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Orijinal araştırma (Original article)

Parasitoids complex of the olive leaf gall midges, *Dasineura oleae* (Angelini 1831) and *Lasioptera oleicola* Skuhravá, 2011 (Diptera: Cecidomyiidae) in Hatay Turkey, with descriptions of new genus and species from Tetrastichinae (Hymenoptera: Eulophidae)

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Summary

Two species of gall midges, *Dasineura oleae* (Angelini 1831) and *Lasioptera oleicola* Skuhravá 2011 (Diptera: Cecidomyiidae), on leaves and shoots of *Olea europea* L. were reared in Hatay Province, Turkey in 2007-2010. In the study as main mortality factors of the gall midges were 11 species of larval/pupal parasitoids from 5 families of Hymenoptera, Platygasteridae: *Platygaster oleae* Szelenyi 1940, Eupelmidae: *Eupelmus urozonus* Dalman 1820, Torymidae: *Torymus phillyreae* Ruschka 1921, Pteromalidae: *Mesopolobus mediterraneus* (Mayr 1903), *M. diffinis* (Walker 1834), *M. aspilus* (Walker 1835), Eulophidae: *Anaprostocetus acuminatus* (Ratzeburg 1848), *Quadrastichus dasineurae* Doğanlar et al. 2009*, Aprostocetus samandagus* sp.new*, Aprostocetus lasiopteru* sp.new, *Zeytinus hatayensis* gen.and sp. new. The new taxa were described and their diagnostic characters and some biological data are gIven. An identification key for the parasites was provided.

Key words: Parasitoids, gall midges, new genus and species, Turkey

Anahtar sözcükler: parazitoitler, gal sinekleri, yeni cins ve türler, Türkiye

Introduction

Up to now only the olive leaf gall midge, *Dasineura oleae* (Angelini 1831) (Diptera: Cecidomyiidae) has been recorded as gall inducer on olive, *Olea europea* L., but not any species of *Lasioptera*.

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The olive leaf gall midge has been generally accepted as a secondary pest of olive in Turkey and in the countries of Mediterranean Region (Skuhravá & Skuhravy, 1997). But Al-Tamimi (1997) and Hrncic (1998) stated that it has been an important pest of some olive orchards in Amman, Jordan and in Montenegro, Italy, respectively. In Turkey the olive leaf gall midge has been reported from Bursa (Mudanya), Denizli (Trotter, 1903), Antalya, Hatay (Alkan, 1952), Aegean Region, Antalya, Hatay (İyriboz 1968; İren & Ahmet, 1973; Skuhravá et al. 2005). In the recent years, 2007-2010, the olive leaf gall midge and its parasites develop high populations in the Hatay region (Doğanlar et al., 2011).

There are not many works on mortality factors of *D. oleae*, Avidov & Harpaz (1969) stated *Platygaster* sp. as larval parasitoid of the pest, and Al-Tamimi (1997) stated that climatic conditions as temperature and relative humidity and natural enemies, especially the endoparasitoid *Platygaster oleae* Szelenyi 1940 (Hym: Platygastridae) were given as the main mortality factors in Amman district. Doğanlar et al. (2009) reared and described *Quadrastichus dasineurae* Doğanlar, LaSalle, Sertkaya and O. Doğanlar (Hym. Eulophidae) as larval parasitoid of *D. oleae* in Hatay province. Recently, some specimens of parasitoids were reared from galls of *D. oleae* and *Lasioptera oleicola* Skuhravá 2011 on leaves and shoots of *O. europea* as larval or pupal parasitoids of the host in Hatay province, Turkey. After working on the specimens it was found that they are very interesting ones, including a new genus and some new species of *Aprostocetus* (Hym: Eulophidae). After those works it was found that the studies for integrated control of the gall midges to be conducted in the future need their names.

The aims of this work to find out the parasitoid complex of the gall midges in Hatay province, Turkey, and to describe the new parasitoid species, and an identification key provide for them.

Materials and Methods

The study was conducted in 2007-2010 in Hatay province, Turkey. The galls of *Dasineura oleae* and *Lasioptera oleicola* on leaves and shoots of *O. europea* were counted for rearing the parasitoids. The galls on the leaves and shoots on the branches were collected mainly in 2007 and 2010 and brought to laboratories in plastic bags. They were placed in glass vials (15 cm length x 1 cm diameter) and kept under laboratory conditions (30 °C temperature and 60-70 % relative humidity) for rearing purpose. The adults emerged from the galls were killed in 96% ethyl alcohol for taxonomic studies. The hosts of the parasitoids were determined by the study on larval morphologies of the hosts obtained by dissecting the plant materials from which the parasitoids hosts were emerged, and determined by working on adult morphologies. Morphological terminology follows LaSalle (1994). This study is based upon the specimens reared from the

host. Some parts of the specimens were slide-mounted in Canada balsam. The new taxa were identified by following the keys of Graham (1987, 1991), and compared with the species of the genera from the Palearctic Region. The examined specimens were deposited in the collection of the Insect Museum of Plant Protection Department, Agriculture Faculty, Mustafa Kemal University, Hatay, Turkey. Photographs of diagnostic characters of the new species were taking by using a stereo-microscope with a digital camera attached to it.

Results and Discussions

By the study conducted one new genus and 11 species from 5 families of Hymenoptera were obtained. The species are:

Platygasteridae: *Platygaster oleae* Szelenyi, 1940, Eupelmidae: *Eupelmus urozonus* Dalman, 1820, Torymidae: *Torymus phillyreae* Ruschka, 1921, Pteromalidae: *Mesopolobus mediterraneus* (Mayr, 1903), *Mesopolobus diffinis* (Walker, 1834), *M. aspilus* (Walker, 1835), Eulophidae: *Anaprostocetus acuminatus* (Ratzeburg, 1848), *Quadrastichus dasineurae* Doğanlar et al., 2009*, Aprostocetus samandagus* sp.new*., Aprostocetus lasiopterus* sp.new. and *Zeytinus hatayensis* gen. and sp. new.

