

A New Species of *Cymbiola* (Volutidae) from Western Australia

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ABSTRACT The widespread Western Australian volute that is referred to as "*Cymbiola nivos*a" is shown here to actually represent a complex of closely-related sibling species, each with its own distinct geographical distribution: a northern species, *Cymbiola oblita* (E.A. Smith, 1909), which ranges from near Port Hedland north to Cape Leveque and the Dampier Archipelago; a central species *Cymbiola nivos*a (Lamarck, 1804), which ranges from Port Hedland south to Shark Bay; and a new southern deep water species, here named *Cymbiola cooperi* Petuch and Berschauer, n. sp., which ranges from Shark Bay south to near Leeman.

KEY WORDS *Cymbiola nivos*a species complex, Dampierian Molluscan Province, Flindersian Molluscan Province, sibling species, *Cymbiola oblita*, *Cymbiola cooperi*

INTRODUCTION

*Cymbiola nivos*a (Lamarck, 1804) is a commonly-encountered volute species that lives on intertidal sand flats all along Western Australia, often occurring in large aggregations (Weaver & duPont, 1970; Plate 1, Figures A, B). Recent research has shown that what was previously referred to as the taxon "*Cymbiola nivos*a" is actually a species complex of three closely-related sibling species. The *C. nivos*a species complex has a wide range and in fact extends into two different molluscan provinces (the tropical Dampierian Molluscan Province and warm-temperate Flindersian Molluscan Province; Petuch & Berschauer, 2021). Because of this distribution into different water masses and temperature regimes, these volutids have become separated into three geographically separate, and morphologically-distinct species: the northern species *C. oblita* (E.A. Smith, 1909), which ranges from Cape Leveque and the Dampier Peninsula south to Port Hedland;

the well known central species *C. nivos*a (Lamarck, 1804), which ranges from Port Hedland south to Shark Bay; and a newly-discovered southern species which occurs in deeper, offshore waters, from Sharks Bay south to near Leeman (Figure 1). This new southern species, here named *Cymbiola cooperi* Petuch & Berschauer, new species, is described in the following sections. This new discovery demonstrates that volutid evolution along Western Australia is more complex than originally thought. The type will be deposited in the BlueSky Research Foundation Collection (BSRF), Yorkeys Knob, Queensland, Australia, and bears a BSRF number.

SYSTEMATICS

Class	Gastropoda
Subclass	Prosobranchia
Order	Neogastropoda
Superfamily	Volutoidea
Family	Volutidae
Subfamily	Cymbiinae
Genus	<i>Cymbiola</i> Swainson, 1831



Figure 1. Map of Australia denoting *Cymbiola nivosa* complex distribution. Dark-red= *C. oblita* (E.A. Smith, 1909); Yellow-gold= *C. nivosa* (Lamarck, 1804); Blue= *C. cooperi* n. sp.

Cymbiola cooperi Petuch and Berschauer, new
species
(Plate 1 Figures C-F)

Description. Shell smaller than other members of the species complex, ranging from 60 to 80 mm in length, oblongly-ovate, with proportionally-low spire; shoulder sharply angled, carinated, ornamented with 9-10 low, slightly-flattened rounded knobs; body whorl

inflated, shiny and polished; subsutural area distinctly sloping; shell color uniformly pale gray, with distinct lavender or purplish tint; lavender-gray base color overlaid with numerous large, widely-spaced white spots; sloping subsutural area ornamented with numerous closely-packed brown hairlines that extend half way from suture; edge of shoulder marked with broad white or pale lavender band, producing white or pale lavender knobs; interior

of aperture and entire columellar area colored dark orange-tan, with darkest colored area along inner edge of lip; protoconch proportionally very large, rounded, domelike, composed of 2 ½ whorls; protoconch color white or pale whitish-lavender, ornamented with 18-20 raised ridges that are arranged in radiating pattern.

Type Material. HOLOTYPE - length 64.1 mm, width 35.9 mm, off Leeman, Western Australia, BSRF TC030; PARATYPES - length 81.5 mm, width 39.0 mm, from the same locality as the holotype, in the research collection of the junior author; length 59.5 mm, width 31.4 mm, from the same locality as the holotype, in the research collection of the senior author.

Type Locality. Collected from a deep water spiny lobster (crayfish) trap set on a sandy substrate in 90 m depth off Leeman, Western Australia, Australia.

