On two partially known species of the genus *Gammarus* Leach 1813/14 (Fam. Gammaridae) from Asia Minor (Turkey) (Contribution to the Knowledge of the Amphipoda 304)

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**Abstract**

Two only partially known species of the family Gammaridae (Crustacea Amphipoda), *Gammarus werneri* (S. Karaman 1934) and *Gammarus paraorientalis* G. Kar. (new comb.) are treated. *Rivulogammarus kesslerianus werneri* ssp. n. has been shortly described by S. Karaman (1934) from Iznik (Asia Minor, NE Turkey) and later considered synonym of *Gammarus balcanicus* Schäferna 1922 (G. Karaman, 2003).

Based on detailed study of holotype and one more recent sample of the same species from Iznik, this species is redescribed, figured and elevated to the species rank, *Gammarus werneri* (S. Karaman, 1934), belonging to *Gammarus balcanicus* Complex,

*Rivulogammarus balcanicus orientalis* ssp. n. has been described by S. Karaman (1934) from Derbend [eastern site of Erdschas- dag (=Erciyas-dagi), Asia Minor (Turkey)]. Recently this species was redescribed and figured as distinct species, *Gammarus orientalis* (S. Karaman, 1934) from type locality and adjacent localities (G. Karaman, 2017). The new study showed that the name *Gammarus orientalis* is "nomen preoccupatum", because the species under the same name has been described by Dana (1852) from Sundai, and new name for *G. orientalis* from Iznik is proposed, *Gammarus paraorientalis* G. Kar. (new name).

**Key words**: Amphipoda, *Gammarus*, new name, new status, redescription, Turkey.

**Introduction**

The fauna of Amphipoda in Turkey has been investigated remarkably by various scientists during last century (S. Karaman, Schellenberg, Pinkster, G. Karaman, Ruffo, Ozbek etc.) and many new taxa of subterranean and epigean species have been discovered and described, especially of the genera *Niphargus* and *Gammarus*. Most of these descriptions are based on classical morphological, ecological and zoogeographical data. Among all these taxa, some of them were described very shortly and with scarce number of figured, making the recognition of these taxa very hard, and sometimes overlooked. Some other described taxa have been neither redescribed more in detail nor collected again, and by this way removed superficially as synonyms of already known species.

Stanko Karaman (1934) among other new taxa, described briefly two new taxa from Turkey (Asia Minor): *Rivulogammarus kesslerianus werneri*, ssp. n. from Iznik, and *Rivulogammarus balcanicus*...
orientalis, ssp. n. from Derbent. Stock (1969) removed genus Rivulogammarus S. Kar. 1931a to genus Gammarus Fabricius 1775 as synonym.

Gammarus kesslerianus werneri has been never redescribed nor collected again, and this taxon is here redescribed based on holotype and new sample from the same locality, and elevated to the specific rank, Gammarus werneri (new comb).

Gammarus balcanicus orientalis has been considered synonym of Gammarus balcanicus (Karaman & Pinkster 1987), but later G. Karaman (2017) redescribed this taxon and elevated it to the specific rank, Gammarus orientalis (S. Karaman 1934). Recently it was observed that Dana (1852) has described one new species of Amphipoda under the same name, Gammarus orientalis n. sp. By this way, G. orientalis from Turkey became “nomen preocc.”, as we now proposed a new name for it, Gammarus paraorientalis G. Kar. (new name).

Material and Methods

The samples were preserved in 70% ethanol. The specimens were examined from slides and specimens 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 on to slides with Faure liquid for final preservation. Some morphological terminology and setae formulae follow G. Karaman’s terminology (Karaman, G., 1969) 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]. Terms “setae” and “spines” are used based on its shape, not origin.

Our studies are based on the morphological, ecological and zoogeographical investigations only.

