

Systematic Revision of the Genus *Anoplocopea* Racovitza, 1907 (Crustacea: Isopoda) with a Description of a New Species from the Atlantic Coast of the Iberian Peninsula

C. Nolting², P. Reboreda¹, J. W. Wägele²

With 18 figures

Abstract

The genus *Anoplocopea* is revised and a new generic diagnosis presented. *Anoplocopea ischiana* Verhoeff, 1943 and *A. armata* Verhoeff, 1943 are shown to represent male and female of the same species, the valid name is *Anoplocopea ischiana* Verhoeff, 1943. The 3 species of this genus, including the new species *Anoplocopea lusitanica* n. sp. from the Iberian peninsula, are compared and described.

Key words: Crustacea, Isopoda, Sphaeromatidae, *Anoplocopea*, Iberian Peninsula, Taxonomy.

The genus *Anoplocopea* was established by E. Racovitza in 1907 for the species *A. hanseni*, found in the Mediterranean (Gulf of Ajaccio, Corse). In 1944 Verhoeff described two new species from the small island of Ischia (Gulf of Naples), naming them *A. ischiana* and *A. armata*. The examination of the type material has shown that these two species are representing only the different sexes of one species, *A. ischiana* being the male and *A. armata* the female. For several years the genus remained unnoticed, until Prunus & Pantoustier (1974) reported the occurrence of *A. hanseni* in the Gulf of Tunis. Until now these have been the only records. Racovitza (1907) published a dorsal view of *A. hanseni*, but no drawings of appendages. Verhoeff (1943) added few illustrations for the species he described, wherefore our knowledge of this genus is very fragmentary. As no detailed descriptions of *A. hanseni* and *A. ischiana* exist, the present study aims to fill this gap.

Specimens of the new species *A. lusitanica* n. sp. were collected and described independently during two studies carried out on the isopod fauna of the Atlantic coast of Spain (Reboreda, unpublished thesis) and Portugal (Nolting, unpublished thesis).

Anoplocopea Racovitza, 1907

Type species: *Anoplocopea hanseni* Racovitza, 1907

Composition: *A. hanseni* Racovitza, 1907, *A. ischiana* Verhoeff, 1943 (= *A. armata* Verhoeff, 1943), *A. lusitanica* n. sp.

Generic diagnosis

Body oval. Females smaller and more convex than males. Lateral margins of pereonite 1–6 hirsute. Head only little narrower than body, produced anteriorly into a narrow epistome. Eyes prominent, round, posteriorly framed by anterolateral margin of pereonite 1. Pereonites 2–5 shorter than pereonite 1 and of approximately equal length. Coxal plates of pereonite 6 enlarged posteriorly, covering laterally and surpassing posteriorly pereonite 7, females with smaller plates. Pleon short, without obvious sutures, as long as pereonites or longer. Pleotelson large, proximally with a dorsal pair of shallow longitudinal ridges near the median line, their distinctness varying within the species. Opening

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of pleotelsonic channel visible from above in adult males as a circular, open foramen or a slit on telsonic apex, in females and immature specimens only a shallow concavity visible in dorsal view. Pleotelsonic channel never closed. Posterior margin of pleotelson protruding little beyond sympodite of uropods, ventrally hirsute. Degree of pleotelsonic tuberculation differing within the species. Mouthparts not reduced in females. Medial lobes of articles of maxillipedal palp weakly developed. Pereopod 1 short and stout, with short triangular carpus, propodus not enlarged. Pereopods 2–7 slender, length of posterior legs increasing.

Pleopods 1–3 natatory with long setulated setae. Exopodite of pleopod 3 consisting of two articles. Pleopods 4–5 respiratory, without swimming setae, not plicate. Exopodite of pleopod 5 with 1 distal and 2 medial lobes, with thickened cuticle. Uropods long-oval, uniramous, inserted laterally on pleotelson, similar in both sexes. About half of uropod surpassing tip of pleotelson, endopodite absent. Outer margins of exopodite hirsute, at least slightly upcurved near the base. Inner brood pouches not developed, oostegites of brooding females on pereonites 1–4.

The name *Anoplocopea* ('unarmed') was obviously introduced by Racovitza (1907) to stress the morphological difference to the closely related species *Campecopea hirsuta*, in which males are bearing a single acute median projection on the tergite of pereonite 6.

In his diagnosis of the genus, Racovitza already mentioned the characteristic large coxal plates of pereonite 6, the articulation in the exopodite of pleopod 3 and the large uropod exopodites that lack an endopodite. These are also the main characters used by Harrison & Ellis (1991) in their key for the spaeromatid genera. Verhoeff (1943) mentions that in contrast to *Sphaeroma*, specimens of *Anoplocopea* can not enroll to a perfect ball, but the details he discusses are not understandable. The lack of large pleonal epimera and the large sixth coxal plates must be functionally correlated with enrollment.

Sphaeromatids with similar uropods are easily distinguished by other characters (only some of these characters are mentioned): species of *Ancinus* and *Bathycopea* have large prehensile first pereopods, males of *Campecopea* possess a large caudally directed spine on pereonite 6, in *Ciliacaea*, *Geocerceis*, *Paracerceis*, *Paraciliacaea* and *Pistorius* females still have both uropodal rami, species of *Cymodetta* have a large pointed pleotelson, in *Discerceis* pleonal sutures are distinct,

Neonaesa and *Monolistra* have no enlarged sixth coxal plates.

In his description of 2 new *Anoplocopea* species, Verhoeff (1943) stated that the uropod endopodite is not missing, but fused to the ventral pleotelsonic margins and that this character is shared with *Campecopea*. This is not correct since in all spaeromatid isopods the endopodite is fused to the sympod, therefore the whole uropod would be immobile if the endopodite was fused to the pleotelson.

Anoplocopea lusitanica n. sp.

Type material: holotype 1 male, 3.2 mm, Cabo Carvoeiro (middle Portugal, near Peniche), 39°21' N 9°23' W 11. 5. 1994, upper mesolitoral, in colonies of *Chthamalus stellatus*, *Mytilus edulis* and *Lithophyllum incrustans*. Paratypes: 1 female, 2.8 mm; 3 juveniles of up to 2.5 mm and 16, respectively 12 microscopic slides with appendages from a male (3 mm) and a female (2.8 mm); all same locality as holotype. Type material deposited in the Museum für Naturkunde der Humboldt-Universität zu Berlin (Berlin), reg. no. 27173.

Further material (in the collection of the Dpto. De Biología Animal, Santiago de Compostela): SPAIN. Ria de Ferrol (Galicia), 43°29'12" N 8°15'44" W. **Priorino** [31. 7. 1988, *Codium tomentosum*: 1 juvenile *Laminaria ochroleuca*: 1 female; 2 gravid females, 3 males. *Mytilus edulis* and *Fucus serratus*: 1 postmanca, 3 juveniles, 3 females, 1 gravid female, 2 premales.] **Carino** [10. 3. 1988, middle mesolitoral: 1 female; 2 premales; 2 males. 2. 8. 1988, *Balanus perforatus*: 7 mancas; 10 postmancas; 7 juveniles; 9 females; 38 gravid females; 2 premales; 13 males, *L. ochroleuca*: 2 postmancas; 2 juveniles; 7 females; 27 gravid females; 1 premale; 12 males, *Mytilus edulis*: 1 juvenile; 5 females; 4 gravid females; 1 premale; 1 male. 27. 9. 1988, mesolitoral: 2 gravid females.] **Fornelos** [20. 2. 1988, *Fucus vesiculosus* and *Chthamalus stellatus*: 1 gravid female; 2 premales; 7 males. 15. 5. 1988, *Mytilus edulis*: 1 postmanca; 6 juveniles; 9 females; 1 premale; 9 males. 15. 5. 1988, *F. vesiculosus*: 1 juvenile; 1 female; 2 gravid females; 1 premale; 13 male. 24. 11. 1988, *Chondrus crispus*: 3 juveniles; 1 females; 33 gravid female; 4 premales; 8 males.] **Laxe** [16. 4. 1988, *M. edulis*: 1 juveniles; 1 female; 3 gravid females; 1 male. 28. 8. 1988, *M. edulis*: 2 gravid females; 1 male.] **Mugardos** [21. 12. 1987, *F. vesiculosus*: 1 male.] **Pta. Redon-**

da [8. 11. 1988, middle mesolitoral, *F. vesiculosus*: 1 postmanca; 1 juvenile.] **Batel** [17. 4. 1988, *M. edulis*: 10 juveniles; 25 females; 4 premales. *Laurencia pinnatifida*: 3 females; 11 gravid females; 5 males.] **San Martin** [19. 3. 1988, middle mesolitoral: 1 juvenile; 3 females.] **Cabalinos** [27. 3. 1988, *M. edulis*: 2 females; 1 gravid female, middle mesolitoral: 2 premales; 1 males; 1 juvenile; 5 females; 2 gravid females; 4 premales; 5 males.] **O Segano** [21. 11. 1987, mesolitoral: 2 gravid females, *M. edulis*: 1 juvenile; 2 females; 2 gravid females; 1 male, *B. perforatus* and *M. edulis*: 3 gravid females. 18. 2. 1988, lower mesolitoral: 1 female; 1 gravid female, *Corallina officinalis*: 1 gravid female; 2 males, *M. edulis*: 2 postmancas; 3 females; 18 juveniles; 5 gravid females; 9 premales; 2 males. 16. 4. 1988, *M. edulis*: 6 juveniles; 3 females; 2 gravid females; 2 males, middle mesolitoral: a postmanca; 1 juvenile; 3 females; 9 gravid females. 16. 6. 1988, middle mesolitoral: 3 juveniles; 2 females; 2 premales; 2 males. 30. 7. 1988, mesolitoral, *M. edulis*: 1 manca; 2 postmancas; 2 females; 4 gravid females; 2 males, *C. officinalis*: 2 juveniles; 6 gravid females; 1 premale; 1 male, *F. vesiculosus* and *M. edulis*: 5 males. *M. edulis* in upper mesolitoral: 1 female; 4 males.]

PORTUGAL. Afife (North Portugal), 41°46' N 8°52' W, 17. 5. 1994, *Fucus spiralis*: 1 juvenile. Baleal (near Peniche, middle Portugal), 39°21' N 9°23' W, 12. 5. 1994, mesolitoral, in *Chthamalus stellatus* and *Mytilus edulis*: 2 males; 5 females. Cabo Carvoeiro (near Peniche, middle Portugal), 11. 5. 1994, upper mesolitoral, in *Chthamalus stellatus*, *M. edulis* and *Lithophyllum incrustans*: 10 juveniles, 16 females, 7 males.

Etymology: The species is named after its geographical distribution.

Description of male

figs. 1–5

Body about twice as long as wide, broadly oval (fig. 1). Lateral margins of pereonites 1–6 hirsute. Ventrolateral margin of pereonite 1 prolonged, reaching anteriorly under the eyes. Large eyes laterally on cephalothorax. Pereonites 2–5 of roughly equal length, width increasing, with distinct coxal plates. Coxal plate of narrow pereonite 6 enlarged posteriorly, thus surpassing the distal margin of the pleon. Distal dorsal margins of pereonites 6 and 7 each forming a prominent transverse ridge. A second, less

prominent ridge dorsally on pereonite 7. Width of pereonite 7 limited by coxal plates of pereonite 6. Pleon short, all pleonites fused, no sutures remaining. Pleotelson wider than long. Posterior margin smoothly rounded, with few long setae. Uropods inserted subproximally. Ventilation channel visible from above as open foramen or slit. Dorsal surface convex in the central region, bearing a shallow longitudinal carina on either side of the midline. Proximal region somewhat depressed, thus forming a transverse groove along the posterior margin. Dorsal surface tuberculated on posterior pereonites and pleon, more numerous tubercles on pleotelson.

