TWO NEW SPECIES OF PHREATIC HARPACTICOIDS FROM IRAN
(CRUSTACEA: COPEPODA)

by

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ABSTRACT

Two new species of the genus Nitocrella Chappuis (s. str.) are described from subterranean, phreatic waters of Iran. These two species, N. petkovskii and N. paece, belong according to the recent revision of Petkovski (1976) to the chappuisi and vasonica groups of the genus, respectively.

RÉSUMÉ

Deux espèces nouvelles du genre Nitocrella Chappuis (s. str.) sont décrites des eaux souterraines phréatiques d’Iran. Ces deux nouvelles espèces, N. petkovskii et N. paece appartiennent, d’après la révision récente de Petkovski (1976), respectivement aux groupes chappuisi et vasonica du genre.

INTRODUCTION

In the course of recent researches on the biology of the underground phreatic waters of Iran, carried out by the Zoological Institute of the University of L’Aquila (Pesce, in press), numerous samples of interstitial harpacticoid copepods were obtained from freshwater wells in the highland of Isfahan.

Among the materials entrusted to me for study, two undescribed species of the genus Nitocrella Chappuis (s. str.) were found: these species are described and illustrated below as Nitocrella petkovskii n. sp. and Nitocrella paece n. sp.

Many thanks are due to Professor T. K. Petkovski (Skopje) for verifying my identifications and for helpful suggestions.

Nitocrella petkovskii n. sp. Fig. 1

Material. Two ♀ and three juv. (copepods III, IV), freshwater well (IR. 34) at Shahr-e-Kord, Hafes street, Isfahan, 2,200 m above sea-level (water level at 4.1 m, water depth 2.3 m; temperature 16.2°C; pH 7.5; bottom sediment composed of small vegetable and limestone detritus); May 25, 1978; coll. Pace & Rahim.

One ♀ and one ♂, freshwater well at Farrochá, Isfahan, 2,200 m above sea-level (water level at 30.5 m, water depth 5.2 m; temperature 16.5°C; bottom sediment composed of sandstone detritus and clay); May 24, 1978; coll. Pace & Rahim.

In the above localities the new species lives in association with other harpacticoid copepods as Nitocrella paece (described below) and Aithelissa crassa (Sars), and with the following other organisms: Bryocyclops cf. neuter Kiefer and Diacyclops hisitorus (Rehberg) (both cyclopoid copepods), Candoniinae (Ostracoda), Nais elinguis (Müller) (Oligochaeta), water mites, collemboles and some mosquito larvae.

Types. One ♀ (holotype) and one ♂ (allotype), completely dissected and mounted in Faure’s medium on microscope slides, deposited in the Zoologisch Museum, Amsterdam; remainder (paratypes) in the Zoological Institute of the University of L’Aquila (author’s collections).

Description. — Female: General shape as usual in the genus; body elongate and slender; unpigmented and blind; length well over 0.55 mm, including furcal rami but excluding furcal setae, antennae and antennulae. Genital segment short, receptaculum seminis as in fig. 1. Antennula 8-segmented, aesthetes on the 4th article much longer than the following articles together. Antenna, exopod triangular, 1-segmented and armed with 3 apical setae, the inner one plumose. Mouthparts without particular characteristics as compared to those of the other species in the genus.

P₁: endopod 3-segmented; article 1 as long as the first and second articles of the exopod together, and armed with a long inner seta which reaches the tip of the 2nd article; article 2 without well-developed spines or setae; article 3 with 2 long apical setae and a short setula. Exopod shorter than the endopod and 3-segmented; articles 1 and 2 with 1 outer spine only, article 3 with 2 outer spines and 2 long apical setae.

P₂ - P₄: endopod 2-segmented, reaching about the middle of article 2 of the exopod; article 1 without spines or setae; article 2 with 1 (P₂) and P₄ and 2 (P₃) long apical setae overreaching the tip of article 3 of the exopod. Exopods of P₂ and
Fig. 1. *Nitocrilla petkovskii* n. sp., ♀. a, P₁; b, P₅; c, antenna, exopod; d, P₂; e, P₄; f, P₃; g, genital field; h, furcal rami and anal operculum, ventral view.

P₅ 3-segmented; article 1 with 1 outer spine, article 2 with 1 outer spine and 1 long inner seta, article 3 with 2 subapical spines and 2 long apical setae; exopod of P₆, articles 1 and 2 as those of P₅ and P₆, article 3 armed with 5 setae or spines (3 apically implanted, 1 on the inner and 1 on the outer margin).

Setal formula P₁ - P₄ as follows:

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<thead>
<tr>
<th></th>
<th>exopod</th>
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<tbody>
<tr>
<td>P₁</td>
<td>0 0 022</td>
<td>1 0 120</td>
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<tr>
<td>P₂</td>
<td>0 1 022</td>
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<td>P₃</td>
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<tr>
<td>P₄</td>
<td>0 1 122</td>
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P₅: basiendopod with 3 inner barbed spines;
exopod about as long as wide, bearing 4 setae of different sizes.

Furcal rami conical, slightly longer than wide; outer margin with a small seta; dorsal surface with a long seta, about 3.5 times longer than each furcal ramus; apically there are 4 setae: the outer is the shorter (about twice the length of the furcal ramus), the inner is about 1.3 times longer than the outer one, the mediodistal ones are the longest and of different size (the inner about 1.85 times as long as the outer one).

Anal operculum with naked distal margin and 6-7 small spinules on each side.

Male: Construction and armature of the thoracic and abdominal appendages, as well as its other characteristics, with the exception of the antennulae, are comparable to those of the female.

