



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

# INTEGRATED DISEASE MANAGEMENT FOR Seedling Diseases

## THE PATHOGENS

- *Rhizoctonia solani* - (AG 4).
- *Pythium* spp. – (several species but *P. ultimum* is the most common)
- *Fusarium* spp. – (several species other than the Fusarium wilt pathogen)  
Etc. – (over 30 different species of fungi have been isolated from dying cotton seedlings)
- Anthracnose (*Colletotrichum gossypii*) is rarely seen in Australia but has been reported in Northern Australia and Queensland. All parts of the plant may be attacked. Typical symptoms include a girdling of the stem at or near ground level.

## SYMPTOMS

- Pre-emergent seed rots
- Post-emergent damping-off (wilting, collapse and death of seedlings)
- Slow early season growth, small cotyledons and reddened hypocotyls
- Lesions on roots

Affected plants may be scattered across the field or concentrated in poorly drained areas. In some situations seedling diseases may be particularly evident in rows where other factors such as fertiliser placement, herbicide application, planting depth etc have had an effect.

## ECONOMIC IMPACT

Actual and potential costs associated with seedling diseases include:

- The cost of standard seed treatment fungicides used by all growers
- Replant costs including seed, fuel, labour and in some situations, extra water
- Cost of late season insect control which can be expensive
- Yield reductions associated with late replants or delayed maturity

## ASSESSMENT

Estimate the stand by counting the number of established plants/metre at at least 20 sites across the field. The difference between the estimated stand at 6-8 weeks after planting and the number of seed/metre sown indicates the level of seedling mortality. Seedling mortality includes the effects of seedling pests such as wireworms and incorporates seed viability.

An alternative method is to estimate stand immediately after emergence and again 6-8 weeks later.

## DISEASE CYCLE

The fungi that cause seedling diseases of cotton are common soil inhabitants and therefore widely distributed.

## FAVoured BY

Anything that slows down germination and seedling growth favours infection by the seedling disease pathogens. Cool and/or wet weather conditions are particularly conducive to disease development. Other factors that may contribute to increased seedling disease problems include:

- Poorly formed, low or loose seed beds
- Incorrect planting depth
- Poor placement of fertiliser (under the planting line)
- Excessive rates of herbicide at planting
- Relocation of herbicide into root zone by rain after planting (esp. in loose beds)
- Smearing of the planting slot or compaction in the seed bed
- Infection by other pathogens such as the black root rot pathogen
- Waterlogging or poor drainage

## DISPERSAL

Seedling disease pathogens are easily dispersed with soil and plant residues by wind or water and by the activities of man. They are present in most soils.

## SURVIVAL

These fungi can survive indefinitely as saprophytes on plant residues in the soil.

## HOST RANGE

Seedling disease pathogens have a wide host range and can survive on the residues of many crops and weeds. There is some evidence that seedling diseases may be more severe after incorporation of legume residues.

# A CONTROL STRATEGY

# Seedling Diseases

## PLANNING

- Use a variety with good seedling vigour
- Use effective seed treatment fungicides

## GROUND PREPARATION

- Plant into well prepared, high, firm beds
- Carefully position fertiliser in the bed – not under the plant line!

## PRE-PLANTING

- Plant into moisture rather than planting dry and watering-up

## AT PLANTING

- Delay planting until temperature and moisture conditions are optimum
- Be careful with the use of herbicides at planting

## ROTATIONS

- Incorporate rotation crop residues as soon as possible after harvest (especially legume crop residues)