HYPOPYGIA OF THE *SPARETUS* SPECIES GROUP OF *ENTEDON* DALMAN (HYMENOPTERA: EULOPHIDAE), WITH DESCRIPTIONS OF TWO NEW SPECIES

Mikdat Doğanlar*, Oğuzhan Doğanlar and Peter S. Boyadziev*****

* Mustafa Kemal University, Faculty of Agriculture, Department of Plant Protection,TR-31034, Hatay, TURKEY. E-mail: doganlar@mku.edu.tr
** Trakya University, Medical school, Department of Medical Biology, 22030, Edirne, TURKEY. E-mail: doganlaro@yahoo.com.tr
*** University of Plovdiv,"Paisii Hilendarski",24 Tsar Asen St.4000 Plovdiv, BULGARIA. E-mail: boyadz@uni-plovdiv.bg

[Doğanlar, M., Doğanlar, O. & Boyadziev, P. S. 2013. Hypopygia of the *sparetus* species group of *Entedon* Dalman (Hymenoptera: Eulophidae), with descriptions of two new species. Munis Entomology & Zoology, 8 (2): 831-851**]**

ABSTRACT: Ten species of the *sparetus* species group of genus *Entedon* Dalman (Hymenoptera: Eulophidae: Entedoninae) were collected in Turkey: *E. bakacakicus* Doğanlar, 2013, *E. sparetus* Walker, 1839, *E. cardui* Askew,2001, *E. longiventrosus* Dalla Torre, 1898, *E. thomsonianus* Erdös, 1944, *E. lixi* Erdös, 1951, *E. insignis* Erdös, 1944, *E. mecini* Askew, 1992 and two new species, *E. nizipicus* n. sp., *E. adiyamanicus* n. sp.. Hypopygia of the species, except *E. bakacakicus*, and morphological characters of the species were studied. Identification keys to the Turkish species of the *sparetus* species group of genus *Entedon* were provided by aid of several characters.

KEY WORDS**:** Hymenoptera (Eulophidae), *sparetus* species group of *Entedon*, Turkey.

In the taxonomy of Pteromalidae (Hymenoptera: Chalcidoidea) the morphology of hypopygia has been studied for separating the species of *Mesopolobus* Westwood, 1833 by Graham (1969), for the species of *Pachyneuron* Walker, 1833 and *Euneura* Walker, 1844 by Doğanlar (1986) and for the species of *Dibrachys* Förster, 1856 by Doğanlar (1987). In the taxonomy of Eulophidae (Hymenoptera: Chalcidoidea) Graham (1987, 1991) used the morphology of hypopygia in the classification of species of some genera in Tetrastichinae, Doğanlar (1991a,b) for some species of Ormyridae, and Tarla et al. (2010) for species of genus *Oopristus* Steffan, 1968 in Monodontomerinae (Torymidae).

Erdös (1944, 1951) erected the subgenus *Megalentedon* by the species of the *Entedon sparetus* species group. Later, Graham (1963, 1971) treated as a group of species related to *E. sparetus* Walker and then the group was accepted by Askew (1992) and Gumovsky (1997).

Graham (1971) gave 6 species, *E. thomsonianus* Erdös, 1944, *E. sparetus* Walker, 1839, *E. lixi* Erdös, 1951, *E. insignis* Erdös, 1944, *E. longiventrosus* Dalla Torre, 1898, and sp. indet. D (described later as *E. mecini* by Askew, 1992) in the *sparetus* species group, and keyed out them by some diagnostic characters. Gumovsky (1997) included *E. sparetus, E. mecini, E. insignis, E. longiventrosus, E. thomsonianus, E. zerovae* Gumosky, 1995 in this group. Gumovsky & Boyadzhiev (2003) demonstrated wide morphological variety in the specimens of *E. sparetus,* and *E. lixi*, *E. insignis*, *E. mecini, E. longiventrosus* were synonymized with *E. sparetus* due to the many measurements employed for the testing of possible distinction between the 'large', 'mid' and 'small' varieties become unsuccessful. Askew et al. (2001), and then Gumovsky & Boyadzhiev (2003) failed to provide any reliable characters for separation of females of *E.*

cardui Askew, 2001 from the females of *E. sparetus*. Gumovsky (2007) stated that the females of *E. sparetus* are easily confused with the females of *E. cardui*, which differs only by the shorter malar space (eye height 1.8–2.5 times as long as malar space in *E. sparetus*, but about 3.0 times in *E. cardui*).

In Turkey Doğanlar (1985) recorded *E. insignis*, *E.lixi*, and *E. thomsonianus* from the *sparetus* species group and some other species of *Entedon* from the Eastern Anatolia, and Doğanlar (2013) described a new species, *E. bakacakus*, from Şanlıurfa.

In this work the morphology of hypopygia of the species in the *sparetus* species group of *Entedon* was treated as diagnostic characters for the systematic of the species from Turkey, and aids some morphological characters a new identification key was created for the species of the *sparetus* species group of *Entedon* and some new synonyms were created.

MATERIAL AND METHOD

This study is based upon examination and identification of the specimens collected from several parts of Turkey. The examined specimens were deposited in Insect Museum of Plant Protection Department, Agriculture Faculty, MustafaKemalUniversity, Antakya, Hatay, Turkey (MKUI). Specimens were collected by sweeping and putting the whole contents of the swept materials directly in 96 % ethanol. After sorting the material, individuals were mounted on cards for further morphological studies. The species were identified by following the keys of Graham (1971), Gumovsky (1997) and Gumovsky & Boyadzhiev (2003). The hypopygia were separated from metasoma by dissecting and slide mounted in Canada balsam, the other parts of the metasoma were replaced on its own card near its mesosoma. Wings and antennae of some paratypeswere slide-mounted in Canada balsam. Photographs of diagnostic characters of the genera were taken by using of Leica DM 5500 B microscope with a digital Leica DFC 295 camera attached to it.

Terminology and abbreviations

Morphological terminology follows Graham (1969) in hypopygia as in Fig. 1, Gibson (1997) and Gumovsky & Boyadzhiev (2003). Abbreviations used in the key and descriptions are: OOL= shorter distance between ocello-ocular line POL= distance between posterior ocelli, MDO= distance between median and lateral ocelli, OCL= shorter distance between lateral ocelli and occipital carina. The name of some parts of hypopygium given in Fig. 1.

RESULTS AND DISCUSSION

Key to female of the species of the *sparetus* species group of *Entedon* by using the characters of hypopygia

1- Hypopygium with anterior median incision almost absent, at most broadly v-shaped (Fig.2 a-c).....2

- Hypopygium with anterior median incision deep in several shapes (Fig. 2a, 3a, b).....4

2- Antero-lateral angle circular, towards median incision slightly concaved; posterior lobe posteriorly circular, but narrowing towards median incision, median sclerotized line reached almost anterior margin of hypopygium, posterior median incision as in Fig. 2a.....*sparetus* Walker

- Antero-lateral angle angular, towards median incision slightly convexes; median sclerotized line reached slightly above middle of hypopygium (Fig. 2b,c).....3

3-Posterior lobe posteriorly circular, posterior median incision as in Fig. 2b....*insignis* Erdös
-Posterior lobe narrowing towards median incision, posterior median incision as in Fig. 2c.....*mecini* Askew

4- Hypopygium with anterior median incision C-shaped, antero-lateral angle circular, posterior lobe gradually tapering backwards, median sclerotized line reached at most slightly above middle of hypopygium, posterior median incision as in Fig. 3a..... *thomsonianus* Erdös
- Hypopygium with anterior median incision V-shaped, or U-shaped; other characters variable.....5

5- Hypopygium with anterior median incision and antero-lateral angle together broadly V-shaped, antero-lateral angle narrowing apically, sides of hypopygium slightly convexes towards median incision; posterior lobe posteriorly circular, median sclerotized line reached almost anterior margin of hypopygium, posterior median incision narrow as in Fig. 3b.....*adiyamanicus* n. sp.
- Hypopygium with anterior median incision V-shaped, other characters variable.....6

6-Hypopygium with anterior median incision narrow V-shaped, antero-lateral angle angular; median sclerotized line reached about middle of hypopygium (Fig. 4a,b).....7
-Hypopygium with anterior median incision broad V-shaped; antero-lateral angle circular; other characters variable (Fig. 4c,d).....8

7-Antero-lateral angle towards median incision concaved; posterior lobe posteriorly circular, posterior median incision as in Fig. 4a).....*cardui* Askew
-Antero-lateral angle towards median incision circular; posterior lobe posteriorly narrowing towards posterior median incision; posterior median incision as in Fig. 4b.....*nizipicus* n. sp.

