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MORPHOLOGIC NOTES, LOCATIONS AND BIOTOPS  
of the Phreatic Harpacticoida (Fig. 1) —  
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## A STUDY ON THE FRESH-WATER PHREATIC HARPACTICOIDA (CRUSTACEA COPEPODA) IN BULGARIA

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Seven species of phreatic harpacticoids are reported, all of them inhabiting well-waters in Southwest and Northeast Bulgaria and river-phreatic waters in the South-eastern part of the country. The well samples were collected by means of phreatic-biological net (Čvetkov, 1968), and from the riverphreatic waters after the Chappuis-Karaman method. The harpacticoids were collected and rendered to the author by the Senior Research Fellow L. Čvetkov from the Zoological Institute at the Bulgarian Academy of Sciences and by Zh. Zhelev, an undergraduate at the Department. To both of them I herewith express my profound gratitude.

In the faunal list the sign "+" is placed in front of the names of the new species of the fauna for the country. The harpacticoid copepods are preserved totally in 76° alcohol or in sections of microscopic slides, prepared through For-Berlese in the collection, belonging to the Department of Hydrobiology and Ichthyology in the Sofia University.

### FAUNAL LIST

#### *Phyllognathopodidae* Gurney

- + 1. *Phyllognathopus viguieri* (Maupas, 1892)  
*Ameiridae* Monard.
- 2. *Nitocrella hirta* Chappuis, 1923  
*Canthocamptidae* G. O. Sars.
- 3. *Elaphoidella elaphoides* (Chappuis, 1923).
- + 4. *Elaphoidella fonticola* Chappuis, 1937.
- + 5. *Elaphoidella borutzky* n. sp.
- + 6. *Ceuthonectes* sp.  
*Parastenocaridae* Chappuis.
- + 7. *Parastenocaris bohémica* Štěrba, 1968.

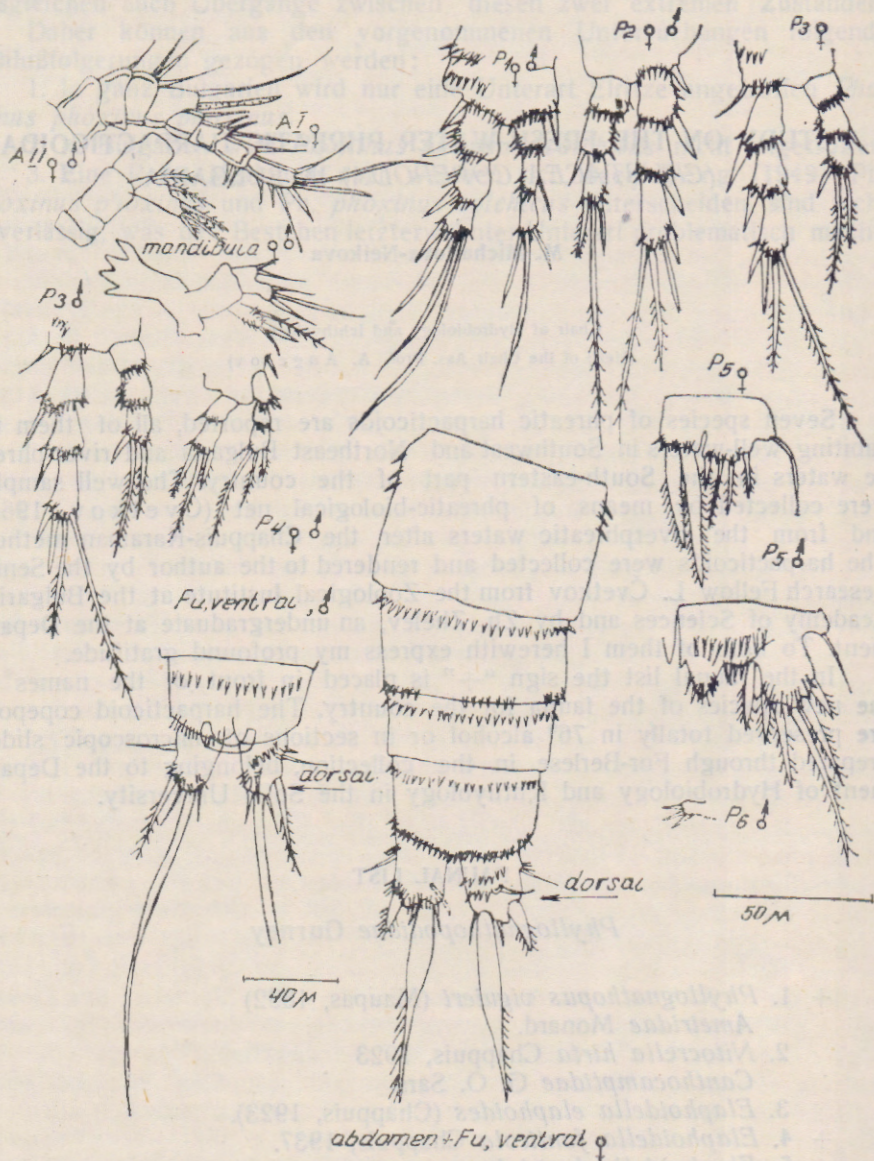


Fig. 1. *Phyllognathopus viguieri* (Maupas), ♀ + ♂ (Orig.)

