial ribs.

Etymology: Named to honor Dominique Olivier, a man with a rich heritage, strong quiet character, and an elegant chess player with a library on the game he denied having read!

***Christensenius dominiquei* Holotype**

Shell diameter: 4.6 mm
 Shell height: 2.4 mm, 52.2% of shell diameter
 Spire protrusion: 0.4 mm, 16.6% of shell height
 Aperture height: 1.7 mm, 85% of aperture width
 Aperture width: 2.0 mm
 Rib count: 59
 Riblets per rib interspace: 2
 Number of whorls: 4.75

Umbilicus diameter: 1.2 mm, 26% of shell diameter
 Late juvenile whorl descension: 4°
 Body whorl descension: 6°

***Christensenius etelelae* n. sp.**
 (Fig. 106)

Type material: Holotype SMNS-ZI0157957 (ex MS 8752); 18 paratypes (MS 8774: 14, MS 9702: 4); all leg. M. Severns & R. Gage, Mar 2016.

Type locality: Aweoweonui, Koloa District, Kauai. 21°54'09.5"N, 159°23'54.3"W.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 33.3% of shell diameter; axial rib count 97; palatal barrier height order, tall to low: 4th, 2nd, 1st, 3rd, 5th.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 3.3 mm; 4.75 whorls; apex low; spire protrusion 12.5% of shell height; shell height 48.5% of diameter; peristome thick, reflected basally; no shoulder; apical suture crenulated, shallow; aperture lunate, slightly constricted supra-peripherally, obstructed; aperture height 83.3% of width; umbilicus width 33.3% of shell diameter, gradual decoiling; late juvenile whorl descension 1°, body whorl descension 8.6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace less axial rib width, late juvenile rib interspace equals axial rib width, body rib interspace irregular, one to two times axial rib width; axial rib count 97; two riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st bifid, gradual ascension, extended between the 4th and 5th palatal barriers, 2nd crescentic, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, 1st columellar, crescentic, thick, rapid ascension, 2nd basal, crescentic, thick base, rapid ascension, 3rd basal, tall, crescentic, thick base, rapid ascension, 4th sub-peripheral, moderately crescentic, evenly thickened, rapid ascension, 5th supra-peripheral, low, thin, moderately crescentic, rapid ascension. Palatal barrier height order 4th, 2nd, 1st, 3rd, 5th.

Etymology: *Christensenius etelelae* is named to honor Amalia Etelel "Hawkeye" Starmer, a person with a rare and captivating character and sister of Eva Talreng "Lightfoot" Starmer.



Fig. 106. *Christensenius etelelae*, 3.3 mm, SMNS-ZI0157957 (ex MS 8752), HOLOTYPE, Kauai, Aweoweonui.

***Christensenius etelelae* Holotype**

Shell diameter: 3.3 mm
 Shell height: 1.6 mm, 48.5% of shell diameter
 Spire protrusion: 0.2 mm, 12.5% of shell height
 Aperture height: 1.0 mm, 83.3% of aperture width
 Aperture width: 1.2 mm
 Rib count: 97
 Riblets per rib interspace: 2
 Number of whorls: 4.75
 Umbilicus diameter: 1.1 mm, 33.3% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 8.6°

***Christensenius gallichanae* n. sp.**
 (Fig. 107)

Type material: Holotype NHMUK 1900.12.18.1369; one paratype (NHMUK 1900.12.18.1370); all leg. The Sandwich Island Committee of the Royal Society of the British Association.

Type locality: Kauai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality, Kauai.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 23.8% of shell diameter; axial rib count 68; palatal barrier height order, tall to low: 4th, 3rd, 1st, 2nd, 5th.

Description: Color: flammulated. Shell: discoidal, slightly expanded laterally; diameter 4.2 mm; 4.5 whorls; apex planar; spire protrusion 8.1% of shell height; shell height 44% of diameter; peristome thick, reflected basally; shoulder slightly raised; apical suture crenulated, canaliculate; aperture lunate, expanded peripherally, flattened supra-

peripherally, obstructed; aperture height 85.3% of width; umbilicus width 23.8% of shell diameter, constricted decoiling; late juvenile whorl descension 1.1°, body whorl descension 3.4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace less than axial rib width, late juvenile rib interspace 1.5 to two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 68; five riblet per rib interspace prior to alteration; sulcus-like depression. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, bifid, extended between the 4th and 5th palatal barriers, rapid ascension, 2nd low, crescentic, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, rapid ascension, 1st columellar, low, thick, crescentic, 2nd basal, low, crescentic, evenly thickened, 3rd basal, tall, slim, crescentic, 4th sub-peripheral, tall, slim, crescentic, 5th supra-peripheral, low, crescentic, slightly recessed. Palatal barrier height order 4th, 3rd, 1st, 2nd, 5th.



Fig. 107. *Christensenius gallichanae*, 4.2 mm, NHMUK 1900.12.18.1369, HOLOTYPE, Kauai.

Etymology: Named for Jennifer Gallichan of the National Museum Wales, who together with Harriet Wood compiled the 2008 edition of *The New Molluscan Names of César-Marie-Felix Ancey*, for her hard work and signed copy of this fascinating book.

***Christensenius gallichanae* Holotype**

Shell diameter: 4.2 mm
 Shell height: 1.85 mm, 44% of shell diameter
 Spire protrusion: 0.15 mm, 8.1% of shell height
 Aperture height: 1.45 mm, 85.3% of aperture width
 Aperture width: 1.7 mm
 Rib count: 68
 Riblets per rib interspace: 5
 Number of whorls: 4.5
 Umbilicus diameter: 1.0 mm, 23.8% of shell diameter
 Late juvenile whorl descension: 1.1°
 Body whorl descension: 3.4°

Christensenius jameyi n. sp.
(Fig. 108)

Type material: Holotype ANSP 130541; two paratypes (ANSP 501743: 2); all ex coll. BPBM.

Type locality: Kipu, Koloa District, Kauai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 22.9% of shell diameter; axial rib count 75; palatal barrier height order, tall to low: 3rd, 2nd, 1st, 4th, 5th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 3.5 mm; 4.75 whorls; apex moderately raised; spire protrusion 16.3% of shell height; shell height 52.3% of diameter; peristome moderately thickened, reflected sub-peripherally; low shoulder; apical suture crenulated; aperture lunate, expanded peripherally, obstructed; aperture height 85.7% of width; umbilicus width 22.9% of shell diameter; constricted decoiling; early and late juvenile whorl descension 2.4°, body whorl descension 5.9°. Sculpture: radial ribs present on embryonic whorls; early juvenile whorls rib interspace less than axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 75; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, bifid, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd low, thin, crescentic, extended between the 2nd and 3rd palatal barriers, gradual ascension; five palatal barriers, rapid ascension, not recessed, 1st columellar, crescentic, thin base, 2nd basal tall, crescentic, thin base, 3rd basal, tall, crescentic,



Fig. 108. *Christensenius jameyi*, 3.5 mm, ANSP 130541, HOLOTYPE, Kauai, Kipu.

slim, thin base, 4th sub-peripheral, low, crescentic, thin base, 5th supra-peripheral, low, evenly thickened, marginally crescentic. Palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.

Etymology: *Christensenius jameyi* is named to honor Jamey Van Der Merwe, co-caretaker of Kipu Kai, Kauai with his wife Anne Elisa Murray during our visit.

Christensenius jameyi Holotype

Shell diameter: 3.5 mm

Shell height: 1.83 mm, 52.3% of shell diameter

Spire protrusion: 0.3 mm, 16.3% of shell height

Aperture height: 1.2 mm, 85.7% of aperture width

Aperture width: 1.4 mm

Rib count: 75

Riblets per rib interspace: 2

Number of whorls: 4.75

Umbilicus diameter: 0.8 mm, 22.9% of shell diameter

Late juvenile whorl descension: 2.4°

Body whorl descension: 5.9°

Christensenius koloaensis n. sp.
(Figs. 109, 313)

Type material: Holotype SMNS-Z10157958 (ex MS 9010); four paratypes (MS 9689: 3, MS 8816: 1); all leg. M. Severns & R. Gage, Aug 17, 2011.

Type locality: Mahaulepu, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W.

Other material studied: 232 specimens from Kauai: Koloa District, Mahaulepu, leg. M. Severns & R. Gage Aug 17, 2011 (MS 8849: 3, MS8786: 4, MS 9696: 4, MS 9697: 11, MS 8785: 3, MS 8817: 4, MS 8759: 28, MS 8762: 33), leg. P. Sutter, Apr 10, 1996 (MS 8647: 8, MS 8610: 16), Aweoweonui, leg. M. Severns & R. Gage, March 2016 (MS 8756: 22, MS 8731: 13), Waiopili, leg. M. Severns & R. Gage Aug 16, 2011 (MS 8839: 12, MS 8633: 29, MS 8829: 8, MS 8836: 4, MS 8799: 9, MS 8830: 13, MS 8648: 5, MS 8833: 3).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known from Mahaulepu, Waiopili and Aweoweonui in the Koloa District, Kauai.

Diagnosis: Color pattern flammulated; shell: sub-turbinate; umbilicus width 28% of shell diameter; axial rib count 88; palatal barrier height order, tall to low: 3rd, 2nd, 1st, 4th, 5th.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 5.0 mm; 4.75 whorls; apex planar; spire protrusion 14.8% of shell height; shell

height 54% of diameter; peristome thickened, reflected sub-peripherally; low shoulder; apical suture initially crenulated; aperture reniform, expanded peripherally, flattened supra-peripherally, obstructed; aperture height 85% of width; umbilicus width 28% of shell diameter, constricted decoiling; late juvenile whorl descension 2°, body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace less than axial rib width, late juvenile rib interspace equals axial rib width, body rib interspace irregular, one to two times axial rib width; axial rib count 88; three riblets per rib interspace prior to alteration; sulcus-like depression. Barriers: two parietal barriers, equidistant on parietal wall, 1st tall, slim, bifid, rapid ascension, extended toward the 5th palatal barrier, 2nd low, evenly thickened, blade-like, gradual ascension, extended toward the 3rd palatal barrier; five palatal barriers, recessed, rapid ascension, 1st columellar, low, thick, truncate, 2nd basal, tall, evenly thickened, marginally crescentic, 3rd basal, tall, crescentic, 4th sub-peripheral, crescentic, evenly thickened, 5th supra-peripheral, thin, tall. Palatal barrier height order 3rd, 2nd, 1st, 4th, 5th.



Fig. 109. *Christensenius koloaensis*, 5.0 mm, SMNS-Z10157958 (ex MS 9010), HOLOTYPE, Kauai, Waiopili.

Etymology: Named for Koloa District where it is found at several fossil sites.

***Christensenius koloaensis* Holotype**

Shell diameter: 5.0 mm
 Shell height: 2.7 mm, 54% of shell diameter
 Spire protrusion: 0.4 mm, 14.8% of shell height
 Aperture height: 1.7 mm, 85% of aperture width
 Aperture width: 2.0 mm
 Rib count: 88
 Riblets per rib interspace: 3
 Number of whorls: 4.75
 Umbilicus diameter: 1.4 mm, 28% of shell diameter
 Late juvenile whorl descension: 2°
 Body whorl descension: 7°

***Christensenius regis* n. sp.**
 (Figs. 110, 314–316)

Type material: Holotype SMNS-ZI0157959 (ex MS 9226); seven paratypes (MS 9208: 1, MS 9209: 1, MS 9225: 5); all leg. M. Severns, R. Gage & J. Van Der Merwe, Apr 8, 2019.

Type locality: Kipu Kai, Lihue District, Kauai. 21°54'47.45"N, 159°23'20.50"W.

Other material studied: 333 specimens from Kauai: 132 specimens from Lihue District, Kipu Kai, leg. M. Severns, R. Gage and J. Van Der Merwe, Apr 8, 2019 (MS 9224: 112), Koloa District, Mahaulepu, leg. M. Severns & R. Gage, Aug 17, 2011 (MS 8810: 1, MS 8809: 1, MS 9006: 1, MS 9688: 15, MS 9692: 1), Aweoweonui, leg. M. Severns & R. Gage, March 2016 (MS 8732: 1). 201 specimens from Koloa District, Mahaulepu, leg. M. Severns & R. Gage Aug 17, 2011 (MS 8781: 3, MS 8757: 54, MS 8811: 23, MS 8596: 25, MS 8780: 27, MS 8812: 17, MS 8815: 2, MS 8779: 1, MS 8782: 17, MS 8798: 22, MS 8808: 1, MS 8814: 1, MS 9008: 1, MS 8806: 1), leg. R. Gage, Feb 27, 1996 (MS 8621: 1), leg. M. Severns & R. Gage Aug 17, 2011 (MS 8749: 1, MS 8807: 1, MS 6433: 1, MS 8820: 1), leg. P. Sutter, 1996 (MS 8788: 1).

Status and Distribution: Extant. Presumed extinct. Known only from Kipu Kai in Lihue District, Aweoweonui and Mahaulepu in Koloa District, Kauai.

Diagnosis: Color pattern flammulated; shell turritate; umbilicus width 22% of shell diameter; axial rib count 65; palatal barrier height order, tall to low: 4th, 2nd, 1st, 3rd, 5th.

Description: Color: flammulated. Shell: turritate, tall; diameter 5.0 mm; 5.25 whorls; apex raised; spire protrusion 20.8% of shell height; shell height 62.4% of diameter; peristome thickened, reflected sub-peripherally; sloping shoulder; apical suture crenulated, shallow; aperture lunate, expanded peripherally, slightly flattened supra-peripherally, moderately obstructed; aperture height 81.8% of width; umbilicus width 22% of shell diameter, constricted decoiling; early juvenile whorl descension 3°, late juvenile whorl descension 4° body whorl descension 8°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two to three times axial rib width, body rib interspace irregular, two to four times axial rib width; axial rib count 65; two riblets per rib interspace prior to alteration; faint spiral cords.

Barriers: two parietal barriers, 1st evenly thickened, bifid, gradual ascension, extended toward 5th palatal barrier, 2nd low, marginally crescentic, rapid ascension, extended between the 2nd and 3rd palatal barriers; five palatal barriers, 1st columellar, low, thick, crescentic, rapid ascension, 2nd basal, crescentic, evenly thickened, rapid ascension, 3rd basal, tall, evenly thickened, crescentic, rapid ascension, 4th sub-peripheral, low, thin, marginally crescentic, gradual ascension, 5th supra-peripheral, low, thin, marginally crescentic, gradual ascension. Palatal barrier height order 4th, 2nd, 1st, 3rd, 5th.



Fig. 110. *Christensenius regis*, 5.0 mm, SMNS-ZI0157959 (ex MS 9226), HOLOTYPE, Kauai, Kipu Kai.

Remarks: Specimens from Kipu Kai still had periostracum while all others were fossil.

Etymology: Named to recognize its commanding shape.

***Christensenius regis* Holotype**

Shell diameter: 5.0 mm

Shell height: 3.12 mm, 62.4% of shell diameter

Spire protrusion: 0.65 mm, 20.8% of shell height

Aperture height: 1.8 mm, 81.8% of aperture width

Aperture width: 2.2 mm

Rib count: 65

Riblets per rib interspace: 2

Number of whorls: 5.25

Umbilicus diameter: 1.1 mm, 22% of shell diameter

Late juvenile whorl descension: 4°

Body whorl descension: 8°

***Christensenius antiquus* (Solem, 1977)**

(Figs. 111, 112)

Cookeconcha antiqua Solem, 1977: 905–906.

Type material: Holotype USNM 214243.

Type Locality: Midway, Sand Island core (S-22) at 42.4 m depth in coarse foraminifera sand.

Material studied: One specimen from Sand Island, Midway Atoll, Northwest Hawaiian Islands.

Status and Distribution: Late Pleistocene fossil. Extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 35.3% of shell diameter; axial rib count 75; palatal barrier height order, tall to low: 5th, 4th, 3rd, 2nd, 1st.

Redescription: Color: flammulated. Shell: sub-discoidal, expanded laterally; diameter 1.7 mm; 3.25 whorls; apex raised; spire protrusion 4.6% of shell height; shell height 63.5% of diameter; peristome evenly thickened; low shoulder; apical suture crenulated, canaliculate; aperture reniform, expanded peripherally, obstructed; aperture



Fig. 111. *Christensenius antiquus*, 1.7 mm, USNM 214243, HOLOTYPE, Midway.



Fig. 112. *Christensenius antiquus*, 1.7 mm, USNM 214243, HOLOTYPE, Midway.

height 95.4% of width; umbilicus width 35.3% of shell diameter, gradual decoiling; late juvenile whorl descension 1° , body whorl descension 7° . Sculpture, embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace 1.5 times axial rib width; body rib interspace irregular, two to three times axial rib width; axial rib count 75; two to four riblets between axial ribs after alteration. Barrier: two parietal barriers, equidistant on parietal wall, 1st tall, crescentic, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd low, crescentic, gradual ascension, extended between the 2nd and 3rd palatal barriers; Five palatal barriers, 1st columellar, truncate, low, gradual ascension, 2nd basal, truncate, low, broad base, rapid ascension, 3rd basal, tall, crescentic, broad base, rapid ascension, 4th sub-peripheral, low, thick, ascension rapid, 5th supra-peripheral, crescentic, thick base, recessed, gradual ascension. Palatal barrier height order 5th, 4th, 3rd, 2nd, 1st.

Remarks: Midway endodontid land shells were found at a depth of 35–40 m in a Late Pleistocene core sample (Ladd et al., 1970). No precise age is given for the

stratigraphy containing the endodontid shells, though the Late Pleistocene is dated as c. 129,000 B.C.E. to c. 11,700 B.C.E.

Etymology: According to Solem (1977): “The specific name *C. antiquus* refers to the fossiliferous nature of the find and the total absence of living endodontids from Midway Atoll.”

Christensenius antiquus Holotype

Shell diameter: 1.7 mm

Shell height: 1.08 mm, 63.5% of shell diameter

Spire protrusion: 0.05 mm, 4.6% of shell height

Aperture height: 0.62 mm, 95.4% of aperture width

Aperture width: 0.65 mm

Rib count: 75

Riblets per rib interspace: two to 4

Number of whorls: 3.25

Umbilicus diameter: 0.6 mm, 35.3% of shell diameter

Late juvenile whorl descension: 1°

Body whorl descension: 7°

Cookeconcha Solem, 1976

Type species: *Cookeconcha hystrix* (Pfeiffer, 1846) [replacement name for *Cookeconcha setigera* (Gould, 1844)] (Fig. 113). **Diagnosis:** Two parietal barriers, no (0) palatal barriers. **Includes:** 15 species, 4 nominal plus 11 newly described herein (Fig. 115) distributed on Hawaii (3), Maui (2), Molokai (4), Oahu (4), and Kauai (3) (Fig. 114).



Fig. 113. *Cookeconcha hystrix* (Pfeiffer, 1846) [replacement name for *Cookeconcha setigera* (Gould, 1844)], type species of *Cookeconcha* Solem, 1976; 5.3 mm, ANSP 47770, Oahu.

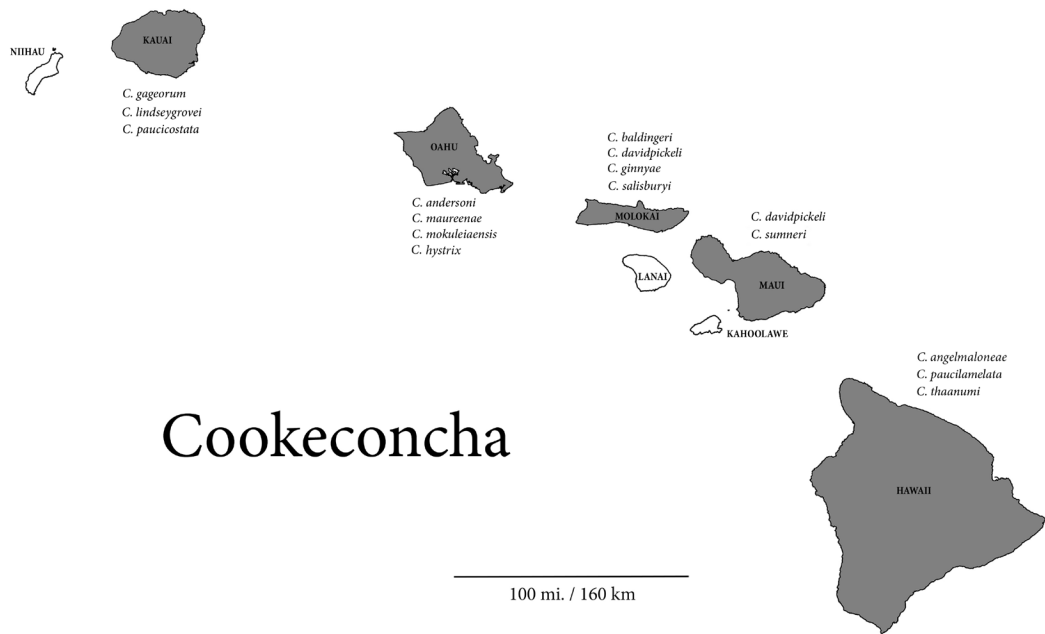


Fig. 114. Distributions of the species of *Cookeconcha* in the Hawaiian archipelago.

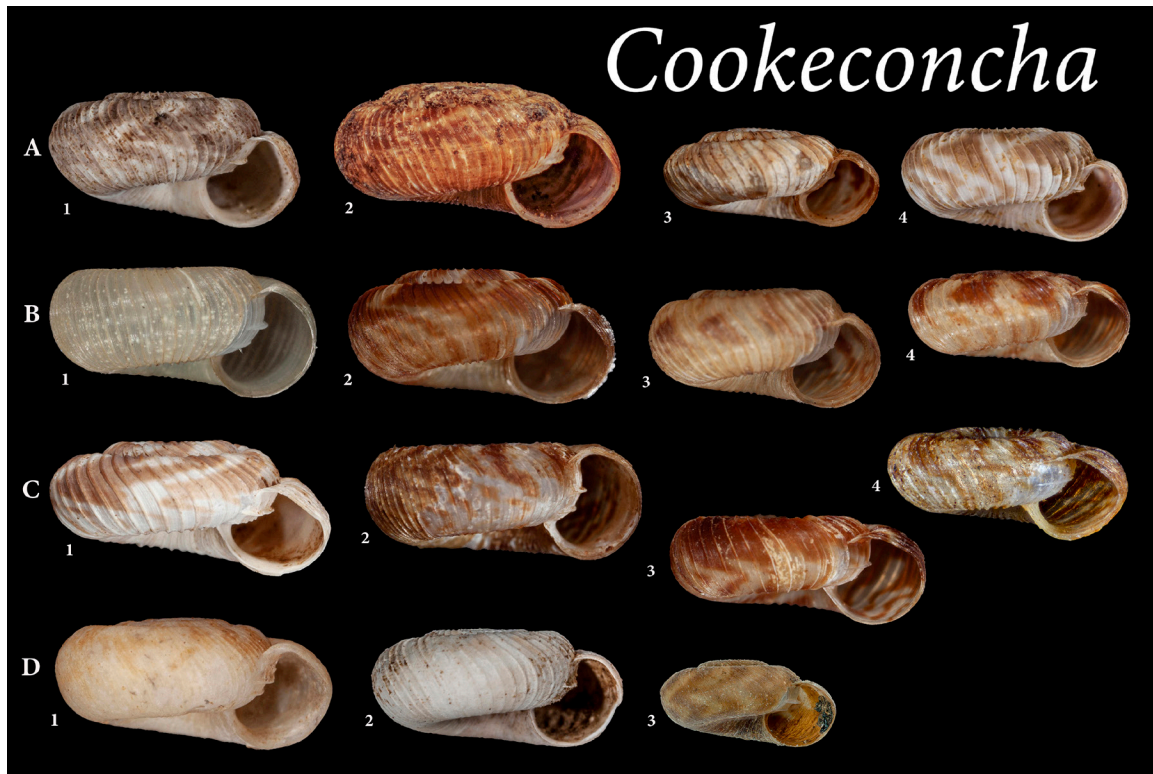


Fig. 115. Scaled images of specimens of the 15 species of the genus *Cookeconcha*.

Row A: Hawaii & Maui

- (1) *Cookeconcha paucilamellata*, 5.0 mm, SMNS-ZI0157994 (ex MS 9173), Neotype, Hawaii
- (2) *Cookeconcha thaanumi*, 5.7 mm, ANSP 89245, Lectotype, Hawaii
- (3) *Cookeconcha angelmaloneae*, 4.3 mm, ANSP 59381, Holotype, Hawaii
- (4) *Cookeconcha sumneri*, 4.5 mm, SMNS-ZI0157963 (ex MS 8653), Holotype, Maui

Row B: Molokai

- (1) *Cookeconcha salisburyi*, 5.3 mm, ANSP 130573, Holotype
- (2) *Cookeconcha ginnyae*, 5.3 mm, ANSP 108641, Holotype
- (3) *Cookeconcha davidpickeli*, 4.6 mm, ANSP 108377, Holotype
- (4) *Cookeconcha baldingeri*, 4.4 mm, ANSP 264731, Holotype

Row C: Oahu

- (1) *Cookeconcha maureenae*, 5.6 mm, ANSP 386247, Holotype
- (2) *Cookeconcha mokuleiaensis*, 5.5 mm, ANSP 501754, Holotype
- (3) *Cookeconcha andersoni*, 5.1 mm, ANSP 130572, Holotype
- (4) *Cookeconcha hystrix*, 4.8 mm, ANSP 58140, Paralectotype

Row D: Kauai

- (1) *Cookeconcha lindseygrovei*, 5.5 mm, ANSP 130568, Holotype
- (2) *Cookeconcha gageorum*, 5.0 mm, SMNS-ZI0157962 (ex MS 8629), Holotype
- (3) *Cookeconcha paucicostata*, 3.5 mm, MCZ 17271, Lectotype

Cookeconcha angelmaloneae n. sp.
(Fig. 116)

Type material: Holotype ANSP 59381; two paratypes (ANSP 501747: 2); all ex coll. A.D. Brown.

Type locality: Sandwich (Hawaiian) Islands. Probably Hawaii Island.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 31.4% of shell diameter; axial rib count 52.

Description: Color: flammulated, periostracum a mahogany brown. Shell: sub-discoidal, slightly expanded laterally; diameter 4.3 mm; 4.5 whorls; apex planar; spire protrusion 10% of shell height; shell height 46.5% of diameter; peristome evenly thickened, thin, slightly reflected basally; raised shoulder; apical suture crenulated, impressed; aperture lunate, flattened supra-peripherally, unobstructed; aperture height 87.5% of width; umbilicus 31.4% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 3°, body whorl descension 4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile rib interspace three times axial rib width, body rib interspaces irregular, three to four times axial rib width; axial rib count 52; five riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st elevated, blade-like, gradual ascension, 1/3rd down the parietal wall, 2nd diminutive, crenulated, 2/3rds down the parietal wall. No palatal barriers.



Fig. 116. *Cookeconcha angelmaloneae*, 4.3 mm, ANSP 59381, HOLOTYPE, Sandwich (Hawaiian) Islands (probably Hawaii Island).

Remarks: Though there is no specific collecting data for *Cookeconcha angelmaloneae*; this species, in spire height and aperture shape, resembles *C. thaunumi* from Kaiwika and *C. paucilamellata* from Palihoukapapa, locations at the distal ends of the Hamakua Forest, on the Island of Hawaii.

Etymology: Named to honor a brilliant, almost immortal and deeply loved Hawaii woman, Angel Blessing Buquing Kamahele Malone of Kona. Angel diagnosed the disease that led to me having to put-down my dear friend and companion, the spectacular cattle dog Kaupo Kobe.

Cookeconcha angelmaloneae Holotype

Shell diameter: 4.3 mm

Shell height: 2.0 mm, 46.5% of shell diameter

Spire protrusion: 0.2 mm, 10% of shell height

Aperture height: 1.4 mm, 87.5% of aperture width

Aperture width: 1.6 mm

Rib count: 52

Riblets per rib interspace: 5

Number of whorls: 4.5

Umbilicus diameter: 1.35 mm, 31.4% of shell diameter

Late juvenile whorl descension: 3°

Body whorl descension: 4°

Cookeconcha paucilamellata (Ancy, 1904)
(Figs. 117, 317, 318)

Endodonta hystricella var. *paucilamellata* Ancy, 1904: 65-71 — unaccepted > superseded combination.

Cookeconcha paucilamellata (Ancy, 1904) — Solem, 1976: 219.

Type material: Neotype SMNS-ZI0157994 (ex MS 9173) [designated here], leg. David Walker, Aug 27, 1946.

Type locality: Palihoukapapa, Hamakua District, Hawaii.

Other Material studied: 27 specimens from Hawaii: Hamakua District, Palihoukapapa, leg. D. Walker, Aug 27, 1946 (MS 8608: 21, MS 9174: 1, MS 8607: 1, MS 8869: 1), Kohala District, Waikii (ANSP 130575: 3), ex coll. BPBM.

Status and Distribution: Extant. Presumed extinct. Known from Palihoukapapa in the Hamakua District and Waikii in South Kohala District.

Diagnosis: Color pattern flammulated; shell sub-discoidal, depressed; umbilicus width 26% of shell diameter; axial rib count 65.

Redescription: Color: flammulated. Shell: sub-discoidal, depressed, slightly compressed laterally, sulcate; diameter 5.0 mm; 4.25 whorls, apex sunken; spire protrusion 7.4% of shell height; shell height 54% of diameter; peristome thick, reflected; flattened shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, flattened supra-peripherally, unobstructed; aperture height 90% of width; umbilicus 26% of shell diameter, constricted decoiling; late juvenile whorl descension 1.4°; body whorl descension 13°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib width, late juvenile rib interspaces three to four times axial rib width, post alteration rib interspaces irregular, two to four times axial rib width; axial rib count 65; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st low, blade-like, smoothly crested, gradual ascension, halfway down the parietal wall, 2nd diminutive, crenulated, gradual ascension, $\frac{3}{4}$ the way down the parietal wall. No palatal barriers.



Fig. 117. *Cookeconcha paucilamellata*, 5.0 mm, SMNS-ZI0157994 (ex MS 9173), NEOTYPE, Hawaii, Palihoukapapa.

Remarks: From fossils found at Palihoukapapa on the island of Hawaii, Ancey (1904) described *Endodonta hystricella* var. *paucilamellata* as having two parietal barriers and no palatal barriers. However, *Helix hystricellus* Pfeiffer, 1859 has two parietal barriers and four palatal barriers. Solem correctly treated *E. hystricella* var. *paucilamellata* as a species-level taxon, *Cookeconcha paucilamellata* (Solem, A. 1976, Part 1: 219). The species is distinct from all other endodontid species, however no type specimens were located. The author examined 27 specimens collected by David Walker in 1946 from Ancey's type locality of Palihoukapapa and selected the neotype: SMNS-ZI0157994 (ex MS 9173).

Etymology: Name may refer to the lack of palatal barriers.

Cookeconcha paucilamellata Neotype.

Shell diameter: 5.0 mm

Shell height: 2.7 mm, 54% of shell diameter

Spire protrusion: 0.2 mm, 7.4% of shell height

Aperture height: 1.8 mm, 90% of aperture width

Aperture width: 2.0 mm

Rib count: 65

Riblets per rib interspace: 4

Number of whorls: 4.25

Umbilicus diameter: 1.3 mm, 26% of shell diameter

Late juvenile whorl descension: 1.4°

Body whorl descension: 13°

Cookeconcha thaanumi (Pilsbry & Vanatta, 1905)
(Figs. 118, 319)

Endodonta thaanumi Pilsbry & Vanatta, 1905: 574–575 —
unaccepted > superseded combination.

Cookeconcha thaanumi (Pilsbry & Vanatta, 1905) —
Solem, 1976: 219, 220.

Type material: Lectotype ANSP 89245 [designation attributed to Baker, 1963: 233]; paralectotype ANSP 455279; both leg. Thaanum, 1905.

Type locality: Kaiwika, Hilo District, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known from Kaiwika, Hilo District and Olaa, Puna District, island of Hawaii.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 26.3% of shell diameter; axial rib count 69.

Redescription: Color: flammulated. Shell: sub-discoidal; diameter 5.7 mm; 5 whorls; apex planar; spire protrusion 15.5% of shell height; shell height 50.9% of diameter; peristome evening thickened, thin, slightly reflected basally; raised shoulder; apical suture crenulated, canaliculate; aperture lunate, expanded peripherally, flattened supra-peripherally, unobstructed; aperture height 86.4% of width; umbilicus constricted, 26.3% of shell diameter, constricted decoiling; late juvenile whorl descension 2.5°; body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib width, late juvenile rib interspaces three to four times axial rib width, post alteration rib interspaces irregular, two to four times axial rib width; axial rib count 69; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crenulated, gradual ascension, halfway down the parietal wall, 2nd diminutive, crenulated, gradual ascension, $\frac{3}{4}$ the way down the parietal wall. No palatal barriers.



Fig. 118. *Cookeconcha thaanumi*, 5.7 mm, ANSP 89245, LECTOTYPE, Hawaii, Kaiwiki.

Remarks: Examination of material from Molokai (FMNH 46237: Kaluaaha) and Maui (ANSP 89242: Honokawai Gulch) previously identified as *C. thaanumi*, are shown to be *Cookeconcha ginnyae* n. sp. from Molokai and *Cookeconcha sumneri* n. sp., from Maui, respectively. This restricts the range of *C. thaanumi* to Kaiwiki, Hilo District and Olaa, Puna District, Hawaii.

Etymology: Named to honor D. Thaunum of Hilo, Hawaii.

***Cookeconcha thaanumi* Lectotype**

Shell diameter: 5.7 mm
 Shell height: 2.9 mm, 50.9% of shell diameter
 Spire protrusion: 0.45 mm, 15.5% of shell height
 Aperture height: 1.9 mm, 86.4% of aperture width
 Aperture width: 2.2 mm
 Rib count: 69
 Riblets per rib interspace: 4
 Number of whorls: 5
 Umbilicus diameter: 1.5 mm, 26.3% of shell diameter
 Late juvenile whorl descension: 2.5°
 Body whorl descension: 7°

***Cookeconcha sumneri* n. sp.**
 (Figs. 119, 320–322)

Type material: Holotype SMNS-ZI0157963 (ex MS 8653); six paratypes (MS 8964: 1, MS 8652: 1, MS 9193: 1, MS 9194: 1, MS 9195: 1, MS 8307: 1); all leg. H. James, Apr 1988.

Type locality: Puu Makua Cave, 1350.6 m, Honuaula Moku, Makawao District, Maui. 20°39'15.09"N, 156°21'24.04"W.

Other material studied: 1110 specimens from Maui: Makawao District, Honuaula Moku, Puu Makua Cave, 1350.6 m, leg. H. James, Apr 11 to 20, 1988 (MS 8651:

332, MS 8962: 212, MS 8968: 153, MS 8969: 161, MS 8971: 18, MS 8973: 6, MS 8974: 4, MS 8579: 2, MS 9197: 6, MS 8967: 1), Waihou Spring Cave, 1247.2 m, leg. M. Severns, P. Fiene & S. Olson, Mar. 2, 1988 (MS 8639: 1, MS 9206: 31, MS 8640: 109, MS 8970: 42, MS 8975: 3, MS 8646: 1), Hana District, Kahikinui Moku, Auwahi Cave, 1203.7 m, leg. M. Severns, May 1982 (MS 9196: 2, MS 9000: 2, MS 8656: 7, MS 8972: 8), Honokawai, leg. D. Thaunum (ANSP 89242: 9).

Status and Distribution: Holocene fossil. Presumed extinct. Known from Puu Makua Cave at 1350.6 m, Waihou Spring Cave at 1247.2 m, Honuaula Moku, Makawao District, and Auwahi Cave at 1203.7 m, Kahikinui Moku, Hana District, Maui.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 30% of shell diameter; axial rib count 45.

Description: Color: flammulated. Shell: discoidal, slightly compressed laterally; diameter 4.5 mm; 4.5 whorls; apex planar; spire protrusion 3.6% of shell height; shell height 62.2% of diameter; peristome evenly thickened, thin, not reflected; raised shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, slightly constricted supra-peripherally, unobstructed; aperture height 88.2% of width; umbilicus 30% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 1°, body whorl descension 9.6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace one to 1.5 times axial rib width, late juvenile rib interspace three times axial rib width, body whorl rib interspace irregular, three to four times axial rib width; axial rib count 45; three riblets per rib interspace prior to alteration. Barriers parietal barriers, 1st low, thick, rapid ascension, halfway down the parietal wall, 2nd diminutive, crenate, 3/4th down the parietal wall. No palatal barriers.



Fig. 119. *Cookeconcha sumneri*, 4.5 mm, SMNS-ZI0157963 (ex MS 8653), HOLOTYPE, Maui, Puu Makua Cave.

Etymology: Named for Sumner Erdman, cattlemen and maka aina'na (watcher of the land) of Ulupalakua.

***Cookeconcha sumneri* Holotype**

Shell diameter: 4.5 mm
 Shell height: 2.8 mm, 62.2% of shell diameter
 Spire protrusion: 0.1 mm, 3.6% of shell height
 Aperture height: 1.5 mm, 88.2% of aperture width
 Aperture width: 1.7 mm
 Rib count: 45
 Riblets per rib interspace: 3
 Number of whorls: 4.5
 Umbilicus diameter: 1.35 mm, 30% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 9.6°

***Cookeconcha davidpickelli* n. sp.**
 (Fig. 120)

Type material: Holotype ANSP 108377; nine paratypes (ANSP 501750 ex 108377: 9); both leg. D. Thaanum, Pillsbury Exp., 1913.

Type locality: Kalamaula, Palaau Moku, Molokai.

Status and Distribution: Extant. Presumed extinct. Known from the type locality on Molokai and Honokawai Valley, Lahaina District, Maui.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 28.2% of shell diameter; axial rib count 52.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 4.6 mm; 4.7 whorls; apex sunken; spire protrusion 6.3% of shell height; shell height 52.2% of diameter; peristome, evenly thickened, thin, moderately reflected basally; raised shoulder; apical suture crenulated, impressed; aperture lunate, slightly constricted supra-peripherally, unobstructed; aperture height 92.1% of width; umbilicus 28.2% of shell diameter; constricted decoiling; late juvenile whorl descension 1°, body whorl descension 4.6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace 2.5 times axial rib width, body whorl rib interspace irregular three to four times axial rib width; axial rib count 52; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st low, blade-like, gradual ascension, 1/3rd down the parietal wall, 2nd low, diminutive, crenulated, 2/3rd down the parietal wall. No palatal barriers.



Fig. 120. *Cookeconcha davidpickelli*, 4.6 mm, ANSP 108377, HOLOTYPE, Molokai, Kalamaula.

Remarks: I could not reliably separate specimens of *Cookeconcha davidpickelli* from Molokai and Maui. Thus, this species is one of four known to occur on more than one island. The other three species, *Liiliiliconcha maui*, *L. johnstarkeri* and *Randallius fisheri*, are smaller and similar to each other in size (2 mm), which no doubt aides dispersal (see also Remarks for *Liiliiliconcha maui*).

Etymology: Named to honor my longtime friend and editor, David Pickell.

***Cookeconcha davidpickelli* Holotype**

Shell diameter: 4.6 mm
 Shell height: 2.4 mm, 52.2% of shell diameter
 Spire protrusion: 0.15 mm, 6.3% of shell height
 Aperture height: 1.75 mm, 92.1% of aperture width
 Aperture width: 1.9 mm
 Rib count: 52
 Riblets per rib interspace: 3
 Number of whorls: 4.7
 Umbilicus diameter: 1.3 mm, 28.2% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 4.6°

***Cookeconcha baldingeri* n. sp.**
 (Fig. 121)

Type material: Holotype ANSP 264731; three paratypes (ANSP 501749: 3); all leg. D. Thaanum, ex coll. Brooklyn Museum.

Type locality: Molokai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 31.8% of shell diameter; axial rib count 46.

Description: Color: flammulated. Shell: discoidal; diameter 4.4 mm; 4.6 whorls; apex planar; spire protrusion 10.5% of shell height; shell height 43.2% of diameter; peristome, evenly thickened, thin, sub-peripherally reflected; raised shoulder; apical suture crenulated, shallow; aperture lunate, expanded peripherally, slightly constricted supra-peripherally, unobstructed; aperture height 91.2% of width; umbilicus 31.8% of shell gradual decoiling; late juvenile whorl descension 3°, body whorl descension 6.8°; Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace one to 1.5 times axial rib width, late juvenile rib interspace 2.5 times axial rib width, body whorl rib interspace irregular, three to four times axial rib width; axial rib count 46; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, blade-like, gradual ascension, 2/5th down the parietal wall, 2nd crenulated, diminutive, 3/5th down the parietal wall. No palatal barriers.



Fig. 121. *Cookeconcha baldingeri*, 4.4 mm, ANSP 264731, HOLOTYPE, Molokai.

Etymology: Named to honor Adam Baldinger, Collection Manager for Malacology at the Museum of Comparative Zoology and a steadfast resource during this long project, and others.

***Cookeconcha baldingeri* Holotype**

Shell diameter: 4.4 mm
 Shell height: 1.9 mm, 43.2% of shell diameter
 Spire protrusion: 0.2 mm, 10.5% of shell height
 Aperture height: 1.55 mm, 91.2% of aperture width
 Aperture width: 1.7 mm
 Rib count: 46
 Riblets per rib interspace: 4
 Number of whorls: 4.6

Umbilicus diameter: 1.4 mm, 31.8% of shell diameter
 Late juvenile whorl descension: 3°
 Body whorl descension: 6.8°

***Cookeconcha ginnyae* n. sp.**

(Figs. 122, 323)

Type material: Holotype ANSP 108641; five paratypes (ANSP 501751: 5); all leg. H.A. Pilsbry & C. M. Cooke, Jan 26, 1913.

Type locality: Near tunnel entrance, Kalihi-Kaunakakai, Kona Moku Molokai.

Other material studied: 133 specimens from Molokai: Kona Moku, Kalihi-Kaunakakai, leg. Pilsbry & Cooke, Jan 26, 1913 (ANSP 505235: 132), Kaluaaha (FMNH 46237: 1).

Status and Distribution: Extant. Presumed extinct. Known from Kalihi-Kaunakakai and Kaluaaha, Molokai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 28.3% of shell diameter; axial rib count 60.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 5.3 mm; 4.75 whorls; apex sunken; spire protrusion 11.1% of shell height; shell height 50.9% of diameter; peristome, evenly thickened, thin, not reflected; low shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, moderately constricted supra-peripherally, unobstructed; aperture height 86.4% of width; umbilicus 28.3% of shell diameter, constricted decoiling; late juvenile whorl descension 1°, body whorl descension 6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile



Fig. 122. *Cookeconcha ginnyae*, 5.3 mm, ANSP 108641, HOLOTYPE, Molokai, Kalihi-Kaunakakai.

rib interspace two times axial rib width, body whorl rib interspace irregular three to four times axial rib width; axial rib count 60; three riblets per rib interspace prior to alteration. Barrier: two parietal barriers, 1st diminutive, crenulate, halfway down the parietal wall, 2nd hair-thin, diminutive, crenulated, $\frac{3}{4}$ way down the parietal wall. No palatal barriers.

Etymology: Named for Virginia Kinzey, my first true traveling partner who is no doubt still traveling, somewhere.

***Cookeconcha ginnyae* Holotype**

Shell diameter: 5.3 mm

Shell height: 2.7 mm, 50.9% of shell diameter

Spire protrusion: 0.3 mm, 11.1% of shell height

Aperture height: 1.9 mm, 86.4% of aperture width

Aperture width: 2.2 mm

Rib count: 60

Riblets per rib interspace: 3

Number of whorls: 4.75

Umbilicus diameter: 1.5 mm, 28.3% of shell diameter

Late juvenile whorl descension: 1

Body whorl descension: 6°

***Cookeconcha salisburyi* n. sp.**

(Figs. 123, 324, 325)

Type material: Holotype ANSP 130573, ex coll. BPBM.

Type locality: Pali Pelekuni, Kona Moku, Molokai.

Other material studied: Four specimens from Molokai: Kona Moku, Waihee, ex coll. BPBM (ANSP 130571: 2), Kaunakakai, leg. Pilsbry & Cooke, 1913 (ANSP 108878: 2).

Status and Distribution: Extant. Presumed extinct. Known from Pali Pelekuni, the pipeline trail above Kaunakakai, and Waihee, Kona Moku, Molokai.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 32% of shell diameter; axial rib count 57.

Description: Color: indiscernible. Shell: discoidal, slightly compressed laterally; diameter 5.3 mm; 4.4 whorls; apex sunken; spire protrusion 4% of shell height; shell height 2.5 mm, 47.2% of diameter; peristome, thin, not reflected; raised shoulder; apical suture crenulated; aperture reniform, unobstructed; aperture height equal to width; umbilicus 32% of shell diameter, open decoiling; late juvenile whorl descension 1°; body whorl descension

5°. Sculpture: embryonic sculpture present; early juvenile whorls rib interspace two times axial rib width, late juvenile rib interspace three times axial rib width, body whorl rib interspace irregular three to four times axial rib width; axial rib count 57; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st moderately tall, blade-like, gradual ascension, 2nd low, blade-like, crenate, gradual ascension, $\frac{1}{4}$ way down the parietal wall. No palatal barriers.



Fig. 123. *Cookeconcha salisburyi*, 5.3 mm, ANSP 130573, HOLOTYPE, Molokai, Pelekuni Pali.

Etymology: Named to honor Richard Salisbury, a meticulous malacologist and friend.

***Cookeconcha salisburyi* Holotype**

Shell diameter: 5.3 mm

Shell height: 2.5 mm, 47.2% of shell diameter

Spire protrusion: 0.1 mm, 4% of shell height

Aperture height: 2.1 mm, equal to aperture width

Rib count: 57

Riblets per rib interspace: 4

Number of whorls: 4.4

Umbilicus diameter: 1.7 mm, 32% of shell diameter

Late juvenile whorl descension: 1°

Body whorl descension: 5°

***Cookeconcha andersoni* n. sp.**

(Fig. 124)

Type material: Holotype ANSP 130572; four paratypes (ANSP 501752: 4); all ex coll. BPBM.

Type locality: Palehua, Waianae District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 35.2% of shell diameter; axial rib count 50.

Description: Color: flammulated. Shell: discoidal, depressed, slightly expanded laterally; diameter 5.1 mm; 4.5 whorls; apex sunken; spire protrusion 4.5% of shell height; shell height 43.1% of diameter; peristome, evenly thin, not reflected; high shoulder; apical suture canaliculate; aperture lunate, constricted supra-peripherally, unobstructed; aperture height 90% of width; umbilicus 35.2% of shell diameter, gradual decoiling; late juvenile whorl descension 1°, body whorl descension 3°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace less than four times axial rib width, body whorl rib interspace irregular, three or four times the axial rib width; axial rib count 50; five riblets per rib interspace prior to alteration. Barrier: two parietal barriers, 1st blade-like, crenate, gradual ascension, 2nd low, thin, crenate, gradual ascension, ¾ way down the parietal wall. No palatal barriers.



Fig. 124. *Cookeconcha andersoni*, 5.1 mm, ANSP 130572, HOLOTYPE, Oahu, Palehua.

Etymology: Named for my good friend and fellow world traveler, Joan Anderson, born a Scot and now a true Maui kama'aina.

***Cookeconcha andersoni* Holotype**

Shell diameter: 5.1 mm
 Shell height: 2.2 mm, 43.1% of shell diameter
 Spire protrusion: 0.1 mm, 4.5% of shell height
 Aperture height: 1.8 mm, 90% of aperture width
 Aperture width: 2.0 mm
 Rib count: 50
 Riblets per rib interspace: 5
 Number of whorls: 4.5
 Umbilicus diameter: 1.8 mm, 35.2% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 3°

***Cookeconcha maureenae* n. sp.**
 (Figs. 125, 326, 327)

Type material: Holotype ANSP 386247; one paratype (ANSP 501753: 1); both leg. O. Oswald, Apr 24, 1938.

Type locality: As described by Oswald; southerly, ravine 10, northerly spur being junction of trails, mile post 11.5, Mauna Kapu Trail and Gown Trail, 21° 26' N, 158° 06' W, Pohakea Pass, Waianae District, Oahu.

Other material studied: 73 specimens from Oahu: Waianae District, Lualualei, leg. O. Oswald, Oct 14, 1928 (ANSP 377791: 5), leg. O. Oswald, Jan 3, 1932 (ANSP 386187: 1), Pohakea, leg. O. Oswald, Apr 9, 1938, (ANSP 386215: 2, ANSP 386217: 13), Lualualei, leg. O. Oswald, Apr 15, 1938 (ANSP 386227: 1), leg. O. Oswald, Jun 5, 1938 (ANSP 386233: 11), Wailua District, Kawaiiloa, leg. O. Oswald, Jun 7, 1941 (ANSP 379554: 2), southerly, ravine 12, mile post 14, Gowen Trail, Pohakea Pass, leg. O. Oswald, May 15, 1938 (ANSP 503405 ex 383583: 3), southerly, southerly half of ravine 10, Gowen Trail, Pohakea Pass, leg. O. Oswald, May 1, 1938 (ANSP 383582C: 8), southerly, ravine 11, mile post 13.5, Gowen Trail, Pohakea Pass, leg. O. Oswald, May 1, 1938 (ANSP 383581A: 10), ravine 7, southerly side Gowen Trail, Pohakea Pass, leg. O. Oswald, May 15, 1938 (ANSP 383580: 1), southerly along trail, ravine 8, stream bed, Gowen Trail, Pohakea Pass, leg. O. Oswald, Apr 24, 1938 (ANSP 383578G: 11), southerly along trail, ravine 9, stream bed, Gowen Trail, Pohakea Pass, leg. O. Oswald, Apr 24, 1938 (ANSP 383577B: 5).

Status and Distribution: Extant. Presumed extinct. Known from Pohakea Pass and Lualualei, Waianae District, Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal, depressed; umbilicus width 31.2% of shell diameter; axial rib count 45.

Description: Color: flammulated. Shell: sub-discoidal, depressed, expanded laterally; diameter 5.6 mm; 4.85 whorls; apex sunken; spire protrusion 11.1% of shell height; shell height 48.2% of diameter; peristome, thin, basally reflected; low shoulder; apical suture crenulated shallow; aperture lunate, expanded peripherally, flattened supra-peripherally, unobstructed; aperture height 80.9% of width; umbilicus 31.2% of shell diameter, constricted decoiling; late juvenile whorl descension 1°, body whorl descension 3°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace 2.5 times axial rib width, body whorl rib interspace irregular, two or four times the axial rib width; axial rib count 45; four riblets per rib

interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, crenate, gradual ascension, 2nd low, thin, crenate, diminutive, ¾ way down the parietal wall. No palatal barriers.



Fig. 125. *Cookeconcha maureenae*, 5.6 mm, ANSP 386247, HOLOTYPE, Oahu, Pohakea Pass.

Etymology: Named for Maureen (Mo) Crowley, an extraordinary wife and friend.

***Cookeconcha maureenae* Holotype**

Shell diameter: 5.6 mm
 Shell height: 2.7 mm, 48.2% of shell diameter
 Spire protrusion: 0.3 mm, 11.1% of shell height
 Aperture height: 1.7 mm, 80.9% of aperture width
 Aperture width: 2.1 mm
 Rib count: 45
 Riblets per rib interspace: 4
 Number of whorls: 4.85
 Umbilicus diameter: 1.75 mm, 31.2% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 3°

***Cookeconcha mokuleiaensis* n. sp.**
 (Fig. 126)

Type material: Holotype ANSP 501754; four paratypes (ANSP 130569: 4); all ex coll. BPBM.

Type locality: Mokuleia, Waialua District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 38.2% of shell diameter; axial rib count 72.

Description: Color: flammulated. Shell: discoidal, slightly compressed laterally; diameter 5.5 mm; 4.5 whorls apex planar; spire protrusion, none; shell height 41.8% of

diameter; peristome, evenly thickened, thin, sub-peripherally reflected; high shoulder; apical suture canaliculate; aperture reniform, unobstructed; aperture width 86.3% of height; umbilicus 38.2% of shell diameter, open decoiling; late juvenile whorl descension 0°, body whorl descension 2°. Sculpture: embryonic sculpture absent; late juvenile whorl rib interspace less than three times axial rib width, body whorl rib interspace irregular, three or four times the axial rib width; axial rib count 72; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, blade-like, gradual ascension, 2nd low, thick, gradual ascension, ¾ down the parietal wall. No palatal barriers.



Fig. 126. *Cookeconcha mokuleiaensis*, 5.5 mm, ANSP 501754, HOLOTYPE, Oahu, Mokuleia.

Etymology: Named for the type locality Mokuleia, Oahu.

***Cookeconcha mokuleiaensis* Holotype**

Shell diameter: 5.5 mm
 Shell height: 2.3 mm, 41.8% of shell diameter
 Spire protrusion: none
 Aperture height: 2.2 mm
 Aperture width: 1.9 mm, 86.3% of aperture height
 Rib count: 72
 Riblets per rib interspace: 4
 Number of whorls: 4.5
 Umbilicus diameter: 2.1 mm, 38.2% of shell diameter
 Late juvenile whorl descension: 0°
 Body whorl descension: 2°

***Cookeconcha hystrix* (Pfeiffer, 1846)**
 (Figs. 127, 328, 329)

Helix setigera (A. Gould, 1844: 174) — unaccepted > junior homonym of *Helix setigera* Rossmässler, 1836.

Helix hystrix Pfeiffer, 1846: 67 — unaccepted > superseded combination.

Cookeconcha hystrix (Pfeiffer, 1846)—Solem, 1976: 220-221.

Type material: Lectotype USNM 20930 [designated by Yeung et al. (2017: 16) for *Helix setigera* Gould, 1844]; one paralectotype (ANSP 58140: 1); both ex coll. A. A. Gould.

Type locality: Wahoo (phonetic for Oahu).

Other material studied: seven specimens from Oahu: Kona District, Konahuanui (ANSP 47770:1), ex coll. J. S. Philips (ANSP 95253:1) leg. D. Thaanum (FMNH 46444: 1); ex coll. A. A. Gould type coll. (MCZ 169367: 1, MCZ 87861: 1, MCZ 169368: 1, MCZ 216825: 1).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 43.8% of shell diameter; axial rib count 54.

Redescription: Color: flammulated. Shell: discoidal, depressed, slightly expanded laterally; diameter 4.8 mm; 4.25 whorls apex sunken; spire protrusion 8.7% of shell height; shell height 47.9% of diameter; peristome evenly thickened, thin, slightly reflected basally; low shoulder; apical suture crenulated, shallow; aperture lunate, expanded peripherally, constricted supra-peripherally, unobstructed; aperture height 94.3% of width; umbilicus width 43.8% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 5.1°, body whorl descension 7.2°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile rib interspace two times axial rib width, body whorl rib interspace irregular, one to two times axial rib width; axial rib count 54; three riblets per rib interspace prior to alteration. Barrier: two parietal barriers, 1st low, blade-like, gradual ascension, 2nd very low, thin, half as wide as the 1st parietal, crenulated by radial ribs in the parietal callous. No palatal barriers.

Remarks: *Helix setigera* Gould, 1844 has been considered a junior primary homonym of *Helix setiger* Sowerby, 1841 (Yeung et al., 2017: 17). Pfeiffer (1846: 67) proposed *Helix hystrix* and listed Gould's *H. setigera* in its synonymy. Yeung et al. (2017) concluded that since *setiger* and *setigera* are spelled differently (and with different origins), the two names can be applied to different species (i.e., are not homonyms) and Pfeiffer's *hystrix* is an unnecessary replacement name for Gould's *setigera*. Nevertheless, the name *Helix setigera* Gould, 1844 remains preoccupied by *Helix setosa* var. *setigera* Rossmässler, 1836. Since Pfeiffer's name is available, whether or not it was necessary, it has priority (ICZN4 Article 52.3). *Cookeconcha hystrix* is redescribed here



Fig. 127. *Cookeconcha hystrix*, 4.8 mm, ANSP 58140, PARALECTOTYPE, Oahu.

from a paralectotype rather than the lectotype, which is a poor specimen. The species appears to have been restricted to Mt. Konahuanui.

Etymology: Unknown.