Antenna 1 short (fig. 2), with 3 peduncular articles. First article large and robust, with 4 featherlike setae. Short and stout article 2 with 3 or 4 distal featherlike setae. Article 3 little shorter than article 1, with a pair of such setae distally. Flagellum of 4 to 5 articles (number may vary within one specimen); all articles, except the first and the last with one apical aesthetasc.

Antenna 2 (fig. 2) only little longer than antenna 1, with 4 peduncular and 10 flagellar articles. First and second article of peduncle short and as wide as long. Distal outer margin with 1 and 2 simple setae respectively. Article 3 longer than broad, distally with plumose setae dorsally and ventrally. Last peduncular article largest, cylindrical, distally with 3 sensory setae on ventral side. Dorsally 1 such seta, accompanied by 2 long and simple setae.

Length of flagellum articles decreasing distally, becoming more and more cylindrical. All articles, except the basal and terminal, with tufts of simple setae at the distal ventral margin. Last article with long simple setae distally.

Mandibel robust (fig. 2). Pars molaris with toothed margin and wrinkled surface. Pars incisiva formed by 3 blunt teeth. Right lacinia mobilis with one large and one small tooth, left one with 3 teeth of equal size. Palp of 3 articles. First article of mandibular palp elongate, the following articles somewhat smaller and more robust. Article 2 with distally 2–3 robust setulated spines. Article 3 with a row of 7–8 such spines, the distal one enlarged.

Outer endite of maxilla 1 straight, with 10 distal spines. The outer ones cone-shaped and smooth, inner spines slender and serrated. Small inner endite bearing distally 3 large, curved setulated setae and a single small and simple one.

Maxilla 2 flattened, with 3 endites. Inner margin of basis bearing some spiny scale-like setae. Inner endite distally with 8 cone-shaped setu-

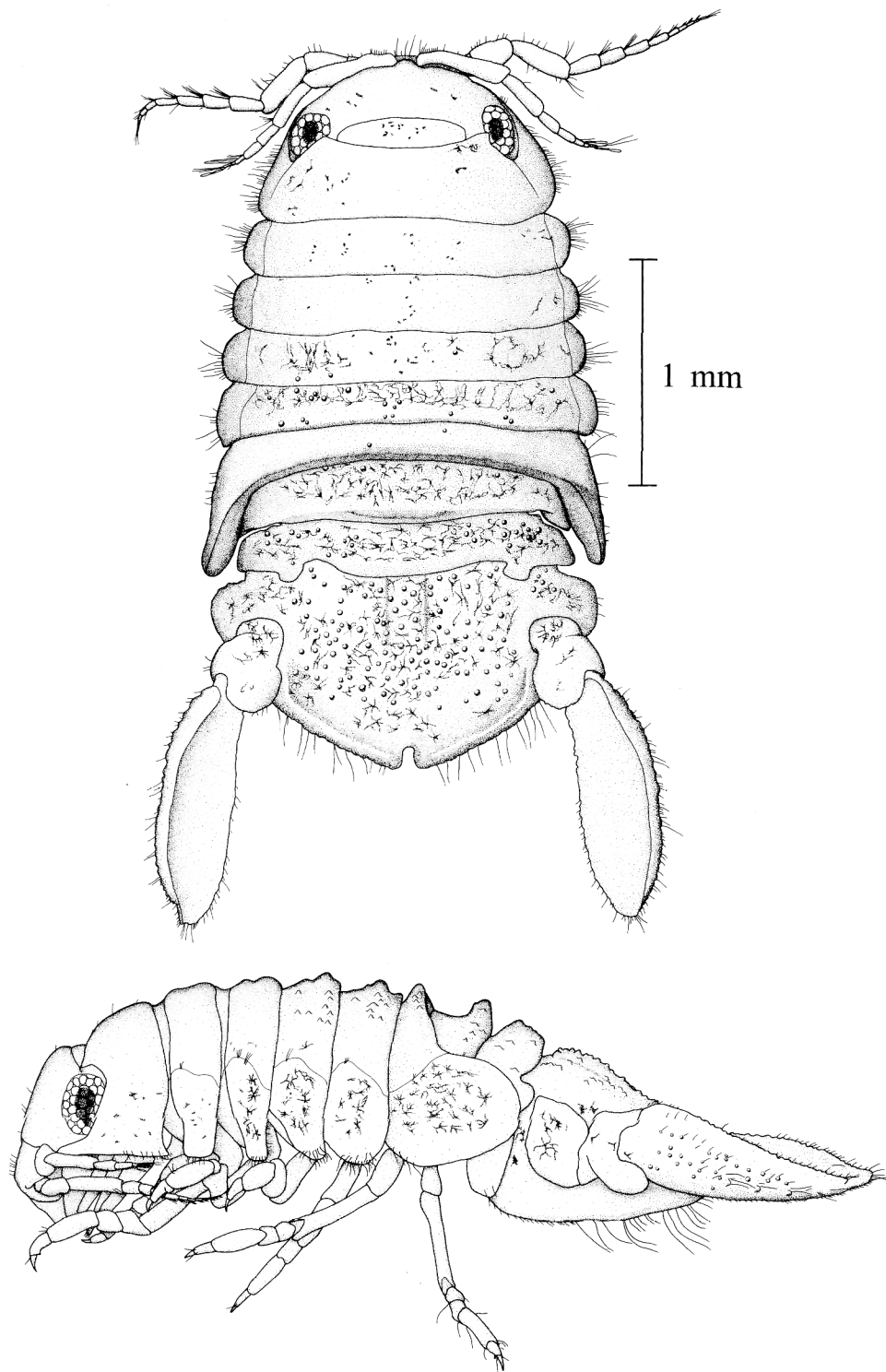


Fig. 1. *Anoplocopea lusitanica* n. sp. Holotype, male, 3.2 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Dorsal and lateral view

lated setae. Medial and lateral endite with row of 3, respectively 4 strong serrated setae.

Maxilliped (fig. 2) strong and robust. Ventral margin of endite curved laterally, thus appearing vaulted. Apical margin carrying up to 5 plumose short setae and ventrally two smooth and stout spines. One large retinaculum in the midst of the

inner margin. Palp of 5 articles. First article small, article 2 largest, with an obvious inner lobe. Article 3 short, with medial lobe. Articles 4 and 5 more slender, 5 shortest. Simple setae at the inner margins of articles 2–4 and at the tip of last article. Article 4 with one such seta at the outer distal edge.

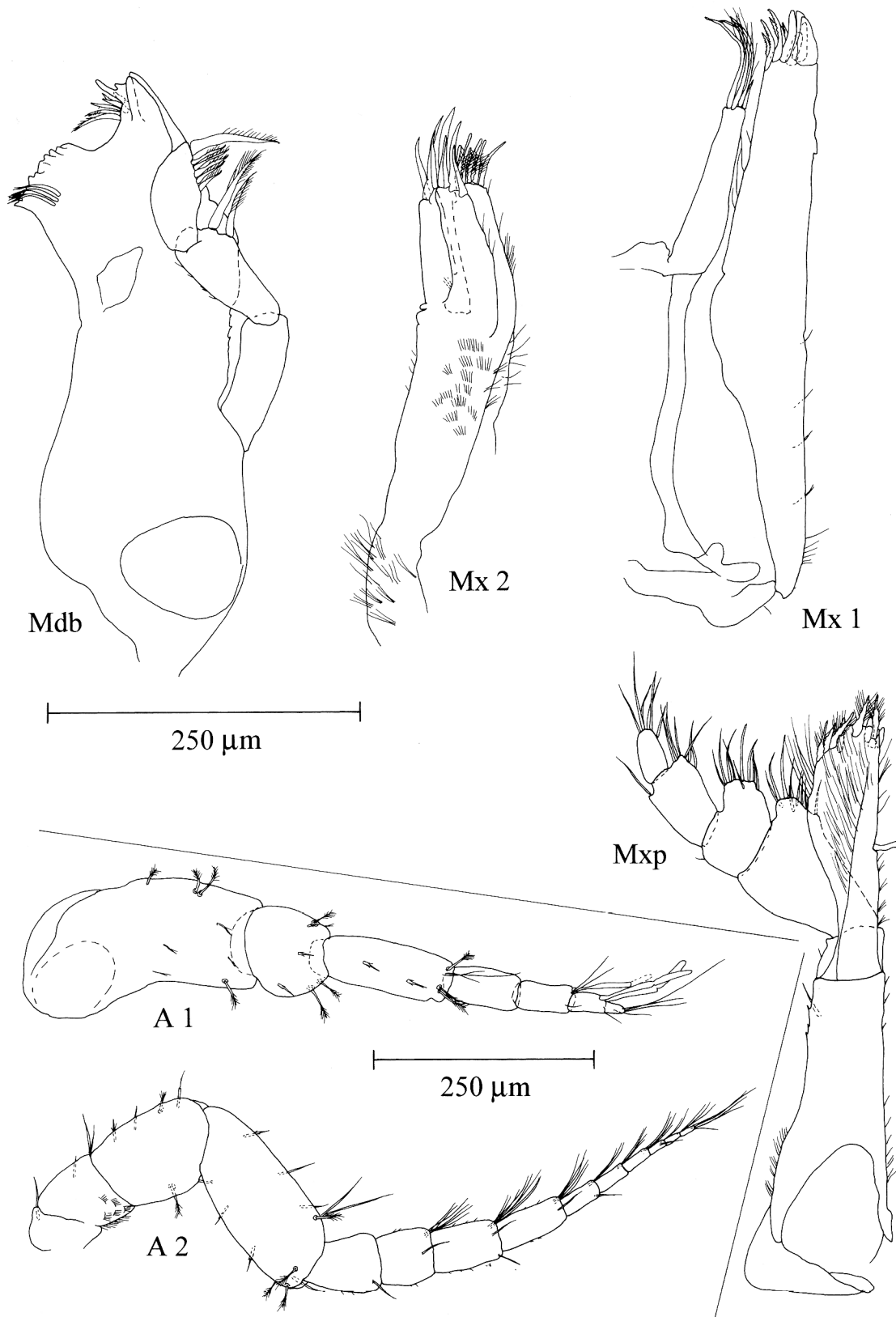


Fig. 2. *A. lusitanica* n. sp. Male, 3 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Antenna 1, antenna 2 and mouthparts

