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FURTHER STUDIES ON GENUS *NIPHARGUS* SCHIÖDTE, 1849 (FAM. NIPHARGIDAE) FROM THE NEAR EAST (CONTRIBUTION TO THE KNOWLEDGE OF THE AMPHIPODA 260)

SUMMARY

During our further studies of the subterranean genus *Niphargus* Schiödte, 1849 (Fam. Niphargidae) from the Near East, three new taxa are described: *Niphargus tauri afioni*, ssp. n. from the subterranean waters near Afion town in Turkey, *N. nadarini favitor*, ssp. n. from the subterranean waters near Al Nabk in Syria and *N. nadarini iraquensis*, ssp. n. from the subterranean waters in Iraq (Haditha, Tigris drainage system and from Baghdad, Euphrates drainage system). Its taxonomical status and relationships regarding the nominative subspecies are discussed. The *N. nadarini* Species- Complex is analyzed and a key to the taxa of this complex is presented. This is the first discovery of the genus *Niphargus* Schiödte, 1849 in Syria.

Key words: Amphipoda, *Niphargus*, taxonomy, new taxa, Near East, Iraq, Syria.

INTRODUCTION

The fauna of the Amphipoda in the region of the Near East has only been studied intensively during last half century, based on the samples collected during numerous expeditions organized by various countries (Germany, Italy, France, etc.), as well as by the study of the scientists living in the countries of the Near East (Karaman, S., 1950; Karaman, S., 1959; Alouf, 1972; Alouf, 1973; Ruffo, 1974; Karaman, G. & Pinkster, 1977; Karaman, G., 1992; Akbulut & Sezgin, 2000; Bat et al., 2001; Fišer et al., 2009; Özbek & Özkan, 2010, Özbek & Özkan, 2011, etc.). Among these, the epigean species were markedly better studied than were the subterranean ones [Karaman, G., 1985; Karaman, G., 1998; Karaman, G., 2003; Karaman, G., 2012, etc.). Many of the known subterranean species are described based on a scarce number of specimens and are often based on the specimens from one locality only. In this way, every description or redescription of these species is welcomed for recognition of the value of single taxa and its variability.

During our investigations of the material in our hands, we described three new subspecies, *Niphargus tauri afioni* from Turkey, *N. nadarini favitor* from Syria and *N. nadarini iraquensis* from Iraq.

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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 body-parts were temporarily submersed in the mixture of glycerin and water for study and drawing. The body-length of examined specimens were measured by tracing individual's mid-trunk lengths (from tip of head to end of telson) using camera lucida. Later all appendages have been transferred to Liquid of Faure. The advantage of use of Liquid of Faure is that it is possible to remove again all dissected body-parts from Liquid of Faure by water and study it again from various positions under the microscope. After the end of the study, the same body-parts can be put in Liquid of Faure again and covered by thin cover glass making definitive microscope slides. All illustrations were inked manually.

TAXONOMICAL PART

Family Niphargidae

NIPHARGUS TAURI AFIONI, ssp. n.
Figs. 1-5

MATERIAL EXAMINED: TURKEY: subterranean waters, 4 km. from Afion (Province of Afion), P. 3, June 2, 1971, female, 11.5 mm (leg. Argano, Boitani & Cottarelli). Holotype (female, 11.5 mm) is provisorily preserved in the KARAMAN`s Collection in Podgorica, Crna Gora [S-7120].

DIAGNOSIS (partially, female only): Very similar to *Niphargus tauri tauri* Schell. 1933. Body slender, epimeral plates subrounded. Inner plate of maxilla 1 with 2 setae, palpus not exceeding tip of outer plate-spines. Coxae 1 and 4 broader than long, coxae 2-3 nearly as long as broad. Gnathopods 1-2 with propodus trapezoid, not larger than corresponding coxae, and dactylus not exceeding posterior margin of propodus, with one median seta along outer margin. Pereopods 3-7 with one spine along inner margin. Basipodit of pereopods 5-7 dilated, with poorly marked ventroposterior lobe. Pleopods 1-3 with 2 retinacula each, peduncles poorly setose. Urosomites 1-2 with single dorsolateral seta only. Uropod 1 with subequal narrow rami, uropod 2 with inner ramus slightly longer than outer one. Uropod 3 narrow, elongated, second article of outer ramus exceeding half of first article. Telson deeply incised, not tapering distally.

DESCRIPTION. FEMALE 11.5 mm with oostegites (holotype): Body slender, metasomal segments 1-3 with 4-6 dorsal posterior marginal setae each (fig. 1C); urosomite 1 with 1 dorsolateral seta on each side (fig. 2A); urosomite 2 on each dorsolateral side with one seta only (fig. 2A); urosomite 3 naked.

Urosomite 1 with one ventroposterior spine- like seta near basis of uropod 1-peduncle.

Epimeral plates 1-3 with convex ventral and posterior margins bearing short posterior marginal setae, ventroposterior corner marked with strong corner spine-like seta (fig. 1C). Epimeral plate 2 with 3 subventral spines, epimeral plate 3 with 4 subventral spines (fig. 1C).

Head with short rostrum, subrounded lateral cephalic lobes and ventroanterior excavation (fig 1A), eyes absent. Antenna 1 reaching almost half of body [ratio: 5.0: 11.5]; peduncle articles 1-3 progressively shorter [ratio of articles: 57: 42: 23], poorly setose (fig. 1A); main flagellum consisting of 22 articles [most of them with 1 short aesthetasc each]. Accessory flagellum short, 2-articulated, exceeding half of last peduncle article (fig. 1A).

Antenna 2: peduncle article 3 short, with long single setae (fig. 1A); peduncle article 5 is slightly shorter than article 4 [ratio: 49: 43], both with several long setae remarkably longer than diameter of aticles themselves (fig. 1A); flagellum slender, consisting of 9 articles (fig. 1A); antennal gland cone short.

Mouthparts basic. Labrum entire. Labium with entire outer lobes and small, but well developed inner lobes (fig. 2B).

Mandible: molar triturative. Left mandible: incisor with 5 teeth, lacinia mobilis with 4 teeth (fig. 2C). Right mandible: incisor with 4 teeth, lacinia mobilis with row of unequal small teeth (fig. 2D). Mandible palpus 3-articulated: first article short, naked; article 2 with 7-8 strong setae (fig. 2E); palpus article 3 nearly as long as article 2, with 18-20 short marginal D-setae and 5 distal long E-setae (fig. 2E); along outer face appears one group of 5 A-setae (fig. 2F), on inner face appear 3 single B-setae (fig. 2E).

Maxilla 1: inner plate with 2 setae (fig. 1B); outer plate with 7 distal spines [one spine is with several lateral teeth, 6 spines are with one lateral tooth each]; palpus 2-articulated, slightly exceeding basis of spines of outer plate (fig. 1B), bearing 5 distal setae.

Maxilla 2: inner plate is more narrow than outer one, both with marginal setae only (fig. 2G).

Maxilliped: inner plate short, with 3 distal spines accompanied by several setae (fig. 2H); outer plate longer, but not reaching distal end of palp article 2, bearing a row of mesial marginal smooth spines; palpus article 3 with one bunch of long setae at outer margin (fig. 2H); palpus article 4 with one median seta along outer margin (fig. 2H), nail shorter than pedestal.

Coxae 1-4 relatively short, with several short marginal setae each. Coxa 1 distinctly broader than long (high), with rounded ventroanterior margin (fig. 3A). Coxae 2-3 nearly as long as broad (figs. 3D; 4A); coxa 4 broader than long, with concave posterior margin (fig. 4C).

Coxae 5-7 progressively shorter towards coxa 7, bearing a few marginal setae each. Coxae 5-6 bilobed, with anterior lobe longer (higher) than posterior one (fig. 5A, B). Anterior margin of coxa 5 nearly as long as coxa 4 (figs. 4C; 5A). Coxa 7 entire, with convex ventral margin (fig. 5D).

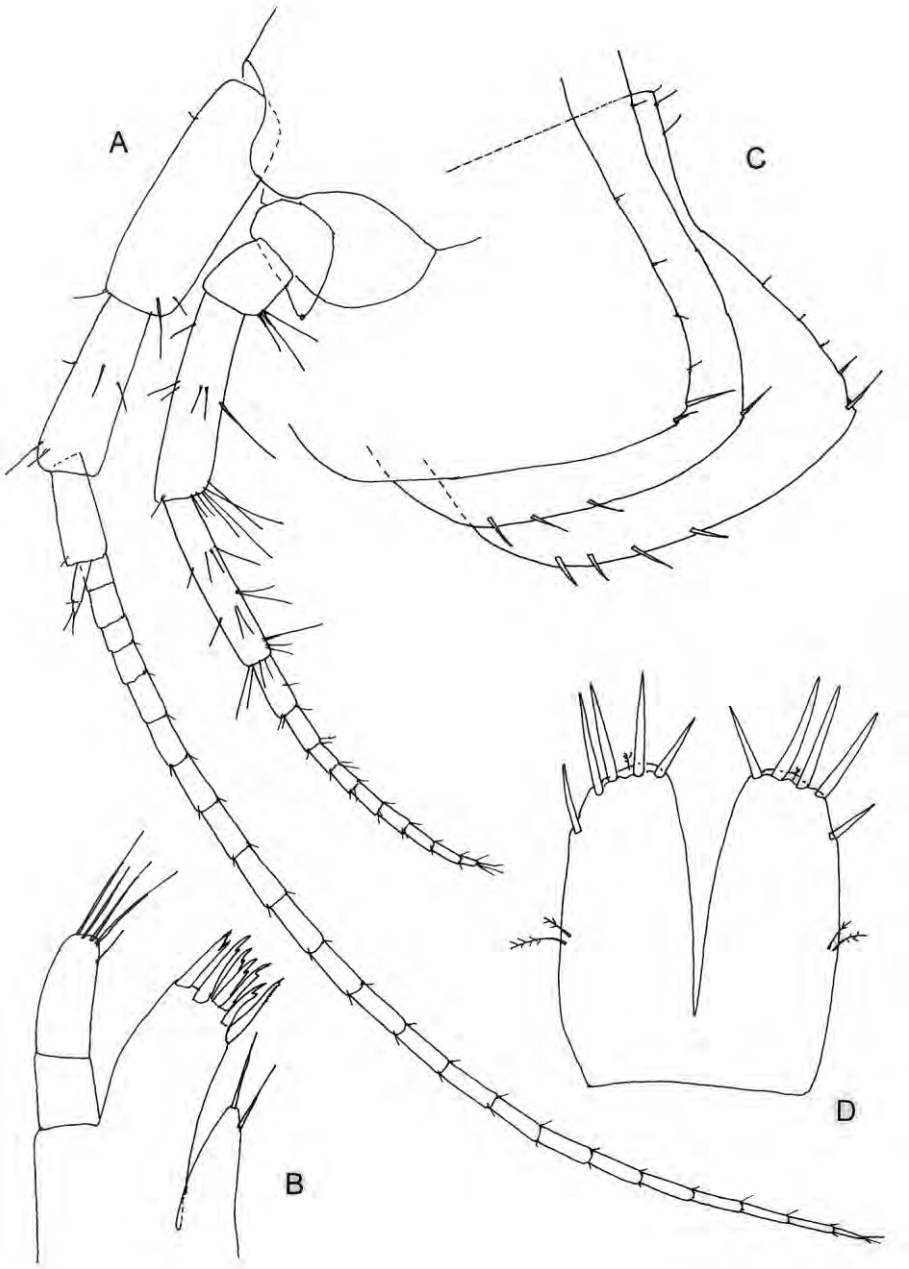

Fig. 1. *Niphargus tauri afioni*, ssp. n., female 11.5 mm (holotype), Afion, Turkey; A= head with antennae 1=2; B= maxilla 1; C= epimeral plates 1-3; D= telson.

