1986

Experimental summary.

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EXPERIMENTAL SUMMARY 1986

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Trials

1. Lupin Root Rot: 86C14, 86WH15, 86ME85, 86LG63, 85C63, 86WH14
2. Lupin Hypocotyl rot: 86BA49, 86BA21
3. Rhizoctonia coleoptile rot of wheat: 86BA19, 86BA20
4. Rhizoctonia root rots in long term wheat-pasture rotation trials.

86C14 - Pleiochaeta root rot of lupins : effect of sowing depth

Aim:	To determine the optimum sowing depth for lupins where Pleiochaeta root rot is the predominant root pathogen.
Location:	East Chapman Research Station
Soil type:	Yellow loamy sand
Crop:	Lupins (Illyarrie)
Sowing date:	16/5/86
Establishment:	Direct drill, cone seeder with cultitrash discs
Seeding rate:	80 kg/ha
Plot size:	1.7 x 40 m
Results:	Shallow sowing caused more root rot and reduced yield.

Treatment sowing depth (cm)	Mean depth of seed burial (cm)	Root rot (17/6) (R.D.I.)	Nodulation (20/8)	Stand density (plants/m^2) 17/6	Stand density (plants/m^2) 20/8	Biological yield (21/10) (g/m)	Grain yield (kg/ha)
2	1.1	0.82	2.0	30	31	328	760
4	1.5	0.72	2.2	38	33	353	1,054
6	2.3	0.62	2.3	39	33	421	1,080
8	2.7	0.49	2.5	36	33	424	1,204
10	3.4	0.44	2.5	35	30	482	1,235
LSD 5%		0.16	0.3	5	NS	52	125

Comments: The extent of the yield differences between sowing depth treatments is not consistent with the hypothesis that root rot reduces yield mainly by reducing stand densities. Although the Pleiochaeta spore count was quite low (448 spores/g soil, 0-10 cm) disease levels were moderate due to dry soil conditions. Partial rotting of lupin roots reduced nodulation.

86WH15 - Pleiochaeta root rot of lupins : effect of seeding depth

Aim:	To determine the optimum sowing depth for lupins where Pleiochaeta root rot is the predominant root pathogen.
Location:	Wongan Hills Research Station (2EA)
Soil type:	Yellow loamy sand
Crop:	Lupins (Yandee)
Sowing date:	19/5/86
Establishment:	Direct drill, cone seeder with tines
Seeding rate:	80 kg/ha
Plot size:	40 x 1.7 m
Results:	Deeper sowing decreased root rot. Sowing at about 5 cm looks optimum.

Treatment depth of sowing (cm)	Measured depth of sowing (cm)	Root rot severity	Stand density (plants/m^2) 11/6	3/9	Grain yield (kg/ha)
2	2.0	1.93	41	41	2,593
4	5.5	0.65	40	42	2,769
6	8.6	0.15	39	37	2,405
8	12.4*	0.08*	22	15	1,729
10	14.7*	0.00*	12	8	1,167
LSD 5%		0.23	4	4	219

* Only 1 replicate sampled

Comments:	Disease presence low to moderate at this site. Pleiochaeta spore count = 941 spores/g (0-10 cm)

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86ME85 - Effect of seeding depth of lupins at different disease pressures

Aim:	To determine the optimum seeding depth for lupins under different diseases pressures. To quantify the effect of crop rotation on lupin diseases.
Location:	Merredin Research Station, lease block (Korbel)
Soil type:	Yellow brownish gritty sand over yellow gravelly sandy loam
Crop:	Lupins (Yandee)
Sowing date:	30/5/86
Establishment:	Direct drilled, cone seeder with tines
Seeding rate:	80 kg/ha
Plot size:	1.7 x 40 m
Results:	Where disease pressure was high there was a reduction in root rot with deeper sowing (interaction significant, p = 0.07).

