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A NEW SPECIES OF *ECHINOGAMMARUS* FROM NORTHERN SPAIN,

ECHINOGAMMARUS PSEUDO-AQUILIFER NOV. SPEC.

(CRUSTACEA, AMPHIPODA)

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ABSTRACT

New material of the genus *Echinogammarus* belonging to the *berilloni*-group was collected in the western Pyrenees and north-western Spain. In material from spring regions and caves a new species was found, which in general appearance seems to be intermediate between *E. berilloni* s.s. and *E. aquilifer*. A comparative description of the new species is given along with some notes on the ecology of *Echinogammarus berilloni*.

INTRODUCTION

In 1973 Pinkster published an extensive account on the *berilloni*-group of the genus *Echinogammarus* Stebbing, 1899, based on intensive systematic sampling in many parts of France and in all drainage systems of the Iberian peninsula (Pinkster, 1973). From this paper it became clear that 9 out of 10 species known in this group are restricted to rather small areas in

the northern half of the Iberian peninsula.

Especially the western Pyrenees and the northern provinces of Spain, facing the Atlantic Ocean appeared to be very rich. Since 1973 a lot of new material was collected in these areas in particular from wells, caves, spring areas and upper courses of stream systems. In accordance with Pinkster's cited paper it was found that *E. berilloni* (Catta, 1878) was the common species in all

samples from the more downstream parts of the river systems, while other species occur in the faster running, upper courses and spring regions of these systems. In the western Pyrenees this appeared to be *E. aquilifer* Pinkster, 1969, but in the material from the foothills of the Cordillera Cantabrica a new species was found, described here under.

DESCRIPTIVE PART

Echinogammarus pseudoaquilifer n.sp.

Material examined.-

Spain

prov. Santander:

- Small brooklet, partly underground near Cuévas de Altamira, NW of Torrelavega, 7-III-1977, 30 cm wide, 30 cm deep, with gravel bottom, 38 specimens among which 10 precopulations (the ♂ holotype, ♀ allotype and 36 paratypes have been deposited in the Zoölogisch Museum Amsterdam, under cat. no. ZMA Amph. 106.460 a, b and c).
- Small well near parking lot of Cuévas de Altamira, NW of Torrelavega, 7-VII-1977, 50 cm in diameter, 70 cm deep, 12 specimens among which one precopulation.
- Small confluent of Rio Deva, crossing road between Panes and La Hermida, 30-III-1971, 5 specimens.

prov. Vizcaya:

- Small, partly covered well on right bank of Rio Carranza, E of Molinar, 22-VII-1979, about 150 specimens, many of them in precopulation.

prov. Guipúzcoa:

- Small brooklet, about 200 m from the Atlantic at Santurraran (= W of Deva), 18-VII-1979, 10 cm deep, 20 cm wide, gravel bottom, moderately fast running, 59 specimens many of them in precopulation.
- Small confluent of Rio Urola, near Virgen de Iciar, on road N 634 between Zumaya and Deva, 30-III-1971, alt. 280 m, fully overshadowed, 30 specimens.

prov. Oviedo:

- Stagnant pool in Cueva del Pindal, about 500 m from entrance, near village Pimiango, NW of Unquera, 31-VII-1979, 1 specimen.

Diagnosis.-

A large species, making a slender impression. Abdominal segments covered with numerous, often very long setae. Antenna 2 with a flag-like brush of setae on the inner surface of the flagellum. Pereiopods 3 to 7 with many long, often curled setae.

Description.-

Male: The maximum length observed in six samples is 18 mm. The urosome segments, more particularly the 1st and 2nd, each have a low but distinct dorsal hump, which however is usually hidden under dense clusters of long, curved setae, and sometimes with small spines in between the setae. This setation which occurs also on all metasome segments, is rather short in juveniles but becomes gradually longer with each moult (Fig. 3B).

