



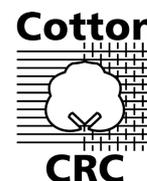
NSW COTTON PATHOLOGY 2001-2002

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Commercial cotton crops across NSW, including the Macintyre, Gwydir, Namoi, Macquarie, Lachlan, and Murrumbidgee Valleys and the Bourke area, were inspected in November 2001 and February-March 2002. The incidence and severity of those diseases present was assessed and field history, trash carryover, ground preparation, cotton variety, planting date and seed rate were recorded for each of the 99 fields that were surveyed. This represents the nineteenth consecutive year of disease surveys in NSW.

Cool wet conditions during October and early November 2000, followed by relatively cool conditions until after December, impacted significantly on the health of cotton crops. Seedling diseases were particularly severe and *Verticillium* wilt and *Fusarium* wilt were enhanced by these conditions. The use of varieties with disease resistance, where available, and the minimisation of the spread of soilborne pathogens has been beneficial and should remain a high priority for the industry.

Seedling disease

As part of the disease survey an estimate of the number of seeds planted per metre is compared to the number of plants established per metre. This comparison produces an estimate of seedling mortality which includes the impact of seedling disease (*Rhizoctonia* and *Pythium*) as well as seed viability, the activity of soil insects such as wireworms and physical problems such as fertiliser burn.

Crops planted in mid to late September, 2001 generally established better than crops planted in October, 2001. This reflected the warm conditions experienced in late September and the cool, wet conditions throughout much of October. Mean seedling mortality for the crops inspected across NSW was 30.9%, which was very close to that of the 2000/2001 season (31.9%). The values for these two seasons were much higher than the average for the previous five seasons (22.4%), reflecting the overriding influence of climatic conditions on seedling disease. Accordingly, seedling mortality in 2001/2002 was particularly high in the Macquarie valley (39%), the Lachlan valley (34%) and the Murrumbidgee valley (41%).

In the 2001/2002 season there was no evidence of a significant interaction between black root rot and seedling mortality (Figure 1). A similar result was obtained when the data for the 2000/2001 season were compared. This suggests that past observations of enhanced seedling mortality in association with black root rot are only applicable to patches of very severe black root rot. Growers generally reported less replanting in the 2001/2002 season and this probably reflects the fact that planting rates across NSW averaged 1.9 seeds per metre more than in the previous season.

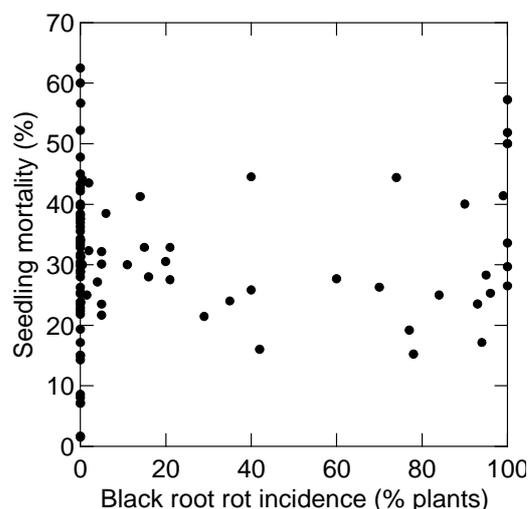


Figure 1. Lack of relationship between black root rot and seedling mortality of cotton across NSW in the 2001/2002 season ($r^2 = 0.01$)

Fusarium wilt

Fusarium wilt is not as widespread as other diseases but its distribution is increasing at an exponential rate. In the 2001-2002 season there were 15 new reports of Fusarium wilt on farms in NSW, bringing the total count to 56. This included seven new cases in the Gwydir valley, three in the Macquarie, two in the Macintyre, two at Bourke and one at Brewarrina for the first time. Fusarium wilt was confirmed in another three samples from anonymous locations. There were several newly affected fields on farms where the disease had previously been reported. While the lower Namoi, Menindee, Lachlan and Murrumbidgee areas of NSW are free from reports of the disease (so far!) it must be assumed that the disease is much further widespread than is currently recognised.

Observations of the progress of Fusarium wilt over several years have clearly indicated that (i) changing from a susceptible to a less susceptible variety will reduce the incidence and severity of Fusarium wilt in the first instance and (ii) the incidence and severity will still increase in the less susceptible varieties thereafter. These studies have all been conducted in warm areas near the Queensland border. The cool conditions at the start of the 2001-2002 season were very favourable for infection of seedlings by *Fusarium*. The first result from a parallel study in one field in the Macquarie valley indicates that Fusarium wilt *may* progress much faster in cooler areas.

