ЦРНОГОРСКА АКАДЕМИЈА НАУКА И УМЈЕТНОСТИ
ГЛАСНИК ОДЈЕЉЕЊА ПРИРОДНИХ НАУКА, 23, 2019.

ЧЕРНОГОРСКАЯ АКАДЕМИЯ НАУК И ИСКУССТВ
ГЛАСНИК ОТДЕЛЕНИЯ ЕСТЕСТВЕННЫХ НАУК, 23, 2019

THE MONTENEGRIN ACADEMY OF SCIENCES AND ARTS
PROCEEDINGS OF THE SECTION OF NATURAL SCIENCES, 23, 2019

UDK 595.3(560)

Murat Özbek[*], *Boris Sket*[**]

A NEW *RHIPIDOGAMMARUS* (CRUSTACEA: AMPHIPODA) SPECIES FROM TURKEY: FIRST RECORD OF THE GENUS FROM THE EASTERN MEDITERRANEAN REGION, WITH AN IDENTIFICATION KEY FOR THE GENUS

Abstract

A new species of the genus *Rhipidogammarus* Stock 1971 (Crustacea: Amphipoda) was identified from Turkey. *Rhipidogammarus gordankaramani* sp. nov. is the newly identified species and the first representative of the genus, both for Turkey and for the Eastern Mediterranean area. Holotype male and allotype female specimens are morphologically described. The morphology of the new species is compared with its relatives and a map showing the distribution of the genus was presented. A diagnostic key for 8 valid species of the genus is provided.

Keywords: Eastern Mediterranean, Turkey, groundwater, *Rhipidogammarus*, new species

INTRODUCTION

The genus *Rhipidogammarus* Stock, 1971 includes species that generally prefer interstitial waters from close to the coast or islands (Stock, 1978). Although adapted to hypogean waters, all of the known species have more or less developed eyes (Stock, 1988). So, most of them are usually characterized as 'semi-subterranean' animals (Karaman, 2012). To date, a total of 7 species of *Rhipidogammarus*

[*] Murat Özbek, Department of Hydrobiology, Faculty of Fisheries, Ege University, TR-35100 Bornova — Izmir, Turkey. Corresponding author: *ozbekm71@gmail.com*

[**] Boris Sket, Biotechnical Faculty, Department of Biology, University of Ljubljana, PO Box 2995, Ljubljana, SI-1001, Slovenia. E-mail: *boris.sket@bf.uni-lj.si*

have been identified: the type species *Rh. rhipidiophorus* (Catta, 1877), *Rh. karamani* Stock, 1971, *Rh. variicauda* Stock, 1978, *Rh. triumvir* Notenboom, 1985, *Rh. nivariae* Stock, 1988, *Rh. rheophilus* Stock & Sánchez, 1990 and *Rh. gomeranus* Beyer & Stock, 1994.

The representatives of the genus were mainly recorded from the central and western part of the Mediterranean (Stock, 1988). There are also records from the northern coasts of Africa (Bakalem, Dauvin, & Grimes, 2019; Zakhama-Sraieb, Zribi, Charfi, Mnasser, & Charfi-Cheikhrouha, 2017). While most of the identified species are distributed in the Mediterranean belt, three species (*Rh. nivariae*, *Rh. rheophilus* and *Rh. gomeranus*) have been identified from the Canary Islands (Stock, 1988; Stock & Sànchez, 1990; Beyer & Stock, 1994). The easternmost distribution point of the *Rhipidogammarus* genus was the Adriatic coast of Montenegro (Karaman, 2012). There is no record from the eastern part of the Mediterranean to date.

In the present paper, *Rhipidogammarus gordankaramani* sp. nov. is identified. The genus *Rhipidogammarus* is now firstly recorded from Turkey and from the Eastern Mediterranean region. A map showing the distribution of the genus and a key for the genus were presented.

MATERIAL AND METHODS

Animals were sampled at Göynük village, Kemer, Antalya Province by one of us (B. S.; Figure 1). Gammarids were collected in gravels of the Göynük Canyon outflow. In the low gravely shore. Water brackish to marine, with remarkable freshwater influx.

Karaman-Chappuis Method (KC-probe) was effective at gravely river banks. A hole in the gravel or sand can be dug using a shovel; the water that collects in that hole can then be ladled out and filtered through a hand net (Sket, 2018). The number of *Rhipidogammarus* specimens was scarce to numerous in shallow gravel. They were sampled together with few organic debris and scarce animals, mainly insect larvae.

The body length was measured as the distance between distal heaps of head and telson.

Permanent slides of both holotype and allotype specimens were prepared using CMCP-10 high-viscosity mountant. The photographs of the extremities were taken with a digital camera attached to a microscope (Olympus CX31) and processed with image processing programs. A digitizer board (Wacom PTH-451) connected to a PC and its standard pen were used to draw illustrations on a transparent layer of the original photo of each extremity. Scale bars were marked using a micrometric slide for each magnification ratio of the microscope. The collected samples are stored in the Museum of the Faculty of Fisheries of Ege

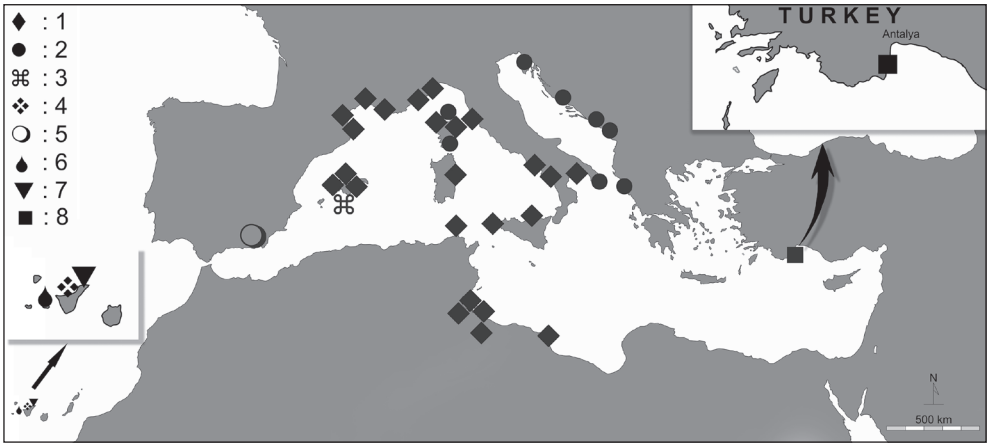

FIGURE 1. Distribution of the *Rhipidogammarus* genus and the type locality of *Rhipidogammarus gordankaramani* sp. n. (1: *Rh. rhipidiophorus*; 2: *Rh. karamani*; 3: *Rh. variicauda*; 4: *Rh. nivariae*; 5: *Rh. triumvir*; 6: *Rh. gomeranus*; 7: *Rh. rheophilus*; 8: *Rh. gordankaramani* sp. nov.) (Modified from Stock, 1988).

