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FRESHWATER SHRIMPS FROM VENEZUELA I: SEVEN NEW SPECIES OF PALAEMONINAE (CRUSTACEA: DECAPODA: PALAEMONIDAE)

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Abstract.—Seven new species of palaemonid shrimps are described: *Macrobrachium reyesi, Macrobrachium pectinatum, Macrobrachium atabapense, Macrobrachium rodriguezi, Macrobrachium pumilum, Macrobrachium dierythrum,* and *Palaemonetes (Palaemonetes) mercedae.* All the specimens were collected in Venezuela. Details of living color patterns, fecundity, and variation are provided. The new species are compared with previously described, and morphologically related, South American species.

Resumen.—Se describen siete especies de camarones palaemónidos nuevos para la ciencia: *Macrobrachium reyesi, Macrobrachium pectinatum, Macrobrachium atabapense, Macrobrachium rodriguezi, Macrobrachium pumilum, Macrobrachium dierythrum,* and *Palaemonetes (Palaemonetes) mercedae.* Todos los especímenes fueron colectados en Venezuela. Se dan detalles del patrón de coloración en vivo, de la fecundidad, y de la variación morfológica. Se hacen comparaciones con especies previamente descritas y en especial con las especies suramericanas consideradas más relacionadas morfológicamente.

The decapod fauna of part of South America is relatively well known (Hulbert et al. 1981). The revision of Holthuis (1952) remains the most comprehensive taxonomic work treating the palaemonid shrimps. However, some geographical areas have not been extensively studied because of the inaccessibility of many parts of the continent, and the few available collections. Some of the poorer known regions are the Orinoco and Amazon basins, where recently several new species of palaemonids were found (Kensley and Walker 1982, Rodriguez 1982, Pereira 1985). While making a survey of the freshwater shrimps of Venezuela the author found seven undescribed species of palaemonid shrimps, six belonging to the genus *Macrobrachium* and one to the genus *Palaemonetes.* The purpose of the present paper is to present descriptions of these species. The following abbreviations are used: cl., for carapace length; tl., for total length; MBUCV, Museum of Biology Universidad Central de Venezuela; and USNM, National Museum of Natural History, Smithsonian Institution, U.S.A.

Macrobrachium Bate, 1868
Macrobrachium reyesi, new species
Figs. 1, 6C

Holotype.—Male MBUCV (XI-1707), 44 mm tl.; 10.3 mm cl. Paratypes 18 males MBUCV (XI-1706), 3 males and 3 females (USNM 228619). Collected 16 Jan 1982 by Guido Pereira and Matias Reyes.

Type locality.—Quebrada (stream) Corral de Piedra. El Limón, Maracay, Edo. Aragua, Venezuela, 10°15'N, 67°35'W.

Etymology.—The species is dedicated to Matias Reyes who first collected specimens of this species in 1974, kindly gave me the sample, and helped me in the field.

Additional material.—8 specimens, MBUCV (XI-1216), Bocono River, between Barrancas and Portuguesa, Edo. Trujillo, Venezuela. 9°5'N, 70°10'W, Nov 1974;

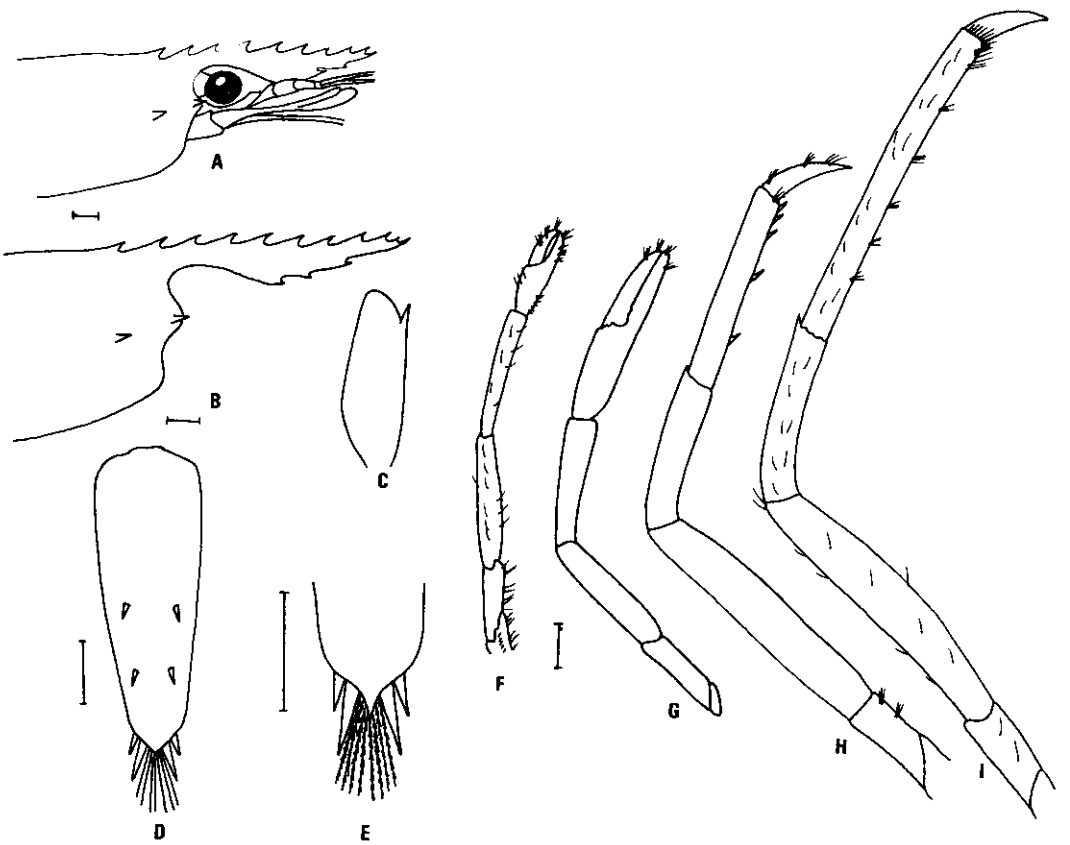

Fig. 1. *Macrobrachium reyesi,* new species. A, Cephalic part of cephalothorax; B, Same in detail; C, Scaphocerite; D, Telson; E, Posterior part of telson; F, First pereiopod; G, Second pereiopod; H, Third pereiopod; I, Fifth pereiopod. All from paratypic male. Scale = 1 mm.

coll. F. Mago.—5 specimens, MBUCV (XI-1331), pond in the road between Guanare and Guanarito, Edo. Portuguesa, Venezuela, 8°50'N, 69°10'W, May 1981; coll. D. Taphorn and J. Reid.—2 specimens, MBUCV (XI-1615), Stream Grande, Cojedes River system, Edo. Yaracuy, Venezuela, 10°5'N, 68°45'W, May 1978; coll. F. Mago.—3 specimens, MBUCV (XI-1630), Stream Corral de Piedra, El Limón, Maracay, Edo. Aragua, Venezuela, 10°15'N, 67°35'W, 1974; coll. M. Reyes.—4 specimens, MBUCV (XI-1781), Stream Grande, Cojedes River system, Edo. Portuguesa, Venezuela, 9°50'W, 68°45'W, 1978; coll. F. Mago.—25 specimens, MBUCV (XI-1708), Stream Corral de Piedra, El Limon, Maracay, Edo. Aragua, Venezuela, 10°15'N, 67°35'W, Jan 1982; coll. G. Pereira and M. Reyes.

