



Ecologica Montenegrina
ISSN 2396-9744 (online) | ISSN 2397-0173 (print)


Ecologica Montenegrina 89: 161-168 (2025)
This journal is available online at: www.biotaxa.org/em
<https://dx.doi.org/10.37828/em.2025.89.9>

Article

<https://zoobank.org/urn:lsid:zoobank.org:pub:E3A381D7-647C-44A9-8623-17FF1ACAD8CF>

A new species of *Landouria* from Thailand, with a deep umbilical groove (Gastropoda, Stylommatophora, Camaenidae)


BARNA PÁLL-GERGELY^{1,2}, SAKBOWORN TUMPEESUWAN³
& CHANIDAPORN TUMPEESUWAN^{3,*}

¹ Centre for Agricultural Research, HUN-REN Centre for Agricultural Research, 2462 Martonvásár, Brunszvik u. 2, Hungary. E-mail: pallgergely2@gmail.com;  <https://orcid.org/0000-0002-6167-7221>

² Department of Soil, Water and Natural Sciences, Albert Kázmér Faculty of Agricultural and Food Sciences of Széchenyi István University, Vár 2., 9200 Mosonmagyaróvár, Hungary.

³ Department of Biology, Faculty of Science, Mahasarakham University, Kantharawichai District, Maha Sarakham 44150, Thailand.

E-mail: stumpeesuwan@yahoo.com;  <https://orcid.org/0000-0001-5900-7862>

* Corresponding author. E-mail: ctumpeesuwan@yahoo.com;  <https://orcid.org/0000-0003-2066-1271>

Received 11 August 2025 | Accepted by V. Pešić: 10 September 2025 | Published online 13 September 2025.

Abstract

Landouria canalifera Páll-Gergely, Tumpeesuwan & Tumpeesuwan sp. nov. is described from Koh Samui, southern Thailand. It is characterized by a deep groove inside the umbilicus on the last ca. 1.5 whorls, corresponding with a columellar fold in the aperture. Also, there is a basal apertural tooth, corresponding with a shallow groove on the basal side of the shell just behind the peristome. These two barriers form a shallow canal in the aperture. Although the reproductive anatomy of this new species is not known, it probably belongs to the genus *Landouria*, which is widespread in Thailand and in the neighboring countries.

Key words Taxonomy, systematics, conchology, apertural barriers, Samui Island.

Introduction

Traditionally, the genus *Landouria* Godwin-Austen, 1918 is characterized by a small (ca. 10 mm), orbiculate shell with an open umbilicus and the absence of a dart sac and associated mucous glands (Godwin-Austen 1918). In contrast, the speciose Asian genus *Aegista* Albers, 1850, although similar in shell morphology, possesses a dart apparatus (Schileyko & Kuznetsov 1998). The type species of *Landouria* is *Helix huttonii* L. Pfeiffer, 1842, which was originally described from the western Himalayas, this species was also reported as distributed in north and northeast India, northern Myanmar, southwest China, and the also from western Ghats of southwest India (Raheem *et al.* 2014). Godwin-Austen (1918) added three other Himalayan and one Sri Lankan species in *Landouria*. Following the works of van Benthem Jutting (1950, 1959), Zilch (1966), Richardson (1985), and Schileyko & Kuznetsov (1998), 29 species have been assigned to this genus from the Himalayas, Sri Lanka,

Indonesia, and the Philippines—despite their heterogeneous shell morphology and often unknown reproductive anatomy.

Recently, several new species have been described and some unaccepted original combination names were assigned to *Landouria*. These *Landouria* species were discovered from China (Páll-Gergely *et al.* 2013), Indonesia (Dharma 2015; Marwoto 2016; Nurinsiyah *et al.* 2019), Timor-Leste (Köhler *et al.* 2019), Myanmar (Páll-Gergely *et al.* 2020), and Thailand (Tumpeesuwan & Tumpeesuwan 2019; Nahok *et al.* 2021, 2024), increasing the number of known *Landouria* species to 54 (MolluscaBase eds. 2025).

Hirano *et al.* (2014) demonstrated that two *Landouria* species from Laos form a sister group to a clade of high-spined species from Japan and Taiwan, which also lack a dart apparatus. This suggests that the loss of the dart apparatus likely occurred in a common ancestor of these groups.

