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Cultivar evaluation in high rainfall areas

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DEPARTMENT OF AGRICULTURE

Western Australia



EXPERIMENTAL SUMMARY 1977

D.J. Gillespie
Plant Research Division

1. CULTIVAR EVALUATION IN HIGH RAINFALL AREAS

Trikkala Evaluation Trial (76 MT3/2698 Ex)

A joint trial with D.A. Nicholas.

The trial's aim is to compare the competitive ability under grazing of Trikkala and Yarloop clover on a waterlogged new land site. The competitive ability to be measured in the presence and absence of clover scorch. (Kabatiella caulivora). Plots were established having different proportions of Yarloop/Trikkala - see Table 1. Establishment of the trial took place in 1976 with an actual seeding rate in the pure plots of 66 kg/ha and 50 kg/ha germinable seed for Yarloop and Trikkala respectively. Good growth in late 1976 resulted in high seed yields being produced. The Trikkala set considerably more seed than Yarloop (average 48% higher in pure plots.) After germination in 1977 the amount of seed remaining was measured and amounted to 70% and 42% of original seed for Trikkala and Yarloop respectively.

At germination in 1977 plant density was fair on the pure Trikkala plots but very poor on the pure Yarloop and Yarloop dominant plots. The plots are individually grazed (three dry ewes/plot) and sheep had to be removed from the trial in mid May 1977, primarily due to the poor growth of Yarloop - low plant density. Growth on the pure Trikkala plots was satisfactory during winter but the Yarloop plots didn't recover until mid August. Following a flash grazing in late August stock were returned to all plots by mid September.

TRIKKALA EVALUATION TRIAL

SEED SET 1976/77

TABLE 1

Plot	SEED SET kg/ha			% above Ground	Residual* Hard Seed	%Residual Hard Seed	Plant Density May 1977 (Plants/ Sq.metre)
	Above Ground	Below Ground	Total				
					<u>kg/ha</u>		
100% Trikkala Scorch	637	424	1061	60%	716	67%	913
No Scorch	872	299	1171	74%	857	73%	969
36% Trikkala Scorch	464	217	681	68%	457	67%	296
No Scorch	718	476	1194	60%	810	68%	721
16% Trikkala Scorch	447	222	669	67%	282	42%	383
No Scorch	513	257	770	67%	440	57%	378
12% Trikkala Scorch	550	174	724	76%	377	52%	370
No Scorch	636	340	976	65%	567	58%	424

TABLE 1 (Continued)

Plot	SEED SET kg/ha			% above Ground	Residual* Hard Seed	%Residual Hard Seed	Plant Density May 1977 (Plants/ Sq.metre)
	Above Ground	Below Ground	Total				
					<u>kg/ha</u>		
8% Trikkala Scorch	288	140	428	67%	235	55%	170
No Scorch	615	243	858	72%	455	53%	131
4% Trikkala Scorch	321	191	512	63%	279	54%	410
No Scorch	647	215	862	75%	485	56%	291
100% Yarloop Scorch	423	274	697	61%	285	41%	335
No Scorch	580	234	814	71%	343	42%	229
AVERAGE SCORCH	447	235	682	66%	376	55%	411
NO SCORCH	654	295	949	69%	565	60%	449

* RESIDUAL HARD SEED MEASURED IN MAY 1977 AFTER GERMINATION.

CULTIVAR EVALUATION TRIALS

Six large field trials were established in 1977 to evaluate the performance under grazing of cultivars previously identified as being resistant or tolerant of clover scorch (*Kabatiella caulivora*) and/or root rot (*Pythium* and *Fusarium* spp.). All trials were sown into old pastures that were badly deteriorated and had very low levels of clover.

Spring production figures for three of the trials are given in Table 2. No yield figures for the three Esperance sites were taken because of drought.

TABLE 2

DRY MATTER PRODUCTION (kg/ha) IN 7 WEEKS SPRING 1977

Cultivar	Trial Site		
	Karridale*	Denmark(Dry Land)	Denmark(Wet)
39327YB	4748	2543	3539
Larisa	4509	2371	2632
Trikkala	3773	1747	1849
Esperance	3799	1743	1434
Dinninup	4221	1273	1803
Mt Barker	4151	1076	1432
Woogenellup	4184	1104	1097
Yarloop	3836	1322	1028

* Little clover scorch or root rot at this site this year.

All four new cultivars have out performed the commercial varieties in the Denmark trials. 39327YB, a very late maturing Yanninicum fully resistant to clover scorch and tolerant of root rot, has been outstanding in both winter and spring production.

2. PASTURE DETERIORATION

Field Experiments

Three trials established in 1975 to determine whether various cultivation techniques could control root rot and subsequent pasture deterioration have now concluded.

The differences in clover density, botanical composition, and root rot levels that were present in the first year (1976) were almost completely eliminated at all sites by the second year. In almost every case the control plots had higher clover density, higher clover yield and higher total sward yield than any of the treatments (see Table 3). This occurred even though the control plots had slightly higher root rot levels at two of the three sites.

TABLE 3

CULTIVATION TRIALS - 1977 PLANT DENSITY AND DRY MATTER PRODUCTION (7 WEEKS)

TREATMENT	CLOVER DENISITY(PLANTS/SQ METRE)			SPRING DRY MATTER YIELD(kg/ha)			
	Karridale	Walpole	Narrikup		Karridale	Walpole	Narrikup
1.Spring spray then Autumn reseeding	81	629	773	Clover	33	210	380
				Other	253	682	1014
				Total	286	892	1395
2.Spring oat crop & Autumn reseeding	66	764	903	Clover	32	462	272
				Other	270	591	1112
				Total	302	1050	1385
3.Autumn Cultivation & dry reseeding	83	938	826	Clover	41	256	328
				Other	361	607	1075
				Total	402	864	1403
4. Control	425	1182	829	Clover	163	580	331
				Other	535	582	1073
				Total	698	1163	1405

The conclusion is that any benefits to pasture productivity resulting from cultivation and reseeding along the south coast are only short term gains.

