Review of Ceranisus (Hymenoptera: Eulophidae) of Turkey, with description of a new species

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Abstract. Three species of Ceranisus Walker, 1841 (Hymenoptera: Eulophidae: Entedoninae) were collected recently in Turkey, including C. menes (Walker, 1839) and C. pacuvius (Walker, 1841) in southeastern Anatolia. A new species, C. hirsutus Doğanlar & S. Triapitsyn, is described from Şanlıurfa Province. The genus Urfacus Doğanlar, 2003 is synonymized under Ceranisus and its type species, U. bozovaensis Doğanlar, 2003 is transferred to Ceranisus as C. bozovaensis (Doğanlar, 2003) comb. n., and the species is redescribed from the new material. An identification key to both sexes of Ceranisus from Turkey and Europe is provided.

INTRODUCTION

The thrips-attacking genus Ceranisus Walker, 1841 (Hymenoptera: Eulophidae: Entedoninae) is a member of a natural, apparently monophyletic group of four genera within the subfamily Entedoninae (Hymenoptera: Eulophidae), all of which are larval parasitoids of thrips (Thysanoptera) (Schaff, 1991; Triapitsyn & Headrick, 1995; Loomans, 2003; Triapitsyn, 2005; Triapitsyn & Morse, 2005). Another genus, Urfacus Doğanlar, 2003, was recently described from Turkey (Doğanlar, 2003). Its true identity was not clear (Triapitsyn, 2005) until now when, based on the new material collected in Turkey by the senior author of this communication during 2005, it has become obvious that it should be regarded as a new synonym of Ceranisus.

In Europe, the species of Ceranisus were first keyed by Graham (1963), who also described a new species, C. lepidotus, from Great Britain. Erdős (1966) then described C. plantianus from Britain. More recently, Cameron et al. (2004) described a new species, C. antalyacu S. Triapitsyn, 2004, from the Asian part of Turkey (Antalya) and compared it with the related Holarctic species of the genus. Triapitsyn & Headrick (1995) reviewed the Nearctic species of Ceranisus; Triapitsyn & Morse (2005) revised the New World fauna of the genus. Triapitsyn (2005) gave a world taxonomic revision of Ceranisus and three other related entedonine genera of thrips parasitoids, and listed their known host associations. Earlier, Loomans & van Lenteren (1995) provided a nice overview of the described thrips parasitoids and their importance for biological control of thrips pests. The present study adds an interesting, very unusual new species of Ceranisus from Turkey and corrects the descriptions of the female and male of C. bozovaensis (Doğanlar, 2003), comb. n. from Urfacus. Identification keys to both sexes of Ceranisus in Europe and Turkey are also provided.

MATERIAL AND METHODS

Morphological terminology follows Gibson (1997). This study is based upon examination and identification of about 100 specimens collected from the southern and southeastern Anatolia, some of which were slide-mounted in Canada balsam. The examined specimens were deposited in the collections indicated by the following acronym: ICMKU, Insect Museum of Plant Protection Department, Mustafa Kemal University, Antakya, Hatay, Turkey, and UCRC, Entomology Research Museum, Department of Entomology, University of California, Riverside, California, USA. Abbreviations used in the key and descriptions are: C = Claval antenomere, and F = Funicular antenomere.

Genus Ceranisus Walker, 1841

Figs 1–18

Ceranisus Walker, 1841: vi, pl. N, Fig. 2. Type species: Cirrospilus pacuvius Walker, 1841 by monotypy.

Ceranisus: Triapitsyn, 2005: 288–307 (world revision including list of synonyms, diagnosis, key to females).


Diagnosis

Body and appendages yellow to dark brown or black; occipital suture present and conspicuous (can be straight, sinuate, or angulate); frontal grooves reaching eye at level of anterior (median) ocellus; malar sulcus present and conspicuous (can be straight, sinuate, or angulate); frontal grooves reaching eye at level of anterior (median) ocellus; malar sulcus present and straight in most species, very rarely split (Y-shaped); mandible reduced (without teeth); female flagellum with 2 funicle segments and a distinct 2- or 3-segmented clava (usually 2-segmented but 3-segmented in C. russelli Crawford, 1911) and C. hirsutus Doğanlar & Triapitsyn sp. n.), apical claval segment with an apical spicula in both sexes; male antenna often with a swollen scape, male flagellum with 2-segmented funicle and 3-segmented clava; mesosoma usually smooth or at most lightly sculptured but distinctly reticulate in C. lepidotus Graham,
1963 and *C. bozovaensis* (Doğanlar, 2003) comb. n.; notaui indistinct, sometimes distinct but faint; midlobe of mesoscutum with 2 pairs of setae (except with 1 such pair in most *C. russelli* and with 4 pairs in *C. hirsutus*); anterior margin of scutellum straight; scutellum with 1 pair of setae except in *C. hirsutus* with more than 4 pairs; forewings broadened beyond submarginal vein; marginal vein of forewing not expanded except in males of *C. bozovaensis* notably expanded, especially basally, in some of the specimens; petiole at most as long as wide, notably wider than long.

