

ПРИРОДОНАУЧЕН МУЗЕЈ НА МАКЕДОНИЈА — СКОПЈЕ

## FRAGMENTA BALCANICA

MUSEI MACEDONICI SCIENTIARUM NATURALIUM

XI

15. XII. 1980

№ 5 (247)

**PARAPSEUDOLEPTOMESOCHRA ITALICA N. SP., A NEW  
HARPACTICOID FROM SUBTERRANEAN WATERS OF ITALY  
(CRUSTACEA, COPEPODA, AMEIRIDAE) \*) \*\***

By

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**(With 2 figures in the text)**

### ABSTRACT

*Parapseudoleptomesochra italica* n. sp., a new harpacticoid copepod from subterranean waters of Central and Southern Italy is described.

The new species is close to *Parapseudoleptomesochra iranica* (Löffler) from phreatic waters of Iran because of the armature of the exopod of P.1—P.4 and the morphology and armature of the furcal rami; it is easily distinguishable from this species by the armature of the endopod of P.2—P.3, the armature of the basiendopod and the exopod of P.5 and, at last, by the armature of the anal operculum.

The genus *Parapseudoleptomesochra* Lang is for the first time reported from subterranean waters of Italy.

While examining populations of copepods from phreatic subterranean waters of Central and Southern Italy, a large number of Harpacticoids of the genus *Parapseudoleptomesochra* Lang, hitherto unknown from Italy, were identified.

This material is referable to a new species here described as *Parapseudoleptomesochra italica* n. sp.

\*) Contribution to the knowledge of the underground-water fauna in Central and Southern Italy: XVI.

\*\*) Research supported by a grant C. N. R. n. CT 79.00988.04.

***Parapseudoleptomesochra italica* n. sp.**

(figures 1—2)

**Material:**

1 female (holotype), dissected and mounted on coverlips in Faure's medium (coll. Pesce at the Zoological Institute, University of L'Aquila, Ma. 58.1), Marche, Central Italy, brackish-water well, south of Senigallia (Pesaro), 20. III. 1979, coll. G. L. Pesce and D. Maggi.

Paratypes — 3 females and 1 juv. (cop. IV), dissected and mounted on coverlips (coll. Pesce, Zool. Inst. Univ. L'Aquila, Ma. 57.1 — Ma. 58.2), the same data as holotype; 3 females, dissected and mounted on coverlips (coll. Pesce, Zool. Inst. Univ. L'Aquila, Ma. 9.1 — Ma. 9.3), Marche, Pto. Recanati, brackish-water well, about 500 m from the Adriatic sea coast, 20. XII. 1978, coll. G. Baldoni; 1 juv. (cop. IV), dissected and mounted on coverlips (coll. Pesce, Zool. Inst. Univ. L'Aquila, Ma. 20.1), Marche, Altidona beach, brackish-water well near the sea, 30. VIII. 1978, coll. G. Baldoni; 1 female, dissected and mounted on coverlips (coll. Pesce, Zool. Inst. Univ. L'Aquila, Ma. 31. 1, Ma. 41.1), Marche, Osimo, freshwater wells, 27. XII. 1978, coll. G. Baldoni; 6 females, 1 male, dissected and mounted on coverlips (coll. Muséum d'Histoire Naturelle de Geneve, Suisse), Marche, brackish-water wells at Numana, 20. III. 1979, coll. G. L. Pesce and D. Maggi; 1 female, 3 males, dissected and mounted on coverlips (coll. Museo Civico di Storia Naturale di Verona, Italy), Marche, S. Severino, fresh-water well, 21. IV. 1979, coll. G. Baldoni.

2. females, 1 male, dissected and mounted on coverlips (coll. Pesce, Zool. Inst. Univ. L'Aquila, P. 70), Abruzzes, Central Italy, Barano, fresh-water well, 7. IX. 1973, coll. G. L. Pesce.

