

**LEANDER PLUMOSUS SP. NOV., A NEW PALAEMONINE SHRIMP
(CRUSTACEA: PALAEMONIDAE) FROM THE MALDIVE ISLANDS.**

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ABSTRACT

A new palaemonid shrimp, *Leander plumosus* sp. nov., is described and illustrated on the basis of specimens collected in the Maldive Islands, but the species was first noticed on the island of Bali, Indonesia. The species is remarkable in the conspicuous development of plumose setae on the rostrum, body and antennal peduncles. A sensory mechanism on the third maxilliped is described. A key to the identification of the four known species of the genus *Leander* Desmarest is provided.

KEYWORDS: Crustacea, Decapoda, Palaemonidae, *Leander*, new species, Maldive Islands, Bali, key to genus.

INTRODUCTION

The author received for identification some photographs of Balinese shrimps taken in 1990 by Roger Steene. Amongst these were some striking pictures of a beautifully coloured shrimp that appeared to belong to the Palaemonidae, but which could not be identified as any known genus or species. Unfortunately, no specimens were collected. A copy of the photograph was published in Indonesia in the hope that specimens might be obtained (Bruce 1990) and subsequently in Australia by Steene (1990). Copies of the photograph were also circulated amongst collectors. The photograph was recognised by Helmut Debelius, as being of a species occurring in the Maldive Islands. Through his good offices, Herwarth Voigtmann, of Maayafushi, Ari Atoll, subsequently provided a single specimen, which on examination proved to belong to the genus *Leander* Desmarest and represented an undescribed species. In some *Leander* species, the rostra of male and female are morphologically different. On request, Mr Voigtmann then provided a second specimen of the complementary sex. It is of rare occurrence for specimens of new species to be supplied on demand, although Holthuis (1981) describes a somewhat similar event with *Pontonia hurii* Holthuis (now *Anchiopontonia hurii* (Holthuis)). It is even more remarkable when the specimens are obtained from a locality at such a great distance,

nearly 5000 km, from the initial site of discovery, although the holotype of *P. hurii* was separated by an even greater distance from the paratypes, collected some two years later.

Carapace refers to the postorbital carapace length. The specimens are deposited in the collections of the Northern Territory Museum (NTM), Darwin.

SYSTEMATICS

Palaemonidae Rafinesque, 1815
Palaemoninae Rafinesque, 1815
***Leander* E. Desmarest, 1849**

Type species: *Leander tenuicornis* (Say, 1818).

Diagnosis (from Chace and Bruce, 1993). Rostrum without elevated basal crest; carapace with submarginal branchiostegal spine, without hepatic or branchiostegal suture; fourth thoracic sternite without slender median process; mandible with palp; ambulatory pereopods with dactyls simple; endopod of male first pleopod with appendix interna.

***Leander plumosus* sp. nov.**
(Figs 1-5, 6AB, Plate 2)

Unidentified palaemonid shrimp - Bruce, 1990: 62-63, fig. 2; Steene, 1990: 285, colour fig.

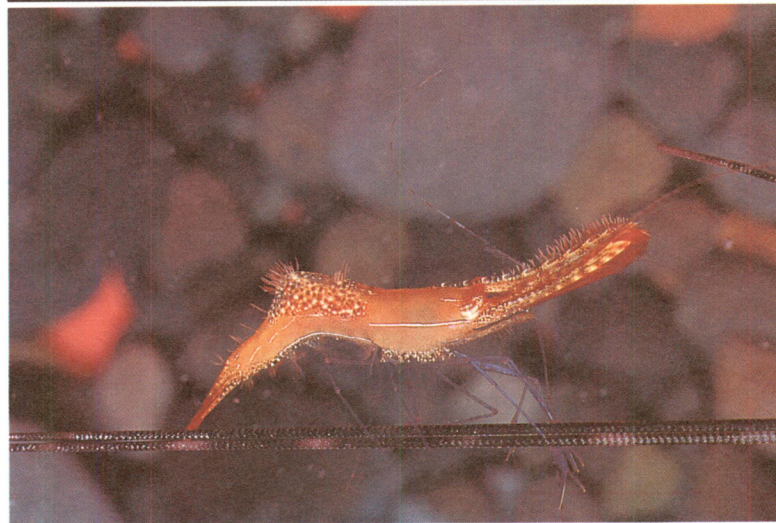
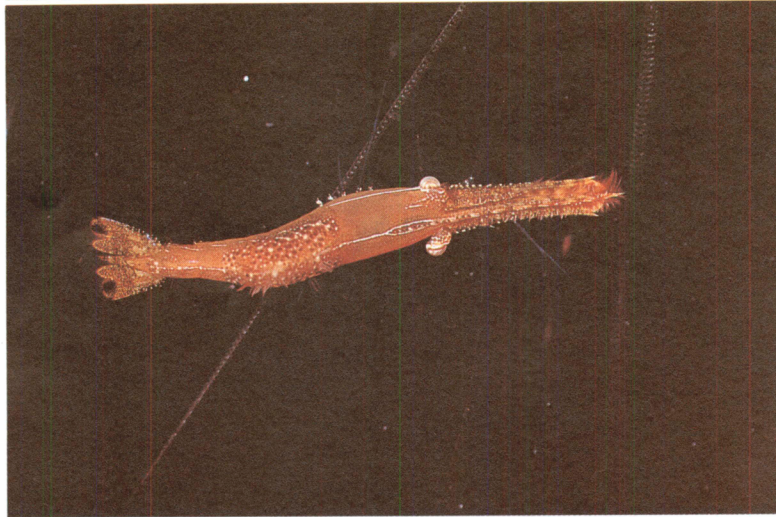


Plate 2. *Leander plumosus* sp. nov. A, specimen from Maldives Islands, photograph Herwarth Voigtmann; B, C, specimen from Bali, Indonesia, photographs by Roger Steene.

