On two new or interesting Amphipoda from Italy and Montenegro (Contribution to the knowledge of the Amphipoda 290)

GORDAN S. KARAMAN

Montenegrin Academy of Sciences and Arts, Podgorica, Montenegro, E-mail: karaman@t-com.me

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Abstract
One new species of the family Niphargidae (Amphipoda Gammaridea), Niphargus frontalis, sp. n. is described from the subterranean waters of Frontale, Coldigioco, Italy, and its relations to other similar Niphargus species from Italy is discussed.

The species Typhlogammarus mrazeki Schäf. 1906 (fam. Typhlogammaridae) is mentioned from new locality in Montenegro and the variability of this species is presented.

Key words: taxonomy, Amphipoda, Niphargus frontalis, new, Italy, Montenegro, Typhlogammarus mrazeki.

Introduction
The subterranean fauna of Amphipoda in Italy has been studied intensively during last hundred years and numerous new and known taxa of the family Niphargidae (over 60) have been discovered and described by various scientists (Garbini, Ruffo, D’Ancona, Vigna-Taglianti, Stoch, S. Karaman, G. Karaman, etc) (G. Karaman, 1993). The great contribution to these studies was given by numerous speleological societies and speleologists who collected the samples of subterranean amphipods in the caves and abysses, and sent it to the scientists for study.

Recently I obtained the samples of genus Niphargus Schiodte, 1849 from the waterhouse in Frontale near Coldigioco in Central Italy. The results of this study are presented in this work.

Typhlogammarus mrazeki Schäf. 1906 (fam. Typhlogammaridae) known from various subterranean waters of western Balkan is mentioned from one new locality of Montenegro.

Material and Methods
The samples of specimens were preserved in 70% ethanol. The specimens were examined and dissected in the mixture of glycerin and water, using a Wild M 20 stereomicroscope. The body length of examined specimens was measured by tracing individual’s mid-trunk lengths (tip of the rostrum to end of the telson) and drawings were made using a camera lucida attachment and manually inked. Later, the dissected specimens were transferred onto slides with Faure liquid for final preservation. The advantage of Faure liquid is that it is possible later to dissolve the liquid on slides again, using normal water, and remove the dissected pieces on new slides for further studies.
Some morphological terminology and setae formulae follow G. Karaman’s terminology (Karaman, G., 1969; 2012) regarding the last mandibular palpus article [A = setae on outer face; B = setae on inner face; C = additional setae on outer face; D = lateral marginal setae; E = distal long setae] and propodus of gnathopods 1 and 2 [S = corner spine; L = lateral slender serrate spines; M = facial setae; R = subcorner spine on inner face]. Terms “setae” and “spines” are used based on its shape, not origin.

Our studies are based on the morphological, ecological and zoogeographical investigations only. The further studies on the genetic and molecular level will show the same or different value of these taxa.

Taxonomical part

Family Niphargidae

*Niphargus frontalis*, sp. n.

Figures 1-8


**Diagnosis**: Large species, body strong, epimeral plates distinctly angular; urosomal segments 1-2 on dorsolateral side with spines in both sexes; Maxilla 1 outer plate with spines bearing one lateral tooth each (except inner spine); coxae short. Dactylus of gnathopods 1-2 with numerous setae along outer margin; L spines on palm of gnathopod 2 are sitting partially behind S-spine. Dactylus of pereopods 3-7 short, with strong spine at inner margin. Pleopods with 2 retinacula. Outer ramus of uropods 1 and 2 slightly shorter than inner ramus in both sexes. Uropod 3 outer ramus elongated, with spinose first article and with short setose distal article in both sexes. Telson moderately long, incised nearly 2/3 of telson length bearing distal, marginal and facial strong spines.

**Description.** MALE 17.0 mm (holotype): Body rather strong, metasomal segments 1-3 with 3-5 dorsoposterior marginal short setae each (fig. 5E).

Urosomal segment 1 on each dorsolateral side with 1 strong spine; urosomal segment 2 with 3 strong spines on each dorsolateral side, urosomal segment 3 naked (fig. 1F). Urosomal segment 1 on each ventroposterior corner with one spine near basis of uropod 1 peduncle (fig. 1F).

Epimeral plates 1-3 nearly quadrate, with distinct ventroposterior corner (fig. 5E). Posterior margin of epimeral plates 2 and 3 slightly sinusoid, bearing several short setae; plates 2-3 with 2 subventral spines each (fig. 5E).

