VEGETABLE CROPS

CORNELL COOPERATIVE EXTENSION

Sclerotinia Rot of Cabbage

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Sclerotinia rot of cabbage (sometimes referred to as white mold) affects cabbage cultivars grown for sauerkraut, storage, and fresh market. The disease is caused by the fungus *Sclerotinia sclerotiorum.* This fungus can cause serious losses in the field, in storage, and under transit and market conditions. *S. sclerotiorum* is widely distributed in relatively cool and moist areas throughout the world. The fungus has a wide host range and is known to attack over 360 species of plants. In the Cruciferae family alone, it has been recorded on 18 genera and 32 species. In New York State the fungus is capable of infecting many types of vegetables and is particularly serious on snap beans. It also infects weeds such as ragweed, dandelion, and wild clover.

Symptoms and Signs

Although cabbage can be infected during any growth stage, most plants are infected in the field after midseason. Infections may occur on the stem at the soil line, on the leaves at their bases, or where the foliage comes in contact with the soil; but most infections originate at the top or on the sides of midseason to mature cabbage heads in New York State. The infections begin as tan, water-soaked, circular areas, which soon become covered by white, cottony fungal growth (fig. 1). The host tissue becomes soft and watery as the disease progresses. The fungus eventually colonizes the entire cabbage head and produces large, black, seedlike structures called sclerotia on the diseased tissue (fig. 2).

Disease Cycle

The sclerotia produced on the diseased tissue are overwintering and survival structures, approximately 2 to 20 mm long. The sclerotia survive in a dormant state on or in the soil during the winter months. In the spring, summer, and fall months, under wet conditions, the sclerotia develop small, tan, trumpet-shaped, mushroom-like structures called apothecia (fig. 3). The spores produced in the apothecia are called ascospores, which are forcibly discharged and carried by wind to susceptible plants. In cabbage fields, apothecia are frequently found in moist protected locations underneath the lower leaves of mature plants.

The ascospores require nutrients and a thin film of water on the plant surface to be able to germinate and infect a plant. Blossoms of many plants, including weeds, are an excellent source of nutrients for ascospore germination. The most frequently observed source of nutrients in New York State cabbage fields is common ragweed flowers. Ragweed has become a serious problem in cabbage fields because of the lack of herbicides to control it effectively. Ragweed flower parts are often infected with *Sclerotinia sclerotiorum,* and infected ragweed plants can pass the disease to healthy cabbage when the plants are in contact with each other (figs. 4, 5).

Cool, moist conditions favor the development of the disease in the field, although the fungus can grow over a wide temperature range. The fungus requires considerable moisture for the sclerotia to germinate and for the ascospores to infect plants. It has been observed that white mold is more prevalent in cabbage with restricted air circulation caused by low areas and woods surrounding the field. This is because the poor air drainage allows moisture to be retained in the soil and on the plants for a longer period of time. The resulting extended wet period favors the development of white mold.

Control

Implementation of a single control measure will not be effective against white mold because the fungus that causes the disease *(S. sclerotiorum)* is an aggressive pathogen with a wide host range. White mold on cabbage can be managed most successfully by combining cultural practices that discourage disease development. For example, growers should avoid planting cabbage in fields that are surrounded by dense woods that will restrict air circulation and subsequently delay drying. Rows should be planted in the direction of the prevailing winds to promote air drainage and drying of plant and soil surfaces.

Fields with a history of white mold should be planted with nonsusceptible crops such as grains (corn, rye, wheat, etc.). Cabbage and other susceptible crops (broccoli, cauliflower, beans, peas, etc.) should not be planted in fields where white mold has become a problem because continuous cropping of susceptible crops will result in a buildup of the fungus in the soil and increased disease incidence.