1 female, dissected and mounted on coverlips (coll. Pesce, Zool. Inst. Univ. L'Aquila, Pu. 121.1), Apulia, Southern Italy, S. Pietro in Bevagne (Lecce), brackish-water well, 20. VII. 1976, coll. G. L. Pesce and G. Fusacchia; 4 females, dissected and mounted on coverlips (coll. Pesce, Zool. Inst. Univ. L'Aquila, Pu. 136.1 — Pu. 136.4), Apulia, Lesina, around the lake, brackish-water well, 8. X. 1976, coll. G. L. Pesce, P. Teté and D. Maggi; 1 female, dissected and mounted on coverlips (coll. Petkovski, Prirodno-naučen Muzej, Skopje, Jugoslavija, Pu. 109.4), Apulia, S. M. in Bagno, brackish-water well, about 100 m from the sea coast, 10. VI. 1976, coll. P. Teté and D. Maggi.

**Diagnosis:**

A small, eyeless and depigmented *Parapseudoleptomesochra*, with elongated and slender appendages. The 3rd article of the exopod with 5 (P.1 — P.3) or 6(P.4) spines or setae. The 1st and 2nd articles of the endopod P.2—P.3, each with an inner subapical seta, the 3rd article with 3—4 setae or spines. The 3rd article of the endopod P.4 armed with 4 setae. Basiendopod of P.5 with 5 (female) and 3 (male) spines; exopod ovoidal, armed with 6 (female) and 5 (male) setae. Distal margin of the anal operculum slightly convex and armed with numerous hair-like spinules. Caudal rami short, their length being about 1,3 times the width.

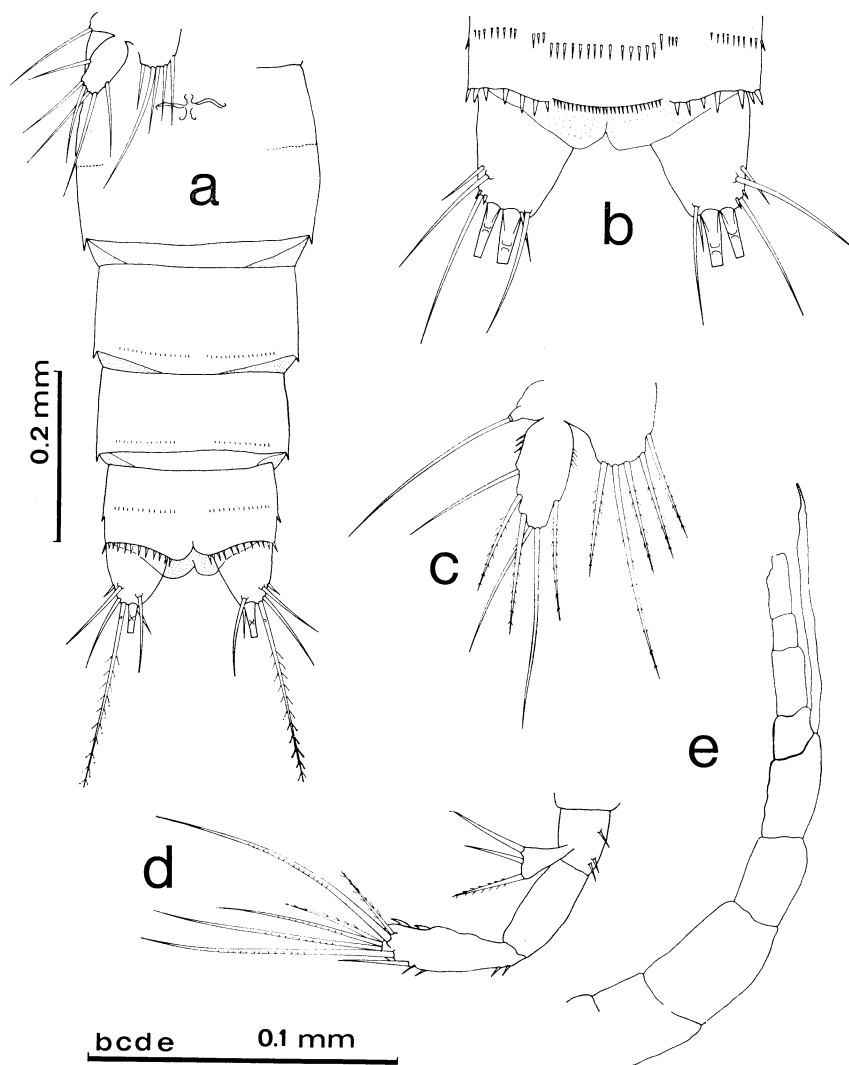


Figure 1 — *Parapseudoleptomesochra italica* n. sp., female a. abdomen and caudal rami, ventral view (paratype, Apulia); b. caudal rami, dorsal view (paratype, Marche); c. P.5 (paratype, Apulia); d. antenna (holotype); e. antennula (holotype).