Description of holotype.—Rostrum straight with tip slightly pointing upward, apex reaching slightly beyond distal end of scaphocerite; upper border bearing 9 (6 to 9 paratypes) regularly distributed teeth; 2 of which behind posterior margin of orbit; small subapical tooth frequently present; lower margin with 3 (3 to 4 paratypes) teeth. Carapace smooth. Scaphocerite 2.7 times longer than wide. Abdomen smooth, posteroventral angle of fifth pleuron acute. Sixth abdominal segment 1.3 times length of fifth, 0.4 times that of telson. Telson with 2 pairs

of dorsal spines, situated at ½ and ¾ of length from base; posterior margin, tapering abruptly to median apex, bearing 2 pairs of lateral spines, inner of which overreaching median apex, and 8 plumose setae between inner spines. First pereiopods smooth and slender, with tip of dactyl overreaching scaphocerite; palm cylindrical in cross section, thickest at midlength, and 0.9 times as long as dactyl; carpus 3.2 times length of palm, subequal to merus. Second pair of pereiopods slender, smooth, equal in size, and overreaching distal border of scaphocerite by ½ length of palm; fingers smooth, closing over entire length; proximal tooth on opposable margin of each; palm cylindrical in cross section, 2.4 times longer than wide, 0.75 times length of dactyl; carpus 1.3 (1.2–1.5 paratypes) times length of palm, subequal to merus; ischium smooth. Third pair of pereiopods reaching distal border of scaphocerite; propodus with longitudinal row of 5 spines on inner margin, 2.2 times length of dactyl, 1.3 times that of carpus. Fifth pair of pereiopods reaching distal border of scaphocerite; propodus, with longitudinal row of 4 (3–5 paratypes) spines on inner margin, 4.0 times length of dactyl, 2.0 times that of carpus.

Size.—Largest male measures 38.6 mm tl. and 10.3 mm cl. Largest female 35 mm tl. and 9.0 mm cl.

Fecundity.—One ovigerous female, 32.0 mm tl. and 8.5 mm cl. with 22 oval eggs, 2.2–1.5 mm diameter.

Larval development.—Abbreviated (Pereira, in prep).

Color.—Translucent in life.

Remarks.—This species is similar to *M. jelskii* (Miers) from which it can be distinguished by the shape of rostrum: it is relatively shorter, and straight in *M. reyesi,* the apex overreaching the scaphocerite, while *M. jelskii* has the rostrum slightly arcuate over the eye, overreaching the scaphocerite by about ⅛ of its length; a diagnostic feature of this species is the short length of the second pair of legs overreaching the scaphocerite by half the length of the palm, while in other American species, at least by the entire palm.

Macrobrachium pectinatum, new species
Figs. 2, 3, 6B

Holotype.—Male MBUCV (XI-1759) 46.8 mm tl. and 9.3 mm cl. Paratypes, 2 males and 2 females MBUCV (XI-1760), 1 male and 2 females (USNM 228620) collected 17 April 1982 by Guido Pereira and Ramiro Ruyero.

Type locality.—Atabapo River, Sta. Cruz, Territorio Federal Amazonas, Venezuela 3°20′N, 67°29′W.

Etymology.—The specific name is derived from the Latin word *pecten,* a comb, to note the pectinate appearance of the cutting edges of fingers.

Description of holotype.—Rostrum straight with anterior ⅓ curved upwards, and distal ¼ overreaching distal border of scaphocerite; upper border bearing 8 teeth, 6 of them regularly distributed along posterior half, 2 basal ones located behind posterior margin of orbit; anterior half unarmed except for 2 small subapical teeth; lower margin with 7 (6–8 paratypes) teeth. Carapace smooth. Scaphocerite 2.3 times longer than wide. Abdomen smooth, posteroventral angle of fifth pleuron acute. Sixth abdominal segment 1.4 times length of fifth, 0.8 times length of telson. Telson with 2 pairs of dorsal spines, situated near ½ and ¾ its length from base; posterior margin tapering abruptly to median apex, bearing 2 pairs of lateral spines, inner of which overreaching median apex, and 8 plumose setae between inner spines. First pereiopods smooth and slender, reaching distal ⅓ of scaphocerite; palm cylindrical, thickest at midlength, 0.8 times length of dactyl; carpus 4.1 times length of palm, 1.2 times length of merus, 3.5 times length of dactyl; fingers gaping when closed; cutting edge bearing single series of strong hairs, giving pectinate appearance. Second pair of pereiopods smooth and subequal in size, overreaching

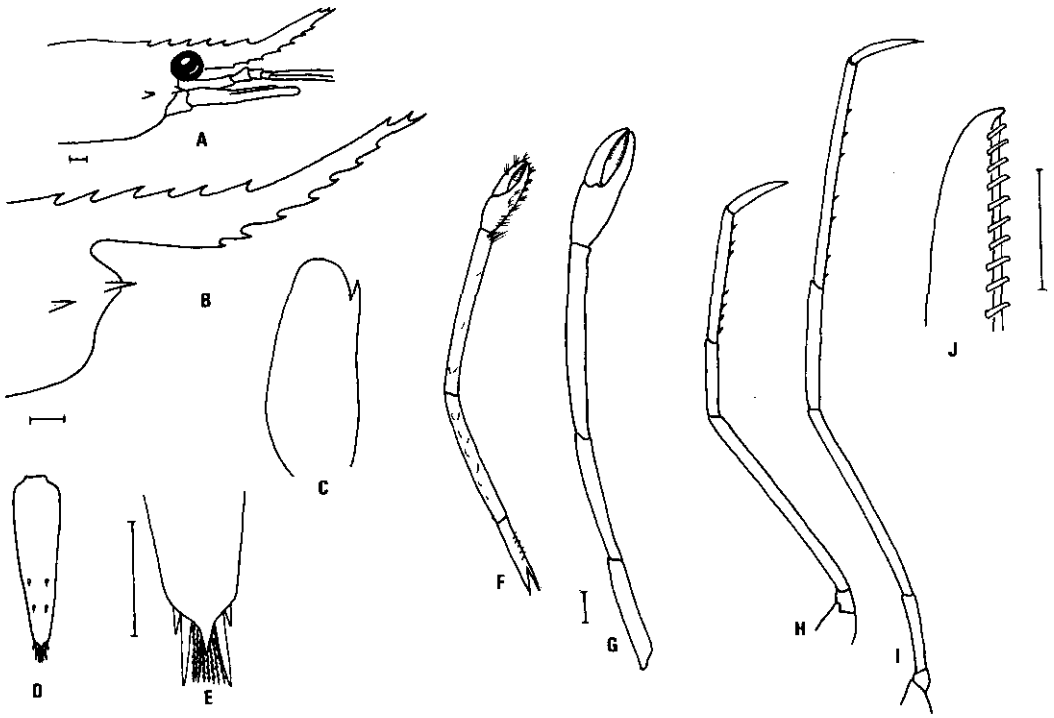

Fig. 2. *Macrobrachium pectinatum,* new species. A, Cephalic part of cephalothorax; B, Same in detail; C, Scaphocerite; D, Telson; E, Posterior part of telson; F, First pereiopod; G, Second pereiopod; H, Third pereiopod; I, Fifth pereiopod; J, Detail of dactyl of second pereiopod. All from paratypic male. Scale = 1 mm.

distal border of scaphocerite by entire palm; fingers gaping when closed, with cutting edges bearing single row of strong hairs giving pectinate appearance; palm cylindrical in cross section, 1.6 times longer than wide, same length as dactyl; carpus 3.0 times length of palm, 1.6 times length of merus, 2.8 times length of dactyl. Third pair of pereiopods overreaching distal border of scaphocerite by ⅓ of propodus; propodus with row of 8 (7–9 paratypes) spines longitudinally on inner margin, 2.1 times length of dactyl, 1.8 times length of carpus. Fifth pair of pereiopods overreaching distal border of scaphocerite by entire propodus; propodus, with longitudinal row of 8 (7–9 paratypes) spines on inner margin, 3.0 times length of dactyl, 1.8 times length of carpus.

Size.—Largest male 33.9 mm tl. and 9.3 mm cl. Largest female 44.0 mm tl. and 10.7 mm cl.

Fecundity.—One ovigerous female, 42.0 mm tl. and 9.9 mm cl. with 24 oval eggs, 2.3–1.5 mm diameter.

Color.—Body ground color pink, with some darker zones on base of rostrum, on posterolateral and posterodorsal surfaces of cephalothorax. Abdomen striped with very dark, almost black, bands at junction of segments. Telson with narrow longitudinal dorsal band; uropods with darker zone proximally.