8-Posterior lobe posteriorly almost straight, median sclerotized line reached about apical margin of hypopygium, posterior median incision as in Fig. 4c.....*longiventrosus* Dalla Torre
- Posterior lobe posteriorly narrowing towards posterior median incision, median sclerotized line reached about middle of hypopygium, posterior median incision as in Fig. 4d.....*lixi* Erdös

Key to female of the species of the *sparetus* species group of genus *Entedon*

1-Apical margin of forewing without fringe.....2
- Apical margin of forewing with fringe; other characters variable.....4

2- Head and mesosoma with unusual broad, coarse reticulations medially, meshes are about 4 times wider than meshes on side part, its diameter about 0.11 mm. side lobes finely reticulated; F_1 about 2.3 times as long as broad, with 2 basiconic peg sensillae medially, additional to the apical basiconic peg sensillae (Fig. 5a-c); combined length of pedicel plus flagellum about 0.7 times breadth of head; metasoma with syntergum half-length of its basal breadth, last tergum 1/3 length of its basal breadth.....*bakacakicus* Doğanlar
-Head and mesosoma with fine reticulation, its diameter at most 0.025 mm. F1 with apically placed 3 basiconic peg sensillae; combined length of pedicel plus flagellum about 0.7 times breadth of head (Fig. 6); the other characters variable.....3

3- F_1 about 3 times as long as broad, F2 and F3 at least slightly longer than broad;clava about twice as long as broad, (Fig. 6a-c);metasoma with syntergum 2/3 length of its basal breadth, last tergite about as long as its basal breadth; Up to 6 mm.....*thomsonianus* Erdös

--F_1 about 2.3 times as long as broad, F2 and F3 quadrate; clava about 2.2 times as long as broad (Fig. 6d-f);metasoma with syntergum 0.5times as long as its basal breadth, last tergite 0.5 times as long as its basal breadth. Up to 3.4 mm.....*nizipicus* n. sp.

4-Syntergum of metasoma nearly as long as itsbasal breadth, last tergite 1.4 times as long as its basal breadth;eye height about 2.5 times. F1 with two rows basiconic peg sensillae in apical half;Combined length of pedicel plus flagellum about 0.78-0.8 times breadth of head. Up to 3.5 mm..... *sparetus* Walker
- Metasoma with syntergum distinctly shorter than its basal breadth; last tergite at most as long as its basal breadth; the other characters variable.....5

5- Combined length of pedicel plus flagellum at most 0.66 times breadth of head.....6
- Combined length of pedicel plus flagellum at least 0.7 times breadth of head.....7

6-Eye height about 2.3-2.5 times malar space; antenna having F1 with 4 basiconic peg sensillae in apical half as in fig. 8b,c; metasoma with syntergum about 0.66 times as long as its basal breadth or slightly more; last tergite.....*longiventrosus* Dalla Torre
-Eye height about 2.7-3.0 times malar space; antenna having F1 with 5 basiconic peg sensillae in 3 rows as in Fig. 9b; metasoma with syntergum about 0.4 times as long as its basal breadth; last tergite as long as basal breadth. Up to 3.0 mm.....*cardui* Askew

7- Antennae with F1 having some basiconic peg sensillae medially, additional to apical ones as in fig. 10; eye height 1.8–2.5 times as long as malar space; combined length of pedicel plus flagellum about 0.72 times breadth of head; metasoma with syntergum about 0.57-0.64 times as long as its basal breadth; last tergite 0.8-0.86 times as long as basal breadth.....*mecini* Askew
- Antennae with F1 having some basiconic peg sensillae apically.....8

8-Antenna (Fig. 11) with F1 having one basiconic peg sensilla in 1/3 apical part, additional to the apical ones as in Fig. 11b, clava with C1 having two rows of longitudinal sensillae (Fig. 11c);combined length of pedicel plus flagellum about 0.70-0.77 times breadth of head; metasoma with syntergum about half as long as its basal breadth; last tergite about as long as its basal breadth.....*lixi* Erdös
-Antenna with F1 having mostly apically placed basiconic peg sensillae as in fig. 12 b, clava with C1 having mostly one row, of longitudinal sensillae or a few additional ones (Fig. 12c); the other characters variable.....9

9-Antennae (Fig. 12) with F1 at least three times as long as broad, with at least 5 basiconic peg sensillae apically; eye height about 2.5 times malar space; metasoma with syntergum about 0.7 times as long as its basal breadth; last tergite as long as basal breadth..... *insignis* Erdös
-- Antennae with F1 1.8 times as long as broad, with only two basiconic peg sensillae apically; eye height about 2.7times malar space; metasoma with syntergum as long as its basal breadth; last tergite 0.86 times as long as basal breadth. Length 2.2 mm..... ....*adiyamanicus* n. sp.

Key to male of the species of the *sparetus* species group of *Entedon*

1-Antennal funicle with three segments; club with 2 segments.....2
-Antennal funicle with four segments; club with 1-segmented.....5

2-Apical margin of forewing bare, without fringe.....3
-Apical margin of forewing with a fringe.....4

3-Scape 3 times, pedicel 2.7-2.8 times, F1 2.8, F2 2, F3 and F4 1.3, F5 1.75 times as long as broad; longitudinal sensillae on flagellar segments at least in two rows (Fig.14 a-c). Male genitalia as in Fig. 15b..... .....*thomsonianus* Erdös

-Scape 2.75 times, pedicel twice, F1, F2 1.67, F3 1.4, F4 1.1, F5 1.5 times as long as broad; longitudinal sensillae on flagellar segments mostly in one row, sometimes with one additional sensilla(Fig. 14d-f). Male genitalia as in Fig. 15a.....*nizipicus* n.sp.

4-Scape 3 times, pedicel 1.7, F1 2.8-3.0, F2 1.6, F3 1.3, F4 as long as broad, F5 1.33 times as long as broad; longitudinal sensillae on flagellar segments sparse as in (Fig. 16a-c)..... .....*cardui* Askew
-Scape 3.9 times, pedicel twice, F1 twice, F2 1.55, F3 1.44, F4 1.5times, F5 twice as long as broad; longitudinal sensillae on flagellar segments dense as in (Fig. 16d-f)..... .....*insignis* Erdös

5-Head and mesosoma with unusual broad, coarse reticulations medially, meshes are about 3 times wider than meshes on side part, its diameter at least 0.11 mm. side lobes finely reticulated; F_1 about 2.3 times as long as broad; flagellar segments with one row of longitudinal sensillae, except F5 with 3 rows longitudinal sensillae (Fig. 17a-c)..... .....*bakacakicus* Doğanlar
-Head and mesosoma with fine reticulation, its diameter at most 0.01 mm. other characters variable..... 6

6-Scape 2.75 times as long as broad; pedicel about 1.26 as long as broad; 0.6 times as long as F1; F1 about 1.5, F2 1.25 times as long as broad, F3 quadrate, F4 1.28 times as long as broad, clava about (including spicula) 2.33 times longer than broad; flagellar segments with sparse longitudinal sensillae, mostly in one row, F1 apically broader than base, almost truncate cone-shaped (Fig. 18a-c).....*lixi* Erdös
-Scape 3 times as long as broad; pedicel at least 1.5 times as long as broad; F1 twice or more than twice as long as broad; segments with dense longitudinal sensillae, mostly more than one row, F1 almost ellipsoidal (Fig. 19, 20).....8

8-Pedicel about 1.7 as long as broad; F1 about 2.44, F2 1.6, F3 1.5, F4 2.0, times as long as broad, clavaabout(including spicula) 3.3 times longer than broad; flagellar segments with dense longitudinal sensillae, mostly more than one row, clava with two rows longitudinal sensillae (Fig. 19a-c).....*sparetus* Walker
-Pedicel at most 1.5 as long as broad; flagellar segments shorter than alternate species, clava at most twice longer than broad (Fig. 20).....9

9-Scape 5.0 times as long as broad; pedicel about 1.3 as long as broad; F1 1.4, F2 0.75, F3 and F4 0.84 times as long as broad, clavaabout1.2 times longer than broad (Fig. 20a-c)... .....*longiventrosus* Dalla Torre
-Scape 3.75 times as long as broad; pedicel about 1.5 as long as broad; F1 twice, F2 1.67, F3 1.1, F4 1.4, times as long as broad, clava one-segmented, about twice longer than broad (Fig. 20d-f).....*mecini* Askew

***Entedon thomsonianus* Erdös**
(Fig. 6a-c; 14a-c; 15b)

Entedon (Megalentedon) thomsonianus Erdös, 1944: 27.
Entedon thomsonianus Erdös; Graham, 1971: 342.

