

COPEPODA FROM THE MIDLITTORAL ZONE OF THE
BLACK SEA — RUMANIAN SHORE.

I. NITOCRA ELONGATA n. sp.

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ABSTRACT

DESCRIPTION OF A NEW SPECIES, NITOCRA ELONGATA,
FROM THE PSAMMON OF THE MIDLITTORAL ZONE.

Studies of the psammon off the Rumanian shore have been carried on for some ten years (1) by the Staffs of the Divisions of Marine Biology of both the Academy of the Socialist Republic of Rumania and the „Grigore Antipa” Museum of Natural History. Last year, further researches began with the psammon from the midlittoral zone (2, 3) south of Constanta to the Bulgarian border.

One of the dominant animal groups among the main psammobionts of that interesting biotope are the copepods.

On examining the copepods originating from 20 midlittoral stations I found 15 harpacticoid species among which one species new for science.

Nitocra elongata n. sp.

(Figs 1—3)

Holotype: 1 ♀ deposited in the collection of the “Gr. Antipa” Museum of Natural History, no. 83.

Allotype: 1 ♂ deposited in the collection of the “Gr. Antipa” Museum of Natural History, under the same number.

Dissected material: 115 spms; 90 ♀♀, 25 ♂♂.

Examined material: 1,589 spms; 1,464 ♀♀, 51 ♂♂, 29 copepodites.

Localities: Eforie Nord 19.X.1965, 0 m, 1,151 spms; Costinesti 25. VI. 1965, 0.5 m, 433 spms; Vama Veche 19.XI.1965, 0 m, 5 spms.

Female (Fig. 1 a) Length 0.38—0.46 mm. Breadth 0.70—0.75 mm. Rostrum weakly prominent. Genital double-somite dorsally and laterally divided by chitinous stripe. Abdominal segments each with two rows of spinules, one towards distal edge, the other, provided with slenderer hairs, towards the middle. Anal operculum with small hairs. Furcal rami (fig. 2 f) 1.65 times longer than broad, with a row of spinules dorsally towards inner edge, nearly centrally. In addition to two much developed terminal setae, the furca bears three shorter

