

# Verticillium wilt: Not dead and not forgotten

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**V**erticillium wilt used to cause major yield losses in cotton in Australia. The disease was successfully controlled with the widespread adoption of resistant varieties during the 1990s.

But the incidence of Verticillium wilt has increased recently in some areas. It is important that growers continue to utilise the available management tools to prevent a resurgence of this disease. Knowing where Verticillium wilt occurs, field by field, is essential for decisions on the use of resistant varieties. February and March are the best months to inspect crops for symptoms.

## 2002-03 SEASON

The mean incidence of Verticillium wilt in commercial crops across all of NSW was relatively low, at 5.6 per cent of plants (6.7 per cent in 2001-02). Verticillium wilt has not been recorded in central Queensland or the Murrumbidgee Valley.

The incidence in most areas of NSW and Queensland was below four per cent (Figure 1) but in the Namoi Valley it was 11.7 per cent (11.4 per cent in 2001-02).

This recent increase in the incidence of Verticillium wilt in the Namoi Valley reflects the use of susceptible cotton varieties. In



Severe Verticillium wilt occasionally causes premature defoliation.

the period from 1994 to 1997, around 90 per cent of the Namoi Valley crop was sown to resistant varieties (varieties with a 2002 V-rank of 90 or higher).

In contrast, the average planting of resistant varieties in the Namoi Valley over

the past four seasons was less than 50 per cent of crops (Figure 2). If the recent trend of declining use of resistant varieties continues, then the severity of Verticillium wilt in cotton crops will increase accordingly.

## TEMPERATURE AFFECTS DISEASE SEVERITY

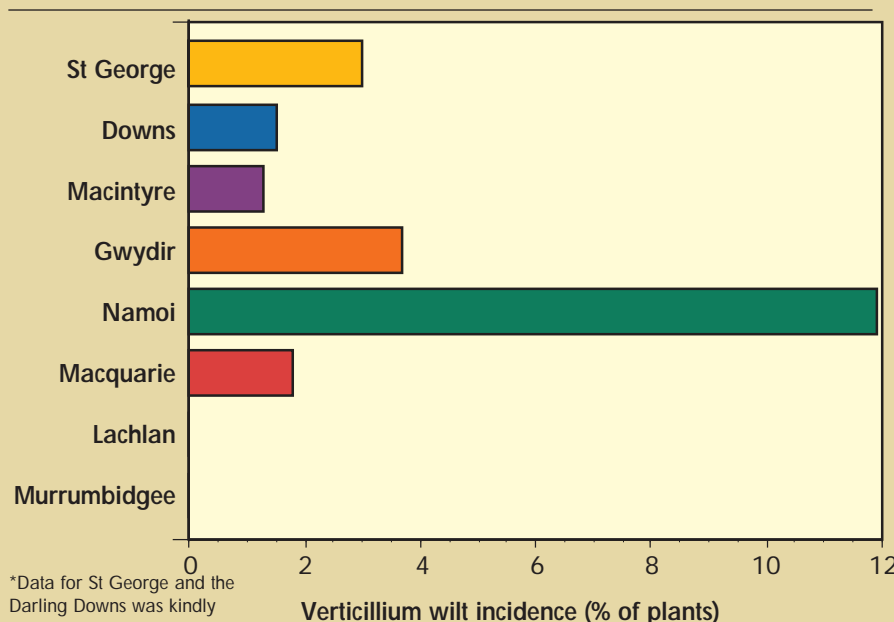
Verticillium wilt is most severe with cool conditions in February and March. Cotton's resistance against Verticillium wilt is dependent on temperature. Varieties that are resistant at 25 to 27°C are susceptible at 20 to 22°C.

The warm conditions experienced through most of the 2002-03 season were less favourable to the Verticillium wilt pathogen and the incidence of the disease was low overall. But in January and February 2003 at Wee Waa, for example, 34 per cent of nights had minimum temperatures below 20°C.

So the disease was prominent in fields with a recent history of severe Verticillium wilt, even in varieties with good resistance.

Resistant varieties should be deployed according to the history of disease, not expectations of upcoming seasonal conditions. Even though some Verticillium wilt

FIGURE 1: Verticillium wilt in the 2002-03 season\*



\*Data for St George and the Darling Downs was kindly provided by Steve Allen.

may occur in resistant varieties in a cool season, there are other management tools that should be used to tackle problem fields.

