

Title                   Blackleg - the stubble connection  
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Contact             VIC: Steve Marcroft, VIDA  
                          Ph: 03 5362 2111, [steve.marcroft@nre.vic.gov.au](mailto:steve.marcroft@nre.vic.gov.au)  
  
                          NSW: Gordon Murray, NSW Agriculture  
                          Ph: 02 6938 1999, [gordon.murray@agric.nsw.gov.au](mailto:gordon.murray@agric.nsw.gov.au)  
  
                          SA: Mark Sosnowski, SARDI  
                          Ph: 08 8303 9380, [sosnowski.mark@saugov.sa.gov.au](mailto:sosnowski.mark@saugov.sa.gov.au)

\*Note - this report may contain independently supported projects, which complement the work in this GRDC research program.

## Take home message

- Proximity to last year's canola crop is more important for the spread of blackleg than the number of years since the paddock was sown to canola.

Victorian researchers have found that proximity to last year's canola stubble is more important for blackleg infection, than the number of years since the paddock was last sown to canola. Recent trials from the Department of Natural Resources and Environment have shown that the vast majority of spores released come from the previous year's stubble rather than stubble that is two, three or four years old.

Researchers also found that the timing of blackleg spore release varies markedly depending upon summer rainfall. While similar amounts of spores were released from trials at Lake Bolac (Western district) and Birchip (southern Mallee) far fewer spores were released from stubble at Wonwondah (southern Wimmera), which experienced a drier summer.

In Wonwondah trials, 54 paddocks were surveyed to see how long the stubble remained, the ability of aged stubble to release spores and how far the spores travelled from previous stubble paddocks. Paddocks were also surveyed at Birchip and Lake Bolac to determine the various effects of rainfall and burning on persistence of stubble. In each area the volume of stubble present from the previous year was nearly four times as much as from two-year-old stubble. This shows that the stubble decomposed very rapidly during that first 12 months, with only the woody root section remaining intact for at least four years.

Burning reduced the volume of canola stubble by more than half.

These results differ in some respects from the blackleg situation in Western Australia. The dry environment in that region means that the amount of spores released is more even over a four-year period. Researchers in Victoria also found that more spores were released from the one-year-old stubble, than older stubble. In these trials, the potential for infection from last year's stubble was about 30

times greater than two, three or four year old stubble.

With this information in mind, proximity to last year's canola crop is obviously more important for the spread of blackleg, than the number of years since the paddock was last sown to canola.

The Table following outlines the reduced rate of blackleg infection with increasing distance from last year's canola stubble.

This information may explain why many NSW farmers have been able to follow a canola / wheat / canola rotation with no more yield loss from blackleg compared to longer rotations.

### **Yield loss and stem canker with increasing distance from 1999 canola stubble.**

<b>Distance to 1 year old canola stubble (m)</b>	<b>Disease severity (% plants with &gt;80% internal canker)</b>	<b>Percent oil yield loss</b>	<b>Percent grain yield loss</b>
< 100	27	4.0	19
100 - 200	16	0.7	17.7
700	13	0.0	3.6
1000	8	0.0	6.3

Researchers surveyed paddocks from Cowra to Lockhart in southern NSW with both short (every two years) and long (no canola in previous four years) canola rotations. Trial results showed that blackleg levels in southern NSW were unrelated to paddock history. Interestingly, more blackleg developed in earlier sown crops in 2000 while the reverse occurred in 1999. Work is continuing to identify the seasonal conditions that influence blackleg development.

The difference between seasons in NSW shows that the results of single years have to be taken cautiously, and that more years of observations are needed before definite conclusions can be made.

Recent SARDI trials showed that stubble continued to release spores throughout winter until August, with the most infection following the first large new season rainfall event. Blackleg infection could be reduced if the timing of sowing could be delayed until after the first large new season rainfall event.

These field trials also demonstrated that susceptibility to blackleg infection might change at different stages of plant growth. Some varieties were more resistant to infection as seedlings and then in the stem as the plants matured, but all varieties were equally susceptible to leaf infection.

## **Crop lodging in 2000**

SARDI research has also shown the blackleg fungus can be growing deep inside

the stem of both resistant and susceptible varieties well before external symptoms develop. Under certain conditions, this internal growth of the fungus can sufficiently weaken the stem to cause lodging. This may explain why some resistant canola varieties experienced severe lodging with little or no visible symptoms in Victoria and South Australia in 2000.

## **Impact-in-furrow®**

Other research work has been carried out in South Australia to determine the effectiveness of the fungicide Impact-in-furrow®.

Trials conducted in 2000, under high blackleg incidence, showed up to a 30 percent increase in yield following application of the fungicide. However the most resistant variety used in the trials (Surpass 400, blackleg resistance rating of 9) was unaffected by blackleg and yield was unaffected by Impact-in-furrow®.

## **New Blackleg Symptom**

Many canola plants died before windrowing in 2000. These symptoms occurred across SA, Victoria and NSW. The blackleg fungus was isolated from rotted roots of these plants by researchers in each state. As this symptom has not been reported before, work is underway to determine whether the blackleg fungus is the primary cause of the problem. This premature death of canola plants has been noted over the last few years and may be increasing.

## **New Blackleg Rating System**

A national blackleg rating scheme has been developed to ensure all Australian canola breeding programs work from the same system and release consistent ratings for canola varieties. The ratings rank the varieties from most to least resistant. A variety with a higher ranking will yield better under high pressure from blackleg in the field. Contact your local Department of Agriculture for a list of the current varieties available and their blackleg ratings.

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