

CONTRIBUTIONS TO THE STUDY OF THE GENUS
AMPHIASCUS SARS (PART.), COPEPODA, HARPACTICOIDA
FROM THE BLACK SEA

AMÉLIE MARCUS

On décrit une espèce nouvelle, *Amphiascus longarticulatus* n.sp., ainsi que le mâle de l'espèce *A. polapinquus* Marcus, les deux recueillis dans le champ de *Phyllophora* de la Mer Noire.

We continue our study on the copepoda material collected in the *Phyllophora* field of the Black Sea, (8), a material given for determination purposes by Victoria Tigănuș, candidate for a doctor degree. The present paper deals with two species belonging to the genus *Amphiascus* Sars (part).

A. longarticulatus is a species new to science. *A. polapinquus* Marcus has been described only on the basis of females.

Amphiascus longarticulatus n.sp.
(Fig. 1—4)

Holotype: 1 ♀ in the collection of the Museum of Natural History "Gr. Antipa", no. 252; allotype: 1 ♂, ditto, no. 253.

Material examined: 111 specimens; 59 ♀, 40 ♂, 12 juv.

Location: *Phyllophora* field of the Black Sea. Date: X.1969. Depth: 31—45 m. Stations: 1134, 1140, 1142, 1143.

Description

Female, (fig. 1 a). Total length 0,860 mm (0,800—0,920 mm). Maximal width 0,230 mm (0,220—0,250 mm). Rostrum, (fig. 1 c) prominent, triangular. Genital double somite divided by a chitinous stripe, centrally disrupted on the ventral surface. Still on the ventral side, a row of spinules in the superior half of somite, above the chitinous stripe. Inferior margin

of abdominal somites, each with one row of dorso-lateral spinules, which on the ventral face are discontinuous. Genital area as in fig. 2 g. Furca, (fig. 3 e) almost quadrilateral, a little broader than long, the ratio being 1.12—1.32. Furcal inner seta (fig. 3 e) slightly swollen at base.

Antennula, (fig. 1 c) 8-segmented. Segments one and two with a diameter broader than in the other 6. Segments two and four of subequal length about twice as long as the third segment.

Antenna, (fig. 2 e) Exopodite and endopodite trisegmented. Coxa small, bare. Allobasis with a seta inserted about the middle of the anterior edge. First segment of exopodite with a seta, the second one bare, the third with four setae, one inner lateral and three apical.

Mandible, (fig. 2 a). Pars incisiva strongly dentate. Exopodite and endopodite normally developed.

Maxillula, (fig. 2 b). Exopodite and endopodite of subequal size.

Maxilla, (fig. 2 c). Syncoxa with three endites of which the first bearing three and the other two by two apical setae each. Basis with claw, an apical seta and a long superficial seta.

Maxillipede, (fig. 2 d). The second segment of endopodite with a long apical claw and two setae.

Leg 1, (fig. 3 a). Exopodite consisting of three segments equal in length. Endopodite also trisegmented. Distal segment thrice as long as the intermediate one bearing three apical setae. The seta inserted in the outer corner is stronger and slightly sinuous at the middle. Central seta about twice as long as the inner one.

Legs 2—4, (fig. 3 b-d). The third inner seta of distal segment of exopodites in legs 3—4 is short. Setae and spines formula:

	Ex.		End.	
P2	1.1.	2.2.3.	1.2.	1.2.1.
P3	1.1.	3.2.3.	1.2.	3.2.1.
P4	1.1.	3.2.3.	1.1.	2.2.1.

Leg 5, (fig. 2 f). Exopodite with 6 setae; basiendopodite with 5 setae.

Male, (fig. 1 b). Total length, 0.565 mm (0.560—0.575 mm). Maxima, width 0.173 mm (0.170—0.175). Furcal inner seta normal as against the female where it is swollen in the basal portion.

Antennula, (fig. 1 c) with usual dimorphic modifications.

Antenna and mouthparts as in female. Basipodite of leg 1 with three spines (fig. 4 b).

Leg 2, (fig. 4 d). Distal segment of endopodite with three setae, one apical seta and two juxtaposed outer spines. Of these outer spines the inferior one is bifid at the tip, a structure obvious only in certain positions.

Leg 5, (fig. 4 a). Exopodite with two strong, plumose setae of different length. Endopodite with six setae, four strong, plumose and two fine, bare.

Etyymology. (From latin, longus, articulus). The name, was suggested by the length of the furca, of the segments 2 and 4 of A1 and of that of the distal segment of endopodite of P1.