Cookeconcha hystrix Paralectotype

Shell diameter: 4.8 mm

Shell height: 2.3 mm, 47.9% of shell diameter

Spire protrusion: 0.2 mm, 8.7% of shell height

Aperture height: 1.65 mm, 94.3% of aperture width

Aperture width: 1.75 mm

Rib count: 54

Riblets per rib interspace: 3

Number of whorls: 4.25

Umbilicus diameter: 2.1 mm, 43.8% of shell diameter

Late juvenile whorl descension: 5.1°

Body whorl descension: 7.2°

Cookeconcha gageorum n. sp.
(Figs. 128, 330)

Type material: Holotype SMNS-ZI0157962 (ex MS 8629), leg. P. Sutter, 1996.

Type locality: Polihale Ridge, Polihale, Waimea District, Kauai. 22°05'55.70"N, 159°44'38.30"W.

Other material studied: One specimen from Kauai: Hanalei District, Kalihikai, Anini Beach, leg. P. Sutter, 1996 (MS 8615: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality and Anini Beach.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 30% of shell diameter; axial rib count 60.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 5.0 mm; 4.25 whorls; apex planar; spire protrusion 4.3% of shell height; shell height 47% of diameter; peristome evenly thickened, thin, marginally reflected basally; low shoulder; apical suture crenulated, impressed; aperture reniform; slightly expanded peripherally, unobstructed; aperture height 97.3% of width; umbilicus 30% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 3°; body whorl descension 5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace approximately 1.5 times axial rib width, late juvenile rib interspace two times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 60; two riblets per rib interspace prior to alteration; faint spiral cords. Barriers: two parietal barriers, 1st low, thick, gradual ascension, 1/3rd down the parietal wall, 2nd diminutive, marginally crenulate, gradual ascension, 2/3rds down the parietal wall. No palatal barriers.



Fig. 128. *Cookeconcha gageorum*, 5.0 mm, SMNS-ZI0157962 (ex MS 8629), HOLOTYPE, Kauai, Polihale.

Etymology: Named to honor Reginald and Sandy Gage for all their friendship and support over many years of fossil snail collecting on Kauai.

***Cookeconcha gageorum* Holotype**

Shell diameter: 5.0 mm
 Shell height: 2.35 mm, 47% of shell diameter
 Spire protrusion: 0.1 mm, 4.3% of shell height
 Aperture height: 1.8 mm, 97.3% of aperture width
 Aperture width: 1.85 mm
 Rib count: 60
 Riblets per rib interspace: 2
 Number of whorls: 4.25
 Umbilicus diameter: 1.5 mm, 30% of shell diameter
 Late juvenile whorl descension: 3°
 Body whorl descension: 5°

***Cookeconcha lindseygrovei* n. sp.**
 (Fig. 129)

Type material: Holotype ANSP 130568; one paratype (ANSP 501748: 1); both ex coll. BPBM.

Type locality: Limahuli, Hanalei District, Kauai.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoid; umbilicus width 30.9% of shell diameter; axial rib count 86.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 5.5 mm; 4 whorls; apex planar; spire protrusion 7.1% of shell height; shell height 50.9% of diameter; peristome evenly thickened, reflected basally; high shoulder; apical suture canaliculate, crenulated; aperture lunate, expanded peripherally, flattened supra-peripherally, unobstructed; aperture height 97.7% of width; umbilicus 30.9% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 2°, body whorl descension 4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace one to 1.5 times axial rib width, late juvenile rib interspace two times axial rib width, body whorl rib interspace irregular, one to two times axial rib width; axial rib count 86; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, marginally crescentic, gradual ascension, 1/4 down the parietal wall, 2nd low, blade-like, gradual ascension, 1/2 down the parietal wall. No palatal barriers.



Fig. 129. *Cookeconcha lindseygrovei*, 5.5 mm, ANSP 130568, HOLOTYPE, Kauai, Limahuli.

Etymology: Named to honor Dr. Lindsey Grove for his unwavering support over the years and his love of fossils.

Cookeconcha lindseygrovei Holotype

Shell diameter: 5.5 mm
 Shell height: 2.8 mm, 50.9% of shell diameter
 Spire protrusion: 0.2 mm, 7.1% of shell height
 Aperture height: 2.1 mm, 97.7% of aperture width
 Aperture width: 2.15 mm
 Rib count: 86
 Riblets per rib interspace: 2
 Number of whorls: 4
 Umbilicus diameter: 1.7 mm, 30.9% of shell diameter
 Late juvenile whorl descension: 2°
 Body whorl descension: 4°

Cookeconcha paucicostata (Pease, 1871a)
 (Figs. 130, 331, 332)

Pityis filicostata Pease 1871: 454 — unaccepted > junior subjective synonym.

Pithys paucicostata Pease, 1871: 395 — unaccepted > superseded combination.

Cookeconcha paucicostata (Pease, 1871) — Solem, 1976: 218.

Type material: Lectotype MCZ 17271 [designated by Johnson, 1994: 20]; one paralectotype (MCZ 298476: 1); both ex coll. W.H. Pease.

Type locality: Kauai.

Other material studied: Six specimens from Kauai: Koloa District, Mahaulepu, 21°53'58.51"N, 159°24'54.20"W, leg. P. Sutter, Apr 10, 1996 (MS 9172: 1, MS 8289: 3), leg. M. Severns, R. Gage, Apr 17, 2011 (MS 8796: 1), Kawaihau District, Kapaa, leg. W. H. Pease (MCZ ex. 45159: 1).

Status and Distribution: Extant. Presumed extinct. Mahaulepu, Koloa District. Kapaa, Kawaihau District, Kauai. No specific type locality recorded.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 25.7% of shell diameter; axial rib count 54.

Redescription: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 3.5 mm; 3.5 whorls; apex planar; spire protrusion 17.6% of shell height; shell height 48.6% of diameter; peristome thin, marginally reflected basally; raised shoulder; apical suture canaliculate; aperture lunate; expanded peripherally, unobstructed; aperture height 89.3% of width; umbilicus 25.7% of shell diameter; constricted deicoiling; late juvenile whorl descension 2.3°; body whorl descension 7.3°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace approximately

equal to axial rib width, late juvenile rib interspace two times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 54; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, marginally crescentic, rapid ascension, 1/3rd down the parietal wall, 2nd low, blade-like, 2/3rd down the parietal wall. No palatal barriers.

Remarks: *Pityis filicostata* Pease 1871b is the junior subjective synonym of *Cookeconcha paucicostata* (Pease, 1871a). *Cookeconcha paucicostata* offers rare evidence of the longevity of endodontid species in Hawaii as demonstrated by Pease's live collected specimens from Kapaa, and Preston Sutter's Pleistocene fossils from Mahaulepu.

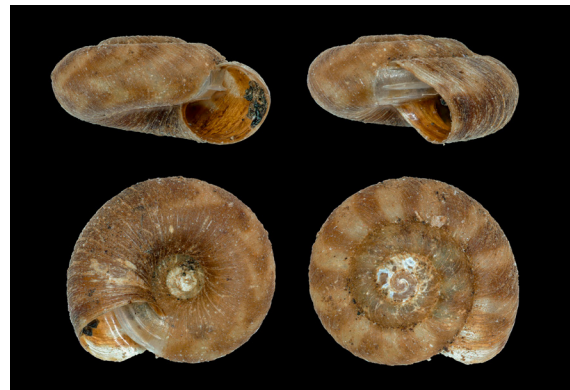


Fig. 130. *Cookeconcha paucicostata*, 3.5 mm, MCZ 17271, LECTOTYPE, Kauai.

Etymology: Species name translates as having few costae or radial ribs.

Cookeconcha paucicostata Lectotype

Shell diameter: 3.5 mm
 Shell height: 1.7 mm, 48.6% of shell diameter
 Spire protrusion: 0.3 mm, 17.6% of shell height
 Aperture height: 1.25 mm, 89.3% of aperture width
 Aperture width: 1.4 mm
 Rib count: 54
 Riblets per rib interspace: 3
 Number of whorls: 3.5
 Umbilicus diameter: 0.9 mm, 25.7% of shell diameter
 Late juvenile whorl descension: 2.3°
 Body whorl descension: 7.3°

Gageia n. gen.

Type species: *Gageia polihale* n. sp. (Fig. 131). **Diagnosis:** Three parietal barriers, two primary parietal barriers, first bifid, one umbilical sutural parietal barrier; six palatal barriers. **Includes:** One species newly described herein (Figs. 131, 133, 134) and endemic to Kauai (Fig. 132). **Etymology:** The monospecific genus *Gageia* is named to honor Hawaiian malacologist Reginald Gage.



Fig. 131. *Gageia polihale* n. sp., type species of *Gageia* n. gen.; 4.0 mm, MS 9171, PARATYPE, Kauai, Polihale Ridge.

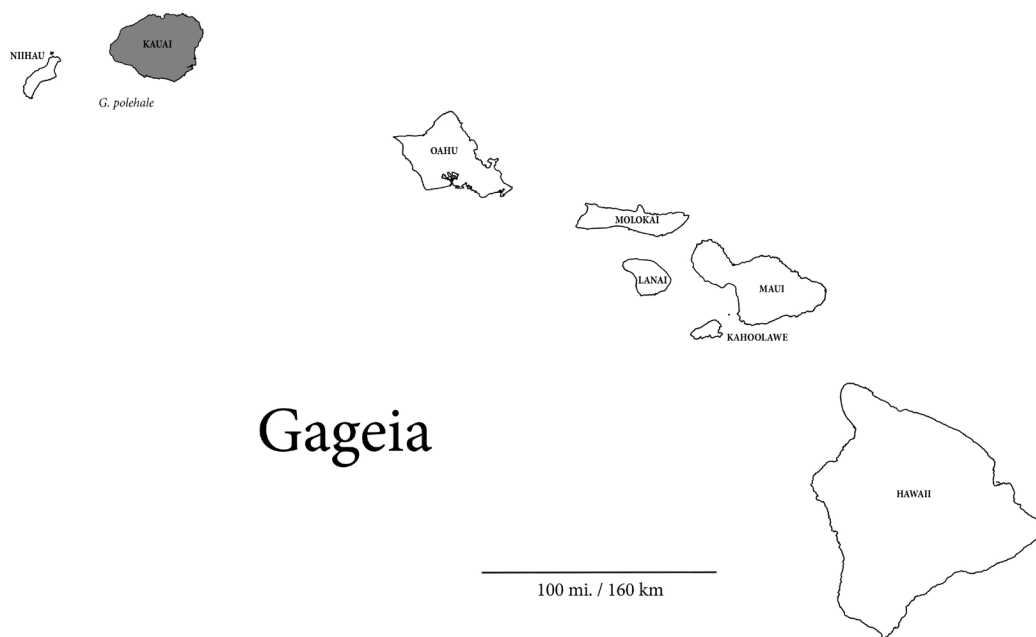


Fig. 132. Distribution of the species *Gageia polihale* in the Hawaiian archipelago.



Fig. 133. *Gageia polihale*, 5.0 mm, MS 8624, PARATYPE, Polihale Ridge, Kauai.

Gageia polihale n. sp.
(Figs. 131, 133, 134, 333, 334)

Type material: Holotype SMNS-ZI0157964 (ex MS 8623); five paratypes (MS 9170:1, MS 9169: 1, MS 9171: 1, MS 8624: 1, MS 8753: 1); all leg. P. Sutter, 1996.

Type locality: Polihale Ridge, Waimea District, Kauai.

Other material studied: Eight specimens from Kauai: Waimea District, Polihale, leg. P. Sutter, 1996 (MS 8622: 8).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 28% of shell diameter; axial rib count 70; palatal barrier height order, tall to low: 4th, 5th, 3rd, 6th, 2nd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally, sulcate; diameter 5.0 mm; 5.25 whorls; apex planar; spire protrusion 11.9% of shell height; shell

height 42% of diameter; peristome evenly thickened, thin, reflected sub-peripherally; low shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, obstructed; aperture height 70% of width; umbilicus 28% of shell diameter, constricted decoiling; late juvenile whorl descension 1.7°, body whorl descension 4°. Sculpture: present on embryonic whorls; juvenile whorls rib interspace less than axial rib width, late juvenile rib interspace equals axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 70; three riblets per rib interspace prior to alteration; fine spiral cords. Barriers: three parietal barriers, 1st tall, thin, crescentic, rapid ascension, extended toward the 5th palatal barrier, 2nd low, thick, gradual ascension, extended toward the 3rd palatal barrier, 3rd umbilical parietal, low, thick, recessed, opposite the 2nd palatal barrier; six palatal barriers, rapid ascension, 1st columellar, low, truncate, 2nd basal, moderately tall, evenly thickened, crescentic, 3rd basal, tall, evenly thickened, crescentic, 4th basal, tall, thick, crescentic, 5th sub-peripheral, tall, crescentic, thin base, 6th supra-peripheral, tall, thin base, crescentic. Palatal barrier height order 4th, 5th, 3rd, 6th, 2nd, 1st.



Fig. 134. *Gageia polihale*, 5.0 mm, SMNS-ZI0157964 (ex MS 8623), HOLOTYPE, Polihale Ridge, Kauai.

Etymology: Named for the type locality Polihale, Waimea District, Kauai.

Remarks: This unique species from Kauai is reluctantly placed in a monospecific genus with the hope other species of this genus are eventually discovered.

***Gageia polihale* Holotype**

Shell diameter: 5.0 mm

Shell height: 2.1 mm, 42% of shell diameter

Spire protrusion: 0.25 mm, 11.9% of shell height

Aperture height: 1.4 mm, 70% of aperture width

Aperture width: 2.0 mm

Rib count: 70

Riblets per rib interspace: 3

Number of whorls: 5.25

Umbilicus diameter: 1.4 mm, 28% of shell diameter

Late juvenile whorl descension: 1.7°

Body whorl descension: 4°

Hobdya n. gen.

Type species: *Hobdya thwingi* (Ancey, 1904) (Fig. 135). **Diagnosis:** Two primary parietal barriers, one or two sutural parietal barriers, three tall palatal barriers, 1st columellar, 2nd and 3rd sub-palatal and 3 to 5 low, recessed sub-palatal barriers. **Includes:** 10 species, 1 nominal plus 9 newly described herein (Fig. 137) distributed on Hawaii (1), Maui (2), Oahu (5), and Kauai (2) (Fig. 136). **Etymology:** *Hobdya* is named to honor the remarkable Lanai born botanist Robert (Bob) Hobdy (1942–2023) who freely offered insight from an encyclopedic memory with a calm demeanor.



Fig. 135. *Hobdya thwingi* (Ancey, 1904), type species of *Hobdya* n. gen.; 2.2 mm, ANSP 108368, Hawaii, Hualalai.

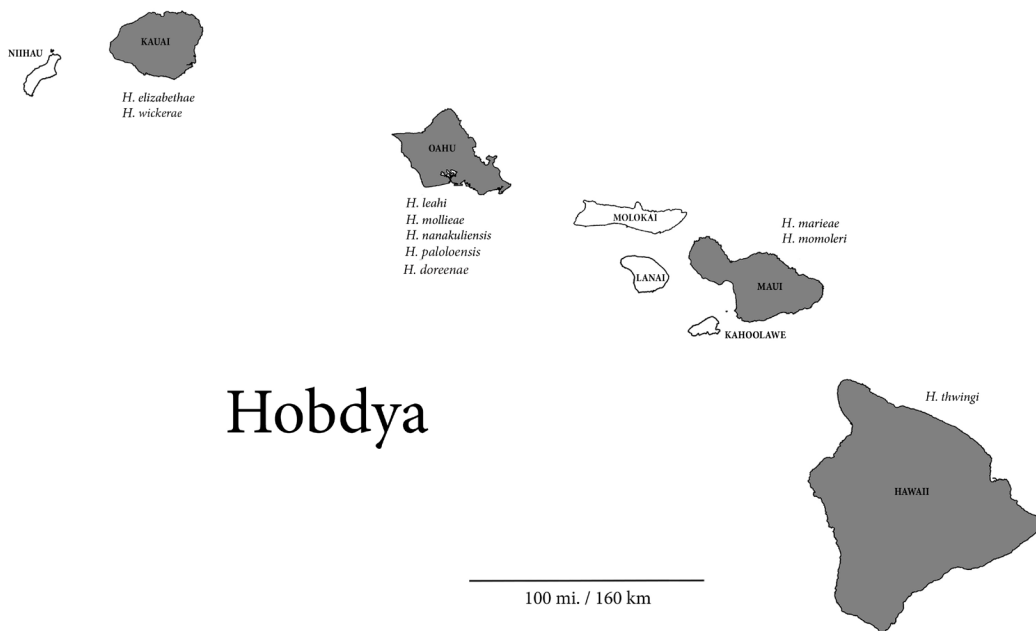


Fig. 136. Distributions of the species of *Hobdya* in the Hawaiian archipelago.



Fig. 137. Scaled images of specimens of the 10 species of the genus *Hobdya*.

Row A: Hawaii & Maui

- (1) *Hobdya thwingi*, 2.2 mm, BPBM 18806, Syntype, Hawaii
- (2) *Hobdya marieae*, 2.4 mm, SMNS-ZI0157966 (ex MS 8309), Holotype, Maui
- (3) *Hobdya momoleri*, 2.2 mm, SMNS-ZI0157967 (ex MS 9133), Holotype, Maui

Rows B & C: Oahu

- (1) *Hobdya leahi*, 2.3 mm, ANSP 108940, Holotype
- (2) *Hobdya nanakuliensis*, 1.5 mm, ANSP 376763, Holotype
- (3) *Hobdya mollieae*, 2.6 mm, ANSP 128037, Holotype
- (4) *Hobdya doreenae*, 2.0 mm, SMNS-ZI0157968 (ex MS 8721), Holotype
- (5) *Hobdya paloloensis*, 2.0 mm, ANSP 384351, Holotype

Row D: Kauai

- (1) *Hobdya wickerae*, 2.1 mm, SMNS-ZI0157965 (ex MS 9434), Holotype
- (2) *Hobdya elizabethae*, 2.0 mm, ANSP 324111, Holotype

***Hobdya thwingi* (Ancey, 1904)**

(Figs. 138, 335, 336)

Endodonta thwingi Ancey, 1904: 66 — unaccepted > superseded combination.

Cookeconcha thwingi (Ancey, 1904) — Solem, 1976: 213, 214.

Type material: Syntype BPBM 18806, leg. E. W. Thwing.

Type locality: An old crater in Kona, Hawaii.

Other material studied: 15 specimens from Hawaii: Kona District, leg. D. Thaanum (ANSP 94508: 7), leg. D. Thaanum, 1913 (ANSP 108368: 8).

Status and Distribution: Extant. Presumed extinct. Known from the type locality and a small crater on the side of Mt. Hualalai, Kona, Hawaii.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 36.4% of shell diameter; axial rib count 72; primary palatal barrier height order, tall to low: 5th, 3rd, 1st, 7th, 9th.

Redescription: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.2 mm; 4.5 whorls; apex raised; spire protrusion 18.2% of shell height; shell height 50% of shell diameter; peristome evenly thickened, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture lunate, compressed supra-peripherally, obstructed; aperture width equal to aperture height; umbilicus 36.4% of shell diameter, open decoiling; late juvenile whorl descension 1.8°, body whorl descension 5°. Sculpture: embryonic whorl sculpture absent; juvenile whorls rib interspace equal to width of the axial ribs, late juvenile whorls rib interspace 1.5 times the width of the axial ribs, body whorl rib interspace irregular, two to three times the width of the axial ribs; axial rib count 72; three riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended between the 7th and 9th palatal barriers, 2nd tall, crescentic, rapid ascension, extended between the 3rd and 5th palatal barriers; five primary palatal barriers, 1st columellar, thick, tall, crescentic, 3rd basal, tall, evenly thickened, crescentic, 5th sub-peripheral, tall, crescentic, 7th peripheral, medium height, crescentic, 9th supra-peripheral, medium height, crescentic; four sub-palatal barriers, 2nd basal, thick, low, diminutive, crescentic, 4th sub-peripheral, low, diminutive, recessed, 6th peripheral, low, diminutive, recessed, 8th supra-peripheral, low, rounded, diminutive, recessed. Primary palatal barrier height order 5th, 3rd, 1st, 7th, 9th.



Fig. 138. *Hobdya thwingi*, 2.2 mm, BPBM 18806, SYNTYPE, Hawaii, Kona.

Remarks: The syntype BPBM 18806 and the topotype ANSP 94508 have nine palatal barriers while other specimens examined had only seven or eight palatal barriers having lost one or both of the diminutive supra-peripheral sub-palatals.

Etymology: Named to honor the Rev. E. W. Thwing, who discovered the species.

***Hobdya thwingi* Topotype**

Shell diameter: 2.2 mm

Shell height: 1.1 mm, 50% of shell diameter

Spire protrusion: 0.2 mm, 18.2% of shell height

Aperture height: 0.75 mm, equal to aperture width

Rib count: 72

Riblets per rib interspace: 3

Number of whorls: 4.5

Umbilicus diameter: 0.8 mm, 36.4% of shell diameter

Late juvenile whorl descension: 1.8°

Body whorl descension: 5°

***Hobdya marieae* n. sp.**

(Fig. 139)

Type material: Holotype SMNS-ZI0157966 (ex MS 8309), leg. H. James, Jul 20 & 21, 1990.

Type locality: Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District, Maui. 20°37'25.87"N, 156°23'53.89"W.

Status and Distribution: Holocene fossil. Presumed extinct. Known only from the type locality, Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District, Maui.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 43.4% of shell diameter; axial rib count 66; primary palatal barrier height order, tall to low: 2nd, 4th, 6th, 7th, 8th.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.4 mm; 4.25 whorls; apex slightly raised; spire protrusion 10.8% of shell height; shell height 50% of shell diameter; peristome evenly thickened, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture lunate, sub-peripherally rounded, constricted supra-peripherally, obstructed; aperture width equal to height; umbilicus 43.4% of shell diameter, open decoiling; late juvenile whorl descension 1.5°, body whorl descension 4°. Sculpture: embryonic sculpture absent; juvenile whorls rib interspace equals axial rib width, late juvenile whorls rib interspace 2.5 times axial rib width, body whorl rib interspace irregular at two to 3.5 times axial rib width; axial rib count 66; two riblets per rib interspace prior to alteration. Barriers: three parietal barriers, 1st tall, bifid, rapid ascension, extended toward the 7th palatal barrier, 2nd tall, crescentic, gradual ascension, extended toward the 5th palatal barrier, 3rd umbilical parietal, low, rounded, gradual ascension, extended toward the 2nd palatal barrier, equal in size to the 1st sub-palatal barrier; five primary palatal barriers, 2nd columellar, tall, thick, crescentic, rapid ascension, 4th basal, tall, thick, crescentic, rapid ascension, 6th sub-peripheral, tall, thick, crescentic, rapid ascension, 7th peripheral, low, evenly thickened, crescentic, rapid ascension, 8th supra-peripheral, low, thick, crescentic, rapid ascension; three sub-palatal barriers, 1st columellar, low, rounded, recessed, 3rd basal, low, crescentic, recessed, rapid ascension, 5th basal, low, thin, diminutive, rapid ascension, recessed. Primary palatal barrier height order 2nd, 4th, 6th, 7th, 8th.



Fig. 139. *Hobdya marieae*, 2.4 mm, SMNS-ZI0157966 (ex MS 8309), HOLOTYPE, Maui, Puu Naio Cave.

Remarks: This species has a unique pair of barriers complimenting each other in size and location with the 1st palatal barrier on the columella and the 3rd parietal barrier on the parietal callous.

Etymology: Named for the remarkably talented private French chef Marie Pavillard.

***Hobdya marieae* Holotype**

Shell diameter: 2.4 mm

Shell height: 1.2 mm, 50% of shell diameter

Spire protrusion: 0.13 mm, 10.8% of shell height

Aperture height: 0.75 mm, equal to aperture width

Rib count: 66

Riblets per rib interspace: 2

Number of whorls: 4.25

Umbilicus diameter: 1.0 mm, 43.4% of shell diameter

Late juvenile whorl descension: 1.5°

Body whorl descension: 4°

***Hobdya momoleri* n. sp.**

(Figs. 140, 337–339)

Type material: Holotype SMNS-ZI0157967 (ex MS 9133); two paratypes (MS 9132: 1, MS 8308: 1); all leg. H. James, Jul 20 & 21, 1990.

Type locality: Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District, Maui. 20°37'25.87"N, 156°23'53.89"W.

Other material studied: 69 specimens from Maui: Makawao District, Honuaula Moku, Puu Naio Cave, 392.9 m, leg. H. James, Jul 20–21, 1990 (MS 6587: 2, MS 8945: 1, MS 6571: 6), Hana District, Kahikinui Moku, Auwahi Cave, leg. M. Severns, May 1982 (MS 8561: 1), leg. H. James, Apr 20, 1988 (MS 8857: 1, MS 8858: 1), Lua Lepo Cave, 825.1 m, leg. M. Severns, Apr 2011 (MS 8792: 2), leg. M. Severns & S. Olson, Apr 1988 (MS 8928: 4, MS 8670: 1, MS 9135: 4), leg. M. Severns & S. Olson, Apr 16, 1988 (MS 8678: 1), leg. H. James, Apr 20, 1988 (MS 8859: 1), leg. M. Severns & S. Olson Apr 20, 1988 (MS 8657: 1), leg. M. Severns & S. Olson Apr 22, 1988 (MS 8909: 2, MS 8912: 1, MS 8669: 3, MS 8899: 1, MS 8672: 2, MS 8665: 1, MS 8669: 3, MS 8916: 1, MS 8919: 22, MS 8921: 1, MS 8922: 2, MS 8924: 1, MS 8939: 1), Kahawaihapapa Cave (MS 8547: 2, MS 8855: 2), leg. M. Severns & I. Richling, Feb 21, 2017.

Status and Distribution: Holocene fossil. Presumed extinct. Known from Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District; Lua Lepo Cave, 825.1 m, Auwahi Cave, 1203.7 m, and Kahawaihapapa Cave, Kahikinui Moku, Hana District, Maui.

Diagnosis: Color flammulated; shell sub-turbinate; umbilicus width 40.9% of shell diameter; axial rib count 52; primary palatal barrier height order, tall to low: 5th, 3rd, 1st, 6th, 8th.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.2 mm; 4 whorls; apex raised; spire protrusion 21.7% of shell height; shell height 52.3% of shell diameter; peristome thin, not reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, slightly compressed peripherally, obstructed; aperture width 93.3% of aperture height; umbilicus 40.9% of shell diameter, open decoiling late juvenile whorl descension 1°, body whorl descension 4°. Sculpture: embryonic sculpture absent; juvenile whorls rib interspace equal to the width of the axial ribs, late juvenile whorls rib interspace two times the width of the axial ribs, body whorl rib interspace irregular at 2.5 to three times the width of the axial ribs; axial rib count 52; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, bifid, gradual ascension, extended toward the 7th palatal, 2nd tall, thin, crescentic, ascends rapidly, extended toward the 4th palatal; five primary palatal barriers, 1st columellar, thick, crescentic, rapid ascension, 3rd primary palatal, basal, tall, thick, crescentic, rapid ascension, 5th primary palatal, sub-peripheral, tall, thin at the base, crescentic, rapid ascension, 6th peripheral, low, thin at the base, crescentic, rapid ascension, 8th low, evenly thickened, crescentic, rapid ascension; three sub-palatal barriers, 2nd basal, thin at the base, crescentic, recessed, 4th basal, low, thin, diminutive, rapid ascension, recessed, 7th supra-peripheral, low, thick, crescentic, rapid ascension, recessed; primary palatal barrier height order 5th, 3rd, 1st, 6th, 8th.



Fig. 140. *Hobdya momoleri*, 2.2 mm, SMNS-ZI0157967 (ex MS 9133), HOLOTYPE, Maui, Puu Naio Cave.

Remarks: Holotype has two sub-palatal barriers, the paratype has three. For the description, I included the 3rd sub-palatal barrier to stress the point that even within a species, the number of sub-palatal barriers may not be constant.

Etymology: Named for my friend Mo Moller of Kahikinui, a man who understands people and how things work.

***Hobdya momoleri* Holotype**

Shell diameter: 2.2 mm
 Shell height: 1.15 mm, 52.3% of shell diameter
 Spire protrusion: 0.25 mm, 21.7% of shell height
 Aperture height: 0.75 mm
 Aperture width: 0.7 mm, 93.3% of aperture height
 Rib count: 52
 Riblets per rib interspace: 2
 Number of whorls: 4
 Umbilicus diameter: 0.9 mm, 40.9% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 4°

***Hobdya doreenae* n. sp.**

(Fig. 141)

Type material: Holotype SMNS-ZI0157968 (ex MS 8721); six paratypes (MS 9705: 4, MS 9704: 2); all leg. S. Olson, Feb 16, 1992.

Type locality: Ohikilolo, Waianae District, Oahu.

Other material Studied: 34 specimens from Oahu: Waianae District, Ohikilolo, leg. S. Olson, Feb 16, 1992 (MS 8722: 34).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color flammulated; shell sub-turbinate; umbilicus width 30% of shell diameter; axial rib count 66; primary palatal barrier height order, tall to low: 5th, 3rd, 1st, 7th, 6th.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.0 mm, 4.5 whorls; apex raised; shell height: 52.5% of shell diameter; spire protrusion 14.3% of shell height; peristome evenly thickened, thick, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture lunate, sub-peripherally rounded, constricted supra-peripherally, obstructed; aperture height 93.3% of width; umbilicus 30% of shell diameter, gradual decoiling; late juvenile whorl descension 3.5°, body whorl descension 6.3°. Sculpture: embryonic sculpture absent; juvenile whorls rib interspace equals axial rib width, late juvenile whorls rib interspace 1.5 times body whorl rib interspace irregular at 1.5 to two times axial rib width; axial rib count 66; two riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crescentic, gradual ascension, extended toward the 6th palatal barrier, 2nd low,

blade-like, gradual ascension, extended toward the 4th palatal barrier; five primary palatal barriers, 1st columellar, tall, thick, recessed, 3rd basal, tall, crescentic, 5th sub-peripheral, tall, thick, crescentic, 6th peripheral, low, evenly thickened, 7th supra-peripheral, low, thick; two sub-palatal barriers, basal, low, thin, recessed, 4th basal, low, thin, recessed. Primary palatal barrier height order 5th, 3rd, 1st, 7th, 6th.



Fig. 141. *Hobdya doreenae*, 2.0 mm, SMNS-ZI0157968 (ex MS 8721), HOLOTYPE, Oahu, Ohikilolo.

Remarks: The specimens were in a grey soil that contained the bones of extinct birds.

Etymology: Dedicated to Doreen Hobdy, a traditional Hawaiian and loving wife who quietly played the ukulele and sang beside her husband's bed each day until he had passed.

***Hobdya doreenae* Holotype**

Shell diameter: 2.0 mm

Shell height: 1.05 mm, 52.5% of shell diameter

Spire protrusion: 0.15 mm, 14.3% of shell height

Aperture height: 0.7 mm, 93.3% of aperture width

Aperture width: 0.75 mm

Rib count: 66

Riblets per rib interspace: 2

Number of whorls: 4.5

Umbilicus diameter: 0.6 mm, 30% of shell diameter

Late juvenile whorl descension: 3.5°

Body whorl descension: 6.3°

***Hobdya leahi* n. sp.
(Figs. 142, 340)**

Type material: Holotype ANSP 108940; one paratype (ANSP 108946: 1); both leg. H. A. Pilsbry & Bryan, 1913.

Type locality: Leahi (Diamond Head), Kona District, Oahu.

Other material studied: 15 specimens from Oahu: Kona

District, Diamond Head, leg. D. Walker, Oct 1946 (MS 8603: 1, MS 8604: 11, MS 8864: 3).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color flammulated; shell sub-turbinate; umbilicus width 39.1% of shell diameter; axial rib count 93; primary palatal barrier height order, tall to low: 6th, 2nd, 4th, 8th, 7th.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.3 mm, 3.5 whorls; apex raised; spire protrusion 17.4% of shell height; shell height 50% of diameter; peristome evenly thickened, thick, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture lunate, sub-peripherally rounded, constricted supra-peripherally, obstructed; aperture width equal to height; umbilicus 39.1% of shell diameter, openly decoiling; late juvenile whorl descension 2°, body whorl descension 4°. Sculpture: embryonic sculpture absent; juvenile whorl rib interspace equal to radial rib width; late juvenile whorl rib interspaces irregular, 1.5 to 2 times radial rib width; axial rib count 93; one riblet per rib interspace prior to alteration. Barriers: 4 parietal barriers, 1st apical parietal, low, callous-like, 2nd primary parietal, tall, bifid, gradual ascension, extended between 6th and 7th palatal barriers, 3rd primary parietal, tall, bifid, gradual ascension, extended toward 4th palatal barrier, 4th umbilical parietal, low, diminutive, angled toward 1st palatal barrier; five primary palatal barriers, 2nd columellar, tall, thick, crescentic, 4th basal, tall, crescentic, 6th sub-peripheral, tall, thick, crescentic, 7th peripheral, low, evenly thickened recessed, 8th supra-peripheral, low, thick; three sub-palatal barriers, 1st columellar, low, small, callous-like, recessed, 3rd basal, low, thick at the base, recessed, 5th basal, low, thick at the base, recessed. Primary palatal barrier height order, tall to low: 6th, 2nd, 4th, 8th, 7th.



Fig. 142. *Hobdya leahi*, 2.3 mm, ANSP 108940, HOLOTYPE, Oahu, Leahi (Diamond Head).

Etymology: Leahi is Hawaiian for Diamond Head.

Hobdya leahi Holotype

Shell diameter: 2.3 mm

Shell height: 1.15 mm, 50% of shell diameter

Spire protrusion: 0.2 mm, 17.4% of shell height

Aperture height: 0.85 mm, equal to aperture width

Rib count: 93

Riblets per rib interspace: 1

Number of whorls: 3.5

Umbilicus diameter: 0.9 mm, 39.1% of shell diameter

Late juvenile whorl descension: 2°

Body whorl descension: 4°

Hobdya mollieae n. sp.

(Fig. 143)

Type material: Holotype ANSP 128037; one paratype (ANSP 501755: 1); both leg. H. A. Pilsbry, 1920.

Type locality: Mokuoloe Island, Kaneohe Bay, Koolau-poko, Oahu.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color flammulated; shell sub-discoidal; umbilicus width 42.3% of shell diameter; axial rib count 82; primary palatal barrier height order, tall to low: 5th, 3rd, 1st, 6th, 7th.

Description: Color: flammulated. Shell: sub-turbinate, diameter 2.1 mm; 4.5 whorls; apex raised; spire protrusion 14.5% of shell height; shell height 45% of diameter; peristome thickened, basally reflected; low shoulder; apical suture crenulated, shallow; aperture reniform, slightly flattened basally and supra-peripherally, obstructed; aperture width equal to height; umbilicus 42.3% of shell diameter, openly decoiling; late juvenile whorl descension 2.2°, body whorl descension 5°. Sculpture: embryonic sculpture absent; juvenile whorls rib interspace less than width of the axial ribs, late juvenile whorls rib interspace equal to width of the axial ribs, body whorl rib interspace irregular, at two to three times the width of the axial ribs; axial rib count 82; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, bifid, gradual ascension, extended between the 7th palatal barrier, 2nd tall, crescentic, rapid ascension, extended toward the 4th palatal barrier; five primary palatal barriers, 1st columellar, tall, crescentic, rapid ascension, 3rd basal, tall, thick, crescentic, rapid ascension, 5th sub-peripheral, tall, thick, crescentic, rapid ascension, 6th peripheral, low, thick, diminutive, recessed, 7th supra-peripheral, tall, thick, crescentic; two sub-palatal barriers, 2nd

basal, low, diminutive, recessed, rapid ascension, 4th basal, low, diminutive, recessed. Primary palatal barrier height order 5th, 3rd, 1st, 6th, 7th.



Fig. 143. *Hobdya mollieae*, 2.6 mm, ANSP 128037, HOLOTYPE, Oahu, Moku O Loe (Coconut Island) in Kaneohe Bay.

Etymology: Named to honor Mollie Fuller Haskell (1979–2022) who ventured to Hawaii to solve a problem that could not be solved and passed. She is missed.

Hobdya mollieae Holotype

Shell diameter: 2.6 mm

Shell height: 1.17 mm, 45% of shell diameter

Spire protrusion: 0.17 mm, 14.5% of shell height

Aperture height: 0.9 mm, equal to aperture width

Rib count: 82

Riblets per rib interspace: 3

Number of whorls: 4.5

Umbilicus diameter: 1.1 mm, 42.3% of shell diameter

Late juvenile whorl descension: 2.2°

Body whorl descension: 5°

Hobdya nanakuliensis n. sp.

(Fig. 144)

Type material: Holotype ANSP 376763; two paratypes (ANSP 501756: 2); all leg. O. Oswald.

Type locality: As described by Oswald; 21° 24' N, 158° 08' W, Nanakuli, Waianae District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 40% of shell diameter; axial rib count 61; primary palatal barrier height order, tall to low: 1st, 4th, 6th, 7th, 8th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 1.5 mm; 3.75 whorls; apex raised; spire protrusion 13.6% of shell height; shell height 48.7% of shell diameter; peristome thick, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, sub-peripherally rounded, constricted supra-peripherally, obstructed; aperture width 83.3% of height; umbilicus 40% of shell diameter, openly decoiling; late juvenile whorl descension 1.6°, body whorl descension 3.7°. Sculpture: embryonic sculpture absent; juvenile whorls rib interspace equals axial rib width, late juvenile whorls rib interspace two times axial rib width, body whorl rib interspace irregular at two to 2.5 times axial rib width; axial rib count 61; one riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, bifid, rapid ascension, extended between the 7th and 8th palatal barriers, 2nd crescentic, rapid ascension, extended toward the 4th palatal barrier; five primary palatal barriers, 1st columellar, tall, thick, crescentic, rapid ascension, 4th basal, tall, crescentic, rapid ascension, 6th sub-peripheral, tall, crescentic, rapid ascension, 7th supra-peripheral, low, thick, crescentic, recessed, rapid ascension, 8th supra-peripheral, low, crescentic, recessed, rapid ascension; three sub-palatal barriers, 2nd and 3rd basal, low, thick, recessed, rapid ascension, 5th sub-peripheral, low, crescentic, recessed, rapid ascension. Primary palatal barrier height order 1st, 4th, 6th, 7th, 8th.



Fig. 144. *Hobdya nanakuliensis*, 1.5 mm, ANSP 376763, HOLOTYPE, Oahu, Nanakuli.

Etymology: Named for the type locality.

***Hobdya nanakuliensis* Holotype**

Shell diameter: 1.5 mm
 Shell height: 0.73 mm, 48.7% of shell diameter
 Spire protrusion: 0.1 mm, 13.6% of shell height
 Aperture height: 0.6 mm
 Aperture width: 0.5 mm, 83.3% of aperture height
 Rib count: 61
 Riblets per rib interspace: 1

Number of whorls: 3.75

Umbilicus diameter: 0.6 mm, 40% of shell diameter

Late juvenile whorl descension: 1.6°

Body whorl descension: 3.7°

***Hobdya paloloensis* n. sp.**

(Fig. 145)

Type material: Holotype ANSP 384351; one paratype (ANSP 501756: 1); both leg. O. Oswald.

Type locality: As described by Oswald; $\frac{3}{4}$ up second kukui glen, under large rock, right, 21° 18' N, 157° 48' W, Palolo, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality, Palolo.

Diagnosis: Indiscernible color pattern; shell sub-turbinate; umbilicus width 37.5% of shell diameter; axial rib count 65; primary palatal barrier height order, tall to low: 4th, 6th, 1st, 7th, 2nd.

Description: Color: indiscernible. Shell: sub-turbinate, slightly compressed laterally; diameter 2.0 mm; 3.5 whorls; apex raised; spire protrusion 17.7% of shell height; shell height 56.5% of diameter; peristome thick, basally reflected; low shoulder; apical suture crenulated, shallow; aperture reniform, slightly compressed sub- and supra-peripherally, obstructed; aperture width 92.9% of height; umbilicus 37.5% of shell diameter, open decoiling; late juvenile whorl descension 3°, body whorl descension 5.3°. Sculpture: embryonic sculpture absent; juvenile whorls rib interspace equal to the width of the axial ribs, late juvenile whorls rib interspace three times the width of the axial ribs, body whorl rib interspace irregular at two to three times



Fig. 145. *Hobdya paloloensis*, 2.0 mm, ANSP 384351, HOLOTYPE, Oahu, Palolo.

the width of the axial ribs; axial rib count 65; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st crescentic, rapid ascension, extended toward the 7th palatal, 2nd crescentic, gradual ascension, extended toward the 4th palatal barrier; five primary palatal barriers, 1st columellar, tall, thick, crescentic, rapid ascension, 2nd basal, low, thin, crescentic, rapid ascension, 4th basal, tall, thick, crescentic, rapid ascension, 6th sub-peripheral, tall, crescentic, thick, rapid ascension, 7th supra-peripheral, tall, thick, crescentic, rapid ascension; two sub-palatal barriers, 3rd basal, low, crescentic, diminutive, recessed, 5th sub-peripheral, low, diminutive recessed. Primary palatal barrier height order 4th, 6th, 1st, 7th, 2nd.

Etymology: Named for the type locality.

Hobdya paloloensis Holotype

Shell diameter: 2.0 mm

Shell height: 1.13 mm, 56.5% of shell diameter

Spire protrusion: 0.2 mm, 17.7% of shell height

Aperture height: 0.65 mm, 92.9% of aperture width

Aperture width: 0.7 mm

Rib count: 65

Riblets per rib interspace: 2

Number of whorls: 3.5

Umbilicus diameter: 0.75 mm, 37.5% of shell diameter

Late juvenile whorl descension: 3°

Body whorl descension: 5.3°

Hobdya elizabethae n. sp.

(Fig. 146)

Type material: Holotype ANSP 324111, leg. H. A. Pilsbry & C. M. Cooke.

Type locality: Aurowuonui (phonetic of Aweoweonui?), Koloa District, Kauai.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 35% of shell diameter; axial rib count 58; primary palatal barrier height order, tall to low: 2nd, 7th, 5th, 8th, 9th.

Description: Color: flammulated. Shell: sub-discoidal; diameter 2.0 mm; 3.75 whorls; apex raised; shell height 50% of diameter; spire protrusion 10% of shell height; peristome thick, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture reniform, sub-peripherally rounded, slightly constricted supra-peripherally, obstructed;

aperture width equal to height; umbilicus 35% of shell diameter, open decoiling; late juvenile whorl descension 2.3°, body whorl descension 5.4°. Sculpture: embryonic sculpture absent; juvenile whorls rib interspace equals axial rib width, late juvenile whorls rib interspace two times axial rib width, body whorl rib interspace irregular at two to three times axial rib width; axial rib count 58; two riblets per rib interspace prior to alteration. Barriers: four parietal barriers, 1st apical parietal barrier, low, rounded, diminutive, compliments the 10th palatal in size and shape, 2nd primary parietal, tall, bifid, rapid ascension, extended between the 8th and 9th palatal barriers, 3rd primary parietal, tall, crescentic, gradual ascension, extended toward the 6th palatal barrier, 4th sutural parietal barrier, low, diminutive, gradual ascension. five primary palatal barriers, 2nd columellar, tall, thick, crescentic, 5th basal, low, thick, crescentic, 7th peripheral, tall, thick, crescentic, 8th peripheral, thick, crescentic, 9th supra-peripheral, low, thin, crescentic, recessed, five sub-palatal barriers, 1st columellar, callous-like, recessed, 3rd basal, low, recessed, 4th basal, low, evenly thickened, recessed, 6th sub-peripheral, tall, crescentic, recessed, 10th supra-peripheral, low, rounded, diminutive, recessed. Primary palatal barrier height order, tall to low: 2nd, 7th, 5th, 8th, 9th.



Fig. 146. *Hobdya elizabethae*, 2.0 mm, ANSP 324111, HOLOTYPE, Kauai, Aurowuonui (Aweoweonui).

Remarks: The type specimen is undoubtedly a fossil from the Koloa District, Kauai; most likely from Aweoweonui based on the collecting data and its similarity to other fossils from that area. *Hobdya elizabethae* is similar to *H. thwingi* in size and shape but differs in having four parietal barriers, an additional sub-palatal barrier, a different palatal barrier height order and a lower rib axial count.

Etymology: Named to honor Elizabeth (Liz) Fiene.

Hobdya elizabethae Holotype

Shell diameter: 2.0 mm

Shell height: 1.0 mm, 50% of shell diameter
 Spire protrusion: 0.1 mm, 10% of shell height
 Aperture height: 0.8 mm, equal to aperture width
 Rib count: 58
 Riblets per rib interspace: 2
 Number of whorls: 3.75
 Umbilicus diameter: 0.7 mm, 35% of shell diameter
 Late juvenile whorl descension: 2.3°
 Body whorl descension: 5.4°

***Hobdya wickerae* n. sp.**
 (Figs. 147, 341–344)

Type material: Holotype SMNS-ZI0157965 (ex MS 9434); four paratypes (MS 9236: 1, MS 9207: 1, MS 9237: 1, MS 9239: 1); all leg. M. Severns, R. Gage & J. Van Der Merwe, Apr 8, 2019.

Type locality: Kipu Kai, Lihue District, Kauai. $21^\circ 54' 47.45''\text{N}$, $159^\circ 23' 20.50''\text{W}$.

Other material studied: 746 specimens from Kauai, Lihue District, Kipu Kai, leg. M. Severns & J. Van Der Merwe, Apr 20, 2019 (MS 9232: 611, MS 9238: 6), Koloa District, Mahaulepu, leg. M. Severns & R. Gage Aug 17, 2011 (MS 8778: 4), leg. R. Gage Feb 27, 1996 (MS 8618: 1, MS 8630: 1, MS 8619: 1), leg. P. Sutter Apr 10, 1996 (MS 8291: 1), leg. M. Severns Aug 18, 2011 (MS 8851: 22), Waiopili, (MS 8826: 1, MS 8842: 1, MS 8743: 1, MS 8828: 55, MS 8838: 6, MS 8846: 24, MS 9009: 9), Aweoweonui, leg. M. Severns & R. Gage, March 2016 (MS 8740: 1), leg. R. Gage, I. Richling and M. Severns, March, 2016 (MS 8822: 1), in sand by a ditch, Wailua Golf Course.

Status and Distribution: Extant. Presumed extinct. Known from coastal fossil sites in Kipu Kai, Mahaulepu and Waiopili in Koloa District, Kauai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 38% of shell diameter; axial rib count 74; primary palatal barrier height order, tall to low: 5^{th} , 3^{rd} , 1^{st} , 6^{th} , 7^{th}

Description: Color: flammulated. Shell: sub-discoidal; diameter 2.1 mm; four whorls; apex slightly raised; spire protrusion 14.3% of shell height; shell height 50% of shell diameter; peristome evenly thickened, basally reflected; moderately raised shoulder; apical suture crenulated, shallow; aperture lunate, rounded basally, compressed peripherally, flattened supra-peripherally, obstructed; aperture width 87.5% of aperture height; umbilicus 38% of shell diameter, open decoiling; late juvenile whorl descension 4° , body whorl

descension 5° . Sculpture: embryonic whorl sculpted; juvenile whorls rib interspace equal to width of the axial ribs, late juvenile whorls rib interspace two times the width of the axial ribs, body whorl rib interspace constant at 2.5 times the width of the axial ribs; axial rib count 74; two riblet per rib interspace prior to alteration. Barriers: four parietal barriers, 1^{st} apical parietal, low, callous-like, 2^{nd} primary parietal, tall, crescentic, ascends rapidly, extended between the 6^{th} and 7^{th} palatal barriers, 3^{rd} primary parietal, tall, crescentic, gradual ascension, extended toward the 4^{th} palatal barrier, 4^{th} umbilical parietal, low, rounded, gradual ascension, angled toward the 1^{st} palatal barrier; five primary palatal barriers, 1^{st} columellar, tall, thick, crescentic, rapid ascension, 3^{rd} basal, tall, thick, crescentic, rapid ascension, 5^{th} sub-peripheral, tall, thick, crescentic, rapid ascension, 6^{th} supra-peripheral, low, crescentic, gradual ascension, 7^{th} supra-peripheral, thick, gradual ascension. two sub-palatal barriers, 2^{nd} sub-palatal, basal, low, rounded, rapid ascension, recessed, 4^{th} sub-palatal, basal, low, diminutive, callous-like, recessed. Primary palatal barrier height order, tall to low: 5^{th} , 3^{rd} , 1^{st} , 6^{th} , 7^{th}



Fig. 147. *Hobdya wickerae*, 2.1 mm, SMNS-ZI0157965 (ex MS 9434), HOLOTYPE, Kauai, Kipu Kai.

Etymology: Named for Melanie Wicker; barrel rider, socialite, and friend.

***Hobdya wickerae* Holotype**

Shell diameter: 2.1 mm
 Shell height: 1.05 mm, 50% of shell diameter
 Spire protrusion: 0.15 mm, 14.3% of shell height
 Aperture height: 0.8 mm
 Aperture width: 0.7 mm, 87.5% of aperture height
 Rib count: 74
 Riblets per rib interspace: 2
 Number of whorls: 4
 Umbilicus diameter: 0.8 mm, 38% of shell diameter
 Late juvenile whorl descension: 4°
 Body whorl descension: 5°

Liiliiconcha n. gen.

Type species: *Liiliiconcha henshawi* (Ancey, 1904) (Fig. 148). **Diagnosis:** Two parietal barriers, six palatal barriers wherein 1st, 3rd, and 4th are tall; 2nd, 5th, and 6th are diminutive. **Includes:** 10 species, 1 nominal plus 9 newly described herein (Fig. 150) distributed on Hawaii (2), Maui (2), Kahoolawe (1), Lanai (1), Molokai (4), and Oahu (5) (Fig. 149). **Etymology:** *Liiliiconcha* is a combination of “liiliili” (very small in Hawaiian) and *concha*.



Fig. 148. *Liiliiconcha henshawi* (Ancey, 1904), type species of *Liiliiconcha* n. gen.; 2.5 mm, MS 8600, Hawaii, Palihoukapapa.

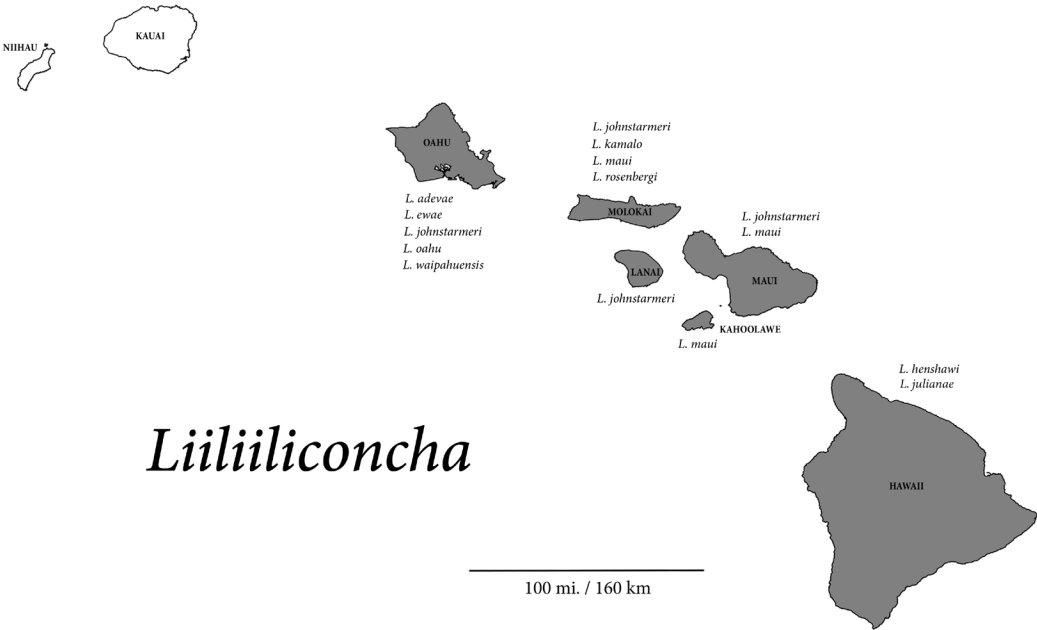


Fig. 149. Distributions of the species of *Liiliiconcha* in the Hawaiian archipelago.



Fig. 150. Scaled images of specimens of the 10 species of the genus *Liiliiconcha*.

Row A: Hawaii.

- (1) *Liiliiconcha henshawi*, 2.0 mm, MNHN IM-2000-9654a, Syntype
- (2) *Liiliiconcha julianae*, 2.0 mm, SMNS-ZI0157969 (ex MS 9026), Holotype

Row B: Maui & Molokai.

- (1) *Liiliiconcha rosenbergi*, 1.8 mm, ANSP 108739, Holotype, Molokai
- (2) *Liiliiconcha kamalo*, 1.4 mm, ANSP 109966, Holotype, Molokai
- (3) *Liiliiconcha johnstarkeri*, 2.0 mm, SMNS-ZI0157970 (ex MS 9685), Holotype, Maui
- (4) *Liiliiconcha maui*, 2.0 mm, SMNS-ZI0157971 (ex MS 8664), Holotype, Maui

Rows C & D: Oahu.

- (1) *Liiliiconcha adevae*, 2.3 mm, SMNS-ZI0157972 (ex MS 9663), Holotype
- (2) *Liiliiconcha evae*, 2.4 mm, ANSP 386218, Holotype
- (3) *Liiliiconcha waipahuensis*, 2.1 mm, ANSP 116720, Holotype
- (4) *Liiliiconcha oahu*, 2.5 mm, ANSP 380209, Holotype

Liliiliconcha henshawi (Ancey, 1904)
(Figs. 151, 345, 346)

Endodonta (*Thaumatodon*) *henshawi* Ancey, 1904: 66 — unaccepted > superseded combination.

Cookeconcha henshawi (Ancey, 1904) — Solem, 1976: 213, 214.

Type material: Syntype MNHN IM 2000-9654a, leg. C. F. Ancey, 1907.

Type locality: Hawaii, Palihoukapapa on the Hamakua slope of Mauna Kea, 1219.2 m.

Other material studied: 47 specimens from Hawaii: Hamakua District, Mana, Palihoukapapa, leg. David Walker, Aug 22, 1946 (MS 8606: 2, MS 8464: 1, MS 8600: 1, MS 8465: 1, MS 8867: 1, MS 8868: 3, MS 8866: 17), leg. David Walker, Aug 27, 1946 (MS 9192: 18, MS 9683: 3), Waimea, leg. H. W. Henshaw (ANSP 91121: 2).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 28% of shell diameter; axial rib count 41; primary palatal barrier height order, tall to low: 4th, 1st, 3rd.

Redescription: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 2.0 mm; 3.75 whorls; apex slightly raised; spire protrusion 9.3% of shell height; shell height 53.5% of diameter; peristome evenly thickened, thin, reflected sub-peripherally; high shoulder; apical suture crenulated, impressed; aperture lunate, rounded basally, slightly flattened supra-peripherally, obstructed; aperture height equal to width; umbilicus 28% of shell diameter, constricted decoiling; late juvenile whorl descension 2°, body whorl descension 4.8°. Sculpture: embryonic whorl sculptured; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, two to four times axial rib width; axial rib count 41; three riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crescentic, rapid ascension, extended between the 4th and 5th palatal barriers, 2nd low, thick, gradual ascension, extended between the 3rd and 4th palatal barriers; three primary palatal barriers, 1st columellar, tall and thick, crescentic, 3rd basal, tall, crescentic, 4th sub-peripheral, tall, crescentic; three sub-palatal, 2nd basal, diminutive, often callous-like, recessed; 5th peripheral, low, crescentic, diminutive, recessed, 6th supra-peripheral, low, blade-like, diminutive, recessed. Primary palatal barrier height order 4th, 1st, 3rd.



Fig. 151. *Liliiliconcha henshawi*, 2.0 mm, MNHN IM 2000-9654a, SYNTYPE, Hawaii, Palihoukapapa.

Etymology: Named for Prof. H. W. Henshaw, then of Hilo, a well-known naturalist who studied Hawaiian birds and land snails.

Liliiliconcha henshawi Syntype

Shell diameter: 2.0 mm

Shell height: 1.07 mm, 53.5 % of shell diameter

Spire protrusion: 0.1 mm, 9.3% of shell height

Aperture height: 0.8 mm, equal to aperture width

Rib count: 41

Riblets per rib interspace: 3

Number of whorls: 3.5

Umbilicus diameter: 0.56 mm, 28% of shell diameter

Late juvenile whorl descension: 2°

Body whorl descension: 4.8°

Liliiliconcha julianae n. sp.
(Figs. 152, 347, 348)

Type material: Holotype SMNS-ZI0157969 (ex MS 9026); seven paratypes (MS 9684: 1, MS 9018: 1, MS 9014: 4, MS 9030: 1); all leg. J. Vivona, 2018.