Identification key for the parasitoids of gall midges in Hatay province

1- Pronotum in profile more or less triangular, and extending to tegulae; antennae arising near margin of clypeus, 10 segmented; front wings without marginal and stigmal veins ……
……..…Platygasteridae……..……***Platygaster oleae*** Szelenyi

--… Pronotum in profile more or less quadrate, and not quite reaching tegulae; number of antennal segments variable; front wings with marginal and stigmal veins; thorax with a distinct prepectus ……
…… Chalcidoidea…….....…….....……2

2- Hind coxa at least three times larger than front; ……
…….***Torymus phillyreae*** Ruschka

-- Hind coxa only little larger than front; other characteristics partly different…….……3

3- Mesopleuron convex, not impressed; middle basitarsus and tibial spur enlarged; antennae with one ring segment and seven funicular segments ……Eupelmidae……..……..***Eupelmus urozonus*** Dalman

-- Mesopleuron always impressed; middle basitarsus slim and tibial spur small; antennae with two or more ring segments……..……4

4- Tarsi 5-segmented; notauli incomplete; antennae 13-segmented……
……...Pteromalidae.....5

-- Tarsi 4-segmented; notauli complete; antennae at most 9-segmented……
……Eulophidae…….....…7

5- Mid tibiae with a black band on anterior margin; hind wing of male with black spots, and 4th and 5th segments of flagellum and club black, other segments yellow…..…….…… ***Mesopolobus diffinis*** (Walker)

-- Mid tibiae without black band; hind wing of male without spots, segments of funicular segments yellow ……...……6

6-Female with gaster as long as head plus thorax; male with mid tibial spur as long as maximum wide of mid tibia; club of male black, almost as long as wide…….***Mesopolobus mediterraneus*** (Mayr)

-- Female with gaster at least slightly longer than head plus thorax; male with mid tibial spur distinctly longer than maximum wide of mid tibia; club of male black only dorsally, yellow ventrally, at least 1.3-1.5 times longer than wide ……..……..…***Mesopolobus aspilus*** (Walker)

7- Ocelli enclosed in an area marked off by impressed lines; just outsides each lateral ocellus there is a shallow subtriangular fovea……..…….8

-- Ocelli not enclosed in such a distinct area……..……..……..9

8- First segment of mid and hind tarsi much shorter than second segment; hind coxa without dorsolateral carina; body none metallic, with black and yellow spots…….……***Zeytinus hatayensis*** gen. and sp. new

-- First segment of mid and hind tarsi at least as long as second; hind coxa with a fine curved dorsolateral carina; body mostly metallic…… ……..…***Anaprostocetus acuminatus*** (Ratzeburg)

9- Forewing having submarginal Vein with 1 dorsal seta; funicular segments longer than wide; gaster longer than head plus thorax combined, body mostly pale yellow..…***Quadrastichus dasineurae*** Doğanlar et al. 2009

-- Forewing having submarginal vein with 2 or more dorsal seta; body mostly black; other characteristics partly different ……..……10

10- Females…….……..11

-- Males……..…… 12

11- Ovipositor sheaths plus postcercale 0.60 length of hind tibia; pedicellus 2.67 times as long as broad; clava 2.67 as long as wide, with C1 quadrate, C2 1.33 times as long as wide; C3 0.8 times as long as C2. Funicle with F1-F2 subequal in length, and in width; 3 times as long as wide; F3 slightly shorter wider than F2, 1.75 times as long as broad…….…….……***Aprostocetus samandagus*** sp.new

-- Ovipositor sheaths 0.28-0.35 length of hind tibia, pedicellus 2.33 times as long as broad; clava 2.9-3.25 times as long as wide, C1 2.27 times as long as wide, C2-C3 almost quadrate; C3 0.75 times as long as wide Funicle with F1 2.25, F2 2.0 and F3 1.75 times as long as wide ……..……***Aprostocetus lasiopterus*** sp.new

12- At least hind tibia black; pedicellus as long as F1; funicle with F1 quadrate, following segments gradually shortening and narrowing, F2 2.1 times, F3 2.8 and F4 2.75 times as long as wide …… ***Aprostocetus samandagus*** sp.new

-- Tibiae yellow to white; pedicellus 0.8-0.86 as long as F1; funicle with F1 1.14- 1.27 times as long as broad, following segments almost equal in width and length, F2- F4 twice as long as broad……..…… ……..***Aprostocetus lasiopterus*** sp.new

Platygaster oleae Szelenyi, 1940

Szelenyi 1940: 232-234. Holotype female, Crikvenika, Croatia, Yougoslavia (*Bollow*), Deutchen Entomologischen Institutes, Berlin-Dahlem, by original designation.

Host: *Dasineura oleae* Loew. (Szelenyi, 1940; Al-Tamimi, 1997).

Distribution: Croatia (Szelenyi 1940), Greece, (Fauna europea, 2010), Israel (Avidov & Harpaz, 1969), Amman, Jordan (Al-Tammi, 1997).

Material studied:Turkey, Hatay (**New record**): Antakya, 13.IV. -21.V. 2008, 18♀♀, 13♂♂; 18.IV. -20.V. 2009, 12♀♀, 8♂♂; 11.IV. -27.V. 2010, 21 ♀♀, 19 ♂♂; Samandağ, Vakıflı, 11-21. V. 2007, 31♀♀, 18 ♂♂; 15-17. IV. 2008, 11♀♀, 8 ♂♂; 19. V. 2009, 3♀♀, 2 ♂♂; 15.IV. -17.V. 2010, 8 ♀♀, 5 ♂♂; all of the specimens were reared by Doğanlar and Sertkaya as endoparasitoid of *D. oleae*.

Torymus phillyreae Ruschka, 1921

Torymus phillyreae Ruschka 1921: 340-341. Lectotype ♀, Italy, Naturhistorisches Museum, Vienna, Austria, designated by Graham (1994).Synonyms were given by Graham (1994).

Host: Diptera: Cecidomyiidae: 7 spp.; Hymenoptera: 1 sp. (Ruschka, 1921; Herting, 1978; Graham, 1994)

Distribution: Armenia, Russia, Ukraine (Zerova et al., 2003); Europe (Ruschka 1921; Herting, 1978; Graham, 1993)

Material studied: Turkey, Hatay, Samandağ, Vakıflı, (**New record**), 14.V.2007, 2 ♂♂,, (Leg. Doğanlar), reared as endoparasitoid of *D. oleae*.

Eupelmus urozonus Dalman, 1820

Eupelmus urozonus Dalman, 1820: 378. Vestrigothia, Sweden, types unknown. Synonyms were given by Dalla Torre Von (1898) and by Graham (1969).

