

## Two unusual keyhole limpets (Mollusca: Gastropoda: Fissurellidae) from southern California

Charles L. Powell, II <sup>1</sup> and Cheryl D. Millard <sup>2</sup>

<sup>1</sup> U.S. Geological Survey, Menlo Park, California 94025; [powell2@sbcglobal.net](mailto:powell2@sbcglobal.net)

<sup>2</sup> 4024 North West Country Lane, Bremerton, Washington 98312; [dyes.inlet.limpet@gmail.com](mailto:dyes.inlet.limpet@gmail.com)

**ABSTRACT** Two small keyhole limpets (Mollusca: Gastropoda: Fissurellidae) were collected live by the senior author and his father (Charles Powell) in the winters of 1967 and 1968 from the side/bottom of moderately flat rocks in the low intertidal zone at Doheny Beach State Park, Dana Point, Orange County, southern California. The larger specimen was collected in the winter of 1968 and the small specimen was collected in winter of 1967. These specimens resemble the genus *Lucapinella* yet do not quite match any of the known species. The shells are also somewhat similar to *Dendrofissurella scutellum* from South Africa and two species of *Amblychilepas* from Australia, however neither of the Dohney Beach specimens can be attributed to those species. This possible new species is assigned to the genus *Lucapinella* and remains unnamed until additional specimens can be located to determine if they are a new species, a rare exotic species, or a very unusual, miniature *L. callomarginata*.

**KEYWORDS** Mollusca, Fissurellidae, keyhole limpet, intertidal zone, southern California

### INTRODUCTION

Two small fissurellid limpets attributed to the genus *Lucapinella* were collected by the lead author and his father, Charles Powell (deceased), one each during the winter months of 1967 and 1968 from Dohney Beach State Park, Orange County, California. These two specimens are different from any known eastern Pacific *Lucapinella*, and are described and illustrated here.

### Measurements:

Measurements are defined as follows: **height**= the greatest distance between the dorsal and ventral termini; **length**= the greatest distance between the anterior and posterior termini; **width**= the greatest distance between the dorsal and ventral surfaces.

### Abbreviations:

Institution abbreviations include **CAS IZ**= Invertebrate Zoology section, California Academy of Sciences, Golden Gate Park, San Francisco, CA; **LACM**= Malacology Department, Natural History Museum of Los Angeles County, Los Angeles, CA; **USGS**= U.S. Geological Survey, Menlo Park, CA campus; **TBD**= to be determined (type numbers could not be obtained due to the current pandemic).

### SPECIMEN DESCRIPTIONS

The larger specimen (Figures 1 A-C) appears somewhat worn and is about 16.7 mm long, 9.3 mm wide, and 4.2 mm high. The color is split into four parts as if there is an X centered on the apical orifice. Coloration of the top and bottom quadrants is reddish and the side quadrants are off-white to gray and somewhat blotchy. The apical orifice is a bit less than 1/6<sup>th</sup> the shell

length and located dorsally about the center of the shell, is generally broadly over, although the larger specimen appears to have been injured and the left side of the orifice is almost pointed. The sculpturing consists of major scabbarded ribs with a smaller secondary scabbarded rib mid-way between the major ribs and tertiary scabbard ribs between the major and secondary ribs with riblets on either side. The interior of the shell shows smooth margins, a trait unusual in *Lucapinella*. On the ventral side and interior of the shell margins is a muscle scar, which is rounded at the bottom and slightly pinched about the apical orifice. The scar then widens before inclining to a broadly rounded point at the top. Around the apical orifice is a broad scar about the same shape as the apical orifice but not thickened to any extent, as seen in most *Lucapinella*.

