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Common blossom thrips, *Frankliniella schultzei* Trybom (Insecta: Thysanoptera: Thripidae)[1]

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Introduction

Florida is home to a large number of invasive as well as native species of thrips. Hot temperatures and high humidity are important factors supporting huge populations of thrips in Florida. In the genus *Frankliniella*, the common blossom thrips, *F. schultzei* Trybom, is a relatively new vegetable pest in South Florida. It is a key pest in tomato and cucumber fields in South America.

Figure 1. Dorsal view of an adult common blossom thrips, *Frankliniella schultzei* Trybom. Photograph by: Vivek Kumar, University of Florida

Synonymy

In Australia, *F. schultzei* was earlier known as *F. lycopersici* Steele, while in South America it was described as *F. paucispinosa* Moulton (Sakimura 1969).

Other synonymies of *F. schultzei* include:

- *F. interocellaris* Karny
- *F. sulphurea* Schmutz
- *F. delicatula* Bagnall
- *F. dampfi* Priesner (1923)
- *F. dampfi interocellularis* Karny (1925)
- *F. lycopersici* Andrewartha (1937)
- *Parafrankliniella nigripes* Firault (1928)
- *F. paucispionosa* Moulton (1933)
- *F. sulphurea* Schmutz (1913)
- *Physopus schultzei* Trybom (1910)
- *Euthrips gossypii* Shiraki (1912)
- *F. delicatual* Bagnall (1919)

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- *F. trybomi* Karny (1920)
- *F. persetosa* Karny (1922)
- *F. tabacicola* Karny (1925)
- *F. africana* Bagnall (1926)
- *F. agnlicana* Bagnall (1926)
- *F. aeschyli* Girault (1927)
- *F. kellyana* Kelly & Mayne (1934)
- *F. dampfi nana* Priesner (1936)
- *F. favoniana* Priesner (1938)
- *F. pembertoni* Moulton (1940)
- *F. clitoriae* Moulton (1940)
- *F. schultzei nigra* Moulton (1948)
- *F. ipomoeae* Moulton (1948)
- *F. insularis* (Franklin) Morison (1930)

Distribution

The common blossom thrips has a very wide distribution and is mainly found in tropical and subtropical areas throughout the world (Vierbergen and Mantel 1991).

Reported worldwide distribution is as follows:

- **Africa**: Angola, Botswana, Cape Verde, Chad, Congo, Egypt, Ethiopia, Gambia, Ghana, Kenya, Libya, Madagascar, Mauritius, Morocco, Namibia, Niger, Somalia, South Africa, Sudan, Uganda, Zimbabwe
- **Asia**: Bangladesh, India, Indonesia, Iran, Iraq, Israel, Java, Malaysia, Pakistan, Sri Lanka
- **Australia and South Pacific:** Australia (New South Wales, Northern Territory, Queensland, South Australia, Victoria, Western Australia), French Polynesia, Papua New Guinea
- **Central America and Caribbean:** Barbados, British Virgin Islands, Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico.
- **Europe:** Belgium, mainland Spain, Netherlands, Spain, United Kingdom
- **North America:** United States (central and southern Florida, Colorado, Hawaii.
- **South America:** Argentina (Rio de Janeiro), Brazil (Minas Gerais, Parana, Rio Grande do Norte, Santa Catarina, Sao Paulo), Colombia, Chile, Guyana, Paraguay, Peru, Uruguay, Venezuela

Description

Frankliniella schultzei manifest two different color morphs, a dark and a pale form (Sakimura 1969). The two forms are anatomically similar to each other (Mound 1968). Sakimura (1969) reported the varied distribution of the two color morphs across the globe:

The dark form is mainly distributed:

- south of the Sudan to the Cape in Africa,
- from the Philippines to the south shore of Australia in western Pacific region,
- from the Caribbean to the south of Argentina in South America,
- Florida and Colorado in North America,
- Netherland in Europe, and
- throughout India in Asia.

The light form exists in:

- in Egypt, Sudan, Uganda and Kenya in Africa,
- Hawaii in North America,
- India, and
- New Guinea in the western Pacific region.

