A Survey of Thrips (Thysanoptera) Species Infesting Cotton Seedlings in Alabama, Arkansas, Georgia, Louisiana, Mississippi, and Tennessee[1]

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Abstract The common species of thrips that are considered pests of cotton, *Gossypium hirsutum* (L.), include flower thrips, *Frankliniella tritici* (Fitch); tobacco thrips, *Frankliniella fusca* (Hinds); western flower thrips, *Frankliniella occidentalis* (Pergande); onion thrips, *Thrips tabaci* (Lindeman); and soybean thrips, *Neohydatothrips variabilis* (Beach). Thrips feeding on cotton seedlings can inhibit plant growth, reduce plant stand, delay crop maturity, and reduce seed-cotton yield. Surveys were conducted in Alabama, Arkansas, Georgia, Louisiana, Mississippi, and Tennessee to determine the thrips species infesting cotton seedlings during 1996 to 1999. Cotton seedlings were sampled weekly between 7 and 48 days after plant emergence at one to four field sites in each state. Over 12,000 thrips adults were collected using plant washing procedures with 9,005 individuals mounted on slides, and identified to species. The tobacco thrips was the most common species collected in all states, except Georgia, and comprised at least 63% of the thrips adults in all instances, except four. The occurrence of flower thrips and soybean thrips was variable; however, neither species accounted for more than 21% of thrips identified in each state. Western flower thrips accounted for less than 15% of adults collected in all instances except two (28% and 30%) in Louisiana. Also, individual specimens of *Thrips nigropilosus* Uzel and *Anophothrips obscurus* Müller were collected in Alabama, and several specimens of *Microcephalothrips abdominalis* (Crawford) were collected in Arkansas and Louisiana.

Key Words Cotton, Thysanoptera, *Frankliniella fusca, Frankliniella occidentalis, Frankliniella tritici, Neohydatothrips variabilis*

Pest species of thrips found on cotton, *Gossypium hirsutum* (L.), seedlings are classified in the Family Thripidae. Phytophagous thrips species feed on the epidermal

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and mesophyll cells and pollen of plants. Several researchers have documented thrips feeding on cotton seedlings. The symptoms of thrips feeding include malformation of leaves, reduced leaf area, retarded plant growth, seedling mortality, delayed crop maturity, and lower yields (Gaines 1934, Dunham and Clark 1937, Watts 1937b, Parencia et al. 1957, Telford and Hopkins 1957, Race 1961, Leigh 1963, Watson 1965, Davis et al. 1966, Davis and Cowan 1972, Harp and Turner 1976, Rummel and Quisenberry 1979, Leser 1985, Parker and Huffman 1985, Carter et al. 1989, Burris et al. 1989, Ratchford et al. 1989, Tugwell and Cochran 1989, Burris et al. 1990, Colyer et al. 1991, Bourland et al. 1992, Parker et al. 1992, Burris et al. 1994, Roberts 1994, Almand 1995, Burris et al. 1995, Graham et al. 1995, Freeman 1996, Roberts and Rechel 1996, Van Duyn et al. 1998, Faircloth et al. 1999).

Flower thrips, *Frankliniella tritici* (Fitch); tobacco thrips, *Frankliniella fusca* (Hinds); western flower thrips, *Frankliniella occidentalis* (Pergande); onion thrips, *Thrips tabaci* (Lindeman), and; soybean thrips, *Neohydatothrips variabilis* (Beach), are considered pests of cotton during seedling development. Thrips species composition on cotton varies geographically across the U.S. Flower thrips and soybean thrips have been reported to be the most abundant thrips species infesting cotton seedlings in Texas (Gaines 1934). In Mississippi, flower thrips, tobacco thrips, soybean thrips, and *Frankliniella runneri* (Morgan) were the most common species (Dunham and Clark 1937). Lambert (1985) observed both flower thrips and tobacco thrips as dominant species attacking cotton seedlings in Georgia; however, All et al. (1992) found only tobacco thrips. In South Carolina, Watts (1937a) identified flower thrips, tobacco thrips, onion thrips, and soybean thrips infesting cotton seedlings. Subsequent surveys of seedling cotton in South Carolina found western flower thrips, tobacco thrips and flower thrips (DuRant et al. 1994). In Oklahoma, western flower thrips was the predominant species infesting cotton seedlings during 1990 (Karner and Cole 1992). In Louisiana, thrips species composition varies on cotton seedlings, but all surveys indicated that tobacco thrips is the most common species (Sharp and Eddy 1938, Newsom et al. 1953, Burris 1980, Graves et al. 1987).