Type locality: Ala Makahiki Trail, Kealahakua Bay, Kona District, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality, Kealahakua.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 35% of shell diameter; axial rib count 59; primary palatal barrier height order, tall to low: 1st, 4th, 3rd.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.0 mm; 3.5 whorls;

apex raised; spire protrusion 13% of shell height, shell height 57.5% of diameter; peristome thick, reflected sub-peripherally and basally; low shoulder; apical suture crenulated, shallow; aperture reniform, compressed peripherally, obstructed; aperture width 93.3% of height; umbilicus 35% of shell diameter, gradual decoiling; late juvenile whorl descension 2.5°, body whorl descension 3.7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile rib interspace 1.5 times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 59; three riblet per rib interspace prior to alteration; faint spiral cords; Barriers: two parietal barriers, 1st thin, tall, bifid, rapid ascension, extended toward the 6th palatal, 2nd tall, thick, bifid, rapid ascension, extended between the 3rd and 4th palatals; three primary palatal barriers, 1st columellar, tall, evenly thickened, rapid ascension, 3rd sub-peripheral, tall, thick, marginally crescentic, rapid ascension, 4th sub-peripheral, tall, thick, crescentic, rapid ascension; three sub-palatals, 2nd basal, callous-like, diminutive, recessed, 5th and 6th supra-peripheral, low, diminutive, callous-like, recessed. Primary palatal barrier height order 1st, 4th, 3rd.



Fig. 152. *Liliiliconcha julianae*, 2.0 mm, SMNS-ZI0157969 (ex MS 9026), HOLOTYPE, Hawaii, Kona.

Remarks: Relatively fresh specimens found beneath an old Hawaiian trail.

Etymology: Named to honor the archeologist Juliana Vivona of Captain Cooke, Kona, for her generous contribution to this revision.

***Liliiliconcha julianae* Holotype**

Shell diameter: 2.0 mm

Shell height: 1.15 mm, 57.5% of shell diameter

Spire protrusion: 0.15 mm, 13% of shell height

Aperture height: 0.75 mm

Aperture width: 0.7 mm, 93.3% of aperture height

Rib count: 59

Riblets per rib interspace: 3

Number of whorls: 3.5

Umbilicus diameter: 0.7 mm, 35% of shell diameter

Late juvenile whorl descension: 2.5°

Body whorl descension: 3.7°

***Liliiliconcha maui* n. sp.**

(Figs. 153, 349–352)

Type material: Holotype SMNS-ZI0157971 (ex MS 8664); nine paratypes (MS 8860: 1, MS 8583: 1, MS 9146: 1, MS 8716: 1, MS 8883: 1, MS 8885: 1, MS 8884: 1, MS 8671: 1, MS 8915: 1); all leg. M. Severns & S. Olson, Apr 22, 1988.

Type locality: Lua Lepo Cave, 825.1 m, Kahikinui Moku, Hana District, Maui. 20°37'48.51"N, 156°19'50.07"W.

Other material studied: 164 specimens from Maui: 147 specimens, Hana District, Kahikinui Moku, Lua Lepo Cave, 825.1 m, leg. M. Severns & S. Olson, Apr 22, 1988 (MS 8940: 1, MS 9159: 3, MS 8697: 1, MS 8686: 3, MS 8938: 4, MS 8934: 4, MS 8575: 51, MS 8689: 1, MS 8918: 7, MS 8710: 7, MS 8927: 2, MS 8658: 3, MS 8933: 4, MS 8581: 4, MS 8906: 12, MS 8913: 8, MS 8713: 1, MS 8936: 13, MS 8702: 1, MS 8923: 1, MS 8572: 4, MS 8667: 8, MS 8937: 7). Two specimens from Makawao District, Honuaula Moku, Puu Naio Cave, 392.9 m, leg. H. James, Jul 20–21, 1988 (MS 8940: 1), Unit IV-C(1), leg. H. James, July 20–21, 1990 (MS 8593: 1). 10 specimens, Wailuku District, Kealaloloa Moku, Mid-Maui Sand Pit, leg. M. Severns, P. Fiene & C. Pittman Feb 6, 1993 (MS 8310: 1, MS 8886: 1, MS 8887: 1, MS 9142: 1, MS 8898: 5, MS 8888: 1). Two specimens from Lahaina District, Honolua Moku, Mokuleia Bay, leg. C. Pittman (MS 8890: 1, MS 8889: 1). Three specimens from Molokai; Koolau Moku, Moomomi, leg. S. Olson & J. Aidem Feb 14, 1993 (MS 8894: 1, MS 8718: 1, MS 8893: 1). Five specimens from Kahoolawe; Kahoolawe O Kanaloa Moku: Makawao District, Schooner Bay, leg. Pilsbry & Cooke, 1913 (ANSP 108858: 4, ANSP 119424: 1).

Status and Distribution: Holocene fossil. Presumed extinct. Known from Kahikinui Moku, Hana District, Lua Lepo Cave, 825.1 m., Puu Naio Cave, 392.9 m. Honuaula Moku, Makawao District; Mid-Maui Sand Pit, Kealaloloa Moku, Wailuku District, a central valley sand quarry, and above Mokuleia Bay, Maui; Schooner Bay, Kahoolawe O Kanaloa Moku: Makawao District, Kahoolawe; Moomomi in Koolau Moku, Molokai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 35% of shell diameter; axial rib count 73; primary palatal barrier height order, tall to low: 4th, 3rd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 2.0 mm; 3.5 whorls; apex raised; spire protrusion 10.5% of shell height; shell height 47.5% of diameter; peristome thickened, slightly reflected; low shoulder; apical suture crenulated, shallow; aperture reniform, rounded sub-peripherally, slightly constricted supra-peripherally, obstructed; aperture height equal to width; umbilicus 35% of shell diameter, gradual decoiling; late juvenile whorl descension 2° , body whorl descension 6.5° . Sculpture: present on embryonic whorls; juvenile whorls rib interspace 1.5 times axial rib width, late juvenile rib interspace two times axial rib width, body whorl rib interspace 2.5 times axial rib width; axial rib count 73; two riblets per rib interspace prior to alteration. Barriers: parietal barriers, 1st tall, thin, bifid, gradual ascension, extended toward the 5th palatal, 2nd evenly thickened, crescentic, rapid ascension, extended between the 3rd and 4th palatals; three primary palatal barriers, 1st columellar, thick, tall, crescentic, rapid ascension, 3rd basal, tall, thick, crescentic, rapid ascension, 4th sub-peripheral, tall, crescentic, rapid ascension, three sub-palatal barriers, 2nd basal, thick, callous-like, recessed, 5th peripheral, low, thin, diminutive, recessed, gradual ascension, 6th supra-peripheral, low, diminutive, crescentic, recessed, gradual ascension. Primary palatal barrier height order 4th, 3rd, 1st.



Fig. 153. *Liililiconcha maui*, 2.0 mm, SMNS-ZI0157971 (ex MS 8664), HOLOTYPE, Maui, Lua Lepo Cave.

Comparison: *Liililiconcha maui* (Maui, Kahoolawe, Molokai) is distinguished from *L. johnstarrowi* (Maui, Lanai, Molokai and Oahu) by having a shell height 47.5% of shell diameter (vs. 50% in *L. johnstarrowi*); spire protrusion 10.5% of height (vs. 10%); aperture height equal to width (vs. width 87.5% of height); axial rib count 73 (vs. 43); umbilicus diameter 35% of shell diameter (vs. 32.5%); body whorl descension 6.5° (vs. 5.4°); 2 parietal barriers, first tall, bifid and second tall, crescentic (vs. 4 parietal barriers, 1st low, recessed, apical sutural, 2nd tall, thin, bifid, 3rd tall, thin, bifid, 4th umbilical sutural parietal, low, recessed).

Remarks: *Liililiconcha maui*, *L. johnstarrowi* and *Randallius fisheri* are similar in size, 2 mm, which no doubt aided with dispersal to multiple islands. *Cookeconcha davidpickelli*, 4.6 mm, is found on the neighboring islands of Maui and Molokai. All four species are found on Maui Nui, with two, *L. johnstarrowi* and *L. fisheri*, also being found on Oahu.

Etymology: Named for the island of Maui, the largest island of the Maui Nui complex to which the species appears to be endemic.

***Liililiconcha maui* Holotype**

Shell diameter: 2.0 mm

Shell height: 0.95 mm, 47.5% of shell diameter

Spire protrusion: 0.1 mm, 10.5% of shell height

Aperture height: 0.7 mm, equal to aperture width

Rib count: 73

Riblets per rib interspace: 2

Number of whorls: 3.5

Umbilicus diameter: 0.7 mm, 35% of shell diameter

Late juvenile whorl descension: 2°

Body whorl descension: 6.5°

***Liililiconcha johnstarrowi* n. sp.**

(Figs. 154, 353–356)

Type material: Holotype SMNS-ZI0157970 (ex MS 9685); two paratypes (MS 9686: 1, MS 9687: 1); all leg. H. James, Jul 20 & 21, 1990.

Type locality: Puu Naio Cave, 392.9 m, Kahikinui Moku, Hana District, Maui. $20^\circ37'25.87''N$, $156^\circ23'53.89''W$.

Other material studied: 1895 specimens from Maui, Lanai, Molokai and Oahu: 412 specimens from Maui: 259 specimens from Makawao District, Honuaula Moku, Puu Naio Cave, 392.9 m, leg. H. James, Jul 20 – 21, 1990 (MS 9163: 19, MS 9162: 3, MS 6575: 12, MS 6570: 15, MS 6568: 70, MS 6577: 3, MS 6569: 19, MS 6583: 5, MS 6576: 7, MS 8946: 1, 9143: 1, MS 9655: 1, MS 6581: 6, MS 6580: 1, MS 6578: 1, MS 9160: 1, MS 6579: 3, MS 6567: 40, MS 9145: 1, MS 6582: 7, MS 6584: 2, MS 6573: 9, MS 6574: 7, MS 6572: 2, MS 9144: 2, MS 8926: 2, MS 6082: 2), 17 specimens from Puu Naio Cave 392.9 m, leg. H. James, Jun 10, 1988 (MS 9161: 2, MS 8935: 9, MS 8856: 6), 151 specimens from Hana District, Kahikinui Moku, Lua Lepo Cave, 825.1 m, leg. M. Severns & S. Olson, Apr 16 to 22, 1988 (MS 9158: 4, MS 8903: 5, MS 8931: 3, MS 8932: 2, MS 8576: 11, MS 8684: 2, MS 8662: 2, MS 8659: 1, MS 9157: 1, MS 8687: 9, MS 8900: 1, MS 8709: 5, MS 8910: 3, MS 9141: 1, MS 8907: 1, MS 8706: 5, MS 9156: 11, MS 8712: 1, MS 8947: 1, MS 8925: 2, MS 8703: 5, MS 8692:

7, MS 8911: 1, MS 8698: 14, MS 8582: 33, MS 9131: 1, MS 8929: 6, MS 8694: 1, MS 8562: 1, MS 8573: 6, MS 8904: 4), two specimens from Lua Lepo Cave, 825.1 m, leg. H. James, Apr 20, 1988 (MS 8861: 1), one specimen from Wailuku District, Wailuku Moku, Waiehu Golf Course, leg. M. Severns, Aug 30, 2011 (MS 8311: 1), leg. M. Severns, 30 August, 2011 (MS 8824:1), in a lithified sand dune. Four specimens from Lanai: Lae Palolo, leg. M. Severns Feb 6, 1993 (MS 8862: 1, MS 8863: 2, MS 9155: 1). One specimen from Molokai: Kona Moku, Makolelau, leg. Pilsbry & Cooke, 1913 (ANSP 108378: 1). 1456 specimens from Oahu: Kona District, Manoa, leg. O. Oswald, 1939, ex coll. Oswald (ANSP 384393:1); Koolauloa District, Kaaawa, leg. O. Oswald, Jun 2, 1928 (ANSP 376761: 7), one specimen, Waialua District, Kawailoa, leg. H.A. Pilsbry, 1920 (ANSP 128083: 671), Koolauloa District, Laie, leg. Pilsbry & Cooke, 1913 (ANSP 108970: 173), Laie, leg. O. Oswald, Jan 1, 1937 (ANSP 502766 ex 380209: 30), Koolauloa District, Malaekahana, leg. H.A. Pilsbry, 1920 (ANSP 128034: 1), Kahuku, leg. Pilsbry & Cooke, 1913 (ANSP 117336: 599), Waianae District, Luaaleui, leg. O. Oswald, Oct 3, 1928 (ANSP 378492: 1).

Status and Distribution: Holocene fossil. Presumed extinct. Known from Honuaula Moku, Makawao District, Puu Naio Cave, 392.9 m, Kahikinui Moku, Hana District, Lua Lepo Cave, 825.1 m, and Wailuku Moke, Wailuku District Waiehu Golf Course: Maui; Lae Palolo, Lanai; Makolelau, Molokai; Laie, Kaaawa, Kawailoa, Kahuku, Luaaleui and Malaekahana, Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 32.5% of shell diameter; axial rib count 43; primary palatal barrier height order, tall to low: 3rd, 4th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 2.0 mm; 3.5 whorls; apex raised; spire protrusion 10% of shell height; shell height 50% of diameter; peristome evenly thickened, reflected sub-peripherally; raised shoulder; apical suture crenulated, moderately impressed; aperture lunate, rounded sub-peripherally, flattened supra-peripherally, obstructed; aperture height 87.5% of width; umbilicus 32.5% of shell diameter, gradual decoiling; late juvenile whorl descension 1.8°; body whorl descension 5.4°. Sculpture: present on embryonic whorls; juvenile whorls rib interspace equal to axial rib width, late juvenile rib interspace three times axial rib width, body whorl rib interspace constant at approximately four times axial rib width; axial rib count 43; two riblets per rib interspace prior to alteration. Barriers: four parietal barriers, 1st apical sutural parietal, low, trace-like, recessed, 2nd primary parietal, tall, thin,

bifid, gradual ascension, extended between the 5th and 6th palatal barriers, 3rd primary parietal, tall, thick, bifid, rapid ascension, extended between the 3rd and 4th palatal barriers, 4th umbilical sutural parietal, low, recessed; three primary palatal barriers (1st columella, 2nd basal and 3rd sub-peripheral; three sub-palatal barriers, 2nd basal, low, thin, crescentic, recessed, 5th peripheral, low, blade-like, diminutive, recessed, 6th supra peripheral, low, evenly thickened, marginally crescentic. Primary palatal barrier height order 3rd, 4th, 1st.



Fig. 154. *Liiliiconcha johnstarmeri*, 2.0 mm, SMNS-Z10157970 (ex MS 9685), HOLOTYPE, Maui, Puu Naio Cave.

Remarks: *Liiliiconcha johnstarmeri* is a widespread and variable species. Of the 415 specimens examined from Maui, 122 had no sutural parietals, and 294 specimens had sutural parietals in the 1st and 4th positions. Also there are two parietal barriers that are bifid and a residual palatal barrier was noted between the 4th and 5th palatals of one specimen (see Comparison and Remarks for *Liiliiconcha maui*)

Etymology: Named for John Starmer, diver, hiking partner and a back-pocket pocket-guide for this paper and to thank him for dedicating *Geograpsus severnsi* to the author.

***Liiliiconcha johnstarmeri* Holotype**

Shell diameter: 2 mm
 Shell height: 1 mm, 50% of shell diameter
 Spire protrusion: 0.1 mm, 10% of shell height
 Aperture height: 0.8 mm
 Aperture width: 0.7 mm, 87.5% of aperture height
 Rib count: 43
 Riblets per rib interspace: 2
 Number of whorls: 3.5
 Umbilicus diameter: 0.65 mm, 32.5% of shell diameter
 Late juvenile whorl descension: 1.8°
 Body whorl descension: 5.4°

Liililiconcha kamalo n. sp.
(Fig. 155)

Type material: Holotype ANSP 109966; one paratype (ANSP 501758: 1); both leg. H. A. Pilsbry & C. M. Cooke, Jan 29, 1913.

Type locality: West ravine of Kamalo, Kona Moku, Molokai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 35.7% of shell diameter; axial rib count 45; primary palatal barrier height order, tall to low: 4th, 3rd, 1st.

Description: Color: flammulated. Shell: discoidal, depressed, compressed laterally; diameter 1.4 mm; 3.25 whorls; apex sunken, spire protrusion, none; shell height 48.6% of shell diameter; peristome evenly thickened, thin; low shoulder; apical suture crenulated, shallow; aperture reniform, constricted peripherally, obstructed; aperture width 86.6% of height; umbilicus 35.7% of shell diameter, open decoiling; early juvenile whorl descension 0°, body whorl descension 3°. Sculpture: present on embryonic whorls; early juvenile whorls rib interspace equals axial rib width, late juvenile whorl rib interspace two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 45; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st thin, marginally crescentic, gradual ascension, extended between the 4th and 5th palatal barrier, 2nd thick, crescentic, rapid ascension, extended toward the 4th palatal barrier; three primary palatal barriers,

1st columellar, thick, crescentic, rapid ascension, 3rd basal, tall, thick, crescentic, rapid ascension, 4th sub-peripheral, tall, thick, crescentic, rapid ascension; three sub-palatal barriers, 2nd basal, low, diminutive, callous-like, recessed, 5th and 6th supra-peripheral, low, diminutive, recessed. Primary palatal barrier height order 4th, 3rd, 1st.

Etymology: Named for the type locality.

Liililiconcha kamalo Holotype

Shell diameter: 1.4 mm

Shell height: 0.68 mm, 48.6% of shell diameter

Spire protrusion: none

Aperture height: 0.6 mm

Aperture width: 0.52 mm, 86.6% of aperture height

Rib count: 45

Riblets per rib interspace: 3

Number of whorls: 3.25

Umbilicus diameter: 0.5 mm, 35.7% of shell diameter

Late juvenile whorl descension: 0°

Body whorl descension: 3°

Liililiconcha rosenbergi n. sp.
(Figs. 156, 357)

Type material: Holotype ANSP 108739; four paratypes (ANSP 501759: 4); all leg. H. A. Pilsbry & C. M. Cooke, Feb. 2, 1913.

Type locality: Mauna Loa, Kaluakoi Moku, Molokai.

Other material studied: 76 specimens from Molokai: Kaluakoi Moku, Moomomi, leg. Pilsbry, Jan 30, 1913 (ANSP 117343: 30) and Mauna Loa, leg. Pilsbry & Cooke, Feb 2, 1913 (ANSP ex 108739: 46).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known from the type locality near the top of Mauna Loa and Moomomi, Molokai.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 30.5% of shell diameter; axial rib count 60; primary palatal barrier height order, tall to low: 1st, 4th, 3rd.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 1.8 mm; 3.5 whorls; apex raised; spire protrusion 13% of height; shell height 51.1% of diameter; peristome evenly thickened, marginally reflected sub-peripherally; raised shoulder, apical suture crenulated; aperture reniform, rounded sub-peripherally, supra-peripherally constricted, obstructed; aperture height equal to width; umbilicus 30.5% of shell diameter, suture impressed;



Fig. 155. *Liililiconcha kamalo*, 1.4 mm, ANSP 109966, HOLOTYPE, Molokai, Kamalo.

late juvenile whorl descension 3°, body whorl descension 5°. Sculpture: present on embryonic whorls; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace two times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 60; one riblet per rib interspace prior to alteration. Barriers; two equally parietal barriers, 1st thick, bifid, extended between the 5th and 6th palatal barriers, 2nd thick, crescentic, extended toward the 4th palatal barrier; three primary palatal barriers, 1st columellar, thick, broadly crescentic, descends rapidly, 3rd basal, tall, broadly crescentic, gradual ascension, 4th sub-peripheral, tall, thick, broadly crescentic gradual ascension, three sub-palatal barriers, 2nd basal, low, diminutive, callous-like, recessed 5th peripheral, low, thick, diminutive, broadly crescentic, gradual ascension, recessed. 6th supra-peripheral, low, thick, diminutive, broadly crescentic, gradual ascension, recessed. Primary palatal barrier height order 1st, 4th, 3rd.



Fig. 156. *Liiliiconcha rosenbergi*, 1.8 mm, ANSP 108739, HOLOTYPE, Molokai, Mauna Loa.

Remarks: *Liiliiconcha rosenbergi* has perhaps the best defended aperture of all Hawaiian species of Endodontidae.

Etymology: Named to honor Dr. Gary Rosenberg who offered generous help to the author over the years and opened the ANSP Hawaiian Endodontidae collection to this work.

***Liiliiconcha rosenbergi* Holotype**

Shell diameter: 1.8 mm

Shell height: 0.92 mm, 51.1% of shell diameter

Spire protrusion: 0.12 mm, 13% of shell height

Aperture height: 0.67 mm, equal to aperture width

Rib count: 60

Riblets per rib interspace: 1

Number of whorls: 3.5

Umbilicus diameter: 0.55 mm, 30.5% of shell diameter

Late juvenile whorl descension: 3°

Body whorl descension: 5°

***Liiliiconcha adevae* n. sp.**

(Figs. 157, 358)

Type material: Holotype SMNS-ZI0157972 (ex MS 9663); one paratype (MS 9664: 1); both leg. R. Gage.

Type locality: Rocky Hill, Manoa Valley, Kona District, Oahu.

Status and Distribution: Extant, Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal, depressed; umbilicus width 39% of shell diameter; axial rib count 65; primary palatal barrier height order, tall to low: 4th, 3rd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, depressed, slightly compressed laterally; diameter 2.3 mm; 4.5 whorls; apex sunken; spire protrusion 17.4% of height; shell height 50% of diameter; peristome evenly thickened, slightly reflected sub-peripherally; low shoulder, apical suture crenulated, shallow; aperture lunate, flattened supra-peripherally, obstructed; aperture height equal to width; umbilicus 39% of shell diameter, open decoiling; late juvenile whorl descension 2.4°, body whorl descension 6.7°. Sculpture: present on embryonic whorl; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace 2.5 times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 65; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st thick, bifid, extended toward the 5th palatal barrier, 2nd thick, bifid, extended toward the 4th palatal barrier; three primary palatal barriers, 1st columellar, tall, crescentic, 3rd basal, tall, crescentic, 4th sub-peripheral,



Fig. 157. *Liiliiconcha adevae*, 2.3 mm, SMNS-ZI0157972 (ex MS 9663), HOLOTYPE, Oahu, Manoa, Rocky Hill.

tall, thin, crescentic; three sub-palatal barriers, 2nd basal, low, crescentic, diminutive, recessed, 5th peripheral, low, thick, diminutive, crescentic, recessed, 6th supra-peripheral, low, thick, diminutive, crescentic, recessed. Primary palatal barrier height order 4th, 3rd, 1st.

Etymology: Named to honor Adeva Seraphina Purkott, a friend who worked three years in a Covid 19 ward in Germany at great risk to herself for the welfare of others.

***Liiliiliconcha adevae* Holotype**

Shell diameter: 2.3 mm

Shell height: 1.15 mm, 50% of shell diameter

Spire protrusion: 0.2 mm, 17.4% of shell height

Aperture height: 0.75 mm, equal to aperture width

Rib count: 65

Riblets per rib interspace: 2

Number of whorls: 4.5

Umbilicus diameter: 0.9 mm, 39% of shell diameter

Late juvenile whorl descension: 2.4°

Body whorl descension: 6.7°

***Liiliiliconcha evae* n. sp.**

(Fig. 158)

Type material: Holotype ANSP 386218, leg. O. Oswald, Apr 9, 1938.

Type locality: As described by Oswald; southerly along trail, southerly from ravine 5, Gowen Trail, 21° 26'N, 158° 06'W, Pohakea Pass, Waianae District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Indiscernible color pattern; shell discoidal; umbilicus width 45.8% of shell diameter; axial rib count 71; primary palatal barrier height order, tall to low: 4th, 3rd, 1st.

Description: Color: indiscernible. Shell: discoidal; diameter 2.4 mm; 4.2 whorls; apex raised; spire protrusion 16.6% of shell height; shell height 50% of diameter; peristome thin, thickened ahead of the basal barriers, basally reflected; low shoulder; apical suture crenulated, shallow; aperture lunate; slightly flattened supra-peripherally, obstructed; aperture width 87.5% of height; umbilicus 45.8% of shell diameter, open decoiling; late juvenile whorl descension 2.7°, body whorl descension 4.3°. Sculpture: present on embryonic whorls; juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 71; two riblets per rib interspace

prior to alteration. Barriers: two parietal barriers, 1st low, thin crescentic, gradual ascension, extended between the 4th and 5th palatal, 2nd tall, thick, crescentic, gradual ascension, extended between the 3rd and 4th palatals; three primary palatal barriers, 1st columellar, tall, thick, crescentic, rapid ascension, 3rd basal, tall, crescentic, rapid ascension, 4th sub-peripheral, tall, thick, crescentic, rapid ascension, three sub-palatal barriers, 2nd basal, low, thick, diminutive, rapid ascension, recessed, 5th and 6th supra-peripheral, low, thick, diminutive, callous-like, recessed. Primary palatal barrier height order 4th, 3rd, 1st.



Fig. 158. *Liiliiliconcha evae*, 2.4 mm, ANSP 386218, HOLOTYPE, Oahu, Pohakea Pass.

Etymology: Named for Eva Talreng "Lightfoot" Starmer, a person of deep thought and easy manner.

***Liiliiliconcha evae* Holotype**

Shell diameter: 2.4 mm

Shell height: 1.2 mm, 50% of shell diameter

Spire protrusion: 0.2 mm, 16.6% of shell height

Aperture height: 0.8 mm

Aperture width: 0.7 mm, 87.5% of aperture height

Rib count: 71

Riblets per rib interspace: 2

Number of whorls: 4.2

Umbilicus diameter: 1.1 mm, 45.8% of shell diameter

Late juvenile whorl descension: 2.7°

Body whorl descension: 4.3°

***Liiliiliconcha oahu* n. sp.**

(Figs. 159, 359, 360)

Type material: Holotype ANSP 380209; nine paratypes (ANSP 501760: 9); all leg. O. Oswald, Jan 1, 1937.

Type locality: As described by Oswald; coral uplift near beach, opposite old pier, 21°39'N, 157°56'W, Laie, Koolauloa, Oahu.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 40% of shell diameter; axial rib count 101; primary palatal barrier height order, tall to low: 4th, 3rd, 1st.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 2.5 mm; 4.5 whorls; apex raised; spire protrusion 21.7% of shell height; shell height 46% of diameter; peristome evenly thickened, thick, reflected; low shoulder; apical suture crenulated, shallow; aperture reniform, slightly constricted supra-peripherally, obstructed; aperture height equal to width; umbilicus 40% of shell diameter, moderately constricted decoiling late juvenile whorl descension 4°, body whorl descension 4°, body whorl ascension 1°. Sculpture: present on embryonic whorls; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace two times axial rib width, body whorl rib interspace irregular, two to 2.5 times axial rib width; axial rib count 101; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crescentic, gradual ascension, extended toward the 5th palatal, 2nd crescentic, gradual ascension, extended toward the 3rd palatal; three primary palatal barriers, 1st columellar, tall, marginally crescentic, rapid ascension, 3rd basal, tall, evenly thickened, slightly crescentic, rapid ascension, 4th sub-peripheral, tall, thick, crescentic, rapid ascension; three sub-palatal barriers, 2nd basal, low, diminutive, recessed, 5th peripheral, low, diminutive, callous-like, recessed, 6th supra-peripheral, moderately tall, diminutive, rapid ascension. Primary palatal barrier height order 4th, 3rd, 1st.

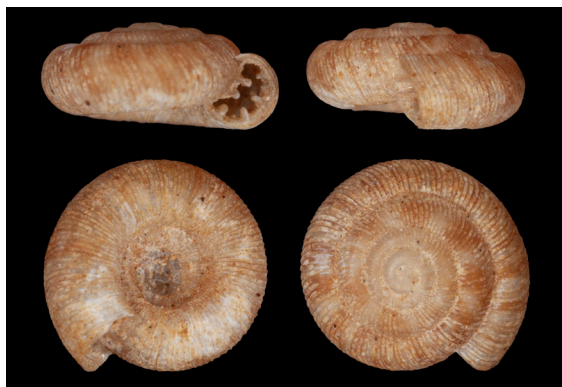


Fig. 159. *Liuililiconcha oahu*, 2.5 mm, ANSP 380209, HOLOTYPE, Oahu, Laie.

Etymology: Named for the island of Oahu.

***Liuililiconcha oahu* Holotype**

Shell diameter: 2.5 mm

Shell height: 1.15 mm, 46% of shell diameter

Spire protrusion: 0.25 mm, 21.7% of shell height

Aperture height: 0.8 mm, equal to aperture width

Rib count: 101

Riblets per rib interspace: 2

Number of whorls: 4.5

Umbilicus diameter: 1.0 mm, 40% of shell diameter

Late juvenile whorl descension: 4°

Body whorl descension: 4°

Body whorl ascension: 1°

***Liuililiconcha waipahuensis* n. sp.**

(Fig. 160)

Type material: Holotype ANSP 116720, leg. H. A. Pilsbry.

Type locality: 50 yards east of post office, Waipahu, Ewa District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 38% of shell diameter; axial rib count 88; primary palatal barrier height order, tall to low: 4th, 1st, 3rd.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 2.1 mm; 4.2 whorls; apex raised; spire protrusion 14.2% of shell height; shell height 50% of diameter; peristome evenly thickened, thin, basally reflected; low shoulder; apical suture crenulated, shallow; aperture lunate, flattened supra-peripherally, obstructed; aperture height equal to width; umbilicus 38% of shell diameter, open decoiling; late juvenile whorl descension 3°, body whorl descension 5°. Sculpture: present on embryonic whorls, early juvenile whorls rib interspaces 1.5 times axial rib width, late juvenile rib interspaces two times axial rib width, body whorl rib interspaces irregular, two to three times axial rib width; axial rib count 88; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thick, crescentic, rapid ascension, extended toward the 5th palatal, 2nd low, thick, gradual ascension, extended toward the 4th palatal; three primary palatal barriers, 1st columellar, tall, thick, rapid ascension, 3rd basal, tall, thick, marginally crescentic, rapid ascension, 4th sub-peripheral, tall, thick, crescentic, rapid ascension; three sub-palatals, 2nd basal, callous-like, diminutive, recessed, 5th and 6th supra-peripheral, low, callous-like, recessed. Primary palatal barrier height order 4th, 1st, 3rd.



Etymology: Named for the type locality.

Liililiconcha waipahuensis Holotype

Shell diameter: 2.1 mm

Shell height: 1.05 mm, 50% of shell diameter

Spire protrusion: 0.15 mm, 14.2% of shell height

Aperture height: 0.7 mm, equal to aperture width

Rib count: 88

Riblets per rib interspace: 1

Number of whorls: 4.2

Umbilicus diameter: 0.8 mm, 38% of shell diameter

Late juvenile whorl descension: 3°

Body whorl descension: 5°

Fig. 160. *Liililiconcha waipahuensis*, 2.1 mm, ANSP 116720, HOLOTYPE, Oahu, Waipahu.

Nesophila Pilsbry, 1893

Type species: *Nesophila tiara* Mighels, 1845 (Fig. 161) **Diagnosis:** Parietal barriers best described as thread-like strands with inconsistent numbers within a species, 0 palatal barriers. **Includes:** Four species, 3 nominal plus 1 newly described herein (Fig. 163); all endemic to Kauai (Fig. 162).



Fig. 161. *Nesophila tiara* Mighels, 1845, type species of *Nesophila* Pilsbry, 1893; 11.0 mm, MCZ 156031, SYNTYPE, Kauai.

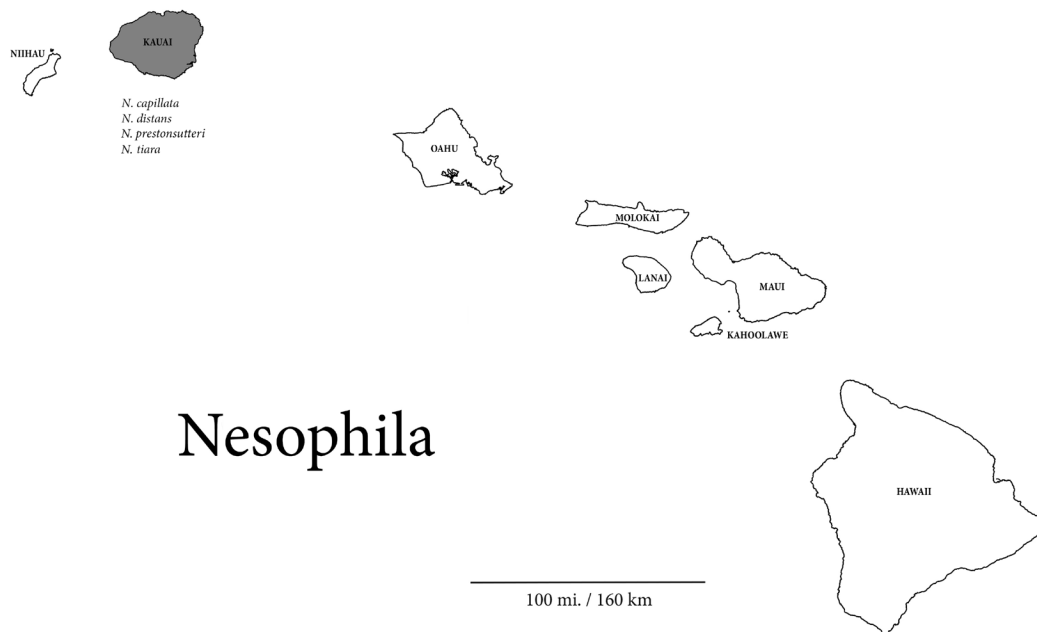


Fig. 162. Distributions of the species of *Nesophila* in the Hawaiian archipelago.

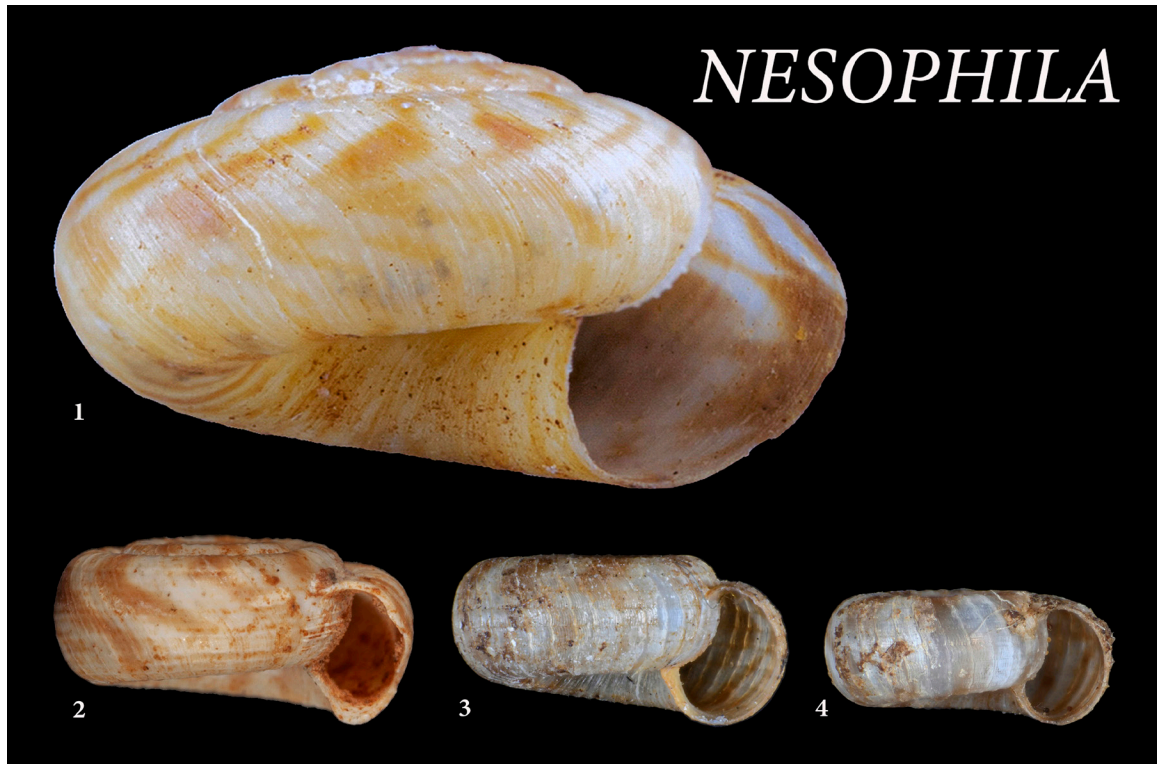


Fig. 163. Scaled images of specimens of the four species of the genus *Nesophila*.

Kauai

- (1) *Nesophila tiara*, 11 mm, MCZ 156031, Syntype
- (2) *Nesophila prestonsutteri*, 5.0 mm, SMNS-ZI0157973 (ex MS 8597), Holotype
- (3) *Nesophila distans*, 4.6 mm, ANSP 391060, Neotype
- (4) *Nesophila capillata*, 4.0 mm, ANSP 1972, Paralectotype

Nesophila capillata Pease, 1866
(Figs. 164, 361)

Helix capillata Pease, 1866: 292 — unaccepted > superseded combination.

Charopa baldwini var. *albina* Ancey, 1889: 176 [here considered junior synonym of *Nesophila capillata* Pease, 1866. *Nesophila capillata* (Pease, 1866) — Solem, 1976: 367–368.

Type material: Lectotype ANSP 1975: 1 [designation attributed to Baker, 1963: 232]; one paralectotype (ANSP 1972: 1); both leg. W. H. Pease, ex coll. A. D. Brown.

Type locality: Hawaiian Islands, Kauai.

Other material studied: Type specimen of *Charopa baldwini* var. *albina* Ancey, 1889 (BPBM 18798).

Status and Distribution: Extant. Presumed extinct. Known only from Kauai.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 42.5% of shell diameter; six thread-like, parietal barriers (Solem, 1976), no palatal barriers.

Redescription: Color: flammulated. Shell: discoidal, depressed, slightly compressed laterally; diameter 4.0 mm; 5 whorls; apex sunken, spire protrusion, none; shell height 47.5% of diameter; peristome thin, not reflected; shoulder not raised; apical suture impressed, crenulate, margined; aperture sub reniform, not obstructed; aperture width 81.3% of height; umbilicus open, regularly decoiling, 42.5% of shell diameter; late juvenile whorl descension 0.0°, body whorl descension 5.3°. Sculpture: embryonic sculpture absent; 39 low, clearly defined radial ribs separated by six to eight riblets prior to the alteration. Several spiral cords cause both the radial ribs and riblets to be crenulated. Barriers: eight low, equally sized, thread-like parietal barriers crossed by radial ribs of approximately the same height and width on the parietal callous; no palatal barriers.

Comparison: Differs from *Nesophila distans* by being discoidal, smaller, slightly compressed laterally and having less descension.

Remarks: Based on type specimen BPBM 18798, *Charopa baldwini* var. *albina* Ancey, 1889 is placed here in the synonymy of *Nesophila capillata* Pease, 1866. I chose the 4.0 mm paralectotype (ANSP 1972) of *Nesophila capillata* for analysis as the specimen is in excellent condition.



Fig. 164. *Nesophila capillata*, 3.85 mm, ANSP 1975, LECTOTYPE, Kauai.

Etymology: Unknown.

Nesophila capillata Paralectotype

Shell diameter: 4.0 mm

Shell height: 1.9 mm, 47.5% of shell diameter

Spire protrusion: none

Aperture height: 1.6 mm

Aperture width: 1.3 mm, 81.3% of aperture height

Number of whorls: 5

Rib count: 39

Umbilicus diameter: 1.7 mm, 42.5% of shell diameter

Late juvenile whorl descension: 0.0°

Body whorl descension: 5.3°

Nesophila distans Pease, 1866
(Fig. 165)

Helix distans Pease, 1866: 290 — unaccepted > superseded combination.

Charopa baldwini Ancey, 1889: 176 — here considered junior synonym of *Nesophila distans* Pease, 1866.

Nesophila distans (Pease, 1866) — Solem, 1976: 367.

Type material: Neotype, ANSP 391060: 1 [designated here], leg. H. W. Pease, ex coll. A. D. Brown.

Type locality: Kauai, Hawaiian Islands.

Status and Distribution: Extant. Presumed extinct. Known only from the island of Kauai.

Diagnosis: Color pattern flammulated; shell sub depressed; umbilicus width 39.1% of shell diameter; eight thread-like, parietal barriers, no palatal barriers.

Redescription: Color: flammulated, light chestnut. Shell: discoidal, rounded peripherally; diameter 4.6 mm; 5 whorls; apex sunken, spire protrusion 8.7% of shell height, shell height 50% of diameter; peristome thin, not reflected; shoulder raised; apical suture impressed, crenulate, not margined; aperture reniform, not obstructed; aperture width 80% of height; umbilicus open, regularly decoiling, 39.1% of shell diameter; late juvenile whorl descension 7.0°, body whorl descension 1.6°. Sculpture: embryonic sculpture absent; rib count 44, five or six riblets between ribs: nine spiral cords visible in the aperture spaced approximately the same as the radial ribs. Barriers: eight low, thread-like parietal barriers; no palatal barriers.



Fig. 165. *Nesophila distans*, 4.6 mm, ANSP 391060, NEOTYPE, Kauai.

Comparison: Differs from *Nesophila capillata* by being larger, having a rounded aperture, and greater shell descension.

Remarks: A type specimen (BPBM 18797) of *Nesophila baldwini* (Ancey, 1889) was noted by Cooke to be a variety of *Nesophila capillata* on the lot label. But after examining the image of this specimen sent by Norine Young, I believe it is rather *Nesophila distans* Pease, 1866. Based on BPBM 18797, *Nesophila baldwini* (Ancey, 1889) is here treated as a synonym of *Nesophila distans* Pease, 1866, whereas *N. baldwini* var. *albina* (Ancey, 1889) is placed in the synonymy *Nesophila capillata* Pease, 1866.

Etymology: Unknown.

Nesophila distans Neotype

Shell diameter: 4.6 mm

Shell height: 2.3 mm, 50% of shell diameter

Spire protrusion: 0.2 mm, 8.7% of shell height

Aperture height: 2.0 mm

Aperture width: 1.6 mm, 80% of aperture height

Number of whorls: 5

Rib count: 44

Umbilicus diameter: 1.8 mm, 39.1% of shell diameter

Late juvenile whorl descension: 7.0°

Body whorl descension: 1.6°

Nesophila prestonsutteri n. sp.

(Figs. 166, 362, 363)

Type material: Holotype SMNS-ZI0157973 (ex MS 8597): 13 paratypes (MS 9713: 1, MS 8288: 9, MS 8595: 1, MS 8598: 1, MS 8614: 1); all leg. Preston Sutter, Apr 10, 1996.

Type locality: Lithified sand dune on the coast, 21°53'06.2"N, 159°25'05.6"W, Mahaulepu, Koloa District, Kauai County.

Other material Studied: One specimen from Kauai: Mahaulepu, Koloa District, leg. M. Severns, Aug 16, 2011 (MS 8768: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known from Waiopili and Mahaulepu, Koloa District, Kauai.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus 54% of shell diameter; six to eight thread-like parietal barriers, no palatal barriers.

Description: Color: flammulated. Shell: discoidal, depressed, compressed laterally; diameter 5.0 mm; 5.25 whorls; apex sunken, spire protrusion 0.4% of shell height, shell height 52% of diameter; peristome basally thickened and reflected, raised shoulder; apical suture canaliculate, impressed; not obstructed; aperture width 73.7% of height; umbilicus open, regularly decoiling, 54% of shell diameter; late juvenile whorl descension 2.7°, body whorl descension 5.6°. Sculpture: embryonic sculpture present; ventrally decussate; poorly defined radial ribs cross nine or 10 raised spiral cords on the base and periphery of the shell but not noted on the apical surface of the late juvenile whorls. Barriers: six to eight thread-like parietal barriers, 4th taller and thicker than the others on the parietal callous; no palatal barriers.

Remarks: This particularly interesting fossil cite also yielded *Newcombia gagei* (Severns, 2009), a genus previously known only from Maui and Molokai.

Etymology: Named to honor Preston Sutter who discovered the small Pleistocene fossil deposit that yielded this species.

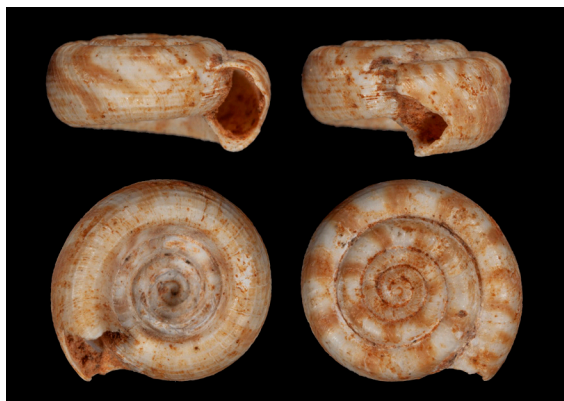


Fig. 166. *Nesophila prestonutteri*, 5.0 mm, SMNS-ZI0157973 (ex MS 8597), HOLOTYPE, Kauai, Mahaulepu.

***Nesophila prestonutteri* Holotype**

Shell diameter: 5.0 mm
 Shell height: 2.6 mm, 52% of shell diameter
 Spire protrusion: 0.1 mm, 0.4% of shell height
 Aperture height: 1.9 mm
 Aperture width: 1.4 mm, 73.7% of aperture height
 Number of whorls: 5.25
 Umbilicus diameter: 2.7 mm, 54% of shell diameter
 Late juvenile whorl descension: 2.7°
 Body whorl descension: 5.6°

***Nesophila tiara* Mighels, 1845
 (Fig. 167)**

Helix tiara Mighels, 1845: 19 — unaccepted > superseded combination.

Nesophila tiara (Mighels, 1845) — Solem, 1976: 366.

Type material: Syntype MCZ 156031.

Type locality: Kauai.

Other material studied: Six specimens from Kauai: Lihue District, Puna Moku, Haupu, leg. BPBM, 15 May 1922 (ANSP 130567: 1), Kilohana, leg. BPBM, 15 May 1922 (ANSP 130566: 1), Kauai, leg. BPBM, 16 Mar 1920, (ANSP 47773: 4).

Status and Distribution: Extant. Presumed extinct. Collected over a vast range from Kaapoko, Halelea Moku, Hanalei District to Haupu, Puna Moku, Lihue District, Kauai.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 34.5% of shell diameter; 7–11 thread-like, parietal barriers (Solem, 1976), no palatal barriers.

Redescription: Color: flammulated. Shell: sub-turbinate, slightly expanded laterally; diameter 11.0 mm; five whorls; apex raised, spire protrusion 24.6% of shell height, shell height 55.5% of diameter; peristome thin, not reflected; shoulder not raised; apical suture impressed; aperture rounded, slightly compressed above and below the periphery, not obstructed; aperture width 88.6% of height; umbilicus 34.5% of shell diameter, regularly decoiling, moderately constricted; late juvenile whorl descension 3.7°, body whorl descension 1.6°. Sculpture: embryonic sculpture absent; low, inconspicuous radial ribs on spire obscured by growth lines on body whorls. Barriers: eight low, equally sized, thread-like parietal barriers; no palatal barriers.



Fig. 167. *Nesophila tiara*, 11.0 mm, MCZ 156031, SYNTYPE, Kauai.

Remarks: Considering their range on Kauai, Solem (1976) suggested there may be several taxa confused with *Nesophila tiara*.

Etymology: Unknown.

***Nesophila tiara* Syntype**

Shell diameter: 11.0 mm
 Shell height: 6.1 mm, 55.5% of shell diameter
 Spire protrusion: 1.5 mm, 24.6% of shell height
 Aperture height: 4.4 mm
 Aperture width: 3.9 mm, 88.6% of aperture height
 Number of whorls: 5
 Umbilicus diameter: 3.8 mm, 34.5% of shell diameter
 Late juvenile whorl descension: 3.7°
 Body whorl descension: 1.6°

Oswaldius n. gen.

Type species: *Oswaldius decussatulus* (Pease, 1866) (Fig. 168). **Diagnosis:** One parietal barrier, no (0) palatal barriers. **Includes:** 23 species, 3 nominal plus 20 newly described herein (Fig. 170); distributed on Hawaii (2), Maui (3), Lanai (1), Molokai (5), Oahu (2), and Kauai (10) (Fig. 169). **Etymology:** *Oswaldius* is named to honor O. Oswald, who's collecting data was invaluable.



Fig. 168. *Oswaldius decussatula* (Pease, 1866), type species of *Oswaldius* n. gen.; 4.1 mm, ANSP 109987, NEOTYPE, Molokai, Moomomi.

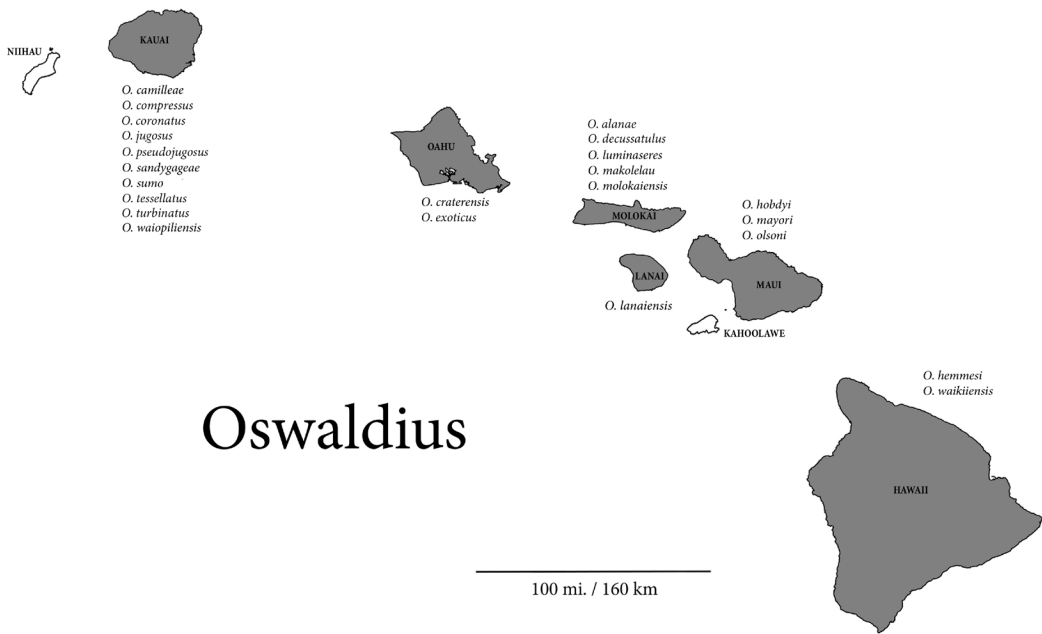


Fig. 169. Distributions of the species of *Oswaldius* in the Hawaiian archipelago.

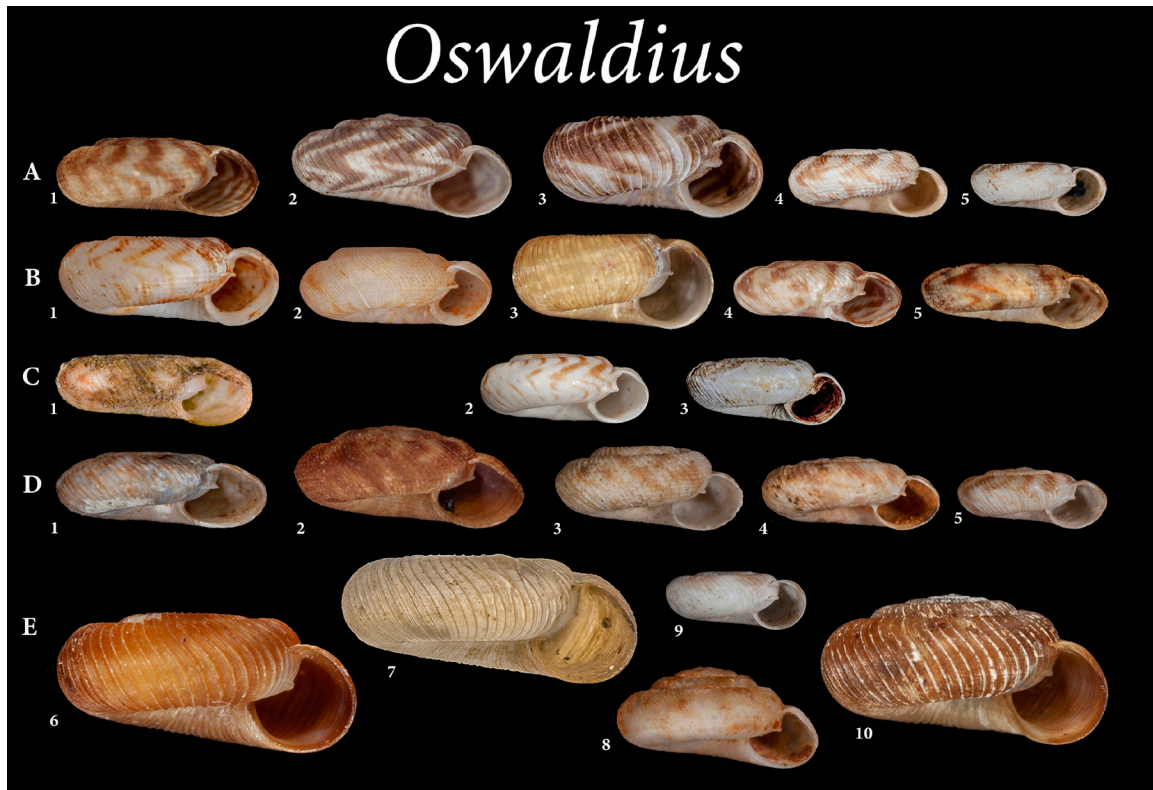


Fig. 170. Scaled images of specimens of the 23 species of the genus *Oswaldius*.

Row A: Hawaii & Maui

- (1) *Oswaldius hemmesi*, 4.3 mm, ANSP 94973, Holotype, Hawaii
- (2) *Oswaldius waikiensis*, 4.7 mm, ANSP 130565, Holotype, Hawaii
- (3) *Oswaldius mayori*, 4.7 mm, SMNS-ZI0157981 (ex MS 8654), Holotype, Maui
- (4) *Oswaldius hobdyi*, 3.4 mm, SMNS-ZI0157980 (ex MS 8594), Holotype, Maui
- (5) *Oswaldius olsoni*, 2.9 mm, SMNS-ZI0157982 (ex MS 8589), Holotype, Maui

Row B: Molokai

- (1) *Oswaldius alanae*, 4.7 mm, SMNS-ZI0157983 (ex MS 8717), Holotype
- (2) *Oswaldius decussatulus*, 4.1 mm, ANSP 109987, Neotype
- (3) *Oswaldius luminaseres*, 4.3 mm, ANSP 130574, Holotype
- (4) *Oswaldius makolelau*, 3.6 mm, ANSP 130563, Holotype
- (5) *Oswaldius molokaiensis*, 4.0 mm, ANSP 94974, Holotype

Row C: Lanai & Oahu

- (1) *Oswaldius lanaiensis*, 4.2 mm, BPBM 14324, Syntype, Lanai
- (2) *Oswaldius exoticus*, 3.6 mm, ANSP 327535, Holotype, Oahu
- (3) *Oswaldius craterensis*, 3.4 mm, ANSP 108956, Holotype, Oahu

Rows D & E: Kauai

- (1) *Oswaldius compressus*, 4.3 mm, SMNS-ZI0157974 (ex MS 8616), Holotype
- (2) *Oswaldius camilleae*, 4.9 mm, ANSP 130562, Holotype
- (3) *Oswaldius tessellatus*, 4.0 mm, SMNS-ZI0157978 (ex MS 8754), Holotype
- (4) *Oswaldius waiopiliensis*, 3.8 mm, SMNS-ZI0157979 (ex MS 8746), Holotype
- (5) *Oswaldius coronatus*, 3.2 mm, SMNS-ZI0157975 (ex MS 8612), Holotype
- (6) *Oswaldius pseudojugosus*, 6.4 mm, ANSP 108379, Holotype
- (7) *Oswaldius jugosus*, 6.3 mm, MCZ 50101, Neotype
- (8) *Oswaldius sumo*, 4.3 mm, SMNS-ZI0157977 (ex MS 8632), Holotype
- (9) *Oswaldius sandygageae*, 3.0 mm, SMNS-ZI0157976 (ex MS 8620), Holotype
- (10) *Oswaldius turbinatus*, 6.1 mm, ANSP 1974, Holotype.

