

A New *Eclogavena* (Gastropoda: Cypraeidae) from the Northern Sulu Sea, Philippines

Edward J. Petuch¹ and Robert F. Myers²

¹Department of Geosciences, Florida Atlantic University, Boca Raton, Florida 33431
epetuch@fau.edu

²Seaclicks/Coral Graphics, Wellington, Florida 33411
robmyers1423@gmail.com

ABSTRACT: A new cypraeid cowrie shell of the genus *Eclogavena* Iredale, 1930 is described from the northern Sulu Sea, southern Philippine Islands. The new taxon, *Eclogavena dayritiana mondejarorum* Petuch and Myers, new subspecies, is described as a subspecies of the widespread Sulu Sea *E. dayritiana* (Cate, 1963) and differs in being a more inflated and lighter-colored, pale blue and white shell. The new subspecies is also compared to the closely-related *E. dani* (Beals, 2002) from deep water off Palawan Island, Sulu Sea, but differs in being a less pyriform, less inflated, and much lighter colored shell. The three Sulu Sea *Eclogavena* species differ greatly in their ecological and bathymetric preferences: *E. dayritiana* lives under coral rubble in intertidal depths, and is often exposed at low tide; *E. dani* prefers coral rubble areas in 25-150 m depths; and *E. dayritiana mondejarorum* lives only inside giant sponges, growing on steep reef walls, in 30 m depth. The three closely-related taxa appear to represent a localized species radiation of *Eclogavena* cowries that is confined to the Sulu Sea.

INTRODUCTION

The genus *Eclogavena* Iredale, 1930 represents a compact group of small, reef-associated erroneinine cowries that are restricted to the western Pacific. Altogether, five species and two subspecies are currently recognized in the genus and include: *Eclogavena coxeni* (Cox, 1873) from Papua New Guinea and the Solomon Islands; the subspecies *E. coxeni hesperina* Schilder and Summers, 1963 from eastern Papua New Guinea and the Louisiade and Bismarck archipelagoes; *E. luchuana* (Kuroda, 1960) from Ryūkyū-shotō, Japan; *E. dayritiana* (C. Cate, 1963) from northern Palawan Island, the Calamian Group, Coron and Culion Islands, and the Cuyo Pass region of the northern Sulu Sea, Palawan Province, Philippines; *E. dani* (Beals, 2002), from southern Palawan Island,

Balabac Island, and the southern Sulu Sea, Palawan Province, Philippines; *E. quadrimaculata* (Gray, 1824), ranging from the Philippines south to Papua New Guinea, the Gulf of Carpentaria and Torres Strait, and south to the Great Barrier Reef and the Queensland coast; and the subspecies *E. quadrimaculata thielei* (Schilder and Schilder, 1938) from northwestern Australia. With the exception of specimens of *E. quadrimaculata thielei* from the Indian Ocean coast of northwestern Australia, all members of the genus are confined to an area of the Pacific Ocean ranging from Shikoku, Japan south to the Great Barrier Reef of Queensland, Australia, and east to the Solomon Sea and the Solomon Islands.

Throughout the range of the genus, most of the species can be found in intertidal or shallow water areas (0-2 m depths), where they occur in

coral rubble or under slabs of dead coral near sea grass beds. A preference for this type of habitat was observed by the senior author in the Torres Straits of northeastern Australia (for *Eclogavena quadrimaculata*), in Tean Bay, Amami-Ōshima, Ryūkyū-shotō, Japan (for *E. luchuana*), and on Nimoa Island, Calvados Chain of the Louisiade Archipelago, Solomon Sea (for *E. coxeni*). Similar shallow water coral rubble habitats for *Eclogavena* species were also observed at Madang, Papua New Guinea for *E. coxeni hesperina* (Harvey, 1973), and at Tangat Island, off Coron Island, Palawan Province, Philippines for *E. dayritiana* (Rawlings, 2009). The only known ecological exception is seen in the recently-discovered *E. dani*, which prefers deep water coral rubble areas, ranging in depth from 25 m (at the type locality off Balabac Island, Palawan Province, southern Sulu Sea, Philippines; (Beals, 2002)) to 150 m (from dredged specimens off southern Palawan Island; Rawlings, 2009). Of all these species, only one, *E. quadrimaculata*, has a wide geographical range and occurs wherever the proper environment presents itself between southern Queensland and the Philippines. The northernmost member of the species complex, *E. luchuana*, also has a wide range, extending from Okinawa to northern Shikoku, Japan. In contrast to these wide-ranging species, all of the other congeners are restricted to small geographical areas, such as *E. dayritiana* to the region of the northern Sulu Sea (see Cate, 1963), *E. dani* to deep water areas of the southern Sulu Sea (Beals, 2002), and *E. coxeni* and *E. coxeni hesperina* to the area of the Solomon and Bismarck seas.

