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# Pasture species investigations - wheat belt (May, 1975)

N. R. McKeown

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## Recommended Citation

McKeown, N R. (1974), *Pasture species investigations - wheat belt (May, 1975)*. Department of Agriculture and Food, Western Australia, Perth. Report.

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DEPARTMENT OF AGRICULTURE

PLANT RESEARCH DIVISION

SUMMARY REPORT

Pasture Species Investigations

Wheat Belt

(May, 1975)

N.R. McKEOWN

CONTENTS

Results from trials comparing the growth and persistence of a number of annual pasture legumes are presented in this report. Rainfall conditions during the year are described briefly and a table of annual and growing season rainfall at relevant centres is appended.

The experiments are grouped as follows according to average annual rainfall:-

Zone A - Average annual rainfall > 400 mm

Zone B - Average annual rainfall 345 - 400 mm

Zone C - Average annual rainfall < 345 mm

and then, further, on soil type.

District Rainfall, 1974.

District	Annual Rainfall			May - Oct. Rainfall		
	1974	Mean	Dep. from Mean	1974	Mean	Dep. from Mean
	mm	mm	%	mm	mm	%
North Coastal	487	407	+20	382	321	+ 16
Central Coastal	919	875	+ 5	781	751	+ 4
North Central	454	366	+24	309	271	+ 12
South Central	501	444	+13	361	322	+ 11

The above table is a good indication of pasture conditions in the wheat belt in 1974. An early close to the dry weather, in some districts early in April, followed generally by useful rains until October, gave excellent conditions for pasture growth for the second consecutive year. In species trials, the early break to the season encouraged the growth of grasses and capeweed and the season favoured the later maturing cultivars.

Zone A - Average Annual Rainfall > 400 mm.A. 1 - Deep Grey Sand

No. 71LG16

Title: Serradella and Lupin Pilot Trial on Deep Sand.

Locality: Kukerin (A.V. Power).  
Average annual rainfall: 423 mm  
Growing season : 5.5 months

Soil: Grey siliceous sand to a depth of at least one metre. Surface pH about 5.0.

Vegetation: Not recorded.

History: Early history not known. Old grazing land. Veldt grass (Ehrharta calycina) was the only useful, exotic species persisting.

Fertilizer: Initial application in 1971 of 247 kg/ha plain superphosphate plus copper, zinc and molybdenum; 2472 kg/ha ground limestone; 123 kg/ha muriate of potash. Superphosphate (202 kg/ha) and potash were applied annually.

Design: (a) 5 early strains of serradella and 2 strains of lupins sown in a randomized block replicated six times.  
(b) 4 strains of Eragrostis curvula and one of E. Lehmanniana sown in 1972 in a randomized block replicated four times. This trial was located adjacent to (a) above; plot size on the two trials was 4.1 square metres.

Results:(a) Serradella.

This experiment, officially concluded in 1972, was visited on several occasions and rated twice. The ratings are not presented here because, although most of the plants were healthy, cover was sparse and productivity was low. Ratings gave low mean scores with only minor differences between Uniserra and the earlier maturing cultivars M20, M22, M34 and M54. There was also evidence of seed transfer by stock, ants and surface water between plots and growth on any plot could have been a mixture rather than a pure stand.

No more observations will be made on this trial.

(b) Eragrostis

Only two plants of Eragrostis survived and developed on this trial, indicating that suitable weather conditions for early growth in spring, followed at least by normal summer rains are essential to establish this species. Risk of failure on deep sands would be high in a short spring season followed by a dry summer. If increased plantings of the grass were ever seriously contemplated, more comparisons of time of planting should be made. No further work will be done with Eragrostis on this site.

Observations on Experiment No. 71LG15

A legume species trial with three rates of potash was sown close to the 71LG16 site in 1971. Germination was very poor and the trial was sown again in 1972. There was little improvement from the second sowing and the trial was abandoned.

