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Redescription of *Harpactea cecconii* (Araneae: Dysderidae)

Recep Sulhi Özkütük, Özge Özden, İlhan Coşar & Kadir Boğaç Kunt

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Abstract. The little-known spider species *Harpactea cecconii* (Kulczyński, 1908) is redescribed based on samples collected from the island of Cyprus. Photographs of the female copulatory organ are given for the first time. In addition, the fine structure of the spiniform embolus of the male copulatory organ is revealed by SEM photographs. The possibility that *H. cecconii* may be endemic to Cyprus is discussed.

Keywords: Harpacteinae, Mediterranean, taxonomy, woodlouse spiders

Zusammenfassung. Wiederbeschreibung von *Harpactea cecconii* (Araneae: Dysderidae). Die wenig bekannte Spinnenart *Harpactea cecconii* (Araneae: Dysderidae) wird anhand von Material wiederbeschrieben, welches auf der Insel Zypern gesammelt wurde. Fotografien der weiblichen Kopulationsorgane werden zum ersten Mal präsentiert. Zusätzlich werden mithilfe von SEM-Fotografien die Feinstrukturen des spiniformen Embolus, einem Teil des männlichen Kopulationsorgans, gezeigt. Es wird die Möglichkeit erörtert, dass *H. cecconii* auf Zypern endemisch sein könnte.

Kulczyński (1908) recorded a total of 19 spider species from Cyprus collected by the Italian entomologist Giacomo Cecconi, seven of which were new to science. Among these, *Harpactea cecconii* (Kulczyński, 1908) was the first dysderid spider recorded from the island. In the aforementioned study, Kulczyński provided a detailed description of the male and female of this species, but did not provide drawings of the female copulatory organs. Brignoli (1980) re-examined the type specimens of *H. cecconii*, but discovered that the females were in poor condition thus making it impossible to examine the vulva. Deltshev & Paraschi (1990) identified male dysderids collected from the Epidaurus region of Greece and the island of Naxos as *H. cecconii*. In their comprehensive checklist of Cypriot spiders, Bosmans et al. (2019) noted the presence of *H. cecconii* in various regions of the island. However, the authors provided neither a description of the species nor details of its copulatory organs. They also emphasized that the Epidaurus record of Deltshev & Paraschi (1990) is highly doubtful.

The aim of the present study is to redescribe *H. cecconii*. Photographs of both the male and female copulatory organs are given. Additionally, the distribution of this species is discussed.

Material and methods

Specimens were collected in Northern Cyprus using a litter reducer, pitfall traps and preserved in 70% ethanol. Digital images of the pedipalp were taken with a Leica MC170 HD digital camera attached to a Leica S8AP0 stereomicroscope and 5–15 photographs were taken at different focal planes and combined. SEM microphotographs were made from dried and sputter coated (by gold) organs by use of a Zeiss Ultra Plus SEM device (Eskişehir Technical University, Eskişehir, Turkey). All measurements are in millimetres (mm). Terminology for the body measurements and copulatory organ structures follows Chatzaki & Arnedo (2006).

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Abbreviations used: Carapace and opisthosoma: CL, carapace length; CW_{max}, maximum carapace width; CW_{min}, minimum carapace width; OL, opisthosomal length; TL, total length. Eyes: AE, anterior median eye; PLE, posterior lateral eye; PME, posterior median eye; AEd, PLEd, PMEd, diameter of AE, PLE, PME respectively. Chelicera: ChF, length of cheliceral fang; ChG, length of cheliceral groove; ChL, total length of chelicera (lateral external view); pt, promarginal teeth; rt, retromarginal teeth. Legs: C, coxa; Tr, trochanter; Fe, femur; Pa, patella; Ti, tibia; Me, metatarsus; Ta, tarsus; d, dorsal; pl, prolateral; rl, retrolateral; v, ventral. Palp: E, embolus; O, opening of the sperm duct; T, tegulum. Vulva: aba, anterior basal arc; btas, basal transverse part of the anterior spermatheca; dc, distal crest; des, distal expansion of the spermatheca; pd, posterior diverticulum; rsas, rod shaped part of the anterior spermatheca; tb, transverse bar. Depository: ETZM, Eskişehir Technical University Zoology Museum, Eskişehir, Turkey (Curator: R. S. Özkütük). ZM-CWRI: Zoological Museum, Cyprus Wildlife Research Institute, Kyrenia, Cyprus (Curator: S. Gücel).

