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**148. New fungicides offer *Phytophthora* control.** Hausbeck, M. Greenhouse Management and Production 29(4):41-43. 2009.

# New fungicides offer Phytophthora control

by Mary Hausbeck

*Phytophthora* sp. (*Phytophthora nicotianae* and *Phytophthora drechsleri* are examples) can be found in floriculture crops and can cause root, crown and foliar blights. Losses can be especially severe in greenhouses and production fields where warm temperatures and ample water favor disease epidemics. Recirculating irrigation water can enhance the spread of Phytophthora.

## Control is difficult

Phytophthora is difficult to control because it produces several different spores that can cause disease. Thick-walled oospores survive between crops on plant containers, benches, floors and in potting media or soil. Other spores include lemon-shaped sporangia, thick-walled chlamydospores and swimming zoospores. Water is important for the spread of the disease. Under warm, wet conditions many spores develop on infected plants and lead to a rapid build-up of disease and spread in a short period of time.

Once an epidemic has developed in a production site it is often difficult to determine how the Phytophthora was introduced, how it is spreading and if it is surviving from year to year. Using genetic tools, research conducted at Michigan State University showed that Phytophthora spread within the greenhouse can occur from zoospores that disseminated through water.

Recent research also shows how Phytophthora may spread among growers. For instance, snapdragon growers at two locations purchased plugs from the same supplier. The Phytophthora from the two locations was identical. While it is possible that the disease was introduced to the locations via infected plants, it is also possible that the Phytophthora was already established at these production sites. The Phytophthora recovered from snapdragons was identical to the Phytophthora collected from the same facility in a previous year indicating the potential for this pathogen to survive even with a fallow period and treatment with a fumigant (methyl bromide/chloropicrin).

In another example, verbena propagated at one greenhouse via cuttings was sold to two other greenhouses for finishing. The finding that the Phytophthora from all three locations were genetically identical suggests that infected plants could have spread *P. nicotianae* from the propagator to the two growers.

## Control challenges

Controlling the spread of *Phytophthora* sp. within and among production facilities can be difficult, and there are two major challenges.

**1. Phytophthora must be kept out of the production site.** This is particularly difficult with floriculture crops because of the widespread distribution of pre-finished plants. Also, plants may not exhibit obvious symptoms until the infection is well established or the plants become stressed (e.g., over- or

**Table 1. Products tested for activity against Phytophthora.**

| PRODUCT | ACTIVE INGREDIENT | LABELED |
|---|---|---|
| Adorn 4SC | fluopicolide | No |
| Mandipropamid 250SC | mandipropamid | No |
| Subdue MAXX EC | mefenoxam | Yes |
| Segway 400SC | cyazofamid | Yes |
| FenStop SC | fenamidone | Yes |
| Fluazinam 500F | fluazinam | No |
| Palladium 62.5WDG | cyprodinil + fludioxonil | Yes |
| SP2015 WDG | experimental | No |
| Insignia 20WG | pyraclostrobin | Yes |
| Alude L | phosphorous acid salt | Yes |
| Terrazole 35WP | etridiazole | Yes |
| Stature DM 50WP | dimethomorph | Yes |

under-watering). Infected plants treated with fungicides may appear healthy until the fungicides wear off and Phytophthora increases.

**2. Eradicating Phytophthora once it has been introduced.** Removing visibly diseased plants will not prevent spore production and spread from plants showing few if any symptoms. Sanitation can limit disease and includes removing plant debris and disinfesting pots and production surfaces. Routinely treating plants with fungicides including mefenoxam (Subdue MAXX) can be helpful. However, Phytophthora can develop resistance to these fungicides and new management strategies and tools are needed.

## Testing fungicides

New Phytophthora products have been introduced with more expected to become commercially available. My plant pathology lab has tested these products for their ability to halt Phytophthora on several crops.

Many crops are susceptible to Phytophthora. Gerbera, poinsettia and pansy were chosen for the Michigan State trials. The fungicides were applied to the plants as a drench in sufficient volume to displace approximately 10 percent of the liquid in the containers. One day after the fungicide drench, a Phytophthora zoospore solution was injected into the growing medium

## Scouting Notes

**Understand pesticide product labels.** Pesticide labels not only give you specific rates, but provide a technical breakdown and need-to-know information prior to application. Todd Burkdoll, BASF Turf & Ornamentals market development specialist said the five key areas to read on labels are:

**1. Mix mindfully**
The tank mixing section of a label explains exactly how to combine a product with other additives. Ignoring these guidelines can create an un-usable compound, clog application equipment and reduce efficacy. Be aware of variances between generic and patented formulas. Even though an active ingredient may be the same, its formula could require different a mixing order.

**2. Follow special statements**
Special label statements describe how to use a product for particular conditions. In uncontrolled climates, weather is an important variable. Make note of the rainfast or drying times in the special statement or your pest control efforts could be lost to precipitation.

**3. Know group numbers**
Group numbers help avoid the risk of resistance by identifying which pesticide products operate under the same mode of action. Group numbers can be used to organize products with different modes of action into a rotation program.

**4. Acknowledge use requirements**
Agricultural and non-agricultural use requirements on product labels are important and vary depending on product use.

