

REVISITING THE USE OF VIRUS INDICATOR PLANTS

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With bedding plant season beginning, I thought a review of using indicator plants might be helpful. Most growers know the Impatiens Necrotic Spot Virus (INSV) and Tomato Spotted Wilt Virus (TSWV) are transmitted by western flower thrips. Growers are also aware that INSV diagnosis is difficult due to widely variable symptoms on a variety of plants. Over the past several years, the UMass Plant Pathology Laboratory has diagnosed many cases of INSV in spring crops, cyclamen and gloxinia. Some growers have had a small number of plants infected with INSV on the same crops each year, while others have lost significant numbers of plants.

We have learned that virus epidemics usually start in one of two ways: from carried-over virus and thrips within a crop or weeds, or by transmission from newly-introduced cuttings primarily from spring crops. Some of the cutting-propagated crops implicated as virus/thrips sources include begonias, double-flowered impatiens and New Guinea Impatiens. Pinpointing the origin of a problem is usually impossible - virus from one source and thrips from another may interact to produce an epidemic involving many plant species. Growers concentrating all of their plants in a single house during winter months run a greater risk of mixing INSV-free seed crops with either leftover fall crops, or new cutting crops that may carry the virus.

Once symptoms suggest that INSV may be present, growers can confirm their suspicions using their own test kits or by sending samples to a diagnostic lab. Test kits are now commercially available from Agdia at a cost of \$150 for 24 samples. Information on using their test kits is available on their web site, www.agdia.com. Some growers find the test kits to be a convenient and valuable tool. Most growers, however, still send samples to a laboratory for confirmation. Dr. Rob Wick, UMass Diagnostic Laboratory, will test for INSV using ELISA (enzyme-linked immunosorbent assay) for \$25 per sample. For the past two years the Greenhouse IPM program has conducted a thrips/INSV survey for growers. Costs of the INSV tests have been partially supported by the UMass Agroecology IPM Program.

A grower's best defense against INSV is to detect it before it destroys a crop. Several years ago, research was conducted using indicator plants to detect the presence of INSV infected thrips in a greenhouse. A few growers tried using indicator plants when the information first came out, but for the most part, growers haven't adopted this practice. After surveying greenhouses for INSV over the past few years and seeing how wide spread INSV has become, and how difficult thrips are to manage, it is time to revisit the practice of using indicator plants.

Petunias and fava beans have been successfully used to detect the presence of thrips infected with TSWV and INSV in greenhouses. Both petunias and fava beans are very attractive to thrips and readily show signs of feeding injury when western flower thrips are present. The petunia cultivars Calypso, Super Blue Magic and Summer Madness have been shown to make good indicator plants for several reasons. First, these varieties are highly attractive to western flower thrips. Secondly, infected petunia plants do not serve as

source of virus in the greenhouse because INSV does not become systemic within these petunias. Infected leaves can be picked off and discarded and petunia indicator plants can remain in the greenhouse to continue monitoring. Another reason is that the virus lesions show up very soon after thrips feed. Thrips feeding injury on the foliage leave distinct white feeding scars. If the thrips are carrying INSV, a brown rim and, later, a circular lesion can be seen around the white feeding scars as early as 2-3 days after exposure to thrips.

It is important to attract and encourage thrips feeding on the foliage of indicator plants. If thrips don't feed on the foliage, you won't see the distinctive viral lesions. To encourage thrips to feed on the foliage of indicator plants, keep the petunia flowers removed from the plants and place a blue **non-sticky** card in each pot at plant height. The blue card will attract thrips to the vicinity and increase the chances that they will actually land on the petunia plants. Blue plastic picnic plants cut in half work well for this purpose.

Petunia indicator plants should be placed among crops at bench or floor level at a rate of one plant every 20 to 30 feet. It has been shown that they should be placed in areas with higher thrips populations, especially if crops potentially susceptible to INSV are present. Though thrips are weak fliers, they may be carried throughout an entire range on air currents, plant material or greenhouse workers. If possible, isolate incoming plant materials with indicator plants for at least three to four days to allow time for thrips scars to develop and show viral lesions.

The fava bean cultivar Aquadulce also works well as an indicator plant. The same general principles apply for using fava bean plants except for one important difference - do not leave virus infected plants in the greenhouse. Any thrips that develop on them can spread the virus to other plants. Remove entire pots once symptoms are observed and replace them with new pots planted with bean seeds. Fava beans do not have a lot of foliage and therefore more plants are needed than when using petunias. One suggestion is to plant one bean seed per 4" pot and place the pots throughout the greenhouse at a rate of 12 pots per 1,000 sq. ft.

Check the bean plants daily. White scars will indicate thrips feeding and a brown rim around the feeding injury indicates that thrips are carrying the virus. Do not confuse leaf spots caused by fungus with those caused by virus. Watch thrips populations and feeding injury as clues. Indicator plants can be a helpful tool for detecting INSV early and for evaluating your cleanup program's effectiveness after INSV has been detected.

Author's note: *I would like to hear from growers using indicator plants this spring. Please call and let me know your experiences. Tina.*

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