White Mold Management In 2025

Scott Bales, MSU Dry Bean Specialist (810) 304-3698

What causes white mold in dry beans?

White mold in dry edible beans is caused by the pathogen *Sclerotinia sclerotiorum*. The fungus will survive in Michigan soils for many years as sclerotia resting bodies, which are about the same size and appearance of mouse droppings. Under cool, moist conditions these sclerotia germinate and produce a mushroom-like fruiting structure called apothecia. Apothecia are about 0.25 inches in size and can easily be confused with other mushroom structures, which do not cause white mold such as the birds nest fungus (Figure 1).

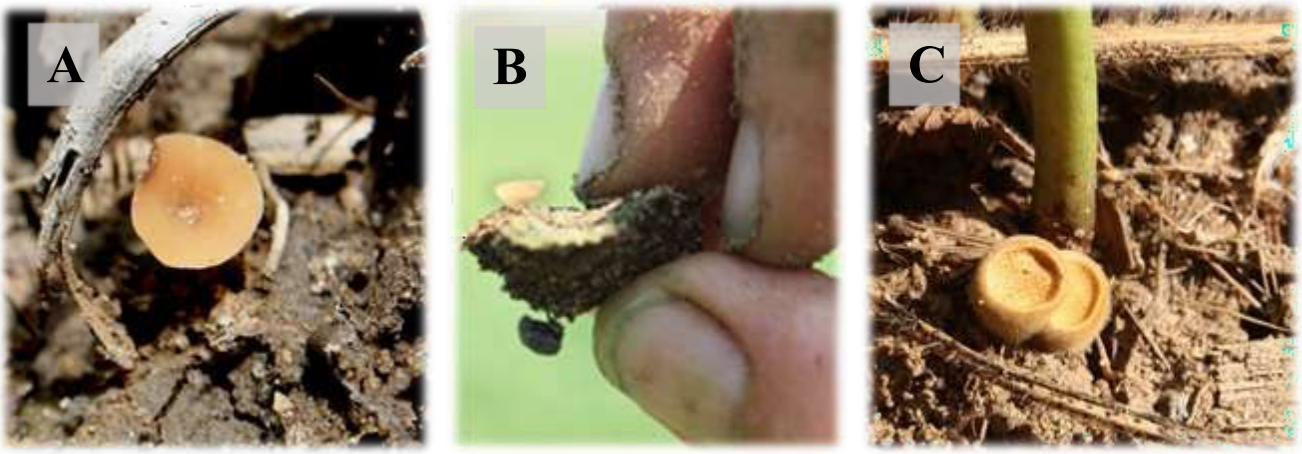

Figure 1. (A) white mold apothecia, (B) white mold sclerotia below the soil surface and apothecia above, (C) birds nest fungi, NOT white mold apothecia. Photos: Dr. Marty Chilvers

While apothecia can be formed under a wide range of soil temperatures and moisture levels, ***maximum development occurs under a canopy when soils have been at high levels of sustained moisture for 7 to 10 days.*** Air temperatures between ***60-77ºF*** are most conducive for development. Once apothecia are formed, they produce airborne spores that lead to infection of the bean plant. This is the primary infection point for white mold in dry beans. The most sensitive point for infection is dead and decaying tissue, such as senesced blossoms. Secondary infection can also occur from direct contact from plant-plant under high levels of relative humidity and cool temperatures. The severity of secondary infection can be greatly increased by frequent rainfall events. While white mold in considered a monocyclic disease (one generation of development per season) the window for apothecia germination can be extended over multiple weeks if the correct environmental conditions exist (shade, soil moisture, and correct temperature).

Why is this of concern now? The dominate market classes produced in Michigan typically flower 45-48 days after planting. Thus, a June 1st planted dry bean is generally expected to reach R1 (1 open blossom per plant) between July 16-July 19th. Routine scouting is needed to confirm this exact timing. Dry beans are **not** susceptible to white mold disease until they flower. Fungicide applications made ahead of flowering will not be effective in white mold disease suppression. Year to year environmental conditions have the greatest impact on disease severity statewide. Rainfall frequency has a greater implication on severity than the total rainfall amount. For example, 0.1” of rain every other day for a week during flowering will lead to a higher severity of white mold infection than one rainfall event of 0.5”.

So will white mold may be a concern in 2025? what should we consider now?

When considering treatment for white mold in dry beans there are many factors to consider, including field history and previous white mold infection, environmental conditions, row spacing, canopy closure,

and the planted variety.