Rotation					Pleiochaeta spores/g (0-10 cm)	Root rot severity Sowing depth					LSD 5%
82	83	84	85	86		2 cm	4 cm	5 cm	6 cm	8 cm	
L	L	L	L	L	4180	0.76	0.41	0.27	0.24	0.13	0.32
L	W	L	W	L	2690	0.79	0.24	0.25	0.13	0.14	
W	L	W	W	L	980	0.17	0.10	0.26	0.15	0.26	
W	W	W	W	L	48	0.16	0.12	0.10	0.06	0.11	
					LSD 5%	0.37					

L = lupin, W = wheat

Rotation 82	83	84	85	86	Brown leaf spot defoliation	*Grain yield (kg/ha)
W	W	W	W	L	6.25	819
W	L	W	W	L	7.64	583
L	W	L	W	L	7.95	118
L	L	L	L	L	> 12**	0
					Sowing depth	
					2 cm	537
					4 cm	538
					5 cm	494
					6 cm	515
					8 cm	449

* Only 1 replicate harvested
** Plants completely destroyed by Brown leaf spot

Comments: The 1:1 lupin-wheat rotation is not viable at this site. Unfavourable texture and poor phosphorus status of the soil predispose lupins to severe brown leaf spot infection. Low temperatures and the short growing season in this area leave the plants unable to compensate for leaf loss due to the disease.

86LG63 - Lupin salvage strategies following severe Pleiochaeta root rot

Personnel: Sweetingham, Stewart

Aim: Determine the effect of Rovral, sowing depth and superphosphate on Pleiochaeta root rot and lupin growth under extreme disease pressure.

Location: Lake Magenta

Soil type: Grey sand

Crop: Lupin (Yandee)

Sowing date: 1/7/86

Establishment: Cone seeder with tines

Seeding rate: 100 kg/ha

Plot size: 1.8 x 40

Results: Deeper sowing decreased root rot and increased yield. Superphosphate slightly decreased root rot. Rovral improved establishment and yield without appearing to decrease disease! Rovral was as effective at half the recommended label rate as at twice the label rate.

	Seedling root rot severity	Plant/m^2 (8/9)	Tap root rotted through (% plants) (10/11)	Final stand density (plants/m^2) (10/11)	Biological yield	Grain yield (kg/ha)
<u>Sowing depth</u>						
2 cm	3.60	32.9	49.6	31.2	3,610	703
5 cm	2.24	36.1	22.9	35.1	4,381	767
LSD 5%	0.18	NS	5.0	2.5	490	
<u>Superphosphate</u>						
0	3.05	33.5	34.7	33.9	3,852	706
75 kg/ha	2.79	35.5	37.8	32.4	4,138	764
LSD 5%	0.18	NS	NS	NS	NS	
<u>Rovral</u>						
0.00 g/kg	2.80	28.9	31.2	24.3	3,566	701
1.25	3.01	34.5	38.1	35.8	4,403	766
2.50	2.94	38.5	37.4	36.3	3,935	757
5.00	2.94	36.0	38.2	36.1	4,077	716
LSD 5%	0.26	4.4	NS	3.5	692	

Comments: Pleiochaeta spore count = 2,872 spores/g (0-10 cm). Spores were distributed deeper into the soil profile than normal due to deep cultivation prior to sowing.

85C63 - Effect of crop rotation on lupin diseases

Aim: To demonstrate the effect of crop rotations and Rovral on the incidence and severity of lupin root and foliar disease.

Location: East Chapman Research Station

Soil type: Yellow loamy sand

Crop: Lupins (Illyarrie)

Sowing date: 16/5/86

Establishment: Direct drilled cone seeder with cultitrash discs

Seeding rate: 80 kg/ha

Plot size: 40 x 1.7

Results:

Rotation 85	85	86	Pleiochaeta (spores/g)	Establishment (16/6) plants/m^2	Root rot severity	Grain yield (kg/ha)
R	L	L	65	28	0.70	1,297
R	W	L	60	26	0.54	1,350
R	R	L	62	26	0.55	1,309
R	M	L	83	26	0.44	1,242
L	L	L	479	29	1.02	1,225
L	W	L	612	25	0.93	1,259
L	R	L	371	27	0.89	1,256
L	M	L	545	26	1.07	1,246
LSD 5%				NS	0.23	NS
Seed treatment						
Nil			-	26	0.80	1,244
Rovral			-	27	1,301	0.74
LSD 5%			NS	NS	NS	NS