## MORPHOLOGIC NOTES, LOCATIONS AND BIOTOPS

*Phyllognathopus viguieri* (Maupas), (Fig. 1) —

Blagoevgrad, South-west Bulgaria, co-operative farm: a pump-well, 3 ♀ ♀ + 3 ♂ ♂ ; 1 ♂ Copepodit, 29 Dec. 1967. Accompanying organisms: *Bryocamptus* (*R.*) *zschokkei caucasicus* Borutzky, 2 ♀ ♀ + 3 ♂ ♂, *Attheyella crassa* (G. O. Sáros), 3 ♀ ♀. Collected by L. Cvetkov.

**Variability.** *Phyllognathopus* is a cosmopolitan species of a very high variability. This variability is due to the different ecological conditions under which this adaptable species lives and also on the geographic environment. The following insignificant changes were observed in the individuals under study: in the three females, the row of spines on the posterior margin of the second abdominal segment is interrupted on the ventral side. In the males this row is continuous and surrounds the segment like a ring. In both sexes of the nominant form the row is continuous and surrounds like a ring the second abdominal segment. Endopod P<sub>3</sub> ♂: the second segment without inner-margin seta. In addition, in this population, is observed comparatively stronger development of the small spines along the thoracic legs, which can be seen on the illustrations.

Length of female, minus the furcal setae 0.60 mm. Length of male, minus the furcal setae 0.57 mm.

A new species for Bulgarian fresh water fauna.

*Nitocrella hirta* Chappuis (Fig. 2)

Railway lodge at the village of Boboshevo, Kjustendil district, South-west Bulgaria: a well, five meters deep, 19 ♀ ♀ + 1 ♂, March 16, 1967. Only species in the sample. Collected by L. Cvetkov.

**Variability.** The different population of *Nitocrella hirta*, inhabiting different localities and under different life conditions in phreatic waters in Bulgaria and Yugoslavia disclose certain morphologic differences both in the nominant form and among themselves. This ecologic variability was reported by Petkovsky (1959) and Michailova (1964, 1966). In the females of the population in the new habitat small morphological changes are observed. These changes pertain to the construction of the furca and the armament of the fifth rudimentary legs (P<sub>5</sub>), which differ to a greater extent than the differences reported by the quoted authors. The deviations are as follows: ♀. The analoperculum has only four big cogs on its outer end. The furcal segments are almost square, with two distally situated lateral setae on the outer margin. Basiendopod P<sub>5</sub> has, just like the nominant form two spines. The exopod has tree appendages: two apical spines and one outer margin seta.

Length of the female, minus the furcal setae 0.54 mm. Length of male, minus the furcal setae 0.53 mm.

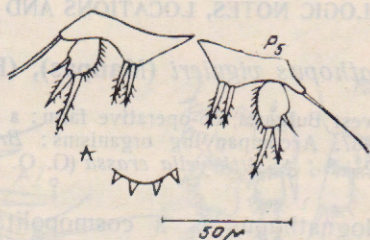


Fig. 2. *Nitocrella hirta* Chappuis,  
♀ (Orig.)

*Elaphoidella elaphoides* (Chappuis)

Village of Belokopitovo, nine kilometers north of Shumen — North-east Bulgaria: pipe-well, 20 cm wide, 4 m deep, lime soil; water temperature 11.5°C, pH  $\approx$  6.5—7.0,  $\approx$  3 ml/l, 1♀, 31 Aug. 1969. Accompanying organisms: *Elaphoidella borutzkyi*, 7♀♀ and *Ceuthonectes* sp., 2♀♀. Collected by Zh. Zhelev.

The diagnostic characteristics of the female coincide completely with those, reported by Chappuis about *Elaphoidella elaphoides*. Length of female, minus furcal setae 0.58 mm.

*Elaphoidella fonticola* Chappuis (Fig. 3—4)

Village of Boboshevo, District of Kyustendil, South-west Bulgaria: seven meters deep well, 5♀♀+3♂♂, 16 March 1967. Only species in the sample. Collected by L. Cvetkov.

*Elaphoidella fonticola* is reported by Chappuis (1937), found in a well in Yugoslavia, town of Nish. The description is made on the only female, overgrown with detritus. Chappuis notes, that this has impeded the observation of the body segments. The finding of more abundant material in a neighbouring district gives me the pleasant opportunity to supplement Chappuis' description of the female and to describe the male, hitherto unknown.

Variability. Female (Fig. 3). The observed females can be related to the species *E. fonticola* after the diagnostic characteristics.  $P_1$ — $P_4$  completely correspond in respect to structure and armament with Chappuis' description and drawings. The little deviations from the nominant form, which were observed, are not so significant to justify the treatment of this population as a separate subspecies. The deviations are as follows: the anal segment has ventrally above the base of the furcal segments four spines (In Chappuis' description three spines). The analoperculum has on its outer end 11 little cogs (in Chappuis' description 9 cogs). The external apical seta of the furcal segments is considerably shortened, having about the same length as the furcal segment, and is enlarged in the base as in the middle one (In the nominant form it is a short spine). The first segment of endopod  $P_3$  has one inner-margin seta (in the nominant form this seta is absent). Basiendopod  $P_5$  has three long, hairy setae and one short spine (in the nominant form the short spine is absent). In one of the females was observed a different armament of the basitelson of the pair leg: the left basitelson has only two long,

hairy setae and one short spine, while the right one is armed normally. In the other three females the armament is normal.

Body length minus the furcal setae 0.65–0.63 mm.

