

The Caridean Shrimps (Crustacea:  
Decapoda) of the *Albatross*  
Philippine Expedition, 1907–1910,  
Part 7: Families Atyidae, Eugonatonotidae,  
Rhynchocinetidae, Bathypalaemonellidae,  
Processidae, and Hippolytidae

FENNER A. CHACE, Jr

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## ABSTRACT

Chace, Fenner A., Jr. 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*, number 587, 106 pages, 29 figures, 1997.—Two new genera, *Clytomanningus* and *Hyashidonus*, are proposed in the Family Processidae. Four new species are described: *Caridina blancoi* from the mouth of the Tayabas River, Luzon, Philippines; *Rhynchocinetes albatrossae* from Surigao Strait, Philippines; *Lysmata philippinensis* from Albay Gulf, Philippines; and *Paralebbeus zygius* from Indonesia; and a new replacement name, *Lysmata kemp*, is proposed for *Lysmata dentata* Kemp (not De Haan). Identification keys are offered for all genera of Processidae and Hippolytidae, Philippine-Indonesian genera of Atyidae, all species of *Rhynchocinetes*, *Clytomanningus*, *Exhippolysmata*, *Latreutes*, *Lysmata*, *Paralebbeus*, *Parhippolyte*, *Saron*, *Thor*, and *Tozeuma*, and the Philippine species of *Caridina*. World checklist of the 37 genera and 280 species and subspecies of the family Hippolytidae herein recognized, with their synonyms, type species, and type localities, is included.

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**Introduction**

General considerations about the *Albatross* Philippine Expedition and its collections have been presented in Part 1 of this series (Chace, 1983a). Repeated below are those format particulars that are common to all of the parts.

The taxa numbered and itemized are those that are known from the Philippines and Indonesia, whether or not they are represented in the *Albatross* collections; those taken by that Expedition are indicated by an asterisk (\*). The genera and species are arranged alphabetically and the latter are numbered sequentially by order of appearance, under each family, in the taxonomic portion of the report. The generic entries comprise at least the reference to the original description, followed by designation of the type species and of the gender of the generic name, a diagnosis, and the geographic and, sometimes, the bathymetric ranges of the genus. The original reference and range are given for each Philippine and/or Indonesian species and subspecies. There has been no attempt to list all references under those taxa headings. Usually, the species and subspecies entries are limited to (1) the original reference and type locality of both senior and junior synonyms mentioned; (2) a reference to a published illustration, if possible; (3) a diagnosis; and (4) the range of the taxon. Under "Material" of species and subspecies represented in the *Albatross* collections are listed the following particulars if known: (1) general locality; (2)

station number; (3) latitude and longitude; (4) depth in meters (in brackets when estimated); (5) character of the bottom; (6) bottom temperature in degrees Celsius; (7) date and astronomical time intervals (hours between midnight and midnight) that the gear operated at the indicated depth; (8) gear used; and (9) the number and sex of the specimens in each lot, with minimum and maximum postorbital carapace lengths in millimeters in square brackets (the numbers and size ranges of ovigerous females are included in the female totals as well as separately). Additional station data may be available in Anonymous (1910). For additional details and illustrations of all caridean genera, see Holthuis (1993).

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The following individuals have contributed importantly to the preparation of this seventh part of the report on the carideans of the *Albatross* Philippine Expedition. Raymond T. Bauer (Center for Crustacean Research, Department of Biology, University of Southwestern Louisiana in Lafayette) reviewed the "Checklist of Genera and Species of Hippolytidae" and the "Key to Genera of Hippolytidae," after having intensively studied the North Pacific hippolytids during the year 1980–1981 that he studied at the National Museum of Natural History, Smithsonian Institution, under a postdoctoral fellowship. Frederick M. Bayer (Department of Invertebrate Zoology, National Museum of Natural History) is recognized herewith for his assistance with classical languages and their application to scientific nomenclature. A.J. Bruce (Head of the Division of Natural Sciences, Northern Territory Museum of Arts and Sciences in Darwin; now retired), for exchanges of

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*Fenner A. Chace, Jr., Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.*

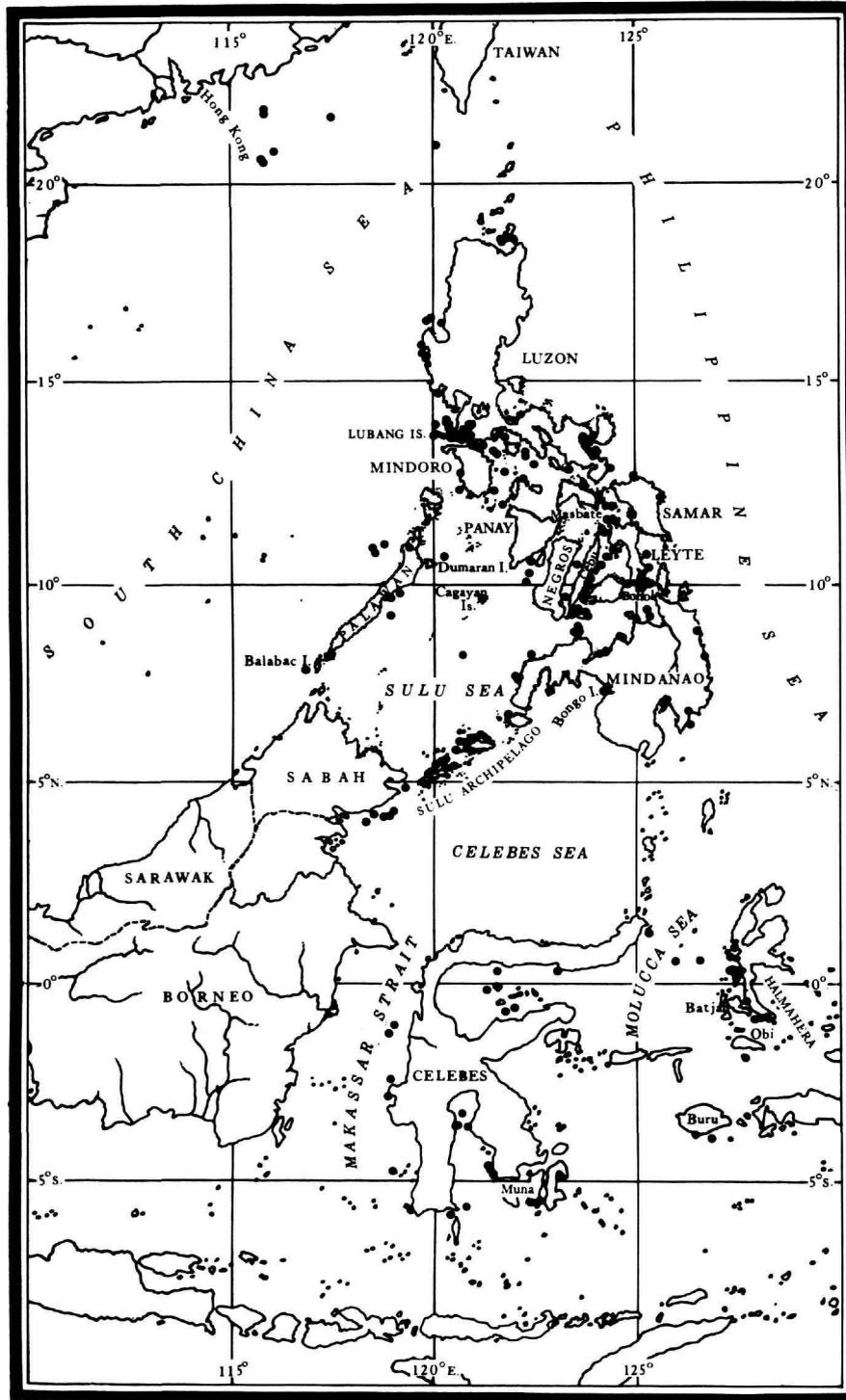


FIGURE 1.—The Philippines and central Indonesia, showing the positions of *Albatross* offshore stations at which caridean shrimps were collected.

ideas about the Bathypalaemonellidae and some of the hippolytid genera. In the course of a visit from Tin-Yam Chan (Institute of Marine Biology, National Taiwan Ocean University in Keelung), we discussed the characters that distinguish the two known species of the Eugonatonotidae. William J. Cooke furnished material of a Hawaiian species of *Lysmata* that clearly showed its affinity to a western Atlantic species, rather than to one from the Indo-Pacific, as previously believed. Charles H.J.M. Fransen (Nationaal Natuurhistorisch Museum in Leiden) prepared detailed drawings to demonstrate that possible morphological distinctions between Pacific and Atlantic populations of two species of *Lysmata* were no more than developmental differences. As with most of the preceding parts of this series, I have profited greatly from the consummate knowledge of decapod crustaceans, especially carideans, of L.B. Holthuis (Leiden Museum) and from his characteristically altruistic willingness to share that knowledge in an effort to preserve and expand our carcinological data base, without regard for his own research agenda. With comparable expertise, Tomoyuki Komai (Natural History Museum and Institute, Chiba, Japan) reviewed the entire manuscript (with the exception of the atyid section) and offered numerous suggestions for improvement. My Smithsonian associate, Raymond B. Manning, has similarly shared his knowledge of the processids and the generic composition of that family. With his customary liberality, C.B. Powell (University of Harcourt, Nigeria) gave permission to publish herein his discovery of *Merguia* in western Africa. Richard Preece (Department of Zoology, University of Cambridge) kindly verified the true type locality of *Nikoides maldivensis*. Curtis W. Sabrosky, Chairman of the Editorial Committee during more than half of the time devoted to the preparation of the Third Edition of the International Code of Zoological Nomenclature, joined Dr. Holthuis in overcoming my resistance to their contention that an "available name," even an "invalid" primary homonym, precludes the adoption of a junior secondary homonym in the case of the hippolytid *Lysmata dentata*. Finally, John Yaldwyn (Museum of New Zealand, Te Papa Tongarewa) facilitated the inclusion of *Hippolysmata morelandi* in the "Key to Species of *Lysmata*" by amplifying his description of that species.

**\*ATYIDAE De Haan, 1849**

ATYADEA De Haan, 1849:168, 184.  
 ATYIDAE Dana, 1852a:13, 16.—Chace, 1992:70, 72, 76.

DIAGNOSIS.—Rostrum, if present, inflexibly attached to rest of carapace. Carapace without longitudinal lateral ridges or suture and without cardiac notch in posterior margin. Eyes neither unusually long nor concealed beneath carapace. Antennule with 2 flagella, neither with accessory branch. Mandible with palp, with subtruncate molar process not distinctly separated from incisor process. Second maxilla with endite well developed, scaphognathite with proximal lobe tapering, bearing series of long setae, and extending far into branchial chamber. First maxilliped with exopod terminating in lash, not in broad, partially detached lobe. Caridean lobe not acutely produced, not overreaching distally produced endite. Second maxilliped with exopod, endopod composed of 4 segments, not terminating in 2 segments attached side-by-side to preceding segment, terminal segment attached to slender, sickle-shaped extension of preceding segment. Third maxilliped composed of 5 segments, slender, pereopod-like. Pereopods usually (except *Limnocaridina*) with strap-like epipods (mastigobranchs) on at least 3 anterior pairs, epipods without naked appendix extending vertically into branchial chamber; 2 anterior pairs of pereopods similar, with fingers of chela usually terminating in tuft of setae; 2nd pereopod with carpus undivided.

RANGE.—Throughout the tropics and most temperate regions of the world; adults almost exclusively confined to fresh water.

REMARKS.—Rather surprisingly, only five of the 35 genera currently recognized throughout the world are apparently known from the Philippine-Indonesian region. Those five may be identified from the following key. Holthuis (1986:104) suggested that the Atyidae be divided into five subfamilies: Xiphocaridinae Ortmann, 1895 (see Chace, 1992:71, 72, 77); Paratyinae Holthuis, 1986; Typhlatyinae Holthuis, 1986; Atyinae De Haan, 1849; and Caridellinae Holthuis, 1986. Of the Philippine-Indonesian genera, *Paratya* belongs to the Paratyinae, *Edoneus* to the Caridellinae, and the remaining three to the Atyinae.

**Key to Philippine-Indonesian Genera of Atyidae**

1. Carapace armed with supraorbital spine; pereopods bearing exopods . . . *Paratya*  
 Carapace not armed with supraorbital spine; pereopods without exopods . . . . . 2
2. Carapace with pterygostomian angle acute, sometimes spinose; 2nd pereopod with carpus deeply excavate, little if at all longer than wide . . . . . 3  
 Carapace with pterygostomian angle usually rounded; 2nd pereopod with carpus not deeply excavate, distinctly longer than wide . . . . . 4
3. Telson with posterolateral angles not overreaching setiferous posterior margin . . . . . *Atyoida*  
 Telson with posterolateral angles overreaching setiferous posterior margin . . . . . *Atyopsis*
4. Eyes pigmented, not degenerate . . . . . *Caridina*  
 Eyes degenerate, not pigmented . . . . . *Edoneus*

**\**Atyoida* Randall, 1840**

*Atyoida* Randall, 1840:140 [type species, by monotypy: *Atyoida bisulcata* Randall, 1840:140; gender: feminine].—Chace, 1983b:4.

*Ortmannia* Rathbun, 1901:120 [type species, by original designation: *Ortmannia henshawi* Rathbun, 1901:120; gender: feminine].

*Pseudatya* J. Roux, 1928:209 [type species, by monotypy: *Pseudatya beauforti* J. Roux, 1928:209 (= *Atya pilipes* Newport, 1847:160); gender: feminine].

*Vanderbiltia* Boone, 1935:159 [type species, by monotypy: *Vanderbiltia rosamondae* Boone, 1935:160 (= *Atya pilipes* Newport, 1847:160); gender: feminine].

**DIAGNOSIS.**—Carapace without supraorbital spine, pterygostomian angle acute, sometimes bluntly so. Telson with posterolateral angles not overreaching setiferous posterior margin. Eyes pigmented, not degenerate. Pereopods without exopods, 2nd pair with carpus deeply excavate, little if at all longer than wide.

**RANGE.**—High islands of the Indo-Pacific region from Madagascar to the Philippines and Indonesia and eastward to Hawaii and the Marquesas and Gambier islands.

**REMARKS.**—A key has been offered by Chace (1983b:4) to the three species of *Atyoida* currently recognized: *A. bisulcata* Randall, 1840, from Hawaii; *A. pilipes* (see below), and *A. serrata* (Bate, 1888) from Madagascar, the Comoro Islands, the Seychelles, Mauritius, and La Réunion.

**\*1. *Atyoida pilipes* (Newport, 1847)**

*Atya pilipes* Newport, 1847:160 [type locality: "Apia, Upoln, New Zealand" (corrected to "Apia, Upolu, Navigator or Samoan Group" by Dana, 1852b:533)].