Western flower thrips have not been reported on cotton seedlings in Alabama, Arkansas, Louisiana, or Tennessee. This species has been found on cotton seedlings in Texas (Gaines 1965), Mississippi (Reed 1988), California (Bailey 1938, Leigh 1984), New Mexico (Race 1961), Oklahoma (Karner and Cole 1992), South Carolina (DuRant et al. 1994), and Georgia (All et al. 1995). Western flower thrips were not found on cotton seedlings in previous surveys in Louisiana. The concern over the occurrence of western flower thrips during seedling development arises from insecticide resistance to carbamates, cyclodienes, organophosphates, and pyrethroids in populations of western flower thrips (Immaraju et al. 1992, Brødsgaard 1994, Herron et al. 1996, Jensen 1998, Kontsedalov et al. 1998) making them more difficult to control than other species. Also, western flower thrips appear to be more damaging to cotton seedlings than tobacco thrips (Faircloth et al. 2000). The objective of this project was to survey the thrips species infesting cotton seedlings in Alabama, Arkansas, Georgia, Louisiana, Mississippi, and Tennessee, with an emphasis on the distribution of western flower thrips.

Materials and Methods

Thrips adults were collected from cotton seedlings in Alabama (Belle Mina, Limestone Co.), Arkansas (Rohwer, Desha Co.), Georgia (Attapulgus, Decatur Co.; Mid-

ville, Burke Co., and; Tifton, Tift Co.), Louisiana (Alexandria, Rapides Parish; Bossier City, Bossier Parish; St. Joseph, Tensas Parish, and; Winnsboro, Franklin Parish), Mississippi (Mississippi State, Oktibbeha Co.; Verona, Lee Co., and; Stoneville, Washington Co.), and Tennessee (Jackson, Madison Co. and Milan, Gibson Co.) during 1996 to 1999. In Georgia at the Attapulgus location there were two planting dates that were sampled, data from both planting dates were pooled for mean occurrence of thrips species, and separated for temporal occurrence of western flower thrips. Also in Georgia there were two sites near the Coastal Plains Experiment Station (Rigdon and Roberts) at Tifton. In Mississippi, the Mississippi State (University) and Verona sites were separated by approximately 80.4 km and were treated as one location representing the eastern portion of Mississippi.

Plant samples (20 to 40 plants per sample) were collected at least once weekly from areas of non-treated cotton between 7 and 48 d after emergence. Samples were processed with either whole plant washing procedures (Burris et al. 1990) or a modification thereof substituting a 70:30 ethanol-water solution for the water, detergent, and sodium hypochlorite solution. Insect samples were preserved either in a 70% ethanol solution, 70% isopropanol solution, or by freezing. Thrips adults were mounted individually on glass microscope slides with carboxylated methyl cellulose mounting media (CMC 10, Master Chemical Co., Bensenville, IL) and covered with glass slips. Thrips were identified to species by morphological characteristics (Stannard 1968, Childers and Beshear 1992, Oetting et al. 1993) utilizing a compound microscope (40× objective yielding 400× total magnification). Approximately 12,000 thrips adults were collected over the 4-yr period, and 9,005 of those were identified. Reference specimens of each species collected in Alabama, Louisiana, Mississippi, and Tennessee were submitted as voucher specimens (No. 76.1 to 76.7) to the entomological museum housed at the Department of Entomology and Plant Pathology at Mississippi State University, Mississippi State, MS.

Results and Discussion

Alabama. Tobacco thrips accounted for 82% in 1998 and 79.9% in 1999 (Table 1). Western flower thrips represented 10.9% in 1998 and 4.7% in 1999 of the totals identified each year. Flower thrips accounted for 4.3% of adults identified in 1998 and 14% in 1999, while soybean thrips represented 2.8% and 1.3% of adults identified in 1998 and 1999, respectively. Individual specimens of *Thrips nigropilosus* Uzel and

Table 1. Summary of thrips species infesting cotton seedlings near Belle Mina, Alabama during 1998 and 1999.

		% of Total				
Year	N*	Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips	Others**
1998	211	82.0	10.9	4.3	2.8	1.9
1999	299	79.9	4.7	14.0	1.3	0.3

* Total number of thrips identified.

