

LYSIOSQUILLOIDES MAPIA, A NEW SPECIES OF STOMATOPOD CRUSTACEAN FROM NORTHERN SULAWESI (STOMATOPODA: LYSIOSQUILLIDAE)

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ABSTRACT. – *Lysiosquilloides mapia*, the third species of the genus, is described from North Sulawesi, Indonesia. The strikingly coloured orange species has previously been pictured in numerous coral reef identification guides, with an apparent western Pacific geographic range of North Sulawesi and the Philippines eastwards to Fiji. Besides its distinctive orange colouration, *Lysiosquilloides mapia* is readily distinguished from the congeneric *L. aulachorhynchus* Cadenat in having a relatively broad antennal scale and a cordiform rostral plate. It is distinguished from *L. siamensis* Naiyanetr in having a strongly conical mesial lobe of the cornea and an angular ventral keel on the eighth thoracic segment. A key to the species of *Lysiosquilloides* is given.

KEY WORDS. – Stomatopoda, *Lysiosquilloides*, taxonomy, new species, Indonesia.

INTRODUCTION

Manning (1977) erected the lysiosquillid genus *Lysiosquilloides* for the eastern Atlantic species *Lysiosquilla aulachorhynchus* Cadenat, 1957, which differs from other lysiosquillids in having moveable submedian teeth on the telson and in possessing flattened, unarmed dorsal processes of the antennular somite. A second species, *L. siamensis* (Naiyanetr, 1980), was later described from the Gulf of Thailand (though it was initially placed in *Lysiosquilla*), and has since been recorded from northern Australia (Ahyong, 2001). The present species, distinctive for its striking orange colouration, has been pictured in numerous coral reef identification guides over the past decade (e.g., Debelius, 1999; Ferrari & Ferrari, 1999; Gosliner et al., 1996; Severns, 1994; and Van der Loos, 2001) but has until now remained undescribed due to a lack of specimens. The authors were recently able to spear a single male specimen, allowing the following description to be completed.

MATERIALS AND METHODS

All measurements are in millimetres (mm). Terminology used follows that of Ahyong (2001) and Manning (1969, 1977). Abbreviations for morphological characters include: antennule (A1), antenna (A2), abdominal somite (AS), maxilliped (MXP), pleopod (PLP), thoracic somite (TS). Total length (TL) is measured along the dorsal midline from the apex of the rostral plate to the apices of the telson submedian teeth. Carapace length (CL) is measured along the midline of the carapace, from the base of the rostral plate to the posterior median margin. Abbreviations for other measurements used herein include: AW, abdominal width measured at the widest point of the 5th abdominal somite; AWCLI, abdominal width-carapace length (abdominal width divided by the carapace length x 100); CI, corneal index (carapace length divided by the cornea width x 100); CW, cornea width, measured as maximum width of cornea; PI, propodal index (carapace length divided by the propodus length x 100); PD, propodus depth, measured as the greatest depth of the propodus; PL, propodus length, measured along pectinate margin from the edge articulating with the carpus to the distal edge. The holotype specimen is deposited in the Museum Zoologicum Bogoriense, Cibinong, Indonesia (MZB).

SYSTEMATICS

LYSIOSQUILLIDAE GIESBRECHT, 1910
(*Lysiosquilloides* Manning, 1977)

Lysiosquilloides mapia, new species
(Figs. 1-3)

Lysiosquilla sp. - Ferrari & Ferrari, 1999: 266; Van der Loos, 2001: 116.

Lysiosquilla sp. 1 - Gosliner et al., 1996: 196.

Lysiosquilloides sp. - Debelius, 1999: 286-287.

"Unidentified mantis shrimp" - Severns, 1994: 114.

Material examined. – Holotype - male (TL 154 mm) (MZB Cru 1504), Mapia Resort house reef, Manado, North Sulawesi, Indonesia, 1° 27.511' N, 124° 45.997' E, 8 m, burrow in black sand amongst scattered coral heads, coll. M. Erdmann & M. Boyer, 8 Jun.2001. Note: holotype damaged by collection with spear; small entry wound present in right gastric groove of carapace, with left raptorial appendage severed cleanly posterior to meral flange (severed appendage accompanies specimen).

