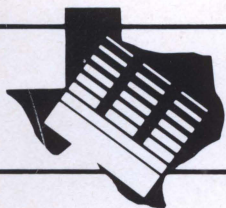


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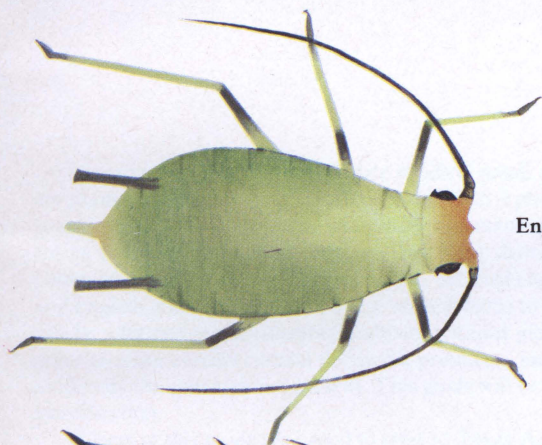
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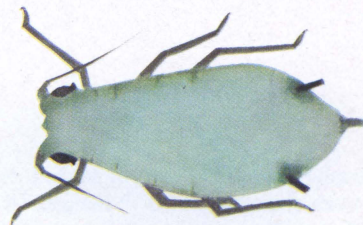


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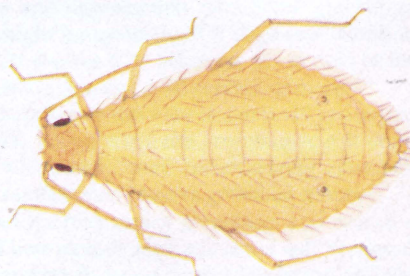
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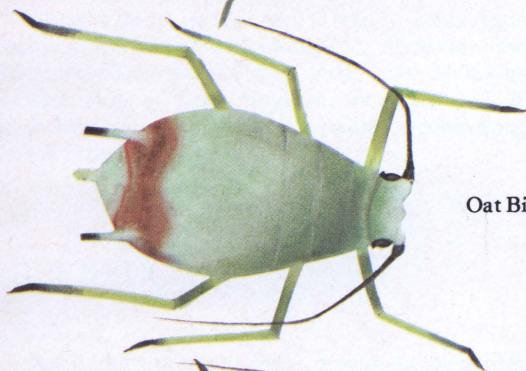
Corn Leaf Aphid



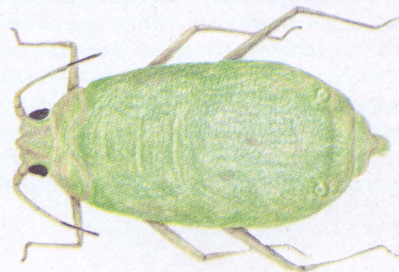
English Grain Aphid



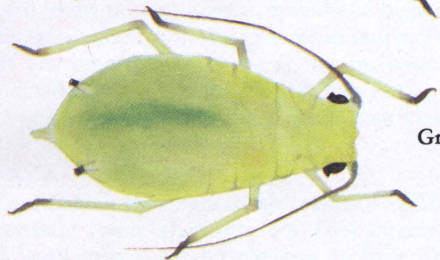
Yellow Sugarcane Aphid



Oat Bird-Cherry Aphid



Russian Wheat Aphid



Greenbug

APHIDS ON TEXAS SMALL GRAINS AND SORGHUM

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Several aphid species can reduce yields of small grains and sorghum and increase production costs in Texas. Aphids such as greenbug, Russian wheat aphid and yellow sugarcane aphid inject toxins into host plants and cause serious plant damage. Other common aphids, such as corn leaf aphid, oat bird-cherry aphid and English grain aphid, do not cause serious harm to plants and can be tolerated in considerable numbers without yield loss. In order to make correct control decisions, producers must be able to identify the aphid species present. This guide will help in aphid identification.