Köhler *et al.* (2019) showed that *Landouria omphalostoma* Páll-Gergely & Hunyadi, 2013 from China and the species from Timor-Leste form a monophyletic group that is sister to a clade of *Aegista* species from China and Taiwan. Therefore, although the dart apparatus has been lost at least three times within the tribe Aegistini (Hirano *et al.* 2014), it seems likely that this loss occurred only once within *Landouria*, rather than independently in the continental and Indo-Australian Archipelago species.

In this study, the first author discovered two samples in the collection of Hemmen from Wiesbaden, which were collected from Koh Samui (Samui Island) in the Gulf of Thailand, southern Thailand (Figure 1). These lots contained a single species with a peculiar, long umbilical groove—a feature not observed in any other species from Thailand (or observed but proved to be much weaker). Here, we describe this new species and classify it within the genus *Landouria*.

Materials & Methods

Determination of the number of shell whorls (precision to 0.25 whorl) follows Kerney and Cameron (1979: p. 13). The shell was photographed via a Nikon SMZ25 digital microscope with Nikon Nis-Elements software.

The approximate locality records in the distribution map of the genus *Landouria* were categorized as verified and unverified records. The records of specimens that genital organs examined by the authors were recognized as verified records, whereas, the reports that lack data of genital organs in literature sources were recognized as unverified records (Figure 1).

Abbreviations:

D: shell diameter (width)

H: Shell height

MNHN Muséum National d'Histoire Naturelle (Paris, France)

NHMSU: Natural History Museum, Mahasarakham University (Maha Sarakham, Thailand)

SMF: Senckenberg Forschungsinstitut und Naturmuseum (Frankfurt am Main, Germany)

Results

Taxonomy

Family Camaenidae Pilsbry, 1895

Subfamily Bradybaeninae Pilsbry, 1934

Tribe Aegistini Kuroda & Habe, 1949

Genus *Landouria* Godwin-Austen, 1918

Landouria Godwin-Austen, 1918: 604.

Thaitropis Schileyko, 2004: 1632 (type species: *Helix goniochila* Pfeiffer, 1862; OD).

Type species. *Helix huttonii* L. Pfeiffer, 1842 (replacement name for *Helix orbicula* Hutton & Benson, 1838), by original designation.

