

Sclerotinia White Mold of Soybean

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Wet, moist, cool conditions just prior to and during flowering are essential environmental conditions for *Sclerotinia* white mold infection and disease development. It takes very few sclerotia on the soil surface to result in substantial amounts of disease when favorable conditions occur at the time of flowering. Environments that favor *Sclerotinia* white mold development occur in fields that are highly productive, with tall, thick stands of soybeans. The disease is usually most severe in areas of fields where moisture collects due to fogs and extended dew periods. Temperatures greater than 90° F will arrest disease development.

Soybean plants infected with *Sclerotinia* first appear wilted, then as they die, the leaves and stems turn brown to tan and stand erect above the soybean canopy. Dying plants can be found approximately two weeks prior to the time when the crop normally matures. The stems of affected plants are covered with a thick white mold, with dark sclerotia forming both inside and outside of the stem and pods. Initial data indicate that soybeans can withstand a substantial amount of white mold before significant yield losses occur. The level of yield loss is dependent on the number of plants infected in the field and how early in the season the plants become infected and die. Plants that are infected late will produce some seed.

The Fungus

The fungus causing *Sclerotinia* white mold is *Sclerotinia sclerotiorum*. It produces a survival structure called a sclerotia which is hard and black, irregular in shape, and very similar in appearance to rat feces, but white to pink in the interior. Under long periods of wet, moist conditions, the sclerotia germinate directly, forming mycelium, or they produce a small mushroom-like fruiting body called an apothecium. Ascospores are produced in small sacs on the top surface of this apothecium. This fungus is reported to infect more than 140 different broadleaf host species.

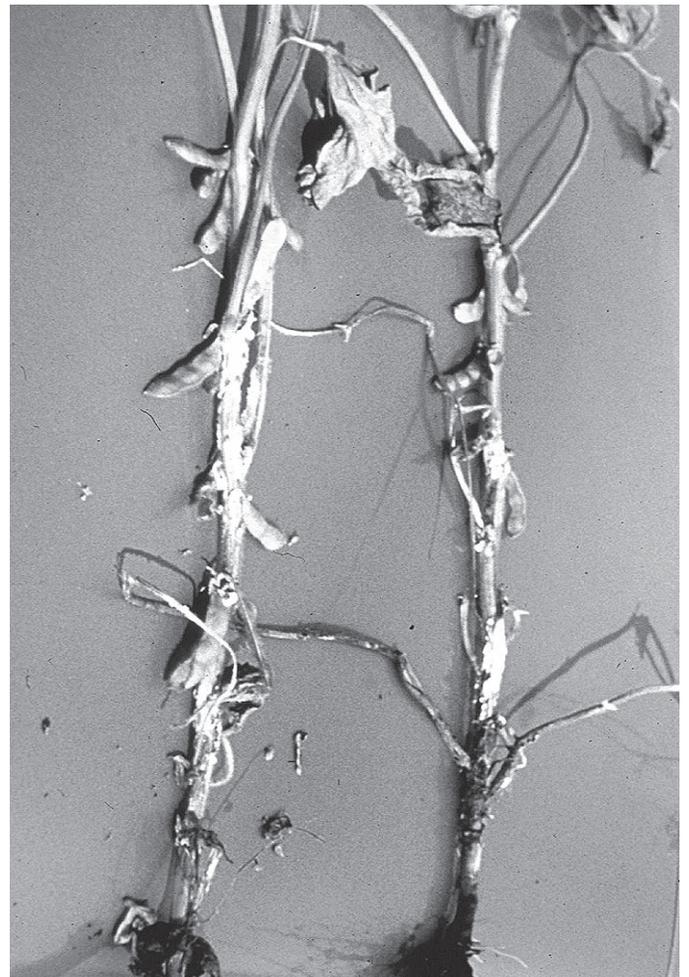


Figure 1. Symptoms of *Sclerotinia* white mold develop late in the season and begin as white fluffy mycelial growth on the stems. The dark, black, irregular shaped structures are the sclerotia, which can survive for a number of years in the soil.

Disease Cycle

The sclerotia, which are formed both inside and outside the host plant, serve as the survival structure. During harvest the sclerotia are combined with the seed or returned to the soil surface with crop residues. Burying the sclerotia in soil appears to enhance their survival ability. In the spring and summer the sclerotia will germinate either directly by forming mycelia or by forming apothecia. Sclerotia will produce apothecia if they are within an inch of the soil surface. The apothecia produce large numbers of ascospores, which are subsequently spread in wind and splashing rain. Once the ascospores germinate, the developing fungus requires a nutrient source prior to infecting plants. On soybeans, the flowers serve as a food source, and subsequently infections occur on the stem near a node where the mycelium colonized dead flowers. Sclerotia developing on diseased soybean plants are returned to the soil during harvest. Sclerotia found in harvested seed can contaminate new fields if seed lots have not been properly cleaned to remove sclerotia prior to planting.

Disease Management

1. Avoid introduction of *Sclerotinia* into the field. Seed should be well cleaned to remove sclerotia to avoid introduction of the fungus into the field. Recent findings from the University of Illinois and Iowa State University indicate that seed treatments will also be effective against *Sclerotinia* on infested seed.

2. Plant soybean varieties that are less susceptible to *Sclerotinia* white mold. Varieties have been identified that develop less *Sclerotinia* white mold than more susceptible varieties from both field and greenhouse studies. Although no soybean variety is known to be highly resistant, a number of high-yielding varieties with moderate partial resistance are available. Soybean producers should contact seed dealers and Ohio State University Extension offices for up-to-date listings

of variety reactions. See Horticulture and Crop Science Series 212, Ohio Soybean Performance Tests, available at OSU Extension offices.

3. Sufficiently long crop rotations with corn and wheat will be effective in minimizing the pathogen buildup over time. Although several years will be required to reduce fungal populations, sclerotia will still germinate and produce apothecia during the seasons when the field is planted to non-host crops. Most sclerotia die over a three- to four-year period between soybean crops. Short crop rotations, such as a soybean-corn rotation, will eventually lead to a build up of sclerotia in the field.

4. Effective weed control is essential. *Sclerotinia* has a very wide host range, attacking common weeds like lamb's-quarters and pigweed. It is imperative that good weed management practices are in place to prevent further buildup of *Sclerotinia* sclerotia in crop production fields.

5. Fungicides are available for use on soybeans for white mold control. Application of fungicides, however, is only recommended for fields where historically white mold has limited yields and the soybean variety is moderately to highly susceptible. Successful fungicide control requires that the spray application penetrates the canopy and reaches the flowers. Current fungicide recommendations for white mold control can also be obtained from your OSU Extension office.

6. In studies that examined the effects of increased row spacing width or reduced seeding rate on *Sclerotinia* white mold development, these practices typically resulted in a decrease in the amount of white mold, but this did not necessarily correspond with an increase in yield. Only varieties that are very susceptible to white mold and that are also produced in fields with a long-standing history of white mold should be planted to wider row widths.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Keith L. Smith, Director, Ohio State University Extension.

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7/98—jaf