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Crop establishment methods for lupin disease management 13 to 23

M Sweetingham

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88N073 Phosphorus x disease on lupins

Co-researcher: J.W. Bowden

Aim: To examine the interactions beteen Pleiochaeta root rot, Brown Spot and phosphorus nutrition of lupins.

Location: Ron Stratford, Wyalkatchem, Bookham Road

Soil type: Yellow loamy sand

Rotation: Lupin 1986, Wheat 1987
Pleiochaeta soil test: 6250 spores/g

Establishment: Stubble raked and burnt. Sprayseed 1.25, Simazine 1.25, Atrazine 0.75. Direct drilled. Danja at 100 kg/ha. Sown 19/5. Super drilled (half topdressed at top rate).

Results:

	Root rot severity (20/6)	Brown spot severity (20/6)	Plant density plants/m^2 (20/6)	Dry weight (kg/ha) 28/6	Brown spot severity L1-L20 (16/8)	Grain yield t/ha
Seed treatment						
Nil	0.34	3.07	34.8	30.2	2.03	0.88
Rovral	0.30	1.83	52.3	88.2	1.61	1.61
LSD (p = .05)	N.S.	0.18	4.2	7.8	***	0.22
Sowing depth						
2 cm	0.44	2.36	51.1	74.9	1.86	1.44
5 cm	0.20	2.54	35.4	43.7	1.78	1.05
LSD (p = .05)	0.06	N.S.	4.2	7.8	N.S.	0.22
Superphosphate						
0 (kg P/ha)	0.32	2.51	45.6	60.8	1.81	1.02
12	0.34	2.36	47.0	68.0	1.81	1.19
25	0.30	2.48	42.0	57.8	1.78	1.27
50	0.33	2.53	39.7	57.5	1.86	1.33
100	0.31	2.39	42.3	53.3	1.85	1.42
LSD (p = .05)	N.S.	N.S.	N.S.	12.3	N.S.	0.36
Fungicide sprays						
Nil					1.90	1.21
Sumisclex					1.35	1.28
LSD (p = .05)					***	N.S.

The yield response due to Rovral is mainly a consequence of increased plant density. Rovral protected seedlings at the cotyledon stage from death by extremely severe Brown spot attack on the leaves and stems. This is the first trial we have observed where Brown spot on the leaves and stems killed plants and it seems that only very small seedlings are killed. The Rovral response at the 5 cm sowing depth (142%) was much greater then at the 2 cm depth (54%). This appeared to be due to the 5 cm sown plots emerging a few days later and being at a more susceptible growth stage to the Brown spot attack than the 2 cm plots.

Note that in a season with a drier start, the 5 cm sown plots may have emerged sooner and suffered less disease. Also the earlier emerged plots would have had relatively more Brown spot infection if the intense rain storm arrived before the later emerged plots got out of the ground.

The effect of sowing depth on root rot was overridden by the leaf disease effects as far as plant growth and yield was concerned.

As with 88SC4 there was no effect of applied P on disease, and again this may have been due to the earliness of the epidemic. Also the higher rates of P slowed early plant growth.

Controlling mid and late season Brown spot with foliar fungicide sprays was effective but had little if any impact on grain yield.

88ME59 Phosphorus x disease on lupins

Co-researcher: J.W. Bowden

Aim: To examine the interactions between Pleiochaeta root rot, Brown spot and phosphorus nutrition of lupins.

Location: A. Cole, South Kellerberrin, Bradley Road

Rotation: Lupins 1986, wheat 1987
Pleiochaeta soil test: 3350 spores/g

Establishment: Stubble raked and burnt. Sprayseed and Simazine. Direct drilled. Danja at 100 kg/ha. Super drilled (half topdressed at top rate).