86WH14 - Semiselective fungicide drenches for lupin root rots

Aim:	To elucidate the fungi involved in lupin root rot and to determine potential yield loss due to root rot.
Location:	Wongan Hills Research Station (Lupin disease nursery)
Soil type:	Grey-yellow loamy sand
Crop:	Lupins (Yandee)
Sowing date:	20/5/86
Establishment:	Handsown (site disc ploughed)
Seeding rate:	100 seeds/m^2
Plot size:	2 x 1 m
Results:	Rovral and Benlate drenches reduced Pleiochaeta infection, improved emergence and plant growth
Comments:	The response to the fungicide drenches is consistent with the hypothesis that Pleiochaeta is the primary pathogen causing root rot. However, Pythiums and Fusariums could be acting as secondary pathogens.

TREATMENT	ROOT ROT SEVERITY (18/6)	FUNGAL ISOLATION (%) (18/6)				TAP ROOT NODULATION	FINAL ESTABLISHMENT (%)	BIOLOGICAL YIELD	
		PLEIOCHAETA	FUSARIUM	PYTHIUM	RHIZOCTONIA			PER PLOT (G/M^2)	PER PLANT (G)
1. Nil	3.92	92	100	39	0	0.4	22	97	7.0
2. Rovral 20 g/m^2	2.29	3	100	79	0	0.9	87	536	11.2
3. Benlate 20 g/m^2	2.69	20	18	61	0	0.9	97	720	13.4
4. Ridomil 4 g/m^2	3.44	96	100	0	4	0.5	28	92	5.4
5. 2 + 3 + 4	0.64	7	22	0	0	1.1	81	586	13.2
LSD 5%	0.50					0.3	10	149	3.0

86BA49 - Fungicides for lupin hypocotyl rot

Aim:	To evaluate possible fungicide seed treatments for the control of Rhizoctonia hypocotyl rot.
Location:	Badgingarra Research Station
Soil type:	Deep white sand
Crop:	Lupins (Chittick)
Sowing date:	1/7/86
Establishment:	Cone seeder with cultitrash discs
Seeding rate:	150 kg/ha
Plot size:	1.7 x 40 m
Results:	Trial was not harvested because of loss of plants due to severe wind blasting shortly after emergence.

Fungicide	Hypocotyl rot	Root rot	Emergence (plants/m^2)
Nil	0.124	0.98	33.5
Rovral	0.068	0.82	32.6
Benlate	0.126	0.90	34.2
Rizolex	0.050	1.25	32.9
Chloroneb/Captan	0.104	1.20	36.7
Campogran	0.046	0.98	35.7
PP450	0.236	0.84	30.5
	NS	NS	NS

Comments: Hypocotyl rot was less severe at this site in 1986 than in previous years. Campogran and Rizolex may be more likely to give economic control of hypocotyl rot than Rovral if disease levels were higher.

86BA21 - Lupin stand density reduction on white sands

Aim:	To determine the importance of <u>Rhizoctonia</u> hypocotyl rot, Pleiochaeta root rot, non-wetting soil, Simazine toxicity and seeding depth on lupin stand reduction on leached deep white sands.
Location:	Badgingarra Research Station
Soil type:	Deep white sand
Crop:	Lupins (Chittick)
Sowing date:	27/5/86
Establishment:	Hand sown, no cultivation, sprayseed 2 L/ha
Seeding rate:	100 seeds/m^2
Plot size:	2 x 1 m
Experimental design:	Factorial, randomized complete block Factor 1: Nil, Wettasoil (recommended rate) Factor 2: Nil, Rovral 20 g/m^2 Factor 3: Nil, Simazine 4 L/ha Factor 4: Sowing depth 2, 5, 8 cm (hand sown)
Results:	Root and hypocotyl rot levels were much lower than expected and neither disease affected yield. Rovral treatment reduced disease but was obviously phytotoxic at the levels applied. Plants yielded more in the deeper sown plots. Simazine (4 L/ha) reduced emergence and yield. The effect on yield was mainly via plant size rather than stand density. Simazine was more damaging on the deeper sown plants. Surprisingly, plants did not show much leaf scorching damage normally associated with Simazine toxicity. Wettasoil only increased the yield of the deeper sown plants.