***Oswaldius hemmesi* n. sp.**
(Figs. 171, 364, 365)

Type material: Holotype ANSP 94973; nine paratypes (ANSP 501761: 9); all leg. D. Thaanum.

Type locality: Waimea, Kohala District, Hawaii.

Other material studied: 14 specimens from Hawaii: Hilo District, Kaiwiki, leg. D. Thaanum (ANSP 89244: 3); Kohala District, Waimea, leg. D. Thaanum, Pillsbury Expedition, 1913 (ANSP 108369: 8); Palihoukapapa, leg. D. Walker, Aug 22, 1946 (MS 8870: 2, MS 8871: 1).

Status and Distribution: Extant. Presumed extinct. Known from Waimea, Kohala District and Kaiwiki, Hilo District, Hawaii. *Oswaldius hemmesi* was live (or fresh dead) collected based on the condition of the observed specimens which all retained their periostracum. No specimens are known to have been collected after 1946.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 40% of shell diameter; axial rib count 71.

Description: Color pattern flammulated. Shell: sub-discoidal, expanded laterally; diameter 4.3 mm; 4 whorls; apex planar; spire protrusion 11.8% of shell height; shell height 39.5% of shell diameter; peristome thin, slightly reflected basally; raised shoulder; apical suture canaliculate, impressed; aperture reniform, expanded peripherally, ovate sub-peripherally, unobstructed; aperture height 80% of width, umbilicus 40% of shell diameter, open decoiling; late juvenile whorl descension 0.2°, body whorl descension 0.5°. Sculpture: decussate, embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile whorls rib interspace three times axial rib width,

body whorl rib interspace irregular, three to four times axial rib width; axial rib count 71; three riblets per rib interspace prior to alteration; spiral cords sunken on body whorl. Barriers: one parietal barrier, blade-like, low, mid-way down the parietal wall, ascends gradually. No palatal barriers.

Remarks: The sunken spiral cords on the body whorl are unique to this species; collected over a vast range.

Etymology: Named to honor Don Hemmes of The University of Hawaii at Hilo, a popular professor, friend, naturalist, and shell collector.

***Oswaldius hemmesi* Holotype**

Shell diameter: 4.3 mm

Shell height: 1.7 mm, 39.5% of shell diameter

Spire protrusion: 0.2 mm, 11.8% of shell height

Aperture height: 1.4 mm, 80% of aperture width

Aperture width: 1.75 mm

Rib count: 71

Riblets per rib interspace: 3

Number of whorls: 4

Umbilicus diameter: 1.2 mm, 40% of shell diameter

Late juvenile whorl descension: 0.2°

Body whorl descension: 0.5°

***Oswaldius waikiensis* n. sp.**
(Fig. 172)

Type material: Holotype ANSP 130565; two paratypes (ANSP 501762: 2); all ex coll. BPBM.

Type locality: Waikii, Kohala District, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 31.9% of shell diameter; axial rib count 71.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 4.7 mm; 4.6 whorls; apex raised; spire protrusion 13.6% of shell height; shell height 46.8% of shell diameter; peristome thin, slightly reflected basally; raised shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, ovate sub-peripherally, slightly flattened supra-peripherally, unobstructed; aperture height 88.6% of width, umbilicus 31.9% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 2.9°, body whorl descension 6.8°, body whorl ascends 3° at terminus. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width,

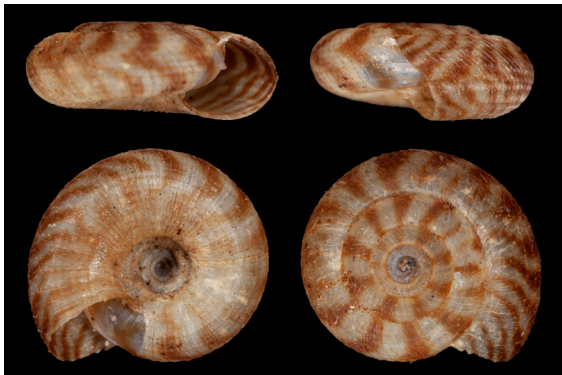


Fig. 171. *Oswaldius hemmesi*, 4.3 mm, ANSP 94973, HOLOTYPE, Hawaii, Kohala.

late juvenile whorls rib interspace 3.5 times axial rib width, body whorl rib interspace irregular, two to 3.5 times axial rib width; axial rib count 71; three riblets per rib interspace prior to alteration; spiral cords faint. Barrier: One parietal barrier, low, blade-like, ascends gradually. No palatal barriers.



Fig. 172. *Oswaldius waikiensis*, 4.7 mm, ANSP 130565, HOLOTYPE, Hawaii, Waikii.

Etymology: Named for the type locality, Waikii, Kohala District, Hawaii.

***Oswaldius waikiensis* Holotype**

Shell diameter: 4.7 mm
 Shell height: 2.2 mm, 46.8% of shell diameter
 Spire protrusion: 0.3 mm, 13.6% of shell height
 Aperture height: 1.55 mm, 88.6% of aperture width
 Aperture width: 1.75 mm
 Rib count: 71
 Riblets per rib interspace: 3
 Number of whorls: 4.6
 Umbilicus diameter: 1.5 mm, 31.9% of shell diameter
 Late juvenile whorl descension: 2.9°
 Body whorl descension: 6.8°

***Oswaldius hobdyi* n. sp.**
 (Figs. 173, 366, 367)

Type material: Holotype SMNS-ZI0157980 (ex MS 8594); two paratypes (MS 8587: 1, MS 9656: 1); all leg. H. James, Jul 20 & 21, 1990.

Type locality: Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District, Maui. 20°37'25.87"N, 156°23'53.89"W.

Other material studied: 12 specimens from Maui: Makawao District, Honuaula Moku, Puu Makua Cave, 1350.6 m, leg. H. James, Apr 20, 1988 (MS 8681: 1), leg. M. Severns & S. Olson, Apr 22, 1988, Hana District, Kahikinui Moku,

Lua Lepo Cave, 825.1 m, (MS 8638: 1, MS 8901: 1), leg. M. Severns, Nov 20, 1983 (MS 8602: 1), Lahaina District, Kaanapali Moku, Honokawai Gulch, leg. D. Thaanum, Pilsbry Expedition, 1913 (ANSP 108371: 8).

Status and Distribution: Extant, Presumed extinct. Known from cave sediments in Puu Maku Cave 1359.6 m, Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District, Lua Lepo Cave, 825.1 m, Kahikinui Moku, Hana District, Honokawai Gulch, Kaanapali Moku, Lahaina District, Maui

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 29.4% of shell diameter; axial rib count 74.

Description: Color: flammulated. Shell: sub-discoidal, moderately expanded laterally; diameter 3.4 mm; 4.25 whorls; apex planar, spire protrusion 10.1% of shell height; shell height 43.5% of diameter; peristome evenly thickened, reflected basally; low shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, compressed supra-peripherally, unobstructed; aperture height equal to width, umbilicus 29.4% of shell diameter, constricted decoiling; late juvenile whorl descension 3.8°, body whorl descension 5.8°. Sculpture: decussate, embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace 1.5 times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 74; three riblets per rib interspace prior to alteration; prominent spiral cords. Barriers: One parietal barrier, low, thin, moderately crescentic, ascends rapidly, 1/3rd down the parietal wall. No palatal barriers.



Fig. 173. *Oswaldius hobdyi*, 3.4 mm, SMNS-ZI0157980 (ex MS 8594), HOLOTYPE, Maui, Puu Naio Cave.

Comparison: *Oswaldius hobdyi* is similar in appearance to *O. decussatulus* and the two were once thought to be a single species (*O. decussatulus*) ranging on Maui and

Molokai. A quick way to separate the two is by collecting locality and rib count: *O. hobdyi* is a Maui endemic and has a rib count of 74 whereas *O. decussatulus* is endemic to Molokai with an axial rib count of 101.

Remarks: ANSP 108371 previously identified as *Oswaldius decussatulus* by D. Thaanum (see Remarks for *O. decussatulus*).

Etymology: Named to honor the brilliant native-born Hawaiian botanist, historian and old-friend, Bob Hobdy.

***Oswaldius hobdyi* Holotype**

Shell diameter: 3.4 mm

Shell height: 1.48 mm, 43.5% of shell diameter

Spire protrusion: 0.15 mm, 10.1% of shell height

Aperture height: 1.3 mm, equal to aperture width

Rib count: 74

Riblets per rib interspace: 3

Number of whorls: 4.25

Umbilicus diameter: 1.0 mm, 29.4% of shell diameter

Late juvenile whorl descension: 3.8°

Body whorl descension: 5.8°

***Oswaldius mayori* n. sp.**
(Figs. 174, 368–371)

Type material: Holotype SMNS-ZI0157981 (ex MS 8654); six paratypes (MS 9200: 1, MS 9201: 1, MS 9202: 1, MS 9203: 1, MS 9204: 1, MS 8655: 1); all leg. H. James, Apr 20, 1988.

Type locality: Puu Makua Cave, 1350.6 m, Makawao District, Honuaula Moku, Maui. 20°39'15.09"N, 156°21'24.04"W.

Other material studied: 647 specimens from Maui: Makawao District, Honuaula Moku, Puu Makua Cave, 1359.6 m, leg. H. James, Apr 20, 1988 (MS 8650: 5, MS 8240: 50, MS 8306: 162, MS 9199: 6, MS 8566: 345), leg. H. James, Apr 11, 1988 (MS 8238: 17, MS 8251: 2, MS 9164: 2), leg. M. Severns, P. Fiene, S. Olson, Mar 2, 1988 (MS: 8644: 1, MS 9658: 1, MS 8641: 36, MS 8645: 5), Puu Naio Cave 392.9 m, leg. M. Severns, 1988 (MS 8878: 1, MS 8272: 1). Hana District, Kahikinui Moku, Auwahi Cave, 1203.7 m, leg. M. Severns, May 1982 (MS 8584: 1, MS 8568: 2, MS 8977: 4), Lua Lepo Cave, 825.1 m, leg. S. Olson, Mar. 25, 1988, (MS 8976: 1, MS 8272: 4, MS 9198: 1).

Status and Distribution: Holocene fossil. Presumed extinct. Known only from soil samples from Honuaula Moku, Makawao District, Waihou Spring Cave at 1247.2 m, Puu Makua Cave at 1350.6 m, and Puu Naio Cave at

392.9 m, and Kahikinui Moku, Hana District, Auwahi Cave at 1203.7 m and Lua Lepo Cave at 825.1 m, Maui.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 31.9% of shell diameter; axial rib count 51.

Description: Color: flammulated. Shell: discoidal, depressed, tall, marginally compressed laterally; diameter 4.7 mm; 4.5 whorls; apex planar; spire protrusion 8.7% of shell height; shell height 48.9% of diameter; peristome basally reflected, thick sub-peripherally, thin supra-peripherally; raised shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, unobstructed; aperture height 84.2% of width; umbilicus 31.9% of shell diameter, moderately constricted decoiling; body whorl descension 4.5°; Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib width, late juvenile whorls rib interspace three times axial rib width, body rib interspace irregular, three to four times axial rib width; axial rib count 51; five or six radial striae in rib interspaces; four riblets per rib interspace prior to alteration; spiral cords are present beginning on the early juvenile whorls. Barriers: one parietal barrier, low, thick, halfway down the parietal wall, ascends gradually. No palatal barriers.



Fig. 174. *Oswaldius mayori*, 4.7 mm, SMNS-ZI0157981 (ex MS 8654), HOLOTYPE, Maui, Puu Makua Cave.

Etymology: Named in remembrance of The Mayor, a dog named for a woodchuck in my mother's garden in Virginia. He began the search for Hawaii's snails and extinct birds with me but like all dogs, was not given enough time to finish.

***Oswaldius mayori* Holotype**

Shell diameter: 4.7 mm

Shell height: 2.3 mm, 48.9% of shell diameter

Spire protrusion: 0.2 mm, 8.7% of shell height

Aperture height: 1.6 mm, 84.2% of aperture width

Aperture width: 1.9 mm
 Rib count: 51
 Riblets per rib interspace: 2
 Number of whorls: 4.5
 Umbilicus diameter: 1.5 mm, 31.9% of shell diameter
 Body whorl descension: 4.5°

***Oswaldius olsoni* n. sp.**
 (Figs. 175, 372, 373)

Type material: Holotype SMNS-ZI0157982 (ex MS 8589); one paratype (MS 8580: 1); both leg. M. Severns & S. Olson, Apr, 1988.

Type locality: Lua Lepo Cave, 825.1 m, Honuaula Moku, Makawao District, Maui. 20°37'48.51"N, 156°19'50.07"W.

Other material studied: two specimens from Maui: Makawao District, Honuaula Moku, Puu Makua Cave, 1350.6 m, leg. H. James, Apr 20, 1988 (MS 9137) and Lahaina District (?), Honokoupi Gulch, no legacy available (FMNH 90636).

Status and Distribution: Holocene fossil. Presumed extinct. Known from Lua Lepo Cave at 825.1 m, Kahikinui Moku, Hana District, and Puu Makua Cave at 1350.6 m. Makawao District, Honuaula Moku, Maui.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 34.5% of shell diameter; axial rib count 75.

Description: Color: flammulated. Shell: discoidal, depressed, weakly decussate; diameter 2.9 mm; 3.25 whorls; apex sunken; spire protrusion, none; shell height 39.6% of diameter; peristome evenly thickened, reflected basally; high shoulder; apical suture crenulated, impressed; aperture lunate, slightly compressed supra-peripherally, expanded peripherally, unobstructed; aperture height 86.9% width, umbilicus 34.5% of shell diameter, suture impressed; late juvenile whorl descension 0.5°, body whorl descension 2.4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 75; two riblets per rib interspace prior to alteration; prominent spiral cords. Barriers: one parietal barrier, low, crescentic, ascends gradually, 1/3rd down the parietal wall. No palatal barriers.

Etymology: Named with great respect to honor Storrs Olson for his inspiring wit and above all infectious love of his science.



Fig. 175. *Oswaldius olsoni*, 2.9 mm, SMNS-ZI0157982 (ex MS 8589), HOLOTYPE, Maui, Lua Lepo Cave.

***Oswaldius olsoni* Holotype**

Shell diameter: 2.9 mm
 Shell height: 1.15 mm, 39.6% of shell diameter
 Spire protrusion: none
 Aperture height: 1.0 mm, 86.9% of aperture width
 Aperture width: 1.15 mm
 Rib count: 75
 Riblets per rib interspace: 2
 Number of whorls: 3.25
 Umbilicus diameter: 1.0 mm, 34.5% of shell diameter
 Late juvenile whorl descension: 0.5°
 Body whorl descension: 2.4°

***Oswaldius lanaiensis* (Sykes, 1896)**
 (Figs. 178, 374)

Endodonta (Nesophila) lanaiensis Sykes, 1896: 127 — unaccepted > superseded combination.
Cookeconcha lanaiensis (Sykes, 1896) — Solem, 1976: 221.

Type material: Syntype BPBM 14324.

Type Locality: Behind Koele, Lanai.

Status and Distribution: Extant. Presumed extinct. Known only from the mountains behind Koele, Kona Moku, Lanai.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 28.6% of shell diameter; axial rib count 71.

Redescription: Color: flammulated. Shell: thin, unreflected shell with indeterminate growth, low, discoidal, expanded laterally; diameter 4.2 mm; 4.25 whorls; apex sunken; spire protrusion, none; shell height 36.9% to diameter; peristome thin, slightly reflected basally; low shoulder; apical suture

crenulated, shallow; aperture lunate, expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, unobstructed; aperture height 70.6% of width; umbilicus 28.6% of shell diameter, constricted decoiling; late juvenile whorl descension 0° , body whorl descension 1° . Sculpture: decussate, embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace three times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 71; three riblets per rib interspace prior to alteration, faint spiral cords. Barriers: one parietal barrier, blade-like, ascends gradually, center of parietal wall. No palatal barriers.



Fig. 178. *Oswaldius lanaiensis*, 4.2 mm, BPBM 14324, SYNTYPE, Lanai, Koele.

Remarks: See *O. molokaiensis* for comparison.

Etymology: Named for the island of Lanai.

***Oswaldius lanaiensis* Syntype**

Shell diameter: 4.2 mm

Shell height: 1.55 mm, 36.9% of shell diameter

Spire protrusion: none

Aperture height: 1.2 mm, 70.6% of aperture width

Aperture width: 1.7 mm

Rib count: 71

Riblets per rib interspace: 3

Number of whorls: 4.25

Umbilicus diameter: 1.2 mm, 28.6% of shell diameter

Late juvenile whorl descension: 0°

Body whorl descension: 1°

***Oswaldius alanae* n. sp.**

(Fig. 179)

Type material: Holotype SMNS-ZI0157983 (ex MS 8717), leg. S. Olson & J. Aidem, Feb 14, 1993.

Type locality: Moomomi, Koolau Moku, Molokai.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 38.2% of shell diameter; axial rib count 81.

Description: Color: flammulated. Shell: discoidal, depressed, decussate; diameter 4.7 mm; 3.25 whorls; apex flat; spire protrusion 5.2% of shell height; shell height 40.4% of diameter; peristome thick, reflected basally; raised shoulder; apical suture crenulated; aperture reniform, expanded peripherally, flattened supra-peripherally, unobstructed; aperture width equal to height; umbilicus 38.2% of shell diameter, gradual decoiling; late juvenile whorl descension 3.5° , body whorl descension 6.8° . Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace of Two to three times axial rib width, late juvenile whorls rib interspace three times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 81; two riblets per rib interspace prior to alteration; prominent spiral cords. Barriers: one parietal barrier, low, thin, ascends gradually, $1/3^{\text{rd}}$ down the parietal wall. No palatal barriers.



Fig. 179. *Oswaldius alanae*, 4.7 mm, SMNS-ZI0157983 (ex MS 8717), HOLOTYPE, Molokai, Moomomi.

Comparison: *Oswaldius alanae* is distinguished from *O. decussatulus* (both Molokai endemics) by having an axial rib count of 81 (vs. 101 in *O. decussatulus*); adult whorl interspace two to four times the axial rib width (vs. interspaces equal to the axial rib width); prominent sub-peripheral spiral cords, dorsal spiral cords absent (vs. peripheral and dorsal spiral cords low, interspaces equal to axial rib interspaces); a spire height 5.2% of the shell diameter (vs. 10%); body whorl descension 6.8° (vs. 4° in *O. decussatulus*).

Etymology: Named for Alana Rivera, Curatorial Assistant in Malacology at The Museum of Comparative Zoology, who photographed species from their collection that were needed for this revision.

Oswaldius alanae Holotype

Shell diameter: 4.7 mm
 Shell height: 1.9 mm, 40.4% of shell diameter
 Spire protrusion: 0.1 mm, 5.2% of shell height
 Aperture height: 1.6 mm, equal to aperture width
 Rib count: 81
 Riblets per rib interspace: 2
 Number of whorls: 3.25
 Umbilicus diameter: 1.8 mm, 38.2% of shell diameter
 Late juvenile whorl descension: 3.5°
 Body whorl descension: 6.8°

Oswaldius decussatulus (Pease, 1866)
 (Figs. 180, 375, 376)

Helix decussatula Pease, 1866: 291 — unaccepted > superseded combination.

Cookeconcha decussatula (Pease, 1866) — Solem, 1976: 221.

Type material: Neotype ANSP 109987 [designated here], leg. H.A. Pilsbry & C.M. Cooke, 1913.

Type locality: Moomomi Dunes, Koolau Moku, Molokai.

Other material studied: 173 specimens from Molokai: Koolau Moku, Moomomi, leg. Pilsbry, Jan 30, 1913 (ANSP 504997: 20, ANSP 117340: 100), leg. Pilsbry & Cooke, 1913 (ANSP 109984: 19, ANSP 109985: 30), leg. S. Olson, J. Aidem, Feb 14, 1993 (MS 8725: 1, MS 9676: 1, MS 9678: 1, MS 9679: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Fossils collected from dune sites between elevations of 30.5 m. and 182.88 m, 0.4 km. to 1.2 km inland from the coast, Moomomi, Koolau Moku, Molokai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 39% of shell diameter; axial rib count 101.

Redescription: Color: flammulated. Shell: sub-discoidal, decussate; diameter 4.1 mm; 4.5 whorls; apex planar; spire protrusion 10% of shell height; shell height 41.5% of diameter; peristome thickened, reflected basally; raised shoulder; apical suture crenulated, impressed; aperture lunate, compressed supra-peripherally, unobstructed; aperture height 92.9% of aperture width, umbilicus 39% of shell diameter, open decoiling; late juvenile whorl descension 1.5°, body whorl

descension 4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace are equal to the axial rib width, body rib interspace irregular, equal to the axial rib width; axial rib count 101; two riblets per rib interspace prior to alteration; peripheral and dorsal spiral cords with interspaces equal to rib interspaces. Barriers: one parietal barrier, tall, thin, ascends gradually, 1/3rd down the parietal wall. No palatal barriers.



Fig. 180. *Oswaldius decussatulus*, 4.1 mm, ANSP 109987, NEOTYPE, Molokai, Moomomi.

Remarks: *Oswaldius decussatulus* is a Molokai endemic. Maui records for *O. decussatulus* (ANSP 89243, 90078, 227020) are referred here to *O. hobdyi* n. sp. Baldwin (1893:16) reported *O. decussatulus* (MCZ 17273, 17274) from Waimea and Wahiawa on Kauai, but this is surely based on an erroneous identification. The most likely species to have confused Baldwin (1893) is *Oswaldius tessellatus* a Kauai endemic found near the Pease home in Waimea to Polihale.

In 1913, Pilsbry and Cooke collected four lots (ANSP 109987, 109985, 117340, 109984) matching the original description of *Oswaldius decussatulus*. As no type material was found, I here designate ANSP 109987 (which matches the original description) as the neotype of *O. decussatulus* (Pease, 1866) and the type locality as Moomomi Dunes, Koolau Moku, Molokai.

Etymology: Named for the decussate shell surface.

Oswaldius decussatulus Neotype

Shell diameter: 4.1 mm
 Shell height: 1.7 mm, 41.5% of shell diameter
 Spire protrusion: 0.17 mm, 10% of shell height
 Aperture height: 1.4 mm
 Aperture width: 1.3 mm, 92.9% of aperture height
 Rib count: 101
 Riblets per rib interspace: 2
 Number of whorls: 4.5

Umbilicus diameter: 1.6 mm, 39% of shell diameter
Late juvenile whorl descension: 1.5°
Body whorl descension: 4°

Oswaldius luminaseres n. sp.
(Fig. 181)

Type material: Holotype ANSP 130574, ex coll. BPBM.

Type locality: Kawela, Kona Moku, Molokai

Status and Distribution: Extant. Presumed extinct.
Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 27.9% of shell diameter; axial rib count 76.

Description: Color: sparingly flammulated. Shell: discoidal, depressed, tall, moderately compressed laterally; diameter 4.3 mm; 3.75 whorls; apex sunken; spire protrusion, none; shell height 48.8% of diameter; peristome thin, fragile, slightly reflected basally; raised shoulder; apical suture canaliculate, impressed; aperture reniform, slightly compressed peripherally, unobstructed; aperture width 94.4% of height; umbilicus 27.9% of shell diameter, constricted decoiling; late juvenile whorl descension 0°, body whorl descension 9°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two times axial rib width, body rib interspace three times axial rib width; axial rib count 76; five riblets per rib interspace prior to alteration; closely spaced spiral cords barely visible through the periostracum. Barriers: one parietal barrier, low, evenly thickened, marginally crescentic, ascends gradually, 2/5th down the parietal wall. No palatal barriers.



Fig. 181. *Oswaldius luminaseres*, 4.3 mm, ANSP 130574, HOLOTYPE, Molokai, Kawela.

Etymology: The paper Chinese lantern was the inspiration for the name *Oswaldius luminaseres*.

Oswaldius luminaseres Holotype

Shell diameter: 4.3 mm
Shell height: 2.1 mm, 48.8% of shell diameter
Spire protrusion: none
Aperture height: 1.8 mm
Aperture width: 1.7 mm, 94.4% of aperture height
Rib count: 76
Riblets per rib interspace: 5
Number of whorls: 3.75
Umbilicus diameter: 1.2 mm, 27.9% of shell diameter
Late juvenile whorl descension: 0°
Body whorl descension: 9°

Oswaldius makolelau n. sp.
(Fig. 182)

Type material: Holotype ANSP 130563, ex coll. BPBM.

Type locality: Mokulelau (Makolelau), Kona Moku, Molokai.

Status and Distribution: Extant. Presumed extinct.
Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 30.5% of shell diameter; axial rib count 72.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally; diameter 3.6 mm; 3.5 whorls; apex planar; spire protrusion 10.7% of shell height; shell height 38.9% to diameter; peristome thin, reflected basally; raised shoulder; apical suture crenulated shallow; aperture lunate, expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, unobstructed; aperture height 75% of width; umbilicus 30.5% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 0°, body whorl descension 3°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace three times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 72; two riblets per rib interspace prior to alteration; widely spaced spiral cords. One parietal barrier, low, crescentic, ascends gradually, 2/5th down the parietal wall. No palatal barriers.

Etymology: Named for the type locality.

Oswaldius makolelau Holotype

Shell diameter: 3.6 mm
Shell height: 1.4 mm, 38.9% of shell diameter



Fig. 182. *Oswaldius makolelau*, 3.6 mm, ANSP 130563, HOLOTYPE, Molokai, Makolelau.

Spire protrusion: 0.15 mm, 10.7% of shell height
 Aperture height: 1.2 mm, 75% of aperture width
 Aperture width: 1.6 mm
 Rib count: 72
 Riblets per rib interspace: 2
 Number of whorls: 3.5
 Umbilicus diameter: 1.1 mm, 30.5% of shell diameter
 Late juvenile whorl descension: 0°
 Body whorl descension: 3°

***Oswaldius molokaiensis* n. sp.**
 (Figs. 183, 377, 378)

Type material: Holotype ANSP 94974; eight paratypes (ANSP 90141: 5, ANSP 501765: 3); all leg. D. Thaanum.

Type locality: Maunahui, Kona Moku, Molokai.

Other material studied: 5 specimens from Molokai: Kona Moku, Kaunakakai, leg. Pilsbry & Cooke, Jan 26, 1913 (ANSP 108642: 1), three specimens from, Kalua'aha, leg. D. Thaanum, (ANSP 90141: 3), one specimen from Maunahui, leg. D. Thaanum, (ANSP 94974: 1).

Status and Distribution: Extant. Presumed extinct. Known only from Kalua'aha and Maunahui, Kona Moku, Molokai.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 32.5% of shell diameter; axial rib count 84.

Description: Color: flammulated. Shell: thin, unreflected shell with indeterminate growth; low, discoidal, expanded laterally; diameter 4.0 mm; 4.5 whorls; apex planar; spire protrusion 7.1% of shell height; shell height 35% of diameter; peristome thin, slightly reflected basally; low shoulder;

apical suture canaliculate, shallow; aperture lunate, greatly expanded peripherally, rounded sub-peripherally, slightly flattened supra-peripherally, unobstructed; aperture height 73.3% of width; umbilicus 32.5% of shell diameter, gradual decoiling; late juvenile whorl descension 1°, body whorl descension 2°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace Three times axial rib width, late juvenile whorls rib interspace 3.5 times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 84; four riblets per rib interspace prior to alteration; widely spaced spiral cords. Barriers: one parietal barrier, tall, thin, marginally crescentic, ascends rapidly, 2/5th down the parietal wall. No palatal barriers.



Fig. 183. *Oswaldius molokaiensis*, 4.0 mm, ANSP 94974, HOLOTYPE, Molokai, Maunahui.

Comparison: *Oswaldius molokaiensis* (Molokai endemic) is distinguished from *Oswaldius lanaiensis* (Lanai endemic) by its sunken apex; no spire protrusion; shell height 35% of shell diameter; thin peristome, slightly reflected basally; high shoulder; apical suture canaliculate, impressed; aperture lunate, expanded peripherally, flattened supra-peripherally; aperture height 73.3% of width; umbilicus 32.5% of shell diameter, gradual decoiling; axial rib count 84 (vs. 71 in *O. lanaiensis*); four riblets per rib interspace prior to alteration; embryonic sculpture present; parietal barrier, strong, crescentic, 2/5th down the parietal wall.

Etymology: On the original, undated labels for ANSP 90141 and ANSP 94974, in D. Thaanum's writing he proposed the name "molokaiensis" for this species and his suggestion is recognized here in the name *Oswaldius molokaiensis*.

***Oswaldius molokaiensis* Holotype**

Shell diameter: 4.0 mm
 Shell height: 1.4 mm, 35% of shell diameter
 Spire protrusion: 0.1 mm, 7.1% of shell height

Aperture height: 1.1 mm, 73.3% of aperture width
 Aperture width: 1.5 mm
 Rib count: 84
 Riblets per rib interspace: 4
 Number of whorls: 4.5
 Umbilicus diameter: 1.3 mm, 32.5% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 2°

Oswaldius craterensis n. sp.
 (Fig. 184)

Type material: Holotype ANSP 108956; five paratypes (ANSP 501766: 5); all leg. H.A. Pilsbry & Bryan, 1913.

Type locality: Diamond Head, Kona District, Oahu.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 33.8% of shell diameter; axial rib count 72.

Description: Color: flammulated. Shell: discoidal, depressed; diameter 3.4 mm; 4.25 whorls; apex sunken; spire protrusion 6.6% of shell height; shell height 44.1% of diameter; peristome evenly thickened, not reflected; raised shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, unobstructed; aperture height 84.6% of width; umbilicus 33.8% of shell diameter, open decoiling; late juvenile whorl descension 1°, body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib

width, late juvenile whorls rib interspace 2.5 to three times axial rib width, body whorl rib interspace irregular, two to 3.5 times axial rib width; axial rib count 72; one riblet per rib interspace prior to alteration; spiral cords moderately close. Barriers: one parietal barrier, low, thick, ascends rapidly, 2/5th down the parietal wall. No palatal barriers.

Etymology: Named for the type locality on the crater floor of Leahi (Diamond Head).

Oswaldius craterensis Holotype

Shell diameter: 3.4 mm
 Shell height: 1.5 mm, 44.1% of shell diameter
 Spire protrusion: 0.1 mm, 6.6% of shell height
 Aperture height: 1.1 mm, 84.6% of aperture width
 Aperture width: 1.3 mm
 Rib count: 72
 Riblets per rib interspace: 1
 Number of whorls: 4.25
 Umbilicus diameter: 1.15 mm, 33.8% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 7°

Oswaldius exoticus n. sp.
 (Fig. 185)

Type material: Holotype ANSP 327535, leg. Bryan.

Type locality: Makapuu, Koolaupoko District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 34.7% of shell diameter; axial rib count 88.

Description: Color: flammulated. Shell: sub-discoidal; diameter 3.6 mm; 4.25 whorls; apex planar; spire protrusion 6.6% of shell height; shell height 41.6% of diameter; peristome thickened basally, slightly reflected basally; raised shoulder; apical suture crenulated, canaliculate; aperture reniform, compressed supra-peripherally, unobstructed; aperture height 84.6% of width; umbilicus 34.7% of shell diameter, gradual decoiling; late juvenile whorl descension 2.5°, body whorl descension 8°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace 2.5 times axial rib width, body whorl rib interspace, irregular two to three times axial rib width; axial rib count 88; one riblet per rib interspace prior to alteration; widely spaced spiral cords. Barriers: one parietal barrier, thick, marginally crescentic, ascends rapidly, 1/3rd down the parietal wall. No palatal barriers.



Fig. 184. *Oswaldius craterensis*, 3.4 mm, ANSP 108956, HOLOTYPE, Oahu, Leahi (Diamond Head).



Fig. 185. *Oswaldius exoticus*, 3.6 mm, ANSP 327535, HOLOTYPE, Oahu, Makapu'u.

Etymology: Named for the specimen's glossy surface and stark contrasting color pattern of brown on white that wraps around the shell changing direction three times before entering the umbilicus.

***Oswaldius exoticus* Holotype**

Shell diameter: 3.6 mm
 Shell height: 1.5 mm, 41.6% of shell diameter
 Spire protrusion: 0.1 mm, 6.6% of shell height
 Aperture height: 1.1 mm, 84.6% of aperture width
 Aperture width: 1.3 mm
 Rib count: 88
 Riblets per rib interspace: 1
 Number of whorls: 4.25
 Umbilicus diameter: 1.25 mm, 34.7% of shell diameter
 Late juvenile whorl descension: 2.5°
 Body whorl descension: 8°

***Oswaldius camilleae* n. sp.**
 (Fig. 186)

Type material: Holotype ANSP 130562; one paratype (ANSP 501763: 1); both ex coll. BPBM.

Type locality: Kalalau Valley, Hanalei District, Kauai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality Kalalau Valley.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 28.5% of shell diameter; axial rib count 82.

Description: Color: flammulated. Shell: sub-turbinate, decussate; diameter 4.9 mm; 4 whorls; apex raised; spire protrusion 13% of shell height; shell height 46.9% of

diameter; peristome evenly thickened, thin, reflected sub-peripherally; low shoulder; apical suture crenulated, shallow; aperture lunate, expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, unobstructed; aperture height 75% of width; umbilicus 28.5% of shell diameter, constricted decoiling; late juvenile whorl descension 2.3°, body whorl descension 2.3°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace three times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 82; two riblets per rib interspace prior to alteration; spiral cord configuration is constant before and after the alteration. Barriers: one parietal barrier, 1/3rd down from the apical suture on the parietal wall, low, even height, blade-like, ascends rapidly. No palatal barriers.



Fig. 186. *Oswaldius camilleae*, 4.9 mm, ANSP 130562, HOLOTYPE, Kauai, Kalalau.

Etymology: Named for Camille Hassan of Paris, France.

***Oswaldius camilleae* Holotype**

Shell diameter: 4.9 mm
 Shell height: 2.3 mm, 46.9% of shell diameter
 Spire protrusion: 0.3 mm, 13% of shell height
 Aperture height: 1.5 mm, 75% of aperture width
 Aperture width: 2.0 mm
 Rib count: 82
 Riblets per rib interspace: 2
 Number of whorls: 4
 Umbilicus diameter: 1.4 mm, 28.5% of shell diameter
 Late juvenile descension: 2.3°
 Body whorl descension: 2.3°

***Oswaldius compressus* n. sp.**
 (Figs. 187, 379, 380)

Type material: Holotype SMNS-ZI0157974 (ex MS

8616); four paratypes (MS 8627: 1, MS 9165: 1, MS 8628: 1, MS 9677: 1); all leg. R. Gage & P. Sutter, Aug 24, 1996.

Type locality: Polihale, Waimea District, Kauai.

Other material studied: five specimens from Kauai: Koloa District, Aweoweonui, 21°54'09.47"N, 159°23'54.26"W, leg. M. Severns, R. Gage, March 2016 (MS 8776: 1, MS 8741: 1, MS 9013: 1, MS 8737: 1, MS 8738: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. *Oswaldius compressus* is known from two widely separated coastal fossil deposits, Polihale in the Waimea District and Aweoweonui in the Koloa District of Kauai.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 34.8% of shell diameter; axial rib count 72.

Description: Color: flammulated. Shell: discoidal, low, expanded laterally; diameter 4.3 mm; 4.1 whorls; apex planar; spire protrusion 3.1% of shell height; shell height 37.2% of shell diameter; peristome evenly thickened, thin, reflected basally; raised shoulder; apical suture crenulated, impressed; aperture lunate, greatly expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, unobstructed; aperture height 68.4% of width, umbilicus 34.8% of shell diameter, constricted decoiling; late juvenile whorl descension 1.5°, body whorl descension 1°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile whorls rib interspace two times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 72; three riblets per rib interspace prior to alteration; faint spiral cords. Barriers: one parietal barrier mid-way down the parietal wall, low, blade-like, ascends gradually. No palatal barriers.



Fig. 187. *Oswaldius compressus*, 4.3 mm, SMNS-ZI0157974 (ex MS 8616), HOLOTYPE, Kauai, Polihale Ridge.

Etymology: The name *Oswaldius compressus* highlights the very low spire and the unusually expanded aperture.

***Oswaldius compressus* Holotype**

Shell diameter: 4.3 mm

Shell height: 1.6 mm, 37.2% of shell diameter

Spire protrusion: 0.05 mm, 3.1% of shell height

Aperture height: 1.3 mm, 68.4% of aperture width

Aperture width: 1.9 mm

Rib count: 72

Riblets per rib interspace: 3

Number of whorls: 4.1

Umbilicus diameter: 1.5 mm, 34.8% of shell diameter

Late juvenile whorl descension: 1.5°

Body whorl descension: 1°

***Oswaldius coronatus* n. sp.**

(Figs. 188, 381)

Type material: Holotype SMNS-ZI0157975 (ex MS 8612), leg. P. Sutter, 1996.

Type locality: Moloa'a Bay, Kawaihau District, Kauai.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 29.6% of shell diameter; axial rib count 68.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally; diameter 3.2 mm; 4 whorls; apex raised; spire protrusion 15.3% of shell height; shell height 40.6% of diameter; peristome evenly thickened, not reflected; raised shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, rounded sub-peripherally, moderately flattened supra-peripherally, unobstructed; aperture width 86.7% of height, umbilicus 29.6% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 1°, body whorl descension 2°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 2.5 times axial rib width, late juvenile whorls rib interspace of three times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 68; two riblets per rib interspace prior to alteration; spiral cords. Barriers: one parietal barrier, low, thickened, ascends gradually, 1/3rd down the parietal wall. No palatal barriers.

Etymology: Named for the crown-like apex that stands proud of the spire.



Fig. 188. *Oswaldius coronatus*, 3.2 mm, SMNS-ZI0157975 (ex MS 8612), HOLOTYPE, Kauai, Moloa'a Bay.

***Oswaldius coronatus* Holotype**

Shell diameter: 3.2 mm

Shell height: 1.3 mm, 40.6% of shell diameter

Spire protrusion: 0.2 mm, 15.3% of shell height

Aperture height: 1.5 mm

Aperture width: 1.3 mm, 86.7% of aperture height

Rib count: 68

Riblets per rib interspace: 2

Number of whorls: 4

Umbilicus diameter: 0.95 mm, 29.6% of shell diameter

Late juvenile descension: 1°

Body whorl descension: 2°

***Oswaldius jugosus* (Mighels, 1845)
(Figs. 189, 382, 383)**

Helix jugosa Mighels, 1845: 19 — unaccepted > superseded combination.

Helix rubiginosa A. Gould, 1846: 173 — unaccepted > junior homonym (not Rossmässler, 1838).

Cookeconcha jugosa (Mighels, 1845) — Solem, 1976: 221–223.

Type material: Neotype MCZ 50101 [designated here], ex coll. C.M. Cooke.

Type locality: Waioli, Hanalei District, Kauai.

Other material studied: One specimen from Kauai: leg. C. M. Cooke (MCZ 156496: 1).

Status and distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color light cream becoming tan after the

alteration; shell discoidal, depressed; umbilicus width 36.5% of shell diameter; axial rib count 75.

Redescription: Color: tan/cream, not flammulated. Shell: discoidal, depressed; diameter 6.3 mm; 5.25 whorls; apex sunken; spire protrusion 3.8% of shell height; shell height 41.3% of diameter; peristome thin, not reflected; low shoulder; apical suture crenulated, shallow; aperture lunate, oblique, expanded peripherally, rounded sub-peripherally, flattened supra-peripherally, unobstructed; aperture height equal to width; umbilicus 36.5% of diameter, open decoiling; late juvenile whorl descension 0°, body whorl descension 4.5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two to 2.5 times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 75; four riblets per rib interspace prior to alteration. Barriers: one parietal barrier, low, diminutive, barely ascending located 1/2 way down the parietal wall. No palatal barriers.



Fig. 189. *Oswaldius jugosus*, 6.3 mm, MCZ 50101, NEOTYPE, Kauai, Waioli.

Remarks: *Oswaldius jugosus* appears to be a species at the distal end of a once much larger range on Kauai that may have included the range of *O. pseudojugosus* (ANSP 108379) and *O. turbinatus* (ANSP 1974, attributed herein to Kauai despite original locality limited to “Sandwich Islands”). All three species are distinct, but similar in size and overall appearance. See *O. pseudojugosus* for comparison.

Etymology: Unknown.

***Oswaldius jugosus* Neotype**

Shell diameter: 6.3 mm

Shell height: 2.6 mm, 41.3% of shell diameter

Spire protrusion: 0.1 mm, 3.8% of shell height

Aperture height: 2.2 mm, equal to aperture width

Rib count: 75

Riblets per rib interspace: 4
 Number of whorls: 5.25
 Umbilicus diameter: 2.3 mm, 36.5% of shell diameter
 Late juvenile whorl descension: 0°
 Body whorl descension: 4.5°

Oswaldius pseudojugosus n. sp.
 (Figs. 190, 384)

Type material: Holotype ANSP 108379, ex coll. C. M. Cooke.

Type locality: Kipu, Lihue District, Kauai.

Other material studied: 299 specimens from Kauai: Puna District, Kapaa ex coll. W. H. Pease (MCZ 17281: 283), Kona District, Wahiawa, ex coll. W. H. Pease (MCZ 17284: 7), Puna District, Kipu, ex coll. C. M. Cooke (ANSP 108379: 5), Kauai, ex coll. W. H. Pease (MCZ 17280: 4).

Status and distribution: Extant. Presumed extinct. Known from Kipu, Lihue District, Kapaa, Kawaihau District, Wahiawa, Koloa District, Kauai.

Diagnosis: Color reddish brown; shell sub-discoidal; umbilicus width 39% of shell diameter; axial rib count 63.

Redescription: Color: reddish-brown, not flammulated. Shell: sub-discoidal; diameter 6.4 mm; 5.5 whorls; apex planar; spire protrusion 6.7% of shell height; shell height 46.9% of diameter; peristome thin, slight basal reflection; low shoulder; apical suture crenulated, shallow; aperture reniform, rounded, expanded peripherally, not constricted, unobstructed; aperture height equal to width; umbilicus 39% of diameter, open decoiling; late juvenile whorl descension 1°, body whorl descension 7.5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace 2.5 times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 63; four riblets per rib interspace prior to alteration. Barriers: one parietal barrier, moderately tall, ascends gradually, 2/5th the way down the parietal wall. No palatal barriers.

Comparison: *Oswaldius pseudojugosus* is distinguished from *O. jugosus* (both Kauai endemics) by having shell height 46.9% of shell diameter (vs. 41.3% in *O. jugosus*); spire protrusion 6.7% of shell height (vs. 3.8%); axial rib count 63 (vs. 75); umbilical diameter 39% of shell diameter (vs. 36.5%); body whorl descension 7.5° (vs. 4.5°). Of interest is the aperture height is equal to width for both *O. jugosus* and *O. pseudojugosus*, and nearly so for *Oswaldius turbinatus*



Fig. 190. *Oswaldius pseudojugosus*, 6.3 mm, ANSP 108379, HOLOTYPE, Kauai, Kipu.

with aperture height 95.5% of width. Though similar, *Oswaldius turbinatus* also has a greater shell height (53.3% of shell diameter) and greater spire protrusion (13.8% of shell height) than *O. jugosus* and *O. pseudojugosus*.

Etymology: Named for its casual similarity to *O. jugosus*.

Oswaldius pseudojugosus Holotype

Shell diameter: 6.4 mm
 Shell height: 3.0 mm, 46.9% of shell diameter
 Spire protrusion: 0.2 mm, 6.7% of shell height
 Aperture height: 2.3 mm, equal to aperture width
 Rib count: 63
 Riblets per rib interspace: 4
 Number of whorls: 5.5
 Umbilicus diameter: 2.5 mm, 39% of shell diameter
 Late juvenile whorl descension: 1°
 Body whorl descension: 7.5°

Oswaldius sandygagae n. sp.
 (Fig. 191)

Type material: Holotype SMNS-ZI0157976 (ex MS 8620), leg. R. Gage, Feb 17, 1996.

Type locality: Mahaulepu, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W.

Other material studied: one specimen from Kauai: Koloa District, Waiopili, leg. M. Severns, Aug 16, 2011 (MS 8840:1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from two sites, Mahaulepu and Waiopili, Koloa District, Kauai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 31.7% of shell diameter; axial rib count 68.

Description: Color: flammulated. Shell: sub-discoidal, rounded; diameter 3.0 mm; 4.25 whorls; apex planar; spire slightly raised; spire protrusion 7.7° of shell height; shell height 43.3% of diameter; peristome evenly thickened, thin, graceful, slightly reflected basally; raised shoulder; apical suture crenulated, impressed; aperture reniform, rounded, unobstructed; aperture width 80% of height; umbilicus 31.7% of shell diameter, constricted deoiling; late juvenile whorl descension 2°, body whorl descension 1°. Sculpture: embryonic sculpture absent; early juvenile whorl rib interspace two times axial rib width, late juvenile whorls rib interspaces of three to four times axial rib width, body whorl rib interspace irregular, three to five times axial rib width; axial rib count 68; two riblets per rib interspace prior to alteration; faint widely spaced spiral cords. Barriers: one parietal barrier, low, thick, ascends gradually, 2/5th down the parietal wall. No palatal barriers.



Fig. 191. *Oswaldius sandygagae*, 3.0 mm, SMNS-ZI0157976 (ex MS 8620), HOLOTYPE, Kauai, Mahaulepu.

Etymology: Named for Sandy Gage who cooked an impressive Portuguese bean soup, had unbounded patience with her husband's snail collecting friends and endured my presence in her house from time to time over many years.

***Oswaldius sandygagae* Holotype**

Shell diameter: 3.0 mm
 Shell height: 1.3 mm, 43.3% of shell diameter
 Spire protrusion: 0.1 mm, 7.7% of shell height
 Aperture height: 1.5 mm
 Aperture width: 1.2 mm, 80% of aperture height
 Rib count: 68
 Riblets per rib interspace: 2
 Number of whorls: 4.25
 Umbilicus diameter: 0.95 mm, 31.7% of shell diameter

Late juvenile descension: 2°
 Body whorl descension: 1°

***Oswaldius sumo* n. sp.**
 (Figs. 192, 385)

Type material: Holotype SMNS-ZI0157977 (ex MS 8632); one paratype (MS 8848: 1); both leg. M. Severns, Aug 17, 2011.

Type locality: Mahaulepu, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W.

Other material studied: One specimen from Kauai: Koloa District, Waiopili, leg. M. Severns, R. Gage, Aug 16, 2011, (MS 8635; 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from Mahaulepu and Waiopili, Koloa District, Kauai.

Diagnosis: Color pattern flammulated; shell turbate; umbilicus width 32.5% of shell diameter; axial rib count 82.

Description: Color: flammulated. Shell: turbate, robust; diameter 4.3 mm; 4.75 whorls; apex raised; spire protrusion 22.7% of shell height; shell height 51.2% of diameter; peristome thick, reflected basally; raised shoulder; aperture, lunate, expanded peripherally, sub-peripherally rounded, flattened supra-peripherally, unobstructed; aperture height 81.2% of width; apical suture crenulated, shallow; umbilicus 32.5% of shell diameter, suture impressed; late juvenile whorl descension 4°, body whorl descension 6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib width, late juvenile whorls rib interspace four times axial rib width, body whorl rib



Fig. 192. *Oswaldius sumo*, 4.3 mm, SMNS-ZI0157977 (ex MS 8632), HOLOTYPE, Kauai, Mahaulepu.

interspace irregular, two to four times axial rib width; axial rib count 82; three riblets per rib interspace prior to alteration; faint spiral cords. Barriers: one parietal barrier, low, thick, marginally crescentic, ascends gradually, $2/5^{\text{th}}$ down the parietal wall from the apical suture. No palatal barriers.

Etymology: Named for its resemblance to a squatting sumo wrestler.

Oswaldius sumo Holotype

Shell diameter: 4.3 mm

Shell height: 2.2 mm, 51.2% of shell diameter

Spire protrusion: 0.5 mm, 22.7% of shell height

Aperture height: 1.3 mm, 81.2% of aperture width

Aperture width: 1.6 mm

Rib count: 82

Riblets per rib interspace: 3

Number of whorls: 4.75

Umbilicus diameter: 1.4 mm, 32.5% of shell diameter

Late juvenile descension: 4°

Body whorl descension: 6°

Oswaldius tessellatus n. sp.
(Figs. 193, 386)

Type material: Holotype SMNS-ZI0157978 (ex MS 8754); six paratypes (MS 8625: 1, 8626: 1, MS 9672: 1, MS 9673: 1, MS 9674: 1, MS 9675: 1); all leg. P. Sutter, 1996.

Type locality: Polihale, Waimea District, Kauai.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal; umbilicus width 30% of shell diameter; axial rib count 66.

Description: Color: flammulated. Shell: sub-discoidal, moderately expanded laterally; diameter 4.0 mm; 4.25 whorls; apex sunken; spire protrusion 11.1% of shell height; shell height 45% of diameter; peristome thin, not reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, expanded peripherally, slight supra-peripheral constriction, unobstructed; aperture height 80% of width; umbilicus 30% of shell diameter, constricted decoiling; late juvenile whorl descension 2° , body whorl descension 6° . Sculpture: decussate, embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib width, late juvenile whorls rib interspace four times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 66; four riblets per rib interspace prior to alteration; axial rib and spiral

cord intersects are raised. Barriers: one parietal barrier, low, blade-like, ascends rapidly, $1/3^{\text{rd}}$ down the parietal wall. No palatal barriers.



Fig. 193. *Oswaldius tessellatus*, 4.0 mm, SMNS-ZI0157978 (ex MS 8754), HOLOTYPE, Kauai, Polihale Ridge.

Remarks: *Oswaldius tessellatus*, found near Pease home in Waimea to Polihale, Kauai, is the most likely species to have mislead Baldwin (1893) to believe *O. decussatulus* was present on Kauai (see Remarks for *O. decussatulus*)

Etymology: Named for the remarkable tessellated sculpture and pattern created by the meeting of the axial ribs and spiral cords.

Oswaldius tessellatus Holotype

Shell diameter: 4.0 mm

Shell height: 1.8 mm, 45% of shell diameter

Spire protrusion: 0.2 mm, 11.1% of shell height

Aperture height: 1.2 mm, 80% of aperture width

Aperture width: 1.5 mm

Rib count: 66

Riblets per rib interspace: 4

Number of whorls: 4.25

Umbilicus diameter: 1.2 mm, 30% of shell diameter

Late juvenile whorl descension: 2°

Body whorl descension: 6°

Oswaldius turbinatus n. sp.
(Fig. 194)

Type material: Holotype ANSP 1974; one paratype (ANSP 501764: 1); both ex coll. Brown (from Pease).

Type locality: Sandwich (Hawaiian) Islands. Probably Kauai.

Status and Distribution: Extant. Presumed extinct. Known only from Kauai (see Remarks).

Diagnosis: Color rust colored, no pattern; shell turbate; umbilicus width 36% of shell diameter; axial rib count 65.

Description: Color: rust colored, not flammulated. Shell: sub-turbinate; marginally compressed laterally; diameter 6.1 mm; 5.5 whorls; apex raised; spire protrusion 13.8% of shell height; shell height 53.3% of diameter; peristome thin, basally reflection; level shoulder; apical suture crenulated, shallow; aperture rounded, slightly constricted supra-peripherally, unobstructed; aperture height 95.5% of width; umbilicus 36% of diameter, moderately constricted decoiling; late juvenile whorl descension 1.7°, body whorl descension 7.7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 65; four riblets per rib interspace prior to alteration. Barriers: one parietal barrier, low, blade-like, barely ascending, 2/5th down the parietal wall. No palatal barriers.

Rib count: 65

Riblets per rib interspace: 4

Number of whorls: 5.5

Umbilicus diameter: 2.2 mm, 36% of shell diameter

Late juvenile whorl descension: 1.7°

Body whorl descension: 7.7°

***Oswaldius waiopiliensis* n. sp.**

(Figs. 195, 387, 388)

Type material: Holotype SMNS-ZI0157979 (ex MS 8746); four paratypes (MS 8831: 1, MS 8837: 1, MS 8852: 1, MS 9657: 1); all leg. M. Severns & R. Gage, Aug 16 & 17, 2011.

Type locality: Waiopili, Koloa District, Kauai. 21°53'06.2"N, 159°25'05.6"W.

Other material studied: eight specimens from Kauai: Koloa District, Waiopili, leg. M. Severns, R. Gage, 2011, (MS 8636: 6), Mahaulepu, leg. P. Sutter, 1996 (MS 8313: 1, MS 8292: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from fossil sites in Waiopili and Mahaulepu, in Koloa District, Kauai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 31.5% of shell diameter; axial rib count 81.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally; diameter 3.8 mm; 4.2 whorls; apex slightly raised; spire protrusion 6.2% of shell height; shell height 42.1% of diameter; peristome thin, basally reflected; low shoulder; apical suture crenulated, shallow; aperture, ovate-lunate, rounded, expanded peripherally, slightly flattened supra-peripherally, unobstructed; aperture height 78.6% of width; umbilicus 31.5% of shell diameter,



Fig. 194. *Oswaldius turbinatus*, 6.1 mm, ANSP 1974, HOLOTYPE, Sandwich (Hawaiian) Islands (Kauai).

Comparison: See account for *Oswaldius pseudojugosus* for comparisons to that species and *O. jugosus*.

Remarks: The two type specimens lack specific locality data but are presumably from Kauai based on their similarity to Kauai endemic *O. jugosus*.

Etymology: Named for its turbate-like spire.

***Oswaldius turbinatus* Holotype**

Shell diameter: 6.1 mm

Shell height: 3.25 mm, 53.3% of shell diameter

Spire protrusion: 0.45 mm, 13.8% of shell height

Aperture height: 2.1 mm, 95.5% of aperture width

Aperture width: 2.2 mm

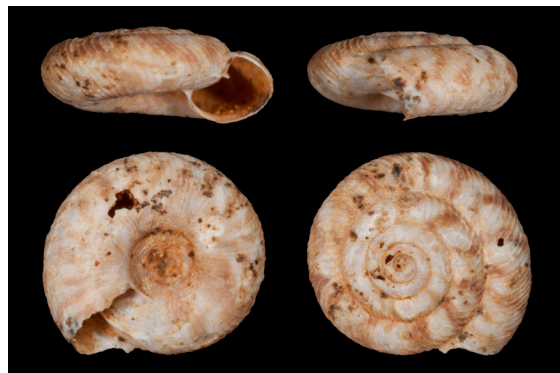


Fig. 195. *Oswaldius waiopiliensis*, 3.8 mm, SMNS-ZI0157979 (ex MS 8746), HOLOTYPE, Kauai, Waiopili.

moderately constricted.; late juvenile whorl descension 3°, body whorl descension 5°. Sculpture: embryonic sculpture absent; early and late juvenile whorl rib interspace three to four times axial rib width, body whorl rib interspace irregular, two to five times axial rib width; axial rib count 81; three riblets per rib interspace prior to alteration; faint spiral cords. Barriers: one parietal barrier, moderately tall, thick, ascends gradually, 2/5th down the parietal wall. No palatal barriers.

Etymology: Named for the type locality.

Oswaldius waiopiliensis Holotype

Shell diameter: 3.8 mm

Shell height: 1.6 mm, 42.1% of shell diameter

Spire protrusion: 0.1 mm, 6.2% of shell height

Aperture height: 1.1 mm, 78.6% of aperture width

Aperture width: 1.4 mm

Rib count: 81

Riblets per rib interspace: 3

Number of whorls: 4.2

Umbilicus diameter: 1.2 mm, 31.5% of shell diameter

Late juvenile descension: 3°

Body whorl descension: 5°

Randallius n. gen.

Type species: *Randallius paulineae* n. sp. (Fig. 196). **Diagnosis:** Two parietal barriers, four palatal barriers. **Includes:** 26 species, 2 nominal plus 24 newly described herein (Fig. 198); distributed on Hawaii (2), Maui (4), Lanai (1), Molokai (2), Oahu (9), and Kauai (10) (Fig. 197). **Etymology:** *Randallius* is named to honor the memory of my friend and frequent dive partner, ichthyologist John (Jack) Randall (1924–2020).



Fig. 196. *Randallius paulineae* n. sp., type species of *Randallius* n. gen.; 4.0 mm, SMNS-ZI0157984 (ex MS 8881), HOLOTYPE, Maui, Lua Lepo Cave.