Remarks.—This species is similar to *M. jelskii* (Miers) and *M. reyesi,* from which it can be distinguished by the gaping fingers of the chela, and the rostral shape, which is distally curved upwards in *M. pectinatum,* while straight in *M. reyesi*; the proximal half of the rostrum is curved over the eyes in *M. jelskii* while straight in *M. pectinatum*; finally there is one tooth behind the margin of the orbit in *M. jelskii,* while *M. pectin-*

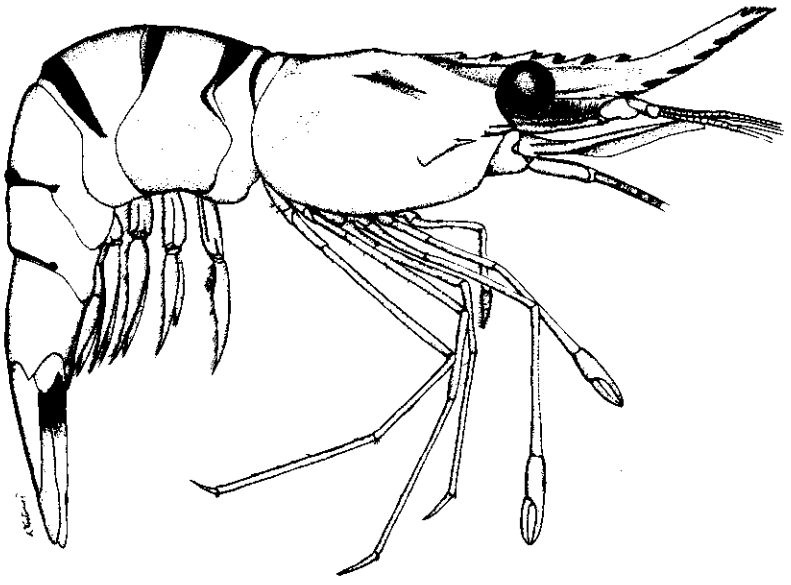

Fig. 3. *Macrobrachium pectinatum,* new species. Color pattern, lateral view of paratypic male.

atum usually has two teeth behind the margin of the orbit. Diagnostic features of this species are, additional to the gaping fingers, the walking legs being unusually long, and overreaching the distal border of the scaphocerite by the propodus.

Macrobrachium atabapense, new species
Figs. 4, 5, 6A

Holotype.—Male MBUCV (XI-1781) 36.6 mm tl. and 11.0 mm cl. Paratypes: 6 males MBUCV (XI-1761), 4 males (USNM 228618) collected 17 April 1982 by Guido Pereira and Ramiro Ruyero at type locality. 2 males MBUCV (XI-1715), collected 16 Jan 1979 by Kate Clark, Temi River at Yavita, 31 Km NE of Maroa, Territorio Federal Amazonas, Venezuela 3°0′N, 67°0′W.

Type locality.—Atabapo River, Sta. Cruz, Territorio Federal Amazonas, Venezuela 3°20′N, 67°29′W.

Etymology.—The specific name *atabapense* is derived from the name of the Atabapo River.

Description of holotype.—Rostrum straight, with apex reaching slightly beyond distal border of scaphocerite; upper border bearing 9 (9–11 paratypes) regularly distributed teeth, 2 of which behind posterior margin of orbit; lower margin with 3 (2–3 paratypes) teeth. Carapace smooth. Scaphocerite 3 times longer than wide. Abdomen smooth, posteroventral angle of fifth pleuron acute. Sixth abdominal segment 1.4 times length of fifth, 0.75 times length of telson. Telson with 2 pairs of dorsal spines, situated near ½ and ¾ its length from base, posterior margin tapering abruptly to median apex, bearing 2 pairs of lateral spines, inner of which overreaching median apex, and 9 (9–10 paratypes) plumose setae, between inner spines. First pereiopods smooth and slender, overreaching scaphocerite by distal part of merus; palm cylindrical in cross section, thickest at midlength, 1.7 times length of dactyl; carpus 3.4 times length of palm, 1.4 times length of merus. Second pair of pereiopods spiny, subequal in shape, about same length, but one more massive; overreaching distal border of scaphocerite by distal end of merus; fingers short and strong, gaping when closed; both fingers with conspicuous teeth; dactyl with 2 teeth, larger

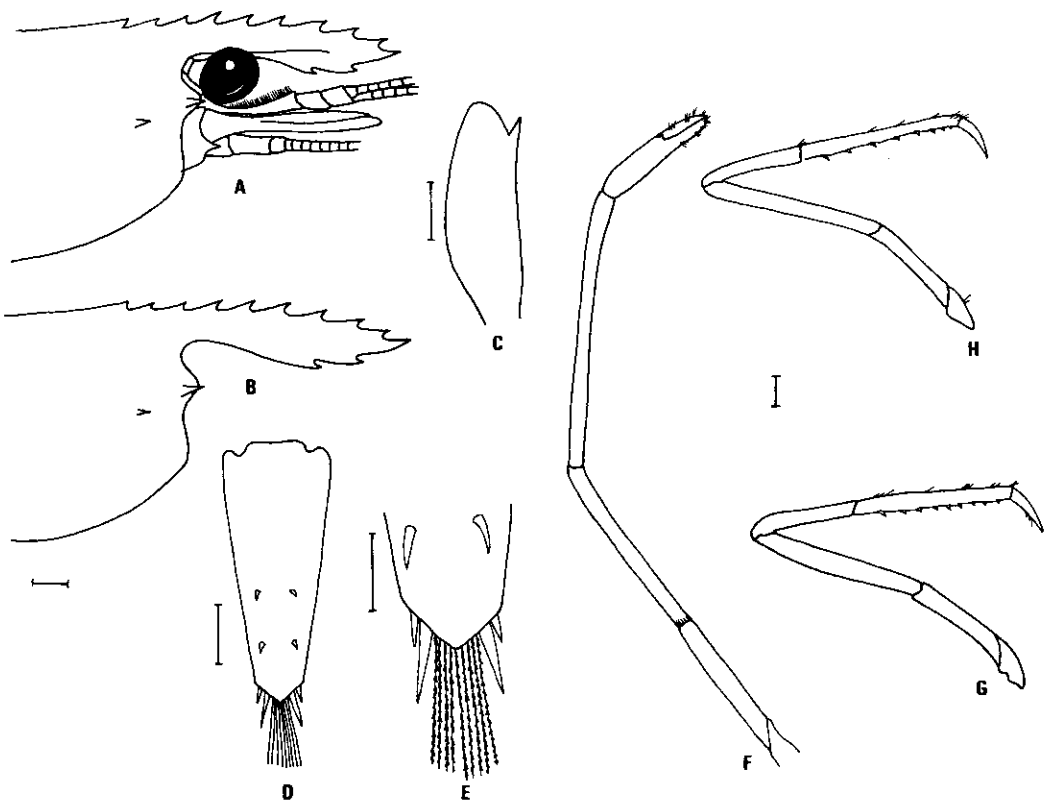

Fig. 4. *Macrobrachium atabapense,* new species. A, Cephalic part of cephalothorax; B, Same in detail; C, Scaphocerite; D, Telson; E, Posterior part of telson; F, First pereiopod; G, Third pereiopod; H, Fifth pereiopod. All from paratypic male. Scale = 1 mm.

situated at distal end of proximal third and smaller just proximal to it, remainder of cutting edge smooth. Fixed finger with strong tooth at end of proximal ¼ and series of 3 (2–4 paratypes) smaller teeth more proximal; no tubercles present on fingers; palm cylindrical in cross section, 3.0 times longer than wide, widest distally, with numerous longitudinal rows of short spines, those on lower surfaces larger than elsewhere, 1.9 times length of dactyl; carpus 0.9 times length of palm, 1.8 times length of merus; spines scarce distally on ventral margin, rest of merus and ischium smooth. Third pair of pereiopods overreaching distal border of scaphocerite by ⅛ of propodus; propodus with longitudinal row of 8 (8–9 paratypes) spines on inner margin, 3.0 times length of dactyl, 1.5 times length of carpus. Fifth pair of pereiopods reaching distal border of scaphocerite; propodus, with longitudinal row of 9 (8–10 paratypes) spines on inner margins; 3.8 times length of dactyl, 1.8 times length of carpus.