Treatment	Seedling stage Root rot	Seedling stage Hypocotyl rot	Maturity Tap root rotted off (%)	Emergence (%)	Final stand density (plants/m^2)	Biological yield (kg/ha)
Nil	1.62	0.06	6.3	84.5	43.6	2,142
Rovral	0.72	0.01	3.6	80.2	40.0	1,369
LSD 5%	0.24	0.02	2.3	NS	NS	419
Nil	1.26	0.04	4.8	80.4	40.2	1,596
Wettasoil	1.07	0.03	5.0	84.3	43.4	1,914
LSD 5%	NS	NS	NS	NS	NS	NS
Nil	1.11	0.03	4.6	87.1	45.9	2,414
Simazine	1.23	0.04	5.3	77.6	37.7	1,097
LSD 5%	NS	NS	NS	4.8	3.4	418
2 cm	1.23	0.01	5.5	87.1	43.9	1,484
5 cm	1.03	0.03	4.7	84.6	41.5	1,337
8 cm	1.25	0.06	4.6	75.4	40.0	2,445
LSD 5%	NS	0.02	NS	6.0	NS	512

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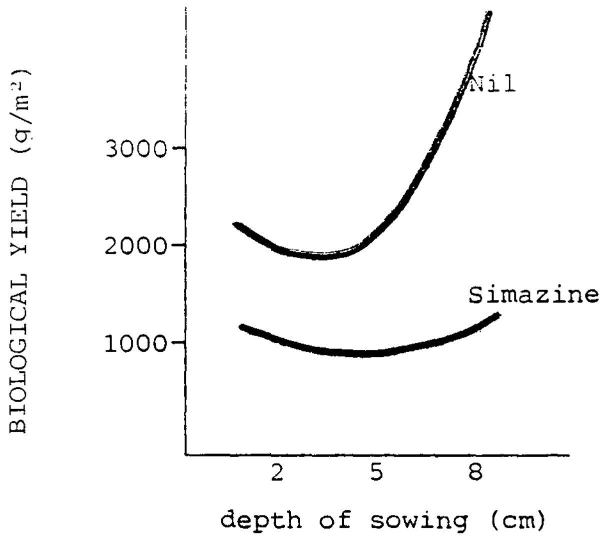
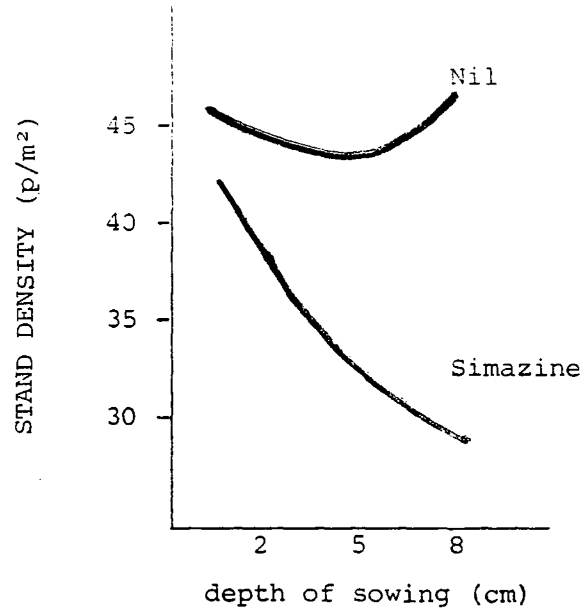
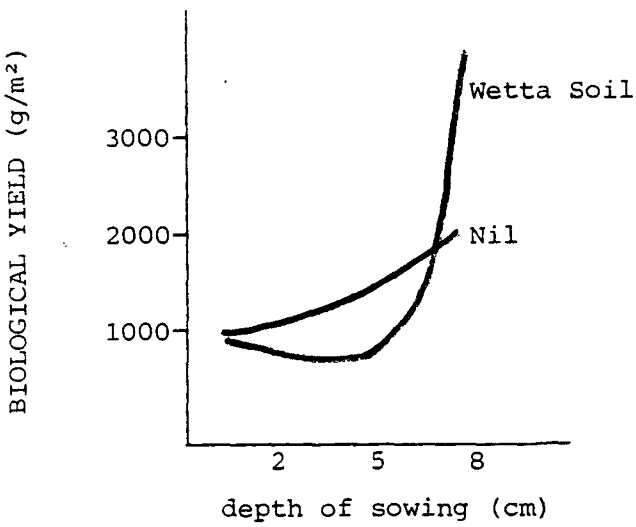

