A Key to the Thrips on Seedling Cotton in the Midsouthern United States

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Introduction

Thrips belong to the insect order Thysanoptera, which is divided into two suborders — Tubulifera and Terebrantia. A primary difference between the two suborders is that Tubuliferans lay eggs on the surface of plant tissue, and Terebrantians insert eggs within plant tissue. All pest species on cotton belong to the suborder Terebrantia. Thrips of the genus *Frankliniella* have been recognized as pests on cotton since 1931 (Eddy and Livingstone 1931). *Frankliniella fusca* (Hinds), *F. tritici* (Fitch), and *F. occidentalis* (Pergande) are all recognized as serious pests of the cotton crop, and *F. williamsi* Hood and *F. bispinosa* Morgan have also been found on seedling cotton. *Frankliniella fusca* and *F. tritici* have historically been the thrips species occurring on seedling cotton (Eddy and Livingstone 1931, Newsom et al. 1954, Watts 1936). *Frankliniella occidentalis* was present in the Midsouth region in the early 1980s as typified by specimens in the Beshear thrips collection housed at the University of Georgia, but it was not recognized as a serious pest of Midsouth cotton until 1985 (Burris et al. 1989, Reed 1988). A recent survey of thrips in Georgia, Mississippi, Arkansas, Alabama, Louisiana, and Tennessee documented the importance of the genus *Frankliniella*, and it established that the important species continue to be *F. fusca*, *F. occidentalis*, *and F. tritici* (Burris et al. 2000, Cook et al. 2003, Freeman et al. 2002, Reed et al. 2001).

Although species of the genus *Frankliniella* are the most important pests of seedling cotton in the Midsouth, *Neohydatothrips variabilis* (Beach) (formerly *Sericothrips variabilis*) and Thrips *tabaci* Lindeman are frequently found on seedling cotton. Watts (1937) reported the presence of 14 species of thrips on cotton, including F. *fusca, F. tritici, F. williamsi, Thrips tabaci, T. panicus* (Moulton) (a synonym of *Plesiothrips perplexus* [Beach]), *Leptothrips mali* (Fitch), *Anophothrips obscurus* (Müller), *Sericothrips variabilis* (Beach), *Echinothrips americanus* (Morgan), *Limothrips cerealium* (Haliday), *Aelothrips bicolor* Hinds, *Stomatothrips flavus* (Hood), and an unidentified species of *Liothrips*. In addition to these species, the Beshear thrips collection contains *F. exigua* (Hood) collected from cotton. Other species collected from cotton and represented by specimens in the collection of the Mississippi State University Entomological Museum are *F. bispinosa* (Morgan), *Caliothrips fasciapennis* (Pergande), *Chirothrips texanus* (Andre), *Sericothrips cingulatus* Hinds, *Microcephalothrips abdominalis* (Crawford, D. L.), and *Thrips nigripilosus* Uzel. *Scolothrips palidus* (Beach) was collected from cotton in a greenhouse at Mississippi State University.

Thrips are often identified on seedling cotton by field personnel involved with insect control and crop consulting. Identification of thrips within the genus *Frankliniella* on seedling cotton is important because control measures may vary with different species. The western flower thrips (*F. occidentalis*) may be difficult to control with insecticides in greenhouses and cotton fields (Graves et al. 1987, Immaraju et al. 1992, Reed 1988). Proper separation of this pest from tobacco thrips (*F. fusca*) and flower thrips (*F. tritici*) is necessary to choose the proper

insecticide to insure economic control. The dark color of tobacco thrips is normally sufficient to separate it from flower thrips or western flower thrips in the Midsouth; however, tobacco thrips and western flower thrips vary from very dark to very light in coloration, making field identification based on color difficult. Additionally, several species of *Frankliniella* are very similar, making it difficult to positively identify them with standard dichotomous keys. A few specimens of thrips from the genus *Frankliniella*, collected from cotton and examined in preparation for this publication, did not key to known species. Positive identification may be accomplished in the future following collection of additional specimens.

A great majority of the thrips collected from cotton in the Midsouth are females. Thrips of at least some species of the genus *Frankliniella* may reproduce parthenogenetically, and in the case of tobacco thrips and flower thrips, this is in the form of arrhenotokous parthenogenesis and produces male offspring from unfertilized eggs (Eddy and Livingstone 1931, Watts 1936). Aggregations of males of western flower thrips on cotton have been described (Terry 1997), and occasionally relatively high numbers of males are collected from seedling cotton plants. However, males are usually far less abundant on cotton than females, and since the authors did not have males of all species for reference, only females are presented in the key.

It is the purpose of this publication to provide a key to thrips species collected from seedling cotton. Parts one and two represent the dichotomous key and identifying characteristics of keyed species, respectively. Note that *Leptothrips mali* and *Stomatothrips flavus* have been reported from cotton. *L. mali* is an arboreal tubuliferan species that would occur on cotton only as an incidental, and *S. flavus* has not been reported in recent years. These species are not included in this key.

Materials and Methods

Most thrips specimens used for this study were either identified by thrips taxonomists — primarily Ramona Beshear (retired) of the University of Georgia or S. Nakahara (retired) of the USDA-ARS in Washington, D.C. — or were compared with thrips specimens identified by thrips taxonomists. Characteristics of each species were photographed for development of the photographic key that would augment identification of thrips mounted on microscope slides and observed under microscopy, thus bypassing the need for interpretation of line drawings. Because not all characteristics can be easily seen or photographed under the same kind of microscopy, phase contrast, Nomarsky, bright field, and dissection microscopy were used as needed. Additionally, because not all specimens provide a perfect mount, photographs of different parts of a single species may include images from different specimens. Images were made with an Evolution MP, 5-megapixel digital camera associated with Image-Pro Plus software (Media Cybernetics, Inc., Silver Spring, Maryland). In some cases, composite images taken at different focal distances were used to increase depth of field and improve clarity. A few images of whole thrips were taken of insects suspended in liquid carboxylated methylcellulose mounting medium (CMC 10, Masters Company, Inc., Wooddale, Illinois). Other images of whole thrips were taken of insects mounted on microscope slides. Only females are included in the key. Most photographs were taken at 400 magnifications, but some were made at 630X or 1000X. Scale bars (lines) are therefore provided on micrographs in section two of the key to aid in determining size relationships.

Mounting Procedure for Thrips Specimens

Thrips must be mounted on microscope slides before characteristics can be adequately observed through a microscope. The following procedure is recommended.

These are the required materials: Microscope slides (76 mm [3 inch] by 25.4 mm [1 inch] by 1 mm), cover slips (12 mm circles), CMC-10 mounting media, fine-tipped forceps, and a microspatula. A satisfactory microspatula used for transferring thrips from alcohol to the mounting medium may be made by flattening the tip of an insect pen with a hammer (place the tip of the pin on a ¼-inch bolt or similar cylindrical surface for use as an anvil).

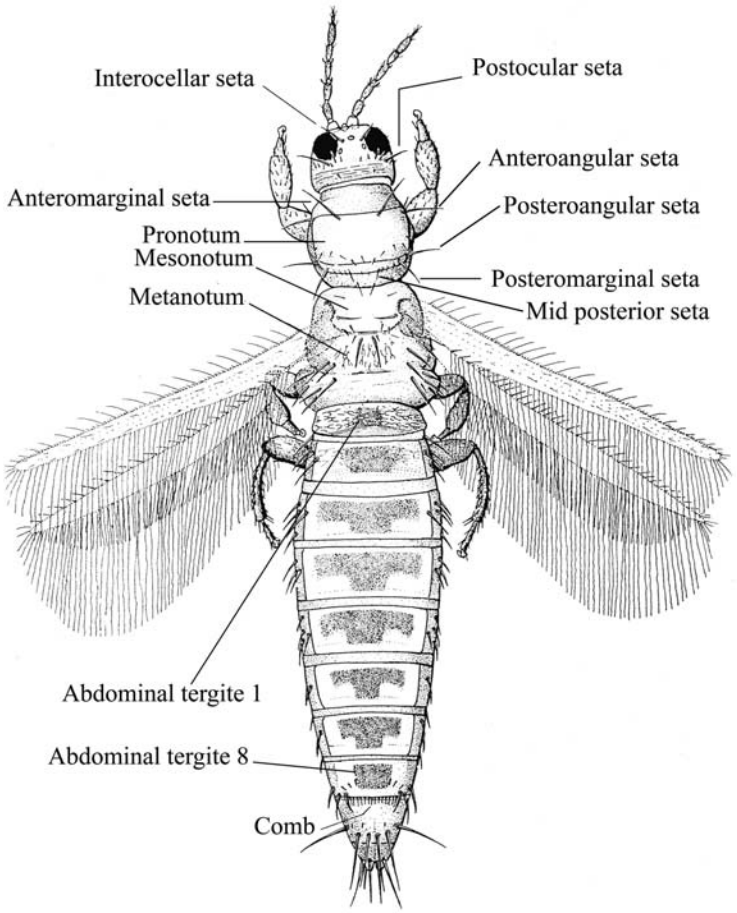

Figure 1. Key characters of thrips.

The first step of the procedure is to place a drop of CMC-10 mounting medium in the center of the slide. Transfer a thrips directly from the alcohol to the drop of mounting medium with the microspatula. Use an insect pin or the microspatula to force the thrips to the bottom of the drop of medium so that it rests ventral side down on the microscope slide with its head facing to the bottom of the slide (toward the technician). Place a coverslip on the drop by holding an edge with a forceps and placing the opposite edge of the coverslip on the slide and lowering the other edge slowly onto the drop of medium. By looking through the microscope and pressing gently with the forceps on the coverslip, press the coverslip down. By careful off-center pressure on the cover slip, the thrips can be moved slightly to center it or arrange it on the slide. Enough medium should be used so that it extends beyond the edge of the coverslip; otherwise, air tends to come under the cover slip as the material cures. Label the slide with the collection date, location, and collector's name. The CMC-10 medium will clear the thrips specimen within a few days to enable identification with a compound microscope. Phase-contrast or Nomarsky type microscopes are preferred.

