TECH Tips

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White Mold in Soybeans- What to do in 2018?

The Late Summer Challenge- that takes action NOW! Last season, **Sclerotinia White mold** has become very noticeable in many fields, especially in central and northern areas of South Dakota and up into southern North Dakota. The disease is insidious, coming at the peak of soybean development in late July and then often girdling even partially infected plants near the base of the plant, killing off the top growth, even if that upper plant growth was not directly infected. What is worse is that white mold produces tough survival structures- called sclerotia, that can remain alive in a field for many seasons.

Figure 1. Soybean plants heavily infected with white mold. White mold management takes planning and a partnership between grower and agronomist.

So how do we control the disease? First and foremost, realize that white mold is an endemic disease, present in much of our territory, and that management takes a SYSTEMS approach. An outline of the steps includes:

1. First and foremost, **varietal selection** is the choice of methods up front. There are no "perfect" varieties out there- there is no true resistance genes for white mold. That said, varietal differences are out there, and the differences in tolerance are generally rated in the seed company literature. Ratings are pretty solid, but can vary a little, again, as there are no true resistance genes to test for. Selecting appropriate defensive varieties for specific fields is a solid start to the season.
2. Secondly, look at **cultural methods**. There are several steps to this process, including:
    - First, consider longer crop rotations away from a white mold susceptible crop. This is not always possible, agronomically or economically, but is a solid white mold management step.
    - Secondly, consider rowed soybeans vs narrow rows vs solid planting in soybeans. Wide rows allow a little more open canopy, which may not be the best for weed control, but the increased air movement generally is less conducive to white mold growth.
    - Third, consider air movement of the field. Closed in fields surrounded by natural "barriers" like tree lines or hills, are often more conducive to white mold development.
    - Do not OVER-FERTILIZE soybeans, especially nitrogen. However, do not UNDERFERTILIZE soybeans either. Rank growth is conducive to white mold. That said, soybean are heavy nutrient users and fertilizing soybeans has been absolutely proven to be effective on increasing soybean yield.
3. **Possibly consider a biofungicide** as part of a long-term management plan. **Contans** is a biological control product for white mold. It is a parasitic fungal organism that lives exclusively on the sclerotia of white mold. It can be effective as part of management program, but has several drawbacks: 1) It is a biological organism.

We can source the product as a moist spore-containing product that we mix in a sprayer and apply, but it is a little difficult to handle and apply, 2) Because it is a biological organism, it is slow to act. It is best applied in the Fall of the year, but can be applied in the Spring as well. It takes time to "grow" in the soil and find the white mold sclerotia before it can affect the development of white mold, and 3) The product is quite expensive. At a "several bushels per acre for a return" cost point, it is only a good fit for "hot spots" to try to regain control of an area. Contans is not a cure-all, but my experience with it over many years at SDSU and in agronomy is that it can be up to 50% effective if conditions are good. It does have multi-year effects.

4. **Consider a seed treatment** that can some effect. A product called HeadsUp seed treatment, although not a direct fungicidal product, has been proven to cause what is called Systemic Acquired Resistance (SAR) reaction in soybeans. This SAR "toughens" the soybean, helping partially control white mold as well as other diseases in soybeans. This product is acting directly to kill a fungal pathogen or any other pathogen, but provides resistance to infection, so it is only part of the management program.
5. **Fungicides for white mold prevention.** Best Management Practices highly recommend the use of fungicides for white mold. The timing for soybeans is straight forward- R1 to R3 soybeans. White mold infects through the dead flowers on soybeans, so infection really is focused to R1 and later. 2017 infections continued strong through R3, with most severe infections at the R2-R3 stage of growth. A listing of the best recommendations for fungicides is provided below.
6. **What about Cobra Herbicide?** Cobra Herbicide has been proved to be partially effective on white mold control. Whether the effect is directly fungicidal or whether it is simply the effect of the common "burn" on the plant causing a "wound reaction" that provides increased resistance is not 100% clear, but is proven.

What Fungicides are Effective for White Mold?