*Atyoida pilipes*.—Chace, 1983b:10, figs. 3–8 [synonymy].

**DIAGNOSIS.**—Rostrum bent somewhat ventrad, unarmed or bearing single ventral tooth (less commonly 2 teeth, very rarely 3). Carapace with pterygostomian angle bluntly acute, not spinous. Telson without conspicuous fixed teeth on posterior margin. Chelae dimorphic, either without palmar portion or with palmar portion shorter than movable finger, not trimorphic, with palmar portion longer than movable finger as in some specimens of other 2 species. Maximum postorbital carapace length of males 6.6 mm, of females about 9 mm.

**MATERIAL.**—PHILIPPINES. Mountain stream back of Romblon, Romblon Island, Sibuyan Sea [12°35'N, 122°15'E], 26 Mar 1908: 1 male [6.6].—Nonucan River, Iligan Bay, Mindanao, 8°13'N, 124°2'E, 6 Aug 1909 (0800), dynamite: 18 males [5.0–5.6], 26 females [5.8–8.3], 15 ovig. [5.8–8.3].

**RANGE.**—Philippines and eastern Lesser Sunda Islands, Indonesia, eastward through the Pacific high islands, as far north as Rota in the Marianas at about 14°N, as far south as Rapa in the Iles Tubuai at about 27½°S, and as far east as Magareva in the Iles Gambier at about 135°W.

**\**Atyopsis* Chace, 1983**

*Atyopsis* Chace, 1983b:26 [type species, by original designation: *Atya spinipes* Newport, 1847:159; gender: feminine].

**DIAGNOSIS.**—Carapace without supraorbital spine, pterygostomian angle spinous. Telson with posterolateral angles overreaching setiferous posterior margin. Eyes pigmented, not degenerate. Pereopods without exopods, 2nd pair with carpus deeply excavate, little if at all longer than wide.

**RANGE.**—High islands of the Indo-Pacific region from Sri Lanka to the Philippines and Indonesia eastward to the Samoa Islands and the Asiatic mainland from India to Thailand and the Malay Peninsula.

**REMARKS.**—A key to the two closely related species of *Atyopsis*, which seem to have similar geographic ranges, was included in Chace (1983b:27). Those key characters are used below in the diagnoses of the two species.

**2. *Atyopsis moluccensis* (De Haan, 1849)**

*Atya moluccensis* De Haan, 1849:186, pl. O [type locality: Moluccas, Indonesia].

*Atyopsis moluccensis*.—Chace, 1983b:27, figs. 16–19 [synonymy].

**DIAGNOSIS.**—Rostrum gradually tapering to slender apex, armed ventrally with 7–16 (commonly 10–14) indistinct serrations. Endopod of 1st pleopod of male less than 1½ times as long from proximal articulation to base of retinaculate projection as maximum width, not including marginal spines. Maximum postorbital carapace length about 25 mm.

**Range.**—Sri Lanka through Thailand and Malaya to Sumatra, Java, Bali, Sarawak, Celebes, and Moluccas in Indonesia and possibly the Philippines.

**\*3. *Atyopsis spinipes* (Newport, 1847)**

*Atya spinipes* Newport, 1847:159 [type locality: Philippine Islands].

*Atyopsis spinipes*.—Chace, 1983b:35, figs. 20–22 [synonymy].

**DIAGNOSIS.**—Rostrum rather abruptly narrowing to somewhat broad apex, armed ventrally with 2–6 discrete teeth. Endopod of 1st pleopod of male more than 1¾ times as long from proximal articulation to base of retinaculate projection as maximum width, not including submarginal spines. Maximum postorbital carapace length about 20 mm.

**MATERIAL.**—PHILIPPINES. Near mouth of Tayabas River, Luzon [13°54'N, 121°36'E], 25 Feb 1909: 1 male [13.0].—"Cabugao" River, Catanduanes Island [13°37'N, 124°17'E], 9 Jun 1909 (0900), 25-foot seine: 1 male [13.0].—"Varadero Mountain," Mindoro (?), 23 Jul 1908: 1 female [13.7].—Malaga River, Hinunangan Bay, Leyte [10°24'N, 125°12'E], 30 Jul 1909: 1 female [10.7] 4 juveniles [2.9–5.0]. Mananga River, Cebu [10°14'N, 123°50'E], 25 Aug 1909: 1 female [11.3].

**RANGE.**—Ryukyu Islands, Taiwan, Philippines, eastward to Caroline, Fiji, and Samoa islands.

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

*Caridina* H. Milne Edwards, 1837:362 [type species, by monotypy: *Caridina typus* H. Milne Edwards, 1837:363; gender: feminine].

DIAGNOSIS.—Carapace without supraorbital spine, pterygostomian margin usually rounded. Telson with posterolateral angles sometimes produced posteriorly but never overreaching setiferous posterior margin. Eyes usually well pigmented, not degenerate. Pereopods without exopods, 2nd pair with carpus not deeply excavate, distinctly longer than wide.

RANGE.—Western equatorial Africa, Egypt, eastern Africa from Somalia to Natal, Madagascar and neighboring islands, Syria, Iran, Iraq, India, Sri Lanka, Burma, Andaman Islands, Malaya, Viet Nam, China, Korea, Japan, Ryukyu Islands, Philippines, Indonesia, Papua New Guinea, Bismarck Archipelago, northern and eastern Australia, New Caledonia, Fiji Islands, Hawaii, Marquesas Islands, and Rapa.

REMARKS.—Few caridean groups offer taxonomic problems of greater difficulty than do the approximately 160 species and subspecies that are currently recognized in this genus. Populations with restricted ranges that seem to have acquired reasonably constant morphological characters may be nearly indistinguishable from highly variable species that range widely through the Indo-Pacific region and even Africa. In spite of the painstaking studies of such eminent carcinologists

as Bouvier, Holthuis, De Man, Ortmann, and J. Roux, few populations can yet be named with satisfactory confidence, and the material collected by the *Albatross* Philippine Expedition is no exception. For that reason, I have tried to illustrate the presumed species in that collection in some detail in order to minimize the confusion that could result from misidentifications.

Although tropical freshwater shrimps have rather finely drawn habitat preferences, there is some indication that nearly all of the species occurring in a broad geographic region may be found in a single stream, if that stream offers the required habitats. Such a postulate seems to be supported by the *Caridina* material in the present collection. Of the eight species represented, no less than six were taken from the Malaga River, on Leyte, five were found in the Calawagan River on Mindoro, and four were collected from the Baganga River on Mindanao.

Hopefully, I have listed all of the species that have been recorded from the Philippines and Indonesia, but attempts to construct a key to the species known from the entire area had to be curtailed because of incomplete descriptions in the literature. The key that follows is limited only to the species recorded from the Philippines.

**Key to Philippine Species of *Caridina***

1. Rostrum ascendent in anterior 1/2, overreaching antennal scale. (Rostrum armed dorsally and ventrally. No more than 3 teeth on carapace posterior to orbital margin; ventral angle of orbit not indistinguishably fused with antennal spine. Sublateral pair of spines on posterior margin of telson longer than intermediate pairs. Stylocerite not reaching nearly as far as distal margin of basal segment of antennular peduncle.) . . . . . 2  
 Rostrum nearly horizontal or slightly downcurved anteriorly; if overreaching antennal scale, unarmed dorsally. (Posterior margin of telson with median triangular projection or fixed tooth.) . . . . . 5
2. Rostrum unarmed on anterior 1/2 of dorsal margin. First pereopod with carpus deeply excavate for reception of proximal portion of chela. Third pereopod with dactyl little more than twice as long as wide. (Telson with median triangular projection on posterior margin. Eggs small, less than 0.5 mm in major diameter.) . . . . . \*8. *C. brevicarpalis endehensis*  
 Rostrum with 1-3 subapical teeth separated from rest of dorsal series. First pereopod with carpus not deeply excavate. Third pereopod with dactyl about 4 times as long as wide . . . . . 3
3. Telson with posterior margin of telson regularly convex, without median triangular projection. Eggs large, at least 0.8 mm in major diameter . . . . \*28. *C. nilotica*  
 Telson with posterior margin bearing median triangular projection. Eggs small, less than 0.5 mm in major diameter . . . . . 4
4. Rostrum very long and slender, armed on posterior portion of dorsal margin with 5-11 rather widely spaced teeth, including at most 1 on carapace posterior to orbital margin . . . . . \*14. *C. gracilirostris*  
 Rostrum not extremely long and slender, armed on posterior portion of dorsal margin with close-set series of 13-27 teeth, including 1-3 on carapace posterior to orbital margin . . . . . \*23. *C. longirostris*

5. Rostrum unarmed ventrally. (Rostrum with 1 or more dorsal teeth, but none on carapace posterior to orbital margin. Ventral angle of orbit fused with antennal spine. Stylocerite not reaching as far as distal margin of basal segment of antennular peduncle. First pereopod with carpus not deeply excavate.) . . . . . 6  
 Rostrum with 1 or more teeth on ventral margin . . . . . 7
6. Rostrum reaching about as far as distal margin of 1st segment of antennular peduncle, armed dorsally with 1 tooth at about midlength . . . . . 9. *C. celestinoi*  
 Rostrum reaching about as far as midlength of 2nd segment of antennular peduncle, armed dorsally with 8–10 teeth . . . . . 19. *C. leytenensis*
7. Rostrum unarmed dorsally. (Ventral angle of orbit fused with antennal spine. Stylocerite not reaching as far as distal margin of basal segment of antennular peduncle. First pereopod with carpus deeply excavate. Eggs small, less than 0.5 mm in major diameter.) . . . . . 8  
 Rostrum with 9 or more dorsal teeth. (Rostrum not reaching as far as distal end of antennular peduncle.) . . . . . 9
8. Rostrum not nearly reaching level of distal end of antennular peduncle. Telson without prominent posteromedian projection. First pereopod with fingers shorter than palm of chela. Third pereopod with carpus about 3 times as long as wide . . . . . 39. *C. typus*  
 Rostrum extending nearly as far as or slightly beyond distal end of antennular peduncle. Telson with prominent posteromedian projection. First pereopod with fingers slightly longer than palm of chela. Third pereopod with dactyl less than 3 times as long as wide . . . . . \*40. *C. villadolidi*
9. First pereopod with carpus 3–4 times as long as wide, not deeply excavate for reception of chela. Third pereopod with dactyl more than 4 times as long as wide. (Three or more teeth of dorsal rostral series situated on carapace posterior to orbital margin. Telson with posterior margin bearing median triangular projection.) . . . . . 10  
 First pereopod with carpus no more than twice as long as wide, deeply excavate for reception of chela. Third pereopod with dactyl no more than 3½ times as long as wide. (Telson with sublateral pair of spines on posterior margin shorter than seta-like intermediate pairs.) . . . . . 11
10. Rostrum with dorsal spines decreasing regularly in size from posteriormost to anteriormost, 3 situated on carapace posterior to orbital margin. Telson with sublateral pair of spines on posterior margin longer than intermediate pairs. Stylocerite falling short of distal margin of basal segment of antennular peduncle . . . . . \*6. *C. blancoi*, new species  
 Rostrum with dorsal spines smallest posteriorly and anteriorly, longest near middle of series, 5–13 situated on carapace posterior to orbital margin. Telson with sublateral pair of spines on posterior margin shorter than seta-like intermediate pairs. Stylocerite overreaching distal margin of basal segment of antennular peduncle . . . . . \*33. *C. serratirostris*
11. No teeth of dorsal rostral series situated on carapace posterior to orbital margin. Telson with posterior margin bearing median triangular projection . . . . . \*18. *C. laoagensis*  
 About 3 teeth of dorsal rostral series situated on carapace posterior to orbital margin. Telson with posterior margin regularly convex, without median triangular projection . . . . . 16. *C. laevis* Blanco [not Heller]

#### 4. *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.

DIAGNOSIS.—Rostrum not reaching as far as distal end of antennular peduncle, slightly upturned anteriorly, armed dorsally with 10 teeth in posterior ½, including 3 on carapace posterior to orbital margin, without subapical teeth, armed

ventrally with 6 teeth. Suborbital angle obscure but not completely fused with antennal spine; pterygostomian margin of carapace rounded. Sublateral pair of posterior telson spines longer than intermediate pairs. Stylocerite reaching nearly as far as distal end of basal segment of antennular peduncle. Carpus of 1st pereopod slightly, not deeply, excavate for reception of chela. Epipods on all but 5th pereopod. Maximum postorbital carapace length 5.2 mm.

RANGE.—Known only from the female holotype.

### 5. *Caridina atyoides* Nobili, 1900

*Caridina atyoides* Nobili, 1900:478 [type locality: Sioban, Pulau, Sipura, Kepulauan Mentawai, off west coast of Sumatra, Indonesia].—Bouvier, 1925:256, figs. 587–591.—J. Roux, 1928: 205.

DIAGNOSIS.—Rostrum short, triangular, not reaching as far as distal end of basal segment of antennular peduncle, sloping ventrad, unarmed dorsally, ventral margin with 0–2 teeth anteriorly. Suborbital angle fused with obtuse, nondentate antennal lobe; pterygostomian margin obtuse, not dentate. Telson with small posteromedian projection, lateral pair of spines on posterior margin shorter than seta-like intermediate pairs. Stylocerite not reaching as far as distal margin of basal segment of antennular peduncle. First pereopod with fingers slightly longer than palm of chela, carpus  $1\frac{1}{2}$  times as long as wide, rather deeply excavate distally for reception of chela. Third pereopod of male robust, merus armed with strong fixed spine near distal end of flexor margin, followed by crest surmounted by 2 or 3 denticles. Epipods on all but 5th pereopod. Eggs small, 0.38–0.40 mm in major diameter. Maximum postorbital carapace length about 8 mm.

RANGE.—Western Sumatra and Seram, Indonesia.

REMARKS.—It seems unlikely that this species can long remain in the genus *Caridina* merely because of the elongate carpi of the first and second pereopods. The general facies of the shrimp, the robust third pereopod of the male, and, especially, the form of the appendix masculina on the second pleopod all suggest a closer relationship to *Atya* than to *Caridina*, but it is probably best to await a revisionary study of the family before removing the species from the present genus.