Part 1: Key to Female Thrips

Species occurring incidentally on cotton are indicated by asterisks (*).

1. a. Antennae with seven segments (including basal segment) (Figure 2) pronotum lacking long setae anteriorly (Figure 3) 2

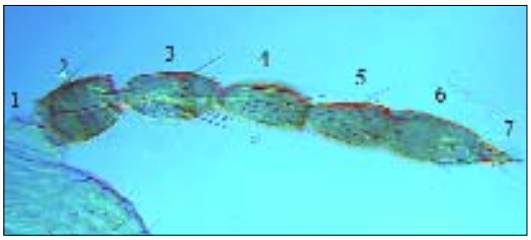

Figure 2

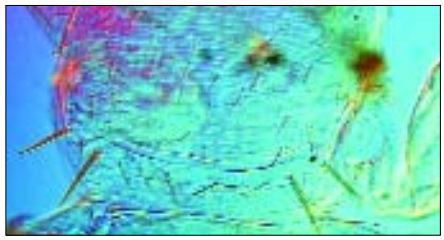

Figure 3

1. b. Antennae with more than seven segments including basal segment (Figure 4) 5

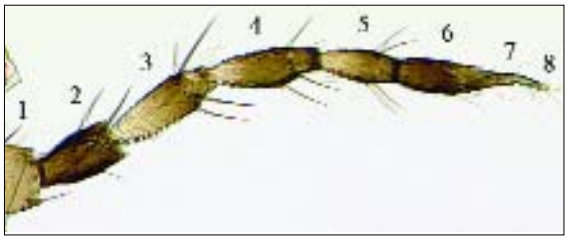

Figure 4

2. a. Second antennal segment expanded distally (Figure 5), abdominal tergites with posteromarginal scallops (Figure 6), head small, about as long as wide (Figure 7) . . . . . *Microcephalothrips abdominalis* *

Figure 5

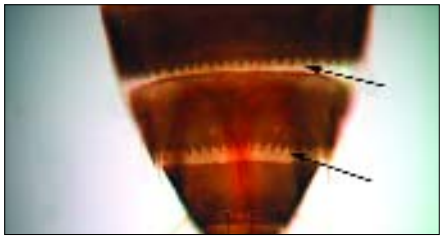

Figure 6

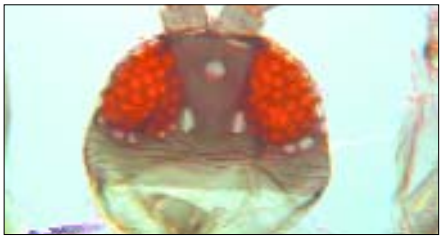

Figure 7

2. b. Second antennal segment not expanded distally (Figure 8), abdominal tergites without obvious posteromarginal scallops (Figure 9) 3

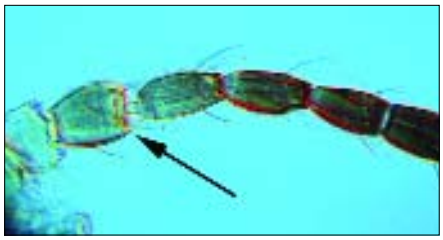

Figure 8

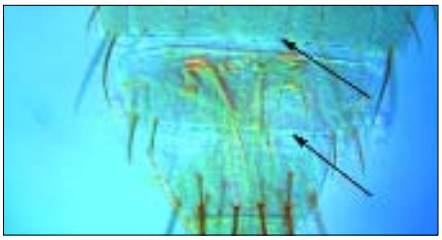

Figure 9

3. a. Head, thorax and tip of abdomen dark (Figure 10), head longer than wide, tenth abdominal tergite split longitudinally (Figure 11), comb absent on the eighth tergite . . . . . *Plesiothrips perplexus* *

Figure 10

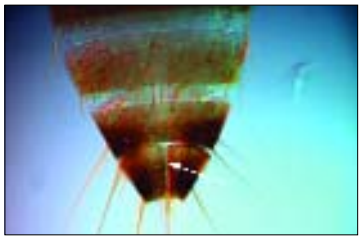

Figure 11

3. b. Body uniformly light colored (Figure 12), head wider than long, comb on the eighth tergite present (Figure 13) 4

Figure 12

Figure 13

4. a. Major pronotal setae stout and light colored (Figure 14), length of setae in comb on the eighth tergite relatively long (Figure 15) . . . . . *Thrips tabaci*

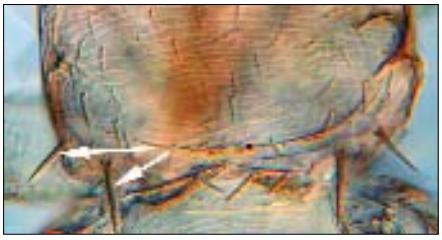

Figure 14

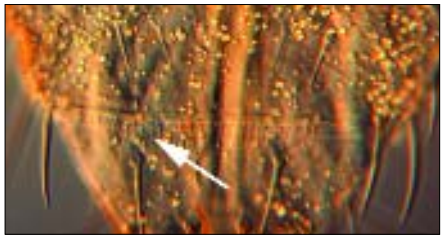

Figure 15

4. b. Major pronotal setae dark colored and slender (Figure 16), setae of comb on the eighth tergite short (Figure 17) . . . . . *Thrips nigripilosus**

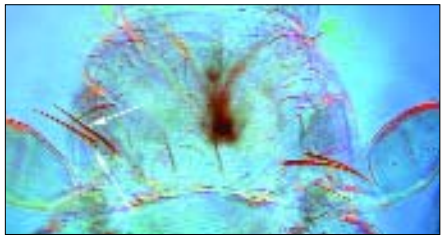

Figure 16

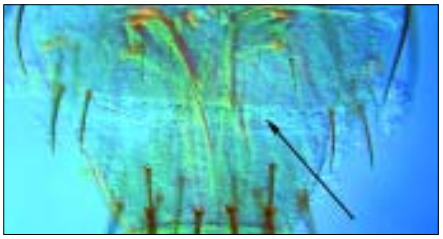

Figure 17

5. a. Antennae with eight segments,
sensory setae forked (Figure 18) or single (Figure 19) 6

Figure 18

Figure 19

5. b. Antennae with nine segments, sensory setae on the third
and fourth antennal segments narrow elongate regions located
on distal end of segment (Figure 20) . . . . . *Aelothrips bicolor* *

Figure 20

6. a. Body nearly colorless, wings with three spots (Figure 21),
all major pronotal setae very long (Figure 22) . . . . . *Scolothrips pallidus* *

Figure 21

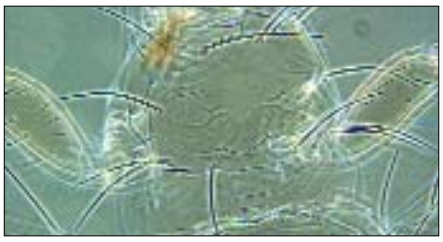

Figure 22

6. b. Body variously colored, pronotal setae short to moderately long,
wings darker and variously colored 7

7. a. Sixth segment of antennae with partial suture or separation at apical third of segment (Figure 23), all pronotal setae short and difficult to see (Figure 24) . . . . . *Anophothrips obscurus*

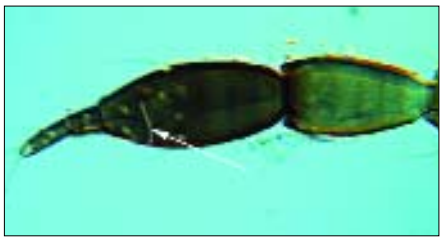

Figure 23

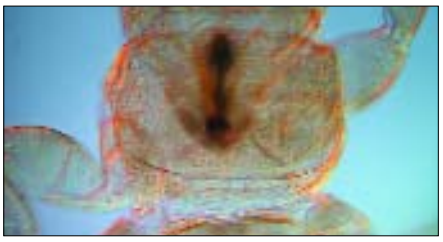

Figure 24

7. b. Sixth antennal segment lacking partial separation (Figure 25), pronotum with at least some posterior setae long (Figures 26, 27) 8

Figure 25

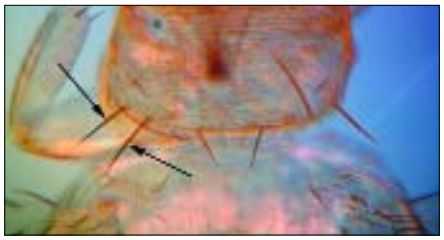

Figure 26

Figure 27

8. a. Forelegs massive (Figure 28), second antennal segment extruded to one side distally (Figure 29), head and pronotum with numerous short spines, pronotum trapezoidal, about as long as wide, only the posteroangular setae long (but clear and difficult to see) . . . . . *Chirothrips texanus **

Figure 28

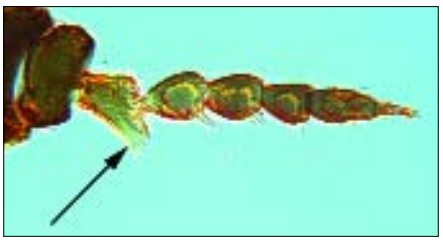

Figure 29

8. b. Forelegs not massive, second antennal segment not extruded, pronotum wider than long (Figure 30) 9

