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THE SUBTERRANEAN FAMILY NIPHARGIDAE (CRUSTACEA) IN BULGARIA (CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 339)

SUMMARY

The family Niphargidae (Crustacea Amphipoda Senticaudata) in Bulgaria is studied, synonymy, new and known localities of each species are presented. Holotype and paratype of *Niphargus vlkanovi* S. Karaman & G. Karaman, 1959 (cave near Zhivata voda) is partially redescribed and figured based on existing slides. The new subspecies *N. vlkanovi burgasi*, ssp. nov. from several localities from Burgas region is described and figured, and its relation to the ssp. *vlkanovi* is discussed. Some new data of *N. bureschi* Fage, 1926, *N. toplicensis* and *N. georgievi* S. Karaman & G. Karaman, 1959 are presented and locus typicus of *N. georgievi* is established. Key to the *Niphargus* species of Bulgaria (18) is composed.

Keywords: taxonomy, subterranean Crustacea, Amphipoda, *Niphargus*, *burgasi*, key, Bulgaria.

INTRODUCTION

The fauna of the subterranean family Niphargidae (Crustacea: Amphipoda) is only partially investigated in Bulgaria by various authors. First mentioned species from Bulgaria cited Schäferna (1922) sub name *Niphargus tatrensis* from Vitosha Mt. 800 m asl. (probably *N. vlkanovi*).

French scientist L. Fage mentioned (1926) *N. puteanus* (Koch) from Progled Cave, Ćepelare district, Rhodopes Mts., 1000 m asl., S. Bulgaria. This locality was mentioned later by Andreev (1972) and Beron et al. (2011) as Sbirkovata peshtera Cave (Sm 4) (= *N. cepelarensis* S. Karaman & G. Karaman, 1959).

Fage described (1926) also first new species from Bulgaria, *Niphargus bureschi*, n. sp. from Dupka Cave near Zakatnik (=Lakatnik), Golemata peštera Cave near village Micre and Divitaška peštera Cave, in Lowetch region. Later Stanko Karaman & Gordan Karaman described (1959) some new species

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(*pecarensis, georgievi, cepelarensis, vlkanovi*) from various localities of Bulgaria, mentioning several new localities of *N. bureschi*.

Andreev (1966) described *N. toplicensis* n. sp. and (1972) cited some new localities of *N. bureschi*. G. Karaman (1973) mentioned *N. valachicus* from Devnja. Andreev (2001) described new species *N. bulgaricus*, and Kenderov & Andreev (2015) described new species *N. cvetkovi*. The species *Niphargopsis trispinosus* Dancau & Capuse, 1959 [loc. typ.: Mehadia, Romania] was cited by Andreev (2001) from Bulgaria. G. Karaman (2022) cited *Niphargus decui* G. Karaman & Sarbu, 1995 from Shabla, .and later (2024b) cited *Niphargus kragujevensis remus* G. Kar. 1992 and *N. kragujevensis femineus*, ssp. nov. from Bulgaria. In the present work is described a new subspecies, *N. vlkanovi burgasi*, ssp. nov. from Burgas region.

The further investigations probably will elevate the number of known subterranean taxa of family Niphargidae in Bulgaria.

MATERIAL AND METHODS

The collected material was preserved in the 70% ethanol. The specimens were dissected using a WILD M20 microscope and drawn using camera lucida attachment. All appendages were temporarily submersed in the mixture of glycerin and water for study and drawing. After study, all appendages are transferred to Liquid of Faure on permanent slides.

All illustrations were inked manually. Some morphological terminology and setal formulae of mandibular palpus and gnathopods 1-2 -propodus follows Karaman`s terminology (Karaman, G. 1969; 2012). All studies in this work are based on the classic morphological, ecological and zoogeographical studies. Terms “setae” and “spines” are used based on its shape, not origin.

TAXONOMICAL PART
Order AMPHIPODA
Suborder SENTICAUDATA Lowry & Myers, 2013
Family NIPHARGIDAE

NIPHARGUS BULGARICUS Andreev, 2001

Niphargus bulgaricus Andreev, 2001: 79, figs. 1-3; Vidinova et al., 2016: 153.

LOCUS TYPICUS: Lake Bolata, N. of cap Kaliakra, Varna reg.), Bulgaria.

LOCALITIES CITED: BULGARIA

Andreev, 2001: Lake Bolata, cap Kaliakra, village Kavarna, reg. Varna; Fontain near river

Ropotamo v. Primorsko, reg. Burgas (NE Bulgaria).

Vidinova et al., 2016: Shabla Lake [$43^0$34`32.2”N, $28^0$34`01.8”E].

DISTRIBUTION: Bulgaria, endemic.

NIPHARGUS BURESCHI Fage, 1926

Figs. 10 E-H

Niphargus plateaui bureschi Fage, 1926: 24, figs. 1-18; Schellenberg, 1934: 209;

Niphargus bureschi Schellenberg, 1935: 208 (key); S. Karaman & G. Karaman, 1959: 158; Barnard, J.L & Barnard, C.M., 1983: 690; Andreev,1972: 65; G. Karaman & Ruffo, 1986: 523; Pandourski, 1993: 165; Beron, 1994: 48; Beron et al., 2011: 591.

LO**CUS TYPICUS**: This species was described by Fage from several localities, among them Temnata Dupka Cave near Lakatnik, Bulgaria. As locus typicus and holotype were never selected, we selected now the locus typicus, Temnata Dupka Cave near Lakatnik, Bulgaria. In the case that Fage`s material of *N. bureschi* is not preserved, we proposed lectotype (male 19 mm) (No.S-1099A) and paralectotype (female 15 mm) (No. S-1099B). They are temporarily deposited in Karaman`s Collection in Podgorica, Montenegro.

MATERIAL EXAMINED: BULGARIA:

IP-21= Dineva peštera Cave near village Gingji, Godečko, Stara planina Mts., 24.3.1995, 2 exp. (leg.?);

IP-23="Dinevata Cave", village Ginzi, dept. of Sofia, Stara planina Occidentale Mt.,1000 m asl., flaques, 28.11.1995, 1 exp. (leg. ?);

X-632- Dineva peštera Cave near village Gingji, Godečko, 12.7.1940, 2 exp. (leg.?);

X-633= Golema peštera near village Micre, Lowetch, 4.9.1924, 1 exp. (leg. Deltchev);

X-634= Temnata Dupka Cave near Lakatnik, 16.2.1958, 1 exp. (leg. V. Georgiev);

S-1099= Temnata Dupka Cave near station Lakatnik, 16.11.1932, 3 exp. (leg. Ivanov);

S-6789= Western Rhodopes Mts., Dobrostan Mt., Martsin gamtsa, cave Ivanova Voda, alt. 1320 m asl., ungerground lake, 8 exp. (leg. B. Petrov & N. Simon);

BU-4= Village Bohot, district Pleven, gouffre Kirov Vartop, 6.4.1985, 3 exp. (leg. P. Beron);

BU-9= Cave Leleška Dupka, village Iglika, district Jowbol, 1 exp. (leg. Beron & Beškov).

LOCALITIES CITED: BULGARIA:

Fage, 1926: Dupka Cave near Zakatnik (=Lakatnik), Kodja Balkan; Golemata peštera Cave near village Micre (Lovetch reg.); Divitaška peštera Cave, Lovetch reg.

S. Karaman & G. Karaman, 1959: Dineva peštera Cave near village Gingji Godečko; Temna dupka Cave, Lakatnik, 420 m asl.; Ptičata dupka Cave on

Stara planina Mts. near Trojan Bulgarie; Cave Lepenica, Čeninsko (Pazardzhik reg.); Zadanka Cave near Karlukovo; Golemata peštera Cave near village Micre; Divitaška peštera Cave near town Lovetch.

Andreev, 1972: Cave Goliami petch near village Varbovo, mixed with *N. pecarensis*; Dineva peŝtera Cave (Stara planina Mts.). Cave "Lepenitza"(Rhodopes Mts.).

Beron, 1994: Elata (Sf. 48); Pandourski (1992a: 404), Levica spring (Mt 2); Vreloto (Mt 3); Propast (Vd 7); Vodni petch (Vd 15); Raenkov kladenec (Vd 26); Jame 1 (Vd 27); Zmiiskata propast (Vd 44); Falkovskata peštera Cave (Vd 46); Jamata (Sf 15); Vodnata peštera Cave (Sf 52); (Pandourski, 1993: 165);

Beron, Petrov & Stoev, 2011: Lepenica Cave near Velingrad (Pazardzhik region).

DISTRIBUTION: Bulgaria, endemic.

REMARKS. Fage described and figured well this species. Variability of some morphological characters has discussed by S. Karaman & G. Karaman (1959) as well as by Andreev (1972). We mentioned some remarks only.

This species was characterized by specific shape of telson remarkably tapering distally, but in some localities this shape is rather modified, lobes are more obtuse and with rather longer distal and marginal spines. The number of telson spines is variable (3-5), along inner (mesial) margin of lobes appear 0-3 short spines or spine-like setae, along outer margin 1-3 spines. Telson is usually always without facial spines, but sometimes one short facial spine can occur on one or both lobes (Fig. 10G, H).

Epimeral plates are always slightly pointed or sharply angular, with various numbers of ventral spines.

Urosomal segments 1-2 with rather variable dorsal spinulation, urosomal segment 1 usually with 1 spine and 1 seta, on each dorsolateral side; urosomal segment 2 with 1-3 spines and 0-1 seta on each dorsolateral side.

Maxilla 1 inner plate with 4-6 distal setae, palpus not reaching distal tip of outer plate-spines (Fig. 10E). Maxilliped inner plate not exceeding outer tip of first palpus article, with up to 6 distal spines (Fig. 10F), palpus article 4 with 2 mesial setae near basis of the nail.

Gnathopod 1 in males remarkably smaller than gnathopod 2, both gnathopods with article 3 bearing one distoposterior bunch of setae on article 3. Propodus of gnathopods 1-2 trapezoid. Palm of gnathopod 1 inclined up to half of propodus-length, palm of gnathopod 2 inclined over half of propodus-length; the shape of propodits can be rather variable according the age and sex. Palm is defined on outer face by corner S-spine accompanied laterally by 2-3 L-spines and 4-5 corner facial M-setae, on inner face by one subcorner R-spine, dactylus with several bunches of 1-3 setae along outer margin.

Dactylus of pereopods 3-7 more or less strong, with strong or weak spine at inner margin. Article 2 of pereopods 5-7 longer than broad, without ventroposterior lobe.

Pleopods with 2 retinacula, peduncle of pleopods scarcely setose, usually with only 0-3 setae each.

Uropod 1 peduncle with dorsoexternal row of spines and dorsointernal row of setae; rami in males and females of nearly equal length.

Uropod 3 elongated in males, with outer ramus composed of 2 nearly equal articles in adult specimens; in females outer ramus of uropod 3 with second article much shorter than first one.

Large distribution area of this species in Bulgaria and variation of many morphological characters suggest necessity for the further studies of variability of its morphological characters.

NIPHARGUS CEPELARENSIS S. Karaman & G. Karaman, 1959

Niphargus cepelarensis S. Karaman & G. Karaman, 1959, 153, figs. 17-23; Andreev, 1972: 64; Barnard, J.L. & Barnard, C.M., 1983: 690; G. Karaman & Ruffo, 1986: 524; Beron, 1994: 13, 486; Beron, Petrov & Stoev, 2011: 591.

?Niphargus puteanus Fage, 1926: 6.

LOCUS TYPICUS: Peštera Cave near village Progled- Čepelare, Rhodopes Mts., 1000 m asl., S. Bulgaria. Andreev (1972) and Beron et al. (2011) cited this locality as "Sbirkovata peštera Cave near Progled Village (Smolyan reg.), 1430 m. asl. In the same cave Beron et al. (2011) mentioned also *N. puteanus*.

MATERIAL EXAMINED:

Holotype Slide II/9

LOCALITIES CITED: BULGARIA:

Fage, 1926: Progled Cave, Ćepelare district, Rhodopes Mts., 1000 m asl., S. Bulgaria (sub name *N. puteanus* (Koch.).

S. Karaman & G. Karaman, 1959: loc. typ.

Andreev, 1972: locus typicus.

Beron, 1994: Bulgaria: (no data).

Beron, Petrov & Stoev, P., 2011: Sbirkovata peštera Cave near Progled Village (Smolyan reg.), 1430 m. asl., Temp. 6^0C. [In the same cave he mentioned also *N. puteanus*].

DISTRIBUTION: Bulgaria, endemic.

REMARKS. This species was described based on females only. Andreev (1972) collected the males also. He mentioned inner plate of "maxillullae" 1 of males is with 2 spines; nail of pereopod 7 dactylus is longer than half of dactylus; uropod 3 in male with articles of outer ramus of equally length, in females distal articles ¼ shorter. He mentioned that established differences don't change the taxonomical position of this species. Unfortunately he omitted to describe uropod 1 in male.

DISTRIBUTION: Bulgaria, endemic.

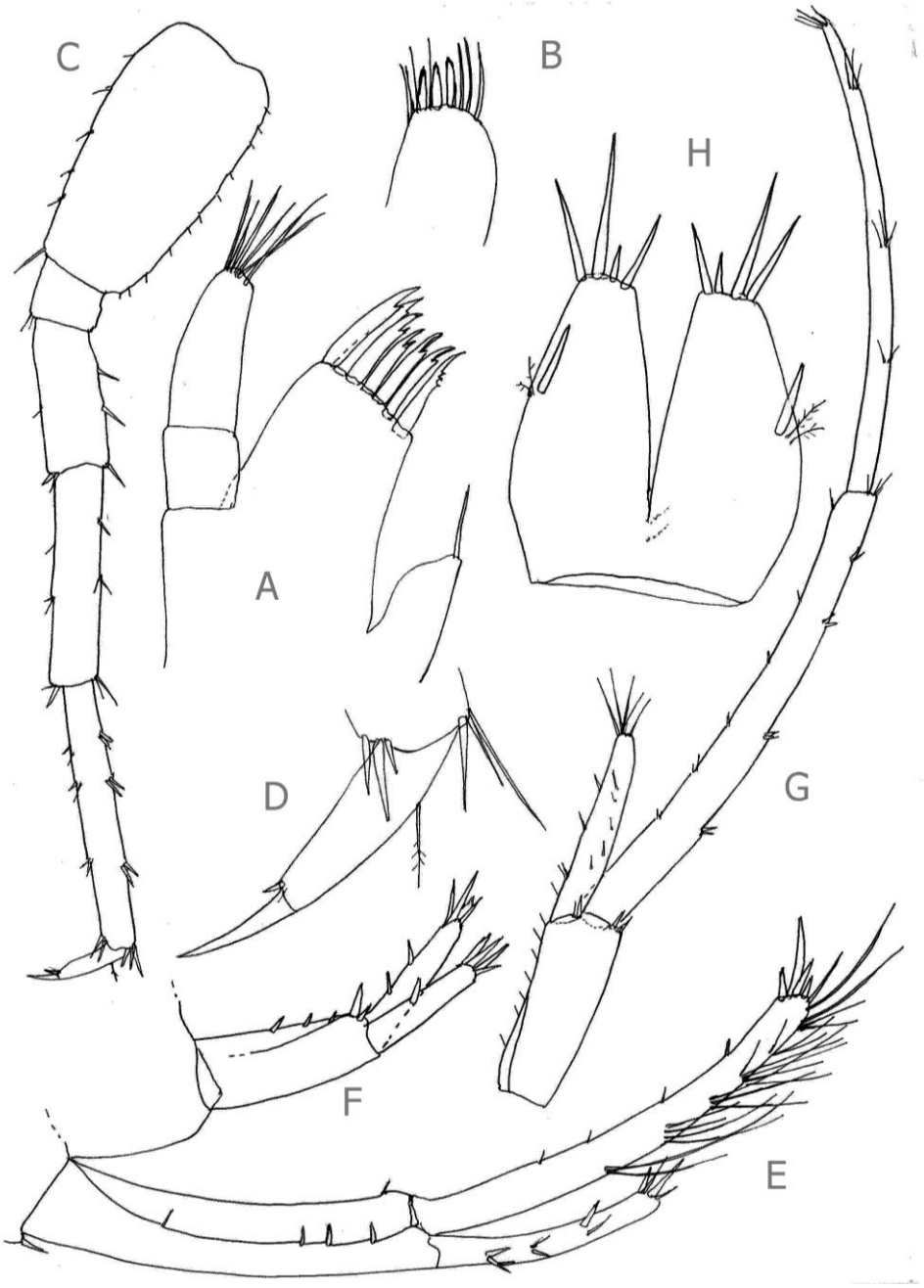

Fig. 1. *Niphargus vlkanovi vlkanovi* S. Karaman & G. Karaman 1959, cave near Zhivata Voda, holotype slide, male 12.0 mm,: A= maxilla 1; B= maxilliped, inner plate; C= pereopod 7; D= dactylus of pereopod 7; E= uropod 1; F= uropod 2; G= uropod 3; H= telson.

