

Redescription of *Exciorolana armata* (Dana, 1853) and synonymy of *Cirolana argentina* Giambiagi, 1930 (Crustacea: Isopoda: Cirolanidae)

Virginia L. Ribetti and Daniel Roccatagliata*

Departamento de Biodiversidad y Biología Experimental, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria, C1428EHA, Buenos Aires, Argentina, e-mail: rocca@bg.fcen.uba.ar

Abstract.—*Exciorolana armata* (Dana, 1853) is redescribed on the basis of material collected from Puerto Quequén, Argentina, the type locality of *Cirolana argentina* Giambiagi, 1930. Based on this material, it is concluded that *C. argentina* is a junior synonym of *E. armata*. The distribution of *E. armata* is extended from Rio de Janeiro to Golfo San José (northern Patagonia). *Exciorolana armata* is most similar to the Chilean species *Exciorolana hirsuticauda* Menzies, 1962 and *Exciorolana monodi* Carvacho, 1977; a table comparing these three species is provided. The male second pleopod and pleotelson of *E. hirsuticauda* are illustrated.

The genus *Exciorolana* Richardson, 1912 contains 15 recognized species, five of which have been reported for the southern part of South America: *E. armata* (Dana, 1853) (Brazil, Uruguay, Argentina); *E. braziliensis* Richardson, 1912 (Pan-American distribution: Gulf of Mexico to Uruguay, Gulf of California to Chile); *E. chilensis* Richardson, 1912 (Chile); *E. hirsuticauda* Menzies, 1962 (Chile); and *E. monodi* Carvacho, 1977 (Chile) (Brusca et al. 1995, Cardoso & Defeo 2003). The species of *Exciorolana* are primarily sand beach dwellers (Bruce 1986). However, *E. chilensis* has been recorded at a depth of about 1250 m, although this may be an erroneous record or a misidentification.

Dana (1853) described *Cirolana armata* from Rio de Janeiro, but his description was not accurate enough to identify this species. Richardson (1912) transferred the species to the genus *Exciorolana*. Lemos de Castro & Brum (1969) redescribed *E. armata* and extended its distribution as

far south as Chapadmalal (about 25 km south of Mar del Plata, Argentina). A fair amount of ecological research has been done on this species (De Alava & Defeo 1991; Pagliosa Alves et al. 1998; Defeo et al. 1992, 1997; Souza & Gianuca 1995; Yannicelli & González 2003; Yannicelli et al. 2002, among others). Unfortunately, the type material of many of the isopods described by Dana is lost, and this seems to be the case with the type material of *E. armata*; apparently it was never deposited in the USNM (Marilyn Schotte, pers. comm.).

Giambiagi (1930) briefly described *Cirolana argentina* from specimens collected in Puerto Quequén, Buenos Aires Province. Since then, this species has been recorded from many beaches in Argentina (Penchaszadeh & Olivier 1975, Escofet 1977, Escofet et al. 1979, Darrigran & Rioja 1988, Dadon et al. 2001, among others). Brusca et al. (1995) included *C. argentina* in a world list of species of the genus *Cirolana*, but pointed out that this species “should perhaps be transferred to the genus *Exciorolana*”. Regrettably, the type material of *C. argentina* (30 speci-

* Corresponding author.

mens, Puerto Quequén, Jan 1922, MACN-In 13052) is lost. The files of the carcinological collection read "frasco vacío"; actually, the jar itself is missing from the shelves.

We have examined freshly collected material from the type locality of *C. argentina* (Puerto Quequén), as well as other specimens deposited in the Museo Argentino de Ciencias Naturales (MACN-In: 14184, 14246, 16331, 18241; see also Material and Methods). The last four lots were added to the invertebrate collection of the MACN between 1924 and 1928. Giambiagi (1930) did not mention these four lots in her paper but since she was a member of the MACN staff, there is no room for doubt that she examined this material at the time she was preparing her description. In fact, the labels of the lots MACN-In 14184 and 14246 read that the material was identified by Giambiagi. Additionally, we have studied many specimens collected in Brazil, Uruguay, and other localities in Argentina. The examination of all this material and comparison of descriptions of the two nominal species reveal that *C. argentina* is identical to *E. armata*.

In this paper, *E. armata*, considered a senior synonym of *C. argentina*, is redescribed from material collected from the type locality of *C. argentina*. A table is presented to show the differences between *E. armata* and the two most similar species, *E. hirsuticauda* and *E. monodi*, both from Chile.

Material and Methods

All the specimens were fixed in 5% formaldehyde seawater solution and subsequently preserved in 70% ethanol. Some specimens were stained with Chlorazole Black E® to facilitate the examination of feeble furrows and carinae on the specimens' surface. Appendages were mounted on slides, with glycerin as mounting medium, and examined under a light

microscope. All drawings were prepared with a camera lucida. For scanning electron micrographs the specimens were critical-point dried, coated with gold, and photographed under a SEM Phillips 515.

Abbreviations are: CP—circumplumose; PMS—plumose marginal setae; RS—robust seta/setae. For clarity, in the drawings setules of only one of these PMS are depicted. Total length of the specimens was taken from the tip of the rostrum to the end of the pleotelson.

In addition to the material of *E. armata*, the following specimens have been examined for comparative purposes: *Exciorolana hirsuticauda* Menzies, 1962. Chiloé Occidental, Ahuenco Chile, coll. A. Carvacho, Jan 1995: 8 adult females, 6 adult males (2 males dissected) (MACN-In 36240). *Exciorolana monodi* Carvacho, 1977. Chiloé Occidental, Río Lar, Chile, coll. A. Carvacho, Jan 1993: 1 adult male (dissected) (MACN-In 36241).

Exciorolana armata (Dana, 1853)

Restricted synonymy:

Cirolana armata Dana, 1853: 771–772, pl. 51, fig. 5a–e [type locality: Rio de Janeiro].

Exciorolana armata: Richardson, 1912: 201.—Lemos de Castro & Brum, 1969: 10–15, figs. 34–51.—Bruce, 1986: 41.—Brusca et al., 1995: 49.—Pires-Vanin, 1998: 610.—Loyola e Silva, 1999: 206–209, figs. 1–2.