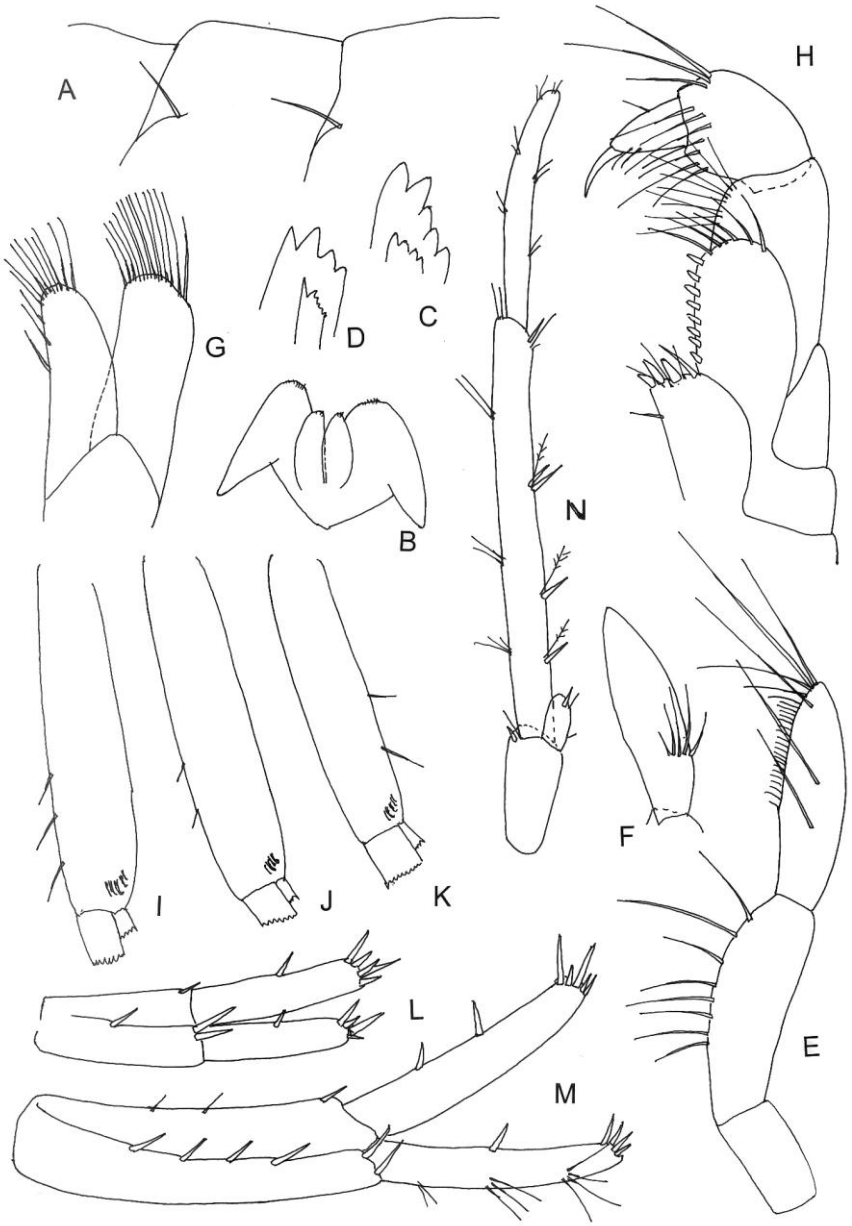

Fig. 2. *Niphargus tauri afioni*, ssp. n., female 11.5 mm (holotype), Afion, Turkey; A= urosome; B= labium; C= incisor and lacinia mobilis of left mandible; D= incisor and lacinia mobilis of right mandible; E= mandible palpus, inner face; F= tip of mandible palpus, outer face; G= maxilla 2; H= maxilliped; I-K= peduncle of pleopods 1-3; L= uropod 2; M= uropod 1; N= uropod 3.

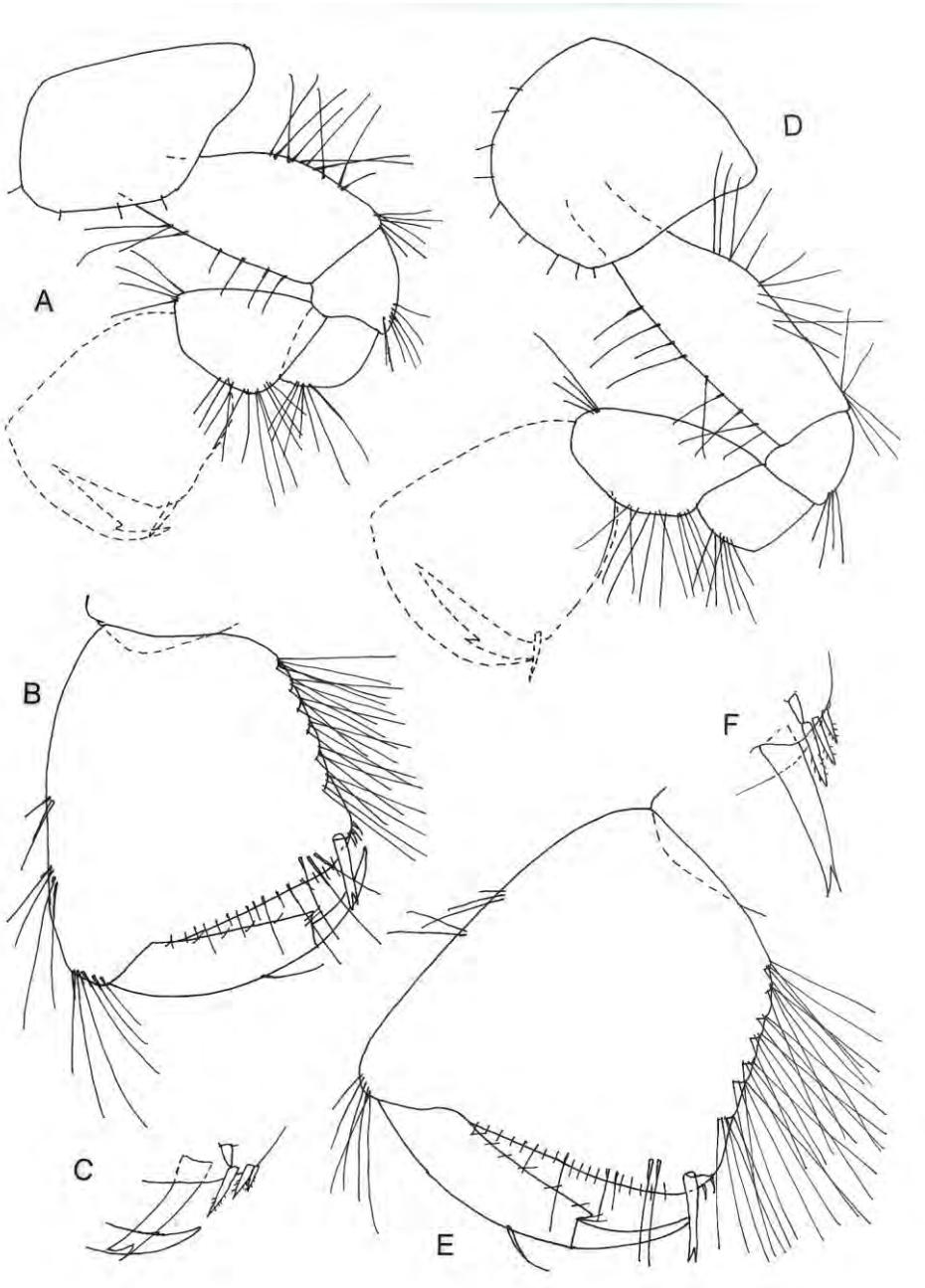

Fig. 3. *Niphargus tauri afioni*, ssp. n., female 11.5 mm (holotype), Afion, Turkey; A-B= gnathopod 1; C= inner tip of gnathopod 1 propodus; D-E= gnathopod 2; F= inner tip of gnathopod 2 propodus.