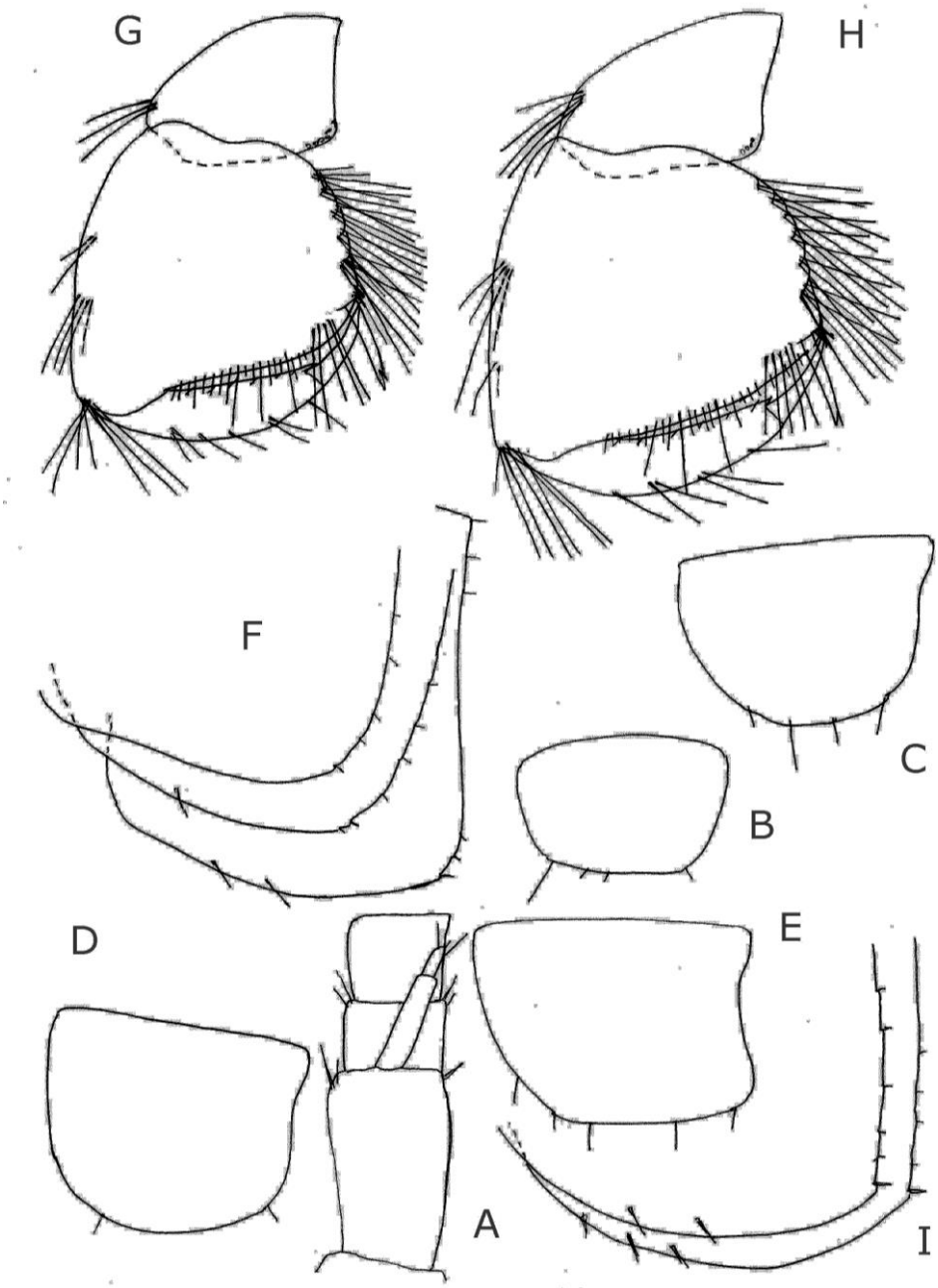

Fig. 2. *Niphargus vlkanovi vlkanovi* S. Karaman & G. Karaman 1959, cave near Zhivata Voda, holotype, slide, male 12.0 mm: A= accessory flagellum; B= coxa 1; C= coxa 2; D= coxa 3; E= coxa 4; F= epimeral plates 1-3; G= gnathopod 1; H= gnathopod 2.

Female paratype 7.0 mm: I= epimeral plates 1-3.

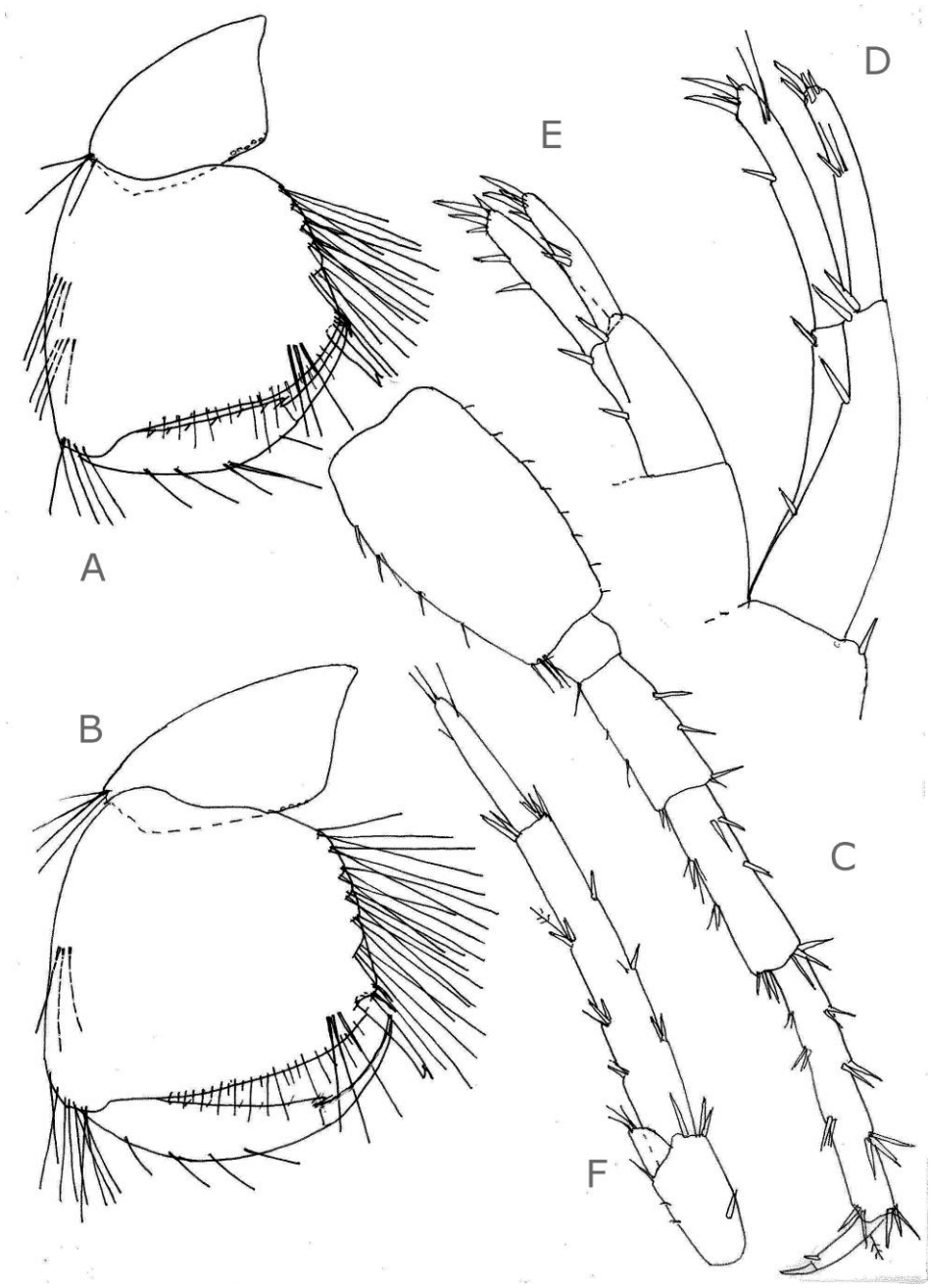

Fig. 3. *Niphargus vlkanovi vlkanovi* S. Karaman & G. Karaman 1959, cave near Zhivata Voda, paratype, slide, female 7.0 mm: A= gnathopod 1 propodus; B= gnathopod 2 propodus; C= pereopod 7; D.= uropod 1; E= uropod 2; F= uropod 3.

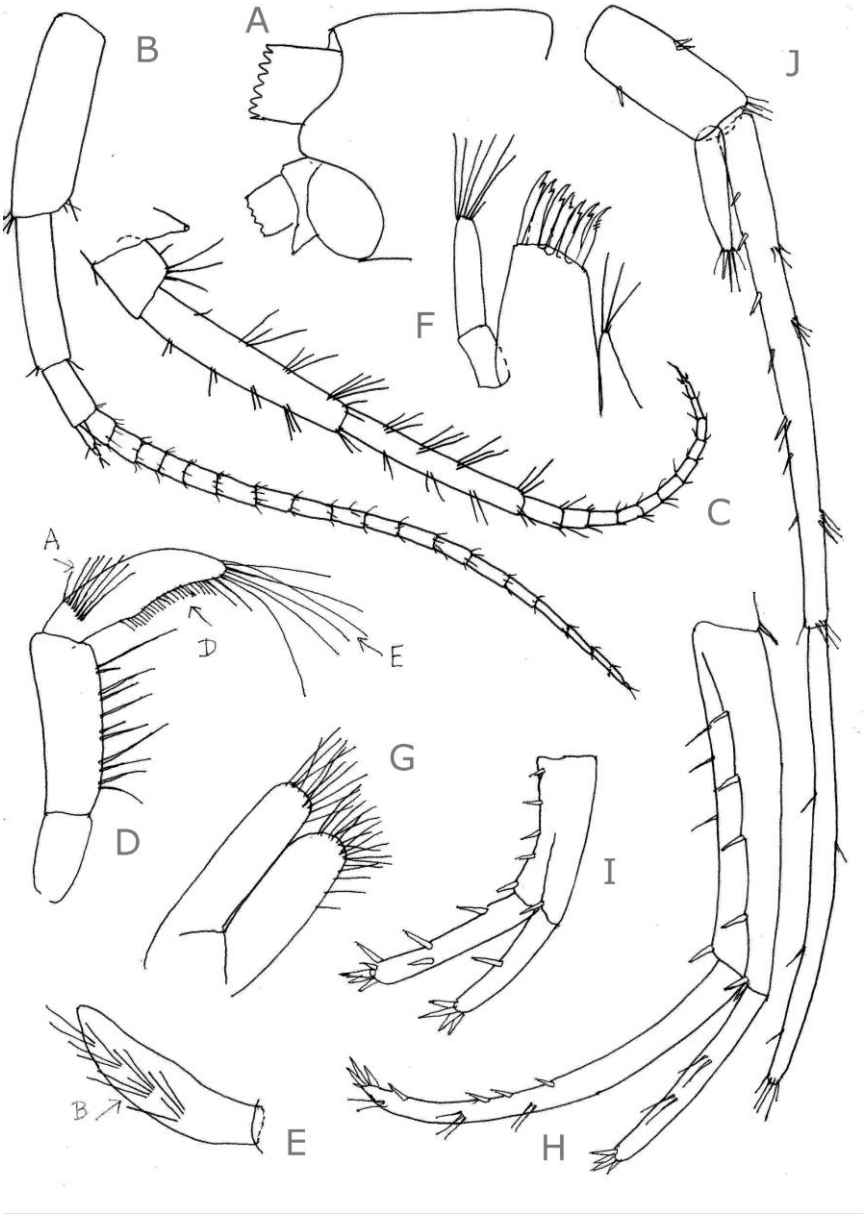

Fig. 4. *Niphargus vlkanovi burgasi*, ssp. nov., Verovnik, Burgas, male 15.5 mm (holotype): A= head; B= antenna 1; C= antenna 2; D= mandibular palpus, outer face (A= facial A-setae; D= lateral marginal D-setae; E= distal E-setae); E= last mandibular palpus article, inner face (B= facial B-setae); F= maxilla 1; G= maxilla 2; H= uropod 1; I= uropod 2; J= uropod 3.

NIPHARGUS CVETKOVI Kenderov & Andreev, 2015

Niphargus cvetkovi Kenderov & Andreev, 2015: 179, figs. 1-4; G. Karaman, 2024b: 15.

LOCUS TYPICUS: Water source "Cheshma Gorgoritsa" near the village Novi Han, E. of Sofia, Bulgaria.

LOCALITIES CITED: Known from locus typicus only.

DISTRIBUTION: Bulgaria, endemic.

REMARKS: Kenderov & Andreev (2015) well described this species. The pilosity of peduncles in pleopods 1-3 is not mentioned, and the figured uropod 1 in male (Fig. 4b) seems to be with rather inflated rami, although authors don`t mentioned it in its description of this species.

NIPHARGUS DECUI G. Karaman & Sarbu, 1995

Niphargus decui G. Karaman & Sarbu, 1995: 77, figs. 1-5; Karaman, G., 2022: 107, figs. 1-6;

? *Niphargus* sp. Andreev, 2001: 85.

LOCUS TYPICUS: Vama Veche village, 10 km south of Mangalia, well, Romania.

MATERIAL EXAMINED:

BULGARIA:

BU-11= Shabla, Tolbuhin region [nearly 65 km NE of Varna], sondage, 3.11.1978, 10 exp. (leg. L. Cvetkov).

ROMANIA:

S-5221: Vama Veche village, 10 km south of Mangalia, well, July 24, 1994, many specimens (holotype and paratypes) (leg. M. Sarbu).

LOCALITIES CITED: **Bulgaria:**

Andreev, 2001: cited *Niphargus* sp. from Chabla Lake, v. Chabla, reg. Varna.

Karaman, G. 1922: Shabla, Tolbuhin region.

DISTRIBUTION: Romania, Bulgaria.

NIPHARGUS DOBROGICUS Dancau, 1964

Niphargus dobrogicus Dancau, 1964: 397, figs. 1-3; Andreev, 1972: 62; Barnard, J.L. & Barnard, C.M., 1983: 691; Petrescu, 1996: 211.

LOCUS TYPICUS: Well in village Schitu, Dui Mai, Vama Veche, reg. Dobrogea, Romania (near coast of Black Sea).

LOCALITIES CITED:

BULGARIA**:**

Petrescu, 1996: Chabla near Black Sea;

Andreev (1972) mentioned on p. 62:" in spring and in well in village Chabla and locality Tauk Liman, NE of-Varna".

ROMANIA:

Dancau, 1964: Schitu; 2 Mai; Vama Veche;

Petrescu, 1996: Schitu; 2 Mai; Vama Veche.

DISTRIBUTION: Bulgaria, Romania.

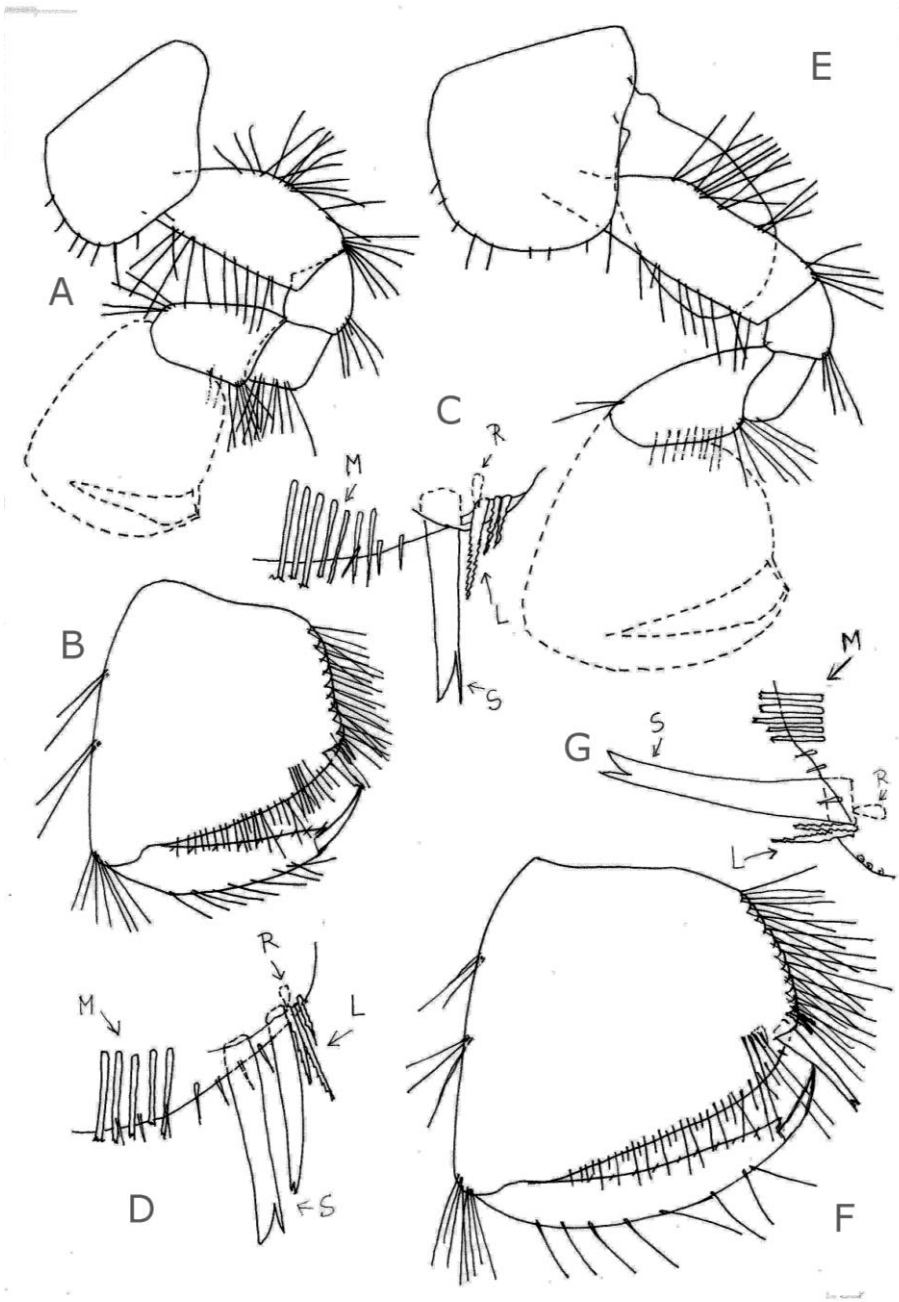

Fig. 5. *Niphargus vlkanovi burgasi*, ssp. nov., Verovnik, Burgas, male 15.5 mm (holotype): A-B= gnathopod 1, outer face; C= facial corner of left gnathopod 1 propodus (S= corner S-spine; L= lateral L-spines; M= corner facial M-setae; R= subcorner R-spine, inner face); D= facial corner S-spines of right gnathopod 1 propodus; E-F= gnathopod 2; G= facial corner of right gnathopod 2 propodus.