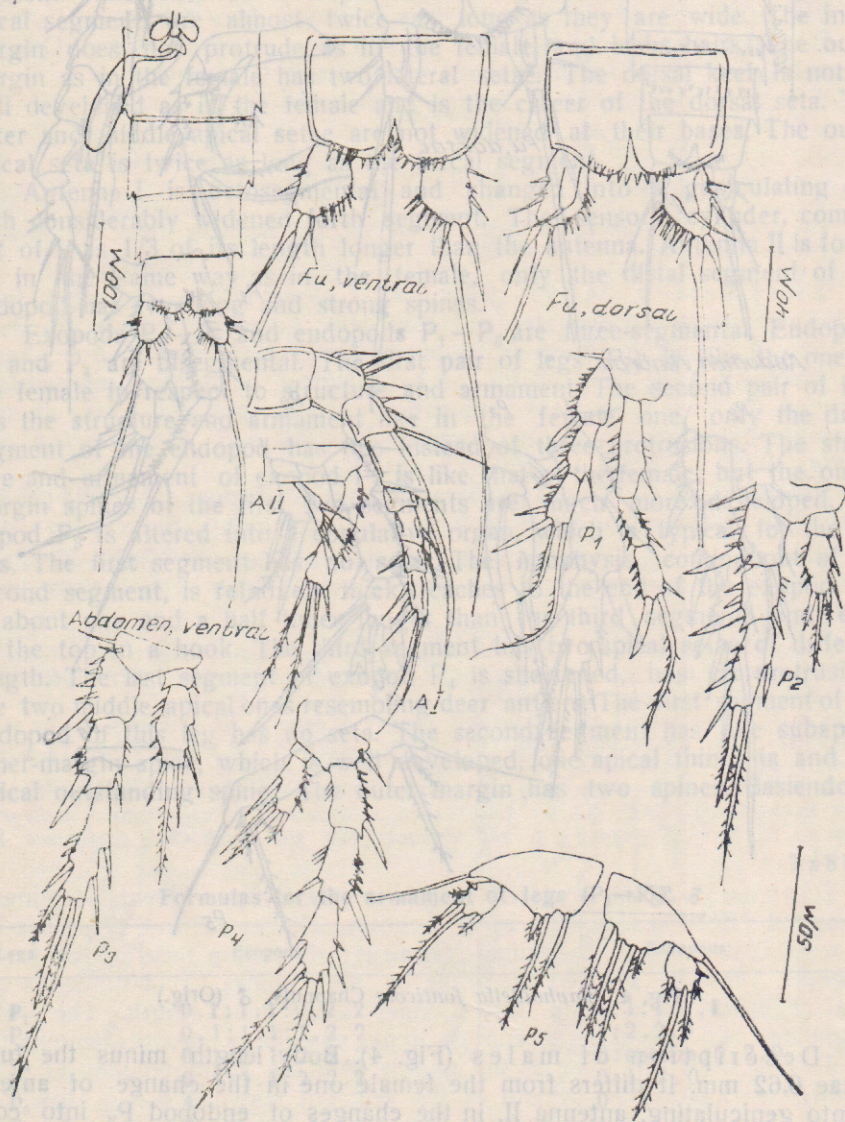


Fig. 3. *Elaphoidella fonticola* Chappuis, ♀ (Orig.)

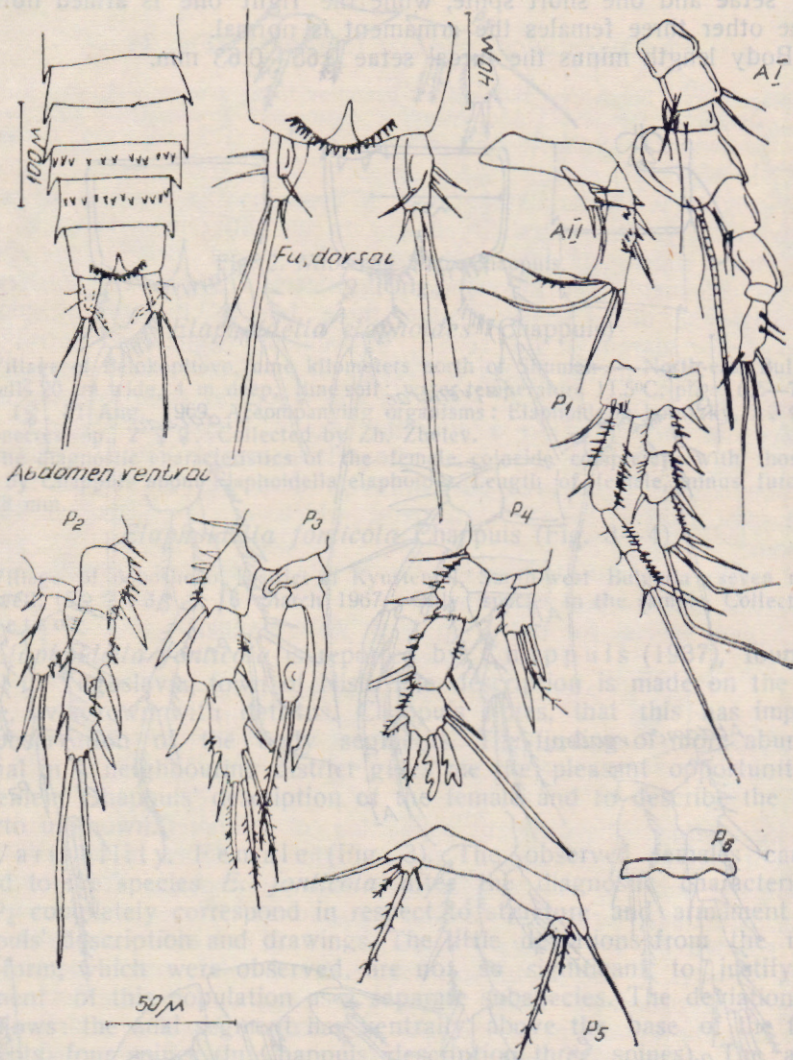


Fig. 4. *Elaphoidella fonticola* Chappuis, ♂ (Orig.)

