

***HARPACTEA KARASCHKHAN* SP. N., A NEW CAVE-DWELLING BLIND SPIDER SPECIES FROM THE MEDITERRANEAN REGION OF TURKEY**

KADIR BOĞAÇ KUNT¹, RECEP SULHI ÖZKÜTÜK¹, MERT ELVERICI^{2,3},
YURI M. MARUSIK^{4,5}, AND GIZEM KARAKAŞ¹

ABSTRACT: A new troglobitic species, *Harpactea karaschkhan* sp. n. (females only), inhabiting Yalandünya Mağarası of Gazipaşa (Antalya Province, Turkey) is described. Detailed morphological description and illustrations of the new species are provided. The relationships of the new species are discussed.

INTRODUCTION

Obligatory cave-dwelling organisms (troglobionts) have attracted attention of the scientific community for almost two centuries. Evolution of troglomorphic traits, such as loss of eyes and pigment, or gains, such as elongated appendages and increases in number or functionality of nonvisual sense organs, often obscures taxonomic relationships due to convergence. On the other hand, narrow distribution ranges and high endemism make troglobionts important subjects of biogeographic studies (Porter, 2007).

In spiders, troglomorphy usually results in loss of eyes and depigmentation. Such species are rather common, although their number varies within family or genus. One of the richest groups in troglobionts is the subfamily Harpacteinae in family Dysderidae.

Among Harpacteinae, reduction of eyes is common in the genera *Folkia* Kratochvíl, 1970 and *Stalagtia* Kratochvíl, 1970; eyes are absent in the monotypic genus *Sardostalita* Gasparo, 1999; and eyes are reduced in *Minotauria attemsi* Kulczyński, 1903 and completely absent in *M. fagei* (Kratochvíl, 1970). With only a few exceptions, species in the genus *Harpactea* Bristowe, 1939 possess fully developed eyes. Eyes are strongly reduced in *H. persephone* Gasparo, 2011 (Kournas Cave, Chania Prefecture, Crete, Greece), and posterior median eyes are absent in *H. sanctidomini* Gasparo, 1997 (Tremi Islands, Italy). Eyes are completely lost in *Harpactea* only in two known cases, *H. stalitoides* Ribera, 1993 (Iberian Peninsula) and *H. strinatii* Brignoli, 1979 (Diros Caves, Peloponnese, Greece).

The third known case of a completely blind *Harpactea* is the new species *Harpactea karaschkhan* sp. n., described here from Turkey. Our description is based on females; the male is unknown. Illustrations of taxonomically important body parts and female reproductive organs are provided.

MATERIAL AND METHODS

Studied material was collected from the type locality, on the walls of the cave by using a hand aspirator. The specimens were preserved in 70% ethanol and deposited in

the Anadolu University Zoology Museum. Digital images of copulatory organs were taken with a Leica DFC295 digital camera attached to a Leica S8AP0 stereomicroscope; five to fifteen photographs were taken in different focal planes and combined using Automontage software. All measurements are in mm, with methods following Chatzaki and Arnedo (2006). Terminology for the copulatory organs is adapted from Deeleman-Reinhold (1993).

The following abbreviations are used in the description: Dimensions of carapace and abdomen, AL, abdominal length; CL, carapace length, CWmax, maximum carapace width; CWmin, minimum carapace width. Chelicera: ChF, length of cheliceral fang; ChG, length of cheliceral groove; ChL, total length of chelicera (lateral external view). Depository: AUZM, Anadolu University Zoology Museum, Eskişehir, Turkey.

TAXONOMY

HARPACTEA BRISTOWE, 1939

HARPACTEA KARASCHKHAN SP. N.

Material examined. Holotype ♀ (AUZM), Turkey, Antalya Province, Gazipaşa District, Beyrebucak Village, cave Yalandünya Mağarası (36°13'9.77"N; 32°24'16.64"E), 05 January 2013, K.B. Kunt leg. Paratypes 1 ♀, 1 juvenile (AUZM), same locality and date as holotype, Y.M. Marusik leg.

