

## ATYID SHRIMPS FROM LAKE POSO, CENTRAL SULAWESI, INDONESIA WITH DESCRIPTION OF A NEW SPECIES (CRUSTACEA: DECAPODA: CARIDEA)

**Yixiong Cai**

*Department of Biological Sciences, National University of Singapore, Lower Kent Ridge, Singapore 119260, Republic of Singapore*

*Current address: Biodiversity Centre, National Parks Board, 1 Cluny Road, Singapore 259569, Republic of Singapore*

*Email: caiyixiong@yahoo.com*

**Daisy Wowor**

*Division of Zoology, Research Center for Biology, Indonesian Institute of Sciences (LIPI),*

*Jalan Raya Jakarta Bogor Km 46, Cibinong 16911, Indonesia*

*Email: daisy\_wowor@yahoo.com*

**ABSTRACT.** – The taxonomy of the freshwater shrimps of the Family Atyidae from Lake Poso, central Sulawesi, is revised on the basis of type material and fresh collections. *Caridina sarasinorum* Schenkel, 1902, and *C. ensifera* Schenkel, 1902, are redescribed in detail and lectotypes for both species are designated. *Caridina acutirostris* Schenkel, 1902, which was originally described based on a single female specimen, was not found during recent field collections. One new species, *C. longidigita*, is also described. Four species of *Caridina* are now known from Lake Poso.

**KEY WORDS.** – Freshwater shrimp, Atyidae, Poso Lake, Sulawesi, *Caridina*, new species.

### INTRODUCTION

Atyid freshwater shrimps of the Lake Poso, central Sulawesi, Indonesia, have only been reported by Schenkel (1902), with three endemic species known thus far, namely *Caridina sarasinorum* Schenkel, 1902, *C. ensifera* Schenkel, 1902, and *C. acutirostris* Schenkel, 1902. Roux (1904) and Chace (1997) mentioned these taxa merely from the original description, without having examined additional material. As part of an attempt to revise the atyid shrimps of Sulawesi, the types in the Basel Museum of Natural History, Switzerland (BMNH) were re-examined. Fresh specimens were also collected from and near Lake Poso as well as older material deposited in the Raffles Museum of Biodiversity Research, Singapore (ZRC) and Division of Zoology, Research Center for Biology, Indonesian Institute of Sciences [formerly Museum Zoologicum Bogoriense (MZB)], Cibinong, Indonesia were also examined. One new species is added to the fauna of the Lake. In the present publication, *C. sarasinorum* and *C. ensifera* are re-described in detail based on the types and subsequent collections. Lectotypes of both species are selected. However, *C. acutirostris*, which was originally described on the basis of a single female specimen, was not found in subsequent collections. A new species, *C. longidigita*, is also described. The abbreviation cl is used for carapace length, measured in mm from the post-orbital margin to the posterior margin of the carapace.

### ATYIDAE De Haan, 1849

#### *Caridina* H. Milne Edwards, 1837

#### *Caridina ensifera* Schenkel, 1902

(Figs. 1, 2)

*Caridina ensifera* Schenkel, 1902: 490, Pl. 8: Figs. 1a–c, 4d [type locality: Danau Poso, Sulawesi (Celebes), Indonesia]; Roux, 1904: 553; Bouvier, 1925: 163, Figs. 344–352; Chace, 1997: 9.

**Material examined.** – Lectotype: male, cl 3.9 mm, BMNH-1a, Lake Poso, Celebes (Sulawesi), Indonesia, coll. Sarasin, no date indicated.

Paralectotypes: 5 males, cl 3.1–3.5 mm, 10 females, cl 3.0–5.3 mm, BMNH-1a, same data as lectotype; 6 males, cl 3.1–3.9 mm, 10 females, cl 3.0–5.3 mm, BMNH 1a, Lake Poso, central Sulawesi, Indonesia, coll. Sarasin; 2 specimens, cl 5.1 mm, MNHN 721, Lake Poso, Sulawesi, exchanged from Museum of Basel, 1904.

Other materials: 1 male, cl 4.0 mm, ZRC 2007.0463, Lake Poso at Tentena, central Sulawesi, 0–1 meter depth, coll. H. Larson, 6 Sep.1989; 9 males, cl 2.5–4.3 mm, 3 females, cl 2.5–3.3 mm, ZRC 2007.0464, Sungai Poso at the outlet of Lake Poso, across the new bridge at rocky cliff, Tentena, Kab. Poso, Sulawesi Tengah, Indonesia, coll. C. Schubart et al., 22 Jan.2000; 17 males, cl 3.2–3.8 mm, 10 females, cl 3.5–4.8 mm, 2 ovigerous females, cl 3.7–4.7 mm, eggs 0.55 × 0.90 mm, MZB CRU-1639, west coast of