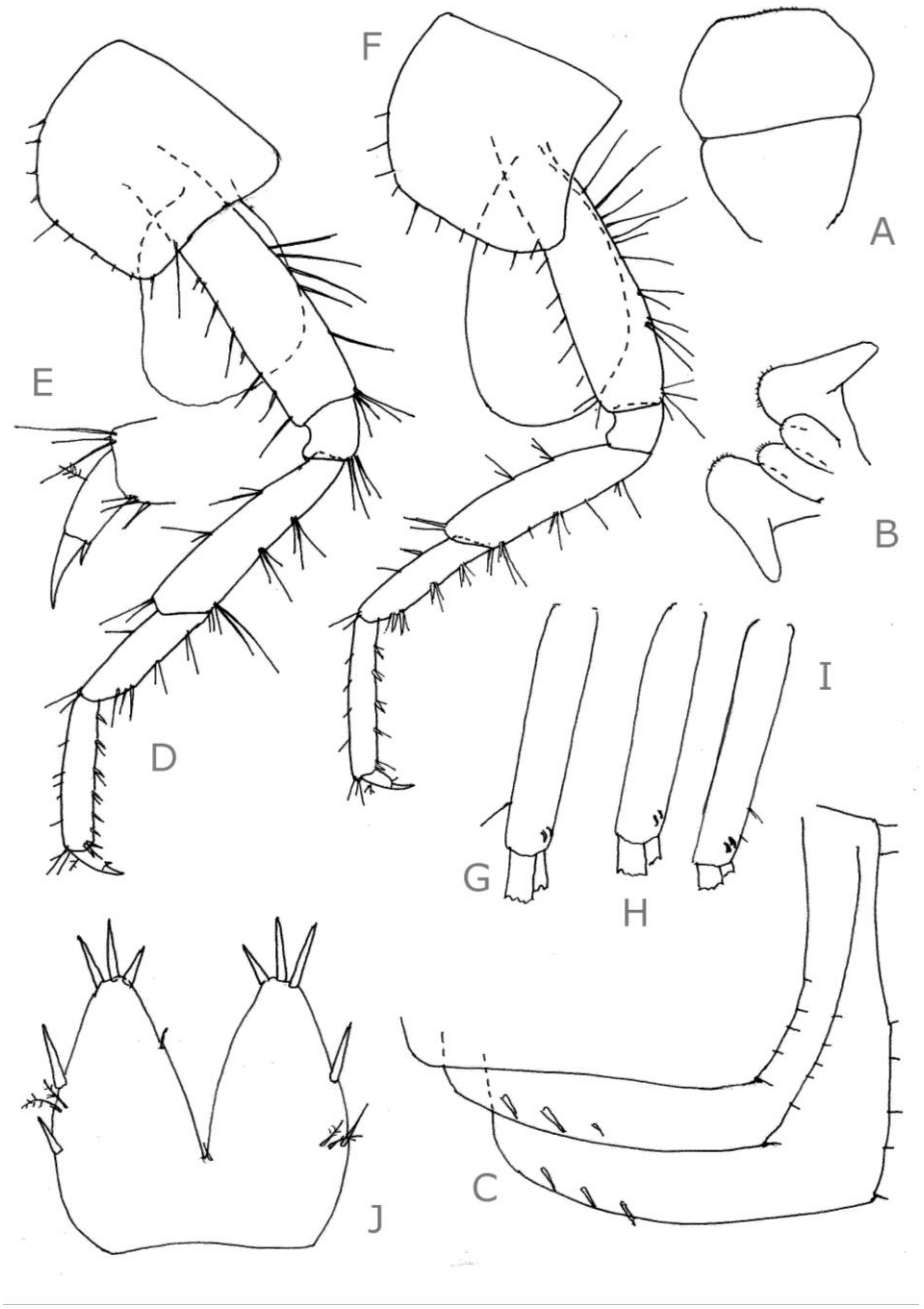

Fig. 6. *Niphargus vlkanovi burgasi*, ssp. nov., Verovnik, Burgas, male 15.5 mm (holotype): A= labrum; B= labium; C= epimeral plates 1-3; D-E= pereopod 3; F= pereopod 4; G= peduncle of pleopod 1; H= peduncle of pleopod 2; I= peduncle of pleopod 3; J= telson.

REMARKS

Andreev (1972) mentioned specimens bearing pleopods with 6 retinacula, uropod 1 outer ramus 1/5 shorter than inner ramus, telson with only one sensitive seta subapical on lateral margin. He considered that small differences are present because of non adult specimens in hands.

NIPHARGUS GEORGIEVI S. Karaman & G. Karaman, 1959

Figs. 11-12

Niphargus ablaskiri georgievi, S. Karaman & G. Karaman, 1959: 148, figs. 9-16; Andreev, 1972: 64; Barnard, J.L. & Barnard, C.M., 1983: 689; G. Karaman & Ruffo, 1986: 522; Beron, 1994: 13;

Niphargus georgievi G. Karaman, 1973: 495.

LOCUS TYPICUS: S. Karaman & G. Karaman (1959) do not cited locus typicus; G. Karaman (1973a) and we selected Ourouchka peštera Cave near village Krochouna, Lovetch as locus typicus, because the most of description and figures are of specimens from this cave.

MATERIAL EXAMINED: BULGARIA:

Holotype Ourouchka peštera Cave, slides.

X-630= Popova peŝtera Cave near village Krochouna, 1 exp. Lovetch reg. (leg.?);

S-2414= Divitaŝka peŝtera-Cave, Lovetch (= Loveč) district, Bulgaria, 5.7.1922, 1 male (leg.?).

BU-5= Cave near Mussina, district Veliko Tarnovo, 12.10.1979, 8 exp. (leg. P. Beron, A. Popov, & S. Andreev);

IP-15A= Cave Malkata vodna, village Micre, dept. Lovetch, subterranean torrent, 19.1.1992, 2 exp. damaged (leg?) cf. *georgievi.*

LOCALITIES CITED: BULGARIA:

S. Karaman & G. Karaman, 1959: 0urouchka peštera Cave and Popova peštera Cave near village Krochouna, Lovetch.

Andreev, 1972 mentioned existence of 2 localities described by S. & G. Karaman (but without name of localities).

Beron, 1994: Zmejovi Dupki (Gb 5); Vodnata Velichovska peštera Cave (Gb 9).

DISTRIBUTION: Bulgaria, endemic.

REMARKS.

This species was described and figured by S. & G. Karaman (1959) from 2 caves of Lowetch region (Popova and Ourouchka Caves) based on males and females up to 14 mm long. Andreev (1972) mentioned that this species is known from one larger region with some other localities (but without names). He agrees with original known description of this species and cited lobes of telson with 1-3 lateral spines, 4-6 apical spines, and the number of retinacula on pleopods 1-3 (4-5-6 to 5-6-7). Later this species was neither redescribed nor mentioned some supplementary morphological data, and we mentioned here some additional data.

Epimeral plates distinctly pointed, plate 3 rather produced, plates 2 and 3 with various number of subventral spines (Fig. 11E).

Urosomal segment 1 with one seta on each dorsolateral side; urosomal segment 2 on each side with 4-5, sometimes to 7 spines; urosomal segment 3 naked. This curiosity of urosomal spinulation was observed already by S. & G. Karaman (1959). Urosomal segment 1 on ventroposterior corner with one spine near basis of uropod 1-peduncle.

Mandibular palpus article 1 naked, article 2 with 15 setae; article 3 nearly as long as article 2, subfalciform, with nearly 30 marginal D-setae and 4-6 distal E-setae, on outer face with 7 facial A-setae, on inner face with 6 facial B-setae (2+2+2) (Fig. 11A).

Maxilla 1 inner plate with 1-2 setae (Ourouchka Cave, Popova Cave, Divitaška Cave) or 3 setae [(Messina, Veliko Tarnovo (Fig. 11H)], outer plate with 7 spines (6 with one lateral tooth, inner spine with 3 lateral teeth), palpus nearly reaching distal tip of outer plate spines (Fig. 11B), bearing usually 6 distal and 2 distomesial setae.

Maxilliped: inner plate with 5-6 distal spines mixed with single setae, palpus usually with 2 mesial setae near basis of the nail (Fig. 11C).

We measured coxal plates 1-4 of Divitaška Cave, male 9 mm. Coxa 1 and 4 are scarcely longer than broad (Fig. 12A, D), coxae 2 and 3 distinctly longer than broad (Fig. 12B, C); coxa 4 with very shallow ventroposterior lobe (Fig. 12D), all coxae scarcely setose.

Gnathopods 1-2: article 3 provided with one distoposterior bunch of setae; article 5 rather shorter than propodus. Gnathopod 1 propodus much smaller than that of gnathopod 2, trapezoid, rather longer than broad, along posterior margin with nearly 10 transverse rows of setae (Fig. 12A); palm inclined poorly less than half of propodus-length, convex, defined on outer face by corner S-spine accompanied laterally by 3 serrate L-spines and corner facial 3 M-setae, on inner face by one subcorner R-spine. Dactylus at outer margin with one median seta, along inner (mesial) margin with several short setae.

Gnathopod 2 propodus trapezoid, nearly as long as broad, along posterior margin with nearly 12 transverse rows of setae (Fig.12B): palm inclined nearly half of propodus-length, convex, defined on outer face by corner S-spine accompanied laterally by 2 slender L-spines and 3 corner facial M-setae, on inner face by one subcorner R-spine. Dactylus with one median seta at outer margin and several short setae at inner margin.

Pereopods 3-4 dactylus moderately slender, with one spine at inner margin, nail shorter than pedestal.

Pereopods 5-7 moderately long, pereopod 5 shorter than pereopods 6-7, all with articles 3-6 bearing groups of spines mixed with setae nearly as long as spines. In female pereopod 7 article 2 only slightly shorter than article 6 (ratio: 70:80); article 2 rather narrowed, longer than broad (ratio: 70:42), posterior margin poorly convex, with nearly 13 setae (Fig. 11D), ventroposterior lobe absent. Dactylus moderately strong, with one spine at inner margin and one median seta at outer margin, nail shorter than pedestal (Fig. 11D).*Niphargus kragujevensis femineus* G. Karaman, 2024b: 15, figs. 3-8.

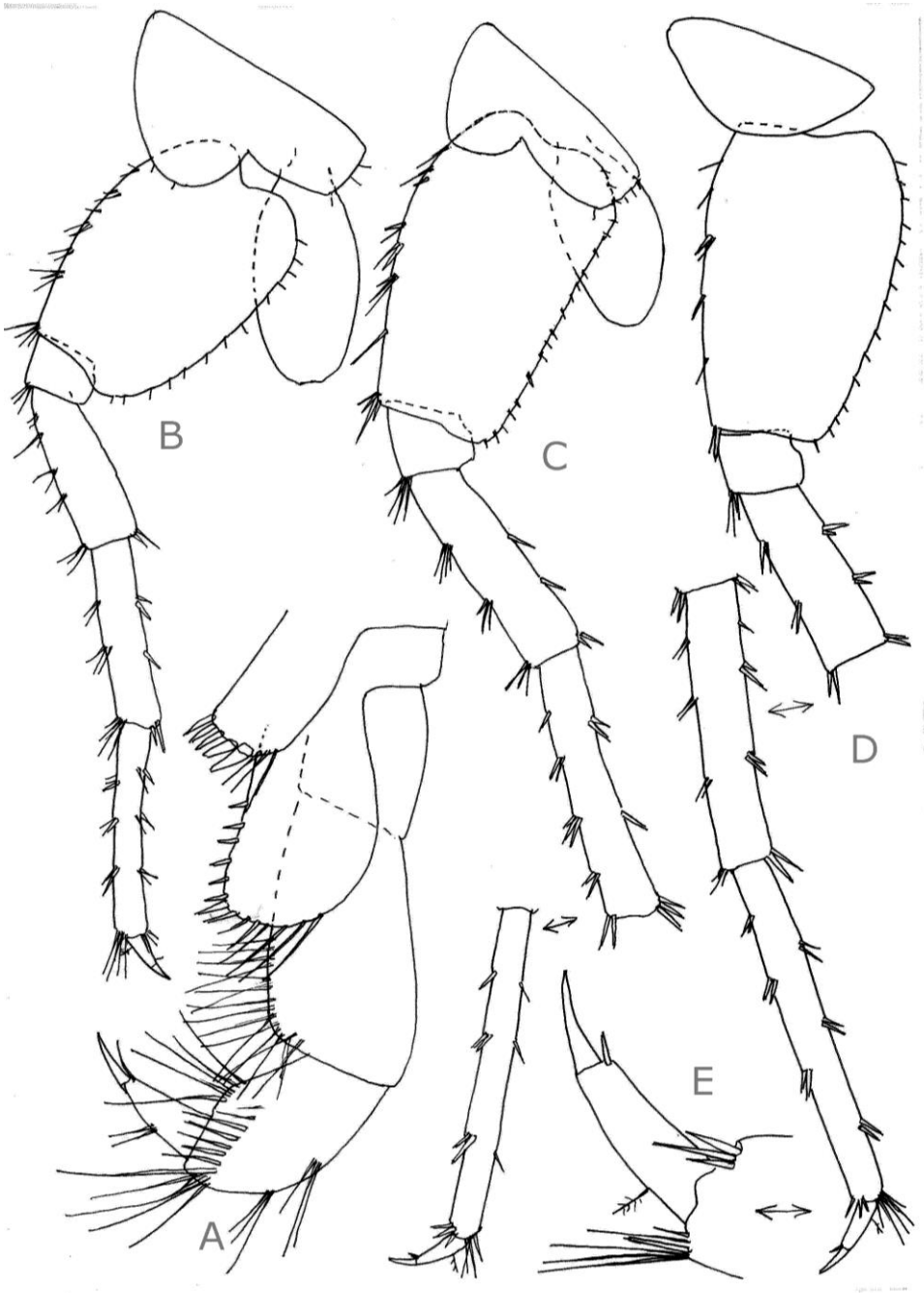

Fig. 7. *Niphargus vlkanovi burgasi*, ssp. nov., Verovnik, Burgas, male 15.5 mm (holotype): A= maxilliped; B= pereopod 5; C= pereopod 6; D-E= pereopod 7.

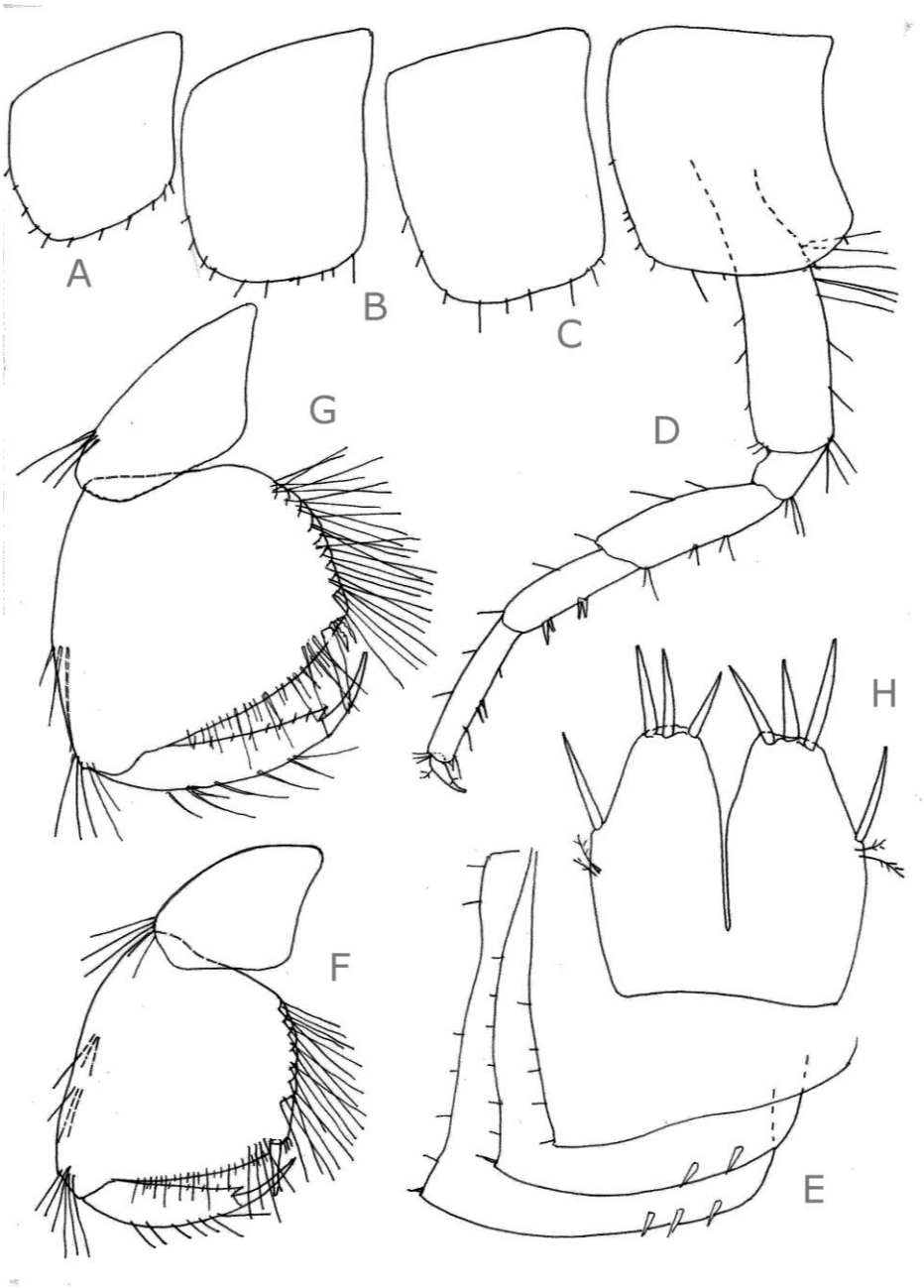

Fig. 8. *Niphargus vlkanovi burgasi*, ssp. nov., Verovnik, Burgas, female 12.0 mm (paratype): A= coxa 1; B= coxa 2; C= coxa 3; D= coxa 4 and pereopod 4; E= epimeral plates 1-3; F= gnathopod 1; G= gnathopod 2; H= telson.

