

Eulophid parasitoids (Hymenoptera: Eulophidae) of the horse chestnut leafminer, *Cameraria ohridella* (Lepidoptera: Gracillariidae), from İstanbul, Turkey

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Abstract: The eulophid parasitoids (Hymenoptera: Eulophidae) of *Cameraria ohridella* Deschka and Dimic (Lepidoptera: Gracillariidae) on horse chestnuts (*Aesculus hippocastanum* L.) in İstanbul were determined for the first time. Horse chestnut leaves infested with leafminers were collected in 2008 and adult parasitoids were obtained in emergence cages in the laboratory. A total of 10 eulophid parasitoid species were identified, 5 of which, namely *Cirrospilus viticola* (Rondani), *Pnigalio mediterraneus* (Ferrière and Delucchi), *Minotetrastichus frontalis* (Nees), *M. platanellus* (Mercet), and *Closterocerus trifasciatus* Westwood, were recorded for the first time in Turkey. All of the identified parasitoid species have already been reported as parasitoids of *C. ohridella* in countries of Europe. Therefore, our findings are in accordance with these studies carried out in European countries.

Key words: *Cameraria ohridella*, parasitoids, Eulophidae, new records, İstanbul, Turkey

İstanbul-Türkiye’de atkestanesi yaprak güvesi, *Cameraria ohridella* (Lepidoptera: Gracillariidae)’nın Eulophid parazitoidleri (Hymenoptera: Eulophidae)

Özet: İstanbul’da atkestanelerinde (*Aesculus hippocastanum* L.) bulunan *Cameraria ohridella* Deschka ve Dimic (Lepidoptera: Gracillariidae)’nın eulophid parazitoidleri (Hymenoptera: Eulophidae) ilk defa incelendi. Zararlıının bulunduğu atkestanesi yaprakları 2008 yılında toplandı ve ergin parazitoidler laboratuvarında çıkış kafeslerinden elde edildi. Toplam 10 tane eulophid türü teşhis edildi. Bunlardan 5 tanesi, *Cirrospilus viticola* (Rondani), *Pnigalio mediterraneus* (Ferrière ve Delucchi), *Minotetrastichus frontalis* (Nees), *M. platanellus* (Mercet) ve *Closterocerus trifasciatus* Westwood, Türkiye’de ilk kez kayıt edildi. Tespit edilen tüm parazitoid türleri zaten Avrupa ülkelerinde *C. ohridella*’nın parazitoidleri olarak rapor edilmiştir. Bu yüzden bulgularımız, Avrupa ülkelerinde yapılan çalışmalardan elde edilen sonuçlarla aynıdır.

Anahtar sözcükler: *Cameraria ohridella*, parazitoidler, Eulophidae, yeni kayıtlar, İstanbul, Türkiye

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The horse chestnut leafminer moth, *Cameraria ohridella* Deschka and Dimic, has rapidly expanded its range in European countries over the past 25 years (Gilbert et al., 2005). It causes serious damage to the leaves of the white-flowering horse chestnut, *Aesculus hippocastanum* L., because of its epidemic population densities and the inefficiency of natural control mechanisms (Heitland et al., 2005). Horse chestnuts are commonly planted as ornamental trees in many provinces of Turkey. *Cameraria ohridella* was first recorded from İstanbul in 2004 (Cebeci and Acer, 2007), probably several years after the first appearance of the moth in Turkish territory. Leafminers are often heavily attacked by parasitic Hymenoptera species; about 30 species are known to be able to develop on the horse chestnut leafminer, mostly chalcidoids of the family Eulophidae (Grabenweger et al., 2010). Although eulophid parasitoids have been studied frequently in Turkey (Kaya, 1975; Tuncyurek-Soydanbey, 1978; Doğanlar, 1985; Çıkman et al., 2006; Gençer, 2009), no comprehensive field investigation has been carried out to assess the parasitoid complex of the horse chestnut leafminer thus far. In the present study, we studied the eulophid parasitoids of *C. ohridella* in İstanbul for the first time.

Infested leaves of *A. hippocastanum* (leaf litter as well as leaves picked haphazardly from the lower branches of the trees) were collected in November and December of 2008 in the Belgrade Forest of İstanbul (41°09'N-41°12'N, 28°54'E-29°00'E) when *C. ohridella* was diapausing in the pupal stage. Leaf samples were put into boxes (33 × 20 × 7 cm) and kept at room conditions (21 °C and 60% humidity). Parasitoid emergence started on 23.01.2009 and continued until 08.05.2009. Parasitoids were removed from the box and prepared for determination.

A total of 10 species of eulophids were obtained from the horse chestnut leaves infested with *C. ohridella* mines, from 3 subfamilies of Eulophidae. The determined parasitoid species are listed below along with information on alternative hosts and their distribution in Turkey, when known.

Subfamily **Eulophinae**

***Cirrospilus viticola* (Rondani, 1877)**

Material examined: 2 exs., 13.02.2009. In total, 2 females.

Distribution and host in Turkey: New record for Turkey.