Size.—Largest male 31.4 mm tl. and 12.0 mm cl. Largest female 26.0 mm tl. and 8.0 mm cl. Ovigerous females not available.

Color.—Ground color violaceous with salmon pink longitudinal median stripe, extending from rostrum to 6th abdominal segment.

Remarks.—This species is similar to *M. quelchi* (De Man). The main differences are: the second leg is relatively shorter in *M. atabapense,* overreaching scaphocerite by distal end of carpus, while by ⅝ of the car-

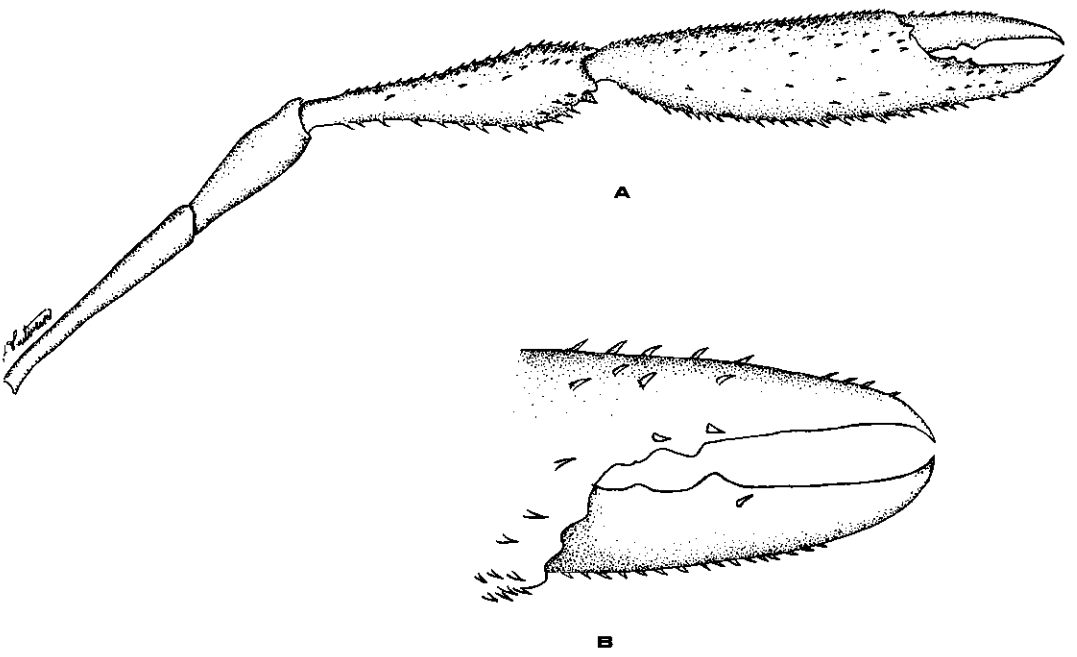

Fig. 5. *Macrobrachium atabapense*, new species. A, Second pereiopod; B, Distal part of chela of second pereiopod. From a paratypic male.

pus in *M. quelchi*. Also, the ratio carpus: palm is 0.9, and carpus: merus 1.8 in *M. atabapense*, while 0.75, and 1.2 respectively in *M. quelchi*; the second legs in *M. atabapense* have more numerous and more prominent spines than has *M. quelchi*. Finally, they have very different color patterns (Holthuis 1952, Pereira 1985).

Macrobrachium dierythrum, new species
Figs. 7, 8, 12

Holotype.—Male USNM 228323, 18.6 mm tl. and 4.2 mm cl. Paratypes: 3 males, 17 females USNM 228324, collected 15 Jan 1984, by Guido Pereira and Ernesto Panier.

Type locality.—Aguaro River, Paso Garzerito, Edo. Guarico, Venezuela, 8°10′N, 66°25′W.

Etymology.—The specific name is derived from the Greek word *dierythros* meaning variegated with red, to call attention to the red color of shrimp.

Additional material.—2 males, and 470 females MBUCV (XI-2207); locality, date, and collectors same as above.

Description of holotype.—Rostrum straight, with tip reaching distal border of scaphocerite; upper border bearing 9 (8–10 paratypes) regularly distributed teeth, 2 of which behind posterior margin of orbit, third just over or anterior to it; lower margin with 4 (3–5 paratypes) teeth. Carapace smooth. Scaphocerite 3.1 times longer than wide. Abdomen smooth, posteroventral angle of fifth pleuron acute. Sixth abdominal segment 1.5 times length of fifth, 0.6 that of telson. Telson with 2 pairs of dorsal spines, situated at ½ and ¼ its length from base; posterior margin acute, tapering abruptly to median apex, bearing 2 pairs of lateral spines, inner of which overreaching median apex, and 4 plumose setae between inner spines. First pereiopods slender, overreaching distal border of scaphocerite by dactyl; palm cylindrical in cross section, 1.5 times

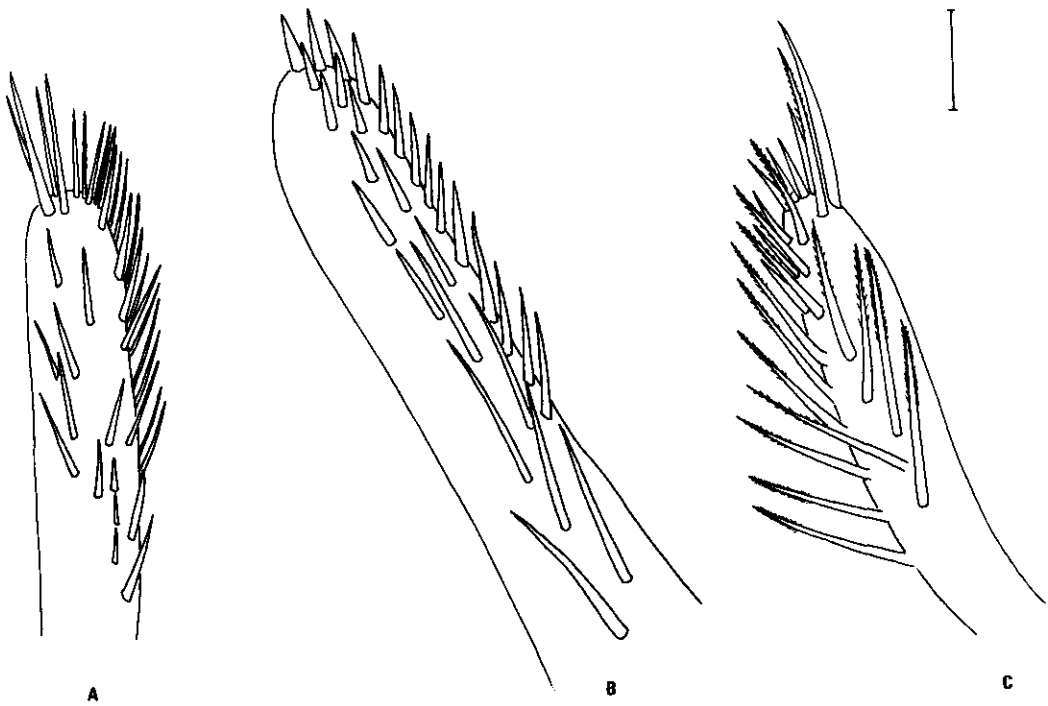

Fig. 6. Appendices masculinae. A, *M. atabapense*, new species; B, *M. pectinatum*, new species; C, *M. reyesi*, new species. From paratypes. Scale = 100 M.

length of dactyl; carpus 2.2 times length of palm, 1.1 that of merus. Second pair of pereiopods similar in shape and size, overreaching distal border of scaphocerite by ⅔ of carpus; fingers straight, both with conspicuous teeth; dactyl with 2 teeth at ⅛ and ⅝ its length from base, fixed finger with 2 teeth just proximal to each tooth on dactyl; fingers without tubercles; palm cylindrical in cross section, 3.1 times longer than wide, with several longitudinal rows of spines, 1.5 times length of dactyl; carpus 0.8 times length of palm, 0.9 times length of merus, spinulation pattern as on palm; merus with three rows of ventral spines; ischium smooth, except for scattered ventral spines. Third pair of pereiopods not reaching distal border of scaphocerite; propodus with longitudinal row of 7 spines on inner margin, 2.2 times length of dactyl, 1.9 times length of carpus. Fifth pair of pereiopods not reaching distal border of scaphocerite; propodus with longitudinal row of 7 spines on inner margin; 2.4 times length of dactyl, 2.2 times length of carpus.