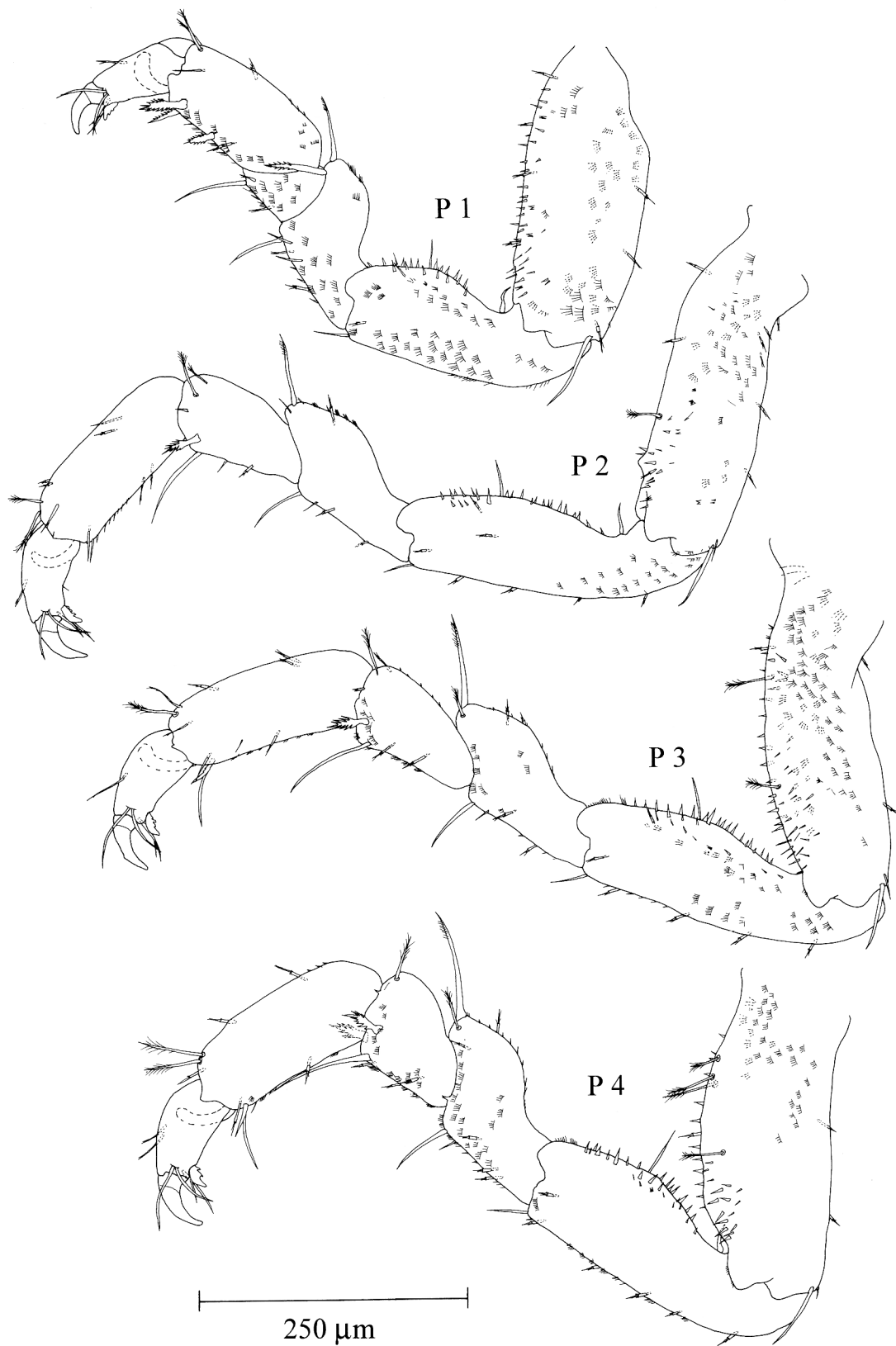


Fig. 3. *A. lusitanica* n. sp. Male, 3 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Pereopods 1–4

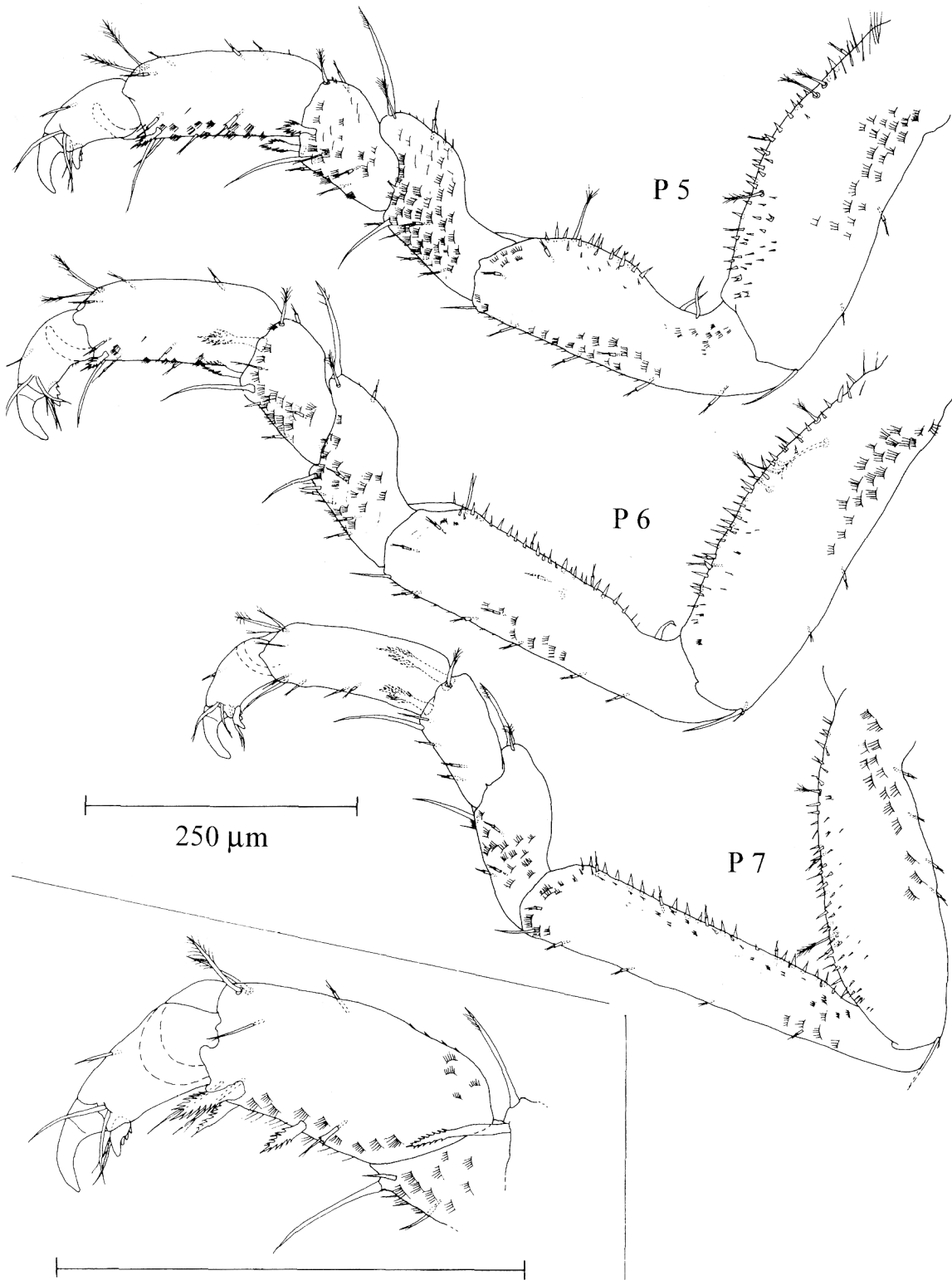


Fig. 4. *A. lusitanica* n. sp. Male, 3 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Pereopods 5–7 and detail of pereopod 1

Pereopod 1 robust (fig. 3). One strong simple seta at the inner distal edge of basis, merus and carpus and a smaller one also on ischium. Outer margin of basis and ischium with strong tiny spines, probably derived from cuticular scales. Outer distal edge of merus with two strong se-

tae, one distally setulated, the other distally plumose. Triangular carpus of pereopod 1 short. Inner margin of propodus with 3 robust serrated sensory spines, outer margin distally carrying two plumose setae. Dactylus with a pair of long and simple setae at the caudal distal margin, rostral

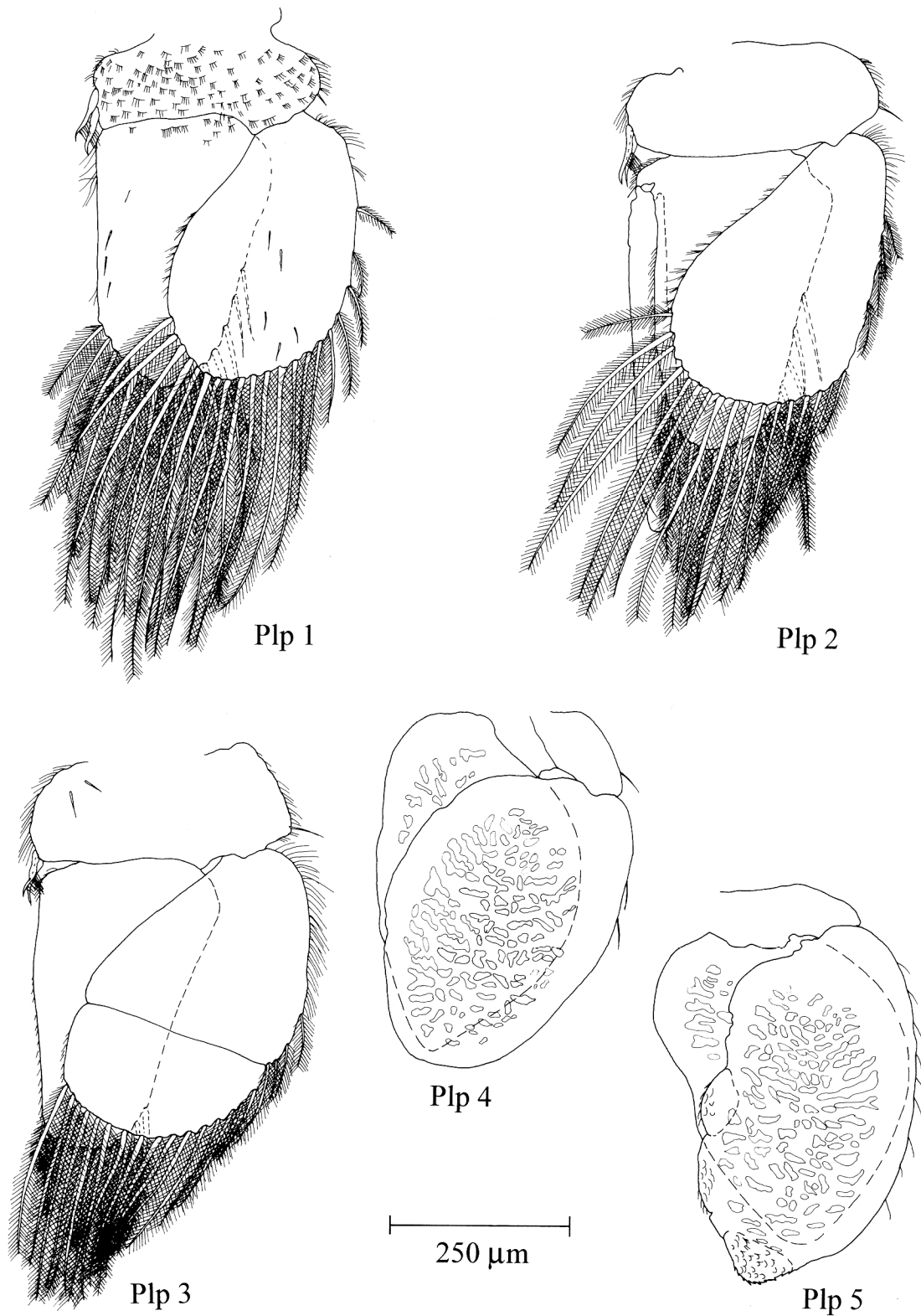


Fig. 5. *A. lusitanica* n. sp. Male, 3 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Pleopods 1–5

margin with one long and one shorter seta. Distal claw robust, shorter than dactylus, small inner claw with 2 or 3 accessory teeth. Numerous spiny scales at the inner margins of ischium, merus, carpus and propodus.