Diagnostic characters were given by Gumovsky (2007). Some additional characters as follows: Female: Hypopygium with anterior median incision C-shaped, antero-lateral angle circular, posterior lobe gradually tapering backwards, median sclerotized line reached at most slightly above middle of hypopygium, posterior median incision as in Fig. 3a. -Head and mesosoma with fine reticulation, its diameter at most 0.025 mm. flagellar segments with sparse longitudinal sensillae; F1 with apically placed 3 basiconic peg sensillae; combined length of pedicel plus flagellum about 0.7 times breadth of head (Fig. 6). F_1 about 3 times as long as broad, F2 and F3 at least slightly longer than broad;clava about

twice as long as broad, (Fig. 6a-c); metasoma with syntergum 2/3 length of its basal breadth, last tergite about as long as its basal breadth; Up to 6 mm. Male: Antennal funicle with three segments; club with 2 segments; Scape 3 times, pedicel 2.7-2.8 times, F1 2.8, F2 2, F3 and F4 1.3, F5 1.75 times as long as broad; longitudinal sensillae on flagellar segments at least in two rows (Fig. 10a-c). Male genitalia as in Fig. 11b.

Distribution. Widely in Europe (Boucek & Askew, 1968; Askew et al., 2001; Gumovsky & Boyadzhiev, 2003), Ukraine,Georgia, Turkmenistan (Gumovsky, 2007).

Host. *Lixus cardui* Olivier (Curculionidae) (Erdös, 1944, 1951; Boucek & Askew, 1968; Gumovsky, 2007).

Material examined: Turkey: 5 ♀♀, Hatay, Belen, Kömürçukuru, 24.iv.2008, swept from pasture (M. Doğanlar); 1♀, Adıyaman, Gölbaşı, Araban yol ayrımı, 02.v.2008, swept from lent field (M. Doğanlar); 2♀♀, 2♂♂, Antalya, 05.v.1988, swept from Compositae; 1♀, İzmir, Gümüldür, 21.v.1987 (H. Çam); 2♀♀, Sivas, Kangal, 39° 14' 74" N 37° 10' 45" E, 1541 m, 03.vii.2005, swept from *Onopordon* sp, (O. Doğanlar); 1♂, Şarkışla, Tavladeresi, 19.vi.2003, (O. Doğanlar); Erzurum, 1 ♀, 20.vi. 1973, (M. Doğanlar); 1 ♀, 08.ix.1978, (M. Doğanlar); 2♀♀, 18.vi.1982 (M. Doğanlar); 2♂♂, 17.vi.1986 (M. Doğanlar) (MKUI).

***Entedon nizipicus* n.sp.**
(Figs. 4b; 6d-f; 10d-f; 11a)

Diagnosis. Hypopygium (Fig. 4a,b) with anterior median incision almost missing, antero-lateral angle circular, towards median incision slightly concaved; posterior lobe distally circular, but narrowing towards median incision, median sclerotized line reaching almost anterior margin of hypopygium, posterior median incision as in Fig. 4b. Metasoma 1.75 times as long as head plus mesosoma, about 4 times as long as broad; penultimate tergite of metasoma as long as broad, about one fifth of length of the metasoma, last tergite 1.4 times as long as broad; antennal scape of female 5 times as long as broad; pedicel about 1.8 times as long as broad; F1 about 2.28, F2 1.7, F3 1.25 times as long as broad, clava two-segmented, about 2.3 times longer than broad, slightly 2.1 times longer than the preceding segment; eye height 2.75 times as long as malar space; breadth of mouth opening 2.06 times as long as malar space; fore wing 2.25 times as long as broad, apical margin without; hind tibia about 1.33 times as long as its tarsus, fore 1.16 and mid tibiae about 1.2 times as long as their tarsi.

Description:

Female. Body length 3.4 mm. Colour of body metallic dark blue, frons with weak greenish tint. Entire antennae dark. Legs dark, except knees, extreme distal ends of tibiae and first two tarsomere of mid and hind legs, which are pale. Dorsal pale longitudinal stripe on fore tibia discernible along entire tibia.

Head in dorsal view 2.6 times as broad as long; POL: OOL: MDO: OCL= 16:7:7:2 in holotype. Occipital margin sharp. Eyes sparse setose, with short setae, eye height 3.15 times as long as malar space. Head in front view 1.36 times as broad as long. Interocular distance 2.4 times as long as eye breadth. Malar sulcus indicated by a line. Breadth of mouth opening 2.3 times as long as malar space. Clypeus reticulate, its anterior margin truncate. Antennae inserted slightly above the level of ventral eye margin. Pedicel plus flagellum 0.68 times broad of head.

Antennal scape of female 5.3 times as long as broad; pedicel about 2.4 as long as broad; 0.75 times as long as F1; F1 about 2.28, F2 1.57, F3 1.2 times as long as broad, clava two-segmented, about 2.2 times longer than broad, slightly 1.8 times longer than the preceding segment. Mesosoma 1.5 times as long as broad. Pronotal collar hardly traceable, postero-lateral corners of pronotum evenly rounded. Mesoscutum 1.43 times as broad as long, notauli traceable anteriorly as very fine sutures, posteriorly as shallow depressions; scutellum slightly longer than broad and as long as mesoscutum. Propodeal surface finely reticulate, median carina complete, lateral sulcus incomplete; paraspiracular sulcus deep, complete; supracoxal flange moderate; spiracular elevation with blunt projection below, propodeal callus with 10 long setae. Metapleuron with comparatively blunt protrusion. Hind coxa reticulate dorsally. Fore femur about 3.3 times as long as broad, fore tibia 5.7 times as long as broad, about 1.17 times as long as its femur; mid femur 3.9 times as long as broad; mid tibia 6.67 times as long as broad, spur of mid tibia as long as breadth of tibia, 0.54 as long as dorsal margin of mid basitarsus; hind femur about 3.3 times as long as broad, hind tibia about 5.6 times as long as broad, spur of hind tibia about 0.75 times as long as breadth of its tibia, and 0.75 times as long as dorsal margin of hind basitarsus. Hind tarsus 0.8times as long as its tibia, mid tarsus 0.82 times as long as its tibia. Ratio of tibiae and tarsi of holotype are as follows: fore tibia: tarsus 60:50; fore tarsomeres: 9:13:10:12 (+ pretarsus 7); mid tibia: tarsus 80: 66; mid tarsi: 20–28 (dorsal – ventral edge of basitarsus): 14–16: 10: 10 (+ pretarsus5); hind tibia: tarsus 90: 46; hind tarsi: 20–25: 13–17: 10: 12 (+ pretarsus 8).

Fore wing 2.3 times as long as broad; costal cell bare, comparatively wide, 5.2 times as long as broad, as long as marginal vein; subcosta of submarginal vein with 2 dorsal setae, postmarginal vein slightly longer than stigmal; speculum open below; apical margin without fringe. Hind wing 2.6 times as long as broad.

Petiole reduced, strongly transverse. Metasoma almost as long as head plus mesosoma, about 1.75 times as long as broad; syntergum of metasoma 0.5 times as long as broad, about two-ninth of length of the metasoma, last tergite 0.5 times as long as broad. Hypopygium with anterior median incision narrow V-shaped, antero-lateral angle angular; median sclerotized line reached about middle of hypopygium (Fig. 4a,b), antero-lateral angle towards median incision circular; posterior lobe posteriorly narrowing towards posterior median incision; posterior median incision as in Fig. 4b.

Male. Body length 1.8 mm. Similar to female except as follows: eye height 2.33 times as long as malar space. Antennae with pedicel plus flagellum as long as breadth of head. Antennal scape 3 times as long as broad; pedicel about 1.7 as long as broad; 0.5 times as long as F1; F1 about 2.44, F2 1.6, F3 1.5, F4 2.0, times as long as broad, clava one-segmented, about (including terminal spine) 3.3 times longer than broad. Forewing twice as long as broad, with costal cell as long as marginal vein; Metasoma twice as long as breadth, slightly longer than mesosoma.

Type material. Holotype , ♀, Turkey: Şanlıurfa, From Nizip to Suruç 15 km., 04.v. 2006, swept from lent field (M. Doğanlar). Paratypes: 3♂♂, Şanlıurfa, From Nizip to Karkamış 5 km., 17.iv.2010, swept from pasture (M. Doğanlar); 1♂, Sivas, Keçili village, 18.vi. 2003, swept from pasture (O. Doğanlar). All of the types were deposited in MKUI.