In 1973 it was noticed that the Uniserra serradella plots had improved and could be identified quite easily on the site. The early opening and good rainfall in 1974 further encouraged the growth of the serradella, and by September the potash treated plots had developed into useful pastures.

Serradella Ratings (0-5)for Cover and Growth

Plot No.	Rate of potash kg/ha	Rating (0-5)
1	0	1.0
24	0	1.0
5	63	2.0
26	63	2.5
16	126	5.0
25	126	4.5
9	251	4.0
30	251	4.0

The effect of the old potash dressings was very obvious in 1974 and emphasized the need for adequate continuous moisture for useful growth of annuals on the deep sand. It is assumed that there was a carryover of hard seed from 1971 and 1972, increased slightly by seed set in 1973, and together this seed produced the greatly improved growth in 1974.

Serradella was not the only species which benefited from the good season. Patches of cupped clover and Geraldton were well distributed through the paddock. Veldt grass, which had grown in spaced tussocks since before 1971, was thriving. In this good season the need for better plant nutrition was evident, but so also was the interdependence of fertilizer additions and rainfall in getting economic returns from this type of country.

A. 2 - Grey-brown Sand or Sandy Clay

No. 74KA3

Title: Legume Species Trial

Locality: Katanning (D. Hore)  
Average annual rainfall 490 mm  
Growing season 6 months

Soil: A. Grey-brown sandy clay overlying clay  
B. Grey-brown sand overlying clay

History: Cleared about 60 years. Superphosphate used regularly and about 1 tonne/ha applied in the last ten years. The whole farm at one time sown to Dwalganup subterranean clover.

Design: 9 cultivars sown in a randomized block, replicated 3 times.  
The experiment was sown on 2 sites: A, heavy soil and B, light soil, in the same paddock.

Results:

Sowing of this trial was delayed by late arrival of seed in Perth. Heavy rain in late May - early June flooded site A which could not then be seeded until June 17. On July 4, all cultivars except Yamina cupped clover had germinated satisfactorily.

When visited on August 27, site A was not worth rating. There was evidence of severe, continuous waterlogging and Dwalganup, Daliak and Yarloop sub. clovers were the only surviving cultivars. The plots were grassy and the legumes unthrifty, with no plant more than 7 cm in height.

Site B was slightly better, though still disappointing. The plots were reasonably free from weeds, but Yarloop was the only cultivar which had grown at all well.

Growth and Cover Rating, 27/8/74Site B

Cultivar	Rating, 0 - 5
Yarloop	5
Geraldton	3.5
Daliak	3.2
Dwalganup	2.8
Cyprus	2.0
Harbinger	1.8
M. polymorpha	1.7
Jemalong	1.5
Yamina	0

The above ratings are strictly relative.

It is intended to repeat this experiment in 1975.

Zone B - Average Annual Rainfall 345 - 400 mm.B.1 - Deep Yellow Sand

No. 70TS2

Title: Legume Species TrialLocality: East Marchagee (K. Barker).  
Annual average rainfall: 356 mm  
Growing season : 4 monthsSoil: Deep yellow sandHistory: Geraldton sub. clover pasture followed by crop in 1968 and 1969.  
Trial seeded May 1970.  
Early applications of fertilizer not known.  
Trial planted with 202 kg/ha No. 2 Mix Cu-Zn-Mo superphosphate.  
1971 -1973 inclusive, 135 kg/ha plain super.Design: Randomized block with two replications.  
Plot size: 2.11 x 20.12 metres.Results:

It was reported previously that the soil at this site was well suited to the growth of subterranean clover and that none of the alternative legumes had developed into a useful pasture. Plots 1, 2 and 3 formed a dense block of clover and it was thought that Northam A and Geraldton had mixed and spread between plots. To test this, seed sampled from plots early in 1974 was grown out and the seedlings identified:

Yield and Botanical Composition of Sub. Clover Seed

Plot No.	Sown cultivar	Seedlings in mixture(%)		Seed 26/2/74 kg/ha
		Sown cv.	Geraldton	
1	Northam A	70.8	28.2	203
2	Geraldton	97.5	97.5	193
3	Uniwager	7.9	84.8	248
9	Uniwager	27.3	75.2	53
10	Geraldton	98.3	98.3	56
14	Northam A	51.7	48.3	132

Seed Yields of Other Cultivars and Volunteer Geraldton

Cultivar	Seed yields kg/ha		
	Sown cv.	Geraldton	Total
Harbinger	0.9	68.9	69.8
Tornafield	18.8	75.6	94.4
Pitman serr.	0	53.9	53.9
Uniserra	18.5	30.3	48.8
Kondinin rose	10.3	7.7	18.0



The tables indicate that there was no movement of Northam A into other plots but that Geraldton increased markedly in plots 1, 3, 9 and 14, presumably from seed set in the 1967 pasture. Few Geraldton plants were noticeable either as a contaminant in the plots or in the adjacent paddock in 1971. Subsequently a good clover pasture developed in the paddock, and it is obvious that Geraldton also competed effectively in the plots. There could have been some migration between plots, but a Geraldton content of 48.3% in plot 14 is unlikely to have arisen in this way.

No more observations will be made on this experiment.

B.2 - Deep Yellow Sand

No. 72TS5

Title: Legume Species Trial

Locality: Arrino (R. Gundill)  
Average annual rainfall: 393 mm  
Growing season : 3.75 months

Soil: Deep yellow sand

Vegetation: Blackboy and prickly bush.

History: Cleared 1956-57.  
Last cropped 1969 and has received 4 bags superphosphate, also copper, zinc and molybdenum.  
1972: 202 kg/ha No. 1 Mix super. with muriate of potash cross strips at 44.8 and 89.6 kg/ha.  
1973 and 1974: 202 kg/ha plain super.

Design: 11 legume cultivars sown in a randomized block, replicated twice.  
Sub-plot size, 2.11 metres x 10.12 metres.

Results:Seedling Density 1973 & 1974

Cultivar	Seedlings/m <sup>2</sup>			
	Not grazed		Grazed	
	31/5/73	19/6/74	31/5/73	19/6/74
Geraldton	121	922	29	107
Uniwager	91	553	33	5
Northam A	101	525	4	72
Daliak	74	411	29	114
Harbinger	24	184	23	47
Uniserra	19	57	29	10
Olympus rose	21	312	23	35
Tornafield	23	142	12	33
Yamina cupped	19	369	15	37
Sirint rose	6	156	10	5
Pitman serra.	0	0	2	0
Means	45	330	19	42

This area, west of Arrino, may not have experienced the continuity of effective soil moisture which prevailed in most districts in 1974. When plants were counted in June, grass and capeweed were plentiful but pasture legumes were backward and stressed for moisture. There was plenty of ungerminated seed on the soil surface.

The plots were mown in June and by August the legume content had improved appreciably. Like the 70TS2 site at Marchagee, this is a sub. clover soil and not suited to either Tornafield or Harbinger medic. Olympus rose clover, Yamina cupped clover and Uniserra serradella have persisted well but have not been as productive as sub. clover.

Growth and Cover Ratings, 28/8/74

Cultivar	Cover (0-5)		Growth (0-5)		Total (20)
	Ungrazed	Grazed	Ungrazed	Grazed	
Geraldton	3.8	3.0	3.0	2.5	12.3
Uniwager	1.8	2.0	1.5	2.0	7.3
Northam A	3.5	2.0	2.8	2.0	10.3
Daliak	3.3	1.8	3.3	1.8	10.2
Harbinger	0	1.0	0	1.0	2.0
Uniserra	2.8	1.5	2.0	2.0	8.3
Olympus rose	4.0	0.5	3.5	0.5	8.5
Tornafield	0.3	0.5	0.8	0.5	2.1
Yamina	3.0	0.2	3.0	0.3	6.5
Sirint rose	2.3	0	2.5	0	4.8
Pitman serra	0.3	0.3	0.2	0.2	1.0
Means	2.3	1.2	2.1	1.2	

The results for seedling regeneration, cover and growth, all indicate a depressing effect from grazing. The grazed sections of the plots were open to paddocksheep but the plots were not selectively grazed. Nevertheless, it can be seen that grazing reduced production from rose and cupped clovers more than it did from sub. clover.