Head with short rostrum and short subrounded lateral cephalic lobes (fig. 1C), eyes absent.

Antenna 1 slightly exceeding half of body (ratio: 91:170), peduncular articles 1-3 progressively shorter (ratio: 54:46:24), scarcely setose, setae are much shorter than diameter of articles themselves (fig. 1A); peduncular article 3 reaching nearly half of peduncular article 2; main flagellum consisting of 31 articles (most of them with one short aesthetasc). Accessory flagellum 2-articulated, short, not exceeding half of peduncular article 3 (fig. 1B).

Antenna 2: peduncular article 4 only hardly longer than article 5 (ratio: 75:72), both articles along ventral margin with several bunches of setae as long as or longer than the diameter of the articles themselves (fig. 1C); flagellum slender, slightly exceeding the length of last peduncular article (ratio: 93:72) and consisting of 12 articles (fig. 1C); antennal gland cone short (fig. 1C).

**Mouthparts.** Labrum short, broader than long, convex distally. Labium with small inner lobes, outer lobes entire, convex (fig. 5D).

Left mandible: incisor with 5 teeth, lacinia mobilis with 4 teeth, accompanied by 5-6 rakers. Right mandible: incisor with 4 teeth, lacinia mobilis with several teeth, accompanied by 5-6 rakers (fig. 3C). Mandibular palpus of both mandibles equal, 3-articulated: first article smooth; second article with 18 setae; third article falciform, slightly longer than second article (ratio: 62:57), with nearly 32 marginal D-setae and
Figure 1. Niphargus frontalis, sp. n., male 17.0 mm, Frontale, waterhouse, Italy: A= antenna 1; B= accessory flagellum; C= head and antenna 2; D= maxilla 1; E= maxilla 2.
Figure 2. Niphargus frontalis, sp. n., male 17.0 mm, Frontale, waterhouse, Italy: A= maxilliped; B= gnathopod 1, outer face; C= distal corner of gnathopod 1 propodus, inner face [S= corner spine; L= lateral spines; M= facial M-spines; R= subcorner spine]; D= gnathopod 2, outer face; E= distal corner of gnathopod 2 propodus, inner face [S= corner spine; L= lateral spines; R= subcorner spine]
Figure 3. *Niphargus frontalis*, sp. n., male 17.0 mm, Frontale, waterhouse, Italy: A= mandibular palpus, outer face [A=A-setae]; B= last palpus article of mandible, inner face [B=B-setae]; C= incisor, lacinia mobilis and rakers of right mandible; D-E= pereopod 3; F-G= pereopod 4; H= telson.
7. The distal E-setae on the outer face are attached to a group of 9 A-setae (fig. 3A), and the inner face shows three groups of B-setae (4-4-3) (fig. 3B).

Maxilla 1: Inner plate short, with 3 distal setae (fig. 1D); outer plate with 7 spines [6 spines with one lateral tooth each, one spine with 2-3 lateral teeth]; palpus short, not reaching the tip of the outer plate-spines, 2-articulated, bearing 9 setae (fig. 1D).

Maxilla 2: Both plates slightly unequal, with marginal setae only (fig. 1E).

Maxilliped: Inner plate with 4 distal slender spines accompanied by single setae (fig. 2A); outer plate not reaching half of the palpus article 2, along disto-mesial margin with row of smooth spines; palpus article 3 along outer margin with one medial and one distal group of setae; palpus article 4 with one medial seta along outer margin and 2 setae near basis of the nail; nail shorter than pedal (fig. 2A).

Coxae 1-4 relatively short. Coxae 1 slightly broader than long (ratio: 55:45), with subrounded ventroanterior corner and bearing nearly 13 marginal short setae (fig. 2B). Coxae 2 is longer than broad (ratio: 68:60), with poorly concave posterior margin and provided with row of 7-8 marginal setae (fig. 2D). Coxae 3 and 4 only slightly longer than broad (ratio: 66:58), bearing row of several short marginal setae (fig. 3D). Coxae 4 longer than broad (ratio: 65:60), ventroposterior lobe is not developed, along margin with row of nearly 10 short setae (fig. 3F).

Coxa 5-7 progressively smaller towards coxa 7. Coxa 5 broader than long (ratio: 50:40), anterior lobe subrounded, scarcely setose (fig. 4A).

