United States Department of Agriculture

RNAi for Western Flower Thrips Control

Man-yeon Choi & Kelly Donahue

Tomato Spotted Wilt Virus vectored by WFT

Stages of thrips life cycle

One of the world's most economically important pests, Western Flower Thrips (WFT) are a very small soft bodied insect native to the Southwestern United States. WFT have become invasive in other parts of the world due to the global market of plant material. It can be found in both greenhouse and field environments having a very broad host range including many ornamental, nursery and vegetable crops. It is the most economically important of the thrips species largely due to its ability to vector viruses, especially Tomato Spotted Wilt Virus, which damages crops. It is a significant pest of cucumbers, sweet peppers, eggplants and many ornamentals.

Thrips are a piercing-sucking insect that can be found on the leaves, buds, flowers and fruits. Damage is due to feeding on the surface of plant tissue, which can vector viruses, and from oviposition which takes place inside tissue. Current control relies on routine insecticide applications and IPM. Years of repeated insecticide applications have led to resistance of WFT to certain chemical families. The Choi lab hopes to find a more environmentally friendly treatment that can be used in an IPM program for control of WFT. Molecular tools such as RNA interference (RNAi) and Receptor interference (Receptor-i) offer potential to target a specific gene in the thrips genome that when knocked out would critically impact the survival of thrips.

The lab has established a WFT colony that can be used to identify DNA markers and potential targets for RNAi. With RNA extraction, we have identified an internal transcribed spacer (ITS) gene as a DNA marker in 2 separate WFT strains, one from OR and one from Korea. Since the DNA sequences were identical in each strain, the ITS gene can be used for molecular ID. The pheromone biosynthesis activating neuropeptide, known as PBAN, was also identified. This family of neuropeptides function to control pheromone production, muscle contraction and diapause in various insects. Future research will look at the PBAN gene and potential gene targets that would be useful for the application of RNAi and Receptor-i.

Feeding damage on leaf surface

Any questions or suggestions, please contact Man-Yeon Choi (mychoi@usda.gov), Research Entomologist, or Kelly Donahue (kelly.donahue@usda.gov) with the USDA-ARS HCRU.

Pacific West Area – Horticultural Crops Research Unit
3420 NW Orchard Ave. Corvallis, OR 97330-5098
Voice: 541-738-4021 Fax: 541-738-4025

Agricultural Research - Investing in Your Future