Cirolana argentina: Giambiagi, 1930: 331–334, 12 figures [type locality: Puerto Quequén, Argentina] (Preprints were issued on December 24th, 1930, and this must be considered the year of publication of *C. argentina* according to article 21.8 of the ICZN). —Giambiagi, 1931: 327–328.—Brusca et al., 1995: 17.

Material examined.—BRAZIL: Praia Vermelha (near Paraty), Rio de Janeiro State, coll. S. Mazzucconi, 19 Nov 2000, 1 specimen (MACN-In 36214). Praia Santinho, Florianópolis, coll. D. Roccata-

- gliata & L. López Greco, 28 Oct 2004, 287 specimens (MACN-In 36215). Praia Santinho and Praia Inglesa, Ilha de Santa Catarina, Florianópolis, coll. A. Valverde, 28–29 Dec 1997, 88 specimens (MACN-In 36216).—URUGUAY: Barra del Chuy, Departamento de Rocha, coll. O. Defeo, date unknown, 30 specimens (MACN-In 36217). José Ignacio (near the lighthouse), Departamento de Maldonado, coll. D. Roccatagliata, 18 Sep 1998, 54 specimens (MACN-In 36218).—ARGENTINA: Buenos Aires Province.—Punta Indio, Río de la Plata Estuary, coll. V. Ribetti & J. Faivovich, 23 Aug 1997, 61 specimens (MACN-In 36219). San Clemente del Tuyú, coll. L. Fiorito, 1991, 5 specimens (MACN-In 36220). San Clemente del Tuyú, coll. D. Roccatagliata & J. R. Dadon, 28 Feb 1994, 55 specimens (MACN-In 36221). Las Toninas, coll. G. Chiappini & M. Salinas, 16 Oct 2002, 69 specimens (MACN-In 36222). From Santa Teresita to Valeria del Mar, coll. C. Castaños & J. R. Dadon, 30 Oct–5 Nov 1994, 33 specimens (MACN-In 36223). Costa del Este, coll. D. Roccatagliata & J. R. Dadon, 28 Feb 1994, 254 specimens (MACN-In 36224). Aguas Verdes, coll. G. Thompson, 2 Jan 2004, 5 specimens (MACN-In 36225). Aguas Verdes, coll. G. Thompson, 18 Mar 2004, 6 specimens (MACN-In 36226). La Lucila del Mar, coll. J. R. Dadon, 15 Jan 1996, 26 specimens (MACN-In 36227). La Lucila del Mar, coll. J. R. Dadon & M. Cosarinsky, 15 Oct 1997, 6 specimens (MACN-In 36228). La Lucila del Mar, coll. G. Chiappini & M. Salinas, 13 Oct 2002, 25 specimens (MACN-In 36229). Mar de Ajó, 16 Jan 1995, 11 specimens (MACN-In 36230). Punta Médanos, coll. J. R. Dadon & M. Cosarinsky, 15 Oct 1997, 11 specimens (MACN-In 36231). Cariló, coll. V. Ribetti, 6 Feb 1999, 1 specimen (MACN-In 36232). Mar Azul, ? Jan 1998, 13 specimens (MACN-In 36233). Puerto Quequén, coll. M. Doello Jurado, id. D. Giambiagi, 14 Jan 1924, 85 specimens (MACN-In 14184). Puerto Quequén, coll. I. Bernasconi, id. D. Giambiagi, 31 Mar 1924, 19 specimens (MACN-In 14246). Puerto Quequén, coll. M. Doello Jurado, Jan 1926, 412 specimens (MACN-In 16331). Puerto Quequén, “bought to J. F. Leonardis”, Dec 1928, 2109 specimens (MACN-In 18241 [under this number there is another vial with 459 specimens; its label says “18241 *Cirolana argentina* Giambiagi, Pto. Quequén, II-1928”]). Puerto Quequén, coll. V. Ribetti & J. Faivovich, 1 Nov 1997, 190 specimens (MACN-In 36234). Punta Negra (10 km south to Necochea), “bought to J. F. Leonardis”, 14 Feb 1929, 472 specimens (MACN-In 18241-1). Bahía San Blas, Isla del Jabalí, coll. L. López & A. Volpedo, 5 Sep 1997, 49 specimens (MACN-In 36235). Faro Segunda Barranca, Carmen de Patagones, coll. División Hidrografía, Faros y Balizas, 20 Aug 1930, 11 specimens (MACN-In 19165). Río Negro Province.—Pozo Salado (south to Viedma), coll. A. Bukstein, 12 Jan 1983, 100 specimens (MACN-In 36236). Las Grutas, San Antonio Oeste, coll. D. Roccatagliata, 24–27 Nov 1997, 68 specimens (MACN-In 36237). Las Grutas, San Antonio Oeste, coll. D. Roccatagliata, 26–27 Nov 2000, 18 specimens (MACN-In 36238). Chubut Province.—Bahía Fracasso, Golfo San José, Península Valdés, coll. F. Cremona, 15 Jan 2002, 54 specimens (MACN-In 36239).
- Redescription of the adult male.*—Based on 15 specimens collected in Puerto Quequén, Argentina, 1 Nov 1997 (MACN-In 36234).
- Size 4.7–7.5 mm (all the males from sample MACN-In 36234 were measured).
- Body length 2.26–2.44 times its greatest width (Fig. 1A). Surface smooth, in life translucent with brown, orange and white chromatophores. In ethanol, freshly preserved specimens keep only brown chromatophores but in older preserved specimens chromatophores are absent.