Diagnosis: *Harpactea karaschkhan* sp. n. can be easily distinguished from other species of *Harpactea* found in Turkey and elsewhere by its troglomorphic characters and presence of retrolateral spines on anterior femora, normally absent in this genus. While the new species is similar to the Cretan endemic *Harpactea persephone* in the

¹ Department of Biology, Faculty of Science, Anadolu University, TR- 26470 Eskişehir, Turkey

² Department of Biological Sciences, Faculty of Arts and Sciences, Middle East Technical University, TR-06800 Ankara, Turkey

³ Department of Biology, Faculty of Science and Arts, University of Erzincan, TR-24100, Erzincan, Turkey

⁴ Institute for Biological Problems of the North RAS, Portovaya Str. 18, Magadan, Russia

⁵ Department of Zoology & Entomology, University of the Free State, Bloemfontein 9300, South Africa

Table 1. Leg measurements of *Harpactea karaschkhan* sp. n. (Holotype ♀ / Paratype ♀).

Leg	Fe	Pa	Ti	Me	Ta	Total
I	1.60 / 1.64	1.00 / 1.08	1.20 / 1.48	1.12 / 1.36	0.40 / 0.50	5.32 / 6.06
II	1.50 / 1.60	0.83 / 1.04	1.25 / 1.32	1.00 / 1.16	0.38 / 0.38	4.96 / 5.50
III	1.20 / 1.40	0.63 / 0.72	0.95 / 1.20	1.15 / 1.28	0.42 / 0.44	4.35 / 5.04
IV	1.60 / 1.80	0.80 / 0.92	1.36 / 1.60	1.78 / 1.96	0.43 / 0.55	5.97 / 6.83

Fe = femur, Pa = patella, Ti = tibia, Me = metatarsus, and Ta = tarsus.

mentioned diagnostic characters, the vulva of *H. karaschkhan* sp. n. is unique.

Derivatio nominis: Karas Han is God of Darkness in Turkish and Altaic mythology.

Measurements [Holotype ♀ / Paratype ♀]: AL 2.00 / 2.40; CL 1.83 / 2.04; CWmax 1.30 / 1.40; CWmin 0.80 / 0.88; ChF 0.44 / 0.51; ChG 0.33 / 0.35; ChL 0.81 / 0.90. Leg measurements are given in Table 1.

Description of holotype female: Small-sized spider. Carapace yellow-light brown, darker in the cephalic region, smooth, covered with sparsely distributed brownish hairs, longer and directed forward in the cephalic region. Fovea indistinct. Eyes absent (Figs. 1a,b). Labium, gnathocoxae, and chelicerae reddish-brown. Sternum dirty yellow, brownish at edges. Sternum, labium, gnathocoxae, and chelicerae covered with brownish hairs of similar type and density (Fig. 1c). Cheliceral groove with four teeth, retromarginal teeth smaller than promarginal teeth. Among retromarginal teeth, the proximal tooth is conical and located a bit distally compared to the interspace between the promarginal teeth; the distal tooth is triangular, larger than the other and located at the middle of the cheliceral groove (Fig. 1d). Abdomen yellowish, cylindrical, covered with fine brown hairs.

Legs same color as abdomen. All legs with brownish discoloration at articular points of trochanter with coxa and femur. Tarsus with three tarsal claws. Numbers of denticles on tarsal claws: over 10 on legs I and II; 2 on leg III; absent on leg IV. Scopulae weakly developed, almost absent on tarsus and metatarsus of legs III and IV. Anterior femora with numerous prolateral and dorsal spines (Figs. 1e,f) and one to three prominent retrolateral spines; posterior femora with many spines; one prolateral spine on patella II; four spines on the dorsal side of patellae III and IV; three or four ventral and prolateral spines on tibia II; posterior tibiae and metatarsi with many spines; one dorsal spine on coxa III. Leg formula 4123. Details of leg spination are given in Table 2.

Vulva: Vulva almost equally sclerotized on the entire surface. Distal crest slightly longer than a rod-shaped part of spermatheca, expanding towards apical with comparatively less sclerotized apex (Figs 2a,b). Rod-shaped part of spermatheca short and thick. Distal expansion of the spermatheca circular. Basal transverse part of the anterior spermatheca narrow and V-shaped. “Anterior basal arc”

wing-shaped. Anterior sides more strongly sclerotized than other parts. Transverse bar relatively straight, thin. Membranous sac extremely wide; about three times longer than anterior spermatheca (Figs. 2c,d).