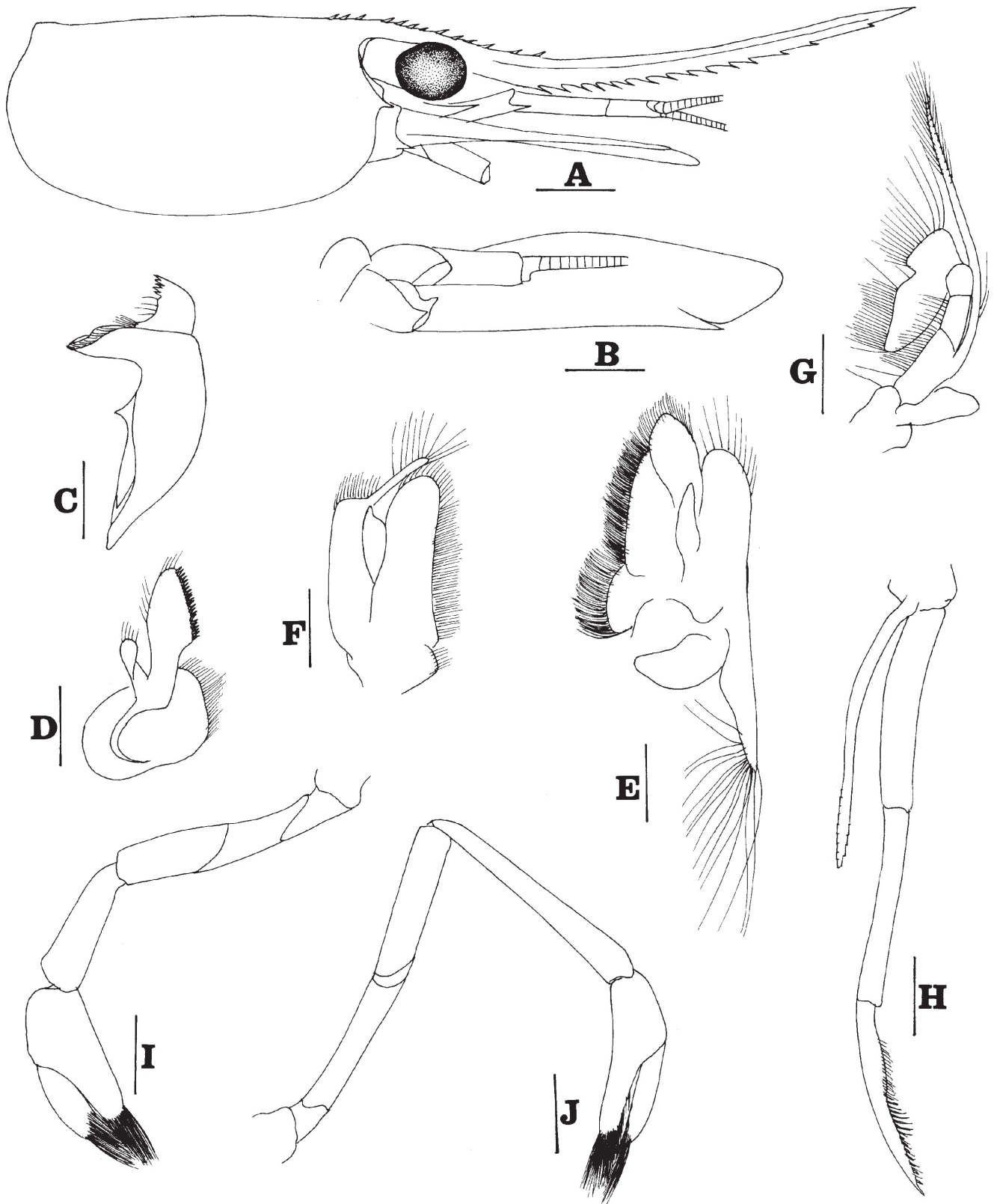


Fig. 1. *Caridina ensifera*: A, cephalothorax and cephalic appendages; B, scaphocerite; C, mandible; D, maxillula; E, maxilla; F, first maxilliped; G, second maxilliped; H, third maxilliped; I, first pereopod; J, second pereopod. Scale bars: A, B = 1 mm; C-J = 0.5 mm. (ZRC).