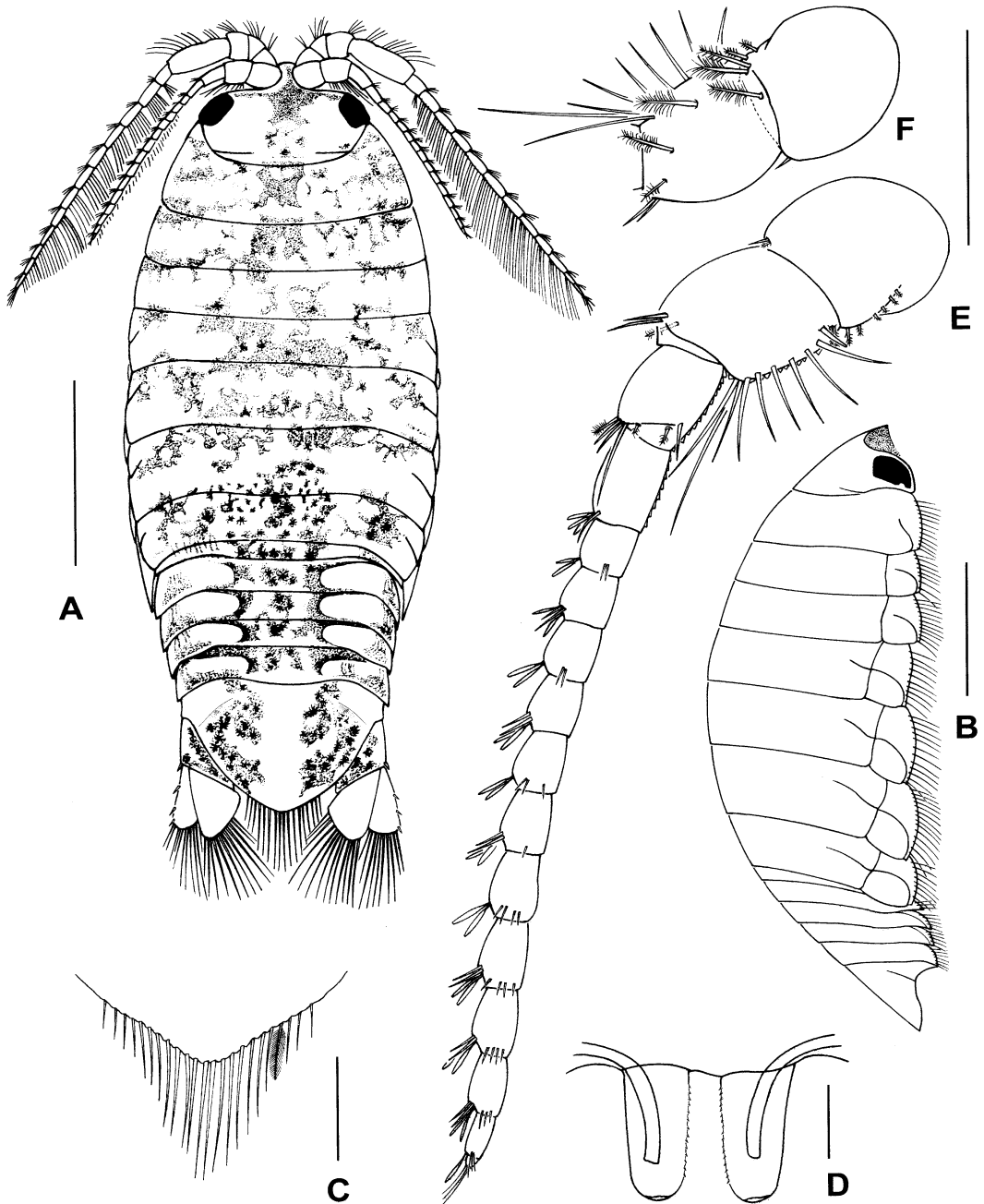


Fig. 1. *Excirrolana armata*. Adult male (MACN-In 36234-1): A, habitus, dorsal view. Adult male (MACN-In 36234-2): B, habitus, lateral view. Adult male (MACN-In 36234-3): C, pleotelson apex; D, genital papillae; E, antenna 1 (left) in dorsal view; F, antenna 1, first two articles in ventral view. Scale bars: A, B, 2 mm; C-F, 0.5 mm.

Cephalon (Fig. 1A, B) with a posterior submarginal furrow on each side indicating presence of a maxillipedal somite. Eyes brownish in ethanol, extending to

ventral surface of cephalon (Fig. 2A); ommatidia arranged in 10 rows of approximately 4-6 units each; posterior margin with a notch (Fig. 1B). Interocu-

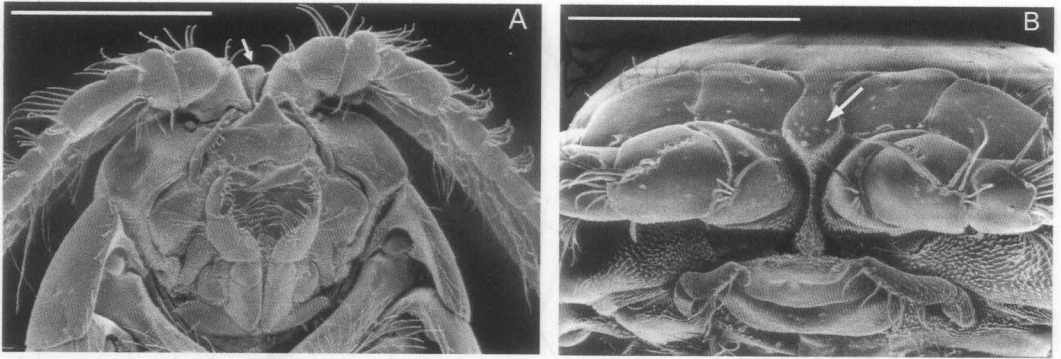


Fig. 2. *Exciorlana armata*. Adult male. SEM photographs of head. A, ventral view; B, frontal view. Arrows point to the rostrum. Scale bars: A, 1 mm; B, 0.5 mm.

lar width about 3 times the width of one eye in dorsal view (Fig. 1A). Frontal lamina extremely narrow (thread-like) in the middle and becoming gradually broader on both apices (Fig. 2B). Labrum, posterior margin slightly concave (Fig. 2A).

Pereon (Fig. 1A, B): Pereonites 1, 5 and 6 subequal in length and the longest, 5 and 6 subequal in width and the widest, ventro-lateral margins in line on pereonites 2–4, and stepped in pereonites 5–7; ventro-lateral margin of pereonite 1 and coxal plates 2–7 with marginal slender setae, and an oblique furrow (which continues upward for a short distance on pereonites 4–7). Coxal plates 5–7 slightly extended beyond posterior margin of segment.

Genital papillae (Fig. 1D) approximately twice as long as their width; medial margin serrate. One specimen shows 5 sperm bundles going through each papilla opening (Lemos de Castro & Brum 1969 described these sperm bundles as setae).