BIOLOGICAL YIELD (g/m²)
3000
2000
1000
Nil
Simazine
2
5
8
depth of sowing (cm)


STAND DENSITY (p/m²)
45
40
35
30
Nil
Simazine
2
5
8
depth of sowing (cm)


BIOLOGICAL YIELD (g/m²)
3000
2000
1000
Wetta Soil
Nil
2
5
8
depth of sowing (cm)

86BA19 - Semi-selective fungicide drenches for wheat root disease

Aim: To estimate the amount of damage being caused by _Rhizoctonia_ and other root pathogens to wheat.

Location: Badgingarra Research Station

Soil type: Deep white sand

Crop: Wheat (Aroona)

Sowing date: 1/7/86

Establishment: Cone seeder with tines. Sprayseed 2 L/ha

Seeding rate: 60 kg/ha

Plot size: 1.4 x 2 m

Results: The Rovral drenches reduced both coleoptile and root rot severity. Rovral reduced _Rhizoctonia_ incidence implicating the role of this group of fungi in root disease at this site.

Treatment	Coleoptile rot	Root rot	Fungal isolations %					
			Pythium		_Fusarium_		_Rhizoctonia_	
			Coleop.	Root	Coleop.	Root	Coleop.	Root
Nil	0.17	0.45	3	33	37	95	1	23
Ridomil	0.23	0.64	0	9	53	84	3	16
Benlate	0.22	0.41	7	35	9	55	0	24
Rovral	0.07	0.28	3	48	64	95	0	5
LSD 5%	NS	0.24	NS	17	23	16	NS	NS

Comments: Trial was severely windblasted preventing the accurate measurement of emergence and yield.

86BA20 - Effect of sowing depth of Rhizoctonia coleoptile rot of wheat

Aim: To determine the effect of seeding depth on colcophile rot (Rhizoctonia) and emergence of wheat.

Location: Badgingarra Research Station (Paddock 1B)

Soil type: Deep white sand

Crop: Wheat (Cranbrook/Aroona)

Sowing date: 2/7/86

Establishment: Scarified, cone seeder with tines

Seeding rate: 60 kg/ha

Plot size: 1.7 x 40 m

Results: Emergence and coleoptile data not collected as trial was severely sandblasted early. Erex reduced subcrown internode length and yield in Cranbrook.

Variety	Seed Treat.	Length subcrown internode (mm)	Subcrown internode lesioning	*Rhizoctonia root rot	Grain yield (kg/ha)
Cranbrook	Nil	27.4	1.11	1.51	644
	Erex	17.3	0.88	1.61	527
Aroona	Nil	24.3	1.18	1.68	513
	Erex	20.9	1.07	1.57	570
	LSD 5%	5.1	NS	NS	106
Depth of Sowing (cm)					
	2	6.3	0.73	1.50	531
	4	14.1	0.76	1.62	538
	6	31.4	1.29	1.61	570
	8	38.1	1.46	1.63	615
	LSD 5%	5.1	0.29	NS	NS

Long-term wheat - pasture rotation trials

Aim: To look at the incidence of Rhizoctonia root rot and the occurence of different strains of Rhizoctonia in different wheat-pasture rotations over a range of soil types and environments.

Results: There appears to be no effect of rotation on Rhizoctonia root disease incidence. 73SG16 (Circle Valley) had the most root rot. 66M29 (Merredin) and 67C13 (Chapman Valley) had negligible disease. There was consistently a higher isolation frequency of binucleate Rhizoctonia spp. (less pathogenic types) from the medics than the wheat.

