1977

South west sub.clover root rot 1976 cultivation experiments

M J. Barbetti

DEPARTMENT OF AGRICULTURE

WESTERN AUSTRALIA

1976 Experimental Summary
(January 1977)

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M.J. Barbetti
Plant Pathologist

1. South West sub-clover Root Rot
1975 cultivation experiments

Aim: To investigate the effect of time of cultivation, and nitrogen application, upon the incidence and severity of both tap and lateral root rot of subterranean clover.

Locality: Karridale (76BU1), Manjimup (75MA1), and Walpole (75DE1)

Treatments:

1. No cultivation
2. Cultivation mid-December
3. Cultivation mid-February
4. Cultivation mid-March
5. Cultivation after the break of the season.

Results:

Assessments made in 1975 (reported in the 1975 Experimental Summaries), at Karridale, Manjimup and Walpole showed that nitrogen application had little in the way of consistent effects upon root rot incidence and severity. Cultivation resulted in reduced levels of both tap and lateral root rot in many instances. These cultivation effects were most obvious and consistent at about the end of May. Cultivation just prior to or just after the break of season were the best cultivation treatments.

Based on these 1975 assessments it was concluded that cultivation did appear to show some promise as a means of reducing levels of root rot.

Further assessments were made at the Walpole and Karridale trial sites in 1976, (the Manjimup site having been ploughed under), and these results are shown in the two tables below.

TABLE 1

Showing the effect of treatment on both the mean levels of tap and lateral root rot at the Karridale site (75BU1) on 16/6/76.

	Tap Root Rot (% Plants)			Lateral Root Rot (% Plants)		
	Healthy	Mild	Severe	Healthy	Mild	Severe
Treat effects overall	NS	NS	NS		NS	NS
Treats better than Control at $p < 0.05$	-	-	-		-	-
T1	6.7	66.1	25.4	0	4.3	95.7
T2	21.3	63.2	14.0	0	15.2	84.8
T3	12.5	67.3	19.7	0	3.6	96.4
T4	16.0	52.4	31.3	0	2.2	97.8
T5	10.0	56.3	33.7	0	1.4	98.6

T1 = Control

T2 = Cultivation mid-December

T3 = " mid-February

T4 = " mid-March

T5 = " after break of season.

TABLE 2

Showing the effect of treatments on both the mean levels of tap and lateral root rot at the Walpole site (75DE1) on 16/6/76.

	Tap Root Rot (% Plants)			Lateral Root Rot (% Plants)		
	Healthy	Mild	Severe	Healthy	Mild	Severe
Treat. effects overall	*	NS	*			NS
Treats. better than Control at $p < 0.05$	T5	-	T5			-
T1	4.8	67.7	27.4	0	0	100
T4	6.3	70.2	22.8	0	0	100
T5	22.0	62.5	15.4	0	0	100
LSD	10.62		4.61			

T1 = Control

T4 = Cultivation mid-March

T5 = " after break of season.

Comments:

At the Karridale site none of the cultivation treatments cuased any significant effects on the levels of tap and lateral root rot, Plants in all treatments had high levels of tap and lateral root rot.

At Walpole, cultivation after the break of season resulted in significantly less ($p < 0.05$) plants with severe levels of tap root rot compared to the untreated control but not when compared to the mid-March cultivation. No treatments had any affect upon the levels of lateral root rot. Plants in all plots still showed high levels of tap root rot, and extremely severe levels of lateral root rot.

It would appear from the 1976 assessments made of the 1975 cultivation trials that there is little if any carryover effects of these cultivation treatments beyond the actual year in which they are carried out.

2. South West Sub-clover Root Rot 1976 Cultivation Experiments

Localities: Karridale (75BU11) Walpole (75DE12), and Narrikup (75AL36).

Treatments:

1. Area fallow August to March; March 1976 cultivation and re-seeded.
2. Spring cultivation and sown to oats; March 1976 cultivation and re-seeded.
3. March 1976 cultivation and re-seeded.
4. Control. No treatment.

Assessments:

Three assessments were made at each site. At each assessment 10 random samples of five plants were dug up from each plot, washed, and rated for disease severity on both tap and lateral roots. The tap root, and total dry weights were recorded for the plants from each plot, for the second and third assessments.

