

Lysiosquillina lisa, a new species of mantis shrimp from the Indo-West Pacific (Stomatopoda: Lysiosquillidae)

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Abstract

Lysiosquillina lisa sp. nov., from Indonesia is the fourth species of the genus to be recognised. This new species has frequently been observed by scuba divers at depths of 20–25 m on volcanic sands at the base of coral reefs ranging from the Andaman Sea to Indonesia, Papua New Guinea and the Philippines. *Lysiosquillina lisa* is readily recognised by its bright, orange-brown coloration but is also the only known member of the Lysiosquillidae bearing a 2- instead of 3-segmented mandibular palp. A key to the species of *Lysiosquillina* is given.

Key words: Lysiosquillidae, *Lysiosquillina lisa*, taxonomy, Stomatopoda.

Introduction

The lysiosquillid genus *Lysiosquillina* was erected by Manning (1995) for two Indo-West Pacific species *L. maculata* (Fabricius, 1793), *L. sulcata* (Manning, 1978), and one western Atlantic species, *L. glabriuscula* (Lamarck, 1818). For much of the last decade, scuba divers in the Andaman Sea, Indonesian Archipelago, and the Philippines have reported sightings of a large, orangish-brown banded species of stomatopod, which clearly belongs to an undescribed species of *Lysiosquillina* Manning, 1995. Unlike most other lysiosquillids, however, which occur in the intertidal or shallow sublittoral zone, this new species is usually only seen by scuba divers at depths of 20–25 m. This new species of *Lysiosquillina* occupies deep burrows in volcanic sands, has frequently been photographed and even featured in popular articles (e.g. Woodward & Aw, 1994). A single female specimen of this species from the Melbourne Ward Collection was located in the collections of the Australian Museum, but is unfortunately in poor condition and lacks reliable locality data. Recently, however, several specimens of this new species have been collected enabling the following account.

Materials and methods

All measurements are in millimeters (mm). Terminology and size descriptors generally follow Ah Yong (1998) and Manning (1969, 1977). Total length (TL) is measured along the midline from the apex of the rostral plate to the apices of the submedian teeth of the telson. Carapace length (CL) is measured along

the midline and excludes the rostral plate. Propodal index (PI) of the raptorial claw is given as 100CL divided by the propodus length. Other abbreviations: antennule (A1), antenna (A2), abdominal somite (AS), maxilliped (MXP), pleopod (PLP), thoracic somite (TS). Specimens are deposited in the Australian Museum, Sydney (AM), the Museum Zoologicum Bogoriense, Indonesia (MZB) and the National Museum of Natural History, Smithsonian Institution (USNM).

Systematic account

LYSIOSQUILLIDAE Giesbrecht, 1910

Lysiosquillina Manning, 1995

Lysiosquillina lisa sp. nov.

(Figures 1–3)

Lysiosquilla sp. — Aw, 1997: 115, 117, 119. — Coleman, 1998: 32.

Lysiosquilla sp. 2. — Gosliner et al., 1996: 196.

Lysiosquillina sp. — Debelius, 1999: 289.

Lysiosquilla sulcirostris. — ?Debelius, 1999: 286 [not *L. sulcirostris* Kemp, 1913].

Holotype. MZB Cru 1444, male (TL 295 mm), Tulamben, northeast Bali, near wreck of "Liberty", 22 m, black sand slope, coll. J. Randall & L. Crosby, October 1999.

Paratypes. AM P60075, 1 male (TL 308 mm), "Angel's Window", Lembah Strait, north Sulawesi, Indonesia,

1°29'47"N, 125°15'10"E, 14 m, from burrow in current swept coarse sand slope, coll. M. Erdmann & J. Randall, 23 September 2000; USNM 307223, 1 male (TL 192 mm), Lanyukang Island, Spermonde Archipelago, southwest Sulawesi, Indonesia, coll. M. Erdmann, 1992.

Other material examined. AM P60074, 1 female (TL 196 mm), ?Mauritius, Mel Ward Collection.

