

Survey of field pea crops and blackspot in Hart region 2007 to 2009

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Key findings

- From 2007 to 2009 field pea crops in the Hart district were sown in an even spread from early May through to June.
- The majority of crops were within 500 m of field pea stubble from the previous year.
- Blackspot was most severe in early sown crops adjacent to field pea stubble.
- There was a significant relationship between predictions of disease risk made by Blackspot Manager and the disease severity observed in these crops.

Why do the surveys?

To identify management decisions that impact on blackspot in field peas and to validate disease risk predictions from Blackspot Manager.

How was it done?

Each year from 2007 to 2009, all field pea crops within a 10-km radius of Hart were identified and mapped. Approximate sowing dates were calculated in winter from the mean number of nodes on 20 plants selected randomly in the crops. This information was used to group crops into sowing categories similar to the sowing dates in the field trials described above; Early (late April to early May), Medium (Mid – late May) and Late (early June onward). Crops representative of each sowing group were selected for assessment of severity of ascochyta blight in late September or October. Selection within each sowing group was based on proximity to infested field pea stubble, such that crops on or adjacent to, within 500 m of, or more than 500 m from infested stubble were represented. Twenty plants were selected in a W transect across the field, one every 50 paces. Plants were assessed for the growth stage (vegetative, flowering, early pods, mature pods), total number of nodes, and number of nodes girdled by ascochyta blight. The effect of sowing period on disease severity was analysed using crops as replicates. The association between observed disease severity and the percentage of ascospores present at crop emergence calculated by Blackspot Manager was also analysed.

Results

In 2007, 2008 and 2009 there were 52, 45 and 41, respectively, commercial field pea crops mapped in a 10-km radius of Hart. Sowing dates were evenly spread in all three seasons; 32.6% were in the Early sown category, 35.6% were in the Medium sown category and 32.7% were sown Late. The majority of the crops were in close vicinity to infested field pea stubble from the previous season; 49.4% were either adjacent to or planted into field pea stubble, 29.9% were no more than 500 m from field pea stubble, and only 20.6% of crops were more than 500 m from field pea stubble. All crops were affected by blackspot at varying severity and disease was assessed in 18, 15 and 22 crops in 2007-09, respectively.

In each consecutive year of the study disease severity significantly increased with earlier sowing ($P \leq 0.01$) (Table 1). The severity of blackspot ranged from 0.4 to 14.8 (average 5.4) girdled nodes in 2007, and from 1.8 to 12.7 girdled nodes (average 5.9) in 2008. In 2009 the minimum disease severity was 8.3 and the maximum was 20.2 girdled nodes (average 13.2). In 2008 proximity to infested stubble significantly ($P < 0.01$) increased blackspot severity at each sowing period. Disease was least severe in crops sown in the mid or late period which were not adjacent to infested stubble (Table 1b). In 2009 disease was least severe in crops sown in the late period not adjacent to infested field pea stubble (Table 1c).

Table 1 Mean severity of blackspot (number of girdled nodes) in field pea crops a 10-km radius of Hart, South Australia from 2007 to 2009.