Dry Matter and Seed Yields, 20/12/73

Cultivar	Dry matter (kg/ha)		Seed (kg/ha)	
	Grazed	Ungrazed	Grazed	Ungrazed
Geraldton	2800	3933	206	291
Daliak	2510	4289	54	231
Uniwager	2659	3352	94	225
Northam A	2379	3746	30	154
Uniserra	n.a.	3324	n.a.	316
Olympus rose	n.a.	3652	n.a.	246
Sirint rose	n.a.	2388	n.a.	83
Yamina	n.a.	3558	n.a.	113
Tornafield	2154	3512	35	28 <sup>+</sup>
Harbinger	2201	3465	22	4 <sup>+</sup>
Pitman serra.	n.a.	3137	n.a.	18

n.a. = not sampled, insufficient growth.

<sup>+</sup> seed from only one plot, the worst of the two.

It is noticeable in the above table that grazing had a relatively minor effect on Geraldton.

It is hoped that this trial can be continued for a number of years to follow the performance of the sub. clovers.

B. 3 - Grey Sand

No. 70NA3

Title: Pasture Species Establishment Trial.

Locality: Tincurrin (H. Easton & Son).  
 Average annual rainfall: 381 mm  
 Growing season 5.5 months

Soil: Grey sand overlying gravel at 46 - 76 cm.

Vegetation: Banksia scrub, with whitegum on adjoining better soils.

History: A range of suitable legumes and Eragrostis curvula were originally sown on this site, with a cover crop of cereal rye, in 1970. All the legumes failed to establish, but the Eragrostis grew well. In 1972 an adjacent site was cultivated and given a basal dressing of 224 kg/ha superphosphate No. 1 Mix. Ammonium nitrate at 157 kg/ha was applied at seeding. Seven legume cultivars and Eragrostis were sown (a) without additional fertilizer (b) with potash (c) with lime (d) with lime and potash. Potash was applied annually at 112 kg/ha. Treatments were sown in a randomized block replicated twice. Plot size was 4.1 square metres. Early in 1973, the 6 old plots of Eragrostis were mowed and 30 metres of each plot marked off in 10-metre sections, A, B and C. Ammonium nitrate was applied to these sections at 40, 20 and 20 kg/ha respectively in the autumn. Section B was dressed with 20 kg again in the spring. Sheep had access to the plots and one metre<sup>2</sup> cage was placed on each plot section. Super. and nitrogen were applied at the same rates in 1974.

Results:(a) Legumes

In 1974 the legume species trial was disappointing. In July, the Box' strain of lupin was growing vigorously, flowering and setting pods. None of the other cultivars had regenerated into anything approaching a pasture and most were represented by individual plants. Serradella, which had promised well in 1972, was not robust; rose and cupped clovers were quite good, and Geraldton sub., where it grew, was healthy. Growth had not improved much by September, but there was a massive growth of lupins and it was noticed that other legumes were growing better where they were protected by lupins.

Seed Yields, 11/12/73

Cultivars	Seed yields kg/ha				
	Super	+ K	+Ca	K+Ca	Mean
Box' lupin	341	837	362	784	581
Pitman serra.	30	410	56	449	236
Uniserra	5.2	404	55	268	183
Yamina cupped	15	157	2.3	103	69
Olympus rose	2.0	101	0	96	50
Tornafield	0	0	2.8	14	4.2
Geraldton	0	0	0	0	0
Mean (first 5)	78.6	381.8	95.6	342.8	

The need to apply potash to this deep sand is obvious, but it might be possible to reduce the annual amount of 112 kg/ha. In relation to soil conservation it has been shown that lupins, serradella and Eragrostis could be developed into a useful pasture. Once established, this pasture could be expected to carry sufficient sheep to defray the cost of fertilizer. It is stressed that such treatment is suggested to safeguard sands already in use; not for further development.