Etymology. — I take great pleasure in naming this species after Prof. T. K. Petkovski, in recognition of his valuable contributions to the systematics of the genus Nitocrella.

Affinities. — Petkovski (1976) recently reviewed the systematics of the genus Nitocrella Chappuis s.l. In that review three species groups within Nitocrella s. str. were recognized, viz. the vasconica group (characterized by 6 spines or setae on article 3 of the P₄ exopod), the chappuisi group (characterized by 5 spines or setae on the distal article of the P₄ exopod), and the birta group (with 3 to 4 spines or setae on that article).

According to this revision, Nitocrella petkovskii n. sp. fits well in the chappuisi group, since the 3rd article of the P₄ exopod is armed with 3 spines and 2 setae.

Among the species of this group, N. petkovskii n. sp. is close to N. neutra Kiefer and N. hypogaeae Shen & Tai. Particularly to the former the new species resembles by the armature of the basiendodop of P₃ and the number of setae on the distal article of the endodop of P₂ and P₃. To the latter species, it resembles by the armature of the distal article of the endodop of P₂ to P₄.

N. petkovskii n. sp. differs from the above species as follows:
— from N. neutra in having 4 (instead of 5) elements (setae or spines) on article 3 of the P₄ exopod, in having longer setae on article 3 of the exopods of P₃ to P₅, in the shorter exopod of P₆, and in the unarmored anal operculum (versus armed with 6-8 small spines);
— from N. hypogaeae by the quite different shape and length of the furcal rami, by the presence of 3 spines on the inner margin of the basiendodop of P₃ (versus a vestigial basiendodop with 1 outer spine only), by the shape of the exopod of P₆, and by the long inner seta on article 1 of the P₃ endodop (versus an unarmored article).

Nitocrella paeae n. sp. Fig. 2

Material. One ♀ and one juv. (copepodid IV), freshwater well at Shar-e-Kord, (former) Palavi road, Isfahan, 2,200 m above sea-level (water level at 5.2 m, water depth 2.2 m; temperature 17.0°C; pH 7.5; bottom sediment composed of small vegetable and sandstone detritus); May 21, 1978; coll. Fae & Rahim. Accompanying fauna: Diacylops biotensis (Rehberg) and Eucyclops serrulatus (Fischer) (both cyclopoid copepods), Candona (Ostracoda), Nais elongis (Müller) and Pelosolex veintinii (Grube) (both Oligochaeta), and water mites.

One ♀ and two juv. (copepodid IV) from sample 19.34 (see for details about this locality under Nitocrella petkovskii).

Types. One ♀ (holotype), completely dissected and mounted in Faeure's medium on microscope slides, deposited in the Zoologisch Museum, Amsterdam; other materials (paratypes) in the Zoological Institute of the University of L'Aquila (author's collections).

Description. — Female: Body slender and elongate; unpigmented and blind; length between 0.38 and 0.41 mm, including furcal rami but excluding furcal setae, antennae and antennulae. Antennula 8-segmented, aesthete on the 4th article slightly longer than the following articles together. Antenna, exopod 1-segmented, subtriangular, and armed with 3 apical setae, the inner clearly plumose. Mouthparts with particular characteristics. Distal margin of the thoracic segments without hyaline lamellae or spines.

P₂ endopod and exopod 3-segmented; endopod, article 1 short (reaching about the middle of the 2nd exopod article) and with a long inner seta, article 2 without setae or spines, article 3 with 2 long setae; exopod shorter than endopod, slightly overreaching the 2nd article of the endopod; articles 1 and 2 each with a spine on the outer sub-
distal margin, article 3 with 2 apical setae and 2 subapical setiform spines.

P₂ - P₄: endopod 2-segmented, clearly overreaching the first article of the exopod; articles 1 and 2 about of the same length, article 2 with a short apical seta. Exopods of P₂ and P₃ very similar, 3-segmented; article 1 with a subdistal outer spine, article 2 with an outer subdistal spine and a long inner seta; exopod of P₄ 3-segmented, articles 1 and 2 as in P₂ and P₃, article 3 armed with 6 spines and setae (2 inner + 2 apical setae, and 2 outer, subdistal spines).

Coxal plates of P₂ - P₄ with markedly prominent lobes.

Setal formula of P₁ - P₄ as follows:

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<td>0 0 010</td>
</tr>
<tr>
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<td>0 1 222</td>
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P₅: basiendopod with 3 stout setae (one damaged in all specimens) on the inner margin and 1 slender seta on the distal corner; exopod slightly wider than long and armed with 4 plumose setae.
Anal operculum with slightly convex medial margin, armed with 5-6 spines; lateral margins each with 3-4 spines.

Furcal rami subparallel, slightly longer than wide (L/w = 1.22 - 1.24), armed with a short lateral seta, a long dorsal seta (about twice longer than each ramus) and 4 distal setae, the inner longer than the outer and about as long as the dorsal one; medial setae both damaged; a small setula is implanted on the inner subdistal margin of each ramus.

Male: Unknown.

**Etymology.** — This species is named after Miss Raffaella Pace who collected it.

**Affinities.** — *Nitocrella paceae* n. sp. quite closely related to *N. vasconica* Chappuis, mainly through the armature of the basiendopod of P₅. From this species, as well as the others in the same group, *N. paceae* is most readily distinguished by numerous characteristics such as the construction and armature of P₁, the armature of the anal operculum, the morphology of the P₅ exopod, the length and armature of the furcal rami, etc.

**LITERATURE**


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