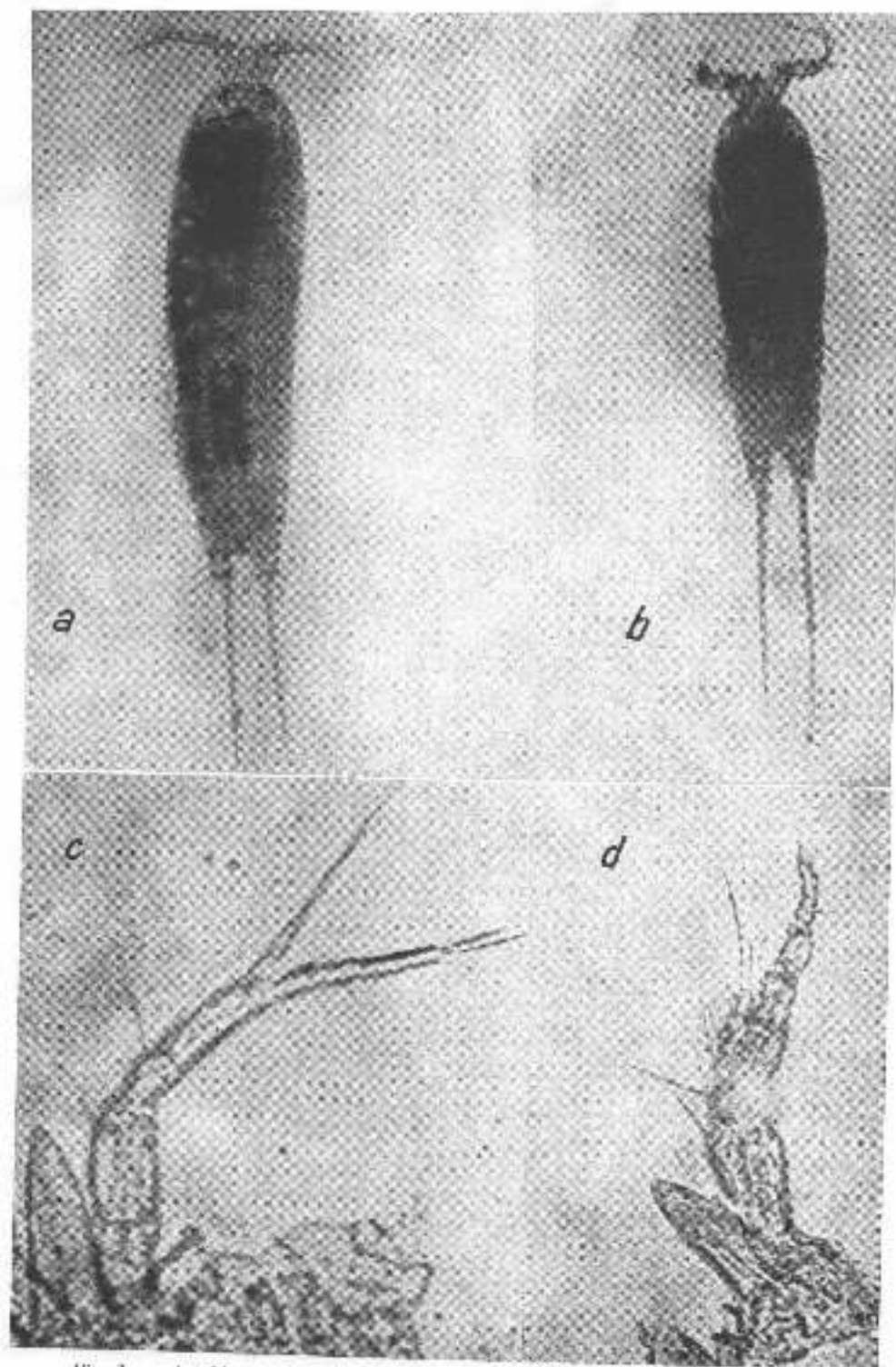


Fig. 1. — *Amphiosus longicaudatus* ♀ and ♂. a — ♀; b — ♂; c — Al♀; d — Al♂.