(b) Eragrostis

A cage was placed in each of the four sections of 3 plots of Eragrostis on December 12, 1973. The quadrat areas were sampled on 20/5/74 but variability was so high that samples from the nitrogen treatments were pooled to give a mean yield per plot. Three more plots were trimmed and caged in May, and growth from May 20 to October 1 is shown below:

Eragrostis Dry Matter Yields

Plot No.	Dry matter kg/ha					Mean
	12/12/73 to 20/5/74	20/5/74 to 1/10/74				
		Ammonium nitrate kg/ha				
		20 July	20 July & Sep.	40 Sep.	0	
1	473	494	293	170	525	371
2	869	1204	695	602	232	683
3	802	926	926	695	664	803
4	-	2192	633	941	556	1081
5	-	926	2624	756	324	1158
6	-	695	664	262	633	564
Mean		1073	973	571	489	

Growth of Eragrostis appears to be limited by low temperatures in winter and lack of moisture in summer. Further observations will be made to determine whether there is any response to time or rate of nitrogen application.

B. 4 - Grey Sand Over Yellow Sand

No. 71TS22

Title: Pasture Legume Species Trial

Locality: Three Springs (R. Redford)  
Average annual rainfall 393 mm  
Growing season 3.75 months

Soil: 20 cm grey sand overlying yellow sand to a depth of 1 metre.

Vegetation: Blackbutt and low scrub.

History: Cleared 1964. Wheat with 202 kg/ha plain super in 1965. Oats and Wimmera ryegrass with 101 kg/ha plain super in 1966. No clover sown. Experiment sown 24-28 May, 1971, with 230 kg/ha No. 1 Mix super and potash strips of 43 and 87 kg/ha. Plain super at 202 kg/ha in 1972 and 1973.

Design: Randomized block with three replications. Plot size, 2.11 metres x 20.12 metres.

Results:

Seedling Density and Cover and GrowthRatings

Cultivars	19/6/74	28/8/74		
	Seedlings per m <sup>2</sup>	Cover (0-5)	Growth (0-5)	Total (10)
Harbinger	246	2.7	3.2	5.9
Pitman serra.	198	3.3	3.0	6.3
Tornafield	173	4.2	4.0	8.2
Uniserra	129	2.8	2.8	5.6
Daliak	79	0.8	1.7	2.5
Hykon rose	27	1.8	2.5	4.3
Lupin, sandplain	23	3.5	4.0	7.5

Seedlings were not as dense as in 1973 but were sufficient to give a good cover on most treatments. The results shown are for the protected section of the plots; the grazed section was sown to wheat with the adjoining paddock.

Tornafield held its position as the best cultivar on this site. The serradellas and Harbinger medic were only a little less productive than Tornafield. Lupins grew strongly, and any of the cultivars mentioned would make a good commercial pasture. Daliak has persisted but is not productive, and it is doubtful whether any strain of sub. clover would grow as well initially on these soils as the alternative species.

Seed and Dry Matter Yields, 1972 & 1973

Cultivar	Seed kg/ha	Dry matter kg/ha		Seed kg/ha	
	22/11/72	26/2/74		26/2/74	
	Gr.	Gr.	Ungr. <sup>++</sup>	Gr.	Ungr.
Lupins	n.a.	0	4307 <sup>++</sup>	0	734
Pitman serra.	n.a.	1935	4931	197	795
Uniserra	122	1561	2996	44	601
Tornafield	310	1124	3964	130	201
Hykon rose	n.a.	1061	3184	2.7	193
Daliak	26	1498	2965	1.7	43
Harbinger	87	811	3121	8.7	29

Gr. = Grazed

Ungr. = Ungrazed

<sup>+</sup> Plots were grazed hard by flock sheep and cultivars other than those shown were not worth sampling.

