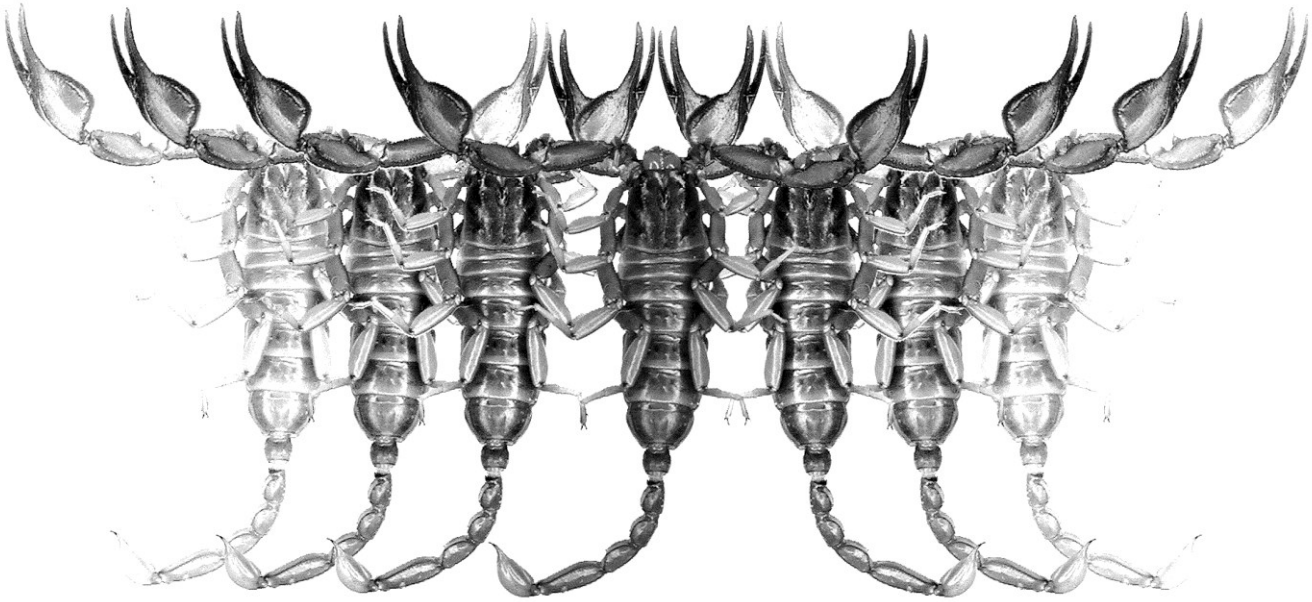
Euscorpius

Occasional Publications in Scorpiology



Euscorpius yagmuri sp. n., a New Scorpion Species from Epirus, Northwestern Greece (Scorpiones: Euscorpiidae)

František Kovařík, Victor Fet & Michael E. Soleglad

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Euscorpius yagmuri sp. n., a new scorpion species from Epirus, northwestern Greece (Scorpiones: Euscorpiidae)

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Summary

A new species *Euscorpius yagmuri* **sp. n.,** is described from coastal Epirus in northwestern Greece based on morphological evidence. With this new species, the fauna of *Euscorpius* of Greece now includes 19 species.

Introduction

A number of detailed recent studies dramatically increased the diversity of *Euscorpius* in Greece (Fet & Soleglad, 2002; Gantenbein et al., 2002; Fet et al., 2003, 2013a, 2013b, 2014a, 2014b; Tropea & Rossi, 2012; Parmakelis et al. 2013; Tropea et al., 2013, 2014). Here, we describe a new, small-sized species from the coastal Epirus in northwestern Greece, *E. yagmuri* sp. n., based on morphological evidence. With this new species, the fauna of *Euscorpius* of Greece now includes 19 species (for a detailed list see Fet et al., 2014a; Tropea et al., 2014). Our data indicate that additional undescribed species of *Euscorpius* are present in Greece (Parmakelis et al. 2013; Tropea et al. in press).