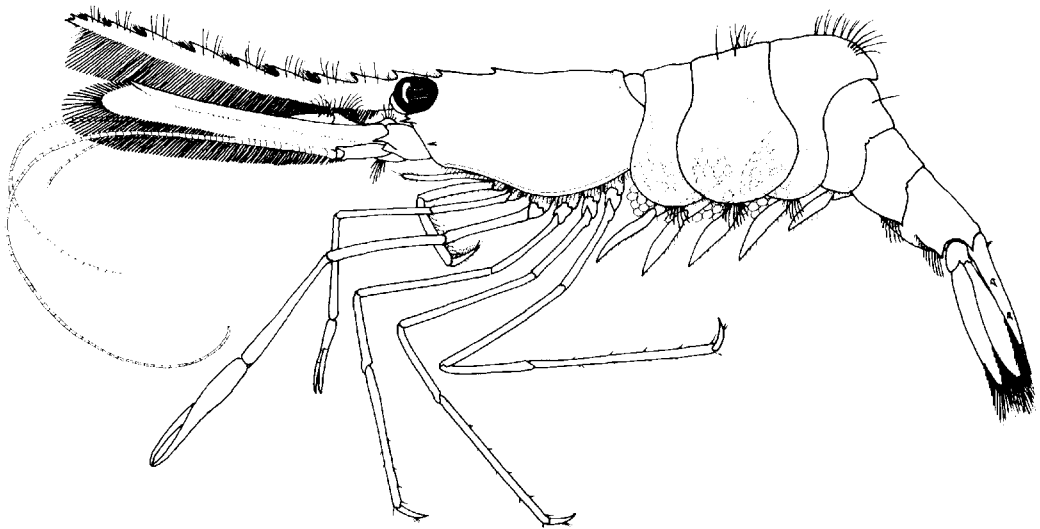


Fig. 1. *Leander plumosus* sp. nov., holotype, ovigerous female, Ari Atoll, Maldives Islands. Scale divisions in millimetres.

Type Material. HOLOTYPE - undissected ovigerous female, Ari Atoll, Maldives Islands, coll. Herwarth Voigtmann, 1991, NTM Cr.008567A; PARATYPE - dissected male, NTM. Cr.008567B, same data as for holotype.

Description. Small sized, slenderly built palaemonid shrimps, each lacking one second pereopod (Fig. 1).

Carapace smooth, glabrous. Rostrum very slender, elongate, slightly up-curved, extending well beyond scaphocerite, about 2.5 times carapace length in male (Fig. 2B), 1.75 times in female (Fig. 2A), dorsal carina feebly developed with acute teeth throughout length, 11 in male, 12 in female. First two teeth situated on carapace, anterior tooth distinctly posterior to level of orbit, posterior tooth in epigastric position, remaining nine teeth rather irregularly distributed in male, more widely spaced proximally, 10 teeth regularly spaced in female, slightly decreasing in size distally in both. Teeth with small median rows of short plumose setae anteriorly to each tooth, with scattered longer erect submedian plumose setae. Ventral carina feebly developed, with nine acute teeth in male, similar, subequal, decreasing in size slightly distally, uniformly distributed over distal two-thirds, distal tooth smaller, close to tip. Twelve teeth present in female, extended over distal four-fifths, proximal four teeth smaller, more closely spaced, distal teeth larger, increasing in size slightly distally, distal tooth remote from

tip. Ventral rostral margin with dense submedian row of coarsely plumose setae from orbital notch to rostral tip, setae short proximally, increasing in length distally, projecting ventrolaterally (Fig. 2C), densely pigmented, completely obscuring ventral rostral teeth. Supraorbital and hepatic spines absent, inferior orbital angle (Fig. 2D) produced, bluntly rounded, without medial flange. Antennal spine acute, marginal, far exceeding inferior orbital angle. Branchiostegal spine acute, subequal to antennal spine, remote from branchiostegal margin; without branchiostegal groove. Anterolateral angle of branchiostegite broadly obtuse, ventral margin setose.

Abdomen smooth (Fig. 2F), with short longitudinal rows of short coarsely plumose setae scattered on tergites of second to fourth segments. Third segment slightly posterodorsally produced, fifth segment about 0.7 of sixth segment length, sixth segment 1.5 times longer than deep, posterolateral angle acutely produced, posteroventral angle produced, dorsally blunt, with small acute ventral tooth, ventral margin with row of short coarsely plumose setae. Pleura of first three segments broadly rounded, enlarged in female, ventral margins setose, central portion of row with longer, coarsely plumose setae in female only. Fourth segment with pleuron posteriorly produced, rounded, setose, without coarsely plumose setae. Fifth segment with pleuron posteriorly produced, acutely pointed

