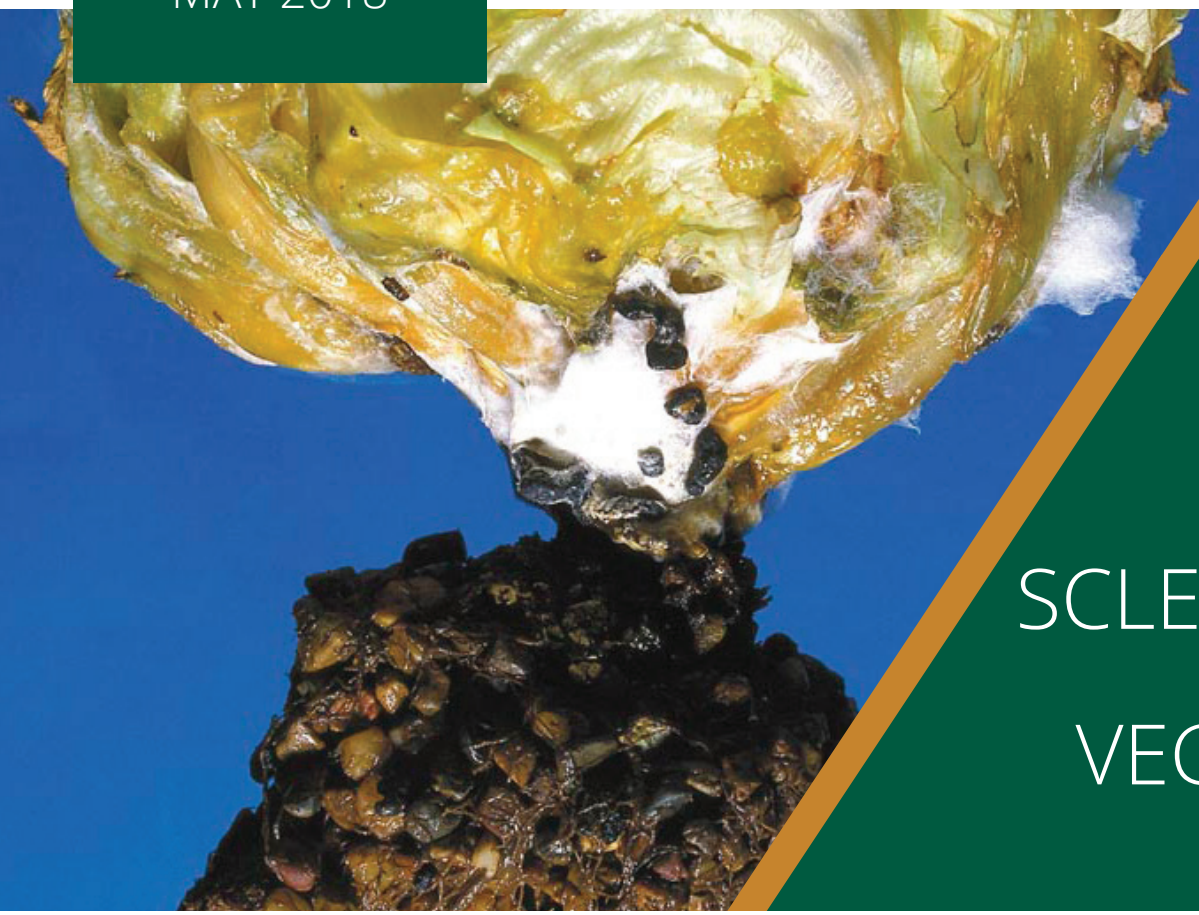
MAY 2018



SCLEROTINIA ROT OF VEGETABLE CROPS

Sclerotinia rot is also known as white mould, cottony rot, drop of lettuce and nesting of beans after harvest. It is caused by pathogenic fungi of two species: *Sclerotinia sclerotiorum* and *S. minor*. A third species, *S. trifoliorum*, was thought to only infect legumes (such as peas and beans) but more recent genetic studies suggest it might also infect other botanical hosts. Overall, these fungal species are an important plant pathogen because of their wide range of hosts – more than 400 different plant species – and they can persist in the soil for many years. Sclerotinia rot can also cause significant yield losses during cropping and as a post-harvest disease.