<sup>++</sup> Coarse stems not included.

This experiment will be terminated at the end of 1975.

B. 5 - Clay Loam

No. 74N03

Title: Pasture Legume Species Trial

Locality: Wyalkatchem (Witney Bros.)  
Average annual rainfall 333 mm  
Growing season 4 months

Soil: 30 cm clay loam overlying loamy gravel.

Vegetation: Tamma, sheoak and wodgil.

History: Not known before 1972, when sown to oats and barley with 35 kg/ha superphosphate. Pasture in 1973 with 130 kg/ha super; 100 kg/ha super applied in 1974. Geraldton and Northam A sub. clovers and Tornafield and Harbinger medics sown alone and as a mixture in this experiment in 1974.

Design: Randomized block with 3 replications.

Results:

This trial was planted under good conditions on May 22, 1974. The soil surface was dry to about 3 cm but good rain fell shortly after planting. On July 22 none of the legumes was thriving particularly well, and all were severely affected by red-legged earthmite. In mid-September the plots were grassy but the sub. clovers were growing quite well. There was no trace of the medics.

Cover and Growth Rating, 11/9/74

Cultivar	Replications			Mean
	1	2	3	
Geraldton	4	4	4	4
Northam A	4	4.5	3	3.8
Tornafield	0	0	0	0
Harbinger	0	0	0	0
Mixture	2	2	1.5	1.8

Harbinger and Tornafield medics were included in this trial because it was planned for light soil. Nevertheless, the complete failure of the two cultivars was unexpected. The soil is suited to subterranean clover and a good stand of Geraldton, and cupped and rose clover was growing nearby. It is considered that the inferior cover of Northam A compared with Geraldton can be attributed to low quality seed (all that was available). On the other hand, the growth of the two cultivars was equally good.



Zone C - Average Annual Rainfall 345 mm.

C. 1 - Wodgil (Yellow Sand Over Gravel)

No. 70ME4

Title: Legume Species Trial

Locality: Walgoolan (P. Wahlsten)  
Average annual rainfall: 305 mm  
Growing season : 3.5 months

Soil: Yellow sand overlying gravel at depth from  
30.5 cm to 45.8 cm.  
Soil pH: Surface, 0 - 8 cm, 5.6; 8 -15 cm, 5.0.

Vegetation: Wodgil

History: Previous application of 695 kg/ha super.,  
plus trace elements.  
Scarified and worked back, early May 1970.  
Treatments seeded May 20 with seed at 27 kg/ha  
and Hyfos fertilizer at 101 kg/ha.  
Topdressed with 202 kg/ha plain super annually  
from 1971 to 1974.

Design: 6 subterranean clover cultivars sown alone  
and also in equal proportions with Geraldton.  
Randomized blocks with 3 replications. Plot  
size, 2.11 metres x 80.48 metres. The main  
plots were subdivided into two sections, A  
and B. Section A was grazed continuously  
during the growing season and section B was  
grazed heavily at intervals to control growth.  
Section C was sown to wheat in 1971. Uncontrolled  
grazing in the summer of 1971 damaged sections  
A and C too much for further useful measurement.  
From 1971 growth on section B was controlled  
by mowing.

Results: Dry Matter Yields and Botanical Composition  
7/8/74

Cultivars	Dry matter kg/ha		Composition (%)			1973 Seed kg/ha
	Total	Legume	Legume	Grass	Capeweed	
Geraldton	4463	1727	38.7	25.8	35.5	46.1
Daglish	4399	1403	31.9	28.8	39.3	51.3
Uniwager	3906	1230	31.5	16.7	51.8	19.4
Northam A	4431	1644	37.1	23.0	39.9	42.9
Mt. Helena A	4667	1274	27.3	19.7	53.0	40.2
Shenton Pk. A	4747	2263	48.5	22.2	29.3	67.7
Ger. + Dag.	4723	2144	45.4	25.5	29.1	37.1
Ger. + Uni.	4496	1439	32.0	35.6	32.4	48.7
Ger. + Nor. A	4198	1473	35.1	23.6	41.3	20.3
Ger. + Mt.H.A	4029	1422	35.3	26.3	38.4	37.3
Ger. + S.P.A.	4093	1805	44.1	17.1	38.8	33.1

The legume content of the pastures was shown to be exceptionally good for fifth year treatments which had not been grazed since 1972. The Northam A and Geraldton plots, mowed once in each growing season, have maintained very similar composition to the same treatments in 70ME2 under hard continuous grazing.