The smaller specimen (Figures 1D-F) also appears worn and is about 14.6 mm long, 8.2 mm wide, and 3.5 mm high. The coloration is different in this specimen with reddish rays extending out from the center of the shell at angles centered around approximately 20°, 160°, 200° and 320°, or approximately 20° from center on the anterior end and approximately 20° from center on the posterior end. Around the apical orifice is an irregular white area with rounded lobes. Between the rays the color is blotchy light brown to cream. Sculpturing is the same as on the larger specimen. The upper right of the shell is presumed to have been injured with a shelf of whitish shell beyond the normal shell margin. The apical orifice is broadly rounded at the top and is widest approximately at its center. The interior of the shell shows smooth margins (unusual in *Lucapinella*) and the healed damage along the upper right margin resulted in a rounded indentation. Interior of the shell margins is a muscle scar rounded at the bottom and slightly pinched about the apical orifice, and then broadening and inclined to

irregular points. Around the apical orifice is a broad scar about the same shape as the apical orifice but not thickened to any extent as in most *Lucapinella*.

## DISCUSSION

Members of the family Fissurellidae from California are divided into 11 genera: *Cranopsis*, *Cornisepta*, *Diodora*, *Emarginula*, *Fissurella*, *Fissurellidae*, *Lucapinella*, *Megathura*, *Puncturella*, *Rimula*, and *Scelidonta*. Of these, the Doheny Beach State Park specimens most closely match the genus *Lucapinella* and they are assigned to that genus. The assignment is somewhat questionable because in profile the anterior and posterior ends bend up significantly and this is not a feature seen in other *Lucapinella*. Other Fissurellidae genera from California are easily separated from these specimens in shell form alone. However the South African species *Dendrofissurella scutellum* (Gmelin, 1791) and *Amblychilepas platyactis* McLean and Kilburn (1986), and the Australian species *Amblychilepas nigrata* (Sowerby, I, 1835) have similar shells that have their anterior and posterior margins bend away from the substrate as do the Doheny Beach specimens.

These specimens compare favorably with the northeastern Pacific genus *Lucapinella* but are easily distinguished from all known species in that genus. In addition, they compare favorably with the South African fissurellids *Dendrofissurella scutellum* and *Amblychilepas platyactis* McLean and Kilburn (1986), and the Australian fissurellid *Amblychilepas nigrata* but can also be distinguished from those species in the shape of the shell.

In the eastern Pacific the genus *Lucapinella* is composed of five species including *L. aequalis*

(Sowerby, 1834), *L. callomarginata*, *L. crenifera* (Sowerby, 1835), *L. eleanorae* McLean (1967), and *L. milleri* Berry (1959) (Keen, 1971). The only southern California species of *Lucapinella*, *L. callomarginata*, found from Morro Bay, Monterey County, central California south to Bahia Magdalena, Baja California Sur, México from the low intertidal to 20 m (LACM collections), differs by its larger size, differently shaped apical orifice, fluting on the interior of the shells outer margin, coloration, and sculpture. Additionally, *L. callomarginata* has a profile which is relatively straight to and from the apical orifice, while the Doheny Beach specimens the profiles are slightly concave.

*Lucapinella aequalis* that occurs from Puerto Guatulco, Oaxaca, México, south to Punta Santa Elena, Santa Elena Province, Ecuador (Keen, 1971) can be distinguished from the Doheny Beach specimens by its parallel sides raised and narrow callus on the inside of the apical orifice. The Doheny Beach specimens appear very similar to *L. crenifera*. *Lucapinella crenifera* lives considerably further south occurring from Salinas, Ecuador, south to Bahía Independencia, Pisco Province, Peru and the Islas Galápagos. It can be separated from the Doheny Beach specimens by its narrow apical orifice, coloration, and the number and shape of secondary radial riblets. The smaller and differently colored *L. eleanorae* McLean (1967) found from Guaymas, Sonora, México south to Punta Santa Elena, Santa Elena Province, Ecuador (McLean, 1967) can be distinguished by its coarser sculpture and small oval apical orifice. Lastly, *L. milleri* Berry (1959), which occurs throughout the Golfo de California, south to Archipelago de las Perlas, Panama Bay, Panama (Keen, 1971) is easily distinguished by its small size with a relatively large apical orifice and details of its sculpture.