Results:

	Root rot severity	Brown spot severity L1-L6 (13/7)	Plant density (per m^2) (9/11)	Grain yield (t/ha)
Seed treatment				
Nil	0.23	1.30	33.5	1.03
Rovral	0.20	0.88	34.6	1.06
LSD (p = .05)	n.s.	0.14	n.s.	n.s.
Sowing depth				
2 cm	0.22	-	35.9	1.00
5 cm	0.21	-	32.3	1.09
LSD (p = .05)	n.s.		2.4	0.03
Superphosphate				
0 (kg P/ha)	0.22	1.15	33.8	0.74
12	0.19	1.12	36.6	1.00
25	0.27	1.14	34.5	1.05
50	0.19	1.02	35.1	1.21
100	0.21	1.04	30.2	1.22
LSD (p = .05)	N.S.	N.S.	3.8	0.05
Fungicide sprays				
Nil	-	1.63	-	0.96
Sumisclex	-	0.56	-	1.13

In contrast to 88NO73 leaf disease was not severe early at this site and was only moderate later in the season. As a consequence the yield response to Rovral was negligible. There was no effect of applied P on disease.

Sumisclex sprays reduced Brown spot mid and late season but the apparent yield response should be treated with caution as the Sumisclex treated area also had less ryegrass.

88ME60 Seed treatments for Brown spot and Pleiochaeta root rot of lupins

Aim: To compare fungicide and phosphate seed treatments for control of brown spot and Pleiochaeta root rot and their effect on crop growth.

Location: South Carrabin Research Station (Kidson Paddock)

Soil type: Yellow loamy sand

Rotation: Lupins 1986, Wheat 1987, Pleiochaeta soil test: 5000 spores/g)

Establishment: Stubble raked, Sprayseed/Simazine. Sown May.

Results:

Treatment	Root rot	Brown spot (defoliation count) (3/8)	Plant density (m-2) (21/9)	Dry weight (g/m-2) (23/8)	Grain yield (kg/ha)
Nil	0.33	8.35	35.3	54.8	223
Nil + H_2O slurry	0.54	7.77	33.9	33.3	232
Rovral slurry	0.23	6.78	41.1	85.3	313
Sumisclex slurry	0.17	5.87	44.4	85.5	411
LB Pickle slurry	0.21	7.63	36.7	35.8	178
Bravo slurry	0.31	7.81	34.2	46.8	196
$CaHPO_4$ slurry	0.54	7.15	32.0	39.5	175
Rovral + $CaHPO_4$ slurry	0.18	6.19	41.4	109.3	375
Imbibe H_2O	0.43	8.33	34.9	61.5	205
Imbibe $NaHPO_4$	0.30	9.26	40.1	47.8	197
LSD (p = .05)	0.25	1.80	N.S.	26.3	53

Root rot levels in the trial were low to moderate due to accurate sowing depth 3.5-4.0 cm. There was a severe Brown spot attack three weeks after seeding (2 leaf stage).

Root rot was measured at four weeks and Rovral, Sumisclex, Rovral + $CaHPO_4$ and LB Pickle appeared to give some control. At this stage Rovral, Sumisclex and Rovral + $CaHPO_4$ treatments showed greater vigour. Brown spot defoliation counts taken at first flowering (3/8) showed less disease in Rovral, Sumisclex, and Rovral + $CaHPO_4$ treatements. There were large responses in dry matter and grain yield to these treatments.

These results, evaluated in the light of previous seed treatment trials, indicate that severe Brown spot early in the season can be very damaging to lupin yields and in such situations Rovral and Sumisclex seed treatments are very worthwhile.

88SC33 Rovral and Sumisclex - seed treatment rates for lupins

Aim: To compare the effects of lower rates of Rovral and Sumisclex on brown spot and Pleiochaeta root rot of lupins.

Location: South Carrabin Research Station (Kidson Paddock)

Soil type: Yellow sand

Rotation: Wheat 1987, Lupins 1986

Establishment: Late sown: 1/8 Danja 100 kg/ha.