Pleopods with elevated number of retinacula, usually 4-6. Peduncle of pleopods 1-3 scarcely setose, bearing several single short setae only or naked.

Uropod 1: peduncle with dorsoexternal row of spines and dorsointernal row of setae. Rami of equal length, with several lateral spines and 4-5 distal short spines. Uropod 2 with subequal rami bearing single lateral and 4-5 distal short spines.

Uropod 3 long in male, with short peduncle and short, scale-like, inner lobe bearing distal spine (Fig. 11G). Outer ramus 2-articulated, in adult specimens articles are of equal length: first article along outer margin with several single short spines, along inner margin with row of single short spines mixed with single long plumose setae; second article along both margins with single of paired short setae, at top with several simple setae. Subadult males and females are with second article of outer ramus more or less shorter than first one.

Telson broader than long, gapping, not tapering distally, incised to the 3/4 of telson-length; each lobe with 4 distal and 1-2 outer marginal strong spines, one pair of short plumose setae siting near the middle of outer margin (fig. 12E).

Coxal gills ovoid, not elongated (Fig. 12B, C, D).

In female (9.0 mm, Divitaška peštera) uropod 3 shorter and broader than in male (Fig. 11F). Peduncle short, poorly longer than broad, with single distal spines; inner ramus short, scale-like, with distal spine and seta; outer ramus 2-articulated, first article along outer margin with 4 groups of short spines, along inner (mesial) margin with several short spines mixed with single plumose setae; second article rather shorter than half of first article, along both margins and tip with single or groups of short simple setae.

VARIABILITY. The number of spines on telson is rather variable, usually on each lobe 3-4 distal spines and 1-2 lateral spines, but no facial spines; distal tip of lobes is more or less broad, not narrowed like these in *N. bureschi*. Inner plate of maxilla 1 with 1-2 setae, possible also 3. Inner plate of maxilliped is provided with 3-6 distal spines in various localities.

The specimens from Malkata vodna Cave (juv. 4.8 mm) seems belong to this species, having acute epimeral plates, elevated number of retinacula (3), one outer marginal seta on gnathopod dactylus, and 3-4 spines on each side of urosomal segment 2.

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NIPHARGUS JOVANOVICI S. Karaman, 1931
(Shortened synonymy).

Niphargus jovanovici S. Karaman, 1931: 93, figs. 1-2; G. Karaman, 1980: 17; Pesce & Maggi, 1983: 58; Beron, 2015: 35;

Niphargus jovanovici jovanovici Schellenberg, 1935: 206 (key); S. Karaman, 1943: 173, 207, pl. III, figs. 43-62; Dancau, 1963: 473 (key);

Niphargus (*Jovaniphargus*) *jovanovici jovanovici* S. Karaman, 1960: 86, fig. 5; Dancau, 1963: 473 (key); Sket, 1972: 10, fig. 107;

nec *Niphargus jovanovici jovanovici* Dobreanu, Manolache & Puscariu, 1951: 579, figs. 1-2 (= *N. serbicus* S. Karaman, 1960*).*

LOCUS TYPICUS: Skoplje, Northern Macedonia.

LOCALITIES CITED: BULGARIA:

Beron, 2015: **page: 227**: Mt 13. Shokyovets (Shyokovets) cave near Cherkaski Village. Length 144 m. Deniv. 6 m., underground stream; **page 230**: Mt 35. Sushitsa Cave near Studeno Buche Village. Length 31 m.

Pesce & Maggi, 1983A: "Grecia settentrionale and Isole Ioniche".

DISTRIBUTION: Northern Macedonia, Greece, Serbia, Bulgaria.

NIPHARGUS KRAGUJEVENSIS FEMINEUS G. Karaman, 2024b

Niphargus kragujevensis femineus G. Karaman, 2024b: 15, figs. 3-8.

LOCUS TYPICUS: Ledenicata Cave near vil. Gela (Smoljan region, Rhodopes Mts.), Bulgaria.

MATERIAL EXAMINED:

Ledenicata Cave near vil. Gela (Smoljan region, Rhodopes Mts.), Bulgaria. 3.11.1969, 2 exp. (leg. A.

Popov).

LOCALITIES CITED: BULGARIA.

Karaman, G. 2024: locus typicus.

DISTRIBUTION: Bulgaria, endemic.

REMARKS: see key.

NIPHARGUS KRAGUJEVENSIS REMUS G. Karaman, 1992

Niphargus kragujevensis remus G. Karaman, 1992: 20, figs. V-IX; G. Karaman, 1994: 231; G. Karaman, 1995: 324; G. Karaman, 1997: 350; G. Karaman, 1998b: 236; G. Karaman, 1999: 168; G. Karaman, 2011: 150; G. Karaman, 2024b: 10, figs. 1-2.

LOCUS TYPICUS.: Fountain above the village Prekonoga, Svrljig Mt., Serbia.

MATERIAL EXAMINED: BULGARIA:

IP-7= Gallery artificial "Urvitch" near Sofia, valley of Iskar River, 23.4.1993, 3 exp. (leg.?).

S-7435= Sozopol, in roots (E. of Burgas, coast of Black Sea), 17.12.1963, 3 exp. [leg. Lj. Cvetkov).

LOCALITIES CITED: BULGARIA:

Karaman, G. 2024: IP-7= Gallery artificial "Urvitch" near Sofia, valley of Iskar River.

DISTRIBUTION: Bulgaria, Serbia.

REMARKS. The specimens from Bulgaria agree with description of ssp. ***r****emus* from Serbia.

NIPHARGUS MELTICENSIS Dancau & Andreev, 1973

Niphargus kochianus melticensis Dancau & Andreev, 1973; 135, figs. 1-4; Barnard, J.L. & Barnard, C.M., 1983: 692.
Niphargus melticensis G. Karaman & Ruffo, 1986: 528.

LOCUS TYPICUS: Well in Sokolovo, Lovetch district, Bulgaria.
LOCALITIES CITED: locus typicus only.
DISTRIBUTION: Bulgaria, endemic.

NIPHARGUS MERIDIONALIS Dobreanu & Manolache, 1942

Niphargus carpathicus meridionalis Dobreanu & Manolache, 1942: 301, figs. 13. 15, Barnard, J.L. & Barnard, C.M., 1983: 690; Petrescu, 1996: 208, figs. 18-22: G. Karaman, 2023: 15.
Ceatalar (= Batovo), Bulgaria.

LOCUS TYPICUS: Ceatalar (= Batovo), NE Bulgaria.
LOCALITIES CITED:
Dobreanu & Manolache, 1942: Ceatalar (Caliacra) (= Batovo), Bulgaria;
Petrescu, 1996: Batovo (Bulgaria); Furnica (Romania).
G. Karaman, 2023: Ceatalar (= Batovo), Bulgaria.
DISTRIBUTION: Bulgaria, Romania.
REMARKS.

Dobreanu & Manolache described (1942) *Niphargus carpathicus meridionalis*, ssp. nov. from Ceatalar (Caliacra) (= Batovo). As this region after the Second World War belongs to Bulgaria, Carausu, Dobreanu & Manolache (1955) from Romania omitted this taxon in their book of fauna of Amphipoda from Romania.

Dobreanu & Manolache (1942) in his rather short and incomplete description of *N. c. meridionalis* mentioned that gnathopods are mainly like these of *N. romanicus* Dobreanu & Manolache, 1942. But *N. romanicus* is with dactylus of gnathopods with one median seta at outer margin, what was mentioned already by G. Karaman (2023). Uropod 3 is not described, as well as the number of retinacula ["retinaculum est formé de 3 crochets"].

Petrescu (1996) redescribed this taxon from Batovo Valley and mentioned it for Furnica in SE Romania, not far from Bulgaria border, nearly 60 km N. of Batovo. Dactylus of gnathopod 1 is figured with 5 setae, that of gnathopod 2 with 2 setae; pleopods are with 2 retinacula.

This taxon is quite different from *Niphargus carpathicus*-complex of taxa, based on presence of several setae on outer margin of gnathopods 1-2 propodus,

and represent a distinct species, *Niphargus meridionalis* Dobreanu & Manolache, 1942, with type-locality: Ceatalar (= Batovo), Bulgaria.

NIPHARGUS PECARENSIS S. Karaman & G. Karaman, 1959

Niphargus tauri pecarensis, n. ssp., S. Karaman & G. Karaman, 1959, 143, figs. 1-8; Andreev, 1972: 62; Barnard, J.L. & Barnard, C.M., 1983: 696; G. Karaman & Ruffo, 1986: 533; Beron, 1994: 13, 486; G. Karaman, 2013: 220;

Niphargus pecarensis pecarensis, G. Karaman, 1998a, 116, figs. 1-4; G. Karaman, 1999: 168.

LOCUS TYPICUS: Cave ‚Pečara dupka" near town Belogradčik in NW Bulgaria.

LOCALITIES CITED: BULGARIA

S. Karaman & G. Karaman, 1959: locus typicus.

Andreev, 1972 cited this species for cave “Goliami Petch” near village Varbovo, mixed with *N. bureschi*, in the subterranean running waters.

Beron, 1994: Bulgaria, stygobiont: Haidushkata propast (Vd 5); Jame II (Vd 28); Right suhi petch (Vd 13); Prelaz (Vd 21);

SERBIA:

G. Karaman, 1999; Cave near Gabrovica Village by Kalna, Serbia.

DISTRIBUTION: Bulgaria, Serbia.

?*NIPHARGUS PUTEANUS* Koch, C.L., 1836

Gammarus puteanus Koch, in Panzer 1936: V. 5, n. 2.

Niphargus puteanus (? Koch, 1836) Fage, 1926: 6; Beron et al., 2011: 591 [updated 2017].

LOCUST TYPICUS: Weichselmühle near Regensburg, Germany**.**

LOCALITIES CITED:

Fage 1926: Grotte de Progled, Ċepelare district, Rhodopes Mts., 1000 m.

Beron, Petrov & Stoev, 2011: Sbirkovata peshtera (Sm 4) cave near Progled Village. Alt. 1430 m. Temp. 6 C.(reg. Smolyan) [from the same cave he mentioned also *N. cepelarensis*].

DISTRIBUTION: Central Europe, borders of distribution areal is not clear.

REMARKS. Specimens mentioned for Bulgaria probably belong to some other species.

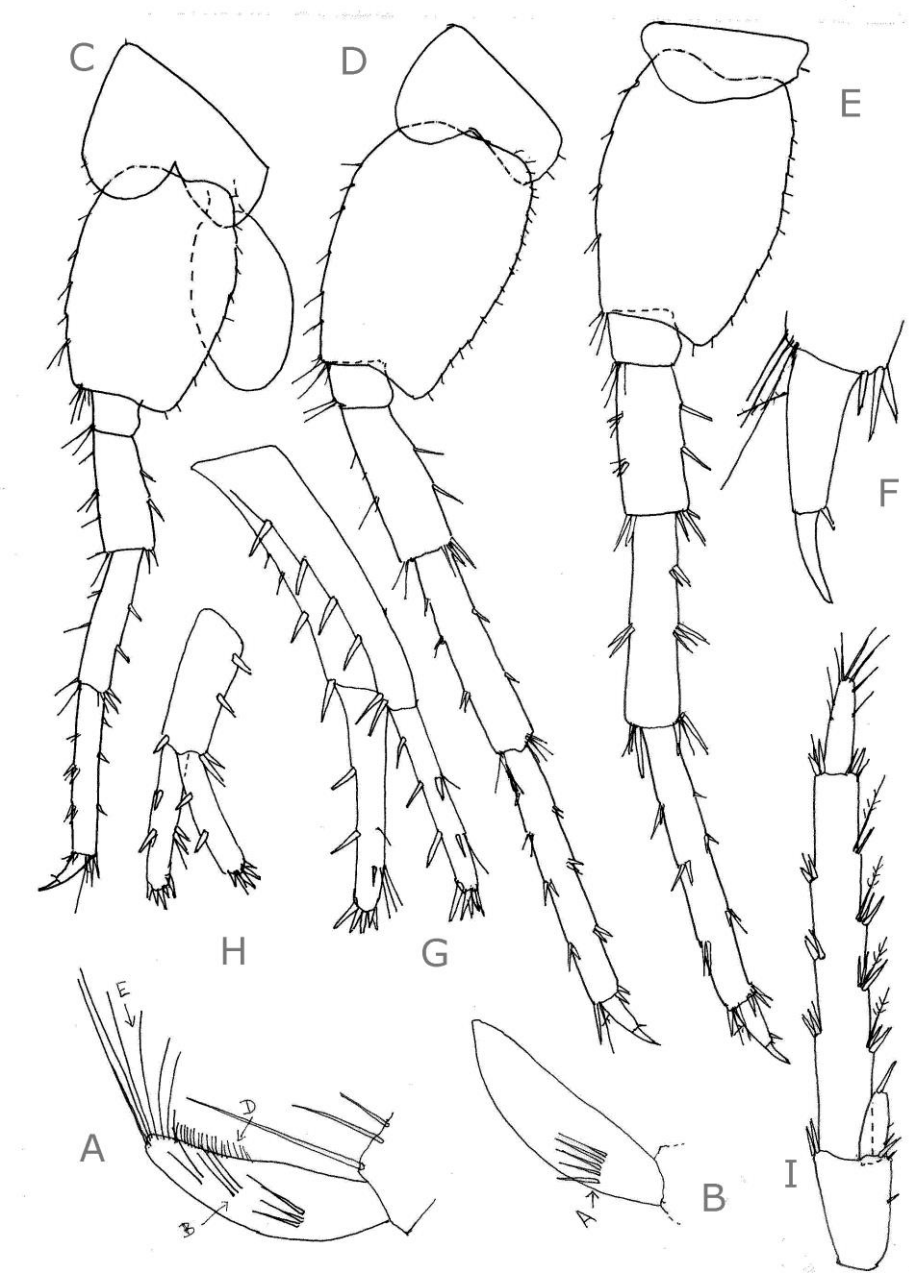

Fig. 9. *Niphargus vlkanovi burgasi*, ssp. nov., Verovnik, Burgas, female 12.0 mm (paratype): A= mandibular palpus, inner face (B=facial B-setae); D= marginal D-setae; E= distal E-setae); B= mandibular palpus, outer face (A= facial A-setae); C= pereopod 5; D= pereopod 6; E-F= pereopod 7; G= uropod 1; H= uropod 2; I= uropod 3.

