

10-1-2010

101 Ways to Try to Grow Arabidopsis: INSV—Your Worst Arabidopsis Nightmare?

Robert Eddy

Purdue University, robeddy@purdue.edu

Daniel T. Hahn

Purdue University, dhahn@purdue.edu

Follow this and additional works at: <http://docs.lib.purdue.edu/pmag>

Suggested Citation

Eddy, Robert and Hahn, Daniel T., "101 Ways to Try to Grow Arabidopsis: INSV—Your Worst Arabidopsis Nightmare?" (2010).
Purdue Methods for Arabidopsis Growth. Paper 22.
<http://docs.lib.purdue.edu/pmag/22>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

Purdue Methods:



INSV--Your worst *Arabidopsis* nightmare?

Impatiens Necrotic Spot Virus (INSV) is a viral disease that kills *Arabidopsis*. It is vectored by western flower thrips, a common greenhouse pest that is attracted to flowering plants. Symptoms include:

- Clearing or yellowing of leaf midrib
- Leaf collapse
- Wilted or collapsed flower stems
- Purpling of leaves, symptoms sometimes displayed on just one side of the plant
- Sudden death of a few plants in a tray or pot, followed by death of more plants

We've experienced fast outbreaks during summer weather, when both the thrips and the disease are more virulent, according to Extension Service specialists. Sometimes this has happened in multiple greenhouse rooms when thrips population was low. Perhaps plants were infected but asymptomatic until heat stress occurred.

INSV can infect more than 600 species, including many commercial floriculture crops and outdoor weeds. Excellent thrips control, roguing of infected plants and strict quarantine procedures are required to eliminate this disease. We recommend immunostrip test kits should be kept on hand for quick diagnosing. They can be stored in a refrigerator for one year. One commercial source is Agdia of Elkhart, IN.

Responding to an infection

Once INSV is discovered in a greenhouse room, there are two practices to choose from, "clearing" or "containment." For the former, all plants in an infected greenhouse room are discarded. The room is cleaned of all plant material and rubbish that could harbor thrips. The room is left empty for 4-7 days. Only newly seeded plants are allowed back in the room. Of course, clearing a room is often not possible because of irreplaceable plants.

Containment involves discarding any plants showing symptoms and any plants that are easily replaceable even if they don't exhibit symptoms. The goal is to get the greenhouse empty as soon as possible while collecting seed or other valuable tissue for the research project. A date is set that all plants will be removed, allowing enough time for seed maturation. Aggressive pesticide spraying and sanitation is implemented. Dedicated lab coats are kept in the room that all personnel must wear so they don't carry thrips out into other areas.

Preventing an infection

At Purdue, we have vastly reduced incidence of the disease by implementing a rotating greenhouse room schedule. A room is cleaned and emptied for several days, then newly seeded or cultured plants allowed in the room for two months. At that time, no more plants are allowed in (a new, clean room is made available for new plants) but the plants present in the room are allowed to remain until harvested. Following harvest, the room is cleaned again. Avoiding the continuous culture of plants breaks the thrips life cycle. The theory is simple but the implementation requires a great deal of communication. It will most likely require pooling many labs into the rotating rooms, rather than allocating each lab their own room.



Figure 1. Mid-rib clearing symptom of INSV. In our experience, this symptom is most closely associated with positive test results for INSV.



Figure 2. Leaf collapse. Note: Leaf skeletonization is unrelated fungus gnat feeding.



Figure 3. Purpling of leaves on one side of plant symptom of INSV. A phosphorous deficiency would be displayed evenly on both sides of plant.



Figure 4. Collapsed flower stems symptom of INSV. The stems appear brown or pale green.



Figure 5. Random distribution of dead plants in and INSV outbreak. Some plants appear perfectly healthy.

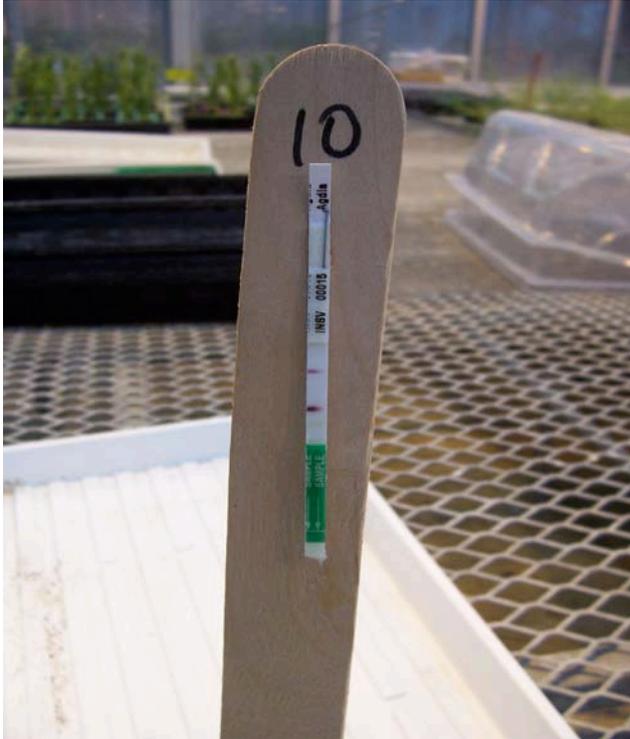


Figure 6. An immunostrip showing positive test for INSV (two red stripes). The test takes 2-3 minutes and requires only a dime-sized piece of symptomatic leaf.



Figure 7. The “Arabidome”. Clear dome with thrips-proof screen for air vent on top. Sealed with tape. Designed to keep thrips out.