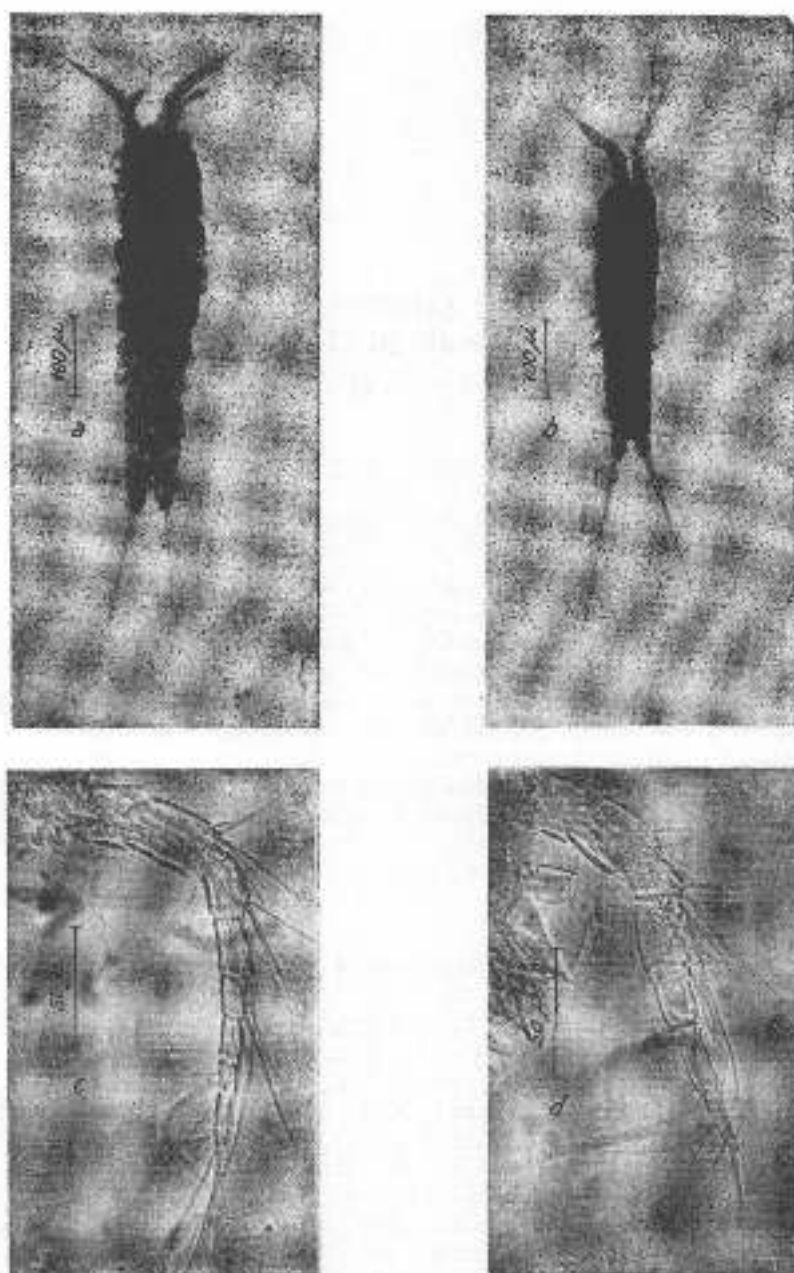


Fig. 1 — *Nitocra elongata* n.sp. ♀ and ♂. a — ♀; b — ♂; c — A₁ ♀; d — A₁ ♂.

(Foto Ș. Boicescu).