Size.—Largest male 18.4 mm tl. and 4.2 mm cl. Largest female 26.0 mm tl. and 6.4 mm cl.

Fecundity.—No ovigerous female available.

Color.—Background color red, with numerous irregular pink spots over body. Antennal and antennular flagella deep blue. Second leg overall red, some clear pink areas, fingers white. Pereiopods 3–5 pink, with 7 transverse red stripes, 1 basally on ischium, 2 on merus, one basally and other at midlength, 2 on carpus, one basally and other at midlength, 2 or 1 on propodus, on second and third ¼ length from base.

Remarks.—Except for the report of Rodriguez (1982), there are no records of *Mac-*

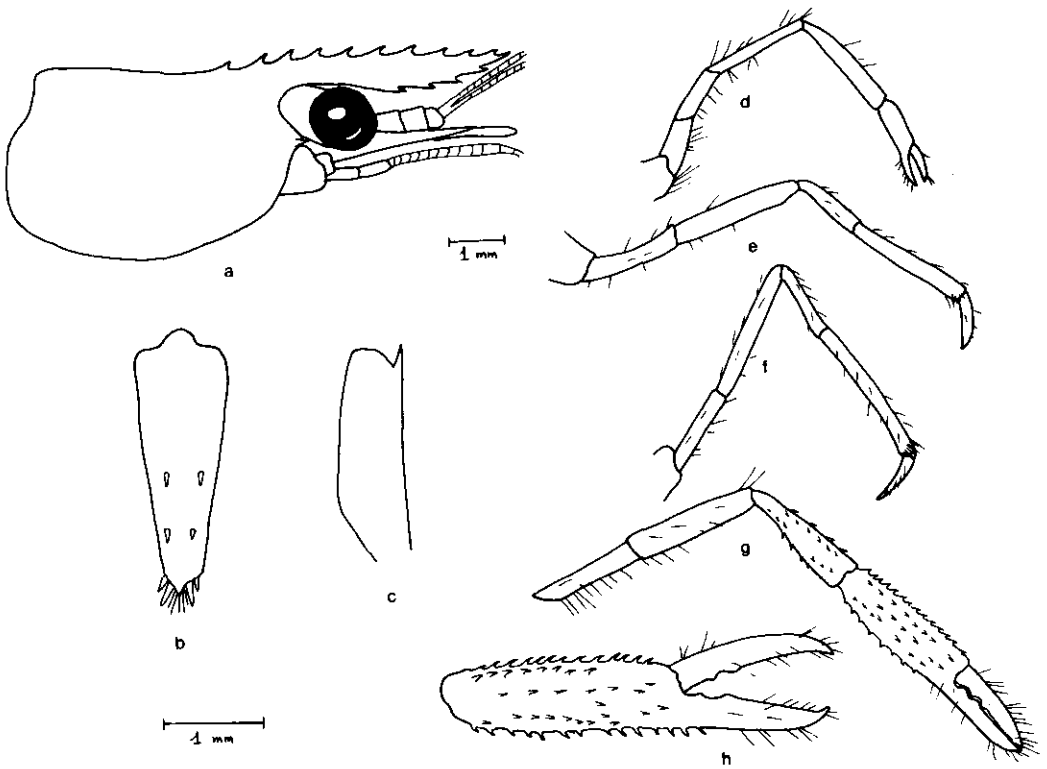

Fig. 7. *M. dierythrum,* new species. A, Cephalic part of cephalothorax; B, Telson; C, Scaphocerite; D, First pereiopod; E, Third pereiopod; F, Fifth pereiopod; G, Second pereiopod; H, Second pereiopod detail. All from paratypic male.

robrachium of such small size in America, probably because rivers in the Guayanas region have not been sampled adequately. Comparisons are made in Table 1.

Macrobrachium rodriguezi, new species
Figs. 10, 12

Holotype.—Male USNM 228321, 16.2 mm tl. and 3.4 mm cl. Paratypes: 25 males USNM 228322, collected 13 Jan 1984 by Guido Pereira and Ernesto Panier.

Type locality.—Caris River, El Tigre, Edo. Anzoategui, Venezuela, 8°45'N, 64°50'W.

Etymology.—The species is named in honor of Dr. Gilberto Rodriguez, pioneer of carcinological studies in Venezuela.

Additional material.—10 males, 18 females MBUCV (XI-2200), locality, date, and collectors same as above.

Description of holotype.—Rostrum arched, with apex reaching third antennular segment; upper border bearing 8 (8–9 paratypes) regularly distributed teeth, one of which situated behind margin of orbit, second just over or behind it; lower margin with 3 teeth. Carapace smooth. Scaphocerite 2.5 times longer than wide. Abdomen smooth, posteroventral angle of fifth pleuron acute. Sixth abdominal segment 1.4 times length of fifth, 0.8 times length of telson. Telson with 2 pairs of dorsal spines, situated at ⅓ and ⅔ of its length from base; posterior margin tapering abruptly to median apex, bearing 2 pairs of lateral spines, inner of which overreaching median apex, with 7 (6–9 paratypes) plumose setae between inner spines. First pereiopods slender, overreaching distal border of scapho-

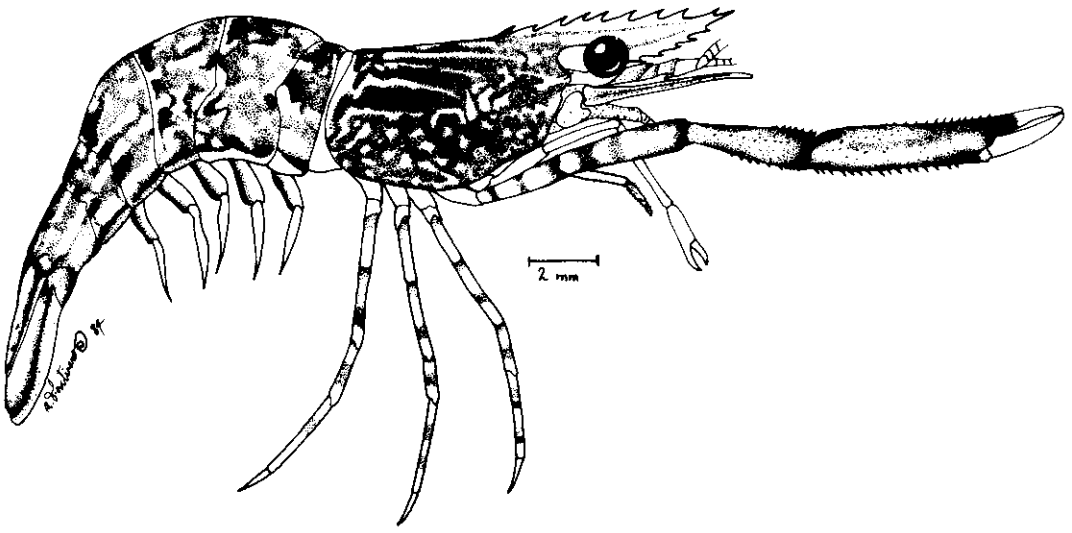

Fig. 8. *M. dierythrum* color pattern, lateral view of paratypic male.

cerite by dactyl; palm cylindrical in cross section, 1.6 times length of dactyl; carpus 1.7 times length of palm, same length as merus. Second pair of pereiopods smooth, equal in shape and length, overreaching anterior border of scaphocerite by palm; fingers straight, without conspicuous teeth; palm cylindrical in cross section, 2.9 times longer than wide, 1.4 times length of dactyl; carpus 0.8 times length of palm, and 0.8 times length of merus. Third pair of pereiopods reaching distal border of scaphocerite; propodus with longitudinal row of 7 spines on inner margin; 2.0 times length of dactyl, 1.7 times length of carpus. Fifth pair of pereiopods overreaching distal border of scaphocerite by ½ of dactyl; propodus with longitudinal row of 7 spines on inner margin, 3.2 times length of dactyl, 2.2 times length of carpus.