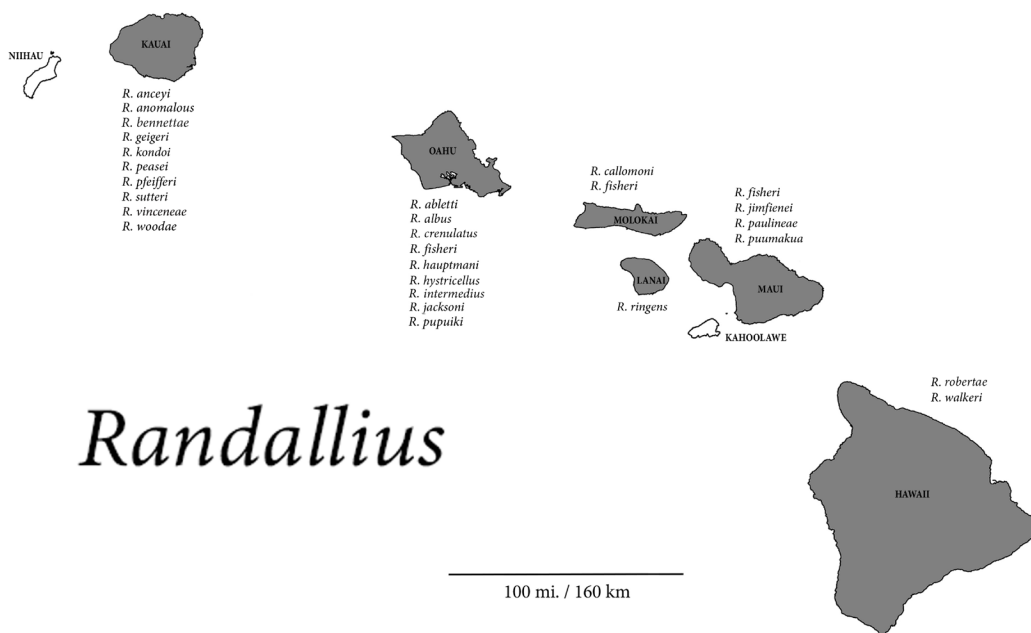


Fig. 197. Distributions of the species of *Randallius* in the Hawaiian archipelago.

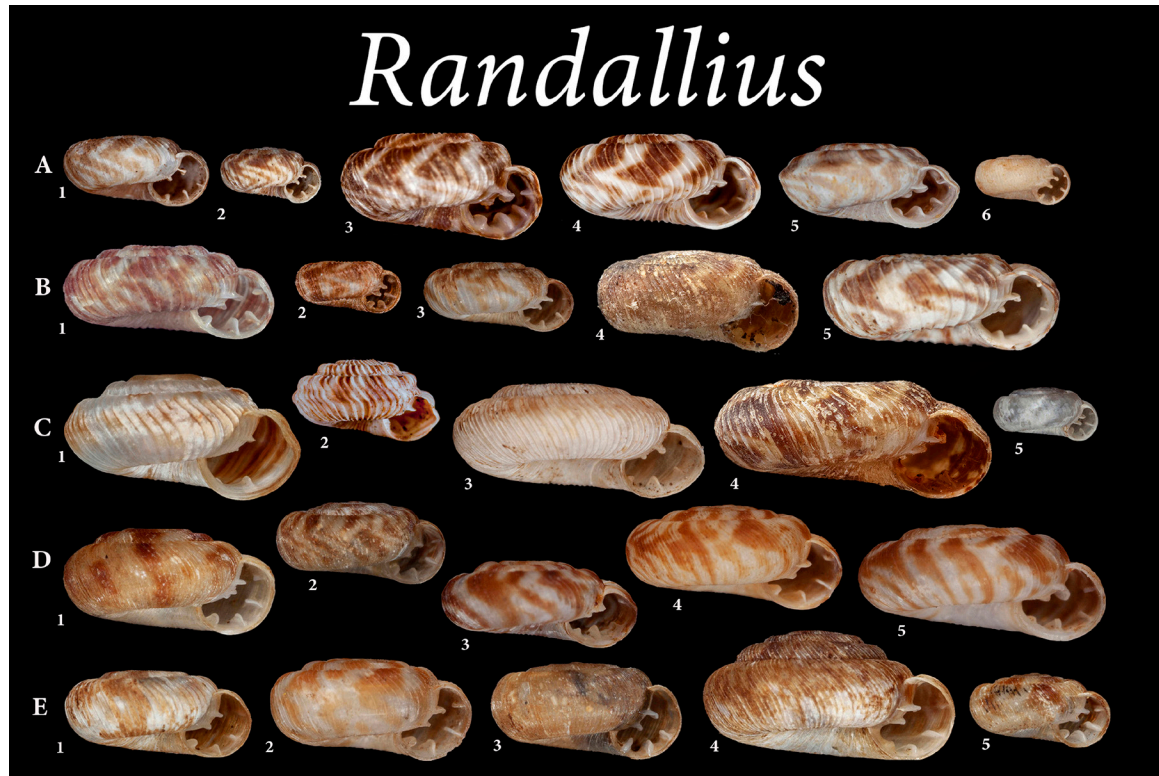


Fig. 198. Scaled images of specimens of the 26 species of the genus *Randallius*.

Row A: Hawaii & Maui

- (1) *Randallius robertae*, 3.0 mm, SMNS-ZI0157985 (ex MS 8605), Holotype, Hawaii
- (2) *Randallius walkeri*, 2.0 mm, SMNS-ZI0157986 (ex MS 9682), Holotype, Hawaii
- (3) *Randallius jimfienei*, 4.0 mm, SMNS-ZI0157992 (ex MS 8879), Holotype, Maui
- (4) *Randallius paulineae*, 4.0 mm, SMNS-ZI0157984 (ex MS 8881), Holotype, Maui
- (5) *Randallius puumakua*, 3.6 mm, SMNS-ZI0157993 (ex MS 9180), Holotype, Maui
- (6) *Randallius fisheri*, 1.9 mm, SMNS-ZI0157991 (ex MS 9130), Holotype, Maui

Row B: Molokai, Lanai & Oahu

- (1) *Randallius ringens*, 4.2 mm, NHMUK 190012.18.1374, Lectotype, Lanai
- (2) *Randallius callomoni*, 2.1 mm, ANSP 95637, Holotype, Molokai
- (3) *Randallius jacksoni*, 3.3 mm, ANSP 378770, Holotype, Oahu
- (4) *Randallius pupuiki*, 4.0 mm, NHMUK 20210054, Holotype, Oahu
- (5) *Randallius abletti*, 4.7 mm, ANSP 386191, Holotype, Oahu.

Row C: Oahu

- (1) *Randallius intermedius*, 4.8 mm, HI, FMNH 7642, Holotype
- (2) *Randallius crenulatus*, 2.9 mm, ANSP 386235, Holotype
- (3) *Randallius hauptmani*, 5.1 mm, ANSP 384054, Holotype
- (4) *Randallius hystericellus*, 5.5 mm, NHMUK 1900.12.18.1388, Neotype
- (5) *Randallius albus*, 2.1 mm, ANSP 378544, Holotype

Row D: Kauai

- (1) *Randallius anomalous*, 4.2 mm, ANSP 58134, Holotype
- (2) *Randallius peasei*, 3.5 mm, MCZ 17281, Holotype
- (3) *Randallius bennettiae*, 3.9 mm, SMNS-ZI0157987 (ex MS 9167), Holotype
- (4) *Randallius geigeri*, 4.4 mm, SMNS-ZI0157988 (MS 9168), Holotype
- (5) *Randallius kondoi*, 5.0 mm, SMNS-ZI0157989 (ex MS 9230), Holotype

Row E: Kauai

- (1) *Randallius vinceneae*, 3.7 mm, MCZ 45159, Holotype
- (2) *Randallius sutteri*, 4.0 mm, SMNS-ZI0157990 (ex MS 8611), Holotype
- (3) *Randallius anceyi*, 3.8 mm, MCZ 396408, Holotype
- (4) *Randallius woodae*, 5.0 mm, MCZ 45158, Holotype
- (5) *Randallius pfeifferi*, 2.7 mm, MCZ 396406, Holotype

***Randallius robertae* n. sp.**
(Fig. 199)

Type material: Holotype SMNS-ZI0157985 (ex MS 8605), leg. D. Walker, Aug 22, 1946.

Type locality: Palihoukapapa, Hamakua District, Hawaii.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 26.7% of shell diameter; axial rib count 50; palatal barrier height order 2nd, 1st, 3rd, 4th.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 3.0 mm; 4.25 whorls; apex raised; spire protrusion 6.7% of shell height; shell height 50% diameter; peristome thin, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, expanded peripherally, moderately obstructed; aperture height 62.8% of width; umbilicus 26.7% of shell diameter, constricted decoiling; late juvenile whorl descension 2°, the body whorl descending at 9°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib width, late juvenile whorls rib interspace 3.5 times axial rib width, body whorl rib interspace irregular, two to five times axial rib width; sulcus-like depression supra-peripherally on body whorl; axial rib count 50; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers equidistant, 1st tall, bifid, extended between the 3rd and 4th palatals, ascends rapidly, 2nd low, thick, crescentic, ascends gradually; four palatal barriers, 1st basal, low, thick, crescentic, ascends gradually, 2nd basal, tall, thin, crescentic, ascends rapidly,



Fig. 199. *Randallius robertae*, 3.0 mm, SMNS-ZI0157985 (ex MS 8605), HOLOTYPE, Hawaii, Palihoukapapa.

3rd sub-peripheral, low, thin, marginally crescentic, ascends rapidly, 4th supra-peripheral, low, thin, ascends rapidly. Palatal barrier height order 2nd, 1st, 3rd, 4th.

Comparison: *Randallius robertae* is distinguished from *R. walkeri* (both endemic to Hawaii Island and described from the same type locality, Palihoukapapa, Hamakua District) by having a shell height 50% of the shell diameter (vs. 55% in *R. walkeri*); spire protrusion 6.7% of shell height (vs. 13.6%); aperture height 62.8% of width (vs. 97.3%); rib count 50 (vs. 40); riblets per axial rib interface 2 (vs. 3); umbilicus 26.7% of shell diameter (vs. 32.5%); body whorl descension 9° (vs. 6°). The shell of *Randallius robertae* is more peripherally expanded than *R. walkeri*, and has a smoothly raised shoulder rather than the steeply raised shoulder of *R. walkeri*.

Etymology: Named for Roberta Fiene, mother of Pauline and Elizabeth and wife of Jim Fiene.

***Randallius robertae* Holotype**

Shell diameter: 3.0 mm

Shell height: 1.5 mm, 50% of shell diameter

Spire protrusion: 0.1 mm, 6.7% of shell height

Aperture height: 1.1 mm, 62.8% of aperture width

Aperture width: 1.75 mm

Rib count: 50

Riblets per rib interspace: 2

Number of whorls: 4.25

Umbilicus diameter: 0.8 mm, 26.7% of shell diameter

Late juvenile whorl descension: 2°

Body whorl descension: 9°

***Randallius walkeri* n. sp.**
(Fig. 200)

Type material: Holotype SMNS-ZI0157986 (ex MS 9682); 10 paratypes (MS 9680: 3, MS 9681: 7); all leg. D. Walker, Aug 22, 1946.

Type locality: Palihoukapapa, Hamakua District, Hawaii.

Other material studied: 13 specimens from Hawaii, Hamakua District, Palihoukapapa, leg. D. Walker, Aug 22, 1946 (MS 8865: 13).

Status and Distribution: Extant. Presumed Extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 32.5% of shell diameter; axial rib count 40; palatal barrier height order 3rd, 2nd, 1st, 4th.

Description: Color: flammulated. Shell: sub-turbinate, slightly compressed laterally; diameter 2.0 mm; 4.25 whorls; apex raised, spire protrusion 13.6% of shell height, shell height 55% of diameter; peristome basally thickened, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, compressed peripherally, moderately obstructed; aperture width 97.3% of height; umbilicus 32.5% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 1°, body whorl descension 6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace three times axial rib width, body whorl rib interspace irregular, three to five times axial rib width; axial rib count 40; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, bifid, ascends rapidly, extended between 3rd and 4th palatal barriers, 2nd low, evenly thickened, marginally crescentic, ascends gradually, extended toward 2nd palatal barrier, four palatal barriers, 1st columellar, tall, evenly thickened, recessed, ascends rapidly, 2nd basal, low, evenly thickened, marginally crescentic, ascends rapidly, 3rd sub-peripheral, evenly thickened, crescentic, ascends rapidly, 4th supra-peripheral, low, thick base, recessed, ascends gradually. Palatal barrier height order 3rd, 2nd, 1st, 4th.



Fig. 200. *Randallius walkeri*, 2.0 mm, SMNS-ZI0157986 (ex MS 9682), HOLOTYPE, Hawaii, Palihoukapapa.

Remarks: See account for *Randallius robertae* for comparison.

Etymology: Named to honor David Walker who collected Hawaiian land snails and meticulously recorded the data for each specimen.

***Randallius walkeri* Holotype**

Shell diameter: 2.0 mm

Shell height: 1.1 mm, 55% of shell diameter

Spire protrusion: 0.15 mm, 13.6% of shell height

Aperture height: 7.5 mm

Aperture width: 7.3 mm, 97.3% of aperture height

Rib count: 40

Riblets per rib interspace: 3

Number of whorls: 4.25

Umbilicus diameter: 0.65 mm, 32.5% of shell diameter

Late juvenile whorl descension: 1°

Body whorl descension: 6°

***Randallius jimfienei* n. sp.**

(Figs. 201, 389, 390)

Type material: Holotype SMNS-ZI0157992 (ex MS 8879); five paratypes (MS 9149: 1, MS 8571: 1, MS 8305: 1, MS 8874: 1, MS 9150: 1); all leg. H. James, Apr 20, 1988.

Type locality: Puu Makua Cave, 1350.6 m, Honuaula Moku, Makawao District, Maui. 20°39'15.09"N, 156°21'24.04"W.

Status and Distribution: Holocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 27.5% of shell diameter; axial rib count 53; palatal barrier height order 2nd, 1st, 3rd, 4th.

Description: Color: flammulated. Shell: sub-discoidal; diameter 4.0 mm; 4.2 whorls; apex planar; spire protrusion 9.4% of shell height; shell height 52.5% of diameter; peristome uniformly thin, reflected; low shoulder; apical suture crenulated, shallow; aperture lunate, constricted supra-peripherally, obstructed; aperture height 88.2% of width; umbilicus 27.5% of shell diameter, constricted decoiling; late juvenile whorl descension 4°, body whorl descension 11°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace three to four times axial rib width, late juvenile whorls rib interspace four to five times axial rib width, body whorl rib interspace irregular, five to seven times axial rib width; supra-peripheral depression; axial rib count 53; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, strong, crescentic, ascends rapidly, extended toward 4th palatal barrier, 2nd low, ascends gradually, extended between 1st and 2nd palatal barriers; four palatal barriers, thickened at the base, 1st columellar, low, thick, crescentic, ascends rapidly, 2nd basal, thick, tall, crescentic, ascends gradually, 3rd sub-peripheral, tall evenly thickened, crescentic, ascends rapidly; 4th supra-peripheral, tall, crescentic, ascends gradually. Palatal barrier height order 2nd, 1st, 3rd, 4th.

Etymology: Named for Mr. Jim Fiene of Racine Wisconsin who loved the details in life.



Fig. 201. *Randallius jimfienei*, 4.0 mm, SMNS-ZI0157992 (ex MS 8879), HOLOTYPE, Maui, Puu Makua Cave.

***Randallius jimfienei* Holotype**

Shell diameter: 4.0 mm
 Shell height: 2.1 mm, 52.5% of shell diameter
 Spire protrusion: 0.2 mm, 9.4% of shell height
 Aperture height: 1.5 mm, 88.2% of aperture width
 Aperture width: 1.7 mm
 Rib count: 53
 Riblets per rib interspace: 3
 Number of whorls: 4.2
 Umbilicus diameter: 1.1 mm, 27.5% of shell diameter
 Late juvenile descension: 4°
 Body whorl descension: 11°

***Randallius paulineae* n. sp.**
 (Figs. 202, 391, 392)

Type material: Holotype SMNS-ZI0157984 (ex MS 8881); nine paratypes (MS 8714: 1, 8954: 1, leg. M. Severns & S. Olson, Apr 22, 1988; MS 8956: 3, MS 9152: 1, MS 8953: 1, leg. M. Severns & S. Olson, Apr 1988; MS 9153: 1, MS 8960: 1, leg. M. Severns & S. Olson, Apr 16, 1988).

Type locality: Lua Lepo Cave, 825.1 m, Kahikinui Moku, Hana District, Maui. 20°37'48.51"N, 156°19'50.07"W.

Other material studied: nine specimens from Maui: Makawao District, Honuaula Moku, Puu Makua Cave, 1350.7 m, leg. H. James, Apr 20, 1988, (MS 9147: 1, MS 8470: 1), Puu Naio Cave, 392.9 m, leg. H. James, Jul. 21, 1990 (MS 9154: 1, MS 8554: 1), Hana District, Kahikinui Moku, Auwahi Cave, 1203.7 m, leg. M. Severns, May 1982, (MS 8563: 1, MS 8876: 1, MS 9205: 1, MS 8877: 1), Lua Lepo Cave, 825.1 m, leg. M. Severns & S. Olson, Apr 22, 1988 (MS 8675: 1).

Status and Distribution: Holocene fossil. Presumed extinct. Known from soil samples from Puu Makua Cave, 1350.7 m, Puu Naio Cave, 392.9 m, Honuaula Moku, Makawao District; Auwahi Cave, 1203.7 m, and Lua Lepo Cave, 825.1 m, Kahikinui Moku, Hana District, Maui.

Diagnosis: Color pattern flammulated; shell sub-discoidal, depressed; umbilicus width 30% of shell diameter; axial rib count 47; palatal barrier height order 2nd, 3rd, 1st, 4th.

Description: Color: flammulated. Shell: sub-discoidal, depressed; diameter 4.0 mm; 4.25 whorls; apex planar; spire protrusion 10.5% of shell height; shell height 47.5% of diameter; peristome moderately thickened, basally reflected; low shoulder; apical suture crenulated, shallow; aperture lunate, constricted supra-peripherally, moderately obstructed; aperture height 87.5% of width; umbilicus 30% of diameter, gradual decoiling; late juvenile whorl descension 2°, body whorl descension 8°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two to three times axial rib width, late juvenile whorls rib interspace four to six times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 47; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, extended between the 3rd and 4th palatal barriers, ascends gradually, 2nd low, crenulated, diminutive; four palatal barriers, 1st basal, lissome, evenly thickened, recessed, ascends rapidly, 2nd basal, tall, crescentic, recessed, ascends rapidly, 3rd sub-peripheral, low, crescentic, recessed, ascends gradually, exceptionally recessed, 4th supra-peripheral, low, thin, crescentic, recessed, ascends gradually. Palatal barrier height order 2nd, 3rd, 1st, 4th.



Fig. 202. *Randallius paulineae*, 4.0 mm, SMNS-ZI0157984 (ex MS 8881), HOLOTYPE, Maui, Lua Lepo Cave.

Etymology: Named for Pauline Fiene.

Randallius paulineae Holotype

Shell diameter: 4.0 mm
 Shell height: 1.9 mm, 47.5% of diameter
 Spire protrusion: 0.2 mm, 10.5% of shell height
 Aperture height: 1.4 mm, 87.5% of aperture width
 Aperture width: 1.6 mm
 Rib count: 47
 Riblets per rib interspace: 4
 Number of whorls: 4.25
 Umbilicus diameter: 1.2 mm, 30% of shell diameter
 Late juvenile descension: 2°
 Body whorl descension: 8°

Randallius puumakua n. sp.

(Figs. 203, 393, 394)

Type material: Holotype SMNS-ZI0157993 (ex MS 9180); 10 paratypes (MS 9179: 1, MS 9178: 1, MS 9177: 1, MS 9181: 1, MS 8304: 1, MS 8570: 5); all leg. H. James, Apr 20, 1988.

Type locality: Puu Makua Cave, 1350.6 m, Honuaula Moku, Makawao District, Maui. 20°39'15.09"N, 156°21'24.04"W.

Status and Distribution: Holocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 22.2% of shell diameter; axial rib count 136; palatal barrier height order 2nd, 4th, 3rd, 1st.

Description: Color: flammulated. Shell: depressed, carinate, sulcate; diameter 3.6 mm; 4.25 whorls; apex sunken; spire protrusion 7.6% of shell height; shell height is 47.2% of diameter; peristome basally thickened, sub-peripherally reflected; low shoulder; apical suture canaliculate, impressed; aperture lunate, rounded basally, expanded peripherally, supra-peripherally concave, obstructed; aperture height 80% of width; umbilicus 22.2% of shell diameter, constricted decoiling; late juvenile whorl descension 2°, body whorl descension 7.9°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two to three times axial rib width, late juvenile whorls rib interspace equal to axial rib width, body whorl rib interspace irregular, two to three times the axial rib width; axial rib count 136; one riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, ascends evenly, extended toward the 4th palatal, 2nd low, thick, ascends gradually; four palatal barriers, 1st basal, low, crescentic, recessed, ascends gradually, 2nd basal, tall, crescentic, recessed, ascends rapidly, 3rd sub-peripheral, evenly thickened, crescentic, recessed, ascends rapidly, 4th supra-peripheral, low, blade-like, marginally crescentic, recessed, ascends rapidly. Palatal barriers height order 2nd, 4th, 3rd, 1st.



Fig. 203. *Randallius puumakua*, 3.6 mm, SMNS-ZI0157993 (ex MS 9180), HOLOTYPE, Maui, Puu Makua Cave.

Etymology: Named for the type locality, Puu Makua Cave at the foot of Puu Makua.

Randallius puumakua Holotype

Shell diameter: 3.6 mm
 Shell height: 1.7 mm, 47.2% of shell diameter
 Spire protrusion: 0.13 mm, 7.6% of shell height
 Aperture height: 1.2 mm, 80% of aperture width
 Aperture width: 1.5 mm
 Rib count: 136
 Riblets per rib interspace: 1
 Number of whorls: 4.25
 Umbilicus diameter: 0.8 mm, 22.2% of shell diameter
 Late juvenile descension: 2°
 Body whorl descension: 7.9°

Randallius fisheri n. sp.

(Figs. 204, 395–397)

Type material: Holotype SMNS-ZI0157991 (ex MS 9130); 11 paratypes (MS 8223: 11); all leg. M. Severns, P. Fiene & C. Pittman, Feb 6, 1993.

Type locality: Mid Maui Sand Pit, 1/4 mile west of the Mokulele Highway, Wailuku District, Maui.

Other material studied: 28 specimens from Maui: Wailuku District, Mid Maui Sand Pit, leg. M. Severns, P. Fiene and C. Pittman, Feb 6, 1993 (MS 9134: 1, MS 8942: 4, MS 8897: 20) three specimens Lahaina District, Makuleia Bay, leg. C. Pittman (MS 8891: 1, MS 8892: 1, MS 8941: 1), eight specimens from Molokai: Koolau Moku, Moomomi, leg. S. Olson & J. Aidem, Feb 14, 1993 (MS 9129: 1, MS 8943: 1, MS 8896: 6), one specimen from Oahu: Waialua District, Haleiwa, leg. H.A. Pilsbry Jan 18, 1913 (ANSP 116698: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. *Randallius fisheri* is known from the central valley (Wailuku Valley), Wailuku District and above Makuleia Bay, Lahaina District, Maui, Moomomi, Koolau Moku, Molokai and Haleiwa, Waialua District, Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 31.5% of shell diameter; axial rib count 75; palatal barrier height order 3rd, 2nd, 1st, 4th.

Description: Color: flammulated. Shell: sub-discoidal; compressed laterally; diameter 1.9 mm; 3.5 whorls; apex slightly raised; spire protrusion 10% of shell height; shell height 52.6% of diameter; peristome moderately thin, not reflected; low shoulder; apical suture crenulated, shallow; aperture lunate; rounded basally, slightly flattened supra-peripherally, moderately obstructed; aperture height equal to width; umbilicus 31.5% of shell diameter, gradually decoiling; late juvenile whorl descension 2.5°, body whorl descension 4°. Sculpture: embryonic sculpture absent; early and late juvenile whorls rib interspace equal to axial rib width, body rib interspace one to two times axial rib width; axial rib count 75; one riblet per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crescentic, ascends gradually, extended between the 4th and 5th palatal barriers, 2nd low, crescentic, ascends rapidly, extended between the 2nd and 3rd palatal barriers; four palatal barriers, 1st columellar, tall, evenly thickened; 2nd basal, tall, crescentic, ascends rapidly; 3rd sub-peripheral, tall, crescentic, ascends rapidly, 4th supra-peripheral, low, thick, ascends rapidly. Palatal barrier height order 3rd, 2nd, 1st, 4th.



Fig. 204. *Randallius fisheri*, 1.9 mm, SMNS-ZI0157991 (ex MS 9130), HOLOTYPE, Maui, Mid-Maui Sand Pit.

Etymology: Named to honor Scott Fisher who has spent his life building and sharing his understanding of the aina (land) – its history, the people, and the environment they called Hawaii.

Randallius fisheri Holotype

Shell diameter: 1.9 mm

Shell height: 1.0 mm, 52.6% of shell diameter

Spire protrusion: 0.1 mm, 10% of shell height

Aperture height: 0.8 mm, equal to aperture width

Rib count: 75

Riblets per rib interspace: 1

Number of whorls: 3.5

Umbilicus diameter: 0.6 mm, 31.5% of shell diameter

Late juvenile whorl descension: 2.5°

Body whorl descension: 4°

Randallius ringens (Sykes, 1896)

(Figs. 205, 398)

Endodonta (Thaumatodon) ringens (Sykes, 1896): 126 — unaccepted > superseded combination.

Cookeconcha ringens (Sykes, 1896) — Solem, 1976): 215–216.

Type material: Lectotype NHMUK 1900.12.18.1374 [designated here].

Type locality: Koele, Lanai.

Other material studied: One specimen from Lanai (ANSP 130553: 1, ex. coll. BPBM).

Status and Distribution: Extant. Presumed extinct. Known only from the mountains of Lanai, behind Koele.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 28.6% of shell diameter; axial rib count 46; palatal barrier height order 2nd, 3rd, 1st, 4th.

Redescription: Color: flammulated. Shell: sub-discoidal, moderately expanded laterally; diameter 4.2 mm; 4.5 whorls; apex sunken; spire protrusion 10.5% of shell height; shell height 45.2% of diameter; peristome uniformly thin, slightly reflected sub-peripherally; low shoulder; apical suture crenulated, shallow; aperture lunate, flattened supra-peripherally, obstructed; aperture height 81.3% of width; umbilicus 28.6% of shell diameter, constricted decoiling; late juvenile whorl descension 2.8°, body whorl descension 3.5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two to three times axial rib width, late juvenile whorls rib interspace four times axial rib width, body whorl rib interspace irregular, four to six times axial rib width; axial rib count 46; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, ascends rapidly, extended between the 3rd and 4th palatal barriers, 2nd low, crenulated, ascends gradually,

extended toward the 2nd palatal barrier; four palatal barriers, 1st columellar, low, thickened at the base, crescentic, ascends rapidly, 2nd basal, tall, thin, crescentic, ascends rapidly, 3rd sub-peripheral, low evenly thickened, crescentic, ascends rapidly; 4th supra-peripheral, crescentic, ascends rapidly. Palatal barrier height order 2nd, 3rd, 1st, 4th.



Fig. 205. *Randallius ringens*, 4.2 mm, NHMUK 1900.12.18.1374, LECTOTYPE, Lanai, Koele.

Comparison: *Randallius ringens* (Lanai endemic) is similar in appearance to *R. geigeri* (Kauai endemic) and distinguished by having a shell height 45.2% of the shell diameter (vs. 47.7% in *R. geigeri*); spire protrusion 10.5% of shell height (vs. 14.2%); aperture height 81.3% of aperture width (vs. 87.5%); axial rib count 46 (vs. 118) with a count of 4 riblets per rib interspaces (vs. 1 riblet per rib interspace); umbilicus diameter is 28.6% of shell diameter (vs. 31.8%); body whorl descension of 3.5° (vs. 8°); palatal barrier height order, tall to low, 2nd, 3rd, 1st, 4th. (vs. 3rd, 2nd, 1st, 4th).

Remarks: The most salient difference between these two similar yet geographically separated species is the axial rib count: 46 for *R. ringens* vs. 118 for *R. geigeri*.

Etymology: Unknown.

***Randallius ringens* Lectotype**

Shell diameter: 4.2 mm
 Shell height: 1.9 mm, 45.2% of shell diameter
 Spire protrusion: 0.2 mm, 10.5% of shell height
 Aperture height: 1.3 mm, 81.3% of aperture width
 Aperture width: 1.6 mm
 Rib count: 46
 Riblets per rib interspace: 4
 Number of whorls: 4.5
 Umbilicus diameter: 1.2 mm, 28.6% of shell diameter
 Late juvenile whorl descension: 2.8°
 Body whorl descension: 3.5°

***Randallius callomoni* n. sp.**

(Figs. 206, 399)

Type material: Holotype ANSP 95637; one paratype (ANSP 501767: 1); both leg. D. Thaanum.

Type locality: Waihanau Gulch, Koolau Moku, Molokai.

Other material studied: Two specimens from Molokai: Koolau Moku, Puu Kolekole, leg. Pilsbry, 1913 (ANSP 108993: 2).

Status and Distribution: Extant. Presumed extinct. Known from above Kaulapapa in a ravine east of Puu Kolekole and Waihanau Valley.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 33.3% of shell diameter; axial rib count 44; palatal barrier height order 3rd, 2nd, 1st, 4th.

Description: Color: flammulated. Shell: discoidal, depressed, compressed laterally; diameter 2.1 mm; 3.8 whorls; apex sunken; spire protrusion 4.7% of shell height; shell height 50% of diameter; peristome evenly thickened, thin, slightly reflected basally; low shoulder; apical suture crenulated, impressed; aperture reniform, rounded, expanded peripherally, obstructed; aperture height 87.5% of width; umbilicus 33.3% of shell diameter, openly decoiling; late juvenile whorl descension less than 1°, body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two to three times axial rib width, body whorl interspace three to four times axial rib width, axial rib count 44; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st low, crescentic, ascends rapidly, extended between the 3rd and 4th palatal barriers, 2nd



Fig. 206. *Randallius callomoni*, 2.1 mm, ANSP 95637, HOLOTYPE, Molokai, Waihanau Gulch.

tall, crescentic, ascends rapidly, extended toward the 3rd palatal barrier; four palatal barriers ascend rapidly, 1st columellar, tall, moderately crescentic, 2nd basal, tall, thin, crescentic, 3rd sub-peripheral, tall, crescentic, 4th supra-peripheral, thick, moderately crescentic, recessed. Palatal barrier height order 3rd, 2nd, 1st, 4th.

Etymology: Named to honor Paul Callomon who provided specimens from the Academy of Natural Sciences of Philadelphia collection, timely photographs when needed, assistance in many ways, guidance and super-human patience during the writing of this revision.

Randallius callomoni Holotype

Shell diameter: 2.1 mm

Shell height: 1.05 mm, 50% of shell diameter

Spire protrusion: 0.05 mm, 4.7% of shell height

Aperture height: 0.7 mm, 87.5% of aperture width

Aperture width: 0.8 mm

Rib count: 44

Riblets per rib interspace: 2

Number of whorls: 3.8

Umbilicus diameter: 0.7 mm, 33.3% of shell diameter

Late juvenile whorl descension less than: 1°

Body whorl descension: 7°

Randallius abletti n. sp.

(Figs. 207, 400)

Type material: Holotype ANSP 386191; five paratypes (ANSP 501768: 5); all leg. Oswald, Nov 19, 1936.

Type locality: As described by Oswald; right 1st kukui glen, 45.7 m, directly below 2nd saddle 3.05 m, from cliff, 21°18'N, 157°48'W, Palolo Valley, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 32.9% of shell diameter; axial rib count 45; palatal barrier height order 2nd, 1st, 3rd, 4th.

Description: Color: flammulated. Shell: discoidal, depressed, slightly expanded laterally; diameter 4.7 mm; 4.25 whorls; apex sunken; spire protrusion 5.2% of shell height; shell height 40.4% of diameter; body whorl supra-peripherally depressed; peristome evenly thickened, sub-peripherally reflected; low shoulder; apical suture crenulated, impressed; aperture lunate, expanded peripherally, supra-peripherally flattened, moderately

obstructed; aperture height 83.3% of width; umbilicus 32.9% of shell diameter, openly decoiling; late juvenile whorl descension 2°, body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace one to two times axial rib width, late juvenile whorls rib interspace three to four times axial rib width, body whorl rib interspace irregular, three to four times axial rib width; three or four radial striae occur in rib interspaces; axial rib count 45; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, bifid, ascends gradually, extended between the 4th and 5th palatal barriers, 2nd low, crescentic, ascends gradually, extended toward the 2nd palatal; four palatal barriers, 1st basal, low, thick, crescentic, 2nd basal, low, thick, crescentic; 3rd sub-peripheral, low, marginally crescentic; 4th supra-peripheral, low, marginally crescentic. Palatal barrier height order 2nd, 1st, 3rd, 4th.



Fig. 207. *Randallius abletti*, 4.7 mm, ANSP 386191, HOLOTYPE, Oahu, Palolo.

Etymology: Named to honor Jonathon Ablett, for his time and assistance to clarify *Randallius hystricellus* with a specimen from the NHMUK's collection.

Randallius abletti Holotype

Shell diameter: 4.7 mm

Shell height: 1.9 mm, 40.4% of diameter

Spire protrusion: 0.1 mm, 5.2% of shell height

Aperture height: 1.5 mm, 83.3% of aperture width

Aperture width: 1.8 mm

Rib count: 45

Riblets per rib interspace: 3

Number of whorls: 4.25

Umbilicus diameter: 1.55 mm, 32.9% of shell diameter

Late juvenile descension: 2°

Body whorl descension: 7°

Randallius albus n. sp.
(Fig. 208)

Type material: Holotype ANSP 378544, leg. O. Oswald, Dec 25, 1928.

Type locality: As described by Oswald; under Kanehoalani, first point Kualoa Ridge, 21°31'N, 157°51'W, Kanehoalani, Koolauloa District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 38% of shell diameter; axial rib count 56; palatal barrier height order 3rd, 2nd, 1st, 4th.

Description: Color: indiscernible. Shell: sub-discoidal, compressed laterally; diameter 2.1 mm; 4.5 whorls; apex planar; spire protrusion 16.2% of shell height; shell height 50% of diameter; peristome evenly thickened, not reflected; raised shoulder; apical suture canaliculate; aperture reniform, constricted peripherally, moderately obstructed; aperture height equal to width; umbilicus 38% of shell diameter, openly decoiling; late juvenile whorl descension 2.3°, body whorl descension 5°. Sculpture: embryonic sculpture absent, body whorl slightly depressed supra-peripherally; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace one to two times the axial rib width, body whorl rib interspace irregular, one to two times axial rib width; axial rib count 56; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st moderately tall, extended toward the 4th palatal barrier, 2nd tall, thin, crescentic, extended between the 2nd and 3rd palatal barriers; four palatal barriers, 1st columellar, tall, crescentic, recessed, 2nd basal, tall, thin, crescentic



Fig. 208. *Randallius albus*, 2.1 mm, ANSP 378544, HOLOTYPE, Oahu, Kualoa Ridge.

3rd sub-peripheral, thin, moderately crescentic, 4th supra-peripheral, tall, thickened, moderately crescentic, recessed. Palatal barrier height order 3rd, 2nd, 1st, 4th.

Etymology: *Randallius albus* is named for the lack of color in the sole fossil specimen.

Randallius albus Holotype

Shell diameter: 2.1 mm

Shell height: 1.05 mm, 50% of shell diameter

Spire protrusion: 0.17 mm, 16.2% of shell height

Aperture height: 0.7 mm, equal to aperture width

Rib count: 56

Riblets per rib interspace: 3

Number of whorls: 4.5

Umbilicus diameter: 0.8 mm, 38% of shell diameter

Late juvenile whorl descension: 2.3°

Body whorl descension: 5°

Randallius crenulatus n. sp.
(Figs. 209, 401, 402)

Type material: Holotype ANSP 386235; five paratypes (ANSP 501769: 5); all leg. O. Oswald, Apr 17, 1938.

Type locality: As described by Oswald; southerly along trail, ravine 7, far out on the northerly spur, Gowen Trail, Pohakea Pass, Oahu.

Other material examined: 10 specimens from Oahu: Waianae District, Pohakea Pass, Gowen Trail, leg. O. Oswald, Apr 2, 1938 (ANSP 386199: 1), leg. O. Oswald, Apr 9, 1938 (ANSP 386216: 1), Honouliuli Trail, leg. O. Oswald, Sep 25, 1939 (ANSP 384056: 1), Lualualei, leg. O. Oswald, Oct 3, 1928 (ANSP 378422: 1), Wailua District, Makaleha, leg. O. Oswald, Sep 7, 1930 (ANSP 376759: 2), Sandwich (Hawaiian) Islands (Oahu), ex coll. Philip Carpenter (FMNH 7642: 1), southerly, ravine 12, mile post 14, Gowen Trail, Pohakea Pass, leg. O. Oswald, May 15, 1938 (ANSP 503407 ex 383583: 3).

Status and Distribution: Extant. Presumed extinct. Known only from Oahu: Makaleha, Wailua District; Honouliuli Trail, Pohakea Pass and Lualualei, Waianae District.

Diagnosis: Color pattern flammulated; shell sub-turbinate, sulcate; umbilicus width 20.7% of shell diameter; axial rib count 48; palatal barrier height order 2nd, 4th, 3rd, 1st.

Description: Color: flammulated. Shell: sub-turbinate, sulcate, carinate, slightly compressed laterally; diameter 2.9 mm; 4.5 whorls; apex planar; spire protrusion 18.7% of shell

height; shell height 55.2% of diameter; peristome evenly thickened, reflected basally; high rounded shoulder; apical suture crenulated, impressed; aperture lunate, unobstructed, expanded peripherally, sulcate supra-peripherally, shoulder low, horizontal; aperture height 81.8% of width; umbilicus 20.7% of shell diameter, marginally constricted decoiling; late juvenile whorl descension 2.4°, body whorl descension 8°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace indiscernible, late juvenile rib interspace 2.5 times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial ribs serpentine, rib count 48; five riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crenate, marginally crescentic, extended toward the 4th palatal barrier, ascends rapidly, 2nd low, thin, crenate, ascends gradually; four palatal barriers, 1st, columellar, callous-like, 2nd tall, crescentic, ascends gradually, recessed, 3rd sub-peripheral, tall, crescentic, recessed, 4th supra-peripheral, tall, recessed. Palatal barrier height order 2nd, 4th, 3rd, 1st.



Fig. 209. *Randallius crenulatus*, 2.9 mm, ANSP 386235, HOLOTYPE, Oahu, Pohakea Pass.

Etymology: Named for the unusually well-defined crenulations of the 1st and 2nd parietal barriers.

***Randallius crenulatus* Holotype**

Shell diameter: 2.9 mm
 Shell height: 1.6 mm, 55.2% of shell diameter
 Spire protrusion: 0.3 mm, 18.7% of shell height
 Aperture height: 0.9 mm, 81.8% of aperture width
 Aperture width: 1.1 mm
 Rib count: 48
 Riblets per rib interspace: 5
 Number of whorls: 4.5
 Umbilicus diameter: 0.6 mm, 20.7% of shell diameter
 Late juvenile whorl descension: 2.4°
 Body whorl descension: 8°

***Randallius hauptmani* n. sp.**

(Fig. 210)

Type material: Holotype ANSP 384054; five paratypes (ANSP 501770: 5); all leg. O. Oswald, Sep 3, 1939.

Type locality: As described by Oswald; right, 1st kukui glen just under the top of the ridge, 21°19'N, 157°49'W, Manoa, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-turbinate; umbilicus width 39.2% of shell diameter; axial rib count 100; palatal barrier height order 2nd, 4th, 3rd, 1st.

Description: Color: indiscernible. Shell: sub-discoidal, slightly expanded laterally; diameter 5.1 mm; 4.8 whorls; apex planar; spire protrusion 10.8% of shell height; shell height 45% of diameter; peristome uniformly thin, fragile, slightly reflected basally; low shoulder; apical suture crenulated, shallow; aperture lunate, uniformly rounded sub-peripherally, distinct periphery, flattened supra-peripherally, moderately obstructed; aperture height 82.4% of width; umbilicus 39.2% of shell diameter, openly decoiling; late juvenile whorl descension 3°, body whorl descension 7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace two times axial rib width, late juvenile whorls rib interspace three times axial rib width, body whorl rib interspace irregular, one to four times axial rib width; two or three radial striae occur in body whorl interspaces; sulcus-like supra-peripheral depression; axial rib count 100; one riblet per rib interspace prior to alteration. Barriers: two parietals barriers, 1st moderately tall, crescentic, ascends rapidly, extended toward the 3rd palatal barrier; 2nd is low,



Fig. 210. *Randallius hauptmani*, 5.1 mm, ANSP 384054, HOLOTYPE, Oahu, Manoa.

diminutive, ascends gradually extended toward the 2nd palatal barrier; four palatal barriers, 1st columellar, low, thick, recessed, 2nd basal, tall, thin, crescentic, recessed, ascends rapidly, 3rd sub-peripheral, low, blade-like, recessed, ascends gradually, 4th peripheral, low, crescentic, recessed, ascends gradually. Palatal barrier height order 2nd, 4th, 3rd, 1st.

Comparison: *Randallius hauptmani* is distinguished from *R. hystricellus* (both Oahu endemics) by having a shell height 45% of shell diameter (vs. 41.8% in *R. hystricellus*); spire protrusion 10.8% of shell height (vs. 4.3%); aperture height 82.3% of width (vs. 85%); axial rib count of 100 (vs. 69); umbilicus 39.2% of shell diameter (vs. 31.8% of diameter); and body whorl descension 7° (vs. 4.7°).

Remarks: *Randallius hauptmani* and *R. hystricellus* are similar in appearance but with *R. hauptmani* in Manoa Valley, Koolau Mts. and *R. hystricellus* near the ca. 1,227 m summit of Mount Ka'ala in the Waianae Mts., 40 kilometers apart.

Etymology: This species is dedicated to Tom Hauptman, an extraordinary helicopter pilot and friend. In more than 70 drops, he lost me only once in West Maui, on Christmas Eve, 1982, and then found me in the dark, rain and clouds by leaning out of a stripped-down helicopter and flying sideways a few feet off the uluhe fern.

***Randallius hauptmani* Holotype**

Shell diameter: 5.1 mm
 Shell height: 2.3 mm, 45% of shell diameter
 Spire protrusion: 0.25 mm, 10.8% of shell height
 Aperture height: 1.4 mm, 82.4% of aperture width
 Aperture width: 1.7 mm
 Rib count: 100
 Riblets per rib interspace: 1
 Number of whorls: 4.8
 Umbilicus diameter: 2.0 mm, 39.2% of shell diameter
 Late juvenile descension: 3°
 Body whorl descension: 7°

***Randallius hystricellus* (Pfeiffer, 1859)
 (Fig. 211)**

Helix hystricella L. Pfeiffer, 1859: 25 — unaccepted > superseded combination]

Cookeconcha hystricella (L. Pfeiffer, 1859) — Solem, 1976): 216-217.

Type material: Neotype NHMUK 1900.12.18.1388 [designated here], ex coll. H. Cumming.

Type locality: Ka'ala, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell discoidal, depressed; umbilicus width 31.8% of shell diameter; axial rib count 69; palatal barrier height order 3rd, 2nd, 1st, 4th.

Redescription: Color: flammulated. Shell: discoidal, depressed, slightly expanded laterally; diameter 5.5 mm; 4.5 whorls; apex sunken; spire protrusion 4.3% of shell height; shell height 2.3 mm, 41.8% of diameter; peristome uniformly thin, slightly reflected basally; low shoulder; apical suture crenulated, shallow; aperture rounded sub-peripherally, flattened supra-peripherally, moderately unobstructed; aperture height 85% of width; umbilicus 31.8% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 2.4°, body whorl descension 4.7°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; supra-peripheral depression; axial rib count 69; seven riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, marginally crescentic, ascends rapidly, extended toward the periphery, 2nd low, crescentic, ascends gradually, angled toward the 4th palatal barrier; four palatal barriers, recessed, 1st columellar, low, thick, ascends gradually, 2nd basal, thick, ascends rapidly, 3rd basal, tall, crescentic, ascends rapidly; 4th sub-peripheral, low, thin, ascends gradually. Palatal barrier height order 3rd, 2nd, 1st, 4th.



Fig. 211. *Randallius hystricellus*, 5.5 mm, NHMUK 1900.12.18.1388, NEOTYPE, Kaala.

Remarks: No type material could be located of *Randallius hystricellus* (Pfeiffer, 1859). It has been attributed to Kauai by Pease, Oahu by Perkins, Maui by Pfeiffer and Hawaii by Ancy who named a variation of *R. hystricellus* from Palihoukapapa near Mana. MCZ Pease lots from Kauai

labeled *hystricellus* had several undescribed species, all *Randallius*, and none matching the description of *R. hystricellus*. Ancey admitted to not having a specimen of *R. hystricellus* to compare when he described *Endodonta hystricella* var *paucilamellata* Ancey, 1904 (*E. h.* var *paucilamellata* was later raised to species level by Solem). Perkins correctly guessed Oahu, specifically Mt. Kaala in the Waianae Mts. As noted by Sykes (1900: 288) "The original examples of this unfigured species, referred as in Mus. Cuming, do not appear to be now in the British Museum. Two specimens found by Perkins agree well with Pfeiffer's diagnosis and dimensions; they also accord in the number of teeth." NHMUK 1900.12.18.1388 matches the description of *Randallius hystricellus* and is a specimen from H. Cuming. It is here designated the neotype for *Randallius hystricellus* (Pfeiffer, 1859).

***Randallius hystricellus* Neotype**

Shell diameter: 5.5 mm
 Shell height: 2.3 mm, 41.8% of shell diameter
 Spire protrusion: 0.1 mm, 4.3% of shell height
 Aperture height: 1.7 mm, 85% of aperture width
 Aperture width: 2.0 mm
 Rib count: 69
 Riblets per rib interspace: 7
 Number of whorls: 4.5
 Umbilicus diameter: 1.75 mm, 31.8% of shell diameter
 Late juvenile whorl descension: 2.4°
 Body whorl descension 4.7°

***Randallius intermedius* n. sp.**
 (Fig. 212)

Type material: Holotype FMNH 7642, ex coll. Philip Carpenter.

Type locality: Sandwich (Hawaiian) Islands. Probably Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the Hawaiian Islands in a general sense, probably Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 25% of shell diameter; axial rib count 56; palatal barrier height order 2nd, 1st, 3rd, 4th.

Description: Color: white with brown stains. Shell: sub-discoidal, broad; diameter 4.8 mm; 4.75 whorls; apex planar; spire protrusion 13.7% of shell height; shell height 53.1% of diameter; peristome evenly thickened, reflected basally; low shoulder; apical suture canaliculate,

shallow; aperture lunate, expanded peripherally, flattened supra-peripherally, unobstructed; aperture height 85.7% of width; umbilicus 25% of shell diameter, constricted decoliling; late juvenile whorl descension 1.3°, body whorl descension 5.4°. Sculpture: Embryonic sculpture absent; early juvenile whorls rib interspace indiscernible, late juvenile rib interspace 2.5 times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 56; sulcate, five riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, ascends rapidly, 2nd low, thin, crenate, ascends gradually; four palatal barriers, 1st columellar, low, rounded, recessed, ascends gradually, 2nd basal, tall, marginally crescentic, ascends rapidly, 3rd sub-peripheral, low, diminutive, recessed, 4th supra-peripheral, callous-like, recessed. Palatal barrier height order 2nd, 1st, 3rd, 4th.



Fig. 212. *Randallius intermedius*, 4.8 mm, FMNH 7642, HOLOTYPE, Sandwich (Hawaiian) Islands (probably Oahu).

Etymology: *Randallius intermedius* appears to be re-absorbing the ghost-like 4th palatal barrier. So, it is considered "intermediate" between *Solemius* with three palatal barriers and *Randallius* with four palatal barriers.

***Randallius intermedius* Holotype**

Shell diameter: 4.8 mm
 Shell height: 2.55 mm, 53.1% of shell diameter
 Spire protrusion: 0.35 mm, 13.7% of shell height
 Aperture height: 1.8 mm, 85.7% of aperture width
 Aperture width: 2.1 mm
 Rib count: 56
 Riblets per rib interspace: 5
 Number of whorls: 4.75
 Umbilicus diameter: 1.2 mm, 25% of shell diameter
 Late juvenile whorl descension: 1.3°
 Body whorl descension: 5.4°

Randallius jacksoni n. sp.
(Fig. 213)

Type material: Holotype ANSP 378770, leg. Oswald, Jun 8, 1929.

Type locality: As described by Oswald; trail leading northerly from 200 yds. north of last kuliana, in high glen, at base of high cliffs, 21°28'N, 158°10'W, Waianae Valley, Waianae District, Oahu.

Other material studied: One specimen from Oahu: (NHMUK 1900.12.18.1370:1).

Status and Distribution: Extant. Presumed extinct. Known from Waianae Valley, Waianae District, Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 33.3% of shell diameter; axial rib count 59; palatal barrier height order 3rd, 2nd, 1st, 4th.

Description: Color pattern flammulated. Shell sub-discoidal, slightly expanded laterally; diameter 3.3 mm; 4.6 whorls; apex planar; spire protrusion 0.2 mm, 13.3% of shell height; shell height 45.4% of diameter; peristome uniformly thin, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture reniform, slightly compressed supra-peripherally, moderately obstructed; aperture height 83.3% of width; umbilicus 33.3% of the shell diameter, gradually decoiling; late juvenile whorl descension 3°, body whorl descension 5°. Sculpture: Embryonic sculpture absent; early juvenile whorls rib interspace two to three times axial rib width, late juvenile whorls with rib interspace three to four times axial rib width, body whorl rib interspace irregular, four to six times axial rib width; axial rib count 59; three riblets per rib interspace prior to alteration. Two parietals barriers, 1st tall, crescentic, ascends

rapidly, angled between the 3rd and 4th palatal barriers, 2nd low, crescentic, ascends gradually, angled between the 1st and 2nd palatal barriers; four palatals barriers, 1st columellar, low, thin, ascends rapidly, 2nd basal, blade-like, ascends rapidly, 3rd sub-peripheral, tall, thin, crescentic, ascends rapidly, 4th supra-peripheral, recessed, low, diminutive, ascends gradually. Palatal barrier height order 3rd, 2nd, 1st, 4th.

Etymology: Named for a truly great Hawaii dog and hiking partner who at the end of the day knew unerringly where the jeep was through many kilometers of forest and never let me fall far behind.

Randallius jacksoni Holotype

Shell diameter: 3.3 mm

Shell height: 1.5 mm, 45.4% of shell diameter

Spire protrusion: 0.2 mm, 13.3% of shell height

Spire protrusion: 13.3% of shell height

Aperture height: 1.0 mm, 83.3% of aperture width

Aperture width: 1.2 mm

Rib count: 59

Riblets per rib interspace: 3

Number of whorls: 4.6

Umbilicus diameter: 1.1 mm, 33.3% of shell diameter

Late juvenile descension: 3°

Body whorl descension: 5°

Randallius pupuiki n. sp.
(Fig. 214)

Type material: Holotype NHMUK 20210054, ex coll. V. W. MacAndrew.

Type locality: Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality, Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 33.8% of shell diameter; axial rib count 80; palatal barrier height order 2nd, 1st, 3rd, 4th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 4.0 mm; 5.5 whorls; apex planar; spire protrusion 12.5% of shell height; shell height 2.0 mm, 50% of diameter; peristome uniformly thin, slightly reflected basally; moderately raised shoulder; apical suture crenulated, impressed; aperture reniform, rounded, moderately obstructed; aperture height 93.8% of width; umbilicus 33.8% of the shell diameter, brood chamber, moderately constricted decoiling; late juvenile whorl descension 2.8°, body



Fig. 213. *Randallius jacksoni*, 3.3 mm, ANSP 378770, HOLOTYPE, Oahu, Waianae Valley.

whorl descension 4.5° . Sculpture: Embryonic sculpture absent; early juvenile whorls rib interspace less than axial rib width, late juvenile whorls with rib interspace equal to axial rib width, body whorl rib interspace irregular, one to two times axial rib width; axial rib count 80; seven riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, ascends gradually, extended toward the 4th palatal barrier, 2nd low, crenulated, ascends gradually, extended between the 2nd and 3rd palatal barriers; four palatal barriers, 1st columellar, tall, marginally crescentic, ascends rapidly, 2nd basal, tall, crescentic, ascends rapidly, 3rd sub-peripheral, tall, blade-like, ascends rapidly, 4th supra-peripheral, recessed. Palatal barrier height order 2nd, 1st, 3rd, 4th.



Fig. 214. *Randallius pupuiki*, 4.0 mm, NHMUK 20210054, HOLOTYPE, Oahu.

Remarks: This well-preserved specimen attests to the idea of leaving specimens in the condition they are found. In the umbilicus, which acts as a brood chamber, are the remains of several embryos.

Etymology: species name means little snail in the Hawaiian language.

***Randallius pupuiki* Holotype**

Shell diameter: 4.0 mm

Shell height: 2.0 mm, 50% of shell diameter

Spire protrusion: 0.25 mm, 12.5% of shell height

Aperture height: 1.5 mm, 93.8% of aperture width

Aperture width: 1.6 mm

Rib count: 80

Riblets per rib interspace: 7

Number of whorls: 5.5

Umbilicus diameter: 1.35 mm, 33.8% of shell diameter

Late juvenile whorl descension: 2.8°

Body whorl descension: 4.5°

***Randallius anceyi* n. sp.**

(Figs. 215, 403)

Type material: Holotype MCZ 396408 (ex. 45159), ex coll. W. H. Pease.

Type locality: Kapaa, Kawaihau District, Kauai.

Other material studied: Two specimens from Kauai, ex coll. W. H. Pease (MCZ 413375: 2).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color: no discernable color pattern; shell sub-discoidal; umbilicus width 34.2% of shell diameter; axial rib count 109; palatal barrier height order, tall to low: 2nd, 1st, 3rd, 4th.

Description: Color: tan with no discernable pattern. Shell: sub-discoidal, slightly compressed laterally; diameter 3.8 mm; 5.5 whorls; apex raised; spire protrusion 10.3% of shell height; shell height 1.95 mm, 51.3% of diameter; peristome evenly thickened, basally thickened within and basally reflected; low shoulder; apical suture crenulated, impressed; aperture reniform, slightly expanded peripherally, slightly compressed supra-peripherally, obstructed; aperture height equal to width; umbilicus 34.2% of diameter, gradually decoiling; late juvenile whorl descension 2.4° , body whorl descension 3.6° . Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace one to 1.5 times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 109; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crescentic, extended between the 3rd and



Fig. 215. *Randallius anceyi*, 3.8 mm, MCZ 396408, HOLOTYPE, Kauai, Kapaa.

4th palatal barriers, ascends rapidly, 2nd low, crescentic, extended toward the 2nd palatal barrier, ascends gradually; four palatal barriers, 1st columellar, tall, evenly thickened, crescentic, descends rapidly to the peristome, 2nd basal, tall, thick base, crescentic, ascends rapidly to the peristome, 3rd sub-peripheral, low, thick base, crescentic, ascends rapidly, 4th supra-peripheral, diminutive, recessed. Palatal barrier height order 2nd, 1st, 3rd, 4th.

Etymology: Named to honor the prolific French malacologist César-Marie-Felix Ancey who described four species reviewed in this revision.

***Randallius anceyi* Holotype**

Shell diameter: 3.8 mm

Shell height: 1.95 mm, 51.3% of shell diameter

Spire protrusion: 0.2 mm, 10.3% of shell height

Aperture height: 1.45 mm, equal to aperture width

Rib count: 109

Riblets per rib interspace: 2

Number of whorls: 5.5

Umbilicus diameter: 1.3 mm, 34.2% of shell diameter

Late juvenile whorl descension: 2.4°

Body whorl descension: 3.6°

***Randallius anomalous* n. sp.**

(Fig. 216)

Type material: Holotype ANSP 58134, ex coll. Newcomb.

Type locality: Hawaiian Islands, Kauai.