Discussion: *Entedon nizipicus* n. sp. is similar to *E. thomsonianus* in having forewing margin without fringe, and F1 with apically placed 3 basiconic peg sensillae; combined length of pedicel plus flagellum about 0.7 times breadth of head (Fig. 6); but it differs from *E. thomsonianus* in having F_1 about 2.3 times as long as broad, F2 and F3 quadrate; clava about 2.2 times as long as broad (Fig. 6d-f); metasoma with syntergum 0.5 times as long as its basal breadth, last tergite 0.5 times as long as its basal breadth (in *E. thomsonianus* F_1 about 3 times as long as broad, F2 and F3 at least slightly longer than broad; clava about twice as long as broad, (Fig. 6a-c);metasoma with syntergum 2/3 length of its basal breadth, last tergite about as long as its basal breadth), and also similar to *E. cardui* in having hypopygium with anterior median incision narrow V-shaped, antero-lateral angle angular; median sclerotized line reached about middle of hypopygium (Fig. 4a,b), but it differs from *E. cardui* by antero-lateral angle towards median incision circular; posterior lobe posteriorly narrowing towards posterior median incision; posterior median incision as in Fig. 4b (in *E. cardui* antero-lateral angle towards median incision concaved; posterior lobe posteriorly circular, posterior median incision as in Fig. 4a); in male it is similar to *E. thomsonianus*, but it differs in having scape 2.75 times, pedicel twice, F1, F2 1.67, F3 1.4, F4 1.1, F5 1.5 times as long as broad; longitudinal sensillae on flagellar segments mostly in one row, sometimes with one additional sensilla (Fig. 10d-f). Male genitalia as in Fig. 11a (in *E. thomsonianus* scape 3 times, pedicel 2.7-2.8 times, F1 2.8, F2 2, F3 and F4 1.3, F5 1.75 times as long as broad; longitudinal sensillae on flagellar segments at least in two rows (Fig. 10a-c). Male genitalia as in Fig. 11b).

***Entedon bakacakicus* Doğanlar**

(Figs. 5a-c; 17a-c)

Entedon bakacakus Doğanlar, 2013: (in press)

Diagnostic characters were given by Doğanlar (2013).some additional characters as follows: Female: Head and mesosoma with unusual broad, coarse reticulations medially, meshes are about 4 times wider than meshes on side part, its diameter about 0.11 mm. side lobes finely reticulated; F_1 about 2.3 times as long as broad, with 2 basiconic peg sensillae medially,additional to the apical basiconic peg sensillae (Fig. 5a-c); combined length of pedicel plus flagellum about 0.7 times breadth of head; metasoma with syntergumhalf length of its basal breadth, last tergum 1/3 length of its basal breadth; Male: F_1 about 2.3 times as long as broad; flagellar segments with one row of longitudinal sensillae, except F5 with 3 rows longitudinal sensillae (Fig. 13a-c).

Distribution. Turkey: Şanlıurfa, Akçakale, Bakacak village (Doğanlar, 2013).

Hosts. Unkown.

Material examined. 1 ♀, 1♂,Turkey, Şanlıurfa, Akçakale, Bakacak village (Doğanlar, 2013) (MKUI).

***Entedon sparetus* Walker**

(Figs. 2a; 7a-c; 15a-c)

Entedon sparetus Walker, 1846: 182.

Diagnostic characters: Female: Hypopygium with anterior median incision almost absent, at most very broadly v-shaped (Fig. 2a); antero-lateral angle circular, towards median incision slightly concaved; posterior lobe posteriorly circular, but narrowing towards median incision, median sclerotized line reached almost anterior margin of hypopygium, posterior median incision as in Fig. 2a; Apical margin of forewing with fringe; Syntergum of metasoma nearly as long as itsbasal breadth, last tergite 1.4 times as long as its basal breadth;eye height about 2.5 times.F1 with two rows basiconic peg sensillae in apical half; Combined length of pedicel plus flagellum about 0.78-0.8 times breadth of head. Up to 3.5 mm; Antennal (Fig. 7a-c) funicle with four segments; club with 1-segmented; Male: - Scape 3 times as long as broad; pedicel at least 1.5 times as long as broad; F1 twice or more than twice as long as broad; segments with dense longitudinal sensillae, mostly more than one row, F1 almost ellipsoidal. Pedicel about 1.7 as long as broad; F1 about 2.44, F2 1.6, F3 1.5, F4 2.0, times as long as broad, clava about (including spicula) 3.3 times longer than broad; flagellar segments with dense longitudinal sensillae, mostly more than one row, clava with two rows longitudinal sensillae (Fig. 15a-c).

Distribution. Throughout in Europe (Boucek & Askew, 1968; Gumovsky & Boyadzhiev, 2003), Ukraine, Georgia, Morocco, Kyrgyzstan, Russian Far East (Gumovsky, 2007).

Hosts. Weevils (*Gymnetron* spp., *Larinus* spp., *Lixus* spp., etc.) in stems of species of *Plantago*, *Cirsium*, *Carduus* (Erdös, 1951; Boucek & Askew, 1968; Graham, 1971), Curculionidae in stems of *Verbascum* spp. (Gumovsky, 2007).

Material examined. Turkey: Tokat, 2♀♀,6 ♂♂, 09.iv.-31.v.1989 (H. Çam); 1 ♀, 6.viii.1986, (M. Doğanlar); 1 ♀, Erzurum, Sansa deresi, 27.v.82, (M. Doğanlar); 1 ♀, Kayseri, Erciyes Mnt. 07.vii.2005 (O. Doğanlar); 1♂, Bulgaria, Stara Zagora region, Sakar Mnt. 1 km NE of Madrets village, 26.iv.2007 (A. Stajanova& P. Boyadziev) (MKUI).

***Entedon cardui* Askew**

(Figs. 4a; 9a-c; 16a-c)

Entedon cardui Askew, 2001: 67.

Diagnostic characters were given by Gumovsky (2007). Some additional characters as follows Female: Hypopygium with anterior median incision deep, narrow V-shaped, antero-lateral angle angular; median sclerotized line reached about middle of hypopygium (Fig. 4a); antero-lateral angle towards median incision concaved; posterior lobe posteriorly circular, posterior median incision as in Fig. 4a; Apical margin of forewing with fringe; Metasoma with syntergum distinctly shorter than its basal breadth; last tergite at most as long as its basal breadth; Combined length of pedicel plus flagellum at most 0.66 times breadth of head; Eye height about 2.7-3.0 times malar space; antenna having F1 with 5 basiconic peg sensillae in 3 rows as in fig. 9 b; metasoma with syntergum about 0.4 times as long as its basal breadth; last tergite as long as basal breadth. Male: Antennal funicle with three segments; club with 2 segments; Scape 3 times, pedicel 1.7, F1 2.8-3.0, F2 1.6, F3 1.3, F4 , F5 1.33 times as long as broad; longitudinal sensillae on flagellar segments sparse as in (Fig. 16a-c).

Distribution. Spain (Askew et al., 2001), Bulgaria, Greece (Gumovsky & Boyadzhiev, 2003), Italy, France and Ukraine (Gumovsky, 2007).

Hosts. Unknown.

Material examined: Turkey: Kilis, 1 ♀, Oğuzeli, Keçikuyusu, 28.iv.2012, swept from *Medicago sativa* field (M. Doğanlar); 1 ♀, Şanlıurfa, Ezgil, 26.iv.2008, swept from *Circium* sp. (M. Doğanlar); 1 ♀, Birecik, 26.iv.2008, swept from *Circium* sp. (M. Doğanlar); 1♂, Sivas, Şarkışla, 19.vi.2003, swept from pasture (O. Doğanlar).

***Entedon adiyamanicus* n. sp.**

(Figs. 3b; 13a-c)

Diagnosis. Hypopygium butterfly-shaped with anterior median incision narrowly U-shaped, antero-lateral angle circular, towards median incision slightly convex; posterior lobe distally circular, median sclerotized line reaching almost anterior margin of hypopygium, posterior median incision narrow as in Fig. 3b. Metasoma 1.1 times as long as head plus mesosoma, about 1.3 times as long as broad; syntergum as long as broad, about one-tenth of length of the metasoma; antennal scape of female 6 times as long as broad; pedicel about twice as long as broad; F1 about 1.8, F2 1.4, times as long as broad, F3 quadrate, clava two-segmented, about 1.8 times as long as broad, slightly more than twice longer than F3 (Figs. 13a-c); eye height 2.7 times as long as malar space; breadth of mouth opening 2.1 times as long as malar space; fore wing 2.1 times as long as broad, apical margin with a fringe of very short setae, which half as long as width of marginal vein at its narrowest part; hind tibia about as long as its tarsus, fore and mid tibiae about 1.1 times as long as their tarsi.

Female. Body length 2.2 mm. Colour of body metallic dark blue, frons with weak bronze tint. Entire antennae dark. Legs dark, except knees, extreme distal ends of tibiae and first two tarsomeres of mid and hind legs, which are pale. Dorsal pale longitudinal stripe on fore tibia discernible along entire tibia.