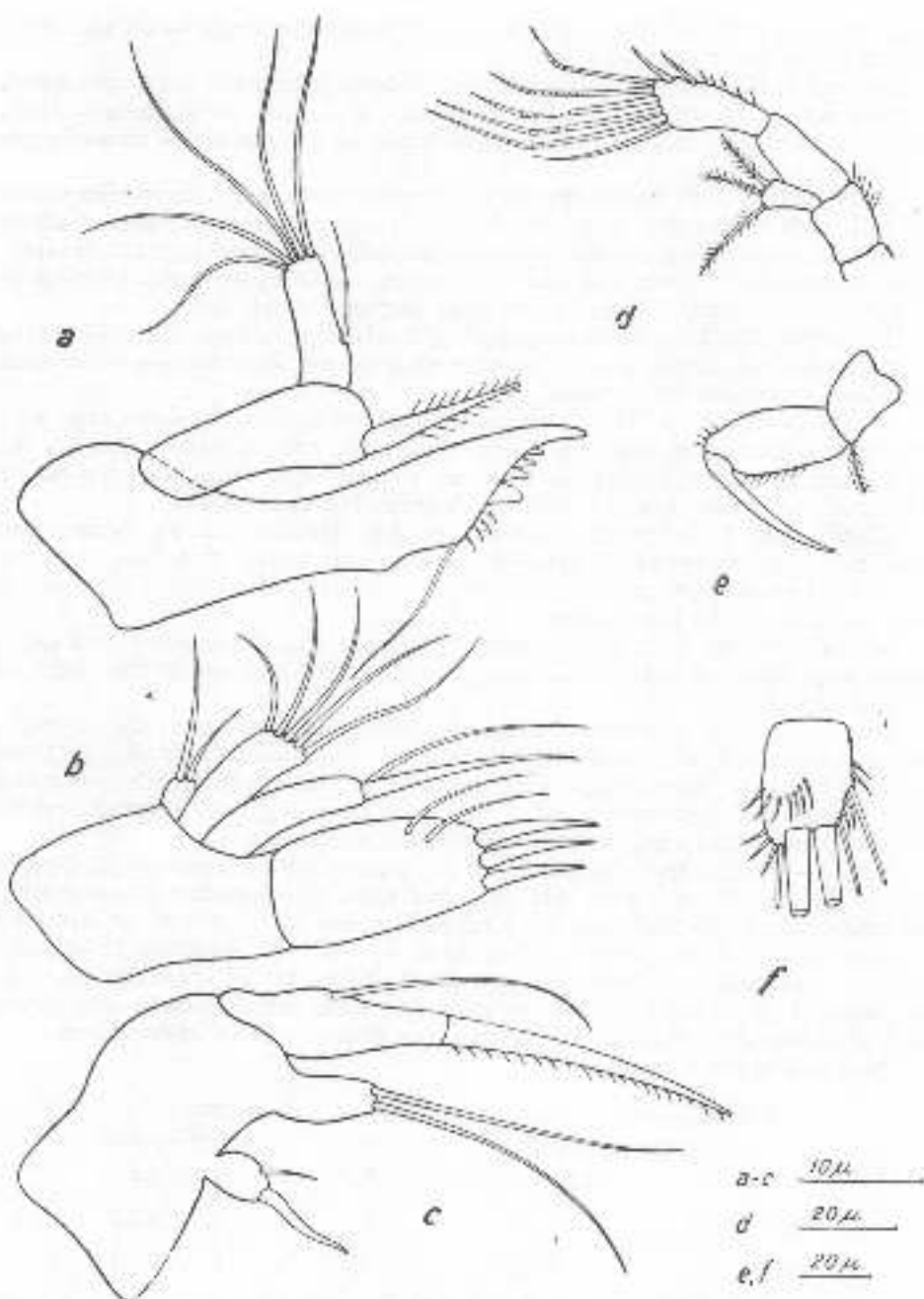


Fig. 2—*Nitocra elongata* n.sp. ♀. a = mandible; b = maxillula; c = maxilla; d = A₄; e = maxillipede; f = Fu.

setae, an inner one and two outer ones as well as spinules towards the distal corners of the inner and outer edges.

Antennula (fig. 1 c) eight — segmented. Second joint is the most developed. Fourth joint, of about the same length as third one, bears an aesthetasc. Fifth, sixth, and seventh joints shorter, of close sizes. Last segment 1.4 times longer than three last ones.

Antenna (fig. 2 d). Basipodite with hairs on anterior edge. Exopodite unarticulated, with three apical plumose setae. First segment of endopodite of about same length as second one, unarmed. Anterior edge of second segment of endopodite with hairs in lower half and with two spines in upper third. Distal edge of same segment with five geniculate setae and one simple hair.

Mandible (fig. 2 a). Precoxa armed as in the figure. Coxa-basis with long terminal seta. No exopodite. Endopodite with simple short seta on inner edge and with five simple setae apically.

Maxillula (fig. 2 b). Precoxa with two setae on surface. Its distal edge with three spines. Coxa with two apical setae, one more robust, slightly curved, the other much slenderer. Basipodite with five slender setae terminally. Exopodite very small, with two setae of different lengths. No endopodite.

Maxilla (fig. 2 c). Syncoxa with two endites. Proximal endite shorter than distal, with one waved spine apically and one very small, thin seta on outer edge. Distal endite with two long, simple, apical setae. Basipodite with strong claw, hairy along the inner edge.

Maxillipede (fig. 2 e). Basipodite with plumose seta. First segment of endopodite with hairs on inner edge. Second endopodite segment in the shape of long, strong claw.

Leg 1 (fig. 3-a). Basipodite with two spines, an inner one and an outer one, and provided with hairs on distal edge. Exopodite composed of three segments of about same length. First segment of endopodite nearly twice and a half longer than segments 2 and 3 together. Third segment, somewhat more elongate than second one, with two geniculate setae apically.

Legs 2—4 (fig 3 b-d) Basipodite of P_2 with spine on outer edge. Basipodites of P_3 and P_4 each with seta on outer edge. All segments of exopodites and endopodites with hairs on outer edge. The second inner seta of last joint of exopodite of P_3 is the thickest of all setae of P_2 . Last segments of endopodites P_3 have each one spine in outer distal angle. Of all these spines, only the spine of endopodite of P_{2-4} is provided with spinules. Inner seta of last joint of endopodites P_{2-4} is thicker than remaining setae of endopodites.