**Keys to species in Europe and Turkey**

1. Females ........................................... 2
   1. Males ........................................... 8
2. Clava 3-segmented (Fig. 1); midlobe of mesoscutum with 4 pairs of setae, scutellum with at least 4 pairs of setae, and axilla with 2 setae (Fig. 3); stigmal vein of forewing distinctly petiolate (Fig. 4). .................. *C. hirsutus* sp. n.
   2. Clava 2-segmented (Figs 11, 16); midlobe of mesoscutum with 2 pairs of setae, scutellum with 1 pair of setae, and axilla with 1 seta (Fig. 14); stigmal vein of forewing short, wide, and sessile .... 3
3. Head and mesosoma distinctly reticulate .......... 4
   4. Head and mesosoma smooth or lightly sculptured .... 5
4. Head and mesosoma brown to bluish-black; marginal vein of forewing without expanded except in males of *C. bozovaensis* notably expanded, especially basally, in some of the specimens; petiole at most as long as wide, notably wider than long.

**Ceranisus hirsutus** Doğanlar & S. Triapitsyn, sp. n.

Figs 1–5

**Types.** Holotype ♀ (on slide, ICMKU), labeled: “TURKEY, Şanlıurfa, Bozova, Kangörmez, 37°26′N, 38°12′E, 430 m, 7.v.2005, M. Doğanlar. Mounted at UCR/ERM by V.V. Berezovsky 2005 in Canada balsam”. Paratypes (same collection data as the holotype): 1 ♀ (on slide, in entellelan, ICMKU); 1 ♀ (on point, UCRC); 2 ♀, 1♂ (on points, ICMKU); 1 ♂ (in alcohol, ICMKU).

**Description**

**Female** (holotype). Body dark brown; antenna light brown, legs light to dark brown, venation brown.

Head. Vertexal suture broadly V-shaped (Fig. 1). Antenna (Fig. 1) with scape slender, about 4.8× as long as wide; pedicel 1.8× longer than wide; F1 notably shorter and narrower than F2, 0.75× as long as and 0.66× as wide as F2, without sensilla; F2 with 1 sensillum; clava including spicula 2.0× as long as wide, C1 slightly shorter than combined length of C2 and C3, distal claval segments subequal in length, C1 and C2 with one sensillum each and C3 with two sensilla.

Mesosoma. (Fig. 3). Almost as long as metasoma; mesoscutum, scutellum, and axillae with light engraved sculpturing, without metallic luster; midlobe of mesoscutum with 8 setae; scutellum with 9 setae. Forewing (Fig. 4) 2.2× as long as wide; longest marginal cilia about 1/8 maximal forewing width; blade hyaline, uniformly covered with numerous microtrichia; submarginal vein with 2 long macrochaetae and 2 hypochaetae opposite to basal macrochaeta; postmarginal vein 0.7× as long as stigmal vein, marginal vein + parastigma 4× as long as stigmal vein, the latter distinctly petiolate. Hind wing about 5.5× as long as wide; blade uniformly setose, hyaline; longest marginal cilia about 1/3 wing’s maximal width. CoxaI lightly sculptured (with long cells).

Metasoma. Petiole about 2× as wide as long. Ovipositor occupying about 2/3 length of gaster, slightly exerted; ovipositor length/metatibia length ratio 1.1 : 1.4

**Measurements** (holotype). Body length: 0.94 mm. Relative measurements, as length or length/width: Antenna: scape: 11.5/2.5; pedicel: 5/2.5; F1: 2.1/1.5; F2: 1.3/2.3; clava: 5.6+1.5/3.5; C1: 2.8; C2: 2.3; C3: 1, spicula: 1.5.


**Male.** Similar to female except for normal sexually dimorphic features, as follows. Antenna (Fig. 2) with scape 3.3× as long as wide; pedicel 1.66× longer than
wide; flagellum as in female but F1 slightly narrower. Genitalia as in Fig. 5. Body length: 1.00 mm. Relative measurements (paratype on slide, as length or length/width): Antenna: scape: 10/3; pedicel: 5/3; F1: 1.5/2; F2: 2/2.3; clava: 7+1.5/4.5, C1: 3, C2: 2, C3: 2, spicula: 1.5.

Diagnosis. This species is similar to the North American C. russelli in having a 3-segmented clava of the female antenna; thus it would key together with C. russelli in the world key to females of Ceranisus by Triapitsyn (2005). It differs from C. russelli and all other described species of Ceranisus in having mesoscutum and scutellum with 8 and 9 setae, respectively (in C. russelli mesoscutum and scutellum with 4 and 2 setae, respectively). At present, it cannot be assigned to any species group defined for Ceranisus by Triapitsyn (2005).

Hosts. Unknown.

Etymology. This species is named for its unusually large number of setae on the mesoscutum and scutellum (hirsutus stands for hairy or bristly in Latin).

Ceranisus bozovaensis (Doğanlar, 2003), comb. n.

Figs 6–15

Urfacus bozovaensis Doğanlar, 2003: 182.

Type locality. Bozova, Şanlıurfa, Turkey.

Type material examined. Holotype: ♂ (wrongly indicated as female in the original description), on card (ICMKU), labeled: “TURKEY: Şanlıurfa, Bozova, 37°22′N, 38°33′E, 570 m, 15.vi.2002, M. Doğanlar, Urfacus bozovaensis Doğanlar. Mounted by M. Doğanlar”. Paratypes (same data as the holotype, ICMKU): 1♀ (wrongly indicated as male in the original description) on cards; 1♀ (wrongly indicated as male in the original description) on slide, mounted in Canada balsam at UCRC by V.V. Berezovskiy in 2005; 1♂ on card (correctly indicated as male in the original description).

Additional material examined. TURKEY: Şanlıurfa, Birecik, Innapl Village, 37°04′N, 37°55′E, 430 m, 6.v.2005, M. Doğanlar, 32♀, 20♂ on cards and points; 4♀, 4♂ on slides (ICMKU, UCRC); 17♀, 8♂ in alcohol (ICMKU).

Redescription

Female. Body dark brown to bluish-black, non-metallic; mouthparts, antenna and tarsi yellow, venation brown.

Head. Vertexal suture broadly V-shaped (as in Fig. 6). Antenna (Fig. 11) with scape slender, about 3.6× as long as wide; pedicel 2× as long as wide; F1 slightly longer than F2 (2.5/2.0), slightly longer than broad, and F2 0.8× as long as broad, F1 without sensilla, F2 with 1 sensillum; clava including spicula 2.0× as long as wide, C1 slightly shorter than C2 (3/4), C1 with one sensillum and C2 with two sensilla.

Mesosoma. Almost as long as metasoma; mesoscutum, scutellum, and axillae with broad meshed reticulate sculpturing; midlobe of mesoscutum with 2 pairs and scutellum with 1 pair setae (Fig. 14). Forewing (Fig. 12) about 2.8× as long as wide; longest marginal cilia about 1/4.4 maximal width of forewing; blade hyaline, uniformly covered with numerous microtrichia; submarginal vein with long macrochaetae and 2–3 hypochaetae opposite to basal macrochaeta; postmarginal vein 0.9× as long as stigmal vein, marginal vein + parastigma about 5× as long as stigmal vein, the latter distinctly sessile. Hind wing (Fig. 13) about 7× as long as wide; blade uniformly setose, hyaline; longest marginal cilia about as long as wing’s maximal width. Coxae lightly sculptured.

Metasoma (Fig. 15). Petiole about 2× as wide as long. Ovipositor occupying 1/2–3/5 length of gaster, slightly exserted; ovipositor length/metatibia length ratio 1.1 : 1.0

Measurements (holotype). Body length: 1.05 mm. Relative measurements (as length or length/width): Antenna: scape: 11/3; pedicel: 6/3; F1: 2.5/2.3; F2: 2/2.5; clava: 7+2/4.5, C1: 3, C2: 4, spicula: 2. Forewing: 65/23; lon-

Male. Description was given by Doğanlar (2003) (as female). Antenna (Fig. 7) with scape 3.2× as long as wide; pedicel and flagellum as in female but F1 quadrate. Mesosoma as in Fig. 9. Marginal vein of the forewing notably and significantly expanded, particularly basally (Fig. 8). Body length about 1.00 mm. Relative measure-

Figs 6–15: Ceranisus bozovaensis (Doğanlar). 6–10 – male; 6 – head in dorsal view; 7 – antenna; 8 – forewing; 9 – mesosoma; 10 – genitalia; 11–15 – female; 11 – antenna; 12 – forewing; 13 – hind wing; 14 – mesosoma; 15 – genitalia. Scale bars = 0.05 mm.
ments, as length or length/width: Antenna: scape: 9.5/3; pedicel: 5.5/3; F1: 2/2.2; F2: 2/2.2; clava: 6.5+1.5/4, C1: 2.5, C2: 2, C3: 2, spicula: 1.5. Genitalia as in Fig. 10.

**Diagnosis.** This species is similar to *C. lepidotus* in having the head and mesosoma reticulate; their antennae in both sexes are also very similar. It differs from *C. lepidotus* in having the mesoscutum with broad meshed reticulate sculpturing and the dorsum of head and mesosoma with bluish tinge, and also in notably expanded marginal vein (especially basally) of the male forewing in the majority of specimens. In *C. lepidotus*, dorsum of the head and mesosoma have a metallic greenish luster and the marginal vein of the male forewing is only slightly thickened in its whole length.

**Hosts.** Unknown.

*Ceranisus menes* (Walker, 1839)

See Triapitsyn & Headrick (2005) for the diagnosis and illustrations of *C. menes* and also Triapitsyn (2005) for the list of its synonyms, distribution, etc. Loomans & van Lenteren (1995) listed the known hosts of this species.

**Type locality.** Near London, England, UK.


**Comments.** This common cosmopolitan species was also recently recorded from Turkey (Kemer) by Triapitsyn (2005).

*Ceranisus pacuvius* (Walker, 1841)

Figs 16–18


**Type locality.** Near London, England, UK.


**Comments.** This species is recorded for the first time from Turkey.

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