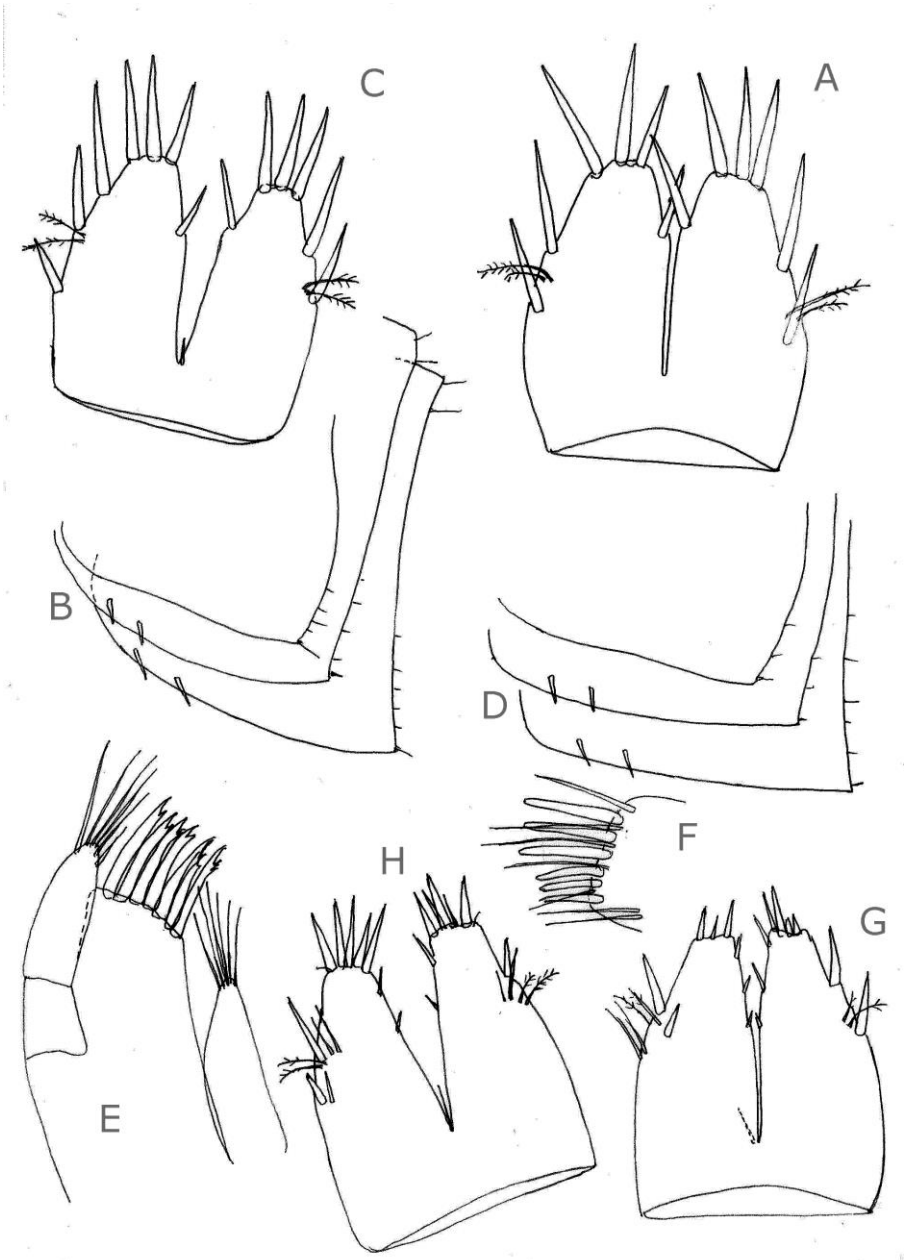

Fig. 10. *Niphargus vlkanovi burgasi*, ssp. nov., Petrova niva, Stoilovo: female 11.0 mm: A= telson; B=, epimeral plates 1-3. C= female 11.1 mm, telson' **Male 11.6 mm**: D= epimeral plates 1-3.
***Niphargus bureschi* Fage 1926**, Temnata Dupka Cave, male 19.1 mm: E= maxilla 1; F= maxilliped, inner plate; G= telson; H= **female 15.5 mm**. telson.

NIPHARGUS TOPLICENSIS Andreev, 1966

Niphargus toplicensis Andreev, 1966: 483, pls. 53, 54; Andreev, 1972: 64; G. Karaman & Ruffo, 1986: 533; Barnard, J.L. & Barnard, C.M., 1983: 696.

LOCUS TYPICUS: spring "Toplitzata" near village Mussomischta, Valley of Mesta River (reg. Goce Deltchev), SW. Bulgaria.

MATERIAL EXAMINED:

EE-38: spring Toplika near Goce Delchev, 21.5.1962, 12 exp. (leg. V.B. Georgiev). This is topotypic material, of the same sample as holotype.

LOCALITIES CITED: BULGARIA

Andreev, 1966: spring "Toplitzata" near village Mussomischta (reg. Goce Deltchev);

Andreev, 1972: karstic spring of the river Mesta (SE Bulgaria); also second spring in the same region (without name).

DISTRIBUTION: Bulgaria, endemic.

REMARKS. Male 9 mm in hands: urosomal segment 1 with 1 strong seta on each dorsolateral side, urosomal segment 2 with 1 spine on each dorsolateral side, urosomal segment 3 naked.

Maxilla 1 inner plate with 3 setae, palpus distinctly reaching basis of outer plate spines. Gnathopods 1-2 article 3 with one distoposterior bunch of setae; palm of propodus on outer face defined by corner strong S-spine accompanied laterally by 2 serrate short L-spines and facial corner 3 M-setae, on inner face by one subcorner R-spine. Pleopods with 2 retinacula, peduncle of pleopods almost naked, with 0-3 short setae only. Telson without lateral spines, lobes lobes with 1 facial spine and nearly 3-4 distal spines.

*NIPHARGUS VLKANOVI VLKANOV*I S. Karaman & G. Karaman, 1959

Figs.: 1-3

Niphargus pancici vlkanovi, S. Karaman & G. Karaman, 1959, 155, figs. 21-29; Andreev, 1966: 285; Andreev, 1972: 62; Barnard, J.L. & Barnard, C.M., 1983: 694; G. Karaman & Ruffo, 1986: 529; Beron, 1994: 13, 486.

? Niphargus tatrensis Schäferna, 1922: 89.

LOCUS TYPICUS: Cave near Živata voda (=Zhivata voda), S. part of Vitoscha Mt., 1100 m. asl., Sofia region, Bulgaria.

MATERIAL EXAMINED: BULGARIA

X-635= Cave near Živata Voda, Sofia reg., 5.2.1925 (leg. Buresch), slides paratype and holotype).

LOCALITIES CITED: All authors cited type locality only.

Schäferna 1922: Vitosha Mt. 800 m asl., Bulgaria [sub N. tatrensis) probably].

DISTRIBUTION: Bulgaria, endemic.

VARIABILITY: Holotype and paratype were at disposition for study only.

REMARKS. This taxon was described and partially figured by S. Karaman & G. Karaman (1959) based on scarce material. For this reason, I have revised the holotype and paratype on slides to complete description and made some additional figures of both sexes.

Male (holotype on slide) 12.0 mm: Metasomal segments with 4-6 dorsoposterior marginal setae (Fig. 2F); urosomal segment 1 on each dorsolateral side with 1 seta, urosomal segment 2 on each dorsolateral side with 1 seta, urosomal segment 3 naked. Urosomal segment 1 at ventroposterior corner with one spine near basis of uropod 1 (Fig. 1E).

Epimeral plates 1-3 subrounded (Fig. 2F), plates 2-3 with 1-3 ventral spines.

Head with short rostrum and subrounded lateral cephalic lobes. Antenna 1 reaching nearly half of body-length, peduncular articles 1-3 progressively shorter, scarcely setose; last peduncular article short; main flagellum consisting of 21 articles (many of them with one short aesthetasc). Accessory flagellum 2-articulated, short, reaching nearly 2/3 of last peduncular article (Fig. 2A).

Antenna 2 moderately slender, peduncular article 5 poorly shorter than 4, both with several groups of setae (the longest setae exceeding diameter of article itself); flagellum longer than last peduncular article, consisting of 9 articles. Antennal gland corner short.

Mouthparts well developed. Mandible palpus article 1 naked, article 2 with 10 setae, article 3 with D, E, A and B-setae.

Maxilla 1 inner plate with one seta, outer plate with 7 spines (6 spines with one lateral tooth, inner spine with 3 lateral teeth), palpus not reaching distal tip of outer plate-spines, provided with 6 setae (Fig. 1A).

Maxilliped: inner plate short, with 3 distal spines mixed with single setae (Fig. 1B); palpus article 4 at inner (mesial) margin with one seta near basis of the nail.

Coxae relatively short. Coxa 1 much broader than long (ratio: 56 37) (Fig. 2B); coxa 2 broader than long (ratio: 69:48) (Fig. 2C); coxa 3 rather broader than long (ratio: 70:57) (Fig. 2D); coxa 4 without distinct ventroposterior lobe, broader than long (ratio: 74:55) (Fig. 2E).

Gnathopods 1-2 poorly larger than corresponding coxae. Gnathopod 1 only slightly smaller than gnathopod 2, article 3 with one distoposterior bunch of setae; article 5 rather shorter than propodus (ratio: 58:75), with distoanterior bunch of setae. Propodus trapezoid, rather longer than broad (ratio: 79:75), along posterior margin with 5 transverse rows of setae. Palm only slightly convex, inclined nearly half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 2 serrate L-spines and 5 corner facial M-setae (Fig. 2G), on inner face by subcorner R-spine. Dactylus along outer margin with 7-8 single of paired median setae, along inner (mesial) margin with row of short setae.

Gnathopod 2: article 3 with one distoposterior bunch of setae; article 5 rather shorter than propodus (ratio: 68:86), with distoanterior bunch of setae (Fig. 2H). Propodus trapezoid, nearly as long as broad (ratio: 86:90), along posterior margin with 6 transverse rows of setae. Palm poorly convex, inclined nearly half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 2 L-spines and 5 corner facial M-setae, on inner face by subcorner R-spine, Dactylus with row of 6-7 single or paired median setae along outer margin, and several short setae along inner margin (Fig. 2H).

Pereopods 3-4 moderately slender, scarcely setose. Pereopod 3: articles 4-7 of different length (ratio: 80:53:60:26), dactylus with slender spine at inner margin near basis of the nail, nail poorly shorter than pedestal. Pereopod 4 similar to pereopod 3, almost as long as pereopod 3.

Pereopods 5-7 scarcely spinose. Pereopod 5 shorter than pereopods 6 and 7, with article 2 rather longer than broad, with 6 setae along posterior margin, ventroposterior lobe absent.

Pereopod 6: article 2 rather longer than that in pereopod 5, with 8-9 posterior marginal setae and without ventroposterior lobe.

Pereopod 7: article 2 remarkably longer than broad (ratio: 74:40), along anterior poorly convex margin with 6 single spine-like setae, along posterior poorly convex margin with 11 short setae, ventroposterior lobe absent (Fig. 1C); articles 4-7 of different length (ratio: 40:60:72:28); articles 4-6 along both margins with single or pair of spines shorter than diameter of articles themselves. Article 6 almost as long as article 2 (ratio: 72:74). Dactylus with spine at inner margin and one median seta at outer margin (Fig. 1D), nail rather shorter than pedestal.

Pleopods 1-3 with 2 retinacula, peduncles almost naked.

Uropod 1: peduncle shorter than inner ramus, with dorsoexternal row of spines, dorsointernal row naked (except distal spine-like seta); inner ramus long, along ventrolateral margin wit 6 bunches of setae, along dorsal margin with row of short setae, distal tip with 4 short spines (Fig. 1E); outer ramus reaching almost half of inner ramus-length, with 3 groups of lateral short spines and setae and with 4 distal short spines.

Uropod 2: inner ramus poorly longer than outer one, both rami with single lateral and 4 distal short spines (Fig. 1F).

Uropod 3 very long; peduncle remarkably longer than broad (ratio: 52:20), with row of very short lateral setae and distal spines; inner ramus elongated, nearly as long as peduncle, with short simple marginal setae and distal bunch of simple setae; outer ramus 2-articulated, long, narrow, first article along inner margin with row of short simple setae, along outer margin with 5 groups of very short spines (Fig.1G); second article almost as long as first one, with 3 lateral and one distal bunch of short simple setae.

Telson almost as long as broad (ratio: 78:83), incised over 2/3 of telson-length; each lobe with 4 distal and one outer marginal spine; a pair of short plumose setae is attached near the middle of outer margin of lobes (Fig. 1H).

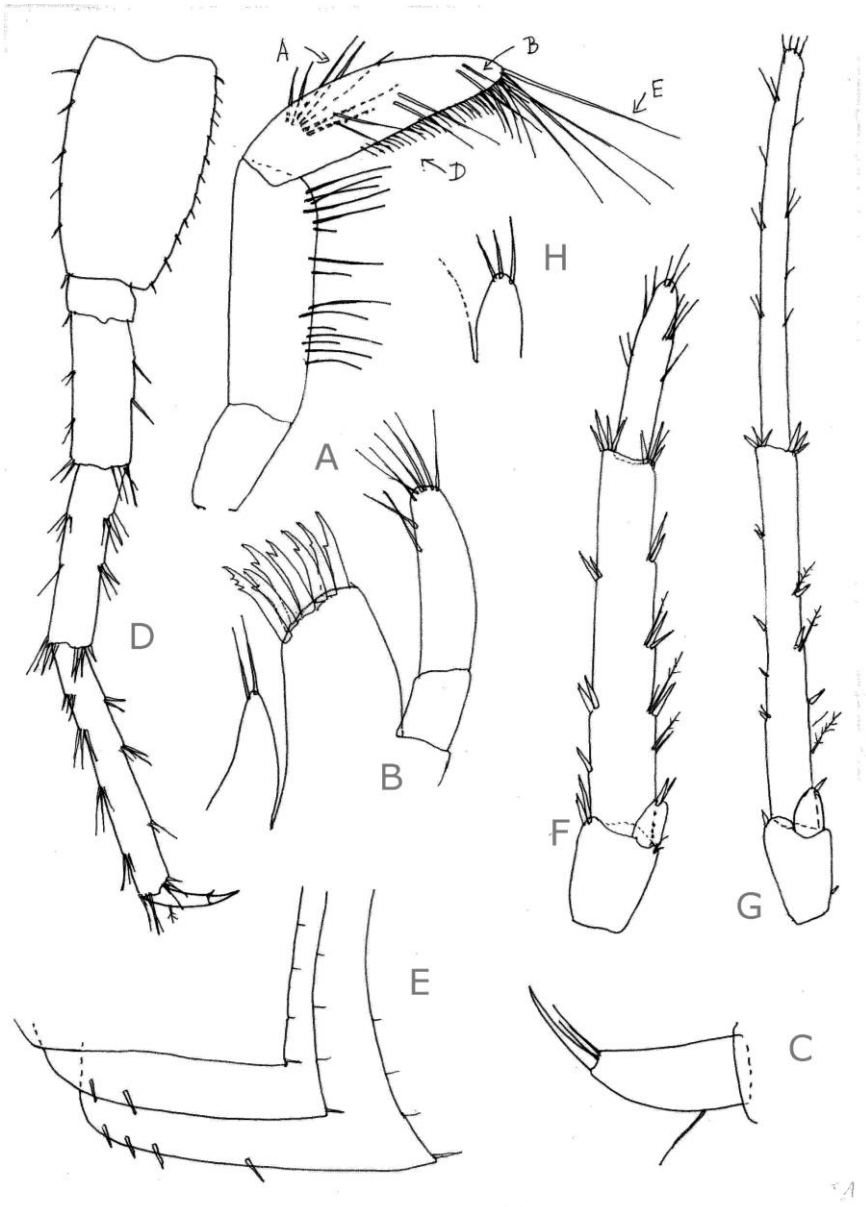

Fig. 11. *Niphargus georgievi* S. Karaman & G. Karaman, 1959, **Popova peštera Cave** near Krochouna, Lovetch Mt., female 14 mm: A= mandibular palpus, inner face (B= facial B-setae; D= marginal D-setae; E= distal E-setae; A= facial A-setae on outer face); B= maxilla 1; C= distal palpus article of maxilliped; D= pereopod 7. female 11.0 mm; E= epimeral plates, female 11.0 mm. **Divitaška peštera Cave near Krochouna**: female 9.0 mm. F= uropod 3. **Cave near Messina vil., Veliko Tarnovo reg**., male 12.0 mm: G= uropod 3; H= maxilla 1 inner plate.