Coxa 6 broader than long (ratio: 49:30), with subrounded anterior lobe (fig. 4C).

Coxa 7 entire, broader than long (ratio: 41:23), with one seta at posterior margin (fig. 4F).

Gnathopods 1-2 relatively large, with propodus larger than corresponding coxa (fig. 2B, D). Gnathopod 1: article 2 along anterior and posterior margin with row of long setae; article 3 at disto-posterior corner with one bunch of setae (fig. 2B); article 5 is shorter than propodus (ratio: 43:63), along anterior margin with distal bunch of setae (fig. 2B). Propodus trapezoid, harder longer than broad (ratio: 63:60), along posterior margin with 10 transverse groups of setae along posterior margin. Palm inclined nearly to the half of propodus-length, defined on outer face by one strong S-spine accompanied laterally by 3 slender toothed L-spines and 4 facial M-setae (fig. 2C), on inner face by one short subcorner R-spine (fig. 2C); dactylus reaching posterior margin of propodus, with row of 3 groups of setae along outer margin (fig. 2B), along inner margin with several setae.

Gnathopod 2: article 2 along anterior and posterior margin with numerous long setae; article 3 at posterior margin with one distal bunch of setae (fig. 2D); article 5 is shorter than propodus (ratio: 53:80), along anterior margin with distal bunch of setae (fig. 2D). Propodus slightly trapezoid, harder longer than broad or as long as broad, along posterior margin with 11 transverse rows of setae (fig. 2D); palm inclined almost 2/3 of propodus-length, defined on outer face by one corner S-spine; 3 L-spines are sitting partially behind S-spine (fig. 2E); on corner face appear 3 M-setae; on inner face is attached one subcorner R-spine (fig. 2E). Dactylus reaching posterior margin of propodus, along outer margin with row of single or bunches of setae (1-1-1-2-2-2), along inner margin with several setae.

Pereopod 3: article 2 along anteroproximal margin with 5-6 long setae, along anterodistal margin with row of short setae; along posterior margin of article 2 are attached several proximal long setae and distal short setae (fig. 3D). Articles 4-6 of unequal length (ratio: 75:43:54), articles 4 and 5 along both margins with setae; article 6 along posterior margin with 4 bunches of short spines and/or setae. Dactylus strong, much shorter than article 6 (ratio: 20:54), along inner margin with one spine, along outer margin with one medial plumose seta (fig. 3E); nail slightly shorter than pedal (ratio: 20:22).

Pereopod 4: articles 2-4 like these in pereopod 3. Articles 4-6 of unequal length (ratio: 63:42:53); article 4 along both margins with several setae (fig. 3F); article 5 at posterior margin with 3 single spines mixed with 1-2 short setae, along anterior margin with single shot setae; article 6 at posterior margin with groups of spines and short setae. Dactylus much shorter than article 6 (ratio: 16:53), at inner margin with one spine near basis of the nail, at outer margin with one medial plumose seta; nail is shorter than pedal (ratio: 18:28) (fig. 3G).

Pereopods 5-7 long and slender like these in male, progressively longer towards pereopod 7 (fig. 4A-G). Pereopod 5: article 2 much longer than broad (ratio: 77:42), along anterior slightly convex margin is attached row of short spine-like setae, along posterior concave margin appear nearly 18 short setae, ventroposterior lobe absent (fig. 4A). Articles 4-6 of unequal length (ratio: 47:56:54); article 4 at posterior margin with 2 groups of 1-2 spines, along anterior margin with 3 bunches of short setae; article 5 along posterior margin with 3 groups of short spines and/or setae, along anterior margin 4 groups of short spines.
Figure 4. *Niphargus frontalis*, sp. n., male 17.0 mm, Frontale, waterhouse, Italy: A-B= pereopod 5; C, D, E= pereopod 6; F, G, H= pereopod 7; I= uropod 3.
Figure 5. *Niphargus frontalis*, sp. n., male 17.0 mm, Frontale, waterhouse, Italy: A= peduncle of pleopods 1; B= peduncle of pleopods 2; C= peduncle of pleopods 3; D= labium; E= epimeral plates 1-3. **FEMALE** 16.3 mm: F= gnathopod 1 propodus, outer face; G= distal corner of gnathopod 1 propodus, inner face [S= corner spine; L= lateral spines; M= facial M-setae; R= subcorner spine]; H= gnathopod 2 propodus, outer face; I= distal corner of gnathopod 2 propodus, inner face [S= corner spine; L= lateral spines; R= subcorner spine].
and/or setae; article 6 is shorter than article 2 (ratio: 77:54), along both margins with bunches of short spines and single short setae. Dactylus strong, much shorter than article 6 (ratio: 14:54), along inner margin with one spine near basis of the nail, along outer margin with one medial plumose seta (fig. 4B), nail is shorter than pedestal (ratio: 21:32).

