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Sclerotinia Diseases

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The fungus genus *Sclerotinia* (sclair-o-TIN-e-ah) includes a number of important plant pathogens. The *Sclerotinia* diseases most often associated with vegetables are caused by *S. sclerotiorum* (sclair-o-she-OR-um) and *S. minor. Sclerotinia minor* has a narrow host range that includes lettuce, celery, carrot, *Delphinium* species, soybean, stock, sunflower, peanut, and a few other plants. *Sclerotinia sclerotiorum* has a wide host range that includes broccoli, cabbage, cauliflower, carrot, celery, bean, lettuce, parsnip, tomato, pepper, potato, stock, sunflower, eggplant, squash, melon and other cucurbit, artichoke, asparagus, beet, and broad bean, as well as many flower crops.

IDENTIFICATION OF *SCLEROTINIA*

Both *S. sclerotiorum* and *S. minor* produce a cottony, white, dense mat of mycelia (mass of fungus strands) on the surface of the host and on adjacent soil surfaces. Within this fluffy white mass, dense white bodies of fungus soon form. These bodies become black and hard as they mature and are called sclerotia (sclair-O-she-ah). The sclerotia act like seeds and allow the fungus to survive for several years in the soil. *Sclerotinia sclerotiorum* produces large (2 to 10 mm in diameter), smooth, rounded sclerotia, while *S. minor* produces small (0.5 to 2 mm in diameter), rough, angular sclerotia (fig. 1). Identification should be made based on a group of sclerotia from the same colony rather than on a single sclerotium.

Note that there is an overlap in sclerotia size and shape. In general, *S. minor* sclerotia are more numerous, smaller, and more angular than the sclerotia of *S. sclerotiorum.*

Figure 1. Sclerotia of *S. sclerotiorum* (left) and *S. minor* (right).

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SYMPTOMS OF *SCLEROTINIA* DISEASES

As these fungi colonize host tissues, they produce a pale brown to gray-brown lesion. Severe tissue degradation, resulting in a mushy soft rot, also occurs. In celery, the white, cottony growth and tissue rot are often accompanied by a pink-scarlet coloration of the tissues. Hence the name pink rot for this disease in celery.

Sclerotinia minor seldom produces spores (fig. 2). This pathogen usually attacks its host root and stem at or near the soil line. Lesions develop on the stem, and the pathogen gradually destroys the vascular tissue of the crown, at which time the plant wilts and collapses.