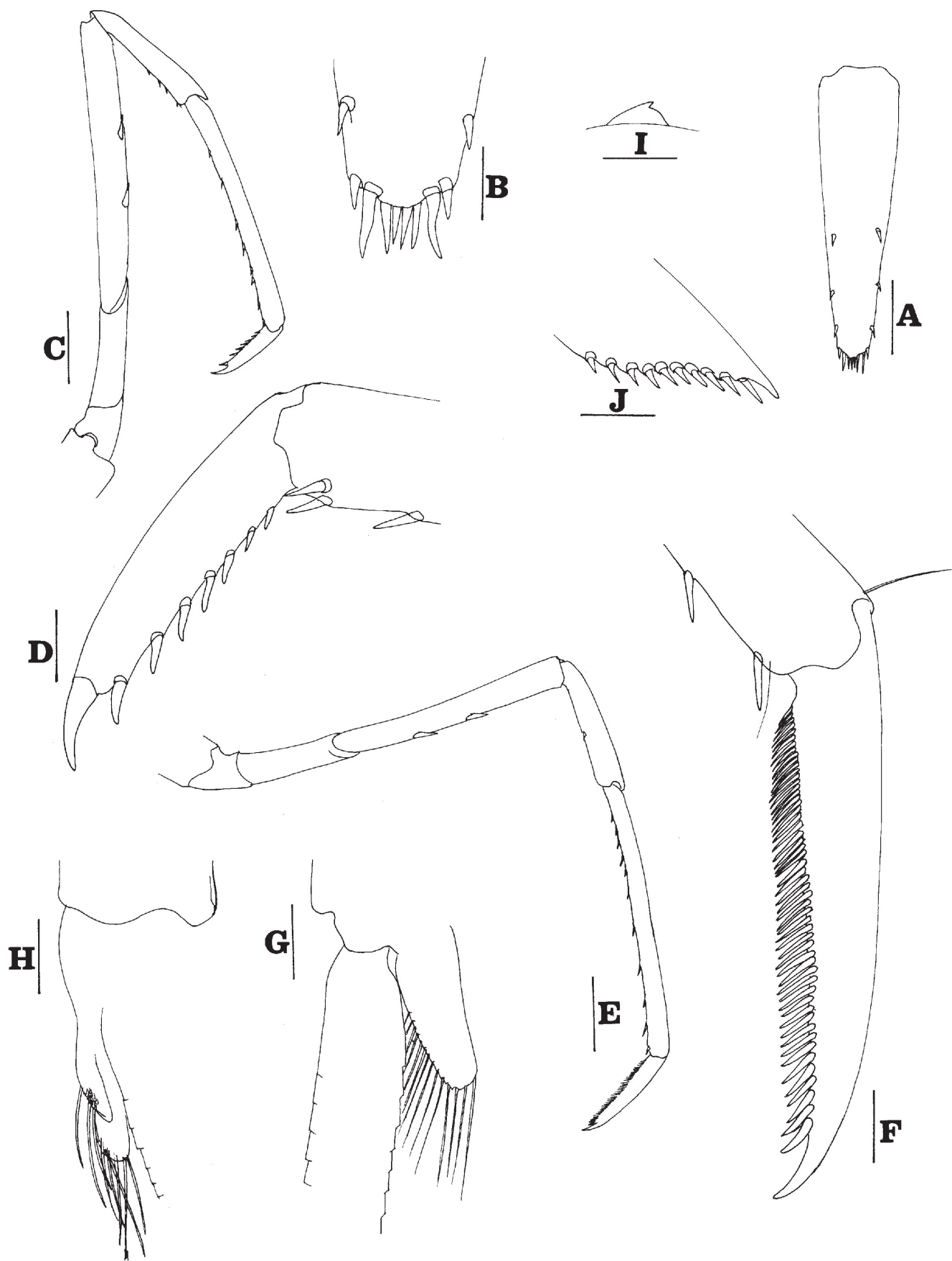


Fig. 2. *Caridina ensifera*: A, telson; B, distal portion of telson; C, third pereiopod; D, dactylus of third pereiopod; E, fifth pereiopod; F, dactylus of fifth pereiopod; G, endopod of male first pleopod; H, appendix masculina and appendix interna of male second pleopod; I, preanal carina; J, diaeresis. Scale bars: A, C, E, I = 0.5 mm; B, G, H, J = 0.2 mm; D, F = 0.1 mm. (ZRC).

Lake Poso at Desa Taipa area, Kab. Poso, Sulawesi Tengah, rocky shore with sand substrate, coll. C. Schubart et al., 22 Jan.2000; 4 males, cl 3.6–3.7 mm, 3 females, cl 3.1–4.4 mm, 2 ovigerous females, cl 3.4 mm, ZRC 2007.0465, east coast of Lake Poso at Desa Besuna, Kab. Poso, Sulawesi Tengah, rocky area, coll. C. Schubart et al., 22 Jan.2000; 13 males, cl 2.3–4.2 mm, 8 females, cl 3.3–4.3 mm, MZB CRU-1640, beach of Lake Poso at Desa Tindolo, Kab. Poso, Sulawesi Tengah, coll. C. Schubart et al., 22 Jan.2000; 4 males, cl 3.3–4.0 mm, 9 females, cl 3.4–4.6 mm, 5 ovigerous females, cl 4.2–4.6 mm, ZRC 2007.0466, south coast of Lake Poso at Desa Pendolo, Kab. Poso, Sulawesi Tengah, white sand with gravel substrate, coll. C. Schubart et al., 22 Jan.2000; 1 male, cl 4.1 mm, ZRC 2007.0467, along Sungai Poso near the outlet of Lake Poso, up to the jetty across Hotel Pamona Indah at the coast of Lake Poso, Tentena, Kab. Poso, Sulawesi Tengah, Indonesia, sandy substrate with clear water, coll. C. Schubart et al., 20 Jan.2000; 3 males, cl 3.8–4.6 mm, 4 females, cl 3.0–5.1 mm, 1 ovigerous female, cl 5.0 mm, ZRC 2007.0468, 0–1 m, Lake Poso at Tentena, Sulawesi, Indonesia, mud and coarse gravel substrate, coll. H. Larson, 6 Sep.1989; 1 male, cl 4.0 mm, ZRC 2007.0469, 0–1 m, Lake Poso at Tentena, Sulawesi, Indonesia, mud and coarse gravel substrate, coll. H. Larson, 6 Sep.1989; 7 males, cl 4.2–4.6 mm, 4 females, cl 3.0–4.8 mm, 2 ovigerous females, cl 4.1–4.7 mm, ZRC 2007.0470, east shore of Lake Poso, between Tentena and Peura, Sulawesi, coll. M. Kottelat, 24 Jun.1988.

**Description.** – Rostrum very long, reaching far beyond end of scaphocerite, ascendant in anterior 2/3, armed dorsally with 9–15 teeth in posterior 1/3 to 1/2, including 1–3 teeth on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 14–26 teeth. Antennal spine placed lower than inferior orbital angle. Pterygostomial margin obscurely angular.

Sixth abdominal segment ca. 0.8 times as long as carapace, longer than telson, 2.6 times as long as fifth segment. Preanal carina with a spine. Telson 3.6 times as long as wide, not terminating in a projection, with 3–5 pairs of dorsal spinules on distal half of telson, placed near lateral edges; with about 3 pairs of distal spines, lateral pair of distal spines distinctly longer than intermediates.

Eyes well developed, anterior end reaching to 0.7 times length of basal segment of antennular peduncle. Antennular peduncle as long as carapace; basal segment of antennular peduncle as long as combined length of second and third segment, anterolateral angle of basal segment reaching to 0.2 times length of the second segment, second segment about 2 times as long as third segment. Stylocerite reaching to 0.8 times length of basal segment of antennular peduncle. Scaphocerite 4.3 times as long as wide.

Incisor process of mandible ending in irregular teeth, molar process truncated. Lower lacinia of maxillula broadly rounded, upper lacinia elongated, with a number of distinct teeth on inner margin, palp slender. Upper endites of maxilla subdivided, palp stout and short, scaphognathite tapering posteriorly with numerous long, curved setae at posterior end. Palp of first maxilliped broad, ending in a triangular projection. Podobranch of second maxilliped reduced to a lamina. Third maxilliped reaching to end of second segment of antennular peduncle, with ultimate segment as long as penultimate segment.

Epipods on first two pereopods. First pereopod reaching to distal end of eye stalk, merus 2.5 times as long as wide, shorter than carpus; carpus slightly excavated anteriorly, 3.0 times as long as high; chela 2.2 times as long as broad, fingers as long as palm. Second pereopod reaching beyond end of second segment of antennular peduncle, merus 4.3 times as long as wide, shorter than carpus; carpus 6.5 times as long as high, 1.4 times as long as chela; chela 3.2 times as long as broad, fingers 1.1–1.4 times as long as palm. Third pereopod reaching to end of second segment of antennular peduncle; propodus 13 times as long as wide, 3.2 times as long as dactylus; dactylus 4.6 times as long as wide (spines included), with 7–9 spines on flexor margin. Fifth pereopod reaching beyond end of basal segment of antennular peduncle; propodus 12 times as long as wide, 2.6 times as long as dactylus; dactylus 4.3 times as long as broad, with 50 spinules on flexor margin.