Pereopod 6: article 2 much longer than broad (ratio: 90:45), along anterior almost straight margin appear nearly 8 spine-like setae, along posterior concave margin appear nearly 17 short setae (fig. 4C), ventroposterior lobe absent. Articles 4-6 of unequal length (ratio: 55:76:85), articles 4 and 4 along both margins with single or paired short spines and/or short setae (fig. 4D); article 6 is only slightly shorter than article 2 (ratio: 85:90), along both margins with bunches of short spines and single short setae; dactylus strong, much shorter than article 6 (ratio: 20:85), at inner margin with one strong spine near basis of the nail, along outer margin with one medial plumose seta (fig. 4E); nail shorter than pedestal (ratio: 24:42).

Pereopod 7: article 2 narrow, much longer than broad (ratio: 90:41), along anterior straight margin appear a row of nearly 8 spine-like setae, along posterior slightly concave margin appear a row of nearly 15 short setae, ventroposterior lobe not developed (fig. 4F). Articles 4-6 of unequal length (ratio: 50:72:92); article 2 along posterior margin with 3 single short spines accompanied by 0-1 short seta; articles 5 and 6 along both margins with bunches of short spines; article 2 is almost as long as article 6 (fig. 4G). Dactylus is much shorter than propodus, at inner margin with 1 spine near basis of the nail, along outer margin with one medial plumose seta (fig. 4H); nail is shorter than pedestal (ratio: 23:50).

Pleopods 1-3 with 2 retinacula each. Peduncle of pleopod 1 with one distal seta along anterior margin (fig. 5A); peduncle of pleopod 2 naked (fig. 5B); peduncle of pleopod 3 along posterior margin with 3 strong setae (fig. 5C).

Uropod 1: peduncle with dorsoexternal row of spines and dorsointernal row of setae (except distal spine); inner ramus only slightly longer than outer one, at outer margin with 3 bunches of short spines accompanied by single simple setae, tip of the ramus bearing 4 short spines (fig. 1F), along inner margin appear 3 single short spines. Outer ramus bearing 3 lateral groups of short spines accompanied with single setae longer than spines; tip of ramus with 4-5 short spines (fig. 1F).

Uropod 2: peduncle with lateral and distal spines; inner ramus only slightly longer than outer one, with 2 bunches of lateral spines and distal bunch of spines (fig. 1F); outer ramus bearing one lateral bunch of spines and 1 simple seta and spine, at tip appear 3-4 spines.

Uropod 3 rather long, peduncle longer than broad (ratio: 45:20), inner ramus scale-like, much shorter than peduncle, and provided with one distal spine and plumose seta (fig. 4 I); outer ramus 2-articulated: first article strong, along outer margin with 5 bunches of short strong spines, along inner (mesial) margin with 6 bunches of strong spines mixed with single long plumose seta; second article of outer ramus much shorter than first one (ratio: 31:135), bearing lateral and distal short simple setae.

Telson nearly as long as broad, gaping, each lobe with 4 distal and one outer marginal spine (fig. 3H); a pair of facial spines is attached in the middle of each lobe; a pair of short plumose setae appears near the middle of outer margin of each lobe.

Coxal gills on pereopods are relatively short, not reaching distal tip of corresponding article 2 (figs. 2D; 3D, F; 4A).

FEMALE 16.3 mm (paratype, with oostegites bearing long setae). Mainly similar to males, metasomal segments 1-3 with 4-6 dorsoposterior marginal setae each (fig. 7G). Urosomal segment 1 on each dorsolateral side with one spine; urosomal segment 2 on each dorsolateral side with 3 spines and 1 seta; urosomal segment 3 naked. Urosomal segment 1 on each ventroposterior corner near basis of uropod 1 peduncle with 1 spine (fig. 6D).