This is one of the few trials in which Shenton Park A has grown and persisted well.

Samples of seed harvested from plots sown to 50:50 mixtures of Geraldton and a test cultivar were planted out and the seedlings identified. The results of earlier tests are shown for comparison.

Percentage Seed Composition

Test cultivar	Block A		Block B					
	11/4/72		1/12/71		28/11/72		3/4/74	
	Ger.	Test	Ger.	Test	Ger.	Test	Ger.	Test
Northam A	47.3	52.7	39.9	60.1	31.9	67.2	45.6	54.4
Mt. Helena A	61.3	38.7	54.5	45.5	64.2	35.5	56.8	43.2
Shenton Pk. A	61.5	38.5	32.2	67.8	52.5	47.1	60.0	40.0
Daglish	85.8	14.2	83.4	16.6	94.8	4.1	51.7	48.3
Uniwager	89.7	10.3	81.3	18.7	92.2	6.1	93.6	3.4
Mean	69.1	30.9	58.3	41.7	67.1	32.0	61.5	37.9

In 1974 the seed was harvested after early rains, some of it had germinated, and this may have impaired the accuracy of the results. Nevertheless, the tendency of Geraldton to maintain dominance in this environment is still evident.

C. 2 - Loamy Sand Over Clay

No. 72LG3

Title: Legume Species Trial

Locality: Lake King (I. Smith)  
Average annual rainfall: 348 mm  
Growing season : 4.0 months

Soil: Grey loamy sand over clay. pH, 7.3 surface;  
9.1 at 7.6 cm depth.

Vegetation: Mallee scrub

History: First crop in 1970; sown with 336 kg/ha No. 1  
Mix superphosphate. 336 kg/ha plain super  
sown with cultivars on May 11, 1972.  
Topdressed with 202 kg/ha plain super 1973, 1974.

Design: 12 cultivars sown in a randomized block  
replicated twice. Plot size, 2.11 metres x  
30.2 metres. Plots fenced in half and one  
half grazed and the other mowed.

Results:

This experiment was rated by the Lake Grace District Office on July 25. Sown legumes were reported to have dominated volunteer species; medics were up to 30 cm in height and sub. clovers, 24 cm.

Growth and Cover Rating, 25/7/74

Cultivar	Cover (C) (0 - 10)		Growth (G) (0 - 10)		C + G (0 - 20)	
	Gr.	Ungr.	Gr.	Ungr.	Gr.	Ungr.
Dwalganup	5.0	7.5	8.0	8.0	13.0	15.5
Daliak	8.5	8.5	9.0	7.5	17.5	16.0
Geraldton	9.0	8.5	8.0	7.5	17.0	16.0
Northam A	8.5	9.0	9.0	9.0	17.5	18.0
Cyprus	4.5	8.0	5.0	7.0	9.5	15.0
Borong	6.5	7.0	8.0	8.0	14.5	15.0
Jemalong	7.0	7.5	7.0	6.0	14.0	13.5
Harbinger	7.5	7.0	7.5	7.0	15.0	14.0
Paragosa	3.0	4.5	5.5	6.0	8.5	10.5
Tornafield	5.0	8.0	7.0	8.0	12.0	16.0
Olympus	5.5	6.0	7.0	7.5	12.5	13.5
Yamina	4.0	5.5	3.5	6.0	7.5	11.5
Mean	6.2	7.3	7.0	7.3	13.2	14.6

Gr. = Grazed 1973 but not grazed 1974.  
Ungr. = Never grazed.