Users of this guide are urged to refer to Texas Agricultural Extension Service publications B-1251, *Managing Insect and Mite Pests of Texas Small Grains*, and B-1220, *Managing Insect and Mite Pests of Texas Sorghum*, for established economic thresholds and recommended insecticides for controlling aphids in small grains and sorghum.

GREENBUG

Host Plants

Small grains, primarily wheat, provide the major winter host of greenbugs; sorghum is the major summer host in Texas. Johnsongrass and other grasses serve as interim hosts when the growth of small grains and sorghum do not overlap. Oats may host greenbugs, but tends to be less infested than wheat.

Description

Mature female greenbugs are approximately 1/16 inch long, with the typical "pear" shape of aphids. They are pale green with a darker green stripe down the middle of the back. The legs and cornicles are also green, except for the tips which are usually black. Winged and wingless forms occur in the same colony, but wingless forms are the most abundant. Winged forms have a single fork of the median vein in the forewing (Figure 7).

Life History

Mature female greenbugs give birth to living female young without mating and without laying eggs. Under favorable conditions, newly-born greenbugs begin reproduction in about seven days, and one female can produce 80 offspring during a 25-day reproduction period. Greenbugs live and reproduce under a wide

temperature range, but the highest rates of reproduction occur between 75 and 85 degrees F. Under favorable environmental conditions, a greenbug population may increase 20-fold per week, although the normal rate is 5- to 6-fold per week. Temperatures below 40 to 50 degrees F or above 95 degrees F reduce greenbug activity and reproduction rate. Some greenbugs are killed by an overnight temperature of 0 degrees F. Continuous temperatures of 20 degrees F or below for seven days or longer often reduce greenbug density by 90 percent or more.

Greenbug abundance tends to be less in small grains that are grazed by livestock, except when the greenbugs are at or below the soil surface (which most often occurs during extended dry weather). Heavy rainfall often reduces greenbug numbers.

Several insect enemies attack greenbugs and reduce their rate of increase. These include adult and larval lady beetles, damsel bugs, green lace-wing fly larvae, syrphid fly larvae, and several species of small parasitic wasps. One wasp species may become so abundant that it completely eliminates greenbugs for a time. The adult wasp deposits an egg within the aphid's body; the egg hatches into a larva that feeds inside the greenbug. Parasitized greenbugs first turn yellowish, then begin to swell, and later turn golden-brown; they are about twice the size of an unparasitized aphid. The enlarged, parasitized aphid is called a "mummy." When the parasite larva completes development, it pupates; then the adult cuts a circular opening in the back of the mummy and emerges.

Damage

Greenbugs injure small grains and sorghum in three ways: (1) Copious amounts of sap are extracted with their piercing-sucking mouthparts, thereby depriving the plant of water and nutrients; (2) A chemical is injected during the feeding process and this causes enzymatic destruction of cell walls which leads to chlorosis (reddening and yellowing) and eventually necrosis (browning) of leaf tissue; (3) Devastating viruses such as barley yellow dwarf virus in small grains and maize dwarf mosaic virus (MDMV) in sorghum may be transmitted, or the plants may be predisposed to other diseases like charcoal rot of sorghum. Greenbugs may infest and injure host crops at almost any stage of plant development from seedling stage to heading or later. Seedling plants are very susceptible to greenbug injury, which may result in plant loss, stunting and delayed maturity. Injurious infestations on larger plants cause stunting and reduced kernel size and quality.

Greenbug infestations in small grains are often first detected by the red-spotted, yellow or orange leaves which appear on a few plants in localized spots within a field. (These symptoms should not be confused with rust disease.) As greenbug density