Pereopods 2–7 (fig. 3–4) with increasing length to the posterior pairs, mainly due to a prolongation of the ischium. Distal outer margin of merus with one long, robust unilaterally setulated seta accompanied by one short plumose

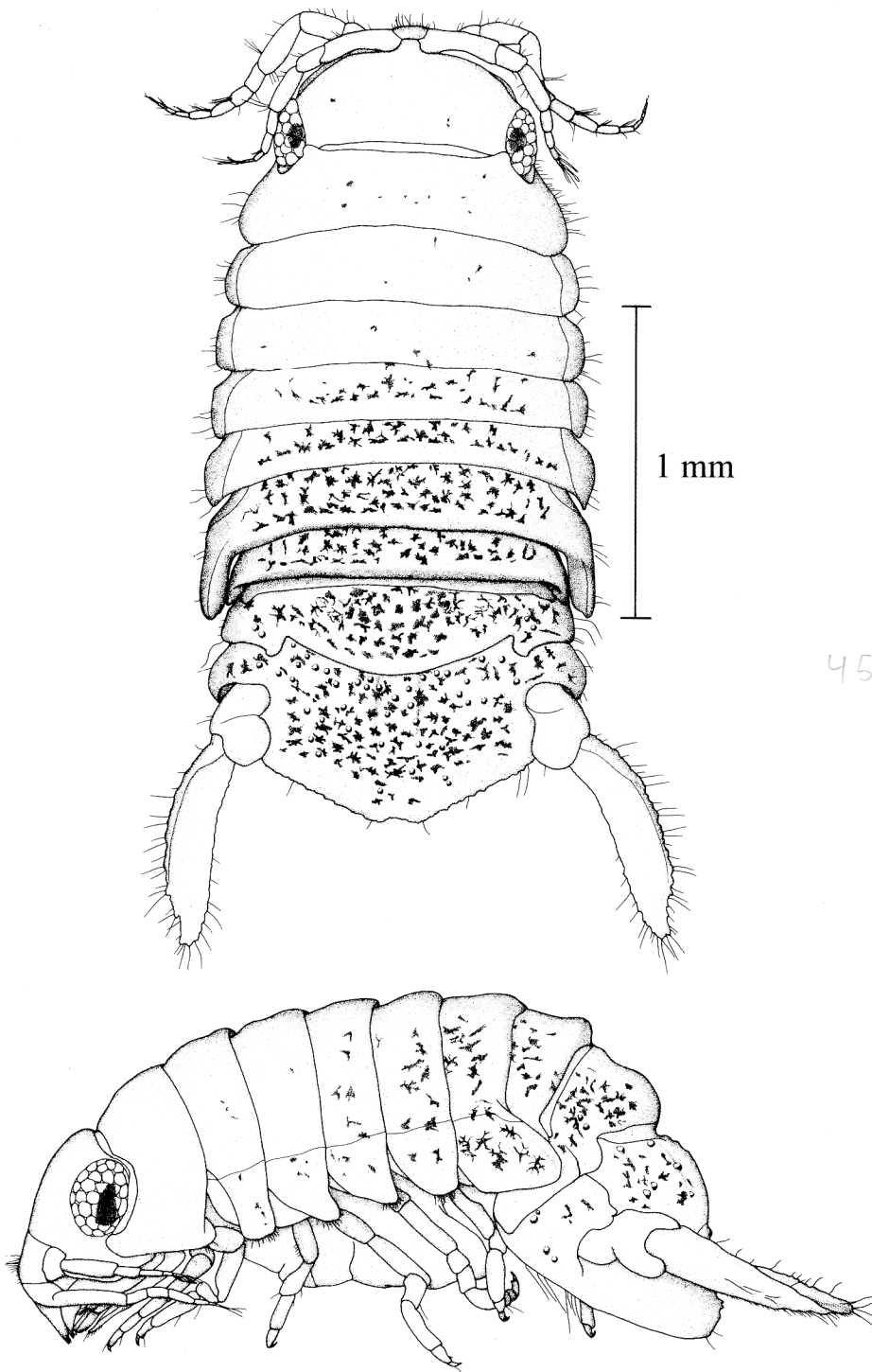


Fig. 6. *A. lusitanica* n. sp. Paratype, female, 2.8 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Dorsal and lateral view

seta. Carpus and propodus with one or two plumose setae at the same place. Outer margin of basis with 2–4 plumose setae. Carpus with distal inner margin carrying one (pereopods 2 and 4), respective 2 (pereopods 3–7) robust serrated spines. Outer margin of basis and ischium with large spiny scales. Setation of dactylus as in pereopod 1. Inner distal edge of basis to propodus

with one strong simple seta on each article, that of ischium little smaller.

All pereopods proximally on ischium with 1 stout curved spine at the outer margin. Surface of pereopods with varying number of serrated scale-like setae, highest densities on basis and ischium. Numerous articulated setae scattered all over the surface.

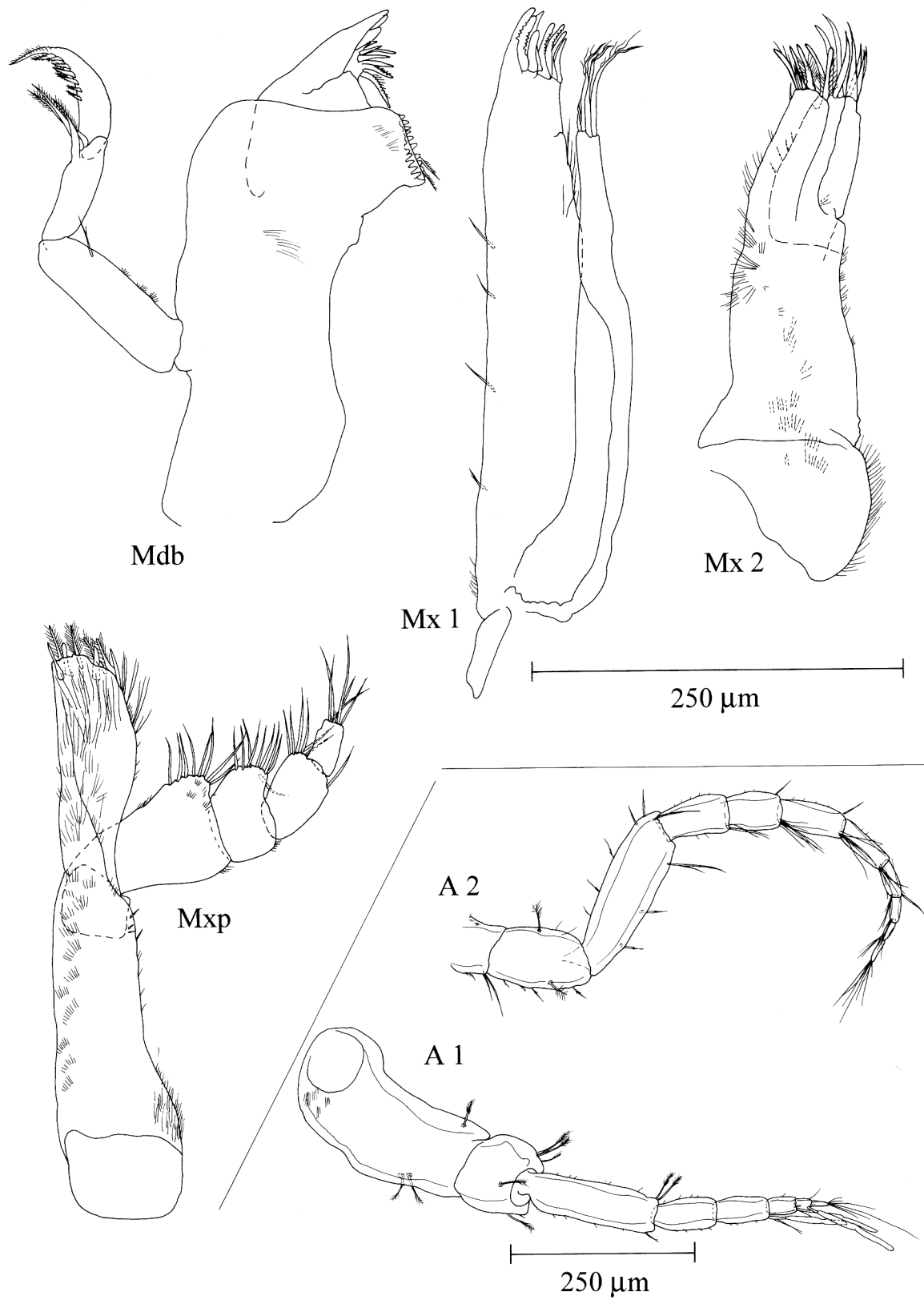


Fig. 7. *A. lusitanica* n. sp. Female, 2.8 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Antenna 1, antenna 2 and mouthparts

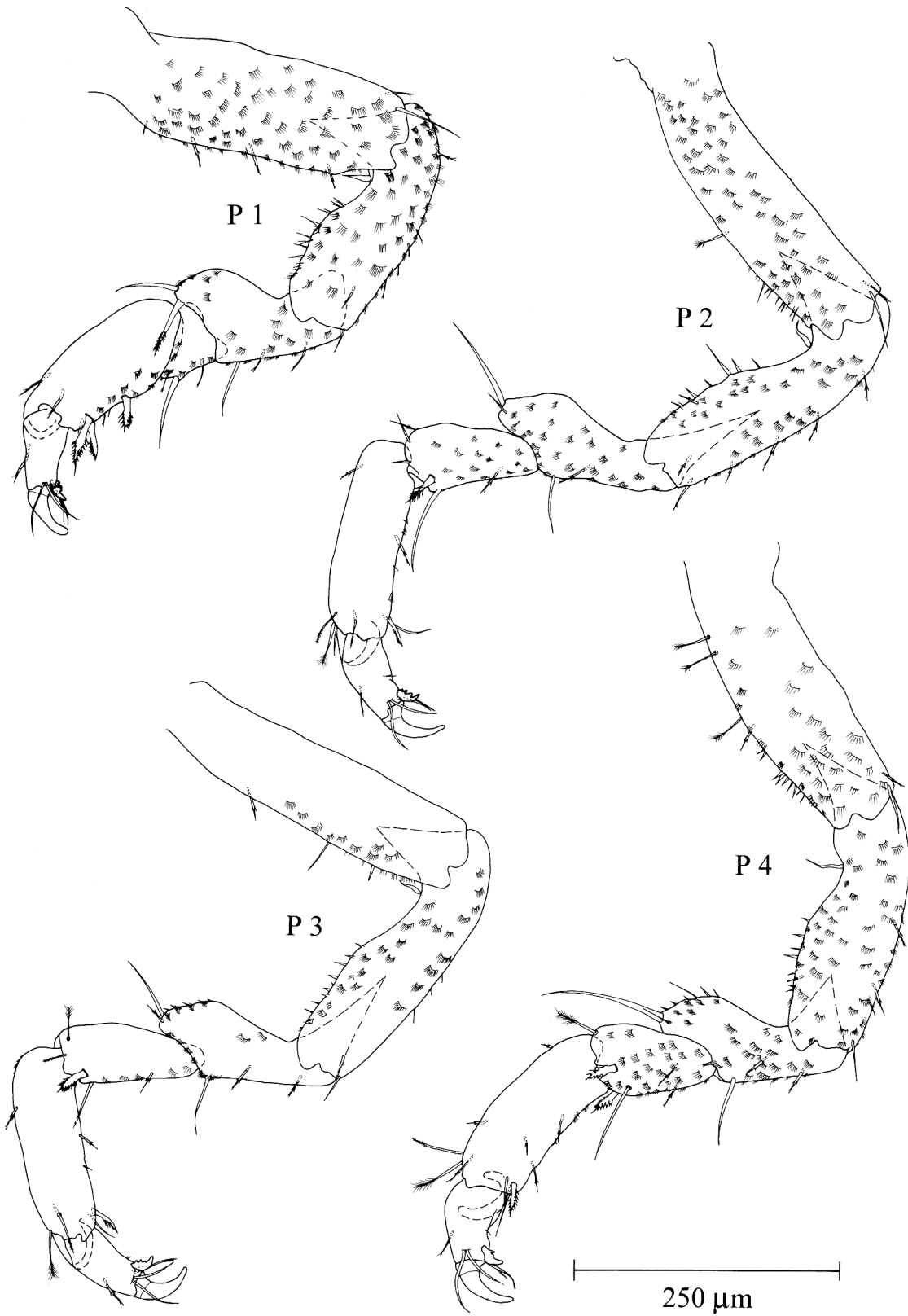


Fig. 8. *A. lusitanica* n. sp. Female, 2.8 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Pereopods 1–4

