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ARTICLE: Burch and Burch. Genus Olivella in eastern Pacific.... 1964 77(1):
1-8. Ariel to Guin library

THE NAUTILUS

Vol. 77

July, 1963

No. 1

GENUS OLIVELLA IN EASTERN PACIFIC

By JOHN Q. AND ROSE L. BURCH

The preparation of a key to species based upon shell characters is always a problem when working with any group. A dichotomous key giving the choice of two alternatives is in favor by many authors, but there are times when this is difficult. In some families, a key may be made simply on obvious morphological characters such as "shell with bands on the body whorl," and let taxonomy go where it may. However, in the Olividae, the worker will immediately be confronted with specimens that are certainly of the same species with some having one band, others 2 or 3 bands, and others with no bands. In the genus *Olivella*, in our opinion, the most dependable character is the pillar structure, and we have arranged the genus largely on this basis. Our opinion is that the multitude of names given to species of this family is because authors have failed to consider variation caused by races. The tendency of a single species to appear in numerous color forms is also a contributing factor.

In giving credit to those who have helped us, please do not assume that they agree with all our conclusions. We wish to acknowledge our indebtedness to Axel A. Olsson whose publication in 1956 of "Studies in the genus *Olivella*" is the most scholarly work on this genus to come to our hands. He has sent type specimens of his species from the eastern Pacific to us for study. Dr. A. Myra Keen helped us with advice, specimens, and the privilege of studying the Stanford collection. Dr. Leo G. Hertlein and Dr. G. Dallas Hanna made available to us the large collection and library of the California Academy of Sciences as well as many useful suggestions. Mr. and Mrs. E. P. Chace gave us free use of the material in the collections of the Natural History Museum of San Diego where we studied the collections of Herbert Lowe, A. M. Strong, and others. They also discussed many problems with us. Dr. S. S. Berry permitted us to study and photograph type specimens in his collection, and also gave us many

Olivella baetica (Marrat in Sowerby, 1871), (fig. 3), has been generally given to P. P. Carpenter, 1864, but Dr. Katherine Palmer, 1958, has shown that we cannot use Carpenter, but must give it to Marrat, who first figured and described it. A number of races have been named ranging from Alaska to far down the outer coast of Baja California, Mexico. We consider these of no systematic value with the possible exception of *Olivella porteri* Dall, 1910. This is placed in the synonymy, but it may be a recognizable race. It is a slender, deeper water form of *Olivella baetica*.

Olivella alba (Marrat in Sowerby, 1871), (fig. 1), was not well known as a species of this fauna prior to the work of A. Olsson, 1956. There are sets in almost all large collections incorrectly assigned to *Olivella inconspicua* (C. B. Adams 1852), *Olivella miriadina* (Duclos 1835), and others that are of this species.

Olivella tergina (Duclos, 1835), (fig. 21), is a common species around Mazatlan, scarcer in the Gulf of California. Surprisingly, it is often confused with *Oliva* (*Strephonella*) *undatella* (Lamarck, 1811). They have in common the strong lirae extending to near end of aperture, and are of somewhat similar shape and color, but the pillar of *Oliva undatella* is not secondarily excavated, and the posterior plicae are much stronger.

Typical specimens of *Olivella gracilis* (Broderip and Sowerby, 1829), (fig. 12), are more elongate with the whorls steeply descending. It is a large species of 20 mm. or more. However, there are many groups of shells with the identical pillar structure and even the color of *Olivella gracilis*, but varying greatly in both shape and size. We either have a great many more species or subspecies, or as we suspect, many races of one entity. *Olivella gracilis*, variety *gaylordi* Ford, 1894, (fig. 26), has the pillar structure of *Olivella gracilis*, but is much smaller with a well defined line of lead black bordering the upper part of the body whorl. The general color is bluish gray. Having studied the type lot we would consider this a good species or subspecies, but have failed to recognize it in any of the material we have seen.

We are satisfied that *Olivella walkeri* Berry, 1958, (fig. 23), is a distinct and recognizable species, but we are not pleased with the assignment of the author to subgenus *Macgintiella* Olsson, 1956. Olsson described this species based upon the type species

Olivella watermani McGinty mainly because of the peculiar radula, the rhachidian tooth of which is completely different from that shown in any other species. The radula was not shown in Olsson's work of 1956, and the above information is by personal communication, June 29, 1962. The pillar structure is that of *Olivella* s.s., and on shell characters alone we think that we are justified in placing *Olivella walkeri* Berry in the subgenus *Olivella*.

