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First record of the family Cunaxidae (Acari: Trombidiformes) from Syria with description of a new species

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ABSTRACT — This paper presents the first record of cunaxid predatory mites from Syria. Two species were collected on *Malva sylvestris* L. growing within citrus orchards: *Cunaxa capreolus* Berlese and a new species named *Cunaxa celineae* n. sp., herein described.

KEYWORDS — *Cunaxa capreolus*; *Cunaxa celineae*; taxonomy; predatory mite; Middle East

INTRODUCTION

Knowledge of mite fauna in Syria is very limited. Recent surveys (2011-2014) on these small arthropods were conducted in more than fifty citrus orchards in Latakia Governorate. The results showed the presence of eighteen predatory mite species of Phytoseiidae Berlese and four species of their common prey of the family Tetranychidae Donnadieu, on citrus trees, soil litter and on wild plants (Barbar, 2013, 2014). In addition to these two families, other mites were also collected and identified at least to the family level, including Cunaxidae mites.

Cunaxidae family includes more than 400 species (Skvarla *et al.*, 2014). Members of this family are fast-running, red, brown or yellow generalist predators and several species have been reported to feed on phytophagous mites, small insects [*i.e.* *Cunaxa capreolus* (Berlese)] and rootknot nematodes [*i.e.* *Coleoscirus simplex* (Ewing)] (Zaher *et al.* 1975; Walter and Kaplan 1991; Castro and Moraes 2010).

The genus *Cunaxa* Von Heyden includes the

highest number of species in the Cunaxidae with a total of fifty species known from all continents, except for Antarctica (Skvarla *et al.*, 2014). Two *Cunaxa* species were found during surveys on citrus orchards in Syria (see Barbar, 2013, 2014). The first one is the cosmopolitan species *C. capreolus*, which was originally described by Berlese (1887) and re-described several times (*i.e.* den Heyer, 1979, 2009; den Heyer *et al.*, 2011). The second one was identified as new for science.

In this paper, the new species is described and illustrated and *C. capreolus* is redescribed. Morphological differences with related species or previous descriptions are presented.

MATERIALS AND METHODS

Mites were collected on *Malva sylvestris* L. (a wild plant species growing within citrus orchards), infested by high densities of *Tetranychus urticae* Kokh and *Bryobia* sp., in two sites in Latakia Governorate,

Syria: in Al-Bahlouliyah, 38°35'95"N 57°35'07"E on 01 July 2012 and in Al-ya'robiyah, 30°35'50"N 48°35'70"E on 15 February 2014. Mites were removed from leaves using the "dipping-checking-washing-filtering" method (Boller, 1984), mounted on slides in Hoyer's medium and dried in an oven at 45°C for three days. Mites were identified using keys to world subfamilies, genera, and species proposed by Skvarla *et al.* (2014) and specimens were compared with original descriptions or re-descriptions of corresponding or related species.

All measurements of specimens are given in micrometers (µm). Body length is measured from the anterior edge of the propodosomal shield to the posterior limit of the idiosoma. Leg length is measured from the proximal edge of the trochanter to the distal end of the claw (Skvarla *et al.*, 2011). The setal notation follows Kethley (1990) as it has been applied to cunaxids by den Heyer and Castro (2008).

The following abbreviations are used for leg chaetotaxy: *sts*: simple tactile seta; *dtsl*: dorsoterminal solenidion; *tsl*: terminal solenidion on tarsi I-III; *T*: trichobothrium; *asl*: attenuate solenidion; *bsl*: blunt rod-like solenidion; *bbsl*: bulbous solenidion; *fam*: famulus (= peg organ), (Sergeyenko, 2009; Skvarla *et al.*, 2011, 2014). Setae in brackets indicate duplex or triplex. Specimens were deposited in the Arthropod Collection of the Department of Plant Protection, Faculty of Agriculture, Al-Baath University, Homs, Syria.

Cunaxa capreolus (Berlese)

Female (n=2) Gnathosoma — Surface of basifemur, telofemur, and genu of palps dorsally smooth and covered ventrally by a very few number of dots. Tibiotarsus of palps covered proximodorsally by denticles. Palpal chaetotaxy from trochanter to tibiotarsus: 0-1-1-3-5. Dorsolateral setae on the basi- and telofemora simple. Stout spine-like setae on the genua and tibiotarsi present. Telofemoral apophysis uncinated, with an obtuse angle formed between its proximolateral side and distolateral side of trochanter. Dorsally the coxal region possesses a papillated area anterolaterally. Proximal segment of chelicerae papillate. Chelicera terminating in

a claw-like digit and with one dorsolateral simple seta. The ventral surface of the hypognathum bears 4 pairs of simple hypognathal setae (*hg1-hg4*) and two pairs of adoral setae. Longitudinal lines and papillae extended from the central area of hypognathum to the insertions of setae *hg1*. Basic area patterned with rough spots.