Description of males (Fig. 4). Body length minus the furcal setae 0.62 mm. It differs from the female one in the change of antenna I into geniculating, antenna II, in the changes of endopod  $P_3$  into copulative organ, in the alteration of the apical setae of exopod  $P_4$ , in the formation of  $P_5$  and other characteristics.

The posterior margin of the abdominal segments is smooth the way it is in the female. The third and fourth abdominal segments on the ventral side have each a row of short spines, situated in the middle of the segment. The anterior analoperculum margin has 19 small cogs. The furcal segments are almost twice as long as they are wide. The inner margin does not protrude as in the female, and lacks hairs. The outer margin as in the female has two lateral setae. The dorsal keel is not so well developed as in the female and is the carrier of the dorsal seta. The outer and middle apical setae are not widened at their bases. The outer apical seta is twice as long as the furcal segment.

Antenna I is octosegmental and changed into a geniculating one with considerably widened fourth segment. The sensory cylinder, coming out of it is 1/3 of its length longer than the antenna. Antenna II is formed in the same way as in the female, only the distal segment of the endopod has two long and strong spines.

Exopods  $P_1-P_4$  and endopods  $P_1-P_3$  are three-segmental. Endopods  $P_2$  and  $P_4$  are bisegmental. The first pair of legs ( $P_1$ ) is like the one in the female in respect to structure and armament. The second pair of legs has the structure and armament like in the female one, only the distal segment of the endopod has two instead of three protrusions. The structure and armament of exopod  $P_3$  is like that of the female, but the outer-margin spines of the first two segments are much more developed. Endopod  $P_3$  is altered into a copulative organ, which is typical for the genus. The first segment has no seta. The apophysis, coming out of the second segment, is relatively thick, reaches to the end of the exopod and is about one and a half times longer than the third segment, and ends at the top in a hook. The third segment has two apical setae of different length. The last segment of exopod  $P_4$  is shortened, has six protrusions, the two middle, apical ones resembling deer antlers. The first segment of the endopod of this leg has no seta. The second segment has one subapical, inner-margin spine, which is well developed, one apical thin seta and one apical outstanding spine. The outer margin has two spines. Basiendopod

Table 1

Formulas for the armament of legs ( $P_1-P_6$ ), ♂

| Legs  | Exopods       | Endopods        |
|-------|---------------|-----------------|
| $P_1$ | 0.1:1.1:0.2.2 | 1:1:1.1.1       |
| $P_2$ | 0.1:1.1:1.2.2 | 1:2.2.0         |
| $P_3$ | 0.1:1.1:2.2.2 | 0:apofiza:0.2.0 |
| $P_4$ | 0.1:1.1:2.2.2 | 0:1.2.0         |
| $P_5$ | 4.            | 0               |
| $P_6$ | 0.            |                 |



$P_5$  protrudes only slightly and lacks any armament; the exopod is square and has one inner-rim and one outer-rim seta and two apical ones, of which the inner one is well developed and is spine-like.  $P_6$  represents a narrow plate.

The armament of the thoracic legs is shown in a table 1.

**Biological data.** All five females have spermatophore. One of the males also has a spermatophore. One pair is in copula.

A new species for the Bulgarian fresh water fauna.

*Elaphoidella borutzky* n. sp. (Fig. 5—6)

The name of this species is in honour of Prof. D-r Borutzky from the Moscow University, in token of a great respect.

**Type series.** 34 ♀♀ + 19 ♂♂; 4 ♀♀ Copepodites. Collected from a pipe-well of 20 cm diameter and 4 m deep, lime soil, village of Belokopitovo, 9 kilometers north of Shumen, North-east Bulgaria, Aug., Sept., Oct. 1969 and Jan., May 1970. The hydrological conditions are constant all round the year — water temperature 11.5°C, pH ≈ 6.5—7.0,  $O_2$  ≈ 3 ml/l. Accompanying organisms: *Ceuthonectes* sp. 2 ♀♀ and *Elaphoidella elaphoides*, 1 ♀. Collected by Zh. Zhelev.

**Holotypus** ♀ N 587 (33 ♀♀ paratipi) and **Allotypus** ♂ No. 598 (18 ♂♂ paratipi), Department of Hydrobiology and Ichthyology, Sofia University.

A large number of males and females, identical with the type series were collected by Zh. Zhelev from wells in three neighbouring villages. The habitats are as follows:

A well one meter wide, five meters deep, lime soil, village of Ivanski, 18 kilometers south-east of Shumen. The hydrological conditions are constant: water temperature 12°C, pH ≈ 7.5,  $O_2$  ≈ 3 ml/l; 5 ♀♀ + 11 ♂♂, 3 ♂♂ Copepodites, Oct. 1969, May, June 1970. Only species in the samples.