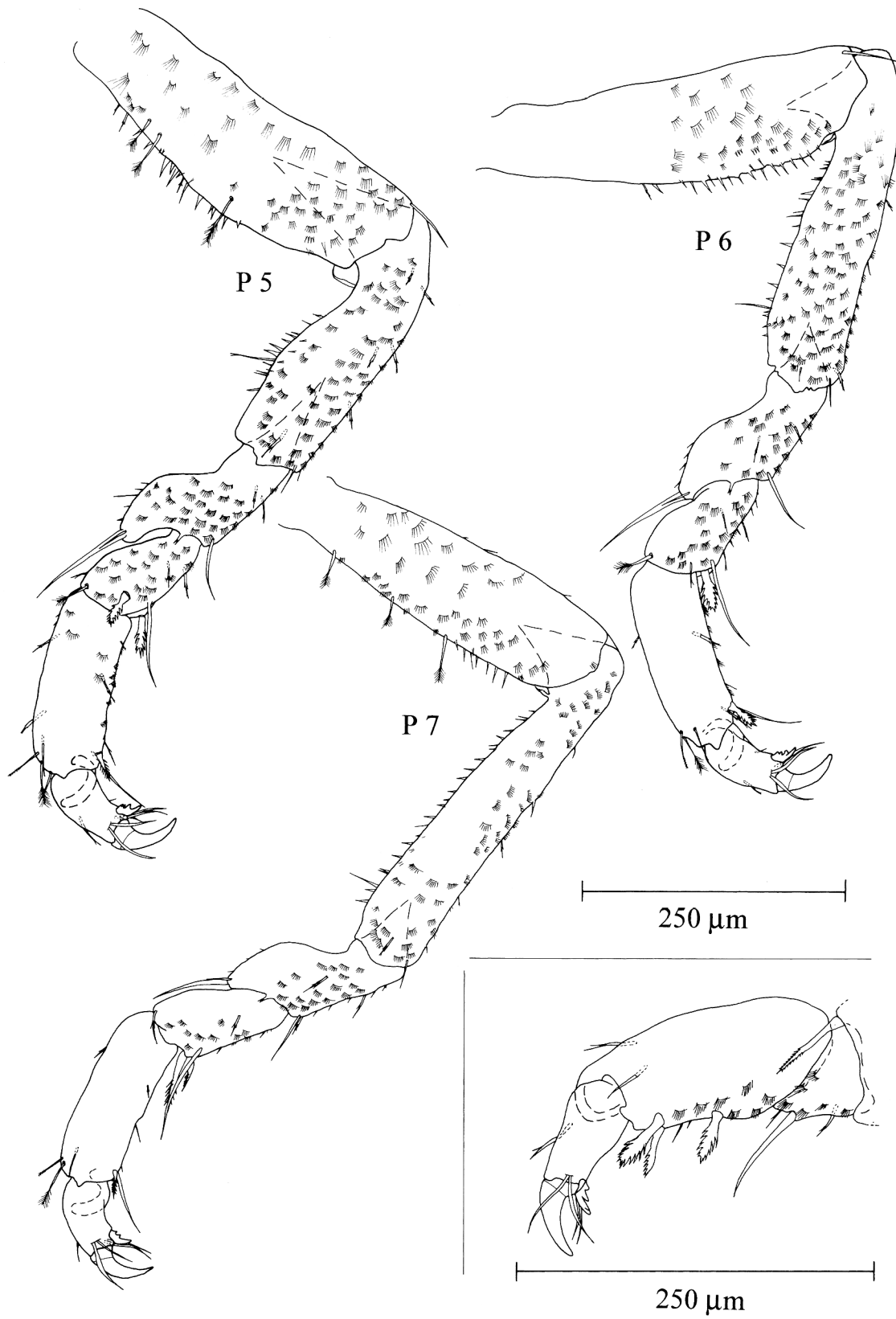


Fig. 9. *A. lusitanica* n. sp. Female, 2.8 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Pereopods 5–7 and detail of pereopod 1

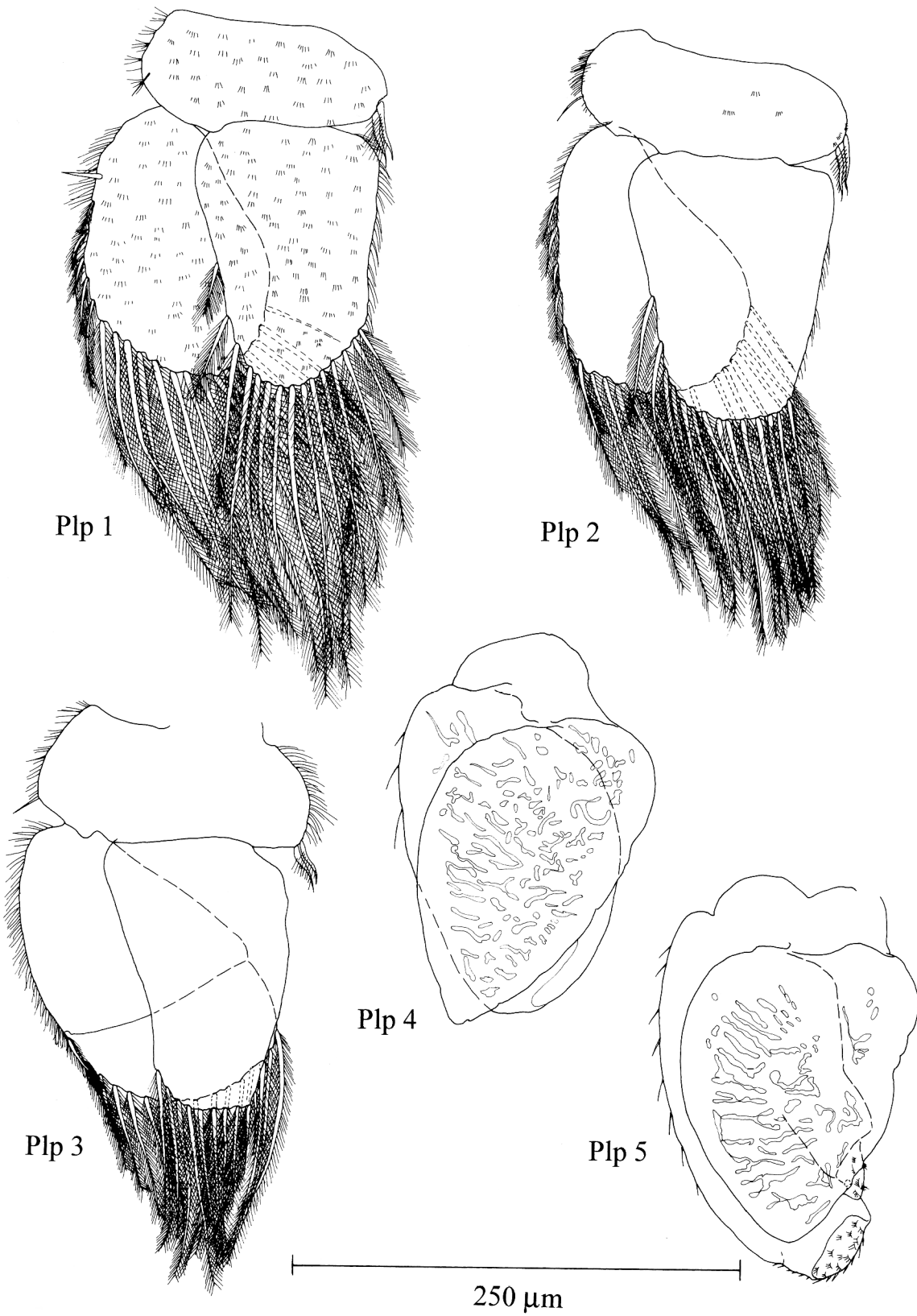


Fig. 10. *A. lusitanica* n. sp. Female, 2.8 mm. Middle-Portugal, Cabo Carvoeiro (near Peniche, 39°21' N 9°23' W, 11. 5. 1994). Pleopods 1–5

Pleopods 1–3 (fig. 5) with large trapezoidal endo- and oval exopodite, distal margins with long swimming setae. Inner margin of sympodite with two robust setulated setae. Rostral surface of pleopod 1 sympodite covered with semicircular spiny scales. Appendix masculina cylindrical and with few scale-like setae, 1 1/4 of length of endopodite of pleopod 2. Medial margin of endopodite of pleopod 2 with a groove to receive the appendix. Exopodite of pleopod 3 bi-articulated.

Pleopods 4 and 5 respiratory, with only few hair-like setae at the outer margin of exopodite. Exopodite of pleopod 5 with one distal and two medial lobes, covered with spiny scales. Rami not plicated.

Uropods uniramous, without endopodite (fig. 1). Exopodite very robust and oblong oval. Dorsal surface with long, central concavity. Proximal outer margin curved upwards. Margins and surface tuberculated, margins with long simple setae in indentations.

Males from Portugal differ from those of Spain in bearing an obvious notch at the distal posterior inner margin of the uropods.

Description of female

figs. 6–10

Mature females (fig. 6) differing from males in following characters: body more convex and much smaller (length up to 3.1 mm). Lateral plates on pereonite 6 smaller, posteriorly not reaching the hind margin of the pleon. Uropod exopodite lanceolate, shorter than in males and very slender. Its tip slightly curved outwards. Dorsal posterior transverse ridges on pereonites 6 and 7 shallower.

Pleotelson shorter, ventilation channel in dorsal view visible only as shallow concavity. Pleotelsonic ridges and tuberculation less pronounced, likewise those of distal margins. Converging pleotelsonic posterior margins straight. Mouthparts well developed, similar to those of males (fig. 7). Flagellum of antenna 1 with 4 or 5 articles (number often differing in left and right antenna). Flagellum of antenna 2 only with up to 8 articles (fig. 7). Legs appearing more slender, setation as in males (fig. 8–9).

Adult females bearing 4 pairs of large membranous oostegites on pereopods 1–4, overlapping in the mid-line. Oostegites reduced between two broods.

Size: Largest males from Spain reaching a length of 3.9 mm, those from Portugal a maximum length of 3.6 mm. Females from Spain reaching 3.1 mm, those from Portugal only 2.6 mm.

Ecology: The following information is based on the more extensive material from Spain. In the Ria de Ferrol (Galicia), *A. lusitanica* n. sp. is very common and inhabits little protected to very exposed areas. The vertical distribution reaches from the middle mesolitoral to the upper infralitoral. Specimens were collected mainly on fucoid algae and between *Balanus perforatus*, but also on other substrates as e.g. colonies of mussels.

In Portugal there seems to be some evidence that *A. lusitanica* prefers more protected coastal areas than the closely related and sympatric *Campecopea hirsuta*. *Campecopea hirsuta* is never found in absence of the balanid *Chthalamus stellatus*, while *Anoplocopea lusitanica* has not been found where *Mytilus edulis* is absent.

Anoplocopea hanseni Racovitza, 1907

Type material: Two syntypes from the British Museum of Natural History (London), reg. no. 1910.1.10.24–25. One male, 3.1 mm. One ovigerous female, broken twice, about 2.5 mm.

Type locality: Mediterranean, Corse, Gulf of Ajaccio, under stones.

Distribution: Known from Corse and the Gulf of Tunis (Prunus & Pantoustier 1974).

The species is not very different from the foregoing one. Details are illustrated in the drawings. The following description points out some important diagnostic characters.

