

Whiteflies: **Bandedwinged Whitefly:** *Trialeurodes abutilonea*
 Silverleaf/Sweet Potato Whitefly: *Bemisia spp.*

Of the whiteflies that occur in Mississippi, the bandedwinged whitefly is by far the most common and the most widely distributed. Low numbers of bandedwinged whiteflies can be found in most fields, most years. But, damaging infestations are relatively uncommon, and most commonly occur in fields that have received repeated insecticide treatments, which disrupt predation and parasitism.

Fortunately, the *Bemisia* whiteflies are rare through most of the state. There are two species, the sweetpotato whitefly, *Bemisia tabaci*, and the silverleaf whitefly, *Bemisia argentifolii*, which are difficult to distinguish from one another. Infestations of *Bemisia* whiteflies are most commonly found in the extreme southern part of the state in cotton fields located near commercial ornamental plant nurseries. However, *Bemisia* whitefly infestations are found occasionally in more northern regions of the state where cotton fields are located near large greenhouses.

Biology: Whiteflies belong to the order *Homoptera*, which also includes aphids. Bandedwinged whiteflies overwinter as eggs and pupae on alternate hosts and increase their numbers on alternate hosts in the spring before moving to cotton. Velvetleaf is a favored early season host, and bandedwinged whiteflies can usually be found on this plant during late spring and early summer. Interestingly, whitefly infestations are usually heavier on hairy leafed varieties of cotton than on smooth leafed varieties. Eggs are deposited on the underside of the leaf and are attached to the leaf by a tapered stalk. Unmated females produce viable eggs, but only males hatch from these eggs. Eggs of mated females may develop into either sex. Individual females produce 50 to 100 eggs during their life.

The eggs hatch into first instar nymphs or crawlers, which move to a site on the underside of the leaf, insert their mouthparts, and become immobile. Second and third instar nymphs remain at the same location, feeding but not moving. Whiteflies feed by inserting their piercing-sucking mouthparts into the vascular system of the plant and consuming sap. Because of the high sugar concentration and relatively low protein content of the sap, the nymphs must process large amounts of sap in order to meet their protein requirements. Excess sap is excreted in the form of "honeydew". Mature nymphs enter a non-feeding "pupal" stage, which last approximately four days at 86° F. The winged adults emerge through a "T-shaped" slit in the back of the pupal case. Mating occurs within one to two days of emergence, and there is a short pre-ovipositional period before females begin laying eggs. Adults also feed on plant sap. During the cotton-growing season three to four weeks are required to complete one generation, but generations overlap.

The biology of the *Bemisia* whitefly is similar, except that this species is not known to overwinter on wild hosts in Mississippi. In the southern part of the state *Bemisia* whiteflies are often found on commercial ornamental plants that are being grown in propagation houses, and they readily move to nearby cotton fields once plants are available. During the fall, nurserymen complain of whiteflies moving from cotton fields into ornamental plantings. *Bemisia* whiteflies may also occur in greenhouses throughout the state, and isolated infestations may develop anywhere that cotton fields are located near greenhouses.

Damage: The damage caused by both species is similar. Both immatures and adults remove sap from the plant, which otherwise would be used for growth and development. Heavy, sustained whitefly infestations can remove enough sap to cause reduced development and yield loss and severe infestations of *Bemisia* whiteflies can kill plants. However, such heavy infestations are relatively uncommon. The most important damage caused by whiteflies is the production of honeydew which, when deposited on open lint, causes "sticky cotton". Sticky cotton is subject to substantial price discounts, because it is more difficult to process. In past years western-grown cotton has suffered from such quality discounts following heavy outbreaks of *Bemisia* whiteflies. Fortunately, the potential for whiteflies to cause "sticky cotton" seems to be much less in the more humid and rainy environment of the Mid-South. The honeydew produced by whiteflies is quickly colonized by "sooty mold" fungi. Although this sooty mold results in a black residue on both leaves and open lint, it also has the beneficial effect of consuming the honeydew and thus reducing the potential for sticky cotton.

By far the greatest potential damage associated with whiteflies is their ability to vector several serious diseases of cotton. Fortunately, none of these diseases are currently a problem within the United States.

Yield Effects: Whiteflies are considered an occasional pest of cotton and very little yield loss is attributed to this pest in most years. However, heavy, prolonged infestations can cause significant yield reductions in infested fields. Over the past ten years estimated yield losses attributed to whiteflies in Mississippi cotton have ranged from 0 to 0.23%.

Control: Cotton plants can tolerate relatively high populations of whiteflies without suffering yield loss, and whitefly numbers are usually kept below damaging levels by beneficial insects. However, when beneficial insect populations are destroyed by insecticide treatments targeted against other pests, potentially damaging whitefly infestations can occur. When whitefly outbreaks do occur, insecticide treatments are often required. Treatment is recommended when whiteflies are present on at least 50% of the plants in a field. Because they occur on the undersides of leaves, where they are protected from insecticide applications, and because they exhibit high levels of resistance to many insecticides, whitefly infestations can be very difficult to control. Because of this, very few insecticides are even recommended for control of whiteflies.

Treatments used against bandedwinged whiteflies are systemic insecticides that are targeted against the adults and feeding immatures. Because eggs and pupae are not susceptible to such treatments, **multiple applications, applied at approximately five-day intervals, are required for successful control.** Although some of the IGR type treatments that are used against *Bemisia* whiteflies are also effective against bandedwinged whiteflies, they are not normally used against this species because of cost. Treatments recommended for control of bandedwinged whiteflies are listed in Table 5.

Treatments recommended for control of *Bemisia* whiteflies are either tank mixtures of systemic insecticides and certain pyrethroids or insect growth regulator (IGR) type treatments. Although the IGR products are usually very costly, a single application may provide effective control.

However, successful control of *Bemisia* whiteflies with the systemic insecticide tank mixtures usually requires multiple applications applied on approximately five day intervals. Treatments recommended for control of *Bemisia* whiteflies are listed in Table 6.

Table 5: Insecticides Recommended for Control of Bandedwinged Whiteflies

Insecticide	Trade Name	Lbs ai/acre
Acephate	Orthene (Generics)	0.5 to 1.00
Methamidophos	Monitor	0.25 to 0.5

Source: Cotton Insect Control Guide, 2003, Publication 343, Mississippi State University Extension Service

Table 6: Insecticides Recommended for Control of *Bemisia* Whiteflies

Insecticide	Trade Name	Lbs ai/acre
pyriproxyfen	Knack	0.054 to 0.067
Fenprothrin + Acephate	Danitol + Orthene	0.15 to 0.3 + 0.5 to 0.9

Source: Cotton Insect Control Guide, 2003, Publication 343, Mississippi State University Extension Service



Whiteflies: Bandedwinged whiteflies are small, powdery white insects found on the undersides of leaves. Adults have two distinct grey bands across each front wing. Immature whiteflies (pictured below), are also found primarily on the underside of leaves. Most of the immatures in this photo are in the pupa or resting stage.

