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Sclerotinia Diseases — Symptoms, Signs and Management

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SCLEROTINIA DISEASES

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The fungus genus Sclerotinia (Sclair·o·tin·e·ah) contains a number of important plant pathogens. Vegetable growers on the central coast are probably most familiar with *S. sclerotiorum (sclair·o·she·orum)* and *S. minor,* the causes of lettuce drop. *Sclerotinia minor* attacks only lettuce. However, *Sclerotinia sclerotiorum* has a wide host range which can include crops such as broccoli, cabbage, cauliflower, carrots, celery, beans, tomato, peppers, potatoes, stocks, and sunflower. Although seldom observed on the central coast, eggplant, squash, artichoke, asparagus, beet, and broad bean can also be hosts to this pathogen along with several flower crops and landscape shrubs.

The most obvious and typical initial symptom of *S. sclerotiorum* or *S. minor* is the presence of a cottony, white, dense mat of mycelial growth (mass of fungus strands) on the surface of the host and on the adjacent soil surface. 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 (pl) (sclair·o·she·ah). A single body is called a sclerotium (sclair·o·she·um) . The sclerotia act like seeds and allow the fungus to survive for several years in the soil. *S. sclerotiorum* produces large (2-10 mm in dia-meter), smooth, rounded sclerotia, while *S. minor* pro-duces small (0.5-2 mm in diameter), rough, angular sclerotia (Fig. 1).

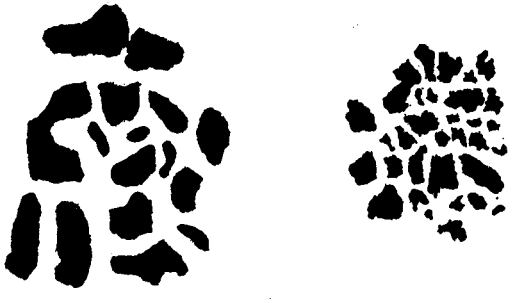


Fig. 1. Sclerotia of *Sclerotinia sclerotiorum* (left) and *S. minor* (right).
Note, there is overlap in size and shape. In general, *S. minor* sclerotia are more numerous, smaller, and more angular than *S. sclerotiorum.*
As the fungus colonizes host tissues, it produces a pale brown to gray-brown lesion. 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 the lettuce stem at or near the soil line. Lesions develop on the stem, and the pathogen gradually "cuts" the plant in two at which time the head collapses or "drops."

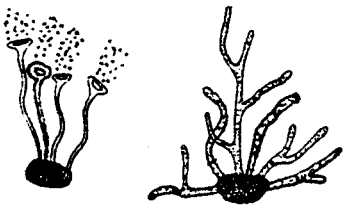


Fig. 2. *S. minor* sclerotia usually germinate by producing a mass of fungal threads (right). *S. sclerotiorum* can produce spores from small mushrooms (left) or germinate directly similar to *S. minor* (right).

Sclerotinia sclerotiorum can attack its host through the soil similar to *S. minor,* but it also frequently produces spores which can be airborne to the host (Fig. 3, 9 o'clock). Hence, it is not uncommon to see *S. sclero-tiorum* infections in the foliage of celery, on the heads of lettuce, cabbage, broccoli or cauliflower, on bean pods, and 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 or fruits (pods).This is why *S.sclerotiorum* can be such a serious pathogen in flowering crops, seed crops, and dry beans.

Both *S. sclerotiorum* and *S. minor* survive between crops as sclerotia in soil or as mycelium in infected plant debris (Fig. 3, 7 o'clock). Under central coast conditions, sclerotia can probably survive up to 3 years in soil in the absence of a host. Under dry conditions sclerotia have retained their viability more than 10 years.

