



INTEGRATED
DISEASE
MANAGEMENT

SEEDLING
DISEASES

BLACK ROOT
ROT

VERTICILLIUM
WILT

FUSARIUM WILT

ALTERNARIA

BACTERIAL
BLIGHT

BOLL ROTS

MYCORRHIZAS

OTHER DISEASES
AND DISORDERS

TIMETABLE

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INTEGRATED DISEASE MANAGEMENT FOR Alternaria Leaf Spot

THE PATHOGEN

Alternaria macrospora

Alternaria alternata

SYMPTOMS

A. macrospora

Leaves – brown, grey brown or tan lesions 3–10mm in diameter - especially on lower leaves - sometimes with dark or purple margins – sometimes with concentric zones obvious. The environment is most favourable within the crop canopy and therefore Alternaria leaf spot should be most severe on lower leaves and least severe on the upper leaves (unless the upper leaves have been affected by premature senescence). Plants with a high fruit load are more susceptible than plants with a low fruit load.

When a susceptible crop is exposed to a favourable environment then defoliation occurs rapidly – especially in Pima varieties. Affected leaves develop an abscission layer, senesce and drop to the ground.

Bolls – circular dry brown lesions up to 10mm across.

A. alternata

Leaves and bolls – usually purple specks or small lesions with purple margins.

ECONOMIC IMPACT

Most commercial varieties of cotton are relatively resistant to Alternaria leaf spot and the impact of the disease on yield is insignificant – unless the crop is severely affected with premature senescence associated with Potassium deficiency. However, Pima cotton is very susceptible and when weather conditions are optimal for disease the crop is defoliated and yield reductions of up to 40% have been reported overseas.

ASSESSMENT

When Alternaria leaf spot is severe and plants are being defoliated then disease severity can be assessed by determining percentage defoliation. Randomly select at least 10 plants (preferably 20-50) and count the total number of nodes with and without mainstem leaves still present. If bolls are affected then the percentage of bolls affected may be determined by counting affected and unaffected bolls on at least ten randomly selected plants.

When disease severity is low it is best assessed by determining the percentage of leaf area affected using a pictorial assessment key (see Assessing Disease on your Farm). An average of one small lesion on each and every leaf is approximately equivalent to 0.1% leaf area infected. Disease severity may also be quantified by assessing the percentage leaf area affected for the lowest one, two or three mainstem leaves. Alternatively, the lowest mainstem leaf from at least 20 randomly selected plants can be collected and dried in a plant press in newspaper for later assessment.

DISEASE CYCLE

The large multi-celled asexual spores (conidia) germinate on the leaf surface when the leaves are wet and the germ tubes enter the leaf via stomates or directly through the cuticle and epidermis. Under ideal conditions the pathogen kills the surrounding leaf tissue and produces more spores on the surface of the lesions within a few days. Numerous spores are produced on defoliated leaves on the ground under the crop.

FAVOURED BY

Spores can only germinate when there is an adequate dew period – a period of several hours of free moisture on the leaf surface. Epidemic development is therefore favoured by either repeated heavy dews or extended periods of wet weather. Symptom development is suppressed by periods of very hot weather.

Plants are most susceptible at the seedling stage and late in the season when the crop begins to 'cut out'. Symptom development is favoured by any physiological or nutritional stress eg heavy fruit load or premature senescence.

Pima varieties are most susceptible. Most upland (*G. hirsutum*) varieties are considered to be moderately resistant although some are quite susceptible.

DISPERSAL

Spores and infected crop residues are dispersed by wind and on machinery and vehicles. Seed borne dispersal has been reported overseas but is thought to be insignificant.

SURVIVAL

Alternaria alternata is widespread and common on any dead or dying plant tissue and vast numbers of spores can originate from dry weeds and grasses and mature cereal crops after rain.

Spores and mycelium of *Alternaria macrospora* can survive on or in infected crop residues as well as on volunteer cotton plants and alternative weed hosts. Survival on crop residues is favoured by dry winter weather conditions.

HOST RANGE

The host range of *Alternaria macrospora* includes cultivated cotton and some malvaceous weeds such as bladder ketmia, sida and anoda weed.

A CONTROL STRATEGY FOR Alternaria Leaf Spot

PLANNING

- Don't plant susceptible varieties in fields with infected residues from a previous crop retained on the surface.

GROUND PREPARATION

- Incorporate residues from a previous crop.
- Provide balanced crop nutrition (especially potassium)

IN CROP

- Use foliar fungicide applications for Pima varieties – NOT before flowering

AFTER HARVEST

- Incorporate crop residues as soon as possible after harvest

ROTATION

- Control alternative weed hosts and volunteer cotton plants