ALABAMA A&M AND AUBURN UNIVERSITIES

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THRIPS

(Thysanoptera: Thripidae)

A MULTI-STATE SURVEY:

SUMMARY OF OBSERVATIONS FOR

ALABAMA, ARKANSAS, GEORGIA, LOUISIANA, MISSISSIPPI, AND TENNESSEE

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ALABAMA COOPERATIVE Extension SYSTEM

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Introduction

Recently, entomologists in six mid-South and southeastern states conducted surveys to evaluate the species composition of thrips on seedling cotton. The Alabama portion of this survey was conducted on the Tennessee Valley Research and Extension Center in Limestone County, Alabama. 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 most of the multi-state survey regions, the tobacco thrips, *Frankliniella fusca* (Hinds), was the most abundant species. However, western flower thrips (Fig. 1) 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 and condition of flora adjacent to a field often can influence the degree of infestation and species present (Fig. 2). After immigration into a cotton field, thrips feeding starts while cotton plants are in the cotyledon stage.

Figure 2. Weeds adjacent to cotton fields can serve as overwintering habitat for thrips.

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).

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.

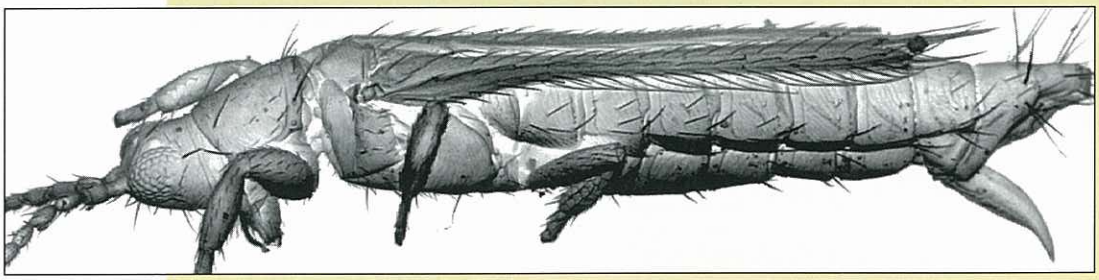
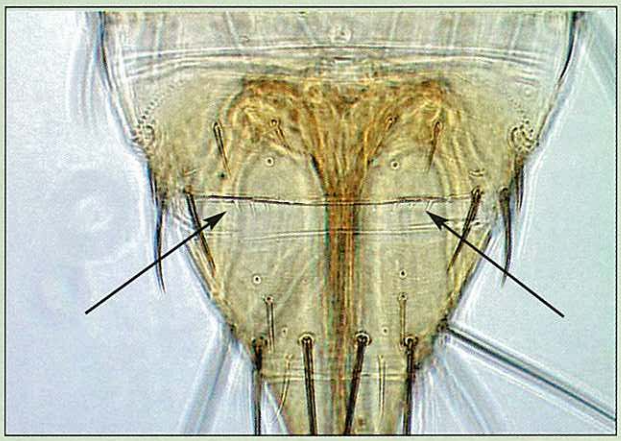


Figure 1. Western flower thrips, adult female viewed with a scanning electron microscope.

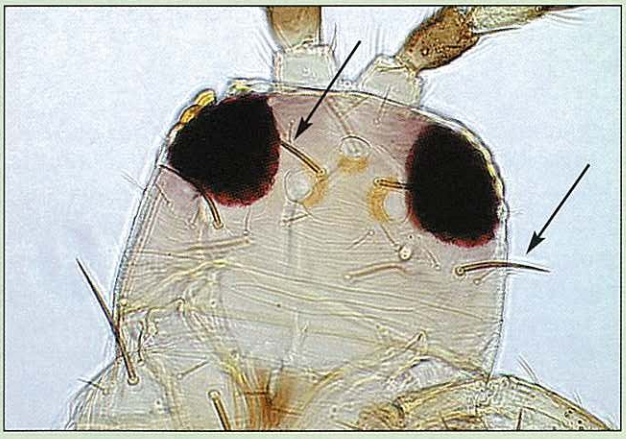
Thrips Species

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 Figures 3, 4, and 5. These characteristics can only be seen with the aid of a microscope at approximately 400x magnification. The species composition found among seedling cotton in Alabama is summarized in Table 1.