Figure 30

9. a. Wings with light or dark bands or spots (Figure 31), abdomen with numerous microsetae at least in lateral areas of tergites (Figure 32) or tergites with spine-like scallops (Figure 33), head and pronotum deeply striated or reticulated (Figures 34-35) 10

Figure 31

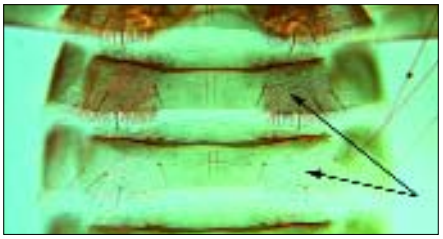

Figure 32

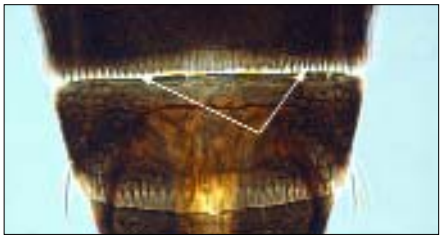

Figure 33

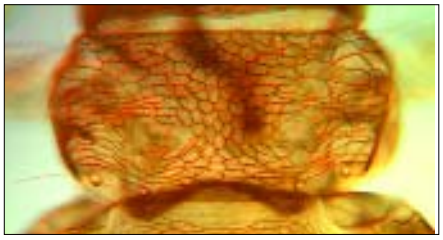

Figure 34

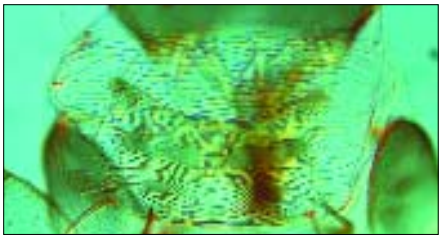

Figure 35

9. b. Wings of uniform color or colorless (Figure 36), microspines lacking on abdomen (Figure 37) . . . 13

Figure 36

Figure 37

10. a. Forewings brown with two light bands in distal half and one at wing base (Figure 38), posteromarginal abdominal tergites with spine-like scallops (Figure 39) . . . . *Caliothrips fasciapennis* *

Figure 38

Figure 39

10. b. Forewings light either at base only or with light bands (Figure 40), abdominal tergites lacking spine-like scallops but with numerous microsetae (Figures 41-42), pronotum striated or reticulate (Figures 43-44) 11

Figure 40

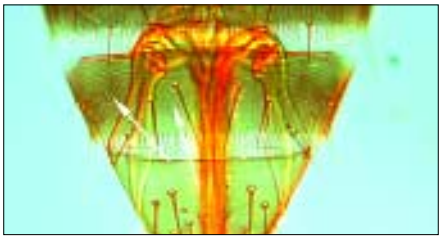

Figure 41

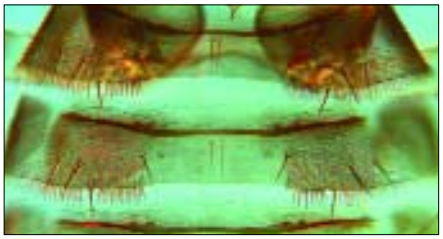

Figure 42

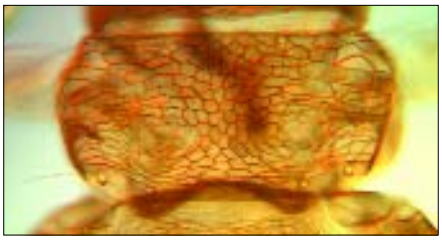

Figure 43

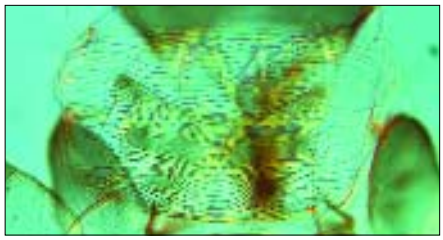

Figure 44

11. a. Head and pronotum reticulate (Figure 45), wings brown with lighter bars basally and midwing (Figure 46), tips of setae on veins and front margin of wing blunt or slightly expanded . . . . . *Echinothrips americanus* *

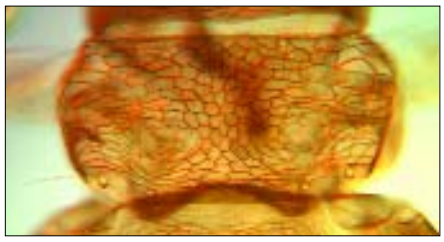

Figure 45

Figure 46

11. b. Pronotum striate (Figures 47-48) 12

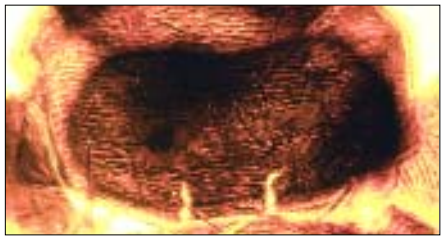

Figure 47

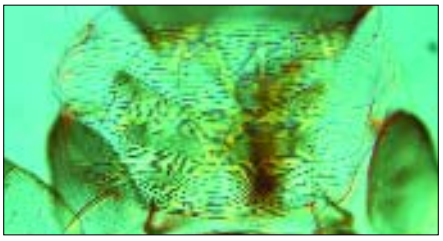

Figure 48

12. a. Wings light at base, otherwise uniformly light brown, head and thorax darkly sclerotized, nearly opaque, fourth through sixth abdominal tergites very light, other segments dark brown (Figure 49) . . . . . *Sericothrips cingulatus* *

Figure 49

12. b. Wings with two dark bands plus dark spot at base (Figure 50), fourth through sixth abdominal segments light colored, other segments light brown, pronotum with smile-shaped sclerotized area (Figure 51) . . . . . *Neohydatothrips variabilis*

Figure 50

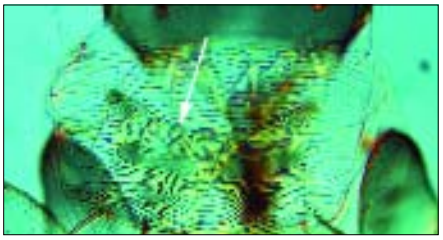

Figure 51

13. a. Veins in forewings delineated by small rectangular platelets (Figure 52), tenth abdominal segment with longitudinal split (Figure 53), sense cones on third and fourth antennal segments single (Figure 54) . . . . . *Limothrips cerealium* *

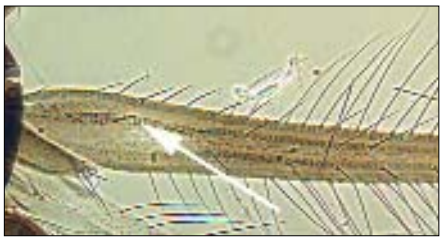

Figure 52

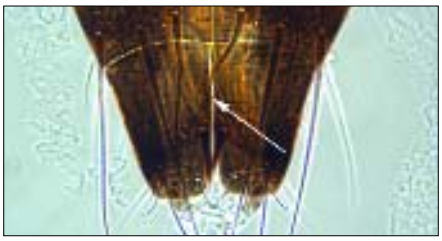

Figure 53

Figure 54

13. b. Pronutum with two small setae between the posteromarginal setae (Figures 55-56), sensory setae on antennae forked (Figure 57) . . . . . *Frankliniella* spp. 14

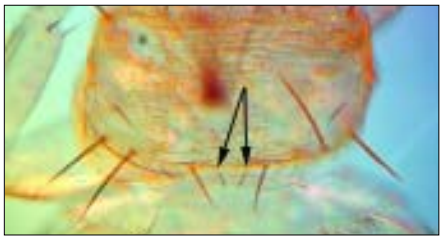

Figure 55

Figure 56

Figure 57

14. a. Postocular seta small, same size as other setae in the row (Figure 58), comb on eighth tergite absent or vestigial (Figure 59), antennal segments uniformly dark, wings present or absent, color usually dark brown but may be light brown with darker areas . . . . . *Frankliniella fusca*

Figure 58

Figure 59

14. b. Postocular seta obviously larger than other setae in the row (Figure 60), color usually light amber, comb present on eighth abdominal tergite (Figure 61) 15

Figure 60

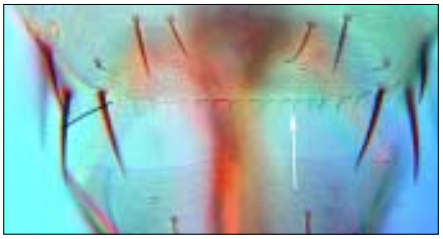

Figure 61

15. a. Postocular setae much shorter than interocellar setae (Figure 62), Comb on eighth abdominal tergite incomplete (lacking spines in center) (Figure 63), pedicel of third antennal segment with angular expanded ring (Figure 64) or vase-like (Figure 65) 16

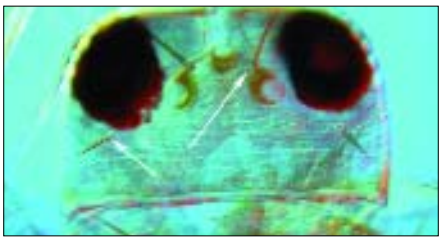

Figure 62

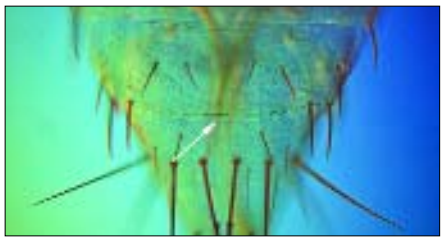

Figure 63

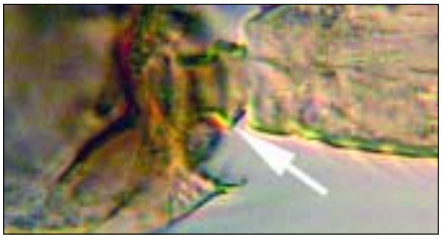

Figure 64

Figure 65

15. b. Comb on eighth abdominal tergite complete (Figure 66), interocellar setae nearly as long as or longer than postocular seta (Figure 67) 17