Methods and Material

Methods

Morphological nomenclature and measurements follow Stahnke (1970), Hjelle (1990), Sissom (1990), Kovařík (2009), and Kovařík & Ojanguren Affilastro (2013); the chela carinae and denticle configuration follows Soleglad & Sissom (2001); and sternum terminology follows Soleglad & Fet (2003). The map was generated by Earth Explorer 6.1, with positional and altitude data compiled through Google Maps.

Abbreviations

See text for morphological abbreviations. Trichobothrial abbreviations follow conventions for the genus *Euscorpius* (e.g. Fet et al., 2014a, 2014b). *Depositories*: FKCP (František Kovařík, private collection, Prague, Czech Republic); NHMW (Naturhistorisches Museum Wien, Vienna, Austria); NMPC (National Museum of Natural History, Prague, Czech Republic).

Material Studied

We studied nine specimens of the species described in this paper. A detailed list of material with label data is provided in the species description.

Systematics

Genus ***Euscorpius*** Thorell, 1876

Subgenus ***Euscorpius*** Thorell, 1876, s.str.

Euscorpius yagmuri Kovařík, Fet et Soleglad, sp. nov.

(Figs. 2–8; Table 1)

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Type material: Holotype ♂, ***Greece***, Epirus, Preveza District, Mt. Zalongo, Cassope (Kassope), 39.145278°N,

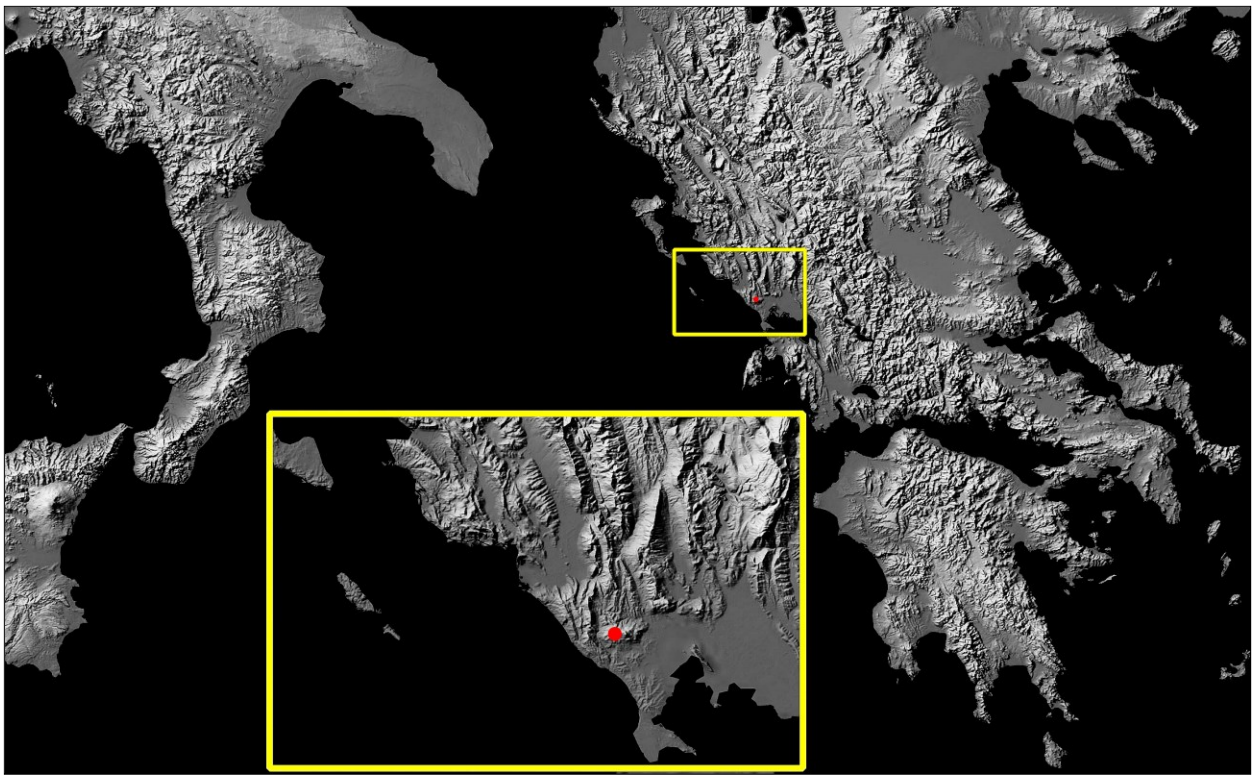

Figure 1: Map showing known distribution of *Euscorpius yagmuri*, **sp. nov.** Cassope, Greece (red icon). Foreground map showing closeup of type locality area is indicated with a yellow rectangle in background map of Greece.