Head in dorsal view 2.53 times as broad as long; POL:OOL:MDO:OCL= 25: 9: 13: 2 in holotype. Occipital margin moderately sharp. Eye with short sparse setae, eye height 2.7 times as long as malar space. Head in front view 1.2 times as broad as long. Interocular distance 2.5 times as long as eye breadth. Malar sulcus indicated by a line. Breadth of mouth opening 2.1 times as long as malar space. Clypeus reticulate, its anterior margin truncate. Antennae inserted slightly above the level of ventral eye margin. Antennal scape of female 6 times as long as broad; pedicel about twice as long as broad; F1 about 1.8, F2 1.4, times as long as broad, F3 quadrate, clava two-segmented, with short terminal spine, about 1.8 times as long as broad, slightly more than twice longer than the preceding segment; eye height 2.7 times as long as malar space. Mesosoma 1.3 times as long as broad. Pronotal collar hardly traceable, postero-lateral corners of pronotum evenly rounded. Mesoscutum 1.75 times as broad as long, notauli traceable anteriorly as very fine sutures, posteriorly as shallow depressions; scutellum as long as broad and slightly longer than mesoscutum. Propodeal surface finely reticulate, median carina complete, lateral sulcus incomplete; supracoxal flange moderate; spiracular elevation with blunt projection below, propodeal callus with 4 long setae. Metapleuron with comparatively blunt protrusion. Hind coxa reticulate dorsally. Fore femur about 3.3 times as long as broad, fore tibia 6.3 times as long as broad, and as long as its femur; mid femur 3.6 times as long as broad; mid tibia

8.5 times as long as broad, spur of mid tibia 1.4 times as long as breadth of tibia, 1.7 as long as dorsal margin of mid basitarsus; hind femur about 3.5 times as long as broad, hind tibia about 7.7 times as long as broad, spur of hind tibia about 1.4 times as long as breadth of its tibia, 1.4 times as long as dorsal margin of hind basitarsus. Hind tarsus 0.88 times as long as its tibia, mid tarsus 0.8 times as long as its tibia. Ratio of tibiae and tarsi of holotype are as follows: fore tibia: tarsus 70: 60; fore tarsomeres: 10: 19: 10: 10 (+ pretarsus 10); mid tibia: tarsus 53: 57; mid tarsi: 11–15 (dorsal – ventral edge of basitarsus): 11–14: 7: 8 (+ pretarsus 7); hind tibia: tarsus 54: 48; hind tarsi: 14–17: 10–12: 8: 7 (+ pretarsus 5).

Fore wing 2.1 times as long as broad; costal cell bare, comparatively wide, 5 times as long as broad, slightly longer than marginal vein; subcosta of submarginal vein with 2 dorsal setae, postmarginal vein slightly longer than stigmal; speculum open below; apical margin with very short fringe, setae of which half as long as width of marginal vein at its narrowest part. Hind wing 3.8 times as long as broad. Petiole reduced, strongly transverse. Metasoma as long as head plus mesosoma, about 1.76 times as long as broad; penultimate tergite 0.4 times as long as basal broad, about one-eighth of length of the metasoma, last tergite about as long as broad. Hypopygium butterfly-shaped with anterior median incision narrowly U-shaped, antero-lateral angle circular, towards median incision slightly convex; posterior lobe distally circular, median sclerotized line reaching almost anterior margin of hypopygium, posterior median incision narrow as in Fig. 3b.

Male: unknown.

Type material. Holotype, ♀, Turkey: Adıyaman, Side of Fırat river, near Atatürk Barage, 37° 27' 99" N, 38° 15' 26' 'E, 402 m, 24.iv.2007, swept from pasture (M. Doğanlar) (MKUI).

Host: unknown.

Discussion: *Entedon adiyamanicus* n. sp. is a unique species in having Hypopygium with anterior median incision and antero-lateral angle together broadly V-shaped, antero-lateral angle narrowing apically, sides of hypopygium slightly convexes towards median incision; posterior lobe posteriorly circular, median sclerotized line reached almost anterior margin of hypopygium, posterior median incision narrow as in Fig. 3b. In antennal characters *E adiyamanicus* is similar to *E. insignis* in having Antenna with F1 having mostly apically placed basiconic peg sensillae as in Fig. 12b, clava with C1 having mostly one row, of longitudinal sensillae or a few additional ones (Fig. 12c), but it differs in having antennae with F1 1.8 times as long as broad, with only two basiconic peg sensillae apically; eye height about 2.7times malar space; metasoma with syntergum as long as its basal breadth; last tergite 0.86 times as long as basal breadth (in *E. insignis* Antennae (Fig. 12) with F1 at least three times as long as broad, with at least 5 basiconic peg sensillae apically; eye height about 2.5 times malar space; metasoma with syntergum about 0.7 times as long as its basal breadth; last tergite as long as basal breadth).

Entedon longiventrosus Dalla Torre
(Figs. 4c, 8a-c; 20a-c)

Entedon longiventris Thomson, 1878: 245, fem. (nec Ratzeburg, 1848). Holotype female (entire metasoma is missing!) of *Entedon longiventris* Thomson (LUZM).
Entedon longiventrosus Dalla Torre, 1898: 40 (nom. n. for *longiventris* Thomson nec Ratzeburg); synonymized with *E. sparetus*.by Gumovsky & Boyadzhiev, 2003.

Diagnostic characters: Female: Hypopygium with anterior median incision broad V-shaped; antero-lateral angle circular; Posterior lobe posteriorly almost straight, median sclerotized line reached about apical margin of hypopygium, posterior median incision very deep as in Fig. 4c; Apical margin of forewing with fringe; Metasoma with syntergum distinctly shorter than its basal breadth; last tergite at most as long as its basal breadth; combined length of pedicel plus flagellum at most 0.66 times breadth of head; Eye height about 2.3-2.5 times malar space; antenna having F1 with 4 basiconic peg sensillae in apical half as in fig. 8b,c; metasoma with syntergum about 0.66 times as long as its basal breadth or slightly more; last tergite almost as long as basal breadth. Male: Pedicel at most 1.5 as long as broad; flagellar segments shorter than alternate species, clava at most twice longer than broad; Scape 5.0 times as long as broad; pedicel about 1.3 as long as broad; F1 1.4, F2 0.75, F3 and F4 0.84 times as long as broad, clavaabout1.2 times longer than broad (Figs. 20a-c).

Studied material: Şanlıurfa, 1 ♀, Bozova, Kangörmez village, 04.v.2006, swept from *Vicia* field plus *Sinpis* sp.; (M. Doğanlar); 1 ♀, Akçakale, Bakacak, 26.iv.2008, swept from *Circium* sp. (M. Doğanlar); 1♂, Adıyaman, Gölbaşı, 19.v.2010, (M. Doğanlar); 1 ♀, Tokat, Niksar, Çamiçi, 26.viii.1993 (M. Doğanlar) (MKUI).

Entedon insignis Erdős
(Figs. 2b, 12a-c, 16d-f).

Entedon (Megalentedon) insignis Erdös, 1944: 29; synonymized with *E. sparetus* by Gumovsky & Boyadzhiev, 2003. syn. n. Lectotype female, TMA No. 5503, Hungary, Vác, Bajáritelep, 30.V, ex *Lixus filiformis* F. (Bíró); paralectotypes: 11 females (TMA 5507-13, 5516-7, 5519, 5522), 8 males (TMA 5504-6, 5514-5, 5518, 5520-1) (TMA).

Diagnostic characters as follows: Female: Hypopygium with anterior median incision almost absent, at most very broadly v-shaped (Fig. 2b); antero-lateral angle angular, towards median incision slightly concaved; median sclerotized line reached slightly above middle of hypopygium (Fig. 2b); posterior lobe posteriorly circular, posterior median incision as in Fig. 2b; apical margin of forewing with fringe; Combined length of pedicel plus flagellum at least 0.7 times breadth of head; Antennae with F1 at least three times as long as broad, with at least 5 basiconic peg sensillae apically, having mostly apically placed basiconic peg sensillae as in fig. 12b, clava with C1 having mostly one row of longitudinal sensillae or a few additional ones (Fig. 12c); eye height about 2.5 times malar space; metasoma with syntergum about 0.7 times as long as its basal breadth; last tergite as long as basal breadth. Male: Antennal funicle with three segments; club with 2 segments; scape 3.9 times, pedicel twice as long as broad, F1 twice, F2 1.55, F3 1.44, F4 1.5 times, F5 twice as long as broad; longitudinal sensillae on flagellar segments dense as in (Fig. 16d-f).

Studied material: 1 ♀, Sivas, Centrum, Keçili village, 39° 30' 49" N 36° 51' 09" E, 1388 m, swept from pasture (O. Doğanlar); 1♂, Gökçekent, Sökün village, 40° 16' 53" N 38° 11' 34" E, 910 m, swept from pasture, (O. Doğanlar); 1 ♀, Şanlıurfa, Bozova, Kangörmez village, 24.iv.2007, swept from *Vicia* sp. and *Sinapis* sp. plantation (M. Doğanlar); 1 ♀, İzmir, Urla, 11.iv.1973, (H. Çam) (MKUI).