Diagnosis

Rostral plate trianguloid, broadest basally; dorsal surface with median carina extending posteriorly about 1/2 to 3/4 length of rostral plate; median carina flanked by shallow groove; ventral surface unarmed, smooth. A2 protopod with blunt, mesio-dorsal projection and short, bulbous mesial papilla; ventral papilla short, bulbous proximally; distal ventral papilla thick, blunt, exceeding half length of A2 peduncle segment 1. Raptorial claw dactylus with 9 or 10 teeth. Mandibular palp 2-segmented. Uropodal endopod dark brown.

Description

Eye with cornea strongly bilobed, mesial lobe rounded, set slightly obliquely on stalk, not extending beyond A1 peduncle segment 2; CI 307–370 (*n* = 4). Ophthalmic somite anterior margin unarmed. Ocular scales low, triangular, separate, inclined anteriorly.

A1 somite dorsal processes broad, low, flattened, with small anterior spine. A1 peduncle 0.48–0.50CL. A2 protopod with blunt mesio-dorsal projection and short, bulbous mesial papilla; with 2 ventral papillae; proximal ventral papilla short, bulbous; distal ventral papilla thick, blunt, elongate, about half length of A2 peduncle segment 1. A2 scale length 2.64–2.97 width and 0.63–0.73CL; entire margin setose.

Rostral plate trianguloid; slightly longer than broad; broadest basally; lateral margins sinuous; dorsal surface with median carina extending posteriorly about 1/2 to 3/4 length of rostral plate; median carina flanked by shallow groove.

Raptorial claw dactylus with 9 or 10 teeth; outer margin sinuous, without distinct basal notch; carpus dorsal margin terminating in short tooth directed ventrally; PI 064–076.

Mandibular palp 2-segmented. MXP1–5 with epipod. MXP5 basal segment lacking ventrally directed spine; merus with narrow, evenly convex, flange on inner margin.

TS5 lateral process obsolete. TS6–7 lateral process broadly rounded. TS8 sternal keel rounded to angular.

Pereiopods 1–3 endopods with slender distal segment, setose on outer and distal margins only.

Male PLP1 endopod with posterior endite;

posterior endite with or without mesial emargination.

Abdominal segments flattened, loosely articulated. AS5 smooth laterally and medially; with deep circular pit anteromesial to posterior articular condyle; posterior margin unarmed, lacking spinules. AS6 smooth medially; with low intermediate and lateral bosses demarcated by irregular sculpture; with acute, triangular, ventrolateral projection anterior to uropodal articulation; sternum posterior margin unarmed.

Telson broader than long, subquadrate, with low median and submedian dorsal bosses; surface around dorsal bosses bearing numerous shallow pits; posterior margin with 4 short prominences either side of midline, with outermost sharpest; lateral margins unarmed; ventral surface with numerous shallow pits; with or without and low postanal carina.

Uropodal protopod terminating in two primary spines, each trefoil in cross-section; inner primary spine longer than outer; protopod unarmed dorsally excepting spine above proximal exopod articulation; lacking ventral spine anterior to endopod articulation. Uropodal exopod proximal segment unarmed dorsally; distal margin with short ventral spine; outer margin with 7 or 8 movable spines, distalmost not reaching midquarter of distal segment. Uropodal endopod lacking strong dorsal proximal fold; length 1.86–2.10 breadth; colour dark brown.

Colour in life. (Figs. 2, 3) Cornea with pale spots. Carapace dark reddish brown with scattered pale mottling and with narrow cream transverse band across cervical region. A2 scale orange-brown medially, white distally and proximally. Raptorial claw merus mottled with reddish brown; propodus and carpus reddish orange; dactylus pale orange. Thorax and abdomen transversely banded with cream and dark red brown, with dark bands distinctly broader than pale bands; articular points between AS5–6 and telson segments red. Telson with dark brown median and submedian patches coalescing anteriorly. Uropodal exopod dark brown on proximal segment and inner proximal two-thirds of distal segment; outer movable spines orange. Uropodal endopod dark brown.