Four other species living in South Africa, Australia, and the eastern United States, *Amblychilepas nigrita*, *A. platyactis* McLean and Kilburn (1986), *Dendrofissurella scutella*, and *Lucapinella limatula* (Reeve, 1850), have shells similar to the Doheny Beach specimens. Some specimens of the western Atlantic species *L. limatula* are remarkably similar to the *Lucapinella* in question. However, they can be distinguished by their apical orifice that is typically pinched in at its top as well as the side profile of the shell that does not show an elevated anterior and posterior end as our specimens do. The South African species *D. scutella* is also similar but can be easily distinguished by its parallel sides and by the shape of the apical orifice. The Australian species *A. nigrita* is also similar but can be distinguished by its straight sides and different shaped apical orifice, which is larger in proportion to the length of its shell. Similarly, the South African species *A. platyactis* McLean and Kilburn (1986) can be distinguished by its differently shaped apical orifice.

Although they were collected live the soft tissue was not retained and additional specimens have not been found in the following 50 years. Because this study is limited to only two shells collected over 50 years ago and no soft tissue was preserved they are not described as new. It is preferred that additional specimens be collected with soft tissue for genetic analysis to ensure these are not simple aberrant specimens of *Lucapinella callomarginata* (Dall, 1871) or an exotic taxon transported to the area by a boat (which seems highly unlikely) as no species matching these two specimens are known worldwide.

