Distribution and dispersion of *Frankliniella schultzei* (Trybom) infesting field cucumbers in S. Florida

Garima Kakkar, Dakshina R. Seal and Vivek Kumar
Department of Entomology and Nematology, University of Florida

Abstract

Frankliniella schultzei (Trybom), common blossom thrips is an emerging pest of economically important various vegetable crops in south Florida. *F. schultzei* is distributed mainly in Africa, India, western Pacific-Australia, Caribbean shore in Colombia to south of Argentina and now in N. America. The direct damage by *F. schultzei* due to feeding causes scarring on host tissues, and in case of severe infestations, it may lead to discoloration and stunted growth of the plant. However, indirect damage by *F. schultzei* is due to the virus transmission to plants, including Tomato spotted wilt virus (TSWV), Tomato chlorotic spot virus (TCSV), Groundnut ringspot virus (GRSV) and Chrysanthemum stem necrosis virus (CSNV). In order to develop a management program for this pest, it is important to understand its behavior and dispersal pattern in the field. Traditionally, insecticides have been applied uniformly to fields, despite the highly varied distribution pattern of insects in a field. Thus, we studied within plant and spatial distribution of this pest to help scouting personnel in sampling and applying control measures selectively and not in the entire field. The current study was conducted in a one acre research plot at Tropical Research and Education Center, Homestead, FL. Cucumber (*Cucumis sativus)* field was planted in rows on a Krome gravelly loam soil. In this study, we found that *F. schultzei* owing to its thigmotactic behavior prefers to feed and reproduce on cucumber flowers with an aggregated distribution in the field.

Introduction

Thrips are a very small insects. Adult females of *F. schultzei* 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 comb on the 8th abdominal segment. The following text and images describe identifying characteristics of *F. schultzei*.

Dorsal view of *F. schultzei* adult

Following are the important identification features for *F. schultzei*.

1. The interocellar setae arise along an imaginary line across the front edges of the two hind ocelli. (fig 1.a).
2. The anteromarginal setae (1) are slightly shorter than anteroangular setae (2) on the anterior of the prothorax (fig 1.b).
3. The abdominal comb is weakly developed on the 8th abdominal segment. (fig 1.c).

Fig 1.a

Fig 1.b

Fig 1.c

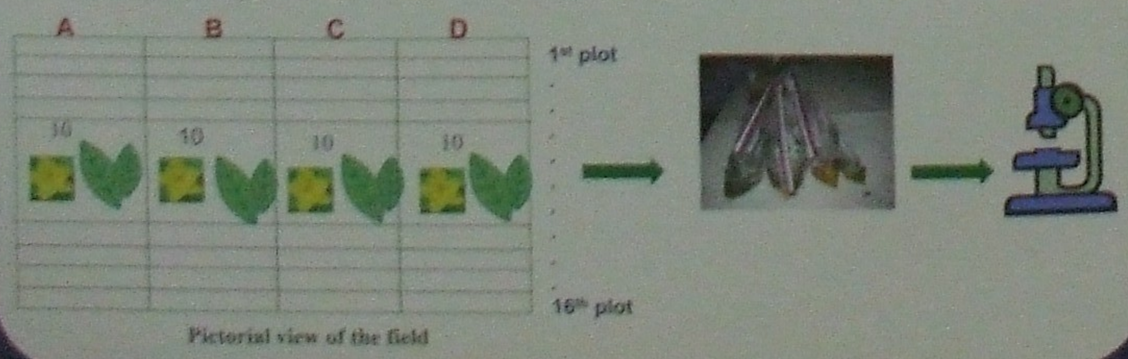
Objectives

The distribution study of a new pest in an area is important to understand its behavior in the field. The two objectives are:

1. To study the distribution pattern of *F. schultzei* on the cucumber plant.
2. To study the within field distribution pattern of *F. schultzei*.

Material and Methods

The study was conducted in two, 0.5 acre research plots at Tropical Research and Education Center, Homestead, FL. Cucumber (*Cucumis sativus)* field was planted in rows on a Krome gravelly loam soil. Each of the two fields were divided into four equal blocks (A, B, C, D) to collect samples for spatial and within field distribution study. Each block was further divided into 16 equal sized plots. The division of field was done to understand the dispersion of thrips in the field with time.



Pictorial view of the field

Sampling and Data collection

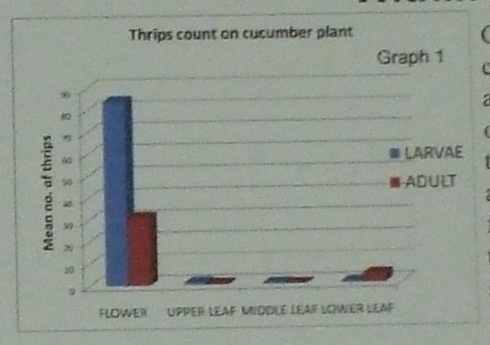
Within plant distribution: Ten plants were randomly selected in each plot. Each plant was stratified into three sections to collect upper leaf, middle leaf, lower leaf and flower

Within field distribution: Flower samples were collected in this study. Sampling was done as discussed for within plant distribution.

- ❑ First sampling was done after one wk of flowering. Samples were collected once a wk for 5 wks.
- ❑ Samples collected for both the studies were placed in separate ziplock® bags and brought back to IPM lab, TREC, UF. The samples were then placed in a one quart plastic cup with 75% ethanol to dislodge various thrips species from leaves and flowers. The thrips in the alcohol were sieved and saved in 75% alcohol. Thrips count was done under the microscope for each plot.