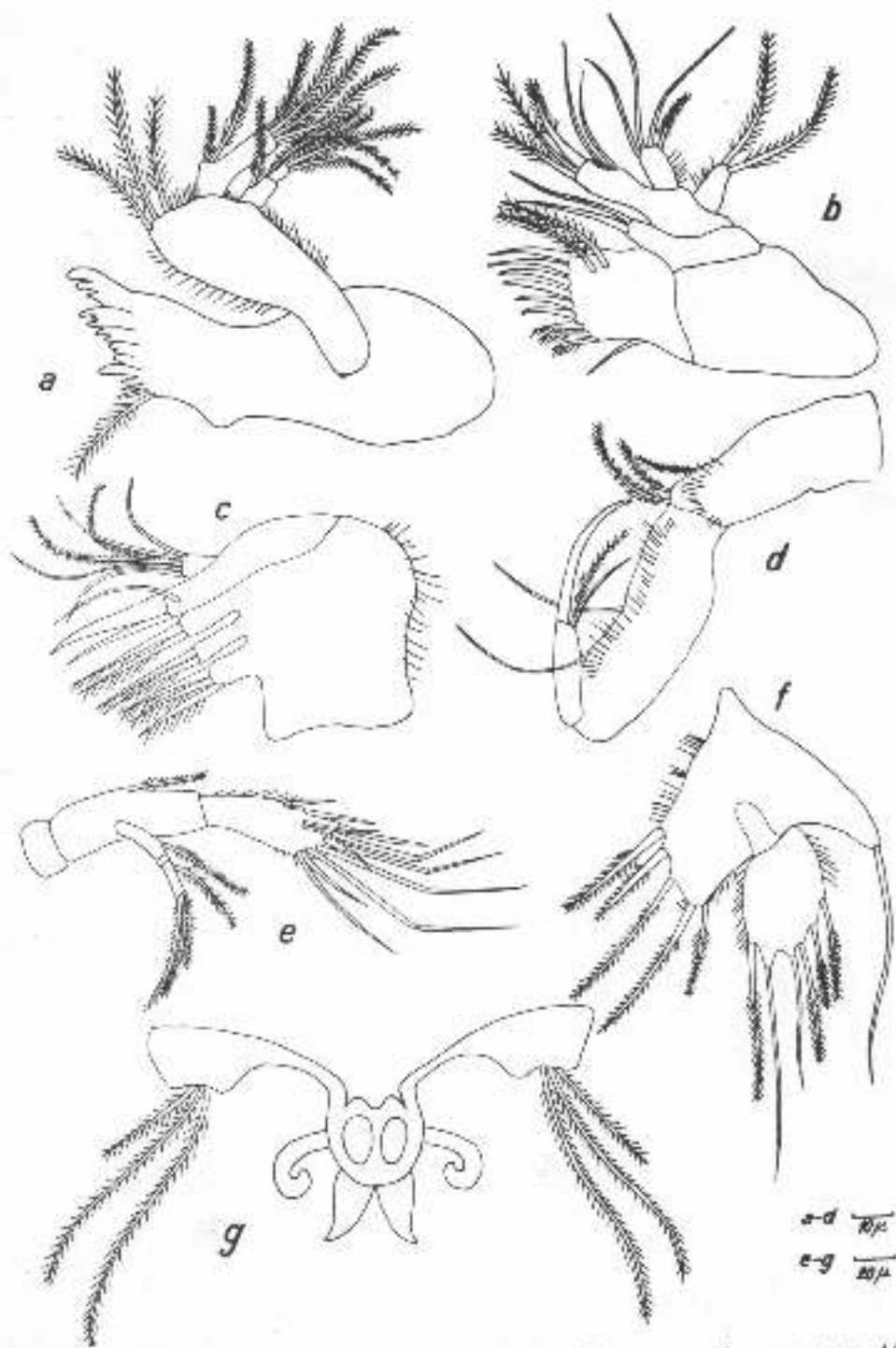


Fig. 2. — *Amphiascus longarticulatus* ♀. a — und.; b — mx3; c — mx., d — mxp.; e — A2; f — P5; g — genital area.

Diagnose. ♀. Furca a little broader than long. Segments 2 and 4 of Al long. Last segment of endopodite P1 thrice as long as the last but one segment. Outer apical seta of the distal segment of endopodite P1, slightly sinuous in the median portion. Exopodite P5 with 5 setae, endopodite with 6 setae.

♂. Absence of sexual dimorphism at maxilliped level. Distal segment of endopodite P2 with two outer juxtaposed spines, the inferior one bifid at the tip. Exopodite P5 with 2 setae endopodite with 6 setae.

Discussion

The systematics of the complex genus *Amphiascus* is so confuse that Lang (6) does not assume the responsibility of a determination key. In the first place the confusion is due to the many incomplete, inadequately illustrated descriptions, and, on the other hand, to the high individual variability.

Within the genus, Lang (5) delimits four groups of species: *minutus*, *varians*, *pacificus*, *amblyops*.

The major taxonomic difficulties appear especially in the *minutus* group to which belongs our species too. Within this grouping Lang (6) separates a subgrouping of species, *A. caudaespinosus*, *A. graciloides* and *A. paracaudaespinosus*, giving some remarks worth mentioning since *A. longarticulatus* presents systematic similarities with this subgrouping, with *A. paracaudaespinosus* respectively, as we are going to demonstrate in the following.

Klie (4) describes the species *A. graciloides* with the subspecies *trisetatus* stating the belonging of the species to the *minutus* group and pointing out the presence of three setae at the basiepodite P5 ♂, a character of the *varians* group.

Lang (6) considers the species as related to *A. caudaespinosus* but invalidates the existence of the subspecies *trisetatus*. The fact that the type-species was found together with the specimens presenting the particularities which determined Klie to create a new subspecies, invalidates indeed the existence of this subspecies. It deals, of course, with an individual variability.

Roc (12) describes the species *A. paracaudaespinosus* pointing out the resemblance with *A. caudaespinosus*, which Lang (6) accepts, also finding certain differences between the two species. However, he leaves the validity of the species *paracaudaespinosus* under the sign of doubt. Lang explains this uncertainty by the assumption that Brian (2), the author of the species *A. caudaespinosus*, did not observe the presence of a shorter seta on the distal segment of exopodite P4, which was shown in *A. paracaudaespinosus*. Even if Brian and Monard (2, 9) who were also later concerned with this species, overlooked the existence of this seta, in our opinion, *A. paracaudaespinosus* presents sufficient differences as against *A. caudaespinosus* to be considered as good species.

