

## Managing western flower thrips by the use of bio-control agents in conventional and solar greenhouses

Poonam Singh, Aying Deng and Stephanie Henrichs  
Assiniboine Community College, Canada

Western flower thrips (*Frankliniella occidentalis*) are one of the most important greenhouse pests in Canada and throughout the world. They have a wide host range that includes greenhouse vegetable crops, flower crops, ornamentals and nursery crops. Thrips scratch and pierce their mouthparts into plant tissue to suck out the cellular contents. This results in the deformation of flowers, leaves, shoots and fruits. The damage by thrips reduces the photosynthetic area, weakens plant vigour, destroys the plants visual appeal and produce unmarketable thrips also transmit and spread plant viruses. A study was initiated at Assiniboine Community College's sustainable greenhouse with three conditions; a conventional greenhouse and two solar greenhouses. The objective was to control pests by using biological control agents (living beneficial organisms called natural enemies) and minimize the use of chemical pesticides in the greenhouse. There are a variety of vegetable, nursery and ornamental crops being grown this greenhouse. Before setting up this experiment, a concerted effort was made to control thrips through various pesticide applications with little success. Thrips control was extremely difficult for several reasons. Adult female thrips lay eggs inside the leaf or petal tissue such that the eggs are protected from pesticides. The eggs hatch into larvae which usually remain protected in flower buds or foliage terminals. During the next stage, the insects move down into the growing media to pupate and remain protected from pesticides. Since the two stages (egg and pupal) are completely protected from direct contact with pesticides, successful control with chemicals was limited. The experiments began with regular monitoring the pest population in all three conditions. *Amblyseius cucumeris* (predatory mite) was applied on plant alone and was applied along with soil applications of *Steinernema feltiae* (parasitoid nematodes) to reduce number of larvae feeding on plants and the adults emerging from pupation. Our results revealed that these biological controls agents tested were highly effective at controlling thrips. The pest population numbers and crop damage were significantly reduced in the greenhouse. Effectiveness of bio-control agents to control thrips was higher when both *A. cucumeris* and *S. feltiae* were used together as compared to when *A. cucumeris* was used alone. Within a six months' time period, weekly monitoring revealed that the thrips population in the conventional greenhouse decreased from 132 to 15 per 4 inch<sup>2</sup> yellow sticky card. In the first solar greenhouse, thrips decreased from 50 to 5 per 4 inch<sup>2</sup> yellow sticky cards. The second solar greenhouses saw a reduction from 30 thrips to 3 per 4 inch<sup>2</sup> yellow sticky cards. Currently no pesticide has been applied for over a year. The thrips are being successfully managed using only bio-control agents. Bio-control agents have proved to be safe, effective, environment friendly, target specific (in comparison to chemical pesticides) and are providing a long-term solution to the pest problems.

### Biography

Poonam Singh is a Researcher and Instructor at Assiniboine Community College's Horticultural Production and Sustainable Food Systems programs. She holds a Bachelor of Science Degree in Agriculture; a Bachelor of Education Degree; a Master of Science Degree in Landscaping and Floriculture and; a Doctorate Degree in Horticulture. A majority of her experience relates to teaching, research and outreach within horticultural sciences. Her major research interest includes "Development of technologies/products for sustainable horticultural production, enhancing food security in Canadian First Nation communities, exploration and enrichment of plant germplasm for genetic enhancement and plant physiological studies".

singhp@assiniboine.net

### Notes: