

# Downy Mildew of Onion

## Symptoms

In the field, large yellowing areas that extend in the direction of the prevailing winds are an indication of Downy Mildew (Fig. 1).



Figure 1. Onions field affected by *P. destructor*. Photo: Howard F. Schwartz, Colorado State University, Bugwood.org

On the plant, symptoms appear on older leaves and seed stalks as elongated light green spots that, under humid conditions, become covered with a light-grayish purple mycelium (Fig. 2).



Figure 2. . Early leaf symptoms of downy mildew on onions. Photo: Tom Isakeit

The tissue under the growth becomes yellow, folds at the lesion and collapses (Fig. 3). Affected plants may be dwarfed, leaves deformed, and bulb size and quality reduced.



Figure 3. Advanced symptoms of downy mildew on field onions. Photo: Howard F. Schwartz, Colorado State University, Bugwood.org

## Causal Agent

Downy mildew of onions is caused by the fungus-like Stramenopile *Peronospora destructor*. The pathogen produces abundant sporangia that germinate directly acting as spores.

Reported hosts other than onions include shallot, leek, garlic and chives.

## Inoculum Source and conditions

The fungus overwinters in volunteer hosts, cull piles, and debris. Spores are wind borne. Spores

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of the fungus present in soil or bulbs germinate, infect roots or bulbs, and develop systemically in the plant. Spores that land on the leaf surface produce local lesions that can spread systemically to younger tissue. Infection can spread rapidly under cool (34–82 °F), damp conditions generating new inoculum within the field. The pathogen requires cool temperatures and the presence of free moisture (rainfall, dew or overhead irrigation) to infect onion plants. Under those conditions repeated disease cycles may occur with devastating results.

## Control

- Use disease-free bulbs, transplants, and seed. There are few resistant cultivars available.
- Rotate to non-hosts (small grains, corn) for at least three years.
- Reduce inoculum by destroying volunteer host plants, cull piles, and plant debris.
- Avoid dense stands, poorly drained soils and overhead irrigation; promote air circulation by planting in the direction of the prevailing winds.
- Consider applying preventive fungicides as soon the conditions are favorable for disease development.
- Spray fungicides at first sign of disease. Thorough coverage and rotation of fungicides are crucial to disease control and to avoid fungicide resistance.

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