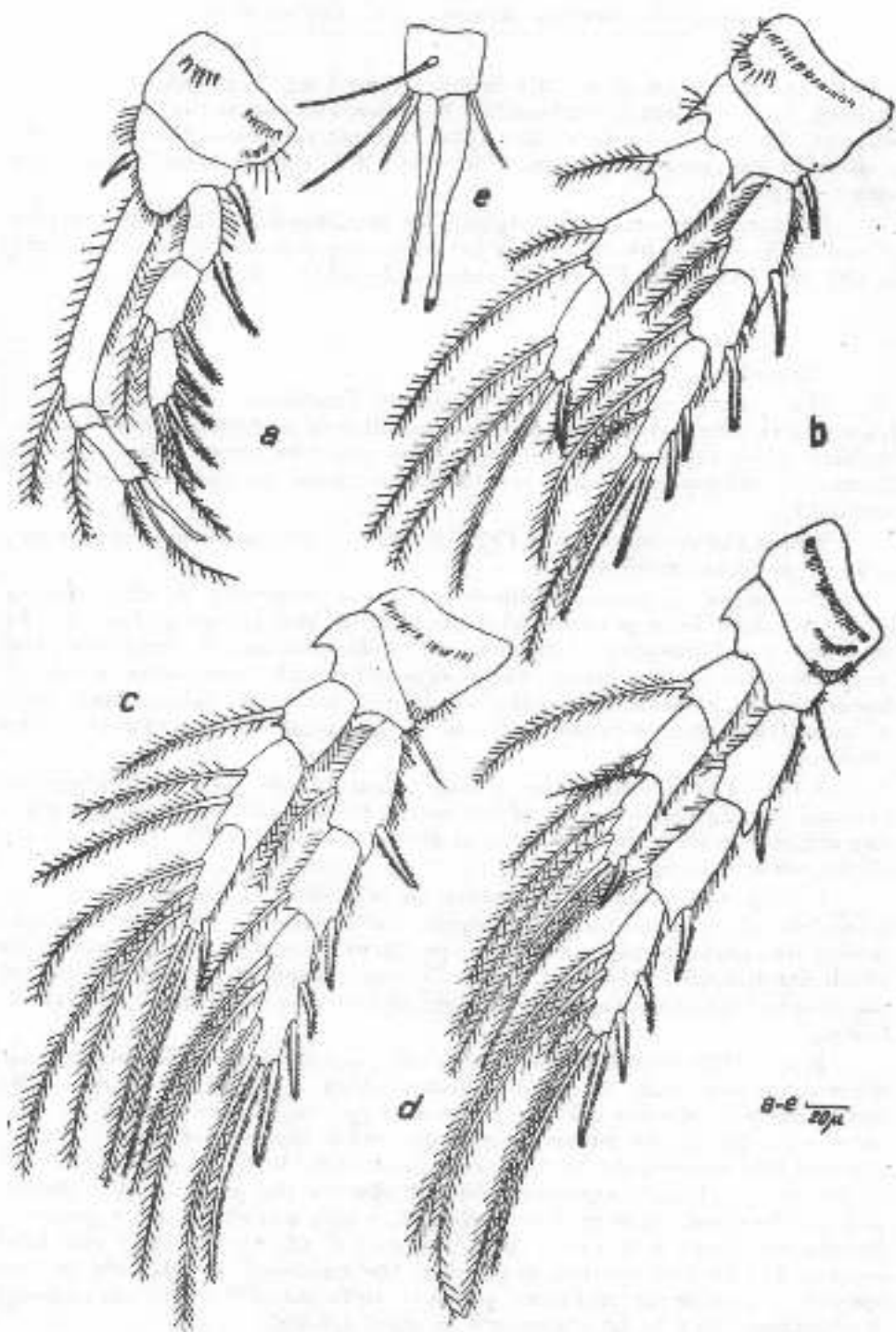


Fig. 3. — *Amphiascus longarticulatus* ♀. a — d = P1 — P4; e = fu.

In the conclusion of the paragraph devoted to the above mentioned species, L a n g (6) points out the necessity of examining a high number of specimens belonging to the respective species in order to elucidate their kinship.

A. caudaespinosus is obviously allied with *A. graciloides*, whereas *A. longarticulatus* resembles mostly *A. paracaudaespinosus*, as it results from the table below.

<i>Amphiascus paracaudaespinosus</i>		<i>Amphiascus longarticulatus</i>
♀		
Length	0,650 mm	0,860 mm
Fa.	In both species wider than long	
A1	3-segmented. Segments 1, 2, 3 and 4 of equal length	3-segmented. Segments 2 and 4, the longest, about twice as long as segment 3
A2	Segment 3 of exop. with 2 apical setae	Segment 3 of exop. with 3 apical setae
Mx.	Basipodite without seta on surface	
P1	Segment 3 of endop. 2—2.50 as long as segment 2	Segment 3 of endop. thrice as long as segment 2
P2—4	Setae and spine formula identical in both species	
P5	Exop. with 6 setae, basiendopodite with 5 setae in both species	
♂		
Length ?		0,565 mm
P2	Outer inferior spine of distal segment of endop., normal	Outer inferior spine of distal segment of endop., bifid at the tip
P5	Exop. with 6 setae, 5 plumose. Basiendopodite with 2 plumose setae of equal length.	Exop. with 6 setae, 4 plumose. Basiendop. with 2 plumose setae of different length.

We emphasize that *A. longarticulatus* is the only representative of the minute group in which the distal segment of exopodite P1 is thrice as long as the median one, a morphological feature present in certain species belonging to the *varians* group, *A. tenellus*, *A. polaris*. By this anatomical structure *A. longarticulatus* establishes a relationship with the *varians* group, just like *A. graciloides* in which the basipodite P5 ♂ presents similarities with the same group.

To the difficulties of systematics, specific to the genus *Amphiascus*, revealed by L a n g (6) also some inconsistencies in the determination key given by the same author in a previous paper (5), may be added. We point out these inadvertences in order to obviate any confusion which might occur in the determinations.