Endopod of male first pleopod sub-rectangular, 0.2 times length of exopod, without appendix interna. Appendix masculina of male second pleopod short, reaching to 0.4 times length of endopod, appendix interna half length of appendix masculina.

Uropodal diaeresis with 10 movable spinules.

Eggs 0.9 × 0.6 mm.

**Colour.** – A single specimen from Lake Poso, had the following colour note: “transparent finely spectra, blue-red n-shape on brachistegal region, blue spot on distal exopod of uropod-conspicuous” (H. Larson, on collection label)

**Habitat.** – Lakes. This species is common in Lake Poso. It occupies a wide range of habitats, living among rocky shores, sandy substrates and among algae.

**Remarks.** – With regard to the form of the rostrum, *C. ensifera* is very similar to *C. endehensis* De Man, 1892 (cf. Chace, 1997: 8, Fig. 3), which is distributed in the Philippines and Indonesia. It can easily be distinguished by its more elongated carpus of the first pleopod (3.1 times as long as wide vs. length shorter than wide); the fewer number of epipods on the pereopods (epipods on the first two pereopod vs. on the first four); and the structure of the telson (not terminating in a projection vs. terminating in a posteromedian projection)

**Distribution.** – Endemic to Lake Poso in central Sulawesi, Indonesia.

### *Caridina acutirostris* Schenkel, 1902

*Caridina acutirostris* Schenkel, 1902: 496, Pl. 8: Figs. 3a–c, 4b [type locality: south of Danau Poso, Sulawesi (Celebes), Indonesia]; Bouvier, 1925: 166, Figs. 353–355; Chace, 1997: 6.

**Material examined.** – Holotype: female, cl 5.2 mm, NHMB 3a, south of Lake Poso, central Sulawesi, Indonesia, coll. Sarasin, no date indicated.



**Diagnosis.** – Rostrum not reaching end of antennular peduncle, slightly upturned anteriorly, armed dorsally with 10 teeth in posterior 1/2, including 3 on carapace posterior to orbital margin, armed ventrally with 6 teeth. Antennal spine placed slightly below inferior orbital angle; pterygostomian margin rounded. Lateral pair of posterior telson spines longer than intermedian pairs. Stylocerite reaching near end of basal segment of antennular peduncle. Carpus of first pereiopod slightly excavated. Epipods well developed on first 4 pereiopods (after Chace, 1997).

**Remarks.** – No fresh material was available for the present study. Chace (1997) has provided a diagnosis based on the original description. Although the first author has examined the single type specimen, the poor condition of the specimen prevents us from re-describing the species in detail. With its complete, well developed epipods (well developed in first 4 vs. at most, developed only in first 2), *C. acutirostris* can easily be separated from other *Cairidina* species of Lake Poso, Sulawesi. Although several collection trips have been made to the Lake Poso, specimens of *C. acutirostris* have not been collected. As all these trips did not sample all the possible habitats along the lake as well as the rivers connected the lake thoroughly, it is too early for us to state any possible causes.

**Distribution.** – Known only from Lake Poso in central Sulawesi, Indonesia.

### *Caridina sarasinorum* Schenkel, 1902

(Fig. 3)

*Caridina sarasinorum* Schenkel, 1902: 492, Pl. 8: Figs. 2a–e, 4a [type locality: Danau Poso, Sulawesi (Celebes), Indonesia]; Bouvier, 1925: 168, Figs. 356–359; Chace, 1997: 19.

**Material examined.** – Lectotype: ovigerous female, cl 3.1 mm, BMNH 2a, Lake Poso, central Sulawesi, Indonesia, coll. Sarasin, no date indicated.

Paralectotypes: 4 males, cl 2.6–2.9 mm, 6 females, cl 2.7–3.4 mm, BMNH 2a, Lake Poso, central Sulawesi, Indonesia, coll. Sarasin, no date indicated.

Other material: 1 male, cl 3.0 mm, ZRC 2007.0471, east coast of Lake Poso at Desa Besuna, Kab. Poso, Sulawesi Tengah, rocky area, coll. C. Schubart et al., 22 Jan.2000; 1 male, cl 2.4 mm, 2 ovigerous females cl 3.0–3.3, egg 0.8 × 0.5 mm, 12 females, cl 2.0–3.7 mm, MZB CRU-1641, south coast of Lake Poso at Desa Pendolo, Kab. Poso, Sulawesi Tengah, white sand with gravel substrate, Schubart et al., 22 Jan.2000; 15 females, cl 3.8–4.5 mm, ZRC 2007.0472, along Sungai Poso near the outlet of Lake Poso, up to the jetty across Hotel Pamona Indah at the coast of Lake Poso, Tentena, Kab. Poso, Sulawesi Tengah, Indonesia, sandy substrate with clear water, C. Schubart et al., 20 Jan.2000; 2 females, cl 3.8 mm, ZRC 2007.0473, west coast of Lake Poso at Taipa area, Kab. Poso, Sulawesi Tengah, rocky shore with sand substrate, coll. C. Schubart et al., 22 Jan.2000; 19 males, cl 2.2–3.5 mm, 11 females, cl 2.2–3.8 mm, ZRC 2007.0474, Sungai Poso at the outlet of Lake Poso, across the new bridge at rocky cliff, Tentena, Kab. Poso, Sulawesi Tengah, Indonesia, coll. C. Schubart et al., 22 Jan.2000; 2 male, 2.4 mm, 1 female, cl 2.2 mm, ZRC 2007.0475, 0–1 m,

Lake Poso at Tentena, mud substrate with coarse gravel, Sulawesi, Indonesia, coll. H. Larson, 6 Sep.1989.

