Figure 11. Ants tend psyllid nymphs, protecting them from natural enemies in order to harvest their honeydew.

T. radiata releases have been made in Central California and a second wasp (*Diaphorencyrtus aligarhensis*) that attacks the younger ACP nymphs was released in Southern California.

Tamarixia and other natural enemies have reduced ACP populations in Southern California, but they have not eradicated the pest and have not halted the spread of HLB. In the absence of ants, these beneficial insects will at least help to reduce psyllids, especially in areas where it is not possible or practical to institute chemical psyllid control measures. Visit the ACP Distribution and Management website (see REFERENCES) to see a map of where these parasites have been released in California.

Ant Control to Protect Natural Enemies

Ants directly interfere with biological control of ACP, so it is very important for residents to control ants around their citrus trees. Ants "farm" the psyllid honeydew, feed it to their young, and vigorously protect psyllids from predators and parasites (also called natural enemies) (Figure 11). Ants do this to preserve this food source for their colony.

Ant control is especially important in areas of California where the very aggressive Argentine ant is found. Argentine ants can significantly reduce *Tamarixia* and *Diaphorencyrtis* attack rates on ACP. For information on ant identification and management in the landscape, see the UC IPM *Pest Notes: Ants* (see REFERENCES).

Chemical Control

In areas where ACP has newly arrived, or where residential citrus trees are close to commercial citrus operations, CDFA conducts residential insecticide treatments to control psyllids. When a psyllid is found in these areas, all citrus and other ACP host plants on a property and nearby properties receive an application of two insecticides: a foliar pyrethroid insecticide to quickly kill adults and immature psyllids by direct contact and a soil-applied systemic insecticide to provide sustained control of nymphs tucked inside young leaves. This combination of treatments may protect trees against psyllids for many months. Home gardeners are encouraged to be vigilant and consider supplementary applications of their own when they see psyllids on their trees.

Because of the threat ACP poses to both backyard and commercial citrus and the urgency of containing this pest, home gardeners outside the areas that are part of the CDFA residential treatment program are encouraged to consider implementing their own psyllid control measures if psyllids are found in their area.

Home gardeners can hire a landscape pest control professional to apply insecticides, or make treatments themselves. Landscape professionals have access to the same pesticides applied by CDFA, which include the systemic imidacloprid and foliar applications of the pyrethroid beta-cyfluthrin.

Home gardeners can apply broad-spectrum foliar sprays (carbaryl, malathion) to rapidly control adults and protect plants for many weeks. The systemic insecticide imidacloprid (Bayer Advanced Fruit, Citrus & Vegetable and other products) is available for use as a soil drench, which moves through the roots to the growing tissues of the plant. This systemic insecticide provides good control of the nymphs for 1 to 2 months. Nymphs are hard to reach with foliar sprays because they are tucked inside the small, developing flush.

Apply the soil drench during summer or fall when roots are actively growing. Broad-spectrum foliar sprays and systemic insecticides are toxic to honey bees, so don't apply them when the citrus trees are blooming.

There are also a number of organic and "soft" foliar insecticides such as oils and soaps (horticultural spray oil, neem oil, insecticidal soap) that can help to reduce psyllids. These insecticides are generally lower in risk to beneficial insects (natural enemies and pollinators); however, they are also less persistent so applications need to be made frequently when psyllids are observed (every 7 to 14 days). Oil and soap insecticides must make direct contact with the psyllid so should be applied carefully to achieve full coverage of the tree. See the "Active Ingredients Compare Risks" button in this publication online for more information about potential hazards posed by these materials.

Treatment Considerations

- Always follow label instructions for the safe and effective use of the product.
- Only apply insecticides if psyllids have been observed in your area.
- Only apply insecticides to host plants of psyllids (citrus and closely related hosts).
- Avoid using insecticides during bloom to limit impacts on bees.
- Thoroughly wet the foliage when spraying, including undersides of leaves.