The species *A. tenuiremis* and *A. congener* are classified in the key, as belonging to the grouping presenting the following characteristics: a) A1

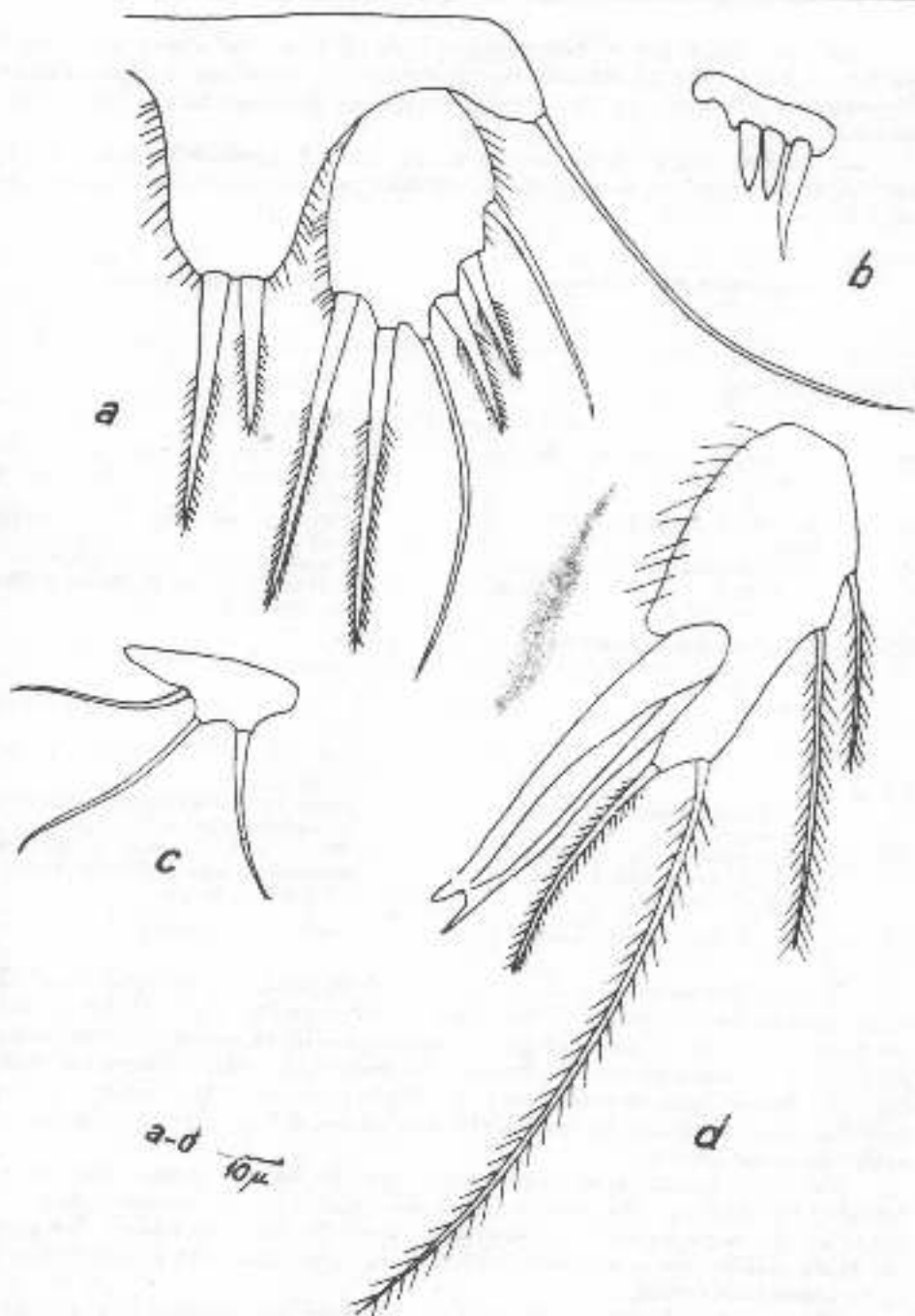


Fig. 4. — *Amphiscus longarticulatus* J. a = P5; b = P1 basis; c = P6; d = P2 endop.

with segments 3 and 4 subequal and b) P1 with median segment of exopodite not elongate. The antithesis: a) Segment 3 of A1 much shorter than segment 4, and b) median segment of exopodite P1, elongate.

A. tenuiremis. A1. According to the text and the figure given by Sars segments 2 and 4 appear as equal, and longer than the others, segment 4 even twice as long as 3. The original description (1) is in accordance with the text.

P1. In the text and in the figure segment 2 of exopodite P1 is shown somewhat longer than the others; this elongation is more obvious in the original description.

A. congener. A1. Text and figure represent segments 1, 2 and 4 subequal whilst segment 3 shorter.

The study of the pontic material and of bibliography makes us suggest the following key for the *minutus* group.