Size.—Largest male 16.2 mm tl. and 3.4 mm cl. Largest female 12.4 mm tl. and 3.0 mm cl.

Fecundity.—Ovigerous females with 10–22 large and oval eggs, average largest diameter 1.3 mm.

Color.—Background color either brown or blue, with longitudinal middorsal cream stripe, from tip of rostrum to sixth abdominal segment.

Remarks.—Comparisons are made in Table 1.

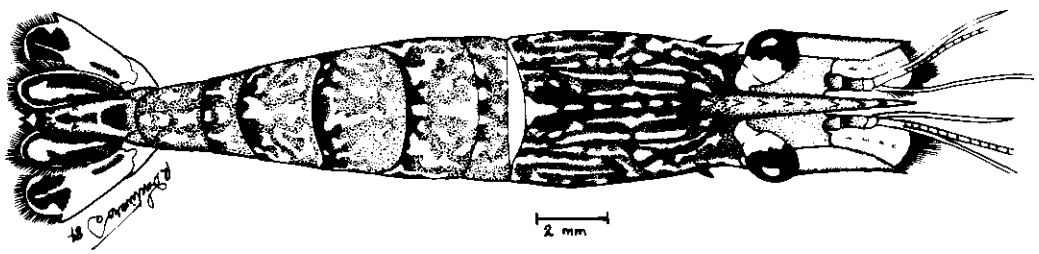

Fig. 9. *M. dierythrum* color pattern, dorsal view of paratypic male.

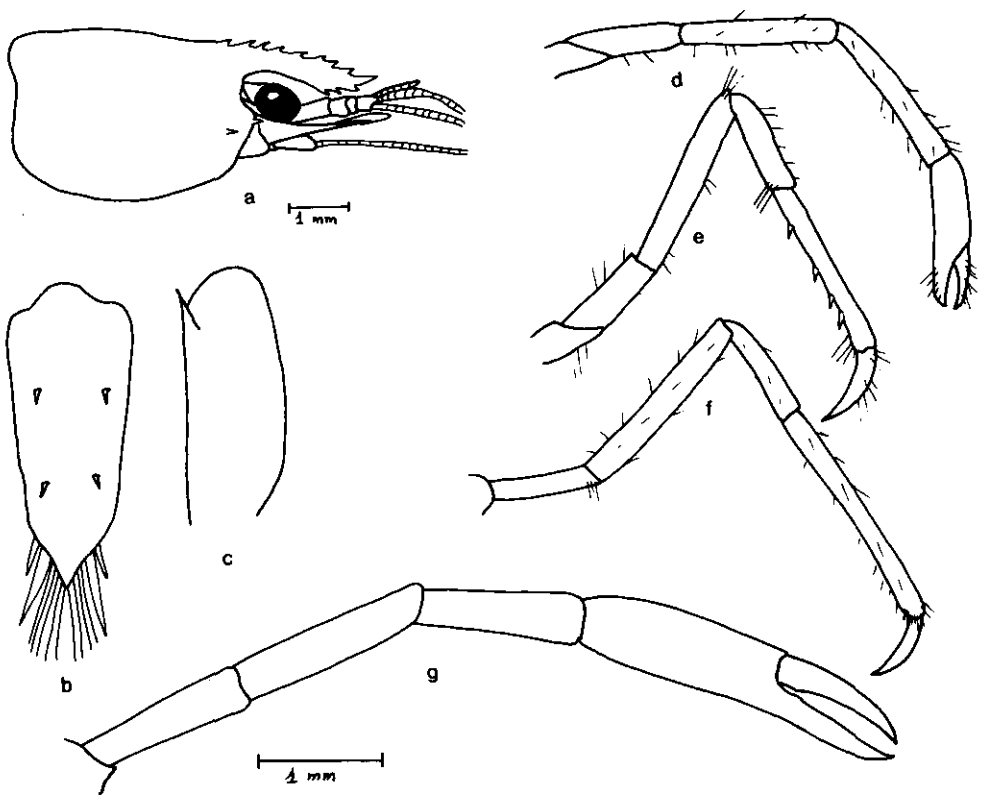

Fig. 10. *M. rodriguezi,* new species. A, Cephalic part of cephalothorax; B, Telson; C, Scaphocerite; D, First pereiopod; E, Third pereiopod; F, Fifth pereiopod; G, Second pereiopod. All from paratypic male.

Macrobrachium pumilum, new species
Figs. 11, 12

Holotype.—Male USNM 228319, 10.5 mm tl. and 3.2 mm cl. Paratypes: 10 males, 16 females USNM 228320, collected 15 Jan 1984 by Guido Pereira and Ernesto Panier.

Type locality.—Aguaro River, Cachimbo pass, Edo. Guarico, Venezuela, 8°10′N, 66°35′W.

Etymology.—The specific name is derived from the Latin word *pumilus,* meaning little, referring to the small size of the shrimp.

Additional material.—2 males, 250 females MBUCV (XI-2204), locality, date, and collectors same as above.

Description of holotype.—Rostrum strongly arched over eyes with apex reaching distal border of scaphocerite; upper border bearing 8 (7–9 paratypes) regularly distributed teeth, 2 of which situated behind posterior margin of orbit; lower margin with 1 (1–2 paratypes) tooth. Carapace smooth. Scaphocerite 3.1 times longer than wide. Abdomen smooth, posteroventral angle of fifth pleuron acute. Sixth abdominal segment 1.8 times length of fifth, 0.8 times length of telson. Telson with 2 pairs of dorsal spines, situated near ⅓ and ⅛ its length from base; posterior margin tapering abruptly to median apex, bearing 2 pairs of lateral spines, inner of which overreaching median apex, and 6 (6–8 paratypes) plumose setae, between inner spines. First pereiopods slender, overreaching distal border of scaphocerite by dactyl; palm cylindrical, 0.8 times length of dactyl; carpus 2.2 times length of palm, 0.9 times length of merus.

