

Natural Enemies of the **SUGARCANE APHID** on Sorghum in South Texas

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Sugarcane aphid background:

The sugarcane aphid (Fig. 1) is an economic pest due to the damage it has on sorghum growth and yield. Each year, the sugarcane aphid overwinters on remnant and ratoon sorghum and Johnson grass in Mexico and South Texas and then moves on to cultivated sorghum. Additional long-distance northward expansion is due to the wind-aided movement of winged aphids coming from maturing sorghum and Johnson grass. South Texas sorghum may be initially infested each year by local overwintering aphids as well as winged aphids flying northward from Mexico. Natural enemies of sugarcane aphids also overwinter in South Texas and can be important in preventing sugarcane aphids from reaching economically damaging levels.



Figure 1. The sugarcane aphid in winged adult and wingless forms. (Photo courtesy of P. Porter)

Sugarcane aphid natural enemies:

Fortunately, many existing natural enemies that feed on other aphid pests in grain sorghum also feed on the sugarcane aphid. The natural enemy complex that preys upon sugarcane aphids can be divided into two groups: predators and parasitoids. The predators are primarily lady beetles (Fig. 2AB), lacewings (Fig. 3AB), and syrphid flies (Fig. 4AB). The parasitoids are very small, non-stinging parasitic wasps (Fig. 5A and 6A). Parasitoid activity can be easily detected by the black mummies (Fig. 5B) and brown mummies (Fig. 6B) they produce.

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Predators:

The predators directly feed upon sugarcane aphids. Predators of the sugarcane aphid include lady beetles, brown lacewings, green lacewings, and syrphid flies. The larval or immature stages do not look like the adults.

■ Lady beetles:

Most adult lady beetles range in color from light yellow-orange to red, while some are dark brown or very light in color (Fig. 2A). Adult size varies by species—they are often three to five times larger than an aphid. Lady beetle larvae are alligator-like and predominantly black with yellow or orange markings (Fig. 2B). However, some lady beetle larvae are very small and may be fuzzy and white due to their secretion of a waxy substance (Fig. 2B). Lady beetle eggs are very small, yellow to orange, football-shaped, and commonly laid in clusters near the aphids. Female lady beetles typically lay dozens to a few hundred eggs over a 3-week period in the summer.

Lady beetle adults and larvae both feed upon sugarcane aphids. The larval stage of lady beetles consumes more aphids than the adult stage. Some lady beetle larvae can eat their weight in aphids within a day, and some lady beetle adults can feed on up to 50 aphids per day.

■ Lacewings:

Lacewing adults are slender, delicate-winged insects that can be green or brown (Fig. 3A). Lacewing larvae are alligator-shaped and have long, hollow, sickle-shaped mouthparts they use to pierce and feed on aphids. Lacewing larvae are yellow to brown with light markings, and some species pile debris on their backs (Fig. 3B). Green lacewing eggs are easy to identify; their eggs are laid at the top of a slender stalk attached to the leaves. Brown lacewing eggs are laid flat on the plant and are much less noticeable. Female green lacewings can lay 10-30 eggs a day and up to 600 eggs in their lifetime.

The adult stages of lacewings do not feed on aphids, only the larvae. Lacewing larvae may consume hundreds of aphids in their 1- to 3-week development.

■ Syrphid flies:

Syrphid fly adults are commonly called hover flies due to their hovering behavior. Adult syrphid flies are brightly colored and



Figure 2A. Adult lady beetles.
(Photo Courtesy of E.L. Maxson)



Figure 2B. Lady beetle larvae.
(Photo courtesy of P. Porter)



Figure 3A. Lacewing adults. (Photo Courtesy of E.L. Maxson)



Figure 3B. Lacewing larvae. (Photos Courtesy of E.L. Maxson)

are frequently confused with wasps and bees. Syrphid flies do not sting, however. Adults are black-bodied with yellow or white markings (Fig. 4A). Syrphid fly larvae are maggot-shaped, legless, and are often yellow, green, or brown (Fig. 4B). Syrphid fly eggs are oval-shaped, creamy white, and usually laid singly near aphid infestations. Female syrphid flies can lay up to 100 eggs during their lifetime.

Like lacewings, the adult stages of syrphid flies do not feed on aphids, only the larvae. Syrphid fly larvae can consume up to 50 aphids per day during their 1- to 3-week development.

Parasitoids:

Parasitoids kill the aphids in a different way, by laying their eggs within the live aphids, resulting in ‘mummies.’ Mummies are the hardened bodies of a parasitized aphid, which enclose the developing immature wasp. Upon hatching from the egg, the parasitoid larva feeds within the aphid’s body. The parasitized aphid then dies and turns into a black or brown mummy, depending on the parasitoid species. The parasitoids continue to develop within the aphid mummies until they are ready to emerge as adult wasps. The parasitoids of the sugarcane aphid are primarily from two different insect families: Aphelinidae, or aphelinid parasitoids (Fig. 5A), and Braconidae, or braconid parasitoids (Fig. 6A). The presence of aphid mummies is the easiest way to detect these parasitoids in the field.

■ Aphelinid parasitoids:

When an aphelinid parasitoid larva kills an aphid, the aphid will turn shiny blue-black in color (Fig. 5B). These mummies stay the same size and shape as the aphid was when it was parasitized. Aphelinid females lay one egg per aphid, but one female can parasitize hundreds of aphids during her 2-week lifetime.

