

Newly Identified *Palmadusta saulae* subspecies from Palawan Island

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ABSTRACT A newly discovered population of *Palmadusta* has been identified off Palawan Island Philippines. This new population has a high occurrence of specimens expressing morphology that do not have the characteristic dorsal blotch which is characteristic of *Palmadusta saulae*. This location lies at the heart of range of *Palmadusta saulae* established by previous finds of specimens from the north at the southern tip of Japan, east to New Caledonia, along the northern shores of Australia to the south and west to the Adaman and Nicobar Islands. While some specimens of *Palmadusta saulae* do not have the dorsal blotch at other locations, such finds are a relatively rare occurrence. This new population of *Palmadusta* from off Palawan Island is herein named *Palmadusta saulae sindyae*.

KEY WORDS Cypraea, *Palmadusta saulae*, *Palmadusta saulae sindyae*, Palawan Island

INTRODUCTION

The size of the nominate species *Palmadusta saulae* (Gaskoin 1843) has been reported to range from 12 to 35 mm, and it has been identified as far north as southern Japan, west to New Caledonia, along the northern shores of Australia to east Adaman and Nicobar Islands (Map 1). A newly discovered population of *Palmadusta* has been identified off Palawan Island, Sulu Sea, Philippines (Map 2), which differs morphologically from *Palmadusta saulae*. Eight specimens from the Palawan Island population are included in this study, and range in size from 19.6 mm (Paratype 7) to 27.5 mm (Holotype).

There are two recognized subspecies of *Palmadusta saulae*, including *P. saulae nugata* (Iredale 1935) from Queensland Australia with “[D]orsal blotch less compact, dorsal spotting finer, dental interstices not tinted orange”, and

P. saulae crakei (Cate, 1968) from Northwest Australia which is “smaller often rostrate, dorsal blotch irregular, often split into



Map 1. *Palmadusta saulae* current habitat range map obtained from www.cowries-world.com. A red star is positioned over Palawan Island.

several smaller dots, dental interstices not tinted orange” The most recent review of the *Palmadusta saulae* complex is set forth in Lorenz, 2017.

Palawan is in the Suluan Infracaroline of the Philippine Subprovince and is an evolutionary hot spot with approximately 20% endemic taxa (Petuch & Berschauer 2021). The island stretches northeast-southwest between the South China Sea to the northwest and the Sulu Sea to the southeast, extending towards Borneo. Situated on the edge of the Sunda Shelf, Palawan has a distinct, elongated geography that acts as a boundary between the South China Sea and the Sulu Sea, impacting local oceanography and species distribution. The holotype and Paratype No. 1 will be deposited in the Natural History Museum of Los Angeles and will bear type numbers denoted “LACM” herein.



Map 2. Ocean floor topography surrounding Palawan Island showing the relatively shallow water of the Sunda shelf bridging the Philippines and Malaysia. The island also forms a barrier between the China and Sulu Seas.

MATERIAL EXAMINED

Eight specimens of *Palmadusta saulae sindyae* were examined in this study and compared to *P.*

saulae saulae Gaskoin 1843, *P. saulae nugata* (Iredale 1935) and *P. saulae crakei* (Cate 1968).

SYSTEMATICS

Class: Gastropoda Cuvier, 1795
 Subclass: Caenogastropoda Cox, 1960
 Order: Littorinimorpha Golikov & Starobogatov, 1975
 Superfamily: Cypraeoidea Rafinesque, 1815
 Family: Cypraeidae Rafinesque, 1815
 Genus: *Palmadusta* Iredale, 1930

Palmadusta saulae sindyae
 Waller & Berschauer, new subspecies
 (Plate 1, Figures A- J; Figure 3)