Mixed colonies of both color forms are reported by Mound (1968) in Egypt, India, Kenya, Puerto Rico, Sudan, Uganda, and New Guinea.

Thrips are very small insects. Adult females are 1.1-1.5 mm long, whereas adult males are 1.0-1.6 mm

in length. Thrips species usually are identified by body color, body setae and a comb on the 8th abdominal segment. The following text and images describe identifying characteristics of *F. schultzei.*

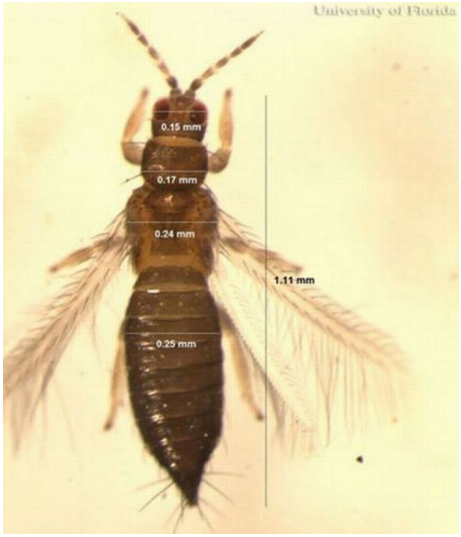

Figure 2. Dorsal view of an adult common blossom thrips, *Frankliniella schultzei* Trybom, with dimensions marked. Photograph by: Vivek Kumar, University of Florida

The interocellar setae arise along an imaginary line across the front edges of the two hind ocelli

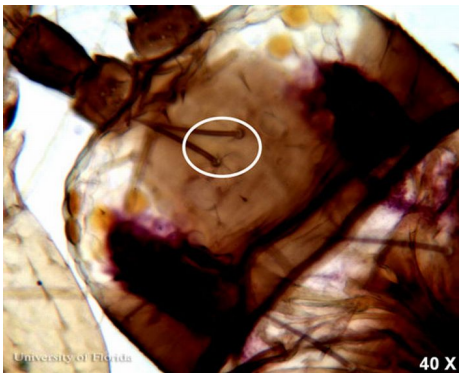

Figure 3. Head of an adult common blossom thrips, *Frankliniella schultzei* Trybom, showing interocellar setae at 40 X magnification. Photograph by: Garima Kakkar, University of Florida

The postocular setae are slightly shorter than interocellar setae on the head of adult female *F. schultzei.*

The anteromarginal setae are slightly shorter than anteroangular setae on the anterior of the prothorax.

The abdominal comb is weakly developed on the 8th abdominal segment.

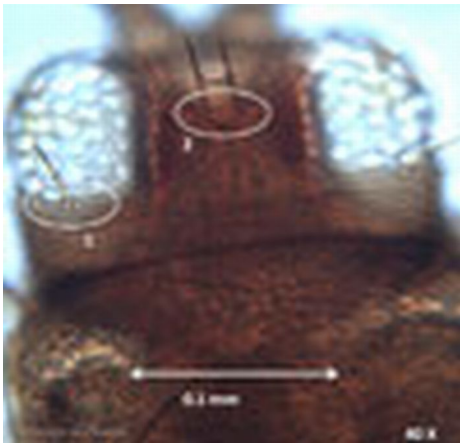

Figure 4. Head of an adult common blossom thrips, *Frankliniella schultzei* Trybom, showing postocular setae (1) smaller than interocellar setae (2) at 40 X magnification. Photograph by: Vivek Kumar, University of Florida

Figure 5. Prothorax of an adult common blossom thrips, *Frankliniella schultzei* Trybom, showing the anteromarginal setae (1) slightly shorter than anteroangular setae (2) on the anterior of the prothorax. Photograph by: Garima Kakkar, University of Florida

Figure 6. Abdomen of an adult common blossom thrips, *Frankliniella schultzei* Trybom, showing a weakly developed comb on the eight abdominal segment at 40 X magnification. Photograph by: Garima Kakkar, University of Florida

THRIPS: A Knowledgebase of Vegetable Thrips, developed by Glades Crop Care and the

University of Florida, includes a graphical identification key for a number of thrips species, including *F. schultzei*, and is available online at http://www.gladescropcare.com/GCC_software.html (Frantz and Fasulo 1997).

