



Onion disease: Downy mildew

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Downy mildew, caused by the fungus *Peronospora destructor*, is a destructive disease of onions and other alliums (garlic, leeks, shallots, etc.). This disease reduces yield and bulb quality in humid, temperate regions. The severity of the disease varies widely with locality and season, and depends upon how often and how long onion foliage is wetted by dew, fogs, irrigation or rain.

Symptoms and effects

The disease is most apparent on older onion leaves and seed stalks. On mornings when dew is still present on the foliage, downy mildew will appear as a violet, fuzzy growth on the leaf and seed stalk surfaces. Infected leaves become pale green or yellow, turn brown, then collapse and die. While downy mildew rarely killed affected plants, bulb size may be reduced, thereby reducing yield and marketability. Killed leaf tissues are often rapidly colonized by the pathogen causing purple blotch, which may obscure the presence of downy mildew. The succulent necks can also be colonized by secondary fungi before or during storage which

may lead to subsequent storage decay. The outer scales of infected bulbs become amber in color and watery. Circular lesions on seed stems cause the stems to break. The flower can also become infected which will result in seed-borne dispersal of the fungus.

Downy mildew is often confused with purple blotch of onion (for details on this disease, see Extension publication *Onion Disorder: Purple Blotch*, A3804).

Disease cycle

Downy mildew overwinters as mycelium on bulbs left in the field after harvest and in cull piles. Thick-walled resting spores, oospores, can withstand adverse conditions in the soil for 4–5 years



Leaves infected by the downy mildew pathogen exhibit pale yellow lesions that soon become brown as tissues die.



Pale yellow lesions caused by downy mildew often lead to death of leaves and tip dieback.

and can germinate to infect seedling onions. Mycelium can survive for long periods on immature bulbs and set onions used for planting gardens.

Once established, the pathogen can complete its life cycle in as few as 11–15 days under ideal (cool and wet) environmental conditions. Multiple cycles can occur throughout the growing season often resulting in severe epidemics. Dry, hot weather is unfavorable for pathogen spread and slows disease progress.

Control

Cultural

The following cultural practices may help to reduce the chances of disease introduction into new fields and to slow disease development.

- Plant only certified disease-free seed, sets, or transplants to prevent infection from becoming introduced into your field.
- Practice a 3- to 4-year crop rotation out of onions and all other alliums.

- Destroy cull piles and avoid overwintering onions or infected debris—incorporation of infected plants in the fall immediately after harvest will hasten decomposition.
- Plant alliums in well-drained soils where there is good air circulation to promote rapid drying of foliage after dew, rain, or irrigation.
- Avoid overhead irrigation if possible to avoid wetting of foliage. Drip and sub-surface irrigation systems are helpful in providing plants sufficient water to meet crop requirements without wetting the foliage.
- Avoid the use of excessive nitrogen fertilization since an over abundance of succulent foliage may lead to prolonged periods of foliage wetting and delays in leaf drying, thus favoring disease development.

Chemical

During cool, humid years, treatment with foliar-applied protectant fungicides may be necessary to protect the crop. Refer to Extension publication *Commercial Vegetable Production in Wisconsin* (A3422) for current fungicide recommendations.



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