Seta and spine formula:

| Endopodites | | | Exopodites | | | |
|-------------|----|-------|------------|----|----|-------|
| 1. | 1. | 1.2.1 | P_2 | 0. | 1. | 1.2.3 |
| 1. | 1. | 1.2.1 | P_3 | 0. | 1. | 1.2.3 |
| 1. | 1. | 1.2.1 | P_4 | 0. | 1. | 2.2.3 |

Leg 5 (fig 3 e). The exopodite, slightly excavated in upper part of inner edge, is more than twice longer than broad. Both inner and outer edges hairy,

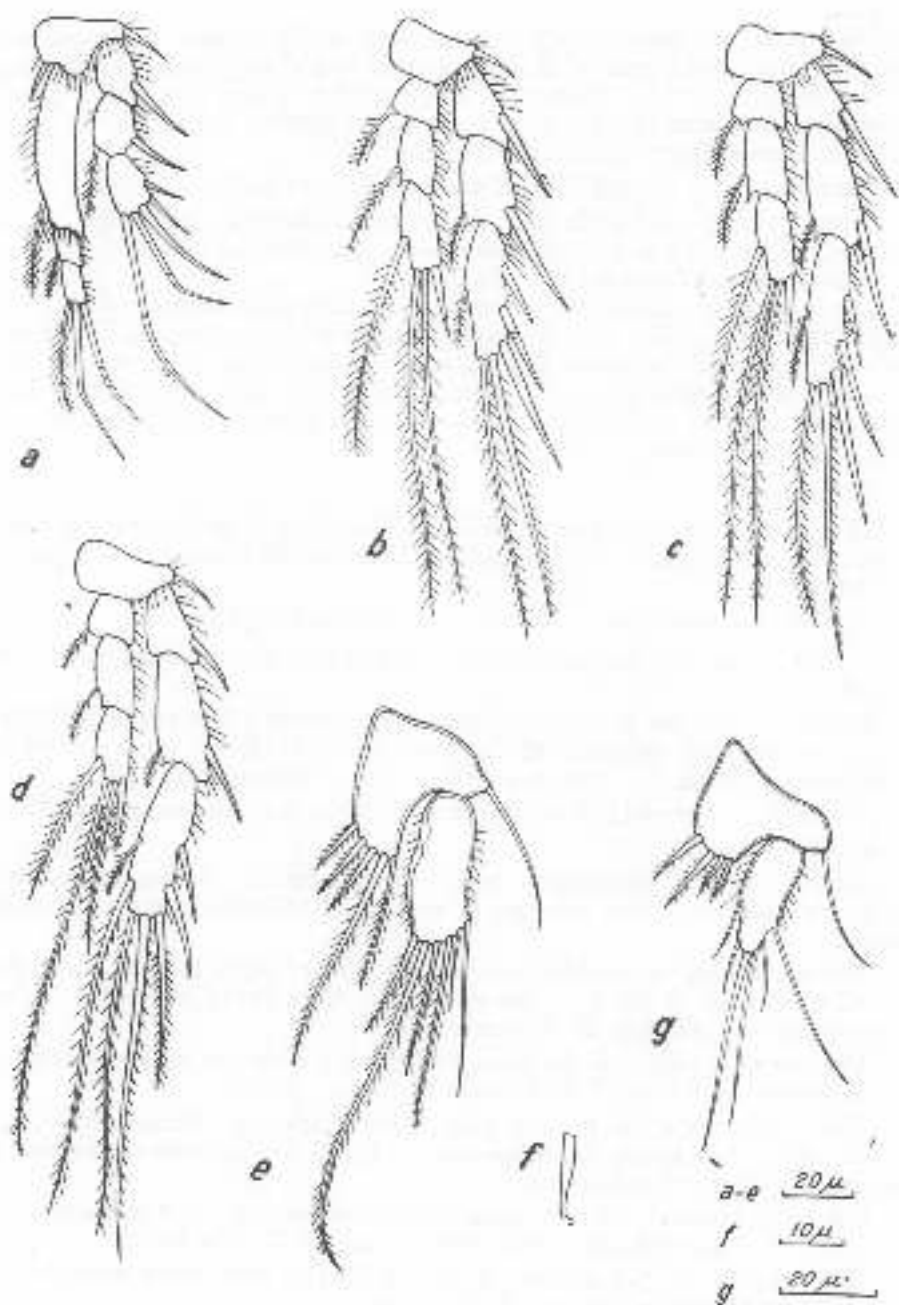


Fig. 3 — *Nitocra elongata* n.sp. ♀ an ♂. a-e — P₆ ♀; f — inner hair of basipodite P₁ ♂; g — P₆ ♂.

