BUG BIZ
Pest Management and Insect Identification Series
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Aphid Parasitoids

Introduction

Aphids are major pests of row crops and ornamental plants. Aphids are soft bodied insects that suck the sap and cause injury to plants (Figures 1 and 2) including the injection of toxins and transmission of plant pathogens. Aphids secrete honeydew, and sooty mold grows on the honeydew (Figure 3). Aphid feeding may result in stunted plant growth, and yellowing, shriveling and deformation of leaves (Figure 4). In Louisiana, common aphid species include the green peach aphid, cotton aphid, pea aphid, cowpea aphid, black bean aphid, potato aphid, glasshouse-potato aphid, milkweed aphid and ornate aphid.

Parasitoids are small insects that play an important role in the natural control of aphids. Parasitoids lay their eggs inside or outside of the body of another insect (host). The parasitoids in the subfamily Aphidiinae are small wasps (0.08 - 0.12 inches) (Figure 5) that lay their eggs only in aphids. Some species attack a limited number of aphid species and sometimes only a single species. The immature parasitoid develops by feeding on the aphid. Such parasitoids can be imported from other countries, reared under laboratory conditions and purchased from commercial insectaries to control target pests.

Figure 1. Winged and wingless aphid. Photo by Patrick Porter, Texas Cooperative Extension, Bugwood.org.

Figure 2. Green peach aphid. Photo by Monique de Souza

Figure 3. Growth of sooty mold on aphid secretions. Photo by Joseph O'Brien, USDA Forest Service, Bugwood.org

Figure 4. Damaged plants due aphid attack. Photo by Monique de Souza

Host range

Aphid parasitoids will only attack and kill aphids. Despite their presence in gardens, aphid parasitoids will not cause damage to plants, others insects, pets or humans.

Aphid parasitoids are commercially available

Aphid parasitoids in the genera *Aphidius* (Hymenoptera: Braconidae) and *Aphelinus* (Hymenoptera: Braconidae) are very effective in controlling aphids when aphid numbers are low. These parasitoids can be purchased from companies that deliver "aphid mummies" which are parasitized aphids. *Aphidius* is usually recommended for the control of melon aphid, cotton aphid, green peach aphid, tobacco aphid, cherry oat aphid, potato aphid and greenhouse potato aphid. However, parasitoids of this genus may be used against other aphids to reduce their numbers as well. The genus *Aphelinus* is suggested for management of the potato aphid.

Figure 5. Parasitoid adult. Photo by David Cappaert, Michigan State University, Bugwood.org

Determining if parasitoids are present in the garden

Adult aphid parasitoids are small dark-colored wasps (0.08 - 0.12 inches) and have long antennae (Figure 5). The presence of the parasitoid can be determined by the presence of mummies (parasitized aphids) on the leaves (Figures 6 and 7). Mummies appear as dark, "bloated" aphids and are a clear sign of parasitism.

Life cycle and ecology

Parasitoids require one host to complete their lifecycles. The egg and larval stages develop in the aphid. In about 48 hours, the small larva emerges from the egg and starts consuming the aphid tissues. In the late stages of development, the larva will consume all the host's tissues including guts and muscles causing death of the aphid. The larva makes a small hole in the aphid and fixes the aphid to the leaf.

The larvae remain inside of the dead aphid and pupate. At this stage, only the aphid's skin is remaining resulting in a "mummy" (Figure 6 and 7). After the completion of development, the tiny wasp will make a hole in the mummy to exit the skin of the aphid and become a free-living adult (Figure 8). The development from egg to adult can range from nine to 23 days. The speed of development depends on the temperature; at low temperatures development is slower and at high temperatures development is faster. Adults live from seven to 15 days. Others factors such as rain, humidity and wind also can affect the development and length of life of the parasitoids.

Levels of control by aphid parasitoids vary. For example, parasitism of cotton aphid and green peach aphid by *Aphidius* sp. was 48 percent and 62 percent, respectively (Sampaio et al. 2001; Soglia et al. 2006), while the same species inflicted 70 percent control of glasshouse-potato aphid, blue alfalfa aphid and potato aphid (Sidney et al., 2010). To enhance the impact of aphid parasitoids, gardeners can use flowering cover crops and reduce the use of insecticides. Remember, parasitoids can be great allies in the battle against aphids.

Figure 6. Aphid mummy. Photo by Whitney Cranshaw, Colorado State University, Bugwood.org

Figure 7. Mummies fixed in cabbage plant. Photo by Monique De Souza

Figure 8. Aphid parasitoid and empty mummy. Photo by Monique de Souza

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Pub. 3484 (online only) 01/16

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