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Phomopsis pod and seed infection of stem-resistant lupin lines.

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WESTERN AUSTRALIA

EXPERIMETAL SUMMARY

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85BA38: Phomopsis pod and seed infection of stem-resistant lupin lines

In an attempt to induce Phomopsis pod and seed infection, plots were irrigated four times with overhead sprinklers applying 20 mm during the evening at fortnightly intervals during the pod-ripening stage.

Assessment of pods for Phomopsis infection was carried out just prior to harvest. All pods on each plant in every plot were individually assessed (a mean of 720 plants per plot). Sub samples of 400 seeds from each plot were also rated for the amount of discoloured seed (discolouration is mostly caused by infection with Phomopsis).

The results are shown in Table 1.

Table 1: Phomopsis pod and seed infection of lupin varieties

Lupin Variety	Stem Resistance Status*	Pod infection $(\frac{n}{N} \times 100)$ †	Discoloured Seed(%)
75A-257	HR	0.0	0.50
-258	HR	0.0	0.17
-259	M-HR	0.08	0.17
-260	M-HR	0.0	0.0
-261	M-HR	1.30	0.67
-262	MR	0.70	0.17
-263	M-HR	0.16	0.25
-264	L-MR	5.08	1.17
73A-184 (Wandoo)	LR	3.43	0.83
-191 (Danja)	LR	5.59	0.58
Illyarrie	S	7.37	1.42
Chittick	S	6.14	0.75

* HR high level of stem resistance
MR medium .
LR low
S susceptible

† n number of infected pods
N number of plants

Three adjacent plots of 73A-184, not irrigated, were also assessed for pod infection and found to be clean. Seed samples were not assessed.

Spore-traps operating within the experimental block during irrigation intercepted pycnidiospores only. A total of 12 pycnidiospores were caught during a 10 minute sampling period on October 23 and 27 on November 6, the first two irrigation periods. This implicates these spores as the source of inoculum for pod infection and supports the hypothesis that pod and seed infection result from rainfall occurring during the pod-ripening stage.

The pod infection ratings shown in the Table are considered to be more reliable as a measure of Phomopsis infection than the 400 seed sub-sample as every plant in each plot was asssessed. Of 20 infected pods randomly selected, all contained 1-3 discoloured seeds, whereas 20 clean pods contained no discoloured seed. The varieties Illyarrie and Chittick which were the most susceptible to Phomopsis stem infection also had the highest levels of pod infection. Varieties with at least a moderate rating for stem resistance also had pod infection ratings well below that of Illyarrie and Chittick, with no pod infection occurring on the two highly stem-resistant lines.

85BA36 - Competitive potential of Type B Phomopsis inoculum.

Lupin trash infected with either the Type A (toxic) form of Phomopsis, the non-toxic Type B form, or mixtures of both was used to inoculate plots of lupins. The recovery rates of the two forms is shown in Table 2.

Table 2. Phomopsis types recovered by isolation from lupins.

Infected Trash Inoculation Treatment	Phomopsis Stem Infection (% means of 3 reps)		
		22.8.85	6.11.85
Type A (naturally infected)	Type A	15.0	54.7
	B	1.7	2.0
Mixed Type A, B (naturally infected)	A	7.7	34.7
	B	0.7	7.0
Type B (artificially infected)	A	1.3	29.7
	B	0.3	3.7
Control (notrash)	A	12.0	56.3
	B	0.3	0.0

The results show that the pure Type B inoculation treatment resulted in a reduction of infection of lupins by the toxic Type A form of the fungus, compared with the other treatments. This was most pronounced at the first time of sampling.

Visual ratings and toxicity tests will be carried out after the first summer rain.

85WH50 - Survival of Phomopsis

Four lupin stubble managements preparatory to cropping to cereal were compared for their effects on survival and inoculum potential of Phomopsis leptostromiformis.

Six quadrat samples of lupin trash were taken from each plot before and after stubble treatment and weighed. Ten pieces of main and lateral stem material were taken from each sample and incubated in moist chambers for assessment of ability to produce fertile stromata. Samples were similarly taken for isolation onto agar to assess mycelial survival.

A summary of the results is given in Table 3 and 4.

Table 3. Recovery of Phomopsis from lupin stubble subjected to different field treatments.

Pre-treatment sample

	Treatment* (means of 4 reps)			
Main stem fraction	1	2	3	4
a) Fertile** stromata (%)	83	84	75	59
b) Mycelial survival (%)	99	99	97	97
Lateral stem fraction				
a) Fertile stromata (%)	59	49	57	42
b) Mycelial survival (%)	55	64	49	51

Post-treatment - first sampling (June 10)

1. Lupin material on surface				
Main stem fraction				
a) Fertilse stromata (%)	39	41	60	45
b) Mycelial survival (%)	25	24	74	65
Lateral stem fraction				
a) Fertile stromata (%)	17	26	44	;47
b) Mycelial survival (%)	19	23	14	30
2. Lupin stem fragments in top 2.5 cm				
a) Fertile Stromata (%)	22	56	29	40
b) Mycelial survival (%)	21	27	23	29

* 1. Harrow burn
2. Disc. plough
3. Minimum cultivation
4. Untreated fallow control

** Containing viable pycnidia

Table 4. Amount of surface trash (kg/m^2) before and after treatment

Treatment	Amount of surface trash (kg/m^2)	
	Before treatment	After treatment
1	0.630	0.107
2	0.648	0.087
3	0.559	0.500
4	0.671	0.562

Thus both the harrow burn and ploughing treatments resulted in a decrease in the amount of surface stem material producing fertile stromata. Mycelial survival was similarly affected.

Fragments, predominatly of the main stem, recovered from the top 2.5 cm of soil six weeks after treatment showed that burying had had little effect on Phomopsis at that stage with the exception of the minimum cultivation treatment.

Of interest was the lower level of Phomopsis on the lateral stems compared with the main stems of both the pre- and post-treatment samples.

Processing of the third set of samples taken at the end of the season has not yet been completed.

Apple Powdery Mildew - Kirup (joint trial with G. Godley, Bunbury Regional Office).

A block of 20 Jonathon apple trees was given a single winter-dormant spray of Dormakil and Nimrod, in addition to a regular 5-spray Nimrod programme during the growing season. The development of mildew was compared with a block of 20 trees which had only the regular growing season Nimrod fungicide spray programme.

Primary disease assessment was done by assessing 100 randomly-selected buds per tree and rating for the presence or absence of visual infection. Secondary mildew ratings were done on 4 randomly-selected extension shoots, assessing the first five fully expanded leaves on each shoot for presence or absence of disease.

The results are shown in the table.

Table. The effect of a winter-dormant fungicide treatment on development of mildew on Jonathon apples.

Disease phase	Date assessed/ Growth Stage	Treatment	Mildew Rating (%, mean of 20 trees)
Primary infection	Oct 11-17 Pink-bud stage	Normal	29.3
		Normal+ Dormant	9.6
Secondary infection	Oct 31/50% Blossom fall	Normal	28.3
		Normal+ Dormant	6.3
Secondary infection	Nov 15/early Fruit set	Normal	28.8
		Normal+ Dormant	10.0
Secondary infection	Nov 29/20 mm Fruit size	Normal	36.5
		Normal+ Dormant	34.5

The results show that the addition of a single winter-dormant treatment to the regular fungicide spray programme resulted in a reduction of primary mildew infection. The development of early secondary infection was also reduced by the dormant treatment. The second and subsequent assessments of secondary infection showed no difference between treatments, due possibly to the experimental design.