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The additional record in Turkey: A larva-pupa parasitoid of orchard ermine moth *Yponomeuta padellus* Linnaeus, 1758 (Lepidoptera: Yponomeutidae): *Baryscapus evonymellae* Bouche, 1834 (Hymenoptera: Eulophidae)

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Abstract
The study was conducted on the orchards of cherry and naturally grown mahlap cultivation in Elazığ province in 2016-2017 years. It has been found that *Ypononeuta padellus* Linnaeus, 1758 (Lepidoptera: Yponomeutidae) species causes significant damage to these plants. *Baryscapus evonymellae* Bouche, 1834 (Hymenoptera: Eulophidae) species were obtained from the larvae and pupa of the pest by cultivating the samples of infected plant with this pest. This species is known as the important natural enemy of these pests in Russia, England, Iran and Turkey. The pest and natural enemy species interaction were determined for the second time in Turkey. Harmful to our country; It is the first harmful record on mahlep in our country. The results of this study are important for the biological control against the pests and IPM studies.

Keywords: Cherry, Mahlep, *Ypononeuta padellus, Baryscapus evonymellae,* Biological Control, Elazığ, Turkey

Introduction
Cherry's origin is the region between the Caspian Sea and the Black Sea. In this respect, Turkey is one of the origin centers of cherries. In the production of cherries with a wide span in the world, Turkey is situated in the important region. Cherry is a plant with fruits maturing earlier among the other temperate-climate fruits. With the varieties developed, cherry production has very extensive breeding periods from very early to very late. Turkey is performing about 5% of the world cherry production and it is in the sixth place among the countries that produce cherries. In Elazığ province, mahlep (*Prunus mahaleb* L.) grows naturally in barren, stony, and sloping lands. So far, no studies have been done on mahlep harmfulness in Elazığ. But; It was reported that, 22 species are present in the 6 ordo in the study carried out to determine the cherry pests in Elazığ province. In these species, *Archip rosanus* Linnaeus were harmful species on these (Çınar ve ark., 2004). Among these species, species of the Yponomeutidae family have not been recorded as harmful. But; *Yponomeuta malinellus* has been reported to be harmful in the apple gardens of Elazığ province (Ayaz and Yücel., 2010) [5]. In Elazığ province; *Yponomeuta padellus* Linnaeus, 1758 (orchard ermine moth) was reported as harmful with significant population living especially on cherry and mahlep plants in a study carried out between the end of May 2016 and the end of June 2017 (Kocak and Kemal., 2009) [11] This species is rarely harmful on cherry, mahlep, apricot and also generally apples and peaches in the world. It feeds intensively on the leaves to make product losses economically (Anonymous 2017a) [2]. Mechanical, chemical and biological control methods are applied in the struggle with the pest. The cherry fields also contain various eggs, larvae and pupae parasitoids, which have been identified worldwide of this pest in Turkey (Aydoğdu and Beyarslan, 2011, Anonymous, 2017 a) [6, 2]. *Baryscapus evonymellae* Hymenoptera: Eulophidae Bouche, 1834 species on *Y. padellus* species causing damage on mahlep and cherry that is determined in this study is known as primary parasitoid on many species, especially Yponomeutidae species in our country and worldwide (Anonymous, 2017b) [3]. With this study; *B. evonymellae* species is second determined to be parasitoids on *Y. padellus* in Turkey.

Material and Method

In this study was carried out with aim to determine to lepidopteran pest between 2016 to 2017 years in Elazığ province of Turkey. The samples that collected were cultured in laboratory and were determined as parasitoids. The Parasitoid samples was determined by second author. The lepidopteran pest was identified by thirth author.

Result and Discussion

Ypononeuta padellus Linnaeus, 1758 (Figure 1.)

The synonyms of this pest are given in the Lepidoptera checklist for Turkey (Koçak and Kemal., 2009) [11]. *Yponomeuta padellus* (Linnaeus,1758) (Yponomeutidae) Synonym(s): *padella* Linnaeus, l758; *evonymella* Scopoli, 1763 nec Linn., 1758; *malinella* Zeller, 1838; *variabilis* Zeller, l844; *diffluellus* Heinemann, l870.