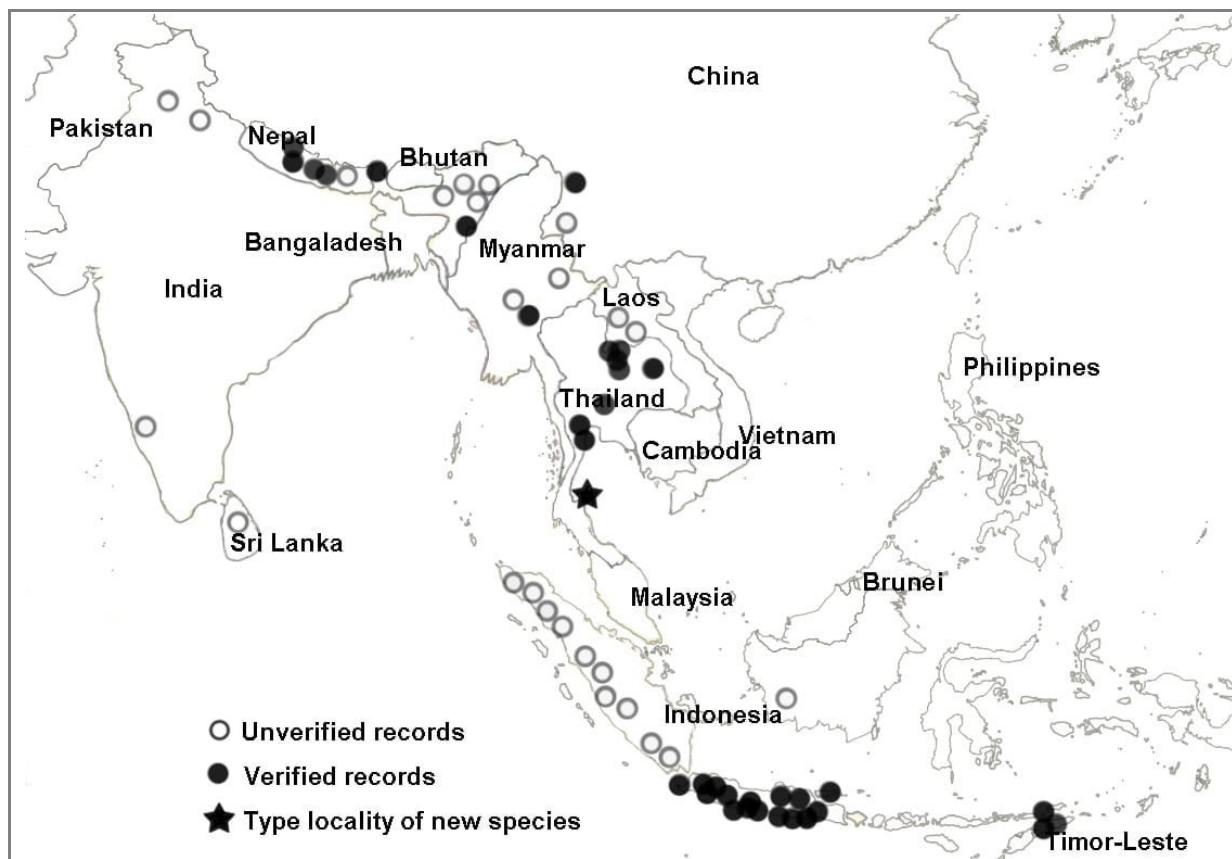


Figure 1. Approximate locality records for *Landouria* spp. and the type locality of *Landouria canalifera* sp. nov. from Samui Island (star) (Remarks: - The record from Philippine by van Benthem Jutting (1950) was excluded from the map because it lacks of exactly location).

***Landouria canalifera* Páll-Gergely, S. Tumpeesuwan & C. Tumpeesuwan sp. nov.**

<https://zoobank.org/urn:lsid:zoobank.org:act:1A4665A7-A94D-4B74-A4DE-C5F0CA3D15E2>

(Figures 2–4)

Type material

Holotype. (NHMSU-00065, D: 10.0 mm, H: 6.6 mm) Thailand, Koh Samui, from Wat Hin Lad (09°31.248'N, 099°57.351'E) to Hin Lad waterfall (09°31.266'N, 099°57.991'E) (Figure 1), time of collection not reported, ex coll. Hemmen (Wiesbaden).

Paratypes. 5 adult shells (NHMSU-00066), same data as for holotype; 4 adult shells, coll. PGB. 6 adult shells (NHMSU-00067), Thailand, Koh Samui, Namuang waterfall 1, 09°27.963'N, 099°59.042'E, leg. Hemmen, 9 Oct. 2000; 2 adult shells, same data as for preceding, SMF 380959; 5 adult shells, same data as for preceding coll. PGB.

Diagnosis

A *Landouria* species with a strongly descending aperture, a wide umbilicus (ca. half of shell width), a groove inside the umbilicus (on the umbilical side of the last ca. 1.5 whorls, see Figures 2D, F, 3), corresponding with a columellar fold in the aperture (Figures 2A, E, 3A). Also, there is a basal apertural tooth (Figure 2E), corresponding with a shallow groove on the basal side of the shell just behind the peristome (Figures 2F, 3).

Description

Shell medium sized for the genus, lenticular, 1.4–1.7 times wider than high with rather strongly elevated spire, dorsal side slightly domed, whorls 6–6.5. Colour light brownish, dark yellowish. The whorls, especially after the first 3, are nearly flat, suture shallow, only indicated. Beginning of body whorl with a central peripheral keel, which gradually disappears (whorl becomes rounded) towards the end of the body whorl. Last ca. half whorl rounded. Protoconch consisting of 1.5–1.75 whorls (Figure 4A–B), moderately glossy, without any particular sculptural elements, only fine, irregular growth lines are visible. Teleoconch with irregular grown lines and fine scale-like periostracum (Figure 4C). The scales are easily worn off, they mostly remain near the suture, on the ventral side and inside the umbilicus.