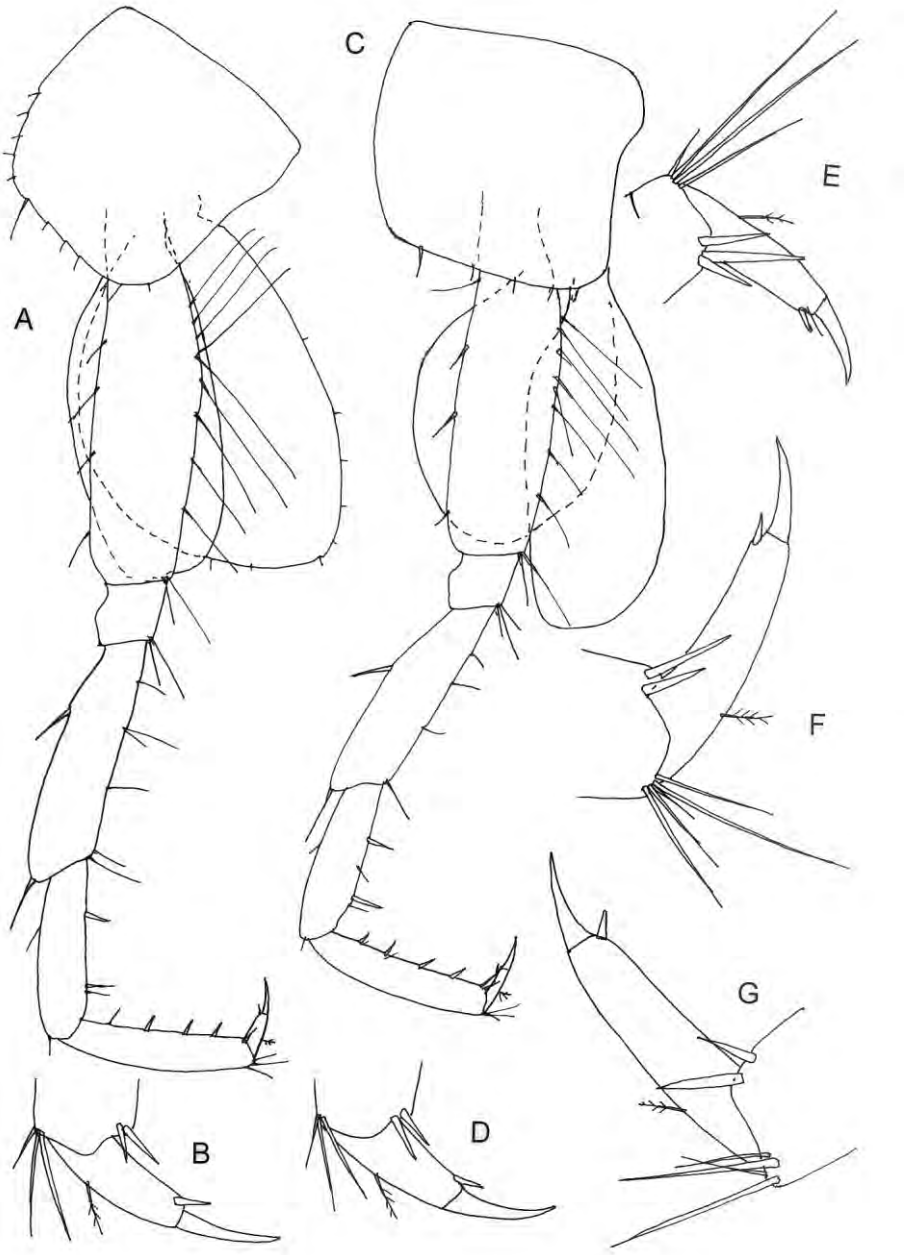

Fig. 4. *Niphargus tauri afioni*, ssp. n., female 11.5 mm (holotype), Afion, Turkey; A-B= pereopod 3; C-D= pereopod 4; E= dactylus of pereopod 5; F= dactylus of pereopod 6; G= dactylus of pereopod 7.

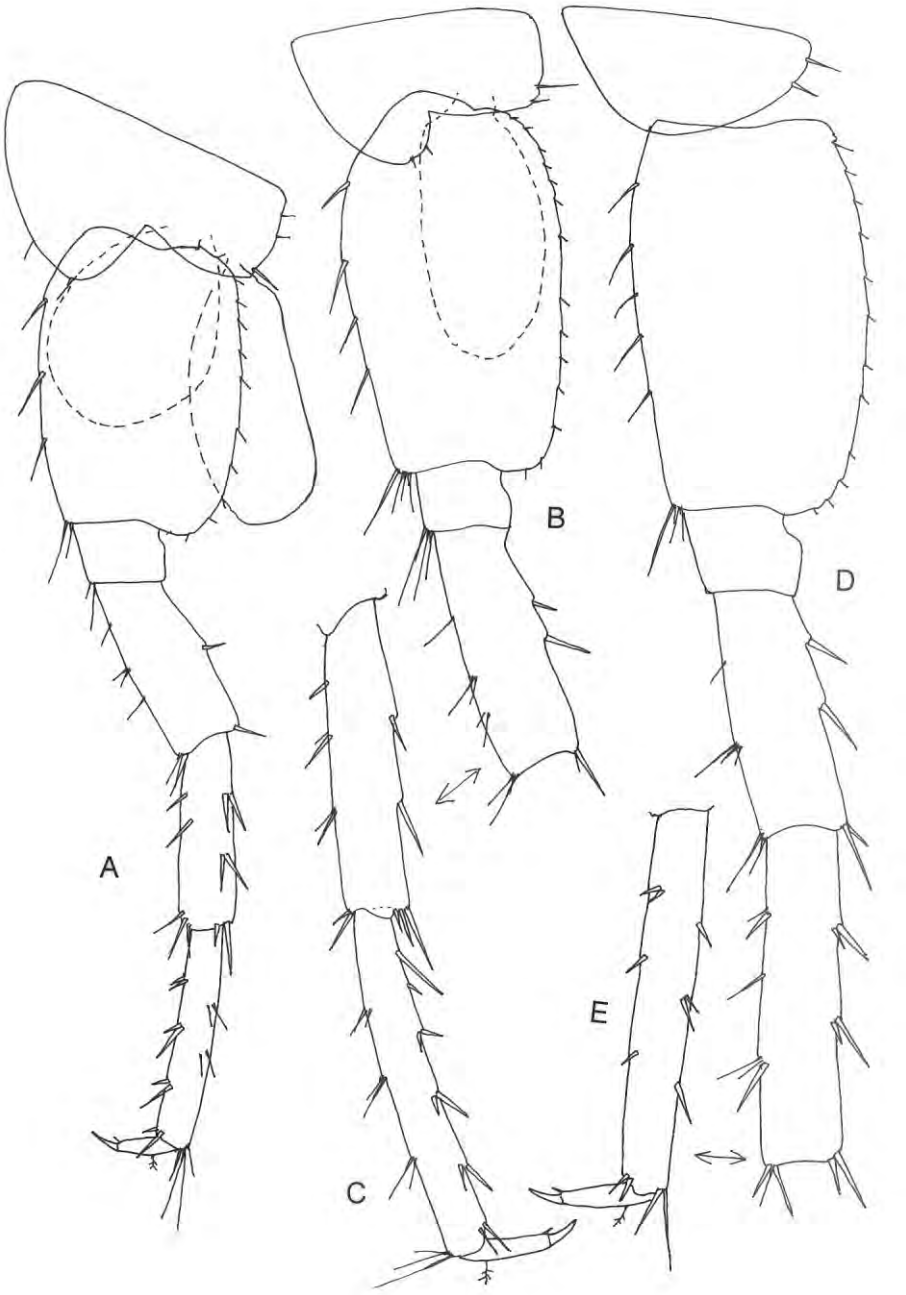

Fig. 5. *Niphargus tauri afioni*, ssp. n., female 11.5 mm (holotype), Afion, Turkey; A= pereopod 5; B-C= pereopod 6; D-E= pereopod 7.

Gnathopods 1-2 relatively small, gnathopod 2 slightly larger than gnathopod 1 (fig. 3A, D); propodus of both gnathopods is not larger than corresponding coxae.

Gnathopod 1: article 2 short and stout, along both margins with numerous long setae (fig. 3A); article 3 along posterior margin with one group of setae; article 5 shorter than article 6 [ratio 36: 55] (fig. 3A). Propodus (article 6) trapezoid, dilated distally, slightly longer than broad, with 6 transverse rows of setae along posterior margin (fig. 3B); palm almost straight, inclined remarkably less than half of propodus length, defined on outer face by one strong corner spine accompanied laterally by 3 short spines and 3 long facial setae (fig. 3B), on inner face by one short subcorner spine (fig. 3C). Dactylus reaching posterior margin of propodus, bearing several setae along inner margin and one median seta at outer margin (fig. 3B); nail reaching nearly half of pedestal length.

Gnathopod 2: article 2 along both margins with numerous long setae (fig. 3D); article 3 along posterior margin with one bunch of setae; article 5 only slightly shorter than article 6 [ratio: 50: 59]. Article 6 trapezoid, longer than broad, dilated distally, with 7 transverse rows of setae along posterior margin (fig. 3E). Palm nearly straight, inclined remarkably less than half of propodus-length, defined on outer face by 1 strong corner spine accompanied laterally by 2 short spines and by 2 long facial setae (fig. 3E), on inner face by one short subcorner spine (fig. 3F). Dactylus reaching posterior margin of propodus, along inner margin with several short setae, along outer margin with one median seta (fig. 3E); nail nearly half as long as pedestal (fig. 3E).

Pereopod 3: article 2 along both margin with long setae (fig. 4A); articles 3-5 along posterior margin with setae, article 6 along posterior margin with short spines. Dactylus moderately slender and short, with one spine at inner margin and one plumose seta at outer margin (fig. 4B); nail poorly shorter than pedestal (fig. 4B).

Pereopod 4 similar to pereopod 3, articles 5 and 6 along posterior margin with short spines (fig. 4C); dactylus with one spine at inner margin and one median plumose seta at outer margin; nail slightly shorter than pedestal [ratio: 30: 40] (fig. 4D).

Pereopods 5-7 progressively longer towards pereopod 7, including its basipodit and dactylus. Pereopod 5: basipodit dilated, slightly longer than broad [ratio: 77: 63], along anterior margin with row of long slender spines (fig. 5A), along posterior convex margin with row of short setae and poorly developed ventroposterior lobe; articles 4-6 of unequal length [ratio: 51: 48: 57], along margins with setae and spines (fig. 5A). Dactylus slender, short, with one spine at inner margin and one plumose seta at outer margin; nail much shorter than pedestal [ratio 23: 47, measured along outer margin of dactylus] (fig. 4E).

Pereopod 6: basipodit ovoid, longer than broad [ratio: 100: 59], along anterior margin with row of long slender spines (fig. 5B, C), along posterior convex margin with row of short setae and marked short ventroposterior lobe; articles 4-6 of unequal length [ratio: 68: 80: 95], with spines and setae along both

margins. Dactylus slender, with one spine at inner margin and one median plumose seta at outer margin (fig. 4F); nail much shorter than pedestal [ratio: 27: 73].

Pereopod 7: basipodit ovoid, longer than broad [ratio: 130: 60], along anterior margin with row of longer spine-like setae, along convex posterior margin with row of short setae, ventroposterior lobe poorly marked (fig. 5D, E); articles 4-6 of unequal size [ratio: 66: 89: 100] with spines and setae along both margins. Dactylus short, relatively slender, with one spine at inner margin and one median plumose seta at outer margin (fig. 4G), nail much shorter than pedestal [ratio: 27: 75].