**5. Follow restrictions and limitations**
Carefully read the "general restrictions and limitations" section on product labels. Knowing the "do not" statements list can mean the difference between producing profitable, healthy plants or damaging an entire crop with poor application practices.

Current labels can be found online at the Crop Data Management Systems Inc. Web site www.cdms.net.

**For more:** Todd Burkdoll, BASF Turf & Ornamentals, james.burkdoll@basf.com.

**Foliar nematodes attack perennials.** Foliar nematodes are microscopic and move in films of water on plant surfaces and enter leaf tissues through stomates. Lesions caused by foliar nematodes are first chlorotic, then necrotic. Early symptoms can appear as small speckles or spots, which look similar to fungal leaf spot diseases or chemical injury. Nematode movement within the leaves is restricted by larger veins, resulting in necrotic lesions with an angular shape.

Foliar nematode damage. Photo by Selin Balci

Foliar nematodes overwinter in plant debris or on infected perennial plants. They survive for long periods of time in leaf tissues and are spread by propagating infected plants and by splashing water. Perennials susceptible to foliar nematodes include anemone, begonia, ferns, hellebores, heuchera, hosta and salvia.

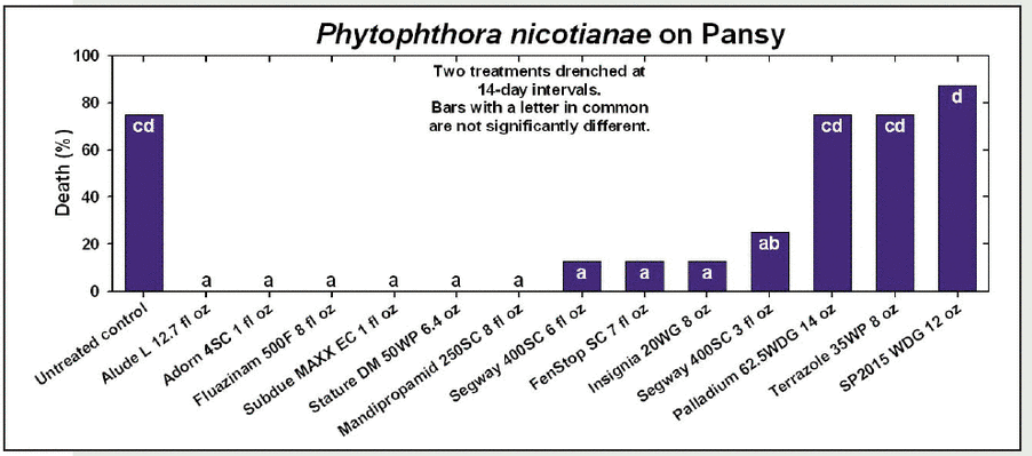
University of Maryland cooperative extension officials said the easiest way to manage foliar nematodes is to avoid bringing them into your operation. Sanitation is the key to keeping these nematodes in check. Carefully inspect new plants for foliar nematode symptoms. If symptoms develop, remove and destroy affected plants.

Pylon is registered for controlling foliar nematodes, but this treatment will only knock down populations, not completely eradicate them.

**For more:** University of Maryland, Central Maryland Research and Education Center, (301) 596-9413; http://ipmnet.umd.edu/ipmupdte.htm.

**Nematodes offer thrips control option.** Different species of entomopathogenic (insect-killing) nematodes are available for soil dwelling pests, reports University of Connecticut greenhouse IPM specialist Leanne Pundt. Growers have been successful applying *Steinernema feltiae* (Nemasys, Nemashield, ScanMask) as a drench against fungus gnat larvae, especially in propagation areas. *S. feltiae* also attacks the pupal and prepupal stages of western flower thrips that are primarily found in the growing medium. Be aware that some thrips may also pupate in chrysanthemum flowers. Nematode efficacy is variable depending on the greenhouse relative humidity and temperature, rate applied, application frequency and the thrips life stage. Pundt said applying the nematodes as a heavy surface spray (sprench) to young, incoming plant material has an added benefit of targeting any incoming fungus gnats and thrips pupae in the growing medium. She said that nematodes need to be alive to be effective. They are very sensitive to ultraviolet light and desiccation.

**For more:** Leanne Pundt, University of Connecticut, Litchfield County, (860) 626-6240; leanne.pundt@uconn.edu.




Adorn 4SC, Alude L, Fluazinam 500F, Mandipropamid 250SC, Subdue MAXX EC and Stature DM 50WP were able to keep pansy plants alive and healthy.

at the base of each plant. Fungicide drenches were reapplied every 14 days.

## Trial results

Plants that were not treated with fungicides became severely diseased and 75 percent of them eventually died. Most of the treatments protected the plants. Several fungicides, including Alude L, Adorn 4SC, Fluazinam 500F, Subdue MAXX EC, Stature DM 50WP and Mandipropamid 250SC, were able to keep all plants alive and healthy. Palladium WDG, SP2015 WDG, and Terrazole WP did not work at all in this study. All products that were tested appeared to be safe for the plants.

*Mary Hausbeck is professor at Michigan State University, Department of Plant Pathology, www.plantpathology.msu.edu.*