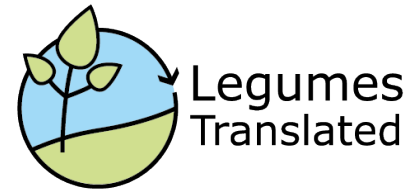


Sclerotinia stem rot in soybean

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More than 100 soybean pathogens have been described worldwide, and about 35 of these are considered capable of causing significant economic damage on soybean. Fungi are the most numerous and harmful, followed by bacteria and viruses. White mould (or sclerotinia stem rot) caused by *Sclerotinia sclerotiorum* is one of the most potentially damaging diseases of soybean worldwide. This soil and seed borne fungus causes significant yield losses. The sclerotia contaminate the harvested crop and this leads to widespread infection the following year when the grain is used as seed. Through contamination of seed crops, a small outbreak leads to widespread infection.

Sclerotinia is potentially the most damaging disease that occurs in all regions where soybean is grown. The infection results in yield losses and contamination of seed with sclerotia. Crop rotation and sowing of disease-free seed are the main control measures. Certified seed is controlled to prevent spread in seed. High plant populations and irrigation at the beginning of flowering (R1) should be avoided.

Description

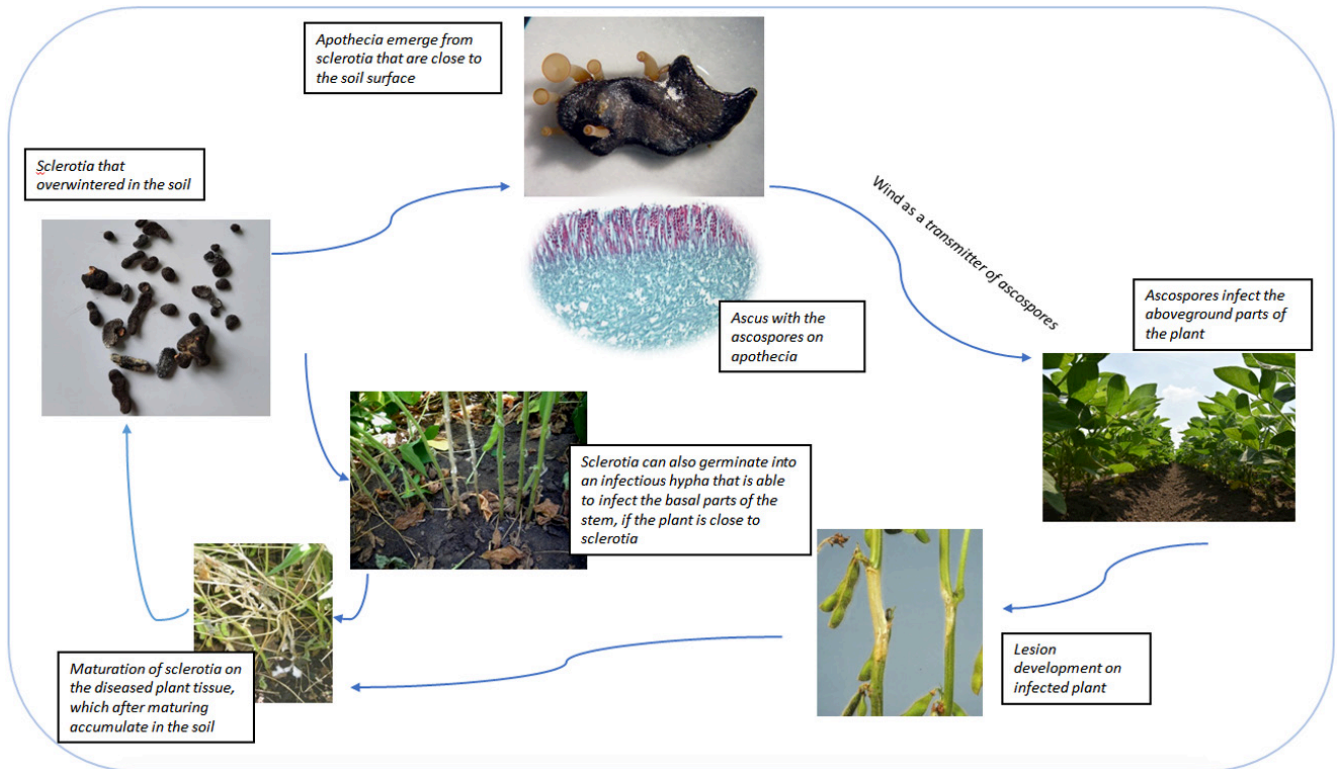
It is important to understand the cosmopolitan nature of *Sclerotinia sclerotiorum*. Sclerotinia is a soil-borne rotational disease hosted by a wide range of broad-leaved crops. In addition to soybean, hosts include oilseed rape, sunflower, pea, faba bean and even potato. Fruiting bodies called sclerotia form in the stems and these dark resting bodies carry the disease in the soil from season to season. There is no host specialisation and so it transmits easily between species within the rotation. Where sclerotia are present in soil, outbreaks depend on weather conditions whether sclerotia are 'germinating' to produce fruiting bodies (apothecia).