Additional material: 2♀♀, Rodopi Mnt. V. Belastica, 300 m, 14.x.1993 (P. Boyadziev); 1 ♀, Rodopi Mnt. L. Mazcigonica, 24.vi.1995 (P. Boyadziev); 1 ♀, Plovdivska, 14.vi.1968 (A. Germanov); 1♂, Grecia Tripolis, 10.v.1987 (P. Angelov).

***Entedon lixi* Erdős**
(Figs. 4d, 11a-c, 18a-c)

Entedon lixi Erdös, 1951: 220. Synonymized with *E. sparetus* by Gumovsky & Boyadzhiev, 2003. syn.n. Lectotype female, TMA No. 5523, Hungary: Kalocsa, 22.V.1947, ex *Lixus elongatus* in caule *Carduus acanthoides* L., (Erdős). 68 paralectotypes: 40 females (TMA No. 5524-59, 8793), 28 males (TMA No. 5560-82, 8794-8, 8793).

Diagnostic characters as follows: Female: Hypopygium with anterior median incision broad V-shaped; antero-lateral angle circular; other characters variable (Fig. 4d); Posterior lobe posteriorly narrowing towards posterior median incision, median sclerotized line reached about middle of hypopygium, posterior median incision as in Fig. 4d; Apical margin of forewing with fringe; Metasoma with syntergum distinctly shorter than itsbasal breadth; last tergite at most as long as its basal breadth; Antenna (Fig. 11) with F1 having one basiconic peg sensilla in 1/3 apical part, additional to the apical ones as in fig. 11 b, clava with C1 having two rows of longitudinal sensillae (Fig. 11c); combined length of pedicel plus flagellum about 0.70-0.77 times breadth of head; metasoma with syntergum about half as long as its basal breadth; last tergite about as long as its basal breadth. Male: Antennal funicle with four segments; club with 1-segmented (Fig. 18), scape 2.75 times as long as broad; pedicel about 1.26 as long as broad; 0.6 times as long as F1; F1 apically broader than base, almost truncate cone-shaped, about 1.5, F2 1.25 times as long as broad, F3 quadrate, F4 1.28 times as long as broad, clava about (including spicula) 2.33 times longer than broad; flagellar segments with sparse longitudinal sensillae, mostly in one row (Fig. 18a-c).

Studied materials: 1 ♀, Erzurum, 08.ix.1978 (H. Özbek); 1 ♀, 26.vi.1979 (M. Doğanlar); 1♂, Kahramanmaraş, Yukarımülk village, 02.v.2008, swept from *Circium* sp. (M. Doğanlar); 1 ♀, Şanlıurfa, Birecik, Arat mnt. Swept from lentil field (M. Doğanlar); 1♂, Bozova, Kangörmez village, swept from *Vicia* sp. and *Sinapis* sp. plantation (M. Doğanlar); 1♀, Erzincan, 09.v.1982 (M. Doğanlar) (MKUI).

***Entedon mecini* Askew**
(Figs. 2c, 12a-c, 16d-f)

Entedon mecini Askew, 1992: 122; synonymized with *E. sparetus*. by Gumovsky & Boyadzhiev, 2003. syn.n. Germany: 5 females, 3 males, Hallig Gröde, Nordsee, Schleswig-Holstein,20.6.1975, *Mecinus* gall on *Plantago maritima* (Tischler); 2 females, 1 male, ibid., "8/83", "4/85" (BMNH).

Diagnostic characters as follows: Female: Hypopygium (Fig. 2c) with anterior median incision almost absent, at most very broadly V-shaped; antero-lateral

angle angular, towards median incision slightly concaved; median sclerotized line reached slightly above middle of hypopygium; posterior lobe narrowing towards median incision, posterior median incision as in Fig. 2c. Apical margin of forewing with fringe; combined length of pedicel plus flagellum at least 0.7 times breadth of head; antennae with F1 having some basiconic peg sensillae medially, additional to apical ones as in fig. 12; eye height 1.8–2.5 times as long as malar space; combined length of pedicel plus flagellum about 0.72 times breadth of head; metasoma with syntergum about 0.57-0.64 times as long as its basal breadth; last tergite 0.8-0.86 times as long as basal breadth. Male: Antennal funicle with four segments, club with 1-segmented (Fig. 20), scape 3.75 times as long as broad; pedicel about 1.5 as long as broad; F1 twice, F2 1.67, F3 1.1, F4 1.4, times as long as broad, clava one-segmented, about twice longer than broad (Fig. 20d-f).

Studied material: Tokat, 1 ♀, 6.viii.1986 (M. Doğanlar); 1 ♀, 19.iv.1989, (H. Çam); 1 ♀, 28.v.1989 (H. Çam); 7 ♂♂, 09. iv.–11.v.1989, swept from pasture (H. Çam) (MKUI).

LITERATURE CITED

Askew, R. R. 1991. Review of species of *Entedon* Dalman having a complete frontal fork with redefinition of the species group of *cioni* Thomson (Hymenoptera: Eulophidae). Entomologica Scandinavica, 22: 219-229.

Askew, R. R. 1992. Additions to the British list of *Entedon* Dalman (Hymenoptera: Eulophidae) with description of three new species. Entomologist's Monthly Magazine, 128:119-128.

Askew, R. R., Blasco-Zumeta, J. & Pujade-Villare, J. 2001. Chalcidoidea y Mymarommatoidea (Hymenoptera) de unsabinar de *Juniperus thurifera* L. en Los Monegros, Zaragoza. Monografias S. E. A., 4: 1-76.

Boucek, Z. & Askew, R. R. 1968. Palearctic Eulophidae (excl. Tetrastichinae). Index of entomophagous insects, Paris, vol. 3. 260 pp.

Dalla Torre, K. 1898. Catalogus Hymenopterorum hucusque descriptorum systematicus et synonymicus. V. Chalcididae et Proctotrupidae. 598 pp. Leipzig.

Dalman, J. W. 1820. Försöktill Uppstaellningaf Insect familjen Pteromalini, I synnerhetmedafseen de padei Sverige funnearter. Kungliga Svenska Vetenskapsakademiens Handlingar, 41: 123-174, 177-182.

Doğanlar, M. 1985. Notes on Chalcidoidea of Turkey, III.Encyrtidae, Tetrastichinae, Aphelinidae, Eulophidae and Elasmidae. Türkiye bitki koruma Dergisi, 9: 91-103.

Doğanlar, M. 1986. Morphological studies on the hypopygium and its importance to the taxonomy of the genera *Pachymeuron*and*Euneura* (Hymenoptera, Pteromalidae), with description of a new species of *Pachyneuron* from Turkey. C.Ü. Fen-Edebiyat Fakültesi, Fen Bilimleri Dergisi, 4: 23-32.

Doğanlar, M. 1987. Hypopygia of most Nearctic and Palaearctic species of *Dibrachys* Foerster, key to most species of the genus and descriptions of three new species (Hymenoptera, Pteromalidae). Spixiana, München, 10: 191-206.

Doğanlar, M. 1991a. Systematic positions of a new species in *Ormyrus* from Turkey and a new genus in the family Ormyridae (Hym., Chalcidoidea), Türkiye Entomoloji Dergisi, 15: 1-13.

Doğanlar, M. 1991b. Systematic studies on the species of *Cyrtosoma* Perris. from Turkey, and descriptions of some new species (Hymenoptera: Ormyridae). Türkiye Entomoloji Dergisi, 15: 71-87.

Doğanlar, M. 2013. A peculiar new species of *Entedon* Dalman (Hymenoptera: Eulophidae) in Şanlıurfa Province, Turkey (in press).

Erdös, J. 1944. Species hungaricae generis *Entedon*Dalm. Kalocsa. 64 pp.

Erdös, J. 1951. Eulophidae novae. Acta Biologica Academiae Scientiarum Hungaricae, 2 (1-3): 169-237.

Gibson, G. A. P. 1997. Morphology and terminology. pp. 16–44 in Gibson, G. A. P., Huber, J. T. & Woolley, J. B. (Eds). Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera). Ottawa, Ontario, National Research Council Research Press.

Graham, M. W. R. de V. 1963. Additions and corrections to the British list of Eulophidae (Hym., Chalcidoidea). Transactions of the Society for British Entomology, 15 (9): 167-275.

Graham, M. W. R. de V. 1969. The Pteromalidae of north-western Europe (Hymenoptera: Chalcidoidea). Bulletin of the British Museum (Natural History) (Entomology) Supplement 16 pp. 908 pp.

Graham, M. W. R. de V. 1971. Revision of British *Entedon* (Hymenoptera: Chalcidoidea) with descriptions of four new species. Transactions of the Royal Entomological Society of London, 123: 313-358.

Gumovsky, A. V. 1997. Review of the genus *Entedon* Dalman, 1820 (Hymenoptera, Eulophidae, Entedoninae). 1. Infrageneric division of the genus *Entedon* with description of a new subgenus from Africa. Vestnik Zoologii, 31 (5-6): 24-36.

