1981

Diseases of lupins and lupinosis.

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SUMMARY OF EXPERIMENTAL RESULTS, 1981

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DISEASES OF LUPINS AND LUPINOSIS

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LUPIN DISEASES

Disease status of lupin crops in 1981

Geraldton:

Brown spot (Pleiochaeta setosa) was widespread, with estimated yield losses of up to 10% on individual crops. Field observations suggest that Unicrop is most susceptible followed by Illyarrie, with Marri being the least susceptible. Infection was related either to the presence of infected lupin trash from 1979, or nearby 1980 trash being blown onto the 1981 crop. This was especially evident when infected trash was on the western side of the crop. There was a tendency for deeper-sown plants to have higher levels of disease, with infection spreading to the collar and hypocotyl. There was some evidence to suggest that two successive cereal crops after lupins could reduce the severity of infection. Root rots were not considered generally to be a problem in 1981.

Three Springs:

Fungal root rots were commonly observed with estimated yield losses of up to 20 per cent in several crops. In others it was considered to be a minor problem with little or no effect on yield. There seemed to be no common cultural factor involved, although sowing too deep (up to 10 cm) was involved in at least two instances.

Brown spot leaf and stem infection was also prevalent with estimated losses on individual properties of up to 10 per cent. In one instance, a high level of disease was associated with potash deficiency. The main source of infection was either 1980 lupin trash within 200 metres of the crop, or 1979 trash in the paddock. However, in several instances, the disease occurred in the absence of trash, thus implicating either infected seed or an alternate host.

Moora:

Brown spot was the most prevalent and damaging disease recorded with losses of up to 20 per cent, and one crop over 50 per cent.

Disease was most severe on poorer deep sands associated with potash deficiency).

In some instances, disease could not be related to nearby infected trash, thus again implicating either infected seed or an alternate host.

Some cases of Rhizoctonia were recorded but generally were considered to have little effect on yield.

Low levels of Cladosporium leaf spot were observed on several crops.

Northam:

Crops were generally healthy, with only very low levels of brown spot and Sclerotinia being present.

Albany:

Generally, low levels of disease were present and were not considered to be affecting yield. However one crop suffered losses of up to 50% from grey leaf spot.

Bridgetown:

Brown spot was the main disease present, causing losses of up to 50%. In several cases, the disease could not be related to nearby infected trash. The organism could not be detected in seed samples, therefore implicating an alternate host.

Root rots were also present in some crops, causing significant losses on two new land plantings.

In December, a widespread disorder occurred, consisting of a flecking and blistering of pods. Seed quality was also affected. Late brown spot infection is suspected but not yet confirmed.

Fungicidal treatment of lupin seed

In a trial at Three Springs, fungicide seed treatments gave yield responses of up to 40 per cent (see Table 1). This was attributed to the control of the diseases brown spot (Pleiochaeta setosa) and fungal root rots.

A yield response to seed treatments was also obtained in a similar trial at Dandaragan but the association with disease control was not as evident (see Table 2).

Table 1. Fungicidal treatment of lupin seeds - Three Springs

Fungicide treatment	Root rot rating		Brown spot defoliation counts		Yield
	Tap root	Feeder roots	Cotyledon	Leaf	t/ha
Rovral (0.06%) + Captan (0.06%)	0.30	0.28	0.04	0.66	1.30
Thiram (0.1%) + Rovral (0.06%)	0.43	0.37	0.07	1.16	1.28
Thiram (0.2%)	0.65	0.59	0.34	1.76	1.24
Rovral (0.13%)	0.33	0.35	0.06	0.45	1.20
Benlate (0.5%)	0.55	0.48	0.35	2.06	1.19
Thiram (0.1%) + Captan (0.06%)	0.79	0.71	0.80	2.24	1.17
Captan (0.12%)	0.92	0.78	0.21	1.54	1.11
Benlate (0.17%) + Rovral (0.08%)	0.40	0.34	0.10	0.82	1.11
Benlate (0.33%) + Rovral (0.04%)	0.44	0.44	0.08	1.30	1.09
Benlate (0.25%) + Thiram (0.1%)	0.64	0.61	0.59	1.86	1.06
Benlate (0.25%) + Captan (0.06%)	0.77	0.68	1.15	3.40	0.94
CONTROL	1.18	1.03	1.70	3.65	0.93