**Comparative material examined.** – Two syntypes of *C. simoni* Bouvier, 1904, cl 4.0–4.1 mm, MNHN-Na 856, Ceylon (Sri Lanka), freshwater, coll. E. Simon, no date indicated.

**Description.** – Rostrum reaching near to or slightly beyond end of scaphocerite, upturn anteriorly, armed dorsally with 12–19 teeth on posterior 1/2–3/4, including 3–7 on carapace posterior to orbital margin, armed ventrally with 8–17 teeth. Antennal spine placed lower than inferior orbital angle. Pterygostomian margin broadly rounded.

Sixth abdominal segment 0.6–0.7 times as long as carapace, shorter than telson, twice as long as fifth segment. Preanal carina with a spine. Telson 4.1 times as long as wide, not terminating in a projection, with 3–5 pairs of dorsal spinules on distal half of telson, with 3 or 4 pairs of distal spines, lateral pair longer than intermediates. Preanal carina with a spine.

Eyes well developed, anterior end reaching to 0.8 times length of basal segment of antennular peduncle. Antennular peduncle as long as carapace; basal segment of antennular peduncle as long as combined length of second and third segment, anterolateral angle pointed, reaching half length of the second segment, second segment about twice as long as third segment. Stylocerite reaching to 0.9 times length of basal segment of antennular peduncle or end of this segment. Scaphocerite 4.4 times as long as wide.

Incisor process of mandible ending in irregular teeth, molar process truncated. Lower lacinia of maxillula broadly rounded, upper lacinia elongated, with a number of distinct teeth on inner margin, palp slender. Upper endites of maxilla subdivided, palp slender and elongated, scaphognathite tapering posteriorly with numerous long, curved setae at posterior end. Palp of first maxilliped broad. Podobranch of second maxilliped reduced to a lamina. Third maxilliped reaching to end of second segment of antennular peduncle, with ultimate segment slightly shorter than penultimate segment.

Epipods well developed on first pereiopod, greatly reduced or absent on second pereiopod, totally absent on third to fifth pereiopods. First pereiopod reaching to end of basal segment of antennular peduncle, merus 2.0–2.7 times as long as wide, shorter than carpus; carpus slightly excavated anteriorly, 1.8–2.7 times as long as high, shorter than chela; chela 2.0–2.7 times as long as broad, fingers subequal to palm in length. Second pereiopod reaching to end of second segment of antennular peduncle, merus 3.2–4.6 times as long as wide, shorter than carpus; carpus 5.0–6.0 times as long as high, 1.3–1.5 times as long as chela; chela 2.8–3.0 times as long as broad, fingers 1.2–1.4 times as long as palm. Third pereiopod reaching to end of antennular peduncle; propodus 10–11 times as long as wide, 3.3–4.4 times as long as dactylus; dactylus 3.0 times as long as wide (spines included), with 5–7 spines on flexor margin. Fifth pereiopod reaching beyond end of basal segment of antennular peduncle;