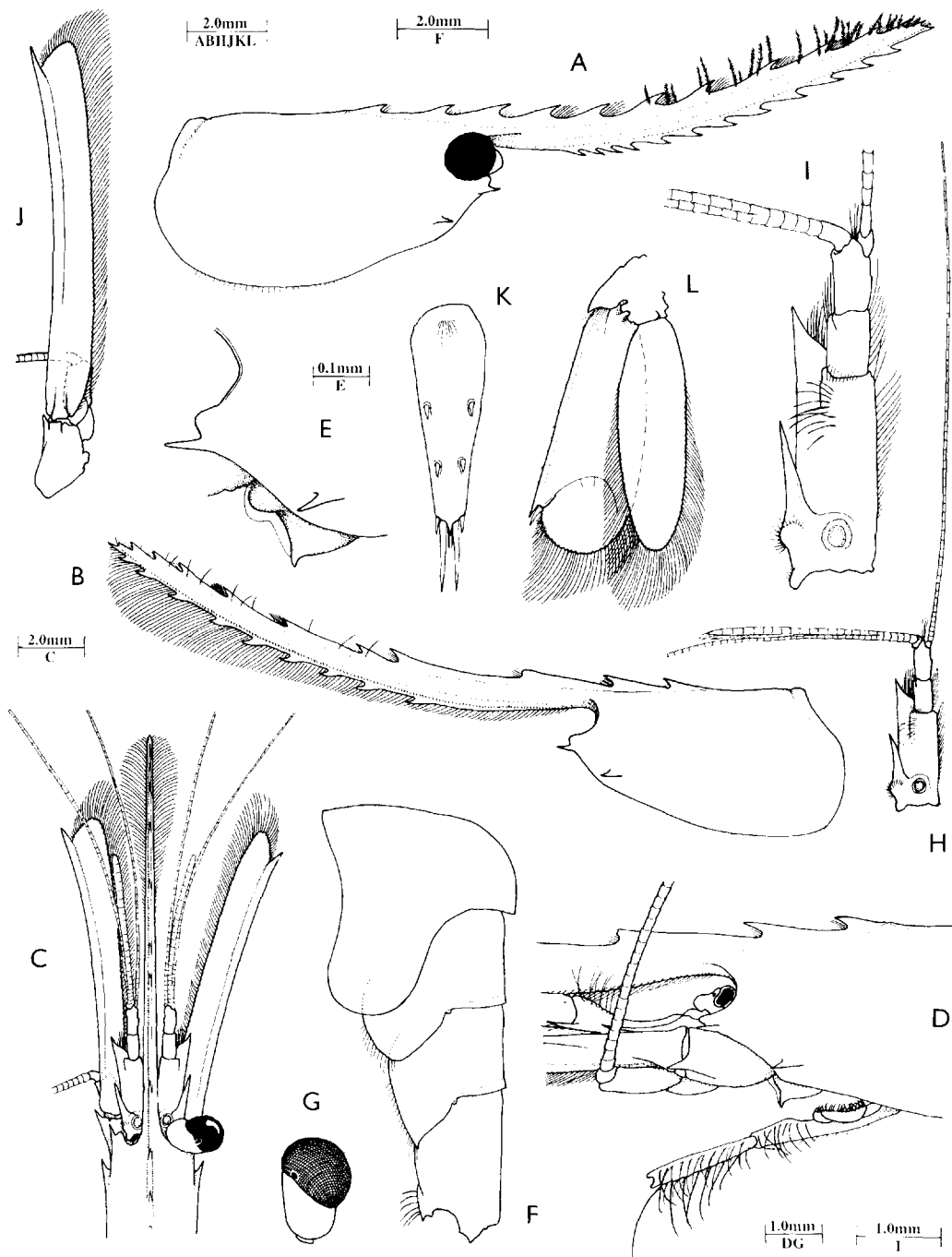


Fig. 2. *Leander plumosus* sp. nov. A, carapace and rostrum, lateral view, ventral rostral setae omitted; B, same, left ventral rostral setae omitted; C, anterior carapace, rostrum and antennae, dorsal; D, anterior carapace and orbital region, lateral; E, pterygostomial region and labrum, lateral; F, third to sixth abdominal segments; G, eye, dorsal; H, antennule; I, antennular peduncle; J, antenna; K, telson; L, uropod. A, female holotype. B-L, male, paratype.

posteroventrally, ventral margin setose, with coarsely plumose setae posteriorly, present in male and female. Telson (Fig. 2K) slender,

about 1.35 times sixth segment length, 3.0 times longer than anterior width, tapering posteriorly, lateral margins straight, convergent posteriorly.

Posterior margin (Fig. 5N) 0.4 of anterior width, biconcave, with long acute median process, dorsally with transverse row of plumose setae proximally, two pairs of similar, subequal spines at 0.43 and 0.7 of telson length. Posterior margin with lateral spines similar to dorsal spines, medial spines long, robust, 3.5 times lateral spine length, 0.3 of telson length, with submedian pair of setulose setae, 0.38 of medial spine length, arising ventral to apical process.

Eye (Fig. 2G) well developed, with large globular cornea with dorsal accessory pigment spot, much wider than stalk, oblique, stalk subcylindrical, slightly compressed, about 1.4 times longer than wide.