Description of male

figs. 11–12

Body oval (fig. 11), surface appearing smoother and not as heavily sclerotized as in *A. lusitanica*. Lateral margins of pereonites with few setae. Coxal plates on pereonite 6 slightly surpassing hind margin of pleon, their apex more acute than in *A. lusitanica*. Transverse carinae on posterior dorsal margin of pereonite 6 little pronounced, on pereonite 7 absent. Distal dorsal margin of pereonite 7 with shallow but obvious central concavity. Pair of longitudinal ridges near

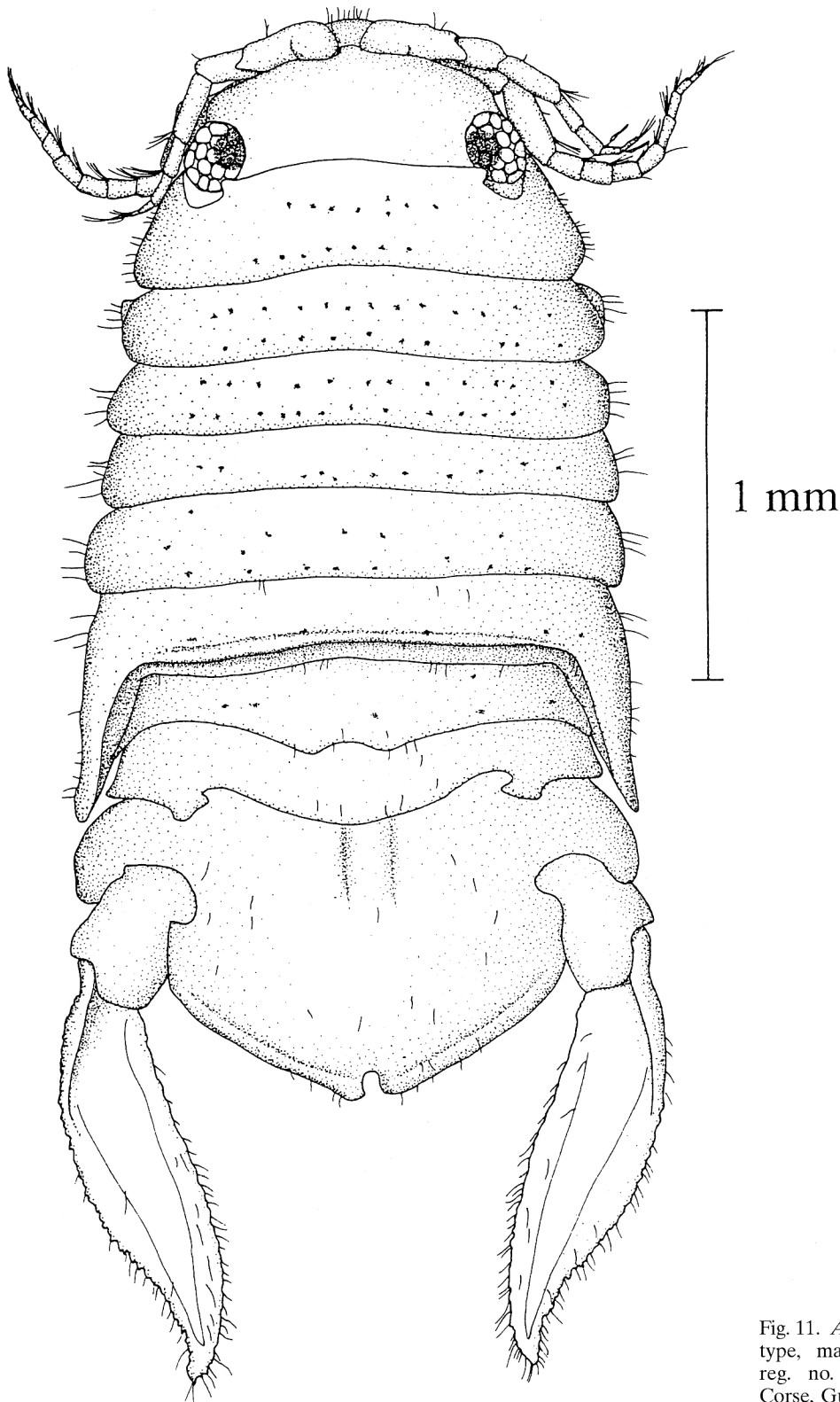


Fig. 11. *A. hanseni* Racovitza, 1907. Syn-type, male, 3.1 mm (BMNH/London, reg. no. 1910.1.10.24), Mediterranean, Corse, Gulf of Ajaccio. Dorsal view

dorsal mid-line of pleotelson inconspicuous. General form of pleotelson as in *A. lusitanica*. Posterior margin of pleotelson with few setae.

Antenna 1 (fig. 12) as in *A. lusitanica*, with 3 peduncular and 5 flagellar articles, middle articles of flagellum each with one aesthetasc.

Antenna 2 (fig. 12) as in *A. lusitanica*, but with only 10 flagellar articles in adult male.

Pereopods 1–7 (fig. 12) small inner claw of dactylus each with a row of several acute teeth. Carpus of pereopod 1 with a robust serrated spine at inner margin. Pereopod 7 with 3 long

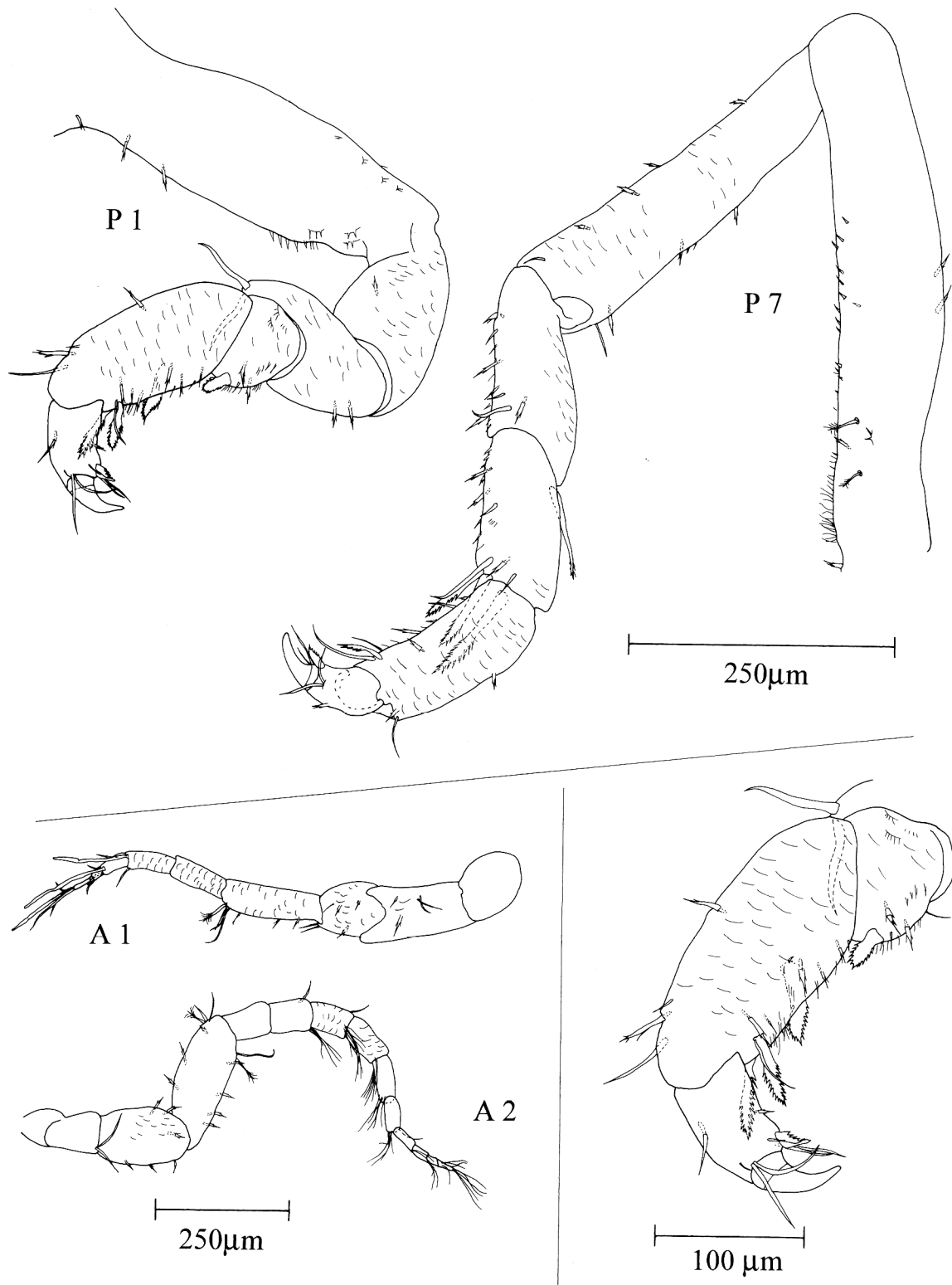


Fig. 12. *A. hanseni* Racovitza, 1907. Syntype, male, 3.1 mm (BMNH/London, reg. no. 1910.1.10.24), Mediterranean, Corse, Gulf of Ajaccio. Antenna 1 and 2, pereopod 1 and 7 and detail of pereopod 1

serrated carpal spines, about half as long as propodus.

Uropod exopodite lanceolate, apex curved outwards, distal lateral margins slightly concave.

Females can only be separated from the foregoing and the following species by the row of small acute teeth on the inner claw of dactyli.

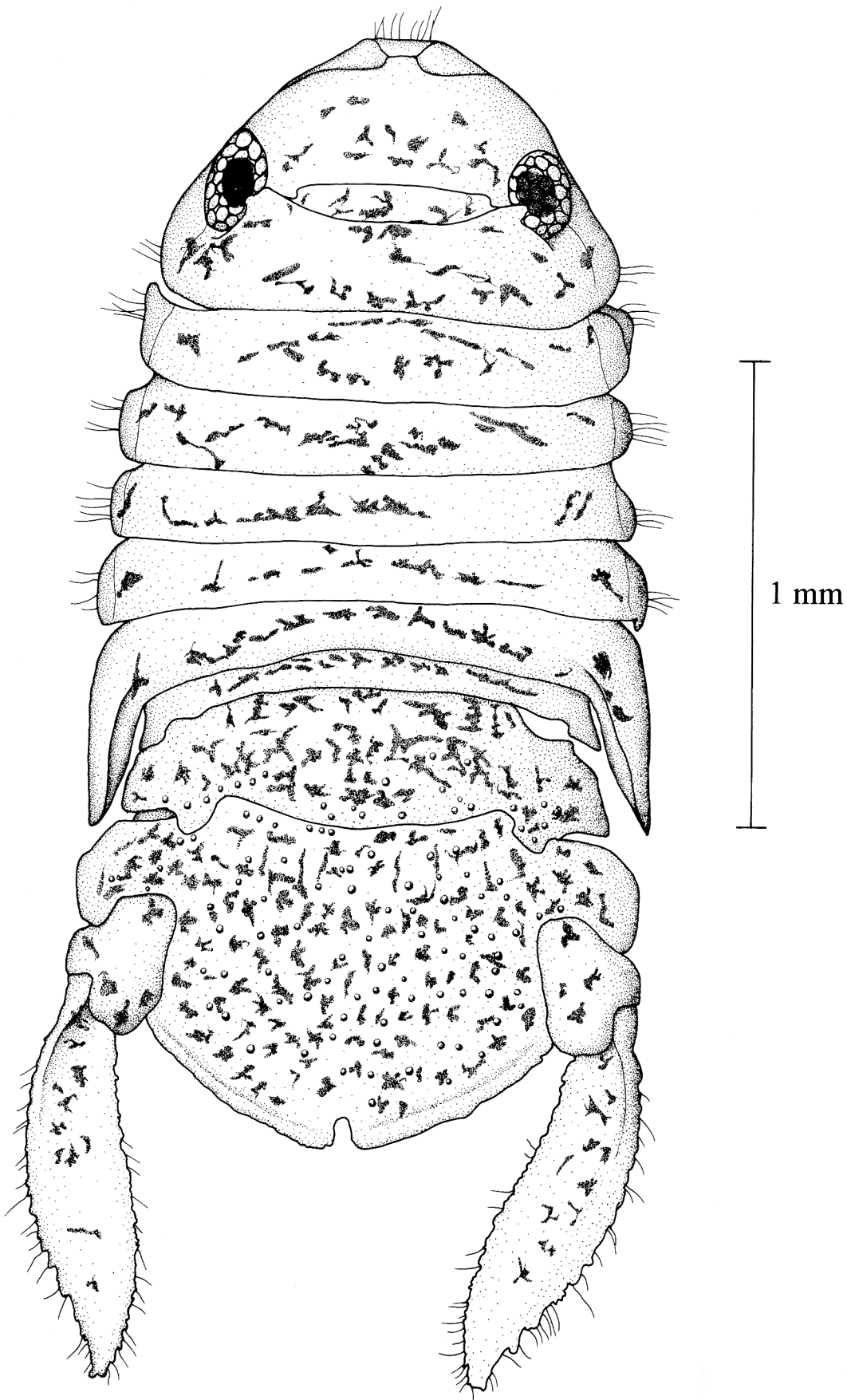


Fig. 13. *A. ischiana* Verhoeff, 1943. Type series, whole (male?) specimen mounted on microslide, 2.4 mm. Mediterranean, Gulf of Naples, Ischia, between Casamicciola and Lacco, under stones, 31. 3. 1942. Dorsal view