Pleopods 1-3 with 5-5-4 retinacula, respectively. Peduncle of pleopod 1 with 3 setae along anterior margin (fig. 2I); peduncle of pleopod 2 with 2 setae along anterior margin (fig. 2J); peduncle of pleopod 3 with 2 strong setae along posterior margin (in lateral view) (fig. 2K).

Uropods 1-2 not elongated. Uropod 1: peduncle longer than rami, with dorsoexternal row of spines and dorsointernal row of setae (except distal spine) (fig. 2M). Rami are not compressed dorsoventrally, with inner ramus slightly longer than outer one [ratio: 74: 67], both rami with lateral and distal short strong spines (fig. 2M]. Uropod 2: rami unequal, not compressed dorsolaterally; inner ramus is longer than outer one [ratio: 48: 43], both rami with lateral and distal spines (fig. 2L).

Uropod 3 elongated and narrow (fig. 2N); peduncle nearly twice longer than broad, with distal bunch of spines (fig. 2N); inner ramus short, scale-like, with distal short spines. Outer ramus 2-articulated: first article along outer margin with spines and single simple setae (fig. 2N), along inner (mesial) margin with spines and single plumose setae (fig. 2N); second article shorter than first one [ratio: 67: 116], along both margins and tip with short simple setae (fig. 2N).

Telson is not elongated, slightly longer than broad [ratio: 85: 73], deeply incised (fig. 1D); each lobe obtuse distally, with 4 distal and one outer lateral marginal spine (fig. 1D); a pair of short plumose setae is attached near the middle of outer margin on each lobe (fig. 1D).

Coxal gills ovoid, usually reaching ventral tip of corresponding basipodites (figs. 4A, C; 5A, B).

Oostegites broad, occur on pereonites 2-5 (figs. 4A, C; 5A).

MALE: unknown.

VARIABILITY: unknown.

DERIVATIO NOMINIS: This species is named in reference to the region of Afion ion Turkey, as to where this taxon was collected.

REMARKS AND AFFINITIES.

Schellenberg (1933) described a new subspecies *Niphargus aquilex tauri* from the cave in Taurus Mts., Turkey, based on specimens males of 7-8 mm. Schellenberg (1935), Karaman, S. (1950), and some other authors mentioned it later as a distinct species, *Niphargus tauri*. Karaman, G. (1973) redescribed this

taxon based on paratype material, male of 7 mm and female 5 mm long.

The specimen in hands, female 11.5 mm from the subterranean waters near Afion, is very similar to the specimens of *N. tauri tauri* from Taurus Mts. by elongated article 2 of outer ramus in uropod 3, elevated number of retinacula, presence of only one median seta along outer margin of gnathopods 1-2, by shape of head, antennae 1-2, subrounded epimeral plates 1-3, shape of coxal plates, maxilliped, single dorsolateral setae on urosomites 1-2 , coxae, etc.

But, our specimen from Afion differs from N. *tauri tauri* by presence of 2 setae on inner plate of maxilla 1, by shorter palpus of maxilla 1 not exceeding tip of spines on outer plate, by elevated number of D-setae on distal palpus article of mandible, by lobes of telson not tapering distally, shorter article 6 of pereopods 5-7, broader article 2 of pereopods 5-7; dactylus of gnathopods 1-2 not exceeding posterior margin of propodus; palm of propodus with 1 corner spine accompanied by 3 short lateral spines.

Based on all these characters and small differences, we consider the specimen from Afion as a distinct subspecies, *N. tauri afioni*, ssp. n. *Niphargus tauri tauri* is known from one unnamed locality within the very large region, Taurus Mountains in Turkey, only, and the variability of various taxonomic characters within other populations of this subspecies is unknown. By this way, we cannot exclude the possibility that the population from Afion can be within the limits of the unknown variability of *N. tauri tauri* Schell. 1933. The further discovery of populations of *N. tauri* in other localities of Taurus Mts., will resolve this problem.

NIPHARGUS NADARINI FAVITOR, ssp. n.

Figs. 6-10

MATERIAL EXAMINED. SYRIA: Al Nabk (= Nebk; El Nabk), 15.6.1971, one male (leg. Argano, Boitani & Cottarelli). Holotype (male, 13 mm) is provisorily preserved in the KARAMAN`s Collection in Podgorica, Crna Gora [S-7119].

DIAGNOSIS (partially, male only): Antenna 2 slender**,** with equal length of peduncle articles 4-5. Mandible palpus with falciform article 3 as long as articles 1-2 combined. Inner plate of maxilla 1 with 2 setae, outer plate with 7 spines [most of them with 1-2 lateral teeth each], palpus short. not exceeding basis of spines on outer plate of maxilla 1. Inner and outer plate of maxilliped are short. Coxae 1 and 4 broader than long, coxae 2-3 as long as broad. Gnathopods 1-2 large, with propodus remarkably inclined, and dactylus bearing several short setae along outer margin.

Dactylus of pereopod 3 and 5 with one spine at inner margin, dactylus of pereopod 4 with 1-2 spines; that of pereopod 6 with 2-3 spines, and dactylus of pereopod 7 with 3 spines at inner margin. Basipodit of pereopods 5-7 dilated, with scarcely marked ventroposterior lobe. Pleopods 1-3 with 2 retinacula, peduncles scarcely setose. Urosomites 1-2 with dorsolateral spines, urosomite 3

naked. Uropod 1 with equal rami; uropod 2 outer ramus shorter than inner one. Uropod 3 elongated, with long second article of outer ramus. Telson narrow, deeply incised, with distal and mesial spines.

DESCRIPTION. MALE 13.0 mm (holotype). Body moderately stout, metasomal segments 1-3 with 4-7 dorsoposterior marginal setae each (fig. 7H); urosomite 1 with 1 dorsolateral spine on each side (fig. 6F) and with one ventroposterior spine near basis of uropod 1 peduncle (fig. 6F); urosomite 2 with 4 dorsolateral spines on each side; urosomite 3 naked (fig. 6F).

Epimeral plates 1-3 distinctly angular, with convex ventral margin and well visible ventroposterior corner (fig. 7H). Posterior margin of epimeral plates 1-2 slightly sinusoid, bearing short posterior marginal setae each (fig. 7H); posterior margin of epimeral plate 3 slightly convex, with several short marginal setae (fig. 7H). Epimeral plates 2-3 with 4 subventral spines each.

Head with short rostrum and subrounded lateral cephalic lobes and excavated ventroanterior margin, eyes absent (fig. 6C).

Antenna 1 slightly shorter than half of the body (ratio: 5.5: 13.0); peduncle articles 1-3 progressively shorter and sparsely setose with short setae; peduncle article 3 slightly shorter than article 2 [ratio 27: 56] (fig. 6D). Main flagellum consisting of 20 articles [most of them with one short aesthetasc]; accessory flagellum 2-articulated, short, exceeding half of peduncle article 3 (fig. 6D).

Antenna 2 slender, with short peduncle article 3 (fig. 6E); peduncle articles 4-5 of subequal length, with bunches of longer setae along ventral margin and short setae along dorsal margin; dorsal setae at article 4 are strong (fig. 6E); flagellum slender, longer than last peduncle article and consisting of 12 articles (fig. 6E). Antennal gland cone short (fig. 6E).

Mouthparts basic. Labrum entire, broader than long, slightly concave distally (fig. 6A). Labium with entire outer lobes and small, but well developed entire inner lobes (fig. 6B).

Mandibles: Molar triturative. Left mandible: incisor with 5 teeth, lacinia mobilis with 4 teeth (fig. 7A). Right mandible: incisor with 4 teeth, lacinia mobilis with row of unequal small teeth (fig. 7B). Mandible palpus 3-articulated: first article short, naked; second article with 9 strong spine-like setae (fig. 7C). Last mandible palpus article falciform, as long as articles 1 and 2 combined (fig. 7C), bearing nearly 21 short marginal D-setae and distal long 5 setae (fig. 7C); on outer face appears one bunch of 6 A-setae (fig. 7D); along inner face are settled 4 bunches of B-setae; C-setae absent (fig. 7C).

Maxilla 1: inner plate with 2 distal setae (fig. 7E); outer plate with 7 spines [1 spine with 3-4 lateral teeth, 2 spines with 2 lateral teeth, 4 spines with one lateral tooth each]. Palpus 2-articulated, short, not exceeding basis of outer plate-spines, and provided with 5 distal setae (fig. 7E).

Maxilla 2: both plates with marginal setae only (fig. 7F).

Maxilliped: inner plate short, with 3 distal smooth spines intermixed with setae (fig. 7G); outer plate short, with row of mesial smooth marginal spines (fig. 7G); palpus 4-articulated, stout, palpus article 3 along outer margin with 2 bunches of 1-2 setae each; palpus article 4 along outer margin of pedestal with 2 setae (fig. 7G), nail shorter than pedestal.

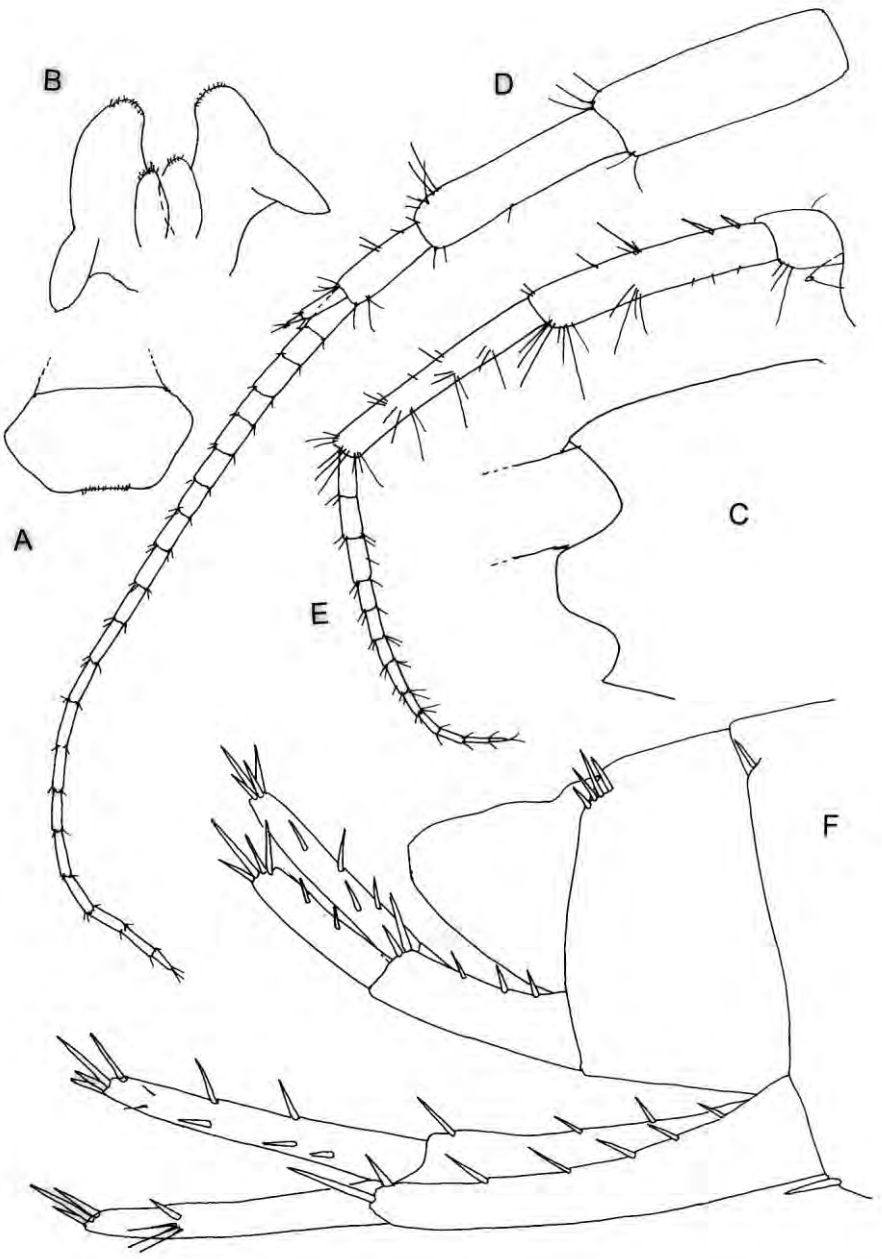

Fig 6. *Niphargus nadarini favitor*, ssp. n., male 11.5 mm (holotype), Al Nabk, Syria; A= labrum; B= labium; C= head; D= antenna 1; E= antenna 2; F= urosome with uropods 1-2.

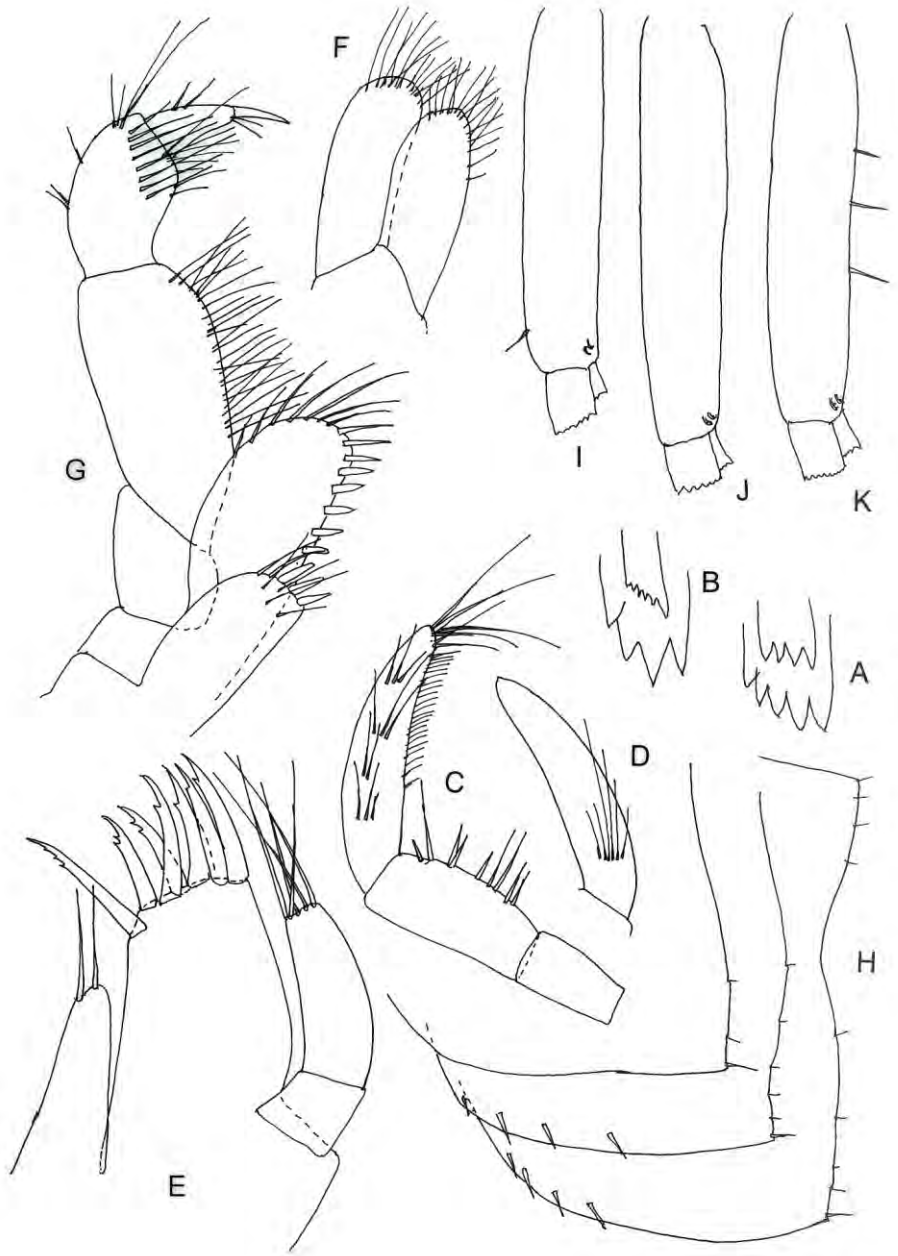

Fig. 7. *Niphargus nadarini favitor*, ssp. n., male 11.5 mm (holotype), Al Nabk, Syria; A= incisor and lacinia mobilis, left mandible; B= incisor and lacinia mobilis, right mandible; C= mandible palpus, inner face; D= tip of mandible palpus, outer face; E= maxilla 1; F= maxilla 2; G= maxilliped; H= epimeral plates 1-3; I-K= peduncle of pleopods 1-3.

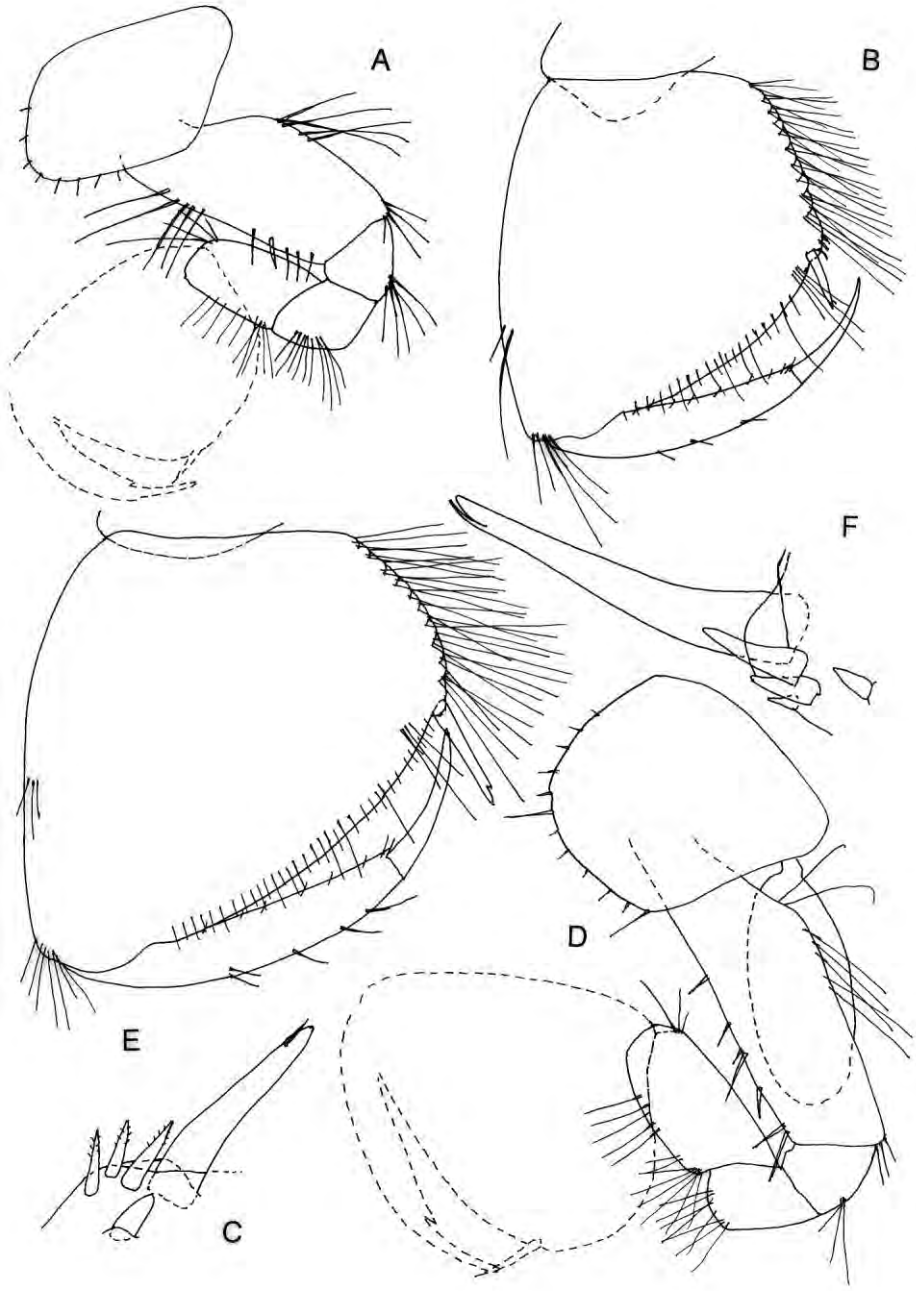

Fig. 8. *Niphargus nadarini favitor*, ssp. n., male 11.5 mm (holotype), Al Nabk, Syria; A-B= gnathopod 1; C= inner tip of gnathopod 1 propodus; D-E= gnathopod 2; F= inner tip of gnathopod 2 propodus.

