

Short communication

First report of parasitoid wasps, *Ascogaster quadridentata* and *Bassus rufipes* (Hym.: Braconidae) on codling moth (Lep.: Tortricidae) larvae from Iran

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چکیده

در جریان بررسی دینامیس جمعیت کرم سیب در منطقه‌ی مراغه واقع در استان آذربایجان شرقی، نمونه‌هایی از لاروهای کامل پارازیت‌شده‌ی کرم سیب از کارتن‌های بسته‌شده روی تنه‌ی درختان سیب در سال‌های ۸۶-۱۳۸۵ به دست آمد. از این لاروها، ۳ گونه زنبور پارازیتوئید جمع‌آوری و شناسایی شد که دو گونه‌ی *Ascogaster quadridentata* Wesm. و *Bassus rufipes* (Nees) از خانواده‌ی Braconidae برای اولین بار از ایران گزارش می‌شوند. گونه‌ی سوم، *Pristomerus vulnerator* (Panzer) متعلق به خانواده‌ی Ichneumonidae بوده و قبلاً از ایران گزارش شده است. بیشترین درصد پارازیتیسیم در منطقه‌ی مورد مطالعه مربوط به گونه‌ی *A. quadridentata* بود.

The codling moth, *Cydia pomonella* (Linnaeus) (Lep.: Tortricidae) is a notorious fruit-boring pest that has extended its original distribution from the natural apple forest of Central Asia to all apple growing regions of the world, with exception of eastern China and Japan (Mills, 2005a). In addition, the codling moth has frequently been recorded as the pest of pear for Asian pear, walnut, and occasionally apricot, peach, and plum (Barnes, 1991). Similarly, the codling moth was considered as the key pest in apple orchards of Iran (Radjabi, 1986).

Natural enemies of the codling moth include birds, spiders, insects, nematodes, bacteria, fungi, protozoa and viruses (Falcon & Huber, 1991). Some of these bio-control agents have been identified as assemblage of the natural enemies of the codling moth in Iran during the past years (Radjabi, 1986; Behdad, 1991; Talebi-Chaichi, 1995; Rowshandel *et al.*, 1998).

In order to fully understand the ecology of this pest, a survey on the codling moth population dynamics was carried out in Maragheh, Eastern Azerbaijan, Iran during 2006-2007. Based on a designed sampling program, the specimens of the codling moth larvae were collected from an untreated apple orchard in the above-mentioned region. Mature larvae and pupae of the codling moth were collected using trunk bounding technique. One faced fluted cardboard bands were placed around the trunk of the trees to serve as pupation site for wondering larvae. Fifteen- to 20-cm bands were encircled the trunk. The bands were placed before the larvae begin to leave the apples to search the pupation sites and removed before

moth emergence. Fiberboard bands were cut to small pieces (about 5 × 5 cm) with the larvae inside and placed into transparent plastic jars (15 × 15 cm). The plastic jars were kept in a growth chamber at 27 ± 0.5°C, 50 ± 10% RH and a photoperiod of 16: 8 (L: D) h. All of the containers were checked daily to collect any emerged moths or appeared parasitoid.

We found three parasitoid wasp species on the codling moth larvae that two of them are reported here for the first time from Iran. The species are as follows:

***Ascogaster quadridentata* Wesmael**

This species belongs to the family Braconidae and the subfamily Cheloninae. The specimens of this species were identified by Dr. Aurel I. Lozan from Czech Republic. This species is reported from Iran and the Near East for the first time. According to Dr. Lozan, *A. quadridentata* is a widely distributed egg-larval parasitoid of *C. pomonella*, *Archips rosana* L., *Recurvaria nanella* (Denis & Schiffermüller), genera *Grapholita* Treitschke, *Pandemis* Hübner, etc. The adult females lay their eggs inside the eggs of codling moth and the larvae develop throughout the egg and larval stages of the host (Anonymous, 2008). This species is the most important parasitoid of the codling moth with a considerable potential to use in IPM programs (Anonymous, 2008). The maximum rate of parasitism for this species on the codling moth was reported from European countries (%42.6 from Austria during 1992-1994) (Mills, 2005a) while, the rate of parasitism was reported lower in Central Asia (%14.5 from Kazakhstan during 1995-1998) (Mills, 2005a). Based on our findings, the range of parasitism rate by this species on the codling moth was %8.85-%9.47 within the studied region. The parasitism rate caused by *A. quadridentata* was the highest amongst the parasitoid collected from Maragheh.

***Bassus rufipes* (Nees)**

This species belongs to the family Braconidae and the subfamily Agathidinae. The specimens of this species were identified by Dr. Aurel I. Lozan from Czech Republic. It is reported here from Iran and also from the Near East for the first time. *Bassus rufipes* is the larval parasitoid of the codling moth. Following a survey for finding the parasitoids of the codling moth in Central Asia, three species were selected to import and release in California (Mills, 2005b), out of which, one was *B. rufipes*. According to Dr. Lozan, *B. rufipes* is known as a parasitoid of macro- and microlepidoptera, which many of them cause damage in gardens and orchards. The maximum rate of parasitism reported for this species on the codling moth

was %0.7 in Switzerland during 1992-1993 (Mills, 2005a). In contrast, the rate of parasitism was reported %33.3 from Kazakhstan in Central Asia during 1995-1998 (Mills, 2005a). However, the range of parasitism rate for this species on the codling moth was observed to be %1.58-%2.21 in our study.

***Pristomerus vulnerator* (Panzer)**

This species belongs to the family Ichneumonidae and the subfamily Cremastinae. The specimens of this species were identified by Dr. Reijo Jussila from Finland. This species has been reported from both Palaearctic and Nearctic regions. It was previously reported on the codling moth from Iran (Radjabi, 1986). The *P. vulnerator* is a solitary larval-prepupal parasitoid (Anonymous, 2008). The adult females lay their eggs inside the young larvae of the codling moth just after the penetration of larvae into fruits (Mills, 2005a). Development of the wasp is completed whenever the codling moth larva is matured. Adult wasp is emerged from cocooning larvae of the codling moth. The maximum rate of parasitism caused by this species on the codling moth was reported from the European countries (%32.4 from Switzerland during 1992-1993 and %27.9 from Austria during 1992-1994) (Mills, 2005a). In contrast, the rate of parasitism was reported lower in Central Asia (%3.1 from Kazakhstan during 1995-1998 and %0.6 from China during 1999-2003) (Mills, 2005a). Our findings revealed that the percent of parasitism by this species on the codling moth larvae was %0.88-%1.05 in the region studied.

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