Results:

TABLE 1

Showing the effect of treatments (listed below) on both the mean levels of tap and lateral root rot, and the mean dry weights of plant tops and roots, at the Karridale site (75BU11).

	Tap Root Rot (% Plants)			Lateral Root Rot (% Plants)			Plant Dry Wts gm/ plant		
	Healthy	Mild	Severe	Healthy	Mild	Severe	Tops	Roots	Tops/ Roots
3.5.76									
Treat. effects overall	*	NS	*	None	None	None			
Treats > Control at $p < 0.05$	2	-	1,2,3	-	-	-			
Treat 1	19.6	66.8	13.5	92.8		7.2			
Treat 2	28.0	62.4	9.6	94.2		5.8			
Treat 3	15.8	72.1	12.1	96.4		3.6			
Treat 4	13.0	54.8	32.3	89.5		10.5			
LSD $p < 0.05$	7.52	-	11.63						
31.5.76									
Treat. effects overall	***	***	**	No plants	***	***	NS	NS	**
Treats > Control at $p < 0.05$	1,2,3	1,2,3	1,2,3	-	1,2,3	1,2,3			
Treat 1	59.6	34.4	6.0	-	83.1	16.9	0.026	0.012	2.14
Treat 2	69.8	25.9	3.9	-	84.4	15.6	0.025	0.012	2.10
Treat 3	50.5	41.4	8.2	-	66.9	33.2	0.023	0.011	2.18
Treat 4	29.6	50.9	20.0	-	14.2	85.9	0.039	0.014	2.93
LSD $p < 0.05$	6.27	4.95	7.39		18.36				0.393
18.8.76									
Treat. effects overall	***	**		No plants	***	***	***	***	NS
Treats > Control at $p < 0.05$	1,2,3	1,2,3	-	-	1,2,3	1,2,3	1,2,3	1,2,3	
Treat 1	96.3	2.8	0.9	-	79.3	20.7	0.4421	0.1574	2.807
Treat 2	95.5	4.6	0	-	94.3	5.7	0.3828	0.1356	2.819
Treat 3	96.5	2.6	0.9	-	66.9	33.1	0.3274	0.1309	2.490
Treat 4	75.3	15.8	8.9	-	11.0	89.0	0.1096	0.0450	2.512
LSD $p < 0.05$	6.871	6.935	NS			13.502	0.0372	0.0111	

T1 = Area fallow August to March; March cultivation and reseeded.
T2 = Spring cultivation and sown to oats; March cultivation and reseeded.
T3 = March cultivation and reseeded.
T4 = Control. No treatment.

TABLE 2

Showing the effect of treatments (listed below) on both the mean levels of tap and lateral root rot, and the mean dry weights of plant tops and roots, at the Walpole site (75DE12).

	Tap Root Rot (% Plants)			Lateral Root Rot (% Plants)			Plant Dry Wts gm/ plant		
	Healthy	Mild	Severe	Healthy	Mild	Severe	Tops	Roots	Tops/ Roots
4.5.76									
Treat. effects overall	NS	NS	***	None	None	None			
Treats. > Control at $p < 0.05$	-	-	1,2,3	-	-	-			
Treat 1	36.8	60.4	2.9		100.0	0			
Treat 2	52.6	46.0	1.4		100.0	0			
Treat 3	22.3	75.1	2.6		97.9	2.0			
Treat 4	41.9	34.9	23.3		57.9	42.1			
LSD ($p < 0.05$)			7.83						
1.6.76									
Treat. effects overall	***	*	***	No plants	***	***	***	***	NS
Treats. > Control at $p < 0.05$	1,2,3	1,2,3	1,2,3	-	1,2,3	1,2,3			
Treat 1	80.4	16.1	3.5	-	60.6	39.4	0.063	0.022	2.78
Treat 2	92.8	5.2	1.6	-	78.9	21.2	0.106	0.038	2.78
Treat 3	84.8	11.9	3.4	-	62.8	37.2	0.053	0.020	2.67
Treat 4	0	38.8	61.2	-	-	100.0	0.019	0.008	0.027
LSD ($p < 0.05$)	11.95	15.71	13.82		8.20		0.0126	0.0035	
24.8.76									
Treat. effects overall	***	***		No plants	***	***	**	***	NS
Treats. > Control at $p < 0.05$	1,2,3	1,2,3		-	1	1	1,2,3	1,2,3	
Treat 1	86.9	12.7	0.4	-	25.0	75.0	0.4008	0.1439	2.788
Treat 2	82.3	16.2	1.5	-	8.0	92.0	0.4113	0.1456	2.810
Treat 3	85.7	13.4	0.9	-	5.7	94.3	0.2477	0.0951	2.833
Treat 4	46.3	38.8	14.9	-	2.3	97.7	0.1222	0.0350	3.482
LSD ($p < 0.05$)	4.980	4.989	NS			7.039	0.0804	0.0221	