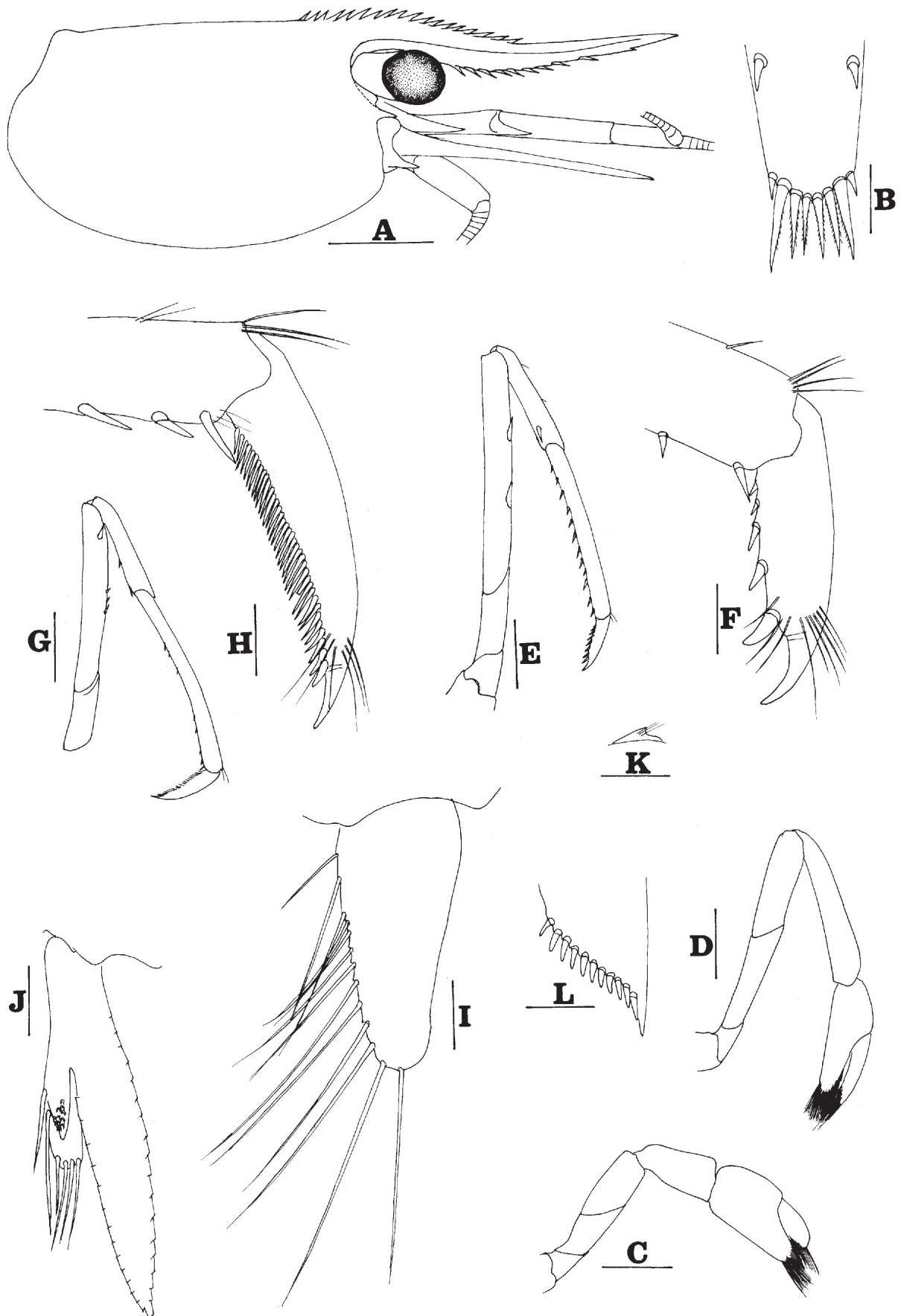


Fig. 3. *Caridina sarasinorum*: A, cephalothorax and cephalic appendages; B, distal portion of telson; C, first pereiopod; D, second pereiopod; E, third pereiopod; F, dactylus of third pereiopod; G, fifth pereiopod; H, dactylus of fifth pereiopod; I, endopod of male first pleopod; J, appendix masculina and appendix interna of male second pleopod; K, preanal carina; L, diaeresis. Scale bars: A = 1 mm; B, F, H, I, J, L = 0.2 mm; C-E, G, K = 0.5 mm. (lectotype, BNHM).

propodus 12 times as long as wide, 3.2–3.5 times as long as dactylus; dactylus 3.0–3.9 times as long as broad, with 48–50 spinules on flexor margin.

Endopod of male first pleopod sub-rectangular, 0.25 times length of exopod, without appendix interna. Appendix masculina of male second pleopod short, reaching to half length of endopod, appendix interna stout, about half length of appendix masculina.

Uropodal diaeresis with 8–11 movable spinules.

Eggs  $0.85 \times 0.5$  mm.

**Habitat.** – This species is commonly found in Lake Poso and prefers rocky shores and sandy substrates.

**Remarks.** – With regard to the form of the rostrum, *C. sarasinorum* is most similar to *C. simoni* Bouvier, 1904 from Sri Lanka. It can be distinguished from *C. simoni* by the absence of an appendix interna on the endopod of the male first pleopod and the presence of a preanal spine (based on comparative material examined).

**Distribution.** – Endemic to Lake Poso in central Sulawesi, Indonesia.

***Caridina longidigita*, new species**  
(Figs. 4, 5)

**Material examined.** – Holotype: male, cl 3.2 mm, MZB CRU-1642, west coast of Lake Poso at Taipa area, Kab. Poso, Sulawesi Tengah, rocky shore with sand substrate, coll. C. Schubart et al., 22 Jan.2000.

Paratypes: 1 ovigerous female, cl 3.2 mm, MZB CRU-1643, data same as holotype; 11 males, cl 2.3–3.2 mm, 4 females, cl 2.3–2.9 mm, 1 ovigerous female, cl 3.0–3.2 mm, ZRC 2007.0476, data same as holotype. Others: 1 male, cl 3.5 mm, MZB CRU-1644, Lake Poso, coll. D. Wowor, Oct.1999; 1 female, cl 3.0 mm, ZRC 2007.0477, Sungai Poso at the outlet of Lake Poso, across the new bridge at rocky cliff, Tentena, Kab. Poso, Sulawesi Tengah, Indonesia, coll. C. Schubart et al., 22 Jan.2000; 19 males, cl 2.9–3.9 mm, 10 females, cl 3.5–3.6 mm, ZRC 2007.0478, east coast of Lake Poso at Desa Besuna, Kab. Poso, Sulawesi Tengah, rocky area, coll. C. Schubart et al., 22 Jan.2000.

**Description.** – Rostrum reaching near to or slightly beyond end of scaphocerite, upturn anteriorly, armed dorsally with 12–21 teeth on posterior 1/2–3/4, including 3–6 on carapace posterior to orbital margin, armed ventrally with 10–18 teeth. Antennal spine placed lower than inferior orbital angle. Pterygostomial margin broadly rounded.

Sixth abdominal segment ca. 0.5 times as long as carapace, shorter than telson, twice as long as fifth segment. Preanal carina with a spine. Telson 3.1 times as long as wide, not terminating in a projection, with 4 pairs of dorsal spinules on distal half of telson, with 4 pairs of distal spines, lateral pair longer than intermediates, median pair shortest. Preanal carina with a spine.

Eyes well developed, anterior end reaching to 0.8 times length of basal segment of antennular peduncle. Antennular peduncle 0.86 times as long as carapace; basal segment of antennular peduncle as long as combined length of second and third segments, anterolateral angle pointed, reaching to 0.4 times length of second segment, second segment about twice as long as third segment. Stylocerite reaching near end of basal segment of antennular peduncle. Scaphocerite 4.2 times as long as wide.

Incisor process of mandible ending in irregular teeth, molar process truncated. Lower lacinia of maxillula broadly rounded, upper lacinia elongated, with a number of distinct teeth on inner margin, palp slender. Upper endites of maxilla subdivided, palp slender and elongated, scaphognathite tapering posteriorly with numerous long, curved setae at posterior end. Palp of first maxilliped ending in a broad triangular form. Podobranch of second maxilliped reduced to be a lamina. Third maxilliped reaching to end of second segment of antennular peduncle, with ultimate segment shorter than penultimate segment.

Epipods absent from all pereopods. First pereopod reaching slightly beyond end of second segment of antennular peduncle, merus 4.7 times as long as wide, shorter than carpus; carpus slightly excavated anteriorly, 5.2 times as long as high, as long as chela; chela 4.5 times as long as broad, fingers 3.5 times as long as palm. Second pereopod reaching to end of second segment of antennular peduncle, merus 6.0 times as long as wide, shorter than carpus; carpus 5.4 times as long as high, as long as chela; chela 4.9 times as long as broad, fingers 3.5 times as long as palm. Third pereopod reaching to end of antennular peduncle; propodus 11 times as long as wide, 5.2 times as long as dactylus; dactylus 2.3 times as long as wide (spines included), with 4–6 spines on flexor margin. Fifth pereopod reaching to end of second segment of antennular peduncle; propodus 13 times as long as wide, 4.6 times as long as dactylus; dactylus 2.8 times as long as broad, with 27–32 spinules on flexor margin.