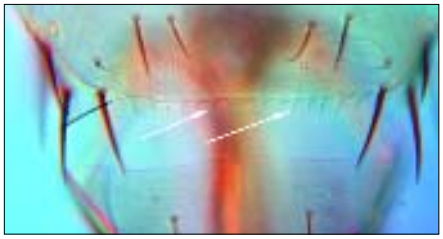

Figure 66

Figure 67

16. a. Pedicel of third antennal segment wider in center – appearing angular (Figure 68); antennal segment two without stout, spine-like setae; antenna coloration from base to apex: light, dark, light, dark, light, dark, dark, dark (Figure 69) . . . . . *Frankliniella tritici*

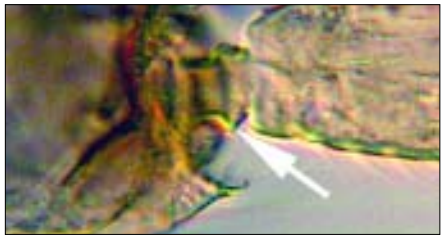

Figure 68

Figure 69

16. b. Pedicel of third antennal segment vase-like; antenna segment two with a pair of stout, spine-like setae (Figure 70) . . . . . *Frankliniella bispinosa* *

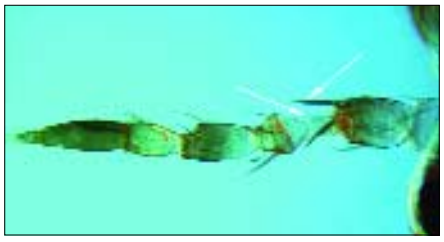

Figure 70

17. a. Major setae on head and pronotum dark, interocellar and postocular setae approximately the same length (Figure 71), second through fifth antennal segments darker distally, sixth through eighth segments dark (Figure 72), color usually amber with some brown areas primarily on anterior central portion of abdominal tergites but the body may be entirely dark brown (Figure 73) . . . . . *Frankliniella occidentalis*

Figure 71

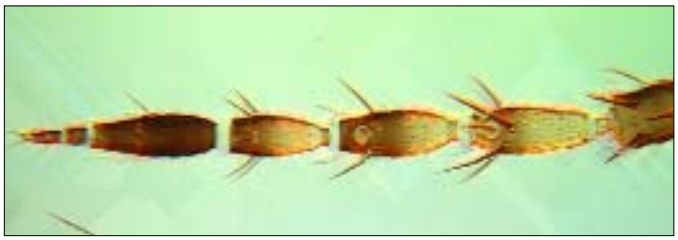

Figure 72

Figure 73

17. b. Comb on eighth abdominal tergite with long, slender setae (Figure 74); interocellar setae about as long as or longer than anteromarginal setae (Figure 75); antennal segments gradually darker towards tips; body coloration light amber lacking dark patches 18

Figure 74

Figure 75

18. a. Interocellar setae about as long as anteromarginal setae (Figure 76) . . . . . *Frankliniella williamsi* *

Figure 76

18. b. Interocellar setae longer than anteromarginal setae (Figure 77) . . . . . *Frankliniella exigua*

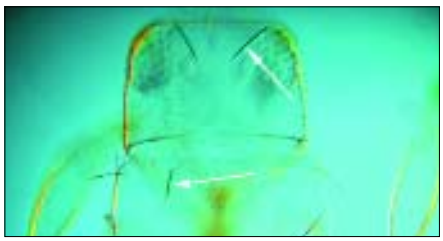

Figure 77

Part 2: Identifying Characteristics of Keyed Species

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Aelothrips bicolor 14
Anophothrips obscurus 15
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Aelothrips bicolor Hinds

Aelothrips bicolor is a common thrips in most of temperate North America and is an inhabitant of prairies and grasslands. It is an incidental on seedling cotton.

Figure 78. *Aelothrips bicolor* female.

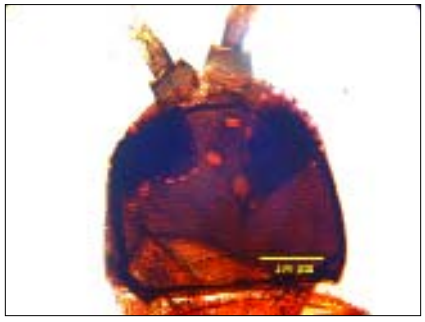

Figure 79. Head.

Figure 80. Antennae.

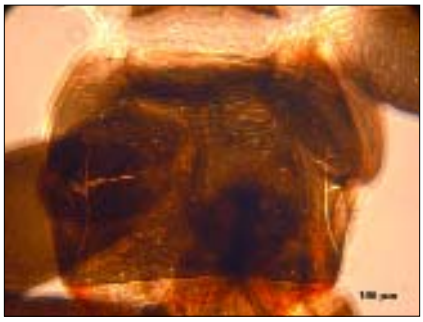

Figure 81. Pronotum.

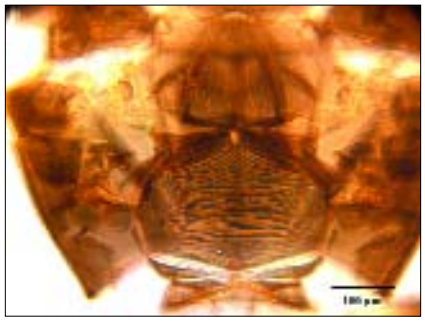

Figure 82. Mesonotum and metanotum.

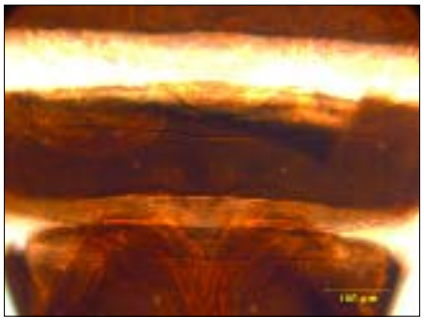

Figure 83. Eighth Abdominal tergite.

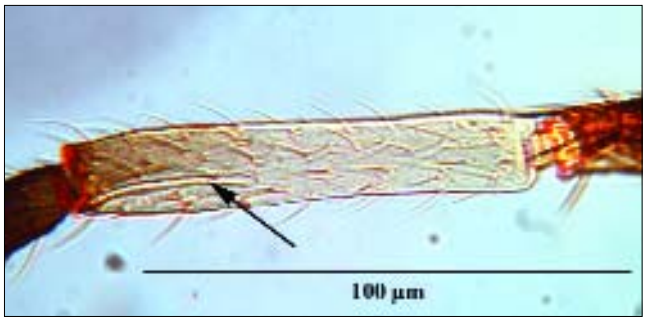

Figure 84. Antenna segment 3 with sensorium.

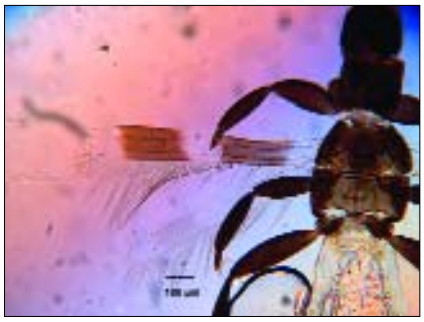

Figure 85. Wing.

Anophothrips obscurus (Müller) — Grass thrips

Anophothrips obscurus, as its common name implies, feeds and lays its eggs primarily on grass but is also commonly found on corn. It has a worldwide distribution. Males of this species are unknown. It is an incidental on seedling cotton.

Figure 86. Female.

Figure 87. Head.

Figure 88. Antennae.

Figure 89. Pronotum.

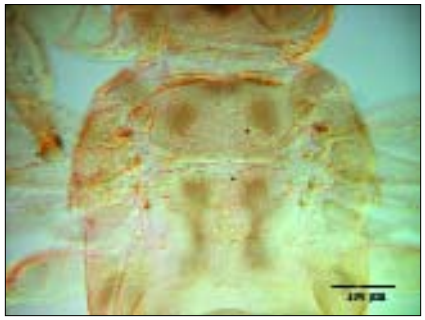

Figure 90. Mesonotum and metanotum.

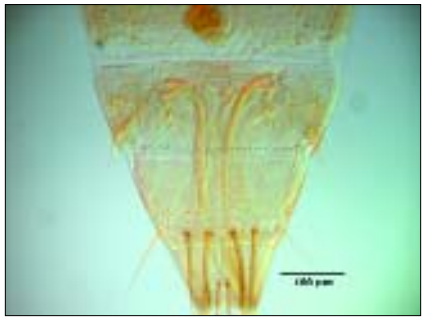

Figure 91. Comb on the eighth abdominal tergite.

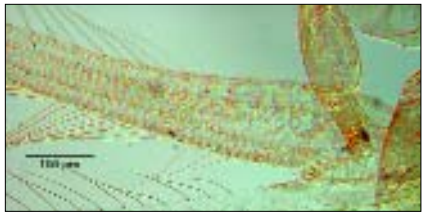

Figure 92. Wing.

Caliothrips fasciapennis (Hood)

This thrips is a grassland-inhabiting species. Other closely related species feed on wild lettuce and similar hosts or on beans. It is an incidental on seedling cotton.

Figure 93. Female.