University, İzmir, Turkey (ESFM). Some paratypes are kept in the zoological collection in University of Ljubljana.

RESULTS AND DISCUSSION

Rhipidogammarus gordankaramani sp. n.

(Figures 2–8)

Holotype: Male, 8.0 mm (ESFM-MALI/13–50), Göynük Town, Antalya Province, Turkey (36°40’42.67” N- 30°33’50.19” E), 29. III. 2013; collected by B. Sket.

Paratypes: Allotype female, 5.5 mm (ovigerous) (ESFM-MALI/13–51), same data as holotype. Seventeen paratypes, same data as holotype.

Description of the holotype male: Body length 8.0 mm. Body translucent, color pale. Eyes slightly reniform with irregular borders, as long as the diameter of the first peduncle article of antenna I. Urosome segments slightly salient (Fig. 2).

Antenna I (Fig. 4A): slender, with weak setation; the first peduncle article wider and longer than the other articles (length ratio: 1>0.88>0.48); some small setules exist on the proximal and dorsal part of the first peduncle article; two groups of simple setae exist along the distal margin; ventral margin of the second article with 4 groups of setae; third article with two groups of setae along the ventral margin; some of the setae longer than the diameter of the third peduncle article; accessory flagellum 4-articulated; flagellum with 24 articles; aesthetascs present.

Antenna II (Fig. 4B): antennal gland cone short; peduncle articles 4 and 5 slender; length ratio of the peduncle articles: 0.3<0.8<1, respectively; peduncle

FIGURE 2. *Rhipidogammarus gordankaramani* sp. nov., Kemer, Turkey. Habitus (up), head (bottom left) and urosomites (bottom right) of the holotype, male, 8.0 mm.

article 3 with e few distal setae; peduncle articles 4 and 5 with 5 groups of simple long setae (longer than the diameter of the peduncle article) along the ventral margin in addition to 3–4 groups of setae on the dorsal side; flagellum with 14 articles; calceoli absent.

Maxilla II (Fig. 3A): inner lobe with a diagonal row of 10 plumose setae; both lobes with numerous setae in their distal margins.

Lower lip (Fig. 3B): inner lobe absent; numerous tiny setae exist in distal and inner margins of the lobes.

Maxilliped (Fig. 3C): inner lobe with 3 robust distal spines in addition to 1 robust spine in distolateral corner, distal and ventral margin with ca. 17 plumose setae; outer lobe with ca. 13 spines along the distal and ventral margin in addition to 2–3 plumose distal setae; second article of the palp with numerous setae along the ventral margin; third article curved, distal part widened and with 3 groups of setae along the anterior margin.

Maxilla I (Fig. 3D, E): inner lobe with 14 plumose setae along the inner margin; outer lobe with 10 serrate spines; palp of left maxilla 1 with 9 setiform spines; palp of right maxilla I with 4 stout spines in its distal part.

Upper lip (Fig. 3F): with numerous minute setae in the distal part.

Mandible (Fig. 3G, H): molar process well developed; lacina mobilis bifurcate; right side with 4, left side with 5 dentitions; article 2 of the palp with 10–11 setae; article 3 of its palp with 2 A-setae; 5 B-setae; 3 C-setae; 16 D-setae; 4 E- setae.

Coxal plates I–IV (Fig. 4C-F): each coxal plate with 1 seta in anteroventral and 1 in(?) posteroventral corners (coxal plate IV with 2 posteroventral setae); all the coxal setae short; coxal plates III and IV with some setules along the distal parts; coxal gills with distinct basal stalk and elongated oval blade; coxal plate I slightly longer than its width; proximal part of coxal plate II wider than the distal part; coxal plate III elongated; width and length of coxal plate IV almost equal.

Gnathopod I (Figs. 4C, C'; 5): basis with 4 long (up to 1.5 times as long as the width of basis) and 4 shorter setae along the anterior margin; posterior margin with 7 long setae in addition to a group of distal setae; ischium with a group of setae in posteroventral corner; merus and carpus with several groups of setae along the posterior side; propodus slightly elongated (length/width ratio: 1.6), with 4 groups of setae along the anterior margin; inner surface with groups of setae; palmar angle with 3 + 1 spines; medial palmar spine absent; dactylus not reaching the posteroventral corner; dactylus with 1 seta along the anterior margin in addition to 2 setules at the base of nail.

Gnathopod II (Figs. 4D, D'; 5): basis with 2 long (two times longer than the width of basis) and 3 short setae along the anterior margin; posterior margin with 5 long and 1 short setae in addition to a group of distal setae; ischium with a group of setae in posteroventral corner; posterior margins of merus and carpus