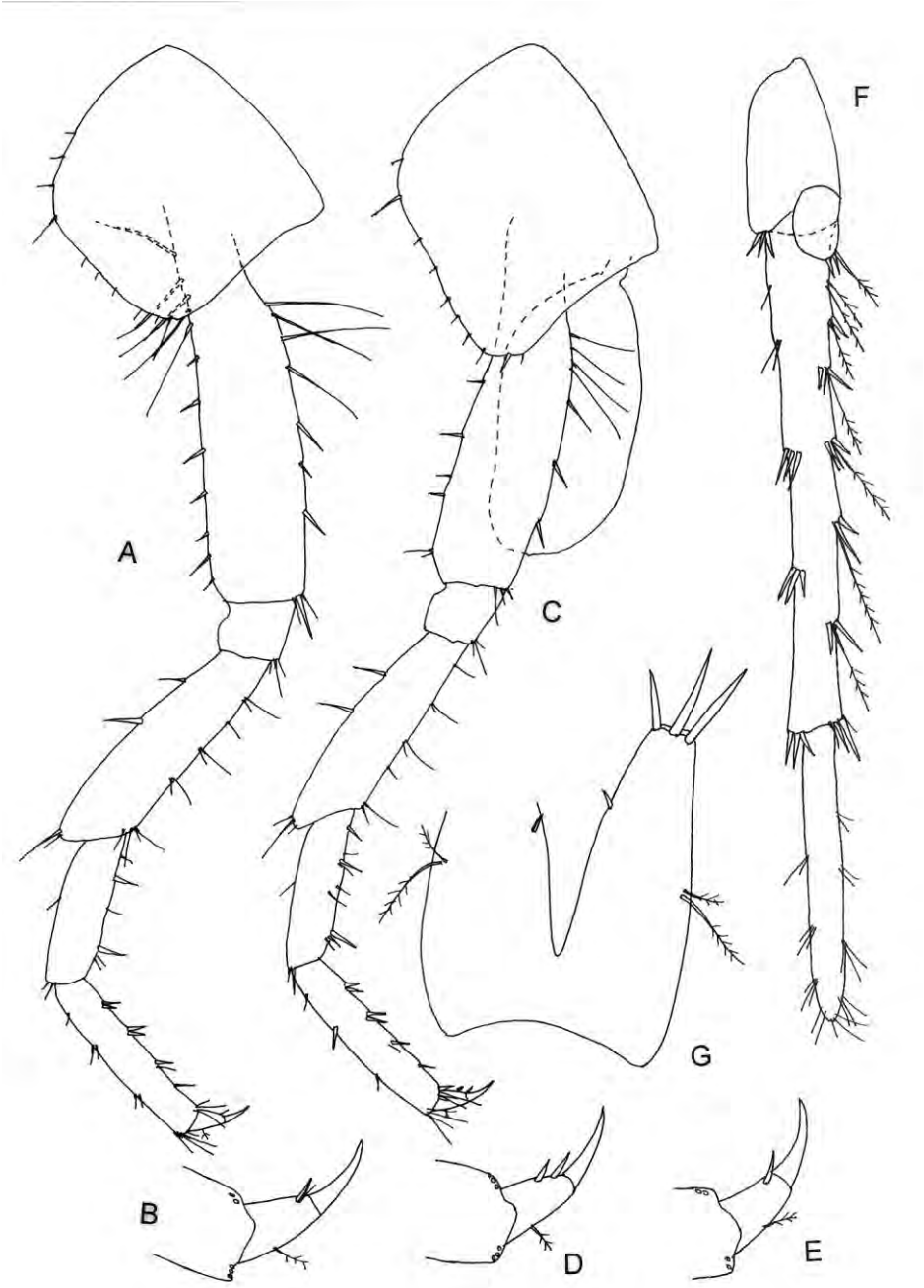

Fig. 9. *Niphargus nadarini favitor*, ssp. n., male 11.5 mm (holotype), Al Nabk, Syria; A-B= pereopod 3; C-E= pereopod 4; F= uropod 3; G= telson.

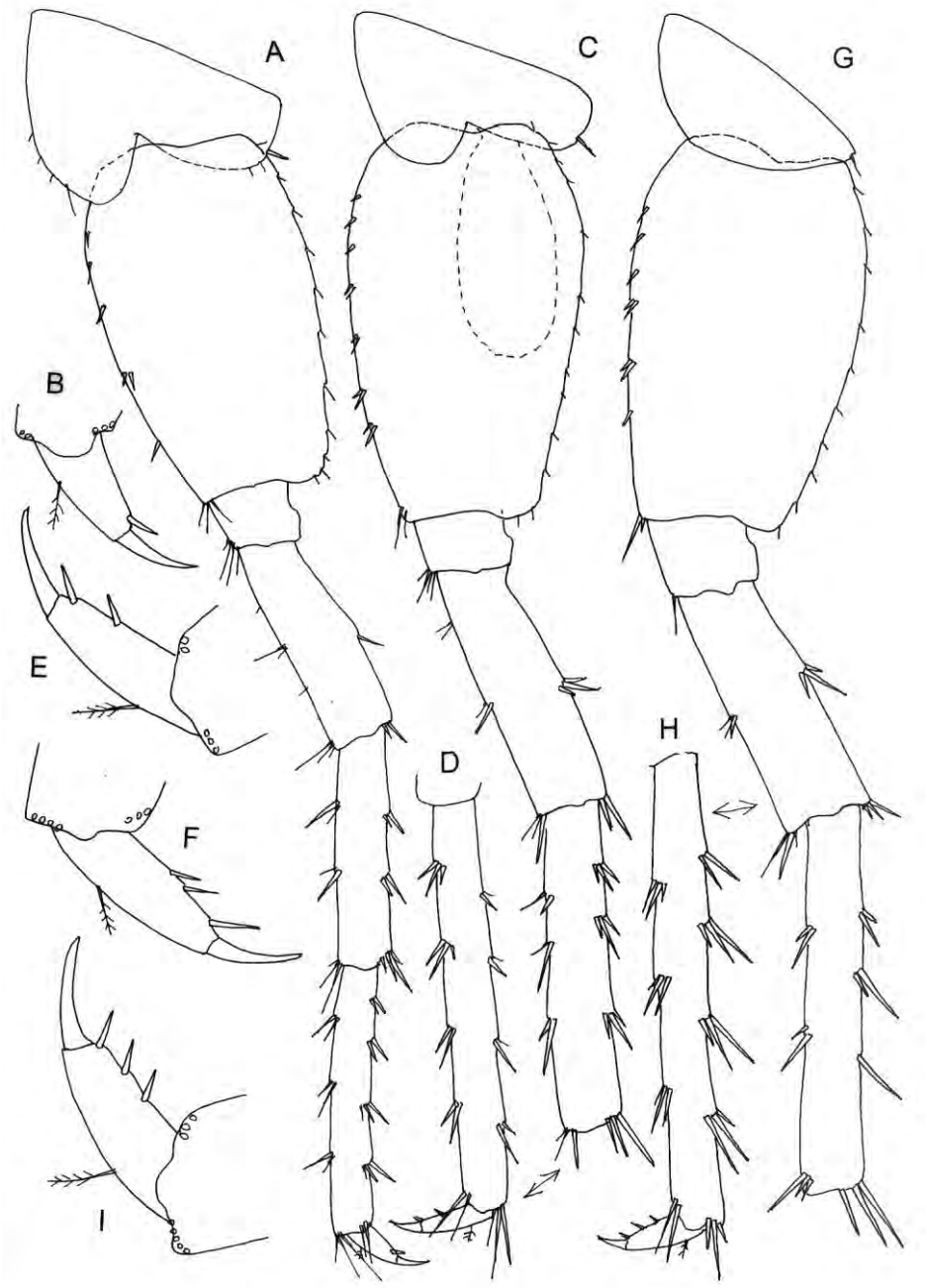

Fig. 10. *Niphargus nadarini favitor*, ssp. n., male 11.5 mm (holotype), Al Nabk, Syria; A-B= pereopod 5; C-F= pereopod 6; G-I= pereopod 7.

Coxae relatively short, bearing short marginal setae each. Coxa 1 remarkably broader than long (high), with subrounded ventroanterior corner (fig. 8A). Coxae 2-3 nearly as long as broad (figs. 8D, 9A). Coxa 4 broader than long, with concave posterior margin and short strong ventroposterior setae (fig. 9C). Coxae 5-7 short. Coxa 5 with anterior lobe nearly as long (high) as coxa 4, with scarcely setose margins (fig. 10A). Anterior lobe of coxa 6 shorter than that of coxa 5 (fig. 10C). Coxa 7 entire, unlobed (fig. 10G).

Gnathopods 1 and 2 large, with propodus larger than corresponding coxae (fig. 8A, D). Gnathopod 1: article 2 with bunches of setae in proximal anterior and posterior margin, and with row of short strong spine-like setae in distal anterior margin (fig. 8A); article 3 with one bunch of posterior marginal setae; article 5 much shorter than article 6 (fig. 8A). Propodus (article 6) trapezoid, slightly longer than broad, with 10 transverse rows of setae along posterior margin. Palm convex, inclined nearly half of propodus-length, defined on outer face by one strong corner spine accompanied laterally by 3 short spines (fig. 8A), on inner face by 1 short subcorner spine (fig. 8C). Dactylus slender, exceeding posterior margin of propodus, with row of short setae along inner margin and row of 3 short setae along outer margin (fig. 8B); nail slightly shorter than half of pedestal.

Gnathopod 2: article 2 (basipodit) along anterior margin with row of short strong spine-like setae (fig. 8D) and long simple setae along posterior margin; article 3 along posterior margin with one bunch of setae (fig. 8D); article 5 shorter than article 6. Propodus larger than that of gnathopod 1, subovoid, nearly as long as broad, along posterior margin with 17 transverse rows of marginal setae (fig. 8E). Palm convex, inclined nearly 2/3 of propodus-length, defined on outer face by one strong corner spine accompanied laterally by 3 short corner spines, at inner face by one short subcorner spine (fig. 8F). Dactylus not exceeding posterior corner of propodus, provided with row of short setae along inner margin and 4 groups of 1-2 setae along outer margin; nail not reaching half of dactylus- pedestal (fig. 8E).