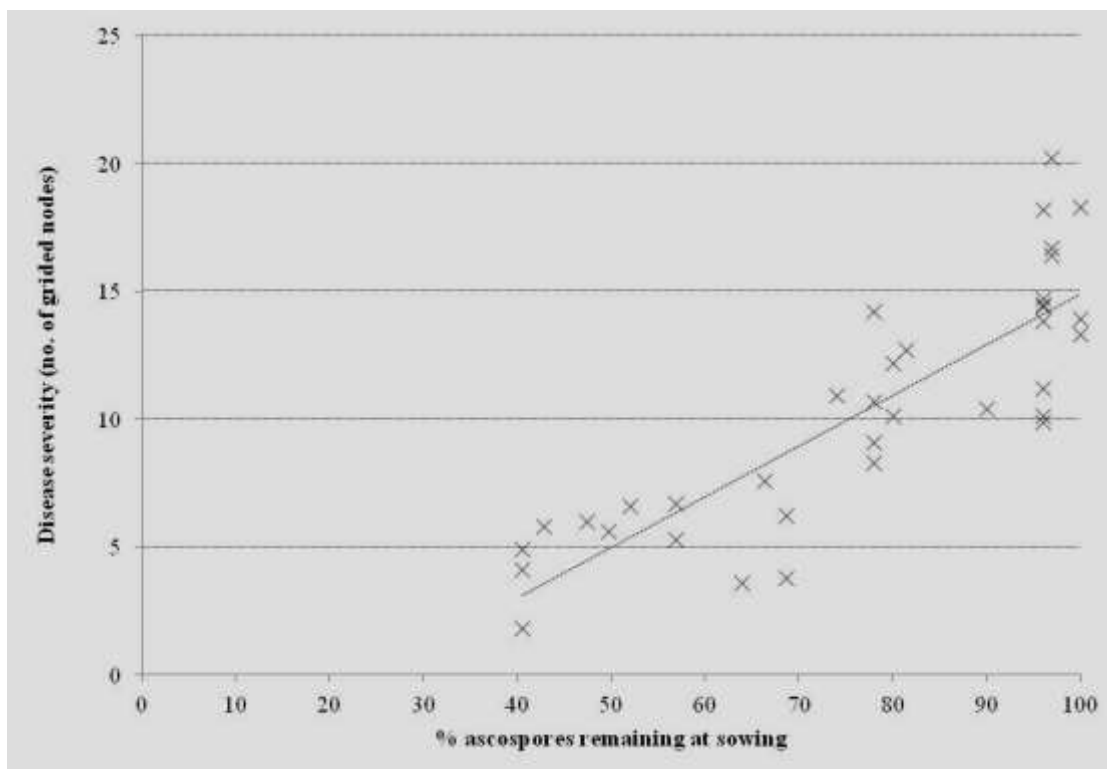
	Sowing period		
	Early (Early May)	Mid (Mid-late May)	Late (early June onward)
(a) 2007	12.4a ^a (3) ^b	4.9b (4)	3.7b (11)
(b) 2008			
Adjacent to or on field pea stubble	8.6a (3)	6.4b (3)	5.7bc (2)
Not adjacent to field pea stubble	4.7de (2)	5.2cd (3)	4.0e (2)
Maximum Least Significant Difference = 1.00; Average Least Significant Difference = 0.93; Minimum Least Significant Difference = 0.82.			
(c) 2009			
Adjacent or on field pea stubble	17.3a (3)	12.2c (4)	11.3c (3)
Not adjacent to field pea stubble	14.0b (4)	14.7b (5)	9.4d (3)
Maximum Least Significant Difference = 1.08; Average Least Significant Difference = 1.02; Minimum Least Significant Difference = 0.93.			

^aNumbers followed by the same letter are not significantly different at $P < 0.001$.

^bNumber of crops per category is in parentheses.

There was a significant linear relationship ($r^2 = 0.72$, $P < 0.001$) between observed disease severity in the survey of crops near Hart and percentage of ascospores present at crop emergence predicted by Blackspot Manager. When 40% of ascospores were present at crop emergence the average observed disease severity was 3 girdled nodes (Fig. 1). Other researchers have estimated that minimal yield loss occurs below 5 girdled nodes.

Figure 1 The linear relationship between the % of ascospores remaining at crop emergence (calculated by Blackspot Manager) and the observed disease severity assessed in the survey of commercial field pea crops in Hart district (10 km radius) in 2008 and 2009.



Summary

The survey of commercial field pea crops in the Hart district validated the effect of time of sowing and distance from infested pea stubble on disease severity. Many growers appear to have ignored basic agronomic disease management strategies of distance from stubble and or delayed sowing. This may be due to constraints in field selection on the property and the yield risk associated with short dry seasons when sowing is delayed. In these circumstances Blackspot Manager allows growers to identify the disease risk linked to their agronomic decisions. Research to identify reasons for the failure of industry to implement current recommendations for field selection and distance from infested stubble is warranted to improve the adoption of integrated disease management strategies aimed at minimising exposure to inoculum.

If crops were sown according to recommendations of Blackspot Manager (i.e. when less than 40% of spores were remaining on stubble) then blackspot severity was less than 3 girdled nodes, a level that does not limit yield.

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