** *Thrips nigropilosus* Uzel and *Anophothrips obscurus* Müller.

Anophothrips obscurus Müller also were identified from Alabama cotton seedlings. Western flower thrips were present in all samples during 1998 and were detected on four of the six sample dates during 1999 (Table 7).

Arkansas. Tobacco thrips represented 66.6% in 1998 and 73.7% of all adults in 1999 (Table 2). Western flower thrips represented 4.3% of the total in 1998 and 3% during 1999. Flower thrips represented 11.7% in 1998 and 18.8% in 1999 of adults identified. Soybean thrips accounted for 17.4% during 1998 and 3% during 1999 of all species. *Microcephalothrips abdominalis* represented 2% and 1.5% of all species during 1998 and 1999, respectively. Western flower thrips were identified from six of the seven samples during 1998 and two of four samples during 1999 (Table, 7).

Georgia. At Attapulgus, tobacco thrips and western flower thrips represented 34.3% and 43.4% of the total sample, respectively, during 1999 (Table 3). Flower thrips represented 20.2% of all species at this location. Unidentified other thrips species accounted for 2.1% of the total sample. Western flower thrips were detected in all samples for both planting dates at the Attapulgus location and ranged in occurrence from 15.4% to 96.4% of the totals (Table 7).

At Midville during 1999, western flower thrips was the most common thrips species collected and comprised 85.9% of the total sample (Table 3). Tobacco thrips and unidentified other thrips species accounted for 10.2% and 3.9%, respectively. No flower thrips were collected at this location. Western flower thrips were present in all samples and ranged in occurrence from 83.7% to 90.7% (Table 7).

At the Tifton sites, tobacco thrips was the most common species and represented 65.8% and 86.7% of the total (Table 3). Western flower thrips accounted for 29.9% (Rigdon) and 6.7% (Roberts) at the Tifton sites. Flower thrips and unidentified thrips species represented 3.9% at Rigdon and 6.7% at Roberts, respectively. Western flower thrips were collected on four of the six sample dates at Rigdon and on one sample date at Roberts (Table 7).

Louisiana. At Alexandria, tobacco thrips accounted for 90.7%, 88.1%, 98.8%, and 100% of all species in 1996, 1997, 1998, and 1999, respectively (Table 4). Western flower thrips represented 2.5% (1996) and 0.6% (1998) of the total identified. No western flower thrips were collected in 1997 or 1999. The occurrence of soybean thrips (0% to 6%) and flower thrips (0% to 4.5%) was low during 1996 to 1999. *Microcephalothrips abdominalis* represented 1.4% of all species during 1997. Western flower thrips were collected on four of the six sample dates during 1996 ranging between 0% and 50% of the total (Table 7). Western flower thrips were collected only on the first sample date during 1998.

Table 2. Summary of thrips species infesting cotton seedlings near Rowher, Arkansas during 1998 and 1999.

		% of Total				
Year	N*	Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips	*M. abdominalis*
1998	350	66.6	4.3	11.7	17.4	2.0
1999	133	73.7	3.0	18.8	3.0	1.5

* Total number of thrips identified.

Table 3. Summary of thrips species infesting cotton seedlings in Georgia during 1999.

Location	N*	% of Total			
		Tobacco thrips	Western flower thrips	Flower thrips	Others**
Attapulgus	1130	34.3	43.4	20.2	2.1
Midville	255	10.2	85.9	0.0	3.9
Rigdon	231	65.8	29.9	3.9	0.4
Roberts	15	86.7	6.7	0.0	6.7

* Total number of thrips identified.
** Unidentified thrips species.

At Bossier City, tobacco thrips and western flower thrips represented 67.9% and 28.3%, respectively, of the total sample in 1996 (Table 4). In 1997, tobacco thrips (74.7%) and flower thrips (18.7%) were the most abundant species identified. Western flower thrips represented 2.7% of the total, while *Microcephalothrips abdominalis* and soybean thrips accounted for 2.7% and 1.3%, respectively, of all species during 1997. Tobacco thrips represented 97.7% of adults identified in 1998. No western flower thrips were collected during 1998. In 1999, tobacco thrips represented 69.7% of the total sample, followed by flower thrips at 12.1%. Western flower thrips and soybean thrips each represented 9.1% of the total. Western flower thrips were collected on all sample dates during 1996 and ranged from 12% to 76.5% of the total samples (Table 7). During 1997 and 1999, western flower thrips were collected only on one sample date in each year and represented 20% and 11.8% of the totals, respectively.