A well, seven meters deep, lime soil, village of Izgrev, 37 km north of the town of Shumen. Water temperature 12°C, pH ≈ 7.5,  $O_2$  ≈ 3 ml/l; 17 ♀♀ + 14 ♂♂, 2 ♀♀ Copepodites, May, August, 1970. The only species in the samples.

A well four meters deep, lime soil, village of Novosel, 13 km west of Shumen. Water temperature 12.5°C, 5 ♀♀, June, 1970. Accompanying organisms: *Attheyella crassa* (G. O. Sars), 3 ♀♀ + 2 ♂♂ and *Bryocamptus* (R.) *zschokkei caucasicus* Borut., 4 ♀♀.

**Diagnosis.** The posterior margin of the body segments is minutely jagged. Both sexes have each a continuous ventral row of spines on the second and third abdominal segment; above the base of the furcal segments, ventrally situated are three or four spines. In both sexes the furcal segments are short, a little longer than their length. The outer margin has two lateral setae and the inner margin is smooth; among the apical setae best developed is the middle one. The analoperculum is arch-shaped, does not reach the end of the segment and has 8—15 jags. The palp of the mandibule is bipartite; the first segment has no setae, and the second one has four. In the female the basiodopod  $P_5$  is well developed, having 3 equally long setae and a short one. The exopod is al-

most twice as long as its width and extensively exceeds the lower margin of the basiendopod, having 4 setae; both the inner and the outer margin have small spines. The distal segment of endopod  $P_2$  of the male

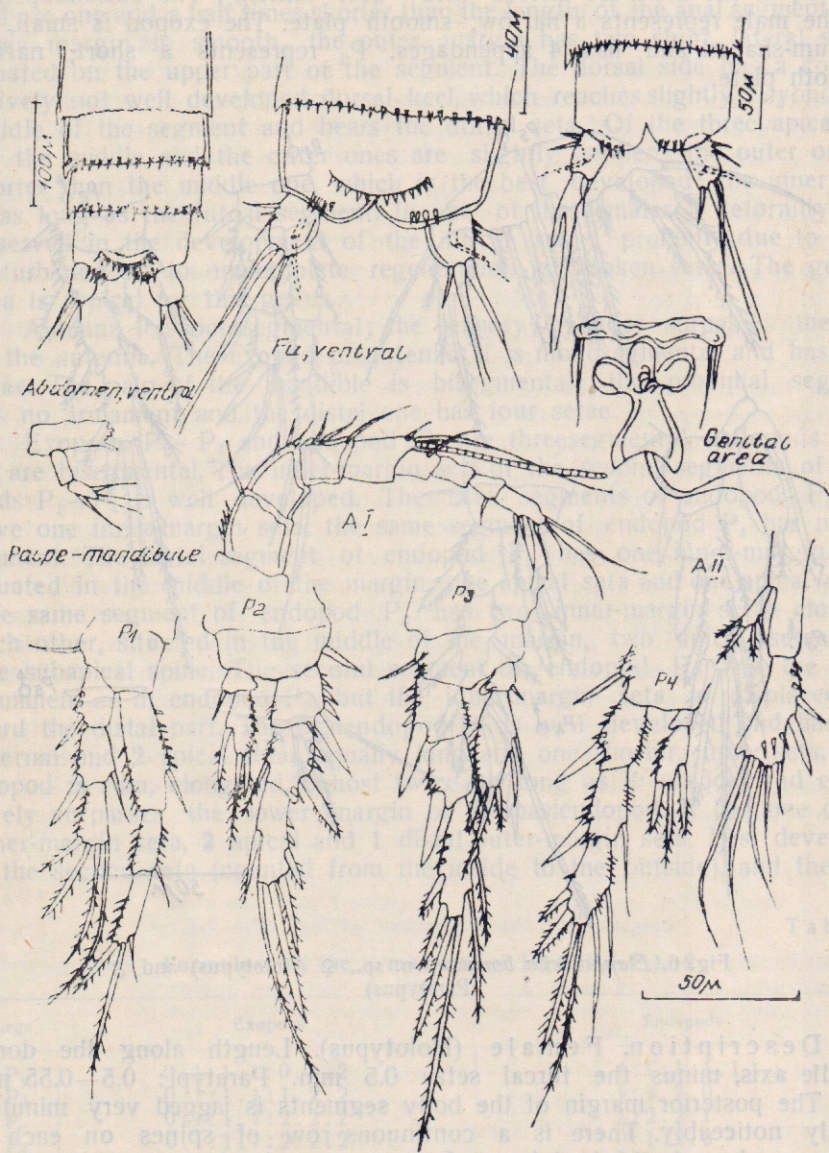


Fig. 5. *Elaphoidella borutzky* n. sp., ♀ (Holotypus)

has one inner-margin seta and one apical seta. The same segment of endopod  $P_4$  in the male has a thick inner-margin spine and two apical appendages. The two middle apical spines of the third segment of exopod  $P_3$  in the male are altered into "deer antlers". The basiepupod  $P_5$  in the male represents a narrow, smooth plate. The exopod is small, trapezium-shaped and has 4 appendages.  $P_6$  represents a short, narrow, smooth plate.