### \*6. *Caridina blancoi*, new species

FIGURE 2

DIAGNOSIS.—Rostrum (Figure 2a) not reaching as far as distal end of antennular peduncle, sloping ventrad anteriorly, armed dorsally with 18 teeth, including 3 on carapace posterior to orbital margin, apex unarmed, armed ventrally with 2 teeth. Suborbital angle acute, distinctly separated from antennal spine; pterygostomian margin rounded. Telson (Figure 2c,d) with small posteromedian projection, sublateral pair of spines longer than intermediate pairs. Stylocerite (Figure 2f) not reaching as far as distal margin of basal segment of antennular peduncle. First pereopod (Figure 2i) with fingers longer than

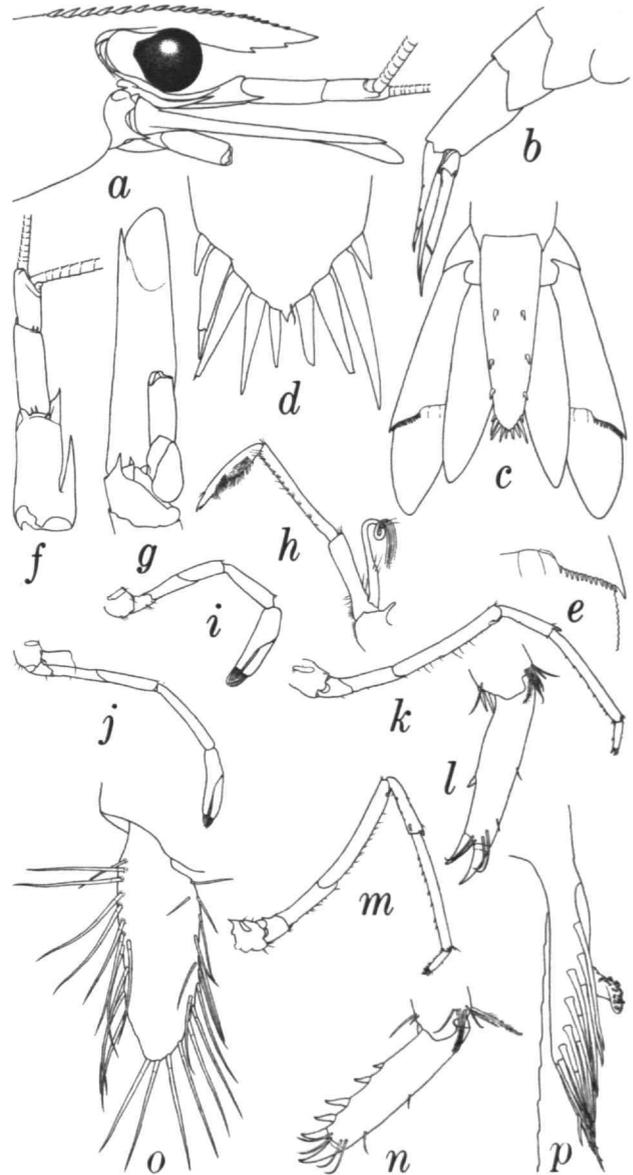


FIGURE 2.—*Caridina blancoi*, new species, male holotype from near mouth of Tayabas River, Luzon, carapace length 2.9 mm: a, anterior carapace and appendages, lateral aspect; b, posterior abdomen, lateral aspect; c, tail fan, dorsal aspect; d, posterior margin of telson, dorsal aspect; e, diaeresis of exopod of right uropod; f, right antennule, dorsal aspect; g, right antenna, ventral aspect; h, right 3rd maxilliped; i, right 1st pereopod; j, right 2nd pereopod; k, right 3rd pereopod; l, same, dactyl; m, right 4th pereopod; n, same, dactyl; o, endopod of right 1st pleopod; p, right appendix masculina and appendix interna.

palm, carpus more than 4 times as long as wide, not deeply excavate distally. Third pereopod (Figure 2k,l) with dactyl more than 5 times as long as wide. Epipods on all but 5th

pereopod. Postorbital carapace length 2.9 mm.

**MATERIAL.**—PHILIPPINES. Near mouth of Tayabas River, Luzon [13°54'N, 121°36'E], 25 Feb 1909: 1 male holotype, USNM 264045.

**TYPE LOCALITY.**—Tayabas River, Luzon.

**RANGE.**—Known only from the type specimen.

**REMARKS.**—The proposal of a new species, based on a single specimen, in a genus that is noteworthy for its variable species, may be questionable, but it seems desirable to call attention to a taxon that apparently differs from all others known in a combination of characters: the form and dentition of the rostrum and telson; the prominence of the suborbital angle; and the form of the chelae and carpi of the two anterior pereopods and of the dactyls of the third and fourth pereopods.

**ETYMOLOGY.**—The species is named for Guillermo J. Blanco, whose two commendable papers on the atyids of the Philippines have been the only available guides to the identity of these little shrimps that are so abundant and important as a secondary source of food throughout those islands.

#### 7. *Caridina brevicarpalis brevicarpalis* De Man, 1892

*Caridina brevicarpalis* De Man, 1892:397, pl. 24: fig. 30–30d [type locality: near Palopo, Sulawesi (Celebes), Indonesia].—Bouvier, 1925:178, figs. 372–374.—Edmondson, 1935a:7, fig. 2a–f.

**DIAGNOSIS.**—Rostrum slightly overreaching antennular peduncle, dorsal margin nearly horizontal, armed with 11–14 teeth on posterior  $\frac{2}{3}$ , none on carapace posterior to orbital margin or on anterior  $\frac{1}{3}$  of rostrum, armed ventrally with 4–7 teeth. Suborbital angle fused with antennal spine; pterygostomian margin rounded. Stylocerite not reaching as far as distal margin of basal segment of antennular peduncle. Carpus of 1st pereopod no longer than wide, deeply excavate for reception of chela. Epipods on all but 5th pereopod. Eggs with major diameter of about 0.53 mm. Maximum postorbital carapace length about 7 mm.

**DISTRIBUTION.**—Sulawesi (Celebes) and Waigeo islands, Indonesia, and Fiji Islands.

#### \*8. *Caridina brevicarpalis endehensis* De Man, 1892

##### FIGURE 3

*Caridina brevicarpalis* var. *endehensis* De Man, 1892:399, pl. 24: fig. 30e [type locality: Nuawari, near Ende, Flores, Indonesia].—Bouvier, 1925:34, 180, pl. 2: fig. 25.—Blanco, 1935:34, pl. 2: fig. 25.

**DIAGNOSIS (Philippine specimens).**—Rostrum (Figure 3a) far overreaching antennal scale, ascendant in anterior  $\frac{1}{2}$ , armed dorsally in posterior  $\frac{1}{2}$  with 9–23 teeth, including 0 or 1 on carapace posterior to orbital margin, dorsally unarmed in anterior  $\frac{1}{2}$ , armed ventrally with 4–24 teeth. Suborbital angle subrectangular, distinct from antennal spine; pterygostomian margin rounded. Telson (Figure 3c,d,f) with rather prominent posteromedian projection elevated above true posterior margin, sublateral pair of posterior spines longer than intermediate

pairs. Stylocerite (Figure 3g) falling far short of distal margin of basal segment of antennular peduncle. Carpus of 1st pereopod (Figure 3j) about  $1\frac{1}{2}$  times as long as wide, deeply excavate for reception of chela. Third pereopod (Figure 3l,m) with dactyl little more than twice as long as wide. Epipods on all but 5th pereopod. Eggs small, major diameter little more than 0.4 mm. Maximum postorbital carapace length 7.3 mm.

**MATERIAL.**—PHILIPPINES. Calawagan River 3 miles [4.8 km] from mouth, Mindoro [13°25'N, 120°28'E], 11 Dec 1908 (1500), 16' seine: 2 ovig. females [5.2, 5.8].—Malaga River, Leyte [10°24'N, 125°12'E], 30 Jul 1909: 248 males [2.2–3.8] 334 females [2.2–7.3], 138 ovig. [4.5–7.3], 146 juv [1.3–2.1].—Baganga River, Mindanao [7°35'N, 126°33'E], 13 May 1908 (1300): 1 ovig. female [6.0].

**RANGE.**—Philippines and Flores and Sumba, Indonesia.

**REMARKS.**—The rostrum is so long in Philippine specimens that they resemble *C. longirostris* and even *C. gracilirostris*, but they can be readily distinguished from those species by the absence of a subapical tooth on the rostrum, as well as by the distinct form of the pereopods. The rostrum, suborbital angle, and posterior spines of the telson are so very different from those in the typical form of *C. brevicarpalis* that the identification of these specimens as subspecies of that species is justified only because of the desirability of avoiding name changes until taxa are studied more intensively.

#### 9. *Caridina celestinoi* Blanco, 1939

*Caridina celestinoi* Blanco, 1939:392, pl. 3: figs. 8–10 [type locality: mountain stream at "Helosig," Leyte, Philippines].

**DIAGNOSIS.**—Rostrum very short, not overreaching basal segment of antennular peduncle, dorsal margin nearly horizontal, armed with single tooth at about midlength, ventral margin unarmed but with pair of long divergent setae in posterior  $\frac{1}{2}$ . Suborbital angle fused with antennal spine; pterygostomian margin acute. First pereopod with carpus nearly 3 times as long as wide, not excavate distally for reception of chela. Maximum postorbital carapace length probably no more than 1 mm.

**RANGE.**—Known only from the unique type specimen.

**REMARKS.**—Until additional material becomes available, the possibility must be considered that *C. celestinoi* merely represents the juvenile form of *C. leytensis*, a species found in the same general area.

#### 10. *Caridina cognata* De Man, 1915

*Caridina cognata* De Man, 1915:397, pl. 28: figs. 3–3g, 4–4b [type locality: several localities in northern New Guinea].

**DIAGNOSIS.**—Rostrum seldom overreaching antennular peduncle, dorsal margin usually almost horizontal, occasionally curving dorsad distally, armed with 11–27 teeth, including 0–4 on carapace posterior to orbital margin, usually without subapical teeth, armed ventrally with 0–10 teeth. Suborbital angle almost completely fused with antennal spine; pterygosto-

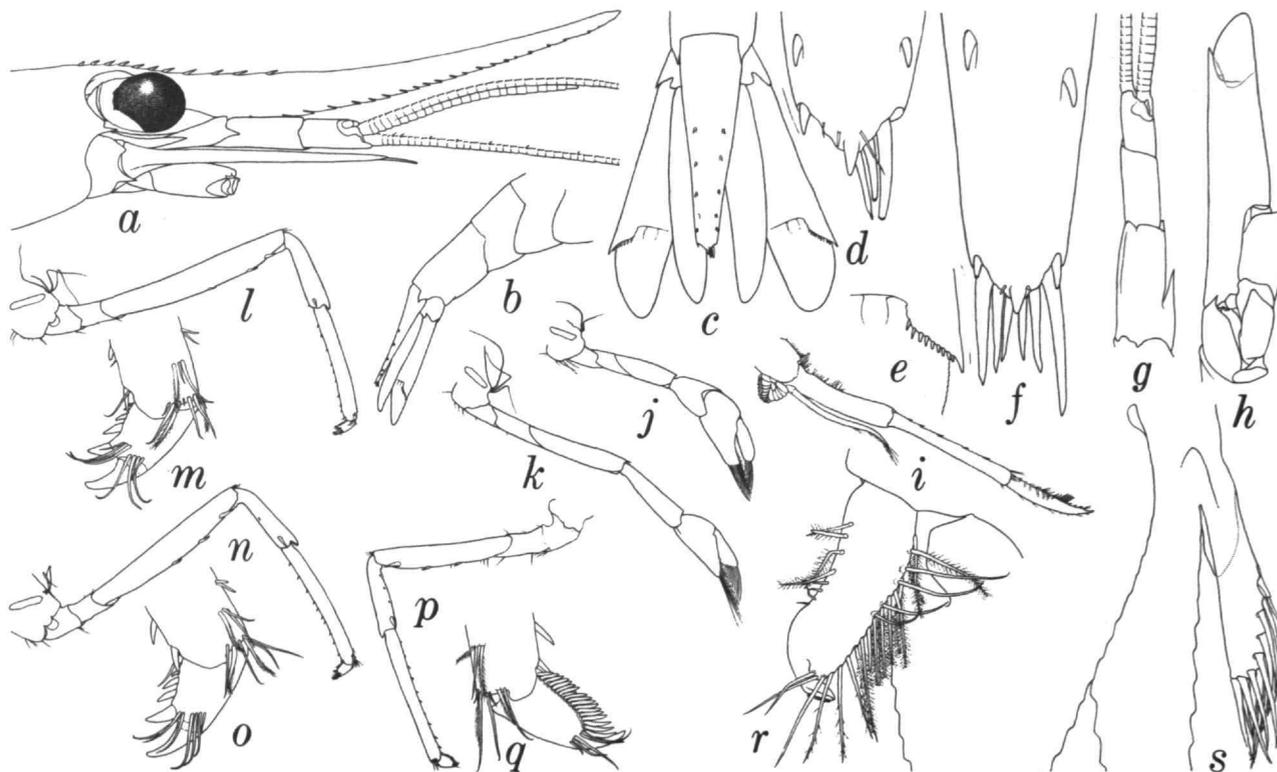


FIGURE 3.—*Caridina brevicarpalis endehensis*, a, f–s, male from Malaga River, Hinunangan Bay, Leyte, carapace length 3.6 mm; b–e, male from same locality, carapace length 3.3 mm: a, anterior carapace and appendages, lateral aspect; b, posterior abdomen, lateral aspect; c, tail fan, dorsal aspect; d, posterior margin of telson, dorsal aspect; e, diaeresis of exopod of right uropod; f, posterior end of telson, dorsal aspect; g, right antennule, dorsal aspect; h, right antenna, ventral aspect; i, right 3rd maxilliped; j, right 1st pereopod; k, right 2nd pereopod; l, right 3rd pereopod; m, same, dactyl; n, right 4th pereopod; o, same, dactyl; p, left 5th pereopod; q, same, dactyl; r, endopod of right 1st pleopod; s, right appendices masculina and interna.

mian margin rounded. Stylocerite falling slightly short of distal margin of basal segment of antennular peduncle. First pereopod with fingers longer than palm of chela, carpus more than twice as long as wide, not deeply excavate distally. Third pereopod with dactyl about 4 times as long as wide. Eggs large, major diameter 0.9–1.0 mm. Maximum postorbital carapace length probably about 4 mm.

RANGE.—Known only from the type series.

#### 11. *Caridina demani* J. Roux, 1911

*Caridina demani* J. Roux, 1911:94 [type locality: Tawarin River, north coast of West New Guinea, Indonesia].

*Caridina De Mani*.—Bouvier, 1925:172, figs. 361, 362.

DIAGNOSIS.—Rostrum reaching, at most, as far as distal end of antennular peduncle, dorsal margin nearly horizontal, armed with 10–20 teeth, including 2 or 3 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 0–5 teeth. Suborbital angle indistinct, partially fused with

antennal spine; pterygostomial margin blunt, slightly wider than rectangular. Telson with sublateral posterior spines longer than intermediate pairs. Stylocerite not reaching quite as far as distal margin of basal antennular segment. First pereopod with fingers slightly longer than palm. Epipods on all except 5th pereopod. Eggs rather large, major diameter about 0.75 mm; maximum postorbital carapace length probably about 3.6 mm.