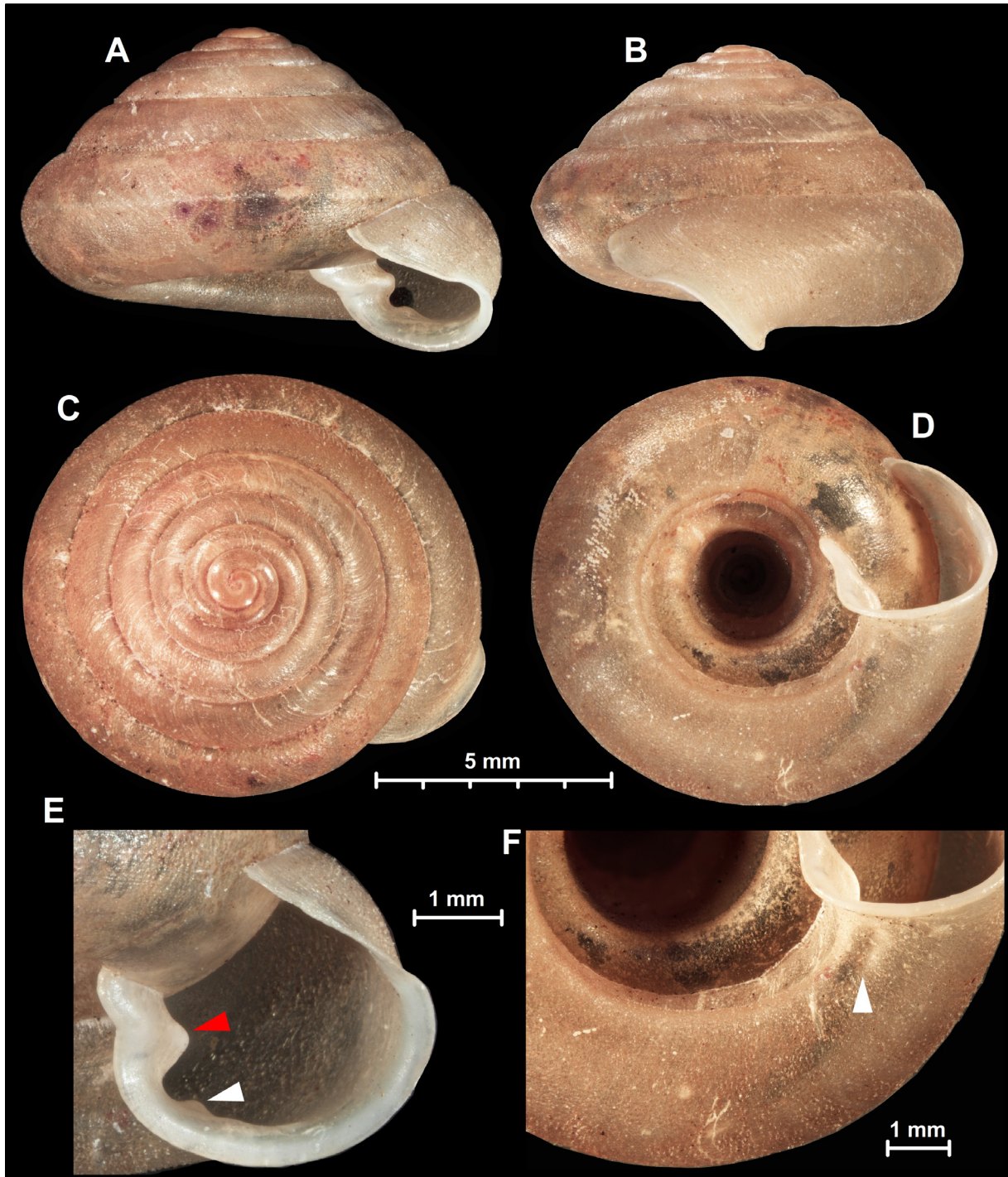


Figure 2. Holotype of *Landouria canalifera* sp. nov. A: apertural view; B: lateral view; C: dorsal view; D: ventral view; E: aperture (red arrow indicates the columellar lamella, white arrow shows the basal tooth); F: ventral side (white arrow indicates the little groove, which corresponds with the basal tooth).

Aperture very strongly oblique to shell axis. Peristome whitish, the uppermost part peristome especially protruding and bending down, it is not reflected. The peristome expands abruptly at ca. the middle of the palatal region, and on the basal region it is reflected. Peristome discontinuous, parietal region of more mature individuals with an additional calcareous layer. There is a blunt columellar fold running deep inside the aperture (Figures 2E and 3), corresponding with the umbilical groove on inner side of the umbilicus. (Figure 3). On the basal region of the aperture there is a small, blunt tooth (Figure 2E), which corresponds with a little groove behind the reflected peristome (Figure 2F). Between the columellar lamella and the basal tooth there is a narrow canal in the aperture. Umbilicus broad, occupies nearly half of the shell's width. Widening of umbilicus is gradual, with the exception of the last ca. 1 whorl, which widens more abruptly. The V-shaped umbilical groove starts ca. 1.5 whorl before the aperture, and is situated in the middle of the whorls.

