Thrips species in strawberries

Ashley Summerfield, Vineland Research and Innovation Centre; Reilly Smith, Summer Research Assistant, OMAFA; Erica Pate, Fruit Crop Specialist, OMAFA

Published November 2024

Thrips are a major agricultural pest in Ontario, including in strawberries. To better understand the thrips species composition in Ontario, commercial strawberry farms in southern Ontario were surveyed during the spring and summer of 2023. This study included open field, high tunnel, and greenhouse production styles, with the objective of determining the proportion of eastern (EFT) and western (WFT) flower thrips (*Frankliniella occidentalis* and *F. tritici*) and onion thrips (OT, *Thrips tabaci*) in the different production styles.

Methods

Two methods were used to monitor thrips; sticky cards, which were collected weekly, and plant taps, which involves tapping blossom clusters into a tray and collecting any thrips that were knocked out using an aspirator (a device used to suck up small insects into a tube).

These samples were then identified and counted at Vineland Research and Innovation Centre. On sticky cards, western flower thrips (WFT) and eastern flower thrips (EFT) cannot be distinguished and were combined into a single “Flower Thrips” category (WFT/EFT). Whereas in the plant tap samples, they were identified separately.

To accurately identify any pattern between outdoor and protected production styles, high tunnel and field sites were paired up within proximity to one another. From each site, the count data from multiple sticky cards collected each sampling date were combined, and a single species proportion was used per sampling date.

Results

The card counts indicated that the proportion of WFT/EFT was highest in the greenhouse, lowest in the field, and high tunnel was intermediate (Fig. 1). Onion thrips were the second most numerous thrips species in both high tunnel and field. The proportion of onion thrips in each production style was significantly different from others; 33% of thrips collected on sticky cards in the field were onion thrips, compared to 20% in high tunnels and only 0.5% in greenhouse strawberries.

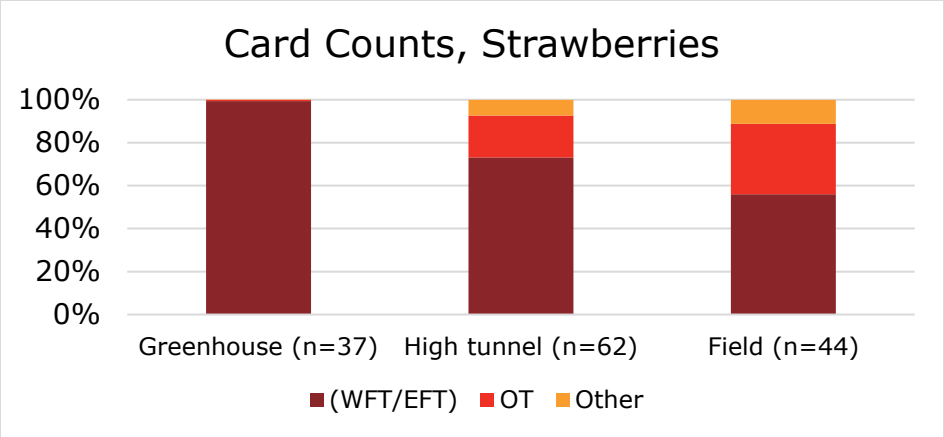

Figure 1. Species composition of thrips caught on sticky cards in Greenhouse, High tunnel, and Field strawberry crops. *Frankliniella* species (*F. occidentalis* and *F. tritici*) were counted together (WFT/EFT) as they could not be reliably differentiated on sticky cards.

The paired field and high tunnel data found location had a significant effect on thrips species composition, while production style (field vs. high tunnel) did not, suggesting that the thrips composition in the surrounding landscape may be a stronger determinant of species proportions than production style. For example, proximity to an onion, garlic, or cabbage field would favour a larger population of OT, while proximity to a floriculture greenhouse may favour WFT. Therefore, it is possible that the high proportion of WFT/EFT in greenhouse strawberries is more attributable to region than production style, although further investigation is necessary.

In the plant tap samples, OT comprised a smaller proportion compared to what was found on the sticky cards (Fig. 2).