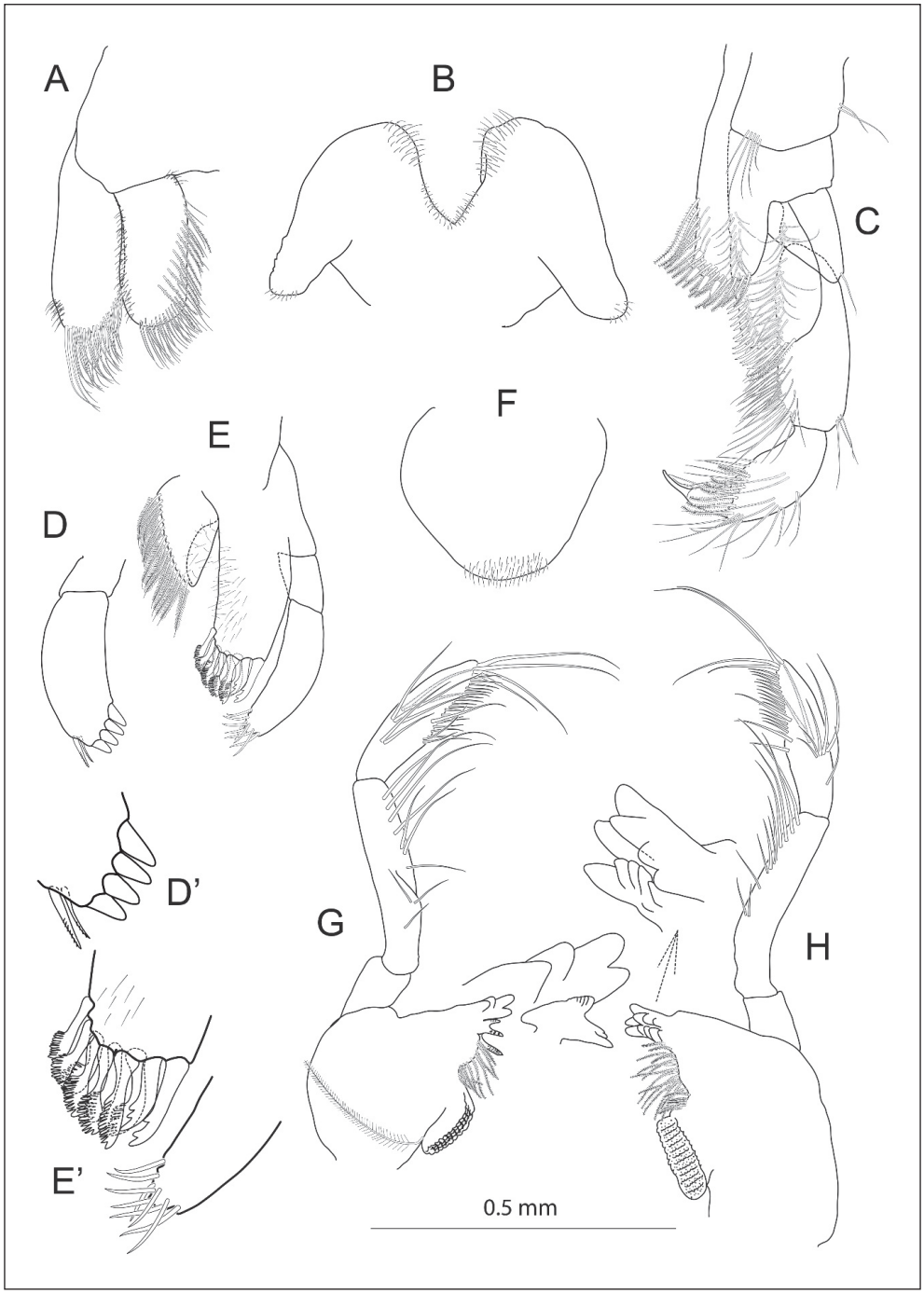

FIGURE 3. *Rhipidogammarus gordankaramani* sp. nov., holotype male, 8.0 mm. A: maxilla II; B: lower lip; C: maxilliped; D: palp of right maxilla I; E: left maxilla I; F: upper lip; G: right mandible; H: left mandible.

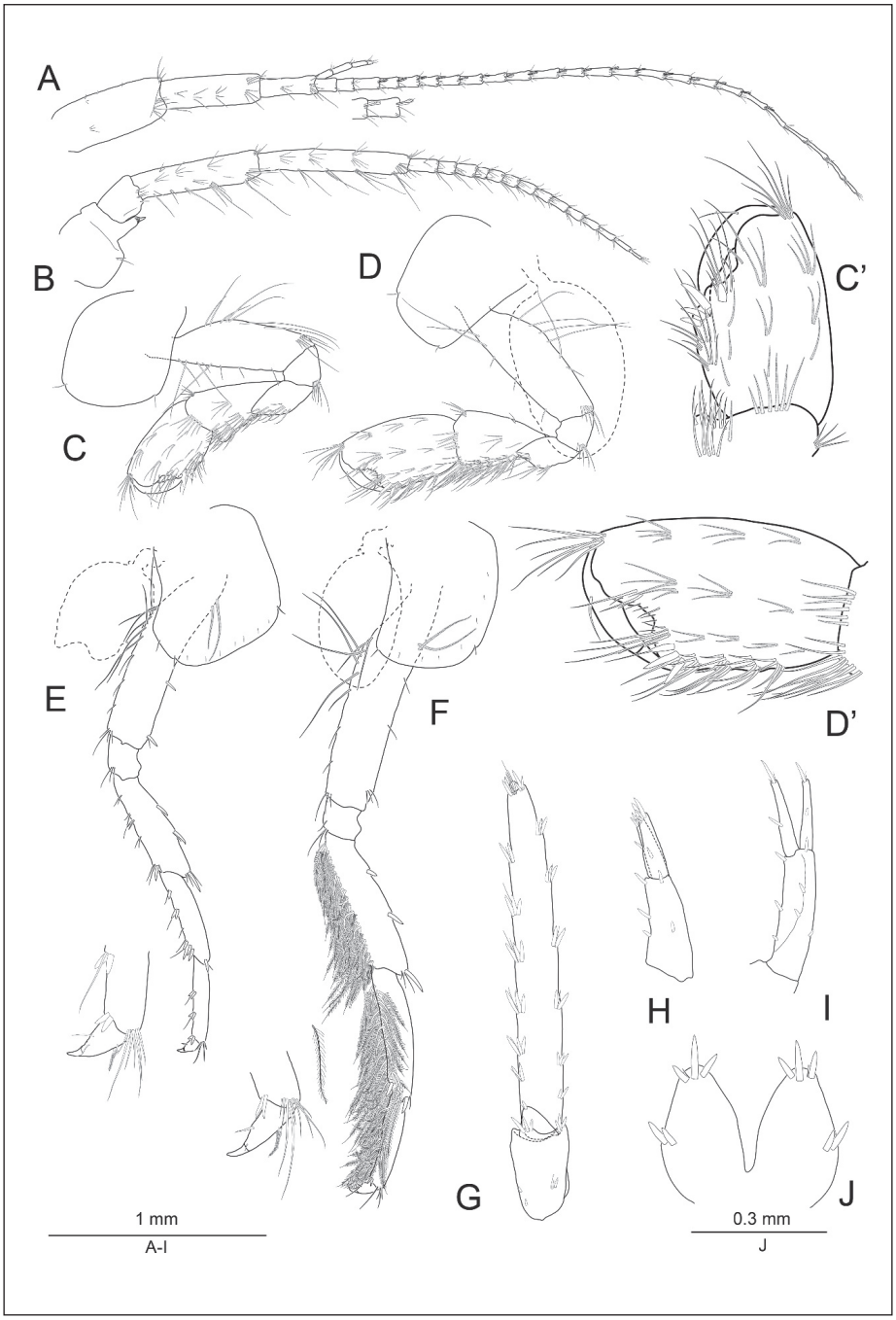

FIGURE 4. *Rhipidogammarus gordankaramani* sp. nov., Kemer, Turkey, holotype male. 8.0 mm. A: antenna I; B: antenna II; C: gnathopod I; C': propodus of gnathopod I; D: gnathopod II; D': propodus of gnathopod II; E: pereopod IV; F: pereopod III; G: uropod III; H: uropod II; I: uropod I; J: telson.