TAXONOMICAL PART

Family GAMMARIDAE

GAMMARUS WERNERI (S. Karaman 1934)

Figures 1-7

Rivulogammarus kesslerianus werneri S. Karaman 1934:130, fig. 3;
Gammarus kesslerianus werneri Barnard & Barnard 1983: 467;
Gammarus balcanicus (part.) G. Karaman 2003; 25.

MATERIAL EXAMINED:
Sp.14. Iznik in Northern Asia Minor, 1900 (leg. F. Werner), holotype on slides;
S-5941= Torrent 2 km from Iznik (Istanbul Kapu), Turkey, 12.12. 1958, 9 exp. (leg.?).

Diagnosis

Metasomal segments smooth, with row of dorsoposterior marginal setae; urosomal segments low, with median and dorsolateral groups of spines and short setae. Urosomal segment 1 at ventroposterior margin with 2 single spines and one bunch of setae. Epimeral plates pointed, with ventral spines. Antenna 1 scarcely setose, antenna 2 with short setae, flagellum moderately slender, calceola usually present in male.

Mouthparts Gammarus balcanicus like. Coxa 1 poorly dilated ventrally, coxa 4 with well developed lobe. Gnathopods 1 and 2 with propodus of the same size but different shape. Pereopods 3-4 with relatively short straight setae. Pereopods 5-7 spinose, with dilated but unlobed article 2, dactylus short and strong. Pleopods with 2 retinacula. Uropods 1-2 with spines. Uropod 3 moderately setose, inner ramus slightly shorter than first article of outer ramus, outer margin of outer ramus with spines and simple setae, inner margin and both margins of inner ramus with plumose setae mixed with short spines; distal article of outer ramus exceeding the spines. Lobes of telson with 2-3 distal spines mixed with single setae, 1-2 setae appear on dorsal face of lobes.
Fig. 1. *Gammarus werneri* (S. Karaman 1934), Iznik (Istanbul Kapu), Turkey, male 8.0 mm: A-B= antenna 1; C-D= left and right antenna 2; E= pereopod 3; F= pereopod 4; G= telson.
Fig. 2. *Gammarus werneri* (S. Karaman 1934), Iznik (Istanbul Kapu), Turkey, male 8.0 mm: A-B= gnathopod 1; C-D= gnathopod 2; E= distal corner of gnathopod 2 propodus, inner face; F= uropod 3.
Fig. 3. *Gammarus werneri* (S. Karaman 1934), Iznik (Istanbul Kapu), Turkey, male 8.0 mm: A= epimeral plates 1-3; B= dorsoposterior margin of metasomal segments 1-3; C= pereopod 5; D= pereopod 6; E= pereopod 7; F= dactylus of pereopod 7.
Fig. 4. *Gammarus werneri* (S. Karaman 1934), Iznik (Istanbul Kapu), Turkey, male 8.0 mm: A= head; B= ventroposterior corner of urosomal segment 1 near basis of uropod 1 peduncle; C= urosomal segments 1-3, lateral view; Holotype, Iznik, male: D= antenna 1; E= mandibular palpus, outer face [ A= A-setae; B= B-setae; D= marginal D-setae; F= distal E-setae]; F= antenna 2; G= gnathopod 1 propodus, outer face; H= gnathopod 2 propodus, outer face; I= telson.
Fig. 5. Gammarus werneri (S. Karaman 1934), Iznik (Istanbul Kapu), Turkey. **Holotype, male**: A= pereopod 7; B= uropod 3 (contour only, entire figure see S. Karaman 1934, fig. 3b); C= second uropod 3 on the same slide. **Female 7.0 mm**, Iznik (Istanbul Kapu), Turkey: D= antenna 1; E= epimeral plates with metasomal segments 1-3; F= telson.
Description. Male 8.0 mm (S-5941). Head with short rostrum and obtuse lateral cephalic lobes, eyes subreniform (fig. 4a). Mesosomal segments naked, metasomal segments 1-3 at dorsoposterior marginal with row of short setae; number of these setae are increasing towards last metasomal segment (6-9-13) (fig. 3B). Urosomal segments 1-3 (urosomites) poorly elevated (in lateral view) (fig. 4C). Urosomal segments 1 and 2 with one dorsomedian and 2 dorsolateral bunches of 1-2 spines and 2-4 short setae each; urosomal segment 3 with 2 dorsolateral bunches of 2 spines accompanied by 3 setae and by one dorsomedian group of 3 setae (fig. 4C). Urosomal segment 1 at ventroposterior corner with 2 single spines and 2 longer setae (fig. 4B).