Results and Discussion

Within plant distribution



Graph 1 represents the mean number of larvae and adult collected during 5wks of study. The number of larvae and adults on flowers were significantly higher than that on leaves. Large number of larvae on flowers suggest that *F. schultzei* breeds on flowers of cucumber plants and forms a small microhabitat in the field. The results from the study helps us to understand the behavior of these tiny insects and determine the sampling unit for scouting personnel.

Spatial distribution

Data was analyzed using sigma plots and Fig 2.represents thrips dispersion in the field during 5 wks of study.

Week 1: The infestation was mainly on the outer rows of the field. Thrips number was low.

Week 2: Increase in thrips adult and larvae due to breeding with an inward movement of thrips.

Week3: Increased number of thrips inside the field.

Week 4: Thrips dispersed all over the field

Week 5: Peaks in the fifth plot suggests the aggregated distribution of thrips in the field.

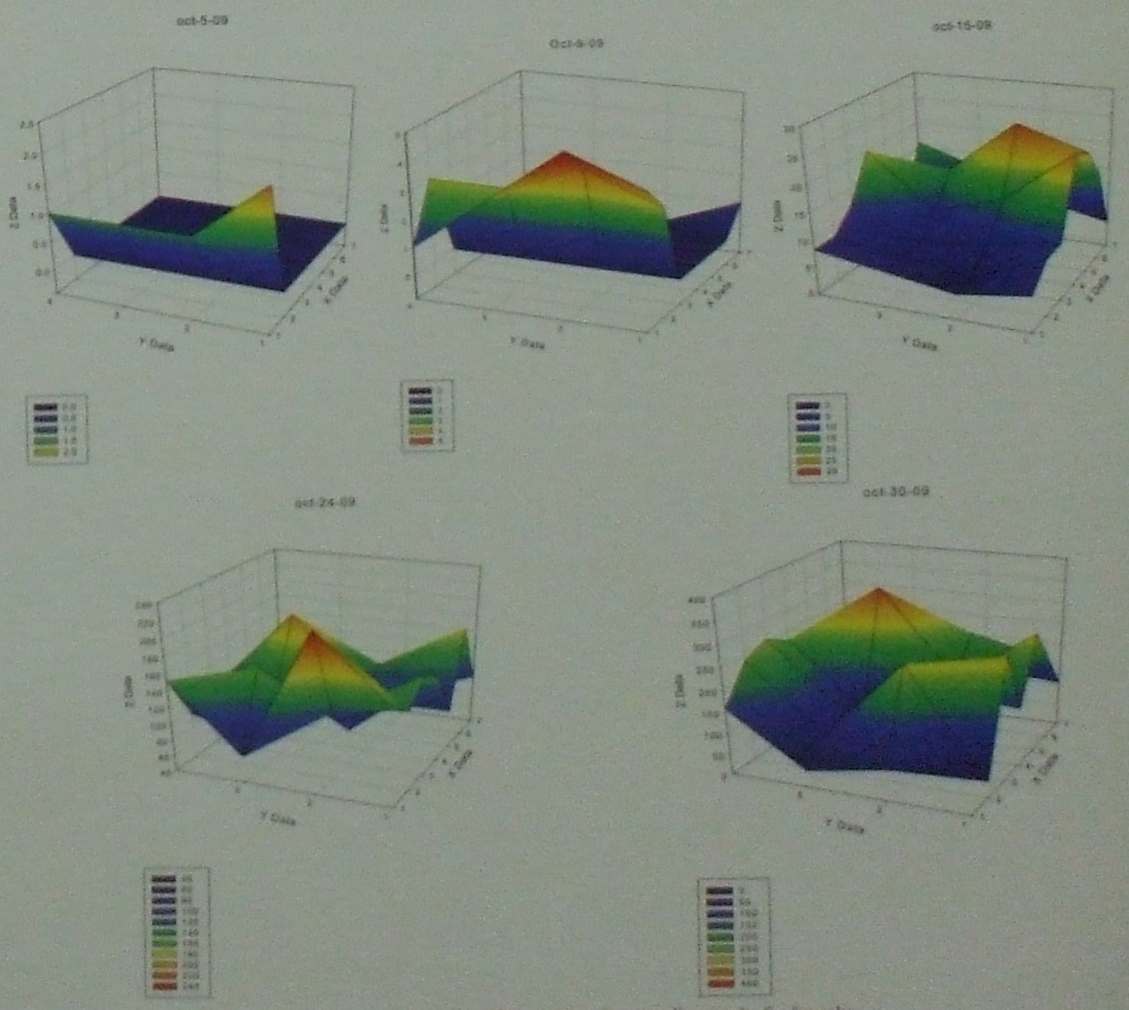


Fig 2. Sigmaplots representing sampling results for 5 weeks

The results from this study indicates that a) Infestation by *F. schultzei* started from edges of the field, slowly progressing inside the field. b) *F. schultzei* forms hot spots in the field suggesting an aggregated distribution in the field.

Based on these results biological controls and bio-rational insecticides can be deployed at the edges of a field when the pest population is low. The application of control measures selectively and not in the entire field will help in reducing the risk and cost of insecticides.