

# Disease Management

Most of the diseases which can effect sunflower can be avoided or their effect minimised by the use of resistant hybrids, crop rotation and consideration of planting times.

The recommended planting strategies for each disease is outlined in this section.

## **RED RUST** (*Puccinia helianthi*)

### **Economic importance**

Current hybrids generally have good levels of resistance so in recent years, losses due to rust have been uncommon. However, the pathogen is continually changing and resistance is overcome every few years. Without resistance, rust levels can quickly build and cause severe epidemics and high yield loss. Therefore, changes in the rust are constantly monitored by the QDPI&F and seed companies.

### **Conditions for Infection**

Temperatures of around 18-20°C favour development of the disease, but free moisture on the surface of

leaves is essential for infection. With adequate moisture and favourable temperatures, infection can occur within 12 hours but pustules containing the reddish brown spores do not develop for 7-12 days, depending on varieties and conditions. Successive cycles of wet weather or dews cause rapid development of the disease.

### **Symptoms**

Small reddish-brown pustules on both the upper and lower leaf surfaces and sometimes on leaf petioles and flower bracts. Very high levels of infection can cause eventual death of leaf tissue. In some varieties, resistance declines at or following flowering and low levels of infection can occur. Unless severe infection occurs early, yield loss generally results from smaller, rather than fewer seeds.

### **Control**

Plant a mix of rust resistant hybrids. Select varieties according to the planting time and the region. Avoid successive plantings of the same or susceptible varieties.

## **ALTERNARIA BLIGHT** (*Alternaria helianthi*)

### **Economic importance**

Under favourable conditions, Alternaria blight can defoliate plants within a week and cause yield losses as high as 70%. Fortunately conditions favouring epidemics of Alternaria Blight occur infrequently and tend to be more common in subtropical regions such as central Queensland.

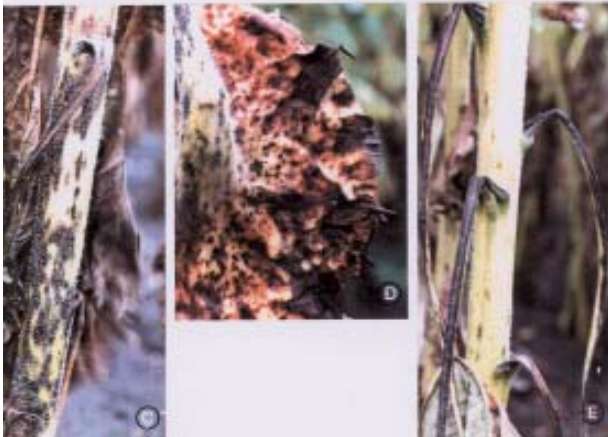
### **Conditions for infection**

Development of the disease is favoured by warm (26-30°C) wet weather. Infection is highly dependent on long periods of leaf wetness. Rain periods lasting for several days cause the disease to develop rapidly. Airborne spores produced on necrotic (dead) tissue initiate new infections. Seedling and flowering plants are highly susceptible. Older (lower) leaves are more susceptible.



**Red Rust**  
(*Puccinia helianthi*)





**Alternaria Blight**  
(*Alternaria helianthi*)

### Symptoms

Roughly circular dark brown to black necrotic lesions on leaves, petioles, stems, flower bracts and petals. Lesions on leaves may be surrounded by a yellow halo. Under favourable conditions lesions expand rapidly and coalesce to form large dead areas, commonly described as blighting. Petiole infections can result in rapid leaf death. Infections generally cause premature leaf senescence.

### Control

Select those hybrids which show some level of tolerance. (There is currently no immunity in hybrids).

Avoid successive plantings.

## SCLEROTINIA HEAD & STEM ROT

(*Sclerotinia sclerotiorum*)

### Economic importance

Losses due to this disease can be quite high, but its occurrence is restricted to late plantings because the disease develops at low temperatures.



### Conditions for infection

Cool (<18°C) moist conditions favour the germination of sclerotes in the soil, which can either directly infect roots or produce airborne spores that infect flowers and sometimes stems and petioles.

### Symptoms

Plants whose roots are infected wilt and die. Fluffy white mycelium and hard black sclerotes are formed at the base and inside the stems of infected plants. rotted tissue.

Flower heads that are infected show a light brown rot on the back of the head, which may extend down the stalk. Rotted heads eventually fall apart, leaving only the fibrous strands of the stalk. Sclerotes form in the rotted tissue.



**Sclerotinia Head & Stem Rot**  
(*Sclerotinia sclerotiorum*)

### Control

Adopt a planting strategy that avoids the crop flowering during cool weather. This is important as sclerotinia is a pathogen of many broadleaf plants and is therefore widely spread. If a crop becomes infected, plant cereal crops in that area for a number of years.

## WHITE BLISTER

(*Albugo trogopogonis*)

### Economic importance

Sunflower appears to be able to sustain high levels of leaf infection (up to 50%) without significant yield loss. Epidemics of white blister are infrequent, due to the specific environmental conditions required for infection.

### Conditions for infection

Cool (<20°C) moist conditions, either from rainfall or dews, are required for infection. These factors limit the occurrence of white blister in Australia, where cool wet conditions rarely occur during the growing season.



**White Blister** (*Albugo trogopogonis*)

### Symptoms

Raised pustules containing the whitish spores develop on the underside of leaves, causing the leaf surface above the pustules to have a blistered yellowish appearance. Stems and petioles can also be infected, but pustules do not develop. Instead, infected areas have a grey bruise-like appearance due to the presence of oospores, the overwintering phase of the fungus. Severe stem infections have not been recorded in Australia, but in South Africa, they can cause lodging.

### Control

Many Australian hybrids have high levels of resistance to White blister. Avoid early planting, although infections that occur early in the life of a crop will not progress as temperatures increase through the growing season.

## MINOR DISEASES

### CHARCOAL STEM ROT

(*Macrophomina phaseolina*)

Occurs in a stressed crop with high soil temperatures (above 35°C). Infected plants die prematurely with the stalks discoloured. Stalk fibres become shredded and covered with very small black sclerotia giving a distinct charcoal appearance.

### RHIZOPUS HEAD ROT

(*Rhizopus oryzae*)

This disease rarely causes economic loss but some infected heads can be observed most summers following rain periods. The disease infects the head through damage caused by insects, birds, hail etc.

## BOTRYTIS HEAD ROT

(*Botrytis cinerea*)

A disease of cool wet autumns. A soft rot can spread over the head developing in grey mould. Easily confused with the early stages of Sclerotinia head rot.

## BORON DEFICIENCY

Both classical boron deficiency symptoms and some others suspected to be caused by boron deficiency have become more common over the past 5-7 years. Symptoms generally show up at or near flowering and include malformed upper leaves which may show purplish or bronze coloured patches. The growing point may become necrotic, plants are stunted, internodes shortened and root development poor. Older leaves may have necrotic patches, discolouration and be thick and leathery. Flowers may be deformed and seed set poor. B deficiency can also cause weakening of the stalk resulting in lodging or head loss as the weight of the developing flower puts stress on the weakened stem. Black lesions are sometimes seen on the stem and deterioration of the pith is common.

Boron deficiency is commonly associated with moisture stress and need not be due to low levels of B in the soil. Instead, the ability to uptake and translocate B may be affected by stress. For example, B deficiency has been reported when good growing conditions are abruptly followed by hot dry conditions. Boron deficient plants often show up in patches, particularly in shallow soils on ridgelines.