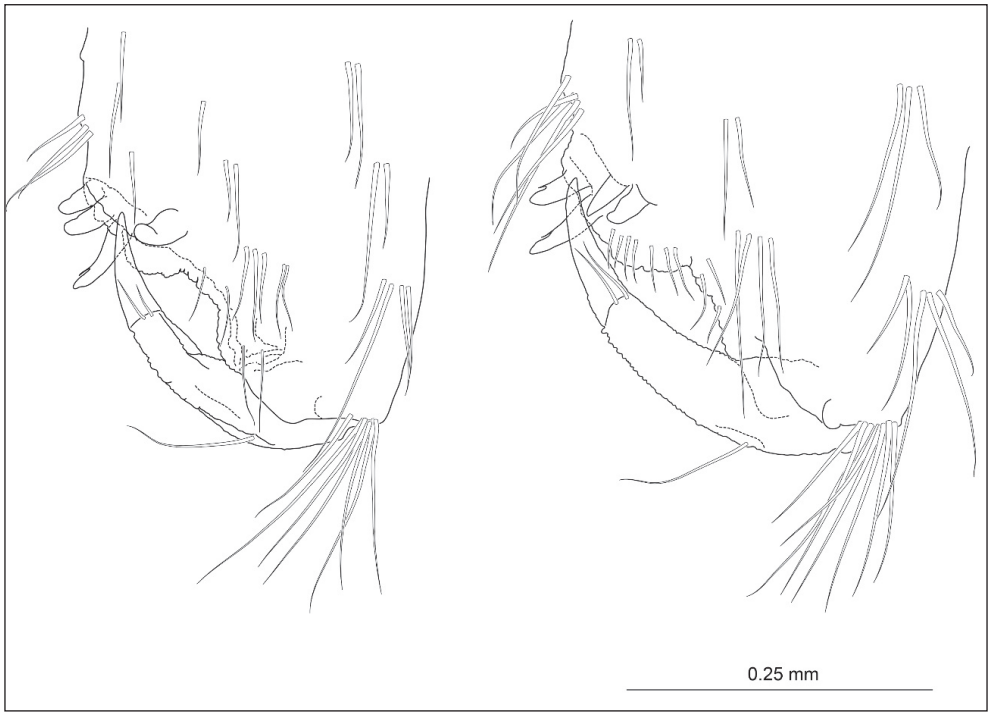

FIGURE 5. *Rhipidogammarus gordankaramani* sp. nov., Kemer, Turkey, holotype male 8.0 mm,. Details of the dactylus and palmar area of gnathopod I (left) and gnathopod II (right).

with groups of setae; propodus with 4 groups of setae along the anterior margin; inner surface of propodus with groups of setae; palmar angle with 2 + 2 spines; medial palmar spine absent; dactylus reaches the posteroventral corner; dactylus with 1 seta at the anterior margin in addition to 2 setules at the base of nail.

Pereopod III (Fig. 4F): basis with 2 long (slightly longer than the width of the basis) and 2 shorter setae along the anterior margin; posterior margin with 6–7 long (up to 1.8 times as long as the width of basis) and 2 short setae; anterior margins of merus, carpus and propodus almost without setae, posterior margins with numerous long plumose setae; posterior margin of propodus with 3 spines; dactylus with a plumose seta along the anterior margin and a simple setae on ventral margin.

Pereopod IV (Fig. 4E): basis with 2 long setae (as long as the width of basis) and 2 spines along the anterior margin; posterior margin with 7–8 long (up to 1.8 times longer than the width of basis) and 3 short setae; anterior margins of merus to propodus almost without setae; posterior margin of merus with 5 groups of short setae; carpus with 3 groups of spines in addition to a few simple setae (longer than the spines); posterior margin of propodus with 2 groups of spines and 2 simple setae (longer than spines); dactylus stout, with a plumose setae on anterior and 2 simple seta on posterior margins.