It has been our privilege to study the type lot of *Olivella versicolor* (Marrat in Sowerby, 1871), (fig. 27). We might accept this species, but have failed to recognize it in any of the material we have studied. The pillar structure is that of the *Olivella gracilis* group, and has been placed in the synonymy of that species by Dr. Myra Keen and others. Maxwell Smith in "Panamic Shells" figured it as a valid species ranging from Baja California to Ecuador. Weinkauff adds the note "Species dubiosa." We concur.

KEY TO EASTERN PACIFIC SUBGENERA AND SPECIES

- 1 Parietal callus not extending past apical end of aperture, or but little above it
 - 2 Columella basally with simple, or sometimes lirate, pillar fold. *Callianax* H. & A. Adams, 1853
 - 3 Columella ending in a simple plica
 - 4 Parietal callus not extending above aperture; shell ellipsoid with strong basal plica; 13 mm. (fig. 16) *pedroana* (Conrad, 1856)
 - 4 Parietal callus extending above aperture, but not to suture; shell ellipsoid; spire short, pointed; 14 mm. (fig. 14) *intorta* (Carpenter, 1856)
 - 4 Columella with one plait at base; body whorl yellowish or pinkish with 3 brownish red, spiral bands, with chestnut blotch at upper end of parietal wall; narrow brown band at base ending in basal notch; 4 to 5 mm. (fig. 25) *zonalis* (Lamarck, 1811)
 - 3 Columella ending in double plicae
 - 4 Shell broad and stout; spire conic; usually bluish gray, unicolor; 25 mm. (fig. 4) *biplicata* (Sowerby, 1825)
 - 4 Shell oblong; spire sharp-pointed; color grayish or drab, with darker spots; 15 to 20 mm. (fig. 3) *baetica* (Marrat in Sowerby, 1871)
 - 2 Columella basally with one plain fold, bordered externally by low groove; shell minute; spire turrit; small blunt nucleus; 3.5 mm. (fig. 13) *inconspicua* (C. B. Adams, 1852)

Minioliva Olsson, 1956

- 1 Parietal callus extending past aperture to or near suture
- 2 Pillar wall concave or deeply excavated; lirae of inner lip if present cut off sharply at inner ends.

- 3 Pillar and parietal wall covered fully by a thick callus; no pillar or parietal lirae at any stage *Pachyoliva* Olsson, 1956

- 4 Callus with short knob-like spire and large body whorl; spire and fasciole white; body whorl with 3 broad brown or bluish-gray, spiral bands; 14 mm. (fig. 8) *columellaris* (Sowerby, 1825)

- 4 Pillar and color pattern similar, but with higher, slenderer and sharply pointed spire, and less calloused; apical $\frac{1}{2}$ of body whorl with faint series of vertical striae; 15 mm. (fig. 20) *semistriata* (Gray, 1839)

- 3 Pillar with lirae along parietal and columellar wall

Olivella Swainson 1840

- 4 Pillar with 3 or 4 oblique lirae below and 3 shorter ones above; color white, often with much darker apex; conic spire half of length; 4 mm. (fig. 1) *alba* (Marrat in Sowerby, 1871)

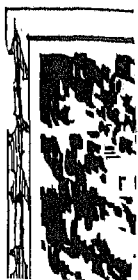
- 4 Pillar with 4 or 5 strong, descending lirae on basal part of columella; shell light and thin, with high turrit spire; color dull white or cream, sometimes with faint spots or flammules of brown in 3 zones (below suture and around middle and base); shape similar to *alba*, but with thinner shell; 7 to 8 mm. (fig. 18) *rehderi* Olsson, 1956

- 4 Pillar with one large fold below, followed above by a few small plaits which do not extend above the middle; wide fasciolar band of yellow or white; color white, variably marked with brownish or grayish zigzags; apex of spire and aperture violet; 18 to 20 mm. (fig. 9) *dama* (Wood, 1828)