Results:

Fungicide g ai/kg seed		Root rot severity (22/8)	Brown leaf spot (leaves 1-8) (20/9)	Establishment (plants/m^2) (20/9)	(31/10)	Fresh weight tops (g/m^2) (20/9)	(31/10)
Nil		2.75	2.27	38	24	70	307
Rovral	1.25	2.09	1.26	46	34	140	543
Rovral	0.94	2.33	1.54	43	36	129	578
Rovral	0.63	2.08	1.42	44	32	122	476
Rovral	0.31	2.11	1.57	47	35	123	591
Sumisclex	1.25	2.21	1.20	46	29	130	513
Sumisclex	0.94	2.26	1.27	45	34	133	519
Sumisclex	0.63	2.13	1.13	43	35	127	541
Sumisclex	0.31	2.38	1.10	41	32	110	440
LSD (p = .05)		0.40	0.30		4		163

Disease reduction and growth responses for Sumisclex versus Rovral appear comparable. There were no significant differences between rates of either fungicide down to 25% of the label rate.

1.3 Rhizoctonia root and hypocotyl rots

88NO74 Fungicides and sowing depth for Rhizoctonia root rot

Aim: Effect of fungicides and sowing depth on the control of root and hypocotyl rot at a Rhizoctonia ZG6 site.

Location: Robin McGill, Goomalling, Bolgart East Road

Soil type: Grey sand

Rotation: Lupins 1986, wheat 1987

Establishment: Stubble raked and burnt. Sprayseed and Simazine (1.2 L + 1.5 L/ha). Super 50 kg/ha drilled. Danja 110 kg/ha. Sown 25/5.

Results:

	Measured sowing depth (cm)	Root rot severity	Hypocotyl rot severity	Plants/m^2 (25/9)	Grain yield (t/ha)
Seed treatment					
Nil (50 kg/ha super)	4.6	0.54	0.12	42.0	2.25
Rovral	4.2	0.66	0.10	42.1	2.30
Campogran	4.3	0.53	0.03	41.4	2.29
Rizolex	4.2	0.20	0.04	44.6	2.19
Nil (200 kg/ha super)	4.2	0.40	0.06	37.2	2.29
LSD (p = .05)	N.S.	0.36	N.S.	4.1	N.S.
Sowing depth					
2-3 cm	3.3	0.46	0.05	43.0	2.29
4-5 cm	4.1	0.49	0.06	42.3	2.30
6-7 cm	5.4	0.46	0.10	39.1	2.20
LSD (p = .05)	1.0	N.S.	N.S.	4.9	0.07

The incidence of disease was extremely patchy across the trial site making conventional analysis of variance unreliable. Campogram and Rizolex may have reduced hypocotyl rot and Rizolex appears to have reduced root rot. The high rate of drilled super (200 kg/ha) slightly reduced plant establishment but had no effect on grain yield.

88GE53 Rizolex for Rhizoctonia control in lupins

Aim: To determine the effect of rizolex (sprayed and incorporated) on Rhizoctonia root and hypocotyl rot of lupins.

Location: P. Smart, Mingenew, Mooriary Road

Soil type: White sand

Rotation: Lupins 1987, Wheat 1986

Establishment: Sprayseed, Simazine and Fungicide sprays 11/5. Dry sown 12/5 cultitrash.

Results:

Treatment	Hypocotyl rot severity	Root rot severity	Plants/m^2	Grain yield t/ha
Nil	1.24	0.40	28.3	0.88
Rizolex 100 g/ha	1.26	0.66	24.4	0.89
Rizolex 200 g/ha	1.17	0.65	27.6	0.93
Rizolex 400 g/ha	0.95	0.34	26.9	0.89
Rovral 500 g/ha	1.07	0.52	25.7	0.91
	N.S.	N.S.	N.S.	N.S.

Shell Chemicals suggested Rizolex may offer protection against Rhizoctonia hypocotyl and root rot when sprayed on the soil surface and incorporated with a cultitrash. There was negligible if any control at the high rate (cost $40/ha!).

88GE31 Cultivation and sowing depth for Rhizoctonia patch and hypocotyl rot of lupins.

