First Report of Anaphes chrysomelae (Hymenoptera: Mymaridae) on the Eggs of Chrysolina herbacea (Coleoptera: Chrysomelidae) in Turkey

Authors: Tarla, Şener, and Tarla, Gülcan

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First report of *Anaphes chrysomelae* (Hymenoptera: Mymaridae) on the eggs of *Chrysolina herbacea* (Coleoptera: Chrysomelidae) in Turkey

Şener Tarla and Gülcan Tarla*

The mint leaf beetle *Chrysolina herbacea* (Duftschmidt) (Coleoptera: Chrysomelidae) is an important invasive species that causes severe damages to various wild and cultivated varieties of mint. It was recorded for the first time by Weise (1897) in Turkey. Both the adults and the larvae feed on plant foliage. The eggs are often laid in groups, usually on the foliage, but sometimes on the bunches of mint flowers. A mymarid species was obtained from eggs of *C. herbacea* in many provinces of Turkey. This species belongs to the genus *Anaphes* Haliday (Hymenoptera: Mymaridae), which has not previously been reported from Turkey. The family Mymaridae includes the smallest known insects, all parasitoids in the eggs of other insects (Huber 1986) except for 2 species that parasitize larvae of a species of Eulophidae (Huber et al. 2009).

The genus *Anaphes* currently includes about 230 nominal species of Mymaridae, several of which are used for biological control of other insects (Huber 1992, 2004, 2011). The members of the genus are egg parasitoids mainly of Curculionidae and Chrysomelidae. Four species of *Anaphes* have been used, sometimes successfully, for the biological control of important agricultural and forestry pests in several countries (Clausen 1978; Huber 1986). There is continued interest in using other members of this genus in many biological control programs (Aeschlimann 1986; Collins & Grafius 1986; Jackson 1986; Aeschlimann et al. 1989; Dysart 1990; Huber 1992). *Anaphes chrysomelae* (Bakkendorf) was first described by Bakkendorf (1960) from material collected in Bocca di Magra, Italy. To our knowledge, this species has not been reported from outside Italy. With this study, we report occurrence of *A. chrysomelae*, reared from the egg masses of *C. herbacea* (Fig. 1) in Turkey.

Surveys and collections were made from March to August at several sites in Adana (38.0289°N, 36.0967°E; 1,191 m), Hatay (36.3231°N, 36.1983°E; 108 m), and Uşak (38.6489°N, 29.3339°E; 819 m) provinces. The egg mass samples were collected for the first time in Hatay Province in 2004. Then, samples were taken from time to time until 2015 in other provinces. Egg masses of *C. herbacea* were collected from leaves of *Mentha* spp. (Lamiaceae) and brought to the laboratory in refrigerated boxes. They were then individually transferred into cotton-plugged glass tubes (1.6 cm in diameter, 10 cm long). For emergence of parasitoids inside the host, egg masses of *C. herbacea* were placed in transparent bags at 26 ± 2 °C, 65 ± 10% RH, and a 16:8 h L:D photoperiod in an incubator.

The parasitoid adults that emerged from field-collected eggs were identified as *Anaphes* at the genus level. The parasitoids and chrysomelid beetles were preserved in 70% ethanol and sent to Dr. R. Jesu (Dipartimento di Entomologia e Zoologia Agraria, Univ. Napoli, Portici, Italy) and A. N. Ekiz (Department of Biology, Faculty of Arts and Science, Uşak University, Uşak, Turkey) for identification. The specimens were then identified as *A. chrysomelae* and *C. herbacea* by experts. The photographs were acquired with an Olympus SZX10 microscope with an integrated Olympus SC30 camera. The specimen materials for this record were deposited in the collection of the Insect Museum of the Plant Protection Department, Faculty of Agriculture and Natural Sciences, Uşak University, Uşak, Turkey.

The fauna of Mymaridae in Turkey has not been well studied. Three genera and about 20 species of Mymaridae are recorded in Turkey (Donev 2001; Noyes 2016). Our field surveys, conducted for the first time in Hatay Province in 2004, showed that *A. chrysomelae* was a parasitoid of *C. herbacea* eggs in Turkey. *Anaphes chrysomelae*, described from Italian material (Bakkendorf 1960), is a common gregarious egg parasitoid of *Chrysomela americana* L. (Coleoptera: Chrysomelidae) living on *Rosmarinus* and *Lavandula* species (Lamiaceae) along the Neapolitan costal area (Laudonia & Jesu 1991). It is known to attack *C. herbacea* and other Chrysomelidae living on Lamiaceae (Bibolini 1970; Hopkins 1978). To our knowledge, this parasitoid species has only been reported from Italy. With this study, Turkey is the second country in the world where this species is known to occur. Only 1 species of *Anaphes* was previously known from Turkey in the past: *A. diana* Girault is reported as the predominant egg parasitoid of *Sitona* species (Coleoptera: Curculionidae) throughout the Mediterranean range of Spain, France, Italy, Greece, Bulgaria, Romania, Turkey, and Syria (Aeschlimann 1986).

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Summary

Anaphes chrysomelae (Bakkendorf) (Hymenoptera: Mymaridae) was obtained from field-collected eggs of *Chrysolina herbacea* (Duftschmidt) (Coleoptera: Chrysomelidae) on *Mentha* spp. (Lamiaceae) in Adana, Hatay, and Uşak provinces in Turkey. Until now, *A. chrysomelae* has been found only in Italy. With this study, Turkey is the second country in the world where *A. chrysomelae* is known to occur. This is the second *Anaphes* species known from Turkey, and one of more than 20 species of Mymaridae reported so far from Turkey.