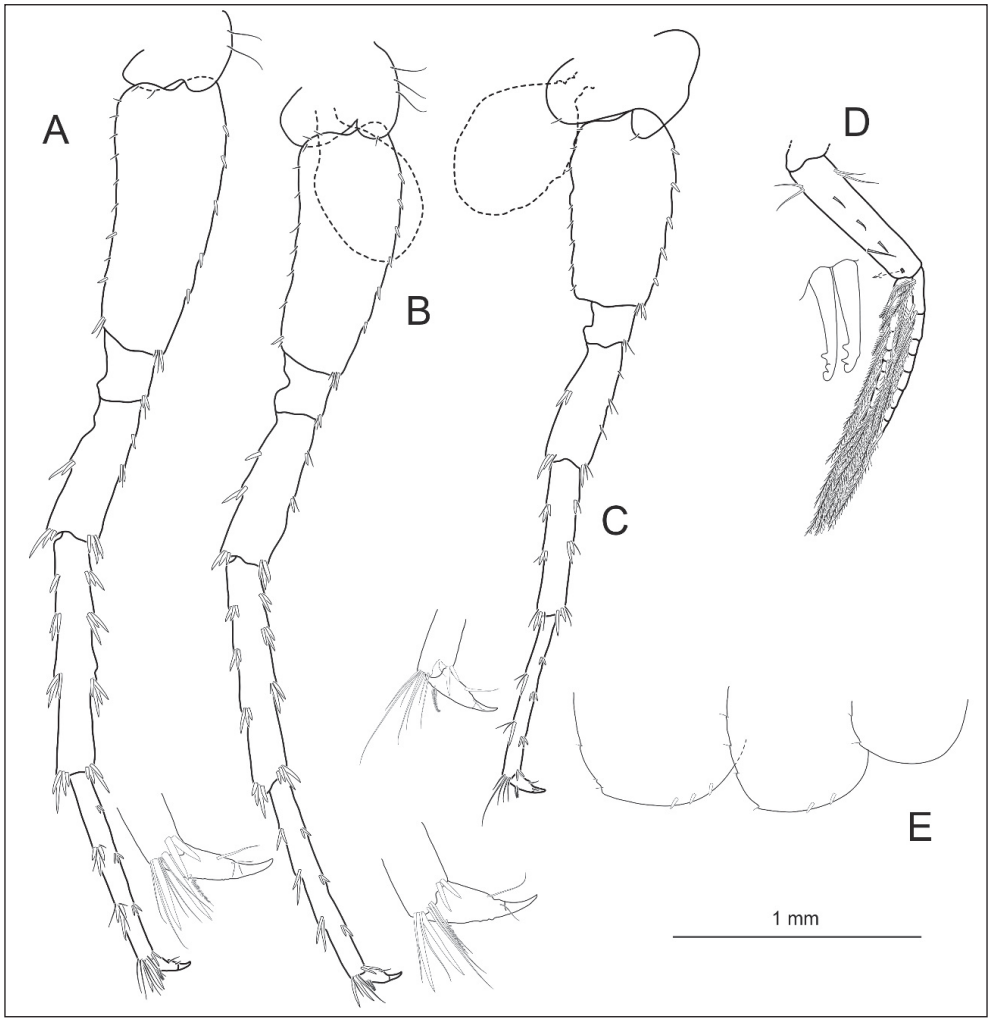

FIGURE 6. *Rhipidogammarus gordankaramani* sp. nov., Kemer, Turkey, holotype male, 8.0 mm. A: pereopod VII; B: pereopod VI; C: pereopod V; D: pleopod II; E: epimeral plates.

Pereopod V (Fig. 6C): coxa bilobate, each lobe with 1 seta in distal margin; basis elongated (length/width ratio: 1.9); posterior margin of the basis with 7–8 short setae; anterior margin with 5 spines in addition to a spines group in distal corner; anterior margin of the merus with 3 groups of short setae, posterior margin with 2 groups of spines; carpus with 3 groups of spines together with a few short setae along both its margins; propodus with 3 groups of spines along the anterior margin, posterior margin with 2 groups of spines together with a few setae; dactylus with a plumose setae on outer margin and 2 setae on inner margin.

Pereopod VI (Fig. 6B): coxa bilobate, with a seta on distal part of each lobes; anterior lobe with 3 longer setae; basis elongated (length/width ratio: 2.6); posterior

margin slightly concave with 8–9 short setae; posteroventral corner with 1 spine together with a short seta; anterior margin of the basis slightly convex, bears 6 spines in addition to 2 distal spines; both margins of the remaining articles almost without setae; posterior margins of merus and carpus with 3 and 4 groups of spines, respectively; propodus with 3 groups of spines on each of both margins; dactylus with a plumose setae on outer margin and 2 setae on inner margin.

Pereopod VII (Fig. 6A): coxal gill absent; coxa slightly bilobate; each lobe with 2 setae; basis elongated (length/width ratio: 2.6); posterior margin concave, anterior margin convex; posterior margin with 7–8 short setae in addition to 2 spines; posteroventral corner with a spine and a short seta; anterior margin of the basis with 5 setae in addition to a spine and 2 short setae in distal corner; merus with 3 and 2 groups of spines on its anterior and posterior margin, respectively; both margins of carpus with 4 groups of spines; propodus with 3 groups of spines along the anterior margin; posterior margin with 2 groups of spines intermixed with few setae; dactylus with plumose setae on outer margin and 2 setae on inner margin.

Pleopods (Fig. 6D): biramous; with numerous plumose setae in each ramus; with two retinacula.

Epimeral plates (Fig. 6E): all of them rounded and bear 2–3 short setae along their posterior margins; plate I without any armament on ventral margin; plate II and III with 2 and 3 spines on ventral margin, respectively.

Uropod I (Fig. 4I): longer than uropod II; peduncle longer than both rami; exopodite shorter than endopodite; armaments reduced; each ramus with 1 dorsal spine in addition to distal spines; peduncle with 2 spines along inner and outer margins in addition to a spine on ventral margin.

Uropod II (Fig. 4H): exopodite shorter than endopodite; peduncle longer than rami; each ramus with 1 dorsal spine in addition to distal spines.

Uropod III (Fig. 4G): peduncle and inner ramus much shorter than outer ramus; peduncle with 2 groups of spines in proximal part; inner ramus scale like, with a spine on its distal end; outer and inner margins bare; outer ramus elongated (longer than 4 times of peduncle length); inner and outer ramus with 6 groups of spines; plumose setae absent in both margins, only a few simple setae (slightly longer than the neighboring spines) present along the inner margin; second article of the outer ramus shorter than the spines.

Telson (Fig. 4J): deeply (up to ca 75% its length) cleft; each lobe with 2 lateral spines and 3 terminal spines and 1 seta (shorter than the spines); subterminal armaments absent; length/width ratio of the lobes: 1.9/1.

Urosomites (Fig. 2): slightly elevated, salient; each urosomite with a median and two groups of lateral armaments.

Description of allotype female: Antenna I and II are more setose than those of holotype male (setae along the ventral margins of peduncular and flagellar articles longer); antenna I with 18 flagellar articles; accessory flagellum 3-articulated (Fig. 7A). Setae on the ventral margins of the peduncular articles of antenna II very long (3 times longer than the width of the peduncle article); flagellum 9-articulated, calceoli absent (Fig. 7B).

Gnathopod I and II look similar with those of the holotype male but more setose; coxal plate I and II with 2 short setae along their ventral margins (Fig. 7C, C', D, D').

Pereopod III less setose than that of male; posterior margin of merus densely setose with long plumose setae but they are absent along the posterior margins of carpus and propodus; a few simple setae and 3 groups of spines exist on the posterior margin of carpus; posterior margin of propodus with 1 group of spines together with a simple seta (longer than the spines); dactylus similar with that of the male (Fig. 8A).

Pereopod IV with a few simple setae together with spines along the posterior margins of merus to propodus; length/width ratio of the coxal plate IV is 1.15/1 (Fig. 8B).

Pereopods V to VII without long setae along the anterior margins of the articles (the only merus of pereopod V bears a few setae along the anterior margin); short setae exist on posterior margins of basal articles of pereopod V to VII; posteroventral corner of the basis of pereopod VII with a spine (Fig. 8C-E).