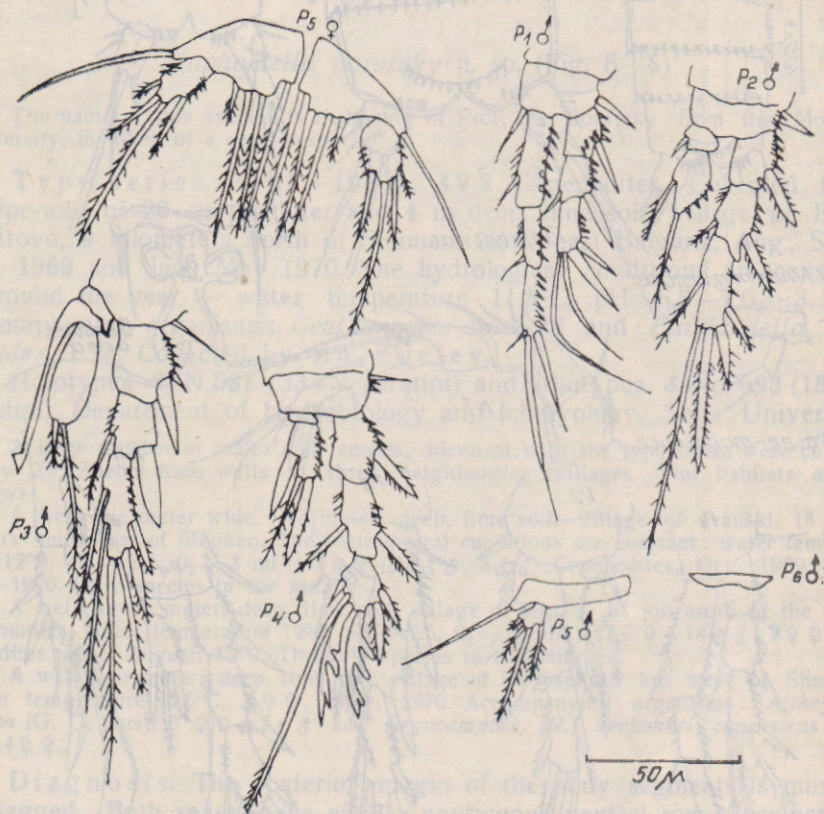


Fig. 6. *Elaphoidella borutzky* n. sp., ♀ (Holotypus) and ♂ (Paratypus)

**Description.** Female (Holotypus). Length along the dorsal, middle axis, minus the furcal setae 0.5 mm. Paratypes: 0.5–0.55 mm.

The posterior margin of the body segments is jagged very minutely, hardly noticeably. There is a continuous row of spines on each of the second and third abdominal segments, situated ventrally, above the posterior margin. On the anal segment, situated ventrally, above

the base of the furcal segments, on both sides of the medial axis, there are 3—4 spines. The analoperculum is well developed, arch-shaped, does not reach the posterior end of the anal segment and has 8—15 long cogs on its posterior margin. The furcal segments are small, almost square and are one and a half times shorter than the length of the anal segment. The inner margin is smooth, the outer margin has two short, lateral setae, situated on the upper part of the segment. The dorsal side has a comparatively not well developed dorsal keel, which reaches slightly beyond the middle of the segment and bears the dorsal seta. Of the three apical setae the middle and the outer ones are slightly swollen; the outer one is shorter than the middle one, which is the best developed; the inner seta is as long as the furcal segment. In one of the females a deformity was observed in the development of the furcal setae, probably due to gene disturbance or to uncomplete regeneration of broken setae. The genital area is typical for this genus.

Antenna I is octosegmental; the sensory cylinder surpasses the end of the antenna. The exopod of antenna II is monosegmental and has four setae. The palp of the mandible is bisegmental; the proximal segment has no armament and the distal one has four setae.

Exopods  $P_1$ — $P_4$  and endopod  $P_1$  are threesegmental, endopods  $P_2$ — $P_4$  are bisegmental. The inner-margin seta of the second segments of exopods  $P_1$ — $P_4$  is well developed. The first segments of endopods  $P_1$ — $P_3$  have one inner-margin seta, the same segment of endopod  $P_4$  has no armament. The distal segment of endopod  $P_2$  has one inner-margin seta, situated in the middle of the margin, one apical seta and one apical spine. The same segment of endopod  $P_3$  has two inner-margin setae close to each other, situated in the middle of the margin, two apical setae and one subapical spine. The second segment of endopod  $P_4$  has the same armament as in endopod  $P_2$ , but the inner-margin seta is displaced toward the distal part. The basiendopod  $P_5$  is well developed and has one internal and 2 apical setae equally long and one shorter, inner seta. The exopod is slim, elongated, almost twice as long as it is wide, and excessively surpasses the lower margin of the basiendopod. It has one distal, inner-margin seta, 2 apical and 1 distal outer-margin seta. Best developed is the second seta (counted from the inside to the outside), and the first

Table 2

Formulas for the armament of legs ( $P_1$ — $P_5$ ), ♀

| Legs  | Exopods       | Endopods  |
|-------|---------------|-----------|
| $P_1$ | 0.1:1.1:0.2.2 | 1:1:1.1.1 |
| $P_2$ | 0.1:1.1:1.2.2 | 1:1.2.0   |
| $P_3$ | 0.1:1.1:2.2.2 | 1:2.2.1   |
| $P_4$ | 0.1:1.1:2.2.2 | 0:1.2.0   |
| $P_5$ | 4             | 4         |

and third ones are equally long. The inner and the outer margins of the exopod have spines.