Material examined: Elazığ, Baskil, Doğancık village, 29.06.2017, 112 exc., leg. Ozgen Firstly recorded in Elazığ province.

Remarks: Offshoots of cherry and mahlep plants that were contaminated with the pest were cultured in the laboratory on 28.05.2017, and exits of pests and parasitoids were recorded. Adult butterflies started to exit on 24.06.2017, and exits from non-parasitized larvae were recorded on 29.06.2017. Although there are no records about this species that it is harmful on the mahlep plant in our country, it has been recorded that it causes harm on the mahlep plant in the palearctic zone (Anonymous, 2017 b) [3]. This is the first record that this species causes harm on the mahlep plant in Turkey. The species have also caused partial damages on the cherry trees found in the same location. The species and its damages on the mahlep plant is shown in Figure 1.

Baryscapus evonymellae Bouche, 1834 (Figure 2.)

Material examined: Elazığ, Baskil, Doğancık village, 15.06.2017, 38 exc. leg. Ozgen.

Remarks: Parasitoid exits from the samples of larvae were observed on 15.06.2017. Firstly recorded in Elazığ province

Distribution in Turkey: Ankara, Erzincan, Iğdır, Kars (İren, 1960, Doğanlar, 1982) [12, 7].

In the studies of the previous years, the following species have been determined as the parasitoids of larvae and pupas of *Y. padellus: Triclistus Yponomeuta* Aeschlimann, 1973 *Trieces tricarinatus* Holmgren 1858, *Diadegma armillatum* Gravenhorst in 1829, *Pimpla contemplator* Muller 1776, *Diadegma armillata* Gravenhorst, 1829, *Zenillia dolosa* Meigen, 1824 belonging to Tachiniidae family and *Bessa parallela* Meigen, 1824 belonging to the Ichneumoniidae family (Anonymous, 2017 c) [4]. In our country, the species *Chelonus* (*Chelonus*) *annulatus* (Nees, 1816) of the Braconidae family has been determined as the parasitoid (Aydoğdu and Beyarslan, 2011) [6].

The species *B. evonymellae* studied in this study has been determined in our country as the egg parasite of *Y. malinellus* and *Malocosoma neustria* Linnaeus, 1758 (Doğanlar, 1993; Özbek and Çoruh, 2010) [8, 14]. In addition to these records; in the study on determination of species belonging to Yponomeuidae family in Ankara province, it has been reported that the parasitoid is parasitized *H. malinella* ve *Y. padella* (İren, 1960) [12]. In the United Kingdom, Iran and Russia however, this species has been determined as the parasitoid of *Yponomeuta padella* (Linnaeus, 1758) (Hesami *et al*., 2006, Yegorenkova *et al*., 2007) [9, 13]. Furthermore, this species has been determined in America as the significant endoparasitoid larva-pupa parasitoid of *Y. malinellus* (Kuhlmann *et al*., 1998) [10]. This species also is known as primary parasitoids on *Diplolepis spinosa* and *D. spinosissimae* from the Cynipidae family, *Leucoptera spartifoliella* from the Lyonetidae family, *Myelois cribrella* and *M. cribrumella* from the Pyralidae family, *Yponomeuta cognatellus*, *Y. evonymellus* and *Y. rorellus* from the Yponomeutidae family (Anonymous, 2017c) [4].

Considering the populations created by and harms caused by the species *Y. padellus* in apricot, cherry, plum, peach and apple plants from time to time, importance of biologic methods has been increased in the fight against this pest. Given the economic importance of these products for the Elazığ province, the potential harms of these species and biodiversity of its natural enemies come to the front. Since the species *B. evonymellae* has been found on this pest has been determined as the natural enemy of the important pests belonging to the order Lepidoptera and it is being used in biologic fight programs attach importance on its presence in the province. This species is indicated among the natural enemies of the pest in England. These results constitute the basic data for the studies aiming at the mass production of the species in future years as the species has been determined as the natural enemy of the pest for the second time in our country and collected many samples on pest.

Fig 1: Harms of *Ypononeuta padellus* Linnaeus, 1758 on *Prunus mahalep*

Fig 2: Habitus of *Baryscapus evonymellae* Bouche, 1834.

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