

6-1-2001

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Charyl R. Biller
South Dakota State University

Martin A. Draper

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Recommended Citation

Biller, Charyl R. and Draper, Martin A., "White Mold of Vegetables and Ornamentals in the Home Garden" (2001). *Fact Sheets*. Paper 89.
http://openprairie.sdstate.edu/extension_fact/89

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White Mold

of Vegetables and Ornamentals in the Home Garden

Cheryl R. Biller
Extension Plant Diagnostician
North Dakota State University

Martin A. Draper
Extension Plant Pathologist
SDSU Plant Science Department

NDSU Extension Circular (Rev.), June 2001
South Dakota Extension Fact Sheet 910



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



NORTH DAKOTA STATE UNIVERSITY



SOUTH DAKOTA STATE UNIVERSITY
College of Agriculture & Biological Sciences
SDSU Cooperative Extension Service

USDA

White 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*.

Aconite	Chicory	Gayfeather	Milk thistle	Ragweed
Acrodium	China-aster	Gazania	Milkvetch	Rape
Alfalfa or lucerne	Chinese cabbage	Gentian	Milkweed	Rape (bird)
Alkanet	Chinese gooseberry	Geranium (fish, florists')	Monarch of the Veld	Raspberry (red)
Almond	Chokeberry (red)	Gerbera	Monkshood (azure)	Rhubarb
Amaranthus	Chrysanthemum	Gherkin (West Indian)	Mountain bluet	Rocket salad
Anemone (poppy)	Cineraria (florists')	Ginseng (American)	Mouse-ear cress	Rock melon
Angelica	Citron	Gladiolus	Mulberry (white)	Rose
Anise	Cleavers, Goosegrass	Globeflower	Mullein (moth)	Roselle
Apple	Clover (alsike, crimson, Egyptian,	Gloxinia	Muskmelon	Rutabaga (swede)
Apple of Peru	holy, least hop, red, sierra,	Goldenbells	Mustard (black, leaf, white)	Safflower
Apricot	sub-terranean white,	Goldenglow	Myoporium	Sage
Artichoke	zigzag)	Goldenrod	Narcissus	Salsify
Asparagus	Cockscomb	Gourd (yellow flowered)	Nasturtium (garden, wild)	Scabious (sweet)
Asphodel	Columbine	Goutweed	Nemesia	Shepherdspurse
Aster	Colza	Granadilla (purple flowered)	Nettle	Slipperwort
Avocado	Coriander	Grape (European wine)	New Zealand spinach	Snapdragon
Baby's breath	Corn chamomile	Grapefruit	Nightshade (beaked, silverleaf)	Soybean
Bachelor buttons	Cornflower	Groundnut or wildbean	Oak	Sowthistle
Banana (Cavendish, common)	Corn salad	Groundsel (ragwort)	Oats	Spiderflower
Barberry	Cosmos (common)	Guayule	Okra	Spikenard
Barley (winter)	Cow-parsnip	Hebe	Onion	Spinach
Basil	Cowpea or black-eyed pea	Hedgemustard (tall)	Orange (common or sweet,	Spurge (thyme-leaved, toothed)
Bean (Adzuki, black, gram,	Crabapple	Hemp	Mandarin, (sour or Seville)	Squash (summer, winter)
civet, kidney, or dwarf, lima,	Crabgrass	Henbane	Pak-choi (Bok-choi)	Stephanotis
mung, pinto, scarlet, runner)	Crownvetch	Heuchera	Pansy	Stock (common, intermediate)
Begonia	Cryptomeria	Hibiscus (Chinese)	Parsley	Strawberry
Bellflower (chimney and willow)	Cucumber	Hollyhock (Antwerp, common)	Parsnip	Strawflower
Birdsfoot trefoil	Cynoglossum	Hop (common or European)	Papaw	Sugar-apple
Bittercress	Cypress or whitecedar (Lawson)	Horsechestnut	Pea (field, garden)	Sunflower
Black salsify	Dahlia	Horseradish	Peach	Sunn hemp
Bleeding heart	Daisy (African, English, oxeye,	Houndstongue	Peanut	Sweet alyssum
Bluebells	Shasta, Swan river,	Hyacinth	Pear	Sweetclover (annual yellow,
Bristlegrass (green)	Transvaal)	Hydrangea	Pelargonium	yellow, white)
Broadbean or vetch	Dandelion (common, Russian)	Iris (English, German, Siberian)	Pennycress (field)	Sweetpea
Broccoli	Deadnettle	Jamaica sorrel	Peony	Sweet potato
Broomrape	Delphinium	Jerusalem artichoke	Pepper (chilli, red or sweet)	Sweet sultan
Brussels sprouts	Dill	Jute	Peppergrass	Tansymustard
Buckhorn	Dock (yellow or curled)	Kale	Peppermint	Teasel (common, Fuller's)
Buckwheat	Dutchman's pipe	Kale (tree)	Periwinkle (common,	Thistles
Buffalobur	Eggplant	Kenaf Kohlrabi	Madagascar)	Tickseed
Burclover or toothed medic	Endive	Lambsquarters	Pe-tsai	Toadflax
Buttercup (Persian, wild)	Escarole	Larch (Japanese)	Petunia (garden, wild)	Tobacco (common,
Butterfly flower	Eucalyptus or gum	Larkspur (bouquet, candle,	Phlox	flowering, wild)
Cabbage	Euonymus	garland, rocket)	Pigeonpea	Tomato
Calendula	Evening primrose	Lawson cypress	Pigweed (rough)	Tree tomato
Camellia	False dragonhead	Lemon	Pine (Japanese red)	Tulip
Candytuft	Fennel	Lentil	Plantain (common)	Turnip
Cantaloupe	Fenugreek	Lettuce (head, leaf, prickly	Plum (American, garden or	Udo
Canterbury bells	Fig (cultivated, magnolia-leaf)	Romaine)	prune)	Valerian (common or
Cape gooseberry	Fireweed	Lilac (common)	Poinsettia	garden-heliotrope)
Cape marigold	Firewheel	Lily (Easter, Madonna)	Poison-hemlock	Vetch (common, hairy)
Caraway	Flax (common, flowering)	Lime	Poppy (California, opium)	Wallflower
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
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.



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

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 and cured.
- 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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Fig. 4 & 5 – SDSU Plant Science Department

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the USDA. Larry Tidemann, Director of Extension, Associate Dean, College of Agriculture & Biological Sciences, South Dakota State University, Brookings. Educational programs and materials offered without regard for race, color, creed, religion, national origin, ancestry, citizenship, age, gender, sexual orientation, disability, or Vietnam Era Veteran status.

5,000 printed at a cost of ? each. FS 910. March 2002.