provided with six setae. Second inner seta is the longest, its length more than four times the length of the penultimate outer seta (which is the shortest) and more than three times than length of first inner seta. Distal edge of baseoendopodite with five plumose setae nearly reaches the middle of exopodite. Penultimate outer seta is the longest.

Male (fig. 1 b). Length 0.33—0.40 mm. Breadth 0.65—0.70 mm.

Antennula (fig 1 d) with usual dimorphic alterations. Inner hair of basipodite of P_1 modified as straight spine with hook-like tip (fig 3 f).

Legs 2—4 as in female, not modified.

Leg 5 (fig. 3 g). Inner and outer edges of exopodite hairy; the latter 2.15 times longer than broad, with 6 simple setae of different lengths. Third inner seta the longest and broadest. Fourth inner seta and last outer seta of about the same length. Distal edge of baseoendopodite with four setae slender hairy, reaches the limit of upper third of exopodite. The two inner setae, of equal length, are the shortest.

Discussion

The genus *Nitocra* is represented in the Black Sea by seven species, namely *N. spinipes*, *N. hibernica*, *N. pusilla*, *N. fallaciosa*, *N. lacustris*, *N. typica* and *N. pontica*.

Our species resembles to the two last mentioned species.

Nitocra typica, an oligohaline cosmopolitan species was described in 1864 by BOECK.

Nitocra pontica was described in 1938 by JAKUBISIAK as a variety of *Nitocra typica* from material collected off Cavarna (5). In 1940 this variety was raised to the specific status by LANG under the name *Nitocra pontica* (6).

Hereunder is presented a comparative table for *Nitocra typica*, *Nitocra pontica* and our species.

Nitocra elongata resembles both above species, having nevertheless distinctive characters that separate it from both *Nitocra typica* and *Nitocra pontica*.

The operculum, antennula, hair of exopodite of leg 5 in the female, inner hair of basipodite of leg 1 in the male, and the hairs of exopodite of leg 5 in the male are identical as in *Nitocra typica*.

The dorsal spinules of the furca, length and shape of exopodite of leg 5 in the female are identical with those in *Nitocra pontica*.

The length of the furca, outer hair of 3rd segment of endopodite of leg 3 in the male, and length of exopodite of leg 5 in the male distinguish our new species from related species.

Since the antenna and oral parts of *Nitocra pontica* are not known, such parts can be compared only with similar ones of *Nitocra typica*.

The exopodite of the antenna is in our species with three plumose setae while in *Nitocra typica* they are simple setae.

The endopodite of the mandible bears in *Nitocra elongata* five apical setae while in *Nitocra typica* these are only four in number.

