Quick Thrips Identification in Tomato and Pepper in Georgia

D. Riley and A.N. Sparks, Jr.
University of Georgia
2018

The following information is provided as a tool to aid in identification of common thrips species collected from tomato, pepper, and tobacco in Georgia. Its purpose is to aid in separation and identification of the most common and abundant species. Many other species of thrips can be collected from these crops (usually in low numbers). Where species identification is critical, confirmation of thrips identifications should be made through a trained thrips taxonomist using slide mounted specimens. However, this site should provide some basic skills in sorting out bulk samples of thrips from tomato, pepper, and tobacco. Refer to established thrips taxonomy sites such as http://anic.ento.csiro.au/thrips/identifying_thrips/Thripidae.htm for more information.

Thrips belong to the insect order Thysanoptera which is typified by small (0.5-5 mm), slender insects, with or without wings (four wings when present). The wings are long and narrow with a fringe of long hairs on both the front and hind wings. This is why thrips are sometimes referred to as "fringe-wing" insects. The mouth parts are a sucking type with an asymmetrical, conical proboscis, oriented posteriorly on the bottom side of the bottom side of the head (mouthcone appears to arise between the front legs; see figure below). The antennae are filiform (threadlike) with 4 to 9 segments of roughly equal size. The thrips covered in this publication belong to the suborder Terebrantia, which have the last abdominal segment conical or rounded and the females have a well-developed ovipositor (Figure 1). Thrips in the suborder Tubulifera have the last segment tubular (Figure 2) and females lack an ovipositor.

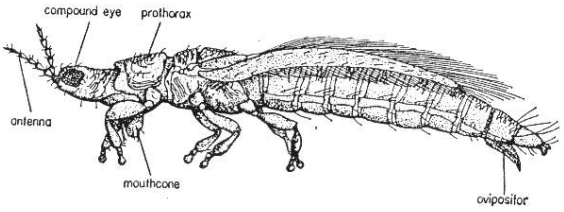


Figure 2. Female Thripidae from Stannard (1968)

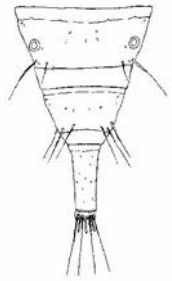


Figure 1. Tubulifera abdomen from Stannard 1968.

The shape of the pedicel (base) of the 3rd antennal segment and setae (hairs) on the 2nd are important for identification of the thrips in this publication. Additionally, the setae on the anterior (front) and posterior (back) margins of the pronotum (dorsal plate of the prothorax) as well as the setal comb on the dorsal - posterior margin of the 8th abdominal segment are important for species identification. Sexing thrips is generally done by detecting the presence (female) or absence (male) of an ovipositor (see below).

Thrips are commonly found on foliage and flowers of tomato, pepper and tobacco. For foliage feeding species, thrips can be easily collected by shaking plants or plant parts in a collection container (box, cup, etc.) to dislodging the thrips. Various modifications of these containers, such as addition of a screen wire mesh over a collection box, can aid collection by providing a surface to strike the plants against and increase the chance of dislodging the thrips. An insect aspirator method (suctioning insects off of the foliage) can also be a very accurate relative sampling method for thrips, but this requires some patience and can be tedious. A newer

method, the quart-Styrofoam beat cup (Figure 3) may be better suited for scouting programs because it can be used to efficiently detect thrips early in the growing season. The beat cup has a high level of precision and efficiency, and is low in cost of materials make it the best method for commercial scouting programs of pre-flowering solanaceous crops. Whatever collection container is used, the thrips on the container walls can be picked up with a moistened brush. In flowering crops, thrips commonly found in blooms are most easily collected by placing 5-10 blooms directly into a 20 ml vial half filled with a 50% alcohol solution and sorted in the laboratory under magnification. Thrips are most commonly preserved in a 70 % alcohol solution. For more permanent storage in the alcohol solution, thrips should first be placed in a killing solution (e.g. AGA, KAAD) and later moved to alcohol. However, for proper identification of many species, it is strongly recommended that the thrips specimens be mounted onto glass slides suitable for a compound microscope.

