

THRIPS

(Thysanoptera: Thripidae)

A MULTI-STATE SURVEY:

SUMMARY OF OBSERVATIONS FOR ARKANSAS, ALABAMA,
GEORGIA, LOUISIANA, MISSISSIPPI AND TENNESSEE

Jeremy Greene, Charles Allen, Don Johnson, Gus Lorenz and Glenn Studebaker
with
Eugene Burris, Ralph Bagwell, Don Cook, Barry Freeman,
Gary Herzog, Gary Lentz, Roger Leonard and Jack Reed



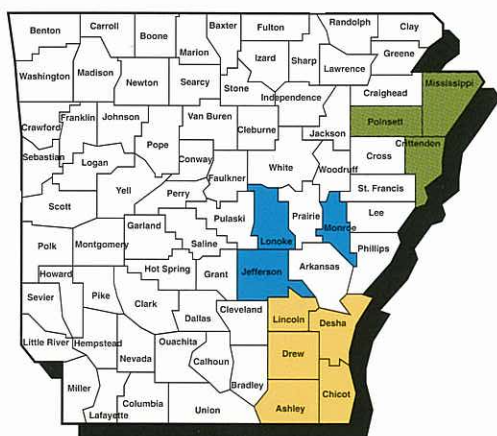


Figure 1. Arkansas survey sites for 1998-2002.
Northeast (green): Trumann, Tyrnza, Marion, Jericho. **Central (blue):** Lonoke, Holly Grove, Pine Bluff. **Southeast (gold):** Rohwer, Moscow, Sherrill, Grady, Yorktown, Gould, Dumas, Backgate, Watson, Winchester, Kelso, Tillar, McGehee, Jerome, Boydell, Montrose, Portland, Parkdale, Lake Village, Wilmot, Eudora.

Introduction

Recently, entomologists in six mid-south and southeastern states conducted surveys to evaluate thrips on seedling cotton. Arkansas sites are shown in Figure 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-

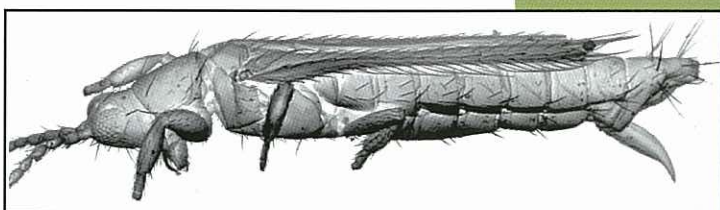


Figure 2. Western flower thrips adult female viewed with a scanning electron microscope.

state survey regions, tobacco thrips, *Frankliniella fusca* (Hinds), continue to be the predominant species of occurrence. However, western flower thrips (Figure 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 (Figure 3). After immigration into a cotton field, thrips feeding starts while cotton plants are in the cotyledon stage.



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

Movement and Selection of Hosts

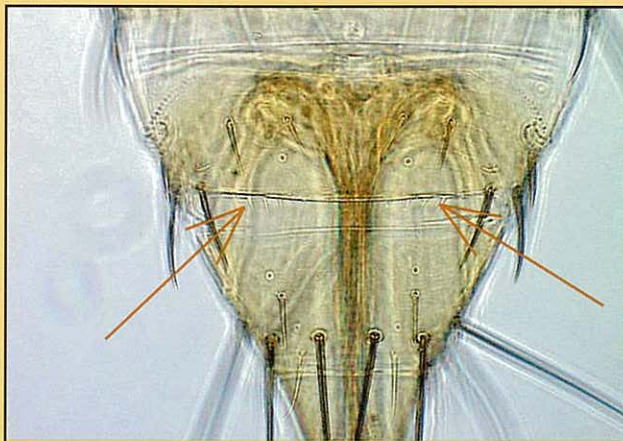
Like other insects, thrips locate hosts using color, shape, size and volatiles associated with them. Cues for detection of hosts may be general for polyphagous species or very specific for more monophagous species. Mating, feeding and oviposition may occur on the same host, so cues used for detection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

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 4, 5 and 6. The percent of total thrips collected in Arkansas surveys, 1998-2002, is shown in Table 1.



Flower thrips

● (*Frankliniella tritici*)

- Eighth abdominal segment = comb incomplete

Figure 4. Characteristics that help identify eastern flower thrips.