Antennular peduncle (Fig. 2I) reaching to about 0.35 of rostral length. Proximal segment about 2.4 times longer than wide, medial margin with long plumose setae, with minute ventromedial tooth, lateral margin straight, anterolateral margin (Fig. 5A) strongly acutely produced, slightly exceeding distal margin of intermediate segment, medial margin feebly sinuous, with coarsely plumose submarginal setae ventrally, continuous with row of similar setae along lateral margin. Stylocerite well developed, slender, acute, reaching to about 0.8 of segment length, proximal lateral margin swollen, periphery ringed with short finely plumose setae with swollen pore-bearing basal process (Fig. 5B). Statocyst normally developed, with subcircular statolith. Distal dorsolateral region of segment with numerous, scattered, coarsely plumose setae. Intermediate segment about 0.33 of proximal segment length, 1.5 times longer than wide, subcylindrical, medial margin strongly setose. Distal segment about 1.1 times intermediate segment length, subcylindrical, 2.0 times longer than wide. Upper flagellum (Fig. 2H) slender, biramous, rami fused for five proximal segments only, shorter free ramus about 4.0 times longer than fused portion, with about 19 groups of aesthetascs, lower ramus much longer than shorter ramus, filiform. Lower flagellum (Fig. 2H) slender, about 0.4 of longer upper ramus length.

Antenna (Fig. 2J) with stout basicerite with strong acute lateral tooth. Ischiocerite and merocerite normal; carpocerite short, subcylindrical, about 2.5 times longer than wide, reaching to about 0.15 of scaphocerite length. Scaphocerite elongate, slender, reaching to about 0.8 of rostral length, lateral margin feebly concave, with strong acute distolateral tooth, lamella narrow, medial margin subparallel to lateral

margin, 9.0 times longer than central width, distal lamella bluntly angular, distinctly exceeding tip of distolateral tooth, margins densely fringed with long coarsely setulose setae.

Ophthalmic somite without *bec ocellaire*, with small median pigment spot. Epistome with low rounded posteriorly convergent longitudinal ridges. Labrum (Fig. 2E) acutely produced ventromedially, with laminar median lamella anteriorly. First and second thoracic sternites fused (?), forming transverse ridge with median notch; third with transverse ridge; fourth with short stout, transversely compressed blunt median process. Fifth with rounded transverse lateral ridges; sixth and seventh unarmed; eighth with short stout anteriorly flattened median process (male only).

Mandible (right) (Figs 3A, 5C) robust. Palp (Fig. 5F) slender, three-segmented, distal segment slender, subcylindrical, longer than combined length of proximal segments, with several slender simple setae distally. Molar process (Fig. 5D) stout, with four blunt teeth distally, without setal brushes. Incisor process (Fig. 5E) short, broad, with three large acute teeth distally, outer tooth larger than inner teeth, medial margin sharp.

Maxillula (Fig. 3B) with bilobed palp (Fig. 5G), upper lobe larger than lower, lower lobe curved, without distal setae. Upper lacinia (Fig. 5H) slender, curved, distally truncate, with about nine stout simple teeth distally, with sparse simple setae. Lower lacinia short, tapering, with numerous serrulate setae distoventrally.

Maxilla (Fig. 3C) with simple, slender, tapering palp, with numerous short plumose setae along lateral margin. Basal endite slender, deeply bilobed, upper lobe longer than lower, each with about 13 and 11 slender, simple distal setae respectively, upper lobe with setae along dorsal and ventral margins. Coxal endite obsolete, margin weakly convex. Scaphognathite about 2.5 times longer than broad, posterior lobe well developed, 1.4 times longer than broad; anterior lobe 1.4 times longer than broad, distally narrow, medial margin deeply concave distally, convex proximally.

First maxilliped (Fig. 3D) with slender, tapering palp, with single long plumose pre-terminal seta. Basal endite broad, medial margin densely fringed with slender, finely serrulate setae, with submarginal medial dorsal row of similar setae. Coxal endite separated from basal endite by deep notch, distinctly bilobed, distal lobe with numerous, long, finely serrulate setae, proximal