Status and Distribution: Extant. Presumed extinct. Known only from Kauai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 30.9% of shell diameter; axial rib count 104; 4 parietal barriers, palatal barrier height order 3rd, 2nd, 1st, 4th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 4.2 mm; 5.5 whorls; apex raised; spire protrusion 16.3% of shell height; shell height 51.2% of diameter; peristome evenly thickened, marginally reflected basally; low shoulder; apical suture crenulated, shallow; aperture reniform, rounded, slightly constricted supra-peripherally, obstructed; aperture height 96.7% of width; umbilicus 30.9% of diameter, moderately constricted decoiling; late juvenile whorl descension 1.5°, body whorl descension 4.5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 0.5 to one to times axial rib width, late juvenile whorls rib interspace two times axial rib width, body whorl rib

interspace irregular, two to three times axial rib width; axial rib count 104; three riblets per rib interspace prior to alteration. Barriers: four parietal barriers, 1st tall, even thickness and height, extended toward the 4th palatal barrier, ascends rapidly, 2nd low, barely raised above the parietal callous, the 3rd is tall, moderately thick, ascends gradually, extended toward the 3rd palatal barrier, the 4th is lower than the 3rd, evenly thickened, marginally crescentic, ascends rapidly, extended toward the 2nd palatal barrier; four palatal barriers, recessed, 1st columellar, tall, lissome, crescentic, ascends rapidly, 2nd basal, tall, crescentic, lissome, ascends rapidly, 3rd sub-peripheral, tall, lissome, crescentic, ascends rapidly, 4th supra-peripheral, low, crescentic, ascends gradually. Palatal barrier height order 3rd, 2nd, 1st, 4th.



Fig. 216. *Randallius anomalous*, 4.2 mm, ANSP 58134, HOLOTYPE, Kauai.

Remarks: Only one specimen of this finely detailed species was observed, but it is my hope that others will be found providing collecting data.

Etymology: The name refers to the unusual development 2nd, 3rd, and 4th parietal barriers.

***Randallius anomalous* Holotype**

Shell diameter: 4.2 mm

Shell height: 2.15 mm, 51.2% of shell diameter

Spire protrusion: 0.35 mm, 16.3% of shell height

Aperture height: 1.45 mm, 96.7% of aperture width

Aperture width: 1.5 mm

Rib count: 104

Riblets per rib interspace: 3

Number of whorls: 5.5

Umbilicus diameter: 1.3 mm, 30.9% of shell diameter

Late juvenile whorl descension: 1.5°

Body whorl descension: 4.5°

***Randallius bennettiae* n. sp.**
(Figs. 217, 404, 405)

Type material: Holotype SMNS-ZI0157987 (ex MS 8315); two paratypes (MS 8475: 1, MS 9167: 1); all leg. M. Severns, I. Richling & R. Gage, Mar 2016.

Type locality: Wailua Golf Course, Wailua, Lihue District, Kauai.

Other material studied: 32 specimens from Kauai: Lihue District, Wailua, Wailua Golf Course, leg. P. Sutter, 1996, ex coll. D. Hemmes (MS 8476: 1, MS 8293: 11), leg. M. Severns & R. Gage, March 2016 (MS 8793: 7, MS 8794: 12, MS 8823: 1).

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 32% of shell diameter; axial rib count 74; palatal barrier height order 2nd, 3rd, 4th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, expanded laterally; diameter 3.9 mm; 4.5 whorls; apex raised; shell height 43.6% of diameter; spire protrusion 11.8% of shell height; peristome basally thickened, slightly reflected basally; raised shoulder; apical suture crenulated, impressed; aperture lunate, flattened sub-peripherally, rounded peripherally, flattened supra-peripherally, moderately obstructed; aperture height 78.6% of width; umbilicus 32% of shell diameter, gradual decoiling; late juvenile whorl descension 2.1°, body whorl descension 5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile rib interspace two to 2.5 times axial rib width, body whorl rib interspace irregular, three to four times axial rib

width; axial rib count 74; four riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st moderately tall, crescentic, ascends rapidly, extended between the 3rd and 4th palatal barriers, 2nd low, thick, marginally crenulated, ascends gradually, extended between the 2nd and 3rd palatal barriers; four palatal barriers, 1st columellar, low, crescentic, 2nd basal tall, evenly thickened, marginally crescentic, ascends rapidly, 3rd sub-peripheral, low, thick base, crescentic, ascends rapidly, 4th supra-peripheral, low, evenly thickened, marginally crescentic, ascends rapidly. Palatal barrier height order 2nd, 3rd, 4th, 1st.

Etymology: Named with great respect for Ms. Ruby “Fu” Bennett-McNeil who taught me to read.

***Randallius bennettiae* Holotype**

Shell diameter: 3.9 mm
Shell height: 1.7 mm, 43.6% of shell diameter
Spire protrusion: 0.2 mm, 11.8% of shell height
Aperture height: 1.1 mm, 78.6% of aperture width
Aperture width: 1.4 mm
Rib count: 74
Riblets per rib interspace: 4
Number of whorls: 4.5
Umbilicus diameter: 1.25 mm, 32% of shell diameter
Late juvenile whorl descension: 2.1°
Body whorl descension: 5°

***Randallius geigeri* n. sp.**
(Fig. 218)

Type material: Holotype SMNS-ZI0157988 (ex MS 9168), leg. P. Gephart, 1996.

Type locality: Wailua Golf Course, Lihue District, Kauai.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 31.8% of shell diameter; axial rib count 118; palatal barrier height order 3rd, 2nd, 1st, 4th.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 4.4 mm; 5.5 whorls; apex raised; spire protrusion 14.2% of shell height; shell height 47.7% of diameter; peristome evenly thickened, thin, reflected basally; low shoulder; apical suture crenulated; aperture reniform, smoothly rounded, moderately obstructed; aperture height 87.5% of width; umbilicus 31.8% of shell diameter, gradual decoiling; late juvenile whorl descension 3°, body whorl descension 8°. Sculpture: embryonic



Fig. 217. *Randallius bennettiae*, 3.9 mm, SMNS-ZI0157987 (ex MS 8315), HOLOTYPE, Kauai, Wailua Golf Course.

sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile whorls rib interspace of 1.5 times axial rib width, body whorl rib interspace irregular, one to two times axial rib width; axial rib count 118; one riblet per rib interspace prior to alteration. Barrier: two parietal barriers, 1st tall, ascends gradually, extended toward the periphery, 2nd low, marginally crescentic, ascends gradually; four palatal barriers, 1st columellar, tall, thick, crescentic, recessed, ascends rapidly, 2nd basal, tall, marginally crescentic, ascends rapidly, 3rd sub-peripheral, tall, evenly thickened, marginally crescentic, ascends rapidly, 4th supra-peripheral, low, crescentic, recessed. Palatal barrier height order 3rd, 2nd, 1st, 4th.



Fig. 218. *Randallius geigeri*, 4.4 mm, SMNS-ZI0157988 (ex MS 9168), HOLOTYPE, Kauai, Wailua-Golf-Course.

Etymology: Named for Daniel Geiger who, besides instructing, has beguiled the scientific community with brilliant books on mollusk and orchids – a gifted teacher.

***Randallius geigeri* Holotype**

Shell diameter: 4.4 mm
 Shell height: 2.1 mm, 47.7% of shell diameter
 Spire protrusion: 0.3 mm, 14.2% of shell height
 Aperture height: 1.4 mm, 87.5% of aperture width
 Aperture width: 1.6 mm
 Rib count: 118
 Riblets per rib interspace: 1
 Number of whorls: 5.5
 Umbilicus diameter: 1.4 mm, 31.8% of shell diameter
 Late juvenile descension: 3°
 Body whorl descension: 8°

***Randallius kondoi* n. sp.**
 (Figs. 219, 406–408)

Type material: Holotype SMNS-ZI0157989 (ex MS 9230); five paratypes (MS 9228: 3, MS 9229: 1, MS 9231:

1); all leg. M. Severns, J. Van Der Merwe & R. Gage, Apr 8, 2019.

Type locality: Kipu Kai, Lihue District, Kauai. 21°54'47.45"N, 159°23'20.50"W.

Other material studied: 2460 specimens from Kauai: Kawaihau District, Anini Beach, leg. P. Sutter, 1996 (MS 8613: 1), Lihue District, Hanamalu Flat, leg. Pilsbry and Cooke, Aug 7, 1933 (ANSP 324101: 30, ANSP 344291: 2418), ex coll. BPBM (ANSP 130536: 4), Koloa District, Aweoweonui, leg. M. Severns, I. Richling, R. Gage, Mar. 2016 (MS 8750: 1, MS 8734: 1), Waiopili, leg. M. Severns & R. Gage, Aug 16, 2011 (MS 8841: 1), Mahaulepu, leg. M. Severns & R. Gage, Aug 17, 2011 (MS 8631: 1, MS 8802: 1, MS 8805: 1, MS 8748: 1).

Status and Distribution: Extant. Presumed extinct. Known from coastal fossils sites in Kawaihau District, at Anini Beach, Lihue District at Kipu Kai and Hanamalu Flat, Koloa District at Aweoweonui, Waiopili and Mahaulepu, Kauai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 33% of shell diameter; axial rib count 98; palatal barrier height order 2nd, 3rd, 4th, 1st.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 5.0 mm; 5.25 whorls; apex raised; spire protrusion 17% of shell height; shell height 47% of diameter; peristome basally thickened, basally reflected; low shoulder; apical suture crenulated, shallow; aperture lunate, rounded basally, expanded peripherally, slightly constricted supra-peripherally, moderately obstructed; aperture height 83.3% of width; umbilicus 33% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 3°, body whorl descension 5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace approximately two times axial rib width, late juvenile rib interspace three to four times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 98; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, crescentic, ascends rapidly, extended toward the 3rd palatal barrier, 2nd low, thick, ascends gradually, extended toward the 2nd palatal barrier, low; four palatal barriers, 1st columellar, low, thick, recessed, ascends rapidly, 2nd basal tall, evenly thickened, crescentic, ascends rapidly, 3rd sub-peripheral, low, thin, recessed, ascends gradually, 4th supra-peripheral, evenly thickened, recessed, ascends rapidly. Palatal barrier height order 2nd, 3rd, 4th, 1st.



Fig. 219. *Randallius kondoi*, 5.0 mm, SMNS-ZI0157989 (ex MS 9230), HOLOTYPE, Kauai, Kipu Kai.

Etymology: This species is dedicated to the memory of Dr. Yoshio Kondo who told me he thought *Partulina* were extinct, then sent me out to find them. He was a remarkable, kind and selfless malacologist.

***Randallius kondoi* Holotype**

Shell diameter: 5.0 mm
 Shell height: 2.35, 47% of shell diameter
 Spire protrusion: 0.4 mm, 17% of shell height
 Aperture height: 1.5 mm, 83.3% of aperture width
 Aperture width: 1.8 mm
 Rib count: 98
 Riblets per rib interspace: 2
 Number of whorls: 5.25
 Umbilicus diameter: 1.65 mm, 33% of shell diameter
 Late juvenile descension: 3°
 Body whorl descension: 5°

***Randallius peasei* n. sp.**
 (Figs. 220, 409, 410)

Type material: Holotype MCZ 17281, ex coll. W. H. Pease.

Type locality: Kapaa, Kawaihau District, Kauai.

Other material studied: 15 specimens from Sandwich (Hawaiian) Islands; ex coll. A. D. Brown (ANSP 1981: 9, ANSP 1983: 3); ex coll. W. Newcomb (ANSP 58134: 3).

Status and Distribution: Extant. Presumed extinct. Specifically known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 25% of shell diameter; axial rib count 87; palatal barrier height order 2nd, 1st, 3rd, 4th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 3.5 mm; 4.75 whorls; apex planar; spire protrusion 17.6% of shell height; shell height 48.6% of diameter; peristome evenly thickened, thin, slightly reflected basally; raised shoulder; apical suture crenulated, shallow; aperture reniform, constricted peripherally, moderately obstructed; aperture height equal to width; umbilicus 25% of diameter, constricted decoiling; late juvenile whorl descension 3.4°, body whorl descension 4.4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two to three times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 87; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st gradually ascending, of an even height, extended between the 3rd and 4th palatal barriers, 2nd gradually ascending, low, blade-like, extended between the 2nd and 3rd palatal barriers; four palatal barriers, 1st columellar, thick, tall, crescentic ascends rapidly; 2nd basal, tall, thick base, crescentic, ascends rapidly, 3rd sub-peripheral, tall, moderately thick, crescentic, ascends gradually, 4th supra-peripheral, low, thin, marginally crescentic, ascends gradually. Palatal barrier height order 2nd, 1st, 3rd, 4th.



Fig. 220. *Randallius peasei*, 3.5 mm, MCZ 17281, HOLOTYPE, Kauai, Kapaa.

Etymology: Named to honor the naturalist William Harper Pease (1824–1871).

***Randallius peasei* Holotype**

Shell diameter: 3.5 mm
 Shell height: 1.7 mm, 48.6% of shell diameter
 Spire protrusion: 0.3 mm, 17.6% of shell height
 Aperture height: 1.3 mm, equal to aperture width
 Rib count: 87
 Riblets per rib interspace: 3

Number of whorls: 4.75
 Umbilicus diameter: 0.75 mm, 25% of shell diameter
 Late juvenile whorl descension: 3.4°
 Body whorl descension: 4.4°

***Randallius pfeifferi* n. sp.**
 (Fig. 221)

Type material: Holotype MCZ 396406 (ex. 45159); five paratypes (MCZ 396407: 5); all ex coll. W.H. Pease.

Type locality: Kapaa, Kawaihau District, Kauai.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 29.6% of shell diameter; axial rib count 73; bifid; palatal barrier height order 2nd, 3rd, 1st, 4th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 2.7 mm; 4.5 whorls; apex raised; spire protrusion 13.8% of shell height; shell height 53.7% of diameter; peristome evenly thickened, thin, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, rounded, not constricted, obstructed; aperture height 87% of width; umbilicus 29.6% of diameter, moderately constricted decoiling; late juvenile whorl descension 1.9°, body whorl descension 5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace one to 1.5 times axial rib width, late juvenile whorls rib interspace two to three times axial rib width, body whorl rib interspace irregular, two to four times axial rib width; axial rib count 73; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, bifid, extended toward the 4th palatal barrier, ascends rapidly, 2nd

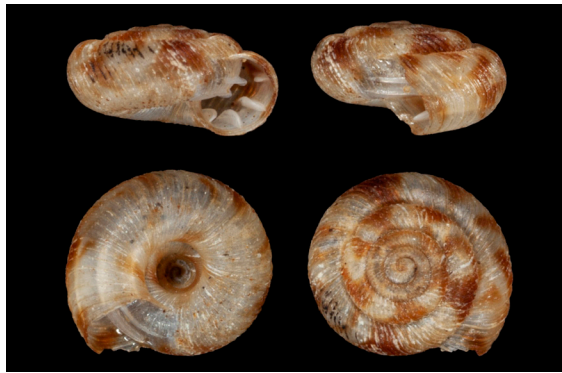


Fig. 221. *Randallius pfeifferi*, 2.7 mm, MCZ 396406, HOLOTYPE, Kauai, Kapaa.

low, simple, extended between the 2nd and 3rd palatal barriers, ascends gradually; four palatal barriers, 1st columellar, tall, thin, crescentic, ascends rapidly, 2nd basal, tall, crescentic, ascends rapidly, 3rd sub-peripheral, tall, thick base, crescentic, ascends rapidly, 4th supra-peripheral, low, crescentic, recessed, ascends gradually. Palatal barrier height order 2nd, 3rd, 1st, 4th.

Etymology: Named to honor Professor Ludwig Pfeiffer (1805–1877), a prolific German naturalist and conchologist.

***Randallius pfeifferi* Holotype**

Shell diameter: 2.7 mm
 Shell height: 1.45 mm, 53.7% of shell diameter
 Spire protrusion: 0.2 mm, 13.8% of shell height
 Aperture height: 1.0 mm, 87% of aperture width
 Aperture width: 1.15 mm
 Rib count: 73
 Riblets per rib interspace: 3
 Number of whorls: 4.5
 Umbilicus diameter: 0.8 mm, 29.6% of shell diameter
 Late juvenile whorl descension: 1.9°
 Body whorl descension: 5°

***Randallius sutteri* n. sp.**
 (Fig. 222)

Type material: Holotype SMNS-ZI0157990 (ex MS 8611), leg. P. Sutter, 1996.

Type locality: Moloaa, Kawaihau District, Kauai.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from Moloaa and Kapaa, Kauai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 30% of shell diameter; axial rib count 65; bifid; palatal barrier height order 2nd, 3rd, 1st, 4th.

Description: Color: flammulated. Shell: sub-discoidal, moderately compressed laterally; diameter 4.0 mm; 5.5 whorls; apex planar; spire protrusion 10% of shell height; shell height 50% of diameter; peristome uniformly thin, basally reflected; low shoulder; apical suture crenulated, shallow, crenulated; aperture reniform, rounded, compressed peripherally, moderately obstructed; aperture width 93.7% of height; umbilicus 30% of shell diameter, moderately constricted decoiling; late juvenile whorl descension 2°, body whorl descension 6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial rib width, late juvenile rib interspace three to four times axial rib width, body rib interspace irregular, three to four times axial rib width; two or three radial striae present in rib interspaces;

axial rib count 65; three riblets per rib interspace prior to alteration. Barriers, two parietal barriers, 1st tall, bifid, ascends gradually, extended toward the 4th palatal barrier, 2nd low, thin, of an even height, ascends rapidly, extended toward the 3rd palatal; four palatal barriers, 1st columellar, tall, thin, lissome, ascends rapidly, 2nd basal, tall, thin, crescentic, ascends rapidly, 3rd sub-peripheral, tall, thin, lissome, ascends gradually, 4th supra-peripheral, low, lissome, ascends gradually. Palatal barrier height order 2nd, 3rd, 1st, 4th.

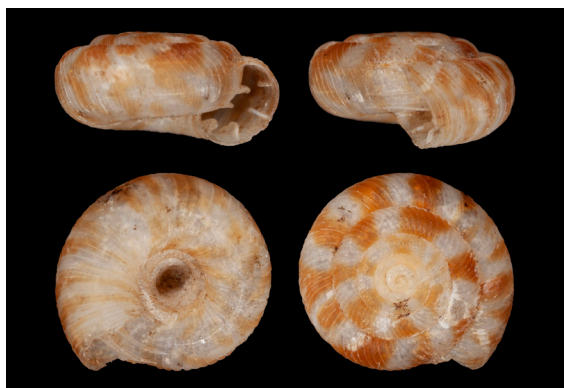


Fig. 222. *Randallius sutteri*, 4.0 mm, SMNS-ZI0157990 (ex MS 8611), HOLOTYPE, Kauai, Moloa'a Bay.

Etymology: Named to honor Mr. Preston Sutter with great respect for his insatiable and infectious curiosity about fossil Hawaiian land shells.

***Randallius sutteri* Holotype**

Shell diameter: 4.0 mm
 Shell height: 2.0 mm, 50% of diameter
 Spire protrusion: 0.2 mm, 10% of shell height
 Aperture height: 1.6 mm
 Aperture width: 1.5 mm, 93.7% of aperture height
 Rib count: 65
 Riblets per rib interspace: 3
 Number of whorls: 5.5
 Umbilicus diameter: 1.2 mm, 30% of shell diameter
 Late juvenile descension: 2°
 Body whorl descension: 6°

***Randallius vinceneae* n. sp.**
 (Figs. 223, 411)

Type material: Holotype MCZ 45159, ex coll. W. H. Pease.

Type locality: Kapaa, Kawaihau District, Kauai.

Other material studied: Two specimens from Sandwich (Hawaiian) Islands; ex coll. W. Newcomb (ANSP 58134: 2).

Status and Distribution: Extant. Presumed extinct. Known from the Sandwich (Hawaiian) Islands, (W. Newcomb), Kapaa, Kauai (Pease).

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 32.4% of shell diameter; axial rib count 70; palatal barrier height order 2nd, 1st, 3rd, 4th.

Description: Color: flammulated. Shell: sub-discoidal, slightly compressed laterally; diameter 3.7 mm; 4.5 whorls; apex planar; spire protrusion 8.1% of shell height; shell height 50% of diameter; peristome uniformly thin, not reflected; low shoulder; apical suture crenulated, impressed; aperture lunate, rounded basally, slightly flattened supra-peripherally, moderately obstructed; aperture height 89.7% of width; umbilicus 32.4% of diameter, constricted deoiling; late juvenile whorl descension 1.85°, body whorl descension 4.8°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace two to 2.5 times axial rib width, body whorl rib interspace irregular, two to three times axial rib width; axial rib count 70; five riblets per rib interspace prior to alteration. Barriers: two parietal barriers; 1st thin, raising slowly then quickly, extended toward the 4th palatal barrier, 2nd blade-like, low, of even height, extended toward the 2nd palatal barrier; four palatal barriers, 1st basal, tall, thin, ascends rapidly, recessed, 2nd basal, tall, lissome, marginally crescentic, ascends rapidly, 3rd sub-peripheral, low, crescentic, ascends gradually, recessed, 4th supra-peripheral, low, callous-like, recessed. Palatal barrier height order 2nd, 1st, 3rd, 4th.

Etymology: This species is named to honor Vincen  Starmer, wife to John and mother to Eva (Lightfoot) and Amalia (Hawkeye).



Fig. 223. *Randallius vinceneae*, 3.7 mm, MCZ 45159, HOLOTYPE, Kauai, Kapaa.

Randallius vinceneae Holotype

Shell diameter: 3.7 mm

Shell height: 1.85 mm, 50% of shell diameter

Spire protrusion: 0.15 mm, 8.1% of shell height

Aperture height: 1.3 mm, 89.7% of aperture width

Aperture width: 1.45 mm

Rib count: 70

Riblets per rib interspace: 5

Number of whorls: 4.5

Umbilicus diameter: 1.2 mm, 32.4% of shell diameter

Late juvenile whorl descension: 1.85°

Body whorl descension: 4.8°

Randallius woodae n. sp.

(Fig. 224)

Type material: Holotype MCZ 45158, ex coll. W. H. Pease.**Type locality:** Kauai.**Status and Distribution:** Extant. Presumed extinct. Known only from the type locality.**Diagnosis:** Color pattern flammulated; shell sub-turbinate; umbilicus width 37% of shell diameter; axial rib count 125; palatal barrier height order 2nd, 1st, 3rd, 4th.**Description:** Color: flammulated. Shell: sub-turbinate, slightly expanded laterally; diameter 5.0 mm: 6 whorls; apex raised; spire protrusion 23.1% of shell height; shell height 52% of diameter; peristome moderately thickened, basally reflected; raised shoulder; apical suture crenulated, impressed; aperture reniform, rounded, not constricted, obstructed; aperture height equal to width; umbilicus 37% of diameter, constricted decoiling; late juvenile whorl descension 1°, body whorl descension 4.3°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 0.5 to one times axial rib width, late juvenile whorls rib interspace one to two times the axial rib width, body whorl rib interspace irregular, crowded; axial rib count 125; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, extended toward the 4th palatal barrier, ascends rapidly, 2nd low, blade-like, extended between the 2nd and3rd palatal barriers, ascends rapidly; four palatal barriers, 1st columellar, low, thick, truncate, ascends rapidly, 2nd basal, thick, crescentic, ascends rapidly, 3rd sub-peripheral, low, blade-like, marginally crescentic, ascends gradually, 4th supra-peripheral, recessed, low, thin, slightly crescentic, ascends gradually. Palatal barrier height order, tall to low: 2nd, 1st, 3rd, 4th.Fig. 224. *Randallius woodae*, 5.0 mm, MCZ 45158, HOLOTYPE, Kauai.**Etymology:** Named to honor Harriet Wood of the National Museum Wales, who together with Jennifer Galliehan compiled and wrote the 2008 edition of *The New Molluscan Names of César-Marie-Felix Ancey*, for her hard work to help me get a copy of this fascinating book.***Randallius woodae*** Holotype

Shell diameter: 5.0 mm

Shell height: 2.6 mm, 52% of shell diameter

Spire protrusion: 0.6 mm, 23.1% of shell height

Aperture height: 1.7 mm, equal to aperture width

Rib count: 125

Riblets per rib interspace: 2

Number of whorls: 6

Umbilicus diameter: 1.85 mm, 37% of shell diameter

Late juvenile whorl descension: 1°

Body whorl descension: 4.3°

Solemius n. gen.

Type species: *Solemius luctiferus* (Pilsbry & Vanatta, 1905) (Fig. 225). **Diagnosis:** Two parietal barriers, upper tall; no columella barrier; one to three palatal barriers with first, basal, thick, tall, second sub-peripheral, diminutive, low or absent, and third supra peripheral, callous-like or absent. **Includes:** 8 species, 2 nominal plus 6 newly described herein (Fig. 227); distributed on Molokai (1) and Oahu (7) (Fig. 226). **Etymology:** *Solemius* is named for renowned malacologist Alan Solem (1931–1990).



Fig. 225. *Solemius luctiferus* (Pilsbry & Vanatta, 1905), type species of *Solemius* n. gen.; 5.6 mm, ANSP 58137, LECTOTYPE, Sandwich (Hawaiian) Islands (Molokai).

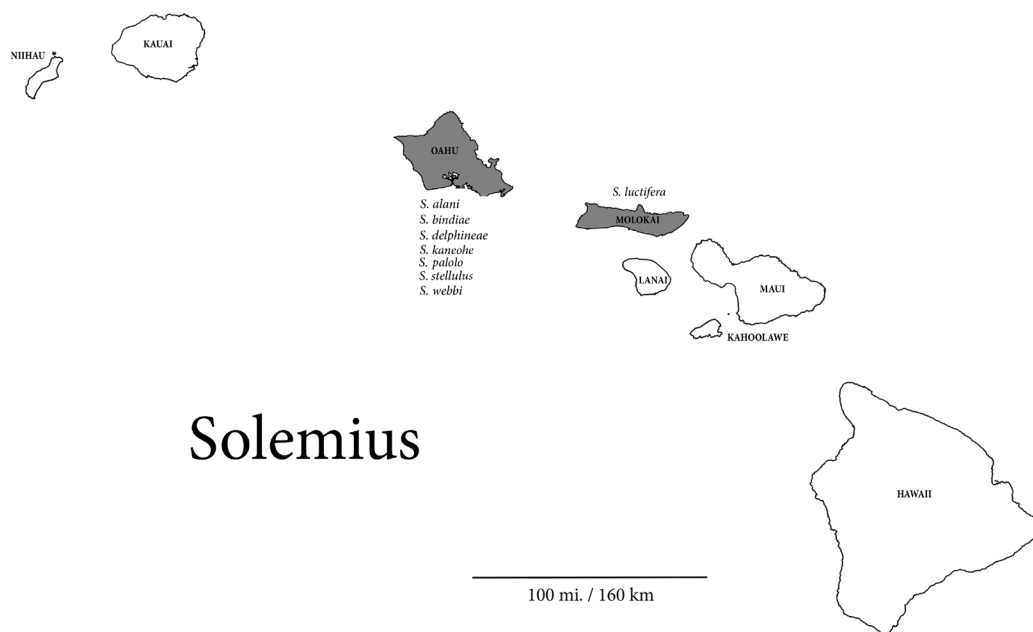


Fig. 226. Distributions of the species of *Solemius* in the Hawaiian archipelago.



Fig. 227. Scaled images of specimens of the eight species of the genus *Solemius*.

Row A: Molokai & Oahu

- (1) *Solemius kaneohe*, 3.0 mm, ANSP 327534, Holotype, Oahu
- (2) *Solemius stellulus*, 4.2 mm, MCZ 169383, Lectotype, Oahu
- (3) *Solemius luctiferus*, 5.6 mm, ANSP 58137, Lectotype, Molokai

Row B: Oahu

- (1) *Solemius alani*, 5.7 mm, ANSP 386206, Holotype
- (2) *Solemius webbi*, 6.0 mm, ANSP 130570, Holotype

Row C: Oahu

- (1) *Solemius bindiae*, 3.7 mm, ANSP 130556, Holotype
- (2) *Solemius palolo*, 4.1 mm, ANSP 386188, Holotype
- (3) *Solemius delphineae*, 7.0 mm, ANSP 47901, Holotype

Solemius luctiferus (Pilsbry & Vanatta, 1905)
(Figs. 228, 412, 413)

Endodonta (Thaumatodon) luctifera Pilsbry & Vanatta, 1905: 575 — unaccepted > superseded combination.

Cookeconcha luctifera (Pilsbry & Vanatta, 1905) — Solem, 1976: 216.

Type material: Lectotype ANSP 58137 [designation attributed to Baker, 1963: 232], ex coll. A. D. Brown.

Type locality: Sandwich (Hawaiian) Islands (Molokai).

Other material studied: five specimens from Molokai: Kona Moku, Kamalo, leg. D. Thaanum, Pilsbry Expedition, 1913 (ANSP 108375: 2), Halawa Moku, Waikolu, ex coll. BPBM, 1932 (ANSP 186400: 3).

Status and Distribution: Extant. Presumed extinct. Known from Waikolu in Halawa Moku and Kamalo in Kona Moku, Molokai.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 32.1% of shell diameter; axial rib count 61; palatal barrier height order 1st, 2nd.

Redescription: Color pattern flammulated. Shell sub-discoidal, broad; diameter 5.6 mm; 5.5 whorls; apex planar; spire protrusion 8.2% of shell height; shell height 43.8% of diameter; peristome evenly thickened, thin, reflected sub-peripherally; low, shoulder; apical suture crenulated, shallow; aperture reniform, expanded peripherally, slightly constricted supra-peripherally, unobstructed; aperture height 90.5% of width; umbilicus 32.1% of shell diameter, gradual decoiling; late juvenile whorl descension 1°, body whorl descension 2.7°. Sculpture: Embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile rib interspace three times axial rib width, body whorl rib interspace irregular, three to four times axial rib width; axial rib count 61; faint spiral cords: five riblets per rib interspace prior to alteration. Two parietal barriers, 1st tall, blade-like, ascends rapidly, halfway down the parietal wall, 2nd blade-like, very low, crenulated, ascends gradually, 3/4th down the parietal wall; two palatal barriers, 1st basal, low, deeply recessed, rounded, ascends gradually, 2nd sub-peripheral, low, ascends gradually, callous-like, present in young shells. Palatal barrier height order 1st, 2nd.

Remarks: A second callous-like palatal barrier was noted sub-peripherally in small specimens (ANSP 58141 and 108375). Like congeners *Solemius alani* and *S. stellulus*, *S. luctiferus* appears to re-absorb palatal barrier(s) after maturation.



Fig. 228. *Solemius luctiferus*, 5.6 mm, ANSP 58137, LECTOTYPE, Sandwich (Hawaiian) Islands (Molokai).

Etymology: Unknown.

Solemius luctiferus Lectotype

Shell diameter: 5.6 mm

Shell height: 2.45 mm, 43.8% of shell diameter

Spire protrusion: 0.2 mm, 8.2% of shell height

Aperture height: 1.9 mm, 90.5% of aperture width

Aperture width: 2.1 mm

Rib count: 61

Riblets per rib interspace: 5

Number of whorls: 5.5

Umbilicus diameter: 1.8 mm, 32.1% of shell diameter

Late juvenile whorl descension: 1°

Body whorl descension: 2.7°

Solemius alani n. sp.
(Figs. 229, 414–416)

Type material: Holotype ANSP 386206; one paratype (ANSP 501771: 1); both leg. O. Oswald, Apr 9, 1938.

Type locality: As described by Oswald; southerly along trail, beginning of ravine 3, Gowen Trail, Pohakea Pass, 21°26'N, 158°06'W, Waianae District, Oahu.

Other material studied: 43 specimens from Oahu: Waianae District, Pohakea Pass, leg. O. Oswald, Apr 2, 1938 (ANSP 386198: 4, ANSP 386205: 1), leg. O. Oswald, Apr 15, 1938 (ANSP 386223: 11), leg. O. Oswald, Apr 17, 1938 (ANSP 386241: 1, ANSP 386244: 1, ANSP 386238: 9), leg. O. Oswald, May 15, 1938 (ANSP 386251: 12), southerly, ravine 12, mile post 14, Gowen Trail, Pohakea Pass, leg. O. Oswald, May 15, 1938 (ANSP 503409 ex 383583: 2), southerly, ravine 11, mile post 13.5, Gowen Trail, Pohakea Pass, leg. O. Oswald, May 1, 1938 (ANSP 383581A: 2).

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 35% of shell diameter; axial rib count 52; palatal barrier height order 1st, 2nd, 3rd.

Description: Color: flammulated. Shell: depressed, slightly expanded laterally; diameter 5.7 mm; 4.5 whorls; apex sunken; spire protrusion 7.7% of shell height; shell height 45.6% of diameter; peristome thin, slightly reflected basally; raised shoulder; apical suture crenulated, shallow; aperture reniform, slightly constricted supra-peripherally, slightly obstructed; aperture height equal to width; umbilicus 35% of shell diameter, moderately constricted decoiling late juvenile whorl descension 2.5°, body whorl descension 4.5°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace approximately equal to axial rib width, late juvenile rib interspace Two times axial rib width, body rib interspace irregular, two to three times axial rib width; axial rib count 52; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, of an even height, crenate, 2nd low, thin, crenate, ascending gradually; three palatal barriers, 1st basal, tall, crescentic, peaked, recessed, ascends rapidly, 2nd sub-peripheral, low, evenly thickened, marginally crescentic, recessed, ascends gradually; 3rd supra-peripheral, greatly reduced, callous-like, recessed. Palatal barrier height order 1st, 2nd, 3rd.



Fig. 229. *Solemius alani*, 5.7 mm, ANSP 386206, HOLOTYPE, Oahu, Pohakea Pass.

Comparison: *Solemius alani* is distinguished from *S. webbi* (both Oahu endemic) by having shell height 45.6% of shell diameter (vs. 42.5% in *S. webbi*); spire protrusion 7.6% of shell height (vs. no spire protrusion); height and width of aperture equal (vs. height 93.3% of width); axial rib count 52 (vs. 51); riblet counts per axial rib interspace 3 (vs. 5); umbilicus 35% of shell diameter (vs. 36.6%); body whorl descension 4.5° (vs. 2.8°).

Remarks: *Solemius alani* has basal, sub-peripheral, and supra-peripheral palatal barriers when young. As the shell grows, the sub-peripheral and the supra-peripheral barriers are reduced with the supra-peripheral barrier eventually vanishing in large specimens, typifying the genus.

Etymology: Named to honor Alan Solem (1931–1990) who inspired this revision.

***Solemius alani* Holotype**

Shell diameter: 5.7 mm

Shell height: 2.6 mm, 45.6% of shell diameter

Spire protrusion: 0.2 mm, 7.7% of shell height

Aperture height: 2.0 mm, equal to aperture width

Rib count: 52

Riblets per rib interspace: 3

Number of whorls: 4.5

Umbilicus diameter: 2.0 mm, 35% of shell diameter

Late juvenile whorl descension: 2.5°

Body whorl descension: 4.5°

***Solemius bindiae* n. sp.**

(Fig. 230)

Type material: Holotype ANSP 130556, ex coll. BPBM.

Type locality: Manoa, Kona District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 35.1% of shell diameter; axial rib count 48; palatal barrier height order 1st, 3rd, 2nd.

Description: Color: flammulated. Shell: depressed, slightly expanded laterally; diameter 3.7 mm; 4.5 whorls; apex sunken; spire protrusion, none; shell height 37.8% of diameter; peristome evenly thickened, slightly reflected basally; high shoulder; apical suture crenulated, shallow; aperture semi lunate, slightly expanded peripherally, sulcate supra-peripherally, marginally obstructed; aperture height 92.6% of width; umbilicus 35.1% of shell diameter, openly decoiling; late juvenile whorl descension less than 0.0°, body whorl descension 2.4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile whorls rib interspace two times axial rib width, body rib interspace irregular, two to 3.5 times axial rib width, axial rib count 48; three riblets per rib interspace prior to alteration, sulcate. Barriers: two parietal barriers, 1st tall, ascends rapidly, extended toward the 2nd palatal barrier, 2nd low, ascends gradually, extended

toward the 1st palatal barrier; three palatal barriers, 1st basal, tall, marginally crescentic, recessed, ascends rapidly, 2nd sub-peripheral, low, crescentic, recessed, ascends rapidly, 3rd supra-peripheral, tall, thin, marginally crescentic, recessed, ascends gradually. Palatal barrier height order 1st, 3rd, 2nd.



Fig. 230. *Solemius bindiae*, 3.7 mm, ANSP 130556, HOLOTYPE, Oahu, Manoa.

Etymology: Named for a calico cat named Bindi Lou, affectionately nick named “The Covid Kitty” as she greeted all walkers on her street during the Covid-19 pandemic lockdown wanting only to be pet.

***Solemius bindiae* Holotype**

Shell diameter: 3.7 mm
 Shell height: 1.4 mm, 37.8% of shell diameter
 Spire protrusion: none
 Aperture height: 1.25 mm, 92.6% of aperture width
 Aperture width: 1.35 mm
 Rib count: 48
 Riblets per rib interspace: 3
 Number of whorls: 4.5
 Umbilicus diameter: 1.3 mm, 35.1% of shell diameter
 Late juvenile whorl descension: 0°
 Body whorl descension: 2.4°

***Solemius delphineae* n. sp.**
 (Figs. 231, 417)

Type material: Holotype ANSP 47901; 11 paratypes (ANSP 501772: 11); all leg. D. Thaanum, Jul 1908.

Type locality: Konahuanui, Koolau Mts. Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated dorsally with light tan spirals ventrally; shell depressed; umbilicus width 27.1% of shell diameter; axial rib count 57; palatal barrier height order 1st, 2nd, 3rd.

Description: Color: flammulated dorsally, light tan spirals ventrally. Shell: sub depressed, slightly expanded laterally; diameter 7.0 mm; 4.75 whorls; apex sunken; spire protrusion 11.1% of shell height; shell height 38.6% of diameter; peristome uniformly thin slightly reflected basally; low shoulder; apical suture crenulated, canaliculate; aperture lunate, expanded peripherally, concave supra-peripherally, marginally obstructed; aperture height 81.6% of width; umbilicus 27.1% of shell diameter, constricted decoiling; late juvenile whorl descension less than 0.6°, body whorl descension 4°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two times axial rib width, body rib interspace irregular, three to five times axial rib width, axial rib count 57; seven riblets per rib interspace prior to alteration, sulcate, fine spiral cords. Barriers: two parietal barriers, 1st tall, extended toward the 2nd palatal barrier, 2nd low, thread-like, slightly crenate, ascends gradually, extended toward the 1st palatal barrier; three palatal barriers, 1st basal, tall, ascends rapidly, plateaus, marginally crescentic, recessed, 2nd sub-peripheral, low, marginally crescentic, thin, ascends gradually, 3rd supra-peripheral, low, thin, marginally crescentic, ascends gradually. Palatal barrier height order 1st, 2nd, 3rd.



Fig. 231. *Solemius delphineae*, 7.0 mm, ANSP 47901, HOLOTYPE, Oahu, Konahuanui.

Comparison: *Solemius delphineae* is distinguished from *S. stellulus* (both Oahu endemics) by having a shell height 38.6% of shell diameter (vs. 38.1% in *S. stellulus*); spire protrusion 11.1% of shell height (vs. no spire protrusion); aperture height 81.6% of aperture width (vs. 92.9%); axial rib count 57 (vs. 25); riblets in axial rib interspaces 7 (vs. 5); umbilicus diameter 27.1% of shell diameter (vs.

34.5%); body whorl descension 4° (vs. 2°); shell with a shallow sulcus highlighting the evenly spaced axial ribs and creating a fine crenulated periphery (vs. shell exaggerated peripherally with large, rounded crenulations a result of thickened axial ribs in *S. stellulus*).

Etymology: Named for Delphine Olivier of Paris, daughter of Dominique Olivier and mother of Camille Hassan.

Solemius delphineae Holotype

Shell diameter: 7.0 mm

Shell height: 2.7 mm, 38.6% of shell diameter

Spire protrusion: 0.3 mm, 11.1% of shell height

Aperture height: 2.3 mm, 81.6% of aperture width

Aperture width: 2.82 mm

Rib count: 57

Riblets per rib interspace: 7

Number of whorls: 4.75

Umbilicus diameter: 1.9 mm, 27.1% of shell diameter

Late juvenile whorl descension: 0.6°

Body whorl descension: 4°

Solemius kaneohe n. sp.

(Fig. 232)

Type material: Holotype ANSP 327534; two paratypes (ANSP 501773: 2); all leg. C.M. Cooke & Neal, Jul 30, 1921.

Type locality: Moku O Loe (Coconut Island), Kaneohe Bay, Koolau-poko District, Oahu.

Status and Distribution: Pleistocene fossil. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 33.3% of shell diameter; axial rib count 44; palatal barrier height order, tall to low: 1st, 2nd, 3rd.

Description: Color: flammulated. Shell: depressed, slightly expanded laterally; diameter 3.0 mm; 4.25 whorls; apex sunken; spire protrusion 1.7% of shell height; shell height 40% of diameter; peristome thin, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture lunate, expanded peripherally, flattened supra-peripherally, moderately obstructed; aperture height 90.9% of width; umbilicus 33.3% of the shell diameter, openly decoiling; late juvenile whorl descension is 0° , body whorl descension 2.5° . Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equals axial ribs width, late juvenile whorls rib interspace two times axial ribs width, body whorl rib interspace irregular, four to five times axial ribs

width; axial rib count 44; two riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, blade-like, ascends rapidly, extended between the 2nd and 3rd palatal barriers, 2nd low, marginally crescentic, ascends gradually, extended toward the 1st palatal barriers; three palatal barriers, 1st basal, tall, crescentic, evenly thickened, ascends rapidly, 2nd sub-peripheral, low, crescentic, ascends gradually, 3rd supra-peripheral, low, blade-like, recessed, ascends gradually. Palatal barrier height order 1st, 2nd, 3rd.



Fig. 232. *Solemius kaneohe*, 3.0 mm, ANSP 327534, HOLOTYPE, Oahu, Moku O Loe (Coconut Island) in Kaneohe Bay.

Etymology: Named for Kaneohe Bay, Oahu.

Solemius kaneohe Holotype

Shell diameter: 3.0 mm

Shell height: 1.2 mm, 40% of shell diameter

Spire protrusion: 0.02 mm, 1.7% of shell height

Aperture height: 1.0 mm, 90.9% of aperture width

Aperture width: 1.1 mm

Rib count: 44

Riblets per rib interspace: 2

Number of whorls: 4.25

Umbilicus diameter: 1.0 mm, 33.3% of shell diameter

Late juvenile whorl descension: 0°

Body whorl descension: 2.5°

Solemius palolo n. sp.

(Figs. 233, 418)

Type material: Holotype ANSP 386188, leg. O. Oswald.

Type locality: As described by Oswald; right, $21^\circ 18' N$, $157^\circ 48' W$, Palolo, Kona District, Oahu.

Other material studied: Five specimens from Oahu: Kona District, Palolo, leg. O. Oswald (ANSP 379627: 1, ANSP 386189: 4).

Status and Distribution: Extant. Presumed extinct. Known only from Palolo, Kona District, Oahu.

Diagnosis: Color pattern flammulated; shell sub-discoidal; umbilicus width 36.5% of shell diameter; axial rib count 53; palatal barrier height order 1st, 2nd, 3rd.

Description: Color: flammulated. Shell: sub-discoidal, slightly expanded laterally; diameter 4.1 mm; 4.25 whorls; apex planar; spire protrusion 8.1% of shell height; shell height 45.1% of diameter; peristome evenly thickened, basally reflected; raised shoulder; apical suture crenulated, shallow; aperture lunate, rounded basally, flattened supra-peripherally, moderately obstructed, aperture height equal to width; umbilicus 36.5% of the shell diameter, openly decoiling; late juvenile whorl descension 2.7°, body whorl descension 6°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.6 times axial rib width, late juvenile whorls rib interspace three times axial rib width, body whorl rib interspace irregular, three to four times axial rib width; axial rib count 53; three riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st tall, thin, slightly crescentic, ascends rapidly, extended toward the 2nd palatal barrier, 2nd low, thick, ascends gradually, extended toward the 1st palatal barriers; three palatal barriers, 1st basal, tall, slightly crescentic, evenly thickened, ascends rapidly, 2nd sub-peripheral, low, slightly crescentic, recessed, ascends gradually, 3rd supra-peripheral, recessed, callous-like. Palatal barrier height order 1st, 2nd, 3rd.



Fig. 233. *Solemnius palolo*, 4.1 mm, ANSP 386188, HOLOTYPE, Oahu, Palolo.

Etymology: Named for the type locality.

Remarks: Most specimens have a greatly reduced, callous-like 3rd palatal supra-peripherally, though some do not.

Solemnius palolo Holotype

Shell diameter: 4.1 mm

Shell height: 1.85 mm, 45.1% of shell diameter

Spire protrusion: 0.15 mm, 8.1% of shell height

Aperture height: 1.4 mm, equal to aperture width

Rib count: 53

Riblets per rib interspace: 3

Number of whorls: 4.25

Umbilicus diameter: 1.5 mm, 36.5% of shell diameter

Late juvenile whorl descension: 2.7°

Body whorl descension: 6°

Solemnius stellulus (Gould, 1844)

(Figs. 234, 419, 420)

Helix stellula A. Gould, 1844: 174 — unaccepted > superseded combination.

Cookeconcha stellula (A. Gould, 1844) — Solem, 1976: 217-218.

Type material: Holotype MCZ 169383 [*sensu* Solem, 1976: 218], ex coll. A. A. Gould; two paratypes (FMNH 155099: 2).

Type locality: Sandwich (Hawaiian) Islands. Oahu (according to Gould, 1852: 57).

Other material studied: Three specimens from Oahu, Kona District, Palolo, ex coll. O. Oswald (ANSP 384350: 2, ANSP 386435: 1).

Status and Distribution: Extant. Presumed extinct. Certainly known from Palolo, Oahu; questionably present on Maui (see Remarks).

Diagnosis: Color pattern of alternating areas of brown and cream; shell depressed; umbilicus width 34.5% of shell diameter; axial rib count 25; palatal barrier height order 1st, 2nd, 3rd.

Redescription: Color: alternating areas of brown and cream. Shell: depressed, slightly expanded laterally, carinate, sulcate, robust radial ribs crescentic at the periphery of the body whorl; diameter 4.2 mm; 4.5 whorls; apex sunken, spire protrusion none, shell height 38% of diameter; peristome thin, basally reflected; flat shoulder; apical suture crenulated, shallow; aperture lunate, compressed peripherally, concave supra-peripherally, minimally obstructed; aperture width 92.9% of height; umbilicus 34.5% of shell diameter, openly decoiling; late juvenile whorl descension 0°, body whorl descension 2°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace equal to axial rib width, late juvenile whorls rib interspace two times axial rib width,

body whorl rib interspace irregular, one to 1.5 times axial rib width; axial rib count 25; five riblets per rib interspace prior to alteration. Barriers: two parietal barriers equidistant on parietal wall, 1st tall, blade-like, ascends rapidly, extended toward the periphery, 2nd low, thread-like, crenulated, ascends gradually; three palatal barriers, 1st basal, slightly elevated, recessed, 2nd sub-peripheral, an opaque scar or raised callous, 3rd an opaque scar or raised callous when present. Palatal barrier height order 1st, 2nd, 3rd.



Fig. 234. *Solemnius stellulus*, 4.2 mm, MCZ 169383, HOLOTYPE, Sandwich (Hawaiian) Islands (Oahu).

Comparison: See species account for *Solemnius delphineae* for comparison.

Remarks: The palatal barriers of *Solemnius stellulus* are difficult to see and may vary in number with the loss of one or both peripheral barriers as the shell ages. Gould (1844) attributed this species to the Sandwich Islands and later to Maui (Gould, 1852: 57). Solem (1976: 217–218) also reported the holotype (MCZ 169383) and two paratypes (FMNH 155099: 2) as coming from Maui with another Maui specimen at The Natural History Museum, London (NHMUK 42.2.21.63). I have never seen *S. stellulus* on Maui in the past 49 years. However, O. Oswald collected 2 lots (ANSP 384350: 2, ANSP 386435: 1) of *S. stellulus* from Palolo Valley on Oahu. This calls into question the occurrence of *S. stellulus* on Maui.

Etymology: Presumably the exaggerated periphery was reminiscent of star light in a night sky.

***Solemnius stellulus* Holotype**

Shell diameter: 4.2 mm
 Shell height: 1.6 mm, 38.1% of shell diameter
 Spire protrusion: none
 Aperture height: 1.3 mm, 92.9% of aperture width
 Aperture width: 1.4 mm
 Rib count: 25

Riblets per rib interspace: 5
 Number of whorls: 4.5
 Umbilicus diameter: 1.45 mm, 34.5% of shell diameter
 Late juvenile whorl descension: 0°
 Body whorl descension: 2°

***Solemnius webbi* n. sp.**
 (Fig. 235)

Type material: Holotype ANSP 130570; one paratype (ANSP 501774: 1); both ex coll. BPBM.

Type locality: Helemano, Wahiawa District, Oahu.

Status and Distribution: Extant. Presumed extinct. Known only from the type locality.

Diagnosis: Color pattern flammulated; shell depressed; umbilicus width 36.6% of shell diameter; axial rib count 51.

Description: Color: flammulated. Shell: depressed, slightly expanded laterally; diameter 6.0 mm; 4.5 whorls; apex sunken; spire protrusion, none; shell height 42.5% of diameter; peristome evenly thickened, thin, slightly reflected basally; raised shoulder; apical suture crenulated, impressed; aperture lunate, slightly flattened supra-peripherally, unobstructed; aperture height 93.3% of width; umbilicus 36.6% of shell diameter, openly decoiling; late juvenile whorl descension 1°, body whorl descension 2.8°. Sculpture: embryonic sculpture absent; early juvenile whorls rib interspace 1.5 times axial rib width, late juvenile rib interspace two times axial rib width, body rib interspace irregular, two to 3.5 times axial rib width; axial rib count 51; five riblets per rib interspace prior to alteration. Barriers: two parietal barriers, 1st low, crenulate, ascends gradually, 2nd diminutive, thread-like, crenulate; one palatal barrier, basal, low, crescentic, recessed, ascends gradually.



Fig. 235. *Solemnius webbi*, 6.0 mm, ANSP 130570, HOLOTYPE, Oahu, Helemano.

Comparison: See species account for *Solemius alani* for comparison.

Remarks: *Solemius webbi* has the 1st palatal barrier diagnostic of the genus. Other palatal barriers may be gone, or be found as residual callous. No indications of other palatals were observed in either specimen, though they may be present in sub-adult shells.

Etymology: Named to honor Kevin Webb, an excellent photographer of often small and fragile specimens at The Natural History Museum, London who's help and talent were invaluable on this project.

***Solemius webbi* Holotype**

Shell diameter: 6.0 mm

Shell height: 2.55 mm, 42.5% of shell diameter

Spire protrusion: none

Aperture height: 2.1 mm, 93.3% of aperture width

Aperture width: 2.25 mm

Rib count: 51

Riblets per rib interspace: 5

Number of whorls: 4.5

Umbilicus diameter: 2.2 mm, 36.6% of shell diameter

Late juvenile whorl descension: 1°

Body whorl descension: 2.8°

DISCUSSION

Hundreds, if not a thousand endemic *Tornatellides macromphala* (Ancey, 1904) appear on the tile of the walkway around my house on some rainy days and crunch under my bare feet as I walk. The house was built in a pasture in 1972, and I suspect they were thriving in the talus, scrub, and grass in the gulch on the side of the property and gradually moved up to the house. It has been 35 years now and they still come out during the rain to spite the introduced ants and predatory snails.

Ground-dwelling *Lyropupa* Pilsbry, 1900 were also collected off rocks in dry areas during the rain. Because of the numbers of specimens of some species of Endodontidae, I suspect they too were similarly abundant during the rain. It is possible those populations living in inhospitable areas in isolation may still exist in relatively large numbers only appearing during the rain.

The first people to arrive in Hawaii may have been annoyed by the snails rather than fascinated simply because of the number of individuals in some populations. The gradual clearing of the land would have eventually brought that to an end. The arrival of predatory ants and snails hastened the native fauna's demise. Considering the diversity of the Hawaiian Endodontidae it is likely there

are still unknown populations, possibly of undescribed species, in specific habitats yet to be found.

New Classifications.—During this revision, thousands of specimens were examined, and morphological patterns became evident among species leading to the grouping of species into a surprising number of genera, and those genera into two subfamilies, one having likely been derived from an ancestral species of a genus of the other.

Previously, the genus *Cookeconcha* Solem, 1976 was broadly defined with many exceptions to account for the characteristics of the 18 original species included. However, Solem (1976: 210) was aware of a greater relationship between the species of *Cookeconcha* when he wrote "Anatomically, the species show differences that in other areas taken, together with conchological data, to indicate generic level separation." By chance, the species Solem originally assigned to *Cookeconcha* represented seven genera, six of which are described in this work.

Species removed from the genus *Cookeconcha*.—Eighteen species with rounded apertures and fine radial ribs from the genus *Endodonta* Albers, 1850 were initially placed in *Cookeconcha* by Solem (1976). A year later *Cookeconcha antiqua* Solem, 1977 from Midway was added. From those 19 original species, I have removed two species, *Cookeconcha elisae* (Ancey, 1889) and *Cookeconcha subpacific* (Ladd, 1958) as described below.

Ancey's (1889) original description and Solem's (1976) brief redescription of *Cookeconcha elisae* match BPBM 18807 and the drawing of *Patula timandra* Hutton, 1883 (see pl. 24, figs. 22 & 23 in Pilsbry, 1892). The arrangement of the palatal barriers does not fall into any of the genera of this revision, nor are there any similar Hawaiian specimens among the thousands examined. Based on these observations, I agree with Caum (1928: 65) that *Cookeconcha elisae* is not a Hawaiian species.

The only specimen of *Cookeconcha subpacific* (Ladd, 1958), USNM 562090, a fossil from Bikini Atoll in the Marshall Islands, could not be located for this revision. However, Ladd's drawing (Ladd, 1958: pl. 30, figs. 7 & 8) illustrates the slight lateral compressing of the body whorl and fine axial ribs as well as a lateral view of the two parietal barriers. Miss Margaret Anne Moran's sketch beautifully illustrates the two damaged parietal barriers as the palatal wall was missing, and she had a clear lateral view. She could not though give any hint of the post palatal region which is obstructed by cemented sand (Solem, 1976: 212).

Following a lengthy discussion in which Solem (1976) compares the similarities of species *C. subpacific*

to the genera *Minidonta* Solem, 1976 and *Cookeconcha*, he admits it may or may not be a *Cookeconcha*. With one damaged specimen with two damaged parietal barriers and no palatal barriers, Solem was left with only the exterior shell of which he writes "Only in lateral compression of the body whorl and rib spacing does *C. subpacific*a more closely resemble *Minidonta* (Solem, 1976: 212)."

Ladd (1958) considered *Cookeconcha subpacific*a to be a lower Miocene (approximately 23 to 16 Ma) species making it millions of years older than the Late Pleistocene (approximately 129,000 to 11,700 years ago) fossil of *Christensenius antiquus* and *Protoendodonta laddi* sampled from Midway. Any association with Hawaiian species must be considered ancestral; however, there are features of *C. subpacific*a similar to species of *Liliiliconcha* such as the size, presence of two parietal barriers, post embryonic radial rib spacing, and slight compression of the body whorl. It is unfortunate the palatal barriers are lost in the holotype of *C. subpacific*a. This single specimen is unique, certainly an ancestral endodontid, but its generic assignment remains unclear.

Hawaiian Endodontids.—The two subfamilies of Endodontidae recognized here, Endodontinae and Nesophilinae, and all of their constituent taxa are considered endemic to the Hawaiian Islands. This includes the nesophilin genus *Cookeconcha* if one agrees that *C. subpacific*a (Ladd, 1958), from the Bikini Atoll, is not a proper member of this genus (see above). The genera of Hawaiian endodontids are determined by the characteristic shape of the shell, periphery expanded in Endodontinae vs. rounded in Nesophilinae, and the number and configuration of the barriers in their constituent species. The palatal barriers tend to be highly developed in species of Endodontinae vs. reduced in Nesophilinae, except in the genus *Christensenius*. For example, the five primary palatal barrier configuration seen in the late Pleistocene fossil *Christensenius antiquus* (Solem, 1977), consisting of a 1st palatal on the columella, 2nd, 3rd, and 4th sub-peripheral, and 5th supra-peripheral, is not present in any other genus of Nesophilinae but is present in all Endodontinae species at some point during growth. In the Endodontinae, though not in the Nesophilinae genus *Christensenius*, these primary barriers are frequently accompanied by sub-palatal barriers between the 1st and 2nd, 2nd and 3rd, and 3rd and 4th primary barriers in addition to peripheral plica, a barrier type not observed in Nesophilinae. Except *Christensenius*, no other Nesophilinae taxa have a five primary palatal barrier configuration as seen in Endodontinae. These observations allow for a hypothesis that genera of Endodontinae evolved from a species of the Nesophilinae genus *Christensenius*.