## Description:

**Female** — Body (fig. 1a) elongated, subcylindrical; total length, excluding antennulae, antennae, and furcal setae, 580 to 640 microns, average 610 microns.

Antennula (fig. 1e) 8-segmented, aesthetasc on the 4th article longer than the following articles together.

Antenna (fig. 1d) with 1-segmented, triangular exopod, armed with 3 apical plumose setae.

Mouthparts without particular characteristics as compared to the other species in the genus.

**P.1** (fig. 2a) — Basis with short external seta and an internal stout plumose spine which reaches about half the length of the 1st endopod's article. Exopod 3-segmented, shorter than the endopod; of the 3 segments the proximal one is longer than the other two, which are almost of equal length; the 1st article with an outer subdistal spine, the 2nd article with an outer subdistal spine and an inner seta, the 3rd article with 3 spines and 2 long apical setae. Endopod 3-segmented; the 1st article slightly shorter than the first two articles of the exopod together, and armed with an inner long seta; the 2nd article without seta or spines; the 3rd article with 2 apical long setae and an slender seta.

**P.2** — **P.3** (fig. 2c, e) — Exopod 3-segmented, longer than the endopod and with articles increasing in length from the proximal to the distal one; the 1st article armed with an outer subdistal spine; the 2nd article with an outer subdistal spine and an inner subdistal seta; the 3rd article with 2 outer subdistal spines, 2 apical and an inner subdistal setae. Endopod 3-segmented, reaching about the tip of the 2nd article of the exopod; proximal segment much shorter than the others; the 1st and 2nd articles, each armed with an inner subapical seta, the 3rd article with 3—4 apical and subapical setae.

**P.4** (fig. 2f) — Exopod 3-segmented, much longer than the endopod; the 1st article as long as the first and second articles of the endopod together, and armed with an outer subdistal spine; the 2nd article well overreaching the tip of the endopod, and armed with one outer subdistal spine and one inner seta; the 3rd article armed with 2 outer subdistal spines and 2 apical and 2 inner long setae.

Setal formula of legs P.1 — P.4 as follows:

	exopod			endopod		
P.1	0	1	023	1	0	120
P.2	0	1	122	1	1	1(2)11
P.3	0	1	122	1	1	1(2)11
P.4	0	1	222	1	1	121

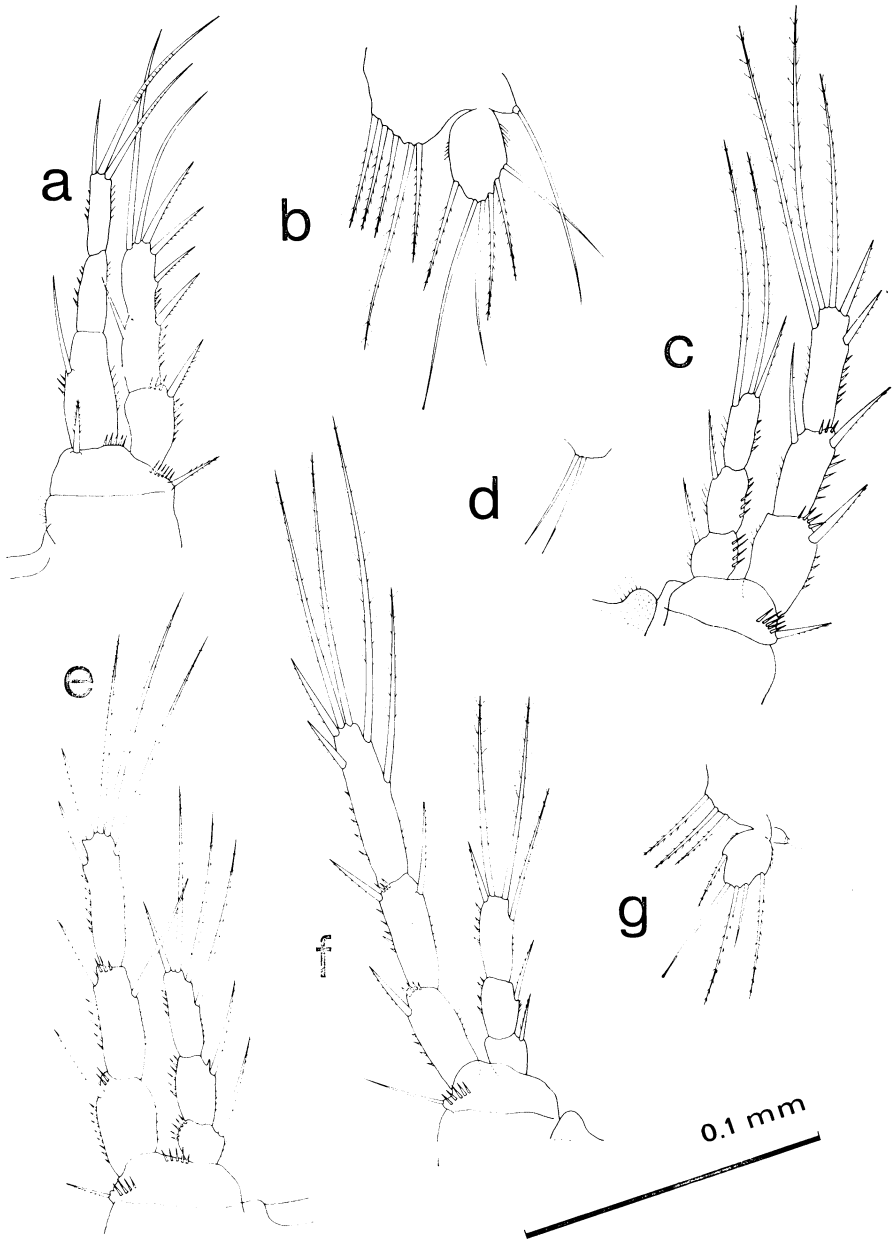


Figure 2 — *Parapseudoleptomesochra italica* n. sp., a. P.1 (female holotype); b. P.5 (female holotype); c. P.2 (female holotype); d. P.6 (male paratype from Marche); e. P.3 (female paratype, Marche); f. P.4 (female paratype, Marche); g. P.5 (male paratype, Marche)

P.5 (fig. 1c) — Basiendopod armed with an outer seta and 5 setulose spines, the 2nd one from the outer about twice longer than the others. Exopod ovoidal, longer than large ( $L/1 = 1,65 - 1,80$ , specimens from Marche; 2,0 — 2,1, specimens from Apulia), and armed with 6 long setae of different length.

Abdominal segments (fig. 1a), each with a posterior row of small spinules, except the last one which is armed with longer spines; the 1st and 2nd segments partly fused dorsally. Genital field as in fig. 1a. Anal operculum convex, armed with numerous hair-like spinules along the medial margin and with 6—7 stout spines on its both sides (fig. 1b).

Caudal rami (fig. 1a, b) subconical, short, slightly longer than large ( $L/1 = 1,38 - 1,43$ , specimens from Marche; 1,20—1,23, specimens from Apulia); outer margin with one small and one longer seta, about at 1/3 distally of furcal ramus; dorsal seta slightly longer than each furcal ramus; apical inner seta short, about 1/3 shorter than the outer one; medial apical setae of different length, the inner about three times longer than the outer one.

Male — Length, excluding antennulae, antennae and furcal setae, 520 to 545 microns, average about 532 microns. Construction and armature of legs P.1 — P.4 without particular characteristics as compared to those of female. Basiendopod of P.5 armed with 3 barbed spines, exopod shorter than in the female ( $L/1 = 1,25 - 1,30$ ) and armed with 5 setae (fig. 2g). P.6 consisting of a chitinous lamella which bears two subequal slender setae (fig. 2d).

#### Variability:

Differences were detected, in the length of the caudal rami and the morphology of the exopod P.5, between the populations from Central Italy and those from Southern Italy: in the former the caudal rami are longer ( $L/1 = 1,20 - 1,22$ ) than in the latter ones ( $L/1 = 1,38 - 1,43$ ); the exopod of P.5 is more elongated ( $L/1 = 2,0 - 2,1$ ) in specimens from Apulia than in those from Marche ( $L/1 = 1,65 - 1,85$ ).