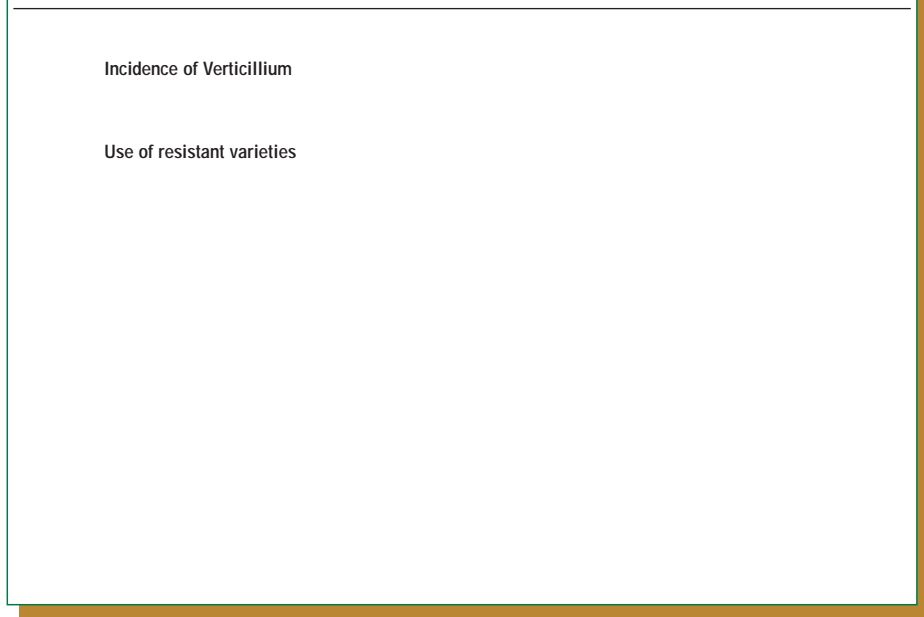
### MISTAKEN IDENTITY

Verticillium wilt does not kill cotton in the same manner as Fusarium wilt. Occasionally plants with severe Verticillium wilt will defoliate, particularly when carrying a large number of bolls for the size of the plant. Premature defoliation occurred in some fields with patches of severe Verticillium in the upper and lower Namoi over the past two seasons.

These fields generally had a history of high levels of Verticillium wilt. In some cases, these symptoms were confused with those of Fusarium wilt but the samples tested negative for Fusarium wilt in the laboratory.

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**FIGURE 2: Changes in the incidence of Verticillium wilt of cotton with the use of resistant varieties**



While theories of a new strain of Verticillium wilt were suggested, the facts are that these fields had grown back-to-back cotton for many years and had high levels of the Verticillium wilt fungus (*Verticillium dahliae*) in the soil.

Several crops with a resistant variety are required to reverse a severe infestation of Verticillium. If the cause of defoliating plants is uncertain, proper diagnosis by plant pathologists is recommended.

**IF IN DOUBT – CHECK IT OUT**

If you are unsure of any disease symptoms in cotton, contact your local Industry Development Officer, or cotton industry extension officer. This is a free service. Growers are urged to use the sample submission form found in the back of the Integrated Disease Management Guidelines folder.

**MANAGEMENT STRATEGY FOR VERTICILLIUM WILT**

- Use resistant varieties. Even if Verticillium wilt has not been severe or obvious for some years it is still important to use resistant cotton varieties. The V-rank provided by the cotton seed companies indicates the relative resistance of their varieties.

- Provide balanced crop nutrition. Excess use of nitrogen can favour the development of Verticillium wilt by creating late-season vegetative growth. Potassium deficiencies can also favour the development of Verticillium wilt especially under heavy boll loads.

- Minimise waterlogging and late season irrigations if possible, especially when cool conditions are expected.

- Incorporate crop residues as soon as possible after harvest. Minimise the movement of crop residues through the tail water recycling system.

- Practice good on-farm hygiene: **Come clean — Go clean.** Control alternative weed hosts such as:

- noogoora and Bathurst burr;
- saffron thistle;
- thornapple;
- caustic weed;
- bladder ketmia;
- burr medic;
- black bindweed;
- pigweed;
- devils claw;
- turnip weed;
- mintweed;
- blackberry nightshade.

- Rotate with sorghum and cereals, instead of sunflower and soybean.

- Knowing the history of disease in your

fields is essential when selecting varieties for next year's crop. February to March is an ideal time to inspect for symptoms of Verticillium wilt.

Effective disease management must be integrated with management of the whole farm. Basic strategies should be implemented regardless of whether or not a significant disease problem exists.

Disease management requires an integrated approach that minimise losses and maximises returns. Specific disease management must also consider other diseases that are present on farm as management for one disease may promote another.

\*On behalf of the Australian Cotton CRC's National Cotton Extension Team.

For more information on managing diseases and inspecting fields refer to the 'Integrated Disease Management Guidelines' available from the Australian Cotton CRC or your local IDO.



## Symptoms of Verticillium wilt

- Leaf mottle — yellowing between the veins, followed by death of leaf tissue starting at the leaf edge (see leaf photo).

- Brown discolouration in the woody tissue, extending throughout the stem and into the petioles (appearing as peppery-looking spots in stem cuts, see stem photo).

- Stunted growth, if infection is severe early in the season.

- Some defoliation may occur, particularly near the end of the season, if infection is severe and there is a heavy boll load.



Symptoms of Verticillium wilt on a cotton leaf.



Verticillium wilt in a cotton stem.