Specimens of the Nesophilinae genus *Solemius* lose barriers as the shell matures while other Nesophilinae genera have lost all their palatal barriers and in the extreme case of the genus *Nesophila* retained only residual parietal and no palatal barriers. Among Nesophilinae, palatal barriers are absent in 43 species in three genera representing 36.4% of species in the subfamily. The loss of the barriers maybe associated with the presence of absence of predators.

The additional barriers in Endodontinae and the loss of barriers in Nesophilinae suggest the habitats of the two subfamilies were quite different. Nesophilinae species have been found off the ground on stumps and logs (Pilsbry and Vanatta, 1906: 783) and mossy tree trunks (Solem, 1976: 62), while Endodontinae species which tend to gain palatal barriers are found on the ground under leaf litter, twigs (Pilsbry and Vanatta, 1906: 783) and talus on slopes (Cooke, 1928: 14). The loss of the barriers maybe associated with the presence or absence of predators in such habitats. For example, if the elevated Nesophilinae habitat reduced the threat of predation, it could have significantly reduced the selective value of the palatal barriers. In contrast, the ground and leaf litter dwelling Endodontinae had evolved generally larger, laterally expanded shells with plicae in the narrow peripheral void of the keel and sub-palatal barriers in some species, supporting the idea of co-existence with a formidable predator.

Species and Habitat.—On Apr 16, 1982, I was searching for the arboreal achatinellid species *Perdicella thwingi* (Pilsbry and Cooke, 1914) in the geriatric forest of Auwahi on Ulupalakua Ranch, walking from one lone stand of trees to another over a lava covered with Kikuyu grass, *Cenchrus clandestinus* (Hochst. ex Chiv.) Morrone, with my dog Mayor. At the end of the day, as I turned the jeep around to start down, I noticed a small pitfall cave just off the road.

When I climbed down into the cave, I found bird bones so fresh in appearance that they looked like leftovers from a cowboy's lunch but unlike any I had ever seen. The distinctive tarsometatarsus, golf-ball diameter cranium and massive toothed rostrum of a moa-nalo, *Thambetochen chauliodous* Olson and Wetmore, 1976, littered the cave floor among the gracile bones and elegantly long curved rostrum of *Apteribis brevis* Olson and James, 1991, both flightless, among thousands of cream-colored land snail shells on black soil appearing to glow in the light of the entrance. This was Auwahi Cave, the first of five spectacular pitfall caves I was to locate in search of fossils. Each was unique and breathtaking. Olson and James (1991: 37) commented: "The considerable amount of material of *Thambetochen* from the dunes of Molokai

pales by comparison with the hundreds of beautifully preserved bones that are now available from the lava tubes of Maui.” This comment could easily be attributed to the preservation of the land snail shells of those caves.

Concave walled pitfall caves were certainly a death trap for flightless birds, but unlike the birds that could not climb out, the land snails could have but apparently not all. The number of shells and the range of their development, from juveniles to adults in all species, suggest they were not all accidental victims like the birds, but rather many lived and died in the talus and leaf litter of the cave floor perhaps being ingested by the trapped birds, as some appear to have been gastroliths.

Evolution and Extinction.—The ground-dwelling snail fauna experienced far greater extinction than the arboreal species while coastal agriculture was being established. With the introduction of cattle, sheep, goats, and horses, the fern understory of the fringe forest which sheltered many molluscan species was slowly destroyed. The trees on the edge of the forest which had been defended during storms were then exposed, and the shallow root systems and their height caused them to topple in the wind (pers. obs.). Slowly the forest was pushed back by grazing, pasture expansion, and decimation of the leeward native forest to an average elevation of 1828.8 m on Haleakala and the Big Island. Similar scenarios played out on Lanai, Molokai, Oahu, Kauai, and Kahoolawe. Kahoolawe was completely denuded leaving almost no fossil record of its terrestrial fauna. These islands lost their lowland and fringe forest, and if they did not have sufficient elevation, they also lost much of their Koa Forest. The ground dwelling Hawaiian snail species gradually, almost imperceptibly, became rare or extinct initially due to habitat loss.

The Puu Naio Extinctions.—The Endodontidae of Hawaii have evolved in isolation for millions of years, radiating into many times the number of species and genera proposed here, and on islands long ago smoothed by erosion, submerged by subsidence, and rinsed clean by repeated rising and lowering of sea levels.

Extinction has certainly been part of the fortune of this dynamic family in Hawaii, but as each island drifted to the west and eventually became a bank or a seamount there was always another island to the east to extend their range and offer millions of years of refuge. The oldest islands of the windward group are Kauai at 4 million years with 51 species and Oahu at 3 million years with 78 species of Endodontidae. Though the islands are approximately the same size, the older Kauai appears to have passed its speciation prime while on Oahu, the state of erosion and potential for isolation encouraged greater speciation. Unsurprisingly, Hawaii the youngest island at 300,000

years, has the least with only 12 of the 183 known species.

Though the Hawaiian Island chain is believed to be 65 million years old, there is no evidence of endemic Endodontidae beyond 28-million-year-old Midway which is less than half the proposed age of the archipelago. Considering there are 183 species represented from a maximum time span of 4 million years, it is easy to imagine the many hundreds of unaccounted for species that may have existed during the 24 million years between the formations of Midway and Kauai.

Three extinct genera are monospecific and each geographically restricted to a single island, *Protoendodonta* collected from a bore on Midway, *Nihoaia* from the small isolated Nihoa, and *Gageia* from Kauai, the youngest of the surviving Northwest Hawaiian Islands, each no doubt a relic of a genus with a larger species base.

Three extant though presumed extinct species provide rare evidence of endodontid dispersal between islands. *Randallius fisheri* is known from three islands: Oahu (Haleiwa, Waialua District), Molokai (Moomomi, Koolau Moku), and Maui (Wailuku District and above Makuleia Bay, Lahaina District). *Liiliiconcha johnstameri* is known from the same three islands: Laie, Kaaawa, Kawailoa, Kahuku, Lualalei and Malaekahana, Oahu; Makolelau, Molokai; Puu Naio Cave, Lua Lepo Cave and Waiehu Golf Course: Maui. *Cookeconcha davidpickelli* is known from two of those three islands: Kalamaula, Molokai, and Honokawai Valley, Maui.

The fossil evidence I am aware of demonstrates the existence of nearly two hundred species on the main islands during the past 100,000 years, while a multitude of unknown species left no fossil record over millions of years in the now largely subsided leeward Hawaiian Islands. The scale of the current extinction is not unprecedented for this family, but unlike past localized extinctions on now submerged islands, this extinction is all-encompassing as there is no longer predator-free habitat in the island chain.

With the ground-dwelling endemic snail fauna decimated in the last century, fossils gathered from four localized pitfall caves (Puu Naio, Puu Makua, Auwahi and Lua Lepo) on Maui of differing elevations and ages offered a unique and remarkably detailed view of the families, their genera and species, and the ranges and habitats of much of that missing fauna. Encouraged by Helen James and Storrs Olson, I cataloged the fossil land snails from the Maui caves and report my findings below. Helen surprised me with bags of dated strata going back approximately 8,000 years from the sediment of Puu Naio Cave which she had meticulously separated. This was an invaluable resource for the study of Endodontidae as previous fossils were collected from Late Pleistocene deposits in sand dunes as well as recent dead specimens

found on the surface. Comparatively few specimens were collected alive and, except for Oswald's effort, rarely had decent collecting data.

Olson and James (1991: 15) described the Puu Naio Cave accordingly: "Fossils occurred at the surface in both the upslope and downslope portions of the tube, and more importantly, in deep, finely stratified sediments that washed into the upslope portion of the cave. Radiocarbon dates of purified collagen from bones indicated that fossil deposition in these sediments took place continuously from approximately 8,000 yrs. ago to the present (James et al., 1987)."

In most situations, the problem of working with fossil snail specimens is you can never really be sure from where they washed in (because they are buoyant) or why they collected in a single place. Pitfall caves, often occurring on hilltops where the lava ceiling is thinnest, are less likely to have water flowing in other than runoff from rain in the immediate vicinity. Thus, it is likely the accumulated snails were living near the cave entrance or within the vegetation and talus below the collapse.

Pitfall caves are geographic points and forests are constantly moving, evolving, maturing, and degrading over and around that point. The cave records their composition and presence by an increase or decline in detritus and specimens deposited in subsequent layers below the open cave ceiling. In Honuaula and Auwahi ahupua'a there are several pitfall caves preserving a record of their snail communities. Their relative proximity and elevations are a remarkably comparable coincidence.

Portions of the snail community recorded in the stratigraphy of Puu Naio Cave at 392.9 m, had an expansive range extending roughly 27.2 km, from the cave across the face of Haleakala to the Piihola Forest Reserve at 792.5 m, and no doubt beyond into the Koolau Forest Reserve before deforestation interrupted the continuous forest corridor connecting them. A number of arboreal Achatinellidae, including several species of Pacificellinae, Tornatellinae, and Tornatellinae, and a few arboreal species of Vertiginidae are recorded as fossils at Puu Naio, and can still be found alive at higher elevations in Auwahi and Honuaula and are especially numerous in the Makawao Forest Reserve. The surviving fauna of the Piihola Forest Reserve is surprisingly like the fossil and extant species found in Auwahi Cave at 1219.2 m, Puu Makua Cave at 1524 m, and in the stratigraphy of Lua Lepo Cave at 825.1 m. For example, Piihola supports the last population of the extant *Partulina dubiosa* (C.B. Adams, 1851) which is also known from fossils in Auwahi Cave and Lua Lepo Cave.

Throughout the Puu Naio Cave stratigraphy, a total of eight species of Endodontidae were recorded with multiple specimens of each except for a single specimen of *Hobdya*

marieae. This single specimen argues strongly for the existence of unrecorded endodontid species in the vicinity of Puu Naio Cave. In higher elevation deposits roughly 6.8 km away, seven of those eight endodontid species were found in surface deposits in pitfall caves along with an additional seven endodontid species not recorded at Puu Naio Cave. Two of those species from Puu Makua Cave were scarce, *Randallius jimfienei* (six specimens) and *Endodonta rugata* (four). I have little doubt the fossils of other species may be found in Puu Makua Cave.

In Puu Naio Cave, with its dated stratigraphy divided into four separate units (I–IV), the number of specimens and the number of species of each family per unit shows that the habitat around the cave entrance changed dramatically over time.

Unit IV, the oldest unit, spans roughly 3,000 years beginning at the cave's creation approximately 8,000 ago. Unit IV contained over 2,978 specimens in eight families, Achatinellidae (308 specimens), Amastridae (551), Endodontidae (431), Euconulidae (47), Gastrodontidae (19), Helicinidae (495), Succineidae (49) and Vertiginidae (601). Unit IV is subdivided into six layers in order of their age, F being the oldest; F, E, D, C, B, and A.

Layer F had 1,011 specimens in five families, Achatinellidae (192 specimens), Gastrodontidae (19), Helicinidae (495), Succineidae (49) and Vertiginidae (282). Amastridae did not occur in the F layer of Unit IV.

Layer E had 408 specimens in four families, Achatinellidae (109 specimens), and the first records of Endodontidae (247), Euconulidae (47), and Amastridae (5). Gastrodontidae, Helicinidae, Succineidae, and Vertiginidae were now gone and do not reoccur at Puu Naio. Four families disappeared before Endodontidae or Euconulidae appeared at about the same time, suggesting that they preferred a habitat not previously available at the cave.

Layer D had 150 specimens of Endodontidae. This layer added one genus and two more species, and was the richest accumulation of endodontid specimens in any layer with five genera and seven of the eight species known from Puu Naio Cave. Curiously, no other families were recorded from Layer D.

Layer C had 240 specimens of three families, Achatinellidae (7), Amastridae (199) and Endodontidae (34). Only two species of Endodontidae were present. Unit IV-C is the last record of Endodontidae and Euconulidae at Puu Naio Cave.

Layers B and A had 241 and 108 specimens of Amastridae respectively, indicating to me the habitat was a dry fringe forest area of ferns and low shrubs. There were no Achatinellidae or any other families represented in either of these layers.

Unit III begins just prior to a thin black ash layer indicating volcanic activity nearby. It spanned about 4000 years and contained 735 specimens in just two families, Achatinellidae (393 specimens) and Amastridae (342). This is consistent with a more developed fringe forest of fern ground cover and scattered trees such as that observed by the author on Mt. Helu in West Maui where the achatinellid species *Partulina induta kaaeana* Baldwin, 1906, *Perdicella ornata* (Newcomb, 1854), and *Auriculella uniplicata* Pease, 1868 were found on scattered trees and the amastrid species *Amastra goniops* (Pilsbry and Cooke, 1914) and *Amastra lahainana* (Pilsbry and Cooke, 1914) were found in the leaf litter beneath the fern ground cover.

Unit II had 72 specimens of Achatinellidae, and Unit I had 56 specimens of Achatinellidae. Amastridae were gone from both units indicating the fern understory was probably gone as well. Polynesians are known to have been present during Unit II and Unit I due to the presence of gecko bones in the strata. Of the eight families and their species known from the stratigraphy of Puu Naio Cave, only two species of Achatinellidae, both unidentified *Tornatellides* (*Tornatellides*) were found in the oldest layer and youngest layers of Puu Naio Cave. The habitat surrounding the cave entrance was never set, always fluid, and favored Achatinellidae and to some extent Amastridae.

Considering the time needed to degrade the lava flow that produced Puu Naio Cave, and the climate changes occurring 8,000 ago, the extensive habitat needed to support the snail community had developed and climaxed by Unit IV-F(3). A gradual decline of families and specimens indicating degradation of subsequent habitat begins after IV-F(3) and continued to the present.

The decline of specimens continued at a relatively even pace until Unit III when black ash appears in the strata indicating local volcanic activity. Volcanism caused a precipitous decline in species and specimens beginning about 4,000 ago. A second black ash layer approximately 1,000 YBP coincidentally ended at the first evidence of the arrival of Polynesians, marking the decline and subsequent extinction of the snail community at Puu Naio Cave.

As stated, some species of the fossil deposit indicated the habitat surrounding Puu Naio Cave was primarily fringe forest. As the climate warmed, the environment created by the fringe forest gradually crept to higher elevations, following the forest and eventually reached Lua Lepo Cave at 825.1 m. Specimens of *Partulina dubiosa* confirmed the existence of fringe forest at Lua Lepo and Auwahi caves, and *Partulina grisea* (Newcomb, 1854) in Unit IV(F-1) confirmed fringe forest at Puu Naio Cave. Also, Lua Lepo Cave included seven of the eight endodontid species from Puu Naio Cave.

A comparison of the endodontids recorded at Puu Naio Cave to those of the three upper caves shows they were more successful at Lua Lepo Cave than at either the Auwahi or Puu Makua. The fossil record preserves 10 species of endodontids in Lua Lepo Cave including three species not found at Puu Naio Cave. Other than endodontids, the specimens recovered from these upper cave sites represented a large percentage of the species recorded from Unit IV-F(3) at Puu Naio Cave, suggesting the snail community remained reasonably intact as it moved to higher elevations.

Auwahi Cave is one mile from Lua Lepo and 380.1 m higher. The six endodontid species from Auwahi added one more endodontid species. Puu Makua Cave, 2.4 km from Auwahi, held 11 endodontid species and added three more, bringing the total number of species of endodontids in a 2.4 km-long corridor to a remarkable 14 species (15 if the unique specimen of *H. marieae* from Puu Naio Cave is included). It is just conjecture, but it might be that the many species in that 2.4 km-long corridor between Lua Lepo Cave and Puu Makua Cave fell within the acceptable ranges of both low and high-elevation species.

This occurrence of so many species may not have been unique, but with no other geographically spaced fossil deposits with such remarkable preservation, I doubt it will be seen again in Hawaii. Unfortunately, none of those cave-deposited species are known to have survived the first few decades of the 20th Century.

Accelerated Extinction.—The Camaenidae genus *Amphidromus* Albers, 1850 of Southeast Asia secretes its eggs into a folded leaf with the eggs exposed at either end hardening to protect those within. When embryonic shells or eggs of Endodontidae are preserved in museum specimens, two or three appear to fill the brood chamber where they would have been exposed to desiccation. On a few of the ANSP specimens collected live, there is an unusual skin-like residue on the walls of the umbilical opening. Perhaps such endodontids used layers of dried mucous to protect eggs from desiccation in the open umbilicus. Predation of eggs in the umbilicus would have been more difficult if they had been covered, leading one to question if predation was more common on juvenile snails rather than eggs. Predation on juveniles and adults would place far too much pressure on ill-prepared endodontid species with low fecundity and exceptionally small young.

In the early 1980's, I explored Auwahi Cave and several other pitfall caves along the lower east rift of Haleakala on Ulupalakua Ranch. Few endemic snail species remained. Exceptions were *Succinea apicalis* Ancey, 1889, and a few small achatinellid species

such as *Tornatellides macroptychia* (Ancey, 1903), *T. subangulatus* (Ancey, 1903) and *T. frit* Pilsbry & Cooke, 1915 found living on the bark and leaves of a few scattered native trees. *Tornatellides procerulus* (Ancey, 1903) and *Lamellidea polygnampta* Pilsbry & Cooke, 1915 were still common in 2012 and found wrapped tightly in the coiled dead leaves of the Halepepe *Dracaena rockii* laying on the grass where they fell; few other living native snails were found. These species tend to shelter in narrow places provided by twisted leaves, moss and rock cracks, or live off the ground on the leaves of trees. As a result, these species are probably rare prey for the generally larger, ground dwelling *Oxychilus alliarius* (J. S. Miller, 1822) which is still prevalent in the grass and leaf litter of the area.

The arrival and establishment of *Oxychilus alliarius* in Hawaii went largely unnoticed until Cooke & Baker (1947). They reported *O. alliarius* from “Three localities on the island of Hawaii...all between 792.5 m. and 1935.5 m elevation and...widely spaced. The second and third findings are between 64 km and 80 km from the first, and between 56 km and 64 km from each other” (Cooke & Baker, 1947:). They also cited E. C. Zimmerman’s 1945 record at 1828.8 m, Puu Lu’au, Maui. However, Puu Lu’au is higher, and the 1828.8 m is probably the elevation of a camp, Ukulele Camp, in the pasture at the edge of the forest below Puu Lu’au. There are three interesting records from the island of Hawaii: at Kilauea, about 4 km from Volcano House (on the Hilo side) near summer cottages at 1219.2 m (D. Walker, 1945 and 1946). Many of these cottages still exist and are constructed primarily of imported redwood. Two records of *Oxychilus alliarius* are from Yoshi Kondo, 1946: the first at Ahualea (Honokoa District, east of Waimea) at 792.5 m, “in an open paddock, with no nearby habitations” (Kondo, 1946). The circular foundation of a redwood water tank is still near a small reservoir in pasture above the last houses bordering the remnant forest. No doubt the road to the reservoir was useful to reach the forest, suggesting this was Kondo’s collecting area. The second record was from Puulaalaa, on the south slope of Hualalai, at 1935.5 m, “about 15 m from an apple and plume orchard” (Kondo, 1946). The orchard surely had a water tank and support buildings such as a bunkhouse constructed of hardy redwood due to its remote location.

The locations and elevation of numerous redwood water tanks are indicated throughout the pastoral lands of Maui on the USGS quadrant maps from the 1950’s (Bob Hobdy, pers. comm. Apr 16, 2023). These pastoral lands usually went up to 1828.8 m and the locations of the water tanks correspond well with the distribution of *Oxychilus alliarius*.

If *Oxychilus alliarius* commonly dispersed on lumber (John Peak, pers. comm. 1982) and redwood lumber was the preferred building material in Hawaii in the 1880’s (Bob Hobdy, pers. comm. Apr 16, 2023), then contaminated lumber shipped to Hawaii and trucked to remote pastures and large agricultural properties could have been the vector. This would explain why *Oxychilus alliarius* was initially overlooked and the wide spacing of early records.

On May 2nd, 1981, in an area approximately 6 m x 1.2 m, I collected 16 shells of two species of amastrids, *Amastra goniops* Pilsbry and Cooke, 1914 (MS 6185) and *Amastra lahainana* Pilsbry and Cooke, 1914 (MS 6385), in the leaf litter beneath thick uluhe fern on a central ridge of Mt. Helu at about 1158.2 m. There were several live *Oxychilus alliarius* in the collecting area, one of which was busily attacking the empty shell of an *A. goniops*, presumably for the calcium. Three large succinid shells of two species and one dead tornatellinid were previously collected on March 18, 1981 (unpublished data, Hike #15).

In May 1982, Cameron Kepler returned to Auwahi Cave at the invitation of the Smithsonian Institution Division of Birds to help collect the bones of extinct birds. He recognized *Oxychilus alliarius* as the species of empty shells he had seen in drifts on the banks of a stream while cataloging native birds in the Koolau Forest of Maui. Later that year, thousands of shells of *O. alliarius* were found by the author in a small cavity-like cave with a smooth earthen floor created by sheet-wash above Auwahi Cave at 1280.2 m (Severns, 1984). In a single random sample, 1,545 shells of two species of endodontids, *Endodonta paulineae* n. sp. (806 specimens) and *Christensenius virginiae* n. gen., n. sp. (739 specimens) were collected with hundreds of *O. alliarius* shells.

Introduced ants have certainly caused damage to the populations of Endodontidae in Hawaii as they did on other Pacific islands, and may have drove many species to extinction (Solem, 1976: 101). In my experience, however, nothing had as an immediate effect on all the ground dwelling species of snails in Hawaii as the establishment of populations of the predatory snail *Oxychilus alliarius* throughout the islands, likely through the local and remote transport of lumber.

The fossil record of snails in the pitfall caves mentioned in this revision are a chronological history of expansion and extinction of suitable habitat due to geological and ecological factors from the present to 8,000 years ago.

GLOSSARY

Conchological terms used in the descriptions.

Color

- flammules (flamculated) – informal radiating color pattern of creams and brown
- countershaded – darker apically, light dorsally
- patches – disconnected markings seen in juvenile whorls

Shell shape

- helmet-like
- turbate
- sub-turbinate
- supra peripherally compressed
- discoidal
- sub-discoidal
- sub-globose
- planorboid
- depressed
- lenticulate
- trochoid
- angled peripherally

Shell growth changes

- embryonic juncture – embryonic to early juvenile – beginning of regular sculpture
- transition – early juvenile to late juvenile – sculpture and spacing enlarge but remain regular
- alteration – late juvenile to body – maturity, axial ribs, riblets and spacing become irregular
- gerontic – crowded ribs – increased descent slows or constricts decoiling of the umbilicus

Shell sculpture

- axial ribs
- obliquely ribbed
- rib interspace
- interstitial striae
- riblets
- spiral cords
- spiral striae
- decussate
- obversely decussate
- carinate
- keeled
- sulcus
- sulcate
- marginally sulcate
- shouldered

Apex

- obtuse
- sunken
- planar
- sub-planar
- raised

Spire

- plano convex
- conoid
- sub-conoid

Suture

- crenulated – scalloped
- canaliculate – canal like
- impressed – deep suture, like a fold
- moderately impressed
- minimally impressed
- margined – raised ridge, often crenulated on the apical side to the suture

Aperture regions

- columellar
- basal
- sub-peripheral
- peripheral
- supra-peripheral
- shoulder

Aperture shapes

- unobstructed
- obstructed
- moderately obstructed
- reniform
- sub-reniform
- lunate
- oblique rhomboid
- rhomboid
- sub-rhomboid
- rounded peripherally
- laterally expanded

Umbilical

- obversely conical
- umbilical suture
- decoiling regularly
- decoiling rapidly
- constricted
- open

Barrier characters

- lissome – thin, graceful
- thread-like – very thin, low
- bifid or bifidity – a longitudinal cleft of the barrier
- crescentic – swollen crest of the barrier
- crenate – resting on intersecting axial ribs
- blade-like – thin, strait, not crescentic

Palatal barriers

- strengthen the leading edge and obstruct the aperture
- located between the umbilical and apical sutures
- numbered from the umbilical to the apical suture
- primary palatal barriers – barriers of the palatal regions that are a constant diagnostic feature
- sub-palatal – located between basal primary palatal barriers
- peripheral plicae – found only in the laterally expanded periphery of Endodontinae (considered folds rather than barriers by Pilsbry and Vanatta, 1905)
- palatal barrier height order is numerical descending from the number one

Parietal barriers

- located between the apical and umbilical sutures defining the parietal callous
- numbered from the apical to the umbilical suture
- sutural parietal barriers one or two, usually diminutive or callous-like
- apical parietal barrier – located between the first parietal barrier and the apical suture
- umbilical parietal barrier – located between the second parietal barrier and the umbilical suture

Order of description

- color pattern
- apex
- spire
- apical and umbilical sutures impressed, etc.
- angle of insertion of apical suture at the peristome
- sculpture of the teleconch ribs, spiral striae, alteration
- aperture or peristome shape
- umbilicus
- measurements: diameter, shell height, spire height, rib count, aperture width and height, umbilicus width/ratio after Pfeiffer, approximate percentage of shell diameter

Collection abbreviations

ANSP: Academy of Natural Sciences of Philadelphia, Pennsylvania, USA.
 BPBM: Bernice Pauahi Bishop Museum, Honolulu, Hawaii, USA.
 FMNH: The Field Museum of Natural History, Chicago, Illinois, USA.

MCZ: Museum of Comparative Zoology, Boston, Massachusetts, USA.

MS: private collection of author, Maui.

NHMUK: The Natural History Museum, London, England, United Kingdom.

SMNS: Stuttgart State Museum of Natural History (Staatliches Museum für Naturkunde Stuttgart), Germany.

USNM: United States National Museum of Natural History, Smithsonian Institution, Washington, District of Columbia, USA.

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Table 2. Distributional checklist of Endodontidae in the Hawaiian Islands. EPE = Extant. Presumed Extinct. H† = Holocene fossil. P† = Pleistocene fossil. HA = Hawaii, MA = Maui, KAH = Kahoolawe, LA = Lanai, MO = Molokai, OH = Oahu, KA = Kauai, NII = Niihau, NIH = Nihau, MW = Midway.

SUBFAMILY	HA	MA	KAH	LA	MO	OH	KA	NII	NIH	MW	Page Numbers
Genus											
Genus species											
ENDODONTINAE Pilsbry, 1895											5
<i>Endodonta</i> Albers, 1850											6
<i>Endodonta concentrata</i> Pilsbry & Vanatta, 1906				EPE*							10
<i>Endodonta kaiholena</i> n. sp.				EPE*							11
<i>Endodonta koele</i> n. sp.				EPE*							11–12
<i>Endodonta helenae</i> n. sp.		EPE*									9–10
<i>Endodonta lihauensis</i> n. sp.		EPE*									8
<i>Endodonta paulinae</i> n. sp.		EPE*									8–9, 201
<i>Endodonta kamehameha</i> Pilsbry & Vanatta, 1906					EPE*						12
<i>Endodonta kawela</i> n. sp.					EPE*						13, 201
<i>Endodonta brevis</i> n. sp.						EPE*					13–14, 201
<i>Endodonta discus</i> n. sp.						EPE*					14
<i>Endodonta elegantula</i> n. sp.						EPE*					15
<i>Endodonta fricki</i> (Pfeiffer, 1858)						EPE*					15–16, 202
<i>Endodonta galea</i> n. sp.						EPE*					16–17, 202
<i>Endodonta kahukuensis</i> n. sp.						EPE*					17–18, 202
<i>Endodonta kaluanui</i> n. sp.						EPE*					18
<i>Endodonta kawaihapaiensis</i> n. sp.						EPE*					19
<i>Endodonta kawaiiloaensis</i> n. sp.						EPE*					19–20, 202
<i>Endodonta laie</i> n. sp.						EPE*					20, 203
<i>Endodonta lamellosa</i> (A. Férussac, 1825)						EPE*					20–21, 203
<i>Endodonta lualualei</i> n. sp.						EPE*					21–23, 203–204
<i>Endodonta makaua</i> n. sp.						EPE*					23, 204
<i>Endodonta manoa</i> n. sp.						EPE*					23–24, 204
<i>Endodonta marsupialis</i> Pilsbry and Vanatta, 1906						EPE*					24–25, 205
<i>Endodonta nikiae</i> n. sp.						EPE*					25–26, 205
<i>Endodonta quasidiscus</i> n. sp.						EPE*					26
<i>Endodonta skeeteri</i> n. sp.						EPE*					26–27
<i>Endodonta ui</i> n. sp.						EPE*					27–28
<i>Endodonta waimano</i> n. sp.						EPE*					28
<i>Endodonta waimanoensis</i> n. sp.						EPE*					28–29
<i>Helenia</i> n. gen.											30
<i>Helenia apiculata</i> (Ancey, 1889)							EPE*				43–44
<i>Helenia binaria</i> (Pfeiffer, 1856)							EPE*				44–45
<i>Helenia ellae</i> n. sp.							EPE*				45–46, 208
<i>Helenia laminata</i> (Pease, 1866)							EPE*				46, 209
<i>Helenia turbo</i> n. sp.							EPE*				47
<i>Helenia moo</i> n. sp.					EPE*						32, 205
<i>Helenia niuhauensis</i> n. sp.								EPE*			47–48
<i>Helenia annae</i> n. sp.						EPE*					32–33, 205
<i>Helenia davisii</i> n. sp.						EPE*					33–34, 206
<i>Helenia ekahanuiensis</i> Solem, 1976						EPE*					34–35
<i>Helenia kalaaloana</i> (Christensen, 1982)						EPE*					35–36, 206
<i>Helenia kobei</i> n. sp.						EPE*					36, 206

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SUBFAMILY	HA	MA	KAH	LA	MO	OH	KA	NII	NIH	MW	Page Numbers
Genus											
Genus species											
ENDODONTINAE Pilsbry, 1895 (continued)											
<i>Helenia</i> (continued)											
<i>Helenia makai</i> n. sp.						H†*					37, 207
<i>Helenia mayori</i> n. sp.						EPE*					37–38, 207
<i>Helenia nanakuli</i> n. sp.						EPE*					38–39, 207
<i>Helenia noe</i> n. sp.						EPE*					39, 207
<i>Helenia puowaina</i> n. sp.						EPE*					40, 208
<i>Helenia ruthae</i> n. sp.						EPE*					40–41, 208
<i>Helenia satyae</i> n. sp.						EPE*					41–42, 208
<i>Helenia waianae</i> n. sp.						EPE*					42–43, 208
<i>Helenia walkeri</i> n. sp.						EPE*					43
<i>Kobeia</i> n. gen.											49
<i>Kobeia amandae</i> n. sp.	EPE*										51
<i>Kobeia arnemanni</i> n. sp.	EPE*										51–52, 209
<i>Kobeia gigantea</i> n. sp.	EPE*										52–53
<i>Kobeia rugata</i> (Pease, 1866)		EPE*									53, 209
<i>Kobeia kamaloensis</i> n. sp.					EPE*						53–54
<i>Kobeia nandiae</i> n. sp.					EPE*						54–55, 209–210
<i>Kobeia ohikilolo</i> n. sp.						EPE*					55
<i>Kobeia striata</i> n. sp.						EPE*					56, 210
<i>Nihoia</i> n. gen.											57
<i>Nihoia christenseni</i> Slapcinsky et al., 2020									Extant*		58
<i>Protoendodonta</i> Solem, 1977											59
<i>Protoendodonta laddi</i> Solem, 1977										P†*	60
<i>Richlingia</i> n. gen.											61
<i>Richlingia aweoweo</i> n. sp.							EPE*				63–64, 210
<i>Richlingia nounouensis</i> n. sp.							EPE*				64, 211
<i>Richlingia richlingae</i> n. sp.							EPE*				65, 211
<i>Richlingia oahuensis</i> n. sp.						EPE*					62–63, 210
<i>Starmeria</i> n. gen.											66
<i>Starmeria pagoda</i> n. sp.							EPE*				68, 211
<i>Starmeria conica</i> n. sp.							EPE*				67–68, 211
NESOPHILINAE n. subfamily											69
<i>Christensenius</i> n. gen.											69
<i>Christensenius nudus</i> (Ancey, 1899)	EPE*										71
<i>Christensenius anneelisae</i> n. sp.							H†*				79–80
<i>Christensenius aweowonuiensis</i> n. sp.							P†*				80, 213
<i>Christensenius discus</i> n. sp.							H†*				80–81
<i>Christensenius dominiquei</i> n. sp.							H†*				81–82, 213
<i>Christensenius etelelae</i> n. sp.							P†*				82–83
<i>Christensenius gallichanae</i> n. sp.							EPE*				83
<i>Christensenius jameyi</i> n. sp.							EPE*				84
<i>Christensenius koloaensis</i> n. sp.							H†*				84–85, 213
<i>Christensenius regis</i> n. sp.							EPE*				85–86, 214

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SUBFAMILY	HA	MA	KAH	LA	MO	OH	KA	NII	NIH	MW	Page Numbers
Genus											
Genus species											
NESOPHILINAE (continued)											
Christensenius (continued)											
<i>Christensenius jackrandalli</i> n. sp.		H†*									71–72, 211–212
<i>Christensenius virginiae</i> n. sp.		EPE*									72–73, 212
<i>Christensenius antiquus</i> (Solem, 1977)										P†*	86–87
<i>Christensenius boucheti</i> n. sp.						EPE*					73–74, 212
<i>Christensenius cookei</i> (Cockerell, 1933)						EPE*					74–75, 213
<i>Christensenius helenjamesae</i> n. sp.						H†*					75–76
<i>Christensenius houarti</i> n. sp.						H†*					76, 213
<i>Christensenius intercarinatus</i> (Mighels, 1845)						EPE*					76–77
<i>Christensenius makaleha</i> n. sp.						EPE*					78
<i>Christensenius moanalua</i> n. sp.						H†*					78–79
Cookeconcha Solem, 1976											88
<i>Cookeconcha angelmaloneae</i> n. sp.	EPE*										90
<i>Cookeconcha paucilamellata</i> (Ancey, 1904)	H†*										90–91, 214
<i>Cookeconcha thaunumi</i> (Pilsbry and Vanatta, 1905)	EPE*										91–92, 214
<i>Cookeconcha gageorum</i> n. sp.							H†*				98–99, 216
<i>Cookeconcha lindseygrovei</i> n. sp.							H†*				99–100
<i>Cookeconcha paucicostata</i> (Pease, 1871)							EPE*				100, 216–217
<i>Cookeconcha sumneri</i> n. sp.		H†*									92–93, 215
<i>Cookeconcha baldingeri</i> n. sp.					EPE*						93–94
<i>Cookeconcha davidpickelli</i> n. sp.		EPE*			EPE*						93
<i>Cookeconcha ginnyae</i> n. sp.					EPE*						94–95, 215
<i>Cookeconcha salisburyi</i> n. sp.					EPE*						95, 215
<i>Cookeconcha andersoni</i> n. sp.						EPE*					95–96
<i>Cookeconcha maureenae</i> n. sp.						EPE*					96–97, 216
<i>Cookeconcha mokuleiaensis</i> n. sp.						EPE*					97
<i>Cookeconcha hystrix</i> (Pfeiffer, 1846)						EPE*					97–98, 216
Gageia n. gen.											101
<i>Gageia polihale</i> n. sp.							H†*				102–103, 217
Hobdya n. gen.											104
<i>Hobdya thwingi</i> (Ancey, 1904)	H†*										106, 217
<i>Hobdya elizabethae</i> n. sp.							H†*				112–113
<i>Hobdya wickerae</i> n. sp.							EPE*				113, 218–219
<i>Hobdya marieae</i> n. sp.		H†*									106–107
<i>Hobdya momolieri</i> n. sp.		H†*									107–108, 217–218
<i>Hobdya doreenae</i> n. sp.						H†*					108–109
<i>Hobdya leahi</i> n. sp.						H†*					109–110, 218
<i>Hobdya mollieae</i> n. sp.						H†*					110
<i>Hobdya nanakuliensis</i> n. sp.						H†*					110–111
<i>Hobdya paloloensis</i> n. sp.						H†*					111–112
Liliiliconcha n. gen.											114
<i>Liliiliconcha henshawi</i> (Ancey, 1904)	H†*										116, 219
<i>Liliiliconcha julianae</i> n. sp.	EPE*										116–117, 219

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SUBFAMILY	HA	MA	KAH	LA	MO	OH	KA	NII	NIH	MW	Page Numbers
Genus											
Genus species											
NESOPHILINAE (continued)											
<i>Liiliiconcha</i> (continued)											
<i>Liiliiconcha johnstameri</i> n. sp.		EPE*		EPE*	EPE*	EPE*					118–119, 220–221
<i>Liiliiconcha maui</i> n. sp.		EPE*									117–118, 219–220
<i>Liiliiconcha kamalo</i> n. sp.					EPE*						120
<i>Liiliiconcha rosenbergi</i> n. sp.					EPE*						120–121, 221
<i>Liiliiconcha adevae</i> n. sp.						EPE*					121–122, 221
<i>Liiliiconcha evae</i> n. sp.						EPE*					122
<i>Liiliiconcha oahu</i> n. sp.						H†*					122–123, 221
<i>Liiliiconcha waipahuensis</i> n. sp.						EPE*					123–124
<i>Nesophila</i> Pilsbry, 1893											125
<i>Nesophila capillata</i> Pease, 1866							EPE*				127, 221
<i>Nesophila distans</i> Pease, 1866							EPE*				127–128
<i>Nesophila prestonsutteri</i> n. sp.							H†*				128–129, 222
<i>Nesophila tiara</i> Mighels, 1845							EPE*				129
<i>Oswaldius</i> n. gen.											130
<i>Oswaldius hemmesi</i> n. sp.	EPE*										132, 222
<i>Oswaldius waikiiensis</i> n. sp.	H†*										132–133
<i>Oswaldius camilleae</i> n. sp.							EPE*				141
<i>Oswaldius compressus</i> n. sp.							H†*				141–142, 224–225
<i>Oswaldius coronatus</i> n. sp.							H†*				142–143, 225
<i>Oswaldius jugosus</i> (Mighels, 1845)							EPE*				143–144, 225
<i>Oswaldius pseudojugosus</i> n. sp.							EPE*				144, 225
<i>Oswaldius sandyageae</i> n. sp.							H†*				144–145
<i>Oswaldius sumo</i> n. sp.							H†*				145–146, 225
<i>Oswaldius tessellatus</i> n. sp.							H†*				146, 226
<i>Oswaldius turbinatus</i> n. sp.							EPE*				146–147
<i>Oswaldius waipiliensis</i> n. sp.							H†*				147–148, 226
<i>Oswaldius lanaiensis</i> (Sykes, 1896)				EPE*							135–136, 224
<i>Oswaldius hobdyi</i> n. sp.		EPE*									133–134, 222
<i>Oswaldius mayori</i> n. sp.		EPE*									134–135, 223
<i>Oswaldius olsoni</i> n. sp.		EPE*									135, 223
<i>Oswaldius alanae</i> n. sp.					H†*						136–137
<i>Oswaldius decussatus</i> (Pease, 1866)					H†*						137–138, 224
<i>Oswaldius luminaseres</i> n. sp.					EPE*						138
<i>Oswaldius makolelau</i> n. sp.					H†*						138–139
<i>Oswaldius molokaiensis</i> n. sp.					EPE*						139–140, 224
<i>Oswaldius craterensis</i> n. sp.						H†*					140
<i>Oswaldius exoticus</i> n. sp.						H†*					140–141
<i>Randallius</i> n. gen.											149
<i>Randallius robertae</i> n. sp.	H†*										151
<i>Randallius walkeri</i> n. sp.	H†*										151–152
<i>Randallius anceyi</i> n. sp.							EPE*				163–164, 228
<i>Randallius anomalous</i> n. sp.							EPE*				164

Table 2. Distributional checklist of Endodontidae in the Hawaiian Islands. EPE = Extant. Presumed Extinct. H† = Holocene fossil. P† = Pleistocene fossil. HA = Hawaii, MA = Maui, KAH = Kahoolawe, LA = Lanai, MO = Molokai, OH = Oahu, KA = Kauai, NII = Niihau, NIH = Nihau, MW = Midway.

SUBFAMILY	HA	MA	KAH	LA	MO	OH	KA	NII	NIH	MW	Page Numbers
Genus											
Genus species											
NESOPHILINAE (continued)											
Randallius (continued)											
<i>Randallius bennettiae</i> n. sp.							H†*				165, 229
<i>Randallius geigeri</i> n. sp.							H†*				165–166
<i>Randallius kondoi</i> n. sp.							H†*				166–167, 229
<i>Randallius peasei</i> n. sp.							EPE*				167–168, 229–230
<i>Randallius pfeifferi</i> n. sp.							EPE*				168
<i>Randallius sutteri</i> n. sp.							H†*				168–169
<i>Randallius vinceneae</i> n. sp.							EPE*				169–170, 230
<i>Randallius woodae</i> n. sp.							EPE*				170
<i>Randallius ringens</i> (Sykes, 1896)				EPE*							155–156, 228
<i>Randallius fisheri</i> n. sp.		H†*			H†*	H†*					154–155, 227
<i>Randallius jimfienei</i> n. sp.		H†*									152–153, 226
<i>Randallius paulineae</i> n. sp.		H†*									153–154, 226–227
<i>Randallius puumakua</i> n. sp.		H†*									154, 227
<i>Randallius callomoni</i> n. sp.					EPE*						156–157, 228
<i>Randallius abletti</i> n. sp.						H†*					157, 228
<i>Randallius albus</i> n. sp.						H†*					158
<i>Randallius crenulatus</i> n. sp.						EPE*					158–159, 228
<i>Randallius hauptmani</i> n. sp.						H†*					159–160
<i>Randallius hystricellus</i> (Pfeiffer, 1859a)						EPE					160–161
<i>Randallius intermedius</i> n. sp.						EPE*					161
<i>Randallius jacksoni</i> n. sp.						EPE*					162
<i>Randallius pupuiki</i> n. sp.						EPE*					162–163
Solemius n. gen.											171
<i>Solemius luctiferus</i> (Pilsbry & Vanatta, 1905)					EPE*						173, 230
<i>Solemius alani</i> n. sp.						EPE*					173–174, 230–231
<i>Solemius bindiae</i> n. sp.						EPE*					174–175
<i>Solemius delphineae</i> n. sp.						EPE*					175–176, 231
<i>Solemius kaneohe</i> n. sp.						EPE*					176
<i>Solemius palolo</i> n. sp.						EPE*					176–177, 231
<i>Solemius stellulus</i> (Gould, 1844)						EPE*					177–178, 231
<i>Solemius webbi</i> n. sp.						EPE*					178–179

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SUBFAMILY	Life Science Identifiers (LSIDs)	Page Numbers
Genus		
Genus species		
ENDODONTINAE Pilsbry, 1895	—	5
<i>Endodonta</i> Albers, 1850	—	6
<i>Endodonta concentrata</i> Pilsbry & Vanatta, 1906	—	10
<i>Endodonta kaiholena</i> n. sp.	urn:lsid:zoobank.org:act:9EC21C88-50D8-4B3A-981E-6958FEB91FD7	11
<i>Endodonta koele</i> n. sp.	urn:lsid:zoobank.org:act:BF23C470-53F2-4B40-BA8A-432CFAF77983	11–12
<i>Endodonta helenae</i> n. sp.	urn:lsid:zoobank.org:act:64BA192B-6DDD-417E-B1E4-0F3FC7FD8341	9–10
<i>Endodonta lihauensis</i> n. sp.	urn:lsid:zoobank.org:act:F0D32876-0398-43D5-9BEF-2DFAEAB2F5AD2	8
<i>Endodonta paulineae</i> n. sp.	urn:lsid:zoobank.org:act:706CB661-1DF4-40FA-A565-1C9B4904B107	8–9, 201
<i>Endodonta kamehameha</i> Pilsbry & Vanatta, 1906	—	12
<i>Endodonta kawela</i> n. sp.	urn:lsid:zoobank.org:act:DE43FCB0-CF4D-4E25-97D2-F2CC9F3D0F88	13, 201
<i>Endodonta brevis</i> n. sp.	urn:lsid:zoobank.org:act:15369A68-1173-4341-9DC0-481B34FCA600	13–14, 201
<i>Endodonta discus</i> n. sp.	urn:lsid:zoobank.org:act:B9B228AA-64C2-49ED-B358-147813A9DC7C	14
<i>Endodonta elegantula</i> n. sp.	urn:lsid:zoobank.org:act:39274798-C85F-4111-9305-E46EE71C14E3	15
<i>Endodonta fricki</i> (Pfeiffer, 1858)	—	15–16, 202
<i>Endodonta galea</i> n. sp.	urn:lsid:zoobank.org:act:0B0B76D0-8F67-484F-A206-09A2FDB84BAB	16–17, 202
<i>Endodonta kahukuensis</i> n. sp.	urn:lsid:zoobank.org:act:6182FBBB-EE26-4802-BDED-88BEE492BFF7	17–18, 202
<i>Endodonta kaluanui</i> n. sp.	urn:lsid:zoobank.org:act:0A5502A7-E4B5-4168-ACBE-3188051D5068	18
<i>Endodonta kawaihapaiensis</i> n. sp.	urn:lsid:zoobank.org:act:B66B4EE9-F7B4-4E55-8CD1-9B8663E3CC46	19
<i>Endodonta kawailoensis</i> n. sp.	urn:lsid:zoobank.org:act:358730FC-4AD5-4415-A4A6-AE0E18DCFDA8	19–20, 202
<i>Endodonta laie</i> n. sp.	urn:lsid:zoobank.org:act:DF0BF195-C7EC-4A7F-9D54-5BABCDD726188	20, 203
<i>Endodonta lamellosa</i> (A. Férussac, 1825)	—	20–21, 203
<i>Endodonta lualualei</i> n. sp.	urn:lsid:zoobank.org:act:28898ECC-5305-48F0-941C-2FAC9A7FA774	21–23, 203–204
<i>Endodonta makaua</i> n. sp.	urn:lsid:zoobank.org:act:E10C2455-A89F-4FB7-A253-E47FAB5E8E98	23, 204
<i>Endodonta manoa</i> n. sp.	urn:lsid:zoobank.org:act:48D9831A-D4BB-40CF-B714-A9EBAA1CBDF5	23–24, 204
<i>Endodonta marsupialis</i> Pilsbry and Vanatta, 1906	—	24–25, 205
<i>Endodonta nikiæ</i> n. sp.	urn:lsid:zoobank.org:act:3C7DE612-B2F1-4562-B33B-D37B18E702D5	25–26, 205
<i>Endodonta quasidiscus</i> n. sp.	urn:lsid:zoobank.org:act:A5D9B4C6-560D-4D82-9B81-AB296BE4195B	26
<i>Endodonta skeeteri</i> n. sp.	urn:lsid:zoobank.org:act:63EBC83D-C017-427C-986B-5A8E50B548C5	26–27
<i>Endodonta ui</i> n. sp.	urn:lsid:zoobank.org:act:DDAB3830-7A2A-47E4-AF70-36D91F9D004D	27–28
<i>Endodonta waimano</i> n. sp.	urn:lsid:zoobank.org:act:532859A0-C464-45CF-B853-5CAF0BDA417D	28
<i>Endodonta waimanoensis</i> n. sp.	urn:lsid:zoobank.org:act:C506CB19-E113-48EB-9849-4DEC12DB22F2	28–29
<i>Helenia</i> n. gen.	urn:lsid:zoobank.org:act:58750BB6-C650-4536-B984-7057DFF9E4FE	30
<i>Helenia apiculata</i> (Ancey, 1889)	—	43–44
<i>Helenia binaria</i> (Pfeiffer, 1856)	—	44–45
<i>Helenia ellæ</i> n. sp.	urn:lsid:zoobank.org:act:183B1AD2-8108-44AE-A77E-1CF863C7ED92	45–46, 208
<i>Helenia laminata</i> (Pease, 1866)	—	46, 209
<i>Helenia turbo</i> n. sp.	urn:lsid:zoobank.org:act:C219BA86-11FD-4968-842A-7E9DE8AC4ACD	47
<i>Helenia moo</i> n. sp.	urn:lsid:zoobank.org:act:8CA05A3A-2455-487D-978A-75AF731BACEA	32, 205
<i>Helenia niuhauensis</i> n. sp.	urn:lsid:zoobank.org:act:CEE72C92-4BA8-4185-A911-00DFB2303563	47–48
<i>Helenia annæ</i> n. sp.	urn:lsid:zoobank.org:act:1E40D479-A55C-4874-86A5-557599B4B42F	32–33, 205
<i>Helenia davisii</i> n. sp.	urn:lsid:zoobank.org:act:68915C14-B11D-4892-AAF2-A81B33424B5B	33–34, 206
<i>Helenia ekahanuiensis</i> Solem, 1976	—	34–35
<i>Helenia kalaeloana</i> (Christensen, 1982)	—	35–36, 206
<i>Helenia kobei</i> n. sp.	urn:lsid:zoobank.org:act:260CB31A-2897-46CE-B84C-44C7C1A5B01D	36, 206

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SUBFAMILY	Life Science Identifiers (LSIDs)	Page Numbers
Genus		
Genus species		
ENDODONTINAE Pilsbry, 1895 (continued)	—	
<i>Helenia</i> (continued)	—	
<i>Helenia makai</i> n. sp.	urn:lsid:zoobank.org:act:DDEA93E2-0F70-4E93-9EF8-3253FFC7038F	37, 207
<i>Helenia mayori</i> n. sp.	urn:lsid:zoobank.org:act:C71B1F2B-5141-4DAF-8F90-ED294EBA8620	37–38, 207
<i>Helenia nanakuli</i> n. sp.	urn:lsid:zoobank.org:act:4D1205D4-5921-41FB-80FD-922F300A9D83	38–39, 207
<i>Helenia noe</i> n. sp.	urn:lsid:zoobank.org:act:6A30474E-9EB0-44B8-94CC-7BE6A1C8C109	39, 207
<i>Helenia puowaina</i> n. sp.	urn:lsid:zoobank.org:act:E358FF07-0707-42F4-B8BE-A1ACA6B9E01F	40, 208
<i>Helenia ruthae</i> n. sp.	urn:lsid:zoobank.org:act:417B512B-3E54-4708-8ECA-3A77E5B346B9	40–41, 208
<i>Helenia satyae</i> n. sp.	urn:lsid:zoobank.org:act:DA347529-A4CB-4CE0-B148-AC2E54B455E5	41–42, 208
<i>Helenia waianae</i> n. sp.	urn:lsid:zoobank.org:act:F9D0CEC1-47FE-45E4-ADC5-C7586CB063A8	42–43, 208
<i>Helenia walkeri</i> n. sp.	urn:lsid:zoobank.org:act:1D597FC9-508B-4F25-AEBB-9B062A5F8672	43
<i>Kobeia</i> n. gen.	urn:lsid:zoobank.org:act:90620653-244A-40CE-9B78-0729B578C46A	49
<i>Kobeia amandae</i> n. sp.	urn:lsid:zoobank.org:act:595EF5C0-BD73-43D9-988B-8C660A62C433	51
<i>Kobeia arnemanni</i> n. sp.	urn:lsid:zoobank.org:act:BE1FD638-2A90-47B0-952A-EE9062B902DD	51–52, 209
<i>Kobeia gigantea</i> n. sp.	urn:lsid:zoobank.org:act:4B383584-356F-4BEB-89F1-9858C6C1AFD0	52–53
<i>Kobeia rugata</i> (Pease, 1866)	—	53, 209
<i>Kobeia kamaloensis</i> n. sp.	urn:lsid:zoobank.org:act:85019C4C-D0E5-43C2-BA96-C92842F77D2C	53–54
<i>Kobeia nandiae</i> n. sp.	urn:lsid:zoobank.org:act:40831B64-6B31-4DEE-9196-8BEEA8E53494	54–55, 209–210
<i>Kobeia ohikilolo</i> n. sp.	urn:lsid:zoobank.org:act:F490FB3B-255D-4D84-8FE7-3E619BB971BB	55
<i>Kobeia striata</i> n. sp.	urn:lsid:zoobank.org:act:990E9EE7-6C33-4704-A313-48CCE6F6F4F2	56, 210
<i>Nihoia</i> n. gen.	urn:lsid:zoobank.org:act:0E63E64B-BDC9-4943-9727-6A84C5B790CD	57
<i>Nihoia christenseni</i> Slapcinsky et al., 2020	—	58
<i>Protoendodonta</i> Solem, 1977	—	59
<i>Protoendodonta laddi</i> Solem, 1977	—	60
<i>Richlingia</i> n. gen.	urn:lsid:zoobank.org:act:65FD1D3F-4C88-4CAD-BB3E-924DFF4CCC79	61
<i>Richlingia aweoweo</i> n. sp.	urn:lsid:zoobank.org:act:9D7BC812-1CEA-4581-9936-4149CB9024A7	63–64, 210
<i>Richlingia nounouensis</i> n. sp.	urn:lsid:zoobank.org:act:9FB28F59-896D-4754-9005-E6CAD8CE15C9	64, 211
<i>Richlingia richlingae</i> n. sp.	urn:lsid:zoobank.org:act:6F4FC27C-B317-43C3-AA27-53F84AF64EA0	65, 211
<i>Richlingia oahuensis</i> n. sp.	urn:lsid:zoobank.org:act:FEAB2DCD-E0E2-4879-BAB2-327E92DAB724	62–63, 210
<i>Starmeria</i> n. gen.	urn:lsid:zoobank.org:act:8EF942D5-FF7D-4988-9849-2FBAE526F2A4	66
<i>Starmeria pagoda</i> n. sp.	urn:lsid:zoobank.org:act:E65ED4C5-5DA9-46C8-85F1-671E36DCFD94	68, 211
<i>Starmeria conica</i> n. sp.	urn:lsid:zoobank.org:act:5EFB4DE7-3BCB-4E19-BBA3-AEEA167FBC7D	67–68, 211
NESOPHILINAE n. subfamily	urn:lsid:zoobank.org:act:A7BAE246-7A10-4E67-86FD-01EC23D36957	69
<i>Christensenius</i> n. gen.	urn:lsid:zoobank.org:act:F0C88D74-22CB-406E-BAB8-88D5F1461FFB	69
<i>Christensenius nudus</i> (Ancey, 1899)	—	71
<i>Christensenius anneeliseae</i> n. sp.	urn:lsid:zoobank.org:act:A8CCE135-2BEC-498A-AA7F-740DFC941F25	79–80
<i>Christensenius aweoweonuiensis</i> n. sp.	urn:lsid:zoobank.org:act:B591FEEB-918F-4492-BFA1-5ECEFO423092	80, 213
<i>Christensenius discus</i> n. sp.	urn:lsid:zoobank.org:act:07AE6B81-F7D1-4F08-852A-1E7876BAC9F3	80–81
<i>Christensenius dominiquei</i> n. sp.	urn:lsid:zoobank.org:act:32FEB157-AA88-4433-AFF3-58F474E27014	81–82, 213
<i>Christensenius etelelae</i> n. sp.	urn:lsid:zoobank.org:act:5E07AA27-A831-41AB-B698-E93AFEE17EEB	82–83
<i>Christensenius gallichanae</i> n. sp.	urn:lsid:zoobank.org:act:961A43C9-9348-4752-89D8-416B240C5AE6	83
<i>Christensenius jameyi</i> n. sp.	urn:lsid:zoobank.org:act:1E7E0CFA-4AC5-477C-BEAD-CF4807E12DB2	84
<i>Christensenius koloaensis</i> n. sp.	urn:lsid:zoobank.org:act:D5FC9316-D9E0-4A55-A9B2-B0C0E08FF862	84–85, 213
<i>Christensenius regis</i> n. sp.	urn:lsid:zoobank.org:act:2858C07E-0678-4B66-8EA8-DBE62C0ED92A	85–86, 214