Host: Listed by Noyes (2010) as follows: Coleoptera: 39 spp.; Diptera: 26 spp, including *Dasineura oleae*, *Lasioptera berlesiana*, *Bactrocera oleae*,;

Hemiptera: 9 spp.; Hymenoptera: 73 spp.; Lepidoptera: 28 spp. Parasitoid hosts: Diptera: 3 spp.; Hymenoptera: 31 spp. (Boucek, 1977; Noyes, 2010).

Distribution: Europe, Asia, North Africa (Boucek, 1977; Noyes, 2010); United States of America (Thompson 1955); Turkey (Bayram et al., 1998; Gençer, 2003; Öncüer, 1991).

Material studied: Hatay, Antakya, 13-21.V. 2008, 22 ♀♀ 18 ♂♂; 17.IV.-21.V. 2009, 11 ♀♀ 7 ♂♂; 3.– 27.V. 2010, 8 ♀♀ 11 ♂♂; Samandağ, Vakıflı, 14.V.2007, 46 ♀♀, 80 ♂♂; 18-27.V. 2008, 17 ♀♀ 8 ♂♂; 12.IV.- 19.V. 2009, 7 ♀♀ 4 ♂♂; 23.IV. – 27.V. 2010, 46 ♀♀ 44 ♂♂; (Leg. Doğanlar and Sertkaya), reared as endoparasitoid of *D. oleae* and/or *L. oleicola*.

Mesopolobus diffinis (Walker, 1834)

Eutelus diffinis Walker 1834: 358. Lectotype ♀, The Natural History Museum, London, United Kingdom, designated by Graham (1957), new combination for *Eutelus diffinis* Walker by Graham (1957) and for *Mesopolobus diffinis* Walker by Graham (1969). Synonyms: given by Graham (1957; 1969).

Host: Diptera: 14 spp.; Lepidoptera: 1 spp. (Graham, 1969; Herting, 1978; Askew & Harris, 2007).

Distribution: Europe (Askew et al., 2001) Asia (Boucek, 1977; Dzhanokmen, 2005); Turkey (Öncüer, 1991).

Material studied: Hatay, Samandağ, Vakıflı, 17.- 22.V. 2009,1 ♀ 3♂; 14. 11. IV.-13.V. 2010, 5 ♀, (Leg. Doğanlar), reared as endoparasitoid of *D. oleae* and *L. oleicola*.

Mesopolobus mediterraneus (Mayr, 1903)

Eutelus mediterraneus Mayr, 1903: 388,399. ♂, ♀, Italy, types unknown.

Mesopolobus mediterraneus (Mayr) New combination for *Eutelus mediterraneus* Mayr by Rosen Von (1958).

Host: Coleoptera: 5 spp., Diptera: 5 spp.; Hemiptera: 1 sp.; Hymenoptera: 14 spp.; Lepidoptera: 11 spp.Parasitoid hosts: Hymenoptera: 3 spp. (Graham, 1969; Herting, 1978; Askew et al., 2001)

Distribution: Europe (Askew et al., 2001); Turkey (Öncüer, 1991).

Material studied: Hatay, Samandağ, Vakıflı, 15.IV.2007, 1 ♀; 14. IV.-15.V. 2009, 1 ♀ 8♂♂; 11. IV.-17.V. 2010, 8 ♂♂,, (Leg. Doğanlar), reared as endoparasitoid of *D. oleae* and *L. oleicola*.

Mesopolobus aspilus (Walker, 1835)

Pteromalus aspilus Walker, 1835:485. Lectotype ♀, The Natural History Museum, London, United Kingdom, designated by Graham (1957). New combination for *Pteromalus aspilus* Walker by Rosen (1958),

Eutelus (*Eutelus*) *elongatus* Thomson: 75. Lectotype ♀, Zoological Museum, Lund UnIVersity, Sweden. Synonym of *Mesopolobus aspilus* (Walker). designated by Graham (1969).

Host: Diptera**:** 2 spp.; Hymenoptera**:** 1 sp.; Lepidoptera**:** 1 sp. Parasitoid hosts: Diptera**:** *Sarcophaga* sp. (Boucek, 1977; Askew et al., 2001).

Distribution: Europe (Walker, 1835; Erdös, 1948; Graham, 1969; Herting, 1978; Askew et al., 2001); Kazakhstan: Tselinograd Obl. (Dzhanokmen, 2005).

Material studied: Hatay, Samandağ, Vakıflı, 17.V.2009,1 ♀; 11.IV.- 19.V. 2009, 13 ♂; 24. IV.-27.V. 2010, 3 ♂, (Leg. Doğanlar), reared as endoparasitoid of *D. oleae* and *L. oleicola*.

***Zeytinus* gen new**

Type species: *Zeytinus hatayensis* sp.new, Gender: feminine.

Etymology: The name is derived from the Turkish name of plant, *Olea europea,* on which its host feeding

Diagnosis: First segment of mid and hind tarsi (Figure. 1g, h) much shorter than second segment. Ocelli (Figure 1 i) enclosed in an area marked off by impressed lines; just outsides each lateral ocellus there is a shallow subtriangular fovea. Antenna of female (Figure1 d) with 3 anelli, the first laminar, the last two discoid, funicle and clava each with 3 segments. Antenna of male (Figure 2 d, e) with ventral plaque of scape placed in upper half; having 2 anelli, 4 funicular segments and 3 claval segments, flagellar segments with compact subbasal whorls of long dark setae. Malar sulcus straight without fovea below eye. Body having raised pentagonal reticulation with a short stalk (Figure 2 c); non metallic, with black and yellow markings.

Hosts: Larval/pupal parasitoid of the gall midges, *D. oleae*. and *L. oleicola*, on leaves and shoots of *O. europea* L.

Comments: The new genus similar to *Kolopterna* Graham and *Sigmophora* Rondani in having first segment of mid and hind tarsi much shorter than second segment, but it differs from both of them in having malar sulcus straight, without fovea below eye and ocelli enclosed in an area marked off by impressed lines but without any carina between ocelli; The new genus also similar to *Anaprostocetus* Graham in having ocelli enclosed in an area marked off by impressed lines; just outsides each lateral ocellus there is a shallow subtriangular fovea but it differs in having first segment of mid and hind tarsi much shorter than second segment, hind coxa without any dorsal carina and reticulation, and body non metallic.

***Zeytinus hatayensis* Doğanlar sp. new**

(Figure 1 a-h; 2 a-f)

Etymology: The name is derived from the locality of types, Hatay, from where the specimens were reared.