Taxonomy

Family Dysderidae C. L. Koch, 1837

Genus *Harpactea* Bristowe, 1939

Harpactea cecconii (Kulczyński, 1908) (Figs 1-4)

Harpactes cecconii Kulczyński, 1908: 51, pl. 2, figs 1-2 (descr. ♂♀)
Harpactea cecconii: Brignoli 1980: 77, figs 4-5 (♂)
H. cecconii: Deltshev & Paraschi 1990: 3
H. cecconii: Le Peru 2011: 266, fig. 391 (♂)
H. cecconii: Bosmans et al. 2019: 50-51

Examined material. CYPRUS, Lefkoşa, Beşparmak Mountain, Alevkayası-Girnekayası (35.28694°N, 33.51694°E), 633 m asl, 1 ♂, 12. Jan. 2018, leg. Kunt & Gücel; Karpaz Peninsula, Dipkarpaz Village (35.67747°N, 34.57784°E), ~ 2 m asl, 2 ♂♂, 16. Jan. 2018 – 22. Mar. 2018, leg. Kunt & Gücel; Lefkoşa, Beşparmak Mountain, Kantara, Antennas (35.38278°N, 33.87500°E), 600 m asl, 5 ♂♂, 1 ♀, 20. Mar. 2018, leg. Kunt & Gücel; Lefkoşa, Beşparmak Mountain, Top of Lapta (35.30917°N, 33.20250°E), 666 m asl, 1 ♂, 24. Mar. – 19. Aug. 2018, leg. Kunt & Gücel; Lefkoşa, Beşparmak Mountain, Yaylatepe, English Camp (35.29500°N, 33.55222°E), 850 m asl, 1 ♂, 3. Nov. 2018, leg. Kunt & Gücel; Lefkoşa,

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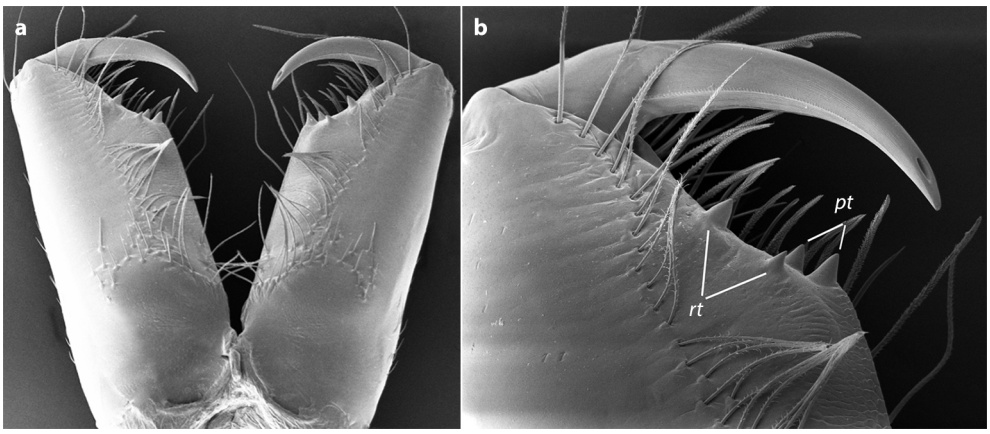

Fig. 1: *Harpactea cecconii*, male chelicerae. **a.** ventral view; **b.** detail of teeth (pt, promarginal teeth; rt, retromarginal teeth)

Değirmenlik Village (35.25194°N, 33.46111°E), 197 m asl, 1 ♂, 2. Dec. 2018, leg. Kunt & Gücel; Lefkoşa, Beşparmak Mountain, Top of Lapta (35.30917°N, 33.20250°E), 666 m asl, 2 ♂♂, 1 ♀, 20. Dec. 2019, leg. Kunt & Gücel.