- **Field location and history:** Dry bean fields with a history of bean, soybean, or potato production and white mold pressure are at a greater risk for severe infections. These fields likely have a large inoculum load and conducive environmental conditions for infection. Location also plays a role in risk as well as production areas in the far north and eastern thumb historically have greater white mold pressure due to cooler temperatures and high relative humidity produced by Lake Huron. Individual fields that may be in lower lying areas or have little air movement (near wood lots) are also at greater risk for infection.
- **Environmental conditions:** Cool wet weather favors white mold infection throughout the flowering period. Both high temperatures and wet-dry cycles can reduce the severity of white mold infection. Current forecast and risk models (Figure 2; July 16, 2025) indicate the majority of the growing region is at low risk in the short term. Note the elevated risk in areas historically most troubled with disease (eastern thumb). As a reminder, white mold cannot infect dry beans until flowering takes place. The Crop protection network is a free website that attempts to determine the risk of apothecia development, it uses weather data from the past 30 days to make a risk prediction.

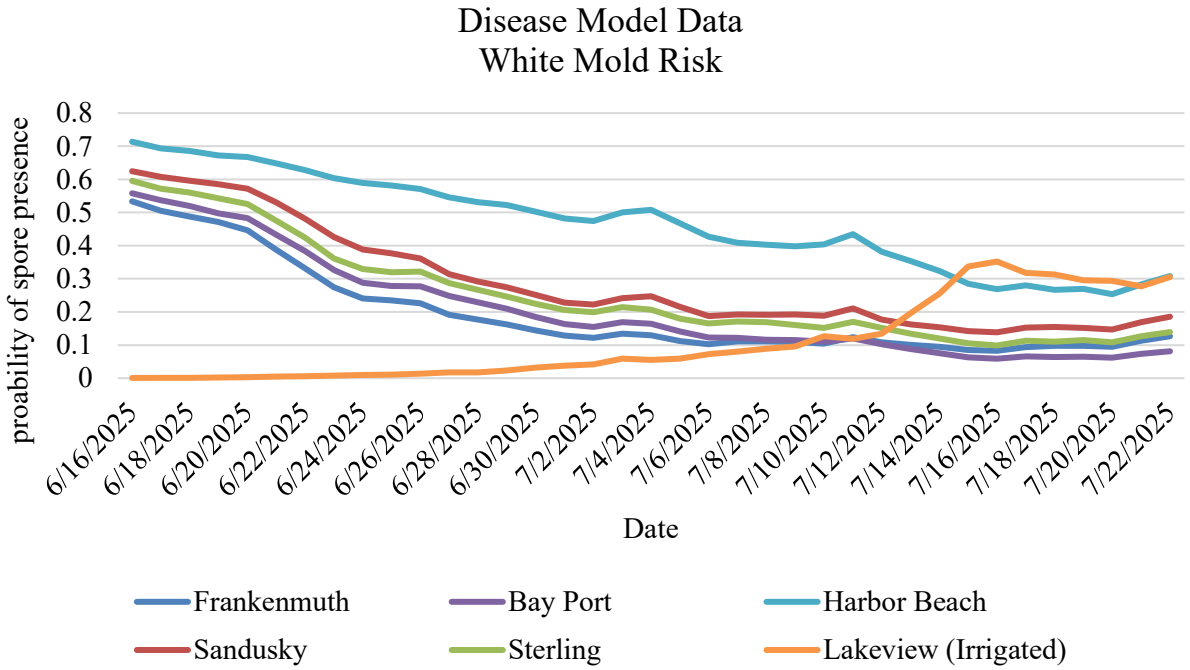

Figure 2. Crop Protection Network Risk Tool as of July 16, 2025 shows low risk for sclerotinia emergence if dry beans were in flowering stage apart from the NE Thumb (Harbor Beach) and west Michigan production under irrigation (Lakeview)

- **Row spacing and row closure**: these factors can affect the level of white mold infection by influencing the micro-climate within the field. Typically, narrow rows close rows sooner in the growing season which helps suppress weeds and increase yields. However, when dry bean rows close with dense foliage, more moisture is retained within the foliage and at the soil surface. This can lead to a greater level of sclerotia germination and a greater number of spores released into the canopy.
- **Variety:** While there is no strong resistance to white mold in any commercial variety of dry bean, some varieties are more tolerant than others. This tolerance is often linked to plant architecture. Varieties that are more upright and compact in growth often have a natural avoidance to white mold infection. Varieties that are more decumbent, produce more foliage, and/or prone to lodging are often more severely affected by white mold, eventually resulting in yield loss. This yield loss can be either directly from the infection, or indirectly from harvest loss and pick at delivery.

If treatment is needed:

Once the decision to make an application for white mold has been made three questions need to be answered: What product? What rate? And at what application timing? Connecting these three factors is key in achieving the desired level of fungicide efficacy (Figure 3).