Fungicide products for white mold fall into three general "Tiers" of effectiveness. These include:

1. ***TOP TIER/ GOLD STANDARDS:*** The fungicides **Endura- from BASF**- our long-time standard for control, and **ProPulse- from Bayer**- are the top products for white mold control. ProPulse combines Proline with fluopyram, (the same active ingredient as ILeVO) and has been shown to be on par with Endura in many trials. These products are not inexpensive, but are consistently the top performers.
2. ***MID TIER/ SILVER PROGRAM:*** There is a NEW product called **Delaro Fungicide**- from Bayer, and it is an interesting product to white mold control. This product has comparable ingredients to Stratego YLD, but has a *significantly* increased ratio of prothioconazole (Proline) to the strobilurin fungicide. Prothioconazole has good white mold activity. Delaro will likely be an excellent fit where white mold pressure is moderate. One or two applications at R1 and/or R3 can be used. Delaro could also be used very effectively as a setup fungicide for a stronger product like Endura or ProPulse- Delaro prior to R1, Endura or Propulse at R3 with heavy pressure. **Proline from Bayer** as a stand-alone product is also a mid-tier fungicide, or it can be used as Proline at R1 Proline followed by Stratego YLD at R3 or Endura at R3, depending on pressure.
3. ***NEXT TIER/BRONZE PROGRAMS:*** Zolera FX and Domark from Arysta are labeled for white mold, and Headline, Priaxor and Stratego YLD fungicides carry suppression labels. Zolera FX (tank mix of Domark and Evito) and straight Domark are the top of these products, but are not intended for control where pressures are heavy. Picoxystrobin (DuPont Aproach fungicide) has been advertised as having activity on white mold- however, I do not have local data to support this claim. Plant health use of any strobilurin, like Aproach, is solid, but I do not recommend them alone for white mold control. Plant health effects of any of these products are solid and proven.

Fungicide BEST MANAGEMENT PRACTICES

Sometimes a challenge has been that many fields with white mold issues DID receive a fungicide application, but white mold was still found in the field. I've received questions as to "why didn't the fungicide work?" Here are a few thoughts (and a challenge):

1. Fungicides can only move UPWARD and OUTWARD from the point of contact with the plant- from the lowest point of contact to be exact. This is my number one reason fungicides appear to "fail." There simply is *no downward movement of fungicides*. Spraying a fungicide on full canopy, R1 stage soybeans is a challenge.
    a. MEDIUM spray droplets, nozzles directed into the canopy, and 15 to 20 GPA of water are all needed to get best white mold control. Thorough coverage is critical.
    b. One promising new technology that may have some effect is the use of the UNDERCOVER UNIT from 360 Yield Center. The undercover unit mounts just above the Y-Drop fertilizer unit. The potential of this technology to spray the entire soybean canopy from top to bottom, getting fungicide to the flowers, where it is needed.
2. Fungicides are effective for white mold only for maybe a couple weeks. White mold starts infecting when we reach R1, but as long as we have dead flowers, the disease has access points and can keep infecting plants.
3. Fungicide applications will not stop an already active stem infection. If white mold starts in the lower plant, it is almost impossible to cure. Multiple applications may have been positive at controlling new infections, but active infections would persist.

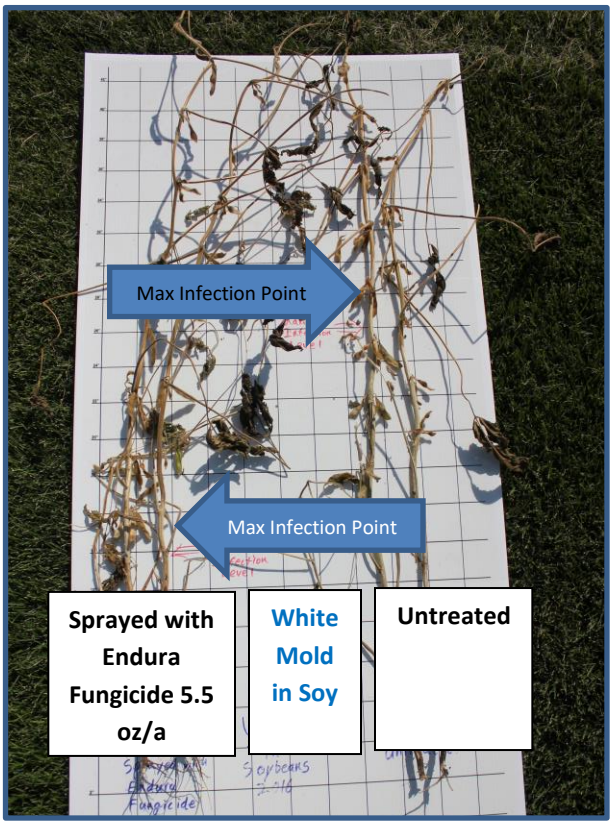

Figure 2. Soybean plants infected with white mold. Fungicide (left) protected the top of the plant, but low stem infection still girdled and ultimately killed the plant. Untreated plant (right) has more severe infection, higher on the plant.

The Bottom Line

White mold is an insidious disease that creeps in late in the season. Management takes a systems approach. It starts as we select varieties for next year, and continues season long with an active trusted partnership between grower and professional agronomist. We can control white mold, but it will take multiple tools, and white mold will remain lurking around the area, ready to strike if we let our guard down.