Epimeral plate 1 quadrate, with marked ventroposterior corner and slightly convex posterior margin bearing 3-4 short marginal setae, along ventroanterior corner appear a row of longer simple setae (fig. 3A); epimeral plate 2 quadrate, with well visible ventroposterior point and nearly vertical posterior margin bearing 4 short marginal setae, along ventroanterior margin are attached 2 long setae. Epimeral plate 3 slightly pointed, along posterior inclined margin are attached 5 short setae. Epimeral plate 2 with one facial and 2 ventral spines, epimeral plate 3 with 4 ventral spines (fig. 3A).

Antenna 1 exceeding half of body-length (ratio: 49:80), scarcely setose; peduncular articles 1-3 progressively shorter, bearing scarce number of setal groups, setae not exceeding diameter of articles themselves (fig. 1A); main flagellum scarcely setose, consisting of 24-25 articles (fig. 1B). Accessory flagellum nearly as long as last peduncular article and consisting of 3-4 articles (fig. 1A). Peduncle of antenna 1 in holotype also with scarce pilosity, accessory flagellum consisting of 4 articles (fig. 4D).

Antenna 2 moderately slender; peduncular articles 4 and 5 nearly of the same length, bearing several bunches of short setae each (fig. 1C, D); flagellum moderately slender, consisting of 8-11 articles bearing several setae each, setae are nearly up to long as diameter of articles themselves, calceola present (fig. 1C, D). Antennal gland cone short (fig. 1C, D). Antenna 2 in holotype like that in male 8 mm (fig. 4F), with peduncular articles 4 and 5 of nearly equal length and moderately slender flagellum consisting of 11 articles (fig. 4F).

Mouthparts well developed, like these in Gammarus balcanicus. Mandibular palpus 3-articulate, like that in holotype; first article naked; second article with 12 strong setae; article 3 subfalciform, slightly shorter than article 2, provided with nearly 28 D-setae, on inner face is attached one bunch of 5 setae, on inner face appear one bunch of 5 B-setae (fig. 4E).

Coxae are scarcely setose marginally. Coxa 1 longer than broad (ratio: 58:43), slightly dilated ventrally (fig. 2A); coxa 2 longer than broad (ratio: 61:47), broadly subrounded ventroanteriorly (fig. 2C); coxa 3 longer than broad (ratio: 68:47), ventroanterior corner slightly subrounded (fig. 1E). Coxa 4 slightly longer than broad (ratio: 74:62), with distinct ventroposterior lobe (fig. 1F).

Coxa 5-7 progressively smaller. Coxae 5 and 6 bilobed, with short anterior lobe and larger posterior lobe bearing scarce number of marginal setae (fig. 3C, D). Coxa 7 entire, much broader than long (fig. 3E).

Gnathopods 1 and 2 are subequally long. Gnathopod 1: article 2 along both margins with long setae in proximal part, and shorter setae in distal part (fig. 2A). Article 3 with one bunch of distoposterior marginal setae; article 5 short, triangular (ratio: 36:23), along anterior margin with one median and one distal bunch of short setae, along posterior margin with 4-5 transverse rows of short setae. Propodus is longer than article 5 and longer than broad (ratio: 51:36), pyriform, along posterior margin with 4 transverse rows of straight setae mixed with single short spines; palm long, slightly concave, with median strong spine accompanied by bunch of long straight setae; anterior margin with scarce number of short setae (fig. 2B). Dactylus along outer margin with one median seta, along inner margin naked. Propodus of holotype like that of male 8 mm (fig. 4G).