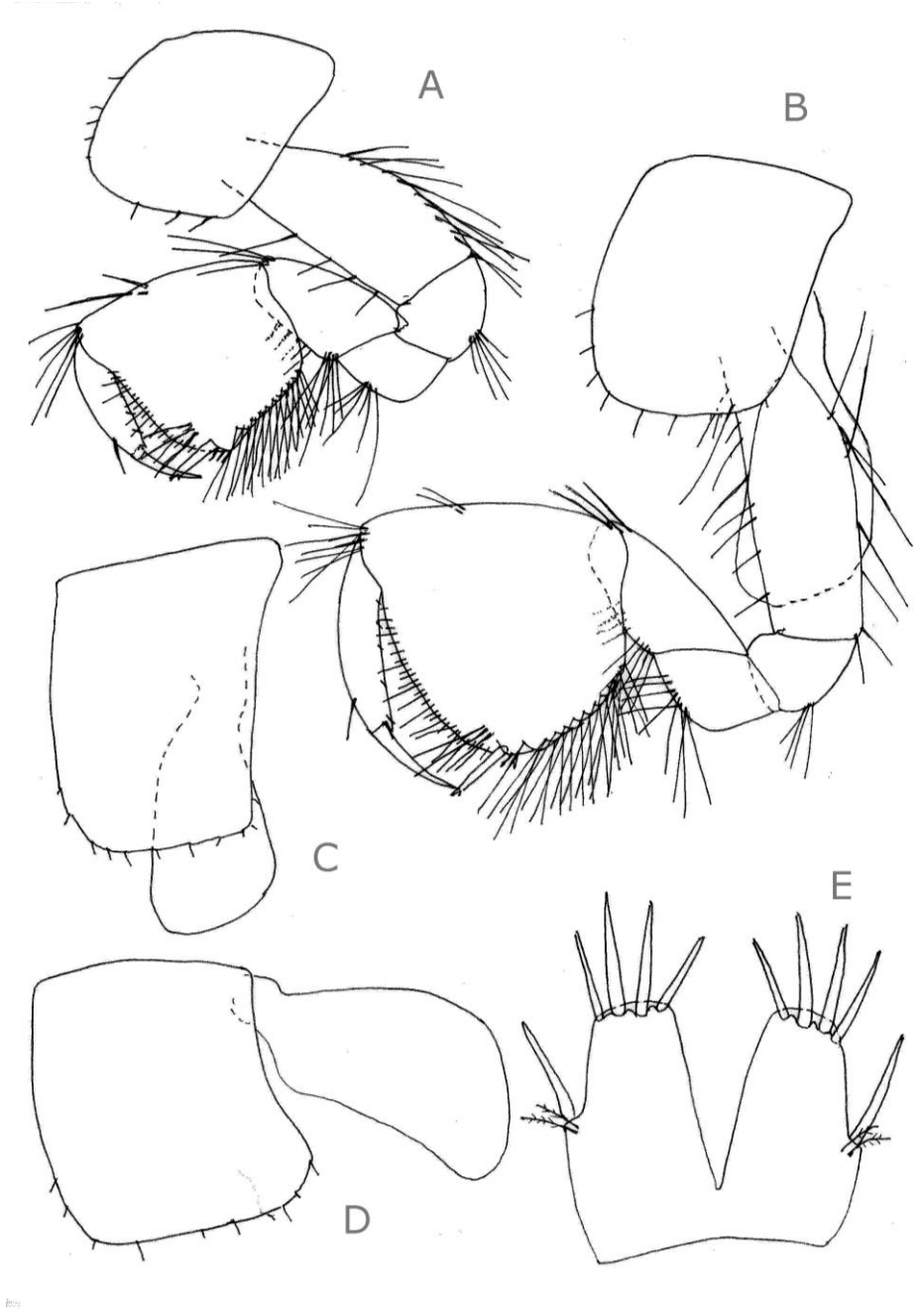

Fig. 12. *Niphargus georgievi* S. Karaman & G. Karaman 1959: Divitaška peštera Cave near Lowetch, male 9.0 mm: A= gnathopod 1, outer face; B= gnathopod 2, outer face; C= coxa 3; D= coxa 4; E= telson

Coxal gills ovoid, relatively short, coxae 2 and 4 rather longer than coxae 3 and 5.

Female 7.0 mm, paratype, slide: Body similar to that in male, but coxae are slightly longer. Urosomal segment 1 with one seta, urosomal segment 2 with one spine on each dorsolateral side, urosomal segment 3 naked. Urosomal segment 1 at ventroposterior corner with one spine near basis of uropod 1 (Fig. 3D).

Epimeral plates rather more angular than these in male (Fig. 2 I), plates 2 with 2 ventral spines, epimeral plate 3 with 2-3 ventral spines.

Antenna 1 not exceeding half of body, consisting of 19 articles; peduncular articles 1-3 progressively shorter, accessory flagellum like that in male. Antenna 2 with flagellum consisting of 10 articles, antennal gland cone short.

Mouthparts like these in male, but maxilla 1 inner plate with 1-2 setae.

Gnathopod 1 only rather smaller than gnathopod 2; article 3 with one distoposterior bunch of setae; article 5 rather shorter than propodus (ratio: 60:80), with one distoanterior bunch of setae. Propodus trapezoid, nearly as long as broad, along posterior margin with 5 transverse rows of setae. Palm convex, inclined nearly to the half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 2 L-spines and 3 corner facial M-setae, on inner face by subcorner R-spine (Fig. 3A); dactylus along outer margin with 5 median setae, along inner margin with several short setae.

Gnathopod 2: article 3 with one distoposterior bunch of setae; article 5 slightly shorter than propodus (ratio: 78:89), with distoanterior bunch of setae. Propodus trapezoid, nearly as long as broad, along posterior margin with 6 transverse rows of setae. Palm slightly convex, inclined nearly to the half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 2 L-spines and 3 corner facial M-setae (Fig. 3B). Dactylus along outer margin with 4-5 median setae, along inner margin with row of short setae.

Pereopods 3-4 like these in male. Pereopods 5-6 like these in male.

Pereopod 7 with article 2 longer than broad (ratio: 78:46), along anterior margin with 5 single spine-like setae and distal group of strong setae, ventroposterior lobe not marked (Fig. 3C). Articles 4-7 of different length (ratio: 41:45:74:35), articles 4-6 with single or groups of short spines along both margins. Article 6 almost as long as article 2 (ratio: 74:78), at inner margin with one spine, at outer margin with one median plumose seta, nail shorter than pedestal.

Pleopods with 2 retinacula, pilosity of peduncles like that in male.

Uropod 1 peduncle with dorsoexternal row of spines, dorsointernal row absent (except distal spine); inner ramus rather shorter than peduncle, with one lateral spine and pair of simple setae, as well as with 4 distal short spines (Fig. 3D); outer ramus nearly as long as inner ramus, with 4 distal short spines, along margin with one spine and 2 simple setae.

Uropod 2: peduncle with lateral and distal spines; inner ramus slightly longer than outer one, with 2 lateral spines and one simple seta, as well as with 4 distal short spines (Fig. 3E).

Uropod 3 slender but relatively short: peduncle with 2 very small lateral setae, one lateral and 3-4 distal spines. Inner ramus very short, scale-like, much shorter than peduncle, provided with 3 distal simple setae. Outer ramus 2-articulated: first article along outer and inner margin with short spines mixed along inner margin with single short plumose setae; second article rather longer than half of first article, bearing several lateral and distal simple setae (Fig. 3F).

Telson like that in male.

Coxal gills like these in male. Oostegites broad, with marginal setae.

NIPHARGUS VLKANOVI BURGASI, ssp. nov.

Figs. 4-9; 10 A-C

LOCUS TYPICUS: Spring near village Varovnik, district Burgas, Bulgaria.

MATERIAL EXAMINED:

S-7442 (BU-1)= Fontaine "Golema Vris", ville Malko Tarnovo, district Burgas, 24.4.1972, 6 exp. (leg. S. Andreev);

BU-2= Spring near village Varovnik, district Burgas, 16.10,1975, 10 exp. (leg. S. Andreev), male 15.5 mm, female 12.5 mm (holotype and paratypes);

BU 3= Fountain Petrova niva, village Stoilovo, district Burgas, 24.6.1980, 18. exp, (leg. S. Andreev);

BU-6= Krvatchi, near village Zvezdetz, district Burgas, 3.3.1971, 18 exp. (leg. S. Andreev).

DIAGNOSIS: Rather similar to *N. vlkanovi vlkanovi.* Maxilla 1 inner plate with 2-3 setae; coxae rather longer. Gnathopods 1-2 with higher number of lateral transverse row of setae on propodus, telson more spiniferous, inner ramus of uropod 1 in males without bunches of simple setae, single setae mixed with single short spines; epimeral plate 3 more angular to almost acute in both sexes.

DESCRIPTION: Male 15.5 mm (BU-2): Body moderately strong, metasomal segments 1-3 with 4 dorsoposterior marginal setae (Fig. 6C); urosomal segment 1 on each dorsolateral side with 1 seta, urosomal segment 2 on each dorsolateral side with 3 setae, urosomal segment 3 naked. Urosomal segment 1 on each ventroposterior corner with one spine near basis of uropod 1 peduncle.

Epimeral plates 1-2 almost subrounded, with convex posterior margin and marked ventroposterior strong corner- seta; epimeral plate 3 obtusely angular, with marked ventroposterior strong spine and nearly vertical posterior margin in distal part; posterior margin of epimeral plates with several short setae, plates 2 and 3 with 3 ventral spines (Fig. 6C).

Head with short rostrum and subrounded short lateral cephalic lobes, ventroanterior excavation developed (Fig. 4A).

Antenna 1 reaching nearly half of body-length; peduncular articles 1-3 progressively shorter and slender (ratio: 62:45:20), very scarcely setose (Fig. 4B); main flagellum consisting of 18 scarcely setose articles (most of them with one short aesthetasc). Accessory flagellum short, 2-articulated, reaching nearly half of peduncular article 3 (Fig. 4B).

Antenna 2 moderately slender; peduncular article 3 with distoventral bunch of setae reaching length of article itself; article 4 rather longer than article 5 (ratio: 68:58), with 3-4 bunches of ventral setae (the longest setae rather exceeding diameter of article itself), at dorsal margin groups of setae are shorter (Fig. 4C). Article 5 with 4 ventral groups of setae longer than diameter of article itself, dorsal bunches of setae is shorter. Flagellum rather longer than last peduncular article, consisting of 12 articles (Fig. 4C). Antennal gland cone short (Fig. 4C).

Mouthparts well developed. Labrum broader than long, with straight of poorly concave distal margin (Fig. 6A). Labium broader than long, inner lobes well developed, outer lobes entire (Fig. 6B).

Mandible well developed; right mandible: incisor with 4 teeth, lacinia mobilis serrate. Right mandible: incisor with 5 teeth, lacinia mobilis with 4 teeth. Palpus mandible 3-articulated: first article naked, second article with 11 setae; third article nearly as long as second one, with nearly 20 D-setae and 6 E-setae, on outer face with one group of 8 A-setae (Fig. 4D), on inner face with 4 bunches of B-setae (Fig. 4E).

Maxilla 1: inner plate with 3 setae, outer plate with 7 spines (6 spins with one lateral tooth, inner spine with 3 lateral teeth); palpus 2-articulated, not reaching distal tip of outer plate spines, bearing 6-7 distal setae (Fig. 4F).

Maxilla 2 with lobes bearing numerous distal setae, inner plate with several distolateral setae (Fig. 4G).

Maxilliped: inner plate short, with 5 distal spines; outer plate reaching nearly half of palpus article 2, bearing row of distomesial spines (Fig. 7A). Palpus article 3 with 2 medial groups of setae along outer margin, article 4 with bunch of 2 median setae at outer margin, and one seta at inner margin near basis of the nail.

Coxae moderately short; coxa 1 rather broader than long (ratio: 55:39), with subrounded ventroanterior corner bearing 8 marginal setae (Fig. 5A). Coxa 2 nearly as long as broad, with 9 marginal setae (Fig. 5E). Coxa 3 broader than long (ratio: 62:55), with 10 marginal setae (Fig. 6D).

Coxa 4 nearly as long as broad, with very shallow ventroposterior lobe, bearing 9 marginal setae (Fig. 6F). Coxa 5 shorter than coxa 4, broader than long (ratio: 68:40), bilobed, anterior lobe not elongated (Fig. 7B). Coxa 6 broader than long (ratio: 60:30), anterior lobe smaller than that of coxa 5 (Fig. 7C). Coxa 7 shallow, entire, much broader than long (ratio: 56:25) (Fig. 7D).

Gnathopods 1-2 of moderate size, nearly as broad as corresponding coxa. Gnathopod 1: article 2 at anterior margin with row of long single setae, along posterior margin with bunches of long setae; article 3 with one distoposterior bunch of setae (Fig. 5A); article 5 shorter than propodus (ratio: 36:50), at anterior margin with distal bunch of setae). Propodus (article 6) trapezoid, rather longer than broad (Fig. 5B) along posterior margin with 9 transverse rows of setae. Palm slightly convex, inclined nearly to the half of propodus-length, defined on outer face of left propodus by corner S-spine accompanied laterally by 2 slender serrate L-spines and 5-7 corner facial M-setae, on inner face by one subcorner R-spine (Fig. 5C). Palm of right propodus with 2 S-spines, 3 L-spines and one R-spine (Fig. 5D) (probably malformation of right propodus palm). Dactylus reaching posterior margin of propodus, along outer margin with 8 mainly single median setae, at inner (mesial) margin with several short submarginal setae.

Gnathopod 2 is remarkably larger than gnathopod 1; article 2 with row of single long setae along anterior margin and bunches of long setae along posterior margin; article 3 with one distoposterior bunch of setae; article 5 rather shorter than propodus (ratio: 49:62), with distoanterior bunch of setae (Fig. 5E). Propodus trapezoid, nearly as long as broad, along posterior margin with 11 transverse rows of setae (Fig. 5 F); palm straight in proximal part and convex in distal one, on outer face defined by strong corner S-spine accompanied laterally by 2 L-spines and 4 corner facial M-setae (Fig. 5G), on inner face by one subcorner R-spine. Dactylus reaching posterior margin of propodus, along outer margin with row of 8 single median setae, along inner margin with several short submarginal setae.

Pereopods 3-4 moderately strong. Pereopod 3: article 2 with row of anterior marginal setae and bunches of setae along posterior margin. Articles 4-7 of different length (ratio: 61:34:41:15), articles 4 and 5 with 3 bunches of setae at posterior margin (setae are shorter to longer than diameter of article itself), along anterior margin with 2-3 groups of setae (Fig. 6D); article 6 at posterior margin with row of short single spines mixed often with short seta; dactylus short and strong, at inner margin with one strong spine near basis of the nail, at outer margin with one median seta nail shorter than pedestal (Fig. 6E).

Pereopod 4 similar to pereopod 3 but rather less setose. Article 2 with row of shorter setae along anterior margin and long setae along posterior margin. Articles 4-7 of different length (ratio: 55:35:43:15), article 5 along posterior margin with 3 groups of short setae and single short spine; article 6 along posterior margin with 5 groups of short setae mixed with single short spine (6F). Dactylus like that of pereopod 3, with one strong spine at inner margin near basis of the nail, nail rather shorter than pedestal.

Pereopods 5-7 rather strong, not elongated. Pereopod 5 distinctly shorter than pereopods 6 and 7, article 2 dilated, rather longer than broad (ratio: 73:50), anterior rather convex margin with 6-7 groups of short setae, along posterior rather convex margin with 14 short setae, ventroposterior lobe not fully developed (Fig. 7B). Articles 4-7 of different length (ratio: 44:50:58:15), articles

4-6 along both margins with groups of short setae mixed often with single short spines. Article 2 is longer than article 6 (ratio: 73:44). Dactylus strong, at inner margin with spine, at outer margin with median plumose seta, nail much shorter than pedestal.

Pereopod 6: article 2 remarkably longer than broad (ratio: 87:51), anterior margin convex proximally, bearing 7 groups of spine-like setae] posterior straight margin with nearly 17 short single setae, ventroposterior lobe not developed (Fig. 7C). Articles 4-7 of different length (ratio: 60:75:91:25), articles 4-6 along both margins with bunches of short spines often mixed with single short setae. Article 6 is longer than article 2 (ratio: 91:87). Dactylus with one spine at inner margin and one median plumose seta at outer margin, nail shorter than pedestal.

Pereopod 7: article 2 longer than broad (ratio: 83:53), along anterior margin with 6 single or groups of spine-like setae, along posterior, rather convex margin, with 14 short setae, ventroposterior lobe not developed (Fig. 7D). Articles 4-7 of different length (ratio: 50:78:98:25), articles 4-6 along anterior and posterior margin with single of paired spines mixed usually with single short setae. Article 2 is rather shorter than article 6 (ratio: 98:83). Dactylus strong, with one strong spine at inner margin near basis of the nail, along outer margin with one median plumose seta, nail shorter than pedestal (Fig. 7E).

Pleopods 1-3 with 2 retinacula. Peduncle of pleopod 1 with one distoanterior seta (Fig. 6G), peduncle of pleopod 2 naked (Fig. 6H), peduncle of pleopod 3 with one posterior seta (Fig. 6 I).

Uropod 1 elongated, peduncle with dorsoexternal rows of spines and dorsointernal row of setae (except distal spine); inner ramus elongated, slightly curved, with 4 spines along dorsal margin and 3 bunches of short simple setae along distoventral margin, at tip with 4 short spines (Fig. 4H); outer ramus reaching nearly half of inner ramus-length, with 2 lateral bunches of simple setae and 4 distal short spines.

Uropod 2: peduncle with several lateral and distal short spines, inner ramus with 4 lateral and 5 distal short spines, outer ramus distinctly shorter than inner one, with one lateral and 4-5 distal short spines (Fig. 4 I).

Uropod 3 long and narrow, peduncle poorly more than two times longer than broad, with single setae and spines; inner ramus short only rather shorter than peduncle (?senior), with 3 distal simple setae and one spine (Fig. 4J). Outer ramus 2-articulated, both article narrowed, of subequal length; first article with several single short spines and setae along inner (mesial) margin; along outer margin with 4 bunches of short simple setae mixed with single short spine; second article along both margins with 1-3 short simple lateral setae and distal bunch of simple setae.

Telson only slightly broader than long, broad, incised nearly 2/3 of telson-length; each lobe tapering distally, bearing 3 short distal spines, 2 single outer marginal spines (exceptionally one spine and one seta), at inner (mesial) margin with 0-1 spine; a pair of short pectinate setae appear near the middle of outer margin of lobes (Fig. 6J).

Coxal gills ovoid, almost reaching distal tip of corresponding article 2 in gnathopod 2 and coxa 4 (Fig. 5E, 6F), shorter in pereopod 3, 5 and 6. (Figs. 6D; 7B, C)

FEMALE 12.0 mm with setose oostegites:

Body moderately strong, metasomal segments with 4-5 dorsoposterior marginal setae; urosomal segment 1 on each dorsolateral side with one seta; urosomal segment 2 with 3 spines on each dorsolateral side, urosomal segment 3 naked.

Epimeral plates rather more pointed regarding males (Fig. 8E), epimeral plate 2 with 2 ventral spines, epimeral plate 3 with 3 ventral spines.

