



Integrated Disease Management for: Boll rot, seed rot & tight lock

Boll rots are caused by a number of pathogens, including fungi and bacteria. Tight lock refers to a type of boll rot, where the lock remains hard and fails to fluff out. The term seed rot is used to describe a boll rot which begins in the seed.

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 per cent, although under optimum conditions up to 30 per cent of bolls can be affected.

Phytophthora boll rot

Infected bolls quickly turn brown and become blackened (sometimes with areas of white mould on the surface 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. *Phytophthora* boll rot usually occurs when soil is splashed up onto low bolls that are beginning to crack open or when low bolls are subject to inundation by tail water backing up into rows. Hosts include safflower, pineapple, tomato and citrus as well as a large number of ornamental plants derived from the Australian native flora.

Sclerotinia boll rot

Sclerotinia boll rot characteristically has black fungal structures (2 to 10mm diameter) within and/or on



Bolls infected with *Phytophthora nicotianae* var. *parasitica* turn brown and become blackened (left) and the locks fail to open (below).



the surface of the rotted bolls. A white cottony fungal growth may be present and the branch adjacent to the boll may also be affected. The sclerotinia germinate to produce apothecia (small cream coloured 'golf tees') which release clouds of microscopic spores that can only infect the plant through dead or dying tissue (e.g. flower petals). The fungus then grows into healthy plant tissue such as the developing boll and down

the fruiting branch towards the main stem. Hosts include sunflower, safflower, soybean and most pasture legumes.

Fusarium boll rot

Not to be confused with Fusarium wilt, Fusarium boll rot causes similar boll rots to Phytophthora, with mould sometimes having a pink discolouration.

Diplodia boll rot

Diplodia boll rot starts as dark brown lesions which rapidly expand to cover the whole boll as the rot progresses. In the later stages of development, bolls become covered with a black smut-like fungal growth which can easily be rubbed off the boll surface. Several other fungi can cause secondary boll rots in cotton, taking advantage of injury or wounds in the boll wall, often caused by insect pests.

Anthracnose boll rot

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. Anthracnose boll rot is uncommon in Australia, but has is occasionally seen in Queensland cotton crops.

Seed rots

Seed rot refers to boll rot that begins in the seed. Pathogens gain entry to the unopened boll when sucking insects (such as green vegetable bug, mirids and pale cotton strainers) feed on the developing seeds through the boll wall. Small black spots 1-2mm diameter on the surface of the boll indicates the feeding of sucking insects on developing seed within

Diplodia boll rot starts as dark brown lesions which rapidly expand to cover the whole boll as the rot progresses.



Sclerotinia boll rot characteristically has large black spores within and/or on the surface of the rotten bolls.



Bolls affected by Diplodia are covered in 'sooty' black spores.

the boll. Seeds within the maturing green bolls are swollen and discoloured yellow or brown. When the affected bolls open, the locks with infected seed fail to fluff out and remain compact and discoloured. Seed rots do not necessarily affect the whole boll and may be limited to one or two locks.

Favoured by

- Boll rots are favoured by wet and humid conditions, especially from a thick rank canopy and high moisture from rains and dews.
- Rainfall on exposed soil that splashes soil up onto low bolls enables infection for some boll rots. Low mature bolls and lodged plants are at high risk of infection.
- Boll rots and tight locks can also develop when bolls that are opening are exposed to wet weather.

- High numbers of sucking pests soon after flowering can increase the likelihood of seed rots.

Control strategy

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.
- Assess incidence prior to or after defoliation by counting all of the bolls on ten plants from each of ten randomly selected sites across the field. Counts should not be confined to areas near the tail drain as this may give a misleading result.



Secondary rot following damage from insects.

AFTER HARVEST

- Thoroughly incorporate crop residues as soon as possible.

AT ALL TIMES

- Practice good farm hygiene and Come Clean Go Clean.

For more information:

- Visit www.cottoninfo.net.au
- Download the 2014-15 Cotton Pest Management Guide from www.cottoninfo.com.au/publications

By Ngaire Roughley (DAF and CottonInfo),
Linda Smith (DAF) and Stephen Allen (CSD).

This fact sheet has been adapted for CottonInfo from the former Cotton Catchment Communities CRC publication Integrated Disease Management, which was authored by Stephen Allen, David Nehl and Natalie Moore.



Green bolls with swollen and discoloured seed resulting from insects feeding on developing seed.