Endopod of male first pleopod subtriangular, 0.3 times length of exopod, no appendix interna. Appendix masculina of male second pleopod short, reaching to half length of endopod, appendix interna short, about 0.3 times length of appendix masculina.

Uropodal diaeresis with 11–14 movable spinules.

**Habitat.** – Lakes. This species is only found on rocky substrates in Lake Poso.

**Etymology.** – The species name combines two Latin words, “long” and “digita” referring to the extremely long fingers. Name is used as a noun in apposition.

**Remarks.** – With regard to the form of the rostrum, *C. longidigita* is very similar to *C. sarasinorum*, but it can easily be separated by the extra long and slender fingers of the chelae of the first and second pereopods (3.5 times as

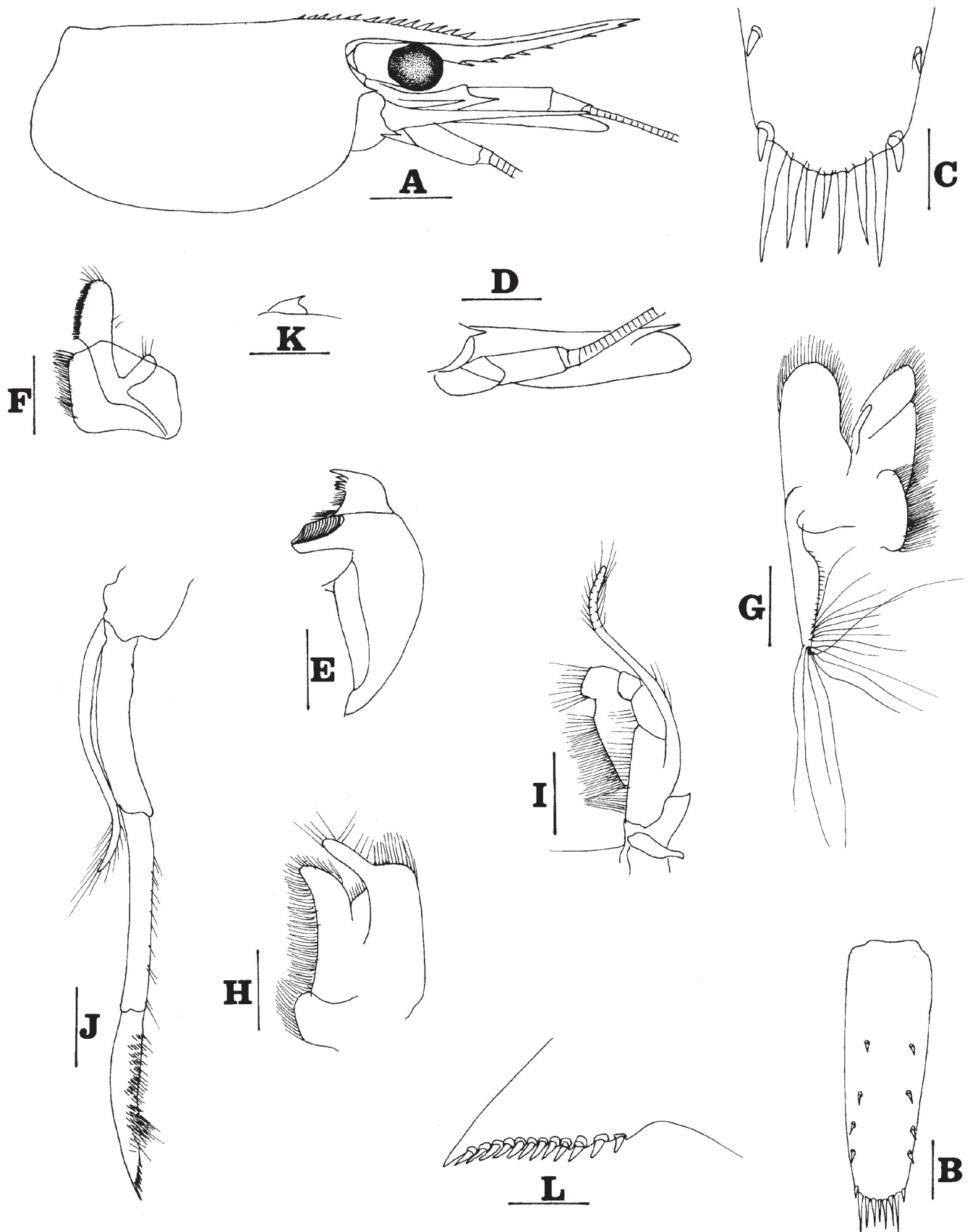


Fig. 4. *Caridina longidigita*, new species: A, cephalothorax and cephalic appendages; B, telson; C, distal portion of telson; D, scaphocerite; E, mandible; F, maxillula; G, maxilla; H, first maxilliped; I, second maxilliped; J, third maxilliped; K, preanal carina; L, diaeresis. Scale bars: A, D = 1 mm; B, E-K = 0.5 mm; C, L = 0.2 mm. (paratype, ZRC 2007.0748).