20.675556°E, 18–19 July 1994, leg. I. Tuf (FCKP); paratypes, same label as holotype, 1 ♂, 4 ♀ (FKCP), 2 ♀ (NHMW 21.957), 1 ♀, 2 ims. (NMPC).

Diagnosis. A small *Euscorpius* species, total length 16–22 mm. Color dark brown; telson, legs, and sternites dark yellow; metasoma dark yellow with brown mottling; chelicerae light, yellow to orange, slightly reticulated. The number of trichobothria on the pedipalp patella ventral surface 8–9. The number of trichobothria on pedipalp patella external surface is: *eb* = 4, eb_a = 4, *esb* = 2, *em* = 4, *est* = 4, *et* = 5–6. The pectinal teeth number in males is 8, in females 6–7. Dorsal patellar spur well-developed. Dorsal carinae on metasomal segments I-IV are granulated. Sexually mature males lack a proximal gap on the chelal fixed finger.

Distribution. Known only from the type locality: Greece, Epirus, Preveza District, Cassope. See map in Fig. 1.

Etymology. We are glad to name the new species after our colleague and friend Ersen Aydín Yağmur (Turkey), who has recently made a great impact on the study of Eastern Mediterranean scorpions, including, but not limited to, those of the genus *Euscorpius*.

Description

MALE. The following description is based primarily on the holotype male, with additional information derived from male and female paratypes. Measurements of the holotype and male and female paratypes are presented in Table 1. See Figure 2 for dorsal and ventral views of the male holotype and female paratype.

COLORATION. Carapace, tergites, and pedipalps dark brown; carapace with some darker mottling; metasoma dark yellow with brown mottling; telson, legs, and sternites dark yellow; genital operculum, pectines, and basal piece yellow; chelicerae light, yellow to orange, slightly reticulated.

CARAPACE (Fig. 3). Anterior edge essentially straight; smooth and lustrous, lacking any indication of carinae. There are two lateral eyes. Median eyes and tubercle are small in size, positioned anterior of middle with the following length and width ratios: 0.406 (anterior edge to medium tubercle middle / carapace length) and 0.167 (width of median tubercle including eyes / width of carapace at that point).

MESOSOMA (Fig. 3). Tergites I–VII essentially smooth; tergite VII lacking lateral and median carinal pairs.

Figure 2: *Euscorpius yagmuri*, **sp. nov.** dorsal and ventral views. **Top.** Male holotype. **Bottom.** Female paratype.

Euscorpius yagmuri				
Cassope, Greece				
	Male Holotype	**Male Paratype**	**Female Paratype**	**Female Paratype**
Total length	21.20	16.40	21.85	21.55
Carapace length	3.15	2.60	3.30	3.20
Mesosoma length	7.50	4.80	9.00	8.50
Metasoma length	7.50	6.25	7.05	7.25
Segment I				
length/width	0.95/1.10	0.75/0.95	0.90/1.10	0.85/1.10
Segment II				
length/width	1.15/1.00	0.95/0.85	1.10/0.95	1.15/1.00
Segment III				
length/width	1.30/0.90	1.05/0.80	1.20/0.90	1.35/0.90
Segment IV				
length/width	1.55/0.85	1.30/0.80	1.40/0.85	1.50/0.85
Segment V				
length/width	2.55/0.90	2.20/0.80	2.45/0.85	2.40/0.85
Telson length	3.05	2.75	2.50	2.60
Vesicle length	2.35	2.05	1.60	1.70
width/depth	1.20/1.35	1.10/1.20	0.90/0.80	0.90/0.80
Aculeus length	0.70	0.70	0.90	0.90
Pedipalp length	10.35	8.60	10.35	10.70
Femur				
length/width	2.55/1.00	2.10/0.85	2.55/0.95	2.60/1.10
Patella				
length/width*	2.60/1.05	2.20/0.85	2.60/1.10	2.75/1.15
DPS height**	0.40	0.30	0.30	0.30
Chela length	5.20	4.30	5.20	5.35
Palm length	2.80	2.35	2.85	2.85
width/depth	1.90/2.10	1.40/1.65	1.80/2.00	1.80/2.10
Fixed finger length	2.20	1.85	2.15	2.20
Movable finger length	3.05	2.50	2.85	3.05
Sternum				
length/width	1.00/1.15	0.95/1.00	1.00/1.20	1.15/1.30
Pectines				
teeth	8/8	8/8	6/6	7/7
middle lamellae	4/4	4+/4+	3/3	3+/4