At St. Joseph, tobacco thrips accounted for 65.6% of all species, while flower thrips and soybean thrips represented 18.8% and 15.6%, respectively, during 1996 (Table 4). Tobacco thrips accounted for 90.9% (1997), 96.4% (1998), and 87.8% (1999) of adults identified. Western flower thrips were collected in 1998, but represented only 0.5% of the total sample. The occurrence of this species increased to 11.7% of the total during 1999. During 1997, *Microcephalothrips abdominalis* accounted for 1.8% of the total sample. During 1998, western flower thrips were collected only on one sample date and represented 2.1% of the total in that sample (Table 7). Western flower thrips were detected in four of five samples during 1999.

At Winnsboro, tobacco thrips (38.9%) was the most abundant species in 1996 (Table 4). Western flower thrips, soybean thrips, and flower thrips accounted for 29.6%, 20.4%, and 11.1%, respectively, of all species. During 1996, western flower thrips were collected on all sample dates and ranged in occurrence from 16.7% to 42.9% in those samples (Table 7). In 1997, tobacco thrips represented 63.3% of the total sample followed by soybean thrips (20%), flower thrips (15%), and *Microcephalothrips abdominalis* (1.7%). No western flower thrips were collected during either 1997 or 1998. In 1998, tobacco thrips accounted for 83.7%, and soybean thrips accounted for 16.3% of all species. Tobacco thrips represented 100% of the samples collected during 1999.

Table 4. Summary of thrips species infesting cotton seedlings in Louisiana from 1996 to 1999.

Location/year	N*	% of Total				
		Tobacco thrips	Western Flower thrips	Flower thrips	Soybean thrips	*M. abdominalis*
Alexandria						
1996	237	90.7	2.5	3.8	3.0	0.0
1997	67	88.1	0.0	4.5	6.0	1.4
1998	168	98.8	0.6	0.6	0.0	0.0
1999	59	100.0	0.0	0.0	0.0	0.0
Bossier City						
1996	184	67.9	28.3	2.2	1.6	0.0
1997	75	74.7	2.7	18.7	1.3	2.7
1998	168	97.7	0.0	0.8	1.5	0.0
1999	33	69.7	9.1	12.1	9.1	0.0
St. Joseph						
1996	32	65.6	0.0	18.8	15.6	0.0
1997	55	90.9	0.0	7.3	0.0	1.8
1998	195	96.4	0.5	0.0	3.1	0.0
1999	196	87.8	11.7	0.0	0.0	0.5
Winnsboro						
1996	108	38.9	29.6	11.1	20.4	0.0
1997	60	63.3	0.0	15.0	20.0	1.7
1998	86	83.7	0.0	0.0	16.3	0.0
1999	12	100.0	0.0	0.0	0.0	0.0

* Total number of thrips identified.

Mississippi. Tobacco thrips was the predominant thrips species identified at the Stoneville location during 1998 (79.6%), followed by western flower thrips (9.7%) (Table 5). Flower thrips and soybean thrips each represented 5.4% of all species. In 1999, tobacco thrips accounted for 92.8% of adults identified. Western flower thrips and flower thrips represented 5.4% and 1.8%, respectively. During 1998, western flower thrips were collected on all sample dates and ranged from 2.8% to 20% of the totals (Table 7). Western flower thrips were collected on three of the four sample dates during 1999, and ranged from 0% to 15.2% in occurrence.

In the Mississippi State/Verona area, tobacco thrips was the most common species identified and represented 94.3%, 84.6%, and 88.1%, respectively, during 1997, 1998, and 1999 (Table 5). Western flower thrips represented 2.3% (1997), 5.9%

Table 5. Summary of thrips species infesting cotton seedlings in Mississippi during 1998 and 1999.

Location/year	N*	% of Total				
		Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips	Others
Stoneville						
1998	93	79.6	9.7	5.4	5.4	0.0
1999	223	92.8	5.4	1.8	0.0	0.0
Mississippi State/ Verona						
1997	349	94.3	2.3	3.4	0.0	0.0
1998	837	84.6	5.9	4.2	5.4	0.0
1999	2560	88.1	6.6	4.8	0.5	0.0

* Total number of thrips identified.