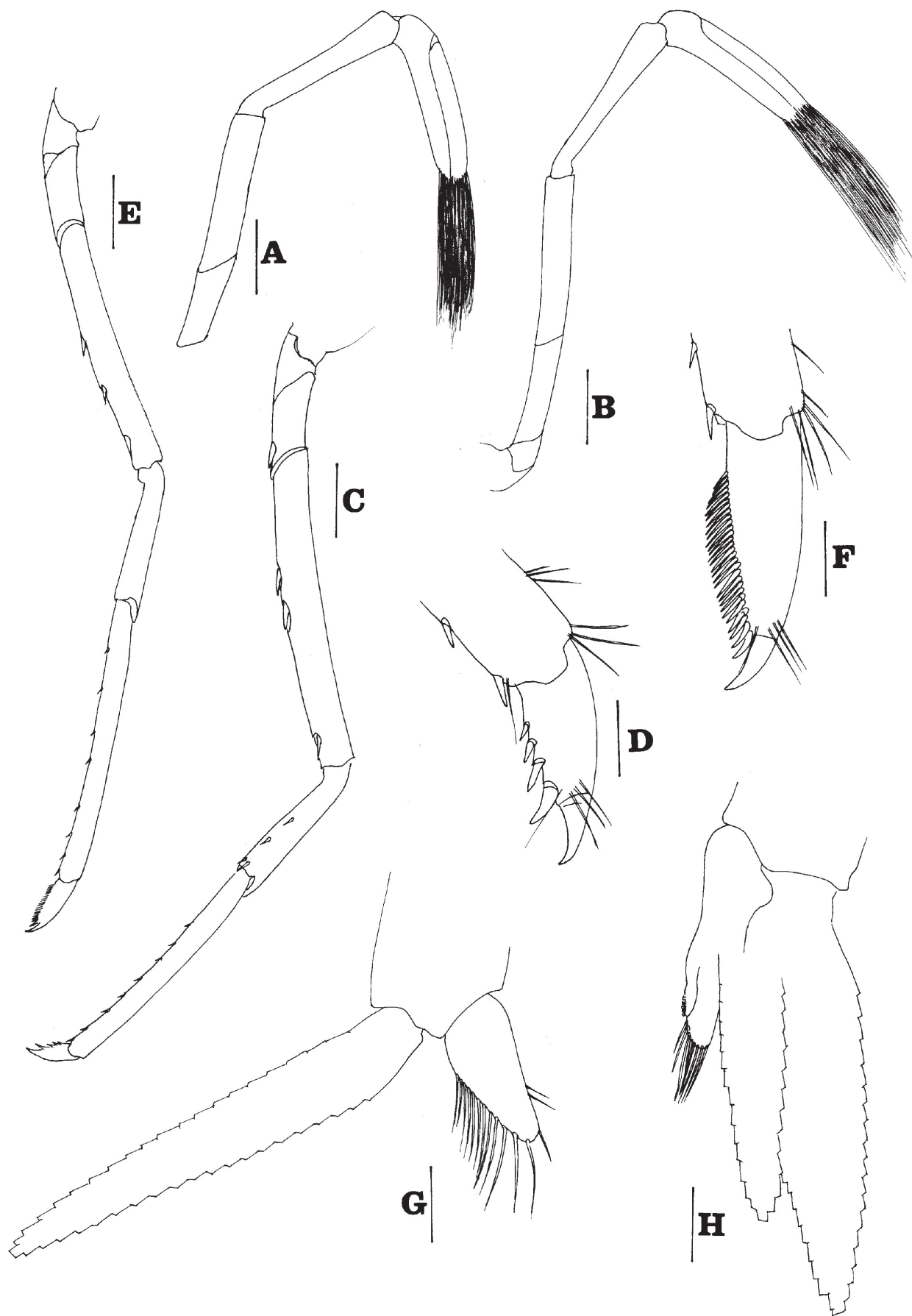


Fig. 5. *Caridina longidigita*, new species: A, first pereiopod; B, second pereiopod; C, third pereiopod; D, dactylus of third pereiopod; E, fifth pereiopod; F, dactylus of fifth pereiopod; G, endopod of male first pleopod; H, appendix masculina and appendix interna of male second pleopod. Scale bars: A–C, E = 0.5 mm; D, F = 0.1 mm; G, H = 0.2 mm. (paratype, ZRC 2007.0748).

long as their respective palms vs. subequal to palm). This character makes *C. longidigita* very different from all the other members in the genus *Caridina*. Other than this, *C. longidigita* also differs from *C. sarasinorum* in having fewer spinules on the dactylus of the fifth pereopod (27–32 vs. 48–50) and the absence of epipods on all the pereopods (see Figs. 6E, F, vs. Figs. 4G, H).

**Distribution.** – Sulawesi (Lake Poso).

#### ACKNOWLEDGEMENTS

The authors are grateful to Peter K. L. Ng (ZRC) for his great support during the course of study and his comments on the manuscript. The first author would like to thank Ambros Hänggi (NHMB) for his hospitality when he visited the museum and for the loans of specimens for this study.

#### LITERATURE CITED

- Bouvier, E. L., 1904. Crevettes de la famille de Atyidés: Espèces qui font partie des collections du Muséum d'histoire Naturelle (Paris), *Bulletin du Muséum national d'Histoire Naturelle* (Paris), **10**: 129–138.
- Bouvier, E. L. 1925. Recherches sur la morphologie, les variations, la distribution géographique des crevettes des la famille des Atyidés. *Encyclopédie Entomologique*, series A, **4**: 1–370, Figs. 1–761.
- Chace, F. A., Jr., 1997. The Caridean shrimps (Crustacea: Decapoda) of the Albatross Philippine Expedition 1907–1910. Part 7: Families Atyidae, Eugonatonotidae, Rhynchocinetidae, Bathypalaemonellidae, Processidae, and Hippolytidae. *Smithsonian Contributions to Zoology*, **58**: 1–106, Figs. 1–29.
- De Man, J. G., 1892. Decapoden des Indischen Archipels, in Max. Weber (ed.). *Zoologische Ergebnisse einer Reise in Niederländisch Ost-Indien*, **2**: 265–527, Pls. 15–29.
- Milne Edwards, H., 1837, *Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux*, **2**: 1–532, atlas, Pls. 1–14.
- Roux, J., 1904. Décapodes d'eau douce de Célèbes (Genres *Caridina* et *Potamon*). *Reveu Suisse Zoologie*, **12** (3): 539–572, Pl. 9.
- Schenkel, E., 1902. Beitrag zur Kenntnis der Dekapodenfauna von Celebes. *Verhandlungen der naturforschenden Gesellschaft in Basel*, **13**: 485–585, Pls. 7–13.