

Plant Pathology Fact Sheet

Downy Mildew of Soybeans

Donald E. Hershman
Extension Plant Pathologist

Importance

Although this disease is rarely of economic importance from a yield perspective, pods and seed may become infected, thus resulting in a reduction in seed quality and marketability.

Symptoms

Small, irregular spots on upper leaf surfaces are initially pale yellow in appearance (FIGURES 1 & 2), later becoming gray-brown with a yellowish margin. On the underside of the leaves, the spots have a gray, fuzzy appearance (FIGURE 3) due to the presence of the pathogen. These fungal-like tufts are reproductive structures of the organism and their appearance is diagnostic for this disease. Symptoms frequently occur at low levels throughout the crop canopy. Early leaf spots are non-descript and are commonly confused with leaf spots and pustules caused by soybean rust.

When pods are infected, an encrusted mass of fungal-like growth is visible inside the pods. Infected seed has a dull white appearance and is partially or completely encrusted with the pathogen (FIGURE 4). This



FIGURE 1. DOWNY MILDEW OF SOYBEAN.

disease sign can be confused with infection by the pod and stem blight fungi (FIGURE 5). If a definitive diagnosis is necessary, submit a representative sample to a qualified plant disease diagnostic laboratory.

Cause and Disease Development

Downy mildew is caused by the fungus-like organism, *Peronospora manshurica*. The downy mildew fungus overwinters in the field as thick-walled resting spores (oospores) in leaf debris and on seed. The oospores serve as the initial source of inoculum; however, wind dissemination of spores produced on the lower surface of leaf lesions is the most



FIGURE 2



FIGURE 3



FIGURE 4

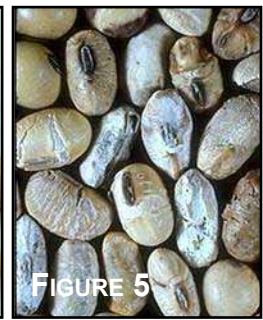


FIGURE 5

FIGURE 2. DOWNY MILDEW SPOTS APPEARING ON THE UPPER LEAF SURFACE ARE INITIALLY SMALL, IRREGULAR AND PALE YELLOW IN COLOR. **FIGURE 3.** A FUZZY, FUNGAL-LIKE GROWTH APPEARS ON THE UNDERSIDE OF INFECTED LEAVES. **FIGURE 4.** DOWNY MILDEW-INFECTED SEED HAS A DULL WHITE APPEARANCE AND IS PARTIALLY OR COMPLETELY ENCRUSTED WITH THE PATHOGEN. **FIGURE 5.** POD AND STEM BLIGHT SEED INFECTIONS (SHOWN HERE) CAN BE CONFUSED WITH DOWNY MILDEW.

important means of spread within the field and from field to field. Typically, infection requires the presence of extended periods of dew and temperatures between 50° F and 80° F.

Disease Management

In most cases, control of this disease is not warranted and there are no “rescue” treatments available. It is also important to note that fungicides commonly used on soybean do not control downy mildew.

When seed quality is of utmost importance, preventative downy mildew control measures include:

- Use certified seed.
- Avoid growing consecutive years of soybean in the same field.
- Use resistant varieties, where available.

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Photos courtesy of Daren Mueller, Iowa State University (Figures 1 & 3) and Clemson-USDA Cooperative Extension Service (Figure 2), Bugwood.org; and Donald Hershman, University of Kentucky (Figures 4 & 5)

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