

Biology and Control of the Strawberry Aphid, *Chaetosiphon fragaefolli* (Cockerell) (Homoptera: Aphididae) in Florida¹

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The strawberry (*Fragaria x ananassa* Duchesne) hosts a wide variety of aphid species. Most of these species have an ample variety of alternate hosts that include strawberries. The true strawberry aphid, *Chaetosiphon fragaefolli* (Cockerell) (Fig. 1), is considered an important pest of wild and cultivated strawberries worldwide. This aphid species is a vector of strawberry viruses such as cytorhabdovirus, one of the most dangerous viruses affecting strawberry (Krczal, 1979) (Fig. 2). Our ability to recognize this pest and the damage it causes is important in determining successful control methods.

Distribution

The strawberry aphid has been reported in the U.S. (California, Michigan, Minnesota, South Carolina, and Washington), Canada, northern Mexico, Europe, Great Britain, South Africa, New Zealand, and Australia (Blackman and Eastop, 2000). Florida is the latest U.S. state to report of this species in North America (Rondon and Cantliffe, 2004).

Hosts

The strawberry aphid is frequently found on wild strawberry, *Fragaria* spp. (especially *F. chiloensis* in North America), *F. vesca*, *F. virginianana*, and *Ponsetia anserine* L. (Blackman and Eastop, 2000; Frazier, 1974). It has also been reported for the first time on cultivated strawberries including 'Treasure', 'Earlibrite', 'Strawberry Festival', 'Sweet Charlie', 'FL 97-39', 'Camarosa', 'Carmine', 'Camino Real', 'Diamante', and 'Ventana' grown under protected cultivation as a variety trial in Florida (Fig. 3). Where the aphid came from is unknown (Rondon and Cantliffe, 2004).

Biology and Description

This soft-bodied insect usually occurs on new shoots, in the crown, and close to the veins on the undersides of leaflets (Fig. 4). Nymphs and adults are covered with knobbed hairs that can be seen with a hand lens (20X) (Fig. 1). In general terms, this characteristic differentiates the strawberry aphid from other species of aphids infesting strawberry. The life cycle of the strawberry aphid includes overwintering

1. This document is HS1009, one of a series of the Horticultural Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: March 2005. Please visit the EDIS Web site at <http://edis.ifas.ufl.edu>.

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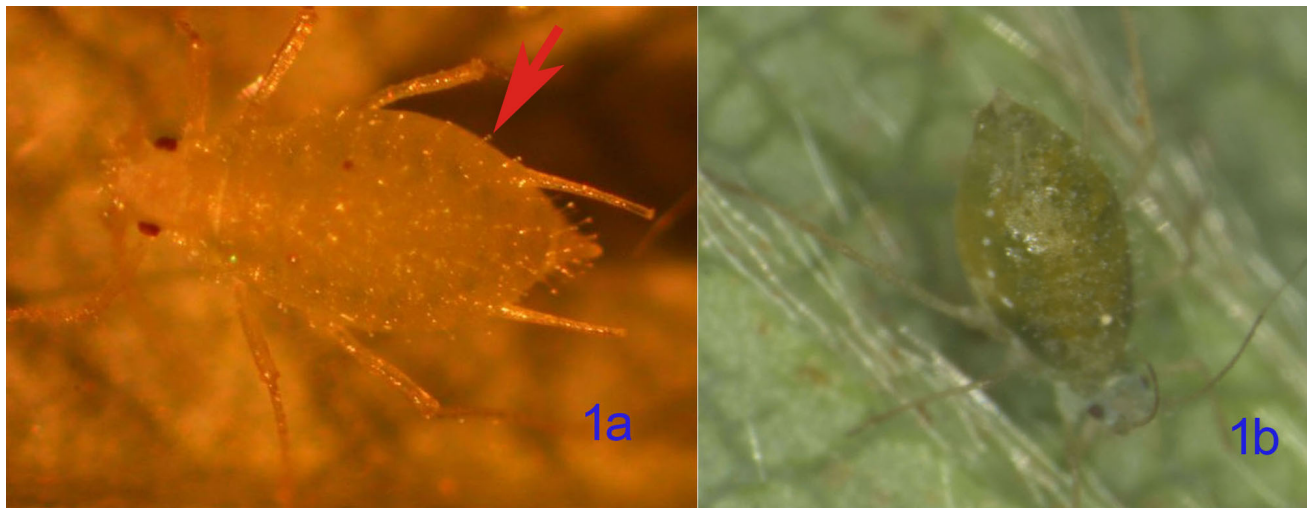


Figure 1. The aphid is typically pale green to yellowish in color. Both adults and nymphs are covered with knobbed hairs that are visible with a hand lens (20X); these hairs are not found on any of the other aphid species infesting strawberry. Credits: Fig. 1a - D.J. Cantliffe, UF/IFAS; Fig. 1b - S.I. Rondon, UF/IFAS