Lateral cephalic lobes more or less truncated. Eyes reniform, more than twice as long as wide, situated not very close to the middorsal line (Fig. 1A).

First antenna more than half as long as the total body length. Peduncle segments 1 and 2 about equal in length. Number of segments in the flagellum and accessory flagellum rather variable, 35 to 46 and 4 to 7, respectively. Armature of both peduncle and flagellum poor (Fig. 1C).

The second antenna (Fig. 1D) shows one of the discriminating characters of the species. It is shorter than the first. The short gland cone attains about the middle of the 3rd peduncle segment. The 4th and 5th peduncle segments long and slender, armed with many groups of short spines and short setae. In some populations the setae are longer towards the distal end of the 5th peduncle segment (Fig. 4D'). The flagellum consists of 18 to 23 segments, each armed with a transverse row of setae on the inner surface, which together form a flag-like brush. Calceoli have not been found.

The mouth parts are basically identical to those illustrated for *E. berilloni* by Pinkster (1969). First segment of the mandibular palp (Fig. 1B) unarmed. Sometimes some small setules are implanted on the inner surface of the 2nd segment. Inferior margin armed with a comb-like row of 24 to 32 D-setae, slightly differing in length, and 4 to 6 E-setae, some of these being plumose. Usually two groups of A-setae and two groups of B-setae are present. (For terminology, see: Karaman & Pinkster (1977)).

Coxal plates 1 to 7 well developed. Inferior margins of the 1st to 4th coxal plates are rounded, set with short setae (Figs. 1E, F, 2A, 3A).

Propodus of first gnathopod (Fig. 2A) pyriform, the palm oblique. There is no clear separation

between the medial palmar spine and the palmar angle spine. The medial palmar spine gradually merges into the palmar angle spines and into the smaller spines along the posterior margin.

Propodus of the 2nd gnathopod less elongate but much stronger developed than the first. The palm is less oblique, more transverse. There is no distinct medial palmar spine, but a group of spines near the palmar angle. Many groups of short setae are implanted on the inner and posterior surface.

Last three segments of the third pereopod (Fig. 1E) bearing groups of long, often curved setae along the posterior margin. Number of setae somewhat variable; their length usually 1.5 to 2 times as long as the diameter of the segments. Dactylus rather short.

Setation of the last three segments of the 4th pereopod (Fig. 1F) less dense and shorter than in pereopod 3.

Basal segment of pereopod 5 (fig. 3B) is about 1.5 times as long as wide. The anterior margin armed with many tufts of setae and spines, increasing in length and number with age. Posterolateral surface set with some groups of setae. Ischium, merus and carpus each with groups of spines and setae along the anterior margins.

The same type of armature, but progressively more developed can be found in pereopods 6 and 7 (Fig. 3C, D). In these legs, the anterior margins of basis, merus and carpus are armed with densely implanted tufts of short setae. Moreover, the posterior margin of basis and merus, as well as the posterolateral surface of the basis, is set with groups of long (or very long in P 7) setae. In all pereopods the relative length of the segments as well as the density of the setation increases with age.

Inner ramus of the 3rd uropod (Fig. 1G) very short and reduced. Exopod armed with clusters of setae (sometimes intermixed with 1 or 2 spines) on the inner and outer margins. The 2nd segment of the exopodite is reduced, as long as or slightly longer than the first exopodal segment.

Telson lobes a little shorter than the pedunculus of uropod 3. A spine and one or two groups of additional setae are implanted on the

outer margin. Some spines and many long setae form the apical armature; the dorsal surface is never armed.

Metasome segments, urosome segments and the epimeral plates (Figs. 2B, B') armed with clusters of long, very often curved setae, sometimes with small spines in between. The number and length of these setae increase with age. Almost invisible underneath these setae, the meta- and urosome segments bear a dorsal hump.