RANGE.—New Guinea.

#### 12. *Caridina ensifera* Schenkel, 1902

*Caridina ensifera* Schenkel, 1902:490, pl. 8: figs. 1a–e, 4d [type locality: Danau Poso, Sulawesi (Celebes), Indonesia].—Bouvier, 1925:163, figs. 344–352.

DIAGNOSIS.—Rostrum far overreaching antennal scale, ascendant in anterior  $\frac{2}{3}$ , armed dorsally with 9–15 teeth in posterior  $\frac{1}{2}$ , including 1–3 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 14–26 teeth. Suborbital angle distinct but not produced; pterygosto-

mian margin very obscurely angular. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not reaching as far as margin of basal segment of antennular peduncle. First pereopod with fingers distinctly longer than palm, carpus 4 times as long as wide, not deeply excavate distally. Three posterior pereopods without epipods. Major diameter of eggs 0.6 mm. Maximum postorbital carapace length about 5.5 mm.

RANGE.—Known only from the type locality.

### 13. *Caridina fecunda* J. Roux, 1911

*Caridina fecunda* J. Roux, 1911:95 [type locality: Danau Jamur, West New Guinea, Indonesia].—Bouvier, 1925:176, figs. 368–371.

DIAGNOSIS.—Rostrum falling slightly short of or slightly overreaching distal end of antennular peduncle, dorsal margin almost horizontal, armed nearly to apex with 18–23 teeth, including 3 on carapace posterior to orbital margin, armed ventrally with 5–7 teeth. Suborbital angle obscure, almost completely fused with antennal spine; pterygostomian margin broadly rounded. Telson apparently lacking posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not nearly reaching level of distal margin of basal segment of antennular peduncle. First pereopod with fingers  $\frac{1}{2}$  again as long as palm of chela, carpus 3 times as long as wide, not excavate for reception of chela. Epipods well developed on 3 anterior pereopods, absent from 4th and 5th. Eggs large, major diameter 0.8 mm. Maximum postorbital carapace length probably about 3 mm.

RANGE.—Known only from the type locality.

### \*14. *Caridina gracilirostris* De Man, 1892

FIGURE 4

*Caridina gracilirostris* De Man, 1892:399, pl. 25: fig. 31–31d [type locality: Balangnipa, Sulawesi (Celebes), Indonesia].—Bouvier, 1925:142, figs. 305–307.—Blanco, 1935:32, pl. 2: figs. 11–17.—Holthuis, 1965:23, fig. 7.

DIAGNOSIS.—Rostrum (Figure 4a) reaching far beyond distal end of antennal scale, curving strongly dorsad throughout, armed dorsally in posterior  $\frac{1}{2}$  with 7–13 widely spaced teeth, rarely including 1 or 2 on carapace posterior to orbital margin, armed ventrally with 15–34 teeth. Suborbital angle distinct, subrectangular or subacute; pterygostomian margin rounded. Telson (Figures 4c,d) with posteromedian projection elevated above true posterior margin, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite (Figure 4f) not nearly reaching level of distal margin of basal segment of antennular peduncle. First pereopod (Figure 4i) with fingers longer than palm of chela, carpus more than twice as long as wide, not excavate distally for reception of chela. Third pereopod (Figure 4k,l) with dactyl more than 4 times as long as wide. Epipods on all but 5th pereopod. Eggs small, major diameter little more than 0.4 mm. Maximum postorbital

carapace length about 7 mm.

MATERIAL.—PHILIPPINES. “Cabugao” River, Catanduanes Island [13°37'N, 124°17'E], 9 Jun 1909 (0900), 25' seine: 9 females [4.9–6.3], 6 ovig. [5.0–5.9].—Nato River, Lagonoy Gulf, Luzon, 13°36'N, 123°33'E, tidewater, 18 Jun 1909: 9 males [3.8–4.3] 192 females [4.3–6.8], 176 ovig. [4.7–6.8].—Paluan River, Mindoro [13°25'N, 120°28'E], 4 Dec 1908; 130' seine: 1 ovig. female [4.5].—Calawagan River, 3 miles [4.8 km] from mouth, Mindoro [13°25'N, 120°28'E], 11 Dec 1908 (1500), 16' seine: 7 males [3.2–4.1] 8 females [3.5–4.7].—Pangauaran River, Port Caltom, Busuanga Island [12°11'N, 120°05'E], 16 Dec 1908 (0700), 25' seine: 5 males [3.5–3.9] 7 females [4.3–4.9], 4 ovig. [4.3–4.9].—Malaga River, Hinunangan Bay, Leyte [10°24'N, 125°12'E], 30 Jul 1909: 67 males [2.7–4.1], 32 females [3.4–5.5], 28 ovig. [4.2–5.5].—Baganga River, Mindanao [7°35'N, 126°33'E], 13 May 1908 (1300): 3 males [3.4–5.6], 1 female with abdominal bopyrid [5.6].—Zamboanga Canal, Mindanao [6°54'N, 122°04'E], 8 Oct 1909, 25' seine: 1 male [2.9].

BORNEO. “Tawao” River, 30 Sep 1909 (0930), mud, sand; dynamite: 1 male [3.9].

RANGE.—Madagascar, India, Philippines, Indonesia, and Palau [Belaue], Caroline Islands.

REMARKS.—Philippine specimens seem to agree well with those described from Madagascar by Holthuis (1965), except in the armature of the telson, especially of the posterior margin, which is noted by Holthuis as lacking intermediate spines or with only a single pair.

In three of the eight males from the Calawagan River, Mindoro, with carapace lengths of 3.2 to 3.6 mm, the appendix interna on the endopod of the first pleopod is rudimentary (Figure 4s). In the large male from the Baganga River, Mindanao, on the other hand, the endopod of the first pleopod is extended as in adult females (Figure 4t).

The single small male from the Zamboanga Canal, Mindanao, differs from all of the other specimens in having two teeth of the dorsal series situated on the carapace posterior to the orbital margin and in having the suborbital angle unusually produced; in this specimen, also, there are more (13) than the usual number of dorsal rostral teeth and fewer (17) than the usual number of ventral teeth.

### 15. *Caridina laevis* Heller, 1862

*Caridina laevis* Heller, 1862a:411 [type locality: Java, Indonesia].—Bouvier, 1925:183, figs. 382–385.

DIAGNOSIS.—Rostrum not overreaching antennular peduncle, dorsal margin slightly sinuous, armed with 14–22 teeth, including 3 or 4 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 4–15 teeth. Pterygostomian margin bluntly subrectangular or obtuse. Telson with sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not reaching level of distal

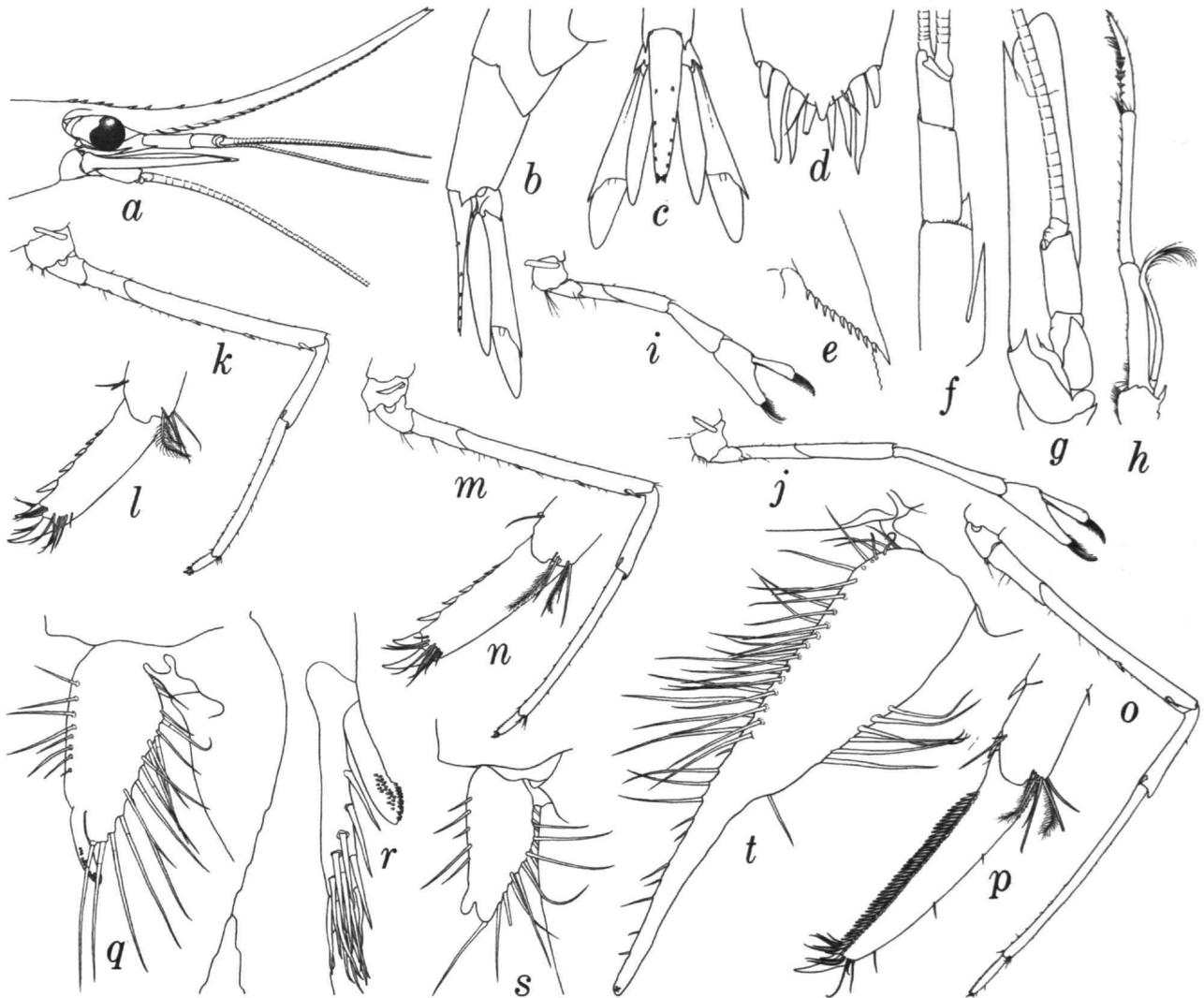


FIGURE 4.—*Caridina gracilirostris*, a–r, male from Nato River, Lagonoy Gulf, Luzon, carapace length 4.25 mm; s, male from Calawagan River, Mindoro, carapace length 3.7 mm; t, male from Baganga River, Mindanao, carapace length 5.6 mm: a, anterior carapace and appendages, lateral aspect; b, posterior abdomen; c, tail fan, dorsal aspect; d, posterior margin of telson, dorsal aspect; e, diaeresis of exopod of right uropod; f, right antennule, dorsal aspect; g, right antenna, ventral aspect; h, right 3rd maxilliped; i, right 1st pereopod; j, right 2nd pereopod; k, right 3rd pereopod; l, same, dactyl; m, right 4th pereopod; n, same, dactyl; o, right 5th pereopod; p, same, dactyl; q, endopod of right 1st pleopod; r, right appendix masculina and appendix interna; s, endopod of right 1st pleopod; t, endopod of left 1st pleopod.

margin of basal segment of antennular peduncle. First pereopod with fingers much longer than palm of chela, carpus  $2\frac{1}{2}$  times as long as wide, only slightly excavated distally for reception of chela. Epipods well developed on 2 anterior pereopods, reduced, rudimentary, or absent on 3 posterior pairs. Eggs large, major diameter 0.70–0.91 mm. Maximum postorbital carapace length probably about 5 or 6 mm.

RANGE.—Known with certainty only from Java.

#### 16. *Caridina laevis* Blanco, 1935 [not Heller]

*Caridina laevis*.—Blanco, 1935:34, pl. 3: figs. 26–32.

DIAGNOSIS.—Rostrum not overreaching antennal scale, dorsal margin faintly convex, armed nearly to apex with 15–19

teeth, including 2-5 on carapace posterior to orbital margin, armed ventrally with 2-6 depressed teeth. Telson without posteromedian projection, sublateral pair of posterior spines slightly longer than mesially adjacent pair but considerably shorter than intermediate pairs of setae. First pereopod with fingers slightly shorter than palm of chela, carpus about as wide as long, deeply excavate for reception of chela. Third pereopod with dactyl slightly less than 3 times as long as wide. Maximum postorbital carapace length probably about 4 mm.

LOCALITY.—“Pulamgue” Lake, Albay Province, Luzon, Philippines.

REMARKS.—The specimens assigned to *C. laevis* by Blanco almost surely do not belong to the species from Java described by Heller, as indicated by the different arrangement of spines on the posterior margin of the telson and the very different form of the chela and carpus of the first pereopod. Blanco's specimens seem to be nearer *P. pareparensis* from Sulawesi (Celebes), but they apparently differ from that species in having a larger mean number of ventral teeth on the rostrum, the carpus of the first pereopod slightly shorter and more deeply excavate, and the posterior margin of the telson armed differently. It seems best, however, not to propose a new name for the Philippine population until it can be re-examined and re-described.

#### 17. *Caridina lanceolata* Woltereck, 1937

*Caridina lanceolata* Woltereck, 1937a:224, figs. I, 7a-c; pls. 3, 6 [type locality: lakes in central Sulawesi (Celebes), Indonesia]; 1937b:307, fig. 11.

DIAGNOSIS.—Rostrum far overreaching antennal scale, dorsal margin strongly incurved, armed with 10-16 teeth, chiefly in posterior  $\frac{1}{2}$ , including 0-4 on carapace posterior to orbital margin and 1-3 subapical, armed ventrally with 5-11 teeth. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not overreaching distal margin of basal segment of antennular peduncle. First pereopod with fingers very slightly longer than palm of chela, carpus 2-4 times as long as wide. Epipods on 2 anterior pairs of pereopods only. Eggs large, major diameter 0.63-0.97 mm. Maximum postorbital carapace length probably about 5 or 6 mm.

RANGE.—Known only from the original records from three lakes in central Sulawesi (Celebes), Indonesia.

#### \*18. *Caridina laoagensis* Blanco, 1939

FIGURE 5

*Caridina laoagensis* Blanco, 1939:390, pl. 2 [type locality: not indicated; presumably Laoag River, Laoag, Province of Ilocos Norte, Luzon, Philippines].