Rhizoctonia patches were visible at 73SG16 and 67N4 (Newdegate). The frequency of isolation of R. solani from these sites may have been increased by earlier sampling.

Isolates are still to be assigned to zymogram group.

Trial	*Rotation				**Seedling root rot severity	Isolations (%)			
						Lesioned tissue		Healthy tissue	
	83	84	85	86		R. solani	R.sp.	R. solani	R.sp.
68SG5	W	W	W	W	0.51	1.5	13	0.3	9
	M	M	M	W	0.52	1.3	13	0.8	22
	W	W	W	M	0.63	0.0	58	0.5	38
73SG16	M	W	M	W	1.29	0.3	21	0.3	16
	M	M	M	W	1.38	1.3	8	0.5	6
	W	M	M	M	0.80	4.0	33	1.5	34
68E5	W	W	W	W	0.31	0.0	8	1.0	7
	C	W	C	W	0.44	0.0	4	0.0	9
	L	W	L	W	0.29	0.0	19	0.0	11
	C	C	C	C	0.40	1.0	47	0.0	7
	W	C	W	C	0.24	0.0	28	0.0	18
	L	L	L	L	0.37	5.0	17	0.0	3
67N4	W	W	W	W	0.56	4.5	27	0.0	26
	C	W	C	W	0.53	0.5	31	0.0	28
	C	C	C	W	0.84	0.0	27	0.0	27
	W	C	W	C	0.06	-	-	0.0	10
	C	C	W	C	0.03	-	-	0.0	10
78WH2	C	W	C	W	0.45	-	-	0.5	9
	W	C	C	W	0.36	-	-	0.5	6
	C	W	C	C	0.14	-	-	0.0	16
78BA1	C	W	C	W	0.25	-	-	1.5	15
	W	C	C	W	0.26	-	-	2.0	20
	C	W	C	C	0.00	-	-	0.0	56

Trial	*Rotation 83	84	85	86	**Seedling root rot severity	Isolations (%) Lesioned tissue *R. solani*	R.sp.	Healthy tissue *R. solani*	R.sp.
67C13	W	W	W	W	0.23	0.0	11	0.0	5
	C	W	C	W	0.07	0.0	8	0.0	11
	C	C	C	W	0.08	0.0	16	0.0	7
	W	C	W	C	0.41	0.0	18	0.0	16
	C	C	W	C	0.15	0.0	10	0.0	9
66M29	W	W	W	W	0.07	0.0	6	0.0	3
	M	W	M	W	0.14	0.0	20	0.0	6
	M	M	M	W	0.08	0.0	5	0.0	7
	W	M	W	M	0.02	-	-	0.0	55
	M	M	W	M	0.01	-	-	0.0	68

* M = medic, W = wheat, C = subclover, L = lupin.
** Scale of 0 to 3.5

86LG35 - Stubble quantities and lupin establishment

Aim: This trial set up by S. Porrit (DRI) was assessed for Pleiochaeta root rot and Brown leaf spot severity.

Experimental design: Split plot

Main plots: (i) cultitrash
(ii) combine

Sub plots: (i) 0 (t/ha) wheat straw
(ii) 1.5 (t/ha)
(iii) 3 (t/ha)
(iv) 6 (t/ha)

Location: J. West Kondinin

Plot size: 7 m x 7 m

Results: Stubble dramatically reduced Brown leaf spot severity but may have slightly increased root rot by decreasing sowing depth. The combine sown plots had less root rot due to deeper seed placement and also less brown leaf spot.

Seeder	Root rot severity (8/7)	Brown leaf spot severity (0-4)(8/7)
Cultitrash	1.79	1.12
Combine	1.12	0.85
LSD 5%	0.62	0.17
Stubble		
0 t/ha	1.19	1.69
1.5	1.51	1.08
3	1.51	0.80
6	1.61	0.38
LSD 5%	NS	0.34

Comments: For more details see S. Porritts experimental summary.