Distribution: *Harpactea karaschkhan* sp. n., is only known from its type locality.

Comments: New species belongs to the genus *Harpactea* based on the position of cheliceral teeth and structure of the vulva. According to the classification of Deeleman-Reinhold (1993), the new species belongs to the *rubicunda* (D) group by having a wide membranous sac on the vulva and spines on coxa III and patella III. Presence of spines on the patellae and the tibiae of the second pair of legs and presence of retrolateral spines on the anterior femora are very unusual characters for the genus *Harpactea*.

Biospeleological notes: Yalandünya cave is located at the foothills of the Taurus Mountains. The cave is formed in bluish-gray Paleozoic (Permian) limestone. It is a 270 m long cave, open for tourists, which starts with a 50 m long corridor sloping from south to north. Following the entrance of the cave at the start of the corridor, the following spiders were observed: numerous *Loxosceles rufescens* (Dufour, 1820) (Sicariidae), several *Heteropoda variegata* (Simon, 1874) (Sparassidae), and some exuviae of *Chaetopelma* sp. (Theraphosidae). Also, funnel webs of *Tegenaria* sp. (Agelenidae) were seen along the corridor between or beneath large rocks. At the end of the corridor, a wide chamber continues eastward. Bat colonies were observed in this chamber [three species, according to Benda and Horáček (1998): *Eptesicus bottae* Peters, 1869; *Pipistrellus savii* (Bonaparte, 1837), and *Plecotus austriacus* (Fischer, 1829)], together with a dense population of a cricket *Ovaliptila beroni* (Popov, 1975) (Orthoptera: Gryllidae) on the cave floor. Terrestrial isopods were observed on the extensively damp walls of the chamber and also under rocks on the ground, together with troglomorphic silverfish *Coletinia* sp. (Zygentoma: Nicoletiidae). The cave continues northward with an initially narrow corridor. At the entrance of this corridor, webs of *Cataleptoneta* sp. (Araneae: Leptonetidae) were present on stone walls. One adult male of *Charinus ioanniticus* (Kritscher, 1959) (Amblypygi: Charinidae) was also collected in this corridor between large rocks on the ground on January 5, 2013. This corridor is followed by a second, terminal chamber, not as wide as the previous one.

