Trap plants for Western flower thrips

Western flower thrips is a serious greenhouse pest worldwide affecting both ornamental and vegetable crops. Controlling this insect accounts for over 25 percent of insect pest management costs in Canada's floriculture industry. Thrips are especially difficult and expensive to control because many of its life stages are hidden in the plant foliage.

The use of trap plants is being investigated for many cropping systems in Canada to provide a new control option for growers in their Integrated Pest Management (IPM) toolbox. Trap plants are more attractive to pests than the "main" crop and concentrate the pest population in a localized site away from the crop where they can be controlled more effectively. The greenhouse offers an ideal situation to use trap plants because it is an enclosed, controlled environment where pest attacks are often predictable.

During 2004-2006 Agriculture and Agri-Food Canada (AAFC) and Flowers Canada (Ontario) have investigated the use of trap plants as part of an integrated pest management (IPM) strategy against thrips on potted chrysanthemum.

Studies coordinated by scientists at AAFC's Greenhouse and Processing Crops Research Centre in Harrow, Ontario tested different potential trap plants such as flowering potted chrysanthemum, flowering potted gerbera and eggplant. Yellow flowering chrysanthemum plants (var. Chesapeake) were the most attractive plants for the thrips and were chosen as trap plants in the rest of the experiments. The studies also demonstrated that thrips preferred the flowering chrysanthemum trap plants over vegetative chrysanthemum plants, plants with buds or with cracking buds (Figure 1). This allows for the flowers to be used as trap plants in chrysanthemum production for almost the complete production cycle.

To understand better how trap plants work, scientists evaluated how the trap plants attracted thrips that were present on a crop plant compared to thrips that were flying through the greenhouse. Although many thrips moved from the crop plants to the trap plants, a significant proportion stayed in the crop (Figure 2).

In contrast, trap plants attracted more of the dispersing thrips. Therefore, it is important to place trap plants at sites where thrips are dispersing or moving through the greenhouse such as vents and doorways or between flowering and non-flowering crops.

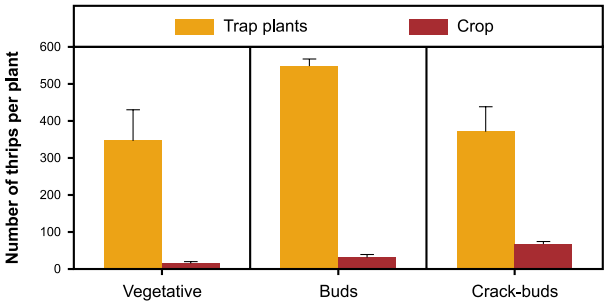

Figure 1. Thrips prefer flowering chrysanthemum plants over all other plant stages (vegetative, bud and crack-bud).

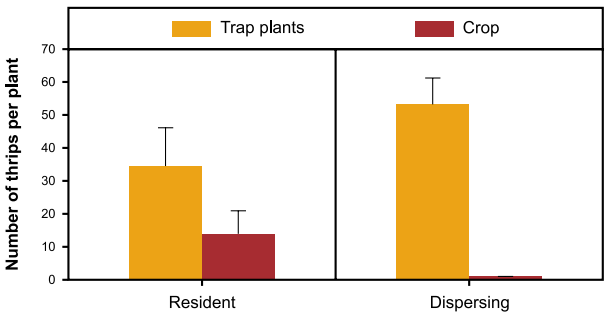

Figure 2. Thrips that were resident on the crop (vegetative chrysanthemum) moved less to flowering chrysanthemum trap plants than dispersing thrips.

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The results from the small-scale research trials at Harrow were then transferred to larger scale research and commercial greenhouses. Trap plants reduced thrips populations in the crop both in the research greenhouses and in the commercial trial (Figure 3). The effect became visible in the third week of the experiments. In all trials, trap plants were replaced weekly to prevent the build-up of thrips populations. Tests were also conducted to evaluate if the efficacy of the trap plants was improved by treating them with an insecticide such as spinosad (Success®) that would kill the thrips. Results indicate that the insecticide did not make a difference. This suggests that once on the trap plant, the thrips stay and do not move back into the crop until the food resource is depleted. However, if trap plants are kept longer than one to two weeks, it is likely that the thrips will eventually leave the trap plant when the flowers start to wilt. In this case, it is expected that measures to control the thrips on the trap plants would improve their efficacy. The last experiment compared different placements of trap plants in the crop and compared perimeter versus intercropping placement. Placing the trap plants interspersed in the crop provided the best thrips control (Figure 4).

These experiments show that trap plants are a valuable IPM tool to manage thrips populations in ornamental crops. By concentrating the thrips on the trap plants, the grower can more easily control any residual thrips populations on the crop using other IPM tools such as biological control.

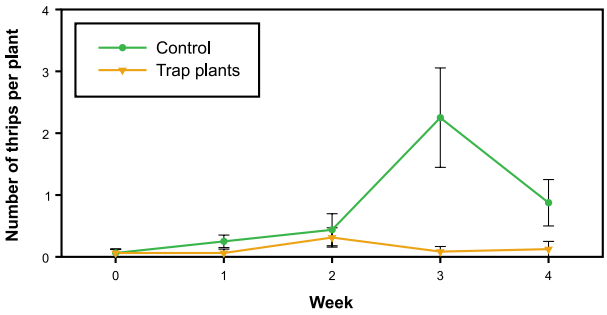

Figure 3. Trap plants reduced thrips populations in the crop under commercial growing practices and natural thrips infestations.

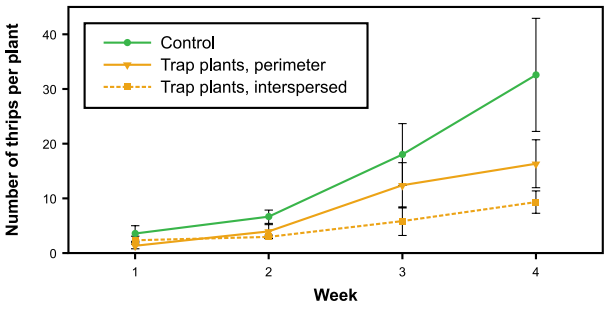

Figure 4. Placing the trap plants interspersed in the crop reduced thrips populations in the crop more than placing them on the perimeter.

Perimeter placement **Interspersed placement**

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