Type m Holotype female, Turkey: Hatay, Samandağ, Vakıflı, 36 07 03 N, 35 58 39 E, 96 m, April-May, 2007 (leg. M. Doğanlar and Sertkaya), reared from the galls of *D. oleae*, on the leaves of *O. europea*, Cat. No:265-31 (Museum of Plant Protection Department, Agriculture Faculty, Mustafa Kemal University, Antakya-Hatay). Paratypes: Antakya., 13-22.V. 2008, 1♀ 3♂♂, 2.- 17.V. 2009, 4 ♂♂; 14.-19.V. 2010, 2 ♂♂, (leg. Doğanlar), deposition same as holotype;13 ♂♂, 3 ♀♀, same data as the holotype.

Diagnosis: Body yellow with a testaceous spot on sides of mesonotum below tegula. Gaster with brownish bands dorsally, base and tip of ovipositor sheaths brown. Malar space 0.5 length of eye; pedicellus plus flagellum as long as wide of mesoscutum; in female funicle filiform, F1-F3 subequal in length, and wide; funicular segments 1.5 times as long as broad.

Description: Female: 1.2-1.3 mm (Holotype 1.2 mm). Some characters addiditional to diagnostic ones were gIVen as follows: eyes dark brown. Wings hyaline, venation pale yellow. dorsellum and legs pale yellow; antennae pale brown.

Body (Figure, 1a) with mesonotum and scutellum distinctly convex. Head about as wide as mesoscutum, about 1.16 times wider than height; POL about 1.7 OOL. Eyes about 2.4 times as long as broad. Mouth nearly 1.5 times malar space. Antenna (Figure 1c ,d) with scape 0.7 times as long as eye, not reaching median ocellus, 3.25 times as long as wide; pedicellus 1.7 times as long as broad; clava 1.5 times broader than F3, twice as long as wide, with C1 quadrate, 1.5 times as long as C2, the latter 0.33 times as long as wide; C3 0.6 times as long as C2, spine 0.2 times as long as C3, with apical seta distinctly shorter than spine; sensilla less numerous on funicle, more so on clava, long and slender, with moderately long bases and short projecting blades.

Thorax (Figure, 1e) 1.5 times as long as broad; pronotum about 4.5 times as wide as long, Mid lobe of mesoscutum 1.4 times wider than long, with raised reticulation, with long 3 adnotaular setae on each side. Scutellum 1.5 times as broad as long, sculptured like mesoscutum; submedian lines not nearer to each other than sublateral lines, enclosing a space 3.6 times as long as broad; setae equal in length, close to each other, distance between anterior pair and fore margin of scutellum 2.3 times distance between setae. Dorsellum about 2.4 as long as wide. Propodeum broadly emarginate, medially 1.33 times as long as dorsellum; median carina distinct, propodeal spiracle very large. Callus with two setae, one outside spiracle, the other near hind corner. Legs moderately long,

slender shaped. Forewing (Figure, 1f) 2.2 times as long as broad; costal cell distinctly shorter than marginal vein (23:28), 5.75 times as long as broad; submarginal with 2 dorsal setae; marginal vein rather thin, 3.7 times length of stigmal vein; stigma small and oblong; speculum closed, narrow; cilia 0.33 length of ST. Hindwing bluntly pointed; cilia 0.28 breadth of wing.

Gaster (Figure, 1a) lanceolate, almost as long as head plus thorax, 0.8 times as broad as thorax, 2.52 times as long as broad, last tergite twice broader than long; postcercale short, almost half as long as longest cercal seta; ovipositor sheaths plus postcercale 0.26 length of hind tibia; tip of hypopygium at half length of gaster.

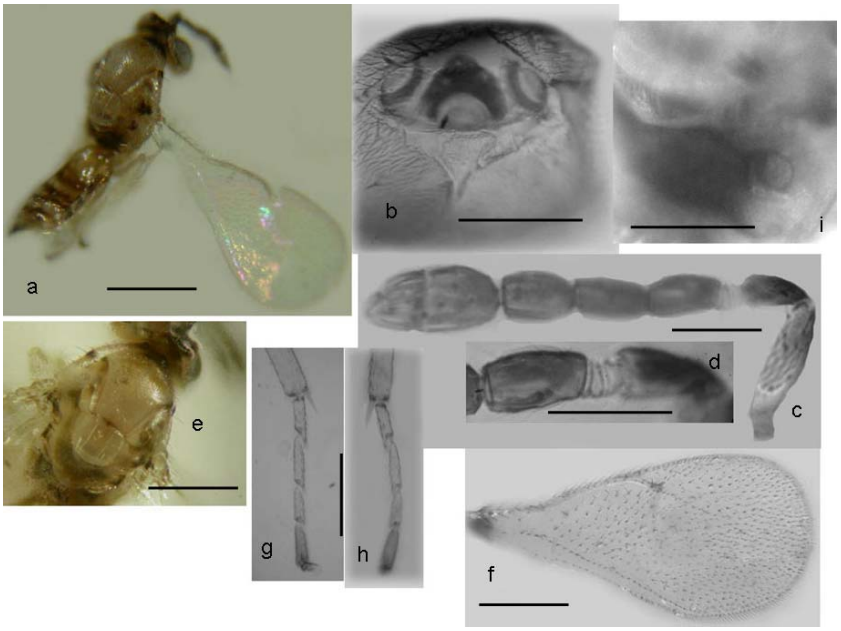

Figure 1. *Zeytinus hatayensis* Doğanlar sp.new female, a. body in dorsal view; b. ocellar triangle; c. antenna; d. pedicel and basal segments of flagellum; e. mesosoma in dorsal view; f. forewing; g. mid tibia; h. hind tibia; i. propodeal spiracle. (Scale bar for a,f = 0.25 mm; for the others 0.125 mm) (Original).

Male: Differs from female as follows. Colour: body (Figure. 2. a, b) mainly yellow, head, pronotum brown, mesoscutum dorsally with a broad, brown spot anteriorly; mesopleuron on upper corner, metapleuron, propodeum and hind half of gaster brown; dorsellum and legs pale yellow; antennae pale brown.