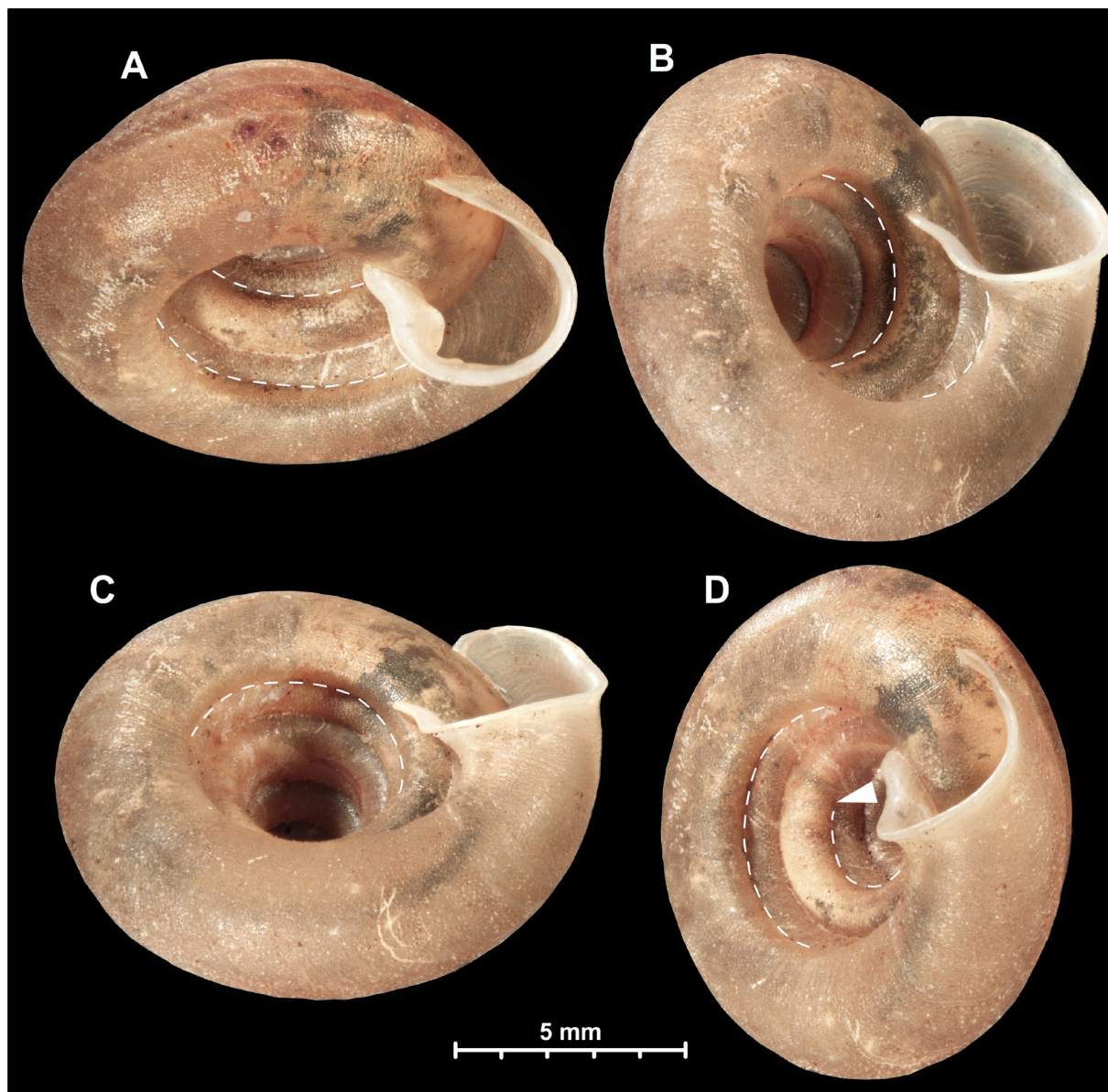


Figure 3. Umbilical groove of *Landouria canalifera* sp. nov. Arrow indicates the approximate starting point of the umbilical groove.

Anatomy

Unknown, as only empty shells were examined.

Measurements (in mm)

D: 9.1–10.8, mean: 10, sample standard deviation (s): 0.53; H: 5.6–7.5, mean 6.4, sample standard deviation (s): 0.5; (n =17).

Differential diagnosis.

The geographically most closely occurring species is *Landouria bella* Nahok & S. Tumpeesuwan, 2024, but it has a rounded body whorl, a more globular shell shape, and its umbilical groove is shallower and shorter (ca. 1 whorl) than that of the new species.