Life Cycle

There are two larval instars and two inactive and non-feeding stages in the life cycle. The latter two stages are known as prepupa and pupa. Females of *F. schultzei* insert their eggs in flower tissue. Silvia et al. (1998) in Brazil studied this thrips life cycle at 24.5°C and reported that a complete generation takes around 12.6 days. The embryonic stage lasts for four days and the 1st and 2nd larval instars, prepupa and pupa take an average of 2.5, 2.5, 1.2, and 2.1 days respectively. The adult female and male longevity is approximately 13 days.

Hosts

Frankliniella schultzei is a polyphagous pest feeding on various ornamental and vegetable hosts in different parts of the world (Milne et al. 1996). It has been recorded from 83 species of plants among 35 families (Palmer 1990). The major hosts of *F. schultzei* are cotton, groundnut, beans and pigeon pea.

However, due to its polyphagous feeding behavior, *F. schultzei* also attacks tomato, sweet potato, coffee, sorghum, chillies, onion and sunflower (Hill 1975).

Economic Importance

Crops suffering economic damage due to *F. schultzei* in different part of the world include tomato, tobacco, cotton, grain legumes, groundnut and lettuce in India; ladys fingers, thistle, Japanese daisies, irises, spinach, tomato, carnation, pumpkin, carola (*Tagates erecta*), aubergine and kidney beans in Cuba; *Allium* sp. (cepa) flowers in Netherland; and cotton, tomato, lettuce, pepper, cucumber and tobacco in Brazil.

Frankliniella schultzei can cause both direct and indirect damages to crop. Both adults and nymphs feed on pollen and floral tissue, leading to flower abortion. Severe infestations can cause discoloration and stunted growth of the plant (Amin & Palmer 1985). However, indirect damage by *F. schultzei* is due to the virus transmission.

Figure 7. Cucumber flower showing decoloration due to feeding by adult common blossom thrips, *Frankliniella schultzei* Trybom. Photograph by: Vivek Kumar, University of Florida

Figure 8. Distorted cucumber fruits due to feeding by the common blossom thrips, *Frankliniella schultzei* Trybom. Photograph by: Garima Kakkar, University of Florida

Tomato spotted wilt virus (*Tospovirus*), is a serious virus causing damage to a wide range of plant species (Prins and Goldbach 1998). The tospoviruses can only be transmitted by thrips and the first record of thrips as vector of plant viruses was by Best (1968).

In Florida, four species in the genus *Frankliniella* are responsible for the transmission of tomato spotted wilt virus (TSWV). These are *F. bispinosa*, *F. fusca* (Hinds), *F. occidentalis* and *F. schultzei* (Mound 2004).

The dark form of *F. schultzei* is known to vector at least four tospoviruses: TSWV (Sakimura 1969, Wijkamp et al. 1995) causing damage to tomato crops in Brazil (Monteiro et al. 2001) and in Paraguay (Ishijima 2002); tomato chlorotic spot virus (TCSV); groundnut ringspot virus (GRSV) (Wijkamp et al. 1995) affecting several crops in

Africa (Nakahara 1997); and chrysanthemum stem necrosis virus (Nagata and de Avila 2000). However, the pale form of *F. schultzei* is reported to be a weak vector of TSWV and TCSV and a non-vector of GRSV (Sakimura 1969, Cho et al. 1988).

Management

Sampling. *Frankliniella schultze*i is an anthophilous thrips species and is frequently found feeding on the flowers of its host plant. Like other thrips, *F. schultzei* can also be sampled using colored sticky traps. A study done in Australia reported sexual discrepancies among *F. schultzei* in color preference. In that study, male thrips were most attracted to yellow sticky traps while female thrips were more attracted to pink sticky traps (Yaku et al. 2007).

Biological control. The efficiency of two predatory mites, *Amblyseius cucumeris* Oudemans and *A. swirskii* Athias-Henriot, as potential biocontrol agents controlling *F. schultzei* populations is under investigation. Recently, the two predatory mites were found to be effective in suppressing the chilli thrips, *Scirtothrips dorsalis* Hood, populations on pepper plants (Arthurs et al. 2009).

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