

A New Species of *Harpa* (Gastropoda: Harpidae) from the Coral Sea Archipelagos of Queensland, Australia

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ABSTRACT A new species of *Harpa*, closely related to the widespread Indo-Pacific *Harpa major* Röding, 1798, is described from the Coral Sea archipelagos east of the Great Barrier Reef system of Queensland, Australia. The new taxon, *Harpa queenslandica*, differs from *Harpa major* in being consistently a smaller and more lightweight shell, in having fewer varices per whorl, in having a much paler shell color, and in having a proportionally-larger protoconch that is composed of 3 ½ whorls.

KEY WORDS *Harpa*, Harpidae, Coral Sea, Queensland, Australia.

INTRODUCTION The shallow water (0-20 m) areas along the Swain Reefs (Mackay/Capricorn Management Area) and the central Great Barrier Reef (Townsville/Whitsunday Management Area) of southern Queensland State, Australia, have long been known to house an unusually-rich molluscan fauna with a high level of endemism. The coral reef complexes of this region are renowned for containing an exceptionally-large and remarkable species radiation of the volutid genus *Cymbiola* (*Cymbiolacca*) (with at least 20 species and subspecies), unusual cypraeid subspecies such as *Cribrarula cribraria melwardi*, *Naria labrolineata maccullochi*, and *Bistolida brevisrostris fluctuans*, and distinctive cone shells such as *Lividiconus biliosus imperator* and the newly-described *Tesselliconus devorsinei*. The high levels of biodiversity and endemism along the southern and central reef complexes demonstrate that these areas, collectively, represent one of the primary “hot spots” of evolution within the Coral Sea Basin.

Farther offshore of the Great Barrier Reef, on the shallow continental shelf that extends eastward into the Coral Sea, lies a large archipelago of coral cays, atolls, and shallow carbonate banks, containing at least 25 major island groups. Of these, only the Diamond Islets and Lihou Reef, on the far eastern edge of the continental shelf, have been regularly visited and explored by divers and collectors. These remote coral atolls were found to house a number of seldom-seen and rare endemic gastropods, with the beautiful striped volute *Cymbiola* (*Cymbiolacca*) *perplicata* being the single most sought-after collector’s item. While searching for this desirable volute on Diamond Islets, Lihou Reef, and off Swain Reefs, a small, very pale or white harp shell (genus *Harpa*) was also encountered in the same habitat that was inhabited by *C. perplicata*. This unusual harp shell was first brought to attention by a well known Queensland molluscan adventurer Doug Thorn, who was trawling these remote region for the elusive *C. perplicata*. Bret Raines and Kim Hutsell were on one of these early

expeditions with Doug Thorn in 1999, and collected specimens of this unique small white *Harpa*. Shortly thereafter, Bret Raines wrote an article about this unique *Harpa* in the American Conchologist (Raines, 2000). Years later, the authors became aware of this interesting *Harpa* and began seeking out further information from Richard Goldberg, Bret Raines, Kim Hutsell, and Doug Thorn. With the generous assistance of members of the Cairns Shell Club, and others, the authors were able to obtain photographs and specimens of a substantial number of specimens. Upon closer examination, this pale-colored harpid was found to represent a new, previously-unrecognized species of *Harpa* closely related to the widespread Indo-Pacific *Harpa major* Roding, 1798. This new endemic Queensland harpid species is described here.

SYSTEMATICS

Class Gastropoda

Subclass Orthogastropoda

Order Sorbeoconcha

Suborder Caenogastropoda

Infraorder Neogastropoda

Superfamily Volutoidea

Family Harpidae

Genus *Harpa* Roding, 1798

Harpa queenslandica Berschauer and Petuch, new species (Figures 1, 2A-F, 3A, 3C, 3E)

Description: Shell small for genus and consistently much smaller than nominate subspecies, averaging 30-50 mm in length; shell thin, lightweight, highly inflated, broadly bulliform; spire low, with broadly sloping whorls; shoulder rounded; body whorl ornamented with 12-18 thin, widely-separated, evenly-spaced axial ribs; facing edge of ribs highly polished, shiny; edge of shoulder

ornamented with row of small, sharp spines, with each spine corresponding to an axial rib; areas between ribs heavily ornamented with distinctive reticulated sculpture pattern composed of very numerous intersecting fine axial and radial threads; aperture wide and flaring, broadly oval in shape; columellar area with broad, shiny, adherent parietal shield; shell base color pure white, overlaid with widely-scattered pale pinkish-tan zig-zag or triangular flammules; ribs pure white, marked with 4 broad, pale pink or pinkish-tan bands, one below shoulder, one on each side of mid-body line, and one around anterior end; pink bands often marked with reddish-brown or dark tan linear flammules or bars, outlining the edge of each band; anterior half of parietal shield marked with large, prominent dark brown patch; posterior end of parietal shield marked with smaller, pale brown or tan patch; interior of aperture pure white; protoconch proportionally very large, dark tan-gold in color, composed of 3 ½ whorls.