Female: Smaller than the male (maximum length 15 mm). Like in all other members of the *berilloni*-group, there exists a marked sexual dimorphism. The setation of the peduncle segments of the 1st and 2nd antenna (Fig. 2D) is longer than in the male. The characteristic brush-like aspect of the flagellum of the 2nd antenna is almost absent. The propodus of the gnathopods is relatively smaller than in the male; the palm is almost transverse and the total number of spines is reduced. Otherwise, the characters found in the male are less pronounced in the female. Thus, the long setae on the basis of P5 to P7 are almost absent, just as the long setae on the epimeral plates; the setae on the dorsal surface of meta- and urosome are always present but less numerous and much shorter than in the other sex.

Variability.-

In general the variability pattern is similar to that discussed by Pinkster (1973): number of segments in the flagella; shape of epimeres; dorsal armature; telson; the number of setae on the appendages.

Ecology and distribution.-

This species inhabits a rather restricted area in the North of Spain. It is found under stones and in between gravel in wells, entrances of caves and narrow, clear upper reaches of mountain streams in the foothills of the Cordillera Cantabrica. In the middle and lower reaches it is replaced by *E. berilloni*.

Remarks.-

At first sight *E. pseudoaquilifer* seems intermediate between *E. aquilifer* and *E. berilloni*. It resembles the first species in the structure

of the 2nd antenna and of the gnathopods, but clearly differs from it in the armature of meta- and urosome, epimeral plates and telson, and armature of pereopods 3 to 7. It differs from *berilloni* in the presence of a brush-like flagellum on the 2nd antenna, and in the structure of gnathopods 1 and 2. In this respect it also differs from *E. feminatus* Pinkster, 1973; *E. longisetosus* Pinkster, 1973; *E. tarragonensis* Pinkster, 1973; *E. calvus* (Margalef, 1956); *E. echinosetosus* Pinkster, 1973, and *E. margalefi* Pinkster, 1973. It differs from *E. meridionalis* Pinkster, 1973, and *E. villaticus* Mateus, 1974, in its dorsal armature and the absence of long setae on the peduncle segments of A2. Finally it differs from *E. zebrinus* Pinkster & Stock, 1971, in the structure of the gnathopods (with a medial palmar spine in *E. zebrinus*) and the armature of the dorsal surface.

Pinkster (1973) and Van Maren (1975) already stressed the wide ecological range of *Echinogammarus berilloni* recording its occurrence in estuarine (Pinkster) and intertidal (Van Maren) habitats. Again, during the present investigation *E. berilloni* was found on the open sandy beach in three different localities on the Atlantic coast of Spain and France. However, and unlike the situation described by Pinkster (1973) this species appears to be able to penetrate into spring regions and even into caves if no other species are present. It was found in six

different localities in the Cuéva de Sangazo, W of Samano, in the Spanish province of Santander, at hundreds of meters from the entrance.