Landouria canalifera sp. nov. resembles *Landouria ptychostyloides* (Schileyko, 2011) (originally described as *Helix ptychostyla* L. Pfeiffer, 1862, *Thaitropis ptychostyla* Schileyko, 2011 is a replacement name, not *Helix ptychostyla* Martens, 1860), but differ by several characters. Namely, the parietal callus is prominent in *H. ptychostyla*, but absent in *L. canalifera* sp. nov.; the last part of last whorl and lip descending in front in *L. canalifera* sp. nov.; the umbilical keel absent in *L. ptychostyloides*, but prominent in *L. canalifera* sp. nov.; The umbilicus is much wider in the new species; *L. canalifera* sp. nov. possesses two apertural folds but *L. ptychostyloides* only one (see fig. 5C in Nahok *et al.* 2024, MNHN-IM-2000-1974).

Landouria monodon Nahok & C. Tumpeesuwan, 2024 also has a shorter (ca. 0.5 whorl) and shallower umbilical groove, a narrower umbilicus, a less descending aperture, and a single tooth in the aperture.

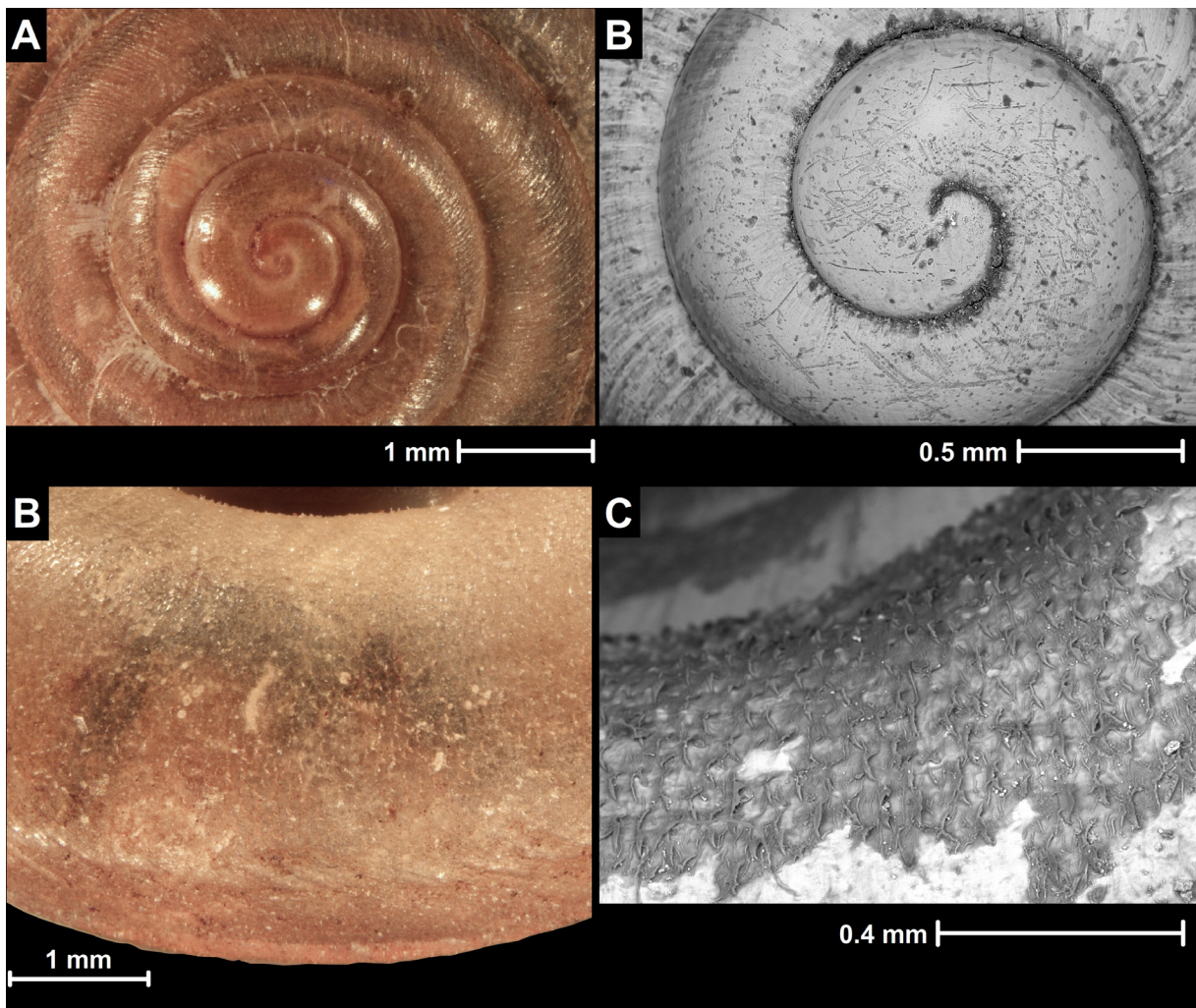


Figure 4. Surface sculpture of *Landouria canalifera* sp. nov. A–B: protoconch; C: ventral surface of the last whorl; D: umbilical side of the penultimate whorl.