902

Table 2. Fungicidal treatment of lupin seed - Dandaragan

Fungicide treatment/response	Root rot rating		Brown spot defoliation counts		Yield
	Tap root	Feeder roots	Cotyledon	Leaf	t/ha
Rovral (0.13%)	1.14	1.14	1.17	4.10	0.60
Benlate (0.17%) + Rovral (0.08%)	1.05	1.06	1.03	4.26	0.60
Thiram (0.1%) + Rovral (0.06%)	0.92	0.93	1.40	4.85	0.59
Captan (0.12%)	1.29	1.24	1.13	4.42	0.55
Rovral (0.06%) + Captan (0.06%)	1.24	1.26	0.86	4.41	0.52
Benlate (0.5%)	0.74	0.65	0.37	4.46	0.52
CONTROL	1.58	1.55	1.99	4.86	0.50
Benlate (0.25%) + Captan (0.06%)	1.42	1.46	1.38	4.58	0.48
Benlate (0.25%) + Thiram (0.1%)	1.39	1.34	1.84	4.70	0.46
Benlate (0.33%) + Rovral (0.04%)	0.94	0.89	0.59	4.23	0.43
Thiram (0.2%)	1.04	0.77	1.78	4.26	0.39
Thiram (0.1%) + Captan (0.06%)	1.50	1.48	1.90	4.78	0.35

Lupinosis

Spray trials:

Single sprays of the fungicide Benlate were applied to lupins at Badgingarra. Three different rates and application times were used. The results are shown in Table 3 and indicate that control of Phomopsis was best achieved using either an early spray at a low rate, or a late spray at a high rate.

Table 3. Phomopsis levels on lupins sprayed with Benlate at Badgingarra

	Percentage of stems infected Time of application		
	Early August	Mid-August	Late August
Benlate 200 g/ha	60	77	97
400 g/ha	83	80	80
600 g/ha	67	73	63
Control	97		

A trial was also carried out at Bridgetown, using Benlate at one rate only (400 g/ha). Stem and seed samples were assessed for Phomopsis infection in January, stems using the visual method and seed by isolations. The results are shown in the Table below.

Table 4. Phomopsis levels on lupins sprayed with Benlate at Bridgetown

Time of Benlate application	Phomopsis levels on stems (0-5)	Phomopsis levels on seed (per cent infection)
Early September	1.35	4.0
Mid September	1.75	5.0
Late September	1.64	8.0
Control - no Benlate	1.71	7.0

Thus at Bridgetown, only marginal control of stem infection, but reasonable control of seed infection was achieved by a single early Benlate spray.

Resistance of lupins to Phomopsis leptostromiformis

Plant breeders' trials were rated for Phomopsis at Badgingarra and Avondale. Some selected lines with low Phomopsis ratings compared with controls are shown in the following Tables.

Table 5. Phomopsis ratings on S2-2 trials

Variety	Phomopsis
70A61-16.4.5	0.8
70A61-16.4	0.9
71A47-14.3.3	0.9
71A47-14.3	0.8
74A03-6.5.4	1.3
74A03-6.5	1.2
73A41-2.9.2	1.4
73A41-2.9.1	1.2
73A41-2.9.15	1.4
73A41-12.4.1	1.3
73A41-12.4.3	1.5
Yandee control	2.3

Again, low Phomopsis levels correspond with low levels in parent lines. Also there is good agreement between sister lines in the 73A41 series.

New sources of Phomopsis resistance were also identified, some examples being shown in the Table below.

Table 6. Phomopsis ratings on S1-1A trials

Variety	Phomopsis
75A42-9	1.1
75A45-10	0.7
75A45-11	0.6
75A54-7	1.0
75A61-1	0.8
75A61-3	0.5
75A61-6	0.5
75A61-7	0.9
75A61-10	0.7
75A61-12	0.4
Yandee control	2.3

Again agreement betwen sister lines provides further evidence for the heritability of Phomopsis resistance. Similar sources of resistance were found in the S1-1B (late) trials.

The collection of early and late determinant types was also assessed at Badgingarra and Avondale. Sources of Phomopsis resistance were located, and again there were instances of close agreement between sister lines.

At Badgingarra, multiplication plots containing advanced breeding lines, including some of those where earlier Phomopsis resistance had been found were assessed. They were also represented in the stage 2-2 trials. Generally, lines showing good Phomopsis resistance in these trials, also gave similar results in the multiplication plots as shown in the Table.

Table 7. A comparison of Phomopsis resistance in selected advanced breeding lines

Breeding line	S2-2 plots	Multiplication plots
74A03-2.2.6	1.4	0.80
70A61-18.4.2	1.3	1.0
70A61-18.4.5	1.1	0.5
70A61-16.4.5	0.8	0.5
73A41-2.9.2.3	1.4	0.8

An important point emerging from the programme is that often the lines showing Phomopsis resistance often give the best yields.