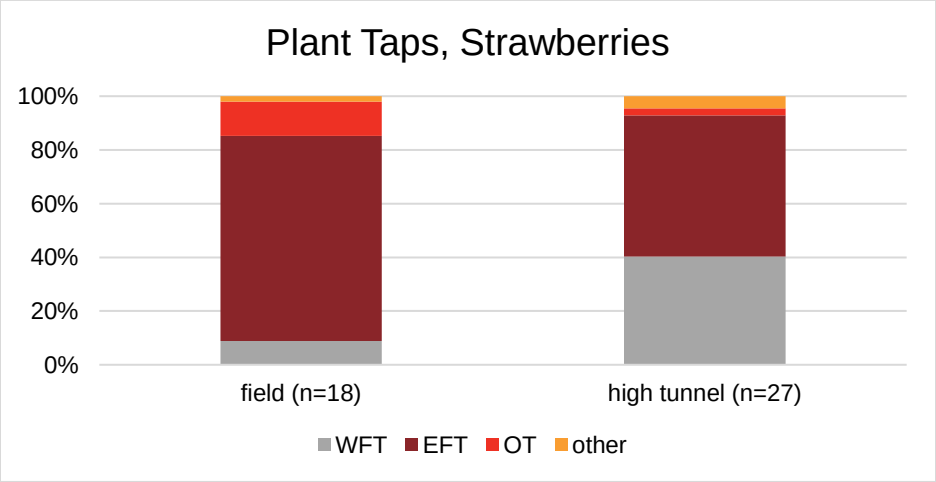

Figure 2. Species composition of plant tap samples

This could suggest that a) OT are caught on cards as they are dispersing, but do not settle or establish in the crop as well as WFT and EFT, or b) that plant tapping method did not favour the collection of OT. Onion thrips are less dependent on flowers compared to WFT & EFT, and are typically found more uniformly throughout the plant, whereas “Flower Thrips” will be more concentrated on or near blooms. If that were the case, then leaf taps may have recovered more OT than what was observed in the flowers.

Overall, of the “Flower Thrips” collected in plant taps, eastern flower thrips were the most abundant species in both production styles, but were a far greater proportion in field grown strawberry (90%) than was found in high tunnel (58%).

In 2024, we continued the project to understand more about the thrips species composition and if there is a difference in production systems (greenhouse vs field) or if it’s due to location as the previous data may suggest. Sticky cards and plant tap samples from commercial strawberry farms in different regions of southern Ontario continued this season and results are pending identification.

Proper identification of thrips is important as effective control measures can vary greatly by species. Identifying the species is necessary to choose appropriate management strategies. To identify thrips on your own farm, check out ‘Thrips under the lens: identification is key’ in the September edition of The Grower or visit the ONgreenhousevegetables blog (ongreenhousevegetables.ca) for thrips identification resources from recent workshops (https://ongreenhousevegetables.ca/2024/09/26/thrips-id-workshop-resources/).

The western flower thrips are the predominant species found in greenhouse strawberries and the most difficult to control with pesticides due to its propensity to develop resistance. In the greenhouse biological control is the primary tool used to manage most thrips and pesticides are a last resort.

Some recommended management strategies:

Cultural control:

- Thrips have a wide host range, including many weed species. Weed control is important to minimize alternative hosts.
- Avoid driving thrips into the field by mowing flowering weeds during strawberry bloom.

Biological control:

- Because western flower thrips have developed resistance to most registered pesticides, biological control is now the primary strategy for controlling thrips in greenhouse crops, including releasing phytoseid mites such as *Neoseiulus cucumeris* or *Amblyseius swirskii*) and predatory bugs and beetles such as *Orius insidiosus* or *Dalotia coriaria*. For a complete list of biocontrol agents, contact a local supplier or keep an eye on the ONGreenhouseVegetables.ca blog for the upcoming release of Publication 836A, *Integrated Pest Management for Greenhouse Fruits and Vegetables*. If adopting a biocontrol strategy early release is important before the thrips population becomes too large and use compatible pesticides as much as possible.

Beauveria bassiana and *Metarhizium brunneum* are beneficial fungal pathogens of thrips that are registered for use in the greenhouse.

Chemical control:

Chemical control of thrips can be difficult due to the timing- thrips are often found during bloom- and because thrips can develop resistance quickly. Thrips are also often hidden in flowers and under the calyx, protected from insecticides, so thorough coverage is essential. Pesticides may be more effective for some thrips species (onion thrips, eastern flower thrips) compared to western flower thrips. If using a pesticide to control thrips, follow these general guidelines:

- Begin applications early, before the thrips population grows too large.
- Apply pesticides in early morning or late afternoon when flight activity of thrips is at a peak. This increases exposure of the thrips to the pesticides.
- Options for thrips control in field grown strawberry includes spinetoram (group 5), cyantraniliprole (group 28), cyclaniliprole (group 28), and flonicamid (group 29)
- Currently only the microbial pesticides mentioned above are registered for use against thrips in greenhouse strawberries.

Figure 3. Thrips damage on strawberry.