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A REVISED KEY TO THE *NITOCRELLA* SPECIES OF THE *HIRTA*-GROUP,  
INCLUDING THE DESCRIPTION OF A NEW SPECIES FROM PHREATIC WATERS OF LESBOS,  
GREECE (COPEPODA HARPACTICOIDA: AMEIRIDAE)

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## ABSTRACT

*Nitocrella maggi* n.sp. from phreatic subterranean waters of the island of Lesbos, Greece, is described. The new species belongs to the *hirta*-group of species sensu Petkovski and differs from the other known species of the group in the  $P_2$ - $P_4$  endopod setation, as well as in the fused basiondopod of  $P_5$ . A revised key to all the species of the *hirta*-group is presented.

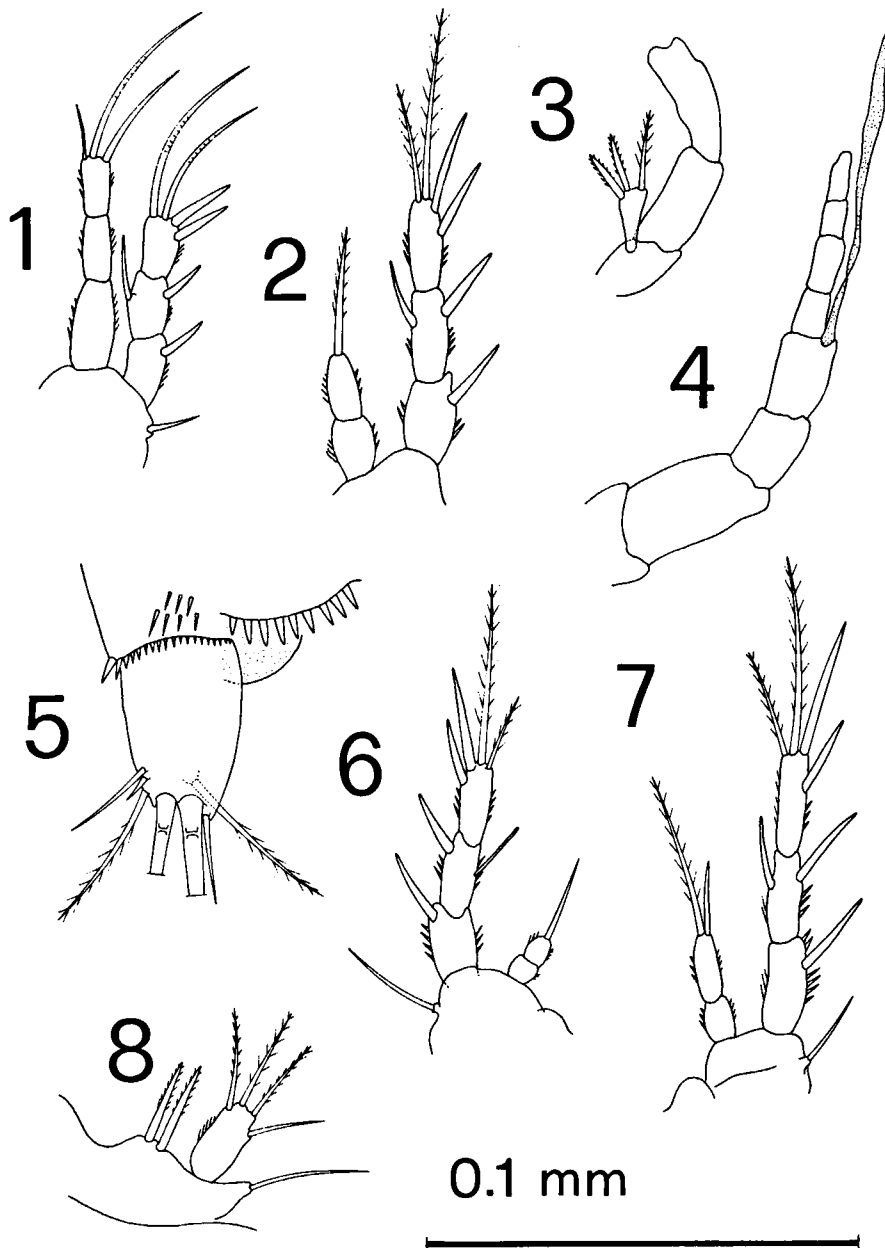
Stygobiological research carried out at Lesbos, Greece, during July 1982 by the Zoological Institute of the University of L'Aquila (Italy) have yielded, besides other remarkable stygobiont groups such as cyclopid copepods, asellid and microparasellid isopods, ostracods and amphipods, an interesting fauna of harpacticoid copepods.

Among this material an undescribed species of the genus *Nitocrella* Chappuis s.str. was identified. This new species, which belongs to

the *hirta*-group of species sensu Petkovski (1976), is herein described as *Nitocrella maggi* n.sp.

The present find extends the occurrence of the genus *Nitocrella* in Greece eastward and suggests that it could be more widespread in the phreatic subterranean waters of that country than previously thought.

Since after the publication of the key to the *hirta*-group of *Nitocrella* by Petkovski, besides *Nitocrella maggi* n.sp., also *N. futur-*



Figs. 1-8. *Nitocrella maggi* n.sp. 1:  $P_1$ ; 2:  $P_2$ ; 3: antenna, exopod; 4: antennula; 5. furcal ramus (ventral view) and anal operculum; 6:  $P_4$ ; 7:  $P_3$ ; 8:  $P_5$ .

*na* Cottarelli and *N. skyrensis* Pesce, respectively from Italy and Greece, have been added, a revised key to the species of the group is given.

Family Ameiridae sensu Lang 1936

Genus *Nitocrella* sensu Petkovski, 1976

*Nitocrella maggi* n.sp.

Material.-

6 ♀♀. Holotype, Author's collection, Zoological

Institute, University of L'Aquila, Italy, No. HLB.28.1; 3 paratypes, as above, No. HLB.28.2-4; 2 paratypes, dissected and mounted on coverlips in Faure's medium, in the collection of the Zoologisch Museum, Amsterdam, Nederland. All specimens were collected at the type-locality, a fresh-water well at Moria, Mytilene, Lesbos (Greece), 28.VII.1982, coll. Pesce, Maggi and Silverii.

Description.-

Based on mature females, length 0.40-0.48 mm, excluding antennae, antennulae and furcal setae. Body slender, dorsally and ventrally ornamented with long spinules along the poste-

rior margin of each abdominal segment; minute spinules on the ventral and dorsal surfaces of the genital, post-genital and terminal somites. Genital field not well defined. Anal operculum armed with 8-9 stout spines.

Caudal rami longer than wide ( $L/1 = 1.50-1.56$ ), with two setae on lateral distal corner, two principal terminal setae (the innermost the longest), one seta on inner distal corner and one long dorsal seta.

$A_1$ , 8-segmented, aesthetasc on segment 4 very long, well overreaching the tip of segment 8.  $A_2$ , exopod 1-segmented, with 3 setae.

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

$P_1$ : both rami 3-segmented; endopod, both segments 1 and 2 naked, segment 1 about as long as the first two segments of the exopod together; segment 3 with 2 long and 2 shorter setae. Exopod shorter than the endopod, segment 1 with an outer spine, segment 2 with one outer spine and one inner seta, segment 3 with 2 outer spines and 2 short apical setae.

$P_2$ : exopod 3-segmented, endopod 2-segmented; segment 1 of the endopod naked, segment 2 with a long, apical seta; exopod, segment 1 with 1 outer spine, segment 2 with 1 outer spine and 1 short, inner seta, segment 3 with 2 outer spines and 2 short, apical setae.

$P_3$ : exopod 3-segmented, endopod 2-segmented; segment 1 of the endopod naked, segment 2 armed with 2 setae of different length; armature of the exopod as in  $P_2$ .

$P_4$ : exopod 3-segmented, endopod 2-segmented; endopod very short, segment 1 naked, segment 2 with 1 apical seta. Setal formula of  $P_1-P_4$  listed below.

	Exopod			Endopod		
$P_1$	0	1	022	0/1	0	120
$P_2$	0	1	022	-	0	010
$P_3$	0	1	022	-	0	020
$P_4$	0	1	022	-	0	010

$P_5$ : basiendopod fused, scarcely protruding, armed with 2 long barbed spines; exopod longer than wide ( $L/1 = 2.0-2.1$ ) and armed with 4 slender setae. Male unknown.

#### Ecology.-

The new species lives in a fresh-water well at Moria, in the eastern part of the island of Lesbos, Greece (depth of the well: 2.5 m; water level on 0.5 m; water temperature: 14.1°C; pH: 6.9; bottom sediment composed of organogenic sandstone). *N. maggi* n.sp. was found in association with other harpacticoid copepods, such as *Elaphoidella* sp. and *Attheyella crassa* (Sars), with the cyclopid copepod *Diacyclops antrincola* Kiefer and with other remarkable stygobionts, viz. microparasellid isopods of the genus *Microcharon* and *Microparasellus*, amphipods, water mites, ostracods, gastropods and oligochaetes.

#### Etymology.-

Named after my colleague and friend Dr. Domenico Maggi, who collected the new species.

#### Remarks.-

Recently Petkovski (1976) divided the genus *Nitocrella* Chappuis s.str. in the following groups, according to the setation of the terminal segment of the  $P_4$  exopod: the *vasconica*-group, with six setae on the terminal segment of the  $P_4$  exopod; the *chappuisi*-group, with five setae on the terminal segment of the  $P_4$  exopod, and the *hirta*-group, with three or four setae on the same segment.

*N. maggi* n.sp., because of the setation of the terminal segment of the  $P_4$  exopod which bears 2 setae and 2 spines, obviously belongs to the *hirta*-group. Within this group, the species most closely related to *N. maggi* n.sp. appear to be *N. juturna* Cottarelli, from phreatic waters of central Italy, *N. hirta* Chappuis, from cave, spring and interstitial waters of Yugoslavia, Hungary, Bulgaria, Austria and Roumania, and *N. calcaripes* Damian & Botosaneanu from phreatic waters of Roumania and Turkey (?).

*N. maggi* n.sp. is easily distinguishable by the fused basiendopod of  $P_5$ , the shortness of all the setae on the exopod of  $P_2-P_4$ , the small endopod of  $P_4$  and by the armature of the endopods of  $P_2-P_4$ .

Because of the lack of males, further discussion on the phylogenetic relationships of the

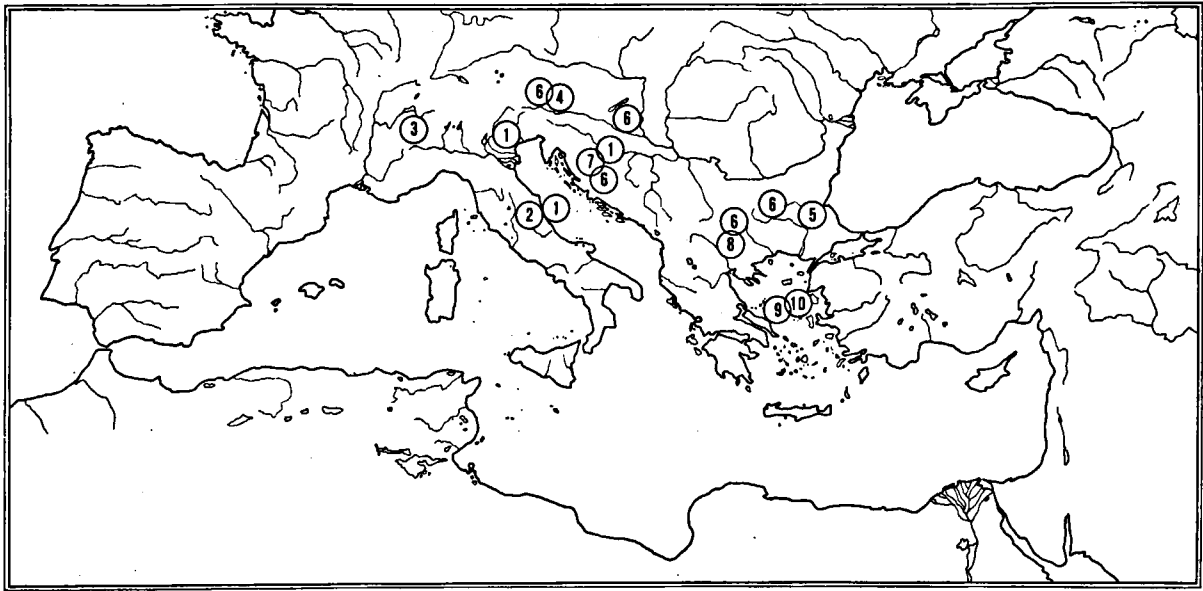


Fig. 9. Distribution of the species of the *hirta*-group of *Nitocrella*. 1: *N. psammophila*; 2: *N. juturna*; 3: *N. omega*; 4 *N. hofmilleri*; 5: *N. calcaripes*; 6: *N. hirta*; 7: *N. slovenica*; 8: *N. tonsa*; 9: *N. skyrensis*; 10: *N. maggii*.

new species must await the collection of new material.

The *hirta*-group, is quite homogeneous, both from a systematic and biogeographical point of view. In fact, the species which belong to it are characterized by a small size, a reduction of the setation on the endopod of  $P_2$ - $P_4$ , and the peculiar armature of the terminal segment of the  $P_4$  exopod; moreover, they show a continuous geographical distribution in Italy and the Balkan area (Fig. 9).

Key to the females of the *hirta*-group of *Nitocrella*. -

- 1. Exp.  $P_4$ , distal segment with 4 setae or spines..... 2
- Exp.  $P_4$ , distal segment with 3 setae or spines..... *N. tonsa* Michailova
- 2. Enp.  $P_4$ , distal segment with 3 setae or spines..... *N. hofmilleri* Brehm
- Enp.  $P_4$ , distal segment with 1 or 2 setae or spines..... 3
- 3. Enp.  $P_3$ - $P_4$ , distal segment with 2 setae or spines..... 4
- Enp.  $P_3$ - $P_4$ , distal segment with 1 seta....  
..... *N. calcaripes* Damian & Botosaneanu
- Enp.  $P_3$ - $P_4$ , distal segment with 2 and 1 seta respectively..... 9

- 4. Enp.  $P_1$ , segment 1 with inner seta..... 5
- Enp.  $P_1$ , segment 1 without inner seta..... 6
- 5. Anal operculum with spines..... 8
- Anal operculum without spines.....  
..... *N. slovenica* Petkovski
- 6.  $P_1$ , enp. longer than corresponding exopod;  $P_5$ , exopod with 3-4 spines..... 7
- $P_1$ , enp. as long as the corresponding exopod;  $P_5$ , exopod with 5 spines.....  
..... *N. omega* Hertzog
- 7. Exp.  $P_5$  with 4 spines..... *N. hirta* Chappuis
- Exp.  $P_5$  with 3 spines.....  
..... *N. hirta tirolensis* Kiefer
- 8. Furcal rami about as long as large.....  
..... *N. skyrensis* Pesce
- Furcal rami about twice as long as large..  
..... *N. psammophila* Chappuis
- 9. Enp.  $P_2$ , distal segment with 2 setae or spines..... *N. juturna* Cottarelli
- Enp.  $P_2$ , distal segment with 1 seta.....  
..... *N. maggii* Pesce

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