Diagnosis. The spheroidal bulb (Figs 2, 3a-c) and simple, spiniform embolus (Fig 3d-g) of *Harpactea cecconii* are similar to those of *Harpactea diraoi* Brignoli, 1978, *H. isaurica* Brignoli, 1978 and *H. sanctaeinsulae* Brignoli, 1978. However, *H. cecconii* differs from the aforementioned species in terms of the embolus/bulb ratio and the membranous formation of its spiniform embolus (Fig. 3e-g). In *H. diraoi*, the bulb length is almost one and a half times the embolus length; in *H. isaurica*, the bulb length is twice the embolus length; in *H. sanctaeinsulae*, the bulb and embolus lengths are almost equal, while in *H. cecconii*, the bulb length is slightly shorter than twice the embolus length.

The vulva of *H. cecconii* is similar to *H. azowensis*; (1) because of the right and left protuberances of the btas (2) the shortness of the rsas (3) and the terminal structure of the dc. However, the dc/des and aba/tb ratios differ between these species.

Description

Measurements (♂/♀). OAL 2.38–2.50/2.52–2.72; CL 1.83–2.00/2.05–2.30; CW_{max} 1.13–1.38/1.60–1.75; CW_{min} 0.75–0.78/0.90–1.00; AMEd 0.09–0.11/0.11–0.11; PLEd 0.08–0.08/0.08–0.08; PMEd 0.07–0.08/0.08–0.09; ChF 0.34–0.40/0.41–0.47; ChG 0.18–0.23/0.28–0.31; ChL 0.75–0.90/0.98–0.98. Leg measurements are given in Tab. 1.

Male. Carapace reddish brown, with sparse short blackish setae on the surface of the carapace. There is a slight tonal difference between cephalic and thoracic regions, although it is not obvious. Cephalic region darker. Fovea blackish brown, distinct. Eyes arranged circularly; one unit distance between PME–PME, PME–PLE and PLE–AE, and two units distance between AE–AE.

Chelicerae, cheliceral fangs, labium and gnathocoxae brown. Cheliceral groove with four tiny teeth (Fig. 1a-b). Promarginal teeth close to each other. Tooth on margin of cheliceral groove slightly larger than the one inside. Of the retromaginal teeth, the one in the middle of the cheliceral groove is larger than the one at the margin (Fig. 1b). Dorsal side of the chelicerae bears blackish setae coming out of a pit. Of these setae, those towards the tip of the chelicerae are longer. Labium and gnathocoxae with whitish, thick and densely arranged hairs at the tips.

Sternum brown, shiny, margins dark brown, with long blackish hairs on posterior margins of sternum. Coxae, trochanters and palpal segments dark brown. Legs yellowish brown, with fine weak brownish setae. All tarsi and first half of the 3rd and 4th metatarsi with weak scopulae. Tarsi with three claws. Frontal tarsal claws on all legs with 7–8 teeth. Leg formula: 4123 or 1423. Number of spines on legs variable; 4–5 spines on prolateral side of 1st femur and 3 spines on prolateral side of 2nd femur. Detailed leg spination given in Tab. 2.

Pedipalp (Figs 2-3)**.** Tarsus: 0.36–0.46 Tibia: 0.36–0.38. Pal-

Tab. 1: Leg measurements of *Harpactea cecconii* (♂ and ♀)