Epimeral plates 1-2 distinctly angular, with poorly convex posterior margin bearing several short setae each; epimeral plate 3 strongly angular, with straight inclined posterior margin bearing several short setae (fig. 7G); epimeral plate 2 with 2 subventral spines, epimeral plate 3 with 3 subventral spines (fig. 7G).

Antenna 1 reaching nearly half of body-length, main flagellum consisting of 23 articles (most of them with one aesthetasc). Accessory flagellum 2-articulated.

Antenna 2 like that in male, main flagellum consisting of 11 articles.

Mouthparts mostly like these in males, both mandibles with 5-6 rakers only. Mandibular palp article 3 falciform, with nearly 26 D-setae and 9 E-setae; on outer face appear 1-2 bunches of A-setae (11 + 1-4 setae), on inner face are implanted 3-4 groups of B-setae (fig. 7A).
Figure 6. *Niphargus frontalis*, sp. n., female 16.3 mm, Frontale, waterhouse, Italy: A= proximal part of pereopod 5; B= proximal part of pereopod 6; C= proximal part of pereopod 7; D= uropod 1; E= uropod 2; F= uropod 3; G= telson.
Figure 7. *Niphargus frontalis*, sp. n., female 16.3 mm, Frontale, waterhouse, Italy: A= distal palpus article of mandible, outer face [A= A-setae]; B= distal part of maxilliped palpus; C= coxa 1; D= coxa 2; E= coxa 3; F= coxa 4; G= epimeral plates 1-3; H= peduncle of pleopod 1; I= peduncle of pleopod 2; J= peduncle of pleopod 3. FEMALE 13.0 mm: K= epimeral plates 1-3.
Maxilla 1: inner plate with 3 setae; outer plate with 7 spines [6 spines with 1 lateral tooth, one spine with 1-2 lateral teeth; palpus 2-articulated, not reaching tip of outer plate-spines, and bearing 8 long setae.
Maxilla 2: both plates with distolateral setae only.
Maxilliped: inner plate with 4-5 distal spines, outer plate with distomarginal row of smooth spines; palpus article 2 at outer margin with one medial group of setae; palpus article 3 along outer margin with 2 medial and one distal bunch of setae (fig. 7B); article 4 at inner margin with 2 setae near basis of the nail, along outer margin with one medial seta (fig. 7B).
Coxae 1-4 with row of marginal setae slightly longer than these in male. Coxa 1 hardly broader than long (ratio: 60:52), with subrounded ventroanterior corner and bearing nearly 12 longer marginal setae (fig. 7C).
Coxa 2 longer than broad (ratio: 76:65), along ventral margin with nearly 14 longer setae (fig. 7D).
Coxa 3 longer than broad (ratio: 84:70), along ventral margin with 13 longer setae (fig. 7E).
Coxa 4 hardly longer than broad (ratio: 77:74), with concave posterior margin and without ventroposterior lobe, along ventral margin with 9 marginal setae (fig. 7F).
Coxae 5-7 rather similar to these in male. Coxa 5 broader than long (ratio: 77:53), relatively broad (fig. 6A). Coxa 6 remarkably smaller than coxa 5, broader than long (ratio: 62:40) (fig. 6B); coxa 7 relatively small, broader than long (ratio: 54:25), with convex ventral margin (fig. 6C).
Gnathopods 1-2 relatively large like these in male. Gnathopod 1 is remarkably smaller than gnathopod 2, with articles 3-5 like these in male. Propodus trapezoid, as long as broad, with 10 transverse rows of setae along posterior margin (fig. 5F); palm slightly convex, inclined nearly 2/3 of propodus-length, defined on outer face by one corner S-spine accompanied laterally by 3 L-spines and 4 long facial M-setae (fig. 5G), on inner face by one subcorner R-spine (fig. 5G). Dactylus reaching posterior margin of propodus, along outer margin with 5 pairs of setae, along inner margin with row of short setae (fig. 5F).
Gnathopod 2 with articles 3-5 like these in male. Propodus trapezoid, nearly as long as broad, along posterior margin with 11 transverse rows of setae (fig. 5H). Palm straight, inclined nearly 2/3 of propodus-length, defined on outer face by one corner S-spine; accompanied with 3 L spines sitting close to S-spine (fig. 5I), 3 long facial setae are implanted laterally of S-spine (fig. 5I); on inner face, palm defined by one subcorner R-spine (fig. 5I). Dactylus reaching posterior margin of propodus, along outer margin with 6 groups of medial short setae (2-2-2-3-3-3), along inner margin with row of short setae (5H).
Pereopods 3-4 like these in males, with strong dactylus bearing one spine at inner margin near basis of the nail, and with one medial plumose seta at outer margin.
Pereopods 5-7 long and slender, similar to these in male. Basipodit of pereopod 5 is narrow, much longer than broad (ratio: 96:48), along anterior margin with nearly 7 bunches of longer spine-like setae (fig. 6A), along posterior slightly concave margin with nearly 16 short setae, ventroposterior dilatation not forming lobe.
Article 2 of pereopod 6 narrow, longer than broad (ratio: 109:52), along anterior almost straight margin appear nearly 10 bunches of spine-like setae (fig. 6B), along posterior slightly concave margin appear nearly 13 short setae; ventroposterior dilatation not forming the lobe (fig. 6B).
Article 2 of pereopod 7 narrow, much longer than broad (ratio: 105:50), along anterior straight margin are attached 8 bunches of spine-like setae, along posterior hardly concave margin appear nearly 12 setae, ventroposterior lobe is not developed (fig. 6C). Dactylus of pereopods 5-7 like that in male, with one strong spine at inner margin near basis of the nail.
Pleopods 1-3 with 2 retinacula each. Peduncle of pleopod 1 with 2 setae at distoanterior margin (fig. 7H); peduncle of pleopods 2 naked (fig. 7I); peduncle of pleopods 3 along posterior margin with row of 4-5 strong setae (fig. 7J).
Uropod 1: peduncle with dorsoexternal row of spines and dorsointernal row of 2 setae or one spine and 1 seta (except distal spine) (fig. 6D); inner ramus slightly longer than outer one, with 2 rows of several short lateral and 4 distal short spines; one bunch of simple setae is attached laterally under the top of the ramus; outer ramus is provided with 2 rows of short lateral spines and bunch of distal short spines; 2 bunches of simple setae are attached laterally (fig. 6D).
Uropod 2: peduncle with lateral and distal short spines; inner ramus is rather longer than outer ramus, both rami at both sides with lateral and distal short strong spines; in distal part of outer ramus appear 2 simple setae near the lateral spine (fig. 6E).
Uropod 3 rather long (fig. 6F), very similar to that in male; peduncle nearly twice as long as broad, bearing single medial seta and spine and distal bunch of spines; inner ramus scale-like, much shorter than
peduncle, bearing distal spine and plumose seta. Outer ramus strong, 2-articulated: first article along outer margin with 5 bunches of short strong spines (fig. 6F), along inner margin with 6 bunches of short spines accompanied by single plumose setae longer than spines; second article much shorter than first article (ratio: 24:140), bearing lateral and distal simple setae (fig. 6F).