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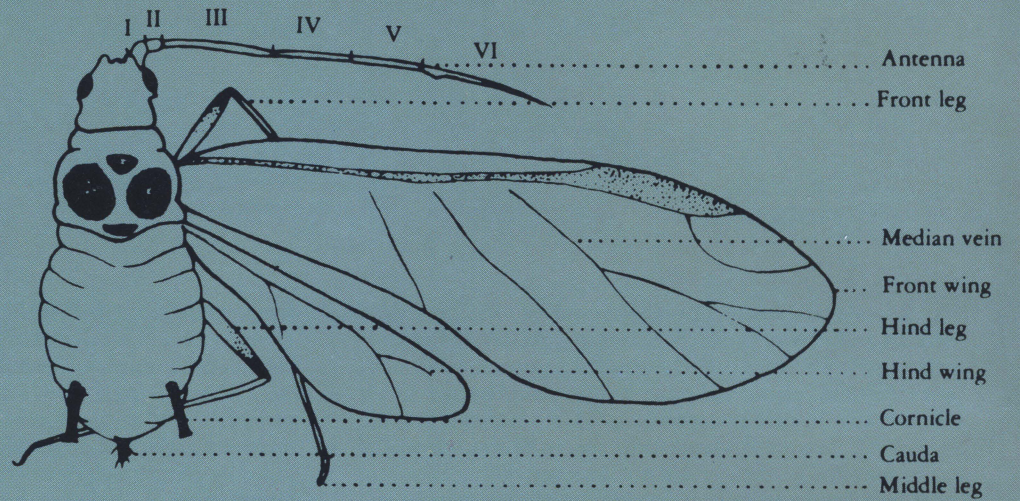


Fig. 1. Anatomy of an aphid.

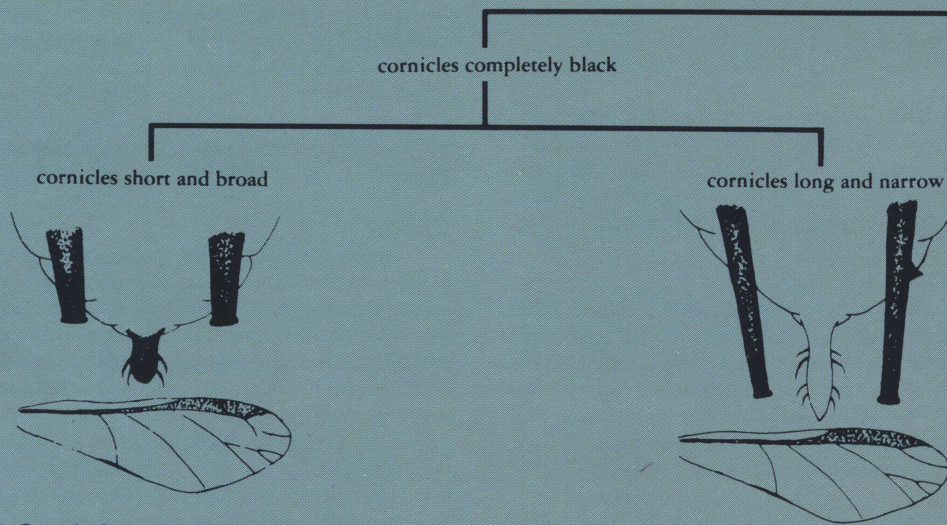


Fig. 4. Corn leaf aphid (*Rhopalosiphum maidis* - Fitch).

Winged form: body green and black; legs, cornicles and antennae black; two-forked median vein in front wings.

Wingless form: Body bluish-green; all of legs, cornicles and antennae are black.

Fig. 5. English grain aphid (*Macrosiphum granarium* - Kirby).

Winged form: Body green and brown; legs and cornicles long; all of legs, cornicles and antennae black; two-forked median vein in front wings.

Wingless form: Body bright green; legs and cornicles long; all of legs, cornicles and antennae black.

APHIDS AND SMALL GRAINS IN TEXAS

Start

cornicles 4 or more times longer than wide

cornicles no longer than wide

5-segmented antennae
Cauda process absent

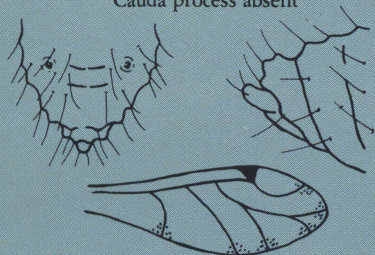


Fig. 2. Yellow sugarcane aphid (*Sipha flava*).