T1 = Area fallow August to March; March cultivation and reseeded.
T2 = Spring cultivation and sown to oats; March cultivation and reseeded.
T3 = March cultivation and reseeded.
T4 = Control. No treatment.

TABLE 3

Showing the effect of treatments (listed below) on both the mean levels of tap and lateral root rot, and the mean dry weights of plant tops and roots, at the Narrikup site (75AL36).

	Tap Root Rot (% plants)			Lateral Root Rot (% plants)			Plant Dry Wts gm/ plant		
	Healthy	Mild	Severe	Healthy	Mild	Severe	Tops	Roots	Tops/ Roots
5.5.76									
Treat. effects overall	*	NS	*	None	None	None			
Treats Control at p 0.05	1,2	-	1,2,3	-	-	-			
Treat 1	47.5	41.0	11.5	97.1		2.9			
Treat 2	64.7	26.2	10.1	100.0		0			
Treat 3	37.5	52.5	10.0	92.5		7.5			
Treat 4	28.5	42.5	29.0	90.8		9.2			
LSD (p 0.05)	14.14		10.34						
2.6.76									
Treat. effects overall	***	**	*	No plants	***	***			
Treats Control at p 0.05	1,2,3	1,2,3	1,2,3	-	1,2,3	1,2,3	NS	NS	NS
Treat 1	79.6	16.4	4.2	-	74.4	25.7	0.104	0.029	3.53
Treat 2	91.2	5.9	2.5	-	82.4	17.6	0.130	0.035	3.68
Treat 3	84.0	10.2	5.9	-	84.5	15.5	0.104	0.029	3.61
Treat 4	36.2	50.6	13.3	-	24.5	75.9	0.083	0.019	4.34
LSD (p 0.05)	12.20	12.42	6.99		9.51				
23.8.76									
Treat. effects overall	NS	NS	NS	No plants	NS	NS	*	**	NS
Treats Control at p 0.05							1,2,3	1,2,3	
Treat 1	69.2	27.4	3.4	-	26.8	73.2	0.4115	0.1370	2.978
Treat 2	75.0	23.6	1.4	-	34.0	66.0	0.3929	0.1469	2.691
Treat 3	69.4	26.9	3.7	-	21.8	78.2	0.2725	0.1004	2.703
Treat 4	64.7	30.9	4.4	-	22.0	78.0	0.1743	0.0575	3.042
LSD (p 0.05)							0.0700	0.0196	

T1 = Area fallow August to March; March cultivation and reseeded.
T2 = Spring cultivation and sown to oats; March cultivation and reseeded.
T3 = March cultivation and reseeded.
T4 = Control. No treatment.

Comments:

The results taken as a whole show that the three treatments applied, viz, leaving an area fallow August to March followed by a March cultivation and re-seeding; spring cultivation and sown to oats followed by a March cultivation and re-seeding; and, just a March cultivation and re-seeding; did reduce the levels of both tap and lateral root rot.

The largest reductions in root rot severity due to application of the treatments appeared to be in relation to levels of lateral root rot rather than tap root rot.

Of the three treatments applied the March cultivation and re-seeding was the least effective.

All treatments resulted in increased top and root weights of plants but overall had no effect on the ratio of tops/roots. It is not known whether these increases in plant top and root weights were correlated or not with reductions in root rot levels.

Except for the Narrikup site, treatment effects appear to have lasted to at least late August.

Although treatments as a whole gave marked reductions in the levels of both tap and lateral root rot, it is important to note that high levels of root rot were still present.

3. White Rust (Albugo) on Rapeseed

Aims: To examine the role of white rust seed infection in disease aetiology and epidemiology, both in an area containing white rust infected trash and in an area deviod of such infected trash.