DIAGNOSIS.—Rostrum (Figure 5a) not overreaching 2nd segment of antennular peduncle, dorsal margin nearly horizontal but elevated slightly above dorsal margin of carapace, armed

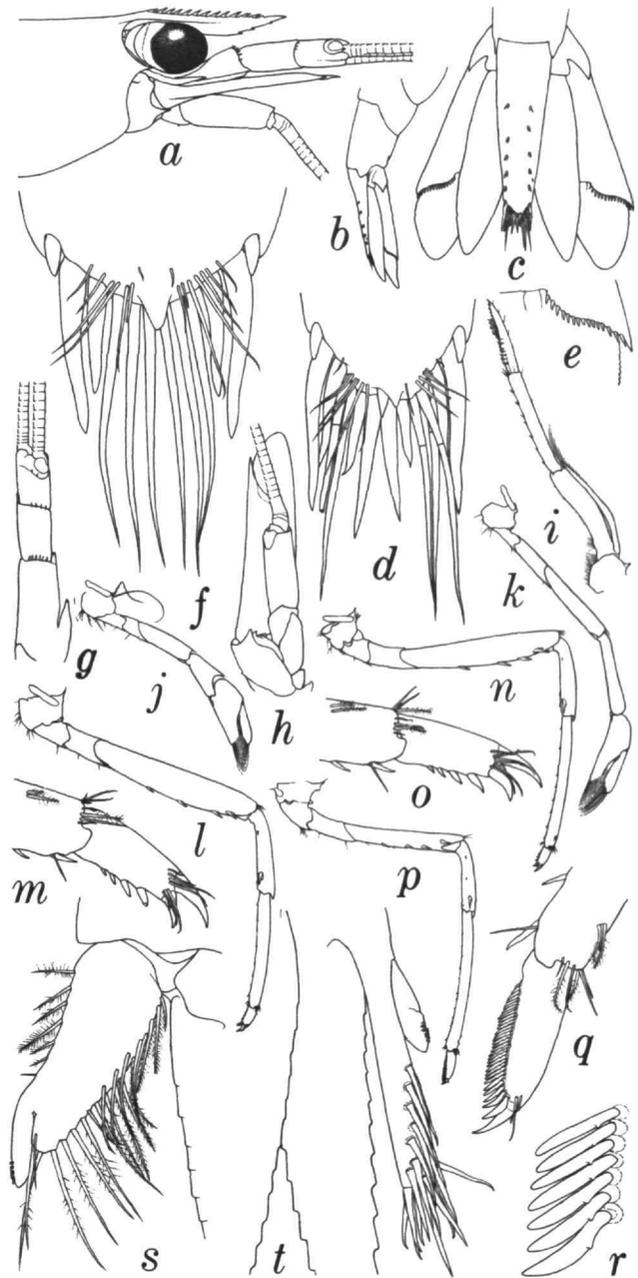


FIGURE 5.—*Caridina laoagensis*, a-e,g-t, male from Malaga River, Leyte, carapace length 3.0 mm; f, ovigerous female from same locality, carapace length 4.7 mm: a, anterior carapace and appendages, lateral aspect; b, posterior abdomen; c, tail fan, dorsal aspect; d, posterior margin of telson, dorsal aspect; e, diacresis of exopod of right uropod; f, posterior margin of telson, dorsal aspect; g, right antennule, dorsal aspect; h, right antenna, ventral aspect; i, right 3rd maxilliped; j, right 1st pereopod; k, right 2nd pereopod; l, right 3rd pereopod; m, same, dactyl; n, right 4th pereopod; o, same, dactyl; p, right 5th pereopod; q, same, dactyl; r, same, spines on flexor margin; s, endopod of right 1st pleopod; t, right appendices masculina and interna.

with 9–17 subequal, evenly spaced teeth, all on rostrum considerably anterior to orbital margin, without subapical teeth, armed ventrally with 1–6 rather inconspicuous teeth. Suborbital angle fused with antennal spine; pterygostomian margin narrowly rounded. Telson (Figure 5*c,d,f*) with posteromedian projection elevated above true posterior margin, sublateral pair of posterior spines longer than immediately mesial pair but much shorter than seta-like intermediate pairs (end of telson obviously abnormally double in specimen illustrated in Figure 5*c,d*). Stylocerite (Figure 5*g*) barely reaching midlength of basal segment of antennular peduncle. First pereopod (Figure 5*j*) with fingers longer than palm of chela, carpus less than twice as long as wide, deeply excavate for reception of chela. Third pereopod (Figure 5*l,m*) with dactyl about 3½ times as long as wide. Epipods on all but 5th pereopod. Eggs small, less than 9.4 mm in major diameter. Maximum postorbital carapace length about 7 mm.

**MATERIAL.**—PHILIPPINES. Yawa River, Luzon [13°10'N, 123°45'E], 7 June 1909 (0600): 2 females [4.9, 5.3], 1 ovig. [4.9].—Malaga River, Hinunangan Bay, Leyte [10°24'N, 125°12'E], 30 Jul 1909: 2 males [3.0, 3.3] 4 females [4.6–6.3], 3 ovig. [4.6–6.3], 1 juv [1.8].

**RANGE.**—Known previously only from the type series.

**REMARKS.**—It is possible that *C. laoagensis* will eventually fall into synonymy with the variable *C. weberi* from Indonesia, but it seems best to retain Blanco's name for the Philippine populations for the time being.

### 19. *Caridina leytenensis* Blanco, 1939

*Caridina leytenensis* Blanco, 1939:391, pl. 3: figs. 1–7 [type locality: "Helosig," Leyte, Philippines].

**DIAGNOSIS.**—Rostrum not overreaching 2nd segment of antennular peduncle, dorsal margin horizontal, armed with 8–10 subequal teeth, all on rostrum anterior to orbital margin, without subapical teeth, ventral margin unarmed. Suborbital angle fused with antennal spine; pterygostomian margin subacute, not rounded. Telson with posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not reaching level of distal margin of basal segment of antennular peduncle. First pereopod with carpus about twice as long as wide, not excavate distally for reception of chela. Third pereopod with dactyl slightly more than 3 times as long as wide. Maximum postorbital carapace length probably about 1.5 mm.

**RANGE.**—Known only from the type locality.

### 20. *Caridina linduensis* J. Roux, 1904

*Caridina linduensis* J. Roux, 1904:541, pl. 9: figs. 1–4 [type locality: Danau Lindu, Sulawesi (Celebes), Indonesia].—Bouvier, 1925:224, figs. 497–503.

**DIAGNOSIS.**—Rostrum reaching about as far as distal end of antennular peduncle, dorsal margin horizontal or faintly

sinuous, armed with 7–13 teeth on posterior 2/3, none on carapace posterior to orbital margin and none subapical, armed ventrally with 0–6 rather long, slender teeth. Suborbital angle not prominent, antennal spine very short; pterygostomian margin rounded. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not reaching level of distal margin of basal segment of antennular peduncle. First pereopod with fingers slightly shorter than palm of chela, carpus slightly less than twice as long as wide, deeply excavate for reception of chela. Epipod reasonably well developed on 1st pereopod, reduced on 2nd, lacking on 3 posterior pairs. Eggs large, major diameter 0.95 mm. Maximum postorbital carapace length 4.5 mm.

**RANGE.**—Known only from the type locality.

### 21. *Caridina lingkonae* Woltereck, 1937

*Caridina Lingkonae* Woltereck, 1937a:218, figs. 1, 1; pls. 3, 6 [type locality: Danau Towuti, Sulawesi (Celebes), Indonesia].

*Caridina lingkonae*.—Woltereck, 1937b:299, fig. 6.

**DIAGNOSIS.**—Rostrum usually overreaching antennular peduncle, dorsal margin slightly concave, armed throughout length with 16–27 teeth, including 3 on carapace posterior to orbital margin, armed ventrally with 8–16 teeth. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not overreaching distal margin of basal segment of antennular peduncle. First pereopod with fingers longer than palm of chela, carpus 4–6 times as long as wide. Epipod reduced on 1st pereopod, lacking on 4 posterior pairs. Eggs large, major diameter 0.70–0.98 mm. Maximum postorbital carapace length probably about 5 mm.

**RANGE.**—Known only from the type locality lake in central Celebes.

### 22. *Caridina loehae* Woltereck, 1937

*Caridina Loehae* Woltereck, 1937a:222, figs. 1, 5a–d; pls. 3, 6 [type locality: Danau Matana and Danau Towuti, Sulawesi (Celebes), Indonesia].

*Caridina loehae*.—Woltereck, 1937b:304, fig. 9.

**DIAGNOSIS.**—Rostrum reaching about as far as distal end of antennular peduncle, dorsal margin faintly sinuous, armed on posterior 2/3 or 3/4 with 10–17 teeth, including 1–3 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 4–7 teeth. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not overreaching distal margin of basal segment of antennular peduncle. First pereopod with fingers subequal to palm of chela, carpus about twice as long as wide. Epipods on two anterior pairs of pereopods only. Eggs large, major diameter 0.76–0.99 mm. Maximum postorbital carapace length probably about 4 mm.

**RANGE.**—Known only from lakes in central Sulawesi (Celebes), Indonesia.

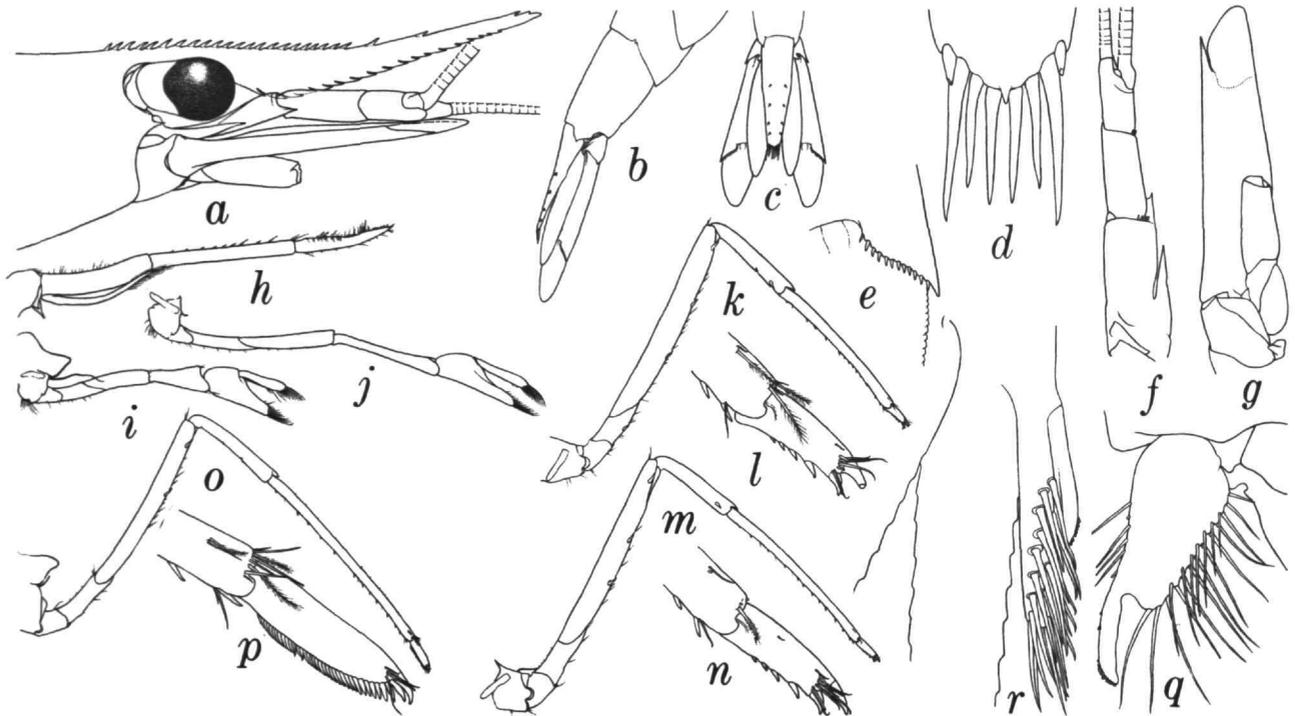


FIGURE 6.—*Caridina longirostris* from Zamboanga Canal, Mindanao, *a, f-r*, male with carapace length of 3.3 mm; *b-e*, male with carapace length of 3.4 mm: *a*, anterior carapace and appendages, lateral aspect; *b*, posterior abdomen; *c*, tail fan, dorsal aspect; *d*, posterior margin of telson; *e*, diaeresis of exopod of right uropod; *f*, right antennule, dorsal aspect; *g*, right antenna, ventral aspect; *h*, right 3rd maxilliped; *i*, right 1st pereopod; *j*, right 2nd pereopod; *k*, right 3rd pereopod; *l*, same, dactyl; *m*, right 4th pereopod; *n*, same, dactyl; *o*, right 5th pereopod; *p*, same, dactyl; *q*, endopod of right 1st pleopod; *r*, right appendix masculina and appendix interna.

**\*23. *Caridina longirostris* H. Milne Edwards, 1837**

FIGURES 6-8

*Caridina longirostris* H. Milne Edwards, 1837:363 [type locality: Macta River, near Oran, Algeria (probably erroneous)].—Holthuis, 1965:20, fig. 6.

*Caridina gracillima*.—Blanco, 1935:32, pl. 1: figs. 5-10 [not *C. gracillima* Lancheester, 1901].

*Caridina modigliani*.—Blanco, 1935:34, pl. 2: figs. 19-24 [not *C. modigliani* Nobili, 1900].

**DIAGNOSIS.**—Rostrum (Figures 6*a*, 7*a*) overreaching antennal scale, dorsal margin ascendant in anterior  $\frac{1}{2}$ , armed with 15-30 teeth, chiefly in posterior  $\frac{2}{3}$ , including 1-3 on carapace posterior to orbital margin and 1-3 subapical teeth separated by unarmed space from remainder of series, armed ventrally with 2-22 teeth. Suborbital angle distinct, sometimes subacute; pterygostomial margin rather narrowly rounded. Telson (Figures 6*c, d*, 7*d, e, g*) with posteromedian projection elevated above true posterior margin, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite (Figures 6*f*, 7*h*) not nearly reaching level of distal margin of basal segment of antennular peduncle. First pereopod (Figures 6*i*, 7*k*) with fingers distinctly longer than palm of chela, carpus about twice

as long as wide, not deeply excavate distally for reception of chela. Third pereopod (Figures 6*k, l*, 7*m, n*) with dactyl nearly 4 times as long as wide. Epipods on all but 5th pereopod. Eggs small, major diameter about 0.4 mm. Maximum postorbital carapace length about 7 mm.