Idiosomal dorsum — Propodosomal plate with two pairs of sensillae (*vi*, *sce*) and two pairs of simple setae (*ve*, *sci*). Propodosomal plate smooth except for the presence of papillae in areas laterally to setae *sce* and striae on anterolateral corners of propodosomal shield. Length of setae *sci* slightly shorter than half the distance between their bases. Hysterosomal shield smooth, bears four pairs of setae (*c1*, *c2*, *d1* and *e1*). Setae *f1* and *h1* on integument. A transverse regular dorsal striae pattern runs from the posterior side of hysterosomal shield to the end of dorsum. Longitudinal striae dorsolaterally. Cupule *im* present on integument posterolateral to *e1*. Setae *h2* occur ventrally.

Idiosomal venter — Idiosomal venter with one pair of propodogastral, four pairs of hystergastral, four pairs of genital setae (*g1-4*, subequal in length) and a pair of anal setae. Genital valves with longitudinal striae. A transverse striae anterior to setae *g1* and posterior to setae *g4*.

Legs — Leg chaetotaxy: coxae I-IV, 3-1-3-2 *sts*; trochanters I-IV, 1-1-2-1 *sts*; basifemora I-IV, 4-4-3-1 *sts*; telofemora I-IV, 4 *sts*-4 *sts*-1 *asl*, 3 *sts*-1 *asl*, 3 *sts*; genua I-IV, 2 *asl*, 1 very short *asl*, {1 *asl*, 1 *sts*}, 4 *sts*-2 *asl*, 5 *sts*-1 *asl*, 5 *sts*-1 *asl*, 5 *sts*; tibiae I-IV, {1 *asl*, 1 *sts*}, 1 *asl*, 4 *sts*-1 *asl*, 5 *sts*-1 *bsl*, 5 *sts*-1 *T*, 4 *sts*; tarsi I-IV, 3 *asl*, {1 *asl*, 1 *fam*, 1 *sts*}, 1 *dtsl*, 2 *tsl*, 20 *sts*-1 *bsl*, 1 *dtsl*, 1 *tsl*, 20 *sts*-1 *tsl*, 20 *sts*-19 *sts*. Surface of trochanters and basifemora I-IV with transverse broken striae. remaining leg segments with papillae which on dorsal side are larger and fewer than on ventral side.

Measurements — Length of idiosoma 392 – 430; width 305 – 310. Length of hypognathum 150; width 100 – 102. Length of palps 180 – 190. Chelicerae 138 – 140. Legs: I 280 – 305; II 275 – 285; III 304 – 312; IV 320 – 338. Length of setae: *hg1* 17; *hg2* 17; *hg3* 18; *hg4* 34; *vi* 140 – 170; *ve* 12 (15); *sce* 240 – 250; *sci* 25; *c1* 38 (33); *c2* 15; *d1* 25 (23); *e1* 25; *f1*

FIGURE 1: *Cunaxa celineae* sp. nov., female. Palp (a); chelicera (b); hypognathum (c).

38 (35); $h1$ 35 (32); $h2$ 10; $g1-4$ 18. Distance between setae: $hg4-4$ 75; $sci-sci$ 52.

Remarks — All morphological characteristics of specimens collected seem to be close to those collected from South Africa and UAE (den Heyer, 1979, 2009). However, specimens of the three localities differ in number of *sts* on tarsi I-IV. The specimens collected differ from Iranian specimens in number of *sts* on coxa IV and on tarsi I-IV (den Heyer *et al.*, 2011).

Material studied — Two Females, Syria, Latakia Governorate, Al-ya'robayah on *M. sylvestris*, 15 February 2014 (Coll. Barbar, Z.)

Cunaxa celineae n. sp.

Female (n=1) (Figures 1-3)

Gnathosoma — (Figure 1). Palps consist of five segments (Figure 1a). Surfaces of trochanter, basifemur, telofemur, and in particular genu covered by denticles. Palpal chaetotaxy from trochanter to tibiotarsus: 0-1-1-3-5. Dorsolateral setae on the basi- and telofemora simple. Stout spine-like setae on the genua and tibiotarsi present. Apophysis of telofemur cone-like with slightly pointed apex and closer to the central part of the segment (Figure 1a). Proximal segment of chelicerae papillate, second segment has some denticles proximodorsolaterally and followed distally by some "furrow-like" lines in different lengths (Figure 1b). Chelicera terminating in a claw-like digit and with one simple seta (Figure 1b). The ventral surface of the hypognathum bears four pairs of simple hypognathal setae ($hg1-4$)

FIGURE 2: *Cunaxa celineae* sp. nov., female idiosoma. Dorsum (a); venter (b).