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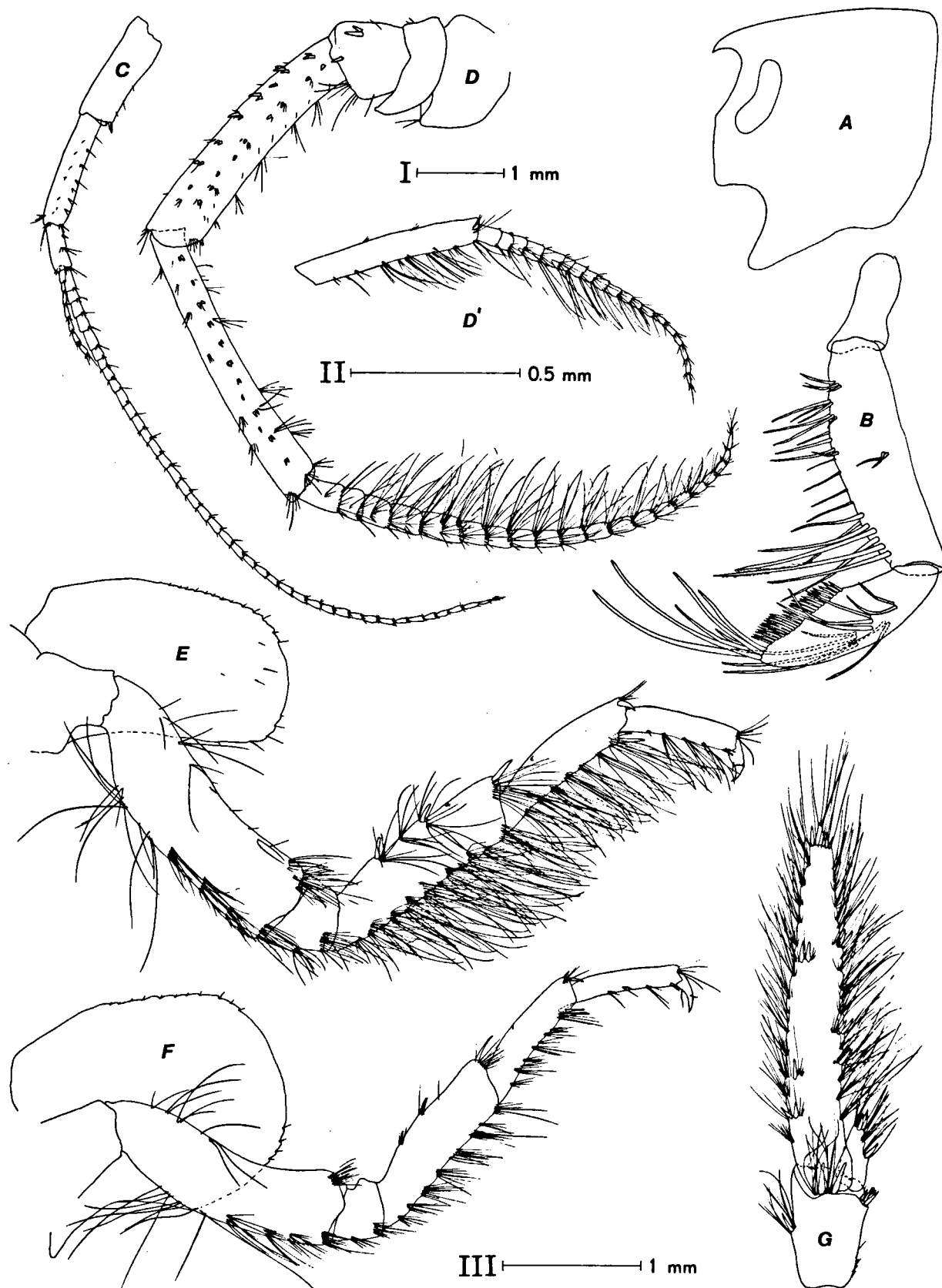


Fig. 1. *Echinogammarus pseudoaquilifer* n.sp. ♂ from the type locality, A, cephalic segment (scale IV); B, mandible palp (II); C, first antenna (I); D, second antenna (III); D', detail of another second antenna (III); E, third pereopod (III); F, fourth pereopod (III); G, third uropod (III).