Diagnosis. – Cornea with mesial lobe strongly conical. A2 protopod with blunt anterior projection bearing apical papilla; with two ventral apical papillae. A2 scale relatively broad. Rostral plate cordiform, longer than broad, broadest in

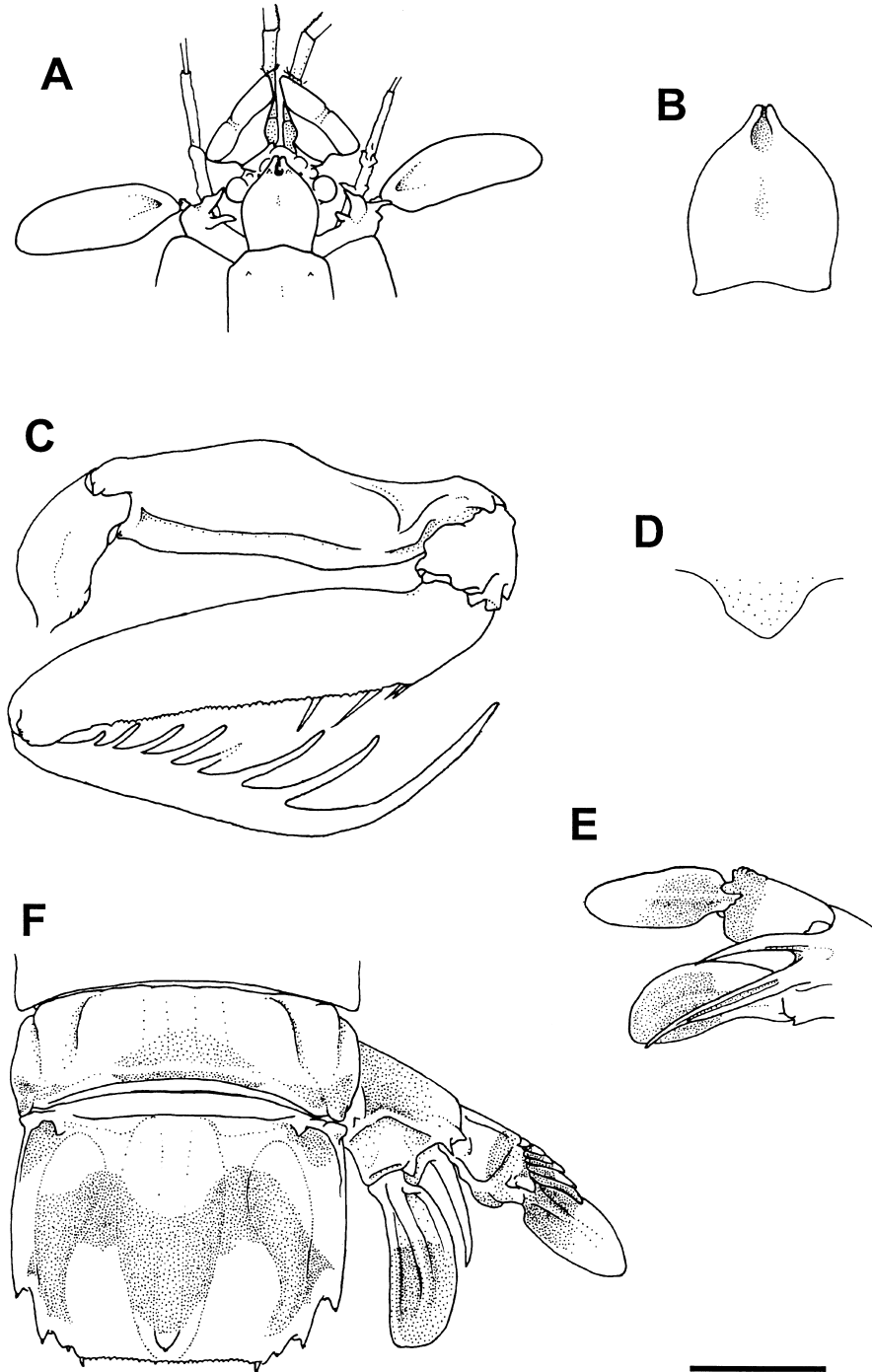


Fig. 1. *Lysiosquilloides mapia*, new species, holotype. A, anterior cephalon, dorsal. B, rostral plate, dorsal. C, raptorial claw, right lateral. D, TS8 sternal keel, right lateral. E, uropod, right ventral. F, AS6, telson and uropod, dorsal. Scale A, C, E-F = 10 mm; B = 5 mm; D = 2.5 mm.

advance of base; apex deflexed, with pronounced median sulcus anteriorly. Raptorial claw with 8 teeth. TS8 sternal keel angular. AS6 smooth medially, with low lateral boss, medially corrugated. Telson with median boss terminating in small spine. Telson submedian teeth with moveable apices. Uropodal protopod with short ventral spine anterior to endopod articulation. Uropodal exopod proximal segment outer margin with 6-7 moveable spines. Endopod with apex dark. Dorsum base colour a striking orange, with bright yellow transverse bands medially on thoracic and abdominal somites.

Description. – Eye with cornea strongly bilobed, mesial lobe distinctly conical, set slightly obliquely on stalk, not extending beyond A1 peduncle segment 2; CI 335. Ophthalmic somite with a pronounced, angular ventral keel, anterior margin with a median point. Ocular scales triangular, erect, separate and inclined anteriorly.

