

Sunflower

Sclerotinia Stem Rot: *Sclerotinia sclerotiorum*

Sclerotinia commonly called 'white mold' affects most broad leaf crops and weeds. It can be a devastating disease and in sunflower it is highly dependent on weather conditions. Sunflower can be affected in three ways: 1. Root infection which results in wilt or stalk rot; 2. Mid-stalk or stem rot infection; and 3. Head infection or head rot.



Disease Cycle: Sclerotia are hard small black bodies produced by the disease in a host of broad leaf crops. Sclerotia over winter in the soil and exist in the soil for many years. Wet soil conditions over a period of 10 to 14 days can stimulate the sclerotia to germinate creating tiny mushrooms. These mushrooms produce apothecia or tiny spores which can be wind-blown to nearby fields. The spores need dew or rain and dead or senescing plant tissue such as dead florets to germinate and infect. Wet and cloudy conditions are necessary for the disease advancement. Both mid-stalk head rot occur when ascospores settle on dead plant tissue. For this to occur weather conditions have to be ideal as indicated in the disease cycle description above. Ascospores can be windblown from neighboring fields.

Symptom

- The stems develop water-soaked spots which later may be covered with a cottony white growth.

- As the disease progresses, affected portions of the stem develop a bleached appearance, and eventually the tissues shred.
- Girdling of the stem results in premature ripening and in lodging of plants.
- Hard black bodies, the *sclerotia*, are formed inside the stem and occasionally on the stem surface. Basal stalk infections rarely occur.
- Yield loss of 10 to 15% has occurred in Saskatchewan, Manitoba and North Dakota; occasionally losses of 50% have occurred in Manitoba

Management

- Use crop rotation; do not plant highly susceptible crops more than once in four years, including dry edible beans, sunflowers, mustard and canola. Use at least a five year rotation for severely infested fields.
 - Avoid planting next to a field that had severe *Sclerotinia* in the past four or five years. Control broad-leaved weeds.
 - Plant thoroughly cleaned seed. Avoid dense stands of canola.
-

Alternaria Blight: *Alternaria helianthi*

Alternaria blight caused by the fungus *Alternaria helianthi* (Hansf.) It is a serious disease of sunflower in many parts of the world including India. The disease is particularly destructive in tropical and sub-tropical regions where a combination of high temperature and extended periods of wet weather causes rapid epidemic development. *A. helianthi* can cause leaf and stem lesions, seedling blight and head rot. It has been reported to reduce seed and oil yield up to 84% and 33%, respectively.

Host range: The pathogen survives between sunflower crops in and on infested crop debris, as a pathogen of safflower and cocklebur, and on seed.

Survival and favourable conditions: Pathogen survives on seed, host debris and weed host. Successive crop of sunflower may also help to multiply the pathogen. Hot weather and frequent rain during the milk and wax stages of development favour

infection. Disease development is favoured by 25-27⁰C temperatures with at least 12 hours of wet foliage and is reported to spread rapidly during the rainy season.

Disease symptoms: The first symptom caused by necrotrophic fungi on leaves is a chlorosis, which enlarges, coalesces and can cause organelle destruction through an enzymatic reaction or by toxic metabolites produced by the fungus during the infection development. *A. helianthi* produce dark brown and striated spots on leaves. These spots are irregular in size and shape with a very dark border and a grey center. The spots on young plants may have a yellow halo. Leaf lesions may coalesce causing leaves to wither. Stem lesions begin as dark flecks, which enlarge to form long, narrow lesions. These stem lesions often coalesce to form large blackened areas resulting in stem breakage. Stem lesions are randomly distributed on the stem and are not associated with the point of attachment of the leaf petiole.



Disease cycle and dissemination: The mycelium rests in the plant debris covering the soil and less frequently on seeds. The fungi can be seed-borne at low levels although seed may be relatively unimportant as a source of the inoculum under most conditions. Seedling blights caused by *Alternaria* may develop when sunflower plants emerge in rainy weather on *Alternaria*-infested land. *Alternaria* spores are spread by wind and splashing water. However, plants at the flowering to maturing stage are more susceptible than plants in the vegetative or budding stage. Conidia are spread by the wind and by the water. Splashing conidia affect the lower leaves as the first. The leaf spots resulting from this primary infection will sporulate and produce new conidia, which are then spread to the whole foliage and will contaminate new plants causing a general

epidemic on that parcel. High temperature (24-27°C) and frequent rain (free water or dew present for a few hours) alternating with periods of dryness is favourable to the sporulation of the fungus.

Disease Management: Disease is managed through practices that such as crop rotation, destruction of the culture debris and tillage operations that bury and rapidly promote residue decomposition. Early planted fields are generally more susceptible to severe disease losses than later planted ones. Plants are most susceptible at flowering and during seed fill. Seed treatment with Captan fungicide significantly reduces the incidence of Alternaria seedling blight. Foliar fungicides with active substances of benomyl (Fundazol), vinclozolin, (Ronilan) and iprodion (Rovral) can be used for control alternaria blight. Different cultural, chemical and biological methods in integrated manner can help in effectively management of this disease.