Figure 1. Holotype of *Harpa queenslandica* 34.5 mm, dredged at 10m off East Diamond Islet, Australia, in 1999.

Type Material: HOLOTYPE: length 34.5 mm, width 23.6 mm, QMNH as number QM MO84636 (in the type collection of the Queensland Museum of Natural History, Brisbane, Australia: Figure 2C); OTHER SPECIMENS EXAMINED: length 30.2, 35.8, 50.9, and 52.9 mm (Figures 2A, D, E, and F) Berschauer Collection ; length 34.1 mm (Figure 2B) Petuch Collection.

Type Locality: The holotype was dredged from between 15 and 20 m depth, northeast of Swain Reef, southern Great Barrier Reef, Queensland, Australia.

Range: At present, the new species is known only from the western Coral Sea, from the areas off Swain Reef, and the coral atolls of Lihou Reef and the Diamond Islets.

Ecology: *Harpa queenslandica* occurs on clean carbonate sand substrates near beds of coral rubble, at depths of 10-25 m within the Neritic Zone of the Coral Sea archipelagos east of the Great Barrier Reef. Here it occurs with other volutoideans such as *Cymbiola (Cymbiolacca) perplicata* and *Miniaceoliva lamberti*.

Etymology: Named for the Australian State of Queensland, to which the new subspecies is endemic.

Discussion: The new taxon represents an isolated species of *Harpa* closely related to the widespread Indo-Pacific *Harpa major* Roding, 1798, that is restricted to the western Coral Sea area and may coexist with *H. major* there. The senior author has been advised that *Harpa queenslandica* and *H. major* coexist in limited areas in the Cairnes region. (Tassey Weinreich, personal communication.) *Harpa queenslandica* (Figures 2A-F) differs from *H. major* in being much paler colored (almost pure white), in being a much thinner and more lightweight shell,

in having a smaller adult size, and in having a characteristic microsculpture pattern on the body whorl in the areas between the ribs. This microsculpture (Figure 3C) is composed of very numerous fine, evenly-spaced axial threads that intersect with numerous fine spiral threads, producing a distinctive dense reticulated pattern. These reticulations are especially prominent on subadult specimens (Figures 2A, 2B, 3A, and 3C) but become over-glazed and more subdued in fully mature specimens (Figure 3A). As shown on Figure 3E, the protoconch of *H. queenslandica* is also proportionally-larger and better-developed than that of *H. major*, being composed of 3 ½ whorls as opposed to 3 whorls. This large protoconch size correlates with the limited geographical range of the new species, indicating that the animal has direct development and a non-planktonic larva, resulting in a very limited ability to disperse.

Typical *Harpa major* (Figure 3B) is a much larger and heavier shell than *queenslandica*, and has a base shell color of a deep pinkish-rose or reddish-tan, overlaid with white zig-zag flammules. The ribs of *H. queenslandica* are pure white with a few bands of pale tan and scattered reddish-brown lines, while those of *H. major* are a deep rose-tan overlaid with thin white stripes and dark brown lines. While having an intracostal sculpture pattern composed of thin longitudinal threads, subadult and adult specimens of *H. major* never exhibit the reticulated intracostal sculpture seen on *H. queenslandica*. The authors have also examined several photographs which show the shells and living animal of *H. queenslandica* and compared and contrasted it to similar photos of the shell and living animal of *H. harpa*. The body and foot of *H. queenslandica* is white with a pattern of tan blotches, and the siphon is tan with white splotches and the eye stalk tentacles are striped white and tan. By comparison the body and foot of *H. harpa* is a medium brown

with a pattern of yellow spots and a few white splotches, and the siphon is a darker brown with light brown splotches and the eye stalk tentacles are striped dark brown and light brown. A photograph of the shell and living animal of *H. queenslandica* is shown in Figure 4.

