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First Record of the Flea Beetle *Psylliodes wrasei* Leonardi and Arnold (Chrysomelidae: Galerucinae: Alticini) in Turkey: A Promising Biological Control Agent for Hoary Cress, *Lepidium draba* L. (Brassicaceae)

Baran ASLAN[1] Fatma BAYRAM[2*] Ebru Gül ASLAN[2**]

[1]Department of Medical and Aromatic Plants, Tefenni Vocational School of Higher Education, Mehmet Akif Ersoy University, 15600, Tefenni, Burdur, TURKEY. Corresponding author's e-mail: aslanb@mehmetakif.edu.tr

[2]Süleyman Demirel University, Faculty of Arts and Sciences, Department of Biology, 32260, Isparta, TURKEY. e-mails: *fatmabayram04@gmail.com, **ebruaslan@sdu.edu.tr

ABSTRACT

Psylliodes wrasei Leonardi and Arnold, 1995 is recorded for the first time from southwest Turkey. Its host plant is determined as *Lepidium draba* L. (hoary cress), a problematic plant in many agricultural ecosystems capable of thriving in various types of habitats. The flea beetle is defined as one of the most promising biological control agents of this weed in Europe and America. In the present study, information concerning its ecology and habitat in Turkey is presented.

Key words: Chrysomelidae, Alticini, *Psylliodes wrasei*, *Lepidium draba*, biological control, Turkey.

INTRODUCTION

The family Chrysomelidae in Turkey is represented with 770 species of which 336 belong to the tribe Alticini (traditionally considered as subfamily), and 48 to the genus *Psylliodes* Latreille (Ekiz *et al*., 2013). During collecting trips in southwestern Turkey, one more *Psylliodes* species was found feeding on *Lepidium draba* L. [= *Cardaria draba* (L.) Desv.; Brassicaceae]. Examination of the samples showed that they are specimens of *P. wrasei* Leonardi and Arnold, 1995.

The species was not listed from Turkey in the last checklist study by Ekiz *et al*. (2013). However, in the internet checklist and iconography of Prof. Lech Borowiec (Chrysomelidae of Europe and the Mediterranean Subregion), "Turkey" appears in the distributional data information given for *P. wrasei* (see http://www.biol.uni.wroc.pl/cassidae/European%20Chrysomelidae/psylliodes%20wrasei.htm). Fortunately, personal communication with Prof. Borowiec revealed that it was based on some unpublished material collected by foreign colleagues without any collection data. Thus, our material represent the first certain record of *P. wrasei* from Turkey with detailed information. Afterwards we noticed that Özdikmen (2012) mentions *P. wrasei*

from Turkey too. However, this was not surprising because in the mentioned study, Özdikmen (2012) also used data from the website of Prof. Borowiec.

Lepidium draba L. (Brassicaceae), whitetop or hoary cress, is a perennial herb indigenous to southwestern and central Asia, now naturalized throughout continental Europe. It is regarded as an aggressive invader growing in nearly all types of soil and habitats (Talmaciu *et al*., 2010). Field surveys conducted in Europe and western United States in order to discover the arthropod fauna associated with *L. draba* revealed that *P. wrasei* is one of the most promising species in biological control of this serious pest (Cripps *et al*., 2006; Hinz *et al*., 2008; Talmaciu and Huma, 2009; Talmaciu *et al*., 2009; 2010). The aim of this work is to report *P. wrasei* for the first time from Turkey, and to inform its potential as biological control agent of *L. draba* which is commonly distributed throughout Turkey.

MATERIAL AND METHODS

The study is based upon the flea beetle material collected from Bafa Lake Natural Park located in Aydın province of Turkey. The samples were collected from vegetation by net sweeping and using mouth aspirator. In June 2012, the collected specimens were overlooked and deposited in the museum as *P. isatidis*, however in May 2013 after noticing the host plant and collecting for the second time; all specimens were checked again and corrected as *P. wrasei*. The insect samples were identificated by the third author according to the figures and keys given by Leonardi and Arnold (1995) and Warchalowski (2010). The host plants damaged by *Psylliodes* specimens were also taken and identified as *L. draba* by H. Özçelik (Süleyman Demirel University, Biology Department). The material collected is deposited at the Biology Department in Süleyman Demirel University, Isparta.