Uropod III looks shorter than that of the male; inner ramus scale lake; outer ramus elongated (more than 3 times length of peduncle article); inner and outer margins of the outer ramus bear 3 and 4 groups of spines, respectively; long setae absent on both margins (Fig. 7E).

Telson cleft to more than its 75% length; 1 lateral spine and 3 terminal spines exist on each lobe; terminal setae absent (Fig. 7F).

Etymology: The specific epithet "*gordankaramani*" derived from the name of our productive colleague Academician Gordan S. Karaman.

Remarks: The new species has some common characters with the other members of the genus but in different combination. A comparison table showing similarities and differences between the new species and their relatives was reconstructed based on Stock (1988) (Table 1). *Rh. gordankaramani* sp. nov. differs from *Rh. nivariae* Stock, 1988 by the absence of setal fans in females. It also differs from *Rh. gomeranus* Beyer & Stock, 1994 and *Rh. rheophilus* Stock & Sànchez, 1990 by the shape of coxal plate IV. The new species has narrower coxal plate IV than those of *Rh. gomeranus* and *Rh. rheophilus*. *Rh. gordankaramani* has few long setae (longer than the spines) along the inner margin of uropod III while *Rh. karamani* Stock, 1971 has no setae along the margins of

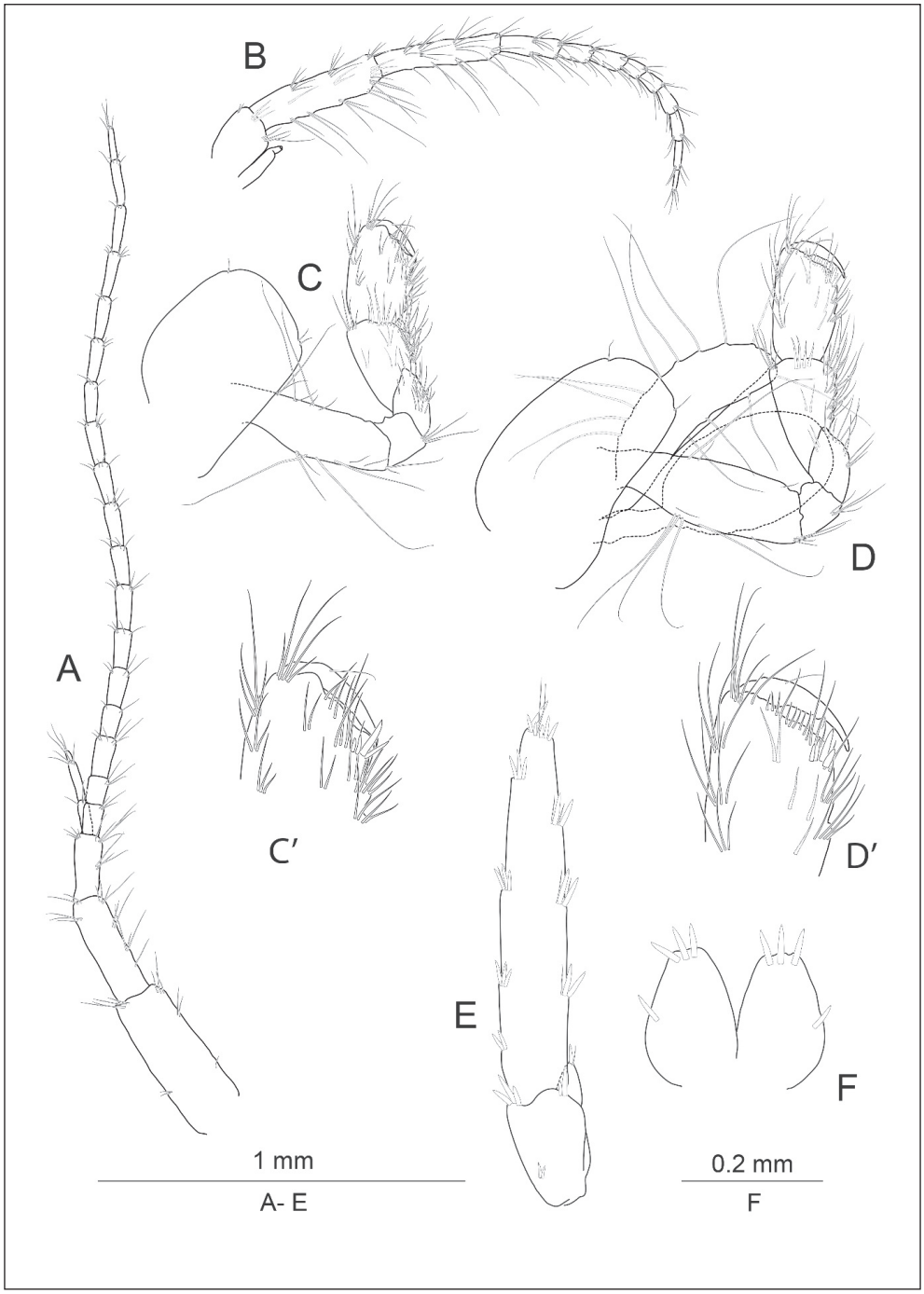

FIGURE 7. *Rhipidogammarus gordankaramani* sp. nov., Kemer, Turkey, allotype female 5.5 mm. A: antenna I; B: antenna II; C: gnathopod I; C': detail of gnathopod I; D: gnathopod II; D': detail of gnathopod II; E: uropod III; F: telson.

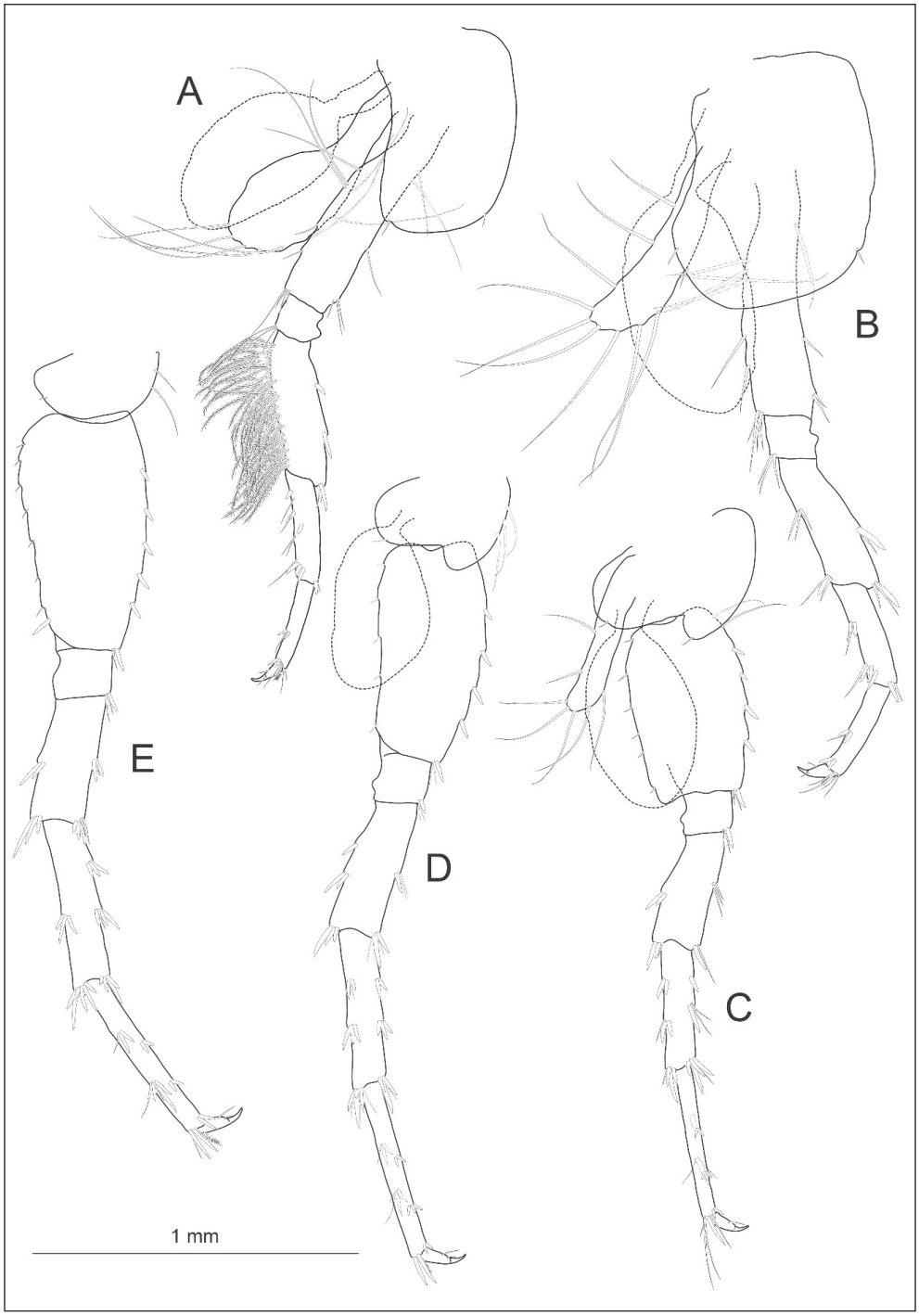

FIGURE 8. *Rhipidogammarus gordankaramani* sp. nov., Kemer, Turkey, allotype female, 5.5 mm. A: pereopod III; B: pereopod IV; C: pereopod V; D: pereopod VI; E: pereopod VII.

uropod III. Similarly, *Rh. variicauda* Stock, 1978 has long setae along the margins of uropod III but the setae are more in number and longer than those in *Rh. gordankaramani* sp. nov. The new species differ from *Rh. triumvir* Notenboom, 1985 by the absence of long setae set along the anterior margin of carpus of pereopod VI. *Rh. gordankaramani* sp. nov. differs from *Rh. rhipidiophorus* (Catta, 1878) also by the shape of mandible palp article 3.

Ecology and distribution.

Like most *Rhipidogammarus* specimens along the Adriatic coast, the new species occurs in gravel of cm texture, in the water freshened by affluence of fresh water from the continent side. For both groups of springs is also characteristic the absence (or nearly absence) of *Homoeogammarus* (syn. *Echinogammarus* p. p.), which are present in most other types of coastal springs (Sket 1986). Characteristic for both is also a very poor addition of *Jaera* sp, in this case *J.* cf. *schellenbergi*. Numerous Oligochaeta, scarce Ephemeroptera, scarce Chironomidae, single Trichoptera, and single Plecoptera specimens are also present. In the surface gravel, *Rhipidogammarus* specimens were scarce, while in the KC-probes they were numerous. The water in holes of the KC-probe was up to 20 cm deep.

Identification key for the species belonging to the *Rhipidogammarus*

1 — Outer ramus of uropod III very long (length/width ratio equal or more than 10x . . . . . ***Rh. variicauda*** Stock, 1978
— Outer ramus of uropod III not very long (length/width ratio less than 10x) 2

2 — Peduncle article 2 of antenna I with 2 groups of setae along the ventral margin 3
— Peduncle article 2 of antenna I with more than 2 groups of setae along the ventral margin 4

3 — Exopodite of uropod III with numerous long, plumose setae. Setae on inferior margin of peduncle articles 4 and 5 in A II long . . . . . ***Rh. rhipidiophorus*** (Catta, 1878)
b) Exopodite of uropod III with very few setae that are not overreaching the spines. Setae on inferior margin of peduncle articles 4 and 5 in AII short . . . . . ***Rh. karamani*** Stock, 1971

4 — A I flagellum long (30 + articulated) . . . . . ***Rh. nivariae*** Stock, 1988
— A I flagellum short (less than 30 articles) 5

5 — Anterior margin of carpus of P VII with long setae (longer than the spines) . . . . . ***Rh. rheophilus*** Stock & Sànchez, 1990
— Anterior margin of carpus of P VII without long setae 6

6 — Coxal plate IV narrow (length is equal or greater than width) 7
— Coxal plate IV wide (width is greater than length). . . . . .
. . . . . ***Rh. gomeranus*** Beyer & Stock, 1994

7 — Anterior margin of carpus of PVI with long setae (longer than the spines) . . . . . ***Rh. triumvir*** Notenboom, 1985
— Anterior margin of carpus of P VI without long setae . . . . . .
. . . . . ***Rh. gordankaramani*** sp. nov.