Telson short, poorly broader than long (ratio: 74:70), with gaping lobes; each lobe with 4 distal strong spines and one spine along outer margin; one bunch of 2-3 strong facial spines are attached in the middle of each lobe (fig. 6G); a pair of short plumose setae is attached in the middle on outer margin of the lobes.

Coxal gills relatively short, not reaching tip of corresponding segment 2 of pereopods (6A, B). Oostegites broad, with long marginal setae.

**Variability**

The short second article of uropod 3 outer ramus in males, like these in females, was found on both large males in hands (17.0 mm and 17.3 mm) and we suppose that this character is stable character for this population.

Inner spine of maxilla 1 outer plate with 1-3 lateral teeth. Inner plate of maxilliped with 4-5 distal spines, palp with or without outer median marginal group of setae.

The stable characters are the position of L-spines on propodus of gnathopods 1-2; presence of groups of setae along outer margin of dactyl in gnathopods 1-2, narrow article 2 of pereopods 5-7 in males and females, presence of strong spines on dorsolateral side of urosomal segments 1 and 2 in males and females, uropods 1-2 in males and females with outer ramus slightly shorter than inner one; epimeral plates, telson and uropod 3 in females like these in male.

Female 13.4 mm with oostegites is provided with epimeral plates slightly more pointed, on epimeral plate 2 are implanted 4 subcorner spines, and on epimeral plate 3 appear 3 subventral spines (fig. 7 K).

Peduncle of uropod 1 in all specimens is with dorsointernal row of setae (except distal spine).

**Holotype:** Male 17.0 mm (holotype) and female 16.3 mm (paratype) are deposited in Karaman’s Collection in Podgorica, Montenegro.