Etymology

This new species is named after the umbilical groove (*canalifera*: groove bearing in Latin).

Distribution

This new species is known from two sites in Koh Samui, Thailand, with ca. 7 km between the two sites as the crow flies.

Remarks

Although this new species is described without anatomical characters (the anatomical study of genital organs and DNA examination will be done after living specimens are collected), the shell shape, apertural shape and teeth, the sculpture (see Páll-Gergely *et al.* 2013; Nurinsiyah *et al.* 2019), and the distribution (Figure 1) makes it unlikely that it belongs to a genus different from *Landouria*.

Acknowledgements

We are grateful to the late Christa Hemmen, who provided us the examined material, and to the Institute for Soil Sciences, Centre for Agricultural Research for the possibility to use the Nikon microscope. Thanks to Professor Motoyuki Sumida, who helped check the language in the manuscript. We deeply thank the Editor, four reviewers: Jaap Jan Vermeulen, Zhe-Yu Chen, Frank Köhler, and Ayu Nurinsiyah, for their advice and comments. This research project was financially supported by Mahasarakham University. This research was performed in accordance with the Animal Care and Use Protocol Review No. IACUC-MSU-003-042/21025.

References

- Albers, J.C. (1850) *Die Heliceen nach natürlicher Verwandtschaft systematisch geordnet*. Berlin: Enslin. 262 pp.
- Dharma, B. (2015) A new species of *Landouria* Godwin-Austen 1918 from Java, Indonesia (Gastropoda, Bradybaenidae). *Schriften zur Malakozoologie*, 28, 7–12.
- Godwin-Austen, H.H. (1918) Zoological results of the Abor Expedition, 1911–12. 49, Mollusca, 9. *Records of the Indian Museum*, 8, 601–621. <https://doi.org/10.26515/rzsi/v8/i12/1918/163139>
- Hirano, T., Kameda, Y., Kimura, K. & Chiba, S. (2014) Substantial incongruence among the morphology, taxonomy, and molecular phylogeny of the land snails *Aegista*, *Landouria*, *Trishoplita*, and *Pseudobuliminus* (Pulmonata: Bradybaenidae) occurring in East Asia. *Molecular Phylogenetics and Evolution*, 70, 171–181. <https://doi.org/10.1016/j.ympev.2013.09.020>
- Hutton, T. & Benson, W.H. (1838) On land and fresh-water shells of the western Himálaya. *The Journal of the Asiatic Society of Bengal*, 7, 211–218.
- Kerney, M.P. & Cameron, R.A.D. (1979) *A field guide to the land snails of Britain and North-west Europe*. Collins, London, 288 pp.
- Köhler, F., Shea, M. & Kessner, V. (2019) Two new species of *Landouria* Godwin Austen, 1918 from Timor-Leste (Stylommatophora, Camaenidae). *Molluscan Research*, 39(3), 253–264. <https://doi.org/10.1080/13235818.2018.1557780>
- Kuroda, T. & Habe, T. (1949) *Helicacea. Sanmeisha*, Tokyo, 6 + 129 pp. [1 pl.] [in Japanese]
- Marwoto, R.M. (2016) The occurrence of the terrestrial snail from Sumatra (Mollusca, Gastropoda). *Zoo Indonesia*, 25, 8–21.
- MolluscaBase eds. (2025). *MolluscaBase. Landouria* Godwin-Austen, 1918. Available from: <https://molluscabase.org/aphia.php?p=taxdetails&id=995786> (2025-08-18).
- Nahok, B., Tumpeesuwan, S. & Tumpeesuwan, C. (2021) Five new species of the land snail genus *Landouria* Godwin-Austen, 1918 (Gastropoda, Camaenidae) from northeastern Thailand, with note on genitalia and radula morphology of *Landouria diplogramma* (Möllendorff, 1902). *European Journal of Taxonomy*, 767, 142–166. <https://doi.org/10.5852/ejt.2021.767.1495>