Gnathopod 2: article 2 along both margins with long setae in proximal part and shorter setae in distal part (fig. 2C). Article 3 with one bunch of posterior marginal setae (fig. 2C). Article 5 triangular and longer than broad (ratio: 36:24), along anterior margin with one median and one distal bunch of setae, along posterior margin with nearly 6 transverse rows of short setae. Propodus is longer than article 5 (ratio: 47:36), longer than broad (ratio: 100:55), along posterior margin with nearly 7 transverse rows of straight setae, along anterior margin with 3-4 bunches of straight setae. Palm concave, with one strong median spine accompanied by bunch of long strait setae (fig. 2D). Dactylus with one median seta at outer margin, inner margin naked. Propodus of holotype like that of male 8.0 mm (fig. 4H).

Pereopods 3 and 4 moderately slender, with pilosity like Gammarus balcanicus. Pereopod 3: article 2 with long setae at both margins. Articles 4-6 of unequal length (ratio: 52:31:37). Article 4 at posterior margin with nearly 5 bunches of straight setae as long as or slightly longer than diameter of article itself,
along anterior margin with 3 bunches of short setae accompanied by single spine. Article 5 at posterior margin with 4 groups of short spines accompanied by single very short setae; article 6 along posterior margin with 5 groups of short spines and single short setae; dactylus short, with spine at inner margin (fig. 1E).

Pereopod 4 is rather shorter than pereopod 3, article 2 along both margins with long setae; articles 4-6 of unequal length (ratio: 40:33:35); article 4 at posterior margin with several groups of short setae up to as long as diameter of article itself (fig. 1F), along anterior margin with 2 groups of short spines accompanied by single short setae; article 5 at posterior margin 3 groups of short spines, along anterior margin with distal bunch of spines. Article 6 along posterior margin with 4 groups of short spines mixed with single short setae; dactylus short and strong, at inner margin with spine-like seta near basis of nail.

Pereopods 5-7 moderately strong, spinose. Pereopod 5 is shorter than pereopods 6 and 7 (fig. 3C, D, E) with article 2 dilated, poorly longer than broad (ratio: 70:55), anterior remarkably convex margin provided with row of short spines and one proximal bunch of setae, along posterior convex margin are attached nearly 14 short setae, ventroposterior corner distinct and angular (fig. 3C); articles 4-6 of unequal length (ratio: 55:50:53), along both margins provided with bunches of short spines; article 4 at posterior margin with 2 groups of spines. Article 2 is longer than article 6 (ratio: 70:53). Dactylus strong, much shorter than article 6 (ratio: 18:55).

Pereopod 6 is slightly longer than pereopod 7, article 2 longer than broad (ratio: 82:52), tapering ventrally, along anterior poorly convex margin appear 6 single short spines and one proximal bunch of setae, along posterior partially concave margin appear nearly 13-14 short setae (fig. 3D). Articles 4-6 of unequal length (ratio: 53:65:61), along both margins with groups of spines (fig. 3D), article 4 at posterior margin with 2 bunches of spines. Article 2 is longer than article 6 (ratio: 82:61); dactylus is much shorter than article 6 (ratio: 21:61).

Pereopod 7: article 2 is longer than broad (ratio: 78:51), along anterior poorly convex margin appear nearly 6 spines and one proximal group of setae; along posterior convex margin appear a row of nearly 11 short setae; on inner face of article 2 appear one submarginal ventral spine and one proximal group of 5 short setae (fig. 3E); ventroposterior corner short. Articles 4-6 of unequal length (ratio: 47:57:60), along both margins with bunches of short spines, sometimes with single short seta. Article 6 is shorter than article 2 (ratio:60:78); dactylus much shorter than article 6 (ratio: 21:60), at inner margin with one spine-like seta near basis of the nail, along outer margin with one median plumose seta (fig. 3F); nail shorter than pedestal (ratio: 22:50). Article 2 of holotype like that of male 8.0 mm, along posterior margin with 13 short setae, on inner face with one proximal facial bunch of 4 short setae and one distal facial spine and 1 short seta (fig. 5A).