Description. Shell shape oblong-ovate, gradually attenuating towards anterior end; dorsum surface smooth; body color light-blue gray to light-brown, ornamented with distinct irregular small chestnut-brown spots, with much larger distinctly darker spots on both margins often extending onto base edges; base slightly rounded, white-cream in color; aperture narrow, slightly arcuate, slightly wider towards anterior extremity; columella slightly gibbous at posterior half of shell; columella groove absent; teeth rather bold, whiter than base color, even excepting those at anterior end of columella; teeth all terminate externally on columella along both edges, aperture edge in even line, columellar edge in even line except two or three at anterior end which advance slightly inwards; teeth on lip are larger, even, extend slightly outwards about one-half to one-third width of lip; teeth number between fourteen to seventeen on columellar side, fifteen to eighteen on labral side; interstices between teeth and between extremities more or less, orange in color; extremities produced, posterior curving towards columella; posterior outer beak longer than inner beak, anterior very slightly so with anterior inner beak even or

slightly longer than outer beak; outer margin prominent, angular, more so towards anterior extremity; inner margin prominent, angular, along anterior third of shell; groove across anterior end, from depression formed along either side by projecting margins, termination of channel reflecting outwards; spire umbilicated, with notch or groove on columellar side, from partial reflection of posterior channel slightly on labral side; internal color light tan to purplish-brown; fossula absent.



Figure 1. *Palmadusta saulae sindyae*, holotype measuring 27.4 mm in length, LACM No. 3991.

Type Material. HOLOTYPE - LACM No. 3991 measuring 27.4 mm in length, 14.7 mm in width, and 11.9 mm in height. PARATYPES - No. 1 LACM No. 3992 measuring 21.9 mm in length, 11.9 mm in width, and 9.8 mm in height; Paratypes 2 through 7 measurements and other data are set forth below:

Size Range. 19.8 to 27.4 mm.

Type Locality. Collected live off Palawan Island, Philippines.

Distribution. At present only known from off Palawan Island, in the Sulu Sea, Philippines.

Etymology. This subspecies is named for Thierry Vulliet's granddaughter Sindy Vulliet,

at his request since he recognized the different character of this taxon and donated the type specimens.

	Length	Width	Height	Labral Teeth	Columellar Teeth	Dorsal Spotting
Holotype	27.4	14.5	12.0	18	17	Y
Paratype 1	21.9	11.9	9.9	18	17	Y
Paratype 2	20.5	11.6	9.4	17	14	Y
Paratype 3	21.1	12.0	9.5	15	17	Y
Paratype 4	25.1	13.9	11.5	18	17	N
Paratype 5	20.8	11.4	9.2	18	17	Y
Paratype 6	20.8	11.7	9.6	16	15	Y
Paratype 7	19.8	10.3	8.4	18	17	Y

RELATED TAXA ACCOUNTS

Palmadusta saulae saulae, Gaskoin, 1843
(Figure 2)

Original Description. “Cypraea Saulae. Cyp. testâ oblong-ovatd, anticè subattenuatâ, fulvescente fusco puntulatd, maculd magnâmedianâ, pallescente; aperturd angustâ, subflexuosâ, anticè latiusculâ; columella posticè subgibbosâ; dentibus prominulis albidis interstitiis aurantiacis; extremitatibus prominentibus subreflexis; marginibus prominentibus subangulatis; spirâ profundè umbilicatâ.

Shell oblong-ovate, gradually attenuating towards the anterior end, quite smooth; of a very light fawn or light flesh-colour, dotted distinctly and irregularly with small chestnut-brown spots, with much larger ones on both margins, and a remarkably large spot of the same colour about the center of the dorsum: base rather round, of a very light reddish yellow colour: aperture rather narrow, slightly flexuous, somewhat wider towards the anterior

extremity: columella rather gibbous at the posterior half of the shell; no columella groove; teeth rather bold, whiter than the base, even, excepting those at the anterior end of the columella. Where they are larger; all terminate externally on the columella in an even line at the edge of the aperture, and within, also in an even line, on the columella, except two or three at the anterior end, which advance a little more inwards; those on the lip are even, and extend a little over it, outwards; in number they are from sixteen to eighteen on the columella side, fourteen to sixteen on the lip; interstices between the teeth and between the extremities more or less of an orange colour; extremities produced, the posterior curving towards the columella; the posterior outer beak longer than the inner, the anterior very slightly so: margins, the outer prominent, angular, more so Towards the anterior extremity; the inner exists but on the anterior third of the shell, and is also prominent and angular; groove across the anterior end, from the depression formed on either side by the projecting margins, and termination of the channel reflecting outwards; spire umbilicated, with a notch or groove on the columella side, from a partial reflection

of the posterior channel: internal colour light reddish brown.” (Proceedings of the Zoological Society of London, Part IX 1842, pg. 24)

Size Range. 13.0 to 45.0 mm in length.