- | | | | | |
|----|------|---|---|----|
| 1 | (2) | P3—4, segment 1 of exop. without inner seta.... | <i>A. demersus</i>
Nicholle | |
| 2 | (1) | P3—4, segment 1 of exop. with inner seta | | 3 |
| 3 | (4) | P5, exop. with 7 setae | <i>A. brevis</i> Sars.. | |
| 4 | (3) | P5, exop. with 6 setae | | 5 |
| 5 | (6) | P5, endop. with 4—5 setae. The fifth outer seta is either absent or very short | | 7 |
| 6 | (5) | P5, endop. with 5 setae | | 9 |
| 7 | (8) | P5, exop. very elongate and acute distally.... | <i>A. hirtus</i> Gurney | |
| 8 | (7) | P5, exop. very rounded | <i>A. gracilis</i> Lang | |
| 9 | (10) | Fu., longer than wide | <i>A. tenuiremis</i> Brady and
Robertson | |
| 10 | (9) | Fu., wider than long | | 11 |
| 11 | (12) | Fu., twice as wide as long | <i>A. minutus</i> (Claus) | |
| 12 | (11) | Fu., less than twice as wide as long | | 13 |
| 13 | (14) | P1, distal segment of endop. subequal in length with median segment | | 15 |
| 14 | (13) | P1, distal segment of endop. 2—3 times as long as the median segment | | 17 |
| 15 | (16) | A1, segments 1 and 2 are the longest.. | <i>A. caudacarinatus</i> Brian | |
| 16 | (15) | A1, segments 2 and 4 are the longest..... | <i>A. graciloides</i> Klic | |
| 17 | (18) | P1, distal segment of endop. thrice as long as the median segment | <i>A. longarticulatus</i> n.sp. | |
| 18 | (17) | P1, distal segment of endop. 2—2.50 times as long as the median segment | | 19 |
| 19 | (20) | P5, exop. elongate, about twice as long as wide. Distal margin of basiendop. reaches to the inferior limit of exop.... | <i>A. ultimus</i>
Monard | |
| 20 | (19) | P5, exop. round, a little longer than wide. Distal margin of basiendop. extends a little beyond the middle of exop..... | | 21 |

- 21 (20) A1, segments 1, 2 and 4 of equal length, segment 3 shorter....
 *A. congener* Sars
- 20 (21) A1 segments 1 and 2 equal in length; segments 3 and 4 of
 equal length, a little shorter than the first two
 *A. paracaudaespinosus* Roe

Amphiasus polapinquus Marcus
 (Fig. 5-6)

Allotype: 1 ♂, in the collection of the Museum of Natural History
 "Gr. Antipa", no. 246.

Material examined: 40 spec.; 28 ♀, 9 ♂, 3 juv.

Location: *Phyllophora* field of the Black Sea. Date: X 1969.

Depth: 31-40 m. Stations: 1134, 1143.

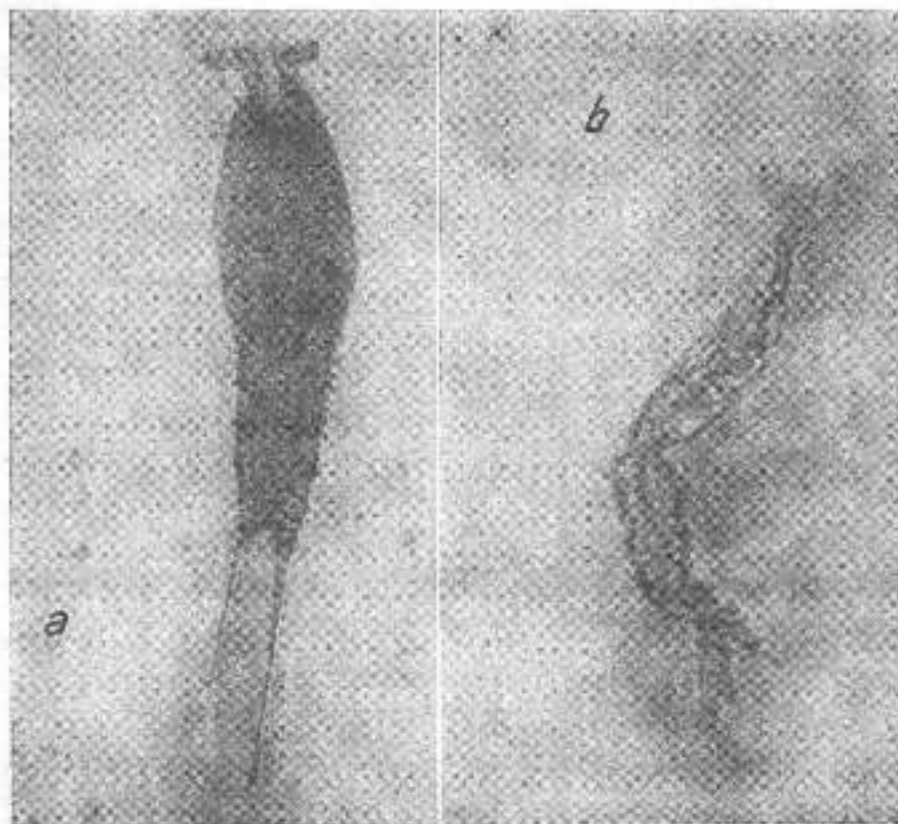


Fig. 5. — *Amphiasus polapinquus* ♂. a = ♂; b = A1.

The female of *Amphiascus polapingvus* has been described on the basis of a copepoda material collected in the biocenosis of the rocky substratum in front of the Romanian littoral of the Black Sea (7). We complete the description of the female with the mouthparts and we wholly describe the male.