Pleopods 1-3 with 2 retinacula, peduncles almost naked. Uropod 1: peduncle with dorsoexternal and dorsointernal row of spines; rami are nearly of the same length, both rami with lateral and 5 distal unequal spines.

Uropod 2: inner ramus is distinctly longer than outer one, both rami with lateral and 4 distal spines.

Uropod 3 moderately slender: peduncle longer than broad (50:29), with one lateral group of 2 spines and several distal spines; inner ramus is slightly shorter than first article of outer ramus, provided at outer and inner (mesial) margin with single long plumose setae, accompanied along outer margin with 4 single spines, at tip appear 2 spines and several setae (fig. 2F). Outer ramus 2-articulated, first article along inner margin with row of long plumose setae, along outer margin appear a row of 5 bunches of short spines mixed with longer simple setae; second article much short, but longer than distal spines of first article and bearing 3 distal simple setae. Pilosity of holotype on slide like that of male 8.0 mm; inner ramus of one uropod 3 is slightly shorter, like that of male 8.0 mm (fig. 5C), other uropod 3 is slightly more elongated (figured also by S. Karaman (1934), here figured with omitted setae and spines (fig. 5B).

Telson poorly longer than broad, lobes with 2 distal short spines mixed with 3 unequal simple setae shorter or longer than spines (fig. 1G) and by one group of 2 submarginal setae in distal part of lobe; a pair of very short plumose setae appear in distal half of each lobe. Telson in holotype like that in male 8.0 mm, right lobe distally with 2 spines accompanied by 2 setae attached very close to each other (right lobe with 3 spines figured on S. Karaman figure, some setae probably broken).

Coxal gills on pereopods 2-4 ovoid, slightly exceeding ventral tip of corresponding pereopod article 2 (figs. 1E, F; 2C); coxal gills on pereopods 5-7 are smaller.

Female 7.0 mm with naked oostegites (S-5941): Rather similar to males, metasomal segments 1-3 with row of dorsomarginal setae progressively increasing towards last metasomal segment (7-9-15) (fig. 5E). Urosomal segments relatively low, urosomal segments 1-2 with one dorsal group of 2 spines mixed with
several short setae, dorsolateral groups are consisting of 1-2 spines mixed with single short setae (fig. 7D); urosomal segment 3 with dorsomedian group of 3 short setae, dorsolateral groups with 2 spines mixed with single short setae.

Fig. 6. *Gammarus werneri* (S. Karaman 1934), Iznik (Istanbul Kapu), Turkey, female 7.0 mm: A-B= gnathopod 1; C-D= gnathopod 2; E= pereopod 5; F= pereopod 6; G= pereopod 7.
Fig. 7. *Gammarus werneri* (S. Karaman 1934), Iznik (Istanbul Kapu), Turkey, female 7.0 mm: A= antenna 2; B= pereopod 3; C= pereopod 4; D= urosome with uropods 1-2.
Urosomal segment 1 at ventroposterior corner near basis of uropod 1 peduncle with 2 single spines and one long seta (fig. 5E).

Epimeral plate 1 nearly quadrate, with well marked ventroposterior corner and slightly convex posterior margin bearing 2-3 setae, and 3 long setae at ventroanterior margin (fig. 5E). Epimeral plate 2 pointed, along posterior slightly concave margin bearing 4-5 short setae, at ventroanterior margin with one long seta, as well as with 3 facial spines. Epimeral plate 3 slightly more pointed than plate 2, at posterior concave margin with 4-5 short setae, at ventral margin with 3 spines (fig. 5E).