(1998), and 6.6% (1999) of the totals identified. Flower thrips accounted for 3.4% (1997), 4.2% (1998), and 4.8% (1999) of all species. Soybean thrips were collected in 1998 (5.4%) and 1999 (0.5%). Western flower thrips were collected on three of the six sample dates during 1997 and ranged from 0% to 7.9% in occurrence (Table 7). During 1998, western flower thrips were collected on three of the four sample dates and accounted for 0% to 7.3% of the totals. Western flower thrips were detected in all samples during 1999 and ranged in occurrence from 3% to 50% of the totals.

Tennessee. In 1998, tobacco thrips represented 93.9% of all species at the Jackson location (Table 6). Soybean thrips accounted for 6.1% of the total identified during

Table 6. Summary of thrips species infesting cotton seedlings in Tennessee during 1998 and 1999.

Location/year	N*	% of Total				
		Tobacco thrips	Western flower thrips	Flower thrips	Soybean thrips	Others
Jackson						
1998	33	93.9	0.0	0.0	6.1	0.0
1999	223	78.9	0.9	11.7	8.5	0.0
Milan						
1998	105	91.4	0.0	2.9	5.7	0.0
1999	223	84.9	0.0	9.5	5.6	0.0

* Total number of thrips identified.

Table 7. Occurrence (percent of total sample) of western flower thrips in Alabama, Arkansas, Georgia, Louisiana, Mississippi and Tennessee.

	Days after seedling emergence (N*)						
Location/Year	7	14	21	28	35	42	49
Alabama							
1998	13.2 (7)	9.7 (3)	19.0 (8)	6.3 (3)	5.4 (2)	—	—
1999	0 (0)	0 (0)	7.1 (3)	12.8 (6)	3.7 (1)	6.6 (4)	—
Arkansas							
1998	0 (0)	1.5 (2)	10.0 (2)	2.2 (1)	3.9 (2)	16.7 (5)	8.3 (3)
1999	1.7 (1)	0 (0)	—	0 (0)	7.9 (3)	—	—
Georgia 1999							
Attapulgus 1	23.1 (7)	50.0 (41)	18.3 (26)	45.8 (210)	—	—	—
Attapulgus 2	71.1 (86)	35.1 (87)	15.4 (2)	96.4 (27)	45.5 (5)	—	—
Midville	83.7 (41)	84.9 (129)	90.7 (49)	—	—	—	—
Rigdon	42.6 (63)	11.1 (3)	0 (0)	12.5 (2)	12.5 (1)	0 (0)	—
Roberts	12.5 (1)	0 (0)	0 (0)	0 (0)	—	—	—
Louisiana							
Alexandria							
1996	4.1 (2)	1.7 (1)	0 (0)	2.2 (1)	0 (0)	50.0 (2)	—
1997	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—
1998	8.3 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—
1999	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
Bossier City							
1996	12.0 (6)	17.1 (6)	33.3 (9)	28.3 (13)	76.5 (13)	55.6 (5)	—
1997	0 (0)	20.0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	—
1998	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—
1999	0 (0)	0 (0)	11.8 (2)	0 (0)	0 (0)	0 (0)	—
St. Joseph							
1996	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—
1997	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—
1998	0 (0)	0 (0)	2.1 (1)	0 (0)	0 (0)	0 (0)	—
1999	7.7 (4)	6.5 (3)	20.4 (11)	15.2 (5)	0 (0)	—	—
Winnsboro							
1996	42.1 (8)	16.7 (6)	33.3 (4)	42.9 (6)	26.7 (4)	33.3 (4)	—
1997	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—
1998	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—
1999	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	—

Table 7. Continued.

Location/Year	Days after seedling emergence (N*)						
	7	14	21	28	35	42	49
Mississippi							
Stoneville							
1998	20.0 (1)	2.8 (1)	15.0 (6)	8.3 (1)	—	—	—
1999	9.5 (6)	1.9 (1)	0 (0)	15.2 (5)	—	—	—
MS State/ Verona							
1997	0 (0)	3.0 (4)	0 (0)	7.9 (3)	0 (0)	—	5.0 (1)
1998	1.1 (1)	7.3 (41)	5.0 (7)	0 (0)	—	—	—
1999	3.0 (35)	7.1 (84)	4.2 (3)	33.1 (42)	—	50.0 (4)	—
Tennessee							
Jackson							
1998	0 (0)	0 (0)	0 (0)	—	—	—	—
1999	2.6 (1)	0.9 (1)	0 (0)	—	—	—	—
Milan							
1998	0 (0)	0 (0)	0 (0)	—	—	—	—
1999	0 (0)	0 (0)	0 (0)	0 (0)	—	—	—

* Total number of thrips identified.