RESULTS

Psylliodes wrasei Leonardi and Arnold, 1995

P. wrasei (Coleoptera: Chrysomelidae) is a recently described flea beetle from the East Mediterranean region (Leonardi and Arnold, 1995). Its known distribution includes Bulgaria, Macedonia, Ukraine, Greece, Georgia, Romania, Hungary (Leonardi and Arnold, 1995; Gruev, 2003; Cripps *et al*., 2006; Warchalowski, 2010; Löbl and Smetana, 2010). This is the first record of it from Asiatic Turkey. In the study of Gruev (2003) based on European endemics of Alticinae, *P. wrasei* was categorized in the Southeasterneuropean endemic group. The record of *P. wrasei* from Turkey within the present study indicates that the distribution of this species is still insufficiently known.

Material examined: Turkey, Aydın, Bafa Lake Natural Park (37°30'19''N, 27°31'18'' E), 12 m, 13.VI.2012, 2 ♂♂, 3 ♀♀, 03.V.2013, 6 ♂♂, 10 ♀♀, 28.V.2013, 5 ♂♂, 1 ♀.

Habitat and host plant: The specimens were collected from a moist meadow located in the northern coast of the Bafa Lake. It is an open area mainly dominated

by Poaceae, Lamiaceae and Brassicaceae vegetations (Fig. 1). *Ps. wrasei* samples were incidentally collected by sweep-net at first. In the following efforts its host plant was detected as *Lepidium draba* L. (Brassicaceae). The host plants were seriously injured by the specimens.

Remarks: *P. wrasei* is a member of the *napi* species-group (Leonardi and Arnold, 1995). It is a macropterous species, usually bluish green in color and with an average of 3.8 mm (changing between 3.33-4.15) in length. Legs are mainly yellowish except the hind femora clearly blackened. In male first protarsomeres are distinctly dilated. Antennae are also of the same color as the legs, more or less darkened apically. Elytra are finely punctured with regular rows (Fig. 2). Within *napi* species-group *P. wrasei* is similar to *P. isatidis* Heikertinger, *P. thlaspis* Foudras, *P. crambicola* Lohse and somewhat to *P. cuprea* (Koch). Specimens of *P. wrasei* are comparatively much larger in body-length than *P. cuprea*, and have longer median lobe of aedeagus than *P. thlaspis*. Please see the table given by Leonardi and Arnold (1995; p.305) for some useful measurements for comparison with the aforementioned species. Aedeagus and spermatheca figures of *P. wrasei* are presented in Fig. 3.

DISCUSSION

Hoary cress (*L. draba*) occurs on every continent except Antarctica displacing some valuable pasture species, and is particularly considered a serious weed without any satisfactory control methods. It can appear in a wide range of habitats including cultivated land, rangeland, pastures, roadsides and waste areas (Cripps *et al*., 2006). In recent years efforts of specialists are focused to find phytophagous beetles associated with *L. draba* in order to limitate its populations.

In the study of Cripps *et al*. (2006) conducted in both Europe and America, the gall-forming weevil *Ceutorhynchus cardariae* Korotyaev and the flea beetle *Psylliodes wrasei* are reported as the most promising potential agents in control of *L. draba*. The results of another study by Talmaciu *et al*. (2009) present three important species as potential agents against control of this plant: *Ceutorhynchus cardariae*, *Psylliodes wrasei*, and the gall mite *Aceria drabae* (Nalepa). Talmaciu *et al*. (2010) obtained similar results and indicated that *P. wrasei* specifically attacks *L. draba*, and can be used as biological control agent for this plant.

The present study represents the first certain record of *P. wrasei* from Asiatic Turkey. As explained above, studies investigating the possibilities for biological control of *L. draba* both in Europe and America declare *P. wrasei* as one of the most promising species in this regard. Its record from Turkey is therefore important in order to search its utilization in controlling *L. draba* populations which is also considerably widespread in Turkey. Further studies and additional records from other regions of the country are needed to show whether it is suitable as potential control agent in Turkey.

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Fig.1. General view of the habitat specimens collected.

Fig. 2. Habitus of the new record (male): *Psylliodes wrasei* Leonardi and Arnold.

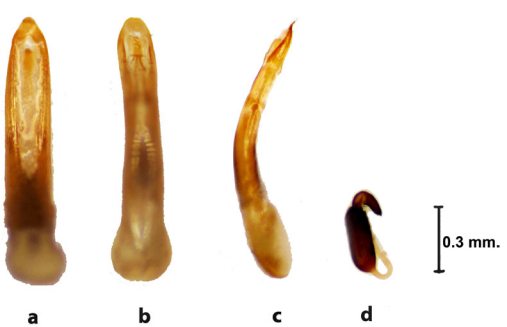

Fig. 3. Genitalia of *Psylliodes wrasei*; a: aedeagus ventral, b: dorsal, c: lateral views d: spermatheca.

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