REFERENCES

[1] Bakalem, A, Dauvin, J.-C, & Grimes, S. (2019). *New marine amphipod records on the Algerian coast*. https://doi.org/10.1017/S0025315414000125

[2] Beyer, G, & Stock, J. H. (1994). Epigean freshwater Gammaridae (Crustacea, Amphipoda) from La Gomera (Canary Islands). *Bijdragen tot de Dierkunde*, *64*(2), 101–114.

[3] Catta, J. D. (1877). Sur un Amphipode nouveau, le *Gammarus rhipidiophorus*. *Actes de La Société Helvétique des Sciences Naturelles*, *60*, 256–263.

[4] Karaman, G. S. (2012). The anchialine Amphipoda (Crustacea) in the subterranean waters of Crna Gora (Montenegro) (Contribution to the Knowledge of the Amphipoda 261). In *Natura Croatica: Periodicum Musei Historiae Naturalis Croatici* (Vol. 21). Retrieved from https://hrcak.srce.hr/87200

[5] Notenboom, J, (1985). *Rhipidogammarus triumvir* n. sp. (Amphipoda, Gammaridae) from wells near Mojonera, Almeria. Stygologia 1: 292–299.

[6] Sket, B, (1986). Ecology of the mixohaline hypogean fauna along the Yugoslav coast. Stygologia, 2(4): 317–338

[7] Sket, B. (2018). Collecting and processing crustaceans of subterranean habitats. *Journal of Crustacean Biology*, *38* (3), 380–384. https://doi.org/10.1093/jcbiol/rux125

[8] Stock, H. (1978). A remarkably variable phreatic Amphipod from Mallorca, *Rhipidogammarus variicauda* n. sp. *Bijdragen tot de Dierkunde*, *48*(1), 89–95.

[9] Stock, J. H. (1971). *A revision of the* Sarathrogammarus *— group (Crustacea, Amphipoda)*. *3*, 94–129.

[10] Stock, J. H. (1988). Stygofauna of the Canary Islands, 6. A new *Rhipidogammarus* (Crustacea, Amphipoda) from Tenerife: first record of the genus outside the Mediterranean region and its biogeographic implications. *Hydrobiologia*, *169*(3), 279–292. https://doi.org/10.1007/BF00007551

[11] Stock, J. H, & Sánchez, E. (1990). First record of Crustacea Malacostraca from fresh waters in the Canary Islands. *Hydrobiologia*, *206*(1), 53–59. https://doi.org/10.1007/BF00018969

[12] Zakhama-Sraieb, R, Zribi, I, Charfi, F, Mnasser, I, & Charfi-Cheikhrouha, F. (2017). Update of checklist of marine Amphipoda in Tunisia Behavioral responses of terrestrial isopods to desert conditions. View project Reproductive ecology of desert species of terrestrial isopod View project Update of checklist of marine Amphipoda in Tunisia from 2009 to April 2017. In *Biodiversity Journal* (Vol. 8). Retrieved from https://www.researchgate.net/publication/331531276

TABLE 1. Differences between the species of *Rhipidogammarus* (based on Stock, 1988)

Character	*variicauda*	*rhipidiophorus*	*karamani*	*triumvir*	*nivariae*	*rheophilus*	*gomeranus*	*gordankaramani* sp. nov.
A I, peduncle article 2	2 (ventral) + 1 (dorsal) groups of elements	2 (ventral) + 1 (dorsal) groups of elements	2 (ventral) + 1 (dorsal) groups of elements	5 (ventral) + 1(dorsal) groups of elements	4 (ventral) + 1 (dorsal) groups of elements	4 (ventral) + 1 (dorsal) groups of elements	5 (ventral) + 1(dorsal) groups of elements	4 (ventral) + 0 (dorsal) groups of elements
Accessory flagellum	5-articulated	4	4	4	4	4	4	4
A I flagellum	33-articulated	22	19	23	31	22	20	24
Mandible palp article 3	normal	short	normal	short	normal	normal	normal	normal
Mandible palp, terminal setae of article 2	not reaching D-setae	mid-way D-setae	reaching D-setae	mid-way D-setae	mid-way D-setae	mid-way D-setae	not reaching D-setae	mid-way D-setae
Setae of coxal plate I–IV	short	short	short	long	long	long	short	short
P III, propodite ♀	without setal fan	without	without	without	with	without	without	without
Coxal plate IV	wide	narrow	narrow	narrow	wide	wide	wide	narrow
P IV, anterior margin, carpus, propodite	unarmed (without spines and/or setae)	unarmed	unarmed	unarmed	armed in ♂	armed in ♂	armed (carpus)	unarmed
P V ♂, armature merus, carpus	2 + 3 groups	1 + 2	1 + 2	1 + 2	2 + 3	2 + 3	2 + 2	2 + 3
P V, setules on posterior margin of basis	< interval between setules	<	<	<	>	<	<	<
P V, setae anterior margin of carpus	= diameter article	almost only spines	almost only spines	< diameter article	> diameter article	< diameter article	> diameter article	< diameter article
P VI, ditto	setae=spines	almost only spines	almost only spines	setae > spines	setae >> spines	setae >> spines	setae > spines	almost only spines
P VI, propodite	3 + 4 groups of elements	3 + 2	3 + 3	3 + 4	4 + 5	3 + 4	1 + 2	3 + 3
P VII, carpus	few setae, < spines	almost only spines	few setae, = spines	few setae, < spines	> spines	> spines	almost only spines	almost only spines
P VII, merus	1 + 2 groups of elements	1 + 2	1 + 2	1 + 2	2 + 3	1 + 2	1 + 2	1 + 2
P VII, propodite	2 + 4 groups of elements	2 + 3	2 + 3	3 + 4	3 + 4	2 + 3	2 + 2	2 + 3
U III, exopodite 1	many setae, 2x length of spines	few setae, 2x length of spines	± no setae	few setae, > spines	many setae, 2x spines	many setae, 2x spines	few setae = spines	few setae > spines
U III, exopodite 1, l/br	10 times longer or more	6–7 times longer	5–6 times longer	6–7 times longer	7.5 times longer	6–7 times longer	5 times longer	8.25 times longer
Telson, distal seta (if present)	shorter than the spines	shorter than the spines	shorter than the spines	Shorter than the spines	Equally long with the spines	Shorter than the spines	Shorter than the spines	1 setule, shorter than the spines
Distribution	*Mallorca Island*	*Central Mediterranean*	*circum Adriatic, Corsica Island*	*Spain*	*Tenerife Island*	*Tenerife Island*	*La Gomera Island*	*Turkey*