Pleon (Fig. 1A, B): Pleonites 1 and 2 completely and partially covered by coxal plates of pereonite 7, respectively. Pleonite 1 the shortest, pleonites 2–4 subequal in length and pleonite 5 the longest. All pleonites with marginal slender setae.

Pleotelson (Fig. 1A, C) wider than long, dorsal surface convex (without

depressions), ventral surface with a few proximal RS on each side (not drawn), posterior margin rounded with 20–26 PMS, medial setae about 4 times longer than marginal ones.

Antenna 1 (Fig. 1E, F) reaching the posterior margin of second pereonite when extended against the body. Peduncle of 3 articles. First article subequal to second, posterior margin with several CP setae, posterior distal angle with 3 CP setae on ventral surface (Fig. 1F), anterior distal angle with 2 minute setae (1 CP, 1 simple). Second article, posterior margin with 2 CP setae, 1 RS and 8–11 simple slender setae, anterior distal angle with 2 simple slender setae, ventral surface with 3 CP setae (Fig. 1F). Third article shorter and narrower than first two; with 3 CP setae and 3 or 4 simple slender setae distally. Flagellum 2.0–2.3 times as long as peduncle, with 11–19 articles, first article variable in length, first to antepenultimate articles with simple slender setae and 2 or 3 aesthetascs (occasionally 1 or 4 aesthetascs on a few articles; first article sometimes glabrous), penultimate article with simple slender setae and 1 aesthetasc, distal article with simple slender setae only.

Antenna 2 (Fig. 3A) extending well beyond third pereonite, highly setose. Peduncle of 4 articles; all with many simple slender setae and third and fourth

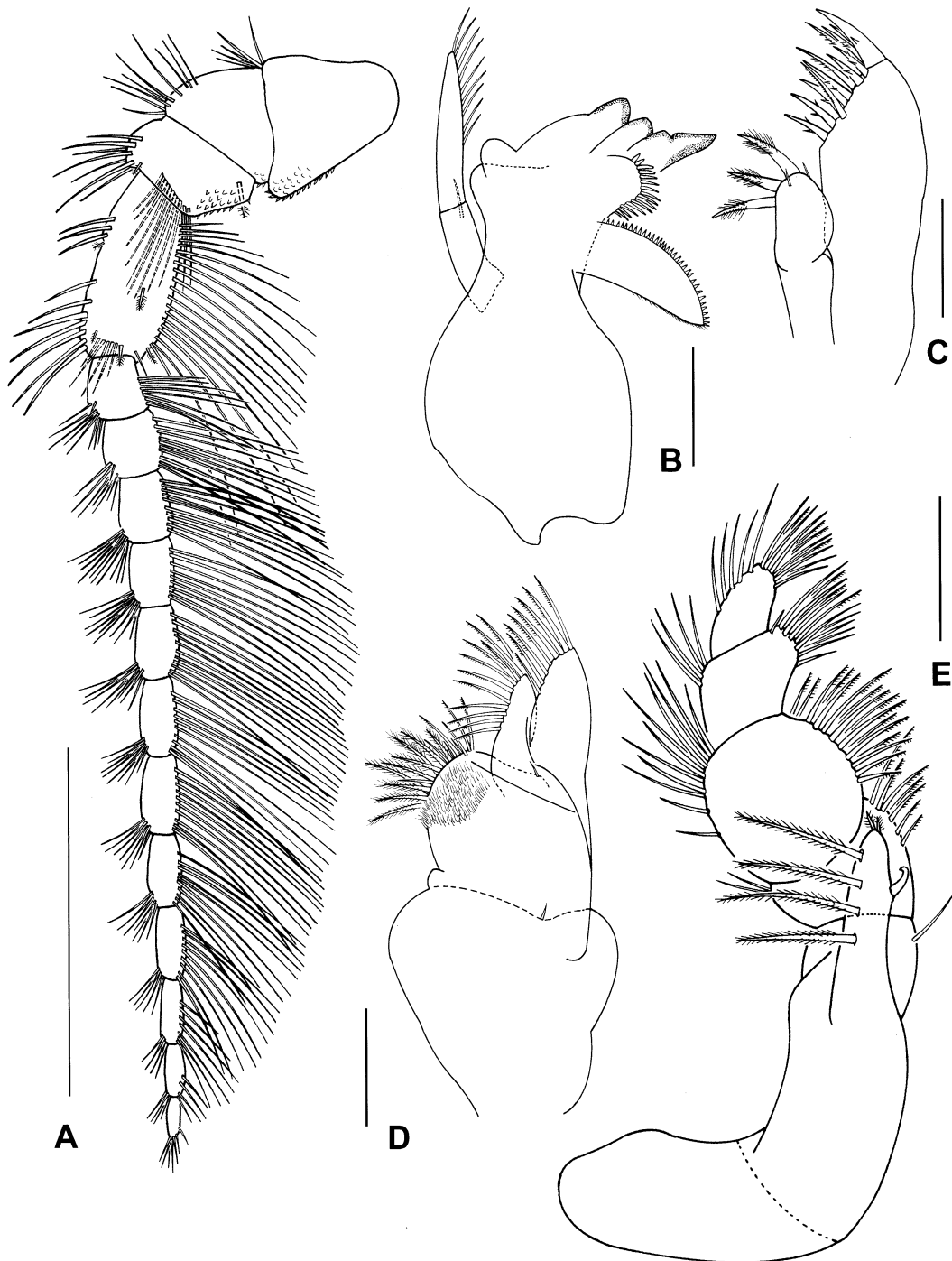


Fig. 3. *Excirolana armata*. Adult male (MACN-In 36234-3): A, antenna 2 (left) in dorsal view; B, mandible (left) in dorsal view; C, maxilla 1 (left) in ventral view; D, maxilla 2 (left) in ventral view; E, maxilliped (left) in dorsal view. Scale bars: A, 1 mm; B-E, 0.2 mm.

articles with 2 and 5 CP setae, respectively; first article subequal in length to second and third combined; fourth article the narrowest and longest. Flagellum of 12 articles; almost twice as long as peduncle; with simple slender setae on both margins, except last article with only a tuft of simple slender setae distally.