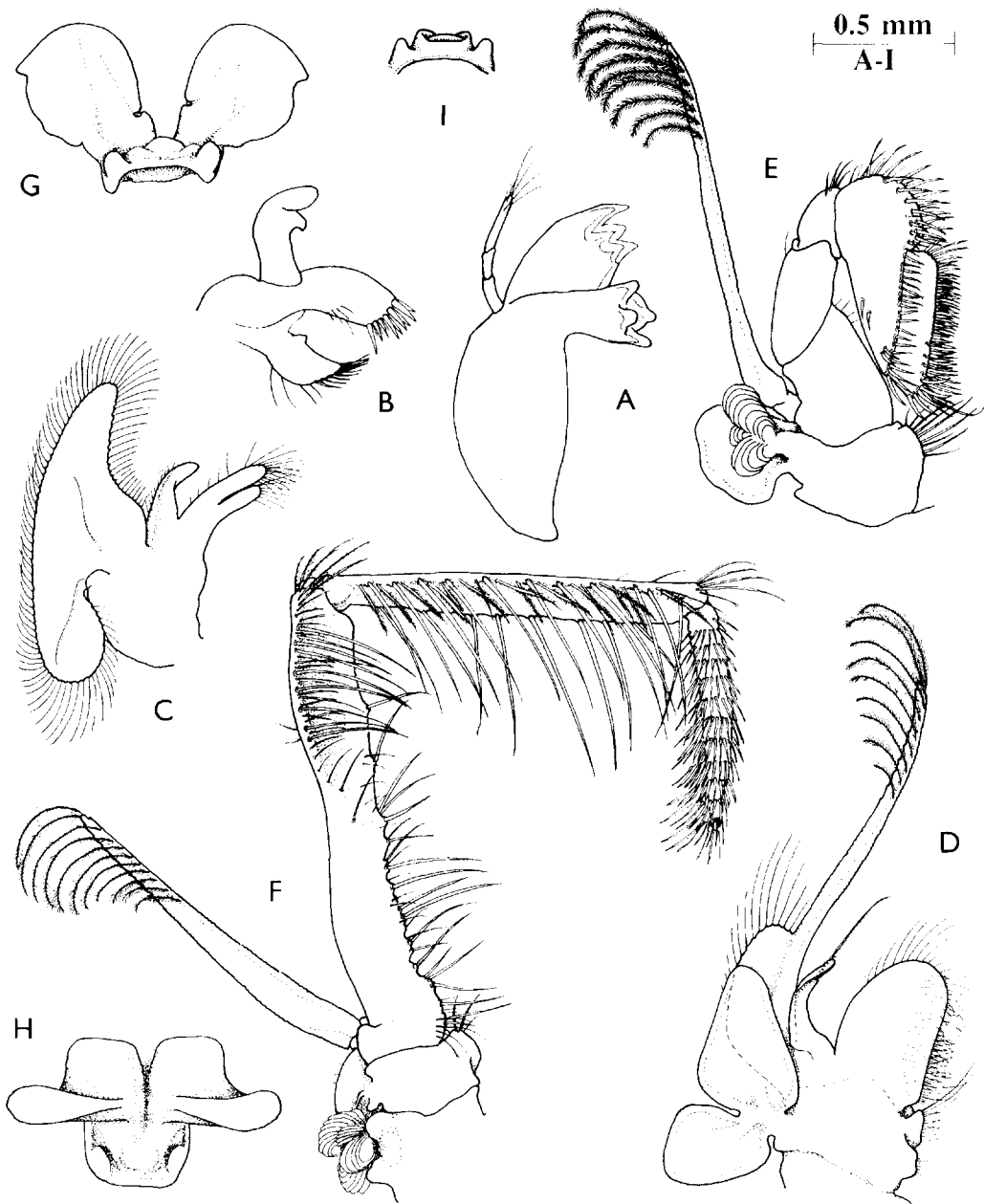


Fig. 3. *Leander plumosus* sp. nov., male, paratype. A, mandible; B, maxillula; C, maxilla; D, first maxilliped; E, second maxilliped; F, third maxilliped; G, paragnaths, posterior; H, same, ventral; I, same, corpus, posterior.

lobe with fewer, shorter setae. Exopod well developed, flagellum broad, with numerous plumose setae distally, caridean lobe narrow. Epipod large, triangular, deeply bilobed, triangular, distal lobe larger than oval proximal lobe.

Second maxilliped (Fig. 3E) with endopod robust. Dactylar segment about four times longer than wide, with about eight long simple spines

distoventrally, medial margin densely fringed with shorter, more slender, biserrate spines. Propodal segment distomedially expanded, margin rounded with numerous stout spines, ventromedial margin with row of short, simple spines, with several longer, stouter spines distally. Carpal segment normal, distal dorsomedial angle acute; ischiomerus normal. Basis robust, medi-