1998. Tobacco thrips represented 78.9% of the samples during 1999. During 1999, flower thrips, soybean thrips, and western flower thrips accounted for 11.7%, 8.5% and 0.9% of all species, respectively. Western flower thrips were identified from two of the four samples during 1999 and represented 2.6% and 0.9% of the thrips adults in those samples (Table 7).

Tobacco thrips was the predominant species collected at Milan in 1998 (91.4%) and 1999 (84.9%) (Table 6). The occurrence of flower thrips ranged from 2.9% to 9.5% of all species. Soybean thrips accounted for 5.7% to 5.6% of the total sample, respectively, during 1998 and 1999. No western flower thrips were collected during 1998 or 1999.

Tobacco thrips was the most common species collected at all locations during these surveys, except Attapulgus and Midville, GA, in 1999. This species accounted for >63% of the thrips adults in all instances, except at Winnsboro, LA, in 1996 and Attapulgus and Midville, GA, in 1999. These results are consistent with previous surveys in Georgia and Louisiana (Sharp and Eddy 1938, Newsom et al. 1953, Burris 1980, Lambert 1985, Graves et al. 1987, All et al. 1992, All et al. 1995) that identified tobacco thrips as the most common thrips species attacking cotton seedlings.

The occurrence of flower thrips and soybean thrips varied from 0% to 20% of all species identified during 1996 to 1999. Watts (1937a) observed variation in the occurrence of these species in South Carolina. Flower thrips was the most common

species infesting cotton seedlings from 1931 to 1935. However, soybean thrips displaced flower thrips as the most prevalent species in 1936.

Western flower thrips were found on cotton seedlings in all states. This species represented <15% of totals for Alabama, Arkansas, Mississippi, and Tennessee. Western flower thrips was the most common species identified at two locations in Georgia (Attapulgus—43.4% and Midville—85.9%) during 1999. In Tennessee, western flower thrips were only detected at Jackson during 1999, and their occurrence was <1%. In Louisiana, the occurrence of western flower thrips was variable across years and locations. This species represented 0% to 30%, of the total identified in Louisiana during 1996. During 1997 to 1999, western flower thrips accounted for <12% of adults identified at all locations, except Attapulgus, Midville, and Tifton, GA.

The occurrence of western flower thrips varied considerably. Western flower thrips either were not observed, detected in single samples at some locations/years, or in all samples at other locations/years. These are the first reports of western flower thrips infesting cotton seedlings in Arkansas, Alabama, Louisiana, and Tennessee. Western flower thrips have been reported infesting cotton seedlings in Mississippi (Reed 1988) and was the predominant species reported infesting cotton seedlings in Oklahoma (Karner and Cole 1992) and South Carolina (DuRant et al. 1994). Western flower thrips also were present periodically in cotton flowers later in the growing season (Graves et al. 1987, Reed 1988, Reed and Reinecke 1990).

Accurate thrips species identification usually requires the use of a microscope capable of 400× magnification making field identification impractical. Pest managers are forced to regard thrips as a pest complex with little consideration for individual species. However, tolerance / resistance to many commercial insecticides including abamectin, bifenthrin, buprofezin, carbaryl, cyfluthrin, cypermethrin, deltamethrin, diazinon, diflubenzuron, dimethoate, endosulfan, fenpropathrin, oxydemeton-methyl, permethrin (Helyer and Brobyn 1992), bifenthrin, permethrin, methomyl, chlorpyrifos, abamectin (Immaraju et al. 1992), acephate, endosulfan (Brødsgaard 1994), cypermethrin, diazinon, methomyl (Zhao et al. 1995), chlorpyrifos, methyl parathion, endosulfan, lambda cyhalothrin, imidacloprid (Herron et al. 1996), and cypermethrin (Kontsedalov et al. 1998) has been reported in western flower thrips populations making them more difficult to control than other species. In addition, western flower thrips appear to be more damaging to cotton seedlings than the predominant species tobacco thrips (Faircloth et al. 2000). Presently, western flower thrips appear to represent a small percentage of the total thrips population on cotton seedlings in much of the Mid-South. But, on individual dates, western flower thrips comprised the majority of the population. If high populations of western flower thrips occur during cotton seedling development, early-season insect pest management strategies may need to be modified.

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