The armament of the legs is shown in a table 2.

**Males (Allotypus).** Length along the dorsal middle axis minus the furcal setae: 0.5 mm. Paratypes: 0.49—0.53 mm. The posterior edge of the body segments is slightly jagged like the one of the female. There is one continuous row of spines over the posterior margin, ventrally on the second and third abdominal segments. Four spines are developed on both sides of the middle axis, ventrally above the base of the furcal segments of the anal segment. The analoperculum is like the one in the female. The furcal segments are a little longer than in the female; the construction and the situation of the setae is like that of the females.

Antenna I is octosegmental, changed into a geniculating one, which is typical of the genus. The construction and armament of antenna II and that of the palp for the mandible are like in the female.

The construction and armament of the first pair of legs ( $P_1$ ) and of exopods  $P_2$ — $P_3$  is like the one in the female, but the outer-margin spines of the first and second segments are better developed. Endopod  $P_2$  has one inner-margin seta on its first segment. The second segment has one inner-margin and one apical seta and the outer margin has spines. The first segment of the three-segmental endopod  $P_3$ , which is changed into an organ of copulation, has no seta. The apophysis of the second segment is thin, one and a half times longer than the third segment, and terminates in a hook. On the third segment there are two apical setae of different length, the outer one surpassing the exopod. Exopod  $P_4$  of the last segment has six setae and spines, the second seta (counted from the inside to the outside), being elongated, and doubled at the end like a fork, while the third and fourth apical spines are considerably developed, resembling deer antlers. The first segment of the endopod is without any seta, the second one has a mighty, thick inner-margin spine, one seta and one apical spine; the outer margin has spines. Basiendopod  $P_5$  represents a narrow, smooth plate; the exopod is small, trapezium-shaped and has 4 projections: one inner distal spine, two apical spines, the inner one

Table 3

Formulas for the armament of legs ( $P_1$ — $P_6$ ), ♂

| Legs  | Exopods       | Endopods        |
|-------|---------------|-----------------|
| $P_1$ | 0.1:1.1:0.2.2 | 1:1:1.1.1       |
| $P_2$ | 0.1:1.1:1.2.2 | 1:1.1.0         |
| $P_3$ | 0.1:1.1:2.2.2 | 0:apofiza:0.2.0 |
| $P_4$ | 0.1:1.1:2.2.2 | 0:1.2.0         |
| $P_5$ | 4             | 0               |
| $P_6$ | 0             |                 |

Table 4

Morphologic differences between *Elaphoidella borutzky* n. sp. and *Elaphoidella varians* Chappuis

| Characteristics        | <i>Elaphoidella borutzky</i> n. sp.<br>♀   | <i>Elaphoidella varians</i> Chappuis,<br>♀   |
|------------------------|--|--|
| Palp of mandible       | First segment without setae. Second segment with 4 setae.  | First segment with 1 seta, second one with 3 setae.  |
| Body segments          | Posterior margin finely jagged.  | Posterior margin smooth.   |
| Furcal segments        | 1 1/2 times shorter than the anal segment.<br>Shortened, almost square. The inner apical seta is as long as the furcal segment, normally developed.  | Equally long as the anal segment.<br>1.6 times longer than wide. The inner apical seta is shorter than the furcal segment, curved.   |
| Endopod P <sub>5</sub> | 4 setae: 3 equally long + a short one.   | 4 setae: 3 of different length + a short one.  |
| Exopod P <sub>5</sub>  | lengthened, twice as long as its width.<br>Overwhelmingly surpasses the basiendopod, 4 appendages.<br>First and third (counted from within) setae are equal and are longer than the exopod.<br>Inner and outer margin have spines. | Slightly lengthened; in the distal part widened.<br>Slightly surpasses the basiendopod, 4 appendages.<br>First and third spine (counted from within) are short, no longer than the exopod.<br>Inner and outer margin have no spines. |
|                        | ♂  | ♂  |
| Palp of mandible       | First segment without setae, second one with 4 setae.  | First segment with 1 seta, second one with 3 setae.  |
| Body segments          | Posterior margin finely jagged. Second and third abdominal segments with one uninterrupted ventral row of spines.  | Posterior margin smooth. Second, third and fourth abdominal segments with an uninterrupted ventral row of spines.  |
| Endopod P <sub>3</sub> | The outer apical seta on the third segment is long and surpasses the exopod.   | The outer apical seta of the third segment is shorter than the exopod.   |

продължение от табл. 4

| Characteristics        | <i>Elaphoidella borutzky</i> n. sp.<br>♂                           | <i>Elaphoidella varians</i> Chappuis,<br>♂                             |
|------------------------|--|--|
| Endopod P <sub>1</sub> | The inner spine of the distal segment is long and well developed.  | The inner spine of the distal segment is short and scantily developed. |
| Exopod P <sub>5</sub>  | 4 setae; first and third (counted from within) are long and hairy. | 3 spines: first and third spine are quite shortened.                   |

being the best developed, and one short, outer-margin distal spine, P<sub>6</sub> is a short, narrow and smooth plate.

The armament of the legs is shown in a table 3.