Winged form: Head, abdomen and legs yellow to yellowish brown, thorax light brown, antennae dusky, cornicles light brown. Dorsal body surface has numerous small to moderate-sized setae; ventral surface of abdomen has transverse rows of five setae. Veins in wing margins become dusty or fade out.

Wingless form: Body, antennae, legs and cornicles bright lemon yellow; longitudinal rows of small tubercles on abdomen from which arise conspicuous setae or hairs.

6-segmented antennae
Cauda process present

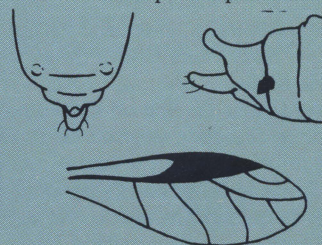


Fig. 3. Russian wheat aphid (*Diuraphis noxia* - Mordvilko).

Winged form: The supercaudal process is short. Tail is about as wide as long. Body color is darker green than the wingless form.

Wingless form: The supercaudal process is elongate, often as long as the tail. Body is pale green.

only tips of cornicles black

reddish-orange spot on back at base of cornicles

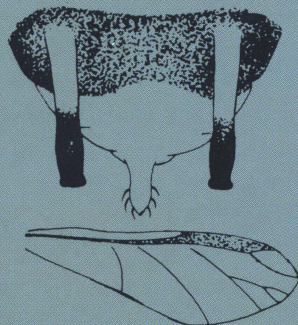


Fig. 6. Oat bird-cherry aphid (*Rhopalosiphum padi* - Linn).

Winged form: Body dark green and black; two-forked median vein in front wings; tips of leg segments, tips of cornicles and antennae are black.

Wingless form: Body olive green with reddish-orange spot on back at base of cornicles; tips of leg segments, tips of cornicles and antennae are black.

without reddish-orange spot on body

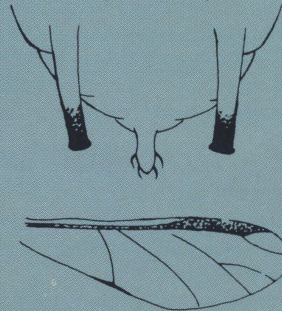


Fig. 7. Greenbug (*Schizaphis graminum* - Rond).

Winged form: Body green and brown; one-forked median vein in front wings; tips of leg segments, tips of cornicles and most of antennae are black.

Wingless form: Body bright green with prominent dark green stripe down the center of the back; tips of leg segments, tips of cornicles and most of the antennae are black.

increases, more plants show the typical damage symptoms. Inspecting for the presence of greenbugs on plants will distinguish greenbug injury from the damage caused by nitrogen deficiency or moisture stress. Greenbugs most often feed in colonies on the undersides of the lower leaves and stems of small grains, but may feed on plant parts at or slightly below the soil surface.

Greenbug infestations in sorghum are detected by the reddish spots on the leaves caused by toxin injected into the plant as aphids feed. Lower leaves are infested first, and the aphids move upward on the plant as the lower leaves die. The reddened areas enlarge as greenbug density increases, and the leaf may die, turning brown from the outer edges toward the center. The undersides of heavily infested leaves, the lower leaves and the soil can be darkened from molds that develop on the abundant honeydew excreted by greenbugs. Seedling sorghum plants are very susceptible to greenbug injury, and turn yellow or reddish when only lightly infested. Seedling death results in stand loss. In larger plants, greenbugs cause stunting and kernel weight reduction, and increase the likelihood of plant lodging.

Biotypes

Since 1958, four major greenbug biotypes have evolved; these have overcome plant resistance, adapted to higher ambient temperatures, infested new hosts such as sorghum, and necessitated the use of higher insecticide dosages for control. These biotypes have been assigned letters from A to E. Biotypes that infest small grains and sorghum are C and E. The biotype C designation was given to the greenbug that began infesting sorghum in 1968. Biotype E designates greenbugs capable of injuring wheat and sorghum resistant to biotype C. Biotype D designates an insecticide-resistant population. Biotype mixtures are common in most areas.

