

First Report of a Gall Midge Species (Diptera: Cecidomyiidae) Associated With Pistachios

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Abstract

A new dipterous pest is reported, for the first time, on commercial pistachios from Sirjan, Kerman province, Iran. The genus of the insect was determined to be *Resseliella* Seitner (Diptera: Cecidomyiidae). Adults are light brown to brown in color and 0.8–1.5 mm in length with females, generally, slightly larger than males. Females have an elongated ovipositor, which is characteristic of the genus. Larvae are orange in color, 2–3 mm in length in the later instars, feed under bark without inducing galls, and cause branch dieback on trees of various ages. Brown to black discolorations are observed on plant tissues under bark where the larvae feed. Infestations observed on current and the previous-year's growths, ranged from 0.5 to 1.2 cm in diameter, and all located in outer branches. Dry leaves and fruit clusters on infested branches remain attached, which may be used to recognize infestation by the gall midge. Dark-colored, sunken spots with splits on the bark located at the base of the wilted sections of the shoots also are symptoms of *Resseliella* sp. larval activity. Species-level identification of the gall midge is currently underway.

Key words: gall midge, Cecidomyiidae, *Resseliella* sp., pistachio

Gall midges belong to the family Cecidomyiidae, a cosmopolitan insect family which includes a large number of phytophagous species (Gagné and Jaschhof 2017), many of which are important agricultural pests. All damage is caused by the larval stages of these insects. Feeding on plant tissues, many species cause abnormal growths and induce galls on plant organs; and some do not. At least 61 phytophagous species on various host plants have been recorded in Iran (Skuhravá et al. 2014).

We report, for the first time, a cecidomyiid species associated with commercial pistachios, *Pistacia vera* L. This is also the first record of a dipterous pest on pistachios (CABI 2019).

Larvae of the gall midge were found midseason (June and July) during examination of a number of trees with dead branches in two pistachio plantations, with drip irrigation systems, about 400 m apart, 14 km northwest of the city Sirjan, Kerman province, Iran (coordinates 29° 31' 40" N 55° 35' 28" E and 29° 31' 49" N 55° 35' 56" E). The larvae were found under the bark of visibly damaged branches, all of which were in the outer parts of the canopy. Infestations were observed on trees between 5 and

26 yr old. We recognized no specific distribution pattern for the infestations throughout the orchards. All damage was observed on female trees. However, currently, there is no reason to believe that male trees are not infested. Infestations were observed on current and the previous-year's growths, with various diameters from about 0.5 to 1.2 cm. In all cases, dry leaves and fruit clusters remained attached to infested shoots. Undetached dead leaves and/or fruit clusters on branches in outer parts of the canopy may be an easily-recognized symptom of infestation by the gall midge (Fig. 1A–D).

To obtain adult midges, infested shoots were collected, cut into 10 cm sections, and put on heat-sterilized garden soil in modified small plastic cages. The cages were kept at room temperature until the appearance of adults. Larvae left the branches and pupated in the soil. Adults, collected and preserved in 76% alcohol, were later examined under a stereomicroscope and identified to genus using the Cecidomyiinae identification key (Gagné 2018). The genus was determined to be *Resseliella* Seitner. Most cecidomyiids are highly host-specific; thus, we can

actually rely on the fact that each host plant relates only to a particular gall midge species (Carneiro et al. 2009). In addition, commercial pistachios have not ever been reported as a host of any gall midge species. Therefore, this species is most likely new to science.

Adult stage insects are light brown to brown in color and about 0.8–1.5 mm in length with females, in general, slightly larger than males (Fig. 2). Our observations suggest that females, using their elongate ovipositors, lay their eggs in splits on the bark, similar to some other *Resseliella* spp., such as *R. theobaldi* Barnes (raspberry cane midge) (Gordon and Williamson 1991). Irregular dark brown to black discolorations on plant tissues were observed under the bark where the larvae were found.

The non-gall-inducing orange-colored larvae, 2–3 mm in length, were found in groups of more than 10 individuals, in most cases (Fig. 3). The larvae feed under bark and cause wilting and, eventually, branch dieback. At closer examinations, dark discolorations with noticeable splits, sunken in most cases, were observed on the bark of infested shoots. The aforementioned are symptoms indicative of *Resseliella* sp. larvae feeding underneath. These symptomatic spots were located at the base of the dead sections of the shoots (Fig. 4A and B).

At this time, the economic importance of this midge has not been determined. However, as it leads to direct yield loss, it could be a potentially serious pest in high-density populations. Spring pruning of wilted and dead shoots, as one of the common orchard management



Fig. 1. (Arrow in A–D) Pistachio shoots of various diameters infested by *Resseliella* sp., all in outer parts of the canopy. Undetached dry leaves or fruit clusters may be a sign of infestation by the gall midge.

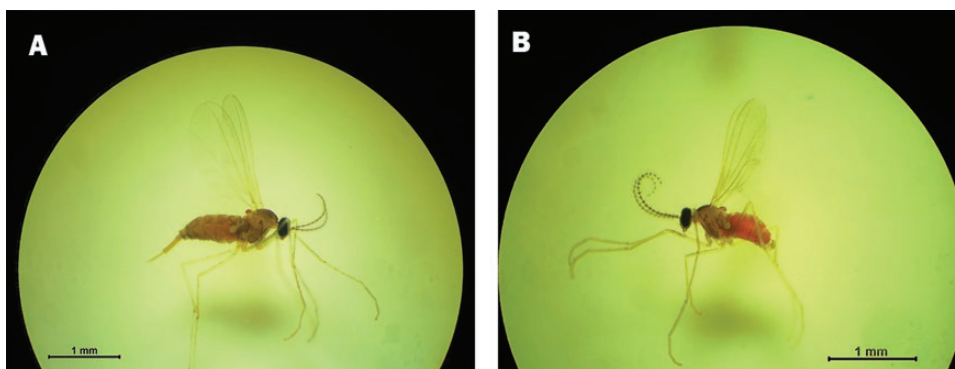


Fig. 2. Adults of *Resseliella* sp. associated with pistachios. (A) Female; (B) Male.



Fig. 3. Orange-colored *Resseliella* sp. larvae under the bark of an infested pistachio shoot. Notice discolorations on the tissues as a result of larval activities.

practices, may have unintendedly reduced the populations of the insect to some extent.

Further research is needed to study the impact, biology, and phenology of this new pest. Also, to determine whether the branch dieback is solely the result of larvae feeding on plant tissues or if there are various pathogenic organisms that may infect the branches at the feeding sites and be in part responsible for the damage.

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Fig. 4. (A and B) Symptomatic spots at the base of the dead/wilted sections of pistachio shoots infested by *Resseliella* sp. Notice dark discolorations, splits, and sunken areas.

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