***Pnigalio mediterraneus* (Ferrière and Delucchi, 1957)**

Material examined: 4 exs., 23.01.2009; 4 exs., 30.01.2009; 5 exs., 06.2.2009; 10 exs., 13.02.2009; 5 exs., 20.02.2009; 10 exs., 27.02.2009; 7 exs., 06.03.2009; 3 exs., 20.03.2009; 3 exs., 03.04.2009; 2 exs., 10.04.2009; 2 exs., 24.04.2009; 3 exs., 08.05.2009. In total, 58 specimens (46 females and 12 males).

Distribution and host in Turkey: New record for Turkey.

***Pnigalio pecticornis* (Linnaeus, 1758)**

Material examined: 1 ex., 30.01.2009. In total, 1 female.

Distribution and host in Turkey: On *Syringopais temperatella* (Lederer) (Lepidoptera: Deoclonidae) in Ankara, Denizli, Erzurum, Kırıkkale, Konya, and Sivas (Kaya, 1975; Tuncyurek-Soydanbey, 1978).

Subfamily **Tetrastichinae**

***Baryscapus nigroviolaceus* (Nees, 1834)**

Material examined: 1 ex., 23.01.2009. In total, 1 female.

Distribution and host in Turkey: On *Micrurapteryx sophorivora* Kuznetsov and Tristan, 1985 (Lepidoptera: Gracillariidae) and in grass in Ankara and Malatya (Gençer and Seven, 2005; Sakaltaş and Gençer, 2005).

***Minotetrastichus frontalis* (Nees, 1834)**

Material examined: 11 exs., 13.02.2009; 13 exs., 20.02.2009. In total, 24 specimens (14 females and 10 males).

Distribution and host in Turkey: New record for Turkey.

***Minotetrastichus platanellus* (Mercet, 1922)**

Material examined: 3 exs., 13.02.2009; 2 exs., 20.02.2009; 2 exs., 27.02.2009. In total, 7 females.

Distribution and host in Turkey: New record for Turkey.

Subfamily **Entedontinae**

***Closterocerus trifasciatus* Westwood, 1833**

Material examined: 4 exs., 30.01.2009; 8 exs., 13.02.2009; 5 exs., 20.02.2009; 2 exs., 27.02.2009; 2 exs., 06.03.2009; 4 exs., 13.03.2009; 3 exs., 20.03.2009; 3 exs., 27.03.2009; 3 exs., 10.04.2009; 2 exs., 17.04.2009; 2 exs., 01.05.2009. In total, 38 specimens (32 females and 6 males).

Distribution and host in Turkey: New record for Turkey.

***Chrysocharis phryne* (Walker, 1839)**

Material examined: 1 ex., 30.01.2009. In total, 1 female.

Distribution and host in Turkey: On *Chromatomyia horticola* (Goureau, 1851) (Diptera: Agromyzidae) in Erzurum and some provinces of central Anatolia (Doğanlar, 1985; Gençer, 2009).

***Pediobius metallicus* (Nees, 1834)**

Material examined: 1 ex., 06.02.2009. In total, 1 female.

Distribution and host in Turkey: On *Chromatomyia horticola* (Goureau, 1851), *Liriomyza cicerina* (Rondani, 1875), *L. strigata* (Meigen, 1830), and *L. trifolii* (Burgess in Comstock, 1880) (Diptera: Agromyzidae) in Adana, Adıyaman, Ankara, İzmir, Mardin, Sivas, Şanlıurfa, and some provinces of central Anatolia (Doğanlar, 1985; Çıkman et al., 2006; Gençer, 2009).

***Pediobius saulius* (Walker, 1839)**

Material examined: 33 exs., 30.01.2009; 36 exs., 13.02.2009; 34 exs., 27.02.2009; 43 exs., 06.03.2009; 42 exs., 20.03.2009; 46 exs., 27.03.2009. In total, 234 specimens (175 males and 59 females).

Distribution and host in Turkey: On *Phyllonorycter* sp. in Erzurum (Doğanlar, 1985).

Although some of the parasitoids obtained are common and well known to parasitize other leafminers in Turkey (Çıkman et al., 2006; Gençer, 2009), there are 5 species that were newly recorded for Turkey, namely *C. viticola*, *P. mediterraneus*, *M. frontalis*, *M. platanellus*, and *C. trifasciatus*. All of the identified parasitoid species have already been reported as parasitoids of *C. ohridella* in countries of Europe (Grabenweger and Lethmayer, 1999; Grabenweger et al., 2010). Therefore, our findings are in accordance with these studies carried out in European countries. Unabated epidemic population densities of the horse chestnut leafminer during the last 20 years in large parts of Europe have led to the conclusion that the native parasitoids will be unable to control this invasive moth in the near future (Heitland et al., 2005). However, signs for increasing parasitism of *C. ohridella* by eulophid parasitoids over long time periods have only recently been detected (Grabenweger et al., 2010). The development of this moth's parasitism may therefore be used as a case study, which allows us to observe the adaptation of native parasitoids to invasive hosts. Currently, the horse chestnut leafminer is expanding its range in Turkey, providing the opportunity to observe the development of the parasitoid complex from the very beginning.

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