Figure 3. Beat cup for sampling thrips from foliage.

It should be noted that although western flower thrips and tobacco thrips can be relatively easy to sort in alcohol, the other flower thrips must be slide mounted to insure correct identification. While color is used as a clue to species identification, this characteristic is variable within species and is particularly variable with preserved specimens.

A Short Key to Thrips Species Collected from Tomato, Pepper and Tobacco in Georgia

1 - Last abdominal segment conical or rounded, females with well-developed ovipositor (Figure 1) 2

Last abdominal segment tubular; females lack an ovipositor (Figure 2) .... suborder Tubulifera

2 - Front edge of pronotum with main setal pairs equal in length, setae behind eyes distinct (Figure 4A); setal comb complete (Figure 5A) .....Western flower thrips, *F. occidentalis*

Front edge of pronotum with inside setae shorter than outside setae, setae behind eyes not distinct (Figure 4B); setal comb incomplete (Figure 5B)..... 3

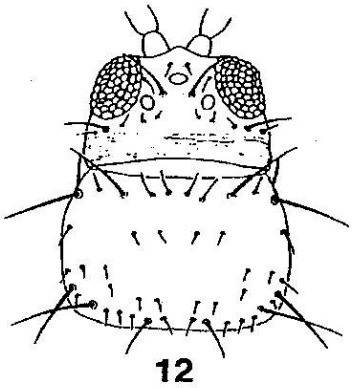
3 - Pedical of 3rd antennal segment straight (Figure 6A) .....Tobacco thrips, *F. fusca*

Pedical of 3rd antennal segment not straight (Figure 6B)..... 4

4 - Pedical of third antennal segment with ‘bump’ in middle, terminal setae on 2nd segment not distinctly thick and spine-like (Figure 7A) ..... *F. tritici*

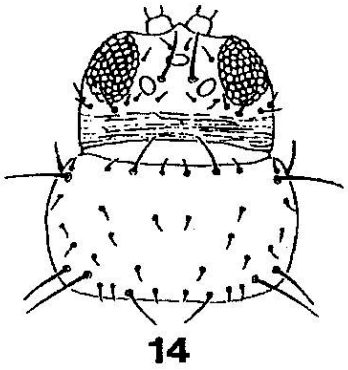
Pedical of third antennal segment with ‘flattened disk’ in middle, terminal setae on 2nd segment distinctly thick and spine-like (Figure 7B).....*F. bispinosa*

Figure 4 A and B



12

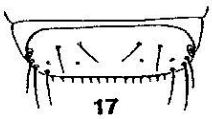
Main setae on front margin of prothorax equal in length; setae behind eyes distinct



14

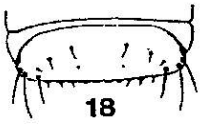
Main setae on front margin of prothorax with inside setae shorter, setae behind eyes distinct

Figure 5 A and B



17

Setal comb complete



18

Setal comb incomplete

Figure 6 A and B

22

Pedical of 3rd antennal segment straight

23

Pedical of 3rd antennal segment not straight

Figure 7 A and B

23

Pedical of 3rd antennal segment with 'bump'; terminal setae on 2nd segment not spine-like

24

Pedical of 3rd antennal segment with 'flattened disk'; terminal setae on 2nd segment spine-like

The figures used in this guide are reproduced from Oetting, R. D., R. J. Beshear, T-X. Liu, S. K. Braman, and J. R. Baker. 1993. Biology and identification of thrips on greenhouse ornamentals. Georgia Agricultural Experiment Station. Research Bulletin 414. 20 pp.. Note that voucher specimens should be maintained from all tests or evaluations to have a positive record of species identification.