Antennae 1 and 2 like these in male, main flagellum consisting of nearly 24 articles; flagellum of antenna 2 consisting of 11 articles, antennal gland cone short.

Mouthparts like that in male. Mandibular palpus article 1 naked, article 3 with nearly 25 D-setae and 6 distal E-setae, on inner face with 8 B-setae sitting in 3 groups (3-3-2) (Fig. 9A), on outer face one group of 5 A-setae (Fig. 9B). Maxilla 1 inner plate with 3 setae. Maxilliped inner plate with 5-6 distal spines, palpus article 4 at inner (mesial) margin with 2 setae near basis of the nail.

Coxae 1-4 rather longer than these in male Coxa 1 rather broader than long (ratio: 53:46), with subrounded ventroanterior corner and bearing 10 marginal short setae (Fig. 8A). Coxa 2 longer than broad (ratio: 63:56), bearing 10 short marginal setae (Fig. 8B); coxa 3 longer than broad (ratio: 70:58), with 8-9 marginal setae (Fig. 8C); coxa 4 only slightly longer than broad (ratio: 67:60), with 7-9 marginal setae, ventroposterior lobe is not distinctly developed (Fig. 8D). Coxa 5 broader than long (ratio: 52:39) (Fig. C); coxa 6 broader than long (ratio: 48:34) (Fig. 9D); coxa 7 shallow, like that in male (Fig. 9E).

Gnathopods 1-2 similar to these in male but slightly smaller. Gnathopod 1 article 5 shorter than propodus (ratio: 70:63), with distoanterior bunch of setae. Propodus trapezoid, rather longer than broad (ratio: 70:63), along posterior margin with 7 transverse rows of setae (Fig. 8F); palm slightly convex, inclined nearly to the half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 3 slender L-spines and 3 facial corner M-setae, on inner face by one subcorner R-spine. Dactylus along outer margin with row of 7 single median setae, along inner margin with several short setae.

Gnathopod 2 moderately larger than gnathopod 1; article 5 shorter than propodus (ratio: 70:82), with distoanterior bunch of setae. Propodus trapezoid, nearly as long as broad, along posterior margin with 9 transverse rows of setae (Fig. 8G); palm slightly convex, inclined rather over half of propodus-length, defined on outer face by corner S-spine accompanied laterally by 2 L-spines and 3-4 corner facial M-setae, on inner face by one S-spine. Dactylus along outer margin with 7 single or paired median setae, along inner margin with several short setae.

Pereopods 3-4 like these in male. Pereopod 4: articles 4-7 of different length (ratio: 45:37:43:14), articles 3-6 scarcely setose. Dactylus with one spine at inner margin and one median plumose seta at outer margin (Fig. 8D).

Pereopod 5 shorter than pereopods 6-7, article 2 rather longer than broad (ratio: 65:45), anterior and posterior margin moderately convex, anterior margin with 7 single or paired spine-like setae, posterior margin with 12 setae (Fig. 9C), ventroposterior lobe not fully developed. Articles 4-7 of different length (ratio: 34:40:46:16). Articles along both margins with single or paired setae accompanied often with single or groups of short spines. Article 2 longer than article 6 (ratio: 65:46), dactylus with strong spine at inner margin and one median plumose seta at outer margin, nail shorter than pedestal.

Pereopod 6: article 2 rather longer than broad (ratio: 73:51), both margins slightly convex; along anterior margin with 7 single spine-like setae and distal group of setae, along posterior margin with 18 short setae, ventroposterior lobe marked (Fig. 9D). Articles 4-7 of different length (ratio: 45:61:73:18), article 4 with 3 single or groups of posterior spines, along anterior margin with 3-4 single or groups of setae; articles 5-6 along both margins with several groups of short spines and setae. Article 2 nearly as long as article 6. Dactylus short, at inner margin with spine near basis of the nail, at outer margin with one median plumose seta, nail shorter than pedestal.

Pereopod 7: article 2 longer than broad (ratio: 75:52), with rather convex lateral margins, at anterior margin appear 6-7 single spine-like setae and distal bunch of setae, along posterior margin with 13-14 short setae (Fig.9E) ventroposterior lobe marked. Articles 4-7 of different length (ratio: 42:59:80:22), articles 4-6 along both margins with single or groups of spines often mixed with short setae (spines and setae not extend diameter of article itself); article 2 shorter than article 6 (ratio: 75:80). Dactylus at inner margin with spine, at outer margin with one median plumose seta (Fig. 9F), nail shorter than pedestal.

Uropod 1 peduncle longer than rami, with dorsoexternal row of spines, dorsointernal row is composed of one spine, one spine-like seta and one seta (in proximal part); rami of nearly equal length, inner ramus with 2 dorsal median and 5 distal short spines, at ventral margin with one bunch of simple setae mixed with one spine and one short median seta; outer ramus at dorsal margin with 3 median and 5 distal short spines, at ventral margin with 2 groups of simple setae mixed with one spine each (Fig. 9G).

Uropod 2: rami nearly equally long, with single lateral and 5 distal short spines, sometimes mixed with one short simple seta (Fig. 9H).

Uropod 3 shorter than that in male. Peduncle almost twice as long as broad, inner ramus scale-like, short, with distal spine. Outer ramus 2-articulated: first article elongated, along outer margin with bunches of short spines, along inner (mesial) margin with single or paired spines mixed with one longer plumose seta (Fig. 9 I); second article much shorter than first one (ratio: 25:107), along both and tip with simple setae.

Telson almost as long as broad (ratio: 74:75), incised nearly ¾ of telson-length; each lobe with 3 distal spines (the longest spine reaching rather less than half of telson-length), and one median spine at outer margin, inner marginal and facial spines absent; a pair of short plumose setae is attaches near the middle of outer margin (Fig. 8H).

Coxal gills ovoid, of moderate size, not reaching ventral margin of corresponding article 2 (Fig. 9C). Oostegites broad, with long marginal setae.

DERIVATIO NOMINIS: The subspecies *N. vlkanovi burgasi* is nominated based on locality district name, Burgas.

HOLOTYPE: male 15.5 mm; **paratype:** female 12.0 mm. Holotype is deposited in Karaman`s Collection in Podgorica, Montenegro.

VARIABILITY:

The specimens from Burgas region differs remarkably from *N. vlkanovi* of type-locality (see key). Despite that we have at disposition for study holotype and paratype of *N. vlkanovi (*from Sofia region) only, we found row of morphological different characters of specimens from Burgas region regarding these of ssp. *vlkanovi* from Sofia region.

Within the ssp. *burgasi*, there are rather variability of telson: the number of strong spines along outer margin (1-3 spines) (Fig. 10A, C), along inner (mesial) margin (0-1) (Fig. 8H, 10A, C), shape of epimeral plate 3 from poorly angular to distinctly acute (Figs. 6J, 10B, D) and number of ventral epimeral spines (2-4), size of adult males and females (11-20 mm), more or rather less inclined palm of gnathopod`s propodus, number of outer marginal median setae on gnathopod`s dactylus.

When we have in hands scarce material of ssp. *vlkanovi* with unknown variability, we couldn`t consider the specimens from Burgas region as identic with these from Sofia region. By this way, we established the specimens from Burgas region (Black Sea area) as new subspecies, ***Niphargus vlkanovi burgasi,* ssp. nov**. with type locality: Spring near village Varovnik, Burgas, Bulgaria.

But we can`t exclude the possibility that morphological characters of specimens from Burgas region are within the maximal limits of variability of *N. vlkanovi*, and discovery of new samples from different localities will put more light on this problem.

On the other hand, *N. vlkanovi* is rather similar to the species *Niphargus anatolicus* S. Karaman 1950b, known from locus typicus only [Emirgan (N. off Istanbul, European part of Turkey). We recently partially redescribed and figured this species (G. Karaman, 2024a), but it is necessary to collect new material of *N. anatolicus* and *N. vlkanovi* from type-locality to clear their taxonomical position.

NIPHARGUS (Niphargopsis) TRISPINOSUS Dancau & Capuse, 1959

Niphargopsis trispinosus Dancau & Capuse, 1959: 1, figs. 1-4; Andreev, 2001: 86;

Niphargopsis trispinosus (part) G. Karaman, 1982: 89, figs. I-VII.

LOCUS TYPICUS: Mehadia, Timisoara region, Romania).

LOCALITIES CITED:

Andreev, 2001: Bulgaria: well in village Glavatzi, reg. Montana.

DISTRIBUTION

The specimens determined sub name *Niphargopsis caspary* (Pratz 1866) [locus typicus: München, Germany] are mentioned by various authors from France, Germany, Switzerland, Austria, Serbia, along the coast of the Sea in Middle Tertiary, from Rhona River in France, over Switzerland and Germany along present valey of Danube River.

The similar specimens, but determined sub name *Niphargopsis trispinosus* by Dancau & Capuse, 1959, are described from Romania and Bulgaria. Some authors cited *Niphargopsis trispinosus* Dancau & Capuse, 1959 as member of genus *Niphargus* Schiödte, 1849.

DISCUSSION

G. Karaman (1982) redescribed *N. caspary* based on specimens from France, Serbia and Romania, showing absence of significant morphological differences between various localities of these countries, considering specimens from Romania (*N. trispinosus*) identic with these of other countries (*N. caspary*). The new molecular genetic methods will probably help in to resolve taxonomical status and relations between these two species.

The presence of the same subterranean species on very long distances is already known in various subterranean species: *Niphargus valachicus* known from Germany to Turkey and Iran (G. Karaman, 1998c); *Niphargus gallicus* Schellenberg, 1935, known from S. France and Romania, etc.

Despite the absence of known significant morphological differences between various distant populations of one species, for the moment we don`t know its detailed molecular, genetic and other characters and possible clear differences which conduct to the possible reproductive isolation of these distant populations. The best way to resolve this problem is to study the degree of reproductive isolation in crossing experimental conditions specimens of various populations.

***NIPHARGUS* (*Phaenogammarus*) *VALACHICUS* Dobreanu & Manolache, 1933**

[Synonymy is shortened]

Niphargus tatrensis valachicus Dobreanu & Manolache, 1933: 104, figs. 2-4;

Niphargus valachicus S. Karaman, 1934: 332; G. Karaman, 1973: 150, fig. 4; Sket, B., 1981: 88;

Niphargus (Phaenogammarus) valachicus S. Karaman, 1960: 83;

Niphargus (Supraniphargus) valachicus valachicus S. Karaman, 1950c: 68, figs. 35-37; Sket, 1958: 67;
Niphargus (Phaenogammarus) mediodanubialis Dudich, 1941: 61, figs. 1-2;
Niphargus (Phaenogammarus) mediodanubialis f. aschizotelzon Dudich, 1941: 72, fig. 3;
Niphargus mediodanubialis = N. valachicus S. Karaman, 1950a: 14;
Niphargus ivanovi nom. nudum, Schäferna in lit., G. Karaman, 1974: 27; Barnard, J.L. & Barnard, C.M., 1983: 692.

LOCUS TYPICUS: Bucharest, Romania.
LOCALITIS CITED: BULGARIA:
G. Karaman 1973: Devnja, mixed with *Gammarus* sp.
DISTRIBUTION:
Along the Danube River valley, from Germany, Austria, Hungary, Slovenia, Croatia, Bosnia & Herzegovina, Serbia, Romania, SE Ukraine, Turkey, etc. to Iran.
REMARKS.
Niphargus valachicus has unique form of urosomal segments [among several hundred taxa of genus *Niphargus*], with extremely large distribution regarding other *Niphargus* taxa. For this reason I often doubt to recognize the subgeneric status of this species [subgenus *Phaenogammarus* Dudich, 1941] or not, because deep molecular genetic investigations on specimens from numerous remote localities are not provided; on the other hands, new more advanced similar studies in the future will put more light on it, as well as on the general position of subgenera and subspecies categories, recognized in our Zoological Codex.

KEY TO THE *NIPHARGUS* SPECIES OF BULGARIA

1. Lobes of telson with 3 long distal plumose setae; propodus of gnathopods 1-2 remarkably egg shaped 2
-- Lobes of telson without long distal plumose setae; propodus of gnathopods 1-2 more or less trapezoid or *kochianus*-type
2. Dactylus of gnathopods 1-2 at outer margin with one median seta; maxilla 1 inner plate with one seta; telson narrow.....*JOVANOVICI*
--- Dactylus of gnathopods 1-2 at outer margin with 3 or more median setae; maxilla 1 inner plate with 2 setae; telson gaping..... *DOBROGICUS*
3. Maxilla 1 outer plate dilated, bearing numerous (over 30) pectinate spines *Niphargus* (*Niphargopsis*) *TRISPINOSUS* (=? *CASPARY*)
--- Maxilla 1 outer plate not dilated, bearing 7 distal spines.....4
4. Dactylus of gnathopods 1-2 with one median seta along outer margin 5
--- Dactylus of gnathopods 1-2 with row of median setae along outer margin.....11
5. Pleopods 1-3 with 2 retinacula.....*MELTICENSIS*
--- Pleopods 1-3 with 3 or more retinacula 6
6. Epimeral plates 1-3 pointed 7
--- Epimeral plates more or less subrounded 8

7. Article 2 of pereopods 5-7 broadly convex, with well-developed ventroposterior lobe; propodus of gnathopods 1-2 kochianus type, with palm not inclined..... *DECUI*
--- Article 2 of pereopods 5-7 more or less elongated, without ventroposterior lobe; propodus of gnathopods 1-2 trapezoid, with remarkably inclined palm..... ..... *GEORGIEVI*
8. Maxilla 1 inner plate with 1 seta.....9
--- Mx1 inner plate with 2 setae..... *CVETKOVI*
9. Peduncle of pleopods 1-3 with numerous lateral setae .... *PECARENSIS PECARENSIS*
--- Peduncle of pleopods 1-3 scarcely setose, bearing 0-3 single setae each.....10
10. Telson of male in with numerous long distal spine-like setae; females with uropod 1 rami not inflated..... *.KRAGUJEVENSIS REMUS*
--- Telson in male with short spines and spine-like setae; female with inflated uropod 1 rami.....*KRAGUJEVENSIS FEMINEUS*
11. Dactylus of pereopods with elevated number of spines along inner margin...12
--- Dactylus of pereopods with only one spine or spine-like seta along inner margin…….....13
12. Urosomal segments 1-2 with one very strong spine on each dorsolateral side... ..... *Niphargus* (*Phaenogammarus*) *VALACHICUS*
--- Urosomal segments 1-2 with one or more setae or weak spines. *BULGARICUS*
13. Pleopods with elevated number of retinacula (up to 5)..... *CEPELARENSIS*
--- Pleopods with 2, exceptionally 3 retinacula only.....14
14. Uropod 3 in males and females short, with short distal article of outer ramus. Article 2 of pereopods 5-7 with lateral margins broadly convex, with short ventroposterior lobe [mx1 inner plate with 4 setae, epimeral plates acute]..... ..... *MERIDIONALIS*
--- Uropod 3 in males long, with long distal article of outer ramus; article 2 of pereopods 5-7 with straight or less convex lateral margin.....15
15. Uropod 1 inner ramus in both sexes as long as outer ramus (telson without facial spines) ..... *BURESCHI*
--- Uropod 1 inner ramus in male much longer than outer ramus (telson with or without facial spines) 16
16. Telson without lateral spines, facial spines present. Epimeral plate 3 slightly pointed,; article 2 of pereopod 7 shorter and stouter, broad; maxilla 1 palpus shorter, reaching basis of outer plate spines ..... *TOPLICENSIS*
--- Telson with lateral spines, facial spines absent. Epimeral plate 3 slightly angular or obtuse, article 2 of pereopod 7 longer and more narrow; maxilla 1 palpus slightly exceeding basis of outer plate spines.....17
17. Inner ramus of uropod 1 in males with numerous lateral simple setae. Maxilla 1 inner plate in male with 1 seta, in female with 1-2 setae; coxae 1-4 in males shallow. Propodus of gnathopods 1-2 in both sexes with lower number of transverse rows of setae (5-6). Uropod 1 peduncle without dorsointernal row of setae (except distal spine) in both sexes. Epimeral plate 3 in male obtusely angular or subrounded..... *VLKANOVI VLKANOVI*
--- Inner ramus of uropod 1 in males with single short setae mixed with spines. Maxilla 1 inner plate in both sexes with 2-3 setae; coxae 1-4 in males rather

longer. Propodus of gnathopods 1-2 in both sexes with elevated number of transverse rows of setae (8-11). Propodus of gnathopod 1 in females remarkably smaller than that of gnathopod 2; Uropod 1 peduncle with dorsointernal row of setae. Epimeral plate 3 in male distinctly angular or slightly pointed .... *VLKANOVI BURGASI*

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REFERENCES

Andreev, S. (1966) .Eine neue Niphargus-Art aus Bulgarien.- International Journal of Speleology, II: 283-288, pls. 53, 54.

Andreev, S. (1972). Diffusion du genre Niphargus en Bulgarie et notes taxonomiques sur Niphargus bureschi.-- Actes I. Col. Int. Niphargus, Verona 1969, Memorie del Museo Civico di Storia Naturale di Verona, fuori serie 5: 61-66.

Andreev, S. (2001). Niphargus bulgaricus sp. n. et deux especes nouvelles pour la faune de Bulgarie-Niphargopsis trispinosus Dancau et Gammarus roeseli (sic!) Gervais (Amphipoda: Niphargidae, Gammaridae).- Historia Naturalis Bulgarica 13: 79-87.