NSW is clearly at the onset of an epidemic of Fusarium wilt. Further spread is inevitable but efforts to minimise this spread should not be relaxed. It is important that growers and consultants confirm and declare if the disease is present in an area. The Fusarium wilt diagnostic service provided by the QDPI is funded by the industry and free to growers. The majority of samples submitted return a negative result and some growers who are withholding samples could be worried unnecessarily. Early detection of the disease is essential in the establishment of an effective control strategy.

Black root rot

Black root rot now occurs in 98% of farms that are regularly inspected in the disease surveys in the Macintyre, Gwydir, Namoi and Macquarie valleys. Approximately 65% of the fields inspected in these areas in the 2001-2002 season had the disease, averaging 28% of plants. Across the whole of NSW (including new production areas where the disease is not widely established) an average of 21% of plants were infected by the black root rot fungus. The severity of black root rot increases with successive cotton crops and there are currently no

adequate control measures. NSW is currently experiencing a widespread epidemic of black root rot.

Verticillium wilt

Overall, the 2001/2002 season was very favourable to the *Verticillium* wilt pathogen and the mean incidence of the disease in commercial crops in NSW was 6.7% of plants, compared to an average of 3.7% over the previous five seasons. A concern is the average in the Namoi valley of 11.4% of plants, compared to 5.5% over the previous five seasons. This greater level of *Verticillium* wilt in the Namoi valley probably reflects the declining use of resistant varieties. Four and five seasons ago 96% of the Namoi valley was sown to resistant varieties, whereas only 63% of the Namoi valley was sown to resistant varieties in the 2001/2002 season. In some fields, susceptible varieties had very little *Verticillium* wilt while in other fields the disease was rampant in the same variety, reflecting the presence of the pathogen due to prior cropping history. If the trend for declining use of resistant varieties continues, then the severity of *Verticillium* wilt will increase accordingly.

Boll rots

The incidence of boll rots was generally low, averaging 0.45% of bolls for NSW production areas, compared with 2.8 % in the previous season. *Phytophthora* boll rot develops when low bolls are inundated with flood or irrigation water or when soil is splashed up onto low bolls as they approach maturity. Hence the generally dry conditions during the second half of the season resulted in a low incidence of the disease. However, heavy local rainfall events in February resulted in severe losses in a few crops, particularly in some Pima crops in the Macquarie valley.

Other boll rots are most common in tall rank crops with dense canopies, particularly when combined with extended periods of wet and overcast weather late in the season. The incidence of other boll rots was less than 0.1% across NSW. A few bolls infected with *Sclerotinia sclerotiorum* were observed in one field in the Lachlan valley.

Alternaria leaf spot

The pathogen that causes *Alternaria* leaf spot survives on crop residues from the previous season. Its survival is favoured by dry winter conditions and the retention of cotton crop residues on the soil surface. Damage to seedlings by *Alternaria* was very low in the 2001/2002 season. *Alternaria* leaf spot was found in 98 % of fields surveyed in March 2002 but the severity was generally very low; 0.16% of leaf area affected, which was similar to the previous season.

Bunchy top / bunchiness

Bunchy top symptoms include small bolls, small leaves and short internodes, usually accompanied by a distinctive leaf mottle occurring around the margins of the leaves (the leaf mottle may be masked if infestation by aphids or mites is severe), and usually confined to a few plants or a distinct patch. The leaf mottle symptoms may occur unaccompanied by the bunchy growth habit. None of the symptoms of leaf mottle or complete bunchy top were observed in any of the 99 cotton crops inspected during the surveys in the 2001/2002 season. A single ratoon plant with the leaf mottle symptoms was observed in one field. Bunchy growth was observed, however, in association with *Fusarium* wilt and with herbicide damage.

Other diseases and disorders

Sudden wilt was observed as isolated plants in several crops that were inspected in March. Sudden wilt is caused by 'ordinary' species of *Fusarium* that are usually non-pathogenic and it is often associated with waterlogging. Affected plants wilt, defoliate and die. Plants may produce

regrowth in some situations. Sudden wilt does not re-occur in the same places in the following crop.