Head like that in male, eyes subreniform, lateral cephalic lobes subrounded. Antenna 1 slightly exceeding half of body-length, peduncular articles 1-3 progressively shorter (ratio: 50:36:23), scarcely setose; man flagellum consisting of 19 articles scarcely setose (fig. 5D). Accessory flagellum consisting of 3 articles (fig. 5D).

Antenna 2 moderately slender; peduncular articles 4 and 5 of nearly same length; article 4 at ventral margin with 3 bunches of setae (the longest setae exceeding diameter of article itself) (fig. 7A), at dorsal side setae are rather shorter; article 5 along ventral margin with several bunches of setae longer than diameter of article itself, setae at dorsal side are rather shorter; flagellum moderately slender, consisting of 8 articles with setae slightly longer than these in male. Antennal gland cone slightly longer than that in males (fig. 7A).

Mouthparts like these in male, including mandibular palpus.

Coxae are rather similar to these in male or scarcely longer, with scarce number of marginal setae. Coxa 1 longer than broad (ratio: 58:43), scarcely dilated ventrally (fig. 6A); coxa 2 longer than broad (ratio: 65:40), scarcely narrow ventrally (fig. 6C). Coxa 3 longer than broad (ratio: 72:43), broadly subrounded and scarcely narrow ventrally (fig. 7B). Coxa 4 more quadrate, slightly longer than broad (ratio: 74:63), with strong ventroposterior lobe (fig. 7C). Coxae 5-7 short, like these in male, progressively smaller towards coxa 7; coxae 5 and 6 bilobed, coxa 7 entire.

Gnathopods 1-2 smaller than these in male. Gnathopod 1: article 2 along both margins with long setae (fig. 6A); article 3 at posterior margin with one distal bunch of setae. Article 5 narrowed, triangular, longer than broad (ratio: 30:20), along anterior margin with 2 bunches of setae, along posterior margin with nearly 5 transverse rows of setae (fig. 6A). Propodus slightly longer than article 5 (ratio: 38:30), longer than broad (ratio: 68:40), along anterior margin with 3 bunches of longer setae, at posterior margin with nearly 3 transverse rows of setae mixed with single marginal short spines; palm inclined almost 1/3 of propodus-length, with median bunch of long setae but median spine absent (fig. 6B); dactylus reaching posterior margin of propodus, along outer margin with one median seta, inner margin almost naked.

Gnathopod 2 scarcely longer than gnathopod 1: article 2 along anterior and posterior margin with long setae, several short setae appear at the ventral tip of article only; article 3 at posterior margin with one bunch of setae; article 5 narrowed, longer than broad (ratio: 35:20) at anterior margin with 2 bunches of setae, at posterior margin with nearly 5 transverse rows of setae (fig. 6C). Propodus longer than broad (ratio: 67:34), linear, along anterior margin with 3 bunches of long setae, at posterior margin with nearly 4 transverse rows of setae; palm inclined, without median palmar spine, at distal corner with one spine (fig. 6D); dactylus reaching posterior margin of propodus, with one median seta at outer margin, inner margin almost naked.

Pereopods 3 and 4 slightly shorter than these in male. Pereopod 3: article 2 along both margins with long setae, in distal part of article setae are rather shorter. Articles 4-6 of different length (ratio: 42:28:31); article 4 at posterior margin with 4-5 bunches of long simple setae (the longest setae exceeding diameter of article itself), along anterior margin appear 3 groups of short spines and short single setae (fig. 7B); article 5 at posterior margin with 4 short spines, along anterior margin with distal bunch of short setae and spines; article 6 at posterior margin with 4 groups of short spines, at anterior margin with distal group of setae. Dactylus short, like that in male, at inner margin with one spine-like seta, at outer margin with one median seta.