Barnard, J.L & Barnard, C.M. (1983). Freshwater amphipods of the World. I. Evolutionary patterns. II. Handbook and bibliography.- Hayfield Associates: Mt. Vernon, Virginia, 1983, pp. XIX 849 pages, 50 figs., 7 graphs, 98 maps, 12 tables.

Beron, P. (1994). Resultats des recherches biospeleologiques en Bulgarie de 1971 a 1994 et liste des animaux cavernicoles bulgares.- Serie Tranteeva-1, Edit. de la Federation bulgare de Speleologique, Sofia, 1-138.

Beron, P. (2015). Cave fauna of Bulgaria.-National Museum of Natural History, Sofia, Bulgarian Academy of Sciences.- East-West Publishing Company, 404 pages.

Beron, P., Petrov, B. & Stoev, P. (2004). The Invertebrate cave fauna of the Eastern Rhodopes (Bulgaria and Greece).-In: Beron, P. & A. Popov (Eds.), Biodiversity of Bulgaria, 2, Biodiversity of Eastern Rhodopes (Bulgaria) and Greece).- Pansoft & Nat. Mus. Natur. Hist. Sofia, pp. 791-803.

Beron, P., Petrov, B. & Stoev, P. 2011 (uploaded 2017). Invertebrate cave fauna of Western Rhodopes (Bulgaria and Greece).- II. Pensoft & National Museum of Natural History Sofia, pp. 583-661.

Carausu, S., Dobreanu, E. & Manolache, C. (1955). Amphipoda. Forme salmastre si de apa dulce.- Fauna Republicii populare Romine, Crustacea, 4 (4): 1-410.

Dancau, D. & Andreev, S. (1973). Sur un nouvel Amphipode souterrain de Bulgarie, Niphargus kochianus melticensis n. ssp. - Inst. Journal Speleology 3: 135-142.

Dancau, D. & Andreev, S. (1974). Remarques systematiques sur le genre Niphargus [Niphargopsis] (Amphipoda Gammaridae).- Studia Babeş Baolyai, J., 14 /4, ser. II: 127-141. (Not seen)

Dancau, D. & Capuse, I. (1959). Niphargopsis trispinosus n. sp., genus new to the Roumanian fauna (Ampipoda).- Folia Balcanica, Skopje, 2 (1): 1-8.

Dancau, D. (1963). Asupra citorva amfipode subterane din R. P. Romina. Niphargus dacicus n. sp. si Niphargus jovanovici ponoricus n. ssp.- Lucrarile Inst. Speolog. Emil Racovita, 1-2: 461-474 (1962/63).

Dancau, D. (1964). Noi contributii la studiul amfipodelor subterane, Niphargus dobrogicus n. sp.- Lucrarile Inst. Speologie Emil Racovita 3: 397-403.

Dobreanu, E. & Manolache, C. (1933). Beitrag zur Kenntnis der Amphipoden Rumäniens.- Notationes Biologicae, Bucarest, 1 (3): 103-108.

Dobreanu, E. & Manolache, C. (1942). Nouvelles contributions a l`etude des Amphipodes de Roumanie. - Bull. sec. Sci. Acad. Romania, 25 (5): 1-12 (293-304).

Dobreanu, E., Manolache, C. & Puscariu, V. (1951). Subspecii de Niphargus jovanovici Kar. in RPR. - Com. Acad. RPR, 1 (7): 579-584.

Dudlch, E. (1941). Niphargus mediodanubialis sp. nov., die am weitestem verbreitete Niphargus-Art des mittleren Donaubeckens. - Fragmenta faunistica Hungarica, 4 (3): 61-73.

Fage, L. (1926). Sur un Niphargus des l`eau souterraines de Bulgarie.– Bull. Soc. Sci. Cluj, 3 (2): 1-6.

Karaman, G. & Ruffo, S. (1986). Amphipoda: Niphargus-Group (Niphargidae sensu Bousfield, 1982), in: Botosaneanu, L. (edit.): Stygofauna Mundi, A Faunistic, Distributional, and Ecological Synthesis of the World Fauna inhabiting Subterranean Waters (including the Marine Interstitial), Leiden, E. J. Brill/ Dr. W. Backhuys, pp. 514-534.

Karaman, G. & Sarbu, S. (1995). Niphargus decui n. sp. (Amphipoda, Gammaridea, Niphargidae) a new species from Romania. -Trav. Inst. Speol. Emile Racovitza, Bucarest, 34: 77-87, 5 figs.

Karaman, G. (1969). XXVII. Beitrag zur Kenntnis der Amphipoden. Arten der Genera Echinogammarus Stebb. und Chaetogammarus Mart. an der jugoslawischer Adriaküste.– Glasnik Republičkog zavoda za zaštitu prirode i Prirodnjačke zbirke u Titogradu, 2: 59–84, 51 figs.

Karaman, G. (1973a). Two new Species of Family Gammaridae from Yugoslavia, Niphargus deelemanae n. sp. and Typhlogammarus algor, n. sp. XLVIII. Contribution to the Knowledge of the Amphipoda. – Archiv für Hydrobiologie, Stuttgart, 72 (4): 490-500, 4 figs.

Karaman, G. (1973b.) XLIX. Contribution to the Knowledge of the Amphipoda. On Three Niphargus Species (Fam. Gammaridae) from the Balkans.- International Journal of Speleology, 5: 143-152, 4 figs.

Karaman, G. (1974). Catalogus Faunae Jugoslaviae, Crustacea Amphipoda (Contribution to the Knowledge of the Amphipoda 60). - Cons. Acad. Sc. Rei Publ. SFJ, Acad. Sc. et Artium Slovenica, Ljubljana, 3 (3): 1-44.

Karaman, G. (1980). Revision of Niphargus jovanovici- group (Fam. Gammaridae) (Contribution to the Knowledge of the Amphipoda 110). - Poljoprivreda i šumarstvo, Titograd, 26 (2): 3-22, figs. I-V.

Karaman, G. (1982). Contribution to the Knowledge of the Amphipoda 125. First discovery of Genus Niphargopsis Chevr. 1922 in Yugoslavia with revision of the Genus (Fam. Gammaridae). - Poljoprivreda i šumarstvo, Titograd, 28 (2): 87-103, figs. I-VII.

Karaman, G. (1992). Two subterranean taxa of the family Niphargidae, Niphargus kragujevensis S. Kar. 1950 and N. k. remus, new subspecies (Contribution to the Knowledge of the Amphipoda 209)- Poljoprivreda i šumarstvo, Podgorica, 38 (3-4): 13-29, 9 figs.

Karaman, G. (1994). Fauna Amphipoda (Crustacea Malacostraca) površinskih i podzemnih voda područja Bor i problemi njihove zaštite [Amphipoda Fauna (Crustacea Malacostraca) of epigean and subterranean waters from Bor region and the problems of its protection].- Naša Ekološka Istina, Borsko jezero, Bor, II (30): 231-232 (rezime).

Karaman, G. (1995a). Diverzitet Amphipoda (Crustacea) Jugoslavije sa pregledom vrsta od medjunarodnog značaja.- In: Biodiverzitet Jugoslavije sa pregledom vrsta od međunarodnog značaja (Stevanović, V. & Vasić, V., eds.), Ecolibri & Biološki Fakultet, Beograd, pp. 318-328.

Karaman, G. (1997). The subterranean fauna of Amphipoda (Crustacea Malacostraca) of Bor region and eastern Serbia (Contribution to the Knowledge of the Amphipoda 230A). - Zbornik Radova Naša Ekološka Istina, Donji Milanovac, pp. 348-353.

Karaman, G. (1998a). Niphargus pecarensis S. & G. Karaman 1959 and its new subspecies N. p. occultus on Balkan (Contribution to the Knowledge of the Amphipoda 208). - Glasnik Prirodnjačkog Muzeja u Beogradu, B 48: 115-132, 8 figs. (1993/94).

Karaman, G. (1998b). New data on Amphipoda Fauna (Crustacea Malacostraca) from Bor region and adjacent regions (Serbia) (Contribution to tke Knowledge of the Amphipoda 232). [Novi podaci o fauni Amphipoda Borskog regiona i susjednih oblasti (Srbija)]. Zbornik radova Ekološka istina, VI Naučno-stručni skup o prirodnim vrednostima i zaštiti životne sredine, Negotin, 27-30 maj, 1998, 6: 235-237.

Karaman, G. (1998c). First discovery of the Family Niphargidae (Gammaridea) in Iran (Contribution to the Knowledge of the Amphipoda 234).- Glasnik Odjeljenja prirodnih nauka, Crnogorska akademija nauka i umjetnosti, Podgorica, 12: 9-22, 4 figs.

Karaman, G. (1999). The Endemic Amphipoda Species (Crustacea) From Serbia And Adjacent Regions (Contribution to the Knowledge of the Amphipoda 236). - Zbornik Radova Ekološka Istina, Zaječar, VII Naučni skup o privrednim vrednostima i zaštiti životne sredine, Zaječar 9-12. juna 1999, pp. 166-169.

Karaman, G. (2011). Check List of the Amphipoda (Crustacea, Malacostraca) from Serbia (Contribution to the Knowledge of the Amphipoda 255A).- Glasnik Republićkog zavoda za zaštitu prirode, Podgorica, 31/32: 143-161.

Karaman, G. (2012). Further investigations of the subterranean genus Niphargus Schiödte, 1849 (fam. Niphargidae) in Serbia. (Contribution to the Knowledge of the Amphipoda 264). Agriculture and Forestry, Podgorica, 58 (2): 45-64, 7 figs.

Karaman, G. (2013). On two members of the genus Niphargus Schiődte, 1849 (Crustacea: Niphargidae) from Balkan Peninsula, N. deelemanae grex, ssp. n. and N. jurinaci S. Kar. 1950 (Contribution to the Knowledge of the Amphipoda 271).-Acta Entomologica Serbica, Beograd 18 (1/2): 207-235, 12 figs.

Karaman, G. (2022). First discovery of Niphargus decui G. Karaman & Sarbu 1995 (Crustacea, fam. Niphargidae) in Bulgaria, with remarks to its variability (Contribution to the Knowledge of the Amphipoda 328). -Agriculture and Forestry, Podgorica, 68 (4):107-121, figs. 1-6.

Karaman, G. (2023). On two groundwater species of family Niphargidae from Balkan Peninsula (Contribution to the Knowledge of the Amphipoda 330).- The Balkans Scientific Center of the Russian Academy of Natural Sciences, 5. Modern Trends in Agricultural Production, Rural Development, Agro-economy, Cooperatives and Environmental Protection, Vrnjačka Banja, Serbia, 29-30. June, 2023, 5: 9-26, 7 figs.

Karaman, G. (2024a). Further study of poorly known Crustacea Amphipoda from Turkey: Niphargus anatolicus S. Karaman, 1950 (Contribution to the Knowledge of the Amphipoda 333) - Glasnik Odjeljenja piirodnih nauka, Crnogorska akademija nauka i umjetnosti, Podgorica, 27: 1-21, 6 figs.

Karaman, G. (2024b). Members of Niphargus kragujevensis S. Karaman, 1950 Complex (Fam. Niphargidae) in Bulgaria (Contribution to the Knowledge of the Amphipoda 337).- Proceedings of the 6th International Scientific Conference Modern Trends in Agricultural Production, Rural Development and Environmental Protection, Vrnjačka Banja, Serbia, June 27–28, 2024, pp. 9-28, 8 figs.

Karaman, S. & Karaman, G. (1959). Beitrag zur Kenntnis der Niphargiden Bulgariens.- Acta, Musei Macedonici Scientiarum Naturalium, Skopje, 6 (7/59): 143-162, 29 figs.

Karaman, S. (1931). 4. Beitrag zur Kenntnis der Süsswasser-Amphipoden.- Glasnik Skopskog Naučnog Društva, Odelenje Prirodnih Nauka, Skoplje, 9 (3): 93-107, figs. 1-6.

Karaman, S. (1934). VI. Beitrag zur Kenntnis jugoslawischer Süsswasseramphipoden.- Zoologischer Anzeiger, Leipzig, 107 (11/12): 325-333, figs. 1-4.

Karaman, S. (1943). Die unterirdischen Amphipoden Südserbiens.- Srpska Kraljevska Akademija, Posebna izdanja, knj. 135, Prirodnjački i matematički spisi, knj. 34, Ohridski Zbornik, 4, 159-312, Beograd, 4: 1-312, figs. 1-215.

Karaman, S. (1950a). O jednom nifargusu iz naših močvara (=Über einen Niphargus aus unseren Sümpfen). -Srpska Akademija Nauka, Posebna Izdanja knj. 158, Odelenje Prirodno-matematičkih nauka, Beograd, 2: 11-20, 26-32, figs. 1-12.

Karaman, S. (1950b). Amfipoda Male Azije I. (Die Amphipoden Kleinasiens. 1.) .- Srpska Akademija Nauka, Posebna Izdanja, knj. 158, Odelenje Prirodno-matematičkih nauka, Beograd, 2: 33-46, figs. 1-18.

Karaman, S. (1950c). Niphargus ilidzensis Schäfema i njegovi srodnici u Jugoslaviji (Supraniphargus ilidzensis Schäferna und seine Nächstverwandten in Jugoslavien).- Srpska Akademija Nauka, Posebna Izdanja, knj. 158, Odelenje Prirodno-matematičkih nauka, Beograd, 2: 51-85, figs. 1-40.

Karaman, S. (1960). Weitere Beitrage zur Kenntnis der Jugoslavischen Niphargiden.- Glasnik Prirodnjačkog muzeja Beograd, Ser. B, 15: 75-90, figs. 1-19.

Kenderov, Lj. & Andreev, S. (2015). Niphargus cvetkovi sp. n., a new species of the genus Niphargus Schiödte, 1847 (Amphipoda, Niphargidae) from Bulgaria.- Acta Zoologica Bulgarica, 67 (2): 179-185, 5 figs.

Koch, C.L. (1835). (In Panzer, 1836) Deutschlands Crustaceen, Myriapoden und Arachniden, Ein Beitrag zur deutschen Fauna.- G.A.W. Herrich-Schäfer, Regensburg 1835-40, 5 (1): 1-24.

Lowry, J.K. & Myers, A.A. (2013). A Phylogeny and Classification of the Senticaudata subord. nov. (Crustacea: Amphipoda). Zootaxa, 3610 (1), 1–80.

Motas, C., Botosaneanu, L. & Negrea, St. (1962). Cercetari asupra biologiei izvoarelor si apelor freatice din partea centrala a cimpiei Romine.- Acad. Rep. Pop. Romine: 1-366.

Pandourski, I. (1992). Acanthocyclops (Acanthocyclops) iskrecensis sp. n. (Copepoda, Cyclopoida) des eaux souterraines de la Stara Planina d'ouest (Bulgarie).– Boll. Mus. reg. Sci. nat. Torino, 10 (2): 401–405 (not seen).

Pandourski, I. (1993). Cyclopides (Crustacea, Copepoda) des eaux souterraines de la Bulgarie. Acanthocyclops (A.) radevi sp. n. et Diacyclops pelagonicus saetosus ssp. n. Mém. de Biospéol., Moulis, 20: 165–168. (not seen).

Pesce, G.L. & Maggi, D. (1983). Ricerche faunistiche in acque sotterranee freatiche della Grecia Meridionale ed insulare e stato attuale delle conoscenze sulla stygofauna di Grecia. - Natura, Milano, 74 (1-2): 15-73.

Petrescu, I. (1996). Contributions to the Knowledge of amphipods (Crustacea: Amphipoda) from Romania. III. Amphipods from south-western Dobrogea. - Travaux du Muséum National d'Histoire Naturelle 'Grigore Antipa", 36: 185-216.

Schäferna, K. (1922). Amphipoda balcanica, with notes about other freshwater Amphipoda. - Vestnik Královské. české Spolecnosti nauk, trida matematičko-prirodovedecká, Praha, 1921-1922, 2: 1-111, 31 figs., 2 pls.

Schellenberg, A. (1934). Amphipoden aus Quellen, Seen und Höhlen. - Zoologischer Anzeiger, 106 (9): 200-209.

Schellenberg, A. (1935). Schlüssel der Amphipodengattung Niphargus mit Fundortangaben und mehreren neuen Formen. - Zoologischer Anzeiger, 111 (7-8): 204-211.

Sket, B. (1958). Prispevek k poznavanju nasih amfipodov. - Biološki Vestnik, Ljubljana, 6: 66-75, figs. 1-13.

Sket, B. (1972). Die Niphargus jovanovici Gruppe (Amphipoda, Gammaridae) in Jugoslawien und NO-Italien. Taxonomisch, Zoogeographisch und Phylogenetisch Betrachtet.- Razprave, Slovenska Akademija Znanosti in Umetnosti, Ljubljana, Razred Prirod. i medic. vede, 15 (5): 1-45 [99-141].

Sket, B. (1981). Distribution, ecological character and phylogenetic importance of Niphargus valachicus (Amphipoda, Gammaridae s. l.).- Biološki Vestnik, Ljubljana, 29 (1): 87-103.

Vidinova, Y., Tyufekchieva, V., Varadinova, E., Stoichev, S., Kenderov, L., Dedov, I. & Uzunov, Y. (2016). Taxonomic list of benthic macroinvertebrate communities of inland standing water bodies in Bulgaria.- Acta Zoologica Bulgarica 68 (2): 147-158.