Yields of Dry Matter, 21/8/74 andSeed, 1973

Cultivar	Dry matter kg/ha	Botanical composition(%)			Seed kg/ha	
		Legume	Grass	Weeds	13/3/74 Gr.	Ungr.
Dwalganup	8267	93	7	0	42	97
Geraldton	7942	85	15	0	114	111
Northam A	7765	82	15	3	67	44
Daliak	7696	78	22	0	78	94
Olympus	6823	82	18	0	228	147
Tornafield	6806	100	0	0	208	395
Yamina	6800	65	35	0	74	168
Borong	6531	100	0	0	88	114
Cyprus	6243	100	0	0	150	531
Paragosa	6210	60	38	2	70	109
Harbinger	5892	100	0	0	127	195
Jemalong	5685	95	5	0	70	109

Germination counts were not made in 1974 because in early winter the plots were under water. Estimates of dry matter yield and botanical composition were only made on the ungrazed section of the trial because the grazed section had been planted to crop.

This is one of the few legume species trials where all the cultivars have grown well, and some better than others. On many trials no species grow particularly well - and some fail to grow at all. The dry matter yields of all treatments on 72LG3 in 1974 were rather phenomenal, and some of them were virtually pure legume stands.

This trial was planted on fairly alkaline soil to compare the performance of the medics. It is interesting to note that in a year like 1974 the sub. clovers still managed to stay ahead.

This trial will be continued to measure the persistence of the cultivars and their relative production in dry years.

SUMMARY

The early break, with good rainfall continuing through most of the growing season, provided optimal conditions for most wheat belt trials. These conditions were in direct contrast to the dry years of the late 1960's and early 1970's.

In 1974, legume growth on droughty deep sands should have been at its best. Serradella responded at Kukerin in direct relationship with earlier heavy dressings of potash. West of Three Springs, serradella and Tornafield medic stayed a little ahead of Harbinger medic and well ahead of Daliak sub. clover and rose clover. On deep sands at Marchagee and Arrino, subterranean clover was the only species worth considering.

The failure of Eragrostis curvula to persist through the dry 1973-74 summer after good germination in late winter, indicates a need for more work on the establishment of this grass on deep sands. The low yields of dry matter at Tincurrin do not offer much incentive for such work, but Eragrostis, lupins and serradella probably give the best chance of pasturing the grossly infertile, erodable sands.

Under favourable conditions, Geraldton sub. clover continued to show its versatility and aggressiveness. On an alkaline loamy sand at Lake King, waterlogged for periods during the winter, Dwalganup, Geraldton and Northam A produced more dry matter than a wide range of other pasture legumes. At Walgoolan, Geraldton maintained better than 50% content in mixtures with other sub. clover cultivars sown in 1970, while in a trial at Marchagee there was evidence of gradual, aggressive regeneration of Geraldton from a sparse pasture sown before the trial.

Only two new legume species trials were planted in 1974, and these were not successful. Trial 74KA3, east of Katanning, demonstrated the need for timely planting. Had seed been available on time, the trial would have been planted before the onset of heavy rains and would have given better results. The failure of Tornafield and Harbinger on 74NO3 should not weight the record unduly against these medics; they have never excelled on clay loams, and they were sorely harassed by red-legged earthmite. The medics will not be replanted, but Northam A and Geraldton will be observed in 1975.

Annual Rainfall at Centres Near Experiments(1974 and Average)

Centre	Rainfall (mm)			
	May - October		Total Annual	
	1974	Avge	1974	Avge
Katanning	445	370	548	490
Kukerin	350	292	495	418
Lake Grace	366	250	n.a.	359
Lake King	238	233	n.a.	348
Moorra	415	374	522	462
Three Springs	317	302	n.a.	396
Walgoolan	237	206	n.a.	297
Wickepin	378	324	558	419
Wyalkatchem	281	238	370	333