

Special Research Report #131: Disease Management

Management of Downy Mildew on Roses

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BACKGROUND

Potted roses grown in U.S. greenhouses and nursery production facilities have been plagued since the 1800s by downy mildew, a highly destructive disease. It may occur sporadically in some areas of the country, but is a

predictable pest in others. *Peronospora sparsa*, the pathogen that infects rose (Fig. 1A), is specialized and does not infect other ornamentals.

Downy mildew of roses occurs on all aboveground plant parts, blighting the leaves and canes. Early symptoms may be confused with nutrient deficiency or spray injury. Leaf spots may be purplish or brown and can appear square, since they may be limited by the larger veins (Fig. 1B). Unlike other downy mildews, rose downy mildew does not usually produce a fuzzy mat (sporulation) on the leaf underside (Fig. 1C). As infected leaves turn yellow and drop, the entire plant may become defoliated. Purple spots on infected canes can enlarge into a blight that affects large sections of the cane. Once leaves start dropping, the disease is advanced and stopping it is difficult.

Since the downy mildew pathogen can be dormant in rose tissue without noticeable symptoms, it is possible to receive plants that appear healthy and then have disease symptoms develop later. It is also possible for the pathogen to persist in a greenhouse or production facility, causing a disease outbreak in the next season. Fungal threads of downy mildew can survive in diseased rose canes. It is also possible that a specialized spore (oospore) can remain dormant either in infected rose debris or soil, thus surviving harsh weather conditions and allowing the pathogen to survive between rose crops.

MATERIALS NEEDED

Fungicide studies were conducted with a commercial nursery cooperator in the southeastern U.S. "Double Knockout" roses appeared to have mild downy mildew

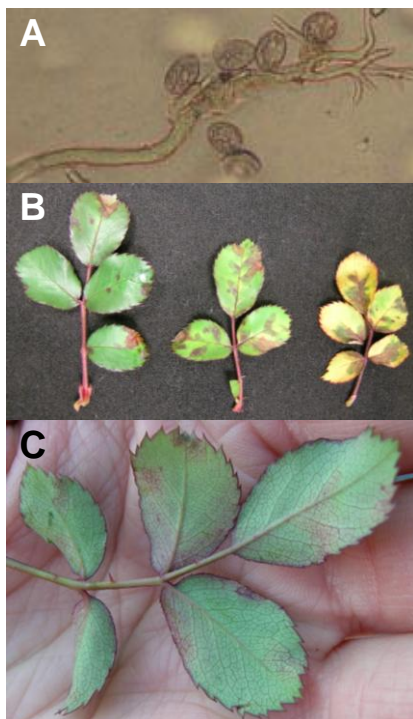


Fig. 1. A, downy mildew spores on spore stalks. Downy mildew symptoms on B, upper and C, lower sides of rose leaves.

Fungicides tested on downy mildew of roses.

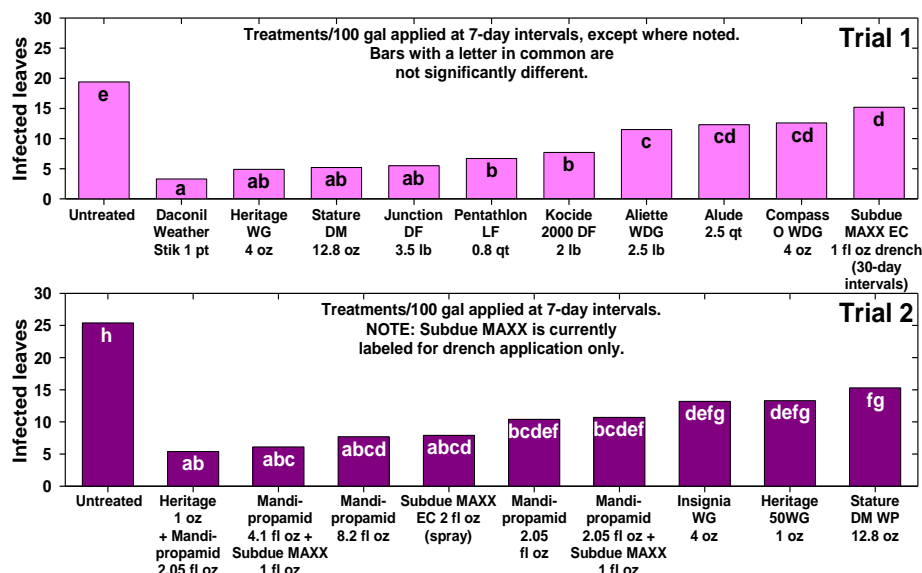
Fungicide	Active ingredient	Labeled
Aliette WDG	fosetyl-al	yes
Alude L	phosphorous acid salts	yes
Compass O WDG	trifloxystrobin	yes
Daconil Weather Stik 6F	chlorothalonil	yes
Heritage 50WG	azoxystrobin	yes
Insignia WG	pyraclostrobin	yes
Junction DF	mancozeb + copper hydroxide	yes
Kocide 2000 DF	copper hydroxide	yes
Mandipropamid 2.09SC	mandipropamid	no
Pentathlon LF	mancozeb	yes
Stature DM 50WP	dimethomorph	yes
Subdue MAXX EC	mefenoxam	yes

symptoms when received by the nursery. Drench applications of Subdue MAXX EC (reduced risk product, Trial 1) were made every 30 days; all other treatments in both studies were applied as weekly sprays. The weather allowed disease to progress. However, it never exploded as it can when conditions are very wet and humid. The numbers of infected leaves/plant were counted.

RESULTS

In Trial 1 (see graph), all fungicides limited numbers of infected leaves when compared with untreated plants, which had nearly 20 leaves per plant infected with downy mildew. Products that limited infection to 5 or fewer leaves included Daconil Weather Stik, Heritage WG (reduced risk), Stature DM, and Junction DF. Some phytotoxicity was observed with applications of Daconil.

In Trial 2, all fungicides were applied as sprays. Mandipropamid is a new, reduced risk, unregistered product with targeted activity against downy mildews and other related pathogens. It was tested alone and in combination with other fungicides. Untreated plants had about 25 infected leaves per plant. Mandipropamid at 8.2 fl oz either alone or mixed with Heritage WG or Subdue MAXX had 8 or fewer diseased leaves. Subdue MAXX EC 2 fl oz applied alone as a spray was also effective.



CONCLUSIONS

The timely application of effective fungicides is an important tool for controlling downy mildew. Since rotating fungicides with different modes of action is important to prevent development of fungicide resistance in the pathogen, additional effective fungicides are needed.

IMPACT TO INDUSTRY

This research may encourage the labeling of Mandipropamid to control downy mildew. A combination of techniques to prevent and control downy mildew is recommended. Keep the production environment dry, practice good sanitation, and use effective fungicides.

When growing roses:

- Scout for disease: Look for dark, purplish spots on leaves and canes.
- Keep the air moving and keep the relative humidity low. Take advantage of the prevailing winds in outdoor production areas.

- Choose effective fungicides and reapply frequently, especially when conditions favor disease development.
- A 5- to 7-day spray schedule may be needed.
- Delay resistance to fungicides developing by alternating products with each application.
- Although some products are systemic, the entire plant must be covered with the fungicide spray for optimal protection.
- All diseased plants should be disposed of or destroyed at a location distant from the production facility.



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