FUSARIUM WILT

Fusarium wilt is caused by the soil-borne fungal pathogen *Fusarium oxysporum* f. sp *vasinfectum* (Fov). Symptoms are often associated with plant stress, including water-logging, root damage and unfavourable growing conditions.

FACT SHEET

THE PATHOGEN

Fusarium wilt, caused by the soil-borne fungal pathogen *Fusarium oxysporum* f. sp. *vasinfectum* (Fov), is extremely difficult to eradicate once established. The Fov pathogen is specific to cotton but can survive saprophytically on the residues of most non-host crops.

Fusarium wilt development is favoured by the use of susceptible cotton varieties and by plant stress factors such as waterlogging, root damage from cultivation, cool and wet growing conditions, nutritional imbalances, and heavy fruit load. Poor farm biosecurity and hygiene practices can also contribute, enabling the pathogen to spread within and between farms and regions.

SYMPTOMS

External symptoms typically begin with stunted growth and dull, wilted leaves, followed by yellowing or browning of the leaves and eventual plant death from the top down. In some cases, affected plants may reshoot from the base of the stem.

These symptoms can appear at any stage of the crop cycle but are more commonly observed during the seedling phase when true leaves are developing, or after flowering during boll fill.

Affected plants may occur individually or in small patches, often (though not exclusively) in low-lying areas of the field or near tail drains.

See image of cotton plant infected with Fov, showing premature death, leading to reduced yields.

Internal symptoms can be observed by cutting into the stem. Infected plants will show a continuous brown discolouration of the vascular tissue, extending from the main root into the stem.

This browning is similar to that seen in Verticillium wilt but tends to be more uniform, lacking the flecked appearance typical of Verticillium infections.

For more information on symptom comparison and overlap among different wilt diseases, refer to the CottonInfo *Wilt Aware* factsheet.

ECONOMIC IMPACT

Failure to implement effective management practices can lead to a build-up of Fov inoculum, resulting in yield losses in some affected fields. The disease has been reported in most cotton growing regions of New South Wales and Queensland. However, it continues to be a significant disease in the Darling Downs, and in some fields in St George in Queensland, as well as the Border Rivers region and Gwydir Valley. Its impacts are evident both early and late in the season if environmental conditions are conducive.

CURRENT MANAGEMENT PRACTICES AND ONGOING RESEARCH

Monitor and diagnose disease accurately
Conduct regular disease surveys to monitor incidence and severity over time. Collect plant samples for diagnostic testing, especially where symptoms may resemble other diseases as some fields can contain a complex of diseases.

The Australian Cotton Disease Collaboration (the ACDC) is continuing to provide ongoing diagnostic support to help growers and consultants identify pathogens, building a national database on the prevalence and distribution of cotton diseases. In parallel, the ACDC is developing machine vision systems to detect and distinguish Verticillium and Fusarium wilt, and to predict disease severity before visible symptoms appear.

Select cotton varieties with a high F-rank and use seed treatments
Select varieties with a high F-rank and use the seed treatment Vibrance® Complete, which contains acibenzolar-S-methyl (Bion®), to help reduce Fusarium wilt severity. Contact your local Cotton Seed Distributors (CSD) Technical Agronomist to discuss your seed requirements.

Plant when soil temperatures are at least 16°C and rising
Delay planting until soil temperatures are suitable to promote strong early root development.

Manage the crop to reduce plant stress
Avoid waterlogging, over-fertilisation, and root damage during cultivation, as stressed or injured plants are more vulnerable to pathogen entry.

Research by the ACDC is quantifying the impact that varying irrigation methods and nutrition management have on the disease incidence and severity of Fusarium wilt under different environmental conditions.

Minimise tailwater movement
Prevent water movement from infected fields to other areas to reduce the spread of Fusarium wilt (Fov) through water.

Retain cotton crop residues on the surface after harvest
Root pull and leave stubble residues on the surface for 60–120 days post-harvest (until grey) to reduce the survival of the pathogen in buried material.

Research by the ACDC is examining how inoculum load, soil type, environmental conditions, and management practices relate to yield loss, with the goal of refining recommendations for managing stubble and residues to reduce the severity of Fusarium wilt (Fov).

Avoid green manure crops
Organic matter from green manure crops can support Fusarium wilt as a saprophyte. Avoid these crops in Fusarium-affected fields.

Rotate with non-host crop
Implement a crop rotation strategy with non-hosts. A summer sorghum/maize-fallow-cotton rotation can increase plant survival, reduce disease incidence and increase yield in the third year compared to continuous cotton. Whereas, legumes such as mungbean are a host of Fov, and can potentially increase disease.

While cotton residues should be left on the surface of the soil after harvest, it is recommended to bury or remove all other crop residues. This is based off research with wheat and barley, where bailing or incorporating residues resulted in less disease compared with leaving them on the surface to weather.

The **Australian Cotton Production Manual**'s *Potential disease implications of rotation crops (in relation to the following cotton crop)* table outlines the likelihood of inoculum levels increasing or decreasing, helping growers choose the most suitable rotation crop before cotton with respect to their disease of concern.

Fusarium diseased adult plant.

Practice good farm biosecurity and hygiene including weed management

Prevent the introduction of Fusarium wilt. Clean down machinery and equipment between farms, and ensure all staff, contractors, and visitors follow Come Clean Go Clean protocols. Control weeds, volunteer and ratoon cotton, which act as host plants, increasing inoculum during fallows.

The **Cotton Pest Management Guide**'s *Weeds as Hosts of Cotton Pathogens* table lists common weeds found in Australian cotton fields that act as host plants for various cotton diseases.

Fusarium wilt is commonly seen in the tail drain.

Plant infected with Fov showing continuous discolouration in the vascular tissue.

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For further information
www.cottoninfo.com.au
www.unisq.edu.au/research/the-acdc

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BEST PRACTICE