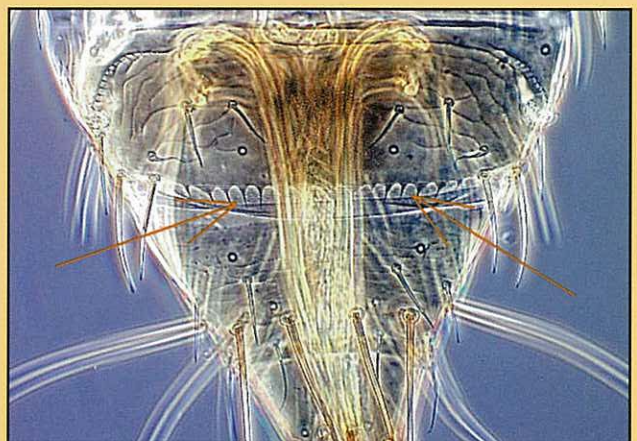


Western flower thrips

● (*Frankliniella occidentalis*)

- Interocular 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.

Damage

The first symptoms of damage are small areas of feeding on the cotyledonary leaves that soon appear silver or whitish (Figure 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 (Figure 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 (Figure 9).



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



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



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

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

Insecticide Efficacy

Recommended thrips control practices in Arkansas 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. Imidacloprid (Gaucho), acephate (Orthene) and thiamethoxam (Cruiser) are available as seed treatments from seed distributors, or growers may choose an on-farm seed treatment option when available.

If acephate is used as an in-furrow spray treatment, test results indicate that 0.9 pound ai per acre has provided consistently good thrips control. If nematodes are a problem, aldicarb (Temik) should be the product of choice. A use rate of 3.33 pounds product per acre will be adequate in most instances. Disulfoton (Di-Syston 8E) at 10.4 to 16.0 fluid ounces product per acre, Orthene 90S at 0.83 to 1.1 pounds product per acre and Orthene 97 at 0.77 to 1.03 pounds product per acre are the recommended in-furrow spray insecticides.



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

References

1. **Burris, E., K.J. Ratchford, A.M. Pavloff, D.J. Boquet, B.R. Williams, and R.L. Rogers.** 1989. Thrips on seedling cotton: Related problems and control. La. Agric. Exp. Stn. Bull. 811.
2. **Burris, E., A.M. Pavloff, G.E. Church, and B.R. Leonard.** 1994. Analysis of cotton pest management strategies. La. Agric. Exp. Stn. Bull. 845.
3. **Eddy, C.O. and E.M. Livingstone.** 1931. *Frankliniella fusca* (Hinds) thrips on seedling cotton. S.C. Agric. Exp. Stn. Bull. 271.
4. **Gaines, J.C.** 1965. Cotton insects. Tex. Agric. Ext. Serv. Bull. B-933.
5. **Lewis, T.** 1997. Thrips as crop pests. CAB International, New York, NY.
6. **Newsom, L.D., J.S. Roussel, and E.E. Smith.** 1953. The tobacco thrips. La. Agric. Exp. Stn. Bull. 474.
7. **Race, S.R.** 1961. Early-season thrips control on cotton in New Mexico. J. Econ. Entomol. 54:974-976.
8. **Reed, J.** 1988. Western flower thrips in Mississippi cotton: Identification, damage, and control. Mississippi Agric. & Forestry Exp. Stn. Info. Sheet 1320.

Table 1. The percent of total thrips collected in Arkansas surveys 1998-2002.

Survey Location		1998			
	<i>Tobacco thrips</i>	<i>Western flower thrips</i>	<i>Flower thrips</i>	<i>Soybean thrips</i>	<i>Other species</i>
Rohwer	50	5	27	15	3
		1999			
	<i>Tobacco thrips</i>	<i>Western flower thrips</i>	<i>Flower thrips</i>	<i>Soybean thrips</i>	<i>Other species</i>
Rohwer	78	3	17	1	1
Holly Grove	96	2	2	0	0
Moscow	92	5	3	0	0
		2000			
	<i>Tobacco thrips</i>	<i>Western flower thrips</i>	<i>Flower thrips</i>	<i>Soybean thrips</i>	<i>Other species</i>
Northeast	71	29	0	0	0
Central	53	47	0	0	0
Southeast	24	76	0	0	0
		2001			
	<i>Tobacco thrips</i>	<i>Western flower thrips</i>	<i>Flower thrips</i>	<i>Soybean thrips</i>	<i>Other species</i>
Rohwer	100	0	0	0	0
		2002			
	<i>Tobacco thrips</i>	<i>Western flower thrips</i>	<i>Flower thrips</i>	<i>Soybean thrips</i>	<i>Other species</i>
Rohwer	97	2	1	0	0

Photos by
Eugene (Gene) Burris
Don Cook
Barry Freeman
Jack Reed

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