Other differences, in the setation of the distal article of the endopod P.2 — P.3, can be found among populations from Central and Southern Italy; namely, the following setal formulae were observed:

variant a:	P.2	1	1	111
	P.3	1	1	111
variant b:	P.2	1	1	111
	P.3	1	1	121
variant c:	P.2	1	1	121
	P.3	1	1	121

Moreover, in one specimen from a sample from Marche region the 3rd article of the left endopod of P.2 bears 3 setae, while the same article of the right endopod P.2 is armed with 4 setae.

#### Remarks and affinities:

Petkovski (1976) recently reviewed the systematics of the harpacticoid copepod genus *Nitocrella* Chappuis (s. restr.). In that review five genera were considered according to the segmentation of the endopod of the legs P.2 — P.4: *Nitocrella* Chappuis (s. restr.); *Pseudoleptomesochrella* Lang; *Parapseudoleptomesochra* Lang; *Nitocrellopsis* Petkovski and *Stygonitocrella* Petkovski; moreover, a subdivision of the genus *Nitocrella* Chappuis in three phyletic lines, viz. *E. gr. vasconica*, *N. gr. hirta* and *N. gr. chappuisi*, was pointed out. Particularly, to the genus *Parapseudoleptomesochra* Lang were removed all those species of *Nitocrella* s. lat. with the endopod of P.2 — P.4 3-segmented.

According to the above revision, *P. italica* n.sp. fits in the genus *Parapseudoleptomesochra* as described by Lang (1948, 1965) and successively reported by Wells (1967) and Petkovski (1976); however, since the new species, as other ones removed to the same genus, is armed with one seta on the inner margin of the exp. P.1—P.4 (versus in the preliminary diagnosis by Lang, the same margin is unarmed) the definition of the genus *Parapseudoleptomesochra* must be enlarged as follows:

#### *Parapseudoleptomesochra* Lang 1965

Body long and slender. Rostral projection obsolete. Antennulae in female seven- (or eight-) segmented, in male haplocer. Antenna with two- (or one-) segmented exopod. First leg with three-segmented exo- and endopod, middle exopod-segment with or without inner seta. Second to fourth legs with three segmented exo- and endopods, first exopod segment without inner seta, second endopod-segment with or without inner seta; distal exopod-segment with 2—3, 2 and 2 outer spines, respectively; middle endopod-segment with inner seta, armature of last segment reduced. Genotype: *P. trisetosa* Krishnaswamy.

The present new species is allied to *P. iranica* (Löffler), known from phreatic waters (wells) of Iran (Löffler, 1959), because of the armature of the exopod of P.1—P.4 and the morphology and the armature of the caudal rami; however, from this species, as well as from the others in the genus, *P. italica* n.sp. can be immediately distinguished by numerous features, as

the armature of the endopod of P.2—P.3, the armature of the basiendopod and exopod of P.5 and, at last, by the morphology and the armature of the anal operculum.

#### Distribution and ecology:

*Parapseudoleptomesochra italica* n.sp is at present known from subterranean waters of Central (Marche, Abruzzes) and Southern (Apulia) Italy, representing the only record of the genus for this region.

#### Type-locality:

Marche, brackish-water well, south of Senigallia (Pesaro), Central Italy.

The new species lives in fresh and in slightly brackish subterranean waters. Particularly in the Marche region it was collected both in fresh and brackish wells (depth: 2,5—12,5 m; water level on 0,5—2,5 m; temperature: 14,1—17,5°C; pH: 6,8—7,2; salinity: 0,01—0,9‰; bottom sediment: organogenic sandstone), in association with other harpacticoid copepods as *Nitocrella stammeri* (Chappuis, 1938), *Attheyella crassa* (Sars, 1863), and the following other animal groups: cyclopoid copepods [*Eucyclops subterraneus* (Graeter), *Tropocyclops prasinus* (Fischer), *Diacyclops bisetosus* (Rehberg), *Acanthocyclops robustus* (Sars), *Diacyclops languidoides* (Lilljeborg)]; amphipods (*Niphargus stefanellii* Ruffo et Vigna Taglianti, 1968); *Niphargus orcinus parenzani* Ruffo et Vigna Taglianti, 1968; asellid isopods [*Proasellus coxalis* (Dollfus 1892); *Proasellus adriaticus* Argano et Pesce, 1979]; gastropods (*Arganiella pescei* Giusti et Pezzoli, in press); oligochaetes (*Peloscolex zavreli* Hrabe); ostracods and water mites.

In the Abruzzes, the new species was collected in a fresh-water well, (depth: 5 m; water level on 1 m; temperature: 12,1°C; pH: 7,2; bottom sediment: sandstone) in association with other harpacticoid copepods as *Nitocrella juturna* Cottarelli and *Attheyella crassa* (Sars), and the following other animal groups: cyclopoid copepods [*Eucyclops serrulatus* (Fischer), *Diacyclops languidoides* (Lilljeborg)]; gastropods and collembols.

In Southern Italy (Apulia), the new species can be found only in a coastal (brackish) subterranean biocenosis (depth: 2,0—2,5 m; water level on 0,5—1,0 m; temperature: 17,5—18,8°C; pH: 7—7,5; salinity: 2,2‰; bottom sediment: organogenic sandstone), which it lives, we can consider *P. italica* n.sp. as a recent immi- [*Attheyella crassa* (Sars), *Nitocrella stammeri* (Chappuis)] and with cyclopoid copepods [*Eucyclops serrulatus* (Fischer), *Cyclops furcifer* Claus, *Diacyclops languidoides* (Lilljeborg), *Halicyclops rotundipes*



Kiefer]; mysidaceans (*Spelaeomysis bottazzii* Caroli); gastropods, oligochaetes and water mites.

Because of the morphological characteristics and the ecological conditions, as well as the composition of the biocenosis in which it lives, we can consider *P. italica* n. sp. as a recent immigrant ("thalassoid" element, according to some AA.) in the underground aquatic system of Italy; moreover it represents, at present, an endemic species for this region.

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## РЕЗИМЕ

**Parapseudoleptomesochra italica n. sp., нов харпактицид од подземните води на Италија (Crustacea, Copepoda, Ameiridae)**

Гузепе Л. Пеше и Трајан К. Петковски

Во тек на проучувањето на копеподните популации од фреатичните води на Централна и Јужна Италија најдено е мноштво харпактициди од родот *Parapseudoleptomesochra* Lang, кои досега не беа познати од територијата на Италија. По деталната анализа на нивната морфолошка градба утврдивме дека се тука работи за еден во науката досега непознат вид, кој сега опширно го опишуваме и го означуваме како *P. italica n. sp.*

Неодамна Petkovski (1976) изврши повторна ревизија на родот *Nitocrella* Chappuis, врз база на бројот на членчињата кај ендоподитите P.2 — P.4, и издвои уште два нови рода, така што наместо некогашниот род *Nitocrella s. lat.* сега има 5 самостојни родови од тоа сродство: *Nitocrella* Chappuis (s. restr.), *Pseudoleptomesochrella* Lang, *Parapseudoleptomesochra* Lang, *Nitocrellopsis* Petkovski и *Stygonitocrella* Petkovski.

Сходно таблицата за детерминација на харпактицидите од фамилијата Ameiridae, која е дадена во ревизијата на Petkovski, набљудуваните харпактициди му припаѓаат на родот *Parapseudoleptomesochra*, кој е основан од Lang (1948, 1965) и сукцесивно дополнет од Wells (1967) и Petkovski, (1976). Во овој род се опфатени нитокреловидните харпактициди со 3-член ендоподит P.2 — P.3.

Во рамките на својот род *Parapseudoleptomesochra italica n. sp.* покажува најголемо морфолошко совпаѓање со *P. iranica* (Löffler), што е опишана од фреатичните води на Иран, и тоа во вооружувањето на егзоподитот P.1 — P.4 и во градбата на фуркалните ветки. Но, како кон иранскиот вид така и кон сите други свои сродници, новата специја јасно се разликува според арматурата на ендоподитот P.2—P.3, потоа според формата на базиендоподитот и егзоподитот P.5, како и според изгледот на аналниот оперкулум.

Трудот е отпечатен со средства од Републичката заедница на научните дејности и Републичката заедница на култура

Печатено во Графички завод „Гоце Делчев“ — Скопје  
Тираж 1000 примероци