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THRIPS

(Thysanoptera: Thripidae)

A Multi-State Survey:

Summary of Observations for Arkansas, Alabama, Georgia, Louisiana, Mississippi, and TENNESSEE

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Introduction

Recently, entomologists in six mid-South and southeastern states conducted surveys to evaluate thrips on seedling cotton. Tennessee sites are shown in **Fig. 1**. The multi-state surveys revealed changes in the thrips pest spectrum for soybean thrips, *Neohydatothrips variabilis* (Beach), and western flower thrips, *Frankliniella occidentalis* (Pergande). Trap captures indicated sporadic occurrence of selected species not reported as pests on seedling cotton. Therefore, since the last surveys were conducted in cotton (1, 3, 4, 7, 8) new thrips pests with varying susceptibility to pesticides have developed on seedling cotton.

Thrips are an annual problem on seedling cotton and are usually the first insect pest that consultants and farmers must manage (1). In many of the multi-state survey regions, tobacco thrips, *Frankliniella fusca* (Hinds), continues to be the predominant species of occurrence. However, western flower thrips **(Fig. 2)** were consistently found in all states except Tennessee, and soybean thrips were common to all the survey regions. Both species may be considered as new pests in comparison with tobacco thrips, flower thrips, *Frankliniella tritici* (Fitch), and other species reported in the older surveys. Endemic species may transfer to new hosts and exotic species are easily transported into new regions of the world.

Dispersal

Thrips dispersal across cotton fields occurs immediately after emergence. The type of flora adjacent to a field often can influence the degree of infestation and species present **(Fig. 3)**. After immigration into a cotton field, thrips feeding starts while cotton plants are in the cotyledon stage.

Figure 1. The 1998-99 survey sites for Tennessee were at UT's Milan Experiment Station and West Tennessee Experiment Station (WTES).

Movement and Selection of Hosts

Like other insects, thrips locate hosts using color, shape, size, and volatiles associated with them. Cues for detection of hosts may be general for polyphagous species or very specific for more monophagous species. Mating, feeding, and oviposition may occur on the same host, so cues used for detection of feeding sites also may serve for detection of hosts for reproduction (5).

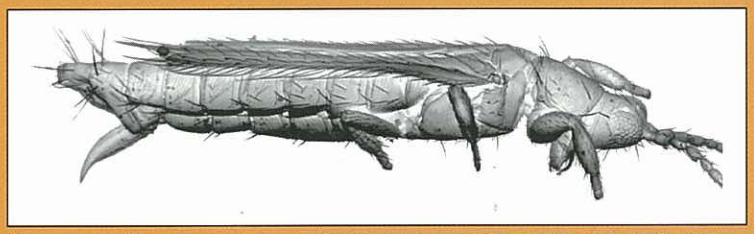
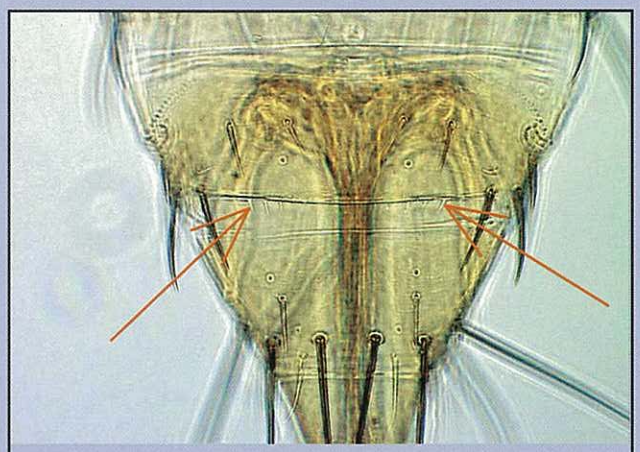


Figure 2. Western flower thrips, adult female viewed with a scanning electron microscope.

Distribution

In cotton, the distribution of thrips species over time indicates population densities generally peak during the last week of May and the first week of June. Occasionally, three distinct peaks occur during the seedling stage of cotton. The multiple cycles develop during dry seasons, and overlapping generations from several species probably account for the deviation in cyclic behavior.

Figure 3. Weeds adjacent to cotton fields can serve as overwintering habitat for thrips.