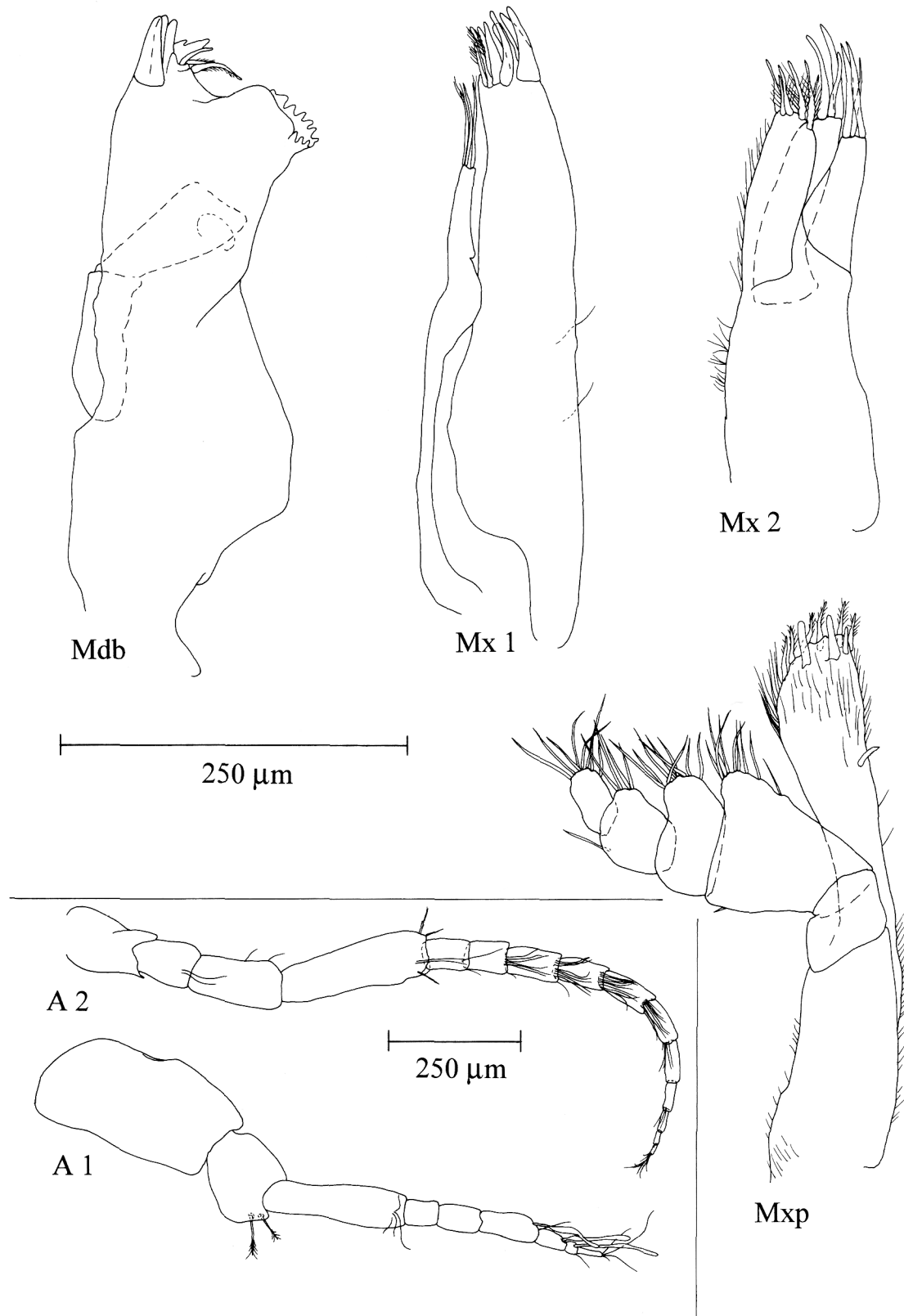


Fig. 14. *A. ischiana* Verhoeff, 1943. Type series, dissected specimens mounted on microslide. Mediterranean, Gulf of Naples, Ischia, between Casamicciola and Lacco, under stones, 31. 3. 1942. Antenna 1, antenna 2, mouthparts

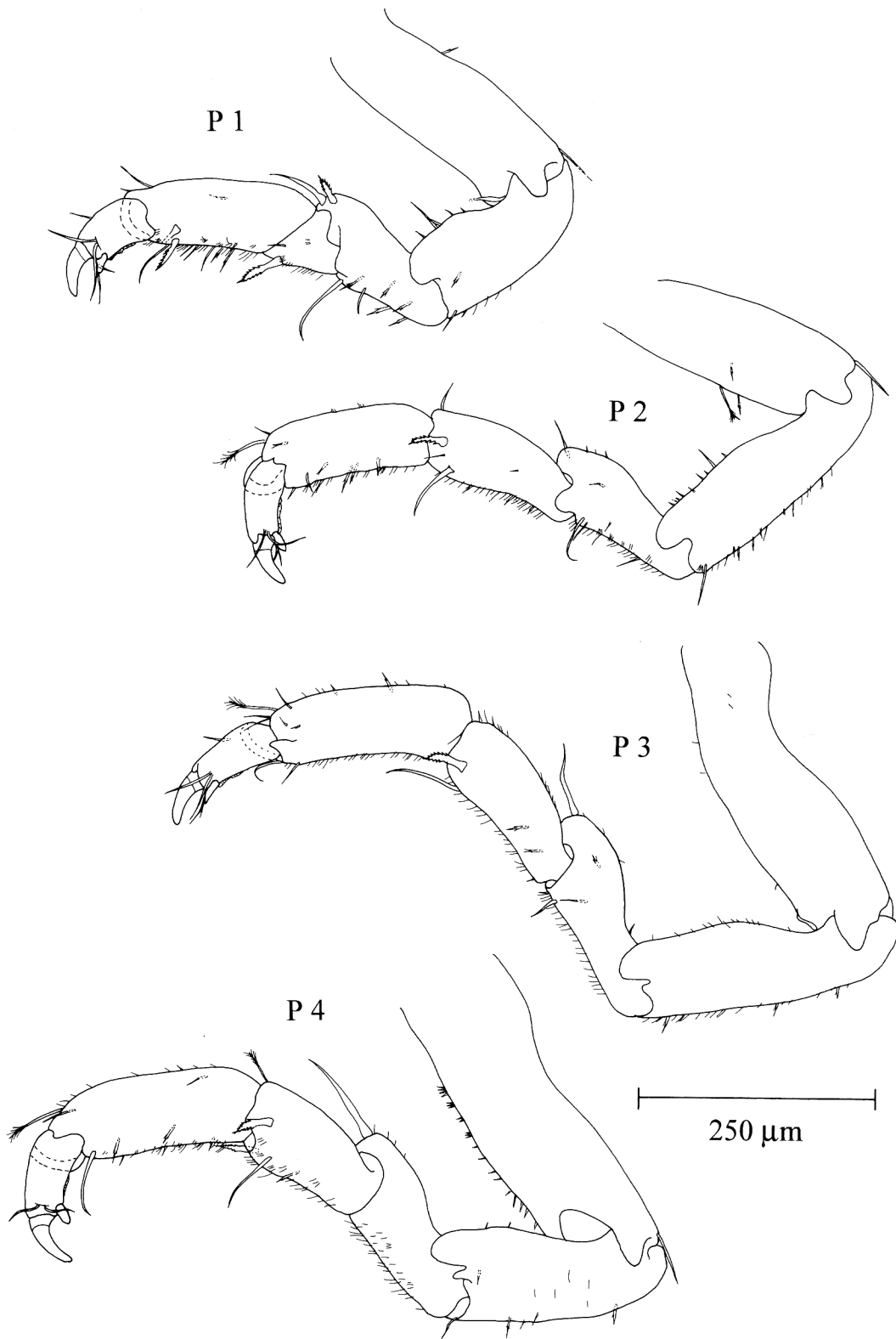


Fig. 15. *A. ischiana* Verhoeff, 1943. Type series, dissected specimens mounted on microslide. Mediterranean, Gulf of Naples, Ischia, between Casamicciola and Lacco, under stones, 31. 3. 1942. Pereopods 1–4

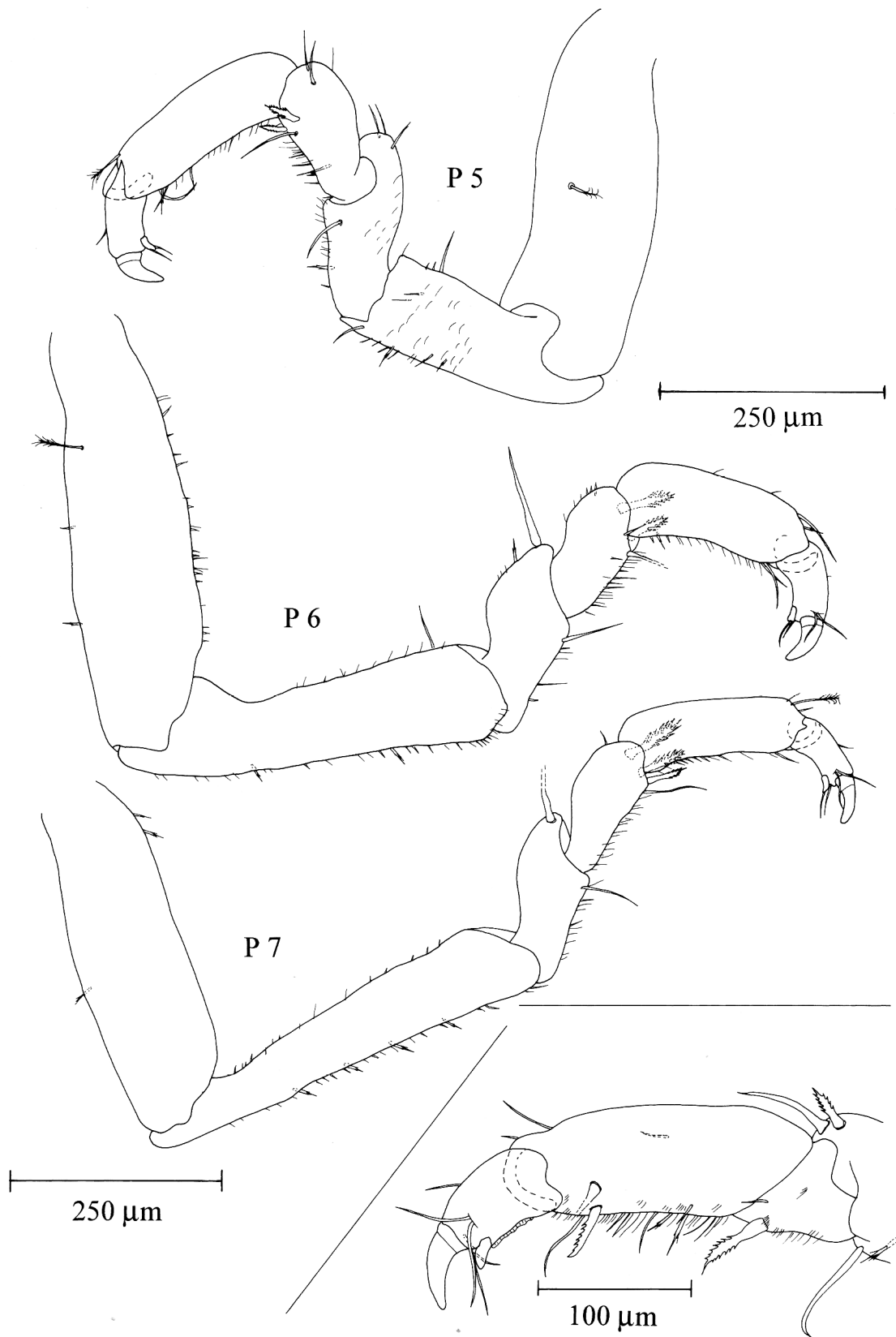


Fig. 16. *A. ischiana* Verhoeff, 1943. Type series, dissected specimens mounted on microslide. Mediterranean, Gulf of Naples, Ischia, between Casamicciola and Lacco, under stones, 31. 3. 1942. Pereopods 5–7, detail of pereopod 1