Type Locality. Philippines and Phuket Thailand.

Palmadusta saulae nugata (Iredale 1935)
(Figure 3)

Original Description: “One of the first shells Mr. Melbourne Ward sent, before he had begun painting all the species, was a beautiful little shell with the information; “Pale orange foot and mantle,” and it has proved to be the very rare species recorded as *Cypraea saulae* Gaskion. It resembles Reeve’s figure in general features, but is more elongate and graceful, measuring 22 mm. in length, 12 mm. in breadth, and ten in height, pale grey with a pale brown irregular dorsal blotch; the spire is sunken and there are a few brown spots on the sides, and the teeth are white, each with a pale golden line between; the teeth numbering on the inner lip eighteen, and on the outer lip seventeen. Until more specimens are secured this may be named as a subspecies as *Palmadusta saulae nugata*



Figure 2. *Palmadusta saulae saulae* (Gaskoin 1843), Sta. Fe, (Bantayan) Hagnaya, Philippines, 28.2 mm, in the David Waller collection.



Figure 3. *Palmadusta saulae nugata* (Iredale 1935), Off Cairns, Queensland Australia, 22.3 mm, in the David Waller collection.

nov.” (The Australian Zoologist 8(2):96-135, pls. 8-9 June 1935, 126 pgs.)

Size Range. 12.0 to 35.0 mm in length.

Type Locality. Cairns, Queensland, Australia.

Palmadusta saulae crakei (Cate 1968)
(Figure 4)

Original Description: “Shell large, broad, narrowing quickly abapically, bulbously ovate, umbilicate; teeth short, well defined on outer lip, intermittently so on the columella, but extending across fossula; front and rear terminals noticeably rostrate; right margin thick, left side uncalloused, curving smoothly from dorsum to base; primary shell color pearl-grey, with large central brown dorsal blotch that covers at least 20% of upper surface, the rest of the dorsum thickly sprinkled with minute brown spots, with a brown spire blotch; base mostly devoid of spotting, of a lighter basic grey color, as are teeth; terminal openings, columella, fossula, and interstices bright orange-yellow; foot and mantle brilliant orange, marked with fawn-colored spots. *Palmadusta saulae crakei* differs from *P. saulae nugata* in having a larger, broader, heavier shell; by the orange interstices (*P. s. nugata* normally does not have color in the interstices); by larger and heavier teeth; and by larger and more prominent chestnut spotting at the margins...” (Western Australian Cowries a second revised, and expanded report Veliger 10(3):212-232).

Size Range. 12.0 to 35.0 mm in length.

Type Locality. Broome, Roebuck Bay, Australia.

DISCUSSION / DIAGNOSIS

Palmadusta saulae sindyae differs from *P. saulae saulae*, Gaskoin, 1843, *P. saulae crakei* (Cate 1968) and *P. saulae crakei* (Cate 1968) in having no large dorsal blotch or blotches often characteristic of the nominate species and

the northern Australian forms. Further, the base dorsal coloration is more of a light brown to



Figure 4. *Palmadusta saulae crakei* (Cate 1968), NW Australia, 21.9 mm. Image obtained from Thelsica at <https://new.thelsica.com/product/palmadusta-saulae-nugata-crakei-21-9-mm-gem/> and used with permission.

blue-gray than the light-pinkish tan or flesh-color dorsal base coloration of *P. saulea saulea* and *P. saulea crakei* or the light-cream dorsal base coloration of *P. saulea nugata*.