Location: P. Smart, Mingenew, Mooriary Road

Soil type: White sand

Rotation: Lupins 1987. Pleiochaeta soil test: 700 spores/g

Results:

	Hypocotyl rot	Root rot	Grain yield (t/ha)
Cultivation			
Nil	0.30	0.24	0.98
Scarify	0.33	0.26	1.00
Sowing depth			
1.5 cm	0.25	0.33	1.01
3.5 cm	0.32	0.20	0.99
5.5 cm	0.30	0.25	0.99
7.5 cm	0.38	0.21	0.98

The trial was sown on a site which had severe Rhizoctonia bare patch and hypocotyl rot in 1987. Only very low levels of disease and no patches occurred in 1988.

88E38 Cultivation and sowing depth effects on Rhizoctonia bare patch in lupins.

Co-researchers: G.C. MacNish, R. Jarvis

Aim: To see if shallow sowing increases the severity of Rhizoctonia patch in lupins.

Location: Esperance Downs Research Station

Results:

	Root rot severity
Cultivation	
Direct drill	1.32
Modified combine .12 cm	0.87
Scarify .12 cm	0.84
LSD (p = .05)	0.26
Sowing depth	
2 cm	0.90
4 cm	1.13
6 cm	1.01
8 cm	0.99
	N.S.

Cultivation to 12 cm as a separate operation or with the modified combine reduced root rot. There was no effect of sowing depth.

The trial was not harvested due to very severe Bean Yellow Mosaic Virus.

88NO92 Semiselective fungicide drenches for root/hypocotyl rot of lupins

Aim: To determine the fungi involved in lupin root and hypocotyl rot on the duplex grey sand over clay soils in the Northam district.

Location: Site 1. Robin McGill, Goomalling, Bolgart East Road
Site 2. Malcolm Edwards, East Beverley, Ewart Road

Soil type: Grey sand

Rotation: Site 1. Lupins 1986, Wheat 1987. Site 2. Lupins 1987

Establishment: Roundup + Simazine (1.0 + 1.5L) immediately before seeding. Handsown at 2 depths 40 seed/m (Danja). No super. Site 1 - sown 19/5. Site 2 - sown 24/5.

Results:

Fungicide	Hypocotyl rot	Root rot	Plant establishment (%)	Isolation frequency (%) on roots (r) and hypocotyls (h) Pythium r	Pythium h	Rhizoctonia r	Rhizoctonia h	Fusarium r	Fusarium h
Site 1									
Nil	0.39	0.89	64.1	34	1	1	22	100	67
Rovral	0.08	0.68	71.9	36	3	1	1	100	73
Benlate	0.09	0.96	71.7	24	3	0	5	67	28
Ridomil	0.41	0.65	67.7	3	0	4	17	100	74
Rizolex	0.18	0.73	68.4	18	13	1	3	100	74
Rovral + Benlate + Ridomil	0.06	0.72	81.7	0	0	1	2	63	55
LSD (p = .05)	0.08	N.S.	8.9						
Sowing depth									
2 cm	0.04	0.93	80.7						
5 cm	0.36	0.61	61.1						
LSD (p = .05)	0.04	0.16	5.1						
Site 2									
Nil	0.46	2.09	25.6						
Rovral	0.06	2.22	60.2						
Benlate	0.10	2.31	55.5						
Ridomil	0.31	1.86	25.7						
Rizolex	0.03	2.17	59.0						
Rovral + Benlate + Ridomil	0.06	1.95	72.0						
LSD (p = .05)	0.08	N.S.	10.02						
Sowing depth									
2 cm	0.05	2.89	47.5						
5 cm	0.29	1.31	51.9						
LSD (p = .05)	0.05	0.38	N.S.						

At both sites the Rhizoctonia controlling fungicides (Rovral, Benlate and Rizolex) reduced hypocotyl rot and improved plant establishment.

No fungicide controlled root rot, possibly due to poor penetration of the fungicide into the soil profile.