Pereopods 3-4 similar to each other, slightly stout (fig. 9A, C), its article 2 in distal part along anterior and posterior margin with short strong spine-like setae, in proximal part with normal longer setae. Article 4 along posterior margin with short setae (fig. 9A, C); articles 5-6 along posterior margin with bunches of short spines. Dactylus of pereopod 3 short, along inner margin with one strong spine near basis of nail (fig. 9B), along outer margin with one median plumose seta, nail nearly as long as pedestal. Dactylus of pereopod 4 similar to that of pereopod 3, but along inner margin with 1-2 strong spines (fig. 9D, E).

Pereopods 5-7 strong, progressively longer towards pereopod 7 (fig. 10A, C, G); their article 2 (basipodit) dilated, but less than twice longer than broad, slightly tapering distally, with slightly convex posterior margin bearing a row of short posterior setae each; ventroposterior corner with poorly developed lobe. Anterior margin of article 2 covered with a row of short marginal spines.

Pereopod 5: article 4 along anterior margin with setae, along posterior

margin with spines; articles 5-6 along both margins with bunches of short spines (fig. 10A). Ratio of length of articles 4-6 is 60: 60: 73. Dactylus short and strong, along outer margin with one median plumose seta, along inner margin with 1 strong spine near basis of the nail (fig. 10B).

Pereopod 6: ratio of length of articles 4-6 is 70: 87: 109; articles 5-6 along both margins with bunches of short spines (fig. 10C, D). Dactylus short, along inner margin with 2-3 spines, along outer margin with one plumose median seta (fig. 10 E, F).

Pereopod 7: ratio of length of articles 4-6 is 70: 103: 127; articles 4-6 along both margins with bunches of longer spines, the longest spines exceeding the width of the articles (fig. 10 G, H); dactylus short, along inner margin with 3 spines, along outer margin with one median plumose seta (fig. 10 I).

Pleopods 1-3 with 2 retinacula each. Peduncle of pleopod 1 with one distoanterior seta only (in lateral projection) (fig. 7 I). Peduncle of pleopod 2 naked (fig. 7J); peduncle of pleopod 3 along posterior margin with 3 posterior marginal strong setae (fig. 7K).

Uropod 1: peduncle longer than rami, provided with dorsoexternal and dorsointernal row of strong spines (fig. 6F); inner and outer ramus of equal length, bearing spines along margins and tip (fig. 6F).

Uropod 2: peduncle with dorsal marginal spines (fig. 6F); outer ramus is remarkably shorter than inner one, both with lateral and distal spines (fig. 6F).

Uropod 3 elongated and narrow (fig. 9F). Peduncle nearly twice longer than broad, with distal bunch of spines. Inner ramus short, scale-like, with distal plumose seta and distal short spines (fig. 9F). Outer ramus 2-articulated: first article along both margins with bunches of short spines, along inner (mesial) margin intermixed with long single plumose setae. Second article of outer ramus slightly exceeding half of first article [ratio: 46: 80], along both margins and tip with bunches of short simple setae (fig. 9F).

Telson longer than broad, relatively narrow, deeply incised; right lobe with 3 distal spines as well as one small spine at mesial margin of lobe (fig. 9G); left lobe with missing tip and with one small spine at mesial margin (fig. 9G); a pair of longer unequal plumose setae are attached near the middle of outer margin of each lobe (fig. 9G).

Coxal gills short, ovoid, never reaching ventral tip of corresponding article 2 (figs. 8D, 9C, 10C).

FEMALE: unknown

VARIABILITY: unknown.

DERIVATIO NOMINIS: The name “favitor” arrives from the Latin word “favitor“, adequate word “protector, true friend” in English.

REMARKS AND AFFINITIES.

Based on existing description of *N. nadarini* from type localities in Lebanon, given by Alouf (1972, 1977), the specimen from Syria (*favitor*, ssp. n.) belongs to *nadarini*-group, but differs from *N. nadarini* by various characters:

equal length of peduncle articles 4-5 of antenna 2; long second article of outer ramus in uropod 3; less pointed epimeral plates 2-3; higher number of posterior marginal setae on basipodit of pereopod 7, equal length of both rami in uropod 1; antenna 1 slightly shorter than half of body; lower number of spines on urosomites 1-2; propodus of gnathopod 1 is longer than broad, with more inclined palm defined on outer face by one strong spine accompanied by 3 short spines; nail of its dactylus long, 2.2 times shorter than pedestal. Propodus of gnathopod 2 with palm defined on outer face by one strong corner spine accompanied laterally by 3 short spines; dactylus long, not exceeding posterior margin of propodus, nail long, slightly shorter than half of pedestal. Dactylus of pereopods 3-7 with slightly higher number of spines along inner margin. Lobes of telson with only 3 distal spines and one mesial marginal small spine. Coxa 4 is distinctly broader than long.

Based on scarce description of holotype and paratypes of *N. nadarini nadarini*, it is not possible to establish other similar or dissimilar taxonomical characters and variability.

Alouf described (1973) another member of the *N. nadarini*-group, *Niphargus altagahizi*, sp. n. from the cave Ras Chekka, nearly 20 km from Dalu Al` Ayn in Lebanon, but this species differs from *N. nadarini favitor* by smaller body size, longer coxae 1-4, higher number of lateral teeth on the spines of outer plate in maxilla 1; by more slender dactylus of pereopods 5-7, more acute epimeral plates, by short second article of outer ramus in uropod 3 in males and females, by presence of dorsolateral setae on urosomites 1-2, by hardly unequal rami of uropod 2, shorter and stouter antennae 1-2, etc.

Niphargus nadarini iraquensis, ssp. n. differs from *N. nadarini favitor* by presence of 7-9 spines on outer plate of maxilla 1, by uropod 1 outer ramus longer than inner one; by coxa 1 as long as broad; coxae 2-4 longer than broad; dactylus of gnathopod 2 not reaching posterior margin of propodus. Basipodit of pereopods 5-7 with well developed ventroposterior lobe. Dactylus of pereopods 3-7 with elevated number of spines along inner margin (dactylus of pereopods 3-4 with 2 spines; dactylus of pereopods 5-6 with 2-4 spines; dactylus of pereopod 7 with 4-6, rarely only 2 spines along inner margin; by urosomite 2 with 2 dorsolateral spines on each side, etc.

Discovery of specimen of *N. nadarini* group in Syria, underlined again the problem of taxonomic status of various populations of *N. nadarini* - complex on Near East.

Evidently, *N. nadarini* represents one complex of various taxonomic entities which status is necessary to clear and recognize. In this light, to resolve this problem, it is necessary to collect further much more rich material of this complex over the area from the Mediterranean coast till Iraq.

For the moment, we tried to recognize the main taxonomic entities within the *N. nadarini*-complex:

Niphargus nadarini nadarini Alouf, 1972

Niphargus nadarini Alouf 1972: 547, figs. 1-5; Alouf 1977: 59; Karaman, G. & Ruffo, 1986: 528; Karaman, G., 1992: 84, figs. 3, 4B.
Niphargus nadarini (part.) Karaman, G., 1986: 14, fig. IV, 8-11.

Locus typicus: wells in village Hawash-Hala, Lebanon].

Distribution: various localities in Israel and Lebanon [Mediterranean Sea drainage system and Read Sea drainage system].

Remarks. Alouf (1972) described the species *Niphargus nadarini*, sp. n. from the subterranean waters of Lebanon [Wells Dammus, Sasin and A. Hayrallah, Hawsh'Hala, Bekaa plain, Lebanon]. Later Alouf cited (1977) this species also from some other localities of Lebanon [resurgence of Shamshine, 15 km SSW of Hawsh`Hala; wells in Talia village 13 km NNE of Hawsh`Hala], springs Ras`l`Ayn in Qbb Ilyas]. Karaman, G. (1986) cited this species (sensu lato) from localities of Lebanon, Israel and adjacent regions [N. Dan; Hule; En Taron; N. Moisa; Enot Avi] and Iraq [Baghdad; Haditha [=Al Hadithah, Euphrates drainage system]. Karaman, G. cited and figured (1992) *N. nadarini* also for Uyun E. of Debsh, nearly 3.5 km SE of Nahal Moisa (Galilea Sea drainage system, Israel).

Karaman, G. (1986; 1992) showed very large variability of various characters of *N. nadarini* (sensu lato) within all studied localities, especially the large variability of the gnathopods 1-2, maxilla 1, dactylus of pereopods 3-7, etc.

Niphargus nadarini favitor, ssp. n.

Locus typicus: Al Nabk (= Nebk; El Nabk), Syria.
Short diagnosis: see above.
Distribution: known from locus typicus only.

Niphargus nadarini iraquensis, ssp. n.

Niphargus nadarini (part) Karaman, G, 1986: 14, figs. I-III, IV, 1-7; V; Karaman, G., 1992: 84.

Material examined: IRAQ: Haditha (El Hadithah), Euphrates drainage system, 7.7.1970, several specimens (leg. H. Al-Amidi); Baghdad (Tigris drainage system]. (data?), several exp. (leg. A.N. Khalaf). Holotype (male 16.2 mm) and paratypes are deposited in KARAMAN`s Collection in Podgorica, Crna Gora.(S-4216).

Short diagnosis: Large specimens up to 21 mm. Head strongly convex dorsally; antenna 1 peduncle articles 1 and 2 of equal length; antenna 2 peduncle articles 4 and 5 of equal length. Maxilla 1: inner plate with 3-5 setae {occasionally only 2); outer plate with 7-9 spines (spines with 1-3 lateral teeth

each, inner spine with several lateral teeth); palp not reaching tip of spines of outer plate. Gnathopods 1-2 with remarkably inclined palm. Pereopods 5-7 elongated, with dactylus bearing several slender spines. Pleopods 1-3 with 2 retinacula, no additional spines near retinacula. Urosomites 1-2 with dorsolateral spines each. Uropod 1: peduncle with dorsoexternal and dorsointernal row of spines; inner ramus usually shorter than outer ramus, inner ramus of uropod 2 longer than outer one. Uropod 3 narrow and long, scarcely spinose, with shorter or longer distal article of outer ramus [Euphrates and Tigris drainage systems].

Description: see Karaman, G., 1986: 14, 19).

Derivatio nominis: This species is named in reference to the region of Iraq, where this taxon was collected.

Locus typicus: Haditha, Euphrates drainage system in Iraq.

Distribution: IRAQ: Haditha (El Hadithah, Euphrates drainage system); Baghdad (Tigris drainage system].

Niphargus altagahizi Alouf, 1973

Niphargus altagahizi Alouf, 1973: 49, fig. 4, pls. 1-4, Karaman, G. & Ruffo, 1986: 522.