**Locus typicus:** Frontale, waterhouse (Coldigioco, Apiro, Marche region, central Italy) (fig. 8).

**Distribution:** Known from type-locality only.

**Derivatio nominis:** The name of the species “frontalis” was nominated according to the name of the locality Frontale near village Coldigioco in Italy, where the species was collected, and derived from Latin “frontalis”, meaning "in front of" some place).

**Remarks and affinities**


But; the male of all these taxa have slender uropod 3 with elongated second article of outer ramus nearly as long s first article.

In *Niphargus frasassianus* G. Kar. et al., 2010 from Frasassi Cave Complex, the females are with poorly elongated second article of uropod 3, like that in *N. frontalis*, but the males are with long second article of uropod 3.
The position of *Niphargus dolenianensis* Lorenzi, 1898 [loc. typ.: wells in Dolegnano between Udine and Gorizia) remain uncertain because of very scarce description of this taxon [see G. Karaman, 1993: 263].

*Niphargus foreli apuanus* Ruffo, 1937 from Grotta Ventaiola Cave in Alpi Apuane is poorly described based on small specimens of 7 mm, and real comparison with our species was not made.

The short distal article of uropod 3, similar in males and females, appear in various *Niphargus* species, especially in all members of some subgenera or species Complex [*Orniphargus*, *Jovaniphargus*, *kochianus* Complex etc., although distal article of uropod 3 outer ramus in these groups is still shorter.

Evidently, affinities with the other species of the genus are rather unclear and cannot be established based on the morphological characters alone. The same problem is present in the delimitation of various Complexes of species or subgenera within genus *Niphargus*.

**Figure 8.** Waterhouse of Frontale, Apiro district, Italy, locus typicus of *Niphargus frontalis*, sp. n.

**Family Typhlogammaridae**

**Typhlogammarus mrazeki** Schäferna 1906

*Gammarus (Typhlogammarus) mrazeki* Schäferna, 1906: 1-24, fig. 1, Pl. I, figs. 1-35; *Typhlogammarus mrazeki* Spandl, 1926: 72, fig. 47; G. Karaman, 2015: 66, fig. 9 (map). (Other authors omitted).

Remarks

*Typhlogammaus mrazeki* is one very variable species what is evident from various descriptions and figures of this species (Spandl, 1927; S. Karaman, 1932; G. Karaman, 1972, etc.). Recently G. Karaman (2015) presented the map of distribution of this species. Now I received one sample of this species collected in the cave above Risan in Montenegro, what urged me again to put more attention on taxonomic characters within various samples of *T. mrazeki*; some of them are mentioned above.

The specimens from Risan agree with description of this species from type- and other known localities. These specimens from Risan [male 20.2 mm, females of 20.0 and 15.0 mm] are with relatively scarce pilosity of the body: epimeral plates 1-3 along posterior margin with normal row of single short setae, 2-4 single subventral spines appear at subventral face of epimeral plates 2 and 3; basipodit of pereopods 5-7 along posterior margin with row of single short setae, and facial row of spines and setae is very scarce; spines and setae on urosomal segments 1-3 is very reduced; articles 4-6 of pereopods 3-7 along both margins with single setae mixed with spines.

Just opposite situation appear in the specimen from Njegoševa pećina Cave in Njeguši (male, 22.5 mm): Body is very setaceous: epimeral plates 1-3 along posterior margin with densely row of short setae like the brush, and 2-4 bunches of subventral spines mixed with setae appear at subventral face of epimeral plates 2 and 3. Basipodit of pereopods 5-7 along posterior margin with dense row of numerous short setae like the brush, facial row of spines and setae on inner face of basipodites is very numerous; elevated number of setae mixed with single spines are present on urosomal segments 1-3; articles 4-6 of pereopods 3-7 along both margins with bunches of setae mixed with spines.

The various specimens from Lipska pećina Cave near Cetinje and Vjetrenica cave in Herzegovina have mixed combination of characters; densely setose pereopods 5-7, but epimeral plates 2 and 3 with ordinary row of single setae along posterior margin; various degree of pilosity of pereopods and epimeral plates, etc.

Besides these two basic ecological forms, “nudus” [with scarce pilosity of the body parts) and “pilosus” (with densely setose body-parts) exist the various populations with transitive characters between these two forms, sometimes within the same population. At the moment we don’t know the genetic background of these, probably ecological variations.

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