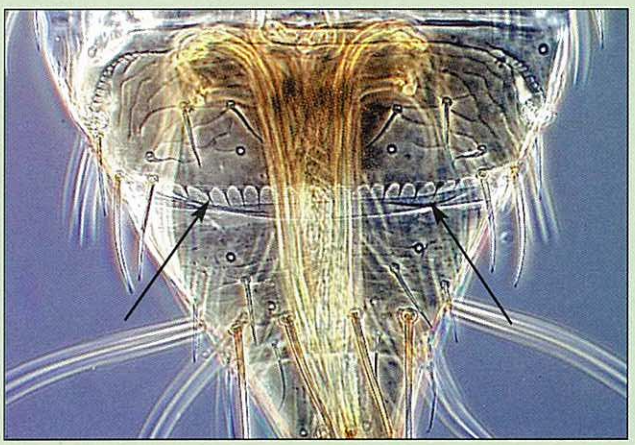
Flower thrips
- *(Frankliniella tritici)*
- Eighth abdominal segment = comb incomplete

Figure 3. Characteristics that help identify eastern flower thrips.



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

Figure 4. Characteristics that help identify western flower thrips.



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

Figure 5. Characteristics that help identify western flower thrips.

Figure 6. First symptoms of thrips feeding on a cotyledon cotton leaf.

Damage

The first symptoms of damage are small areas of feeding on the cotyledonary leaves that soon appear silver or whitish (Fig. 6). Excessive thrips feeding causes delayed maturity, stand loss, and 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. 7). 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. 8)

Figure 8. Loss of apical dominance occurs as a result of severe thrips feeding.

Figure 7. Cotton plants recovering from moderate-heavy thrips damage.

Figure 9. Thrips feeding symptoms were described as early as 1930 in South Carolina.

Similar thrips feeding symptoms were described as early as 1930 for the tobacco thrips, *Frankliniella fusca,* on cotton in South Carolina. This phenomenon was also described in Louisiana by researchers at the USDA Tallulah Laboratory (Fig. 9). 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. 10). Other problems related to thrips damage are increased seedling mortality, reduced plant height, reduced leaf area, delayed crop maturity, and yield loss (1).

Insecticide Use

A wide variety of insecticides and application methods are available for thrips control on seedling cotton. Since thrips are a problem in every field every year, most cotton producers employ some sort of preventative application at planting. Options include seed treatments, in-furrow spray treatments and granular in-furrow treatments. Foliar insecticide sprays are also an option for control but are generally reserved for "as needed" supplemental control to the at-planting treatments. Many factors can impact the choice of insecticide and application method for thrips control. Some of these are cost, ease of application, user safety, nematacidal activity, soil type, location, planting date, herbicide safening characteristics, and environmental concerns. Realizing how serious pest thrips are and that they must be controlled is probably more important than how they are controlled.

Table 1. The percent of total thrips collected in Alabama surveys during 1998 and 1999.

	1998				
	Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips	Others
May 20	84	13	0	0	4
May 28	81	10	6	3	0
June 4	62	19	7	12	0
June 11	88	6	6	0	0
June 17	87	5	3	0	5
Seasonal Average	**80**	**11**	**4**	**3**	**2**
	1999				
	Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips	Others
May 7	100	0	0	0	0
May 14	100	0	0	0	0
May 21	83	10	7	0	0
May 27	81	6	13	0	0
June 7	56	41	4	0	0
June 11	47	39	6	6	2
Seasonal Average	**80**	**14**	**5**	**1**	**0**

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Figure 10. A developing cotton plant exhibiting symptoms of "crazy cotton."

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