To attempt to control both leaf and head white rust infections using a mancozeb fungicide as a seed treatment and in various spray schedules.

Sites: Mt Barker Research Station (76MT11) and Denmark Research Station (76D8). White rust infected trash was present near the trial on Mt Barker Research Station but none was known to be present at Denmark Research Station.

Variety: Brassica campestris var Span.

Seeding: End of May/beginning of June.

Harvest: Only the Mt Barker trial was harvested.

Treatments:

1. Low seed infection.
2. " " " + 2% Manzate 200 seed treatment.
3. " " " + 300 g/ha Manzate 200 spray 4 weeks after emergence.
4. " " " + 300 g/ha Manzate 200 spray 8 weeks after emergence.
5. " " " + 300 g/ha Manzate 200 spray 4 weeks after emergence, and repeated 8 weeks after emergence.
6. High seed infection
7. " " " + 2% Manzate 200 seed treatment.
8. " " " + 300 g/ha Manzate 200 spray 4 weeks after emergence.
9. " " " + 300 g/ha Manzate 200 spray 8 weeks after emergence.
10. " " " + 300 g/ha Manzate 200 spray 4 weeks after emergence, and repeated 8 weeks after emergence.

The low seed infection seed was from a 1975 crop in the Albany area that had $<$ 1% of plants with white rust stagheads at maturity. High seed infection seed was from a 1975 crop in the Mt Barker area that had 80% of plants with white rust stagheads.

Assessment:

Trials were inspected at end of June, mid July, late July, mid August, and late September for levels of white rust leaf infection. Assessments on the levels of white rust stagheads were made in early October.

Results:

Table 1 - Showing the percentage of plants with white rust leaf infection, for both sites, for the assessment dates shown.

Time of assessment	% plant with white rust leaf infection	
	Mt Barker RS	Denmark RS
End June	0	0
Mid July	trace	0
Late July	trace	0
Mid August	50	0
Late September	100	50
Early October	leaves fallen	leaves fallen

Table 2 - Showing the white rust staghead counts per 10 m of plot row, in early October, for both sites. Figures shown represent an average of 4 replications.

Treatment	Staghead counts per 10 m plot	
	Mt Barker RS	Denmark RS
1. Low seed infection	117	44
2. Low seed infection + seed treat (Manzate 200)	122	78
3. Low seed infection + early spray (Manzate 200)	125	44
4. Low seed infection + late spray	97	74
5. Low seed infection + early & late sprays	92	28
6. High seed infection	153	34
7. High seed infection + seed treat.	143	54
8. High seed infection + early spray	122	40
9. High seed infection + late spray	128	56
10. High seed infection + early & late sprays	139	40

Table 3 - Showing the harvest yeilds in kg per plot (60 m x 2.68 m) for the treatments shown, at Mt Barker.

	Treatments									
	1	2	3	4	5	6	7	8	9	10
Yields	6.5	6.8	7.0	6.9	6.1	6.6	6.6	6.7	6.5	6.4

Comments:

Analysis of results showed that mancozeb, either as a seed treatment or as a spray, is ineffective for control of both leaf and head white rust infections. This is despite research done in both Canada and West Pakistan which showed that mancozeb was one of the most active of known chemicals against Albugo.

Analysis showed that there were no individual treatment effects at either site. However, at the Mt Barker site the high seed infection plots overall had a greater ($p < 0.01$) number of stagheads per 10 m of plot (137), compared to the low seed infection plots overall (111).

The greater number of stagheads at Mt Barker Research Station compared to Denmark Research may have been due to the earlier appearance of the disease at Mt Barker, but may equally be due to differences in the conditions at the time of infection at the two sites.

The results neither proved nor disproved the importance of seed infection as a source of spreading white rust into new rape growing areas, but the Mt Barker results suggest that it may play some role.

There was a much earlier build up of white rust leaf infection at the Mt Barker site, where infected trash was present.

No explanation can be made for the disease appearance at Denmark Research Station. It may have been directly the infected seed but this is unlikely as the disease appeared so late in the season and also because there were no differences between plots of high and low seed infection. It is possible that the white rust spread from early systemic head infections which inturn came from infected seeds. The possibility of the disease at Denmark starting from some form of contamination (e.g. in vehicles) can not be ruled out.

Harvest yeilds were not analysed but no effects or differences were apparent.