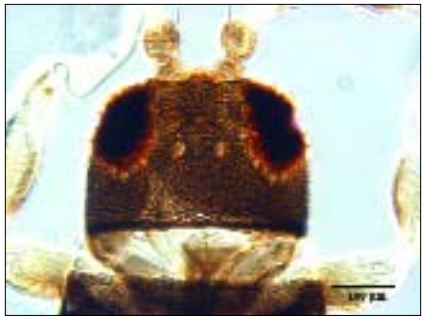

Figure 94. Head.

Figure 95. Antennae.

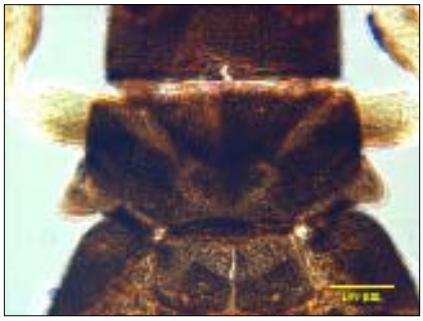

Figure 96. Pronotum.

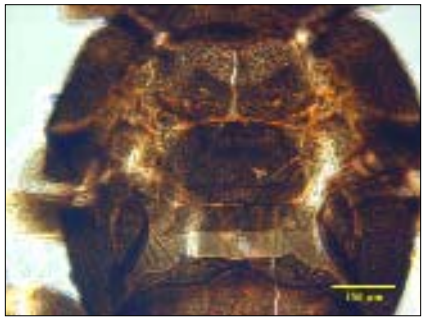

Figure 97. Mesonotum and metanotum.

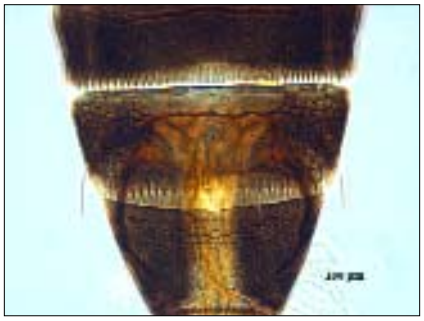

Figure 98. Eighth abdominal tergite.

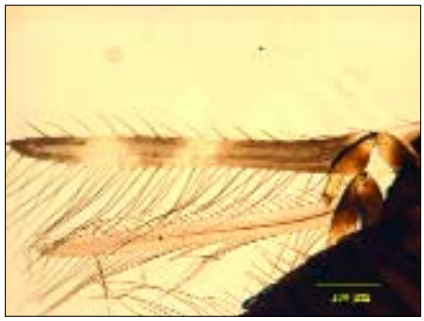

Figure 99. Wing.

Chirothrips texanus Andre

Chirothrips texanus is widely distributed in the United States and is common in grass. It is an incidental on seedling cotton.

Figure 100. Female.

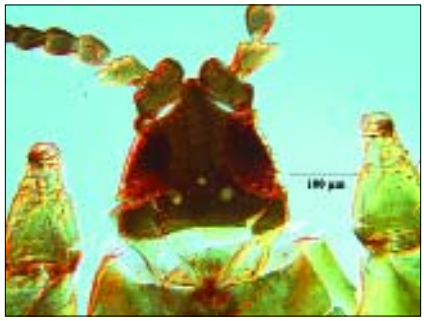

Figure 101. Head.

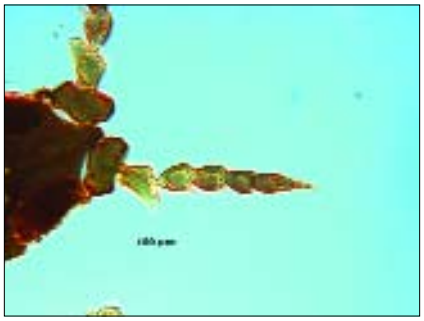

Figure 102. Antennae.

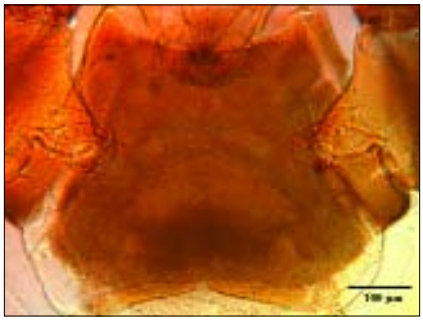

Figure 103. Pronotum.

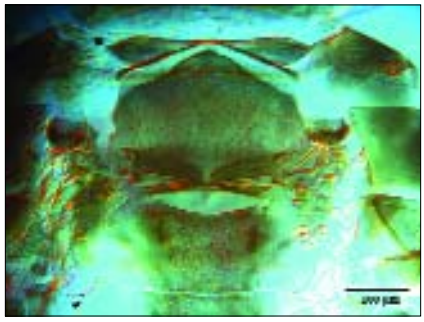

Figure 104. Mesonotum and metanotum.

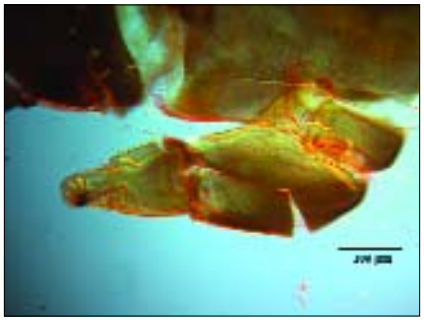

Figure 105. Foreleg.

Echinothrips americanus Morgan – Impatiens thrips

Echinothrips americanus occurs primarily on ornamentals and trees and is common on impatiens and poinsettia plants. It occurs primarily in eastern United States.

Figure 106. Female.

Figure 107. Head.

Figure 108. Antennae (collapsed in this specimen).

Figure 109. Pronotum.

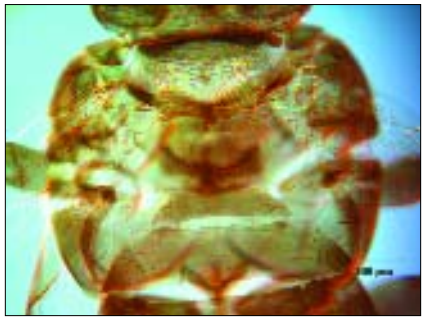

Figure 110. Mesonotum and metanotum.

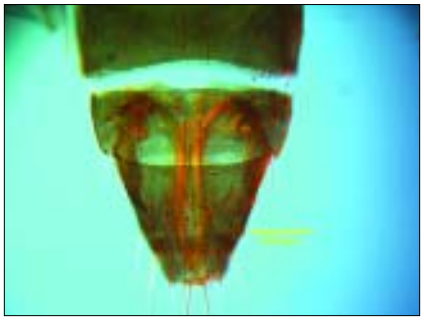

Figure 111. Eighth abdominal tergite.

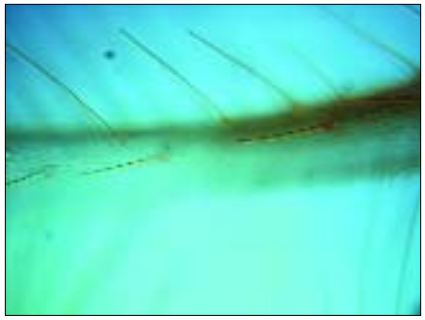

Figure 112. Wing.

Frankliniella bispinosa – Florida flower thrips

Frankliniella bispinosa is primarily a citrus and avocado pest in Florida. Specimens observed for this publication were collected from cotton in Georgia. It may occur in other southeastern states. It is probable that this thrips might be difficult to control with insecticides on cotton because of selection for resistance resulting from the use of insecticides in the citrus industry.

Figure 113. Female.

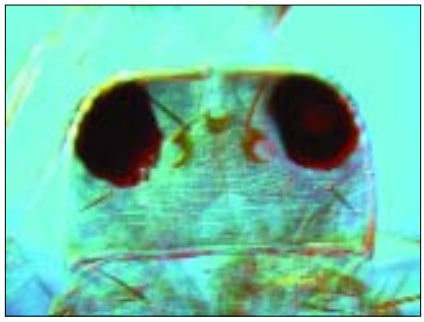

Figure 114. Head.

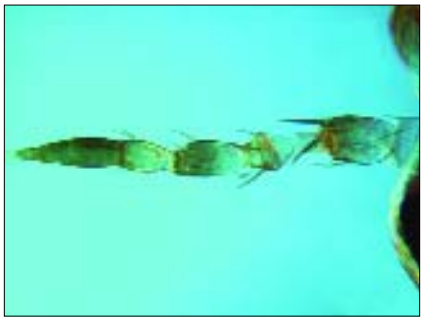

Figure 115. Antennae.

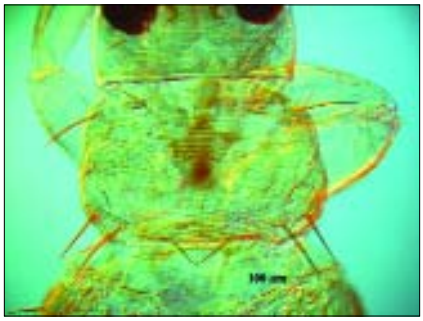

Figure 116. Pronotum.

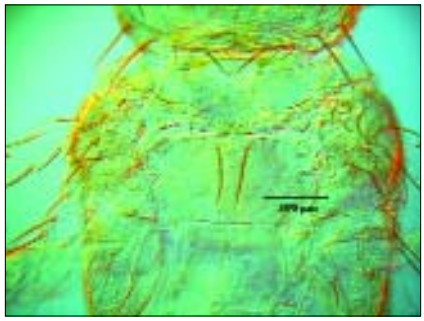

Figure 117. Mesonotum and metanotum.