Antenna (Figure, 2 d, e) with scape 3 times as long as broad, with ventral plaque 0.32 length of scape; pedicellus plus flagellum 1.44 times breadth of mesoscutum; pedicellus 1.5 times as long as broad, as long as F1; funicle as broad as pedicellus, filiform; F1 0.66 times as long as F2 and 1.2 times as long as broad, following segments equal in width, F2 1.8 times, F3 twice, F4 2.2

times as long as broad; clava (Figure, 2f) as wide as F4, 1.1 times longer than F3 plus F4, about 4.3 times as long as broad, with C1 and C2 subequal, each 1.6 times as long as broad, C3 short, as long as basal wide; whorled setae Very long, those of F1 reaching slightly beyond tip of F3. Gaster (Figure, 2c) distinctly shorter and narrower than mesosoma. Genitalia 4.67 times as long as wide.

Biology: The species is an endoparasite of *D. oleae* and *L. oleicola* in galls of the host on the leaf and/or shoots of *O. europea*.

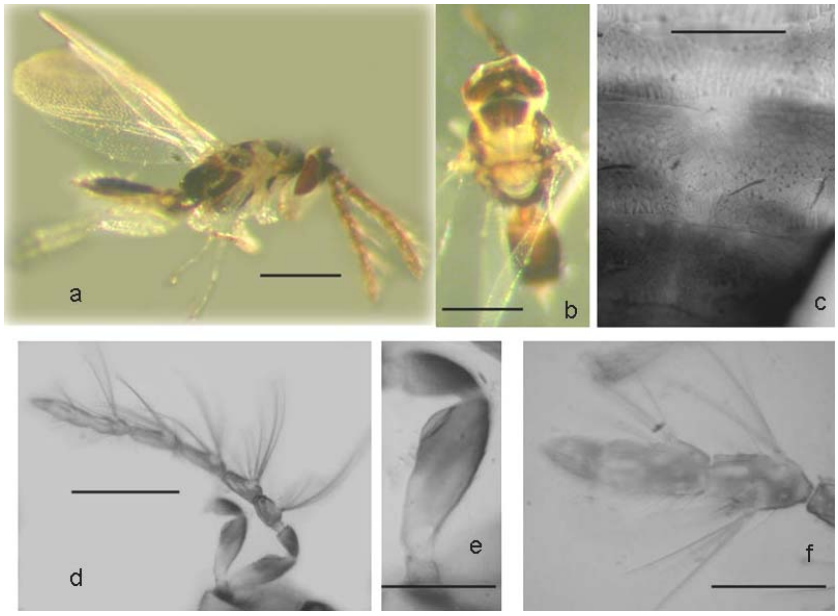

Figure 2. *Zeytinus hatayensis* Doğanlar sp.new, male. a-b. body: a. in lateral view, b. in dorsal View; c. dorsal view of gaster with reticulation; d. antenna; e. scape and pedicel; f. clava. (Scale bar for a,b = 0.25 mm; for the others 0.125 mm) (Original).

Anaprostocetus acuminatus (Ratzeburg)

Entedon acuminatus Ratzeburg, 1848: 169. Germany.

Aprostocetus acuminatus (Ratzeburg, 1848), New combination for *Entedon acuminatus* Ratzeburg by Graham (1961).

Anaprostocetus acuminatus (Ratzeburg), New combination for *Entedon acuminatus* Ratzeburg by Graham (1987).

Host: Diptera: 1 sp.; Hymenoptera: 2 spp.; Lepidoptera: 2 spp.

Distribution: Canada (LaSalle, 1994); Europe (Ratzeburg, 1848; Domenichini, 1966; Graham, 1987); India (Narendran, 2007); Japan (Ikeda, 1997); Turkey (Sakaltaş & Gençer, 2005).

Material studied: Hatay, Antakya, 19-21.V. 2010, 2♂; Samandağ, Vakıflı, 15.V.2007, 3♀; 21.IV. – 23.V. 2010, 2♀1♂. (Leg. Doğanlar), reared as endoparasitoid of *D. oleae* and *L. oleicola*.

Quadrastichus dasineurae Doğanlar et al. 2009

Quadrastichus dasineurae Doğanlar, M., J. LaSalle, E. Sertkaya & O. Doğanlar 2009: 309-314. Holotype female, Hatay, Turkey, original designation.

Host: reared as endoparasitoid of *D. oleae* and *L. oleicola* .

Distribution: Turkey: Samandağ, Hatay (Doğanlar et al. 2009).

Material studied: Hatay, Samandağ, Vakıflı, 11. IV.-25.V.2007, 10♀, 5♂; 14. IV. – 27.V. 2010, 25♀ 22 ♂, (Leg. Doğanlar).

Aprostocetus samandagus Doğanlar **sp. new**

(Figure, 3 a-k)

Etymology: The name is derived from the locality of types, Samandağ-Hatay, from where the specimens were obtained.

Type m: Holotype female, Turkey: Hatay, Samandağ, Vakıflı, 36 07 03 N, 35 58 39 E, 96 m, 15.IV. 2007 (leg. M. Doğanlar), reared from the galls of *D. oleae*, on the leaves of *O. europea*, Cat. No: 250-21 (Museum of Plant Protection Department, Agriculture Faculty, Mustafa Kemal University, Antakya-Hatay). Paratypes: Hatay, Samandağ, Vakıflı, 11. ıV.-27.V.2007, 6♀♀, 7♂♂; 14. IV.–21.V. 2010, 9♀♀ 7 ♂♂, (Leg. Doğanlar).Deposition is same as holotype.

Diagnosis: in female ovipositor sheaths plus postcercale 0.60 length of hind tibia; pedicellus 2.67 times as long as broad; funicle with F1-F2 subequal in length, and in width; 3 times as long as wide; F3 slightly shorter wider than F2, 1.75 times as long as broad; clava 1.5 times wider than F3, 2.67 as long as wide, with C1 quadrate, slightly longer than C2, the latter 1.33 times as long as wide; C3 0.8 times as long as C2. In male at least hind tibia black; pedicel as long as F1; clava at most 5.87 times as long as broad, C1 and C2 subequal in length, about 2.25 times as long as wide, C3 short, 1.86 times as long as basal wide; whorled setae very long, those of F1 reaching distinctly beyond tip of F3.

Description: Female: 1.7-1.9 mm (Holotype 1.8 mm). Some characters addiditional to diagnostic ones were given as follows: body black, wings hyaline, venation pale yellow, dorsellum,tip of tibiae and tarsi pale yellow except pretarsi brown; antennae pale brown, scape and pedicelus ventrally yellow.