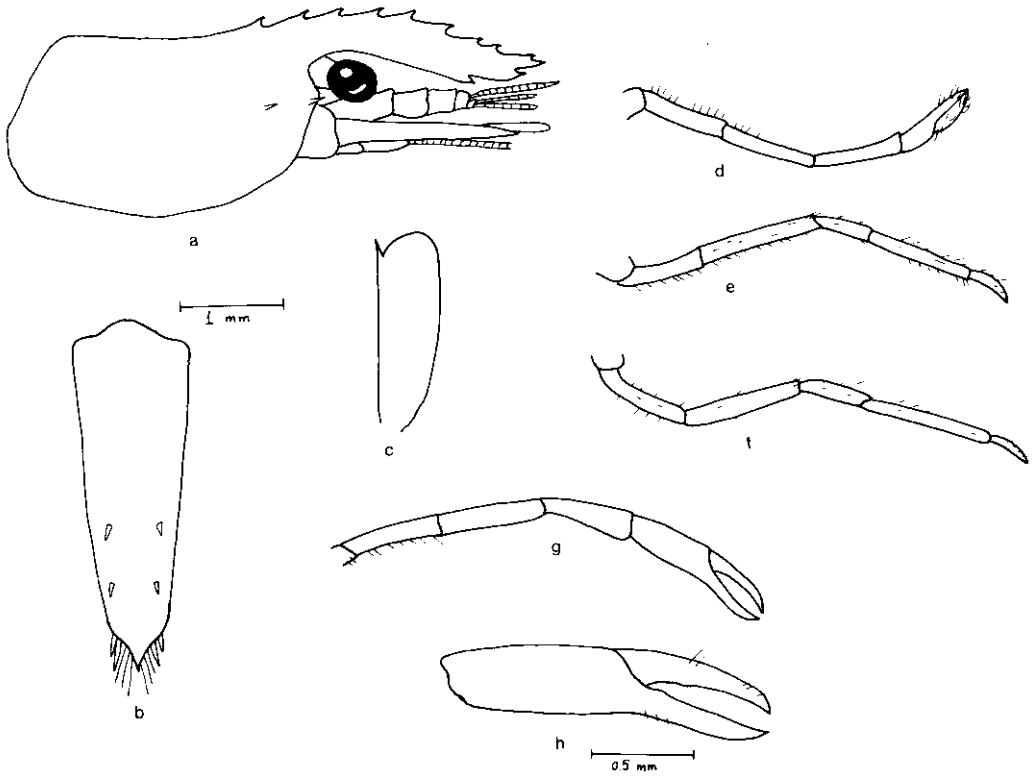

Fig. 11. *M. pumilum,* new species. A, Cephalic part of cephalothorax; B, Telson; C, Scaphocerite; D, First pereiopod; E, Third pereiopod; F, Fifth pereiopod; G, Second pereiopod; H, Detail of second pereiopod.

Second pair of pereiopods smooth, subequal in size, overreaching anterior border of scaphocerite by length of palm; fingers straight, without conspicuous teeth; palm cylindrical in cross section, 2.6 times longer than wide, 1.1 times length of dactyl; carpus 1.1 times length of palm, 0.8 length of merus. Third pair of pereiopods reaching ½ length of scaphocerite with dactyl; propodus with longitudinal row of 6 spines on inner margin, 1.9 times length of dactyl, 1.6 times length of carpus. Fifth pair of pereiopods reaching basal ¼ of scaphocerite; propodus with longitudinal row of 6 spines on inner margin, 2.6 times length of dactyl, 2.0 times length of carpus.

Size.—The largest male 10.5 mm tl. and 3.2 mm cl. Largest female 24.0 mm tl. and 5.2 mm cl.

Fecundity.—One ovigerous female, 16.4 mm tl. and 4.7 mm cl. with 12 oval eggs, 1.6 mm largest diameter.

Color.—Overall body lemon yellow in color.

Remarks.—The last three species are of very small size as compared to other South American species in the genus. Table 1 gives a summary of their most distinguishing features.

Palaemonetes Heller, 1869

Palaemonetes (Palaemonetes) mercedae, new species

Fig. 13

Holotype.—Male MBUCV (XI-1782) 3.2 mm cl. Paratypes 1 male and 1 female MBUCV (XI-1782 B), collected 18 April 1982 by Guido Pereira and Ramiro Ruyero.

Type locality.—Atabapo River at Cha-

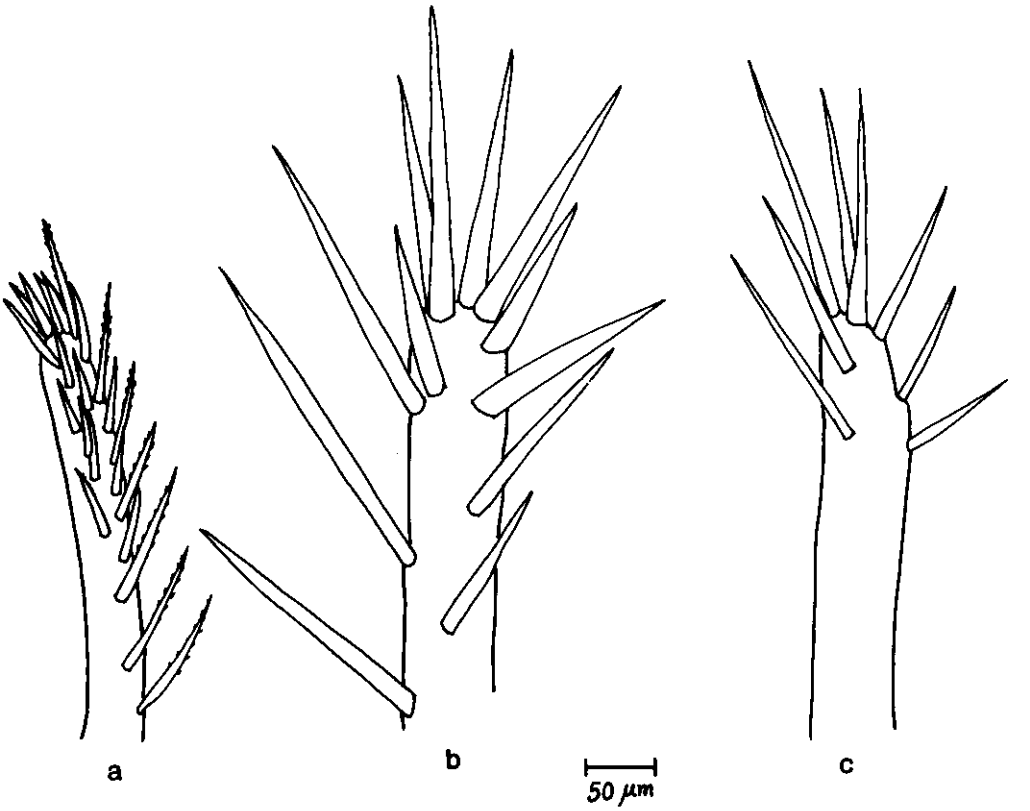

Fig. 12. Appendices masculinae. A, *M. rodriguezi,* new species; B, *M. pumilum,* new species; C, *M. dierythrum,* new species. All from paratypic males.

muchina, Territorio Federal Amazonas, Venezuela, 3°20′N, 67°29′W.

Etymology.—The species is dedicated to my wife Mercedes.

Additional material.—3 males, 17 females, USNM 228318, Departamento Ature, Puerto Ayacucho, Territorio Federal Amazonas, Venezuela, 5°35′N, 67°30′W, Dec 1984; coll. R. Vari.—4 males, 8 females USNM 228317, Departamento Río Negro, between San Carlos and Solano, Territorio Federal Amazonas, Venezuela, 1°56′N, 67°2′W, Dec 1984; coll. J. Fernandez, and O. Castillo.

Description of holotype.—Rostrum slender and straight, reaching distal end of scaphocerite; upper margin bearing 7 (6–7 paratypes) regularly distributed teeth, one of which placed behind orbit, and smaller than rest; lower margin with 2 teeth. Carapace smooth. Branchiostegal spine subequal in length to antennal spine, not reaching anterior border of carapace; branchiostegal groove distinct, extending from midway between branchiostegal and antennal spines. Abdomen smooth, pleura of fifth segment antero- and posteroventrally rounded. Sixth segment 1.6 times as long as fifth, 0.7 length of telson. Telson bearing 2 pairs of dorsolateral spines, at midlength and ⅔ its length from base; posterior margin rounded, ending in median point and bearing 2 pair of spines, neither overreaching tip of telson; with 12 (10–14 paratypes) plumose setae between inner spines. Eyes normal and well pigmented. Antennule with stylocerite sharp, reaching midlength of proximal segment of antennular peduncle;

Table 1.—Distinguishing features between *M. dierythrum*, *M. rodriguezi* and *M. pumilum*; number of postorbital teeth in parentheses; see additional color pattern in the descriptions.