- 4 Pillar with 6 or 7 strong lirae extending along parietal wall to near angle; shell narrowly egg-shaped; spire nearly $\frac{1}{2}$ length; color pattern gray or yellow blotches and arrow-shaped, white marks edged with brown; 16 mm. (fig. 21) *tergina* (Duclos, 1835)

- 4 Pillar similar to *tergina*, with 7 lirae, of which apical 3 arch around anterior canal; shell subellipsoid, spire less than $\frac{1}{2}$ length; color pattern of brown, zigzag lines and 2 dark bands just below the suture; fasciolar band with brown checks; 8.5 mm. *altatae* Burch & Campbell, 1963

- 4 Pillar with series of small lirae extending along col-



umellar part towards parietal wall; color gray or purplish brown shadings, formed by dense pattern of small dots spread over surface in ill-defined bands; related to *tergina* but separable by more ellipsoid shape; 17.5 mm. (fig. 6) *brogii* Olsson, 1956

4 Pillar deeply excavated; 6 or 7 rather uniform and heavy folds on columella; shell slender fusiform; color whitish with irregular reticulations; 20 mm. (fig. 12) *gracilis* (Broderip & Sowerby, 1829)

4 Pillar and color as in *gracilis*, but smaller, with shorter spire and more heavily calloused whorls; 10 mm. (fig. 7) *cocosensis* Olsson, 1956

4 Pillar with several small lirae extending upward along about $\frac{1}{2}$ of inner lip; shell thin, white or yellowish brown, translucent except for opaque white fasciole; spire elevated, evenly tapering; suture narrowly grooved with the junction showing through as a faint line; 10 mm. (fig. 10) *drangai* Olsson, 1956

4 Pillar with narrow raised plate bearing 5 or 6 entering folds; fasciole smooth and wide; color light yellowish brown on whitish or creamy ground; parietal callus thinning out before reaching the suture; 10 mm. (fig. 11) *fletcheriae* Berry, 1958

4 Pillar similar to *fletcheriae*, with 8 to 10 fairly equal plicae set apart from parietal callus; fasciolar band white with brown bars or squares; color gray with 2 bands below suture joined with narrow brown bars; parietal callus semitransparent; interior of outer lip dark brown; 10 mm. *steveni* Burch & Campbell, 1963

4 Pillar similar to *steveni*; 10 lirae on columella almost to apertural angle; upper folds wider and flat, becoming narrower anteriorly with 8th and 9th most prominent; shell obese, white with brown markings; subsutural spiral bands more intense; fasciolar band with brown blotches; interior of outer lip brown; 10 mm. *steveni campbelli* Burch & Campbell, 1963

4 Deep brown callus extending upward past end of aperture, but not quite to suture; upper part of fasciole brown but white below; interior of outer lip dark brown; color and form similar to *volutella*, but with pillar like *Olivella* s.s.; 15 mm. (fig. 5) *bitleri* Olsson, 1956

4 Pillar weak, forming a low ridge along columella, finely lirate below; shell thin, spindle shaped with elevated spire; gray-yellow base color mottled by small brown blotches, which form short crooked lines at su-

