# A new dwarf pseudosquillid of the genus *Raoulserenea* from French Polynesia (Crustacea, Stomatopoda)

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**ABSTRACT**
*Raoulserenea pygmaea*, the fifth species of the genus to be recognized, is described from specimens found from inshore habitats in French Polynesia. The combination of the small size of adults, total length less than 35 mm, and the unarmed, broad, cordiform rostral plate distinguish this species from its congeners. A key to the species of *Raoulserenea* is given.

**KEY WORDS**
Crustacea,
Stomatopoda,
Pseudosquillidae,
*Raoulserenea*,
new species.

**RÉSUMÉ**
*Un nouveau Pseudosquillidae nain du genre* Raoulserenea *de Polynésie française (Crustacea, Stomatopoda).*
*Raoulserenea pygmaea* n. sp., la cinquième espèce du genre, est décrite à partir de spécimens récoltés dans des habitats côtiers en Polynésie française. La combinaison des caractères suivants : petite taille des adultes, longueur totale inférieure à 35 mm et plaque rostrale cordiforme, large et sans processus, distingue l'espèce de ses congénères. Une clé des espèces du genre *Raoulserenea* est proposée.

**MOTS CLÉS**
Crustacea,
Stomatopoda,
Pseudosquillidae,
*Raoulserenea*,
nouvelle espèce.

## INTRODUCTION

In 1995, Manning established a new genus within the Pseudosquillidae, *Raoulserenea*. The genus was named to honor the late Raoul Serène who in 1951 pointed out the differences between the type species of *Raoulserenea*, *R. ornata* (Miers, 1880), and the type species of *Pseudosquilla* Dana, 1852, *P. ciliata* (Fabricius, 1787). Four species were originally included in *Raoulserenea*, *R. hieroglyphica* (Manning, 1972), *R. komaii* (Moosa, 1991), *R. ornata*, and *R. oxyrhyncha* (Borradaile, 1898). All occur in the central and western Indo-Pacific.

In 1980, Caldwell began collecting stomatopods from coral rubble in shallow water habitats around the island of Moorea, French Polynesia. Among the species found was a *Raoulserenea* that could be distinguished from other species in the genus on the basis of size alone. The four species of *Raoulserenea* currently recognized all attain maximum total body lengths of between 65 and 85 mm. The largest individual of this previously unrecognized diminutive species was 33 mm long, and females, with eggs, as small as 22 mm were collected. Below, we describe this new species and briefly discuss its biology.

The holotype and paratypes are in the collections of the National Museum of Natural History, Smithsonian Institution, Washington (USNM). Paratypes also are in the collections of the Muséum national d'Histoire naturelle, Paris (MNHN).

In the section on material, below, the number following the number of specimens is total length (tl), measured on the midline from the anterior margin of the rostral plate to the apices of the submedian teeth of the telson.

## SYSTEMATICS

Family PSEUDOSQUILLIDAE Manning, 1977

*Raoulserenea* Manning, 1995

***Raoulserenea pygmaea*** n. sp.
(Fig. 1)

HOLOTYPE. — **French Polynesia**. Moorea, Society Islands, 17°32'N, 149°50'W, 1 m, rubble, 10-15.XI.1992, leg. R. L. Caldwell, 1 ♀ 33 mm (USNM 260953).

PARATYPES. — **French Polynesia**. Same data as holotype, 5 ♂ ♂ 20-26 mm, 2 ♀ ♀ 21 and 27 mm (USNM 260954), 2 ♂ ♂, 1 ♀ (MNHN-St1978). — 1 m, rubble, V.1980, 1 ♂ 22 mm, 2 ♀ ♀ 22 and 24 mm (USNM 260955). — 25 m, rubble, V.1980, 1 ♂ 15 mm (USNM 260956). — no date, 1 ♂ 22 mm, 1 ♀ 25 mm (USNM 260957). — 1991, 1 ♂ 25 mm, 1 ♀ 22 mm (USNM 260958). — Cook's Bay, Moorea, Society Islands, 0.5 m, rubble, VII.1988, 7 ♂ ♂ 18-28 mm, 2 ♂ ♂ postlarvae 17 and 18 mm, 2 ♀ ♀ 19 and 21 mm, 1 ♀ postlarva 18 mm (USNM 260959).
**Tuamotu Archipelago**. Monihi, low intertidal, 19°00'S, 142°00'W, rubble, V.1980, leg. R. L. Caldwell, 1 damaged ♀ 26 mm (USNM 260958). — Mataiva Atoll, 1 ♀ 22 mm (MNHN-St1979).