Gumovsky, A. V. 2007. A taxonomic revision, biology and morphology of immature stages of the *Entedon sparetus* species group (Hymenoptera: Eulophidae), egg-larval endoparasitoids of weevils (Coleoptera: Curculionidae). Bulletin of Entomological Research, (2007) 97: 139-166.

Gumovsky, A. & Boyadzhiev, P. 2003. Review of the Bulgarian *Entedon* Dalman, 1820 (Hymenoptera: Eulophidae, Entedoninae). Acta Entomologica Bulgarica, 55 (3): 3-32.

Rasplus, J.-Y. 1990. Nouvelles especes afrotropicales du genre *Entedon* Dalman et notes sur leur biologie. Bulletin de la Societe Entomologique de France, 94: 223-245.

Schauff, M. E. 1988. The species of *Entedon* in America north of Mexico (Hymenoptera: Eulophidae). Journal of the New York Entomological Society, 96: 30-62.

Tarla, Ş., Doğanlar, M. & Gözüaçık, C. 2010. The species of *Oopristus* Steffan, 1968 (Hymenoptera: Torymidae: Toryminae: Monodontomerini) of Turkey, with descriptions of two new species. Turkish Journal of Zoology, 34: 487-495.

Thomson, C. G. 1878. Hymenoptera Scandinaviae 5. *Pteromalus* (Svederus) continuation. 245 pp. Lund.

Walker, F. 1846. Characters of some undescribed species of Chalcidites. Annals and Magazine of Natural History, 17: 108-115.

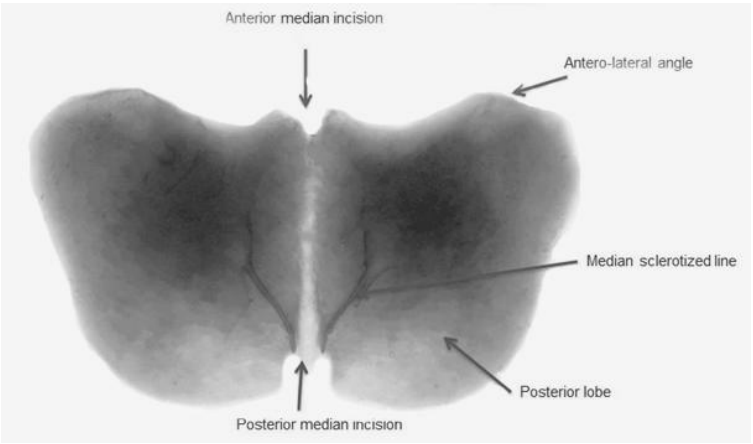

Figure 1. Hypopygium of *Entedon cardui* Askew.

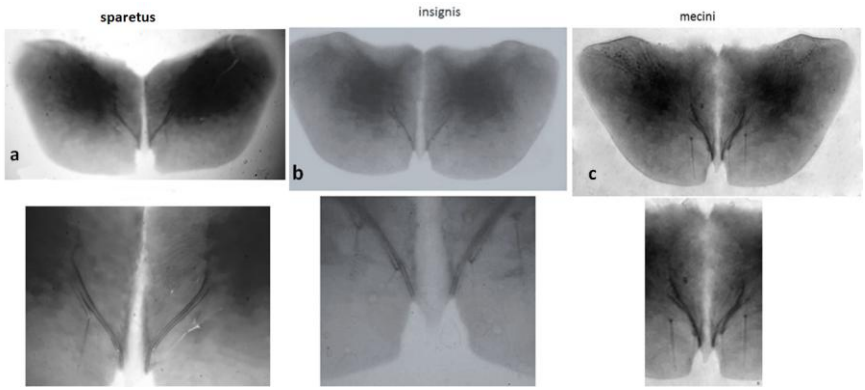

Figure 2. Hypopygia of *Entedon sparetus* Walker, *Entedon insignis* Erdös and *Entedon mecini* Askew.

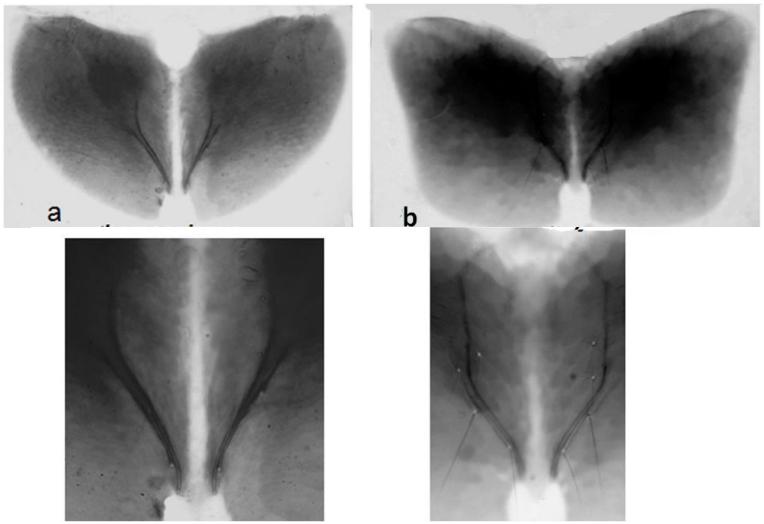

Figure 3. Hypopygia of *Entedon thomsonianus* Erdös (a) and *E. adiyamanus* n. sp. (b).

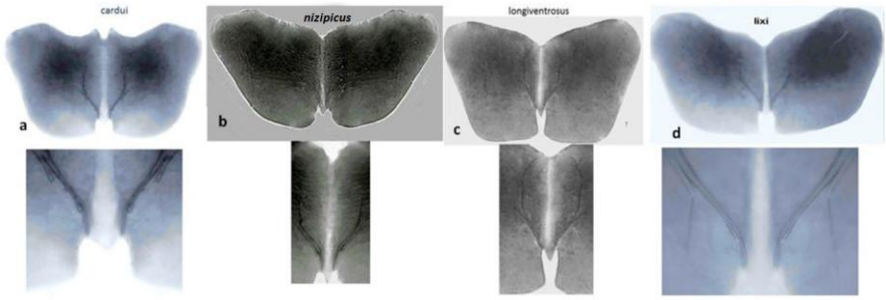

Figure 4. Hypopygia of species of the *sparetus* species group of genus *Entedon*.

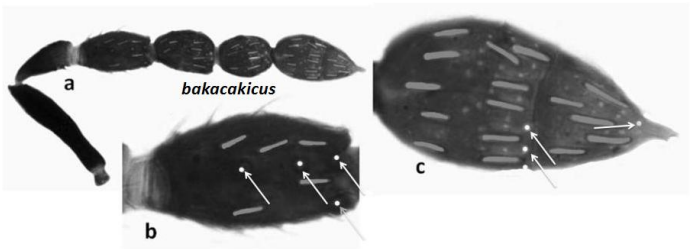

Figure 5. Female antenna of *Entedon bakacakicus* Doğanlar. Arrows state basiconic peg sensillae.

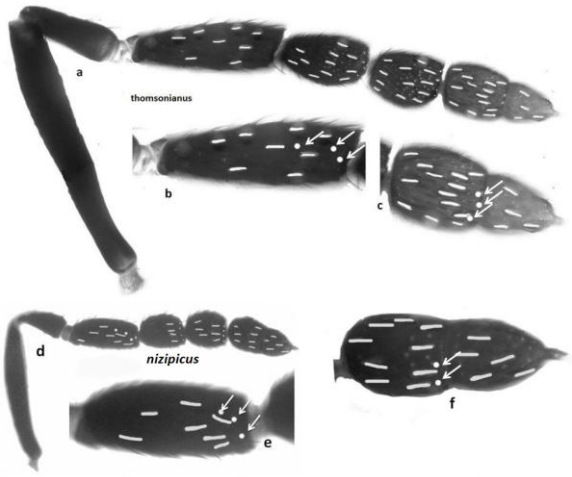

Figure 6. Female antenna of *E. thomsonianus* Erdös and *Entedon nizipicus* n. sp.

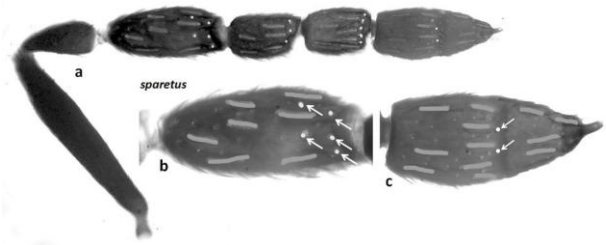

Figure 7. Female antenna of *Entedon sparetus* Walker.