Successful control of white mold with fungicides depends upon spraying at the proper time and completely covering the plants with the chemical. Unfortunately, there are no fungicides registered for use on cabbage to control white mold at this time. Preliminary research conducted at the New York State Agricultural Experiment Station has shown that removing all susceptible weeds from the field is often more effective in preventing white mold on cabbage than

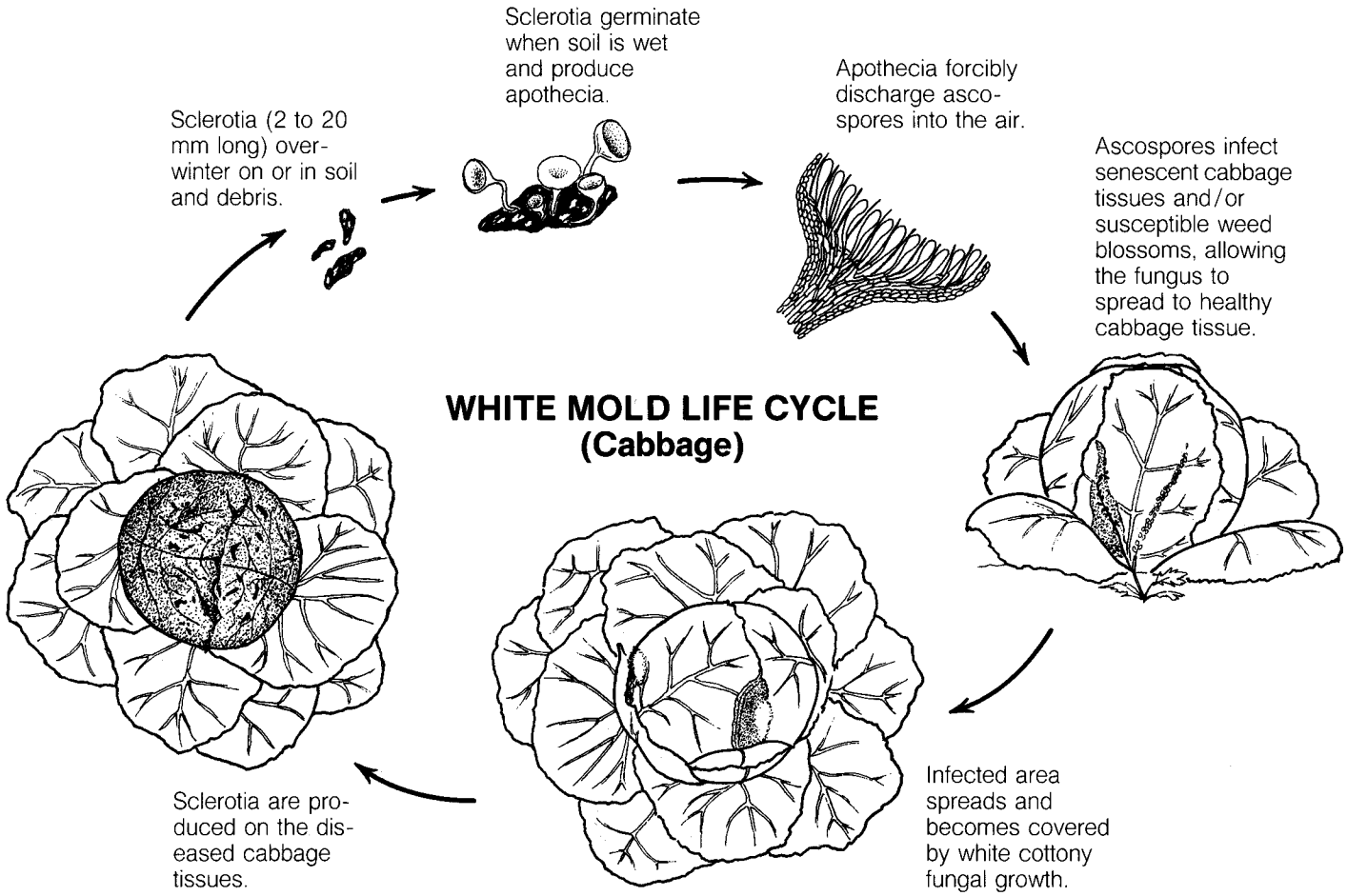

Figure 5. Disease cycle of white mold caused by *Sclerotinia sclerotiorum*.

fungicide applications. Thus, effective control of white mold in cabbage fields can be achieved with good weed control.

Bruises and other types of mechanical injuries to cabbage heads during harvesting operations leave wounds that can be colonized by the white mold fungus. Research has shown that if ascospores are present on the leaf surfaces at harvest, bruises release sufficient nutrients to allow the fungus to infect the wounded area. In commercial storages, the fungus will completely colonize a bruised cabbage head and infect healthy cabbage heads that are in contact with the diseased tissues.

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Quantity discount available.

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