A geographically-isolated subspecies of *H. major* was recently described from the Marquesas Islands of easternmost French Polynesia. This new taxon, *H. major ivojardai* Cossignani, 2013, is substantially more similar to *H. major* than *H. queenslandica* and shares the same type of dark coloration and shell thickness with *H. major*, but has much more heavily-sculptured intracostal areas than *H. major*. The discovery of this Marquesan endemic subspecies, along with the new Queensland species, demonstrates that at least two populations of *H. major* have become sufficiently genetically-isolated to have become sibling species.

ACKNOWLEDGMENTS

The authors extend their thanks to Richard Goldberg, Kim Hutsell, Doug Thorn, Malcolm Ford, Thierry Vulliet, and Jom Patamakanthin, for sharing information about this fascinating small white *Harpa*. Special thanks go out to Cairnes Shell Club members Trevor Young, Stephen Maxwell, Valda Cantamessa, Anne Butler, and to John Boyle for assistance in obtaining specimens and for detailed photographs and measurements of other specimens for study. Dr. John Healy of the Queensland Museum provided information and photographs of other *Harpa* specimens in his museum's collection for comparison. Giorgio Strano provided English translations of Tiziano Cossignani's recent *Harpa* articles from the original Italian. We also extend our sincere appreciation to Tassey Weinreich for allowing

us to use his gorgeous photograph of the live animal of *Harpa queenslandica* in this paper.

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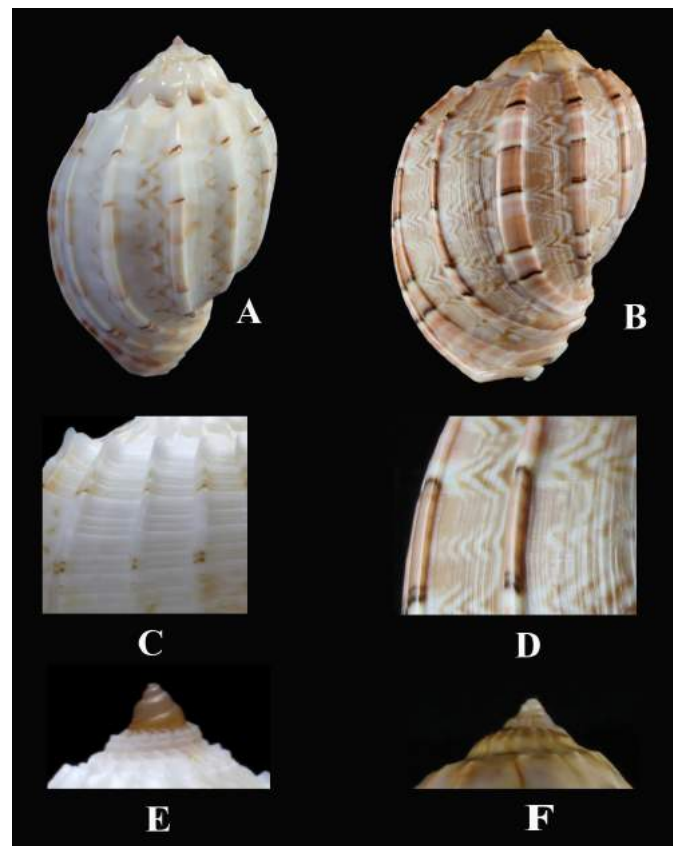


Figure 3. A = *Harpa queenslandica* 67.3 mm, collected diving at 15m off Lihou Reef, Australia in July 2006 by Ron Moylan, in the Trevor Young Collection; B = *Harpa major* 69.9 mm in length, collected off Samar Island, Philippines, from the Berschauer Collection; C = Macroscopic photo of the microsculpture of *H. queenslandica* (from Figure 2A); D = Macroscopic photo of the microsculpture of *H. major* (from Figure 3B); E = Macroscopic photo of the protoconch of *H. queenslandica* (from Figure 2A); F = Macroscopic photo of the protoconch of *H. major* (from Figure 3B).