Mandible (Fig. 3B): Palp of 2 articles, with simple slender setae. Incisor process with 3 (right mandible) or 4 (left mandible) cups, spine row with 12–18 RS; molar process with 34–44 stout spines on the anterior margin.

Maxilla 1 (Fig. 3C): Medial lobe with 3 CP robust and 2 minute setae; lateral lobe with 12 setae (11 RS weakly serrated, 1 combed) and 1 slanted slender seta among them (not drawn).

Maxilla 2 (Fig. 3D): Medial lobe with several CP and comb slender setae; lateral lobes with 9–11 and 7–9 comb slender setae, respectively.

Maxilliped (Fig. 3E): Endite almost reaching distal margin of second palp article, with 3 or 4 long CP setae on dorsal surface, and 2 tiny CP setae distally. Palp, medial margin: first article with 1 simple slender seta, second and third articles with comb slender setae, fourth and fifth with both comb and simple slender setae; lateral margin: second to fifth articles with simple slender setae only.

Pereopods 1–3: Excepting dactylus, all remaining articles with conspicuous elongated simple slender setae.

Pereopod 1 (Fig. 4A): Basis with many simple slender setae on distal half, 1 CP seta on superior margin and a few ones on posterior surface (not drawn), and 1 short RS on infero-distal angle. Ischium slightly longer than width, superior margin produced into a large rounded lobe; with 1 small RS close to infero-distal angle, and long simple slender setae on the rounded lobe (only some drawn), on inferior margin and on anterior and posterior (not drawn) surfaces. Merus, supra-distal

angle produced and with simple slender setae (only some drawn); inferior margin with a row of 5 or 6 RS interrupted by 1 simple slender seta, and 2 small submarginal RS. Carpus, inferior margin with 2 or 3 RS interrupted by 1 simple slender seta. Propodus, slightly longer than ischium, superior margin with a row of simple slender setae; inferior margin (from proximal to distal ends) with 5 or 6 RS, 1 simple slender seta, 1 thick serrate RS and 3 slender unequal comb setae; both surfaces with some short submarginal slender setae. Dactylus, slightly shorter than half of propodus, with slender setae (simple and comb), and 1 RS at base of unguis (see detail).

Pereopod 3 (Fig. 4B): As for pereopod 1 except: basis, superior margin with fewer simple slender setae and more CP setae, infero-distal angle with 1–3 unequal RS. Ischium, length approximately $\frac{3}{4}$ times its width, rounded lobe larger, infero-distal angle with 2 or 3 RS. Merus and carpus, RS on inferior margin thicker. Merus, supra-distal angle larger, with simple slender setae and 2 RS; inferior margin with 6 or 7 RS interrupted by 1 simple slender seta, 1 tiny RS near infero-distal angle, submarginal RS lacking. Carpus with 3 or 4 RS on inferior margin, and 1 CP seta distally. Propodus subequal in length to ischium, inferior margin (from proximal to distal ends) with 3 or 4 RS, 1 slender seta, 1 thick serrate RS and 2 unequal slender setae (the longer barely pectinated); and only 1 short submarginal slender seta on each surface (only that on anterior surface drawn). Dactylus, RS and unguis stouter, comb setae lacking.

Pereopods 4–7: copiously setose, becoming gradually longer posteriorly. From pereopods 4 to 7, simple slender setae decrease in number on anterior surface of basis, and increase on superior margin of ischium, merus and carpus. Pereopods 6 and 7, superior distal angle of merus and carpus with 1 distal serrate