Body (Figure 3 a,b) with mesonotum and scutellum distinctly convex Head about as wide as mesoscutum, 1.06 times wider than height and 2.43 times as wide as length; POL 1.3 OOL. Eyes 1.33 times as long as wide, separated by slightly more than length (18:17). Malar space 0.55 length of eye, sulcus straight.

Mouth nearly 1.4 times malar space. Antenna (Figure, 3c) with scape 0.87 times as long as eye, not reaching median ocellus, 4.75 times as long as wide; pedicellus plus flagellum 1.1 times as long as wide of mesoscutum; pedicellus as wide as F1; antenna with 3 anelli. Funicle filiform, clava with spine 0.25 times as long as C3, with apical seta distinctly shorter than spine;

Thorax (Figure, 3d) 1.22 times as long as broad; pronotum about 5 times as wide as long, Mid lobe of mesoscutum 1.5 times wider than long, moderately conVex, with engraved reticulation, with areoles about 6 times longer than wide; median line very fine, with long 5 adnotaular setae on each side. Scutellum 1.5 times as wide as long, strongly convex, sculptured like mesoscutum; submedian lines slightly nearer to each other than sublateral lines, enclosing a space 3 times as long as broad; setae equal in length, close to each other, distance between anterior pair and fore margin of scutellum 2.5 times distance between setae. Dorsellum about 3.5 as long as wide. Propodeum broadly emarginate, medially as long as dorsellum; median carina distinct, paraspiracular absent. Callus with two setae, one outside spiracle, the other near hind corner. Legs moderately long, slender shaped, hind femora 4.0 times as long as broad; spur of mid tibia as length of basitarsus and twice longer than wide of mid tibia. Forewing (Figure, 3e) 2.23 times as long as broad; costal cell 0.7 as long as marginal Vein, 8 times as long as broad; submarginal with 4 dorsal setae; marginal Vein rather thin, 4.25 times length of stigmal Vein, its front edge with 14 long setae; stigmal vein at 45°, Very thin proximally, stigma small and oblong; speculum closed, broad, extending mid way below M; wing beyond it thickly pilose, especially distad; cilia 0.5 length of ST. Hindwing obtusely pointed; 5.5 times as long as wide, cilia 0.25 breadth of wing.

Gaster (Figure, 3f) lanceolate, 1.07 times as long as head plus thorax, slightly narrower than thorax, 1.67 times as long as broad, its sides subparallel in basal half, apex distictly acuminate; last etrgite (Figure 9) twice wider than long; postcercale short, shorter than longest cercal seta; tip of hypopygium at half length of gaster.

Male: Differs from female as follows. Colour: antenna dark brown, except scape laterally and pedicel ventrally yellow. Tegulae yellow with some dark spots. Legs with at least hind tibia black. Gaster with subbasal yellow spot.

Antenna (Figure 3, g, h) with scape 3.2 times as long as broad, with ventral plaque 0.21-0.26 length of scape; pedicellus plus flagellum 1.46 times breadth of mesoscutum; pedicellus about 1.5 times as long as broad; funicle distinctly broader than pedicellus, filiform; F1 quadrate, about 0.5 times as long as F2, following segments gradually shortening narrowing, F2 2.1 times, F3 2.8 and F4 2.75 times as long as wide; clava (Figure, 3 i) as wide as F4, slightly shorter than F3 plus F4, claval segments gradually shortening, spine 0.26 length of C3, with apical spine as long as spine;

Gaster 1.2 times as long as thorax and twice as long as broad, its sides subparallel; about 0.5 times as wide as mesosoma. Genitalia (Figure 3k) 3.2 times as long as wide.

Host: The species is an endoparasite of *D. oleae* and/or *L. oleicola* in galls on leaf and shoots of *O. europea*.

Distribution: Hatay, Turkey

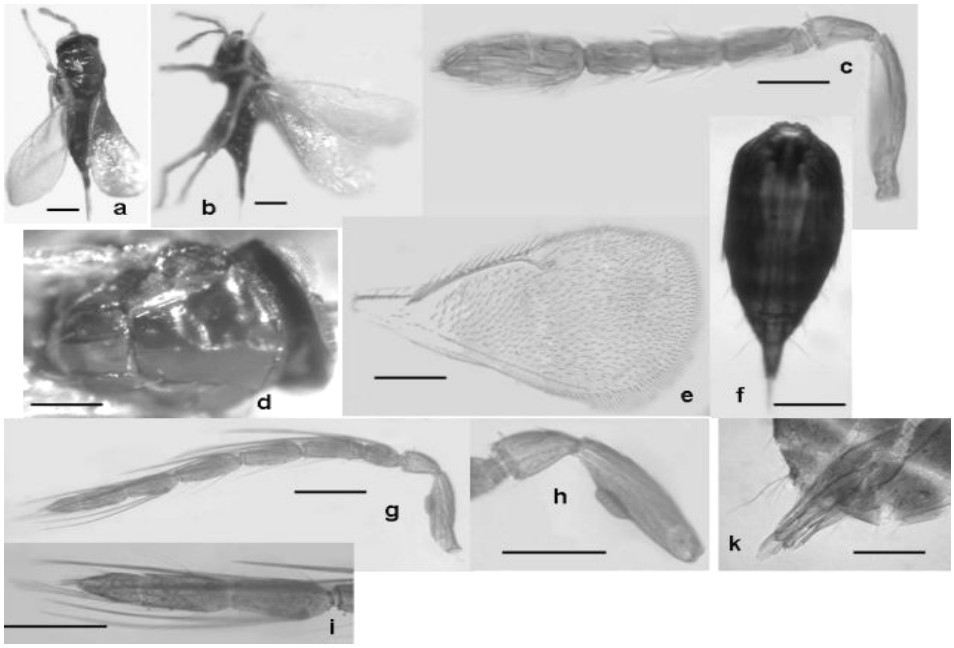

Figure 3. *Aprostocetus samandagus* Doğanlar sp.new, a-f. female. a., b. body: a. in dorsal view, b. in lateral view; c. antenna; d. mesosoma and head, in dorsal view; e. forewing; f. gaster; g-k. male. G. antenna; h.scape and pedicel; i. clava; k. genitalia. (Scale bar for a,b,e = 0.25 mm; for the others 0.125 mm) (Original).