Measurements. Male (*n* = 3) TL 192–308, female (*n* = 1) TL 196. Other measurements of holotype. TL 295 mm. CL 50.2 mm, A1 peduncle 13.9 mm, A2 scale 35.3 mm. Raptorial claw propodus length 78.5 mm. AS5 width 58.8 mm.

Etymology. Named for Lisa Crosby, Divemaster at the Mimpi Dive Resort, Bali, who assisted in locating the holotype. The specific epithet is used as a noun in apposition.

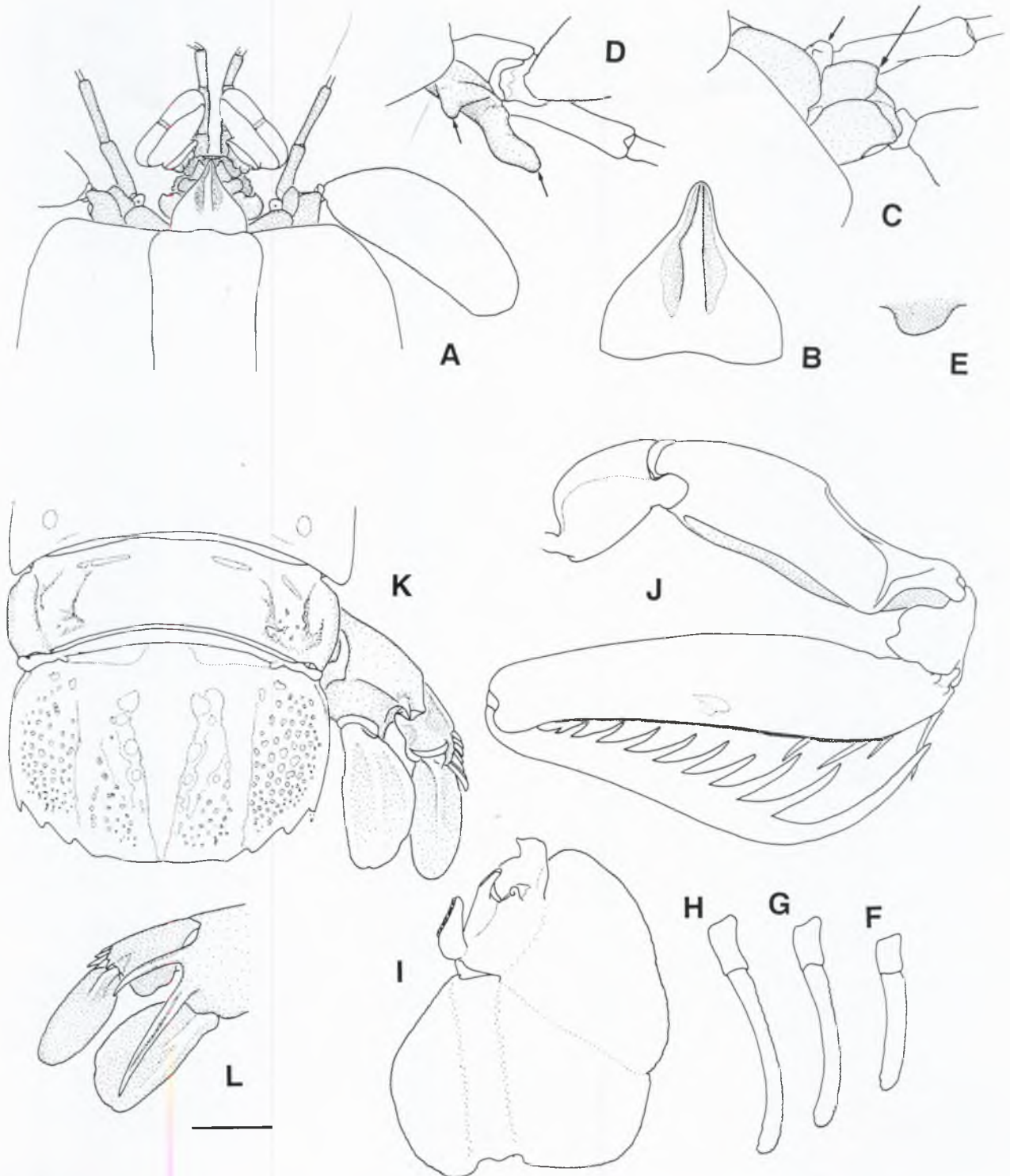


Figure 1. *Lysiosquillina lisa* sp. nov., holotype. A, anterior cephalon, dorsal. B, rostral plate, dorsal. C, antennal protopod, right dorsal (anterior dorsal projection indicated by large arrow; mesial papilla indicated by small arrow). D, antennal protopod and ventral papillae, right

ventrolateral (papillae indicated by arrows). E, TS8 sternal keel, right lateral. F-H, pereopod 1-3 endopod. I, PLP1 endopod, right anterior. J, raptorial claw, right lateral. K, AS5-6, telson & uropod, dorsal. L, uropod, right ventral. Scale A = 12 mm, B-I = 5 mm, J-L = 13.5 mm.



Figure 2. *Lysiosquillina lisa* sp. nov. holotype, dorsal view (J.E. Randall).



Figure 3. *Lysiosquillina lisa* sp. nov., (male paratype, AM P60075) at burrow entrance, Lembeh Strait, north Sulawesi, Indonesia, (J. E. Randall).

Remarks

The four specimens of *L. lisa* sp. nov. agree well, but the two larger males differ from the others in having more distinct grooves flanking the median carina of the rostral plate. In the holotype, the posterior endite of the distal lobe on the endopod of pleopod 1 bears a short distal point (Fig. 1 I); other males lack this distal point. The raptorial claws of the female are relatively shorter as measured by the propodal index suggesting that the species might display sexual dimorphism in raptorial claw size as in *L. maculata* (see Manning, 1978, 1995).