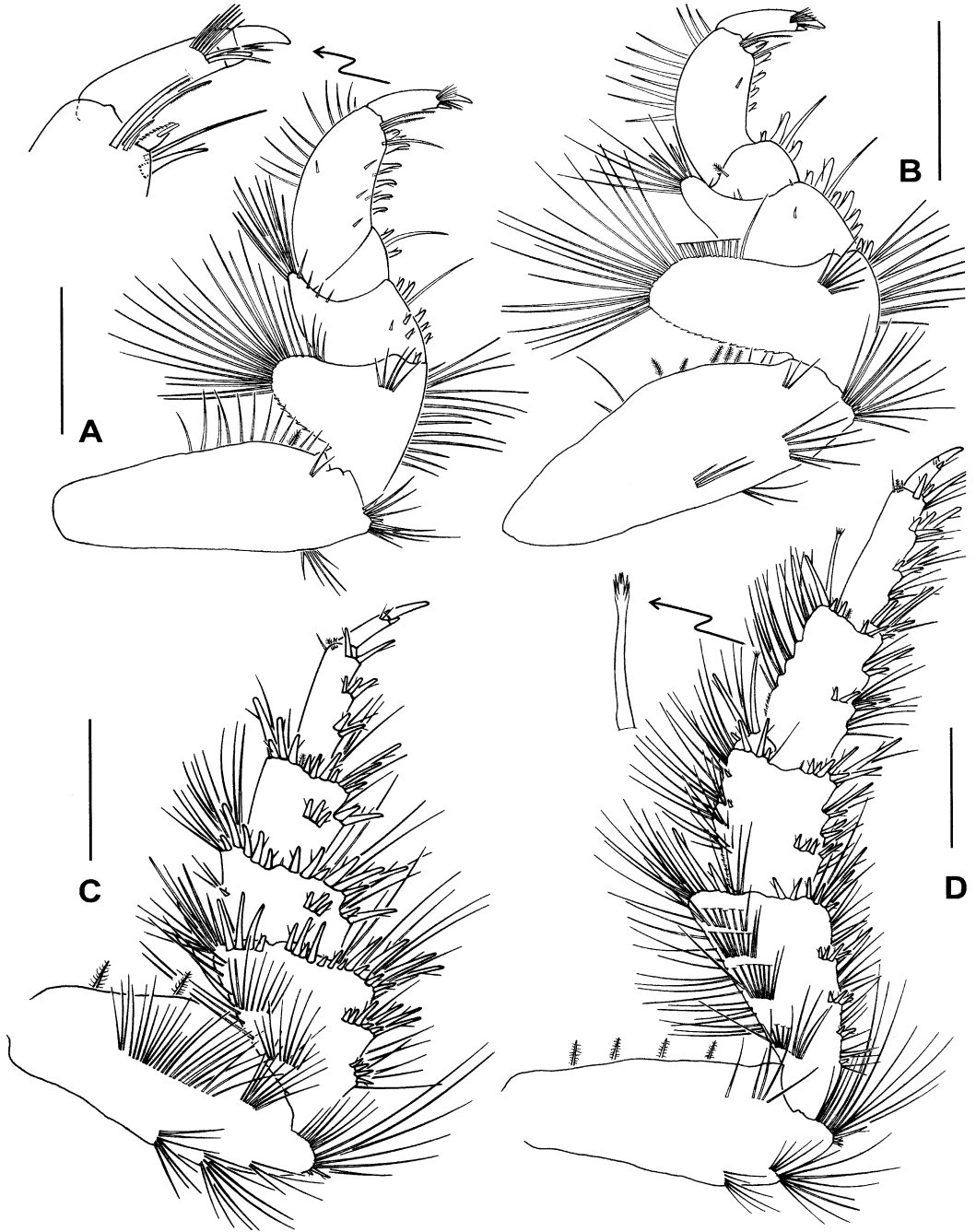


Fig. 4. *Excirolana armata*. Adult male (MACN-In 36234-3): A–D, pereopods 1, 3, 4 and 7, respectively (all left) in anterior view. Scale bars: 0.5 mm.

RS (with about 7 points distally, see detail Fig. 4D).

Pereopod 4 (Fig. 4C): Basis slightly longer than ischium and merus together,

superior margin with a few CP setae, anterior surface and inferior margin with many simple slender setae, infero-distal angle with 2 or 3 unequal RS. Ischium

triangular, as long as wide, with RS distally and on inferior margin, the latter arranged in 2 groups of 3–6 and 6–9 RS; with simple slender setae on anterior surface (arranged in 2 transverse rows) and on superior margin. Merus wider than long; with RS, viz 2–4 on inferior margin, 3 on anterior surface, 0 or 1 (small) on superior margin, and many distally. Carpus, RS arrangement as in merus except for small RS on superior margin always absent (1 or 2 small setae sometimes present in this position); distal end with a CP seta. Propodus, inferior margin with 0 or 1, 3–5, 5, 3 RS along its length (RS on posterior surface not drawn), supra-distal angle with 1 small RS and 2 setae (1 CP, 1 simple). Dactylus with a few slender setae and 1 RS at base of unguis.

Pereopod 7 (Fig. 4D) as pereopod 4 except for: Basis slightly shorter than ischium and merus together, anterior surface with a few simple slender setae; infero-distal angle with unequal 3 or 4 RS. Ischium longer than wide, with RS distally and on inferior margin, the latter arranged in groups of 0–2, 2–4, 3–5, 4–6 RS; anterior surface with 4 or 5 transverse rows of simple slender setae. Merus longer than wide; with 2 or 3 groups with 1–4 RS each on inferior margin, 0–2 short RS near to superior margin, 2–4 RS on anterior surface and many distally (one of them distally serrated, see detail Fig. 4D). Carpus, with 2 or 3 groups containing 1–3 RS each on inferior margin, 2–4 RS on anterior surface and many distally (one of them distally serrated). Propodus, inferior margin with 4 groups having 1 or 2, 3 or 4, 3 or 4, and 3 RS each.

Pleopods (Fig. 5A–E): Peduncles 1–5 with lateral margins lobate; peduncles 1–4 with 3 or 4 coupling hooks and a tuft of plumose slender setae on medial margin. Exopods 3–5 with short lateral incisions and endopods 3–5 without PMS. Appendix masculina long and arched (Fig. 5B), arising basally and ending beyond tip of

endopod; becoming slightly narrower at about half of its length.

Uropod (Fig. 6A): Both rami extending beyond distal margin of pleotelson (Fig. 1A). Peduncle as long as rami, length subequal to its largest width, lateral margin with simple slender setae and RS (4–9 in all); lateral distal angle with 3 or 4 unequal RS; medial margin with 11–17 PMS. Exopod spatulate, length approximately twice its largest width; lateral margin with 3 or 4 RS, lateral distal angle with a tight group of PMS and simple slender setae, distal margin with (from external to internal ends): 1 RS, 4–7 PMS, 1 RS, 4–7 PMS, 1 RS. Endopod subtriangular; lateral margin even (with no pit or notch), with small CP setae and 1 or 2 contiguous PMS; lateral distal angle with a tight group of PMS and simple slender setae; medial margin with (from distal to proximal ends): 1 RS, 3–5 PMS, 1 RS, 10–14 PMS.

Description of the adult female.—Based on 4 specimens with mature gonads, collected in Puerto Quequén, Argentina, November 1, 1997 (MACN-In 36234).

Size 8.3–10.9 mm (only the 4 specimens examined were measured).

Females are of similar appearance to males but average larger. The flagellum antenna 1 has a larger number of articles (16–21) and the setation is slightly more profuse, namely, pereopod 7: anterior surface of merus with 0–3 short RS near to superior margin; inferior margin of propodus with 1–4, 4 or 5, 4 or 5, 3 RS. Uropod: lateral margin of peduncle with simple slender setae and RS (9–12 in all), 3–5 distal RS; medial margin with 15–20 PMS. Distal margin of exopod with (from external to internal end) 1 RS, 5–7 PMS, 1 RS, 7–9 PMS. Lateral margin of endopod with 2 or 3 contiguous PMS; medial margin with (from distal to proximal end) 4 or 5 PMS, 1 RS, 13–16 PMS. Pleotelson with 26–33 PMS on distal margin. These differences between sexes seem to be related to the larger size