Comments: Female: The new species similar to *Aprostocetus catius* (Walker 1839) in having postcercale plus ovipositor about 0.4 times as long as hind tibia and marginal vein 4 times as long as stigmal vein. But it differs from *A. catius* in having pedicellus shorter than F1 and 2.67 times as long as wide (in *A. catius* pedicellus as long as F1 and twice as long as wide); F1 and F2 3 times, F3 1.75 times and clava 2.67 times as long as wide (in *A. catius* F1 and F2 1.7-2.0 times, F3 1.4 times and clava 2.1-2.2 times as long as wide); thorax 1.22 times as long as wide, midlobe of mesoscutum 1.5 times as wide as long (in *A. catius* thorax 1.3-1.4 times as long as wide, midlobe of mesoscutum almost as wide as long); forewing with marginal vein 4.25 times as long as stigmal vein, speculum broad extending almost stigmal vein below marginal vein (in *A. catius* forewing with marginal vein 3.6-4.0 times as long as stigmal vein, speculum

narrow extending a little way below marginal vein). Male: *Aprostocetus samandagus* sp. new is similar to *Aprostocetus gaus* (Walker 1839) in having C3 short and clava slightly shorter than 6 times as long as wide, but it differs from *A. gaus* in having antenna with scape 3.2 times as long as broad, with ventral plaque about 0.21-0.26 length of scape; pedicellus plus flagellum about 1.46 times breadth of mesoscutum; pedicellus about 1.5 times as long as broad; F3 2.8 and F4 2.75 times as long as wide; clava about 5.87 times as long as broad, (in *gaus* antenna with scape 2.7-2.8 times as long as broad, with ventral plaque about 0.30-0.35 length of scape; pedicellus plus flagellum about 1.8 times breadth of mesoscutum; pedicellus about 1.8 times as long as broad, F3 and at most F4 2.2 times as long as wide; clava at most 5.5 times as long as broad).

Aprostocetus lasiopterus Doğanlar **sp. new**

(Figure, 4 a-i)

Etymology: The name is derived from the name of host of the types, *Lasioptera oleicola* Skuhrava 2011.

Material: Holotype female, Turkey: Hatay, Samandağ, Vakıflı, 36 07 03 N, 35 58 39 E, 96 m, 11. IV. 2007 (leg. M. Doğanlar), reared from the galls of *Dasineura oleae*, on the leaves of *Olea europea*, Cat. No: 250-22 (Museum of Plant Protection Department, Agriculture Faculty, Mustafa Kemal University, Antakya-Hatay). Paratypes: Hatay, Samandağ, Vakıflı, 11. IV. -22. V. 2007, 18 ♀♀, 7 ♂♂; 19.V. 2009,1♀; 15.-19.V. 2010, 2 ♀, 2 ♂♂, leg. Doğanlar, deposition same as holotype.

Diagnosis: In female ovipositor sheaths plus postcercale 0.35 length of hind tibia; pedicellus 0.78 length of F1; Funicle with funicular segments gradually shortening, F1 1.28 length of F3; F1 2.25, F2 2 and F3 1.75 times as long as wide; clava 2.9 times as long as wide; C1 2.27 times, C2 almost quadrate; C3 0.75 times as long as wide. In male tibiae yellow to white; scape with ventral plaque about 0.21-0.23 length of scape; pedicel plus flagellum; pedicel 0.8-0.86 as long as F1; funicle with F1 0.7 times as long as F2 and 1.14- 1.27 times as long as broad, F2-F4 twice as long as broad; clava about 5.0 times as long as broad, with C1 1.2 times longer than C2, twice as long as broad, C3 short, 1.7-1.8 times as long as basal wide; whorled setae very long, those of F1 reaching slightly beyond tip of F3.

Description: Similar to *A. samandagus* sp. new excepts as follows: Female: 1.5-1.7 mm (Holotype 1.6 mm). Some characters additional to diagnostic ones were given as follows: Legs with femora mostly testaceous except coxae which are concolorous with mesosoma, basal 2/3 of femora brown, fore tibiae white, mid tibiae with median dark band, hind tibiae pale

brown with anterior and posterior sides yellow; antennae brown, except scape black; gaster basally and last tergite pale brown.

Body (Figure 4.a,b). with mesonotum and scutellum distinctly convex. Head as wide as mesoscutum, about 1.06 times wider than height and 2.43 times as wide as length; POL about 1.3 OOL. Eyes about 1.17 times as long as broad, separated by 1.14 times length. Malar space 0.7 length of eye. Mouth nearly twice malar space. Antenna (Figure, 4.c) with scape as long as eye, reaching slightly above median ocellus, 3 times as long as wide; pedicellus 2.33 times as long as broad, slightly narrower than F1. Funicle filiform, funicular segments gradually shortening; F1 1.28 length of F3; clava 1.37 times wider than F3, spine 0.33 times as long as C3.

Thorax (Figure, 4d) 1.3 times as long as broad; pronotum about 4.6 times as wide as long, Mid lobe of mesoscutum 1.7 times wider than long, with areoles about 4 times longer than wide. Scutellum 1.43 times as wide as long, modarately convex; submedian lines distinctly nearer to sublateral lines than to each other, enclosing a space 1.75 times as long as broad. Legs with spur of mid tibia 1.4 times as long as basitarsus and 1.75 times as long as wide of mid tibia. Forewing (Figure, 4e-g) 2.08 times as long as broad; costal cell 7.33 times as long as broad; marginal 3.33 times length of stigmal vein; cilia 0.44 length of ST. Hindwing 4.33 times as long as wide, cilia 0.22 breadth of wing.

Gaster 1.14 times as long as head plus thorax, 2.06 times as long as broad,; last tergite twice wider than long; postcercale short, 0.5 length of longest cercal seta.

Male: Differs from female as follows. Antenna pale brown, except pedicel mostly yellow.

Antenna (Figure, 4.i) with pedicellus 0.8-0.86 as long as F1; F1 0.7 times as long as F2 and 1.14- 1.27 times as long as broad, following segments almost equal in width and length, F2- F4 twice as long as broad; clava as long as F3 plus F4, with C1 1.2 times longer than C2, twice as long as broad, C3 short, 1.7-1.8 times as long as basal wide;

Gaster as long as thorax, 2.16 times as long as wide, 0.33 times as wide as mesosoma. Genitalia 2.6 times as long as wide.