Control Strategies

Small Grains. The need for insecticidal control of the greenbug in small grains is based on greenbug numbers per linear foot of plant row, the size and vigor of plants, and the effectiveness of natural enemies. Irrigated crops usually can withstand larger greenbug numbers than dryland crops before yield losses occur, but are often more heavily infested. Localized areas of yellowed plants in a field indicate injurious densities of greenbugs. Small grain fields should be scouted for the presence of greenbugs at least weekly, especially during fall and early spring. Information on harmful greenbug densities at various plant heights is provided in B-1251; this publication can serve as a reliable guide to determining the need for insecticides. B-1251 also lists insecticides recommended for greenbug control in small grains. In some areas of the state greenbugs are resistant to certain phosphate insecticides.

Sorghum. The need for insecticidal control of the greenbug in sorghum also depends on greenbug numbers, plant size and vigor, and the suppressive capabilities of natural enemies. Sorghum fields should be scouted weekly to determine greenbug density and plant damage. Refer to B-1220 for additional information on greenbug control and recommended insecticides.

YELLOW SUGARCANE APHID

Host Plants

This aphid infests both small grains and sorghum, but is far more damaging to sorghum. Common wild host plants include johnsongrass and Dallis grass.

Description

Wingless yellow sugarcane aphids are lemon yellow and about 1/16 inch long, with the typical "pear" shape of aphids. The antennae have five segments and are covered with conspicuous but sparse bristles. The first four segments of the antennae are lemon yellow, but the last segment is dark. Six conspicuous bristles project from the front of the head. The eyes are reddish brown. Two longitudinal rows of black spots lie on either side of the middle of the back. Ten longitudinal rows of erect tubercular bristles are present on the top and sides of the thorax and abdomen. The cornicles are short with a dark ring around the opening. Winged adults may occur.

Life History

Yellow sugarcane aphid females begin reproducing about 12 days after birth, and each produces about 45 young in 28 days. Greenbugs and yellow sugarcane aphids produce about the same number of offspring, but greenbugs do so much more rapidly. The same predators that feed on greenbugs also feed on yellow sugarcane aphids, but parasites do not attack yellow sugarcane aphids. There are no known biotypes of yellow sugarcane aphids.

Damage

Yellow sugarcane aphids damage plants by injecting a toxin as they feed. Their damage may delay plant maturity and thus expose sorghum to late infestations of sorghum midge. Yellow sugarcane aphids prefer lower leaves of seedling sorghum plants, and are found on the undersides of such leaves. Purple discoloration of leaf tissue is the first symptom of yellow sugarcane aphid injury to small, seedling sorghum. As feeding continues, the purple color extends from the feeding site toward the stem, and is often followed by yellowing and necrosis of the affected tissue. If aphids remain, the seedling plants usually die. Leaves of taller sorghum plants typically respond to yellow sugarcane aphid feeding by turning yellow. Injured plants usually are severely stunted and have reduced root formation and yield and delayed maturity.

Yellow sugarcane aphids cause the greatest damage when they migrate to very small sorghum seedlings from wild host plants. Sorghum plants with two to five true leaves are easily killed by small numbers of aphids. If not killed, infested plants are severely stunted, delayed and more likely to lodge. Refer to B-1220 for information on using insecticides and for recommended insecticides.

CORN LEAF APHID

Host Plants

Many grasses are hosts of this aphid, including johnsongrass. The aphid infests small grains and sorghum, but is much more abundant in sorghum.

Description

This aphid is a dark, bluish green and about the size of a greenbug or slightly smaller. Its legs, antennae and cornicles are entirely black. It has the typical "pear" shape of aphids.

Life History

The biology of the corn leaf aphid is similar to the species described previously.