The 2002 discovery of a deep water *Eclogavena* species opened up the possibility that other previously-unknown congeners may be present in the unexplored deeper water areas within the Sulu Sea. This supposition was confirmed by the recent discovery of a shallow neritic subspecies of *E. dayritiana* found off

Nangalao Island in the northern Sulu Sea, Palawan Province, Philippines. Here, in depths of 20-30 m, this new member of the Sulu Sea *Eclogavena* species complex was found to be living inside giant sponges that grow on the steep reef walls along the eastern side of the island. This is a completely different type of habitat from those preferred by the other members of its genus, and this may explain why this distinctive cowrie has remained unnoticed until now. Close examination of the Nangalao Island cowrie showed that it exhibits shell characteristics of both the shallow water *E. dayritiana* and deeper water *E. dani*, but is morphologically closest to the former species. Because of this, it is described herein as a sponge-dwelling, bathymetric subspecies of the shallow water *E. dayritiana* that is confined to the northern Sulu Sea. The presence of three endemic *Eclogavena* cowries in the Sulu Sea area clearly demonstrates that the genus is undergoing a localized adaptive radiation, with members having moved into different biotopes, including shallow and deep water coral rubble environments and deep water sponge habitats. Future research, including DNA and isoenzyme studies, may show that *E. dayritiana mondejarorum* represents a full separate species that has evolved to live in deep water sponge bioherms. The holotype and a paratype of the new subspecies are deposited in the type collection of the Section of Malacology, Natural History Museum of Los Angeles County, Los Angeles, California.

SYSTEMATIC SECTION

Class Gastropoda Cuvier, 1795

Subclass Orthogastropoda Ponder and Lindberg, 1997

Order Sorbeoconcha Ponder and Lindberg, 1995

Suborder Hypsogastropoda Ponder and Lindberg, 1997

Superfamily Cypraeoidea Rafinesque, 1815

Family Cypraeidae Rafinesque, 1815

Subfamily Erroneinae Schilder, 1927

Tribe Erroneini Schilder, 1927

Genus *Eclogavena* Iredale, 1930

***Eclogavena dayritiana mondejarorum* new
subspecies
(Figure 1A, B, C, D, E)**

Description: Shell of average size for genus, inflated, bulliform, with high domed dorsum; margins rounded, only slightly thickened on adults; extremities projecting, with anterior extremity being best developed and most protracted; posterior extremity rounded; posterior end with depressed spire area, producing deep pit with exposed protoconch at bottom; edge of posterior pit ornamented with 12-15 large elongated beads, producing distinct coronation pattern; exposed protoconch deep purple-black in color; base color of shell pale cream-white with single large, amorphous, slightly rectangular sky blue patch on mid-dorsum, and with smaller, separate sky blue spot on anterior end; extremities, margins, and base of shell white or pale cream-white; entire dorsum covered with sparse sprinkling of small orange-tan irregular speckles, arranged in loose network; speckles often align to form long parallel streaks perpendicular to shell axis; base of shell rounded; aperture narrow, slightly recurved posteriorly; columella and inner edge of aperture with 16-18 very large, thin, elongated teeth that extend all along shell base to edge of margin; some teeth bifurcate to form secondary interstitial teeth; outer lip with 14-16 very large, thin elongated teeth that also extend along shell base as far as edge of margin; fossula poorly developed, with 3 large teeth; interior of aperture white with brown mottling that corresponds to dorsal color patches.

Type Material: Holotype- length 15.5 mm, width 9 mm, LACM 3263 (Figure 1A, B, C); Paratypes- length 14 mm, LACM 3277 (Figure 1D, E), same locality as the holotype; length 17 mm, same locality as the holotype, in the research collection of the senior author; length 18 mm, same locality as the holotype, in the research collection of the junior author; length

16 mm, same locality as the holotype, in the Douglas Jeffrey collection, Starke, Florida. The type lot was collected by Capt. Douglas Jeffrey and members of the Mondejar Family while on an exploratory diving trip.

Type Locality: Found inside a large sponge that was growing on a steep reef wall in 20 m depth, off the eastern coast of Nangalao Island, Palawan Province, northern Sulu Sea, Philippines.

Range and Ecology: The new subspecies is presently known only from Nangalao Island, east of Linapacan Island, but may also be present on neighboring Beni Island and other smaller islands in the northern Sulu Sea, Palawan Province, Philippines. The new subspecies was found living deep within the oscula and interconnected prosopiles of large *Ircinia*-type sponges in 20-35 m water depth. The subspecies may be present in similar habitats throughout the northern Sulu Sea.