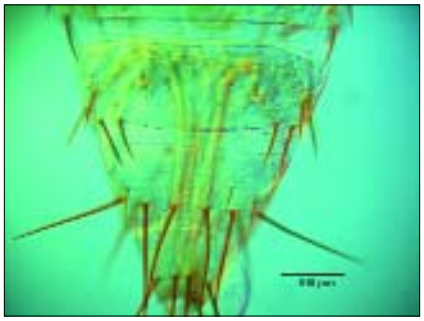

Figure 118. Eighth abdominal tergite.

Frankliniella exigua Hood

Frankliniella exigua specimens in the Beshear thrips collection on deposit at the University of Georgia are well represented. However, Stannard in discussion of *Frankliniella runneri* mentions that *F. exigua* may well be a synonym of *F. runneri* and that *F. runneri* was reported to be a pest on cotton (Stannard 1968). We assume that since *F. runneri* is poorly represented in the Beshear collection and is otherwise not common in the literature, that the species more common in the Midsouth (if they are different) is *F. exigua*. *F. runneri* is not represented in this key.

Figure 119. Female.

Figure 120. Head.

Figure 121. Antennae.

Figure 122. Pronotum.

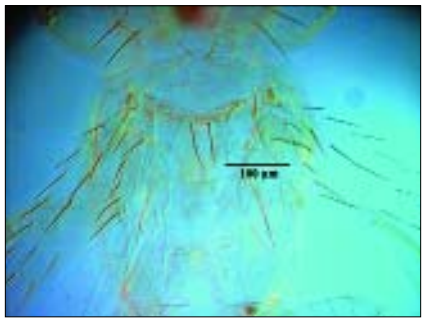

Figure 123. Mesonotum and metanotum.

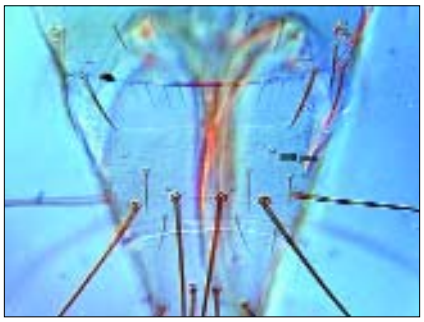

Figure 124. Eighth abdominal tergite.

Frankliniella fusca (Hinds) — Tobacco thrips

Frankliniella fusca is the most common thrips on seedling cotton in the Midsouth, composing about 95% of all thrips collected from the seedling crop. It may reach population levels sufficient to severely stunt or kill seedling cotton, but it tends to disappear from cotton following the generation developed on seedling cotton. Adults of both sexes of this species may or may not have wings (Macropterous – with wings; Brachypterous – without wings). This species is not a flower thrips and is not attracted to blooms but feeds mostly on leaves. It is easily controlled with systemic insecticides and most contact insecticides.

Figure 125. Female with wings.

Figure 126. Female without wings.

Figure 127. Light form.

Figure 128. Head.

Figure 129. Antennae.

Figure 130. Pronotum.

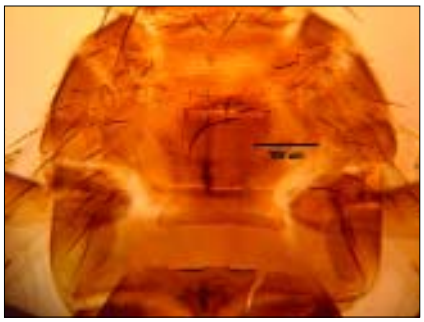

Figure 131. Mesonotum and metanotum.

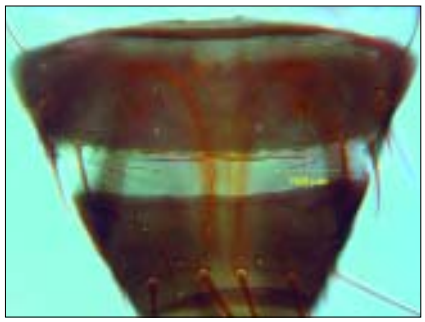

Figure 132. Eighth abdominal tergite.

Frankliniella occidentalis (Pergande) — Western Flower Thrips

Frankliniella occidentalis is common across the cotton belt in the United States and is otherwise distributed worldwide. It is considered a beneficial in cotton in California at times during the season as a predator on spider mites. This has not been verified in the Midsouth. It is an annual pest of seedling cotton in some areas of the Midsouth, where numbers appear to increase during seasons of spring drought. This thrips has occurred in extremely high numbers in blooming cotton, causing leaves to appear scorched and petals to stick together so that blooms do not open properly. Western flower thrips in seedling cotton are generally light amber in color with some dark areas on the abdomen. They may also be entirely dark brown, superficially resembling tobacco thrips. Because they have been historic pests in greenhouses and field crops, western flower thrips populations may be resistant to many commonly used insecticides.

Figure 133. Female, light form.

Figure 134. Female, dark form.

Figure 135. Head.

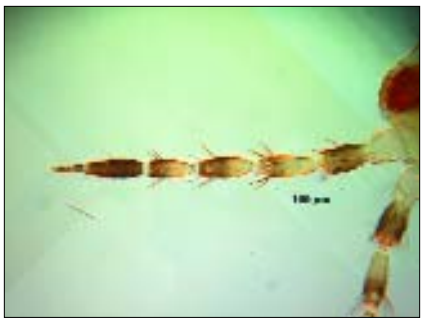

Figure 136. Antennae.

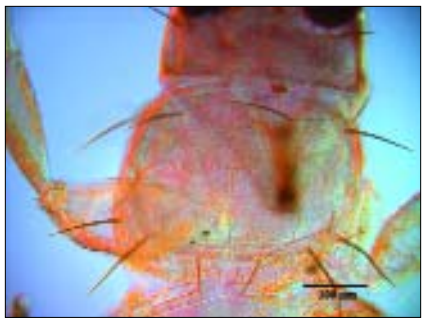

Figure 137. Pronotum.

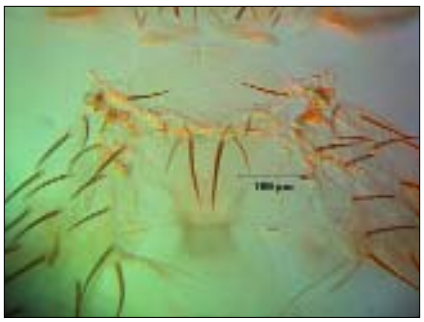

Figure 138. Mesonotum and metanotum.

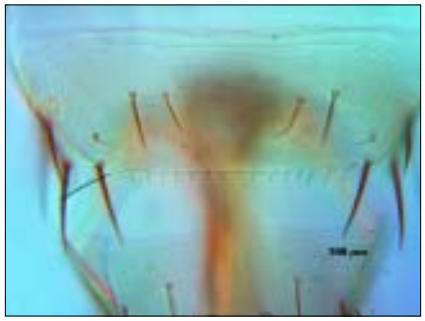

Figure 139. Comb on eighth abdominal tergite.

Frankliniella tritici (Fitch) — Flower thrips (usually called Eastern flower thrips)

Frankliniella tritici is very common throughout the southern United States. It is a true flower thrips that feeds primarily on pollen, but it may occur in relatively high numbers in seedling cotton. It will often be found in the blooms of flowering cotton.

Figure 140. Female.

Figure 141. Head.

Figure 142. Antennae.

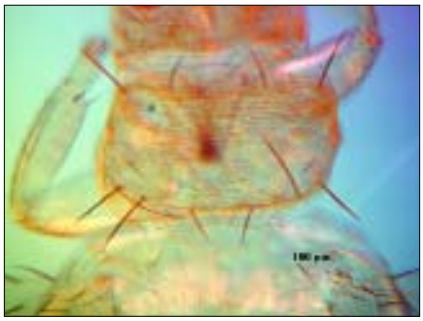

Figure 143. Pronotum.

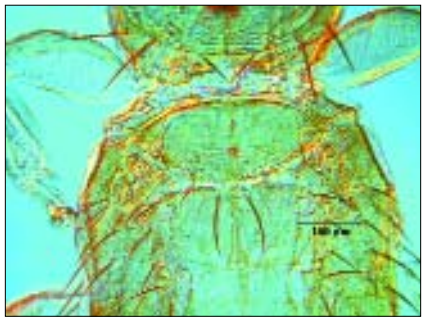

Figure 144. Mesonotum and metanotum.

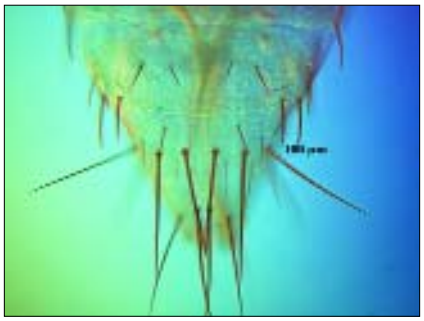

Figure 145. Eighth abdominal tergite.

Figure 146. Joint between the second and third antennal segments.

Frankliniella williamsi Hood — Corn thrips

Frankliniella williamsi is very common on corn. It occurs in the southeastern United States on that crop and has been collected from cotton planted near corn. It is considered an incidental insect on cotton.

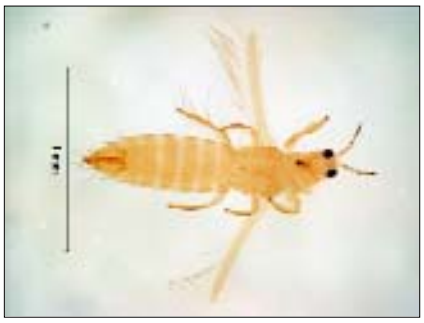

Figure 147. Female.

Figure 148. Head.

Figure 149. Antennae.