| | | <i>Nitocra typica</i> | <i>Nitocra pontica</i> | <i>Nitocra elongata</i> |
|------------------|----------------|---|--|---|
| | | | ♀ | |
| Length | | 0.60—0.70 mm. | ? | 0.38—0.46 mm. |
| Op. | | Slender hairy | Not hairy | As in <i>N. typica</i> . |
| Fu. | | Broader than long. Without spinules. | As broad as long. With spinules dorsally. | 1.65 times longer than broad. Spinules arranged as in <i>N. pontica</i> . |
| A 1 | | Short terminal segments | Elongated terminal segments. | As in <i>N. typica</i> |
| P ₂₋₄ | | Armature of setae and spines identical in all species. | | |
| | Exop. | 1.5—1.7 times longer than broad. | More than twice longer than broad, slightly excavated in upper part of inner edge. | As in <i>N. pontica</i> |
| | F ₄ | 6 setae, the 2nd outer seta the shortest. | 6 setae, the 2nd outer seta and first inner seta equal in length and shortest. | As in <i>N. typica</i> . |
| | Basoend. | Identical in all three species. | | |
| <i>d</i> | | | | |
| Length. | | 0.50 mm | ? | 0.33—0.40 mm. |
| P ₁ | | Inner hair of basipodite in shape of straight spine with hook-like tip. | Inner hair of basipodite in shape of curved spine which hook-like tip. | As in <i>N. typica</i> . |
| P ₂ | | Outer hair of segment 3 of endop. modified, broadened and slightly curved outwards. | As in <i>N. typica</i> | Outer hair of segment 3 of endop. not modified. |
| | Exop. | 1.5—1.7 times longer than broad. 6 setae of usual type. | 1.5 times longer than broad. 6 setae, outer penultimate seta short, spine-like. | 2.15 times longer than broad. As in <i>N. typica</i> More elongate, distal edge reaching limit of upper third of exopodite. |
| | F ₄ | Short, distal edge reaching limit of upper fourth of exopodite. | | |
| | Basoend. | 4 setae, the inner one the shortest. | As in <i>N. typica</i> . 4 setae of equal length. | 4 setae, the 2 outer ones of equal length and shortest. |

The maxillule has in *Nitocra elongata* two setae on its surface while in *Nitocra typica* they are lacking.

In *Nitocra elongata*, the proximal endite of the maxilla bears waved apical spine and short lateral spine while the distal endite bears two long, somewhat equal in size, setae. In *Nitocra typica* the proximal endite has one plumose seta apically and one short lateral seta while the distal endite bears two shorter setae of different lengths.

Maxillipede identical in both species.

The three species under examination show indiscutable relationship. LANG (6) considers that what was described by JAKUBISIAK (9) as the variety *pontica* is a good species. On studying four specimens which he ascribed to *N. pontica*, namely 3 females and one male, ŠERBAN⁽¹¹⁾ found in all four examined specimens elongate exopodite of female leg 5, which is a *Nitocra pontica* character; in one specimen he found opercular spinules, which is a *Nitocra typica* character. In one single male examined he found no distinctive characters. Based on his observations ŠERBAN feels inclined to believe *Nitocra pontica* a subspecies of *Nitocra typica*. The fact that JAKUBISIAK does not state the number of specimens he worked on, is certainly raising a doubt.

I am, however, of LANG's opinion that *Nitocra pontica* is a good species. The finding of the species *Nitocra elongata*, which was built following the study of a rich material, the determination of its own characters and of the differences from and similarities with the two mentioned related species confirm this opinion.

Between *Nitocra typica*, *N. pontica* and *N. elongata* there exist evident resemblances but also precise distinctions which define the scope of a species. Moreover the finding of them all together in the same biotope confirms ecologically the fact that they are valid species.

It can be also, that one is in presence of a bunch of related species derived from the cosmopolitan *Nitocra typica* with a wide ecological plasticity and which in different environments (in the case of our species the Pontic environment) become altered and yield other, closer species, as *Nitocra pontica* and *Nitocra elongata*.

PERKOVSKI (7) found in the Adriatic Sea another variety of *Nitocra typica* which he named *Nitocra typica f. adriatica*, considering it a subspecies. PERKOVSKI does not state in his paper the number of specimens he examined, though the material he had at his disposal was a rich one, his variety might have been considered a bona species, the more so as the seta and spine formula for legs 2-4 differs from that of the type species.

Only when more populations of *Nitocra* from different areas of the Pontic basin are studied will one be able to conclude with certainty as to whether one is in the presence of a bunch of forms or not.

Both *Nitocra pontica* and *Nitocra elongata* derived from *Nitocra typica*. The chief distinctive character of *Nitocra pontica*, elongation of exopodite of P_5 in the female, is maintained also in the new species in which the exopodite and baseopodite of P_5 in the male is sensibly elongate, and that suggested us the name *elongata* for the new species.

A worth emphasizing feature seems to be the reduced size of our species and of *Nitocra typica f. adriatica* as compared with that of the type species.

Unfortunately, one does not know the lengths of the specimens examined by JAKUBSIK.

It might be that younger species have smaller sizes which grow while they improve by adaptation to the environment. Yet this fact must be checked in time.