Aside from the bright, orange-brown, anterior coloration, *Lysiosquillina lisa* sp. nov. differs from congeners in the shape and ornamentation of the rostral plate, in the size and shape of the antennal papillae, in uniquely bearing a blunt mesio-dorsal projection on the antennal protopod (Fig. 1 C) and in uniquely bearing a 2- instead of 3-segmented mandibular palp. The rostral plate (Fig. 1 A, B) in *L. lisa* differs from others in the genus in being broadest basally and in bearing a median carina that extends posteriorly for about 1/2 to 3/4 of the rostral plate length and is flanked by a groove resembling that of *Lysiosquilla sulcirostris* Kemp, 1913, and *Lysiosquilla monodi* Manning, 1977. In *L. maculata* and *L. glabriuscula*, the rostral plate is cordiform and broadest in advance of the base, the median carina is shorter than half the median length of the rostral plate and lacks flanking grooves. In *L. sulcata*, although the rostral plate is broadest basally, it is has a more pentagonal shape and lacks a distinct median carina. Note that Manning (1978) reported some specimens of *L. maculata* with a triangular rostral plate; these specimens require restudy for they may be referable to *L. lisa*.

The mesial and ventral papillae on the antennal protopod are usually slender and falcate (occasionally

bulbous) in lysiosquillids, but in *L. lisa* the mesial papilla and proximal ventral papilla is short and bulbous, and the distal ventral papilla is thickened and elongate, being more than triple the length of the proximal ventral papilla (Fig. 1 C, D). However, because the mesial and posterior ventral papillae occasionally vary in shape in *L. maculata*, variation could also be expected to occur in *L. lisa* and additional material will be required to evaluate this possibility. The size and shape of the distal ventral papilla in *L. lisa*, however, is not approached by that of *L. maculata*.