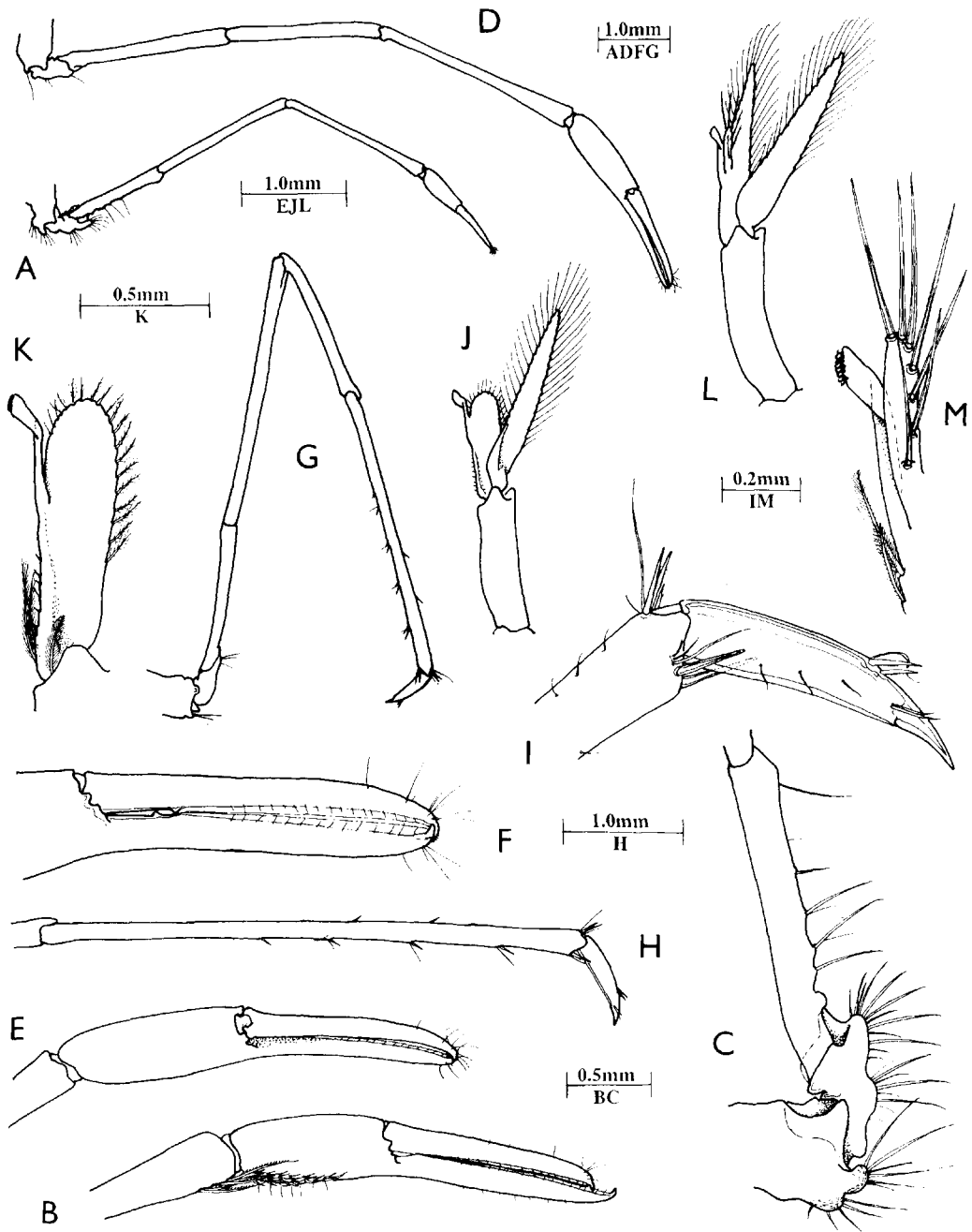


Fig. 4. *Leander plumosus* sp. nov., male, paratype. A, first pereopod; B, same, chela and distal carpus; C, same, ischium, basis and coxa, lateral; D, right second pereopod; E, same, chela; F, same, fingers; G, third pereopod; H, same, propod and dactyl; I, same, distal propod and dactyl; J, first pleopod; K, same, endopod; L, second pleopod; M, same, appendix masculina, appendix interna.

ally excavate. Exopod well developed, flagellum broad, with numerous plumose setae distally. Coxa stout, medial margin feebly convex, with long, slender, distally finely serrulate, spiniform setae. Epipod rounded, with small podobranch.

Third maxilliped (Fig. 3F) with endopod extending distally to exceed carpocerite by 0.5 of terminal segment. Ischiomerus completely fused to basis, combined segment about 3.4 times longer than distal width, expanded and twisted

distomedially (Fig. 5I), distolateral margin with six small stout spines, few short setae, medial margin with numerous long, slender, simple, rigid spiniform setae situated on raised bases, highly mobile, with shorter, more slender setae proximally. Penultimate segment slender, about 5.75 times longer than proximal width, subequal to ischiomeral portion of proximal segment, with numerous long slender mobile spiniform setae medially and laterally, with distally convex curved row of 18 minute, short, acute, non-articulated (?) spinules ventrolaterally at proximal end (Figs 5J-K, 6A-B), immediately adjacent to joint margin. Terminal segment about 0.6 of penultimate segment length, slightly curved, tapering distally, about 6.5 times longer than proximal width, densely spinose, with about 11 transverse groups of serrulate setae medially, scattered small groups laterally, distally unarmed in male (Fig. 5L) (terminal spines broken?), with short stout unarmed terminal spine in female. Exopod well developed, with broad flagellum, reaching to about 0.75 of antepenultimate segment length with numerous plumose setae distally. Coxa short, stout, about 1.75 times wider than long, broadly produced medially, feebly setose, with oval lateral plate, with smaller upper and larger lower arthrobranches.

Paragnaths (Fig. 3G-I) well developed with large rounded alae, with small lateral lobe, corpus with posterolateral tubercles, with median eminence surrounded by low ridge.

First pereopods (Fig. 4A) slender, exceeding antennular peduncle by about length of chela and distal fourth of carpus, carapocerite by carpus and chela, reaching to about 0.75 of scaphocerite length. Chela (Fig. 4B) with palm subcylindrical, slightly swollen, compressed, 2.4 times longer than central depth, with about nine transverse rows of short serrulate setae proximoventrally, with sparse slender simple erect spines. Fingers slender, similar, about 1.6 times palm length, with small robust hooked tips, cutting edges laminar, entire, unarmed. Carpus very slender, about 1.4 times palm length, about 10.5 times longer than distal width, tapered proximally, unarmed, with group of long serrulate spines distoventrally. Merus slightly shorter than carpus, uniform, unarmed, about 12.0 times longer than wide. Ischium about 0.7 of merus length, 8.5 times longer than distal width, proximal ventral margin with sparse spiniform setae. Basis about 0.55 of ischial length, 2.5 times longer than wide, feebly bilobed ventrally, lobes with short simple spiniform setae. Coxa robust,

with small ventral process and lobe, both with spiniform setae.

Second pereopods (Fig. 4D) slender, only one preserved in each specimen, exceeding scaphocerite by half length of fingers, reaching to tip of rostrum. Chelae (Fig. 4E) about 0.66 of carapace length in male, similar in female, palm subcylindrical, smooth, slightly compressed, feebly swollen centrally, about 3.0 times longer than central depth, fingers (Fig. 4F) slender, similar, 1.4 times palm length. Dactylus about 9.0 times longer than proximal width, compressed, with acute hooked tip, cutting edge proximally blunt, with single small acute tooth at 0.25 of length, distal lamina entire. Fixed finger similar, with single small acute tooth slightly proximal to level of dactylar tooth. Carpus about 1.1 times chela length, about 8.0 times distal width, tapered proximally, unarmed. Merus subcylindrical, about 0.75 of carpal length, 10.5 times longer than central width, uniform, unarmed. Ischium about 1.1 times meral length, 9.0 times longer than distal width, slightly expanded distally. Basis and coxa without special features.