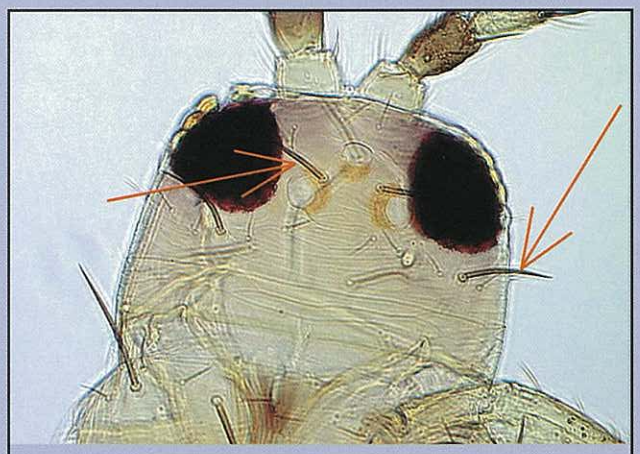


Flower thrips
- *(Frankliniella tritici)*
- Eighth abdominal segment = comb incomplete

FIGURE 4. Characteristics that help identify eastern flower thrips.

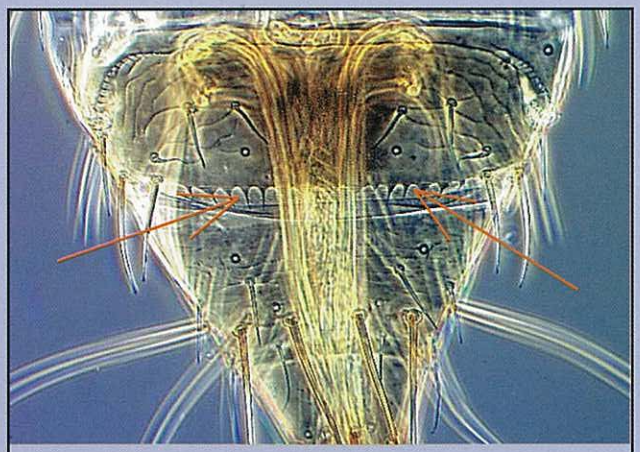
Thrips Species

The multi-state survey indicates the most common thrips species continue to be tobacco thrips and flower thrips. A relatively new pest of cotton, soybean thrips, was probably introduced when soybean acreage rapidly increased during the 1970s. Western flower thrips, another recent addition to the thrips complex on cotton, is a devastating pest of several crops and may seriously impact pest management of cotton. Western flower thrips were present in the Southeast and mid-South by the early 1980s and have subsequently become established as a consistent pest of seedling and in-season cotton. Western flower thrips are tolerant to most standard insecticides and are associated with numerous incidents of virus transmission to soybean, tobacco, and tomato crops. Western flower thrips were reported in Mississippi cotton in 1986 and were present in every cotton-growing county of the Delta by late summer of 1987 (8). Characteristics that help distinguish flower thrips and western flower thrips are shown in **FIG. 4, 5, and 6**. The percent of total thrips collected in Tennessee surveys 1998-99 are shown in Table 1.



Western flower thrips
- *(Frankliniella occidentalis)*
- Interoccellar and postocular seta = same length

FIGURE 5. Characteristics that help identify western flower thrips.



Western flower thrips
- *(Frankliniella occidentalis)*
- Comb = complete

FIGURE 6. Characteristics that help identify western flower thrips.

FIGURE 7. First symptoms of thrips feeding on a cotyledon cotton leaf.

FIGURE 9. Loss of apical dominance occurs as a result of severe thrips feeding.

Damage

The first symptoms of damage are small areas of feeding on the cotyledonary leaves that soon appear silver or whitish **(FIG. 7)**. Excessive thrips feeding causes delayed maturity and/or lost yield. In addition to feeding damage, thrips are an important pest because cotton management decisions for the entire season can be interrupted (2). Immatures and adults show preference for the small leaves and stipules in the bud, resulting in ragged and crinkled leaves as they expand and mature. Size of the first few true leaves is often greatly reduced by thrips feeding **(FIG. 8)**. If feeding damage is severe enough to kill buds in the terminal, apical dominance is lost, and plants become excessively branched or distorted in appearance as secondary terminals form in leaf axils **(FIG. 9)**.

Similar thrips feeding symptoms were described as early as 1930 for the onion thrips, *Thrips tabaci* (Lindeman), on cotton in South Carolina **(FIG. 10)**. Cotton exhibiting these symptoms, i.e. loss of apical dominance and excessive branching, has been described as "crazy cotton" and also may be caused by other insects, diseases, and mechanical damage **(FIG. 11)**. Other problems related to thrips damage are increased seedling mortality, reduced plant height, reduced leaf area, delayed crop maturity, and yield loss (1).