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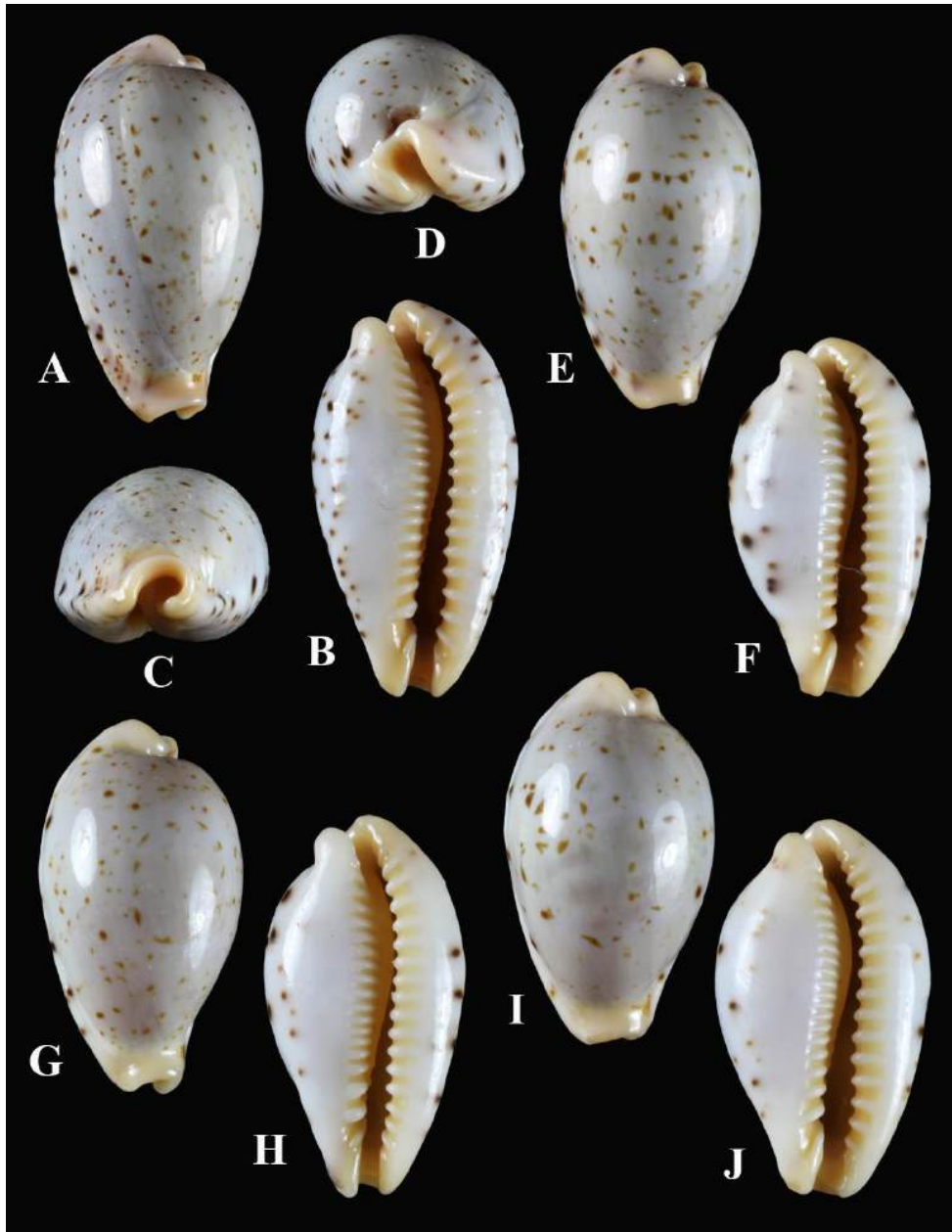


Plate 1. *Palmadusta saulae sindyae* n. ssp.

Figures A-D = Holotype, LACM No. 3991, 27.4 mm in length, 14.7 mm in width, and 11.9 mm in height; E-F= Paratype No. 1, LACM No. 3992, 21.9 mm in length, 11.9 mm in width, and 9.8 mm in height; G-H, Paratype No. 2, in the Waller collection, 20.5 mm in length, 11.6 mm in width, and 9.4 mm in height; I-J= Paratype No. 3, in the Berschauer collection, 21.1 mm in length, 12.0 mm in width, 9.5 mm in height.