Key Words: new record; egg parasitoid; *Mentha*

Uşak University, Faculty of Agriculture and Natural Sciences, Department of Plant Protection, 64200 Uşak, Turkey; E-mail: sener.tarla@usak.edu.tr (S. T.), gulcan.tarla@usak.edu.tr (G. T.)

*Corresponding author; E-mail: sener.tarla@usak.edu.tr (S. T.)

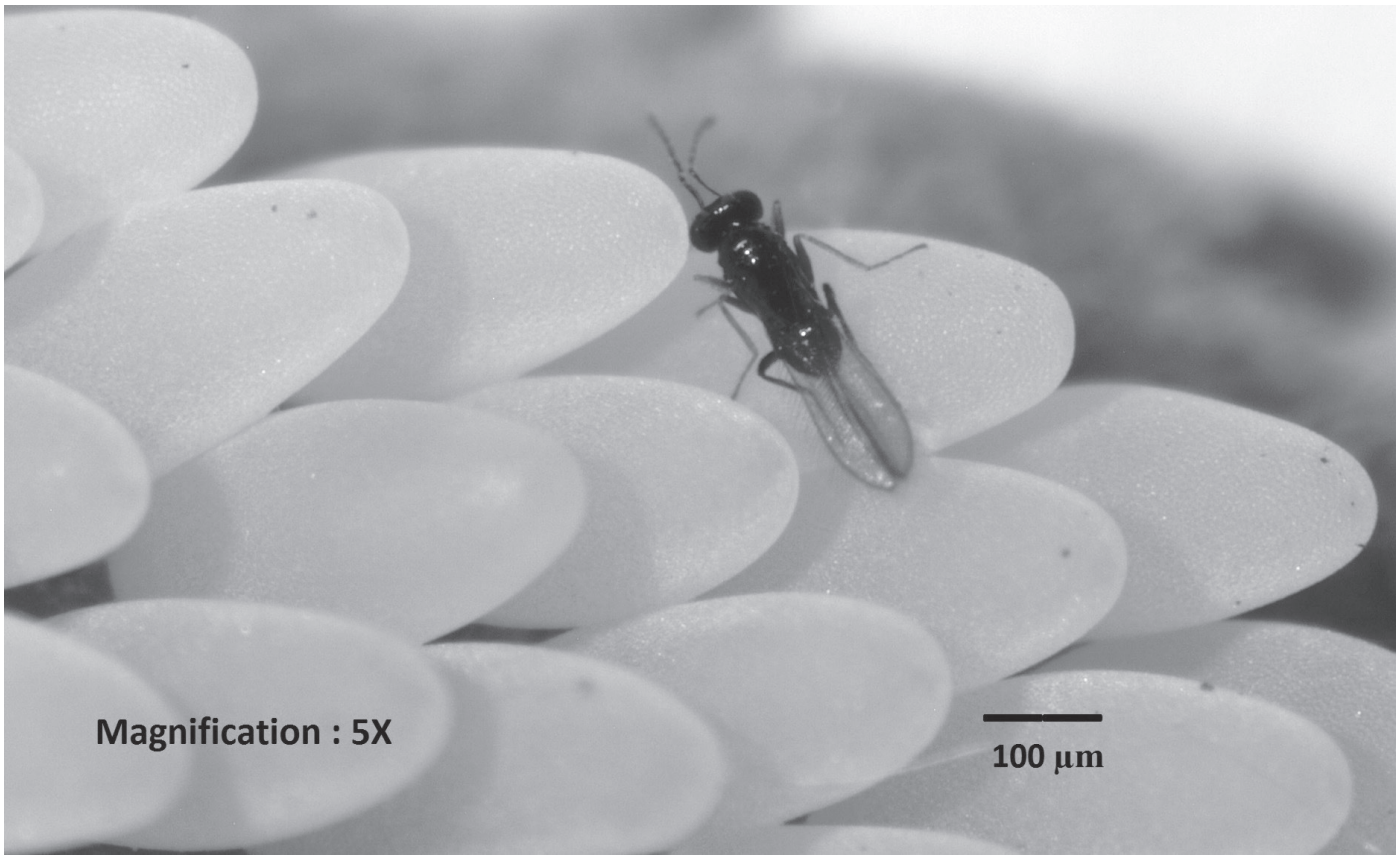

Fig. 1. *Anaphes chrysomelae* reared from the egg masses of *Chrysolina herbacea*.

Sumario

Se obtuvieron *Anaphes chrysomelae* (Bakkendorf) (Hymenoptera: Mymaridae) de huevos recolectados en el campo de *Chrysolina herbacea* (Duftschmid) (Coleoptera: Chrysomelidae) de *Mentha* spp. (Lamiaceae) en las provincias de Adana, Hatay y Uşak en Turquía. Hasta ahora, *A. chrysomelae* se ha encontrado sólo en Italia. Con este estudio, Turquía es el segundo país en el mundo donde se conoce la presencia de *A. chrysomelae*. Esta es la segunda especie *Anaphes* conocida para Turquía, y una más de las 20 especies de Mymaridae reportadas hasta ahora de Turquía.

Palabras Clave: nuevo registro; parasitoide de huevo; *Mentha*

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