White Mold of Dry Beans

White mold is caused by the fungus, *Sclerotinia sclerotiorum*, and has the potential to cause substantial losses in dry beans. The disease causes reductions in the number of harvestable pods and seeds. Losses can also occur from stem infection causing lodging of the canopy. *Sclerotia* produced on diseased plants that are returned to the soil form the inoculum for future crops.

**Lifecycle and Symptoms**

The fungus survives in the soil as black *sclerotia* (Fig. A). Sclerotia germinate by producing tiny, tan, cup-shaped *apothecia* on the soil surface (Fig. B; marked with a ring). *Ascospores* which travel in the wind are produced on the *apothecia*, and infect dying flowers. When these flowers fall, infection may spread to pods, leaves or stems causing *white mold*.

On diseased pods, *white-cottony mycelia* and *sclerotia* are found (Fig. C). These sclerotia provide inoculum for the subsequent crop.

**Why is White Mold Problematic?**

- White mold affects a wide range of crops in a vegetable rotation.
- Sclerotia survive in the soil for 15 to 20 years.
- Only a small number of *apothecia* are needed to cause disease!
- *Apothecia* develop when flowers are produced.
- Resistant varieties are not available.
- Growth attributes that are associated with high yields (canopy closure) promote conditions which are highly conducive for infection and disease.
Management – Planning Ahead

Inoculum comes from the field of interest (spread from neighboring fields is unlikely). Seed is not a source of *Sclerotinia sclerotiorum* inoculum. When establishing a crop, consider these factors to reduce disease risk, especially if the field has a history of white mold (i.e. high risk):

- **Four to five** years between bean crops are preferred;
- **Longer** rotations may be beneficial for varieties which are highly susceptible;
- **Corn or grain** in at least **two** years within the rotation;
- **Row direction (E-W) and spacing (36”)** to promote wind flow;
- Optimize weed management to also promote wind flow;
- Minimize inversion of the soil for sclerotial degradation; and
- Do not over-supply nitrogen which promotes canopy growth.

Proactive and Protect!

In a wet year, be **proactive** in applying fungicides to protect the flowers.

- Timing of the **FIRST** application is critical (**10 to 20% of plants with one flower**);
- Ensure good spray **coverage**;
- Be aware of registered products and their pre-harvest intervals (Table 1);
- Apply fungicides at regular **intervals** to protect the developing flowers. If conditions are conducive to infection, reduce the interval between fungicide applications.
- Rotate products from different resistance groups.

After Crop Management

If white mold incidence was high, consider the following factors:

- Plan cover crops and rotations to reduce inoculum;
- Practice optimal weed management in all crops;

In fields with severe disease (or areas within fields), consider the use of Contans® (*Coniothyrium mimitans*). Optimize control by:

- Minimize soil disturbance after harvest and apply to debris;
- Apply at planting with shallow incorporation and moisture/irrigation.
- Use as part of an integrated strategy.

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<table>
<thead>
<tr>
<th>Product</th>
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<th>Rate/A (product)</th>
<th>Resistance group</th>
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<tr>
<td><strong>Fungicides</strong></td>
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<tr>
<td>Endura® 70 WDG</td>
<td>Boscalid</td>
<td>8 to 11 oz</td>
<td>7</td>
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<tr>
<td>Switch® 62.5 WG</td>
<td>Cyprodinil + Fludioxonil</td>
<td>11 to 14 oz</td>
<td>9 + 12</td>
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<tr>
<td>Rovral® 4F</td>
<td>Iprodione</td>
<td>1.5 to 2 pt</td>
<td>2</td>
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<tr>
<td>Topsin® M 70 WP</td>
<td>Thiophanate-methyl</td>
<td>1 to 1.5 lb</td>
<td>1</td>
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<tr>
<td>Topsin® 4.5 FL</td>
<td>Thiophanate-methyl</td>
<td>20 to 30 oz</td>
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**Biological**

<table>
<thead>
<tr>
<th>Product</th>
<th>Active ingredient</th>
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<tbody>
<tr>
<td>Contans® WG</td>
<td>Coniothyrium minitans</td>
<td>1 to 4 lb/50 to 100 gall water</td>
<td>-</td>
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</tbody>
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**Notes on Contans® WG application:**

- After harvest, apply directly to debris (1 lb/A) and leave for at least 8 weeks before shallow incorporation (or none).
- Applications may also be conducted shortly after planting (2 lb/A) and ensure some soil moisture is present. Estimated cost at 2 lb/A rate is ~ $50/A. May be mixed with some herbicides.