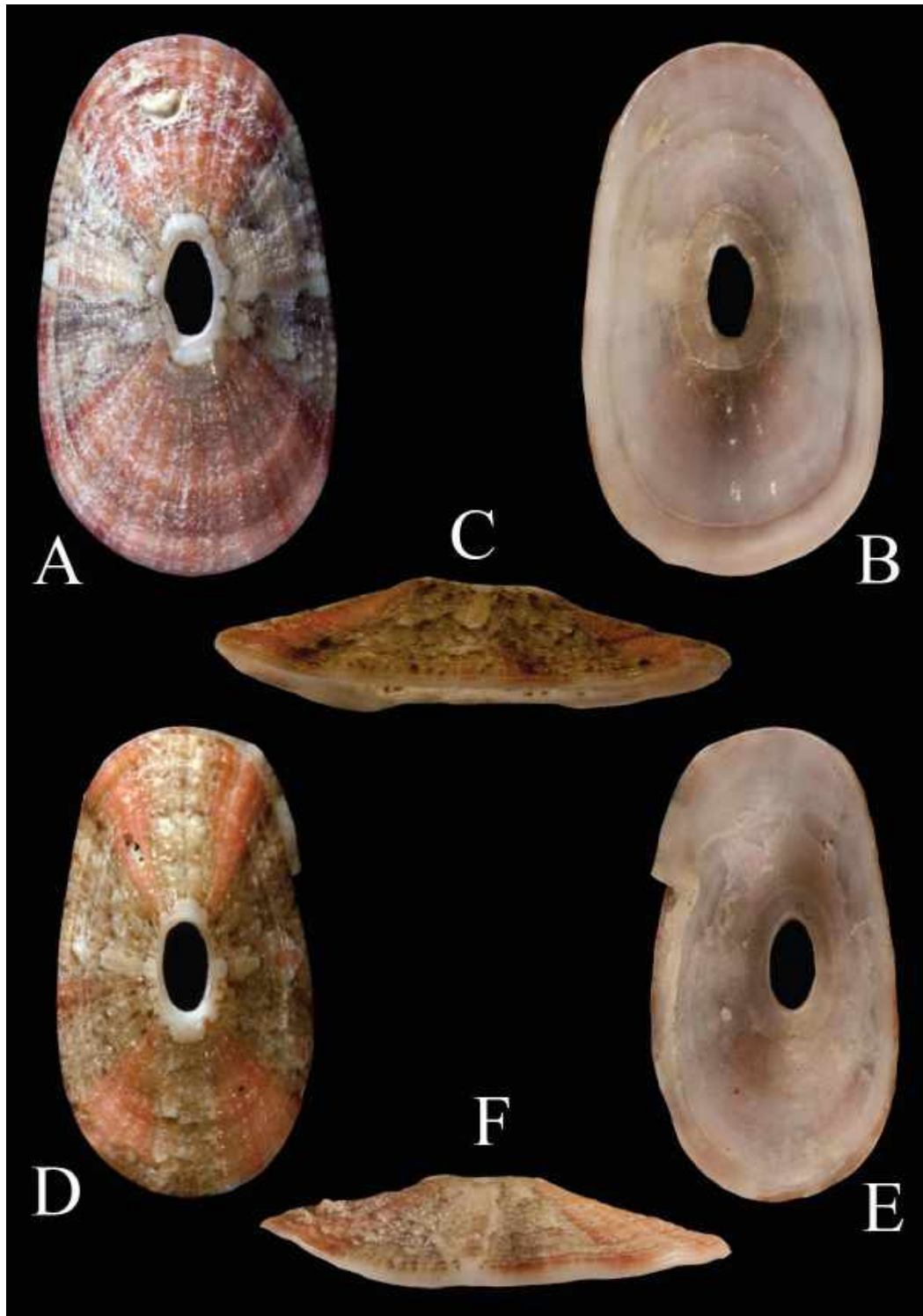
## ACKNOWLEDGEMENTS

We thank Lindsey T. Groves (LACM) for the photographs of *Lucapinella eleanorae* used for comparison with our specimens and his helpful review of the manuscript. Elizabeth Kools (CAS IZ) is thanked for allowing the senior author to examine specimens in her care. We also thank the reviewers Lindsey T. Groves (LACM), Mary McGann (U.S. Geological Survey), and an anonymous reviewer.

## LITERATURE CITED

- Berry, S.S., 1959.** Notes of new eastern Pacific Mollusca—III. Leaflets in Malacology, v. 1, no. 18, p. 108-113.
- Dall, W.H., 1871.** On some new or interesting west American shells obtained from the dredgings of the U.S. Fish Commission steamer Albatross in 1888, and from other sources. U.S. National Museum Proceedings, v. 14, no. 849, p. 173-191.
- Gmelin, J.F., 1791.** Caroli a Linné Systema naturae per regna tria naturae. Editio decima tertia. Leipzig, v. 1, pt. 6, Vermes, p. 3021-2910.
- Keen, A.M., 1971.** Sea shells of Tropical West America: Marine Mollusks from Baja California to Peru (second edition). Stanford. Stanford University Press, 1064 p.
- McLean, J.H., 1967.** West American species of *Lucapinella*. The Veliger, v. 9, no. 3, p. 349-352.
- McLean J.H. and R.N. Kilburn. 1986.** Propodial elaboration in Southern African and Indian Ocean Fissurellidae (Mollusca: Prosobranchia) with descriptions of two new genera and one new species. Contributions in Science, Natural History Museum of Los Angeles County 379:1-12.
- Reeve L.A. 1849-1850.** Monograph of the genus *Fissurella*. In Conchologia Iconica, v. 6, pl. 1-16 and unpaginated text. L. Reeve & Co., London, available online at <https://www.biodiversitylibrary.org/page/9142046>.
- Sowerby, G.B., I. 1834-1845.** Characters of new genera and species of Mollusca and Conchifera, collected by Mr. Cuming. Proceedings of the Zoological Society of London, for 1834:6-8 (14 May 1834), 17-19, 21-22 (17 June 1834), 44-47 (6 September 1834), 68-72 (25 November 1834), 87-89 (25 October 1834), 123-128 (20 March 1835).
- Sowerby, G.B., I. 1835.** Characters of and observations on new genera and species of Mollusca and Conchifera collected by Mr. Cuming. Zoological Society of London Proceedings, for 1834, p. 4-7 (April 3), p. 21-23 (April 16), p. 41-47 (June 1), p. 49-51 (July 17), p. 84-85, 93-96 (September 25), 109-110 (October 9).

Authors' note: If anyone has additional specimens of this potentially new species in their collections we would like to examine them.



**Figure 1.** *Lucapinella* species indeterminate. Collected from the low intertidal zone at Doheny Beach State Park, Dana Point, Orange County, southern California. **A, B, C**= 16.7 mm long, 9.3 mm wide, 4.2 mm high (A. Dorsal view, B. Ventral view, C. Side view); **D, E, F**= 14.6 mm long, 8.2 mm wide, 3.5 mm high (D. Dorsal view, E. Ventral view, F. Side view). These specimens will be deposited with the Invertebrate Zoology section of the California Academy of Sciences when employees of the Academy can return to work after the current pandemic.