WHITE MOLD

Soybean Diseases

Overview

White mold is a significant disease problem of soybean in the north-central region. The incidence and severity of white mold varies from year to year because of its sensitivity to weather conditions. Cool, moist conditions at the time of flowering is most conducive to the development of white mold.

White mold is caused by the soil fungus, *Sclerotinia sclerotiorum*. It is easily distinguished from most other soybean diseases by the presence of white cottony mycelia (moldy growth) and sclerotia on infected plant tissues.

White mold can substantially reduce yield, especially when climatic conditions and management practices favor high yield potential. Severe white mold infection weakens the plant and can result in wilting, lodging and plant death.

In addition to causing yield loss, white mold can affect seed quality and seed production.

**White mold has progressed from a sporadic disease to an annual threat to soybean production**

White mold was discovered in central Illinois in 1948. Although it eventually became a
chronic problem in Michigan, Minnesota, and Wisconsin, outbreaks were localized, and occurred where soybeans were grown in rotation with other susceptible crops.

Beginning in 1990, however, the occurrence of white mold became more widespread in the Great Lake states, and by 1992 was prevalent throughout all the north-central states.

Reasons for the sudden increase of white mold are not fully understood, but are thought to be related to changes in cultural practices that promote a greater canopy density. The increase in white mold may also be due to changes in the genetic base of current soybean varieties, or changes in the white mold pathogen.

Developing a management plan based on knowledge of field history and best disease management practices can help reduce losses from white mold. An effective management plan should include adept recordkeeping, cultural practices, varietal resistance, and possibly chemical and biological control tactics.

**Cycle**

(A) *Sclerotinia sclerotiorum* survives in the soil as sclerotia — hard, black structures that resemble mouse droppings.

(B) Sclerotia within the top two inches of soil can germinate to produce apothecia. Shaded, moist and cool soil favors germination. Apothecia are small, tan, cup-shaped mushrooms about 1/8 to 1/4 inch in diameter.

(C – D) Apothecia produce spores called ascospores that colonize senescing soybean flowers.

(E) Infection can spread into the stem at the node, and is favored by moisture and cool temperatures.

A dense canopy during flowering (growth stages R1 through R3) may provide an ideal microenvironment for spore production, dispersal, and white mold development.

(F) As the fungus grows from the young pods to the nodes and stem of the plant, it eventually girdles the stem and disrupts the transport of water and nutrients. This causes leaves and stems to turn brown and stand erect above the soybean canopy. Closer inspection of the stems may reveal thick white mold, and sclerotia of *S. sclerotiorum*, which can form on the inside and on the outside of infected stem and pods.

(A) The sclerotia fall to the soil during harvesting or remain in crop debris where they survive for many years. In the spring, sclerotia may germinate to form the apothecia, starting the
disease cycle again.

Scouting

Scouting for mushrooms (apothecia) at canopy closure
The best time to scout for apothecia is at canopy closure. This is generally in late June and early July in the north-central region, and will vary with row spacing.

Check the soil under plants growing in high soil moisture areas and closed canopies, especially during flowering. Check areas where moisture collects due to fogs, extended dew periods, and in pockets of poor air drainage.

Scouts should be aware of the difference between apothecia growing from sclerotia, and other harmless mushrooms, such as the one produced by the birds-nest fungus, growing on pieces of organic matter.

University research has indicated that the appearance of apothecia can be predicted using several variables including weather and the amount of soybean row closure in a field. Based on this research, Sporecaster models have been developed to forecast the risk of apothecia being present. You will need to scout your field to determine if the soybean crop meets thresholds such as canopy closure and the presence of flowers. For more information on how to use the app, including video tutorials, see “New smartphone app: Sporecaster, The Soybean White Mold Forecaster” from the University of Wisconsin.

Scouting for white mold-infested plants during pod set
Check near tree lines or other parts of a field that experience less wind disturbance, parts of the field with thick canopies, and fields with a history of white mold. White mold often occurs in patches within fields. Within these patches, look for scattered dead plants.

Infected plants appear wilted, which might be mistaken for drought. Inspect the stems for water-soaked lesions that progress above and below infected nodes, and eventually encircle the stem.

Look for white cottony mycelia (moldy growth) and sclerotia on infected plant tissues. These are signs of *S. sclerotiorum* that are diagnostic for white mold and allow it to be distinguished easily from most other soybean diseases.

Risk Assessment

The growth of the white mold fungus is strongly affected by the environmental conditions in the crop canopy, and is particularly favored by dense soybean canopies.
Rain events during flowering, and wet areas in fields due to fog and extended dew periods are especially favorable for white mold. Risk assessment for white mold is based on these factors, as well as the field history and soybean variety.

### Seasonal risk factors

**Weather**
Moderate temperatures, normal or above normal precipitation, and soil moisture at field capacity or above. Prolonged morning fog, and high canopy humidity (leaf wetness) at flowering into early pod development. White mold potential decreases if air temperatures are high (90 F) during flowering and early pod development.

### Long-term risk factors

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