Description

Mandible, (fig. 6 a). Praecoxa with pars incisiva strongly dentate. Exopodite bisegmented, of nearly equal size with endopodite.

Maxillula, (fig. 6 c). Praecoxa with two superficial setae. Exopodite shorter than endopodite.

Maxilla, (fig. 6 b). Syncoxa with 3 endites. Basis with two apical claws and a superficial seta.

Maxilliped, (fig. 6 d). First segment of endopodite with two bare setae on the inner edge. Second segment with apical claw and two setae, one bare, the other one plumose.

Male, (fig. 5 a). Total length 0,560 mm (0,556—0,573 mm). Total width 0,172 mm (0,169—0,175 mm). Inner furcal seta normal as against that of the female inflated in the basal portion.

Antennula, (fig. 5 b) with usual dimorphic modifications.

Basiopodite of leg 1 with three spines (fig. 6 e).

Leg 2, (fig. 6 b). Distal segment of endopodite with three inner setae the third very long, an apical seta and two juxtaposed spines.

Leg 5, (fig. 6 f). Exopodite with five setae, distally elongate. Basiendopodite with two setae and a small outer spine reaches to the inferior limit of exopodite.

Discussion

A comparative study between the female of *Amphiascus polapingvus* and the female of closely related species *A. propinquus* and *A. polaris* has been carried out (7).

Extending the comparison also to males we find in *A. polapingvus* and in *A. propinquus* an important differences between the length of setae 2 and 3 of the distal segment of endopodite P2, whereas in *A. polaris* these two setae are about subequal. By the elongation of exopodite P5 *A. polapingvus* is closer to *A. polaris*, estranging from *A. propinquus* in which the exopodite is broadened. The elongation of basiendopodite P5 up to the distal margin of exopodite readily distinguishes our species from the related species in which the basiendopodite reaches only to the middle of exopodite.

The study of the male of *A. polapingvus* strengthens our conclusion resulting from the study of the female, a conclusion referring to the intermediate systematic position between *A. propinquus* and *A. polaris*, assigned to our species within the genus *Amphiascus*.