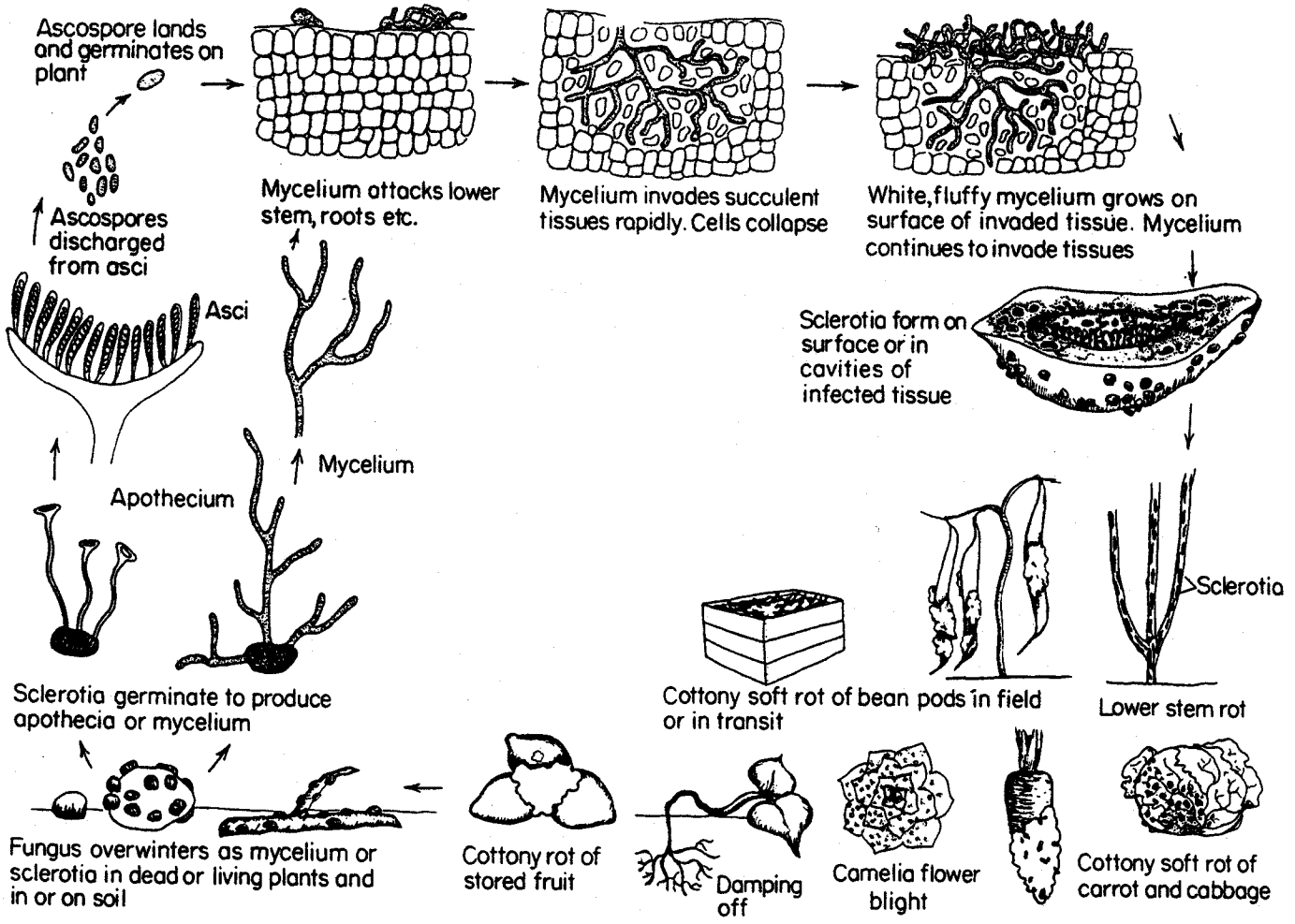
Control of Sclerotinia diseases must be accomplished by using a combination of cultural and chemical means. To date resistant cultivars have not been developed with sufficient resistance to make this a feasible means of

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 both 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 any other crop will help reduce *S. minor*, but may not reduce the *S. sclerotiorum* population. *S. sclerotiorum* can be reduced by planting such non-host crops as corn, small grains or grasses.

It should be mentioned that a non-crop 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 shed doubt on the usefulness of this practice.

Finally, there are a number of fungicides, such as benomyl, chlorothalonil, dichloran, iprodione, thiophanate-methyl, vinclozolin, and metam-sodium that have excellent activity against Sclerotinia. Each fungicide varies with regard to use patterns and the crops labeled for use. Consult the product label for registered uses.

Fig. 3. Development and symptoms of diseases of vegetables and flowers caused by *Sclerotinia sclerotiorum*.



From Agrios, 1988.