Etymology: Named for Lani Mondejar Jeffrey, wife of Capt. Douglas Jeffrey, and the Mondejar Family of Palawan, Philippines.

Discussion: This new northern Sulu Sea cowrie is named as a subspecies of the Coron, Culion Islands, and northern Palawan Province ranging *Eclogavena dayritiana* (Figure 1F, G, H), based primarily upon its general morphological similarities in color pattern, size, and dentition structure. *Eclogavena dayritiana mondejarorum* differs from the nominate subspecies, however, in being a much more inflated and pyriform shell with a distinctly higher and more domed dorsum, in being a paler colored shell with a white base color, large sky blue patches, and scattered pale tan specklings, and by having proportionally larger and better developed coronations around the rim-like edge of the spire depression. *Eclogavena dayritiana dayritiana* is a noticeably darker colored, more

slender and cylindrical shell than is its deep reef, sponge-dwelling offshoot from the isolated central northern Sulu Sea. The tendency for the dorsal speckling to align in parallel stripes is also better developed on the new subspecies.

Eclogavena dayritiana mondejarorum is also similar to the deeper water southern Sulu Sea *E. dani* (Figure 1 I. J. K), but differs in the following shell characteristics: in being a smaller and less bulbous shell, having less developed and stubbier extremities, having more poorly-developed calloused margins, being a much paler-colored shell, lacking the dense dark brown mottling on the dorsum, and having a white base color instead of yellow. The labial dentition of *E. dani* is extremely well developed, extending across the entire shell base and up onto the sides of the labial margin, while that of *E. dayritiana mondejarorum* is far less developed, extending only across the shell base. The southern Sulu Sea *E. dani* has a dark yellow or pale orange coloring on and around the apertural dentition, while the apertural area of the northern Sulu Sea *E. dayritiana mondejarorum* is uniform white or pale cream-white. The marginal callouses of *E. dani* are also proportionally much thicker than those on the new subspecies and cover the entire protoconch, not leaving it exposed as seen on *E. dayritiana mondejarorum*.

ACKNOWLEDGEMENTS

We thank Capt. Douglas Jeffrey and Mrs. Lani Mondejar Jeffrey of Starke, Florida and Palawan Island, Philippines, and the Mondejar Family of Palawan Province, Philippines, for collecting and generously donating the type lot of the new cowrie.

REFERENCES

- Beals, M.N. 2002.** A new species of *Blasicrura* Iredale, 1930 (Gastropoda: Cypraeidae) from the Philippines. *La Conchiglia* 34(303): 15-17, figs. 1-10.
- Cate, C.N. 1963.** A new cowrie (Mollusca: Gastropoda) from West-Central Philippines. *The Veliger* 5(4): 140-143, fig. 1, pl. 15.
- Harvey, G. 1973.** Collecting *Cypraea coxeni hesperina* at Madang. *Hawaiian Shell News* 21 (8): 4-5, figs. 1-5 + 1 unnumbered fig.
- Rawlings, C.E. 2009.** *Cypraea (Eclogavena) dayritiana*- Dayrit's Cowrie. *American Conchologist* 37 (3): 28-30, figs. 1-8 + 1 unnumbered fig.



Figure 1. *Eclogavena* Cowries from the Sulu Sea, Philippines.

A, B, C= *Eclogavena dayritiana mondejarorum* Petuch and Myers, new subspecies. Dorsal, ventral, and lateral views of the holotype, length 15.5 mm. Found in sponges, 20 m depth off the eastern coast of Nangalao Island, Palawan Province, northern Sulu Sea. LACM 3263. **D, E**= *Eclogavena dayritiana mondejarorum* Petuch and Myers, new subspecies. Dorsal and ventral views of the paratype, length 14 mm. Found in sponges, 20 m depth off the eastern coast of Nangalao Island, Palawan Province, northern Sulu Sea. LACM 3277. **F, G, H**= *Eclogavena dayritiana* (C. Cate, 1963), dorsal, ventral, and lateral views of a 16 mm specimen. Collected under coral rubble at low tide, Coron Island, Palawan Province, northern Sulu Sea, Philippines. **I, J, K**= *Eclogavena dani* Beals, 2002, dorsal, ventral, and lateral views of a 19 mm specimen. Found in coral rubble on the deep fore-reef, 30 m depth, off Balabac Island, Palawan Province, southern Sulu Sea, Philippines. From the lateral views, note that *E. dayritiana* has the lowest and most compressed dorsum, *E. dayritiana mondejarorum* has a higher and more domed dorsum, and that *E. dani* has the highest, most inflated, and most domed dorsum.