- ture; interior of outer lip deep brown; 12.7 mm. (fig. 19) *riverae* Olsson, 1956
- 4 Pillar similar to *riverae*, with 12 lirae forming a narrow area along columella; wider upper folds becoming narrow and more vertical basally; inflated shell white covered by small brown spots, with 2 narrow brown bands below suture joined with vertical bars; fasciolar band spotted with brown and rest of fasciole with several brown arcs; 15 mm. *sphoni* Burch & Campbell, 1963
- 4 Sulcate fold bounding canal, with 2 plicae below and several above; parietal callus heavy, wide, sharply bounded, extending to whorl above; color spire and fasciole ivory yellow, rest whitish, indistinctly marked with pale brown, few minute spots under suture; aperture $\frac{2}{3}$ shell. 10.5 mm. (fig. 23) *walkeri* Berry, 1958
- 2 Parietal wall not excavated; lirae of inner lip continuing undiminished into interior. *Lamprodoma* Swainson, 1840
- 3 Lirae numerous, extending upward along pillar to edge of fasciole, absent from wall above; spindle shaped with high spire. 19 mm. (fig. 22) *volutella* (Lamarck, 1811)
- 3 Plicae fewer and shorter, confined to columellar part. *Zanoetella* Olsson, 1956
- 4 Pillar with 4 to 5 long plicae around anterior end; color white with 2 purplish-brown spiral bands. 17 mm. (fig. 24) *zanoeta* (Duclos, 1835)
- 3 Lirae on pillar wall forming a separate structure in form of tongue-shaped ridge; interior of outer lip with fine, low lirae. *Dactylidella* Woodring, 1928
- 4 Spire high and slender; color zigzag pattern of darker lines; fasciole solid brown. 18 mm. (fig. 2) *anazora* (Duclos, 1835)
- 3 Pillar forming tongue along inner lip, widest below where it extends outward assuming a hook-shaped form; rest evenly and finely crenulate; outer lip sharp. *Niteolina* Olsson, 1956
- 4 Pillar finely lirate terminating in larger denticle at each end; narrowly subovate with high conic spire; color gray with brown zigzag lines on white or yellow base edged with gray or brown; parietal callus white; fasciole wide, double; upper band narrow, white or colored, lower band gray or brown. 13 mm. (fig. 17) *peterseni* Olsson, 1956
- 4 Pillar with about 7 small lirae between upper and lower denticles; outer lip smooth; color dull white with zigzag dark-brown marks; spire whorls white; fasciole

wide, dark brown in color except narrow white band above. 9 mm. (fig. 15) *morrisoni* Olsson, 1956

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SUPPLEMENTARY NOTES ON PRE-COLUMBIAN
LITTORINA LITTOREA IN NOVA SCOTIA

By A. H. CLARKE, JR.
National Museum of Canada

Recently Erskine (1961) and Clarke and Erskine (1961) recorded the occurrence of *Littorina littorea* L. in two ancient Micmac Indian camp sites excavated near Halifax, Nova Scotia. The presence of distinctive Indian artifacts, reindeer bones, and thickened valves of *Mercenaria mercenaria* found associated with

valued comments. The Public Museum of Liverpool, England, sent type specimens of *F. P. Marrat* for us to study. Dr. R. Tucker Abbott of the Academy of Natural Sciences of Philadelphia sent the holotype of *Olivella bitleri* Olsson, and a paratype of *Olivella gracilis gaylordi* Ford. Dr. Harald Rehder of the United States National Museum sent the type of *Olivella morisoni* Olsson for our study.

All measurements mentioned are either of the type specimen or are approximate. Plate 1 contains figs. 1 to 9; pl. 2, figs. 10 to 18; and plate 3, facing page 28, figs. 19 to 27.

The acceptance of *Olivella pedroana* (Conrad 1856), and placing *Olivella pycna* Berry, 1935 (fig. 16) in synonymy is a controversial matter. We are satisfied that they are the same species, but there are many who object to the use of a name based upon a fossil when there is any question involved. A study of the soft parts of *Olivella pedroana* is obviously impossible. Furthermore, Conrad's type was lost. Dr. W. P. Woodring selected a lectotype and placed it in the U. S. National Museum. The validity of this action is the source of another controversy. We have no quarrel with those who prefer to use the name *Olivella pycna* Berry, 1935.

Olivella intorta Carpenter, 1856, has been questionable for many years, but specimens from Magdalena Bay, Baja California, Mexico (fig. 14) seem to fill all details of Carpenter's description.

Olivella zonalis (Lamarck, 1811), (fig. 25), presents a problem if we are to use numerous subgenera. It will key out into the same group with those of the subgenus *Callianax*, but it possibly should have a subgeneric name to contain it.

The small turrit species, *Olivella inconspicua* (C. B. Adams 1852) (fig. 13), was not well known until Dr. Ruth Turner published her work on the C. B. Adams types. The species seems to be strictly confined to Panama, but many sets are in collections incorrectly assigned to this species. Most of them seem to be *Olivella alba* (Marrat in Sowerby), which is a very different shell.

Numerous varieties of *Olivella biplicata* (Sowerby, 1825), (fig. 4), have been given names. We dismiss the white *lapillus* along with *fucana*, *angelena*, *parva*, and others as mere forms with no systematic value.