SYMPTOMS

The Sclerotinia fungi induce a variety of symptoms in the above-ground parts of the crop. Symptoms may include yellowing and collapse of leaves and water-soaked lesions, followed by the appearance of a fluffy white fungal threads studded with black resting bodies (sclerotia) of the fungus (figures 1 & 2).

Figures 1& 2. Sclerotia can also form inside stems, flowers and fruit of affected plants. Sclerotia of *S. sclerotiorum* and *S. trifoliorum* can resemble rat dung and be up to 1–1.5cm long. S. minor has smaller sclerotia about the size of a match-head (1-5mm).

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Figure 3. Saucer-shaped apothecia of *S. sclerotiorum* on the soil surface.

DISPERSAL AND LIFE CYCLE

Sclerotia can survive in soils for long periods (up to five years or more). They germinate and may infect the bases of plants directly or those of *S. sclerotiorum* can also produce small creamy-brown saucer-shaped bodies called apothecia on the soil surface (figure 3). Numerous microscopic spores are ejected into the air from the top surface of these mushroom-like bodies. Their release is triggered by water such as rainfall, dew, fog or irrigation. Spores can be carried in air currents and wind until they land on plant tissue where they germinate and infect under humid and moist conditions. Flower petals are more easily infected than healthy vegetative tissue. Infected flowers lead to infections of developing fruit (figure 4). Damaged or senescing parts of plants are commonly also more infected. Sclerotinia rot is more serious under milder temperatures (15–21°C) and prolonged wet weather conditions. Densely planted crops with poor air circulation favour infection due to the higher humidity surrounding leaves and flowers.

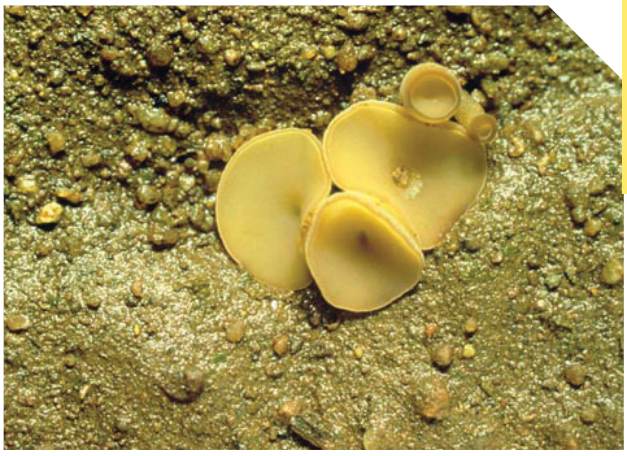

Figure 4. Sclerotinia rot on greenhouse cucumber fruit.