All the stations in which *Nitocra elongata* was found were in the midlittoral zone, in the coarse grain sand substrate.

The new species was found in only two of the total twenty stations sorted out, but where it occurred, it was massively, as a dominant form.

1,589 specimens of *Nitocra elongata* were examined; of these 23 were males, which accounts for a rate of 1.82 percent.

In addition to its occurrence in the sandy facies, *Nitocra typica* was found in the rocky facies off the Romanian coast too. It appears that the related species *Nitocra pontica* and *Nitocra elongata* are connected exclusively with shallow depths and sandy substrate.

COPEPODE DIN ZONA MEDIOLITORALĂ A MĂRII NEGRE LITORALUL ROMĂNESC I. *NITOCRA ELONGATA* N.SP.

РЕЗУМАТ

Se descrie o specie nouă pentru știință *Nitocra elongata* n.sp., găsită în zona mediolitorală a Mării Negre, litoralul românesc, făcându-se și anumite aprecieri asupra înrudirii dintre specia nouă și *Nitocra typica* și *Nitocra pontica*.

În încheiere se fac unele observații ecologice.

КОПЕПОДЫ СРЕДНЕПРИБРЕЖНОЙ ЗОНЫ ЧЕРНОГО МОРЯ РУМЫНСКОГО ПОВЕРЬЯ I. *NITOCRA ELONGATA* n. sp.

РЕЗЮМЕ

Описывается новая для науки вид *Nitocra elongata* n. sp. найденный в среднеприбрежной зоне Черного моря, румынского побережья, проводятся некоторые соображения относительно родства между новым видом *Nitocra typica* и *Nitocra pontica*.

В заключение плащаются некоторые экологические замечания.

REFERENCES

1. BĂCESCU, M., ELENA DUMITRESCU, V. MANEA, E. POR, R. MAYER — 1967 — Sables à *Cerbulomys moestica* Mill. base trophique de premier ordre pour les poissons de la Mer Noire. *Travaux Mus. Hist. Nat. «Gr. Antipa»*, 1: 325—375.
2. BĂCESCU, M., ELENA DUMITRESCU, M.T. GOMOIU, ADRIANA PETRAN — 1967 — Éléments pour la caractérisation de la zone sédimentaire méditerranéale de la Mer Noire. *Travaux Mus. Hist. Nat. «Gr. Antipa»*, 7: 1—14.
3. BĂCESCU, M., ELENA DUMITRESCU, M.T. GOMOIU — 1968 — Quelques considérations sur la dynamique des organismes de la zone méditerranéale sablonneuse en Mer Noire. *Rapport. Verb. Réun. C.I.E.S.M.M.* (in print).

4. CASPERS, H. — 1951 — Quantitative Untersuchungen über die Bodentierwelt des Schwarzen Meeres im bulgarischen Küstenbereich. *Archiv. für Hydrob.*, 45 : 1—192.
5. JAKUBISLAK, S. — 1938 — Sur les Harpacticoides des limans de la Mer Noire. *Archives d'Hydrobiol. et d'Ichtyol.*, 11 : 283—292.
6. LANG, K. — 1948 — Monographie der Harpacticiden Lund, 1652 p.
7. PETKOVSKI, T. — 1954 — Harpacticiden der Grundwassers unserer Meeresküste. *ACTA Mus. Mac. Scient. Nat.*, 2 : 93—123.
8. POR, F. — 1960 — Littorale Harpacticoiden der Nordwest Küsten des Schwarzen Meeres. *Travaux Mus. Hist. Nat. « Gr. Antipa »* 2 : 97—143.
9. POR, F. — 1964 — A study of the levantine and pontic Harpacticoida. *Zoologische Verhandlungen*, 64 : 121 p.
10. SARS, G.O. — 1906 — An account of the Crustacea of Norway. Bergen, 5: 276 p.
11. ȘERBAN, M. — 1959 — Les Copépodes de la Mer Noire. Note préliminaire sur les Harpacticoides de la côte Roumaine. *Lucrările sesiunii științifice Stat. Zoolog. Marine, Agtea*: 259—302.