**Discussion.** The new species *Elaphoidella borutzky* is very closely related with the Balkan species *E. varians* Chappuis (1955), found in cave waters in the mountain Hymette, Greece. The morphological differences between the two species are shown in Table 4. The morphologic difference between *E. borutzky* and *E. varians*, displayed mainly in the different structure and armament of the rudimentary fifth pair of legs, in the structure of the furca, the structure and armament of the body segments, as well as the different ecologic conditions and geographic isolation, suggest, that it is the case of two separate species, genetically close to each other, of a common origin, but of a divergent development in the conditions of subterranean life.

#### *Ceuthonectes* sp.

Village of Belokopitovo, nine kilometers north of the town of Shumen, North-east Bulgaria — a pipe-well, 20 cm wide and 4 m deep — lime soil; water temperature 11.5°C, pH ≈ 6.5—7, O<sub>2</sub> ≈ 8 ml/l, 2 ♀♀, Aug. 31, 1969. Accompanying organisms: *Elaphoidella borutzky*, 7 ♀♀ and *Elaphoidella elaphoides*, 1 ♀. Collected by Zh. Zhelev.

The two females which were found were damaged and there was detritus on their bodies, which hindered the determination of their species.

#### *Parastenocaris bohémica* Štěrba (Fig. 7)

River-phreatic water 5 m off the bank of the Maritza river, near the town of Harmanly, South-East Bulgaria, depth of the water 0.4 m, substratum: fine sand mixed with detritus, 5 ♀♀ + 1 ♂, Oct. 5, 1962. The only species in the sample. Collected by L. Cvetkov.

In respect to morphologic structure, the observed males and females correspond completely to *P. bohémica* Štěrba (1968), described of the river-phreatic water in South-West Bohemia, Czechoslovakia. Length of female, minus the furcal setae 0.30 mm. The male has a spermatophore. It is a new species for the Bulgarian fresh water fauna.

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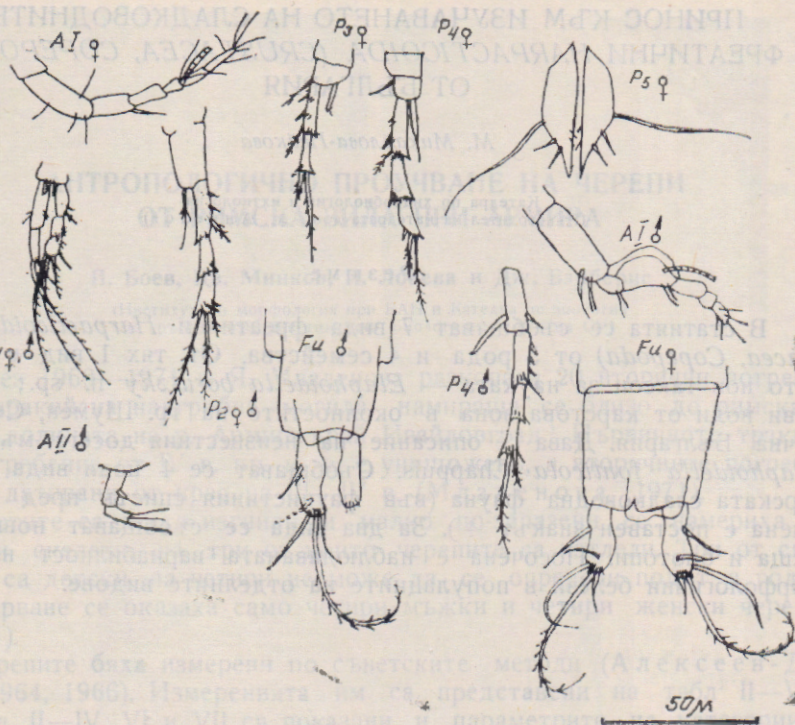


Fig. 7. *Parastenocaris bohémica* Štěrba, ♀ + ♂ (Orig.)

#### LITERATURE

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ПРИНОС КЪМ ИЗУЧАВАНЕТО НА СЛАДКОВОДНИТЕ  
ФРЕАТИЧНИ *HARPACTICOIDA* (*CRUSTACEA, COPEPODA*)  
ОТ БЪЛГАРИЯ

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Резюме

В статията се съобщават 7 вида фреатични *Harpacticoida* (*Crustacea, Copepoda*) от 5 рода и 4 семейства. От тях 1 вид е описан като нов таксон за науката — *Elaphoidella borutzkyi* n. sp.; кладенчови води от карстова зона в околностите на гр. Шумен, Североизточна България. Дава се описание на неизвестния досега мъжки на *Elaphoidella fonticola* Charpui. Съобщават се 4 нови вида за българската сладководна фауна (във фаунистичния списък пред техните имена е поставен знакът +). За два вида се съобщават нови находища и биотопи. Посочена е наблюдаваната вариабилност на някои морфологични белези в популациите на отделните видове.

Fig. 1. *Elaphoidella borutzkyi* sp. n. ♂ + ♀ (Oxig.)

*Elaphoidella* sp.

Village of Belotopolovo, nine kilometers north of the town of Simeon, North-east Bulgaria. — A pipe-well, 20 m deep, in which the water temperature is 11.5°C. The water is clear and has a pH of 7.5. The water is collected by the author in August 1972. The water is collected by the author in August 1972. The water is collected by the author in August 1972.

Fig. 2. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 3. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 4. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 5. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 6. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 7. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 8. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 9. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 10. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 11. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 12. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 13. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 14. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

Fig. 15. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

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Fig. 100. *Elaphoidella fonticola* sp. n. ♂ + ♀ (Oxig.)

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