- **Product**: There are many products to choose from for the management of white mold in dry beans. The Michigan Bean Commission has performed research analyzing the efficacy of many of these products on white mold at different application timings. Fungicide results from 2024 follow a similar trend previous years with treatments of Endura, Omega and Propulse performing well. These results can be found by following this link to michiganbean.com.
- **Rate:** Always consult specific labels for labeled rates for target pests.
- **Timing:** Optimal fungicide application timing can be variable year-to-year, which is a reflection on conditions that favor apothecia development and plant infection. Base recommendations are that first applications made between R1 and 100% full bloom (1/2" pin pod in lower canopy is a good indication). If needed second applications can be made 10-14 days later.
- **Application Method:** When applying white mold fungicides it is recommended that they are done using ground application equipment as aerial applications have proven to be unsuccessful at penetrating the dry bean canopy and covering the blossoms. Current research does not have extensive data on the use of UAV (drone) application methods for fungicide efficacy in dry beans. With any application method it is possible to do a good job, or a poor job based on the attentiveness to detail in regards to canopy penetration and overall coverage. Coverage is very important as these fungicides are preventative and not curative. They work by protecting the sensitive tissue on the surface and are not able to move systemically throughout the plant. A minimum spray volume of 15 gallons per acre (GPA) is recommended for white mold applications and volumes greater than 15 GPA will aid in the coverage of dense canopies. Ground speeds should be kept below 10 MPH and boom height should target the midpoint with the crop canopy; use nozzle manufactures recommendations to calculate this exact distance for optimum performance. Nozzle selection is also very important. Research has found that medium sized droplets offer the most consistent performance, coarse droplets can offer greater control under very dense canopy conditions (higher velocity per droplet). Fine droplets result in poor white mold suppression. It has also been found that the addition of a non-ionic surfactant can at times improve the effectiveness of white mold fungicides in dry beans.

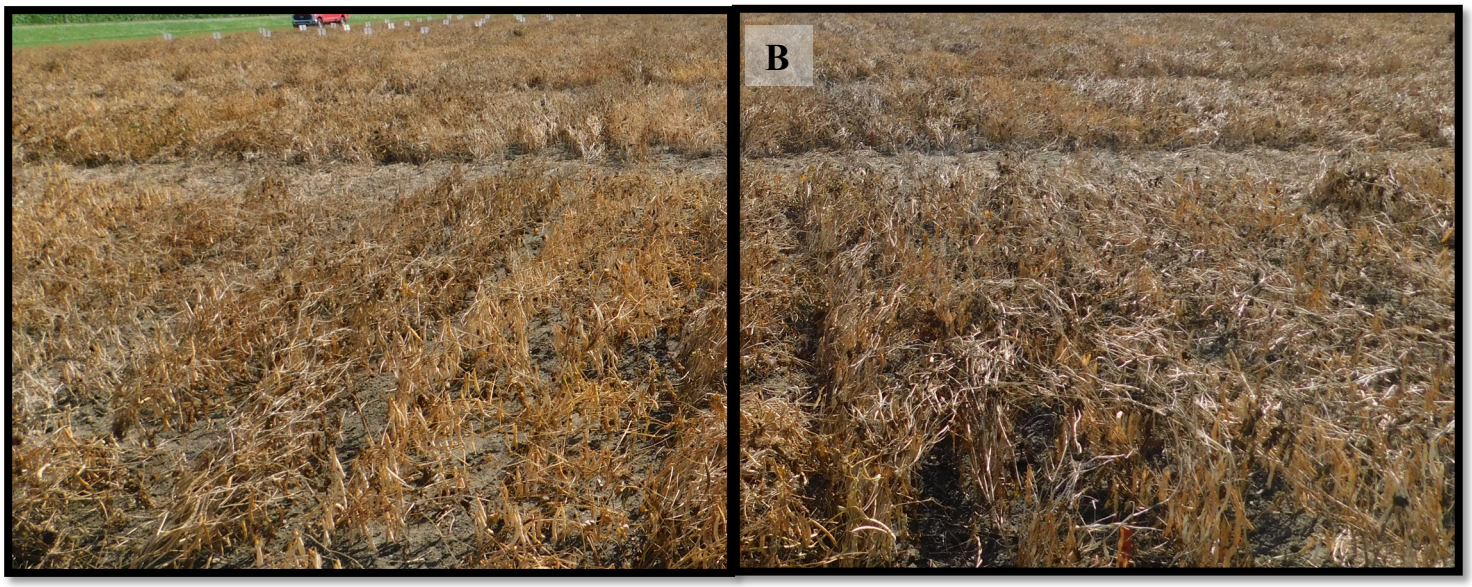

Figure 3. Split variety trial where applications of fungicide were made (A), and paired untreated replications (B) demonstrating fungicide efficacy when disease is present

A MSUE Virtual Breakfast session and recording to follow on white mold management in dry bean and soybean hosted by Dr. Marty Chilvers: Field Crops Pathologist can be found here: https://www.canr.msu.edu/field_crops/virtual-breakfast/