P U L S E S

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Fungicide control of Ascochyta in peas

Key Points

- Ascochyta can cause significant yield losses in peas. Disease is favoured by environmental conditions that include periods of leaf wetness and drying and temperatures that are not over 23°C.
- In trials in New Zealand fungicides have reduced the incidence of disease on stipules, pods and stems in three years.
- The disease pressure in the trials was low and although the incidence of disease was reduced, there were only small increases in yield in two of the three years.
- Amistar and Score reduced the severity of Ascochyta blight on the pods, leaflets and stipules of all varieties.
- Ascochyta disease management in peas is best achieved by using a combination of cultural control and clean seed. Foliar fungicides may be cost effective under high disease pressure.

Background

Ascochyta is a disease complex caused by three fungal pathogens. The primary infection in crops is from seed-borne infection or from fungi over-wintering in crop residue or the soil. Thus the incidence of disease is often low if dry conditions occur during seedling establishment. Overseas research suggests that seed treatments should be used if the level of seed infection is over 3%. Secondary spread occurs by airborne spores and disease is favoured by periods of leaf wetness over 3-5 days and moderate temperatures (15-23°C). Severe infection occurs when plants return to wet periods after periods of dry weather. Given the particular environmental conditions that favour disease, it should be possible to develop a disease forecasting system and the Canadians have made an effort to develop such a system.

Cultural controls using clean seed, crop rotations, growing in warmer, drier seasons and fungicide seed treatments can give effective control. Currently there are limited options for foliar fungicide control of the disease. In the UK, Amistar has been reported to be effective for control of the disease but the timing is critical with the best response from applications at early pod development.

This research evaluated foliar fungicides for control of Ascochyta in peas over four seasons. However, as the incidence of disease was very low in one year, and there was no response to the fungicides, only three years' results are reported. These trials also investigated how plant population influenced the incidence of disease but as there was no clear response, this information is not detailed.

Year 1

The trial was planted in Allure peas in late October in Southland and two fungicides, azoxystrobin (Amistar) and difenconazole (Score), were applied twice, in late December and early January. Plants were assessed for the incidence and severity of disease on the stems, pods and stipules in early February and seed yield was determined at harvest.

Overall the level of disease was low and increased shortly before harvest. The fungicide treatments produced plots with lower levels of disease than the control. Both fungicides significantly reduced the level of infection on the stems and Score also reduced the level of infection on both the stipules and the pods. Although the Score gave more effective disease control, the yield response to both fungicides was relatively small and only Amistar resulted in significant yield responses (Table 1).

Table 1: The severity of disease on the plant parts and the yield of Allure peas for two fungicide treatments. Disease was scored from 0-11 with 0 = no disease and 11 over 80% of leaf infected.

	Ascochyta severity score			
Treatment	Stem	Pod	Stipule	Seed yield (t/ha)
Untreated	6.4	7.0	6.8	1.8
Score 0.5/	4.1	4.7	3.5	2.0
Amistar 1.0/	3.4	6.4	5.8	2.1
LSD (p<0.05)	1.6	1.5	1.1	0.2

Year 2

Allure peas sown in Southland in early October were sprayed with different fungicide treatments (Table 2).

Treatments that had two applications received the first application at first flower opening and all treatments received an application at early pod formation. Disease incidence was assessed in early February and yield was determined in early March.

The severity of disease was very low in this trial and none of the treatments differed significantly from the control, although there was a trend to lower levels of disease for most fungicide treatments. Grain yield was not significantly increased by any fungicide treatments (Table 2). The yield for Alto (cyproconazole) was significantly lower than the control even though the level of disease was very similar to the control. The reason for the yield suppression is not clear. Alto is registered for powdery mildew control in peas but has no activity on Ascochyta.

Table 2: The severity of disease on the plant parts and the yield of Allure peas for a number of fungicide treatments. Disease was scored from 0-11 with 0 = no disease and 11 over 80% of leaf infected.

	Ascochyta severity score			
Treatment	Stipules	Pods	Stems	Grain yield (t/ha)
Nil	4.7	2.7	5.0	3.3
Amistar 0.6*l*	3.2	1.7	3.2	3.1
Amistar 0.8*l*	3.2	1.1	2.6	3.2
Amistar 1*l*	3.5	1.9	2.9	3.3
Amistar 1*l* + 1*l*	3.2	1.4	3.0	3.2
Score 0.5*l* + 0.5*l*	3.2	1.7	2.3	3.4
Alto 0.25*l*	4.1	2.3	4.4	2.7
LSD (p<0.05)	1.7	1.8	3.5	0.4

Year 3

Amistar was applied to the two cultivars (Rex and 4L28) at 1l/ha on two occasions. The first fungicide application was when the plants in the plots were at the first flower stage and the second application was made at the pod swell stage. No Ascochyta blight was observed in the trial plots at the time of fungicide applications. Ascochyta blight severity was assessed on stems, stipules, leaflets (Rex only) and pods of plants in the trial in early February. Grain yield was determined at harvest.

The disease severity was low in this trial even though disease was widespread through the plots. Amistar applications significantly reduced the mean Ascochyta blight score on some plant parts (Table 3). Amistar did not influence plant maturity by increasing green leaf area or any of the components of yield (number of pods/plant or peas/pod) except for the thousand seed weight (TSW). The increase in TSW resulted in a significant yield increase of 0.4t/ha (Table 3).

Conclusions

Overseas reports indicate some control of Ascochyta by both Amistar and Score in field crops. These trials support these findings in that the level of disease was reduced by the use of fungicides in the three years and the level of control provided by the fungicides was very similar in years 1 & 2 with slightly lower levels of control in year 3. However, the increase in yield, although significant in years 1 and 3, was relatively small and the increase in yield only covered the cost of fungicide and application. In year 2, when the disease incidence was lower, there was no significant yield response.

The use of foliar fungicides to control Ascochyta may be economically viable if the disease incidence was high. In years 1 and 3 approximately 20% of some of the plant tissue infected on the control was diseased thus levels of infection higher than 20% may be needed before there will be an economic response.

The variable response to these fungicides suggests that a disease forecasting system will be essential if farmers are to get economic responses from the use of the fungicides tested in these trials. Research on Aschochyta control has been hampered by the low levels of disease in the last two years thus the newer strobilurin chemistry has not yet been tested for Ascochyta control.

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Table 3: The severity of disease on the plant parts and the mean yield of two cultivars of peas with Amistar fungicide treatment. Disease was scored from 0-11 with 0 = no disease and 11 over 80% of leaf infected

	Ascochyta severity score					
Treatment	Stems	Stipules	Leaflets	Pods	TSW (gm)	Yield (t/ha)
Nil	8.8	2.3	3.4	0.8	249	4.9
Amistar	7.3	1.7	2.6	0.6	261	5.3
LSD (p<0.05)	0.6	0.3	0.4	0.2	8	0.3