Table 1: Morphometrics (mm) of *Euscorpius yagmuri*, **sp. nov.**, Patella width is widest distance between the dorsointernal and exteromedial carinae. ** DPS height is from tip of spine to dorsointernal carina centered.

Sternites III–VII smooth and lustrous; VII lacking lateral and median carinae. Stigmata are very small, narrow ellipical.

METASOMA (Fig. 4). Segment I wider than long, length to width ratio 0.864. Segments I–IV: dorsal carinae distinctively granulate to crenulate; dorsolateral carinae vestigial to smooth with trances of granulation at their base; lateral carinae obsolete; ventrolateral carinae obsolete to vestigial on I, smooth on II, smooth to irregularly granulate on III–IV; single ventromedian carina obsolete on I–III, vestigial to irregularly granulate with small granules on IV. Segment V: dorsolateral carinae rounded with scattered granulation, lateral carinae obsolete, ventrolateral and ventromedian carinae distinctively granulate. Anal arch with approximately 15 small pigmented granules. Intercarinal areas essentially smooth.

TELSON (Fig. 4). Vesicle swollen and elongated, with short highly curved aculeus. Vesicle essentially void of granules, very lustrous. Vesicular tabs smooth.

PECTINES (Fig. 3). Medium-developed segments exhibiting length / width ratio 2.028 (length taken at anterior lamellae / width at widest point including teeth). Sclerite construction complex, three anterior lamellae and four middle lamella; fulcra of medium development. Teeth number 8/8. Sensory areas developed along distal aspect on all teeth, including basal tooth. Basal piece large, with wide shallow indentation along anterior edge, length / width ratio 0.464.

CHELICERAE. Movable finger dorsal edge with two small subdistal (*sd*) denticles; ventral edge smooth; serrula not visible. Ventral distal denticle (*vd*) conspic-

Figure 3: *Euscorpius yagmuri*, **sp. nov.** Carapace, mesosoma (partial), and sternopectinal area. **Left.** Male holotype. **Right.** Female paratype.

Figure 4: *Euscorpius yagmuri*, **sp. nov.** Metasoma and telson. **Top.** Male holotype, lateral and ventral views. **Bottom.** Female paratype, lateral, dorsal, and ventral views.

uously longer than dorsal (*dd*). Fixed finger with four denticles, median (*m*) and basal (*b*) denticles conjoined on common trunk; no ventral accessory denticles present.

PEDIPALPS (Figs. 5, 7). Well-developed chelae, moderately carinated, scalloping of chelal fingers lacking, including a proximal gap on the fixed finger when fingers are closed. **Femur:** Dorsointernal and ventrointernal carinae serrated, dorsoexternal lightly serrated, and ventroexternal rounded with scattered granulation, heaviest at base. Dorsal surface covered with small granules, ventral surface scattered with small granules, internal and external surfaces rough with a row of ser-

