1. REPORT

Project Title

Survey and Biology of Maggot (*Delia* spp.) in Lettuce in Central Coast of California

Project Investigator

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Abstract

In 2013, no eggs, maggots or pupae were recovered from the samples collected. However, few fields were investigated and the maggots collected were identified as onion maggot (*Delia antiqua*). In 2014, the maggot eggs and larvae (maggots) were collected from lettuce foliage and soil. This preliminary data (two fields only) suggest that maggot flies lay their eggs in foliage and soil. More sampling is required to determine why these flies lay their eggs on lettuce head (foliage) and whether they prefer head or soil for eggs laying.

Objectives

1. Survey of maggot infestation in lettuce in the central coast (Monterey Co. and San Benito Co.).

   a. To determine the level of infestation and identify the ecological factors contributing maggot infestation.
   b. Taxonomical identification of the maggot species sampled.

2. Study the biology and behavior of maggot in controlled (green house) and field conditions.

Procedures

In 2013, a total of 11"iceberg" lettuce fields were surveyed with a history of maggot infestation. Lettuce fields were ~2.5-5 acres. Each field was divided into 3 zones, 2 exterior zones and one interior zone along the plant rows and a zone included 1-3 beds of plants. Twenty-five plants with root system were randomly sampled from each zone. These plants were bagged separately per zone. Four samples were collected and they were 1, 3, and 6 week after planting as well as a sample was collected closer to harvest. Because eggs could be laid in the soil closer to the stem, top soil samples from crown area were collected. The plants were evaluated for infestation and presence of eggs. Soil samples were subjected to "floatation method" to determine presence of eggs.

In 2014, three fields were sampled at based on the farm calls. Five plant (head lettuce) and soil samples were collected from the two exterior zones and center zone. These fields were ready for

harvest when I received the calls. Samples were evaluated for eggs, maggots, and pupae using methods indicated above.

Results and Discussion

In 2013, maggot pressure on head lettuce was very low. I did not find eggs or maggot infested plants (including in the roots) after following the procedure There were two reports of maggot infestation on lettuce in the Salinas Valley in 2013 (that came to my attention). In the first report, maggot infested the head lettuce with no clear maggot damage (both in the head or roots) and only one maggot was recovered.

In the second report, maggot infestation was found on the roots of organically grown leafy lettuce. In both the occasions, the maggots were identified as onion maggot (*Delia antiqua*); however, maggots reported previously from lettuce were all seedcorn maggot (*Delia platura*). This suggests that there could a complex of maggot species that attack lettuce and cause economic damage..

In 2014, two out of three fields had maggot infestation. Figure 1 shows that eggs and maggots were found both from foliage and soil. It is difficult to conclude (based of small sample size) where the flies prefer to lay eggs (foliage vs. soil) but data suggest that egg laying occurs both on above and below ground structures. The third field sampled had no maggot infestation.

The second objective was not conducted because sufficient maggots were not obtained to carry out experiments. Although this project was officially concluded, I will continue the survey.

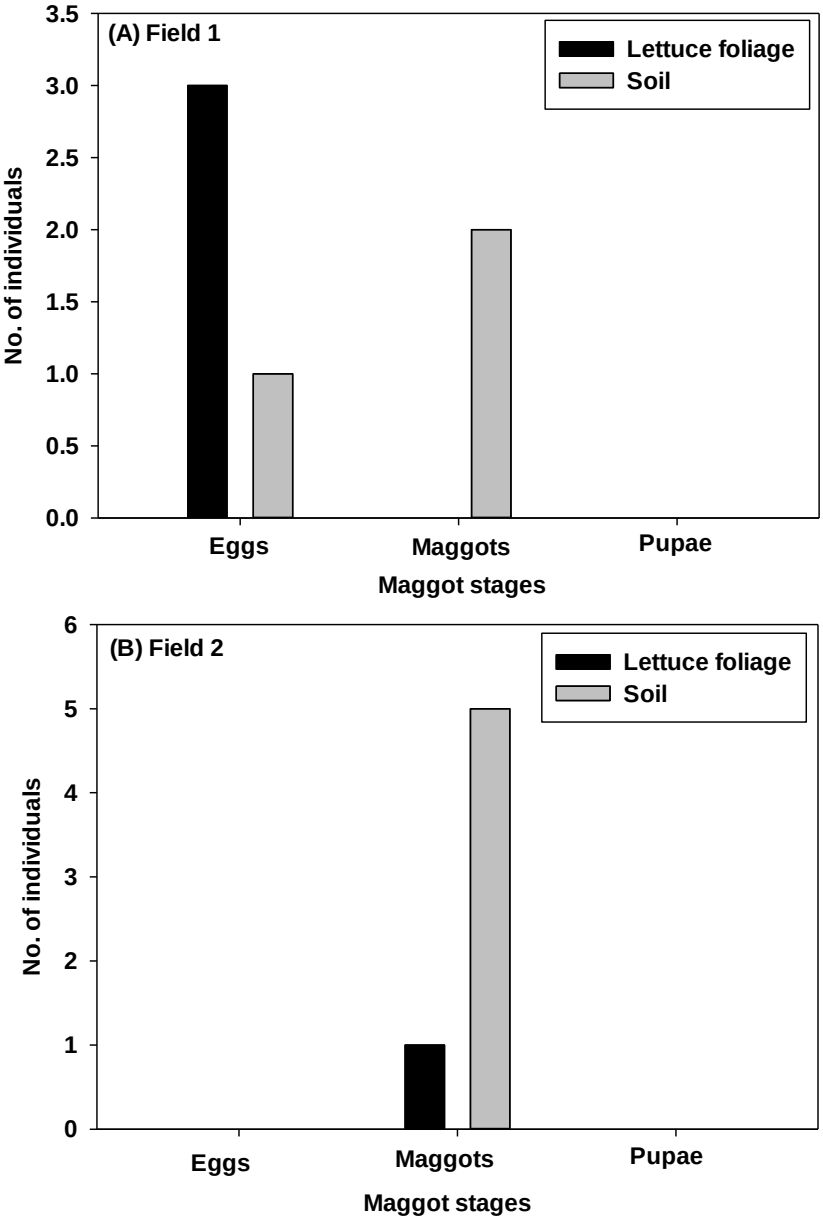

Figure 1. Number of maggot stages collected from the foliage (head lettuce) and soil.