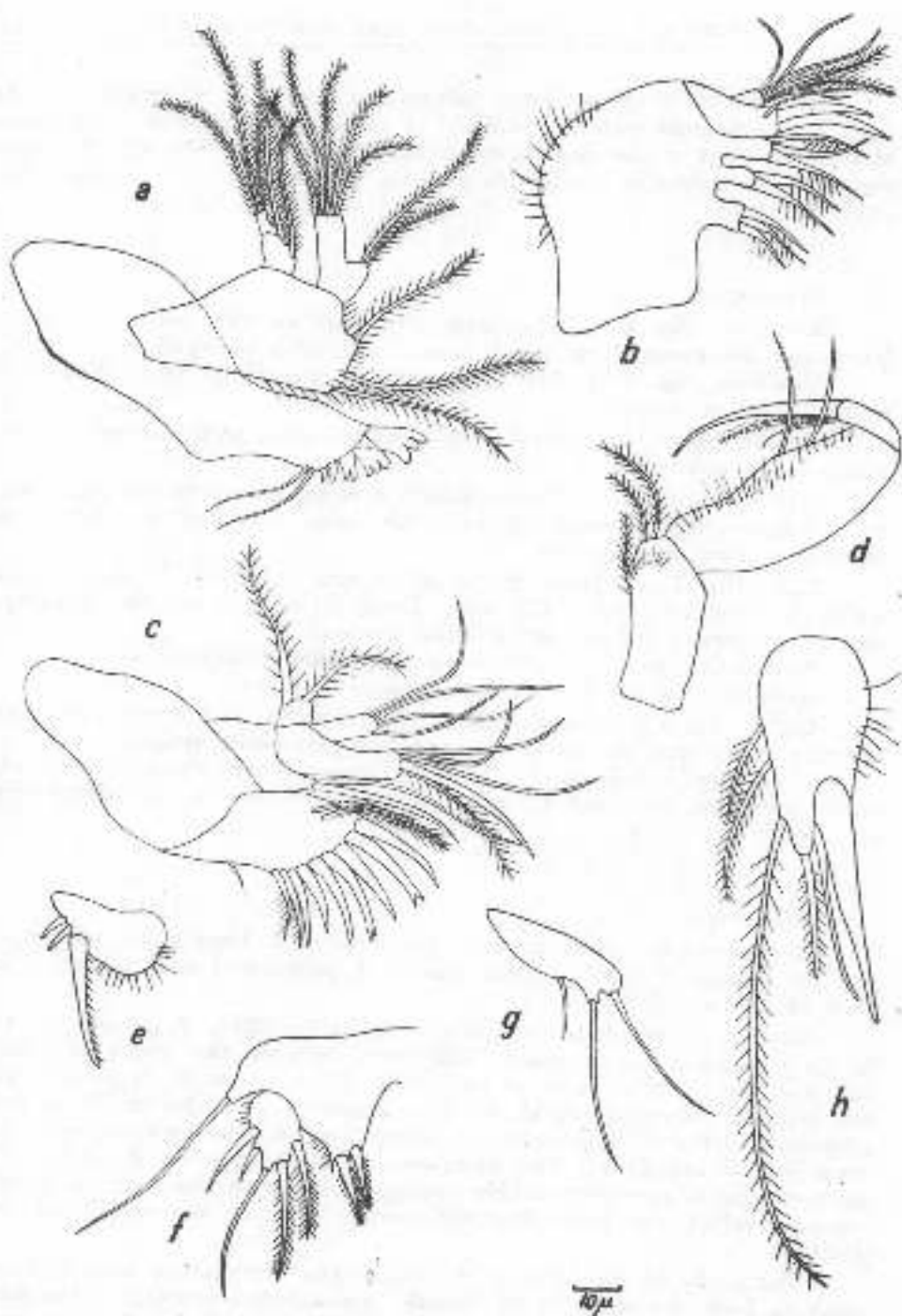


Fig. 6. — *Amphiascus polopingens* ♀ and ♂. a — md. ♀; b — mx. ♂; c — mxl. ♀; d — mxp. ♂; e — P1 basis ♂; f — P5♂; g — P6♂; h — P2 endop. ♂.

CONTRIBUȚII LA STUDIUL GENULUI AMPHIASCUS SARS (PART.),
COPEPODA HARPACTICOIDA, ÎN MAREA NEAGRA

REZUMAT

Se studiază două specii ale genului *Amphiascus* Sars (part.), găsite în cimpul de *Phyllophora* al Mării Negre: *A. longarticulatus* n.sp. și *A. polarpinquus* Marcus.

A. longarticulatus n.sp. Se dă descrierea, se prezintă într-un tabel comparația cu specia cea mai apropiată *A. paracaudaespinosus*, se fac unele considerații asupra sistematicii grupului *minusus* căruia îi aparține noua specie, dându-se în încheiere o cheie de determinare a întregului grup.

A. polarpinquus Marcus. Se completează descrierea femelei cu piesele bucale, se descrie masculul și se fac unele aprecieri referitoare la poziția speciei *A. polarpinquus*, în cadrul genului *Amphiascus*.

ВКЛАД В ИЗУЧЕНИЕ РОДА AMPHIASCUS SARS (PART.)
COPEPODA HARPACTICOIDA В ЧЕРНОМ МОРЕ

РЕЗЮМЕ

Изучаются два вида рода *Amphiascus* Sars (part.), найденные на поле *Phyllophora* Черного моря: *A. longarticulatus* n. sp. *A. polarpinquus* Marcus.

A. longarticulatus n. sp. Описывается и сравнивается в таблице с самым сходным видом *A. paracaudaespinosus*, излагаются некоторые соображения о систематичности группы *minusus*, к которой относится новый вид, и в заключение дается способ определения всей группы.

A. polarpinquus Marcus. Приводится описание самки и частей ее полости рта, описывается самец и высказывается определенное мнение о положении вида *A. polarpinquus*, в роде *Amphiascus*.

BIBLIOGRAPHY

1. BRADY (G. S.), 1880. — A monograph of the free and semi parasitic Copepoda of the British islands. London, 313 p.
2. BRIAN (A.), 1927. — Descrizione di species nuovi o poco conosciute di copepodi bentonici del mare Egeo. *Boll. Mus. Zool. e Anat. Comp. Genova*, ser. 2, 7: 1—37.
3. KLIE (W.), 1942. — Die Gattung *Amphiascus* C. O. Sars, 1911, (Cop. Harp.) im Mittelmeer. *Arch. für Naturgeschichte*, 10, 4: 443—475.
4. KLIE (W.), 1950. — Harpacticoida (Cop.) aus dem Bereich von Helgoland und Kieler Bucht. *Kieler Meeresforsch.*, 7, 1: 76—128.
5. LANG (K.), 1948. — Monographie der Harpacticiden. Lund, 1602 p.
6. LANG (K.), 1965. — Copepoda Harpacticoida from the Californian Pacific coast. *Kungl. Svenska Vetenskap. Handl.*, ser. 4, 10, 2, 560 p.

7. MARCUS (AMELIE), 1966. — Deux Harpacticoides nouveaux trouvés dans le faciès pierreux de la Mer Noire (Agilges). *Trav. Mus. Hist. Nat. «Gr. Antipa»*, 6: 57-70.
8. MARCUS (AMELIE), *Tisbe varipes* n.sp. (Copepoda, Harpacticoida) de la Mer Noire. *Trav. Mus. Hist. Nat. «Gr. Antipa»*, 14, in print.
9. MONARD (A.), 1937. — Les harpacticoides marins de la région d'Alger et de Castiglione. *Bull. Stat. d'Agricult. et de Pêche de Castiglione*, fascic. 2: 11-93.
10. NICHOLLS (A. G.), 1939. — Marine harpacticoids and cyclopoids from the shores of the S-t. Lawrence. *Nat. Canad. Québec*, 66, 241-316.
11. NICHOLLS (A. G.), 1941. — A revision of the families Diosaccidae Sars, 1906 and Laophontidae T. Scott, 1905 (Copepoda, Harpacticoida). *Rec. South Austral. Mus.*, 7, 1: 65-110.
12. ROE (KATHERINE), 1958. — The littoral harpacticoids of the Dalkey (Co. Dublin) Area with descriptions of six new species. *Proceedings Roy. Irish Acad.*, 59, section B, 12: 221-255.
13. SARS (G. O.), 1908. — An account of the Crustacea of Norway. Bergen, 5, 276 p.