Pereopod 4 is slightly shorter than pereopod 3; article 2 at both margins with long proximal and shorter distal setae (fig. 7C). Articles 4-6 of different length (ratio: 36:28:30); article 4 at posterior margin with 5 bunches of long setae (the longest setae slightly exceeding diameter of article itself), at anterior margin with 2 groups of setae (fig. 7C); article 5 at posterior margin with 3 single or paired short spines, at anterior margin with distal group of spines and setae. Article 6 along posterior margin with 3 groups of short spines, at anterior margin with distal group of setae. Dactylus like that in pereopod 3.

Pereopods 5-7 like these in males but slightly shorter, with article 2 slightly broader than these in males. Pereopod 5 article 2 slightly longer than broad (ratio: 65:60), anterior convex margin provided with
row of nearly 8 short spines and one proximal longer seta, at posterior margin with 7-8 short setae, ventroposterior dilatation well developed, but not lobed (fig. 6F).

Article 2 of pereopod 6 slightly longer than broad (ratio: 73:57), at anterior margin with 4-5 groups of spine-like setae, along posterior convex margin with nearly 9 short setae, ventroposterior dilatation minute (fig. 6F).

Article 2 of pereopod 7 slightly longer than broad (ratio: 73:58), at anterior margin with 4 spines and one proximal group of setae, along posterior convex margin with 12 short setae, ventroposterior dilatation not developed (fig. 6G).

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

Uropod 1: peduncle with dorsoexternal and dorsointernal row of spines (fig. 7C); inner ramus is rather longer than outer one, both rami with single lateral and 5 distal spines.

Uropod 2: inner ramus is distinctly longer than outer one, both rami with single lateral and 4 distal unequal spines.

Uropod 3 missing.

Telson is poorly longer than broad (ratio: 70:68), each lobe is provided with 2-3 distal spines accompanied by single setae in distal part of each lobe and by one facial seta and one pair of short plumose setae (fig. 5F).

Coxal gills like these in male. Oostegites lacking marginal setae.

**Description of S. Karaman** is very short, with 2 figures (uropod 3 and telson). He mentioned that *Rivulogammarus kesslerianus* werneri is mainly similar to *Rivulogammarus kesslerianus* Martynov 1931 by longer inner ramus of uropod 3, and that body is with very scarce pilosity, especially pereopods, antenna 2 and uropod 3. He mentioned that by all specimens telson is with 2-3 distal spines, and that apical article of uropod 3 outer ramus is longer than spines near it. He mentioned that werneri differs from *Rivulogammarus pulex danubialis* S. Kar. 1931b (= *G. fossarum* complex) by constant presence of 2 spines on tip of telson lobes as well as by longer apical article of uropod 3 outer ramus.

**Locus typicus:** Iznik, NE Turkey (Asia Minor).

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

We observed the population of *Gammarus pulex* from Iznik: brook near Yenischir Kapi am See, Turkey, 19.4. 1962, many exp. (leg. ?) and these specimens agree with *G. pulex* Linnaeus, 1857 (inflated antenna 2 flagellum, strong pilosity of gnathopods, pereopods and uropod 3, etc.) (G. Karaman 2003: 30).

**Remarks and affinities.**

S. Karaman described this species as subspecies of *Rivulogammarus kesslerianus* Martinov 1931 [loc. typ.: torrent in the Kessler forest near Simferopol, Crimea, Russia] based on longer inner ramus of uropod 3. But *G. kesslerianus* is characterized by very setiferous appendages, as mentioned already S. Karaman and belongs to *Gammarus pulex* Group [division of freshwater genus *Gammarus* regarding the pilosity of body and carina on metasomal segments into 3 groups *pulex* Group, *balcanicus* Group and *roeselii* Group was proposed by Karaman & Pinkster (1977) as an artificial division to facilitate the recognition of numerous taxa].