**MATERIAL.**—PHILIPPINES. "Batangas" River, Batangas, Luzon [13°45'N, 121°03'E], 7 Jun 1908, 15' seine: 4 ovig. females [4.6-5.4].—Nato River, Lagonoy Gulf, Luzon; 13°36'N, 123°33'E, tidewater, 18 Jun 1909 (0630): 1 male [3.4] 14 ovig. females [4.4-5.7].—"Cabugao" River, Catanduanes Island [13°37'N, 124°17'E], 9 Jun 1909 (0900), 25' seine: 1 male [4.1] 3 ovig. females [4.4-5.4].—River and beach, Tilik, Lubang Island [13°49'N, 120°12'E], 14 Jul 1908: 10 males [3.3-3.9] 10 ovig. females [4.7-5.8].—Calawagan River 3 miles [4.8 km] from mouth, Mindoro [13°25'N, 120°28'E], 11 Dec 1908 (1500), 16' seine: 75 males [1.8-3.8] 63 females [1.7-5.8], 6 ovig. [3.8-5.8].—Pangauaran River, Port Caltom, Busuanga Island [12°11'N, 120°05'E], 16 Dec 1908 (0700), 25' seine: 1? [3.7].—Malaga River, Hinunangan Bay, Leyte [10°24'N, 125°12'E], 30 Jul 1909: 138 males [2.0-3.9] 203 females [2.0-6.3], 91 ovig. [4.2-6.3], 5 juv. [1.7-1.9].—Malabang River, Mindanao [7°36'N, 124°04'], 21 May 1908

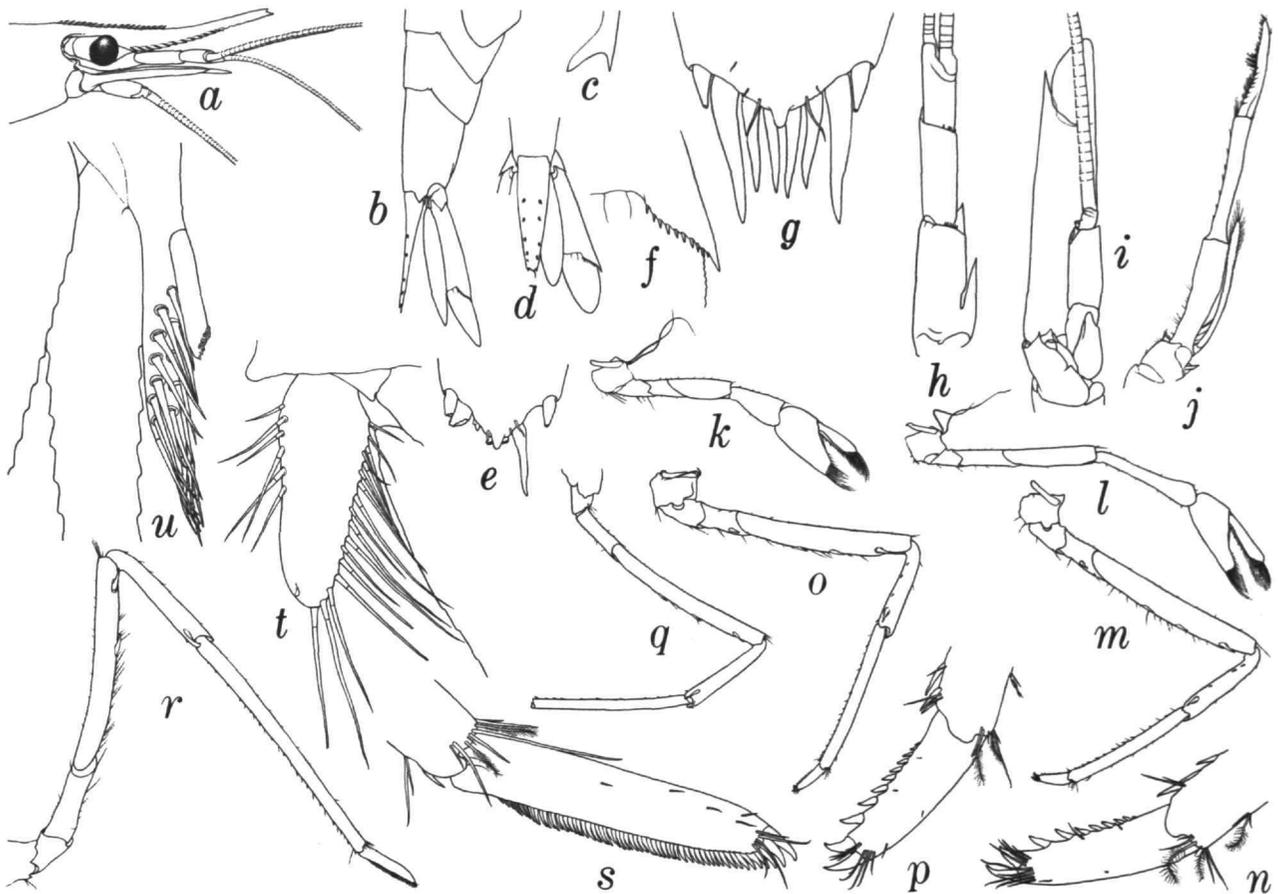


FIGURE 7.—*Caridina longirostris* from Nato River, Lagonoy Gulf, Luzon, *a-f, h-q, t, u*, male with carapace length of 3.4 mm; *g, r, s*, ovigerous female with carapace length of 5.4 mm: *a*, anterior carapace and appendages, lateral aspect; *b*, posterior abdomen; *c*, pre-anal tooth, lateral aspect; *d*, tail fan, dorsal aspect; *e*, posterior margin of telson; *f*, diaeresis of exopod of right uropod; *g*, posterior margin of telson; *h*, right antennule, dorsal aspect; *i*, right antenna, ventral aspect; *j*, right 3rd maxilliped; *k*, right 1st pereopod; *l*, right 2nd pereopod; *m*, right 3rd pereopod; *n*, same, dactyl; *o*, right 4th pereopod; *p*, same, dactyl; *q*, right 5th pereopod; *r*, right 5th pereopod; *s*, same, dactyl; *t*, endopod of right 1st pleopod; *u*, right appendix masculina and appendix interna.

(1500): 1 ovig. female [3.7].—Baganga River, Mindanao [7°35'N 126°33'E], 13 May 1908 (1300): 1 male with abdominal bopyrid [4.4] 10 females [4.0–6.1], 9 ovig. [4.4–6.1].—Cotabato, Mindanao, small stream on south side of river [7°13'N, 124°15'E], 20 May 1908: 4 females [3.2–3.7].—Zamboanga Canal, Mindanao [6°54'N, 122°04'E], 8 Oct 1909, 25' seine: 10 males [3.1–3.4] 32 females [3.5–6.4], 28 ovig. [5.0–6.4].—Lake Ernestine, Cagayan Sulu Island [6°59'N, 118°31'E], 8 Jan 1909: 3 males [3.8–4.2] 4 females [4.6–5.1], 3 ovig. [4.6–5.1].

BORNEO. "Tawao" River, 30 Sep 1909 (0930), mud, sand; dynamite: 1 male [4.2].

CELEBES. Gorontalo [0°33'N, 123°03'E], 15 Nov 1909, market: 134 males [3.2–4.8] 103 females [3.9–5.3], 67 ovig. [4.4–5.3].

RANGE.—Because this species has usually been identified under other names, its overall range is still uncertain. Apparently it occurs throughout the Philippines and Indonesia, as well as in Madagascar, and it may be considerably more widespread.

REMARKS.—If the presence or absence of an appendix interna on the endopod of the first pleopod were accepted as a primary specific character (Holthuis, 1965:9), 37 of the males from the Calawagan River, Mindoro, should be assigned to *C. longirostris*, and 38 to another species. Similarly, only 52 of the males from the Malaga River, Leyte, have an appendix interna on that appendage, and 86 do not. All attempts to correlate other characters with the presence or absence of that appendix have failed. As shown in Figure 8, that appendix displays various degrees of development, irrespective of specimen size,

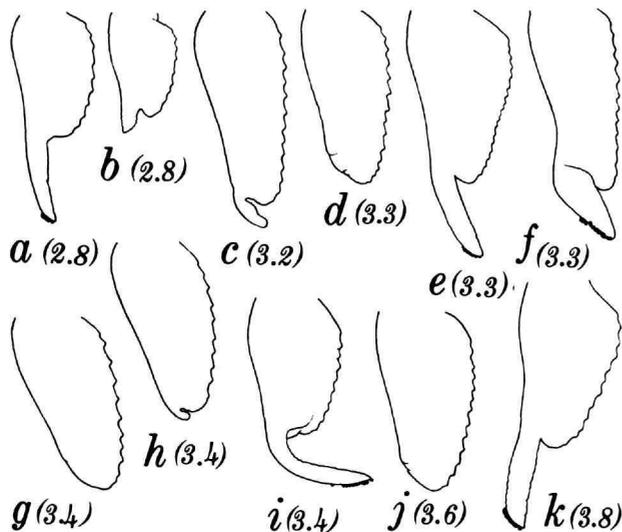


FIGURE 8.—*Caridina longirostris*, endopods of right 1st pleopods of males from Malaga River, Leyte, 30 July 1909; numerals in parentheses indicate postorbital carapace lengths.

and it therefore seems to be an unreliable character in this species.

There is even slight doubt that *C. longirostris* is distinct from *C. nilotica*, as maintained by Holthuis (1965:21), but it is so treated here in order to emphasize the differences between populations from various localities in the Philippines, based largely on the presence or absence of a posteromedian tooth on the telson.

In the series from the Malaga River, Leyte, young males with the appendix masculina less than fully developed vary in carapace length from 2.0 to 2.3 mm.

#### 24. *Caridina masapi* Woltereck, 1937

*Caridina Masapi* Woltereck, 1937a:223, figs. 1, 6a–h; pls. 3, 6 [type localities: the lakes (Danau): D. Matana, D. Mahalona, D. Towuti, and D. Wawontoa, furthermore a lake near Masapi, and a stream between the first two lakes, all localities in S.E. Central Sulawesi (Celebes), Indonesia].

*Caridina masapi*.—Woltereck, 1937b:306, fig. 10.

DIAGNOSIS.—Rostrum falling short of or overreaching distal end of antennular peduncle, dorsal margin nearly straight or slightly ascendant anteriorly, armed on posterior  $\frac{2}{3}$  or more with 11–19 teeth, including 1–4 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 4–10 teeth. Telson without posteromedian projection, sublateral pair of posterior spines shorter than, or subequal to, intermediate pairs. Stylocerite not overreaching distal margin of basal segment of antennular peduncle. First pereopod with fingers about as long as palm of chela, carpus 2–3 times as long as wide. Epipod on 1st pereopod only. Eggs very large, major

diameter 0.94–1.30 mm. Maximum postorbital carapace length probably less than 5 mm.

RANGE.—Known only from the original records from five lakes and a stream in southeast central Sulawesi (Celebes), Indonesia.

#### 25. *Caridina mertoni* J. Roux, 1911

*Caridina mertoni* J. Roux, 1911:84 [type locality: “Grand-Kei,” Kepulauan Ewab (Kepulauan Kai), Indonesia].

*Caridina Mertoni*.—Bouvier, 1925:191, figs. 398–408.

DIAGNOSIS.—Rostrum not nearly reaching distal end of antennular peduncle, dorsal margin mostly horizontal, curving slightly ventrad near apex, armed nearly to apex with 15–27 teeth, including 3–5 on carapace posterior to orbital margin, armed ventrally with 3–10 teeth. Suborbital angle obscure, largely fused with antennal spine; pterygostomian margin rectangularly rounded. Telson with posterior spines subequal.

Stylocerite not reaching nearly to level of distal margin of basal segment of antennular peduncle. First pereopod with carpus about twice as long as wide, distinctly but not deeply excavate distally. Third pereopod with dactyl nearly 4 times as long as wide. Epipods on all but 5th pereopod. Eggs small, major diameter 0.35 mm. Maximum postorbital carapace length 4.5 mm.

RANGE.—Waigeo and Kepulauan Ewab.

#### 26. *Caridina modiglianii* Nobili, 1900

*Caridina Modiglianii* Nobili, 1900:477 [type locality: “Kifa-juc,” Pulau Enggano, Indonesia].

*Caridina Modigliani*.—Bouvier, 1925:159, figs. 332–335.

DIAGNOSIS.—Rostrum overreaching antennal scale, ascendant anteriorly, armed dorsally with 20 teeth in posterior portion, including 5 on carapace posterior to orbital margin and 1 subapical tooth, armed ventrally with 21 teeth. Pterygostomian margin rounded. First pereopod with fingers longer than palm of chela, carpus nearly twice as long as wide, not deeply excavate distally. Maximum postorbital carapace length about 5 or 6 mm.

RANGE.—Known with certainty only from the type locality.

REMARKS.—This species, which is based on a single incomplete female, seems to be identical with *C. longirostris*, except for the number of teeth of the dorsal rostral series that are situated on the carapace posterior to the orbital margin. According to Bouvier (1925:160), *C. modiglianii* has five postorbital teeth, whereas I have seen no more than three in any material of *C. longirostris* that I have examined. It seems best, therefore, to retain Nobili's name until additional material from the type locality can be studied.

#### 27. *Caridina multidentata* Stimpson, 1860

*Caridina multidentata* Stimpson, 1860:29 [type locality: Bonin Islands (Ogasawara Gunto)].—Bouvier, 1925:220, figs. 487–492.

**DIAGNOSIS.**—Rostrum not reaching distal end of antennular peduncle, dorsally convex or straight and directed slightly ventrad, armed dorsally with 20–30 teeth, including 1 or 2 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 5–14 teeth. Suborbital angle fused with antennal spine; pterygostomian margin rounded. Stylocerite falling far short of distal margin of basal segment of antennular peduncle. First pereopod with carpus more than twice as long as wide, deeply excavate distally for reception of chela. Third pereopod with dactyl less than 3 times as long as wide. Eggs large, major diameter nearly 1 mm. Maximum carapace length about 7.5 mm.

**RANGE.**—Recorded from Sumatra, Celebes, and Batjan, but Indonesian material has not been compared directly with specimens from the Bonin Islands, and its identification must be considered questionable for the time being.

**\*28. *Caridina nilotica* (P. Roux, 1833)**

FIGURES 9, 10

*Pelias niloticus* P. Roux, 1833:73, fig. 1 [type locality: Cairo, Egypt].

*Caridina Wyckii* var. *gracilipes* De Man, 1892:387, pl. 24: fig. 29–29e [type localities: Sulawesi (Celebes) and Selajar, Indonesia].

*Caridina nilotica* var. *minahassae* De Man, 1902:895 [type locality: Minahasa, Sulawesi (Celebes), Indonesia].

