1978

Field crops and pasture experiments.

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DEPARTMENT OF AGRICULTURE

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EXPERIMENTAL SUMMARY - 1978

FIELD CROPS AND PASTURE EXPERIMENTS

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LUPINOSIS

Resistance of lupins to *Phomopsis leptostromiformis*
(P. McR. Wood, J. Hamblin, Plant Production Division)

Stage 1-1 and 1-2 of the Plant Breeding Branch were assessed for *Phomopsis* infection prior to harvest.

At each site 25 entries in replicated 10 x 2 m plots were assessed on the 0-5 visual scale (0 = no infection; 1 = 20% of stem area infected; 2 = 40%, etc.).

Mean levels of infection, range for each site and mean levels for different maturity groups and controls are summarised in Table 1.

TABLE 1 *Phomopsis* infection

	ARS *	BRS *	MBRS *	WHRS *
Site mean	1.60	1.80	2.15	0.55
Best genotype	0.75	0.63	1.25	0.13
Worst genotype	2.50	2.75	3.00	1.35
Early genotypes	1.73	1.66	2.28	0.61
Mid season genotypes	1.52	2.08	1.84	0.59
Late genotypes	1.22	1.69	2.31	0.31
Unicrop	2.25	1.56	2.38	0.48
Uniharvest	1.50	1.12	2.25	0.18
Marri	1.38	2.25	2.50	0.45

* Research Stations at Avondale, Badgingarra, Mt Barker, Wongan Hills respectively.

An important finding is the variation of *Phomopsis* levels with different maturity groups, which varied over sites. As none of the varieties had been bred for *Phomopsis* resistance it is unlikely that different strains of the fungus at different sites could account for these results. It seems likely that an environmental trigger, interacting with a critical maturity stage (possibly flowering), determines the level of subsequent *Phomopsis* infection. This will be further investigated in 1979. However it does mean that to obtain a more accurate estimate of resistance, a wide range of sites over a number of seasons must be used.

TABLE 2 Level of *Phomopsis* infection in the best five genotypes and controls

Variety	*Phomopsis* Infection				
	Overall site	ARS	BRS	MBRS	WHRS
72A15.6.7	1.06	0.75	1.63	1.25	0.67
72A15.6.3	1.08	0.88	1.50	1.25	0.70
71A33.7	1.20	1.00	2.00	1.63	0.17
Uniharvest	1.26	1.50	1.13	2.25	0.18
72A15.2	1.27	1.13	2.25	1.50	0.21
Unicrop	1.67	2.25	1.56	2.38	0.48
Marri	1.64	1.38	2.25	2.50	0.45

The results in Tables 1 and 2 thus suggest that variability for *Phomopsis* resistance does exist in the breeding lines which have not been selected for resistance. Field testing of progeny from crosses with parents selected for *Phomopsis* resistance will soon commence.

Lupin Disease Nurseries

(P. McR. Wood, J. Hamblin)

These only had very low levels of disease including *Phomopsis* infection, compared with other areas of Research Stations. This is probably a consequence of nursery sites being established in areas isolated from other lupin growing activities, and should not occur in 1979. Hill plots established in the Dandaragan area to screen primarily for brown spot resistance did not develop disease and were destroyed. It is now considered that Hill plots do not allow a micro-climate suitable for development of leaf pathogens of lupins.

Fodder-rolling of lupins

(a) Badgingarra

Phomopsis levels are being monitored in a grazing trial set up at Badgingarra Research Station by the Animal Health Division. Lupin treatments were: (1) harvested; (2) not harvested; (3) slashed; (4) slashed and rolled.

Results of *Phomopsis* isolations are shown in the table (statistical analysis not yet available).

Treatment	No. of positive *Phomopsis* isolations (rep. means)	
	31/10/78	18/12/78
Harvested	39	100
Not harvested	36	103
Slashed	9	23
Slashed & rolled	13	9

These results are encouraging and suggest that slashing alone may be sufficient to reduce *Phomopsis* to a safe level. Mr J. Allen, Veterinary Pathologist of the Animal Health Division will provide liver biopsy results later.

(b) On-farm Treatments

Several properties were monitored in the Dandaragan area, where farmers had slashed and sprayseeded W.A. Blue Lupins, just prior to senescence. Results of *Phomopsis* isolations are shown in the table below.