ETYMOLOGY. — From the Latin, *pygmaeus*, dwarf or pygmy, alluding to the diminutive size of the species.

MEASUREMENTS. — Males (n = 18), tl 15-28 mm; male postlarvae (n = 2), tl 17 and 18 mm; females (n = 12), 19-33 mm; female postlarva (n = 1), tl 18 mm. Other measurements of holotype, in mm: carapace length 6.7; rostral plate length 1.5, width 2.2; cornea width 1.9; length of propodus of raptorial claw 8.0; fifth abdominal somite width 5.0; telson length 5.1, width 4.2.

DISTRIBUTION. — Known only from Moorea and Tahiti, Society Islands and Manihi and Mataiva Atoll, Tuamotu Archipelago, French Polynesia.

DIAGNOSIS. — Size small, maximum total length 33 mm. Rostral plate broad, lacking anterior spinule, apex obtusely pointed. Eyespots on carapace surrounded by white ring. Propodus of raptorial claw spotted.

### DESCRIPTION

Total length of adults to 33 mm. Eye large, cornea distinctly broadened, not extending beyond segment 2 of antennular peduncle. Antennal scale slender, entire margin setose. Rostral plate broader than long, obtusely pointed anteriorly, lacking apical spine. Carapace dorsum with pair of dark circles surrounded by uninterrupted white ring. Raptorial claw propodus with three movable spines proximally. Lateral margin of thoracic somite 6 broader than that of somite 7. Abdominal somite 5 only with posterolateral spine. Sternal keel acutely pointed on abdominal somites 1-3, sharper, spiniform on somites 4 and 5. Uropodal exopod with 10 graded spines, distalmost overreaching distal segment. Uropodal protopod with