*Caridina nilotica* var. *brachydactyla* De Man, 1908:269, pl. 20: fig. 8 [type locality: Sulawesi (Celebes), Selajar, and Flores, Indonesia].—Blanco, 1935:33, pl. 2: fig. 18.

*Caridina aruensis* J. Roux, 1911:82 [type locality: Kepulauan Aru, Indonesia].

*Caridina nilotica* var. *brevidactyla* J. Roux, 1919:320 [type locality: 9 localities in Kepulauan Aru, Indonesia].

*Caridina nilotica*.—Holthuis, 1965:15, fig. 5.

**DIAGNOSIS (Philippine specimens).**—Rostrum (Figures 9a, 10a) overreaching antennal scale, dorsal margin ascendant in anterior  $\frac{1}{2}$ , armed with 8–19 teeth, chiefly in posterior  $\frac{2}{3}$ , including 0–3 on carapace posterior to orbital margin and 1 or 2 subapical teeth separated by unarmed space from remainder of series, armed ventrally with 7–26 teeth. Suborbital angle distinct, acute or subacute; pterygostomian margin broadly rounded, not produced. Telson (Figures 9c,d, 10c,d) without posteromedian projection but with 1 or 2 minute median spinules, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite (Figures 9f, 10f) not nearly reaching level of basal segment of antennular peduncle. First pereopod (Figures 9i, 10i) with fingers longer than palm of chela, carpus about twice as long as wide, not noticeably excavate distally for reception of chela. Third pereopod (Figures 9k,l, 10k,l) with dactyl  $4\frac{1}{2}$  times as long as wide. Epipods on all but 5th pereopod. Eggs fairly large, major diameter 0.78–0.86 mm. Maximum postorbital carapace carapace length about 5 mm.

**MATERIAL.**—PHILIPPINES. Vicars Landing, Lake Lanao, Mindanao, 22 May 1908, seine: 1 male [3.3] 19 females [3.1–4.8], 5 ovig. [4.0–4.8].—Passi, Panay [10°43'N,

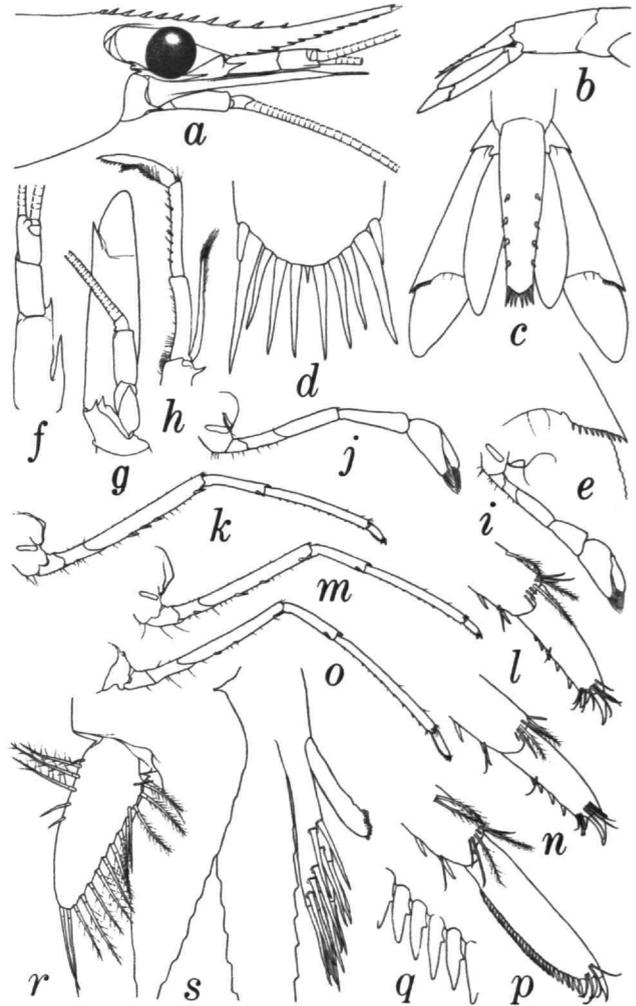


FIGURE 9.—*Caridina nilotica*, male with carapace length of 2.5 mm from Passi, Panay: a, anterior carapace and appendages, lateral aspect; b, posterior abdomen, dorsal aspect; c, tail fan, dorsal aspect; d, posterior margin of telson; e, diaeresis of exopod of right uropod; f, right antennule, dorsal aspect; g, right antenna, ventral aspect; h, right 3rd maxilliped; i, right 1st pereopod; j, right 2nd pereopod; k, right 3rd pereopod; l, same, dactyl; m, right 4th pereopod; n, same, dactyl; o, right 5th pereopod; p, same, dactyl; q, same, spines on flexor margin; r, endopod of right 1st pleopod; s, right appendix masculina and appendix interna.

122°03'E], 13 Jan 1909: 13 males [2.0–2.7] 21 females [2.1–4.0], 3 ovig. [3.6–4.0].

**RANGE.**—Recorded over an extensive range from eastern Africa to Polynesia but in need of additional study and analysis.

**REMARKS.**—The two Philippine lots identified as *C. nilotica* are consistently different and may subsequently be assigned to distinct species. The specimens from Panay (Figure 9) have 8–14 dorsal teeth on the rostrum, of which at most one (more

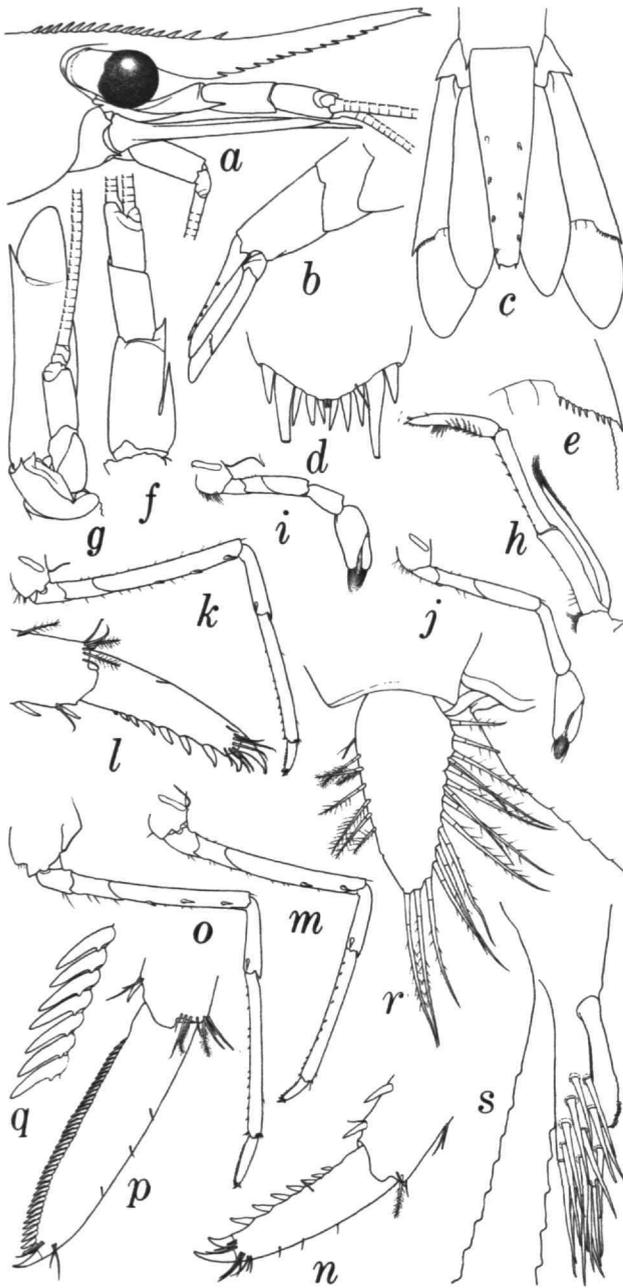


FIGURE 10.—*Caridina nilotica* from Lake Lanao, Mindanao, *a-c, e-s*, male with carapace length of 3.3 mm; *d*, ovigerous female with carapace length of 4.0 mm: *a*, anterior carapace and appendages, lateral aspect; *b*, posterior abdomen; *c*, tail fan, dorsal aspect; *d*, posterior margin of telson; *e*, diaeresis of exopod of right uropod; *f*, right antennule, dorsal aspect; *g*, right antenna, ventral aspect; *h*, right 3rd maxilliped; *i*, right 1st pereopod; *j*, right 2nd pereopod; *k*, right 3rd pereopod; *l*, same, dactyl; *m*, right 4th pereopod; *n*, same, dactyl; *o*, right 5th pereopod; *p*, same, dactyl; *q*, same, spines on flexor margin; *r*, endopod of right 1st pleopod; *s*, right appendix masculina and appendix interna.

frequently none) are situated on the carapace posterior to the orbital margin, and they have the posterior margin of the telson armed with long, slender spines. The Mindanao specimens (Figure 10) have 10–19 dorsal rostral teeth, of which two or three are on the carapace, and 12–26 ventral teeth, and the posterior margin of the telson is armed with short, stout spines. Otherwise, the specimens in both lots agree with the description of the species in Holthuis (1965), except for the absence of an appendix interna on the endopod of the first pleopod (see “Remarks” under *C. longirostris*).

### 29. *Caridina opaensis* J. Roux, 1904

*Caridina opaensis* J. Roux, 1904:547, pl. 9: figs. 8–10 [type locality: Opa Swamp in southeast Sulawesi (Celebes), Indonesia, at about 4°10'S, 122°10'E].

DIAGNOSIS.—Rostrum reaching about as far as midlength of 2nd segment of antennular peduncle, dorsal margin horizontal or inclined slightly ventrad, armed with 17 or 18 teeth, including 3–5 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 3 or 4 teeth. Suborbital angle rounded, not prominent; pterygostomial margin rounded. Telson with sublateral pair of posterior spines slightly longer than intermediate pairs. Stylocerite not reaching level of distal margin of basal segment of antennular peduncle. First pereopod with fingers slightly shorter than palm of chela, carpus 3 times as long as wide, distal end not deeply excavate for reception of chela. Epipods on 2 anterior pereopods, lacking on 3 posterior pairs. Maximum postorbital carapace length 3.25 mm.

RANGE.—Known only from the type locality.

### 30. *Caridina pareparensis* De Man, 1892

*Caridina pareparensis* De Man, 1892:379, pl. 22: fig. 25–25b [type locality: near Parepare, Sulawesi (Celebes), Indonesia].—Bouvier, 1925:236, figs. 538–543.

DIAGNOSIS.—Rostrum not reaching as far as distal end of antennular peduncle, faintly sinuous dorsally with 13–18 teeth, including 3 or 4 on carapace posterior to orbital margin, unarmed near apex, armed ventrally with 0–3 teeth. Suborbital angle obscure; pterygostomial margin rounded. Posterior margin of telson convex, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not reaching as far as distal margin of basal segment of antennular peduncle. First pereopod with carpus rather deeply excavate for reception of chela. Third pereopod with dactyl nearly 4 times as long as wide. Epipods well developed on 1st and 2nd pereopods, greatly reduced on 3rd, rudimentary on 4th. Eggs fairly large, 0.8–0.9 mm in major diameter. Maximum postorbital carapace length probably less than 3 mm.

RANGE.—Apparently known only from the type locality.

### 31. *Caridina rouxi* De Man, 1915

*Caridina rouxi* De Man, 1915:387, pl. 27: figs. 1-11 [type locality: Bouganville Mountains on the north coast of New Guinea at about 141°E].

DIAGNOSIS.—Rostrum not overreaching 2nd segment of antennular peduncle, dorsal margin nearly horizontal, armed with 13-18 teeth, including 2-4 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 3-8 teeth. Suborbital angle barely discernible, almost completely fused with antennal spine; pterygostomial margin rounded. Telson with posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not reaching level of distal margin of basal segment of antennular peduncle. First pereopod with fingers longer than palm of chela, carpus about twice as long as wide, very feebly excavate distally. Third pereopod with dactyl less than 4 times as long as wide. Eggs large, 1.15 mm in major diameter. Maximum postorbital carapace length probably about 4 mm.

RANGE.—Known only from the type locality.

### 32. *Caridina sarasinorum* Schenkel, 1902

*Caridina sarasinorum* Schenkel, 1902:492, pl. 8: figs. 2a-e, 4a [type locality: Danau Poso, Sulawesi (Celebes), Indonesia].

*Caridina Sarasinorum*.—Bouvier, 1925:168, figs. 356-359.

DIAGNOSIS.—Rostrum falling short of or slightly overreaching distal end of antennal scale, slightly ascendant anteriorly, armed dorsally with 12-19 teeth on posterior  $\frac{3}{4}$ , including 3-7 on carapace posterior to orbital margin, unarmed on anterior  $\frac{1}{4}$ , armed ventrally with 8-17 teeth. Suborbital angle distinct but not prominent; pterygostomial margin rounded but not broadly so. Telson with sublateral pair of posterior spines longer than intermediate pairs. Stylocerite reaching nearly as far as distal margin of basal segment of antennular peduncle. First pereopod with fingers shorter than palm of chela, carpus about twice as long as wide, not excavate distally. Epipod on 1st pereopod only. Major diameter of eggs 0.60 mm. Maximum postorbital carapace length about 3.8 mm.

RANGE.—Known only from the type locality.

### \*33. *Caridina serratiostris* De Man, 1892

FIGURE 11

*Caridina serratiostris* De Man, 1892:382, pl. 23: figs. 28-28e [type locality: "Bangkalan" and "Bonea" rivers, Selajar, Indonesia].—Bouvier, 1925:218, figs. 480-486.—Kubo, 1938:92, fig. 21.—Holthuis, 1965:25, fig. 8.

*Caridina serratiostris* var. *celebensis* De Man, 1892:385, pl. 23: figs. 28f-h [type locality: river at Palopo, Luwu, Sulawesi (Celebes), Indonesia].