Legs	I	II	III	IV
♂				
C	0.83–1.00	0.63–0.70	0.50–0.50	0.45–0.63
Tr	0.13–0.30	0.15–0.18	0.13–0.15	0.20–0.25
Fe	1.43–1.75	1.40–1.53	1.13–1.25	1.65–1.75
Pa	1.00–1.13	0.83–1.00	0.50–0.60	0.75–0.83
Ti	1.20–1.63	1.25–1.50	0.75–1.00	1.38–1.60
Me	1.13–1.38	1.13–1.18	1.03–1.10	1.50–1.50
Ta	0.38–0.50	0.40–0.45	0.38–0.40	0.40–0.50
Total	6.10–7.69	5.79–6.54	4.42–5.00	6.33–7.06
♀				
C	0.83–0.88	0.78–0.80	0.50–0.55	0.75–0.75
Tr	0.23–0.25	0.18–0.25	0.17–0.20	0.25–0.25
Fe	1.50–1.75	1.38–1.50	1.08–1.25	1.75–1.88
Pa	1.00–1.13	0.88–0.88	0.63–0.70	0.88–0.88
Ti	1.35–1.48	1.28–1.38	0.75–0.78	1.63–1.70
Me	1.13–1.38	1.20–1.20	1.18–1.23	1.75–1.88
Ta	0.40–0.45	0.38–0.38	0.38–0.38	0.50–0.50
Total	6.44–7.32	6.08–6.39	4.69–5.09	7.51–7.84

Tab. 2: Leg spination of *Harpactea cecconii* (♂ and ♀)

Legs	I	II	III	IV
♂				
C	0	0	2–3 rl	3–4 d
Fe	4–5 pl	3 pl	2–3 d 2–3 rl	3 pl 2 d 0–1 rl
Pa	0	0	0–1 pl 0–1 d 1 rl	0
Ti	0	0	2 pl 1 d 3 rl 4 v	2–3 pl 2–3 d 2–3 rl 4 v
Me	0	0	2 pl 3 rl 2 v	3 pl 2 d 4 rl 4 v
♀				
C	0	0	1 pl	1–4 pl
Fe	0	0	1–2 d 2–3 rl	2–3 pl 1–2 d
Pa	3–4 pl	2 pl	0–1 pl 1 d 0–1 rl	0
Ti	0	0	2 pl 1 d 2–3 rl 4 v	2–3 pl 1–2 d 3 rl 4 v
Me	0	0	2 pl 3 rl 4 v	3 pl 2 d 3 rl 4 v

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Fig. 2: *Harpactea cecconii*, left male bulb. **a.** prolateral view (E, embolus; T, tegulum; arrow indicates a membranous formation); **b.** almost prolateral view; **c.** retrolateral view; **d.** almost retrolateral view. Scale line: 0.10 mm

Fig. 3: *Harpactea cecconii*, right male bulb. **a-c.** prolateral view; **d-g.** detail of embolus. In e and g, arrows indicate membranous formations; O, opening of the sperm duct

pal tarsi and tibiae with long blackish setae. Tegulum spherical; dorsal margin more convex than ventral margin. Tegulum slightly longer than wide, almost twice as long as embolus (Figs 2, 3a-c). Conductor absent. Embolus simple, straight (Fig. 2a). Membranous formations close to the tip of embolus (Fig. 3d-g).