Character	*M. dierythrum*	*M. rodriguezi*	*M. pumilum*
Rostrum	Straight, overreaching scaphocerite by apex	Arched over the eye, reaching distal antennular peduncle	Arched over the eye, overreaching scaphocerite by apex
Rostral formula	$\frac{8–9, (2)}{3–5}$	$\frac{8–9, (1–2)}{3–5}$	$\frac{7–9, (2)}{1–2}$
Second leg	Spiny, overreaching scaphocerite by ⅔ carpus. Palm 3.1 longer than wide, 1.5 length of dactyl	Smooth, overreaching scaphocerite by palm. Palm 2.9 longer than wide, 1.4 length of dactyl	Smooth, overreaching scaphocerite by palm. Palm 2.6 longer than wide, 1.1 length of dactyl
Appendix masculina	With 7 spines on distal ⅓	With 21 spines over its entire length	With 12 spines on distal ½

outer margin of basal segment straight with strong anterolateral spines almost reaching midlength of second segment; second segment about as broad as, but distinctly shorter than, third. Lateral antennal flagella with rami fused for 2 articles, free part of shorter ramus consisting of 7 articles. Scaphocerite 2.8 times as long as broad, with mesial margin convex, lateral margin straight, latter ending in distal spine overreached by lamella. Mouthparts typical of genus. First pereiopods reaching scaphocerite; palm cylindrical in cross section, widest at midlength; fingers slightly longer than palm; carpus 2.9 times as long as dactyl and merus slightly shorter than carpus. Second pereiopods relatively strong, overreaching scaphocerite by length of chela, fixed finger and dactyl each with 1 tooth on proximal third of cutting edge, and 1 less prominent posteriorly, rest of margin entire, palm cylindrical in cross section, 3.6 times longer than wide, 1.7 times as long as dactyl, 0.8 times length of carpus, slightly shorter than merus and same length as ischium. Third pereiopod overreaching scaphocerite by tip of dactyl; propodus 2.5 times as long as dactyl, 2 times length of carpus, same length of merus, 2 times length of ischium. Fifth pereiopods overreaching scaphocerite by length of dactyl; propodus 3.4 times as long as dactyl, 2 times length of carpus, 1.2 times length of merus, and 2.5 times length of ischium. Pleopods and uropods of usual shape, lateral ramus of uropods with movable spine between fixed distolateral tooth and margin of blade. Appendix masculina with 8 spines on distal ½; 4 apical spines aligned in transverse row, and 4 subapical spines in a single longitudinal row (see Flemming 1969 for terminology).

Size.—Male holotype tl. 13 mm; cl. 3.2 mm. Female tl. 15 mm; cl. 4.5 mm.

Fecundity.—Ovigerous females with 15–18 bright red spherical eggs, 1.0 mm in diameter.

Color.—Translucent in life.

Remarks.—This new species is similar to *P. ivonicus* Holthuis. I have compared my specimens with the holotype and paratypic females of the latter at the USNM. The main differences are: the chela of second leg in *P. mercedae* is relatively more robust, the ratio of dactyl : palm being 1:1.6 in *P. mercedae* and 1:1 in *P. ivonicus*. Another distinguishing feature is the shape of posterior margin of telson, which is rounded, with the median apex not overreached by the inner spines in the new species, while in *P. ivonicus* it is truncate and the apex is clearly overreached by the inner spines. There are 8–10 plumose setae on posterior margin of telson in the

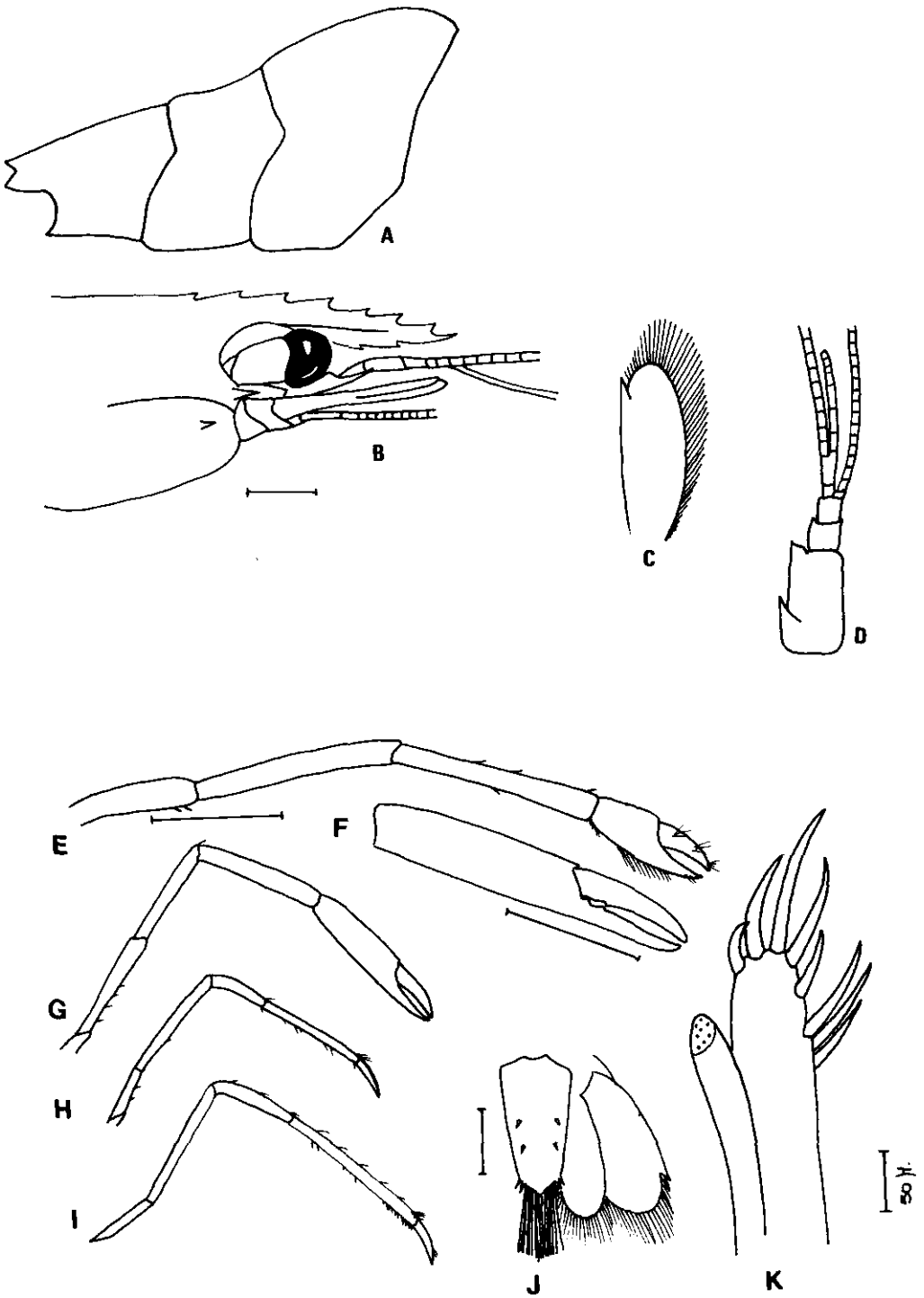

Fig. 13. *Palaemonetes* (*Palaemonetes*) *mercedae*, new species. A, 3–5 abdominal segments; B, Cephalic part of cephalothorax; C, Scaphocerite; D, Antennule; E, First pereiopod; F, Chela of second pereiopod; G, Second pereiopod; H, Third pereiopod; I, Fifth pereiopod; J, Telson and uropods; K, Appendices interna and masculina. All from a paratypic male. Scale = 1 mm.

new species, while there are only two in *P. ivonicus*. The most striking characteristic of this species is the short carpus of the second legs, which is shorter than or equal to that of chela. This character sharply separates the species from the previously known freshwater South American *Palaemonetes*. Strenth (1976) used the morphology of the upper antennular flagellum to separate marine and freshwater species occurring in North America. In this species the distal free portion of the shorter ramus in the lateral antennular flagellum is longer than the fused part, being similar in this feature to the group of South American freshwater species of *Palaemonetes* (*P. argentinus* Nobili, 1901; *P. carteri* Gordon, 1935; *P. ivonicus* Holthuis, 1950).

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