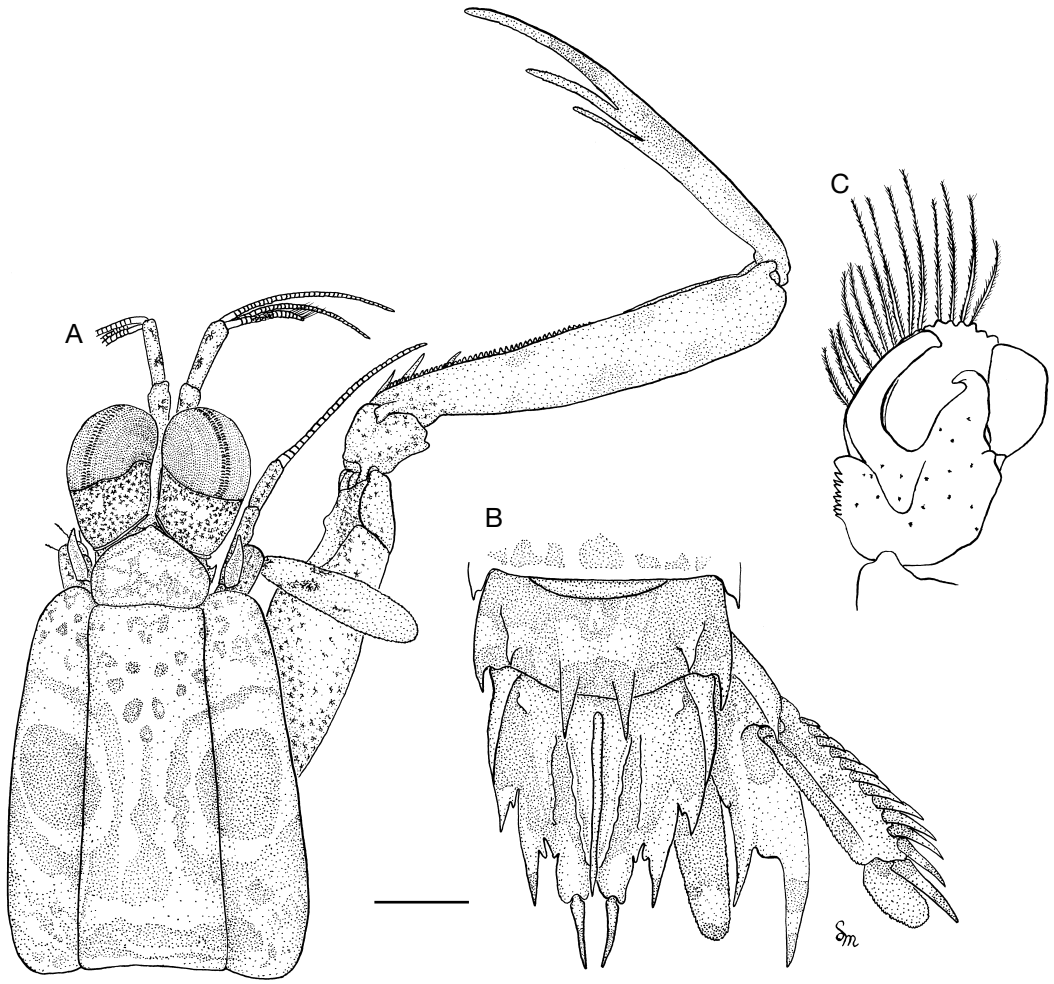


FIG. 1. — *Raoulserenea pygmaea,* n. sp. Female holotype, tl 33 mm; **A**, anterior part of body and raptorial claw; **B**, sixth abdominal somite, telson, and uropod; **C**, endopod of first pleopod of male paratype, tl 25 mm. Scale bar: A, B,1 mm; C, 0.5 mm.

"step" or low prominence on inner margin proximal to base of inner spine. Endopod of male pleopod with tube process longer than hook process.

*Color in life*

Body fairly uniform olive green made up of tiny stellate chromatophores with only a trace of the network of light and dark spots forming the pattern seen on the rostral plate, carapace and merus and propodus of the raptorial appendages of preserved specimens. The antennules are clear with a bluish green tint and the flagella have salmon-colored spots. The antennae are clear with tiny salmon spots on each segment. The antennal scales are clear with pink to salmon margins and setae. The raptorial second maxillipeds are light green with tiny dark spots with the dactyl margins tinged with salmon. Maxillipeds 3-5 are greenish yellow with salmon setae. The margins of the thoracic and abdominal segments are dull red. The pleopods are greenish yellow with salmon setae. The telson is green with transverse white stripes and the margins of teeth and spines salmon. The uropods are blue-green with clear bands, setae salmon, and spines slightly purple.

REMARKS

Manning (1995) recognized the genus *Raoulserenea* for four species previously assigned to *Pseudosquilla* Fabricius, 1787 that are characterized by broad eyes, eyespots on the carapace, and three pairs of dorsal carinae on the telson. *Raoulserenea pygmaea* is the fifth species of the genus to be recognized. Four of these species have now been found in Moorea. In addition to *R. pygmaea, R. komaii* (Moosa, 1991) and *R. ornata* (Miers, 1880) are found in shallow water (depth less than 4 m) and *R. hieroglyphica* (Manning, 1972) is found deeper than 15 m (Caldwell personal observation). Only *R. oxyrhyncha* (Borradaile, 1898) has not been found in French Polynesia.

*Raoulserenea pygmaea* could be mistaken for *R. ornata* and *R. hieroglyphica*, which share the unarmed rostral plate and eyespots on the carapace surrounded by a white ring, but differs in being much smaller than either of those species. Adults of *R. pygmaea* are not known to attain 35 mm in total length, whereas members of *R. ornata* may exceed 80 mm in length (Manning 1995) and adults of *R. hieroglyphica* may reach 83 mm in length (Manning 1977). The rostral plate of *R. pygmaea* has a broadly obtuse point on its anterior margin, as does *R. hieroglyphica,* whereas the rostral plate of *R. ornata* is evenly rounded in adults.