■ Braconid parasitoids:

When a braconid parasitoid larva kills an aphid, the aphid will turn tan to light brown (Fig. 6B). These tan or brown mummies are swollen and rounded in comparison to the blue-black mummies produced by the aphelinid parasitoid larvae. Braconid females lay one egg per aphid, but one female can parasitize up to 100 aphids during her 2-week lifetime.



Figure 4A. Adult syrphid fly. (Photo courtesy of E.L. Maxson)



Figure 4B. Syrphid fly larvae. (Photo courtesy of E.L. Maxson)

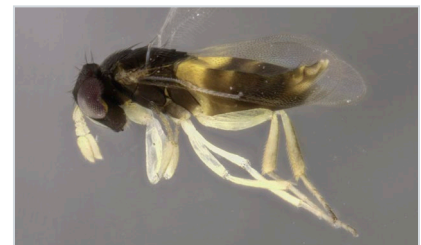


Figure 5A. Aphelinid parasitoid. (Photo courtesy of J.B. Woolley)



Figure 5B. Black mummies. (Photo courtesy of T. Ahrens)

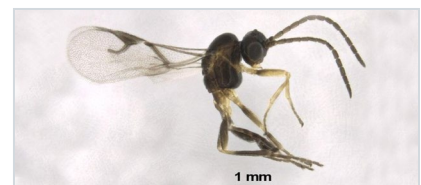


Figure 6A. Braconid parasitoid. (Photo courtesy of J. Coffey)



Figure 6B. Brown mummies. (Photo courtesy of T. Ahrens)

Natural enemies seen in sorghum during sugarcane aphid monitoring in South Texas:

The most common natural enemy of the sugarcane aphid in South Texas is the aphelinid parasitoid, which produces black mummies. Aphelinid parasitoids attack aphids in other crops (wheat) and wild hosts and may move to sorghum and attack sugarcane aphids. The second most commonly observed natural enemies of the sugarcane aphid are lady beetle larvae, and the third most common is the braconid parasitoid that produces the tan or brown mummies. These natural enemies can greatly influence the likelihood of sugarcane aphid populations developing economically damaging levels, especially when natural enemies are present when or soon after sugarcane aphids begin colonizing the field.

In South Texas, the aphelinid parasitoids have been the first natural enemy to be observed when the sugarcane aphid is first detected in sorghum. Often, before the sugarcane aphid even arrives, the presence of these parasitoids is indicated by finding parasitized corn leaf aphids in the sorghum whorl. Corn leaf aphids on sorghum are usually not an economic pest of sorghum since they do not inject a toxin. Instead, the presence of the corn leaf aphid may be beneficial since they attract natural enemies that will also feed on the sugarcane aphid.

Once sugarcane aphids arrive in sorghum, the second natural enemy typically observed are lady beetle adults and larvae. These may also be present before sugarcane aphid arrival, when corn leaf aphids are present. However, based on observations in South Texas, lady beetles tend to appear after the sugarcane aphid arrives.

Managing natural enemies for your benefit:

When monitoring for aphids, you should also monitor for natural enemies. Natural enemy monitoring can be done by examining the tops and undersides of leaves for predator eggs, larvae, and adults. Also look for black and brown mummies, which indicate parasitoid presence. If natural enemies are present soon after aphid arrival, the likelihood of the aphid population increasing to economic levels is reduced. One way to preserve natural enemies in your fields is to avoid using insecticides that kill the natural enemies. Avoid treating for corn leaf aphids unless absolutely necessary. Spray for sorghum midge, headworms, and stink bugs only when needed based on scouting and economic thresholds. Consider insecticides for control of headworms that are the least

toxic to natural enemies (as of October 2019, examples registered for use are Prevathon, Blackhawk, and Heligen). When possible, avoid the use of broad-spectrum insecticides (as of October 2019, examples registered for use are Lannate, Lorsban, Cobalt, Besiege, Warrior, Karate, Asana, Mustang Max, etc.). The use of these insecticides will eliminate most natural enemies and may increase sugarcane aphid populations. Preserving natural enemies can slow the increase of sugarcane aphid populations and may even help prevent the need for insecticide spraying. Although preservation of natural enemies is important, do not sacrifice crop yield for the sake of natural enemies, and always use the economic threshold in your management practices. For information on managing sugarcane aphids and other insect pests of sorghum, see the Texas A&M AgriLife publication “Managing Insect and Mite Pests of Texas Sorghum” (<https://agriflifecdn.tamu.edu/extensionento/files/2019/02/Managing-Insect-and-Mite-Pests-of-Texas-Sorghum-ENTO-085-2018.pdf>), and for videos and other resources on sugarcane aphid scouting and management, visit <https://agrilifeextension.tamu.edu/solutions/sugarcane-aphid/>.

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New

Natural enemies of the sugarcane aphid in South Texas

This collage can be printed on sturdy paper or laminated for field identification.

A) Adult lady beetles. B) Lady beetle larvae. C) Lacewing adult. D) Lacewing larvae.

E) Syrphid fly adult. F) Syrphid fly larvae. G) Aphelinid parasitic wasp that produces black mummies. H) Braconid parasitic wasp that produces brown mummies.