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SUBFAMILY	Life Science Identifiers (LSIDs)	Page Numbers
Genus		
Genus species		
NESOPHILINAE (continued)		
<i>Christensenius</i> (continued)		
<i>Christensenius jackrandalli</i> n. sp.	urn:lsid:zoobank.org:act:BE5FE5D4-0970-49A9-B237-65391B18847D	71–72, 211–212
<i>Christensenius virginiae</i> n. sp.	urn:lsid:zoobank.org:act:2CC29BDF-3C13-490E-95FB-9CBA5556EAC2	72–73, 212
<i>Christensenius antiquus</i> (Solem, 1977)	—	86–87
<i>Christensenius boucheti</i> n. sp.	urn:lsid:zoobank.org:act:A1E7DBFE-2FE8-46C6-B656-180098C1E8C6	73–74, 212
<i>Christensenius cookei</i> (Cockerell, 1933)	—	74–75, 213
<i>Christensenius helenjamesae</i> n. sp.	urn:lsid:zoobank.org:act:6DB199B6-1017-4A16-944B-8DB25182DD97	75–76
<i>Christensenius houarti</i> n. sp.	urn:lsid:zoobank.org:act:41271FC1-2D08-4213-92BA-20DC66D05164	76, 213
<i>Christensenius intercarinatus</i> (Mighels, 1845)	—	76–77
<i>Christensenius makaleha</i> n. sp.	urn:lsid:zoobank.org:act:02D16015-302C-4F63-A9CC-F0BDB63001CC	78
<i>Christensenius moanalua</i> n. sp.	urn:lsid:zoobank.org:act:9863AC8F-E858-44D2-8847-96B6A2A7B7D7	78–79
<i>Cookeconcha</i> Solem, 1976		88
<i>Cookeconcha angelmaloneae</i> n. sp.	urn:lsid:zoobank.org:act:2F4CC8AF-7E34-4F07-A60F-D0EB8194950C	90
<i>Cookeconcha paucilamellata</i> (Ancey, 1904)	—	90–91, 214
<i>Cookeconcha thanumi</i> (Pilsbry and Vanatta, 1905)	—	91–92, 214
<i>Cookeconcha gageorum</i> n. sp.	urn:lsid:zoobank.org:act:FD8D2132-9B2D-479C-A939-82656D35D9E6	98–99, 216
<i>Cookeconcha lindseygrovei</i> n. sp.	urn:lsid:zoobank.org:act:A03E084C-69AB-4AD5-9064-9809085DD917	99–100
<i>Cookeconcha paucicostata</i> (Pease, 1871)	—	100, 216–217
<i>Cookeconcha sumneri</i> n. sp.	urn:lsid:zoobank.org:act:8C4C922B-BBBA-4943-A6DE-EC24F1DE0E15	92–93, 215
<i>Cookeconcha baldingeri</i> n. sp.	urn:lsid:zoobank.org:act:A4A72F31-3982-4A55-9650-8B51A06FA0E4	93–94
<i>Cookeconcha davidpickelli</i> n. sp.	urn:lsid:zoobank.org:act:DBFC466A-158E-41E4-AE7B-6F5A0B564425	93
<i>Cookeconcha ginnyae</i> n. sp.	urn:lsid:zoobank.org:act:8EB91E50-0948-425A-B278-16F127D815E1	94–95, 215
<i>Cookeconcha salisburyi</i> n. sp.	urn:lsid:zoobank.org:act:14C11178-5D05-4F64-875F-646A8132436A	95, 215
<i>Cookeconcha andersoni</i> n. sp.	urn:lsid:zoobank.org:act:8DFF70A9-C928-40A5-9373-63D6092D4A43	95–96
<i>Cookeconcha maureenae</i> n. sp.	urn:lsid:zoobank.org:act:C6906E7F-5F05-44CD-9E9A-D00E7421908D	96–97, 216
<i>Cookeconcha mokuleiaensis</i> n. sp.	urn:lsid:zoobank.org:act:310FE77C-9002-4EE7-822C-87B329AF6BA5	97
<i>Cookeconcha hystrix</i> (Pfeiffer, 1846)	—	97–98, 216
<i>Gageia</i> n. gen.	urn:lsid:zoobank.org:act:9EF4CE8A-AFE1-4CEC-8291-B10F42FA8E15	101
<i>Gageia polihale</i> n. sp.	urn:lsid:zoobank.org:act:5B85A29C-00C5-4C85-A000-A2ABCFE57101	102–103, 217
<i>Hobdya</i> n. gen.	urn:lsid:zoobank.org:act:7DED3A5A-B960-462C-9F4A-B6D7534228EA	104
<i>Hobdya thwingi</i> (Ancey, 1904)	—	106, 217
<i>Hobdya elizabethae</i> n. sp.	urn:lsid:zoobank.org:act:585E13D2-1915-456F-B677-6DF21432BDD0	112–113
<i>Hobdya wickerae</i> n. sp.	urn:lsid:zoobank.org:act:895B4254-8959-4AEE-AB9F-25BC5E69A0CB	113, 218–219
<i>Hobdya marieae</i> n. sp.	urn:lsid:zoobank.org:act:0EA452C1-8347-4084-978B-08F0C1316AE6	106–107
<i>Hobdya momolieri</i> n. sp.	urn:lsid:zoobank.org:act:135B54D3-D9A0-4FA7-8AED-9BA7948B2DF6	107–108, 217–218
<i>Hobdya dorenae</i> n. sp.	urn:lsid:zoobank.org:act:27D71791-8F79-44BB-9D17-6FBF9A0B6B37	108–109
<i>Hobdya leahi</i> n. sp.	urn:lsid:zoobank.org:act:21A8B27B-B6F7-44D9-8E19-941B285887B	109–110, 218
<i>Hobdya mollieae</i> n. sp.	urn:lsid:zoobank.org:act:FEF82862-5556-4599-83C8-BB46DA945BED	110
<i>Hobdya nanakuliensis</i> n. sp.	urn:lsid:zoobank.org:act:3347546B-593F-4DEE-B548-A58A1D42A63B	110–111
<i>Hobdya paloloensis</i> n. sp.	urn:lsid:zoobank.org:act:4A7B7EB9-4621-405D-AF87-09214DF451A1	111–112
<i>Liliiliconcha</i> n. gen.	urn:lsid:zoobank.org:act:43CA0FAA-D236-4ABA-82CB-6714B755A790	114
<i>Liliiliconcha henshawii</i> (Ancey, 1904)	—	116, 219
<i>Liliiliconcha julianae</i> n. sp.	urn:lsid:zoobank.org:act:55736876-1668-456D-ADFE-3E752F4DFFC3	116–117, 219

Table 3. LSID codes for new taxa described in this publication as assigned in ZooBank, the official registry of the International Commission on Zoological Nomenclature (ICZN). LSID for entire publication (Severns, 2026) is: urn:lsid:zoobank.org:pub:76FD8197-E5D9-48BD-801C-621A5884623E

SUBFAMILY	Life Science Identifiers (LSIDs)	Page Numbers
Genus		
Genus species		
NESOPHILINAE (continued)	—	
<i>Liiliiliconcha</i> (continued)	—	
<i>Liiliiliconcha johnstameri</i> n. sp.	urn:lsid:zoobank.org:act:318600CD-C5C8-46D9-AF9B-CAB90728DB00	118–119, 220–221
<i>Liiliiliconcha maui</i> n. sp.	urn:lsid:zoobank.org:act:9E90764C-D386-4368-BC15-A3AB3DBD50D4	117–118, 219–220
<i>Liiliiliconcha kamalo</i> n. sp.	urn:lsid:zoobank.org:act:A2CB4C4F-6A82-40FE-91CB-DE39FDD448E0	120
<i>Liiliiliconcha rosenbergi</i> n. sp.	urn:lsid:zoobank.org:act:97CA2B2E-F12B-4363-9C98-36082BDC3105	120–121, 221
<i>Liiliiliconcha adevae</i> n. sp.	urn:lsid:zoobank.org:act:D40F16D8-9ED4-47BB-86F9-895742513ABA	121–122, 221
<i>Liiliiliconcha evae</i> n. sp.	urn:lsid:zoobank.org:act:B197227B-261F-40A9-9A46-18393C3DF6E4	122
<i>Liiliiliconcha oahu</i> n. sp.	urn:lsid:zoobank.org:act:ABAF3AB-DF81-4A93-AF48-A9E2D24DD02E	122–123, 221
<i>Liiliiliconcha waipahuensis</i> n. sp.	urn:lsid:zoobank.org:act:B1D70C02-700F-4843-89CB-B21152BBA228	123–124
<i>Nesophila</i> Pilsbry, 1893	—	125
<i>Nesophila capillata</i> Pease, 1866	—	127, 221
<i>Nesophila distans</i> Pease, 1866	—	127–128
<i>Nesophila prestonutteri</i> n. sp.	urn:lsid:zoobank.org:act:0E8ACABD-3CC7-44B0-BCD2-BC7BF344BB36	128–129, 222
<i>Nesophila tiara</i> Mighels, 1845	—	129
<i>Oswaldius</i> n. gen.	urn:lsid:zoobank.org:act:18CFD610-971C-4457-88FC-95D7E7913499	130
<i>Oswaldius hemmesi</i> n. sp.	urn:lsid:zoobank.org:act:E9ABFF46-1A07-4AC7-9836-90CD2FA84EBD	132, 222
<i>Oswaldius waikiensis</i> n. sp.	urn:lsid:zoobank.org:act:CFC7E088-5241-4432-A54B-37FD51BB6BFA	132–133
<i>Oswaldius camilleae</i> n. sp.	urn:lsid:zoobank.org:act:DFC1C03A-EA4F-4850-BACD-8E8B57F343F3	141
<i>Oswaldius compressus</i> n. sp.	urn:lsid:zoobank.org:act:32071B9D-1730-4B97-918B-D2556423B2E3	141–142, 224–225
<i>Oswaldius coronatus</i> n. sp.	urn:lsid:zoobank.org:act:A5C1E626-DA35-48A2-B022-B487AEC56D8E	142–143, 225
<i>Oswaldius jugosus</i> (Mighels, 1845)	—	143–144, 225
<i>Oswaldius pseudojugosus</i> n. sp.	urn:lsid:zoobank.org:act:2649BF2C-A49F-403B-9902-C86DB6292CD7	144, 225
<i>Oswaldius sandygagae</i> n. sp.	urn:lsid:zoobank.org:act:F0367B03-AD4F-42CA-88A7-AEF07014408A	144–145
<i>Oswaldius sumo</i> n. sp.	urn:lsid:zoobank.org:act:F2D8933B-C85A-449F-BC4E-C00E19FAE4AE	145–146, 225
<i>Oswaldius tessellatus</i> n. sp.	urn:lsid:zoobank.org:act:8F4DC708-91A6-4B57-913B-F9264087C445	146, 226
<i>Oswaldius turbinatus</i> n. sp.	urn:lsid:zoobank.org:act:588BB4D9-CABC-4182-9617-33A8EC8F79AF	146–147
<i>Oswaldius waipiliensis</i> n. sp.	urn:lsid:zoobank.org:act:0212E5DC-D2DC-4DF3-953F-DCB9EDF521DA	147–148, 226
<i>Oswaldius lanaiensis</i> (Sykes, 1896)	—	135–136, 224
<i>Oswaldius hobdyi</i> n. sp.	urn:lsid:zoobank.org:act:3A063A43-DE2E-45DC-9227-8E2FAA9277D6	133–134, 222
<i>Oswaldius mayori</i> n. sp.	urn:lsid:zoobank.org:act:2BA14C43-9916-4517-9D12-C93E493AE8DF	134–135, 223
<i>Oswaldius olsoni</i> n. sp.	urn:lsid:zoobank.org:act:5060CDFB-7010-4927-88E1-D376F238563B	135, 223
<i>Oswaldius alanae</i> n. sp.	urn:lsid:zoobank.org:act:ECF3E3B7-BFB1-42B7-897F-B2B814B93FDC	136–137
<i>Oswaldius decussatus</i> (Pease, 1866)	—	137–138, 224
<i>Oswaldius luminaseres</i> n. sp.	urn:lsid:zoobank.org:act:AB0E495D-B439-45DE-B15E-A8710C43DE52	138
<i>Oswaldius makolelau</i> n. sp.	urn:lsid:zoobank.org:act:CD408D69-37CF-4E10-87CF-8E5BE2129646	138–139
<i>Oswaldius molokaiensis</i> n. sp.	urn:lsid:zoobank.org:act:2FD4F28D-0F40-45B6-8C1C-E4483C74A268	139–140, 224
<i>Oswaldius craterensis</i> n. sp.	urn:lsid:zoobank.org:act:C7DAB6A1-E5E2-4DF4-9AED-09ABD3E5CA40	140
<i>Oswaldius exoticus</i> n. sp.	urn:lsid:zoobank.org:act:83C7A8B2-F25B-4876-A751-48710953AD29	140–141
<i>Randallius</i> n. gen.	urn:lsid:zoobank.org:act:926DFA9-E479-4846-A794-6CAD6F379B94	149
<i>Randallius robertae</i> n. sp.	urn:lsid:zoobank.org:act:91D76291-408E-4929-81EB-DBC9EF51628A	151
<i>Randallius walkeri</i> n. sp.	urn:lsid:zoobank.org:act:371E8019-5F7C-4336-9ABE-AC1CE171C1E1	151–152
<i>Randallius anceyi</i> n. sp.	urn:lsid:zoobank.org:act:D7F31544-E45E-4ED1-A2F0-ED01D349AE4D	163–164, 228
<i>Randallius anomalous</i> n. sp.	urn:lsid:zoobank.org:act:44FC2496-C967-43F3-96DC-8D3EF97E6997	164

Table 3. LSID codes for new taxa described in this publication as assigned in ZooBank, the official registry of the International Commission on Zoological Nomenclature (ICZN). LSID for entire publication (Severns, 2026) is: urn:lsid:zoobank.org:pub:76FD8197-E5D9-48BD-801C-621A5884623E

SUBFAMILY	Life Science Identifiers (LSIDs)	Page Numbers
Genus		
Genus species		
NESOPHILINAE (continued)		
Randallius (continued)		
<i>Randallius bennettiae</i> n. sp.	urn:lsid:zoobank.org:act:2E4E326A-3E89-4578-B16C-5ECA0D90937B	165, 229
<i>Randallius geigeri</i> n. sp.	urn:lsid:zoobank.org:act:C90E980C-9F4F-4CE7-9D1D-30E62F6D5BB0	165–166
<i>Randallius kondoi</i> n. sp.	urn:lsid:zoobank.org:act:A5C0C74B-8B87-4488-A4F0-AA254DE8BB5F	166–167, 229
<i>Randallius peasei</i> n. sp.	urn:lsid:zoobank.org:act:AEFC8F3C-BD30-4EBD-AB61-C8F5455773C5	167–168, 229–230
<i>Randallius pfeifferi</i> n. sp.	urn:lsid:zoobank.org:act:C5921F0A-38F5-428B-AA03-68698D5FFE2D	168
<i>Randallius sutteri</i> n. sp.	urn:lsid:zoobank.org:act:EA655922-898D-E03-AFFF-9998D06A1685	168–169
<i>Randallius vinceneae</i> n. sp.	urn:lsid:zoobank.org:act:01A1583F-77D4-40EA-956F-3C01A8D4A291	169–170, 230
<i>Randallius woodae</i> n. sp.	urn:lsid:zoobank.org:act:66087481-FADC-491D-BDFF-D191251F3866	170
<i>Randallius ringens</i> (Sykes, 1896)	—	155–156, 228
<i>Randallius fisheri</i> n. sp.	urn:lsid:zoobank.org:act:DF3D5290-73DE-43C8-87F6-80EA48FBDB30	154–155, 227
<i>Randallius jimfieni</i> n. sp.	urn:lsid:zoobank.org:act:E147ED4D-C838-4226-B828-D275F3605075	152–153, 226
<i>Randallius paulineae</i> n. sp.	urn:lsid:zoobank.org:act:D638A9FF-E73D-4BB2-B3A7-9CA387ED0715	153–154, 226–227
<i>Randallius puumakua</i> n. sp.	urn:lsid:zoobank.org:act:85B93D29-478A-49EB-9080-97C167D92226	154, 227
<i>Randallius callomoni</i> n. sp.	urn:lsid:zoobank.org:act:009A5624-6656-4E7F-A9A1-89E15984E87B	156–157, 228
<i>Randallius abletti</i> n. sp.	urn:lsid:zoobank.org:act:1122DF95-770C-41EA-9543-41561FE6D1CD	157, 228
<i>Randallius albus</i> n. sp.	urn:lsid:zoobank.org:act:420DF42C-F545-4559-BD6C-3AD6D7B5995E	158
<i>Randallius crenulatus</i> n. sp.	urn:lsid:zoobank.org:act:DACA6CE2-35DA-4054-AFD1-9C96ADC35139	158–159, 228
<i>Randallius hauptmani</i> n. sp.	urn:lsid:zoobank.org:act:3C54A988-916F-4CC5-9DE2-D338CE0A40A2	159–160
<i>Randallius hystricellus</i> (Pfeiffer, 1859a)	—	160–161
<i>Randallius intermedius</i> n. sp.	urn:lsid:zoobank.org:act:73514176-85D7-4ABA-83DC-3648F21822A4	161
<i>Randallius jacksoni</i> n. sp.	urn:lsid:zoobank.org:act:7305C28D-2E02-4CBC-A49A-3978E3881AC8	162
<i>Randallius pupuiki</i> n. sp.	urn:lsid:zoobank.org:act:C5CF945E-9420-45A0-AD9A-17E92501D1C7	162–163
Solemius n. gen.	urn:lsid:zoobank.org:act:779172D3-29F1-4B8D-8D3E-B2FAA5D6899F	171
<i>Solemius luctiferus</i> (Pilsbry & Vanatta, 1905)	—	173, 230
<i>Solemius alani</i> n. sp.	urn:lsid:zoobank.org:act:1272BBA0-1B97-4BC5-9132-05DFC33CC048	173–174, 230–231
<i>Solemius bindiae</i> n. sp.	urn:lsid:zoobank.org:act:166CAD82-CF8E-41F0-97B1-E34BE277F1FD	174–175
<i>Solemius delphineae</i> n. sp.	urn:lsid:zoobank.org:act:360D744E-867E-4739-A832-25BD458C2EC1	175–176, 231
<i>Solemius kaneohe</i> n. sp.	urn:lsid:zoobank.org:act:699DD781-A322-4448-85CB-4E05AF5571FE	176
<i>Solemius palolo</i> n. sp.	urn:lsid:zoobank.org:act:64D8887E-5746-48FC-BFB1-EFC5ECD91158	176–177, 231
<i>Solemius stellulus</i> (Gould, 1844)	—	177–178, 231
<i>Solemius webbi</i> n. sp.	urn:lsid:zoobank.org:act:08BECF02-77A7-4A50-83D7-F5ECF5C3F2DD	178–179

Appendix. Images of additional specimens of species of Endodontidae treated in this work.

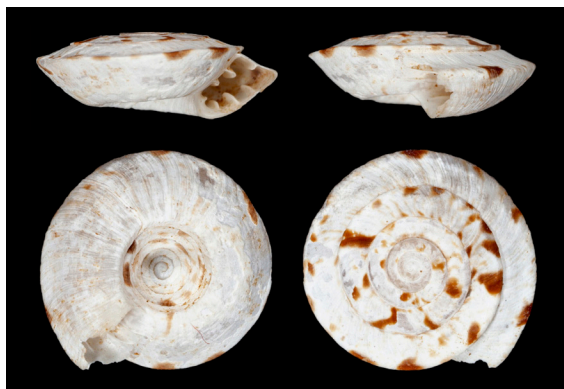


Fig. 236. *Endodonta paulineae*, 6.3 mm, MS 8250, PARATYPE, Maui, Puu Makua Cave.

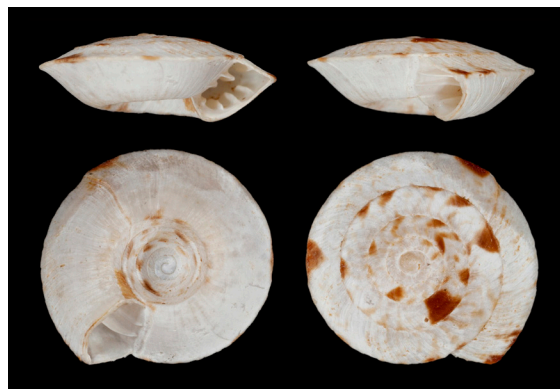


Fig. 237. *Endodonta paulineae*, 6.5 mm, MS 8442, PARATYPE, Maui, Puu Makua Cave.

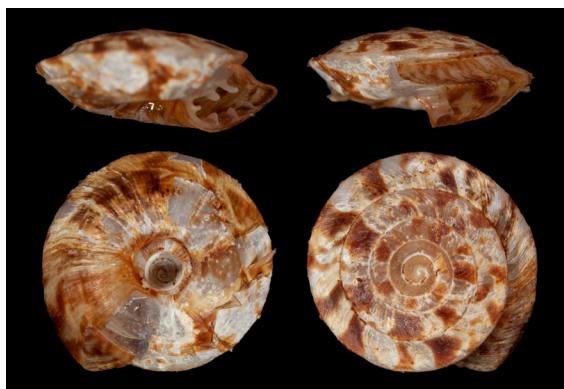


Fig. 238. *Endodonta kawela*, 5.3 mm, ANSP 108373, Molokai, Waihauau.



Fig. 239. *Endodonta kawela*, 5.6 mm, ANSP 130526, Molokai, Kumoku.

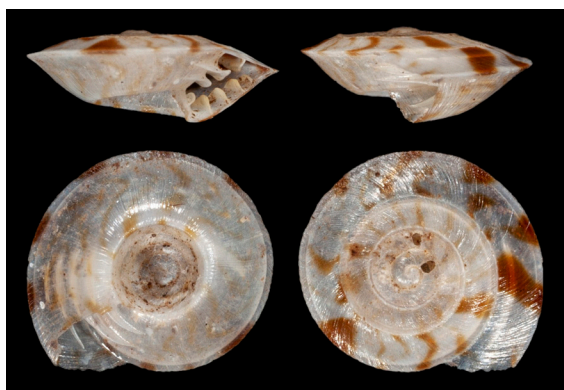


Fig. 240. *Endodonta brevis*, 4 mm, ANSP 386245, Oahu, Pohakea Pass.



Fig. 241. *Endodonta brevis*, 4.1 mm, ANSP 386232A, Oahu, Pohakea Pass.



Fig. 242. *Endodonta fricki*, 6.0 mm, ANSP 108905, Oahu, Popouwela, western ridge.

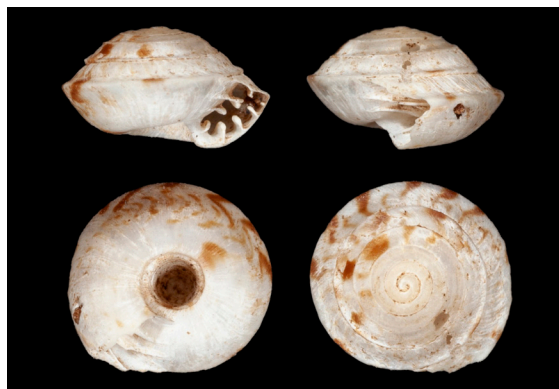


Fig. 243. *Endodonta galea*, 4.4 mm, ANSP 383582, Oahu, Pohakea Pass.

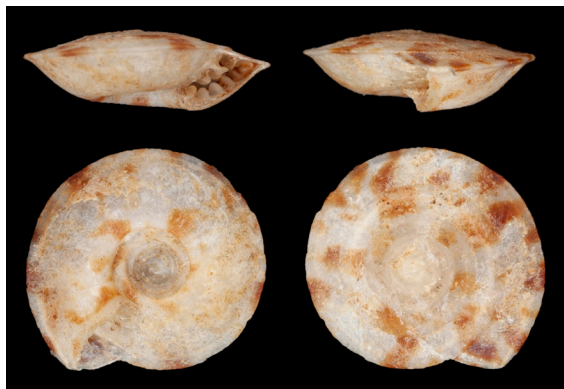


Fig. 244. *Endodonta kahukuensis*, 6.0 mm, ANSP 128184, Oahu, Kahuku.

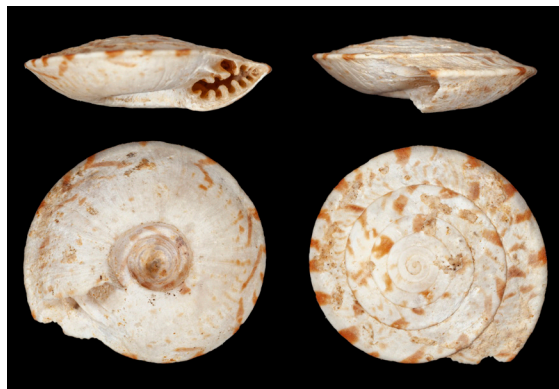


Fig. 245. *Endodonta kahukuensis*, 9.3 mm, ANSP 380205, Oahu, Laie.

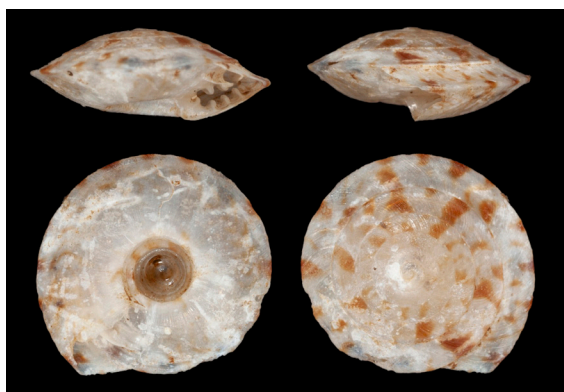


Fig. 246. *Endodonta kawailoaensis*, 5.0 mm, ANSP 379445, Oahu, Kawailoa.

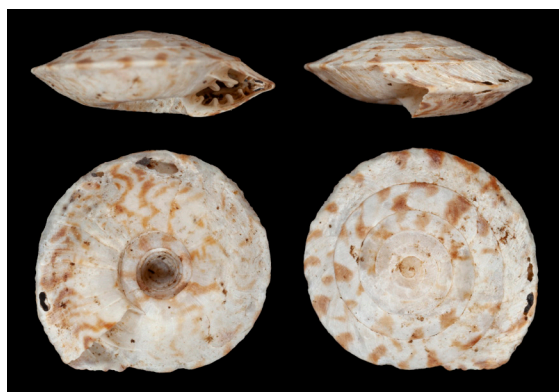


Fig. 247. *Endodonta kawailoaensis*, 5.6 mm, ANSP 379448, Oahu, Kawailoa.



Fig. 248. *Endodonta laie*, 7.1 mm, ANSP 380206, Oahu, Laie.



Fig. 249. *Endodonta laie*, 6.2 mm, ANSP 380207, Oahu, Laie.



Fig. 250. *Endodonta lamellosa*, 2.3 mm, ANSP 386182, Oahu, Manoa, Rocky Hill.



Fig. 251. *Endodonta lualualei*, 6.3 mm, ANSP 109990, Oahu, Kawaihapai.



Fig. 252. *Endodonta lualualei*, 7.8 mm, ANSP 376431, Oahu, Makaleha.



Fig. 253. *Endodonta lualualei*, 6.3 mm, ANSP 128263, Oahu, Waianae.



Fig. 254. *Endodonta lualualei*, 7.0 mm, ANSP 386204, Oahu, Po-hakea Pass.

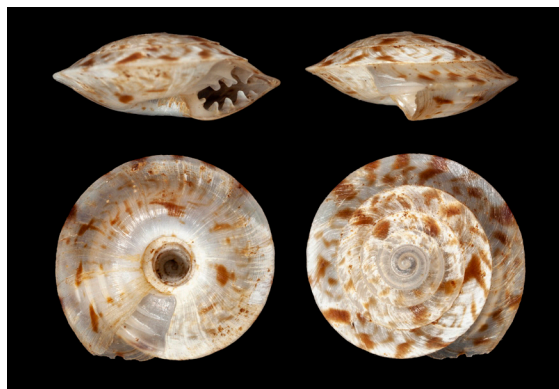


Fig. 255. *Endodonta lualualei*, 7.6 mm, ANSP 377800, Oahu, Lualualei.



Fig. 256. *Endodonta makaua*, 3.4 mm, ANSP 376434, Oahu, Kaaawa (Makaua).



Fig. 257. *Endodonta manoa*, 6.3 mm, ANSP 130511, Oahu, Manoa, Rocky Hill.



Fig. 258. *Endodonta manoa*, 6.4 mm, ANSP 386195, Oahu, Manoa.



Fig. 259. *Endodonta manoa*, 6.7 mm, ANSP 383926, Oahu, Palolo.

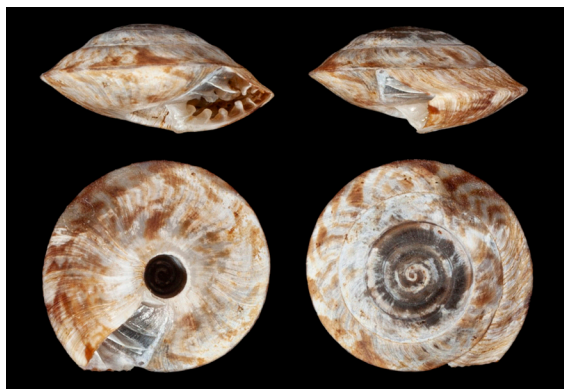


Fig. 260. *Endodonta marsupialis*, 7.2 mm, ANSP 74533, Oahu, Green Peak (Palikea).



Fig. 261. *Endodonta nikiae*, 5.6 mm, ANSP 380198, HOLOTYPE, Oahu, Nanakuli.



Fig. 262. *Helenia moo*, 5.0 mm, MS 9187, PARATYPE, Molokai, Moomomi Dunes.



Fig. 263. *Helenia moo*, 5.2 mm, ANSP 109988, Molokai, Moomomi.



Fig. 264. *Helenia annae*, 4.5 mm, ANSP 386220, Oahu, Pohakea Pass.



Fig. 265. *Helenia annae*, 4.5 mm, ANSP 386213A, Oahu, Pohakea Pass.

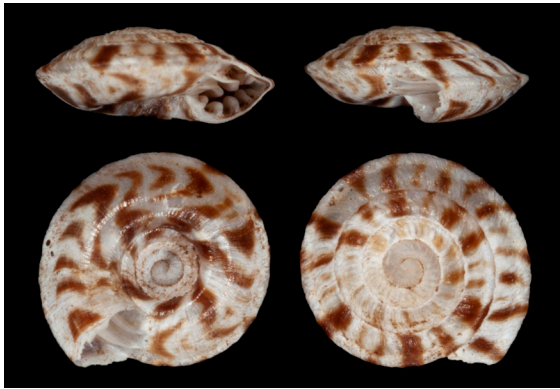


Fig. 266. *Helenia davisi*, 3.0 mm, ANSP 386229A, Oahu, Pohakea Pass.



Fig. 267. *Helenia davisi*, 6.1 mm, ANSP 377815, Oahu, Lualualei.



Fig. 268. *Helenia davisi*, 6.6 mm, ANSP 130471, Oahu, Popouwela.



Fig. 269. *Helenia kalaeloana*, 6.5 mm, ANSP 130521, Oahu, Ewa Mill.



Fig. 270. *Helenia kobei*, 5.2 mm, ANSP 386210, Oahu, Pohakea Pass.

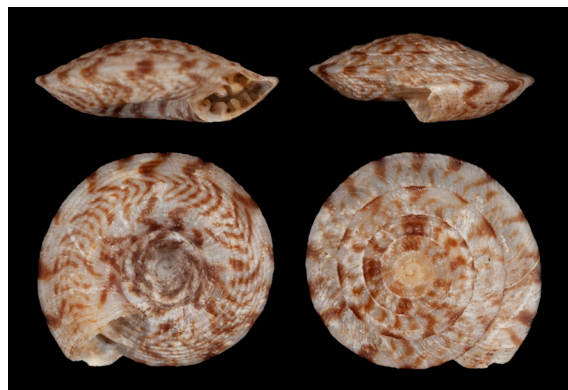


Fig. 271. *Helenia kobei*, 5.3 mm, ANSP 386242, Oahu, Pohakea Pass.



Fig. 272. *Helenium makai*, 4.5 mm, ANSP 130523, Oahu, Kailua.



Fig. 273. *Helenium mayori*, 5.0 mm, MS 8447, Oahu, Makua.



Fig. 274. *Helenium mayori*, 6.2 mm, ANSP 109989, Oahu, Kawaihapai.



Fig. 275. *Helenium nanakuli*, 3.8 mm, ANSP 377812, Oahu, Nanakuli.



Fig. 276. *Helenium noe*, 3.3 mm, ANSP 386197, Oahu, Manoa.



Fig. 277. *Helenium noe*, 3.4 mm, ANSP 130517, Oahu, Round Top (Tantalus).



Fig. 278. *Helenia puowaina*, 4.5 mm, ANSP 130512, Oahu, Punch Bowl.



Fig. 279. *Helenia ruthae*, 4.9 mm, ANSP 130519, Oahu, Leahi (Diamond Head).



Fig. 280. *Helenia ruthae*, 5.0 mm, MS 8467, Oahu, Leahi (Diamond Head).



Fig. 281. *Helenia satyae*, 4.5 mm, ANSP 379447, Oahu, Kawaihoa.



Fig. 282. *Helenia waianae*, 4.3 mm, ANSP 378656, Oahu, Lualualei.

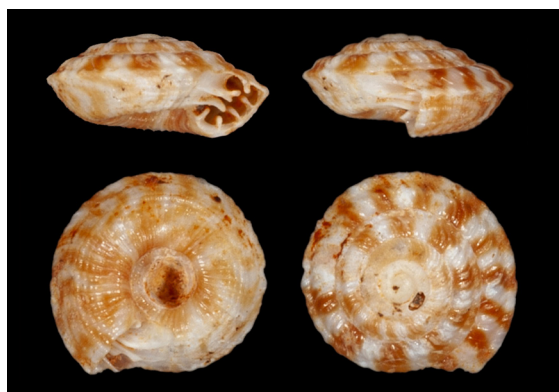


Fig. 283. *Helenia ellae*, 3.0 mm, MS 8769, Kauai, Waiopili.



Fig. 284. *Helenia laminata*, 6.0 mm, MS 8433, Kauai, Wailua.



Fig. 285. *Kobeia arnemanni*, 4.8 mm, ANSP 94510, Hawaii, Palihoukapapa.



Fig. 286. *Kobeia arnemanni*, 5.0 mm, MS 8462, PARATYPE, Hawaii, Palihoukapapa.



Fig. 287. *Kobeia rugata*, 3.4 mm, MS 9191, Maui, Auwahi Cave.



Fig. 288. *Kobeia rugata*, 4.0 mm, MS 9183, Maui, Puu Makua Cave.



Fig. 289. *Kobeia nandiae*, 4.3 mm, ANSP 108879, Molokai, Kaunakakai.



Fig. 290. *Kobeia nandiae*, 4.5 mm, ANSP 108683, Molokai, Kamalo.



Fig. 291. *Kobeia striata*, 2.8 mm, ANSP 386234, Oahu, Pohakea Pass.



Fig. 292. *Kobeia striata*, 3.3 mm, ANSP 386228, Oahu, Pohakea Pass.



Fig. 293. *Richlingia oahuensis*, 4.2 mm, ANSP 379443, Oahu, Kawaihoa.



Fig. 294. *Richlingia aweoweo*, 3.0 mm, MS 8736, PARATYPE, Kauai, Aweoweonui.



Fig. 295. *Richlingia aweoweo*, 3.2 mm, MS 8742, Kauai, Aweoweonui.



Fig. 296. *Richlingia nounouensis*, 4.8 mm, ANSP 130502, Kauai, Wailua.



Fig. 297. *Richlingia richlingae*, 4.0 mm, MS 8435, Kauai, Mahaulepu.



Fig. 298. *Richlingia richlingae*, 4.4 mm, MS 9175, PARATYPE, Kauai, Mahaulepu.



Fig. 299. *Starmeria conica*, 4.2 mm, MS 8427, Kauai, Polihale.



Fig. 300. *Starmeria pagoda*, 6.5 mm, MS 8459, Kauai, Polihale.



Fig. 301. *Christensenius jackrandalli*, 2.5 mm, MS 8882, PARATYPE, Maui, Lus Lepo Cave.



Fig. 302. *Christensenius jackrandalli*, 3.0 mm, MS 8825, Maui, Waiehu Golf Course.



Fig. 303. *Christensenius virginiae*, 2.5 mm, MS 8987, PARATYPE, Maui, Auwahi Cave.



Fig. 304. *Christensenius virginiae*, 3.0 mm, MS 8982, Maui, Auwahi Cave (post alteration decoiling)



Fig. 305. *Christensenius virginiae*, 2.6 mm, MS 8560, Maui, Auwahi Cave.



Fig. 306. *Christensenius boucheti*, 3.6 mm, ANSP 378421, PARATYPE, Oahu, Lualualei.



Fig. 307. *Christensenius boucheti*, 3.3 mm, MS 9665, Oahu, Manoa, Rocky Hill.



Fig. 308. *Christensenius cookei*, 1.9 mm, MCZ 106309, PARALECTOTYPE, Oahu, Tantalus.



Fig. 309. *Christensenius houarti*, 3.9 mm, ANSP 502765 (ex 380209), Oahu, Laie.



Fig. 310. *Christensenius aweoweonuiensis*, 4.7 mm, MS 8312, Kauai, Mahaulepu.



Fig. 311. *Christensenius dominiquei*, 4.0 mm, MS 8854, Kauai, Aweoweonui.



Fig. 312. *Christensenius dominiquei*, 5.0 mm, MS 8819, Kauai, Mahaulepu.



Fig. 313. *Christensenius koloaensis*, 4.0 mm, MS 8816, PARATYPE, Kauai, Mahaulepu.



Fig. 314. *Christensenius regis*, 5.0 mm, MS 9209, PARATYPE, Kauai, Kipu Kai.



Fig. 315. *Christensenius regis*, 4.8 mm, MS 9208, PARATYPE, Kauai, Kipu Kai.



Fig. 316. *Christensenius regis*, 3.7 mm, MS 6433, Kauai, Mahaulepu.



Fig. 317. *Cookeconcha paucilamellata*, 5.0 mm, MS 9174, Hawaii, Palihoukapapa.



Fig. 318. *Cookeconcha paucilamellata*, 5.0 mm, ANSP 130575, Hawaii, Waikii.



Fig. 319. *Cookeconcha thaunami*, 4.5 mm, ANSP 455279, PARALECTOTYPE, Hawaii, Kaiwiki.



Fig. 320. *Cookeconcha sumneri*, 5.1 mm, MS 9194, PARATYPE, Maui, Puu Makua Cave.



Fig. 321. *Cookeconcha sumneri*, 4.5 mm, ANSP 89242, Maui, Honokawai.



Fig. 322. *Cookeconcha sumneri*, 4.5 mm, MS 8639, Maui, Waihou Spring Cave.



Fig. 323. *Cookeconcha ginnyae*, 5.3 mm, FMNH 46237, Molokai, Kaluaaha.



Fig. 324. *Cookeconcha salisburyi*, 3.0 mm, ANSP 108878, Molokai, Upper Kaunakakai.



Fig. 325. *Cookeconcha salisburyi*, 4.4 mm, ANSP 130571, Molokai, Waihee.



Fig. 326. *Cookeconcha maureenae*, 6.3 mm, ANSP 386233, Oahu, Pohakea Pass.



Fig. 327. *Cookeconcha maureenae*, 4.7 mm, ANSP 386227, Oahu, Pohakea Pass.

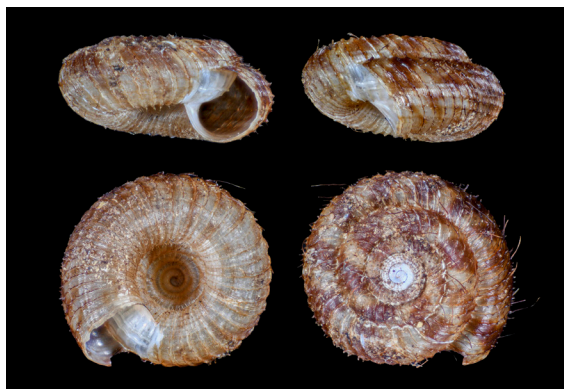


Fig. 328. *Cookeconcha hystrix*, 6.1 mm, ANSP 95253, Oahu, Konahuanui.

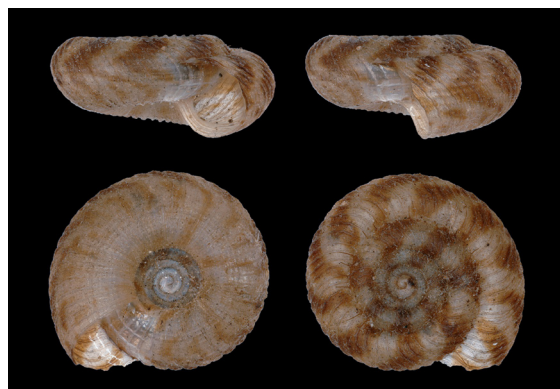


Fig. 329. *Cookeconcha hystrix*, 4.5 mm, MCZ 169368, Sandwich (Hawaiian) Islands (Oahu).



Fig. 330. *Cookeconcha gageorum*, 5.0 mm, MS 8615, Kauai, Anini Kalihiwai.



Fig. 331. *Cookeconcha paucicostata*, 3.4 mm, MCZ ex. 45159, Kauai, Kapaa.



Fig. 332. *Cookeconcha paucicostata*, 4.9 mm, MS 8796, Kauai, Mahaulepu.



Fig. 333. *Gageia polihale*, 4.3 mm, MS 9170, PARATYPE, Kauai, Polihale Ridge.



Fig. 334. *Gageia polihale*, 5.0 mm, MS 8624, PARATYPE, Kauai, Polihale Ridge.



Fig. 335. *Hobdya thwingi*, 2.4 mm, ANSP 94508, TOPOTYPE, Hawaii, Kona.



Fig. 336. *Hobdya thwingi*, 2.2 mm, ANSP 108368, Hawaii, Hualalai.



Fig. 337. *Hobdya momoleri*, 2.0 mm, MS 8547, Maui, Kahawaihapapa Cave.

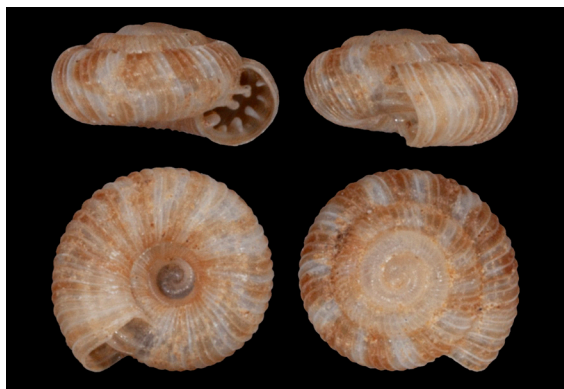


Fig. 338. *Hobdya momoleri*, 3.0 mm, MS 8670, Maui, Lua Lepo Cave.



Fig. 339. *Hobdya momoleri*, 2.0 mm, MS 8895, Molokai, Moomomi Dunes.



Fig. 340. *Hobdya leahi*, 1.9 mm, MS 8603, Oahu, Diamond Head.



Fig. 341. *Hobdya wickerae*, 2.0 mm, MS 9239, PARATYPE, Kauai, Kipu Kai.



Fig. 342. *Hobdya wickerae*, 2.5 mm, MS 8740, Kauai, Aweoweonui.



Fig. 343. *Hobdya wickerae*, 3.0 mm, MS 8618, Kauai, Mahaulepu.



Fig. 344. *Hobdya wickerae*, 2.5 mm, MS 8842, Kauai, Waiopili.



Fig. 345. *Liiliiliconcha henshawi*, 2.0 mm, ANSP 91121, TOPOTYPE, Hawaii, Kohala, Waimea.



Fig. 346. *Liiliiliconcha henshawi*, 2.5 mm, MS 8600, Hawaii, Palihoukapapa.



Fig. 347. *Liiliiliconcha julianae*, 2.0 mm, MS 9018, Hawaii, Kona.



Fig. 348. *Liiliiliconcha julianae*, 1.8 mm, MS 9684, PARATYPE, Hawaii, Kona.



Fig. 349. *Liiliiliconcha maui*, 2.0 mm, MS 8889, Maui, Mokuleia Bay.



Fig. 350. *Liiliiliconcha maui*, 1.8 mm, MS 8593, Maui, Puu Naio Cave.



Fig. 351. *Liiliiliconcha maui*, 2.0 mm, MS 8718, Molokai, Moomomi.



Fig. 352. *Liiliiliconcha maui*, 2.5 mm, ANSP 119424, Kahoolawe, Schooner Bay.

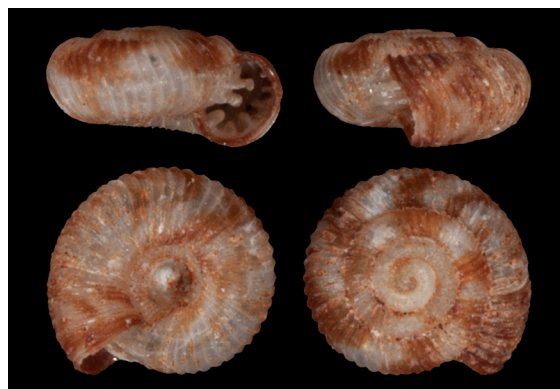


Fig. 353. *Liiliiliconcha johnstarmeri*, 2.0 mm, MS 8862, Lanai, Lae Palolo.



Fig. 354. *Liiliiliconcha johnstarmeri*, 1.9 mm, ANSP 108378, Molokai, Makolelau.



Fig. 355. *Liiliiliconcha johnstarmeri*, 1.9 mm, ANSP 128083, Oahu, Kawaiiloa.



Fig. 356. *Liiliiliconcha johnstarmeri*, 2.0 mm, MS 9141, Maui, Lua Lepo Cave.



Fig. 357. *Liiliiliconcha rosenbergi*, 2.1 mm, ANSP 117343, Molokai, Moomomi.



Fig. 358. *Liiliiliconcha adevae*, 2.0 mm, MS 9664, PARATYPE, Oahu, Rocky Hill, Manoa.



Fig. 359. *Liiliiliconcha oahu*, 2.5 mm, ANSP 501741 (ex 117339), Oahu, Kaelepulu (Kailua).



Fig. 360. *Liiliiliconcha oahu*, 2.6 mm, ANSP 380209, PARATYPE, Oahu, Laie.



Fig. 361. *Nesophila capillata*, 4.0 mm, ANSP 1972, PARALLECTOTYPE, Kauai.



Fig. 362. *Nesophila prestonsutteri*, 5.5 mm, MS 8595, PARATYPE, Kauai, Mahaulepu.



Fig. 363. *Nesophila prestonsutteri*, 4.5 mm, MS 8768, Kauai, Waipili.



Fig. 364. *Oswaldius hemmesi*, 4.3 mm, ANSP 89244, Hawaii, Kaiwika.



Fig. 365. *Oswaldius hemmesi*, 4.7 mm, ANSP 108369, Hawaii, Waimea.



Fig. 366. *Oswaldius hobdyi*, 3.9 mm, MS 8602, Maui, Hukano Cave.



Fig. 367. *Oswaldius hobdyi*, 4.0 mm, ANSP 108371, Maui, Honokawai.



Fig. 368. *Oswaldius mayori*, 4.4 mm, MS 8878, Maui, Puu Naio Cave.



Fig. 369. *Oswaldius mayori*, 4.7 mm, MS 8584, Maui, Auwahi Cave.



Fig. 370. *Oswaldius mayori*, 5.0 mm, MS 8568, Maui, Waihoi Spring Cave.



Fig. 371. *Oswaldius mayori*, 5.0 mm, MS 8655, PARATYPE, Puu Makua Cave, Maui.



Fig. 372. *Oswaldius olsoni*, 2.4 mm, MS 8580, PARATYPE, Maui, Lua Lepo Cave.



Fig. 373. *Oswaldius olsoni*, 3.4 mm, FMNH, 90636, Maui, Honokoupi Gulch.



Fig. 374. *Oswaldius lanaiensis*, 4.7 mm, BMNH 1900 12 18 15 21, Lanai.



Fig. 375. *Oswaldius decussatus*, 4.5 mm, ANSP 109984, Molokai, Moomomi.



Fig. 376. *Oswaldius decussatus*, 4.7 mm, MS 8725, Molokai, Moomomi.



Fig. 377. *Oswaldius molokaiensis*, 3.2 mm, ANSP 108642, Molokai, Hanakalililo.



Fig. 378. *Oswaldius molokaiensis*, 3.6 mm, ANSP 90141, Molokai, Kaluaaha.



Fig. 379. *Oswaldius compressus*, 3.6 mm, MS 8738, Kauai, Aweoweonui.



Fig. 380. *Oswaldius compressus*, 3.8 mm, MS 8627, PARATYPE, Kauai, Polihale Ridge.



Fig. 381. *Oswaldius coronatus*, 2.6 mm, MS 8776, PARATYPE, Kauai, Moloa'a Bay.



Fig. 382. *Oswaldius jugosus*, 6.0 mm, MCZ, 17281, Kauai, Kapaa.



Fig. 383. *Oswaldius jugosus*, 7.2 mm, MCZ, 17284, Kauai, Wahiawa.



Fig. 384. *Oswaldius pseudojugosus*, 6.0 mm, MCZ, 156496, Kauai.

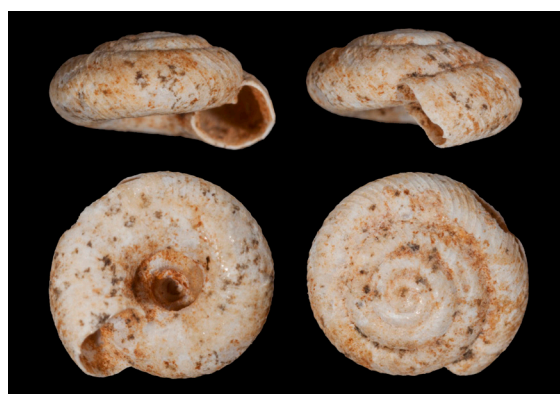


Fig. 385. *Oswaldius sumo*, Molokai, 3.6 mm, MS 8635, Kauai, Waiopili.



Fig. 386. *Oswaldius tessellatus*, 3.3 mm, MS 8625, PARATYPE, Kauai, Polihale Ridge.



Fig. 387. *Oswaldius waiopiliensis*, 2.3 mm, MS 8313, Kauai, Mahaulepu.



Fig. 388. *Oswaldius waiopiliensis*, 2.9 mm, MS 8852, PARATYPE, Kauai, Mahaulepu.



Fig. 389. *Randallius jimfenei*, 2.2 mm, MS 8571, Maui, Puu Makua Cave.



Fig. 390. *Randallius jimfenei*, 2.8 mm, MS 9150, Maui, Puu Makua Cave.



Fig. 391. *Randallius paulineae*, 3.2 mm, MS 9205, Maui, Auwahi Cave.



Fig. 392. *Randallius paulineae*, 4.2 mm, MS 8714, PARATYPE, Maui, Lua Lepo Cave.



Fig. 393. *Randallius puumakua*, 2.7 mm, MS 9179, Maui, Puu Makua Cave.



Fig. 394. *Randallius puumakua*, 3.5 mm, MS 9181, Maui, Puu Makua Cave.



Fig. 395. *Randallius fisheri*, 1.2 mm, ANSP 116698, Oahu, Haleiwa.



Fig. 396. *Randallius fisheri*, 2.0 mm, MS 9129, Molokai, Moomomi Dunes.



Fig. 397. *Randallius fisheri*, 2.0 mm, MS 9134, Maui, Mid Maui Sand Pit.



Fig. 398. *Randallius ringens*, 3.7 mm, ANSP 130553, PARATYPE, Lanai.



Fig. 399. *Randallius callomoni*, 2.0 mm, ANSP 108993, Molokai, Ravine east of Puu Kolekole.



Fig. 400. *Randallius abletti*, 5.6 mm, ANSP 501768 (ex 386191), PARATYPE, Oahu, Palolo.



Fig. 401. *Randallius crenulatus*, 3.5 mm, ANSP 376759, Oahu, Makaleha.



Fig. 402. *Randallius crenulatus*, 4.0 mm, ANSP 503407 (ex 383583), Oahu, Pohakea Pass.



Fig. 403. *Randallius anceyi*, 3.8 mm, MCZ 413375, Kauai.



Fig. 404. *Randallius bennettiae*, 4.1 mm, MS 9167, PARATYPE, Kauai, Wailua Golf Course.

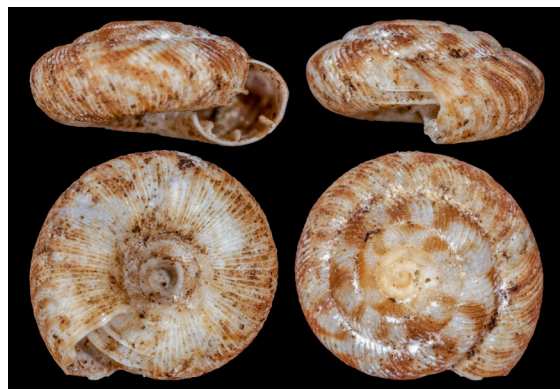


Fig. 405. *Randallius bennettiae*, 4.5 mm, MS 8475, Kauai, Wailua Golf Course.

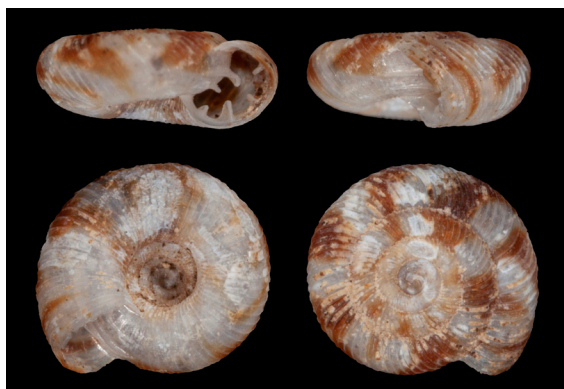


Fig. 406. *Randallius kondoi*, 2.5 mm, ANSP 324101, Kauai, Hanamalu Flat.



Fig. 407. *Randallius kondoi*, 3.6 mm, MS 8802, Kauai, Mahaulepu.



Fig. 408. *Randallius kondoi*, 4.0 mm, MS 9229, PARATYPE, Kauai, Kipu Kai.



Fig. 409. *Randallius peasei*, 3.0 mm, BMNH, 20210055, Kauai.



Fig. 410. *Randallius peasei*, 4.5 mm, ANSP 1983, Sandwich Islands.



Fig. 411. *Randallius vinceneae*, 3.8 mm, ANSP 58134, Kauai.

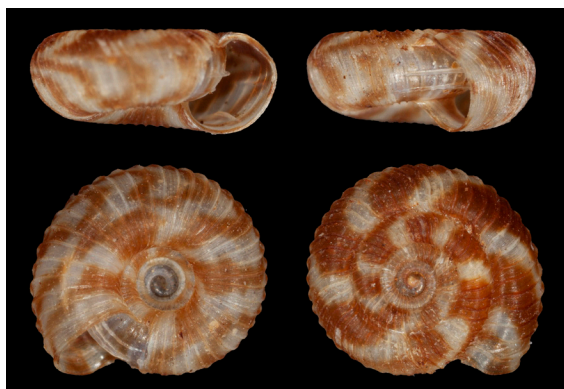


Fig. 412. *Solemius luctiferus*, 3.7 mm, ANSP 108375, Molokai, Kamalo.



Fig. 413. *Solemius luctiferus*, 4.5 mm, ANSP 186400, Molokai, Waikolu.



Fig. 414. *Solemius alani*, 5.5 mm, ANSP 386223, Oahu, Pohakea Pass.



Fig. 415. *Solemius alani*, 6.4 mm, ANSP 386198, Oahu, Pohakea Pass.



Fig. 416. *Solemius alani*, 6.9 mm, ANSP 386241, Oahu, Pohakea Pass.



Fig. 417. *Solemius delphineae*, 5.5 mm, ANSP 501772 (ex 47901), PARATYPE, Oahu, Konahuanui.



Fig. 418. *Solemius palolo*, 3.7 mm, ANSP 386189, Oahu, Palolo.



Fig. 419. *Solemius stellulus*, 4.6 mm, ANSP 386435, Oahu, Palolo.



Fig. 420. *Solemius stellulus*, 5.0 mm, ANSP 384350, Oahu, Palolo.

DEDICATION

THIS REVISION IS DEDICATED TO
REGINALD AND SANDRA GAGE OF KAUAI.
ALOHA NUI REG AND SANDY – MIKE.