*Raoulserenea komaii* would not be confused with these three species, since it is the only one in the area that possesses a rostral plate with a median apical spinule; *R. oxyrhyncha* also has the apical spinule on the rostral plate. The propodus of the raptorial claw is spotted in *R. pygmaea* and *R. hieroglyphica,* not spotted in *R. ornata.* The background color of *R. ornata* is uniformly dark while those of *R. hieroglyphica* and *R. komaii* are marked with dark spots and irregular lines on a lighter background. In preserved specimens, the carapace of *R. pygmaea* displays a pattern of dark spots and irregular lines on a lighter background, but in live specimens the carapace color is a much more uniform olive green made up of numerous tiny dark spots.

In preservative, large specimens of *R. pygmaea* can be distinguished from *R. hieroglyphica* of similar size by the color pattern. Specimens of *R. pygmaea* lack distinct dark bands on thoracic somites 6-8 and abdominal somites 1-4; the fifth abdominal somite has a dark posterior margin. The abdominal plate is dark and abdominal somites 1-5 each have a dark spot posterolaterally, delimited anteriorly by a clear space. In *R. hieroglyphica*, thoracic somites 6-8 are crossed by a single band of dark spots. Abdominal somites 1-5 have two similar bands, one across the middle, the other posteriorly. These somites also have a dark spot on each side at the posterolateral angle. Both species have a prominent dark spot on the sternum at the base of each walking leg.

Between 1988 and 1998, one of us (R. L. C.) collected 230 adult *R. pygmaea* on Moorea. He also collected numerous postlarvae night-lighting in Cook's Bay. Larvae, while still in the water column, molt to postlarvae, which settle into rubble while they are still totally clear, except for their eyes, and are 17-19 mm in total length. Within three to five days they begin to develop some body coloration in the form of tiny speckles and by seven days the two eyespots on the carapace are clearly visible. Newly settled males have partially formed gonopods and after the first post-settlement molt the female gonopores are visible. Like *Pseudosquilla ciliata*, adults will mate at any stage in their reproductive cycle (Hatziolos & Caldwell 1983) and there appears to be no prolonged mate-guarding by males. Courtship behavior contains several of the same elements described for *P. ciliata* but mating often occurs in a cavity in coral rubble (Caldwell, personal observation). One 21 mm female was found with developed sternal cement glands indicating that she was reproductive and two 22 mm females were found brooding yellow egg masses. Fourteen percent of the females 22 mm or larger were collected with eggs. Eggs generally are laid near the time of the full moon and hatch around the new moon. Upon hatching, larvae immediately enter the plankton. The largest female collected was 33 mm total length and the largest male 32 mm. The median size of all adult males collected was 21 mm and of adult females was 22 mm.

On Moorea, *Raoulserenea pygmaea* is found at depths between mean low water and 4 m. They are found over a wide range of habitats from the reef crest and back reef to inshore coastal beaches. Typically, *R. pygmaea* live in cavities and crevices in coral rubble. This species seems to be particu-

larly tolerant of silt and frequently occurs in muddier bays as well as on sandy reef flats and the reef crest. *Raoulserenea pygmaea* is most commonly found co-occurring with the gonodactylid *Gonodactylus childi* Manning, 1971 (a dwarf species as well as a composite species, to be redescribed by Manning), but living in cavities in these same rubble habitats are the pseudosquillids *Pseudosquilla ciliata*, *Raoulserenea komaii*, and *R. ornata*; *Gonodactylellus affinis* (De Man, 1902) and *G. espinosus* (Borradaile, 1898); *Gonodactylus platysoma* (Wood-Mason, 1895), and the lysiosquilloid *Parvisquilla multituberculata* (Borradaile, 1898).

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KEY TO SPECIES OF *RAOULSERENEA*
(from Manning 1995)

1. Rostral plate with median apical spinule ..... 2

— Rostral plate unarmed anteriorly ..... 3

2. Eyespots on carapace surrounded by light, whitish ring ..... *R. komaii*

— Eyespots on carapace surrounded by light, whitish spots ..... *R. oxyrhyncha*

3. Body and propodus of claw covered with light spots and irregular lines (tl to 83 mm) ..... *R. hieroglyphica*

— Body and propodus of claw uniformly colored, lacking white spots and irregular lines . 4

4. Rostral plate rounded anteriorly. Total length of adults to at least 80 mm .. *R. ornata*

— Rostral plate obtusely pointed anteriorly. Total of adults less then 35 mm... *R. pygmaea*

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