- Nahok, B., Chanlabut, U., Tumpeesuwan, S. & Tumpeesuwan, C. (2024) Two new species of *Landouria* Godwin-Austen, 1918 (Gastropoda, Camaenidae) from Thailand, with a key to Thai species. *ZooKeys*, 1208, 347–362. <https://doi.org/10.3897/zookeys.1208.117056>
- Nurinsiyah, A.S., Neiber, M.T. & Hausdorf, B. (2019) Revision of the land snail genus *Landouria* Godwin-Austen, 1918 (Gastropoda, Camaenidae) from Java. *European Journal of Taxonomy*, 526(526), 1–73. <https://doi.org/10.5852/ejt.2019.526>
- Páll-Gergely, B., Hunyadi, A. & Asami, T. (2013) A peculiar new species in the genus *Landouria* Godwin-Austen, 1918 from China (Gastropoda: Heterobranchia: Stylommatophora: Camaenidae). *Molluscan Research*, 33(2), 130–134. <https://doi.org/10.1080/13235818.2013.782794>
- Páll-Gergely, B., Hunyadi, A. & Hausdorf, B. (2020) A new species of *Landouria* Godwin-Austen, 1918 (Gastropoda: Stylommatophora: Camaenidae) from Myanmar. *The Raffles Bulletin of Zoology*, 68, 379–386. <https://doi.org/10.26107/RBZ-2020-0054>
- Pfeiffer, L. (1842) *Symbolae ad historiam Heliceorum, Part II [Sectio altera.]*. Kassel (Th. Fischer), 147 pp.
- Pfeiffer, L. (1862) Diagnoses de neuf espèces nouvelles provenant de Siam. *Journal de Conchyliologie*, 10(1), 39–46, pl 5 figs 1–7, pl. 6 figs 1–5.
- Pilsbry, H.A. (1893–1895) *Manual of Conchology: Structural and Systematic, with Illustrations of the Species. Second Series: Pulmonata. Volume 9. Helicidae Volume 7*. Academy of Natural Sciences of Philadelphia, Philadelphia, xlviii + 366 pp. [71 pls]
- Pilsbry, H.A. (1934) Zoological results of the Dolan West China Expedition of 1931, Part II, mollusks. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 86, 5–28. [pls 1–6]
- Raheem, D., Taylor, H., Ablett, J., Preece, R.C., Aravind, N.A. & Naggs, F. (2014) A systematic revision of the land snails of the Western Ghats of India. *Tropical Natural History*, Supplement 4: I–XIV, 1–244.
- Richardson, L. (1985) Camaenidae: catalog of species. *Tryonia*, 12, 1–479.
- Schileyko, A.A. (2004) Treatise on recent terrestrial pulmonate molluscs. Part 12. Bradybaenidae, Monadeniidae, Xanthonychidae, Epiphragmophoridae, Helminthoglyptidae, Elonidae, Humboldtianidae, Sphincterochilidae, Cochlicellidae. *Ruthenica*, (Supplement 2), 1627–1764.
- Schileyko, A.A. (2011) Check-list of land pulmonate molluscs of Vietnam (Gastropoda: Stylommatophora). *Ruthenica*, 21, 1–68.
- Schileyko, A.A. & Kuznetsov, A.G. (1998) Land snails of the genus *Landouria* Godwin-Austen, 1918 and some other Bradybaenidae of Nepal (Gastropoda, Pulmonata). *Ruthenica*, 8, 43–54.
- Tumpeesuwan, C. & Tumpeesuwan, S. (2019) First verified record of the genus *Landouria* Godwin-Austen, 1918 from Thailand (Gastropoda: Stylommatophora: Camaenidae) with description of a new species. *The Raffles Bulletin of Zoology*, 67, 298–305. <https://doi.org/10.26107/rbz-2019-0021>
- van Benthem Jutting, W.S.S. (1950) Systematic studies on the non-marine Mollusca of the Indo-Australian archipelago. II. Critical revision of the Javanese pulmonate landshells of the families Helicarionidae, Pleurodontidae, Fruticolidae and Streptaxidae. *Treubia*, 20, 381–505.
- van Benthem Jutting, W.S.S. (1959) Catalogue of the non-marine Mollusca of Sumatra and of its satellite islands. *Beaufortia*, 7, 41–191. [pls 1, 2, map]
- Zilch, A. (1966) Die Typen und Typoide des Natur-Museums Senckenberg, 35: Mollusca, Camaenidae (5). *Archiv für Molluskenkunde*, 95, 293–319.