Damage

The corn leaf aphid is less injurious than the aphids previously discussed, primarily because it does not inject a potent

toxin during feeding. It sucks juices from plants and secretes honeydew. The aphid commonly feeds in the plant whorl, where it often becomes extremely abundant and may literally fill the whorl of the middle leaf. The aphid feeds in colonies on the undersides of leaves and may coexist with greenbugs. Feeding causes a yellowish mottling of the leaves. The mottling is apparent, however, only after the leaves creating the whorl have extended. Some marginal leaf necrosis also may be associated with corn leaf aphid feeding, but this is likely the symptom of maize dwarf mosaic virus, which the aphid transmits. In rare instances corn leaf aphids stunt plants, interfere with panicle exertion and, if they are abundant in the panicle, may affect harvest. Heavy infestations during the seedling stage may cause plant death and stand loss. However, in spite of these exceptions, chemical control of the corn leaf aphid is rarely justified. In fact, the aphid is beneficial in that large numbers of corn leaf aphids attract many natural enemies. Because the aphid seldom causes injury and its density declines dramatically with panicle exertion, the natural enemies it attracts are left to suppress greenbugs and other insect pests.

OAT BIRD-CHERRY APHID

Host Plants

This aphid infests small grains but not sorghum.

Description

The aphid is broadly oval and its color ranges from mottled yellowish or olive green to greenish black. Often there are reddish patches around the bases of the cornicles. The antennae are entirely black, but the legs and cornicles are green with black tips.

Damage

Nymphs and adults suck juices from the leaves of small grains. There is no obvious toxin associated with its feeding, and damage symptoms are not readily apparent. The insect is more abundant in the western and northwestern areas of the state than in southern Texas. Chemical control is rarely justified for the oat bird-cherry aphid.

ENGLISH GRAIN APHID

Host Plants

This aphid can be found in wheat, barley, rye or oats. It does not infest sorghum.

Description

The English grain aphid usually is grass-green, but can be yellow or pink with a brown head. There is often a dusky dorsal patch on the abdomen. The long cornicles and antennae are en-

tirely black. The cauda, anal plate and tibiae are pale in color. The winged forms are usually more yellowish or brownish than the winged forms.

Damage

This aphid sucks plant juices and causes damage similar to that of the oat bird-cherry aphid. The English grain aphid does not inject any toxins during feeding and seldom causes yield losses. After plant heading, the aphid can be found clustered in the heads of small grains.

RUSSIAN WHEAT APHID

Host Plants

The Russian wheat aphid has become a pest of wheat, barley, rye, triticale and oats in Texas. It also occurs on brome grass, fescue grass, wheatgrass, canary grass and timothy. Volunteer wheat is a very important host during certain times of the year. This aphid will feed on sorghum but does not reproduce or develop successive generations which cause plant damage. Barley is quite susceptible to attack by this aphid.

Description

The Russian wheat aphid is less than 1/16 inch long. It is greenish with an elongated, spindle-shaped body. It can be distinguished from other common aphids by its short antennae and by the absence of prominent cornicles. It has a fleshy projection above the cauda (or tail) which gives the aphid a "double tail" appearance when observed from the side.

Damage

This aphid is commonly found on small grains within the tightly curled leaf of the newest growth of the plant. As is the case with greenbugs, small populations of the Russian wheat aphid are not readily visible on casual observation. Infested plants sometimes have purple tillers; in heavily infested plants the tillers become prostrate or parallel with the soil surface. This species of aphid injects a strong toxin into the plant during feeding. The toxin produces leaf curling and longitudinal white and yellow streaks. The chloroplast membrane is destroyed by the injected toxin. Large populations of the aphid can kill the plants.

Control

The Russian wheat aphid has been a pest in Texas since the spring of 1986. Research has not been conducted to determine the economic threshold for insecticide treatments. However, research conducted in South Africa indicates that control measures should be based on the growth stage of the plant and the number of infested tillers. In general, if 10 percent of the tillers are infested, insecticide sprays will be required. Plants are the most susceptible to damage at the flag leaf stage. Keeping the flag leaf free of the Russian wheat aphid is advisable.

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