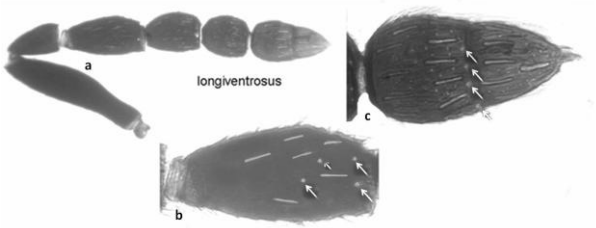

Figure 8. Female antenna of *Entedon longiventrosus* Dalla Torre.

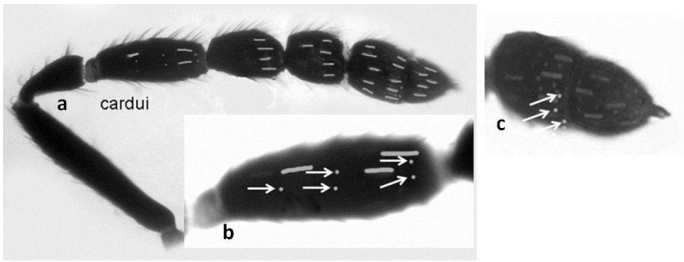

Figure 9. Female antenna of *Entedon cardui* Askew.

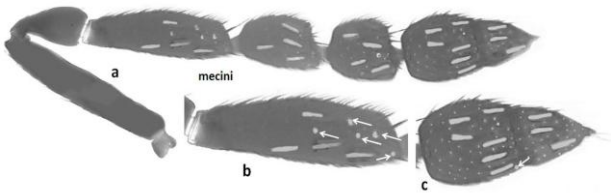

Figure 10. Female antenna of *Entedon mecini* Askew.

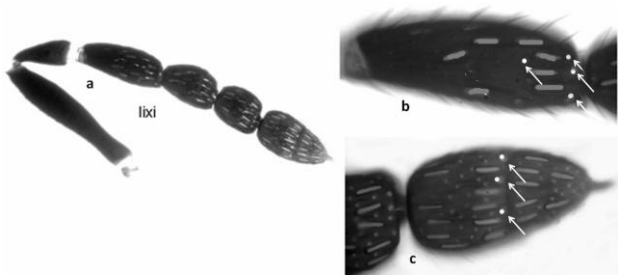

Figure 11. Female antenna of *Entedon lixi* Erdös. Arrows state basiconic peg sensillae.

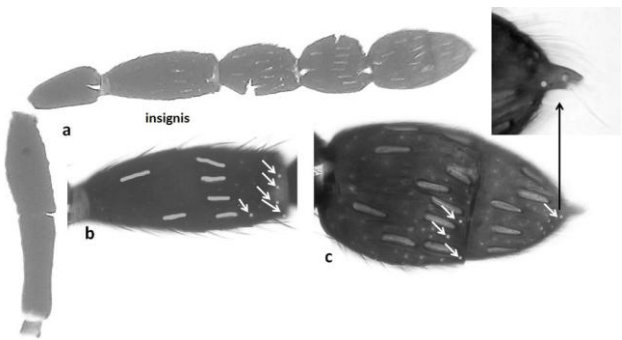

Figure 12. Female antenna of *Entedon insignis* Erdös. White arrows state basiconic peg sensillae.

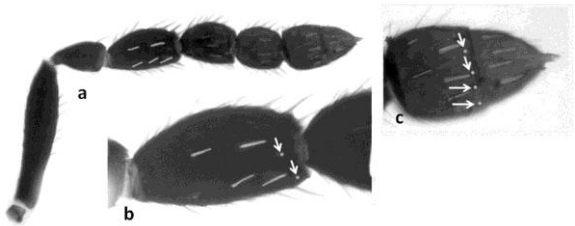

Figure 13. Female antenna of *Entedon adiyamanicus* n.sp. Arrows state basiconic peg sensillae.

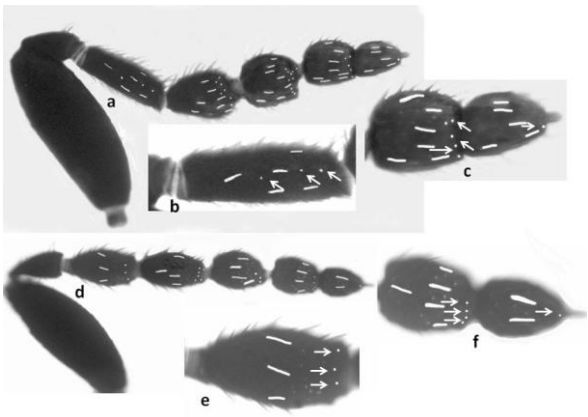

Figure 14. Male antennae of *Entedon thomsonianus* Erdös (a-c) and *Entedon nizipicus* n.sp. (d-f).

Figure 15. Genitalia. a. *Entedon nizipicus* n. sp.; b. *Entedon thomsonianus* Erdös.

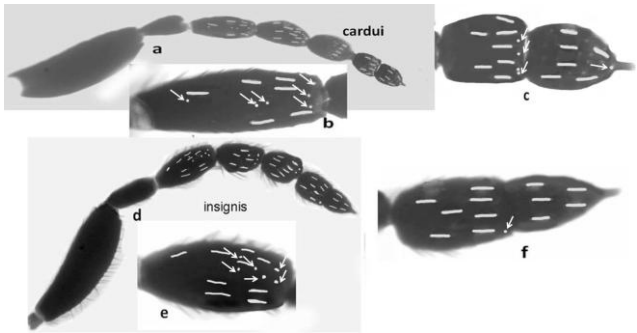

Figure 16. Male antennae of *Entedon cardui* Askew and *E. insignis* Erdös.

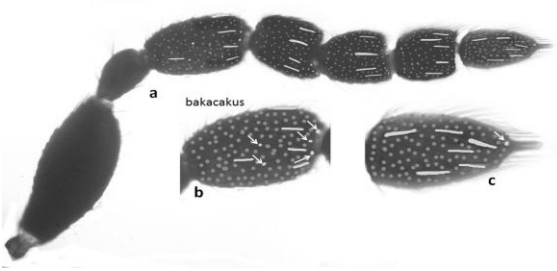

Figure 17. Male antenna of *Entedon bakacakicus* Doğanlar.

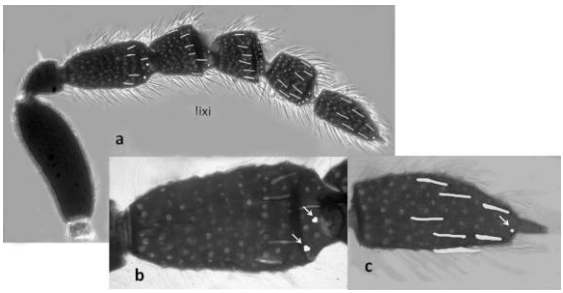

Figure 18. Male antenna of *Entedon lixi* Erdös.

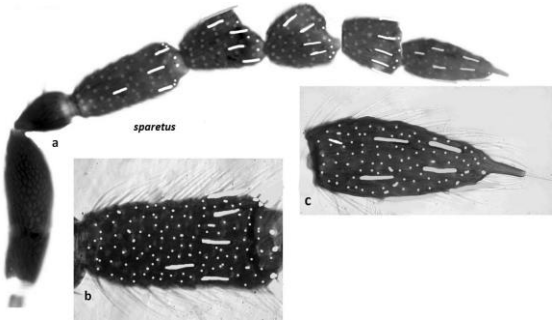

Figure 19. Male antennae of *Entedon sparetus* Walker.

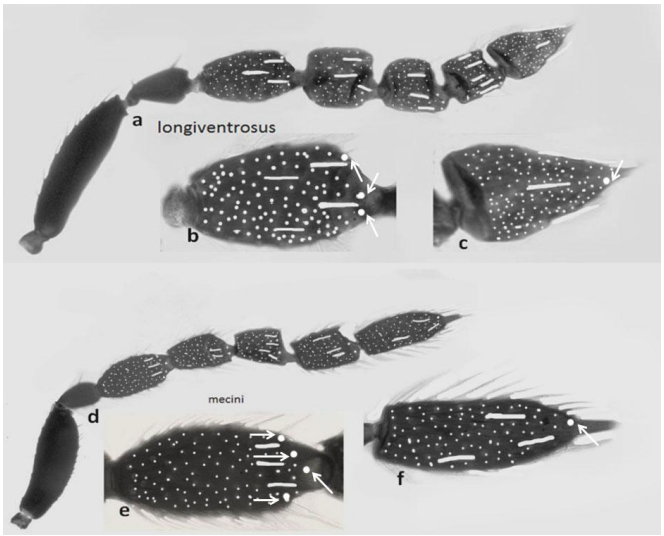

Figure 20. Male antennae of *Entedon mecini* Askew and *E. longiventrosus* Dalla Torre.