Ambulatory pereopods (Fig. 4G) slender. Third pereopod exceeding carapocerite by carpus, propod and dactyl, reaching to about 0.75 of scaphocerite length. Fifth pereopod extending to end of scaphocerite; third pereopod dactyl (Fig. 4I) robust, about 0.16 of propod length. Unguis stout, feebly demarcated, acute, unarmed, feebly curved, about 2.7 times longer than proximal width, 0.33 of corpus length. Corpus slightly compressed, ventral margin sharp, sublinear, unarmed, dorsal margin convex with pair of short simple spiniform setae at about 0.8 of length. Propod (Fig. 4H) slender, 0.85 of carapace length, about 20.0 times longer than distal width, subuniform, slightly expanded distally, with short simple distoventral spines, five smaller similar spines along ventral border, two to three small spines on distodorsal border, two small spines on dorsal margin, distal and dorsal spines slender, with central third minutely serrulate ventrally. Carpus about 0.5 of propod length, 12.0 times longer than distal width, subuniform, with distodorsal lobe, unarmed. Merus about 0.9 of propod length, 16.5 times longer than central width, subcylindrical, unarmed. Ischium subequal to carpal length, 11.0 times longer than central width, slightly tapered proximally, expanded distally, unarmed. Basis and coxa without special features. Fourth and fifth pereopods similar, fourth pereopod propod about 0.87, fifth 0.95 of carapace length,

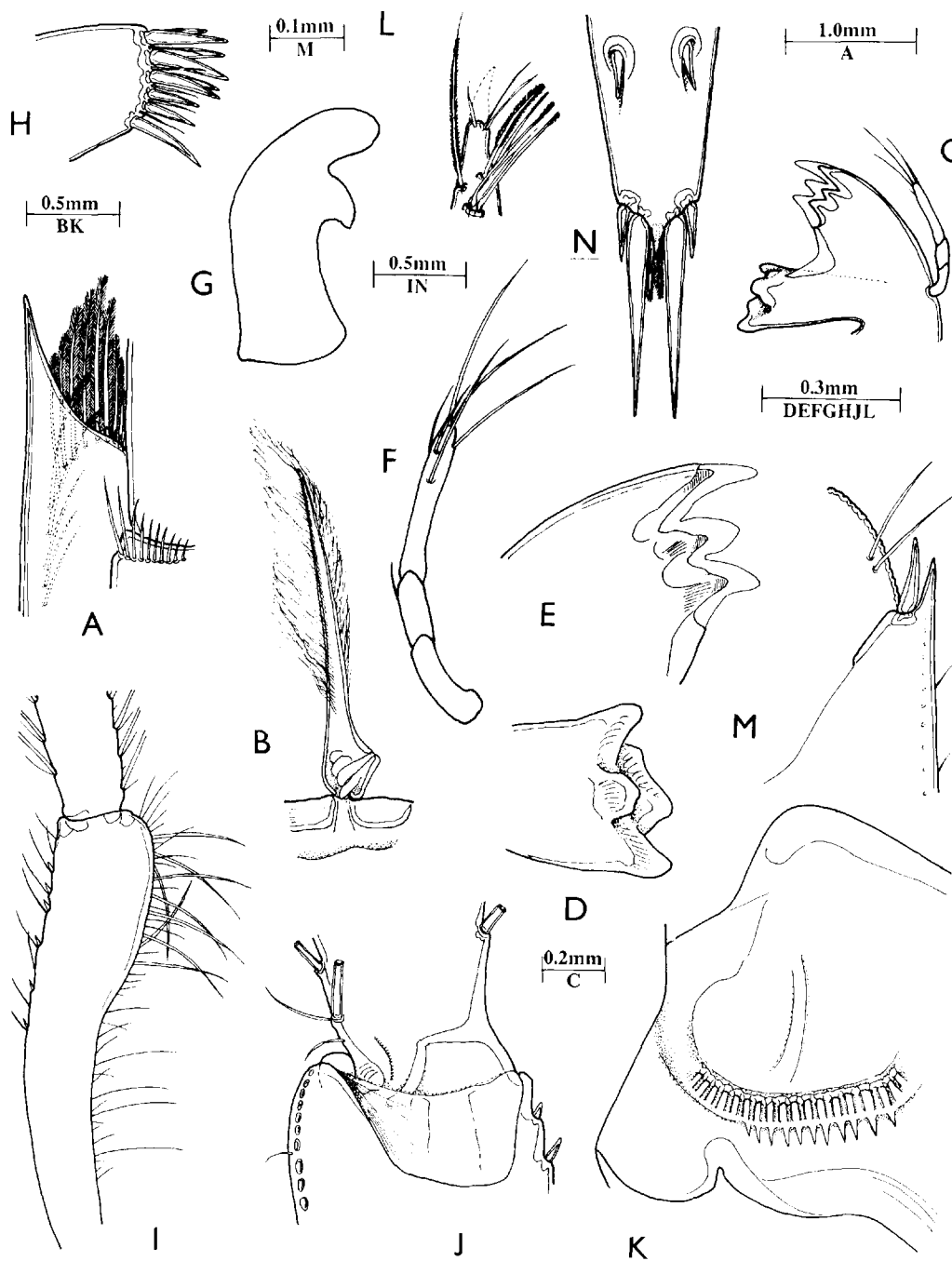


Fig. 5. *Leander plumosus* sp. nov., male, paratype. A, antennule, distolateral angle of proximal peduncular segment; B, same, dorsal seta; C, mandible, molar and incisor processes and palp; D, same, molar process; E, same, incisor process; F, same, palp; G, maxillula, palp; H, same, distal upper lacinia; I, third maxilliped endopod, distal penultimate segment, dorsal; J, same, carpopermal joint, ventral, with possible sensory mechanism; K, same, enlarged; L, same, tip of terminal segment; M, uropod, distolateral angle of exopod; N, telson, posterior marginal spines.

fifth without transverse rows of serrulate setae distolaterally.