DIAGNOSIS.—Rostrum (Figure 11a) not reaching as far as distal end of antennular peduncle, dorsal margin nearly horizontal, armed virtually to apex with 16-33 teeth, including 5-13 on carapace posterior to orbital margin, armed ventrally with 3-7 teeth. Suborbital angle not prominent but distinct from antennal spine; pterygostomial margin rounded. Telson

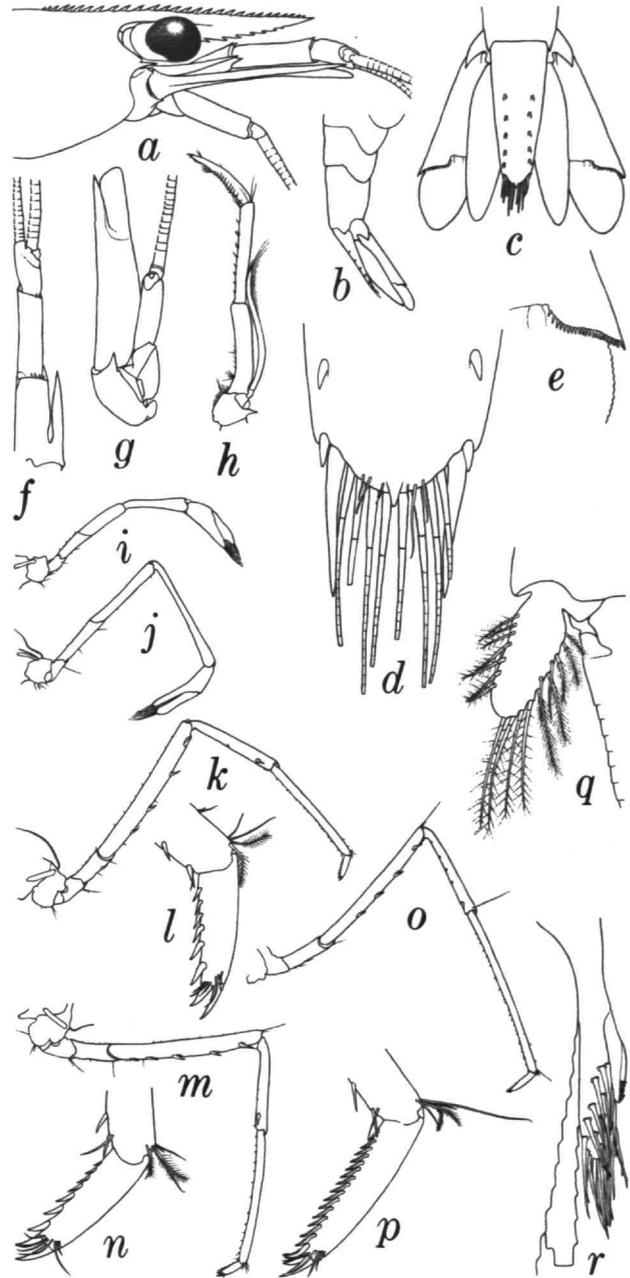


FIGURE 11.—*Caridina serratiostris*, male with carapace length of 2.7 mm from Malaga River, Leyte, 30 July 1909: a, anterior carapace and appendages, lateral aspect; b, posterior abdomen; c, tail fan, dorsal aspect; d, posterior margin of telson; e, diaeresis of exopod of right uropod; f, right antennule, dorsal aspect; g, right antenna, ventral aspect; h, right 3rd maxilliped; i, right 1st pereopod; j, right 2nd pereopod; k, right 3rd pereopod; l, same, dactyl; m, right 4th pereopod; n, same, dactyl; o, right 5th pereopod; p, same, dactyl; q, endopod of right 1st pleopod; r, right appendix masculina and appendix interna.

(Figure 11*c,d*) with posteromedian projection elevated above true posterior margin, sublateral pair of posterior spines shorter than intermediate setae. Stylocerite (Figure 11*f*) overreaching distal margin of basal segment of antennular peduncle. First pereopod (Figure 11*i*) with fingers longer than palm of chela, carpus more than 4 times as long as wide, not deeply excavate distally. Third pereopod (Figure 11*k,l*) with dactyl fully 4 times as long as wide. Epipods on all but 5th pereopod. Eggs small, major diameter about 0.35 mm. Maximum postorbital carapace length little more than 5 mm.

**MATERIAL.**—PHILIPPINES. Palawig River, Port San Vicente, Luzon [18°28'N, 122°09'E], 14 Nov 1908, seine: 1 ovig. female [5.0].—"Batangas" River, Batangas, Luzon [13°45'N, 121°03'E], 7 Jun 1908, 15' seine: 1 ovig. female [3.4].—Calawagan River, Mindoro [13°25'N, 120°28'E], 11 Dec 1908 (1500), 16' seine: 2 females [2.8, 3.8], 1 ovig. [3.8].—Malaga River, Hinunangan Bay, Leyte [10°24'N, 125°12'E], 30 Jul 1909: 149 males [1.9–3.4] 94 females [2.5–5.2], 83 ovig. [3.2–5.2].—Zamboanga Canal, Mindanao [6°54'N, 122°04'E] 8 Oct 1909, 25' seine: 1 ovig. female [5.1].

**RANGE.**—Madagascar, Seychelles, and Mauritius to Okinawa, northeastern Australia, and the Fiji Islands.

#### 34. *Caridina spinata* Woltereck, 1937

*Caridina spinata* Woltereck, 1937a:221, figs. 1, 3; pls. 3, 6 [type locality: Danau Towuti and Danau Matana, Sulawesi (Celebes), Indonesia]; 1937b:302, fig. 8.

**DIAGNOSIS.**—Rostrum overreaching antennular peduncle, dorsal margin slightly upcurved anteriorly, armed with 16–23 teeth, including 3 on carapace posterior to orbital margin and 1 or 2 subapical, armed ventrally with 5–10 teeth. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not overreaching distal margin of basal segment of antennular peduncle. First pereopod with fingers longer than palm of chela, carpus 4 or 5 times as long as wide. Epipods lacking from all pereopods. Eggs rather large, major diameter 0.70–0.77 mm. Maximum postorbital carapace length probably about 3 or 4 mm.

**RANGE.**—Known only from lakes in central Sulawesi (Celebes), Indonesia.

#### 35. *Caridina sundanella* Holthuis, 1978

*Caridina sundanella* Holthuis, 1978a:32, figs. 11, 12 [type locality: "Waikamburu" Brook, 4 km north of Waimangura, western Sumba, Indonesia, about 250 m above sea level].

**DIAGNOSIS.**—Rostrum reaching little if at all beyond 2nd segment of antennular peduncle, straight or curved slightly ventrad, armed dorsally over most of length with 19–26 close-set denticles, including 3 or 4 on carapace posterior to orbital margin, armed ventrally with 6–8 teeth. Suborbital angle distinct, blunt, subacute; pterygostomian margin rounded. Telson with small posteromedian projection, sublateral pair of posterior spines no longer than intermediate pairs.

Stylocerite not nearly reaching level of distal margin of basal segment of antennular peduncle. First pereopod with fingers longer than palm of chela, carpus twice as long as wide, excavated distally for reception of chela. Third pereopod with dactyl more than twice as long as wide. Epipods on all but 5th pereopod. Maximum postorbital carapace length 9 mm.

**RANGE.**—Known only from the type locality on Sumba, Lesser Sunda Islands, Indonesia.

#### 36. *Caridina tenuirostris* Woltereck, 1937

*Caridina tenuirostris* Woltereck, 1937a:224, figs. 1, 8; pls. 3, 6 [type locality: Danau Towuti near Lingkona, Sulawesi (Celebes), Indonesia]; 1937b:309, fig. 12.

**DIAGNOSIS.**—Rostrum overreaching antennular scale, dorsal margin slightly concave, armed on posterior  $\frac{1}{2}$  with 11–17 teeth, including 1 or 2 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 12–15 teeth. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not overreaching distal margin of basal segment of antennular peduncle. First pereopod with carpus less than twice as long as wide. Epipod on 1st pereopod only. Eggs fairly large, major diameter 0.72 mm. Maximum postorbital carapace length probably little more than 3 mm.

**RANGE.**—Known only from the type locality.

#### 37. *Caridina timorensis* De Man, 1893

*Caridina timorensis* De Man, 1893:300, pl. 8: fig. 6 [type locality: Lake Nefko, east of Kuoang, S. Timor, Indonesia].—Bouvier, 1925:189, figs. 394–397.

**DIAGNOSIS.**—Rostrum reaching to or slightly beyond distal margin of basal segment of antennular peduncle, dorsal margin nearly horizontal, armed with 1–5 irregularly spaced teeth, none postorbital or subapical, armed ventrally with 3–5 teeth. Suborbital angle obscure but not fused with antennal spine; pterygostomian margin broadly rounded. Sublateral pair of posterior spines of telson slightly longer than intermediate pairs. Stylocerite not nearly reaching level of distal margin of basal segment of antennular peduncle. First pereopod with fingers little longer than palm of chela, carpus  $1\frac{1}{2}$  times as long as wide, rather deeply excavate distally for reception of chela. Epipods on all but 5th pereopod. Eggs large, major diameter 1.2 mm. Maximum postorbital carapace length probably less than 4 mm.

**RANGE.**—Known only from the type locality.

#### 38. *Caridina towutensis* Woltereck, 1937

*Caridina Towutensis* Woltereck, 1937a:220, figs. 1, 2; pls. 3, 6 [type locality: south end of Danau Towuti, Sulawesi (Celebes), Indonesia].  
*Caridina towutensis.*—Woltereck, 1937b:301, fig. 7.

**DIAGNOSIS.**—Rostrum not reaching as far as distal end of antennular peduncle, dorsal margin slightly convex, especially in posterior  $\frac{1}{2}$ , armed with 14–22 teeth becoming widely

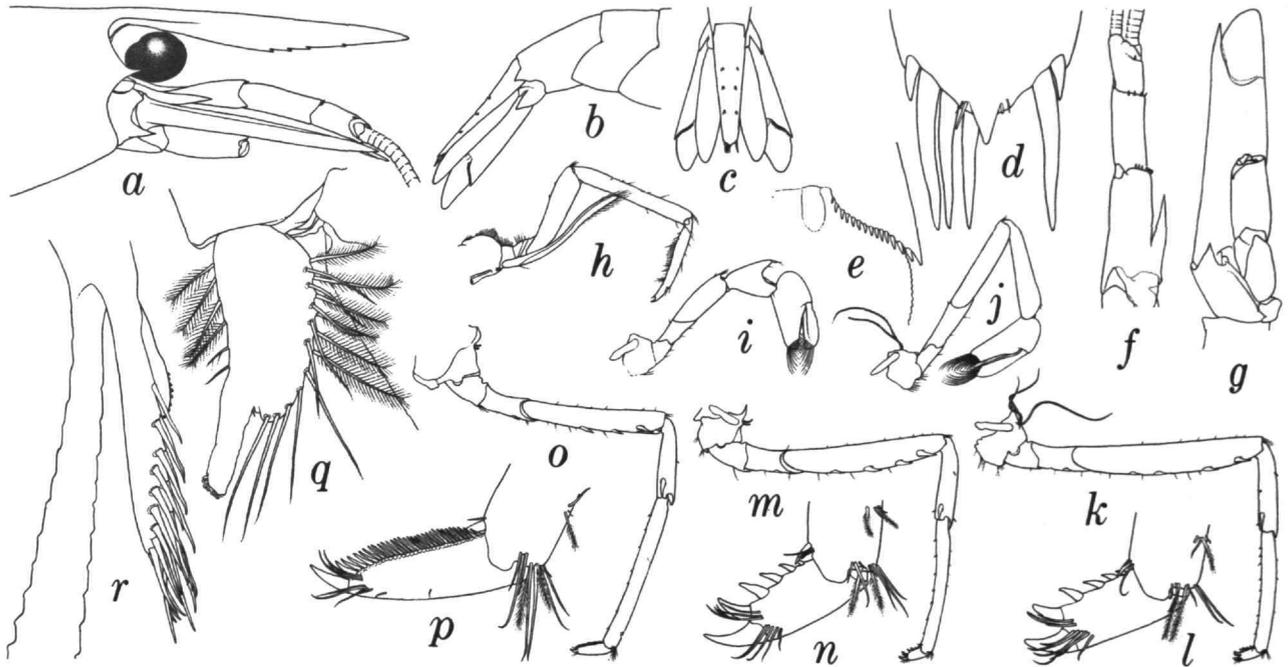


FIGURE 12.—*Caridina villadolodi*, male with carapace length of 3.7 mm from Calawagan River, Mindoro: *a*, anterior carapace and appendages, lateral aspect; *b*, posterior abdomen; *c*, tail fan, dorsal aspect; *d*, posterior margin of telson; *e*, diaeresis of exopod of right uropod; *f*, right antennule, dorsal aspect; *g*, right antenna, ventral aspect; *h*, right 3rd maxilliped; *i*, right 1st pereopod; *j*, right 2nd pereopod; *k*, right 3rd pereopod; *l*, same, dactyl; *m*, right 4th pereopod; *n*, same, dactyl; *o*, right 5th pereopod; *p*, same, dactyl; *q*, endopod of right 1st pleopod; *r*, right appendix masculina and appendix interna.

spaced anteriorly, including about 4 on carapace posterior to orbital margin, without subapical teeth, armed ventrally with 0–5 teeth. Telson without posteromedian projection, sublateral pair of posterior spines longer than intermediate pairs. Stylocerite not overreaching distal margin of basal segment of antennular peduncle. First pereopod with fingers nearly twice as long as palm of chela, carpus about 6 times as long as wide. Epipods lacking from all pereopods. Maximum postorbital carapace length 3 or 4 mm.

RANGE.—Known only from the type locality.

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

*Caridina typus* H. Milne Edwards, 1837:363 [type locality unknown]; 1840, pl. 25bis: figs. 4, 5.—Holthuis, 1965:10, fig. 3.

DIAGNOSIS.—Rostrum not overreaching antennular peduncle, dorsal margin convex, especially near apex, unarmed, armed ventrally with 1–6 teeth. Suborbital angle indistinguishably fused with antennal spine; pterygostomian margin subrectangular.

Telson without prominent posteromedian projection but with strong posterolateral one, sublateral pair of posterior spines slightly shorter than seta-like intermediate pairs. Stylocerite not

nearly reaching level of distal margin of basal segment of antennular peduncle. First pereopod with fingers shorter than palm of chela, carpus about  $1\frac{1}{2}$  times as long as wide, deeply excavate distally for reception of chela. Third pereopod with dactyl about 3 times as long as wide. Epipods on all but 5th pereopod. Eggs small, major diameter about 0.4 mm. Maximum postorbital carapace length about 8 mm.

RANGE.—Eastern Africa to Japan and Polynesia. (In the Smithsonian collections is a lot consisting of two males and two females collected in March, 1976, by Martha McCullough, from streams on Napo Point, near Moron, Bataan, Luzon, Philippines, that I identify with this species.)

### \*40. *Caridina villadolodi* Blanco, 1939

FIGURE 12

*Caridina villadolodi* Blanco, 1939:389, pl. 1 [type locality: Laoag River, Laoag, Province of Ilocos Norte, Luzon, Philippines].

DIAGNOSIS.—Rostrum (Figure 12*a*) extending nearly to or slightly beyond distal end of antennal scale, trending slightly ventrad anteriorly, unarmed dorsally, armed ventrally with 1–7 inconspicuous teeth. Suborbital angle completely and indistinguishably fused with antennal spine; pterygostomian margin