Phytotron Experiments

Several experiments were conducted during 1977 to screen clover selections and crossbreds for susceptibility to root rot. It was possible for the first time to screen crossbred lines from parents previously identified as having some degree of root rot tolerance. In particular, crosses with Guildford D and Nangeela as parents have shown a very high level of root rot resistance. Of nine selections tested the average disease index was 32% (Range 22% (3 lines) - 45%), and plant survival averaged 94% (Range 82 - 100%). Other promising lines were DAW 12.2 (Daliak x Woogenellup) with a disease index of 21% and 97% survival and 70088B a vigorous yanninicum from Turkey (Disease Index 18%, survival 100%).

TABLE 4

Susceptibility of sub clover varieties to root rot infection after four weeks growth.

Variety	% Survival	Disease Index (%)
Daliak	92	35
Dinninup	70	45
Woogenellup	67	63
Larisa	26	81
Trikkala	54	67
Yarloop	67	55
Mt Barker	78	41
Esperance	74	51
39327 YB	89	33
GD 17(AV of 4)	95	32
GD 56(AV of 4)	94	30
DAW 12.2	97	21
HND 7.4	92	25
DMN 16.1	93	25
70088B	100	18

* 100% all plants dead

0% No plant death or root rot

3. LUCERNE PRODUCTIVITY & PERSISTENCE

Lucerne plant density has dropped steadily over the last four years for all varieties when rotationally grazed with sheep at Esperance. Average density is now only 8.0 plants per square metre and productivity is low. Denmat and Aragon have the lowest density while Hunter River and CPI 16601 have the highest. (see Table 5).

In the adjoining cattle trial plant density for all varieties **is** about **double** that of the sheep trial. This trial is set stocked. Lucerne growth is also considerably better than in the sheep trial, with all varieties except Cancreep producing similar yields. In a similar cattle trial at Albany, Hunter River has performed the best and Denmat the worst in terms of dry matter production.

TABLE 5

Lucerne Productivity and Persistence

	TRIAL	DATE	VARIETY							
			Demnat	Aragon	CPI 16601	Siro Peruvian	Paravivo	Cancreep	Hunter River	H.R. + Daliak
PLANT DENSITY (Plants per Square Metre)	74E3 Sheep	Oct. 74	24.1	19.7	21.4	24.6	24.1	18.9	15.7	19.2
		May 75	8.8	14.1	19.1	14.1	13.3	5.9	13.9	9.6
		Feb. 76	14.2	12.1	12.8	15.3	16.5	11.6	9.8	12.8
		Mar. 77	8.3	9.9	11.8	13.2	13.8	10.3	10.2	13.8
		Feb. 78	4.6	6.2	9.6	6.5	7.7	7.7	9.6	12.3
	74E4 Cattle	Oct. 74	-	-	-	33.1	27.7	20.8	23.9	22.1
		May 75	-	-	-	17.2	17.2	15.8	15.4	14.6
		Feb. 76	-	-	-	25.1	18.1	20.6	21.9	16.9
		Mar. 77	-	-	-	19.0	17.7	20.3	18.0	15.9
		Feb. 78	-	-	-	12.5	17.8	14.9	20.8	16.3
DRY MATTER YIELD (kg/ha) 6 weeks growth	74E3 Sheep	Sept 75	186	215	226	306	289	108	151	144
		Jan. 76	693	767	730	1050	836	925	754	850
		Sept 76	403	471	459	566	485	362	342	478
		Mar. 77	54	57	75	52	72	42	45	61
		Aug. 77	150	135	227	311	345	132	317	297
	74E4 Cattle	Sept 75	-	-	-	665	621	572	482	675
		Jan. 76	-	-	-	470	633	813	618	669
		Sept 76	-	-	-	705	902	667	631	766
		Mar. 77	-	-	-	79	131	77	94	78
		Aug. 77	-	-	-	501	504	375	593	621
	75AL30 Cattle	Oct. 76	80	-	-	209	151	286	333	268*
		Nov. 76	88	-	-	195	244	370	460	325*
		Sept. 77	144	-	-	506	382	404	751	716

* No Daliak sown at Green Range

4. EFFECTS OF SALINE IRRIGATION WATER ON PASTURE PRODUCTION

During the 1976/77 irrigation season the effects on pasture production of water from the Wellington (850mg/l of salt) and Stirling (260 mg/l) Dams was measured for the third year.

Results were similar to previous years and no detrimental effects of using water from Wellington Dam were recorded.

TABLE 6 Pasture Yield and Clover Chloride Concentration

Cutting Date	Treatment	PASTURE YIELD kg/ha				Growth Rate kg/ha/day	Clover Chloride (%)
		Clover	Paspalum	Kikuyu	Total		
14/12/76	Stirling	1062	294	480	1837	68.0	2.99
	Wellington	1330	307	289	1926	71.4	3.65
10/1/77	Stirling	1572	428	518	2518	93.3	2.97
	Wellington	1558	362	289	2209	81.8	3.59
8/2/77	Stirling	732	315	503	1550	53.4	3.41
	Wellington	722	234	355	1311	45.2	4.32
15/3/77	Stirling	477	754	639	1869	53.4	4.42
	Wellington	556	616	716	1888	53.9	3.96
20/4/77	Stirling	289	285	332	906	25.2	2.78
	Wellington	373	208	360	941	26.1	2.65
SEASONS TOTAL	Stirling	4132	2076	2472	8680	56.4	3.31
	Wellington	4539	1727	2009	8275	53.7	3.63