In *L. lisa*, the anterior spine on the dorsal processes of the antennular somite is smaller than is usual in species of *Lysiosquilla* or *Lysiosquillina*. Only in large females of large species (>TL 200 mm) which show general reduction in morphological structures, such as *Lysiosquillina maculata* and *Lysiosquilla tredecimdentata* Holthuis, 1941, is the anterior spine on the dorsal processes of the antennular somite relatively small.

Of the three other species of *Lysiosquillina*, *L. lisa* most closely resembles *L. maculata* in the similar number of teeth on the dactylus of the raptorial claw, the dark uropodal endopod, the presence of pale spots on the cornea in life and the large size (TL>300 mm). Whereas all species of *Lysiosquillina* bear dark and light transverse banding on the body, the dark bands in *L. lisa* appear to be the broadest, being distinctly broader than the light bands.

Habitat

In contrast to *L. maculata* and *L. sulcata* which usually burrow in littoral or shallow sublittoral calcareous sands, *L. lisa* apparently burrows in black, volcanic sands at depths of 14–25 m.

Distribution

Known with certainty from Bali and Sulawesi, Indonesia and possibly from Mauritius. Published underwater photographs of this species, however, record *L. lisa* from the Similan Islands, Andaman Sea (Debelius, 1999), Bunaken, Indonesia (Woodward & Aw, 1994, Aw, 1997), Papua New Guinea (Coleman, 1998) and the Philippines (Gosliner et al., 1996).

General discussion

At the time that *Lysiosquillina* Manning, 1995, was first recognised, the genus was distinguished from *Lysiosquilla* Dana, 1852, by lacking the mesio-dorsal projection on the antennal protopod and by having broad instead of slender antennal scales. The mesio-dorsal projection in the majority of species assigned to *Lysiosquilla* by Manning (1995) is present as a sharp tooth. In the Western Atlantic species, *Lysiosquilla campechiensis* Manning, 1962, however, the mesio-dorsal projection is a low and blunt as in *L. lisa*. Hence, the presence of the blunt mesio-dorsal projection on the antennal protopod in *Lysiosquillina lisa*, as in *Lysiosquilla campechiensis* Manning, invalidates one of the distinctions between their respective genera.

In species of *Lysiosquillina*, the length of the antennal scale is less than 3.0 times the greatest width (usually about 2.5 times the width) whereas in *Lysiosquilla*, the antennal scale length exceeds 3.0 times the greatest width (Manning, 1995). Thus, the proportions of the antennal scale in *L. lisa* (2.64–2.97 times the width) are essentially intermediate between that of *Lysiosquilla* and other species of *Lysiosquillina*. Although the proportions of the antennal scale in *L. lisa* align it with other species of *Lysiosquillina* instead of *Lysiosquilla*, the distinction between the two genera now appears to be somewhat arbitrary. Clearly, the status of *Lysiosquillina* as distinct from *Lysiosquilla* warrants further investigation. Internal relationships of the Lysiosquillidae are presently being studied by cladistic analysis (first author, in prep.). A key to the species of *Lysiosquillina* is given below.

Key to species of *Lysiosquillina*

- 1. Rostral plate with long median carina, extending posteriorly 1/2–3/4 length of rostral plate. Mandibular palp 2-segmented. A2 protopod with blunt angular mesio-dorsal projection *L. lisa* sp. nov.
- Rostral plate with short median carina, extending posteriorly not more than 1/2 length of rostral plate.

- Mandibular palp 3-segmented. A2 protopod without angular mesio-dorsal projection 2
- 2. Rostral plate with indistinct median carina flanked by longitudinal grooves, or with single median groove. Apex of uropodal endopod pale, unpigmented *L. sulcata*
- Rostral plate with distinct median carina, not flanked by longitudinal grooves. Apex of uropodal endopod dark, pigmented 3
- 3. Raptorial claw dactylus with 6–7 teeth *L. glabriuscula*
- Raptorial claw dactylus with 8–11 (usually 10–11) teeth *L. maculata*

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