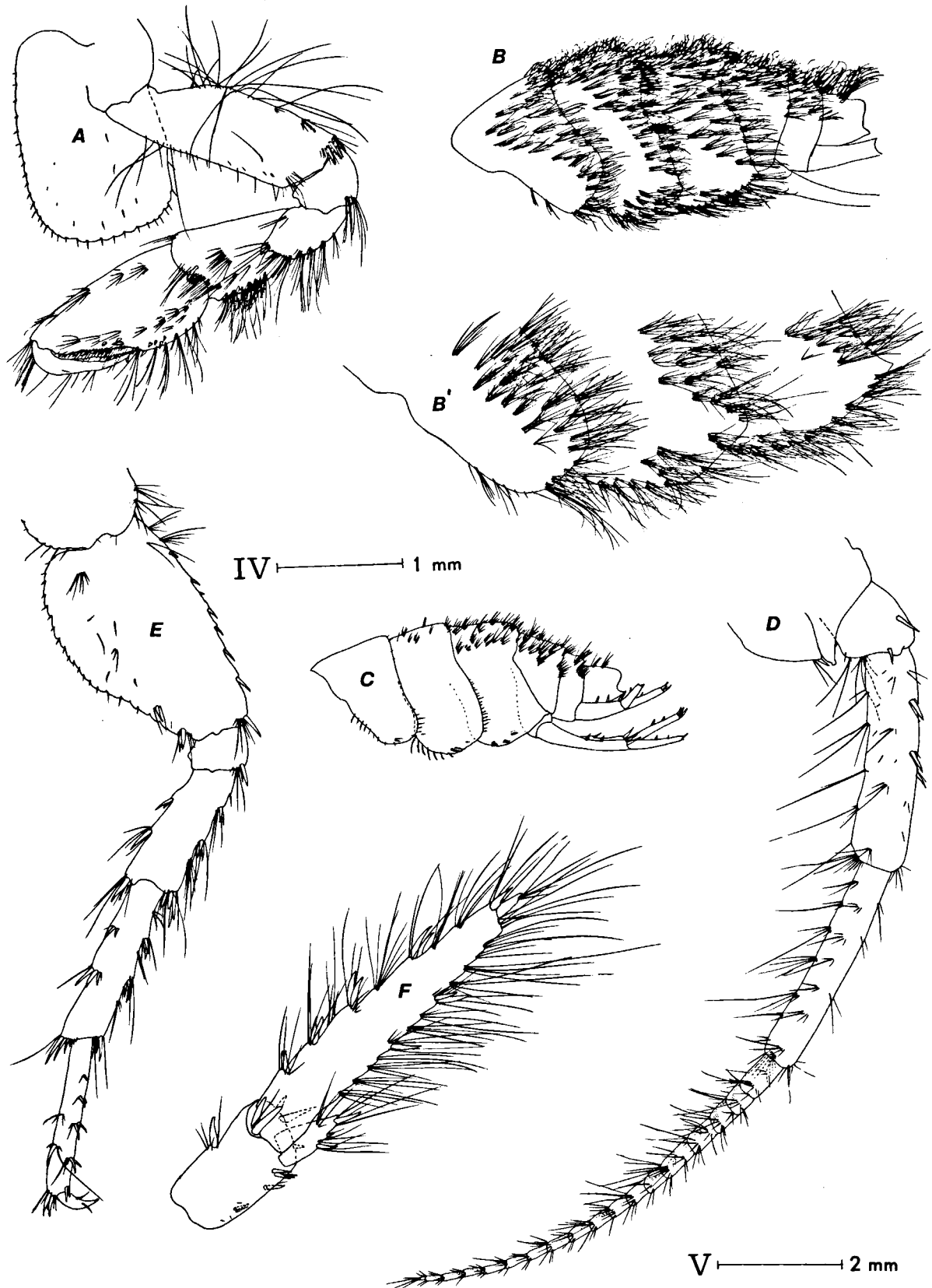


Fig. 2. *Echinogammarus pseudoaquilifer* n.sp. A, B, B' and F ♂, from the type locality; C-E, ♀ from the type locality. A, first gnathopod (III); B, pleosome and urosome (V); B', epimeral plates (IV); C, pleosome and urosome (V); D, second antenna (III); E, seventh pereopod (III); F, third uropod (III).

