



INTEGRATED DISEASE MANAGEMENT FOR Boll Rots

INTEGRATED
DISEASE
MANAGEMENT

SEEDLING
DISEASES

BLACK ROOT
ROT

VERTICILLIUM
WILT

FUSARIUM WILT

ALTERNARIA

BACTERIAL
BLIGHT

BOLL ROTS

MYCORRHIZAS

OTHER DISEASES
AND DISORDERS

TIMETABLE

FARM HYGIENE

ASSESSING
DISEASE

GLOSSARY

APPENDICES

THE PATHOGENS

Several fungi can cause boll rots and some fungi can rapidly colonise bolls that have been damaged by insects or their larvae.

Phytophthora boll rot (*Phytophthora nicotianae* var *parasitica*) is the most common boll rot under Australian conditions and can cause significant yield losses.

Sclerotinia boll rot (*Sclerotinia sclerotiorum*) and Fusarium boll rot (*Fusarium* spp.) are far less common and are usually only seen in very rank crops. (The Fusarium species that are associated with boll rots are not the same as that which causes Fusarium wilt.)

Anthraxnose boll rot (*Colletotrichum gossypii*) has been reported from Northern Australia and is occasionally seen in crops in Queensland. There has only been one old (1923) unconfirmed report of this disease in NSW.

Rhizopus sp. and *Botrytis* sp. produce profuse gray fungal growth over bolls that have been damaged by insect attack.

ECONOMIC IMPACT

Boll rots are most significant when there is a wet finish to the season and especially in tall, rank crops. The incidence of boll rots is generally less than 5% although under optimum conditions up to 30% of bolls can be affected.

ASSESSMENT

The incidence of boll rots can be assessed prior to or after defoliation. Counts should not be confined to areas near the tail drain as this may give a misleading result. Count all of the bolls on ten plants from each of ten randomly selected sites across the field.

PHYTOPHTHORA BOLL ROT

SYMPTOMS

Infected bolls quickly turn brown and become blackened before opening prematurely. The locks, which remain compact and do not fluff out, can be easily dislodged and fall to the ground. Symptoms are most prevalent on the lower bolls.

DISEASE CYCLE

The thick walled survival structures of the pathogen germinate in moist soil to produce the motile zoospores that may be splashed up onto the low bolls during heavy rain. Only bolls that are nearing maturity are susceptible. Bolls that become immersed during irrigation may also become infected.

FAVOURED BY

Low mature bolls or lodged plants.

Heavy rainfall onto wet soil.

Low plant stand that results in more exposed soil and therefore more splash up onto low bolls.

DISPERSAL

The pathogen is easily moved in irrigation water and in association with infected trash. Zoospores may be introduced to bolls by rain splash.

SURVIVAL

The pathogen is a common soil inhabitant that can survive in association with infected crop residues.

HOST RANGE

The pathogen has a wide host range that includes safflower, pineapple, tomato and citrus as well as a large number of ornamental plants derived from the Australian native flora.

SCLEROTINIA BOLL ROT SYMPTOMS

Infected bolls and lesions on stems or branches are usually light brown in colour and large, black, globular sclerotia (and sometimes white fungal growth) can be seen on the surface of the dead tissue. The large black sclerotia can also be found within the rotted boll.

DISEASE CYCLE

The large black survival structures (sclerotia) in the soil germinate when it is cool and wet and produce small 'golf tee'- like structures called apothecia on the soil surface. Clouds of small ascospores are released from these apothecia and carried by wind to dying host tissue that is rapidly colonized. This dying host tissue may be either flower petals that have not dropped off the developing boll or leaf material that has dropped and become 'hung-up' in the plant. The pathogen grows from this dead host tissue base into the boll or branch. More sclerotia are produced within and on infected plant material.

FAVoured BY

Cool wet weather and rank crop growth or a dense canopy.

DISPERSAL

The large black sclerotia can be spread in soil and crop residues on vehicles and machinery or carried in flood or irrigation water. The small ascospores produced under the crop are dispersed by wind.

SURVIVAL

The pathogen is capable of surviving for long periods (many years) as sclerotia in the soil. The sclerotia vary considerably in size and may be either thin and elongated (up to 20mm long) or globular (3-8mm in diameter). The sclerotia have a thick black rind that protects them from desiccation and attack by other soil micro-organisms.

HOST RANGE

S. sclerotiorum has a very extensive host range which includes many weed and crop species including sunflower, safflower, soybean and most pasture legumes. This wide host range further enables the pathogen to survive for long periods between crops.

FUSARIUM BOLL ROT

During prolonged wet weather late in the season low bolls in a dense canopy, and sometimes the fruiting branch they are attached to, die and turn light brown. The pathogen may produce a pink mass of spores over the surface of the unopened boll. *Fusarium* spp are common and widespread soil saprophytes and weak pathogens.

ANTHRACNOSE

This disease is characterised by large spreading lesions on bolls often with a pink spore mass in the centre. The pathogen is able to infect all parts of the cotton plant and at any stage of growth. Seedling stems may be girdled at or near the base of the stem. In countries where this disease is a problem the pathogen can be seed borne. It may be effectively controlled by acid-delinting and the use of fungicide seed treatments. The disease is rarely observed in Australia.

A CONTROL STRATEGY FOR

Boll Rots

PLANNING

- Field drainage should not allow water to back-up into the field and inundate low bolls on plants near the tail drain

PLANTING

- Avoid very low plant populations which result in exposed soil that can be splashed up onto low bolls at the end of the season

IN CROP

- Avoid rank growth and a dense crop canopy if possible

AFTER HARVEST

- Thoroughly incorporate crop residues as soon as possible

AT ALL TIMES

- Practice good farm hygiene – COME CLEAN, GO CLEAN