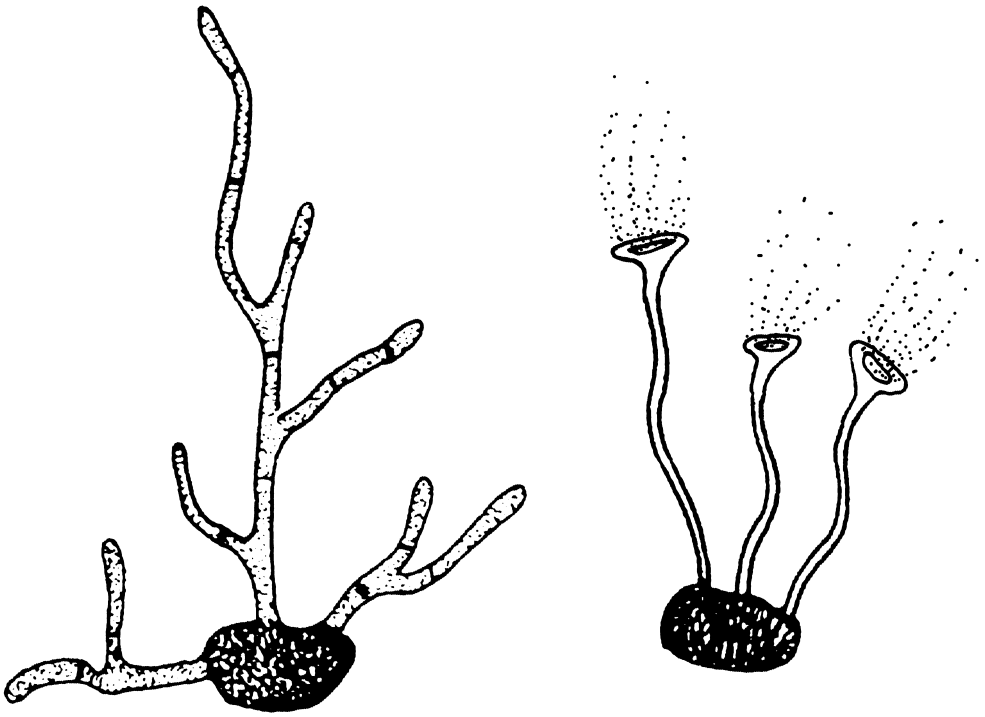

Figure 2. *Sclerotinia minor* sclerotia usually germinate by producing a mass of fungal threads (left). *S. sclerotiorum* can produce spores from small mushrooms (right) or germinate directly similar to *S. minor*.

Sclerotinia sclerotiorum can attack its host through the soil similarly to *S. minor,* but it also frequently produces spores that can be airborne (fig. 3). Hence, it is not uncommon to see *S. sclerotiorum* infections in the foliage of celery, on the heads of lettuce, cabbage, broccoli, cauliflower, and bean pods, and on the aerial parts of other hosts. Senescent flower parts are an ideal site for this pathogen to colonize. From this tissue the pathogen can quickly invade healthy leaves, stems, and fruits (pods). This is why *S. sclerotiorum* can be such a serious pathogen in flowering crops, seed crops, and dry beans.

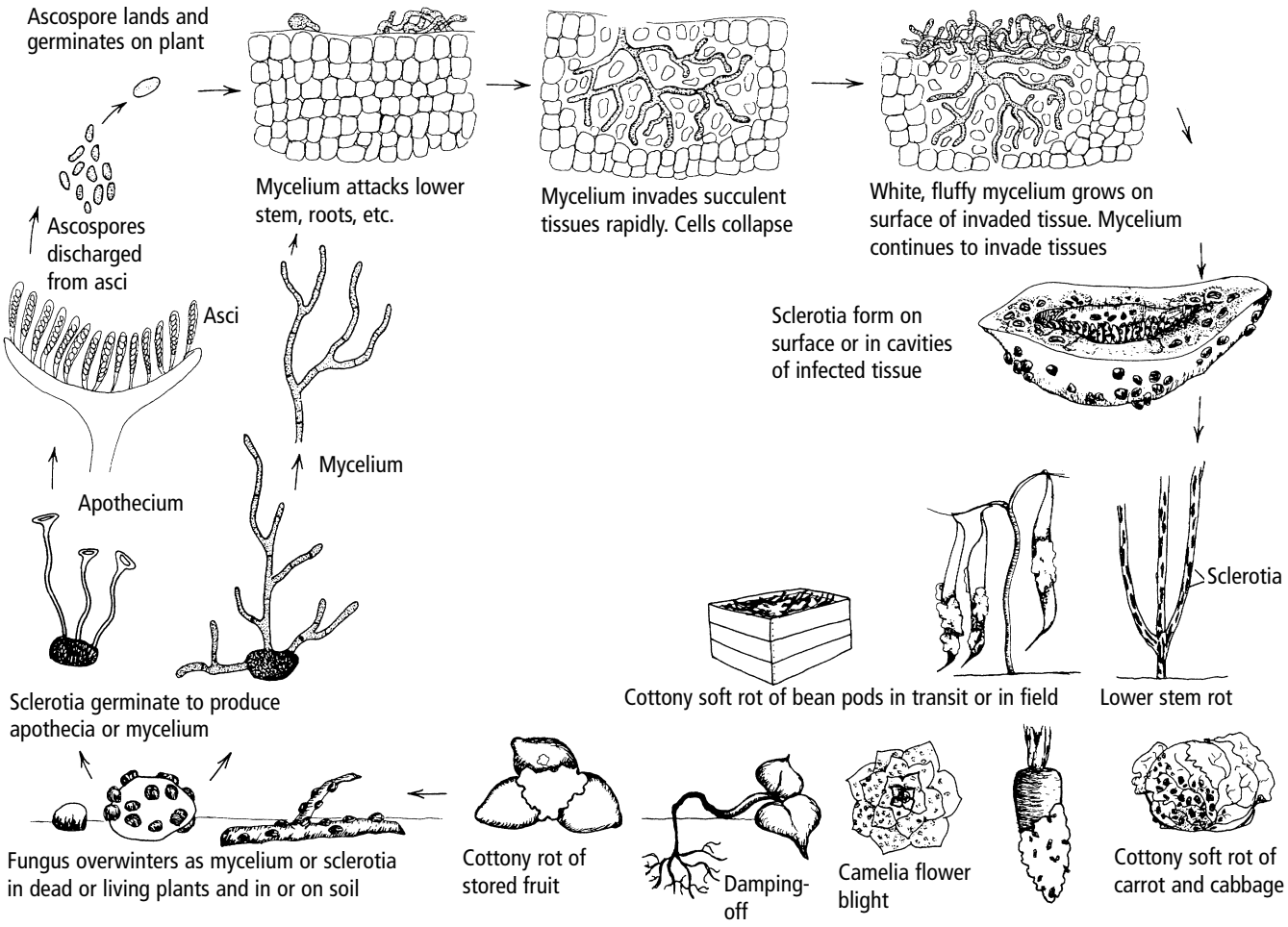

Figure 3. Development and symptoms of diseases of vegetables and flowers caused by *Sclerotinia sclerotiorum*.
(*Source:* Agrios, G. N. 1997. Plant pathology, 4th edition. San Diego: Academic Press.)

MANAGEMENT OF *SCLEROTINIA*

Both *S. sclerotiorum* and *S. minor* survive between crops as sclerotia in soil or as mycelium in infected plant debris (fig. 3). Most sclerotia are short-lived (several months) in soil in the absence of a host. Under dry conditions, however, sclerotia have retained their viability more than 10 years.

Control of *Sclerotinia* diseases must be accomplished by using a combination of cultural and chemical means. Resistant cultivars have not been sufficiently developed to constitute a feasible means of control. Activity of these pathogens is favored by high soil moisture, high air humidity, and cool temperatures. Research has shown that the use of drip irrigation can dramatically reduce these factors near the soil surface and thereby reduce the incidence of *Sclerotinia* diseases. Crop rotation is another important tool in reducing the sclerotial population in the soil. Lettuce is highly susceptible to both *S. sclerotiorum* and *S. minor.* Rotation with less susceptible crops helps to reduce *S. minor* but may not reduce the *S. sclerotiorum* population. *S. sclerotiorum* can be reduced by planting such nonhost crops as corn, small grains, and grasses.

A fallow period does little to reduce the sclerotial population. The wetting and drying of soil that occurs during a cropping cycle is much more effective in reducing the number of active sclerotia in the soil. Deep plowing has been recommended to help suppress *Sclerotinia* diseases, but recent research has cast doubt on the usefulness of this practice in fields with high populations of this pathogen.

Finally, there are a number of fungicides, such as chlorothalonil, dichloran, iprodione, thiophanate-methyl, vinclozolin, and metam-sodium, that have excellent activity against *Sclerotinia.* Always refer to the product label for crop registration and dosage information.

FOR MORE INFORMATION

You'll find detailed information on many aspects of disease and pest management in these titles and in other publications, slide sets, and videos from UC ANR:

Alive and Well: Sustainable Soil Management, Video V92-D

Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control, Publication 3386

Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide, Second Edition, Publication 3332

Plants in California Susceptible to Phytophthora cinnamomi, Publication 21178

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This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Vegetable Crops.