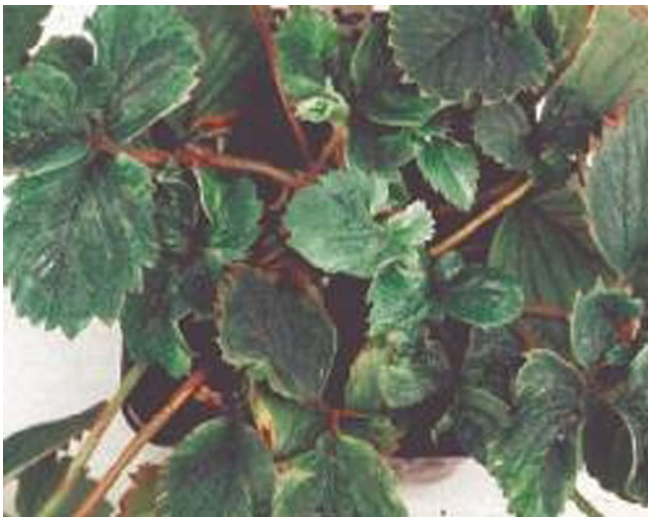


Figure 2. Stunting, vein necrosis, chlorosis, and leaf distortion in strawberries due to strawberry virus transmitted by the strawberry aphid. Credits: K.I. Posthuma, Kent, UK

eggs, nymphs and adult apterae (wingless), and alatae. Eggs are white-yellowish in color when deposited, but hours later they become shiny and black (Fig. 5). Nymphs are small (0.8–1.1 mm in length) and morphologically similar to the adults. Nymphs vary in color from light green to pale yellow (Rondon and Cantliffe, 2004). The pre-reproductive period averages less than 13 days at 25°C (Krczal, 1982). Adults are 1.3-1.5 mm long, pale to yellowish green, and present short setae (hairs) over the body; the antennae are as long as or longer than the length of the body; the corniculi are long, pale, and slender,



Figure 3. Strawberry grown under protected cultivation heavily infested with aphids. Credits: E. Jovicich, UF/IFAS

about 1/4 of the body length; and the legs are pale green and almost translucent. There are two aphid forms: apterae and alatae. Apteræ are small (0.9-1.3 mm in length), elongate oval, translucent, yellowish-white or pale green. Alatae are medium size (1.3-1.8 mm in length) and have a pale greenish abdomen with a brown dorsal patch. Parthenogenetic forms occur throughout the year; however oviparae (alatae and apterae males) may occur in greenhouse and laboratory culture. Oviparae forms have not been reported from the field.



Figure 4. Strawberry aphids (left, nymph 0.8-1.1mm in length; right, adult 1.3-1.5 mm in length) located close to veins. Credits: J.K. Clark, UC



Figure 5. Eggs (0.3-0.5 mm in length) of the strawberry aphid. Credits: J.K. Clark, UC

Damage

Aphid nymphs and adults feed on strawberry plant sap, preventing plant growth. Typical symptoms of aphid damage include curled leaves, yellowish spots, and the presence of sticky honeydew excreted by the aphid. A black sooty mold may develop on the leaves, affecting photosynthesis and possibly reducing plant yields.

Importance

The strawberry aphid is a vector of the strawberry virus, cytorhabdovirus. Strawberry mild yellow edge virus (MYEV) and strawberry crinkle virus (CV) belong to the most pathogenic viruses affecting strawberry (Krczal, 1979). So far, virus incidence in Florida strawberries has been uncommon.

Control

Effective and timely control of the strawberry aphid is essential in strawberry production due to the aphids' ability to develop into large populations in a short period of time. Cultural and mechanical control of the strawberry aphid in greenhouse and open field includes inspecting incoming transplants. Plant monitoring should begin early in the season and continue throughout the duration of the crop. Inspect leaflets and shoots carefully at random throughout the field. A sample size of fifty leaflets or shoots is recommended; this sample size will vary according to farm size. Yellow sticky cards can be useful in detecting the winged form; however, if winged forms are found, a well established aphid population is already in the crop. The presence of ants, who feed on sugar produced by the aphids, is also a sign of the presence of heavy aphid infestation. Chemical control should be considered as a first measure if viruses transmitted by this aphid are detected. For different chemical options, visit the following sites, <http://edis.ifas.ufl.edu/PI037> or <http://strawberry.ifas.ufl.edu>. Control of aphids will reduce the rate of virus spread. However, even insecticide treatments will not provide complete protection against incoming viruliferous aphids (Converse, 2002). It takes only one aphid to spread the virus in your crop; however, keep in mind that not all strawberry aphids transmit viruses.

Biological Based Control Program

There is no extended information regarding the effect of natural enemies specifically on the strawberry aphid. However, there are several biological control options for aphid control. Lady beetles, such as *Hippodamia convergens* Güerin-Menevielle (Fig. 6) and *Coleomegilla maculata* (DeGeer) (Fig. 7), are excellent aphid feeders (Rondon et al., 2004). Lacewings such as *Chrysoperla rufilabris* L and *Chysopa carnea* Say (Fig. 8), and the predatory midge *Aphidoletes aphidimyza* L. are also voracious predators of aphids (Fig. 9) (Heinz, 1998).

Parasitoids are very species specific. So far, there are no reports found for strawberry aphid control in the literature.

If biological control is used:

1. Reduce or limit the use of broad spectrum pesticides
2. Preventive releases are recommended
3. Monitor weekly to detect first sign of pest
4. Using a light soap before release of beneficials is suggested, because if honey dew is present, it may interfere with the search capability of the parasitoid.



Figure 6. *Hippodamia* spp. adult. Credits: J.P. Michaud, IFAS/UF



Figure 7. The pink spotted lady beetle. Credits: M.E. Rice, KSU



Figure 8. Green lacewing adult. Typically, the adult is green with net-like delicate wings. Credits: OSU



Figure 9. *Aphidoletes aphidimyza*, an aphid predator. Credits: J.K. Clark, UC

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