

Special Research Report #107: Disease Management

Management of a New Powdery Mildew on Poinsettia

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BACKGROUND

In 1988, a new powdery mildew first appeared on poinsettia crops in North America. Few powdery mildew fungicides were labeled for use on poinsettia, and the biology of the fungus, an *Oidium* species, was relatively unknown. Research was initiated to obtain information critical for disease management.



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Powdery mildew on bracts.

MATERIALS AND METHODS

Fungicides. Sixteen preventive fungicide treatments were compared on poinsettia 'Freedom Red.' Powdery mildew inoculum was introduced 48 hours after the first fungicide treatment on 14 October. Colonies were counted weekly on four previously-selected leaves and bracts of each plant.



Closeup of mildew colonies on leaf.

Infection was studied in relative humidity chambers providing 35-92% RH at 59, 68 and 77°F (15, 20 and 25°C). Inoculated leaf disks were incubated for 48 hrs, stained with "cotton blue", and examined microscopically.

Spore production. The effect of temperature on conidium (spore) production was measured using leaf disks held on agar disks in Petri dishes for 14 days at 59 or 68°F (15 or 20°C). Conidiophore numbers and spore chain length were counted microscopically.



Chamber for studying sporulation.

Symptoms of infection.

Symptoms of powdery mildew are often latent until fall, when greenhouse temperatures become lower than 86°F (30°C). Colonies on leaf undersurfaces may be hard to detect. Careful scouting and early detection are essential for precise management of powdery mildew on poinsettias.



Pale spots on upper surface; white colonies on undersurface.

CONCLUSIONS

Greenhouse Control

Study: Untreated controls developed 12 colonies per leaf and 22 colonies per bract by 10 December. No powdery mildew was observed on plants treated every 14 days with sterol biosynthesis inhibitors

- Systhane 40WP
- Terraguard 50WP
- Strike 25TOF

or with the following applied every 7 days (all were applied with Latron B-1956 spreader-sticker):

- Pipro 84.4 EC
- Nutrol

Excellent suppression was also obtained with the following applied every 7 days:

- 3336F + Latron B-1956
- Phyton 27 21.8EC
- Milsana 114UBF/FL
- ZeroTol 27%

and with these fungicides applied every 14 days:

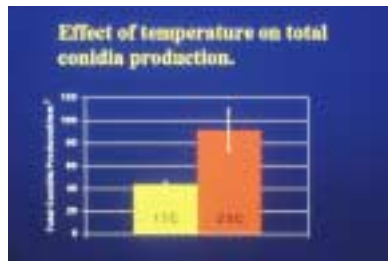
- Cygnus 50WDG
- Compass 50WG
- Heritage 50WG

Most treatments were free from phytotoxicity, but some bract spotting was observed with ZeroTol and Milsana. Residue was moderate to heavy in 3336F, Milsana and Nutrol treatments. Residue in treatments with 3336F used alone was reduced by alternating treatments of 3336F and First Step.

Microscopy Studies:

A. Environmental effects on infection. Infection was most efficient at 68°F (20°C) and relative humidity of 35-

50%. All steps in the infection process were slower at 59°F (15°C). Earlier studies showed that 86°F inhibits infection.



Effect of temperature on spore quantity.

B. Environmental effects on sporulation. Sporulation began 9 days after inoculation. The chains of conidia were longer at 68°F (20°C) than at 59°F (15°C) (having 7 vs. 4 conidia maximum, respectively). Only 50% as many conidia were produced at 15°C (59°F) as at 20°C (68°F).



Spore chains were longer at 20°C (68°F)

IMPACT TO INDUSTRY

(1) Knowing the effects of temperature on this powdery mildew allows growers to manipulate environmental conditions to slow the development of an epidemic. Less inoculum will be produced if temperatures are temporarily lowered from 68 to 59°F. This allows environmental control to be

used as one component of an IPM program that also uses scouting and appropriate fungicides.

(2) Growers may utilize the appropriately registered fungicides found to be effective in this control trial to significantly reduce the disease. Growers can choose materials with demonstrated low residue and minimal chance of phytotoxicity. In order to reduce fungicide residue, growers may be able to use the strategy of alternating a high-residue material with a bicarbonate.

(3) Retailers and wholesalers have a reduced risk of purchasing poinsettias with powdery mildew. Because it thrives at moderate humidities, this particular powdery mildew may become much more visible during retail display or in churches, homes, or lobbies. Thus, careful management in greenhouse production is critical for retail performance.



Poinsettia on left was treated with an effective fungicide.

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