A1 somite dorsal processes broadly rounded, low, flattened and unarmed. A1 peduncle 0.33CL. A2 protopod with blunt anterior projection bearing apical papilla; with two ventral papillae, proximal ventral papilla short with sharp apex; distal ventral papilla elongate with tapered apex, less than half length of A2 peduncle segment 1. A2 scale length 2.45 width and 0.48CL; entire margin setose.

Rostral plate cordiform; longer than broad (length 1.24 width); broadest in advance of base; apex deflexed, with pronounced median sulcus anteriorly that terminates ventrally in a sharp ridge. Raptorial claw dactylus with 8 teeth; outer margin faintly sinuous with shallow basal notch. Carpus dorsal margin terminating in short tooth directed ventrally; PI 071.

Mandibular palp 3-segmented. MXP1-5 with epipod. MXP5 basal segment lacking ventrally directed spine. Merus with broad flange on inner margin, evenly convex.

TS5 lateral process obsolete. TS6-7 process broadly rounded. TS8 sternal keel angular. Pereiopods 1-3 endopods with distal segment slender, setose on outer and distal margins only. Male PLP1 endopod with posterior endite.

Abdominal segments flattened, loosely articulated. AWCLI 101.4. AS5 smooth laterally, with shallow circular pit anteromesial to posterior articular condyle; posterior margin unarmed. AS6 smooth medially with low lateral boss, medially corrugated; with acute triangular ventrolateral projection anterior to uropodal articulation; sternum posterior margin unarmed.

Telson broader than long, subquadrate, dorsal surface with low median and submedian bosses but otherwise smooth, with no evidence of shallow pits on surface; median boss terminating in small spine. Telson submedian teeth with moveable apices and 14-16 submedian denticles; intermediate and lateral teeth sharp; with two blunt intermediate denticles and one blunt lateral denticle; lateral margins of telson unarmed. Ventral surface of telson with scattered shallow pits and a low, broad postanal carina.

Uropodal protopod terminating in two primary spines, each trefoil in cross-section; inner spine longer than outer; protopod unarmed dorsally except for single spine above proximal exopod articulation; with short ventral spine anterior to endopod articulation. Uropodal exopod proximal segment unarmed dorsally; distal margin with pronounced but blunt ventral spine; outer margin with 6 or 7 moveable spatulate spines, distalmost reaching over 1/3 length of distal segment. Uropodal endopod elongate, length 2.2 width, apex dark brown.

Colour in life. – (Figs. 2, 3). Cornea orange with peripheral white spots and 3 black ocelli in a transverse line. Dorsum base colour bright orange, with bright yellow transverse bands. A2 scale orange with yellow stippling. Carapace orange with thin yellow transverse band 2/3 posteriorly; band continuous across merus, and faint across carpus and dactyl. Carapace with a pair of large yellow blotches posterolaterally. Thoracic and abdominal somites overall orange, with transverse yellow bands medially and black mottling along anterior and posterior edge of somites (mottling most pronounced laterally). Telson with black patches anterolaterally and a yellow transverse band 1/3 posterior, black median and lateral patches coalescing anteriorly, with a pair of bright yellow submedian patches. Uropodal protopod mottled dark proximally and bright yellow distally. Uropodal exopod with proximal segment yellow proximally and dark brown distally; distal segment dark brown proximally but with a yellow apex. Uropodal endopod bright yellow proximally, with dark brown apex.

Measurements. – TL 154 mm. AW 28.55 mm. CL 28.15 mm. CW 8.4 mm. A1 peduncle 9.15 mm. A2 scale length 13.5 mm; A2 scale width 5.5 mm. Rostral plate length 7.8 mm; width 6.3 mm. Raptorial claw PL 39.9 mm; PD 8.6 mm.

Etymology. – This species is named after the type locality at the Mapia Resort house reef, operated by Celebes Divers. The word “mapia” means “beautiful” in the local Sangir language, a singularly appropriate adjective to describe this stunningly coloured new species. Mapia is used as a noun in apposition.

Remarks. – With only a single specimen available, it is unfortunately impossible to record potential sexual dimorphism or ontogenetic changes in the morphology of *L. mapia*. Nonetheless, the low, rounded dorsal processes of the antennular somite and the moveable submedian teeth on the telson clearly identify this species as belonging in the genus *Lysiosquilloides*. *Lysiosquilloides mapia* is readily distinguished from its congener *L. aulachorhynchus* (Cadenat, 1957) in possessing a relatively broad A2 scale and in having a cordiform, rather than triangular, rostral plate. These two species are also geographically distinct, with *L. mapia* occurring in the western Pacific and *L. aulachorhynchus* found only in the eastern Atlantic.

Lysiosquilloides mapia is also readily distinguished from the Indo-West Pacific *L. siamensis* (Naiyanetr, 1980) in having a strongly conical mesial lobe of the cornea and an angular



Fig. 2. *Lysiosquilloides mapia*, new species, holotype, at burrow entrance on volcanic sand in front of Mapia Resort, North Sulawesi (M. Boyer).



Fig. 3. *Lysiosquilloides mapia*, new species, holotype, dorsal view depicting orange cephalon and bright yellow transverse banding pattern (M.V. Erdmann).

ventral keel on TS8. Additionally, *L. mapia* has only 6-7 moveable spines on the proximal segment of uropodal exopod (instead of 7-8 in *L. siamensis*), while the dorsal processes of the antennular somite appear more rounded in *L. siamensis*.

While there is no detailed published information on the colour of *L. siamensis* in life, it seems likely that the striking orange colouration of the cephalon in *L. mapia* and the bright yellow transverse banding on the thoracic and abdominal somites are unique to this species.

Due to its partially orange colouration, divers have occasionally confused the co-occurring *Lysiosquillina lisa* Ahyong & Randall, 2001 with *L. mapia*. However, besides the generic level morphological differences between these two species, *L. mapia* is easily differentiated from *L. lisa* even in a field setting by the strongly conical shape of the mesial lobe of the cornea (rounded in *L. lisa*) and the uniform orange colouration of the cephalon (A2 scale is white and orange banded in *L. lisa*).

It should be noted that the dorsal surface of AS1-5 is medially corrugated in the holotype specimen of *L. mapia*, but this appears to be an artifact of preservation and the “wrinkling” of the relatively soft dorsal integument and as such is not mentioned as a diagnostic character of the species.

Habitat. – Debelius (1999) suggests that this species is found in burrows in sand from 2-30 m depth. Gosliner et al. (1996) remark only that the species is found to a depth of 20 m, with no further discussion. The authors’ personal observations of this species in North Sulawesi (n=7) suggest that it generally prefers to burrow in black, volcanic sand substrates over a depth range of 5-20 m, often in areas with some freshwater influx in the vicinity. Van der Loos (pers. comm.) confirms similar habitat observations on a number of individuals in Milne Bay, Papua New Guinea. The majority of published photographs of this species also depict a black volcanic sand substrate surrounding the burrow, though Ferrari & Ferrari’s (1999) photograph seems to show a mixed calcareous/volcanic sand substrate and an unpublished photograph by Bruce Carlson shows the animal in a burrow in white calcareous sand in Fiji. The second author has also observed one specimen in a burrow in white coral sand (5 m depth) on Mantehage Island in Bunaken National Park, North Sulawesi. Finally, the first author has also observed two individuals in 6-10m depth in mixed calcareous/siliceous sand burrows in Anilao, Philippines.

Distribution. – Because of the unmistakable colouration and eye shape of *L. mapia*, it is readily identified from numerous published photographs in coral reef invertebrate guides, which suggest a western Pacific distribution. Debelius (1999) records the species from Talaud (North Sulawesi) and Milne Bay (Papua New Guinea), while Gosliner et al. (1996) report a range of Sulawesi, Indonesia and Fiji. Van der Loos (2001) similarly records a photograph of *L. mapia* from Milne Bay, Papua New Guinea. The majority of photographs and observations of *L. mapia* are from the region around North

Sulawesi, Indonesia including Manado Bay, Lembeh Strait, and the Sangihe-Talaud Islands. Most recently, two individuals were observed by the first author in the Anilao region of Luzon Island, Philippines.

DISCUSSION

Lysiosquilloides mapia is now described after nearly a decade of field observations and published photographs. While this species is relatively widespread in the western Pacific (Sulawesi eastwards to Fiji), it appears to be quite rare. In sixteen combined years of stomatopod research and diving in Indonesia, the authors have only observed 7 individuals. Further collections should help determine if the relatively small size of the holotype male is typical of the species, if there is sexual dimorphism in the size of the raptorial appendage as with many other lysiosquillids (Manning, 1995), and whether the median corrugation on the abdominal somites is a stable character or simply an artifact of preservation. A key to the species of *Lysiosquilloides* is provided below.

Key to species of *Lysiosquilloides*

- 1. Rostral plate triangular, A2 scale slender, length greater than 2.9 times width.....*L. aulacorhynchus*
- Rostral plate cordiform, A2 scale broad, length 2.4-2.7 times width.....2
- 2. Mesial lobe of cornea subglobular, TS8 sternal keel rounded*L. siamensis*
- Mesial lobe of cornea distinctly conical, TS8 sternal keel angular.....*L. mapia*

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