

PLPA-SPIN001-2016

DOWNY MILDEW OF SPINACH

Downy mildew is a wind-borne disease affecting leaves, caused by the fungus-like organism, *Peronospora farinosa* f. sp. *spinaciae*. It infects spinach as well as some species of *Chenopodium*. Under cool, rainy conditions, the disease has the potential to increase extensively and cause substantial leaf damage in a matter of days (Fig. 1).



Fig.1. Extensive and severe symptom development.
Photo: T. Isakeit.

Leaf wetness for at least one hour is required for the spores to germinate and initiate infection. Reproduction of the pathogen requires at least 6 hours of 100% relative humidity and is optimal at a temperature range of 60-68 °F. The earliest symptom is water-soaked spots delimited by veins, giving them an angular appearance (Fig. 2). Later, these spots dry out (Fig. 3) causing blemishes on the leaves and reducing their market quality.



Fig. 2. Detail of early symptoms on the underside of leaf.
Photo: T. Isakeit

Diagnosis is confirmed microscopically by finding “staghorn” spore-bearing structures (Fig. 4) associated with the leaf spots.



Fig. 3. Detail of later symptom on top and underside of leaf. Photos: K. Cochran and O. Alabi.



Fig. 4. Appearance under the microscope, showing spores and “staghorn” spore-bearing structure.
Photo: O. Alabi.

The most effective control measure is to plant resistant cultivars. Early and regularly field scouting coupled with rouging and proper disposal of symptomatic plants may help to reduce inoculum levels. Maintain proper spacing to promote good air circulation and to prevent excessive leaf wetness. Overhead irrigation should be avoided during cool weather conditions. Foliar fungicides are protective in nature and should be applied prior to infection and/or symptom development.

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