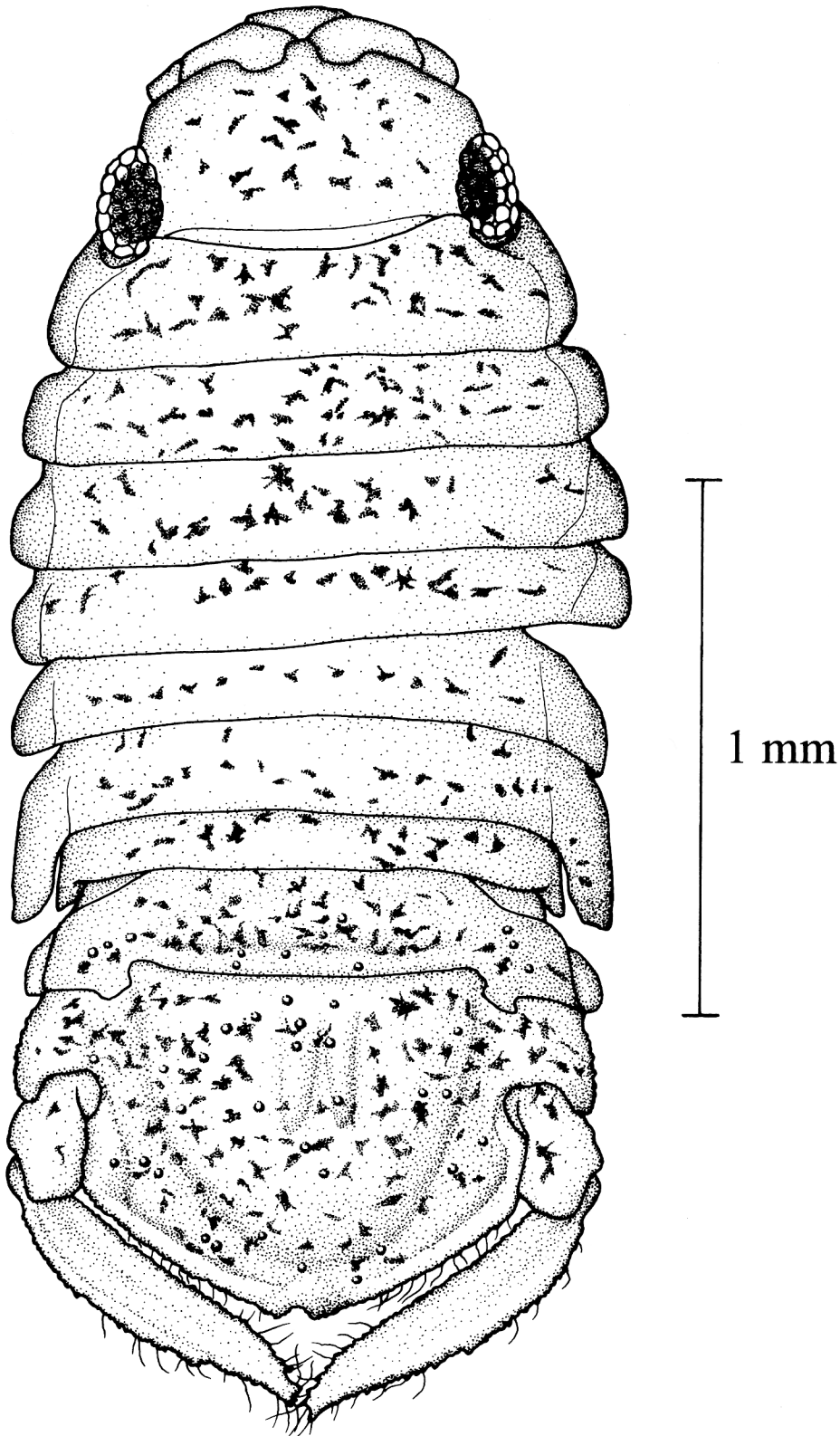


Fig. 17. *A. "armata"* Verhoeff, 1943 (= female of *A. ischiana* Verhoeff, 1943). Type material, whole female specimen as mounted on microslide, 2.4 mm. Mediterranean, Gulf of Naples, Ischia, between Casamicciola and Lacco, under stones, 31. 3. 1942. Dorsal view

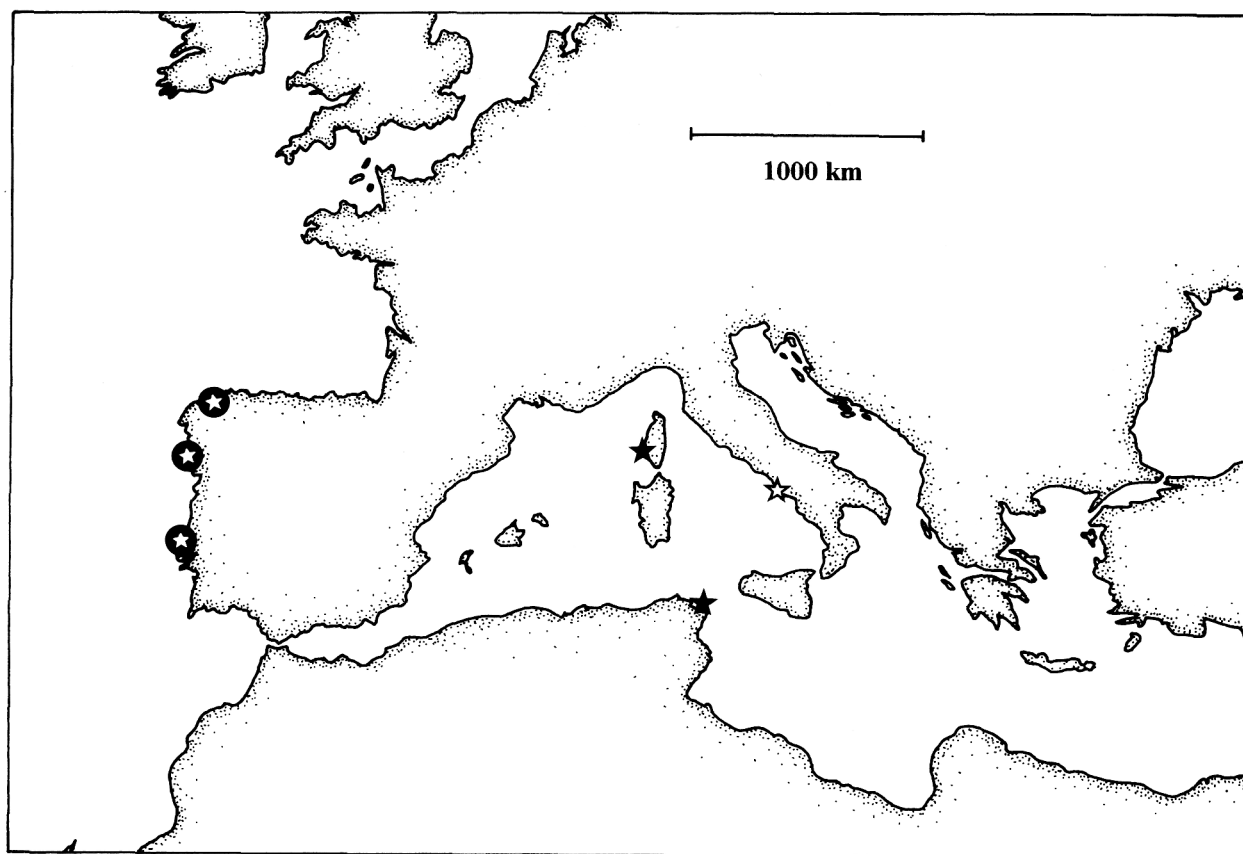


Fig. 18. Distribution of known species of *Anoplocopea*: *H. A. hanseni*, *P. A. ischiana*, *J. A. lusitanica*

***Anoplocopea ischiana* Verhoeff, 1943**

Synonym: *Anoplocopea armata* Verhoeff, 1943

Type material: *A. ischiana*, 8 microslides, Zoologische Staatssammlung (Munich), comprising 1 complete (2.4 mm) and 4 dissected specimens.

A. armata, 2 microslides, Zoologische Staatssammlung (Munich), comprising 1 dissected (ovigerous female) and one complete specimen (2.4 mm).

Type locality: Mediterranean, Gulf of Naples, Ischia, between Casamicciola and Lacco, under stones, 31. 3. 1942.

A. ischiana Verhoeff, 1943 has a strong morphological resemblance to the other species of the genus. The following description refers only to some striking differences. Details that were visible in the type material are presented in the drawings.

Description of male

figs. 13–16

Pleotelson (fig. 13) and pleon tuberculate. Posterior margin of pereonite 7 slightly concave, not bilobed. Transversal carinae on pereonite 6 and 7 and longitudinal carinae on pleotelson little pronounced. Antenna 1 (fig. 14) with 6 flagellar articles, articles 3–5 each with 1 aesthasc. Antenna 2 with up to 11 flagellar articles. Pereopods 1–7 (fig. 15–16) with small inner claw of dactylus smooth, no accessory teeth. Propodus of pereopod 1 with inner margin bearing only 2 serrated spines. One serrated spine on outer margin of merus.

Description of female

(fig. 17: type of Verhoeff's *A. armata*)

Females differ from male specimens in the following characters: coxal plates on pereonite 6 less acute than in males and little shorter. Uropod exopodite appearing more lanceolate. Dorsal surface more convex, especially on pleotelson.

Longitudinal pleotelsonic carinae inconspicuous and broad, fused anteriorly.

A. armata Verhoeff, 1943 (fig. 17) represents the female of this species. Examination of the type material has shown, that the two specimens of *A. armata* are 1 ovigerous and 1 non-ovigerous female. Verhoeff based his separation mainly on the form of the pleotelsonic hind margin and the smaller coxal plates of pereonite 6. Yet, it is a generic character in this genus that females bear only a shallow concavity instead of a pleotelsonic slit or foramen at the posterior margin and have smaller sixth coxal plates. It should have become apparent to him, that all his specimens of *A. ischiana* were young and adult males while the two *A. armata* specimens were females, especially as both his "species" were collected at the same locality.

Discussion

The atlantic species *Anoplocoepa lusitanica* n. sp. can easily be separated from the mediterranean species by their robust concave uropod exopodites, their pronounced dorsal carinae on pereopod 6 and 7, and the larger size. *A. hanseni* Racovitza, 1907 and *A. ischiana* Verhoeff, 1943 are rather similar. Striking differences for a separation are the bilobed posterior margin of pereonite 7 and the denticulate nature of the small inner claw of pereopods 1–7 in *A. hanseni*; the serrated spines on the pereopods are larger in

A. hanseni than in *A. ischiana*. Further well conserved material is needed for comparison of other details. The map (fig. 18) shows the distribution of the species discussed herein.

List of abbreviations

A1, 2	Antenna 1, 2
Mdb	mandible
Mx1, 2	maxilla 1, 2
Mxp	maxilliped
P1–7	pereopods
Plp1–5	pleopods

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