Range. The new species, *Cymbiola cooperi*, extends from Shark Bay south to the Leeman-Green Head area of Western Australia, always in deeper, offshore waters.

Etymology. Named for Merv Cooper, renowned amateur malacologist, citizen scientist, and shell dealer, of Perth, Western Australia, who discovered the new species and brought it to our attention.

Discussion. The three geographical species of the *Cymbiola nivosa* complex differ from each other in the following morphological characters:

1. Shoulder Ornamentation - The well-known central West Australian species *C. nivosa* (Plate 1, Figures A, B) differs from both *C. oblita* (Plate 1, Figures G, H) and *C. cooperi* (Plate 1, Figures C-F) in lacking any prominent shoulder spines or knobs and in having, instead, a low, smooth carina along the edge of the shoulder. Some individuals of *C. nivosa* will exhibit a few

low, poorly-developed shoulder knobs, giving the shoulder carina an undulating appearance. Of the three closely-related sibling species, *C. cooperi* is morphologically-closest in shoulder ornamentation to the northern species, *C. oblita*, but differs in having rounded, low knobs as opposed to the distinctly narrow and pointed spines seen on the northern congener.

2. Shell Color - The well-known central West Australian species *C. nivosa* most commonly has a characteristic dark gray base color, which is overlaid with two bands of prominent dark brownish-black longitudinal hairline flammules, one around the shell mid-body and one around the anterior end. These bands of hairline flammules are missing on both *C. oblita* and *C. cooperi*, with only rare individuals of both species exhibiting faint vestigial banding. The base color of *C. cooperi* is a uniform pale gray-purple while that of *C. oblita* is far more variable, most often being a pale khaki-green or grayish-green with a mottled appearance and with a smeared band of a darker greenish-tan color. All three of these sibling species are covered with large, evenly-spaced white spots, often triangular in shape. These spots are absent on the two wide bands of hairline flammules and mottlings and are also poorly developed on *C. oblita*.

3. Color Pattern of the Subsutural Area - One of the most conspicuous features seen on *C. nivosa* is the concentration of densely-packed large blackish-brown hairline flammules that completely cover the sloping subsutural area of the shoulder. These hairline flammules are poorly-developed on both *C. oblita* and *C. cooperi*, are paler in color, and do not extend across the entire slope of the subsutural area. Those of the northern *C. oblita* are longer than those of the southern *C. cooperi*, which extend only halfway across the subsutural slope.

4. Protoconch Color - Both *C. oblita* and *C. cooperi* have white protoconchs, with some specimens of *C. oblita* having pale khaki-white

protoconchs and with some *C. cooperi* having pale lavender-white protoconchs. The well-known central West Australian species, *C. nivosa nivosa*, stands out from these by consistently having a dark brown or dark tan protoconch.

5. Aperture Color - Typical specimens of *C. nivosa* have a pale tannish-yellow or pale yellow-orange aperture and columellar area, with the inner edge of the lip being colored a light brown color. In *C. cooperi*, the aperture and columellar area are colored a deep burnt orange color, becoming darker and more intense along the inner edge of the lip. The northern species, *C. oblita*, has the lightest aperture color of the three sibling species, being only pale yellow-tan or pale khaki with a yellow inner edge of the lip.

The three closely-related sibling species *Cymbiola nivosa*, *C. oblita*, and *C. cooperi*, are now known to be a component of a larger *Cymbiola* species complex that is endemic to Western Australia. Composed of six known species, these endemic volutes include the three sibling species in the *C. nivosa* complex discussed here, along with the deep water Western Australia *C. irvinae* (E.A. Smith, 1909) and *C. kimbacki* Bail and Limpus, 2014, and the Recherche Archipelago endemic *C. hughmorrisoni* Bail and Limpus, 1997. All of these volutid species share the white-fleckled color pattern, large domelike protoconchs, and conspicuous hairline flammules on the subsutural areas.