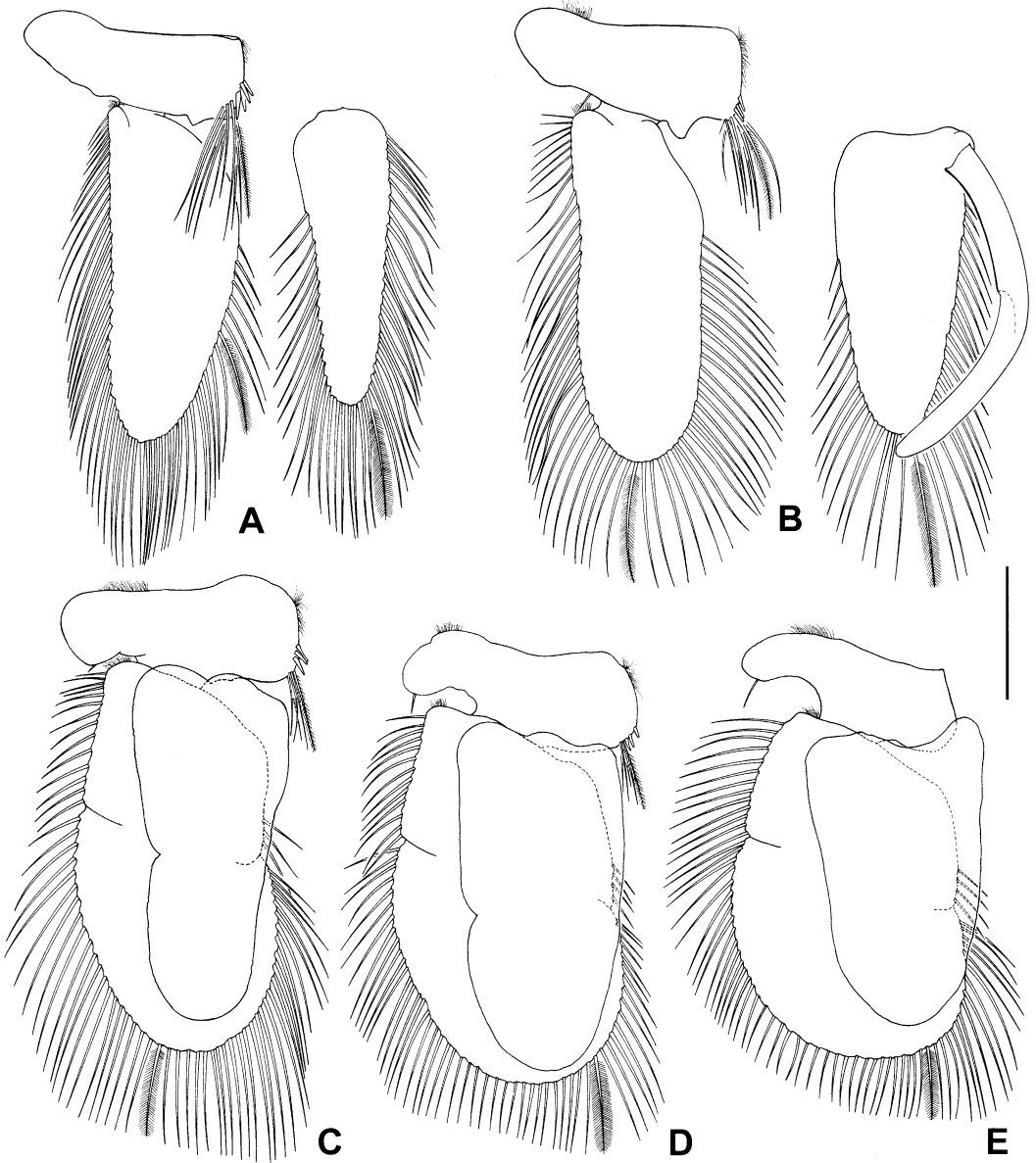


Fig. 5. *Excirolana armata*. Adult male (MACN-In 36234-3): A-E, pleopods 1-5, respectively (all left) in dorsal view; endopod of pleopods 1 and 2 dissected. Scale bar: 0.5 mm.

of the females herein studied, and may not be sexually dimorphic characters.

Remarks on the lot MACN-In 14184 identified by D. Giambiagi de Calabrese.—The vial includes 85 specimens; the label says: “*Cirolana argentina* D.G.C., 14184, Quequén, dád. M. D. J. [granted by Martín Doello Jurado], 1924 [January 14, 1924], Ido. D. G. C. [identified by

Deidamia Giambiagi de Calabrese]”. Four females and 4 males were dissected. No differences were detected among this material and the specimens from Puerto Quequén described above.

Distribution.—Intertidal, ranging approximately from 23°S (Rio de Janeiro, Brazil) to 42°S (Golfo San José, northern Patagonia, Argentina) (Lemos de Castro