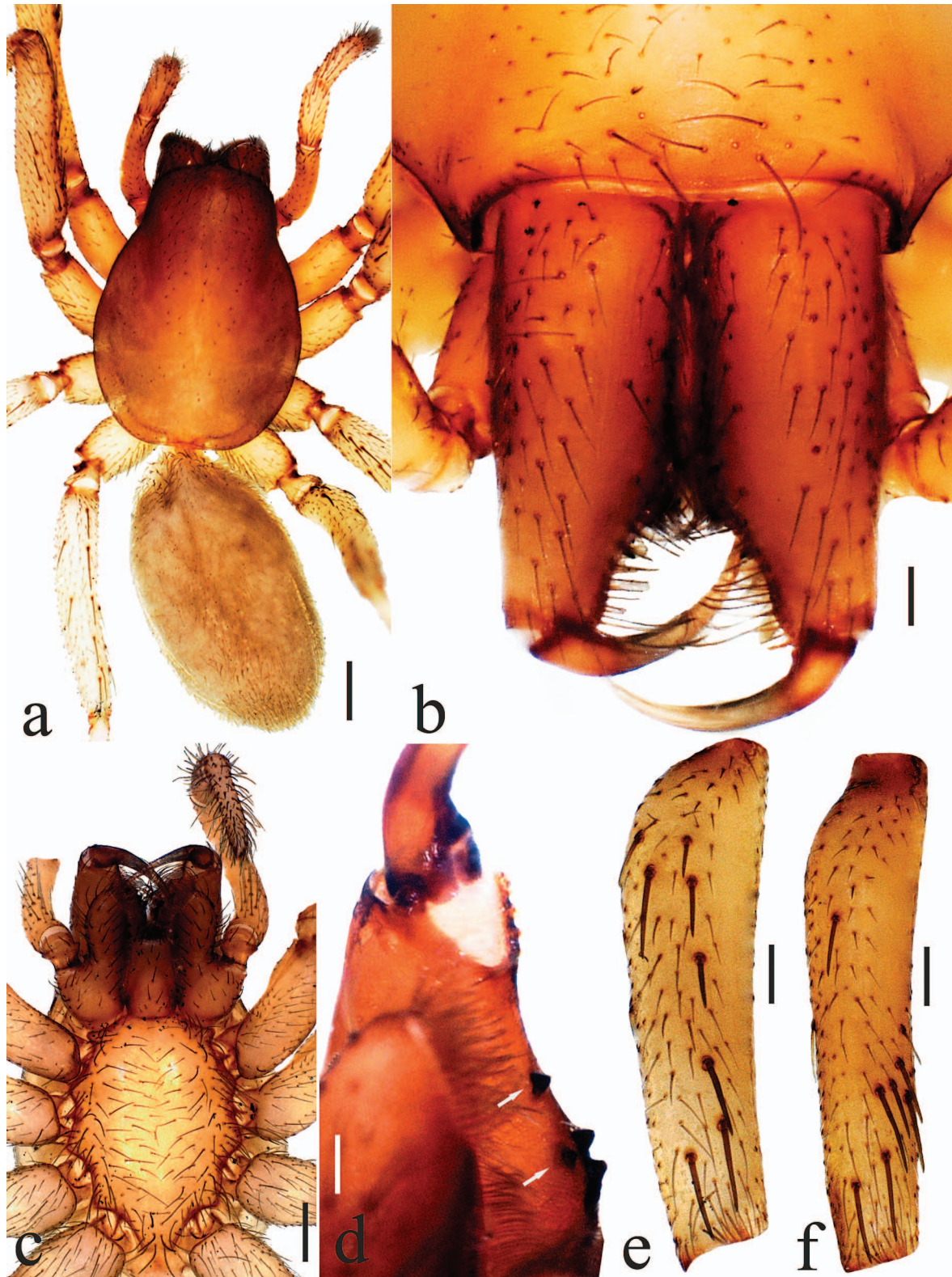


Figure 1. *Harpactea karaschkhan* sp. n. a. General habitus, dorsal view; b. Cephalic region of carapace and chelicera, anterior view; c. Sternum and mouthparts, ventral view; d. Cheliceral teeth, posterior-ventral view (arrows indicate the retromarginal teeth); e. Femur I, prolateral view; f. Femur II, prolateral view. Scale lines: a. 0.5 mm; b. and c. 0.4 mm; d. 0.1mm; and e. and f. 0.25 mm.

Table 2. Leg spination of *Harpactea karaschkhan* sp. n.

♀	Leg I	Leg II	Leg III	Leg IV
Cx	0	0	0-1 d	0
Fe	6-9 pl 2 d 1-2 rl	5-6 pl 3-4 d 2-3 rl	2-4 pl 7-8 d 3 rl	3 pl 6 d 3 rl
Pa	0	0-1 pl	1 pl 2 d 1 rl	1 pl 2 d 1 rl
Ti	0	1-2 pl 2 v	2-3 pl 1 d 2-3 rl 4 v	3 pl 1 d 2 rl 5 v
Me	0	0	2 pl 3 rl 6 v	3 pl 3 rl 5 v

