Thrips:	**Tobacco Thrips**	*Frankliniella fusca*
	Flower Thrips	*Frankliniella tritici*
	Western Flower Thrips	*Frankliniella occidentalis*
	Soybean Thrips	*Neohydatothrips variabilis*

Thrips are a common, early-season pest of Mississippi cotton. Several different species of thrips occur on cotton, but the tobacco thrips is by far the most common, especially on seedling cotton. The biology and damage caused by the different species is similar. Although thrips occur on cotton throughout the growing season, only young seedling plants are susceptible to injury by thrips. Thrips injury to young seedling plants can stunt growth and reduce yield potential. As a result, most cotton is treated with an in-furrow insecticide or seed treatment to prevent the development of damaging populations and, consequently, serious yield losses due to thrips are uncommon.

Biology: Thrips may overwinter as hibernating adults, as larvae on winter plants, or as pupae in the soil. They begin reproducing on weed hosts and other available plants, such as winter wheat, during early spring, and usually complete one or more generations before cotton emerges. As early season hosts senesce and become unsuitable, adult thrips migrate into cotton fields through wind assisted flight.

Thrips insert their eggs into the plant using a sharp ovipositor. Eggs hatch into wingless larvae, which complete two instars before entering a non-feeding pre-pupal stage which develops into a pupa. Pupae may occasionally occur on plants, but most are found in the soil. The time required to develop from the egg to the adult stage varies greatly with temperature, but may be as little as 15 days under optimum conditions.

Damage: Thrips have punch and suck or piercing-sucking mouthparts. A stout needle-like mandible is used to puncture plant tissue and celluar fluids are then sucked in through the maxillary stylets. When it occurs on leaves and other plant parts that have already expanded, this type of injury causes little or no significant harm to the plant. However, when such injury occurs within the terminal bud, on tiny developing leaves and fruiting structures, the effect can be quite different.

When thrips feed on the young undeveloped leaves within the terminal bud, the resulting damage is magnified as those leaves develop and expand. This is because the damaged tissue fails to develop properly, while undamaged tissue continues to grow. After prolonged feeding or feeding by high numbers of thrips, seedlings have a ragged appearance, with visible silvery feeding sites on cotyledons and terminal leaf tissue. Over time these silver areas will become brown in color. Heavily injured leaves usually have a crinkled, tattered appearance and often curl upward at the margins. Seedlings exhibiting this type of injury are often described as "possum eared cotton". Heavy thrips populations can stunt growth, cause death of the terminal bud (resulting in “crazy cotton”), delay fruiting and reduce stand. Thrips damage often is magnified by cool weather or drought, which can slow plant growth and/or lengthen thrips’ developmental time and increase the probability of seedling damage. Seedlings that emerge under warm, favorable growing conditions are much less susceptible to thrips injury than are those that emerge under conditions conducive to slow seedling development. Cotton seedlings become relatively safe from economic injury by thrips once they reach the 4-leaf stage.

Yield Effects: Thrips occur on essentially every acre of Mississippi cotton every year, but the degree of infestation varies considerably depending on the season. The ultimate impact of thrips injury on yield is highly variable. Cotton that is planted under good growing conditions can

withstand relatively heavy infestations without suffering yield loss. However severe thrips injury can result in substantial yield reductions. In 14 trials conducted by Dr. Jack Reed in Mississippi between 1994 and 2000 the yield losses in the untreated check compared to the most effective treatment in the trial ranged from 10 to 271 lbs. of lint/acre. The average yield increase for the standard treatment (aldicarb) was 114 lbs of lint. Average annual statewide yield losses attributed to thrips range from 0.1 to 0.6%, but these losses would be much higher in the absence of effective treatments.

Control: Because thrips are constantly being blown into fields during early season and because emerging cotton seedlings are so susceptible to injury by thrips, "at planting" insecticide treatments are the most common method of control. Several different methods are available for applying insecticides for control of thrips. These include: 1} seed treatments that can be ordered pre-applied to the seed, 2} seed treatments that are mixed with the seed at planting, 3} granular insecticides that are applied in-furrow at planting through special granular applicators, 4} liquid insecticides that are applied as in-furrow sprays at planting, and 5} foliar sprays applied as needed after seedling emergence. Insecticides recommended for control of thrips and the methods by which they are applied are shown in Table 1. Generally, those treatments that are applied as in-furrow granules or sprays will provide control for a longer period (approximately three to four weeks of control) than those products applied as seed treatments (approximately two to three weeks of control). However, it is important to keep in mind that control failures can occur with any of the at-planting type treatments and all fields should be scouted frequently for thrips until plants reach the four-leaf stage.

Table 1: Insecticides Recommended for Control of Thrips on seedling cotton.

Insecticide	Trade Name	Method of application	Application Rate
In-furrow Treatments			
Acephate	Orthene 97SP	In-furrow spray	1.0 lb. Ai/acre
Aldicarb	Temik 15G	In-furrow granules	0.5 to 0.75 lb. Ai/acre
Seed Treatments			
Acephate	Orthene	Hopper box seed treatment	0.5 lb/100 lb seed
Imidacloprid	Gaucho 480	Seed treatment	8 fl. Oz/100 lb seed
Thiamethoxam	Cruiser 5FS	Seed treatment	7.65 fl. Oz/100 lb seed
Foliar Sprays			
Acephate	Orthene 97SP	Foliar spray	0.2 lb. Ai/acre
Dicrotophos	Bidrin 8E	Foliar spray	0.2 lb. Ai/acre
Dimethoate	Dimethoate 4EC	Foliar spray	0.2 lb. Ai/acre
Methamidophos	Monitor 4E	Foliar spray	0.2 lb. Ai/acre

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

Thrips: Seedling cotton is attacked by several species of thrips. Adult thrips are less than 1/16th of an inch in length and have fringed wings which are usually folded along the back.

Immature thrips are wingless and are often a pale yellow or straw colored.

Damage is caused by feeding on very young developing plant parts, resulting in leaves that are crinkled and distorted once they expand