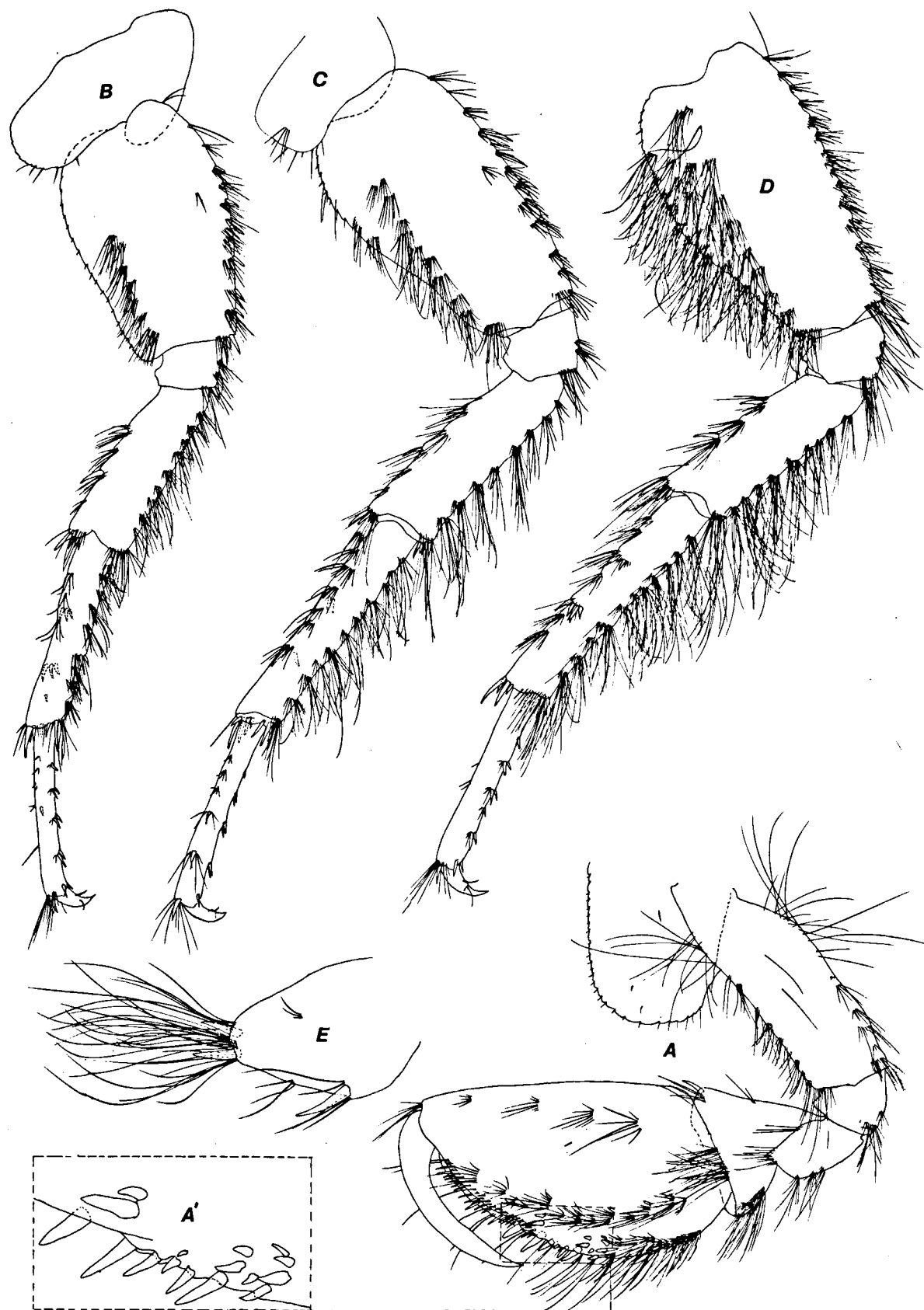


Fig. 3. *Echinogammarus pseudoaquilifer* n.sp. ♂, from the type-locality; A, second gnathopod (III); A', detail of propodus of second gnathopod (IV); B, fifth pereopod (III); C, sixth pereopod (III); D, seventh pereopod (III), E, telson lobe (III).