Cx = coxa, Fe = femur, Pa = patella, Ti = tibia, and Me = metatarsus

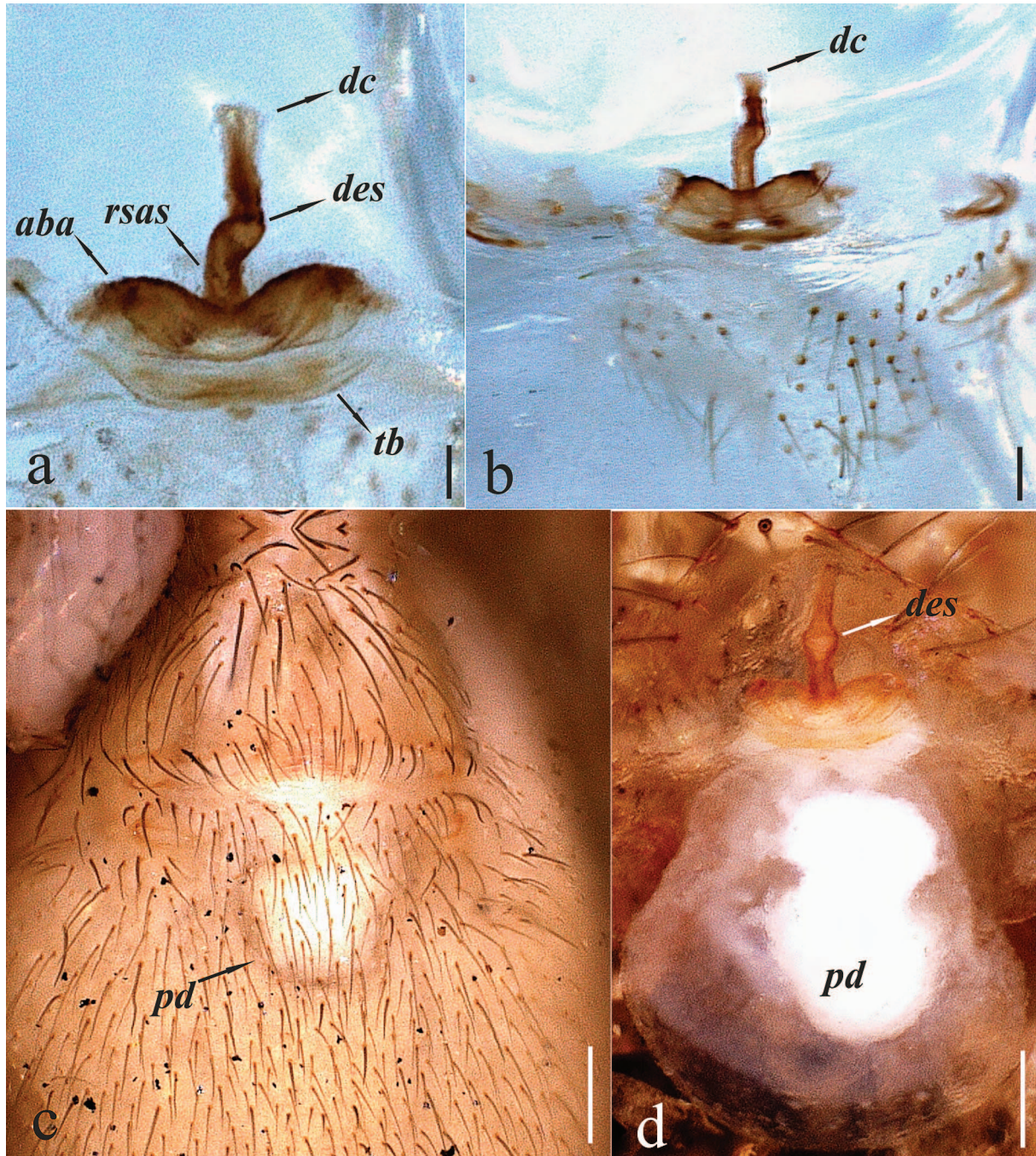


Figure 2. *Harpactea karaschkhan* sp. n. a,b. Vulva, dorsal view c,d. Vulva, ventral view *aba*, anterior basal arc; *dc*, distal crest; *des*, distal expansion of the spermatheca; *pd*, posterior diverticulum; *rsas*, rod-shaped part of the anterior spermatheca; *tb*, transverse bar. Scale lines: a. 0.05 mm; b. 0.1 mm; c. 0.2 mm; and d. 0.25 mm.

This terminal chamber is completely dark, while the rest of the cave is illuminated for tourists, and apparently more humid, with cave mud on the floor and several large columns inside. The specimens of *karaschkhan* sp. n. were collected as they were actively wandering on these columns.

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