Treatment	*Phomopsis* Assessments *		
	Early November	Late November	Mid December
Property A:			
Slashed	1.8		3.2
Sprayed	3.6		-
Control	3.3		3.9
Property B:			
Slashed	2.1	2.1	2.4
Sprayed	3.4	3.4	
Control	3.5	3.4	3.4
Property C:			
Slashed	2.3	2.2	3.2
Sprayed	3.5	3.6	
Control	3.5	3.6	3.5

* Means of 30 plants samples, assessed by isolations on a 0-4 scale.

Thus slashing of W.A. Blue lupins results in an initial reduction in *Phomopsis* levels, compared with the untreated controls. Differences between the slashing treatment and control decreases with time.

Toxicity tests on material will be carried out by the Animal Health Division. The sprayseed treatment did not give control of *Phomopsis*.

Brown spot of lupins (*Pleiochaeta setosa*)

The fungicide dithane used in trials at Dandaragan with Moora District Office gave some control of the disease, but unfortunately this was not reflected in quadrat yields for any one site, as seen in the following tables.

TABLE 1 Disease ratings and quadrat yields for Site 1 (2 reps only)

Treatment*/Rep	Mean disease score	Mean quadrat yield (g)
T1R1	13.5	43.6
4	13.3	57.4
Means	13.4	50.1
T2R1	12.1	52.1
4	9.0	78.9
Means	10.6	65.5
T3R1	12.2	64.0
4	11.8	71.0
Means	12.0	67.5
T4R1	9.6	69.6
4	9.8	57.4
Means	9.7	63.5

* T1 Control, no infected trash inoculum
2 Dithane sprays, no infected trash inoculum
3 Control, with infected trash inoculum
4 Dithane sprays with infected trash inoculum.

TABLE 2 Disease ratings and quadrat yields for Site 2.

Treatment/Rep	Mean disease score	Mean quadrat yield (g)
T1R1	6.8	7.4
2	7.4	10.9
3	7.7	9.2
4	6.8	16.5
5	7.1	15.7
6	7.2	8.4
Means	7.2	11.4
T2R1	4.1	6.9
2	4.2	10.3
3	5.2	11.0
4	3.9	14.1
5	4.5	12.3
6	4.7	6.9
Means	4.4	10.3
T3R1	9.7	11.8
2	8.5	9.9
3	8.1	15.1
4	7.6	13.5
5	6.7	9.8
6	8.1	11.3
Means	8.1	11.9
T4R1	3.9	7.4
2	4.3	10.8
3	4.8	9.1
4	3.6	14.4
5	4.4	18.8
6	3.7	9.7
Means	4.1	11.9

TABLE 3 . Disease ratings, quadrat and plot yields for Site 3

Treatment/Rep	Mean disease score	Mean quadrat yield (g)	Plot yield (kg)
T1R1	7.8	26.1	2.1
2	8.9	13.0	1.3
3	9.8	15.8	1.1
4	11.6	23.9	1.9
5	9.2	21.5	1.9
6	10.0	29.9	3.4
Means	9.6	21.7	2.0
T2R1	7.4	29.9	3.0
2	5.3	15.5	1.1
3	6.3	22.7	2.0
4	6.3	31.1	2.6
5	4.9	29.4	3.3
6	5.7	29.8	2.6
Means	6.0	26.4	2.4
T3R1	8.8	27.5	1.8
2	5.1	22.9	1.6
3	11.1	26.4	1.5
4	10.7	18.4	1.5
5	9.8	24.2	2.6
6	10.4	33.3	4.3
Means	9.3	25.5	2.2
T4R1	5.5	24.3	3.1
2	6.2	14.4	0.9
3	6.4	17.1	1.6
4	6.6	22.0	2.3
5	5.8	26.0	3.3
6	6.5	27.5	3.8
Means	6.2	21.9	2.5

The disease rating method has been previously used to successfully predict yield loss from disease on several other Departmental lupin trials. It is therefore suspected that other factors (weeds, vermin) were influencing yield more than was disease at the three sites.

The introduction of infected lupin trash inoculum as a treatment did not result in higher levels of disease, presumably because of high levels of naturally infected material already present.