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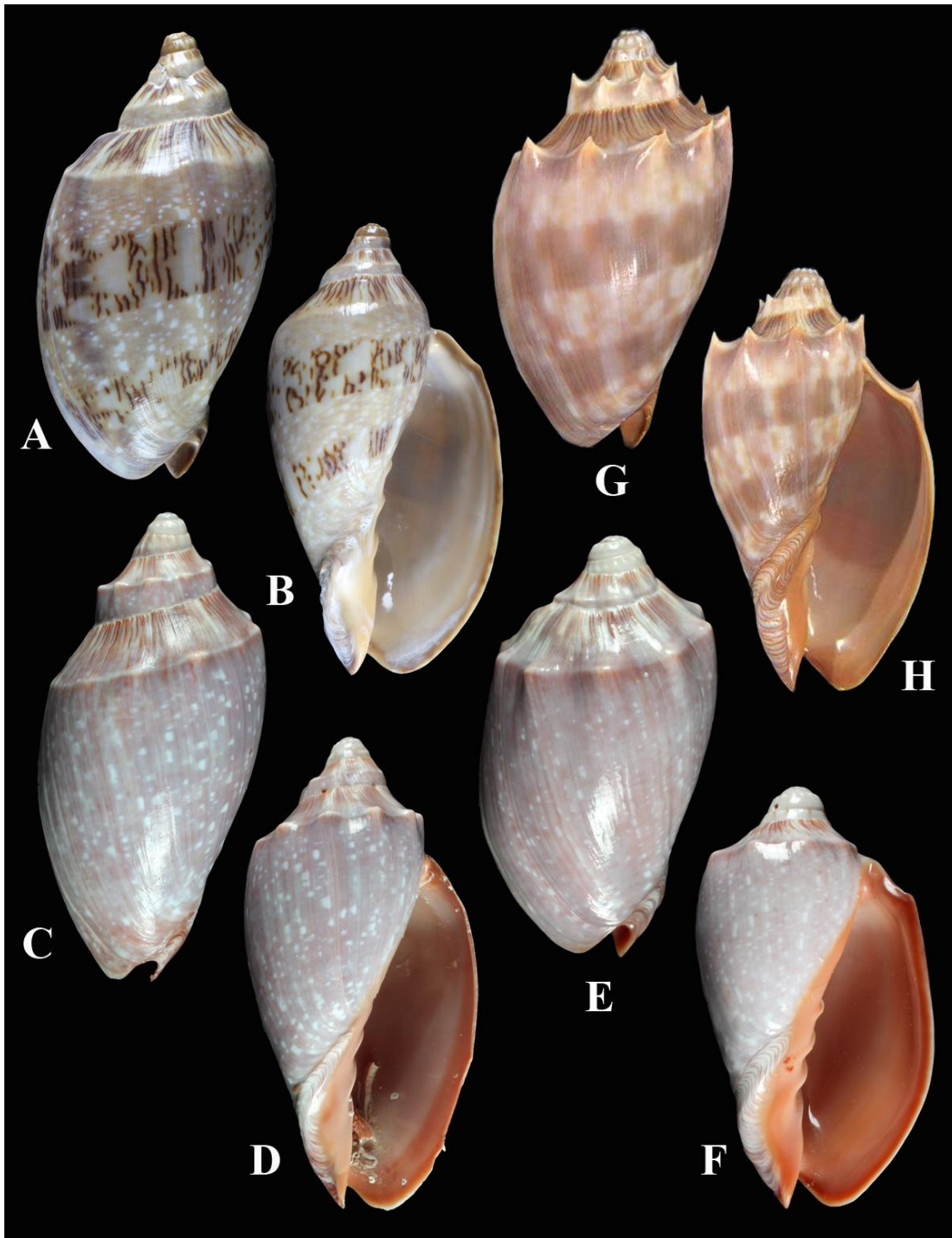


Plate 1. *Cymbiola nivosa* (Lamarck, 1804) and its closely-related sibling species, from Western Australia.

A, B= *Cymbiola nivosa* (Lamarck, 1804), length 91.9 mm, collected at low tide on a sand bar in Sharks Bay, Western Australia; C, D= *Cymbiola cooperi* Petuch and Berschauer, new species, paratype (Berschauer Collection), length 81.5 mm, collected from a deep water lobster (Crayfish) trap set in 90 m depth off Leeman, Western Australia; E, F= *Cymbiola cooperi* Petuch and Berschauer, new species, holotype, length 64.1 mm, collected from a deep water spiny lobster (crayfish) trap set in 90 m depth off Leeman, Western Australia, Australia; G, H= *Cymbiola oblita* (E.A. Smith, 1909), length 47.3 mm, on sand flats at low tide, Cape Leveque, Western Australia.