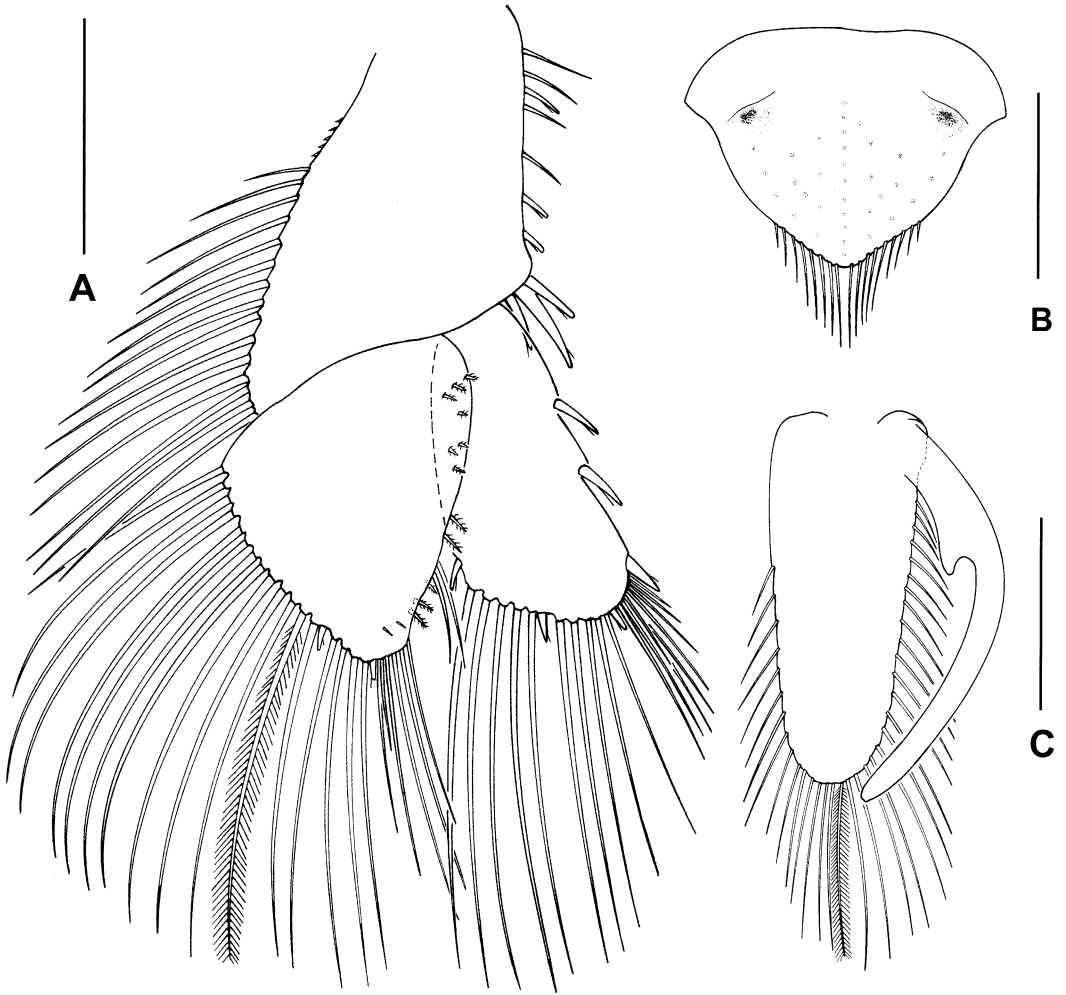


Fig. 6. *Exciorolana armata*. Adult male (MACN-In 36234-3): A, uropod (right) in dorsal view. *Exciorolana hirsuticauda*. Adult male (MACN-In 36240-1): B, pleotelson in dorsal view; C, endopod of pleopod 2 (left) in dorsal view. Scale bars: A, C, 0.5 mm; B, 1 mm.

& Brum 1969, Escofet 1977). This species is euryhaline and invades the Río de la Plata Estuary (Scarabino et al. 1975, Escofet et al. 1979, Darrigran & Rioja 1988, and the new record mentioned herein).

Discussion

Lemos de Castro & Brum (1969) redescribed *E. armata* and extended its distribution south to Buenos Aires Province. Most probably the incomplete description of *C. argentina* presented by

Giambiagi (1930) prevented Lemos de Castro & Brum from synonymizing these two nominal species. Since then *Exciorolana armata* has not been recorded from Argentina, whereas the name *C. argentina* has been profusely cited in Argentine literature (see introduction). We have examined the topotypic material of *C. argentina*, including recently collected lots and others obtained at the time prior to the publication of Giambiagi's description, and we conclude that *C. argentina* is a junior synonym of *E. armata*.

Table 1.—Character differences between *E. armata* and the two most similar species, based on the material herein studied.

	<i>E. armata</i> (Dana, 1853)	<i>E. hirsuticauda</i> Menzies, 1962	<i>E. monodi</i> Carvacho, 1977
Eyes			
Minimum interocular distance	about 3 times width of one eye	about 2.5 times width of one eye	about 5 times width of one eye
Antenna 1			
Length	reaching posterior margin of pereonite 2	reaching posterior margin of pereonite 3	reaching posterior margin of pereonite 1
Flagellum/Peduncle ratio	2.0–2.3	2.3–2.5	1.1
Posterior margin of second article of peduncle	with 8–11 setae	without setae	with ca. 20 setae
Antenna 2			
Length	extending well beyond pereonite 3	extending well beyond pereonite 5	reaching posterior margin of pereonite 2
Flagellum/Peduncle ratio	almost twice	about 2.5 times	about 1.5 times
Appendix masculina	with a slight unevenness at half of its length	with a deep notch at half of its length (Fig. 6C)	with a slight unevenness at half of its length
Uropod			
Peduncle, medial distal angle	not reaching medial margin of endopod	not reaching medial margin of endopod	almost even with medial margin of endopod
Exopod, lateral margin with	3 or 4 RS	2 RS	about 6 RS
Pleotelson			
Submarginal depressions	hardly visible or absent	evident (Fig. 6B)	hardly visible or absent

The distributions of *Exciorolana brazilensis* and *E. armata* are partially overlapping. The former can be quickly distinguished from *E. armata* by having (1) the frontal lamina wider, (2) the antenna less setose, (3) the mandibular palp of three articles, (4) the ischium of the first three pereopods not produced into a large rounded lobe, (5) the pleotelson with a pair of depressions connected by a transverse ridge, and the posterior margin broadly rounded, (6) the uropodal exopod much longer than the endopod, without robust setae on lateral margin, and (7) the uropodal endopod with a deep notch on the lateral margin. In contrast, *E. armata* is most similar to two other intertidal species only known

from Chile, *E. hirsuticauda* and *E. monodi*. These three species differs from all the other members of the genus for showing: (1) a mandibular palp of two articles, (2) the ischium of the first three pereopods produced into a large rounded lobe, and (3) the lateral margin of the uropodal exopod with 2 or more robust setae. Differences among these three species are listed in Table 1.

Almost all the species of the genus *Exciorolana* have a distinct paired submedial depressions on the dorsum of the pleotelson. These depressions are hardly visible or wanting in *E. armata* and in the specimen of *E. monodi* we examined. In contrast, the examined material of *E. hirsuticauda* has two small shallow de-

pressions that become more evident when rotating the specimens (Fig. 6C). However, neither Menzies (1962) nor Carvacho (1977) mentioned these depressions in their respective descriptions.

Another nearly consistent feature of the genus is a small pit (or notch) on the lateral margin of the uropodal endopod. This pit does not occur in *E. armata*, nor in the material of *E. monodi* and *E. hirsuticauda* that we examined. However, Brusca et al. (1995) stated that "In some species (e.g., *E. hirsuticauda*) the pit manifests itself as a minute marginal pocket, flush with the margin of the endopod and very difficult to see." Despite the difficulties in defining this feature, it is clear that none of these South American species have a conspicuous deep pit.

The females of the genus *Excirrolana* are ovoviviparous, with enlarged oviducts serving as uteri and with reduced oostegites (Klapow 1970, Brusca et al. 1995). *E. armata* has oostegites on the third, fourth and fifth pereopods, which become more evident after staining the specimen. These three pairs of oostegites are subequal in size and extend across the midline, although they may not contact medially in very distended gravid females.

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