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SCLEROTINIA LIFE CYCLE

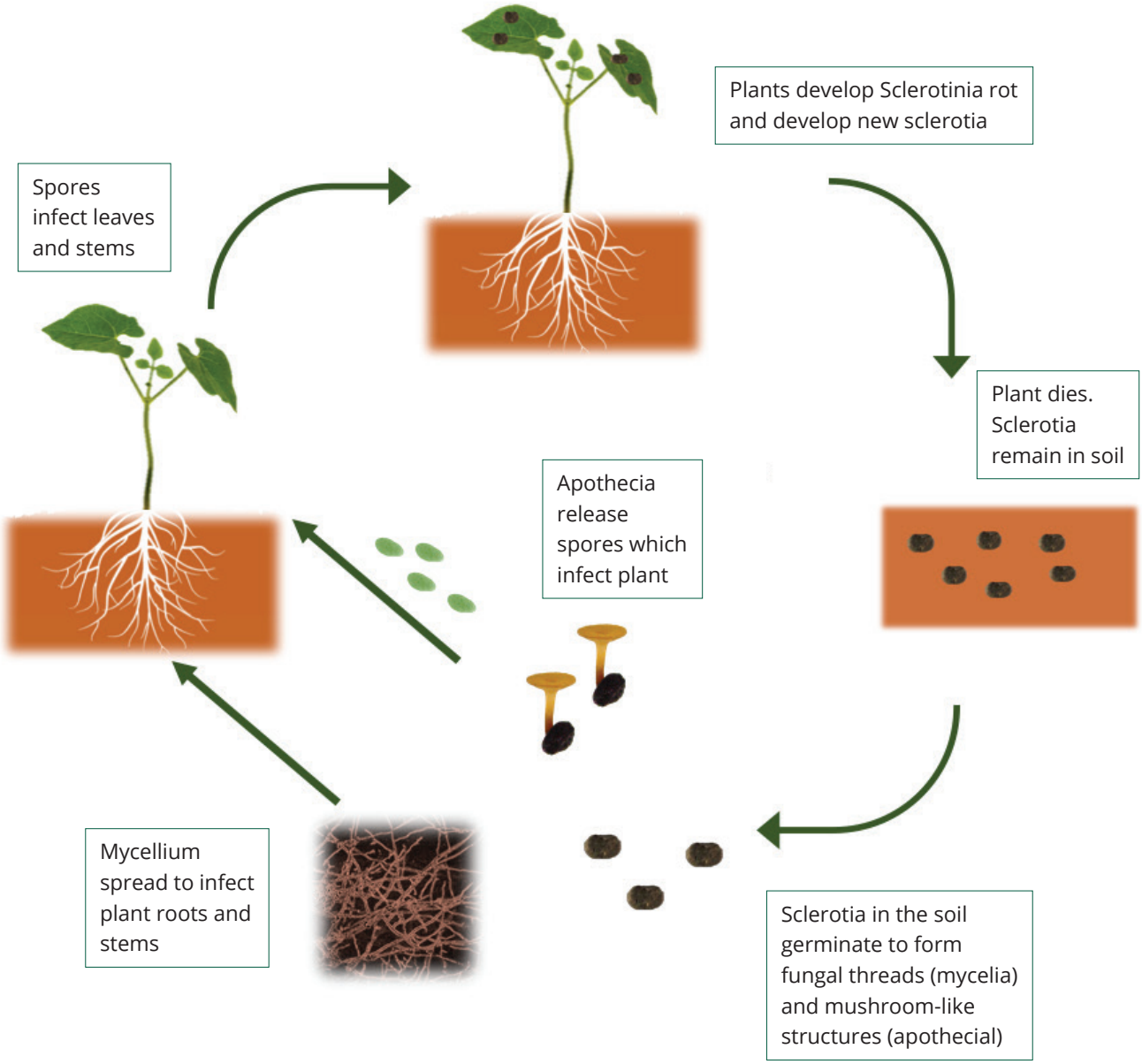

Figure 5. The life cycle of Sclerotinia. Plant dies; Sclerotia survive in soil; Sclerotia germinate to form fungal threads that can directly infect plants at ground level or develop into mushroom-like apothecia that release spores which then infect flowers, and damaged leaves or stems.

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MANAGEMENT OPTIONS

There is a variety of options for Sclerotinia management that involves both, conventional disease control practices such as fungicide application, as well as cultural controls, where the growing situation is amended to reduce favourable conditions for the disease. Current control and management options available for Sclerotinia include:

- Fungicide application with registered protectant and systemic chemicals
- Application of soil fumigants prior to sowing
- Plant crops in well-draining soil
- Increase plant spacing to promote good air circulation around plants
- Crop rotation – ensure a break of around four years between susceptible crop species, particularly in paddocks where crops were previously affected by Sclerotinia rot
- Control broadleaf weeds during crop rotation as many weed species are potential alternative hosts for Sclerotinia fungi
- Amending soil conditions to favour beneficial bacteria and fungi can suppress survival of pathogens
  - Biofumigant and brassica crops release volatile compounds into the soil which can inhibit pathogen growth
  - Application of green manure crops or composted organic matter enhance soil microflora which then compete with soil pathogens
  - There is some current research on the addition of formulated microbial biocontrols (such as products containing the fungi *Trichoderma* or *Coniothyrium* sp.) that can colonise and kill sclerotia of the Sclerotinia fungi in the soil prior to planting. Application of these products to crop residues may also be a useful way to lower sclerotial survival in soil
- Store harvested produce at suitable atmospheric conditions such as low temperature and oxygen levels
- Treat harvested produce with fungicides to prevent post-harvest rots