Locus typicus: cave Ras Chekka, nearly 20 km from Dalu Al` Ayn in Lebanon;

Distribution: Known from locus typicus only.

Niphargus itus Karaman, G., 1986

Niphargus itus Karaman, G., 1986: 28, figs. VI-VIII.

Locus typicus: En Awazin, Israel.

Distribution: ISRAEL: En Awazin: En Teo.

KEY TO THE *NIPHARGUS NADARINI* - COMPLEX

1. Outer plate of maxilla 1 with 7 spines bearing numerous (over 10) lateral teeth each. *N. ITUS* Karaman, G., 1986

--- Outer plate of maxilla 1 with 7-9 spines, bearing much less number of lateral teeth each.....2

2. Pleopods 1-3 with 2 retinacula accompanied by one simple spine; urosomites 1-2 with dorsolateral setae only [article 2 of pereopod 7 ovoid, short] *N. ALTAGAHIZI* Alouf, 1973

--- Pleopods 1-3 with 2 retinacula only, additional simple spine missing. Urosomites 1-2 with dorsolateral spines.....3

3. Coxa 4 broader than long [distal article of outer ramus in uropod 3 long; antenna 2 peduncle articles 4 and 5 of equal length]
N. NADARINI FAVITOR, ssp. n.

--- Coxa 4 as long as or longer than broad.....4

4. Head strongly convex dorsally; antenna 1 peduncle articles 1 and 2 of equal length; antenna 2 peduncle articles 4 and 5 of equal length. Large specimens up to 21 mm; pereopods 5-7 elongated, with dactylus bearing higher number of slender spines; uropod 3 narrow and long; maxilla 1 inner plate with 3-5 setae; outer plate of maxilla 1 with 7-9 spines [Euphrates and Tigris drainage systems]……*N. NADARINI IRAQUENSIS*, ssp. n.

--- Head not or poorly convex dorsally; antenna 1 peduncle articles 1-3 progressively shorter; antenna 2 peduncle article 5 shorter than 4. Smaller body size, up to 14 mm; pereopods 5-7 not elongated, with dactylus bearing lower number of spines; uropod 3 relatively broad and short; maxilla 1 inner plate with 2-3 setae, outer plate with 7 spines only [Mediterranean and Red Sea drainage systems]
N. NADARINI NADARINI Alouf, 1972

CONCLUSION

Several taxa of the genus *Niphargus* Schiödte, 1849 (Amphipoda Gammaridea, Niphargidae) from Near East are studied and described. *Niphargus tauri afioni*, ssp. n. is described from the subterranean waters near town Afion, Turkey. As *N. tauri* Schellenberg, 1933 is known from type locality only (Taurus Mts., Turkey), the variability of its populations is unknown, and we established a new subspecies , *N. tauri afioni*, ssp. n. for the population from Afion (Turkey).

The *Nipharus nadarini* - Complex of taxa is studied. *N. itus* Karaman, G., 1986 from Israel and *N. altagahensis* Alouf, 1973 from Lebanon are cited. Two new subspecies are described: *Niphargus nadarini favitor*, ssp. n. from the subterranean waters in Syria, and *N. nadarini iraquensis*, ssp. n. from the subterranean waters of Euphrates and Tigris drainage systems in Iraq [Haditha; Baghdad]. Because of the scarce material in our hands, it was not possible to evaluate the small differences existing between these two populations in the hands of Iraq.

The *N. nadarini* - Complex of species probably consists of several good species, including these mentioned here as subspecies, but it is necessary to have in our hands much more material to resolve this problem.

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LITERATURE

AKBULUT, M. & SEZGIN, M., 2000. *Orchestia cavimana* Heller, 1865 (Amphipoda Talitridae) in the Turkish Black Sea Fauna. -Turkish Journal of Marine Sciences, 6 (3): 241-244.

ALOUF, N. J. 1972. Description d`un nouvel amphipode gammaride des eaux souterraines du Liban, *Niphargus nadarini* n. sp. - Annales de Speologie, 27 (3): 547-558.

ALOUF, N. J. 1973. Biotope et description de *Niphargus altagahizi* n. sp., Amphipode Gammaride souterrain du Liban. - International Journal of Speleology. 5: 49-61.

ALOUF, N. J. 1977. Nouvelles donnees sur l`ecologie et la biogeographie de *Niphargus nadarini* Alouf (Crustaces, amphipodes). - International Journal of Speleology, 9: 59-63.

BAT, L., AKBULUT, M., SEZGIN, M. & CULHA, M. 2001. On the occurrence of *Niphargus valachicus* Dobreanu & Manolache, 1933 (Amphipoda, Gammaridae) in the western Black Sea region of Turkey. -- Turkish Journal of Zoology 25, 235-239.

FIŠER, C., ÇAMUR-ELIPEK, B. & ÖZBEK, M. 2009. The subterranean genus *Niphargus* (Crustacea, Amphipoda) in the Middle East: A faunistic overview with descriptions of two new species.- Zoologischer Anzeiger, 248: 137-150.

KARAMAN, G. 1973. XXXIV. Beitrag zur Kenntnis der Amphipoden. Neubeschreibung der Art *Niphargus tauri* Schellenberg, 1933 (Gammaridae) aus dem Taurus Gebirge, Klein Asien. - Crustaceana, 24 (3): 275-282.

KARAMAN, G. & PINKSTER, S. 1977. Freshwater *Gammarus* Species from Europe, North Africa and adjacent regions of Asia (Crustacea-Amphipoda). Part. I. *Gammarus pulex*-group and related Species. - Bijdragen tot de Dierkunde, Amsterdam, 47 (1): 1-97.

KARAMAN, G. & PINKSTER, S. 1977A. Freshwater *Gammarus* species from Europe, North Africa and adjacent regions of Asia (Crustacea-Amphipoda). Part. II. *Gammarus roeselii*-Group and related Species. - Bijdragen tot de Dierkunde, Amsterdam 47 (2): 165-196.

KARAMAN, G. 1985. *Foroniphargus pori*, new genus and species of family Niphargidae (Contribution to the Knowledge of the Amphipoda 152) - Poljoprivreda i šumarstvo, Titograd, 31 (4): 51-66.

KARAMAN, G. 1986. First discovery of genus *Niphargus* Sch. in Iraq, Israel and adjacent regions, with description of *N. itus*, new species (Fam. Niphargidae) (Contribution to the Knowledge of the Amphipoda 153). - Poljoprivreda i šumarstvo, Titograd, 32 (1): 13-36.

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 Warers (including the Marine Interstitial), Leiden, E. J. Brill/ Dr. W. Backhuys, pp. 514-534.

KARAMAN, G. & PINKSTER, S. 1987. Freshwater Gammarus species from Europe, North Africa and adjacent regions of Asia (Crustacea-Amphipoda). Part. III. *Gammarus balcanicus*-Group and related species. - Bijdragen tot de Dierkunde, Amsterdam, 57 (2): 207-260.

KARAMAN, G. 1992. New data on four subterranean species of the suborder Gammaridea from Near East region (Contribution to the Knowledge of the Amphipoda 201). - Glasnik Prirodnjačkog muzeja u Beogradu, B 47: 75-89. (1991).

KARAMAN, G. 1998. 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.

KARAMAN, G. 2003 New data on some Gammaridean Amphipods (Amphipoda, Gammaridea) from Palearctic. (Contribution to the Knowledge of the Amphipoda 245). - Glasnik Odjeljenja prirodnih nauka, Crnogorska akademija nauka i umjetnosti, Podgorica,15: 21-37.

KARAMAN, G. 2012. New species *Niphargus religiosus*, sp. n. (Fam. Niphargidae), with remarks to *Amathillina cristata* G.O. Sars, 1894 (Fam. Gammaridae) in Turkey (Contribution to the Knowledge of the Amphipoda 257).- Agriculture & Forestry 53 (07) (1-4): 49-76, 11 figs.

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

KARAMAN, S. 1959. Über eine neue Unterart von *Niphargus tauri* (Schellenberg), n. ssp. *osogovensis* aus Jugoslawien.- Hidrobiologi, Istanbul Universitesi Fen Fakültesi, Seri B, 4 (4): 170-175, figs. 1-12.

ÖZBEK, M. & ÖZKAN, N. 2010. *Amathillina cristata Sars* 1894, a Ponto-Caspian amphipod genus newly recorded from Turkey (Amphipoda: Gammaridae).-Zoology in the Middle East 50: 148-150, 1 fig.

ÖZBEK, M. & ÖZKAN, N. 2011. *Dikerogammarus istanbulensis* sp. n., a new amphipod species (Amphipoda: Gammaridae) from Turkey with a key for the genus.- Zootaxa 2813: 55-64.

RUFFO, S. 1974. Studi sui Crostacei anfipodi LXXV. Il genere *Synurella* Wrzesn. in Anatolia, descrizione di una nuova specie e considerazioni su *Lyurella hyrcana* Dersh. (Crustacea Amphipoda, Gammaridae). - Memorie del Museo Civico di Storia Naturale, Verona, 20: 389-404 (1972).

SCHELLENBERG, A. 1933. Weitere deutsche und ausländische Niphargiden. - Zoologischer Anzeiger, 102 (1-2): 21-33.

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

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DALJNE STUDIJE RODA *NIPHARGUS* SCHIÖDTE, 1849 (FAM. NIPHARGIDAE) SA BLISKOG ISTOKA (260. PRILOG POZNAVANJU AMPHIPODA)

SAŽETAK

Tokom naših daljnih istraživanja podzemnog roda *Niphargus* Schiödte, 1849 (Fam. Niphargidae) sa Bliskog Istoka, opisana su tri nova taksona: *Niphargus tauri afioni*, ssp. n. is podzemnih voda okoline grada Afion u Turskoj, *N. nadarini favitor*, ssp. n. iz podzemnih voda kod mjesta Al Nabk u Siriji, i *N. nadarini iraquensis*, ssp. n. iz podzemnih voda Iraka (Haditha, sliv rijeke Tigris i Bagdad, sliv rijeke Eufrat. Njihov taksonomski status i odnosi prema nominalnoj podvrsti su razmatrani. *N. nadarini*-komplex vrsta je analiziran i sastavljen je ključ za determinaciju taksona tog kompleksa. To je prvo otkriće roda *Niphargus* Schiödte, 1849 u Siriji.

Key words: Amphipoda, *Niphargus*, taksonomija, novi taksoni, Bliski Istok, Irak, Syria.