Biology: *Aprostpcetus lasiopterus* sp. new is an endoparasite of *D. oleae* and *L. oleicola*. in galls of the host on the leaf and shoots of *O. europea*.

Host: *D. oleae* and *L. oleicola*.

Distribution: Hatay, Turkey

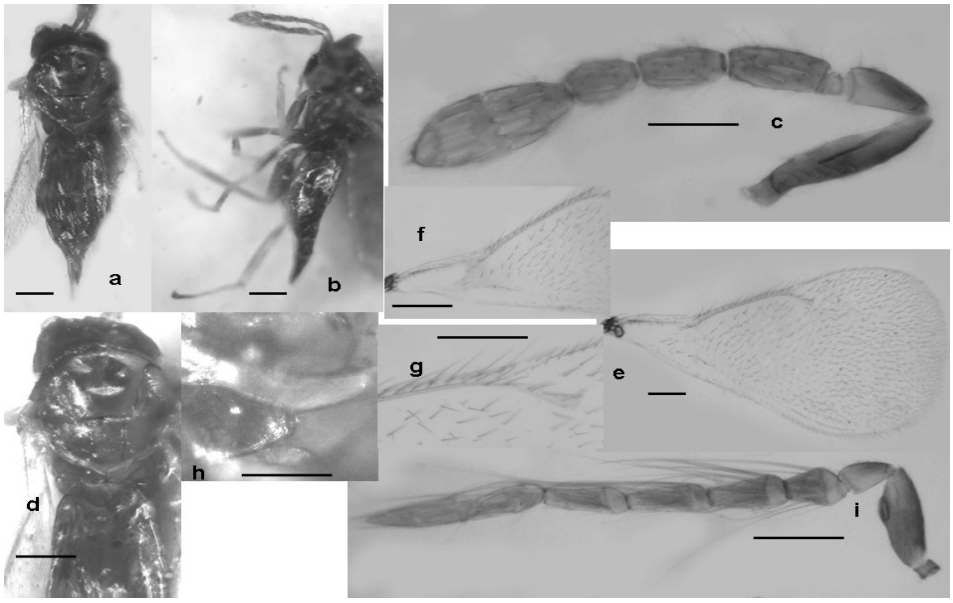

Figure 4. *Aprostocetus lasiopterus* Doğanlar sp.new. a-h. female.a, b. body, a.in dorsal view, b. in lateral view; c. antenna; d.mesosoma; e-g. forewing, h.dorsellum and propodeum; i. male antenna. (Scale bar for a,b,e = 0.25 mm; for the others 0.125 mm). (Original).

Comments: female: the new species similar to *Aprostocetus myrsus* (Walker 1839) in having clava 2.9 times as long as wide and last tergit of gaster at least slightly wider than long, in other species of this section clava at least 3.2 times as long as wide and last tergit of gaster at least 1-1.4 times as long as wide. *Aprostocetus lasiopterus* differs from *A. myrsus* in having all coxae and upper angle of mesopleuron black (in *myrsus* all coxae yellow, and upper angle of mesopleuron pale); C1 shorter than C2 plus C3 (in *myrsus* C1 at least slightly longer than C2 plus C3). In male: the new species similar to *Aprostocetus neglectus* (Domenichini 1957) in having submedian lines of scutellum not or hardly nearer to sublateral lines than to each other, and spur of mid tibia as long as basitarsus, but it differs from *A. neglectus* in having scape with ventral plaque about 0.19-0.24 (0.2) length of scape; pedicellus about 1.2-1.4 (1.33) times as long as broad, 1.1-1.2 times longer than F1; F2 about 2.5 times as long as wide; clava 5.0-6 (5.5) times as long as broad, C3 1.64-1.86 times as long as basal wide; whorled setae very long, those of F1 reaching distinctly beyond 1/3 base of of F4 (in *neglectus* scape with ventral plaque about 0.36-0.38 length of scape; pedicellus about 1.7-2.0 times as long as broad, 1.5 times longer than F1; F2 about 14-18 times as long as wide; clava 3.7-4.0 times as long as broad, C3 with whorled setae not Very long, those of F1 reaching slightly beyond tip of of F2).

As a result of this work it was found that in Hatay province there are more than 11 parasitoid species associated with the gall midges on olive trees in the

orchards without any pesticides applications, and some of them seem secondary ones. In the future works biology of the parasitoid species should be studied in order to clarify their effectiveness on the pest species.

Özet

Hatay-Türkiye'de zeytin yaprak gal sinekleri *Dasineura oleae* (Angelini, 1831) ve *Lasioptera oleicola* Skuhravá 2011 (Diptera: Cecidomyiidae)'nin parazitoit kompleksi, Tetrastichinae (Hymenoptera: Eulophidae)'den yeni bir cins ve türlerin tanımlanması

Hatay İli- Türkiye'de 2007-2010 yılları arasında yapılan çalışmada Zeytin ağacı *Olea europea* L.'nın sürgün ve yapraklarında oluşturulan galler toplanarak laboratuar koşullarında kültüre alınmışlardır. Bu gallerden iki gal sineği, *Dasineura oleae* (Angelini, 1831) ve *Lasioptera oleicola* Skuhravá, 2011 (Diptera: Cecidomyiidae) elde edilmiştir. Bu gal sineklerinin poopülasyonlarını baskı altında tutan en önemli ölüm faktörleri olarak Hymenoptera takımına giren 5 familyadan 11 tür larva veya pupa parazitoiti olarak belirlenmiştir. Bu parazitoitler: Platygasteridae: *Platygaster oleae* Szelenyi, 1940, Eupelmidae: *Eupelmus urozonus* Dalman, 1820, Torymidae: *Torymus phillyreae* Ruschka, 1921, Pteromalidae: *Mesopolobus mediterraneus* (Mayr, 1903), *Mesopolobus diffinis* (Walker, 1834), *Mesopolobus aspilus* (Walker, 1835), Eulophidae: *Anaprostocetus acuminatus* (Ratzeburg, 1848), *Quadrastichus dasineurae* Doğanlar et al., 2009, *Aprostocetus samandagus* n.sp., *Aprostocetus lasiopterus* sp. new *Zeytinus hatayensis* gen. and sp. new. Çalışmada yeni taxa tanımlanmış, bunların ayırt edici özellikleri ve bazı biyolojik bilgileri verilmiştir. Ayrıca bütün parazitoitler için bir teşhis anahtarı oluşturulmuştur.

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