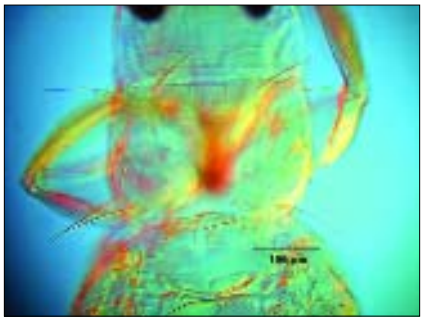

Figure 150. Pronotum.

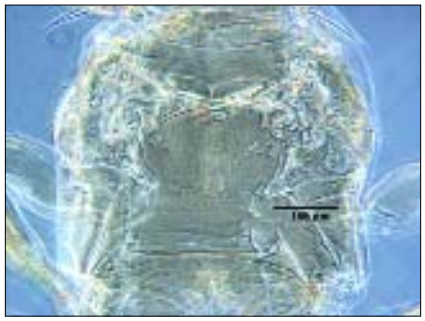

Figure 151. Mesonotum and metanotum.

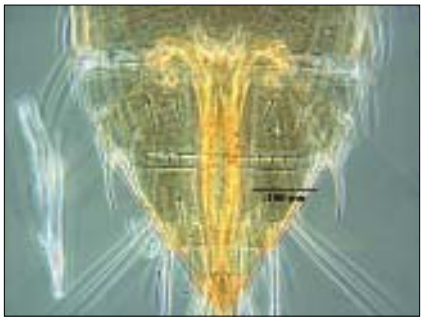

Figure 152. Eighth abdominal tergite.

Limothrips cerealium (Halliday) — Grain thrips

Limothrips cerealium is a thrips that feeds on grain and grasses. It is an incidental on cotton.

Figure 153. Female.

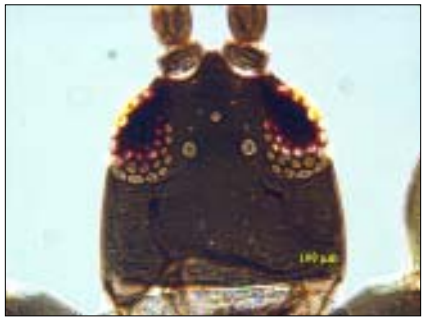

Figure 154. Head.

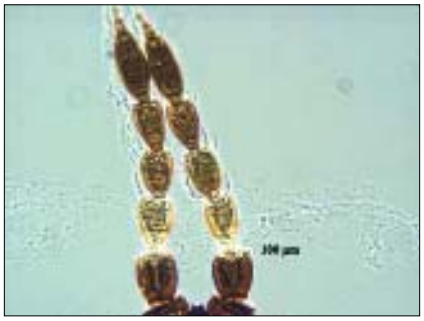

Figure 155. Antennae.

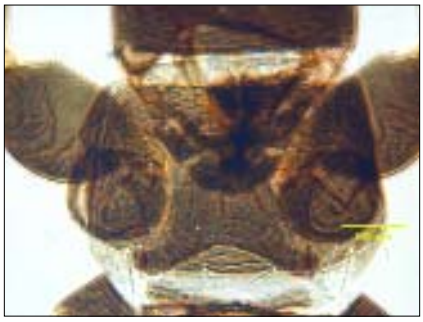

Figure 156. Pronotum.

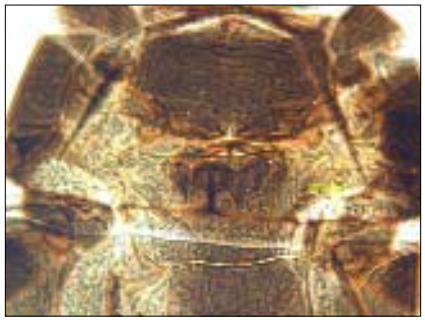

Figure 157. Mesonotum and metanotum.

Figure 158. Eighth abdominal tergite.

Figure 159. Wing.

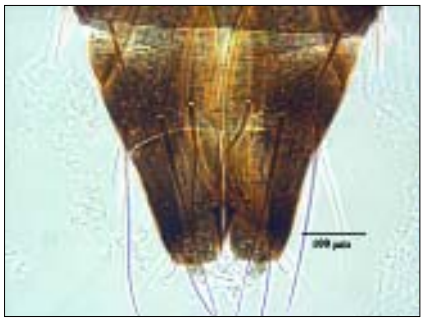

Figure 160. Tenth abdominal tergites.

Microcephalothrips abdominalis (D.L. Crawford) — Composit thrips

Microcepthalothrips abdominalis is a very common flower thrips found on composits such as chrysanthemum, zinnia, and marigolds. They are often found on seedling cotton or caught on sticky traps or in antifreeze traps. They are not considered a serious pest of cotton.

Figure 161. Female.

Figure 162. Head.

Figure 163. Antennae.

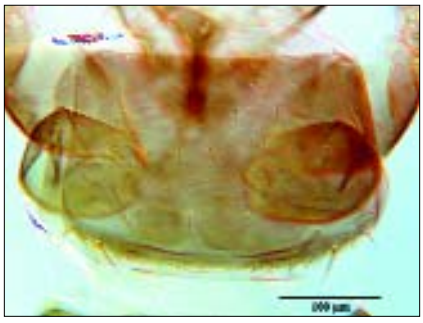

Figure 164. Pronotum.

Figure 165. Mesonotum and metanotum.

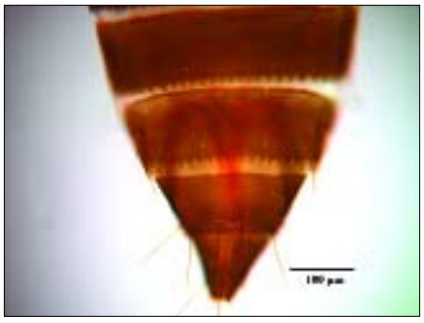

Figure 166. Eighth abdominal tergite.

Neohydatothrips variabilis (Beach) — Soybean thrips

Neohydatothrips variabilis is common throughout the United States and Canada. Its primary hosts are legumes. It is often collected from seedling cotton but is usually not in high numbers. It is not considered a serious pest of seedling cotton.

Figure 167. Female.

Figure 168. Head.

Figure 169. Antennae.

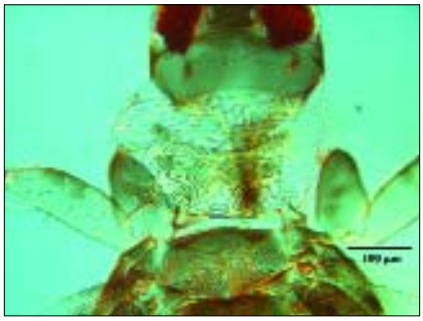

Figure 170. Pronotum.

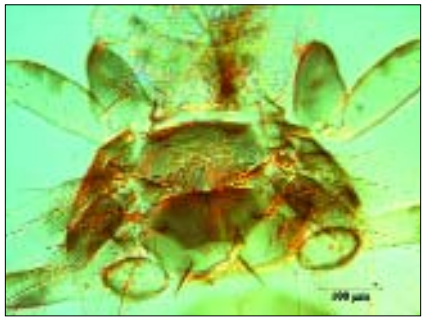

Figure 171. Mesonotum and metanotum.

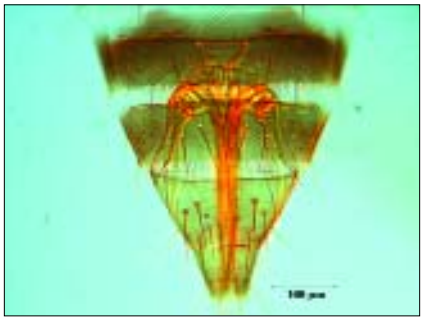

Figure 172. Eighth abdominal tergite.

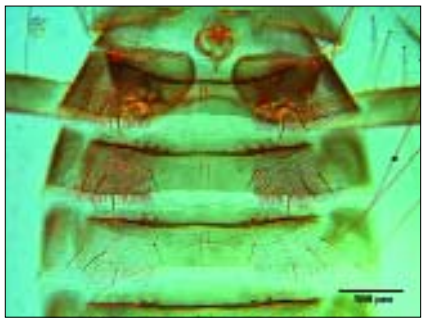

Figure 173. Spines on abdominal tergites.

Plesiothrips perplexus (Beach)

Plesiothrips perplexus is another grass-inhabiting species that occurs incidentally on cotton.

Figure 174. Female.

Figure 175. Head.

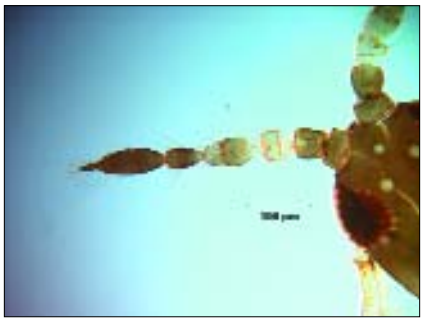

Figure 176. Antennae.

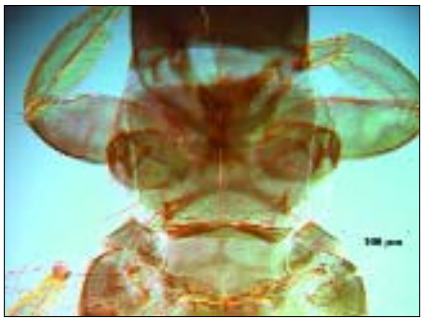

Figure 177. Pronotum.

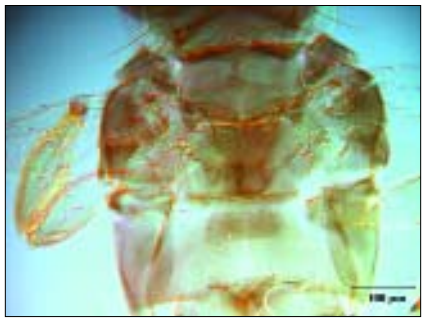

Figure 178. Mesonotum and metanotum.

