

Thrips—An Elusive Greenhouse Pest

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Greenhouse flower thrips, particularly the Western Flower Thrips (*Frankliniella occidentalis*), can cause severe crop damage before it is detected.

Several factors make it difficult to detect the presence of thrips:

1. They are relatively small insects (less than 1/8-inch long), which appear cigar-shaped under magnification.
2. They run and/or jump very quickly when disturbed and hide between overlapping flower petals or within opening buds and axils of leaves.
3. Their entire life cycle is completed in 14 to 35 days, depending upon temperature. Thus a rapid build-up may occur before the thrips are detected or a significant amount of plant injury is apparent.

Prevention and/or Reduction of Thrips Introduction

Prevention of the thrips infestation requires using some of the old "tried and proven" cultural techniques, such as:

1. Carefully inspect all newly received plant material, keep it isolated from the general production area for several weeks.
2. Remove all weeds from both within and outside the greenhouse. Weeds provide a hiding and breeding place for thrips and other greenhouse pests. Eliminate this source.
3. Clean and disinfest empty benches and growing areas prior to reusing the space. "Good housekeeping" procedures should significantly reduce thrips.

Monitoring or Scouting for Thrips Takes Some Practice

1. Thrips must be forcibly dislodged from plants. This is accomplished by sharply tapping a flower or leaf over a sheet of white paper. A 10-20 power hand lens will aid in spotting the rapidly moving thrips.
2. Yellow sticky traps placed just above the crop and checked daily, aid in early detection. When 20 or more thrips are detected per week, start an aggressive spray schedule. Recent Canadian research indicates

that thrips are more attracted to blue colored sticky traps. Either colored trap should be replaced weekly.

Western Flower Thrips transmit tomato spotted wilt virus (TSWV) from infected to healthy plants. TSWV has been reported to affect 170 plant species in 34 families. Symptoms of this virus are influenced by species, cultivar, stage of growth and greenhouse environment. Typical symptoms may include: necrotic and chlorotic ringspots, leaf distortion, leaf surface scarring, chlorosis, stunting, wilting and plant death. Infected plants may also remain symptomless.

Control of western flower thrips requires at least three applications, five days apart of one of the following:

Highly Effective	Class
Avid (8 oz./100 gal.)	Natural Product Mix
Lannate	Carbamate
Dursban	Organophosphate
Effective	
Orthene	Organophosphate
Thiodan	Chlorinated Hydrocarbon
Knox-Out 2 FM	Organophosphate
Cygon	Organophosphate
Metasystox R	Organophosphate
Vydate	Carbamate
Dycarb	Carbamate
Mavrick	Pyrethroid
Carzol	Carbamate

The following spray techniques have been observed to improve the effectiveness of the above materials:

1. Spray with adequate solution, rather than fogging or fumigating.
2. Alternate between different classes of insecticides to avoid the development of resistance.
3. Combine synthetic pyrethroids (Mavrick, Talstar, etc.) with another class of insecticides to "flush" thrips out of hiding. This will increase the thrips' contact with insecticides.
4. Add sugar at the rate of 1 to 1 1/2 lbs./100 gal. of spray solution to increase thrips' feeding activity and thus rate of kill.
5. Spray two times/week for three weeks.
6. Rogue (throw out) severely infested plant material.
7. Be persistent.

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Potting media: To test or not to test?

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Soil testing represents a relatively quick and inexpensive procedure used to estimate (monitor) the general nutritional status of the crop. There are a number of different assay or test procedures used by various testing labs. All procedures are designed to extract the nutrients from the soil which are available to the plant. These numbers are correlated with plant growth, so that the grower and/or specialist can identify potential or existing problems and develop corrective measures if needed.

Why test? Simply put, monitoring soil nutrition allows the grower to better manage the crop.

Obtaining a soil test is a useful "preventive" step in the management of the crop. Potential problems can be identified and corrected

before the crop is planted. During the crop, test results are useful for solving problems which may arise and identifying trends or changes in soil mineral nutrition which could become problematic if left unchecked.

Monitoring soil nutrition and adjusting fertilizer practices accordingly will help save fertilizer and may reduce the need for fungicides by avoiding the high salt levels which favor the outbreak of *Pythium* root rot. Many growers seem to use a binge and purge management strategy on their crops. Fertilizer is applied in excess and then leached out of the pot and onto the ground when the plants begin to suffer. By testing the potting medium on a regular basis, steadily rising salt levels can be detected and corrective measures taken.

How to sample. Pulling a representative soil sample from a crop is extremely important. If the sample does not accurately represent the potting medium of the crop as a whole the results and the interpretation of the results will not be of value and could actually be misleading.

The objective is to pull enough different samples to accurately reflect the nutritional picture of the crop. It is also important to obtain the sample without contamination from foreign materials (i.e. lime, fertilizer salts etc.) in the pail used to collect the sample which may affect the test results.

Each soil sample kit from The University of Connecticut soils testing laboratory contains explicit instructions on how to obtain a sample. Follow these instructions carefully.

Take samples at least six hours after irrigating and at least five days after a feed (preferably just prior to feeding and irrigating), be consistent and always sample at the same time in relation to a fertilizer application. Scrape away and discard the top 1/4" of soil. For pot crops, remove a vertical slice or profile from at least six pots. Mix the samples in a clean bucket, transfer the sample to the test kit and submit it to the testing lab.

When to test. It is a good idea to sample before a crop is planted, especially when formulating your own potting medium. Also sample and test the medium during the crop. This is best done whenever you reach a critical stage in the production of the crop. Critical stages of crop development are represented by changes in the growth of the crop, i.e. the switch from vegetative growth to flowering or anticipated changes in the nutritional management of the crop such as the period of color development of a poinsettia crop.

Test at or before the point in crop development when you typically encounter problems. Also test whenever you grow a new crop, use a

new potting medium or experiment with a new feed program. The soil test results along with your notes on the crop's performance will aid in evaluating these changes in the production program after the crop is finished.

Providing information. Included in each soil sample kit is an information sheet. Take time to fill out the sheet. The information sheet is designed to supply information to the educators and specialist who will interpret the results and provide recommendations. Once the sheet is filled out, it provides the grower with a hard copy of the information which is pertinent to the crop or problem at hand. You may find this record useful in the future. On the back of the sheet is a list of index numbers the grower can use to interpret the test results.

The information sheet contains six questions which the grower must respond to. These questions were designed to force the grower to look closely at the plant, including the upper and lower leaves and the root system, and to describe the symptoms, if a problem exists. The sheet also requests the grower to provide information on the growing medium used (along with any amendments) and the irrigation and feed practices. This information enables the extension agents to make specific recommendations instead of more general suggestions.

Purchasing test kits. Soil test kits cost \$2.00 each and are available at all extension offices and at the Department of Plant Science, W.B. Young Building, room 116B, on the Storrs campus. Growers can also request test kits by mail or over the phone by writing or calling the Storrs campus: College of Agriculture and Natural Resources, Department of Plant Science, U-67, 1376 Storrs Road, Storrs, CT 06269-4067 (203-486-2928). Soil test kits obtained by mail cost \$2.50, additional charges cover the cost of postage.

Samples obtained from greenhouse growers receive top priority in the testing lab and are usually processed within three days.