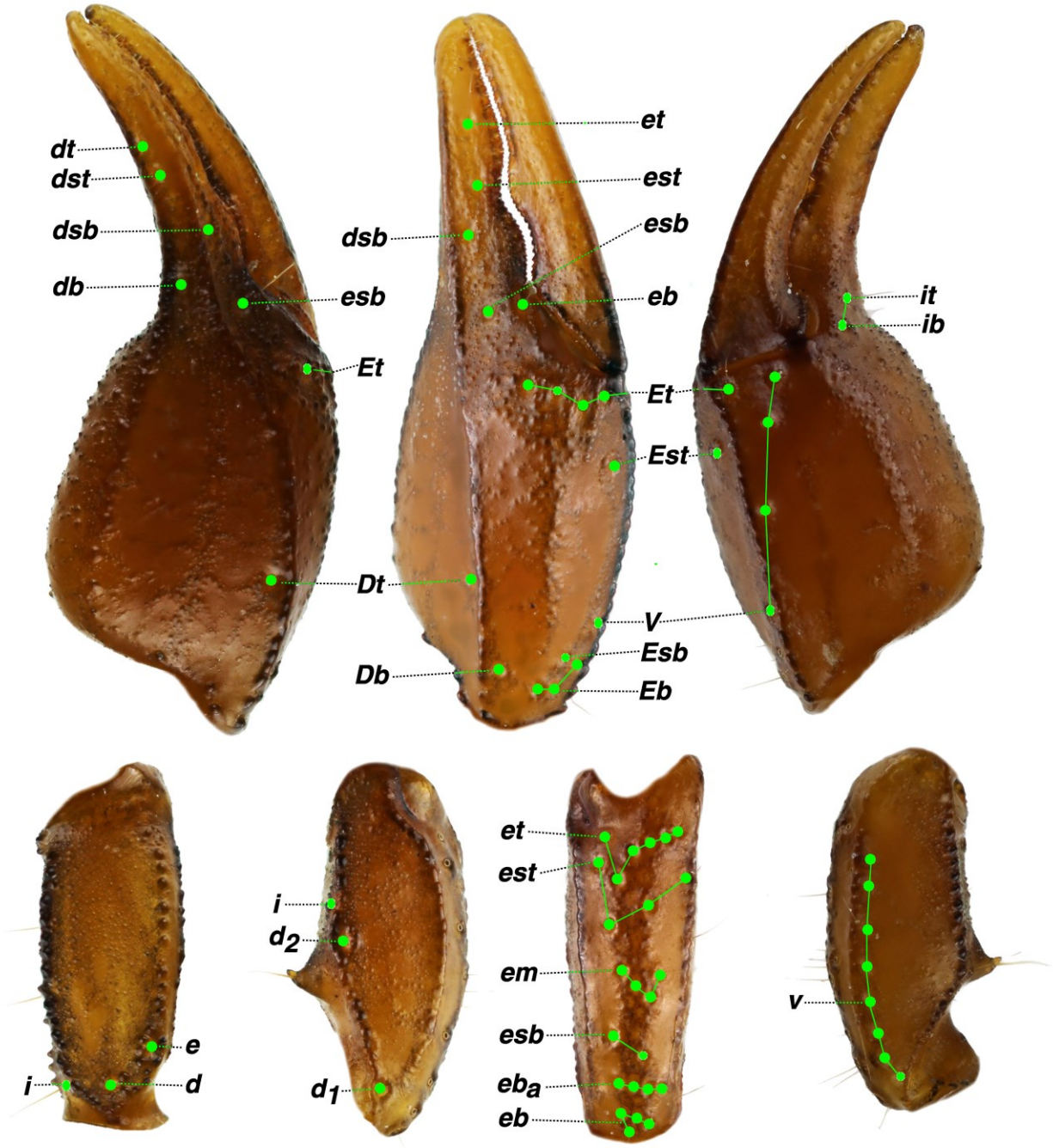

Figure 5: *Euscorpius yagmuri*, **sp. nov.** Trichobothrial pattern, male paratype.

rated granules. **Patella:** Dorsointernal and ventrointernal carinae crenulated, dorsoexternal and ventroexternal mediumly crenulated, and exteromedian carina developed lined irregularly positioned medium sized granules. Dorsal surface rough and ventral surface smooth proximally, rough distally; external rough; internal surface smooth with well-developed, pointed DPS and near obsolete VPS (single small granule). **Chelal carinae:** Complies to the "10-carinae configuration". Digital (*D1*) carina strong, with low-profile granulation; sub-digital (*D2*) essentially obsolete, represented by two granules; dorsosecondary (*D3*) near obsolete, area quite flat, presented by one large basal granule; dorsomarginal (*D4*) well developed lined with medium-sized granules; dorsointernal (*D5*) highly rounded and covered with granules; ventroexternal (*V1*) strong, evenly granulated, curving to external condyle of movable finger; ventromedian (*V2*) obsolete; ventro-