Plant infection starts during flowering stages. Early symptoms are visible in R2 stages and later. Infection first interrupts the flow of water in the stem. After infection, upper leaves lose turgor, wilt and mycelium spreads throughout the plant. At first, the leaves are grey to green in



Sclerotinia on soybean plants. Photograph: IFVCNS



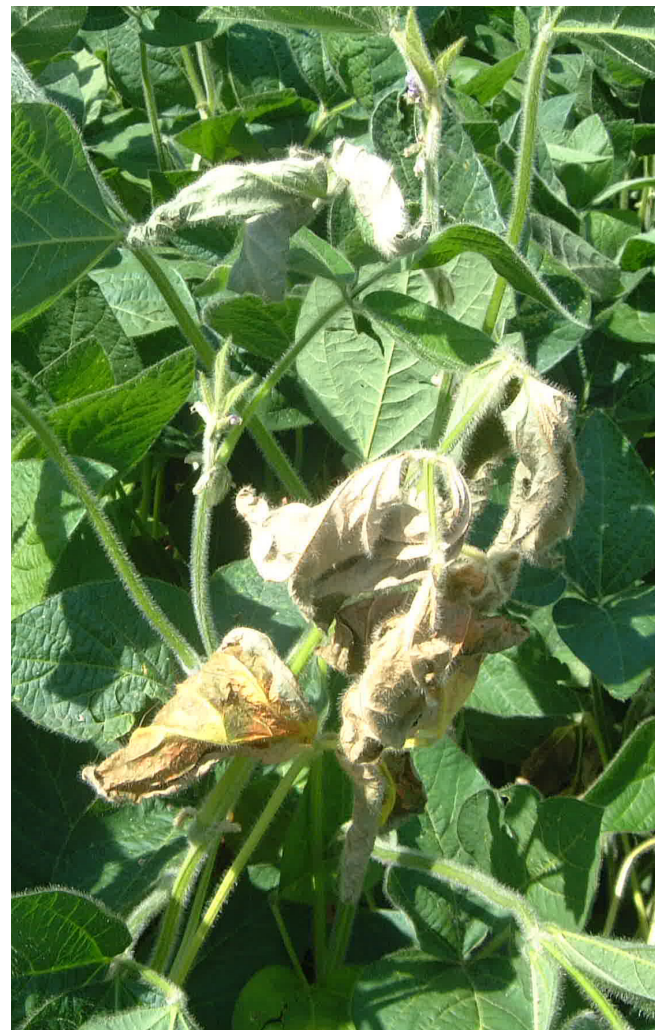


Life cycle of *Sclerotinia sclerotiorum*

colour, later they become darker brown. Wilted leaves remain attached and infected plants are then easily detected. Stem lesions develop 7–14 days before foliar symptoms are visible. Water-soaked lesions spread rapidly and encircle the stem. White cottony mycelium grows through rotten plant parts.

With early infections, the pods dry off completely before the grain filling phase starts, and as a result, such plants produce no grain. If the grains have been formed in the pods before the disease strikes, they remain small. The pods may also be directly infected and become wet and soft with white mycelia growing out. Sometimes they rot completely, and sclerotia form instead seeds. Moisture is very important for the onset and spread of soybean white mould.

There are no known cultivar resistances, similarly to other white mould plant hosts (over 400 plant species). However, there are differences in tolerance between cultivars. Late-maturing genotypes are more susceptible to yield loss than early-maturing ones. Also, short-season cultivars are not physiologically resistant but they may avoid the pathogen attack.



Sclerotinia on soybean plants. Photograph: IFVCNS

Key practice points

- Crop rotation is an important management practice. Susceptible crops should not be grown more often than in one out of four years (a three year gap between susceptible species).
- Biological soil fungicides based on *Coniothyrium minitans* (CONTANS WG®) are available in some countries. These are applied to residues of infected crops after harvest to reduce the number of viable sclerotia.
- Warm humid conditions promote the development of apothecia on sclerotia. Dense plant stands and irrigation, especially at flowering, promote infection if fruiting sclerotia are present in the soil.
- Sclerotia can germinate if moisture is present, resulting in seed decay in storage.
- Soybean seed should be free of the fungus sclerotia which can be achieved by high-quality seed processing.

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