FIGURE 8. Cotton plants recovering from moderate-heavy thrips damage.

Figure 10. Thrips feeding symptoms were described as early as 1930 in South Carolina.

Insecticide Efficacy

Recommended thrips control practices for Tennessee cotton production include use of seed treatments, in-furrow spray treatments, granular in-furrow treatments, and application of foliar treatments "as needed" for serious outbreaks of thrips. Gaucho (imidacloprid) and Orthene (acephate) are available as seed treatments from seed distributors. When the on-farm seed treatment option is selected, growers should apply either acephate 90S or imidacloprid 480F at the rate of 8 oz product/cwt. The recommended in-furrow spray insecticides are Orthene 90S or Address 90S 0.9-1.0 lb ai/A (1.0 to 1.1 lbs product/A), or Di-Syston 8E 0.75-1.0 lb ai/A (12 to 16 oz product/A). Test results indicate these rates have provided consistently good thrips control applied as an in-furrow spray. Recommended in-furrow granule applications are Temik 15G (aldicarb) 0.525 lbs ai/A (3.5 lbs product/A), Payload 15G (acephate) 0.9-1.0 lb ai/A (6.0-6.7 lbs product/A), or Di-Syston 15G (disulfoton) 0.75-1.0 lb ai/A (5.0-6.7 lbs product/A). When Command herbicide is applied, Di-Syston insecticide as an in-furrow granule or spray should be used. Foliar applications of acephate 0.18 lb ai/A (3.2 oz product/A), Bidrin 8 (dicrotophos) 0.1-0.2 lb ai/A (1.6-3.2 oz product/A), dimethoate 4 0.1-0.2 lb ai/A (4.0-8.0 oz product/A), or Monitor 4 (methamidophos) 0.1-0.2 (3.2-6.4 oz product/A) may provide adequate thrips control.

Table 1. The percent of total thrips collected in West Tennessee during the 1998-99 surveys.

1998

Location	Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips
Milan	91	0	3	6
West Tenn.	94	0	0	6

1999

Location	Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips
Milan	85	0	9	6
West Tenn.	79	1	12	8

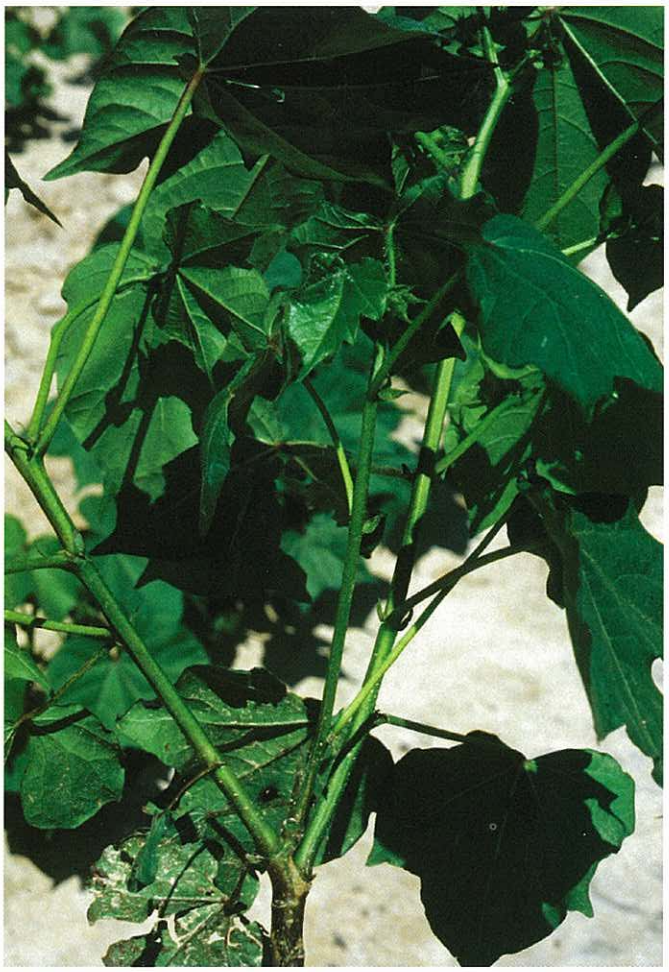


Figure 11. A developing cotton plant exhibiting symptoms of "Crazy Cotton."

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