



# CAES

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## ROSE DOWNY MILDEW

Rose downy mildew is a highly destructive disease in greenhouses, nurseries, and landscapes. The disease attacks almost all above-ground parts of a rose plant, including leaves, stems, peduncles, calyxes, and petals. When conditions are conducive, especially in greenhouses and hoophouses, the disease can cause severe necrosis, distortion, early defoliation, and reduced plant quality.

### SYMPTOMS AND DIAGNOSTICS

On leaves, symptoms include angular or irregular reddish-purple, brown, or black spots, but which may be various on different rose species and cultivars (Figures 1 and 2). Younger leaves are more susceptible to the disease than old ones. As the disease develops, leaves may become distorted and defoliated



Figure 1. Irregular reddish-brown spots on leaves.

prematurely. Symptoms on stems appear as reddish blotches without clear edges (Figure 3). On flowers, symptoms include deformed flower buds and brown patches on petals. Under humid conditions, reproductive structures (sporangiophores and sporangia) can be found on the lower leaf surface (Figure 4), but the mold is too sparse to be detected in fields. The symptom of downy mildew also resembles spray injury, black spot, and Botrytis blight on rose leaves. For a correct disease diagnosis and confirmation, physical samples need to be sent to a plant clinic for a laboratory examination.

### DISEASE DEVELOPMENT

Downy mildew of rose is caused by the fungal-like pathogen, *Peronospora sparsa*, that infects most species in



Figure 2. Angular reddish-purple lesions on leaves.

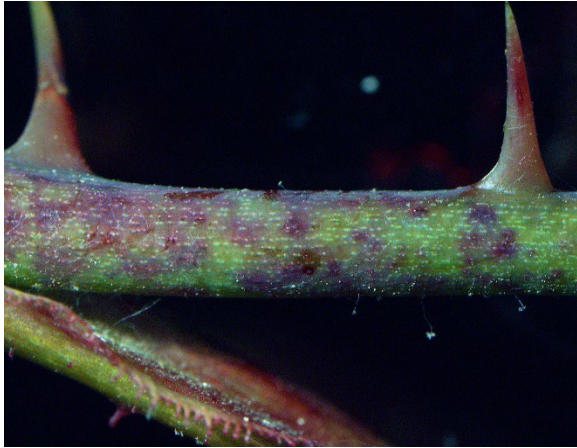


Figure 3. Reddish-purple blotches on a stem

genera *Rosa* and *Rubus*. The pathogen can survive in living host tissues, such as leaves, stems, and root crowns as systemic infections. The sporangia of the pathogen may remain viable on dried, fallen leaves as long as one month. When conditions are conducive, the pathogen produces sporangia on the surface of infected leaves and stems. The spores can be dispersed by water splashes and air movement. Pruning, trimming, and handling infected plant materials can cause spread of the disease. Cuttings taken from infected stock plants may carry the disease without showing symptoms. The optimal condition for spore production and germination is high relative humidity (>85% RH) and cool temperature (60°-70°F). So, cool, damp conditions with frequent rainfall provide ideal conditions for disease development.

### MANAGEMENT

*Resistant cultivars:* All types of roses are susceptible to downy mildew, but there are significant differences in susceptibility to the disease between cultivars or varieties. If available, use resistant varieties.

*Cultural practice:* Purchase and use clean plant materials, such as cuttings or transplants. Remove diseased plant materials from the site to reduce the

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Figure 4. Sparse whitish mold on the lower surface of a leaf.

inoculum. In greenhouses, keep relative humidity lower than 85% and minimize the duration of leaf wetness by adjusting heating and ventilating systems. In landscapes, space and prune rose plants properly to promote airflow. Avoid overhead irrigation and use drip irrigation if possible.

*Fungicide treatment:* Proper cultural practices are essential for effective fungicide management. Once an outbreak occurs, it is hard to control the disease using fungicide applications. Ensure full coverage of fungicide spray on both upper and under sides of leaves. Registered fungicides for downy mildew of rose include mancozeb, chlorothalonil, azoxystrobin, mefenoxam, copper hydroxide, and phosphorous acid products.

### **READ THE LABEL BEFORE APPLYING ANY PESTICIDE!**

We keep all archives of our fact sheets posted. While most practices for disease management do not change over time, please be aware that changes in pesticide regulations occur constantly. When applying pesticides, always consult the label to make sure the pesticide is approved for use on your plants.