Figures 6–8: *Euscorpius yagmuri*, **sp. nov. 6.** Paratype female chela, lateral view. **7.** Holotype male chela, lateral view, and movable finger dentition. **8.** Holotype male legs I–IV, exteroventral view.

internal (*V3*) rounded with scattered with small granules; external (*E*) irregularly developed with scattered granulation. **Chelal finger dentition:** Median denticle (*MD*) row groups in straight line; 6/6 *ID*s fixed finger and -/7 on movable finger; 6/6 *OD*s on fixed and movable fingers; 4/4 and -/5 IADs on fixed and movable fingers, respectively. **Trichobothrial patterns (Fig. 5, paratype male):** Type C, neobothriotaxic: chela ventral = 4/4; patellar *eb* = 4/4, eb_a =4/4, *esb* = 2/2, *em* = 4/4, *est* = 4/4, *et* = 6/6; patellar ventral = 9/9; est_2–est_4 form a straight line.

LEGS (Fig. 8). Both pedal spurs present on all legs, lacking spinelets; tibial spurs absent. Tarsus with single row of spinules on ventral surface, terminating distally with two essentially adjacent spinules. Unguicular spine well-developed and pointed.

HEMISPERMATOPHORE. Partially developed hemispermatophores were extracted, but due to their limited condition, they are not described or illustrated.

Sexual dimorphism. The adult female exhibits subtle chelal finger scalloping and the movable finger lobe is essentially absent, whereas they are slightly more developed in the male; the genital operculum sclerites in the female are connected along the middle, not separated as in the male; genital papillae are absent in the female, but present in the male. The pectinal tooth counts are smaller in the female, 6–7 (6.786) (±0.426) [14] as compared 8 [4] in the male, an 18 % difference in the means (see Table 1). Morphometric differences based on two males and females: The telson vesicle in the female is not as swollen as it is in the male; the telson length compared to its width is 2.833 in the female and 2.521 in the male, exhibiting a 12.4 % difference; the telson length compared to its depth is 3.188 in the female and 2.275 in the male, exhibiting a 40 % difference. Morphometrics involving the chelae show no significant differences between the genders, reflecting the lack of finger scalloping in both genders, which is typically seen in *Euscorpius*. Finally, the carapace is relatively longer in the female, dominating in most morphometric ratios when compared to 23 other morphometrics, the largest difference, when the carapace is compared to the vesicle depth, exhibited a significant 80.6 % mean value difference.

Variation. Pectinal tooth and trichobothrial counts are based on two males and seven females. Pectinal tooth counts: male 8 [4], female 6–7 (6.786) (±0.426) [14] mode = 7; patellar *ventral* (*v*) trichobothrial counts: 8–9 (8.353) (±0.493) [17], mode = 8; patellar *external terminal* (*et*) trichobothrial counts: 5–6 (5.889) (±0.323) [18], mode = 6.

Discussion

The scorpion fauna of coastal Epirus has not been sufficiently studied, and collections from this area have been sporadic. Only a few *Euscorpius* from this part of Greece were reported by Kinzelbach (1975, 1982). The only *Euscorpius* species known from Epirus with trichobothrial numbers eb_a=*eb*=4 is the recently described *E. stahlavskyi* Tropea et al., 2014, from the Smolikas Mountains, which are situated away from the Ionian Sea coast. The new species differs from *E. stahlavskyi* predominantly in size and metasomal granulation, as well as trichobothrial and pectinal teeth number. Closer to the coast, some other common *Euscorpius* species have been found, which are clearly distinguishable by their trichobothrial number, including *E. hadzii* Di Caporiacco, 1950 (Fet & Soleglad, 2002), *E. sicanus* (C.L. Koch, 1837) (Fet et al., 2003), and *E.* (*Polytrichobothirus*) *italicus* (Herbst, 1800) (Gantenbein et al., 2002).

The distinct granulation on metasomal carinae, which is noticeable in *E. yagmuri* sp.n., is a rare feature in *Euscorpius*, which among Greek species is observed in a localized species *E. scaber* from northeastern Greece (Fet et al., 2013a). Further investigation using DNA markers could clarify possible relationship between these two geographically very distant species.

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