Male first pleopod (Fig. 4J) with basipodite about 3.5 times longer than broad, non-setose.

Endopod (Fig. 4K) about 0.75 of basipodite length, 3.7 times longer than central width, subuniform, distally rounded, proximal half of medial margin with eight simple spinules, with

three short robust densely plumose setae proximally; distal and lateral margin with numerous short feebly plumose setae, proximal third of lateral margin glabrous; with well developed appendix interna at about 0.5 of medial margin length, exceeding distal margin of endopod. Exopod about 1.4 times basipodite length, slender, about 8.0 times proximal width. Second pleopod (Fig. 4L) with basipodite 1.2 times first pleopod basipodite length, 4.7 times longer than wide, glabrous. Endopod subequal to basipodite length, 6.5 times longer than proximal width, with appendices (Fig. 4M) at about 0.4 of medial margin length. Appendix masculina with corpus subcylindrical, slightly swollen, 5.5 times longer than central width, 0.25 of endopod length, with ventrolateral row of long simple spines, with two similar terminal spines, subequal to corpus length. Appendix interna not exceeding appendix masculina.

Uropod (Fig. 2L) with protopodite posterolaterally acute, medially fringed with setae. Exopod distinctly exceeding posterior end of telson, reaching to posterior end of medial telson spines, about 2.5 times longer than wide, greatest width at 0.6 of length, diaeresis distinct, broadly rounded distally, lateral margin straight, with acute posterolateral tooth (Fig. 5M) with larger mobile spine medially, with submarginal row of short plumose setae ventrally. Endopod about 0.9 of exopod length, 3.3 times longer than wide, greatest width at about 0.3 of length.

Ova numerous and small.

Measurements (mm). Holotype female, carapace length, 6.0; carapace and rostrum, 17.8; total body length (approx.) 34.5; second pereopod chela, 4.6; length of ovum, *ca.* 0.5. Paratype male, carapace length, 5.3; carapace and rostrum, 18.6; total body length (approx.), 34.0; second pereopod chela, 2.4.

Colouration (from transparencies). Orange-red, darkest dorsally, paler along lateral aspects of body; rostrum, antennal peduncles, scaphocerite, and dorsal surfaces of second to sixth abdominal segments densely covered with short stout, densely red, coarsely plumose setae, similarly coloured setae on uropods and in short rows on central parts of ventral margins of first to third pleura in female, posteroventrally on fifth and sixth segments; rostrum with dorsal carina, including teeth, yellowish white, with reddish spots between teeth, dorsal carapace with thin creamy submedian stria, branchiostegite with thin line of white, margined with red, extending from near antennal spine to pos-

terior ventral margin; abdomen with dorsal surface of first to fourth segments heavily mottled with red and white spots, thin oblique white line crossing first three segments, angulated on third, extending to posterolateral angle of sixth segment, similar white line, margined with orange red, crossing pleura submarginally, posteroventral regions of fourth and fifth pleura mottled red and white; caudal fan similarly mottled; scaphocerite heavily mottled with orange-red and white, tending to form transverse bars, densely fringed with deep red, coarsely plumose setae; third maxilliped with similar orange-red mottlings; pereopods bluish-purple, fingers of second pereopod white distally, ambulatory pereopods and pleopods transparent.

Habitat. The Indonesian specimen was photographed on a coral reef, at a depth of 7 m (Plate 2). The species is apparently solitary and not associated with any other marine animals.

Systematic position. *Leander plumosus* appears to be not closely related to most of the other species of the genus, but may be considered more closely related to *L. tenuicornis* (Say) on account of the similarities of the anterolateral margins of the proximal segment of the antennular peduncle (in both species this being acutely produced to about the level of the distal dorsal margin of the intermediate peduncular segment). The differences in the form of the rostrum and scaphocerite readily separate *L. plumosus* from *L. tenuicornis*. *Leander plumosus* lacks the sexual dimorphism of the rostrum found in *L. tenuicornis*, in which the rostrum is only about 1.6 times the carapace length in males, 1.1 in females, with a deep blade instead of a shallow lamina in the female only. *Leander plumosus* shares with *L. kempi* Holthuis the long, coarsely plumose setae that obscure the ventral rostral teeth and are scattered over the dorsal carapace and abdomens in both species. Again, the two species may be readily separated by the form, length and dentition of the rostrum and shape of the scaphocerite. In *L. kempi*, the rostrum is straight, with 12-14 dorsal teeth and five to seven ventral teeth, only slightly exceeding the scaphocerite, which is only about 4.0 times longer than wide, with the lateral margin convex.

DISCUSSION

The definition of the genus *Leander* provided by Holthuis (1950) refers to the double rows of setae along the ventral margin of the rostrum.