Large variability of morphological characters in various populations of genus *Gammarus* similar to *G. balcanicus* has been observed and used by various authors for description of distinct species from many localities of central and southern Europe, as well as Asia Minor, S. Russia and Near East [*Gammarus nudus* Martynov 1931 (loc. typ.: Salgyr spring near Simferopol, Crimea, Russia); *G. tauricus* Martynov 1931 (loc. typ.: Mountain torrent near Iajla southern bay of Crimea, Russia); *G. konjicensis istrianus* S. Karaman 1931b (loc. typ.: Istra, Croatia); *G. pavlovici* S. Karaman 1929 (loc. typ.: Rašče spring, Skoplje, Macedonia), etc.

Many authors considered that these taxa represent variable population of *G. balcanicus* (G. Karaman, 1977; Karaman & Pinkster 1987, etc). For this reason, the taxon *G. kesslerianus* werneri (S. Karaman, 1934) have been removed (Karaman, G. 2003) to *Gammarus balcanicus* as synonym. The recent molecular genetics investigations indicated the possibility that many of these species despite similar to *G. balcanicus*, represent a distinct taxa.

The present study show that *G. werneri* differs from all other known species of *G. balcanicus* group by presence of 2 spines near basis of uropod 1-peduncle, character never studied in detail in taxa of *Gammarus* by other scientists. Various samples of *Gammarus balcanicus* complex we observed, were
always with one spine at ventroposterior margin of urosomal segment 1. In the combination with other taxonomic characters, the specimens from Iznik cannot be identified as members of *G. balcanicus* Schäferna 1922, but represent a distinct taxon, *Gammarus werneri* (S. Karaman 1934), probably belonging to *G. balcanicus* Complex.

*Gammarus balcanicus* from locus typicus [Kolašin, Crna Gora (Montenegro)] differs remarkably from *G. werneri* besides the urosomal 1 spinulation, also by scarce pilosity of metasomal segments 1-3, by reduced lateral groups of elements (spines and/or setae) on urosomal segment 1, etc.

The large variability of many taxonomic characters within the various populations of *G. balcanicus* Complex are making recognition of various distinct taxa very complicated and optional, mentioned also by Mamos et al. (2014) who provided some molecular-genetic investigations of various population of *G. balcanicus* Complex, and recognized the molecular-genetic diversity among populations of this Complex. The explanation of these results remains still incomplete and request further study.

All these studies will help to understand the taxonomical position of single taxa in combination with morphological, ecological and other investigations. The main problem remains the valuation of actual limited genetical and molecular data for recognition of distinct taxa, where the question of valuation of existing categories as subspecies, subgenera, etc. remains unsolved.

We hope that our morphological study of *G. werneri* will help in further study of *G. balcanicus* Complex of species in combination with other kinds of investigations (genetic, ecological, molecular, etc).

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**GAMMARUS PARAORIENTALIS** G. Kar. (new name)

*Rivulogammarus balcanicus orientalis* S. Karaman, 1934: 131, fig. 4; *Gammarus balcanicus* (part.) G. Karaman & Pinkster, 1987: 211. *Gammarus orientalis* G. Karaman 2017: 640, figs. 1-8.

**Remarks.**

Stanko Karaman described (1934) *Rivulogammarus balcanicus orientalis* n. ssp. from Derbend, eastern site of Erdschias-dag (=Erciyas-dagi), Asia Minor, 2100 m about sea level.

G. Karaman & Pinkster (1987) removed *Gammarus balcanicus orientalis* to *Gammarus balcanicus* Schäferna 1922 as synonym. Later G. Karaman (2017) redescribed *orientalis* from type locality and elevated it to the specific rank, *Gammarus orientalis* (S. Karaman 1934).

Recently we observed that Dana (1852) already have been described one amphipod species as *Gammarus orientalis*, n. sp. from “Hab. in mari prope fretum Sunde”. By this way the species *Gammarus orientalis* (S. Karaman 1934) became “nomen preoccupatum” and we proposed a new name for it, *Gammarus paraorientalis* G. Kar. (new name) with type locality: Derbend, eastern side of Erdschias-dag [=Erciyas-dagi] in Asia Minor.

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