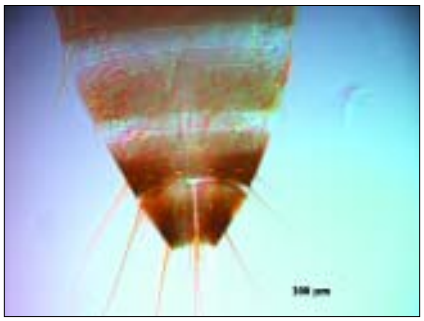

Figure 179. Eighth abdominal tergite.

Scolothrips palidus (Beach)

Scolothrips palidus is a predatory thrips of spider mites. It has been reported from cotton grown in a greenhouse.

Figure 180. Female.

Figure 181. Head.

Figure 182. Antennae.

Figure 183. Pronotum.

Figure 184. Mesonutum and metanotum.

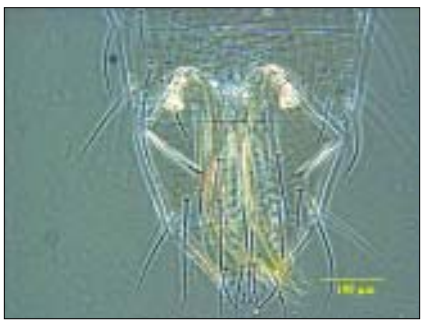

Figure 185. Eighth abdominal tergite.

Sericothrips cingulatus Hinds

Sericothrips cingulatus is a grass-inhabiting species that occurs incidentally on cotton.

Figure 186. Female.

Figure 187. Head.

Figure 188. Antennae.

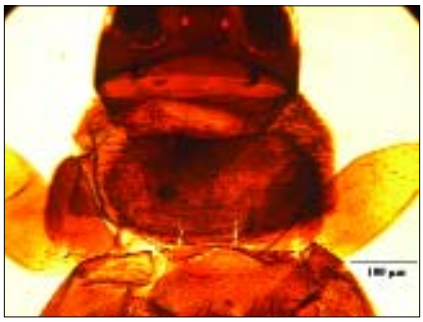

Figure 189. Pronotum.

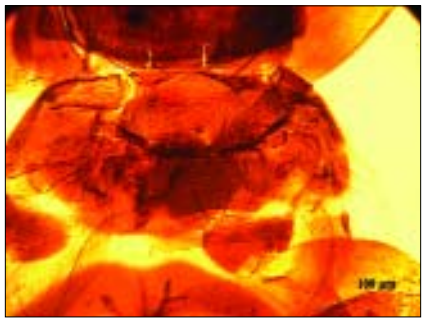

Figure 190. Mesonotum and metanotum.

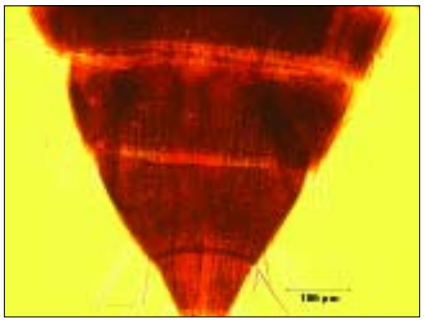

Figure 191. Eighth abdominal tergite.

Thrips nigripilosus Uzel — Chrysanthemum thrips

Thrips nigripilosus closely resembles *T. tabaci* but is primarily associated with chrysanthemum and similar flowers as its name implies. It is an incidental on cotton.

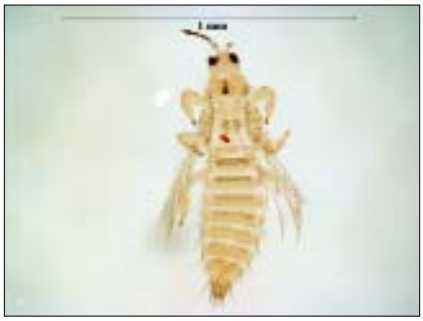

Figure 192. Female.

Figure 193. Head.

Figure 194. Antenna.

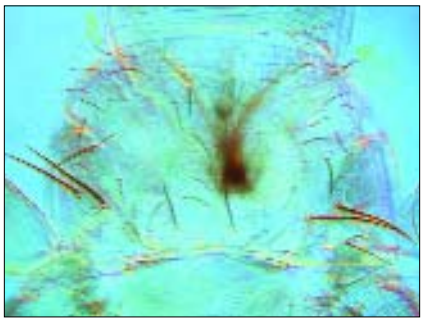

Figure 195. Pronotum.

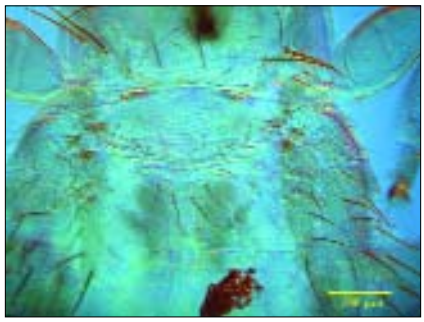

Figure 196. Mesonotum and metanotum.

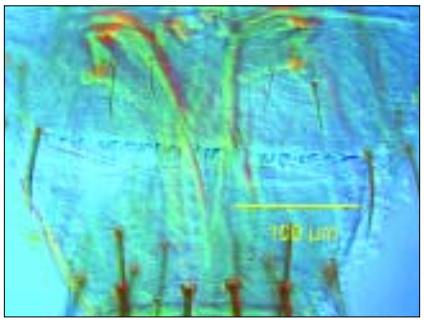

Figure 197. Eighth abdominal tergite.

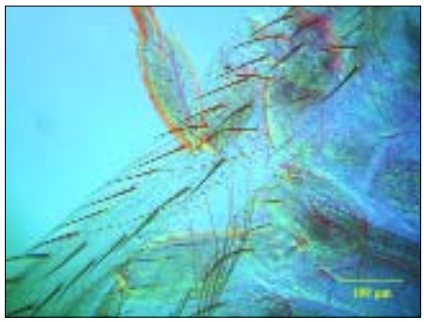

Figure 198. Wing.

Thrips tabaci Lindeman — Onion thrips

Thrips tabaci is distributed worldwide. It is not generally a pest of major significance on seedling cotton and generally occurs with other species on that host. Onions are the preferred host, but it may feed on many field and vegetable crops and flowers.

Figure 199. Female.

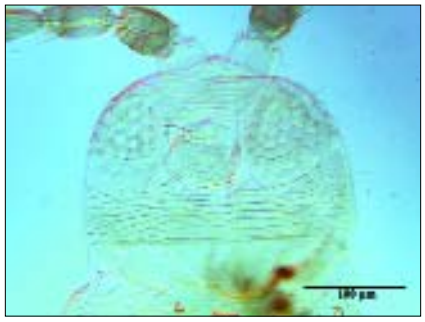

Figure 200. Head.

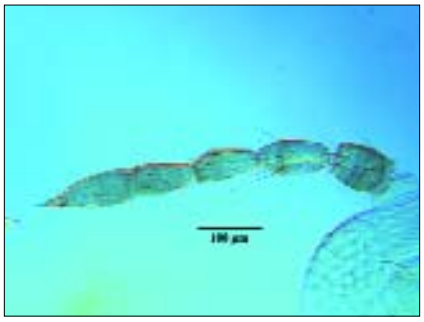

Figure 201. Antenna.

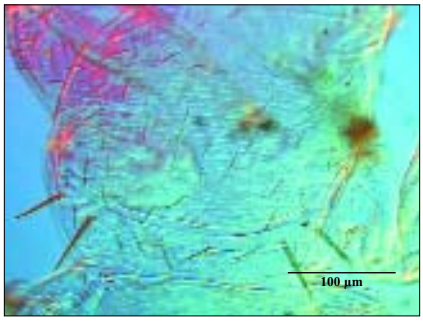

Figure 202. Pronotum.

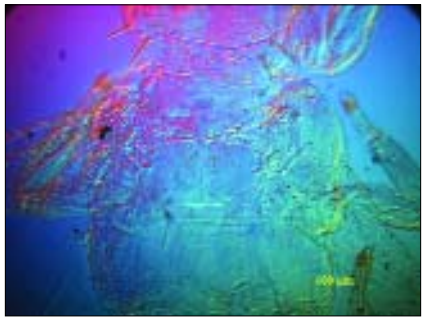

Figure 203. Mesonotum and mentanotum.

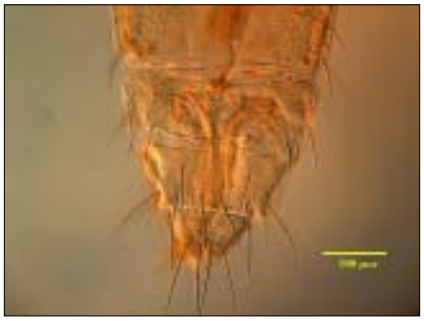

Figure 204. Eighth abdominal tergite.

LITERATURE CITED AND USEFUL REFERENCES

Several publications not cited in this document may be useful for identification of thrips. Stannard published a descriptive review of all the thrips in Illinois that includes many species in the Midsouth (Stannard 1968). His publication serves as a rich source of references. Nakahara reviewed the genus *Sericothrips* and reassigned *S. variabilis* to the genus Neohydatothrips (Nakahara 1968). Thrips of Georgia were reported by Beshear (Beshear 1973). Sakimura and O'Neill (Sakimura and O'Neill 1979) redefined the genus *Frankliniella*; however, revision of the Minuta group included in that document contains only species indigenous to the Southwest that have not been collected from cotton in the Midsouth.

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