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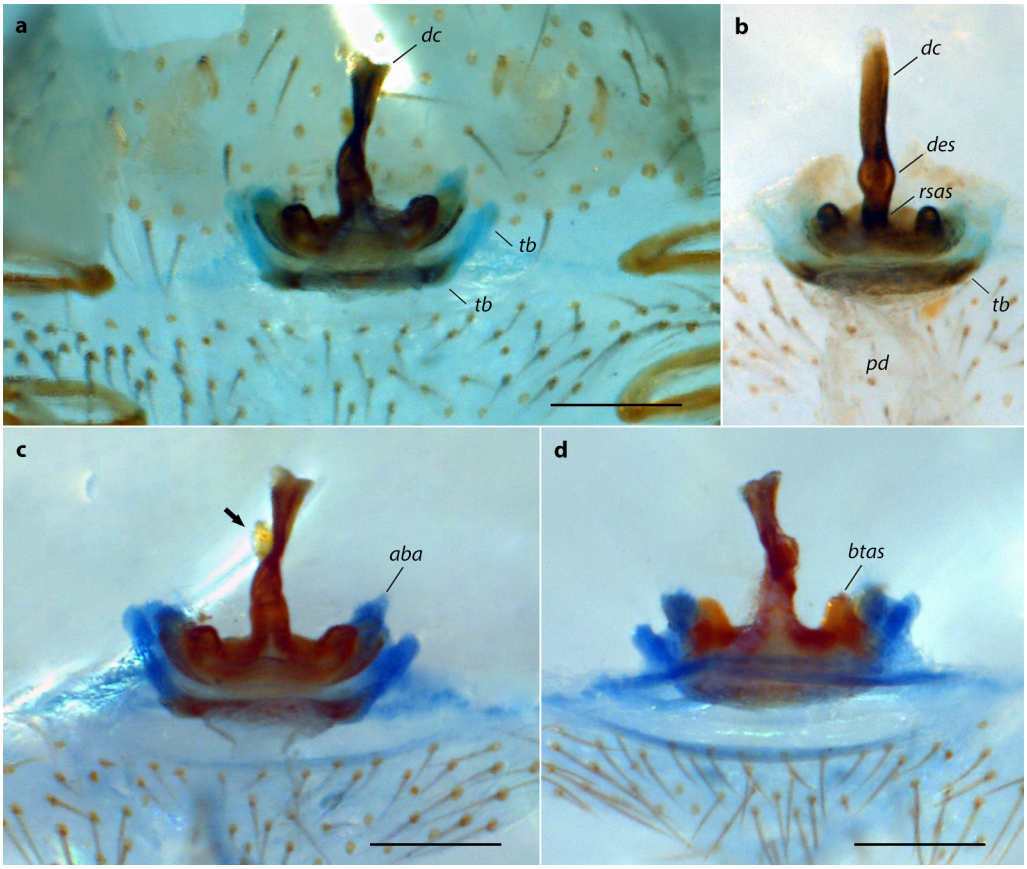

Fig. 4: *Harpactea cecconii*, vulva. **a-c.** dorsal view; **d.** ventral view. In c arrow indicates membranous protrusion of des. Abbreviations: aba, anterior basal arc; btas, basal transverse part of the anterior spermatheca; dc, distal crest; des, distal expansion of the spermatheca; pd, posterior diverticulum; rsas, rod shaped part of the anterior spermatheca; tb, transverse bar. Scale lines: 0.10 mm

Female. No significant difference between males and females in terms of somatic characteristics and external appearance. Leg formula: 4123; number of spines on legs variable, 3–4 spines on prolateral side of 1st femur and 2 spines on prolateral side of 2nd femur. Detailed leg spinations given in Tab. 2.
Vulva (Fig. 4). Des distinct with a membranous protrusion ventrally (Fig. 4a, c), dc long, tip wide. Length of dc about 5–6 times length of rsas; tb flat, thick and sclerotized. Margins of tb hyaline, oriented anteriorly at an angle of about 45 degrees; pd membranous, indistinct (Fig. 4b). Btas characteristic with two humps to the left and right side of anterior spermatheca (Fig. 4d).
Habitat. *Harpactea cecconii* prefers to live in leaf litter and under stones in xerophile maquis and pine forests.
Notes. Due to the taxonomic characters listed below, it is possible to place *H. cecconii* in the *rubicunda* species group *sensu* Deeleman-Reinhold (1993): In males, the bulb is globular and the embolus is spiniform, posterior diverticulum membranous in the female vulva, patellae 3 and coxae 4 with spines.

Many of the *Harpactea* species found in the Mediterranean Basin have spiniform emboli. In some of them, the emboli are morphologically very simple and similar to each other; e.g. *H. sanctaeinsulae* or *H. isaurica*. Although we did not examine the Greek samples of Deltshev & Paraschi (1990), we see a possibility that the authors misidentified their record of *H. cecconni* which could be one of these similar species instead. *Harpactea cecconni* has been repeatedly recorded from Cyprus, but no further unequivocal records are known from the Greek mainland. We thus share the opinion of Bosmans et al. (2019) that *H. cecconii* is likely endemic to Cyprus. Of course, this situation could be clarified in future through further faunistic and taxonomic studies on the genus.

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