FIGURE 3: *Cunaxa celineae* sp. nov., female. Basifemur, telofemur, genu, tibia and tarsus of: leg I (a), leg II (b); leg III (c) and leg IV (d).

and two pairs of adoral setae. Hypognathum with few random papillae and short transverse lines at its base (Figure 1c).

Idiosomal dorsum — (Figure 2a). Propodosomal plate with two pairs of sensillae (*vi*, *sce*) and one pair of simple setae (*sci*). Setae *ve* absent. Propodosomal plate generally smooth except for the presence of an oval area of thin broken striae around setae *sci*. Length of *sce* about 1.4 times longer than *vi*. Six pairs of hysterosomal setae (*c1*, *c2*, *d1*, *e1*, *f1*, *h1*) situated on small platelets. Setae *f1* and *h1* longer than other setae. A transverse regular striae pattern occurs between setae *c1* and *d1*, widely spaced between setae *d1-e1*, *e1-f1* and *f1-h1*. Thin striae in form of broken lines in the central regions between setae *e1-f1* and between setae *f1-h1*. Cupule *im* present posteriolateral to *e1*. Setae *h2* occur ventrally.

Idiosomal venter — (Figure 2b). Idiosomal venter with one pair of propodogastral, four pairs of hysterogastral, four pairs of subequal in length genital setae (*g1-4*) and a pair of anal setae. Genital valves with longitudinal striae. Cupule *ih* present.

Legs — (Figure 3). Leg chaetotaxy: coxae I-IV, 3-1-3-2 *sts*; trochanters I-IV, 1-1-2-1 *sts*; basifemora I-IV, 4-4-3-0 *sts*; telofemora I-IV, 4 *sts*-4 *sts*-1 *asl*, 3 *sts*-1 *asl*, 3 *sts*; genua I-IV, {1 *asl*, 1 *asl*}, {1 *asl*, 1 *sts*}, 1 *asl*, 4 *sts*-2 *asl*, 5 *sts*-1 *asl*, 5 *sts*-1 *asl*, 5 *sts*; tibiae I-IV, {1 *asl*, 1 *sts*}, 1 *asl*, 4 *sts*-1 *asl*, 5 *sts*-1 *bsl*, 5 *sts*-1 *T*, 1 *bbsl*, 4 *sts*; tarsi I-IV, 3 *asl*, {1 *asl*, 1 *fam*, 1 *sts*}, 1 *dtsl*, 2 *tsl*, 18 *sts*-1 *bsl*, 1 *dtsl*, 1 *tsl*, 21 *sts*-1 *tsl*, 21 *sts*-18 *sts*. Surfaces of trochanters and basifemora I-IV with transverse broken striae. Remaining leg segments with papillae which on dorsal side are larger and fewer than on ventral side.

Measurements — Length of idiosoma 540; width 365. Length of hypognathum 168; width 100. Length of palps 225. Chelicerae 153. Legs: I 342; II 330; III 370; IV 380. Length of setae: *hg1* 15; *hg2* 20; *hg3* 20; *hg4* 30; *vi* 195; *sce* 265; *sci* 22; *c1* 20; *c2* 17; *d1* 20; *e1* 16; *f1* 38; *h1* 38; *h2* 12; *g1-4* 12. Distance between setae *sci-sci* 46.

Male and immature — unknown.

Differential diagnosis — This new species closely resembles *C. anomala* Khaustov and Kuznetsov (1998) by the absence of setae *ve*, but differs

from the latter species by possessing the following combination of characters: (1) the presence of a very short bulbous solenidion *bbsl* anterior to the trichobothrium on tibiae IV (absence of this seta in *C. anomala*); (2) proximal segment of chelicerae papillate, second segment has some denticles proximally and dorsolaterally and followed distally by some "furrow-like" lines in different lengths (only the proximal segment is papillate in *C. anomala*) (3) hypognathum with short transverse lines at its base (smooth in *C. anomala*) (4) the presence of an oval area of thin broken striae around setae *sci* (absence of this area on dorsal propodosomal in *C. anomala*) and (5) idiosomal length of *C. celineae* is 540 µm and about 1.5 times longer than that in *C. anomala* (363 µm).

Etymology — The name of the species refers to the first name of author's daughter, Celine Barbar, to whom this species is dedicated.

Type material — Female holotype, Syria, Latakia Governorate, Al-Bahlouliyah, on *M. sylvestris*, 01 July 2012. (Coll. Barbar, Z.).

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