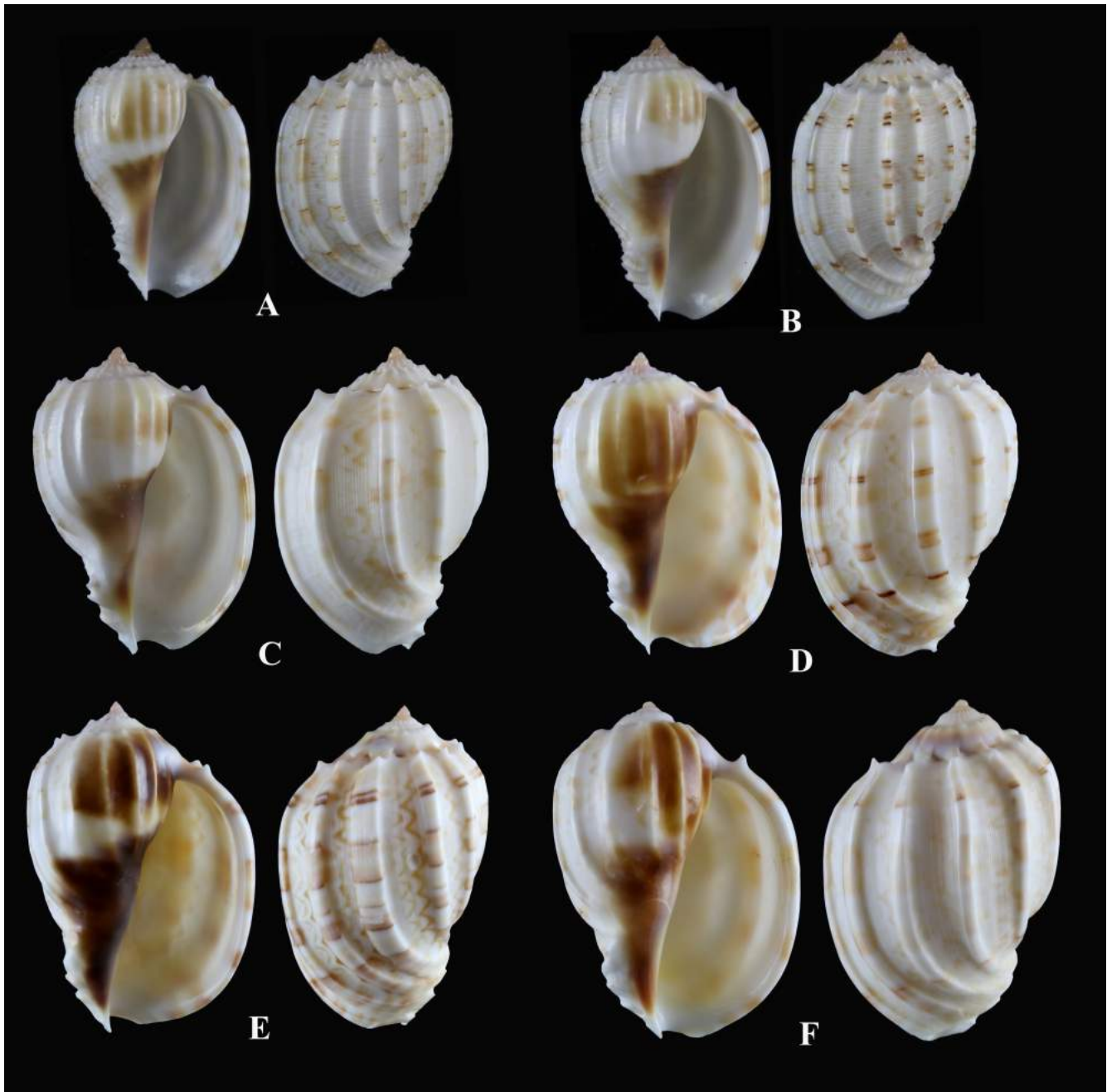


Figure 2. A = *Harpa queenslandica* 30.2 mm in length, dredged in deep water off Swain Reef, Australia by Remy Devorsine and Thierry Vullet in 2014, in the Berschauer Collection; B = *H. queenslandica* 34.1 mm in length, dredged in deep water off Swain Reef, Australia by Remy Devorsine and Thierry Vullet in 2014, in the Petuch Collection; C = Holotype of *H. queenslandica* 34.6 mm in length, dredged at 10 m in coral sand off East Diamond Islet, Australia by Malcolm Ford in 1999, in the type collection of the Queensland Museum of Natural History, Brisbane, Australia, as number QM MO84636; D = *H. queenslandica* 50.9 mm in length, collected by scuba diving at 10-15 m off East Diamond Islet by Doug Thorn in 1999, in the Berschauer Collection; E = *H. queenslandica* 51.9 mm in length, dredged at 15 m off Lihou Reef, Australia by Doug Thorn in 1999, in the Berschauer Collection.



Figure 4. Live specimen of *Harpa queenslandica*, approximately 70 mm in length, collected in 2008 in the Cairns Region, Australia and photographed by Tassey Weinreich. Photo used with written permission of Tassey Weinreich; all rights reserved.

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