PLANT DISEASE MANAGEMENT

of Vegetables and Ornamentals in the Home Garden

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Figure 1. White mold of petunia and marigolds in flower bed. Note the bleached white stems associated with white mold infection.



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hite mold, caused by the fungus *Sclerotinia sclerotiorum*, causes wilt, rot, or blight diseases on more than 370 ornamental plant species, field crops, weeds, and vegetables in 64 plant families (Table 1). These plant species differ greatly in their susceptibility to the white mold fungus. Levels of infection can range from hardly noticeable to complete destruction of the plant. Unfortunately, even those plants which are only slightly susceptible may help build up levels of the fungus in the soil. Then when a very susceptible crop such as cabbage or petunia is planted and conditions are favorable, severe disease losses result.

White mold is one of the most destructive diseases on sunflower and dry beans that farmers experience in the Northern Great Plains. In recent years this disease has become increasingly serious in flower-beds and gardens across the Dakotas.

 Table 1. Plants susceptible to Sclerotinia sclerotiorum.

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Carnation Forget me not Lobelia (edging) Potato Watercress Carrot Forsythia Lotus species Primrose Watermelon Castorbean Foxglove Lupine (blue, European blue, Proboscis flower Wild chamomile Cauliflower Freesia sundial, Washington) Pummelo Wild ginger Celeriac Fuchsia Malvaviscus Pumpkin Wild mustard Celery Gaillardia Mangel Purslane (common) Wintercress Charlock Galinsoga (small-flowered) Marigold Pyrethrum (common, dalmatian) Yardlong bean Chickpea or garbanzo bean Garden cress Matilija poppy Quickweed Yellow rocket	Cape marigold	Firewheel	Lily (Easter, Madonna)	Poison-hemlock	Vetch (common, hairy)
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Charlock Galinsoga (small-flowered) Marigold Pyrethrum (common, dalmatian) Yardlong bean Chickpea or garbanzo bean Garden cress Matilija poppy Quickweed Yellow rocket	Celeriac	Fuchsia	Malvaviscus	·	Wild mustard
Chickpea or garbanzo bean Garden cress Matilija poppy Quickweed Yellow rocket	•		=		
7 1 117	Charlock	Galinsoga (small-flowered)	Marigold	Pyrethrum (common, dalmatian)	Yardlong bean
Chickweed (common) Garlic Medic (black) Radish (garden, wild) Zinnia	•				
	Chickweed (common)	Garlic	Medic (black)	Radish (garden, wild)	Zinnia

Symptoms



Figure 2. Mycelium and sclerotia on a marigold stem. Note the bleached stems and dark sclerotia forming on the stems.

The white mold fungus can cause a blighting or rotting of any above ground or below ground plant part. Infected plants are initially distributed randomly throughout the flower bed or garden. The affected area, or lesion, of the plant takes on a dark green, greasy or water-soaked appearance. On stems the lesion may be brown to bleached white in color. If the humidity is high a white fluffy mycelial (mold) growth appears (Figure 2). Lumpy areas appear in this white growth that develop into hard, black structures as they mature. The lesions expand up and down the plant from the initially infected flower, leaf, or petiole and may eventually consume the entire plant. As the disease progresses the stem is girdled and the plant begins to wilt, eventually dying.

The hard black bodies formed inside or on the outside surfaces of the stem and other plant parts (Figures 3 and 4) are called sclerotia. These are the survival structures of the fungus that are associated with reproduction in later years. Sclerotia may be 1/16-1/2 inch in diameter, depending on the host they are produced on.

The disease can continue to spread throughout the bed if the weather stays cool and moist and air movement is restricted. In the case of vegetables, the disease can continue to spread on stored produce if conditions are favorable for the fungus. High humidity, high moisture, and warm temperatures can lead to rapid destruction of the stored crop. Refrigeration of produce will typically minimize losses to decay.



Figure 3. Sclerotia that covered sunflower head (upper left), internal parts of sunflower head (upper right), bean stem (lower left) and marigold and petunia stems (lower right).



Figure 4. Black sclerotia in the pith (center) of a zinnia stem.

Disease Cycle

White mold persists in the soil as black sclerotia for many years. Sclerotia on or near the soil surface germinate to form one to several stalks with funnels on the end called apothecia. Apothecia are like tiny mushrooms (Figure 5). They produce spores that are forcibly discharged into the air and carried by the wind for a mile or more. If they land on susceptible plant parts infection will occur when there is ample moisture and temperatures are cool to moderate (40-85 F). Initial infection occurs on dead plant tissues such as wilted blossoms. The fungus then invades healthy green tissues, causing a soft rot. The white mycelial growth is visible within a few days and the black sclerotia are present in 10-14 days, completing the life cycle of the fungus.

Control

- Plant in well-drained soil using proper spacing to prevent crowding. Avoid areas with poor air circulation.
- Water thoroughly, early in the day, to avoid prolonged periods with water on the plants.
- If the soil is infested in a small area of the garden, remove as much of the soil as possible and replace with clean soil.
- Practice proper sanitation by CAREFULLY removing all infected plants as soon as possible. Do not compost or use for mulch.
 Burn the infected plants if your community allows open burning.
- Control weeds. Many weeds are hosts to the white mold fungus when ornamental hosts are not present. A micropore weed barrier laid over affected ground can prevent the dispersal of spores from germinating sclerotia.
- Avoid planting susceptible plant species (listed in table 1) on infested sites for at least 3-4 years.
- Plant materials to be overwintered should be stored under cool, dry conditions in a clean storage area. Store only mature, healthy (blemish-free) plant material that has been properly harvested
- Fungicides are available for some types of plants and situations.
 They act to prevent infection; they will not get rid of an existing infection or destroy the sclerotia in the soil. Contact your local County Extension Office for more information on currently available fungicides.

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Figure 5. Funnel-shaped apothecia of Sclerotinia fungus. Note size relative to paper clip.

Photo credits: Fig. 1, 2, 3 – M.A. Draper, SDSU Fig. 4 & 5 – SDSU Plant Science Department



