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Evaluation of Pastures Species

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PLANT RESEARCH DIVISION

SUMMARIES OF EXPERIMENTAL RESULTS,
1969 GROWING SEASON

G. WALTON

EVALUATION OF PASTURES SPECIES

SUMMARY OF RESULTS FROM THE EXPERIMENTAL PROGRAMME FOR THE
1969 SEASON

The 1969/70 Experimental Programme was the evaluation of pasture species, which includes both introductory evaluation in small plots and evaluation of the most promising pastures under the influence of grazing animals.

GRAZING TRIALS

The continuation of the evaluation of Uniwager and Daliak subclovers in two series of trials:

Series 2 (medium rainfall)	68TS12 (Eneabba)
(2575Ex)	68NA15 (Bullaring)
	68LG17 (East Pingrup)
Series 3 (low rainfall)	68GE9 (Gutha)
(2576Ex)	68MO24 (Kirwin)
	68ME13 (Nokaning)

The comparison of Tornafield medic with suitable subclovers (2709Ex); 69MO17 (Watheroo) and 69LG24 (Lake Grace).

The continuation of the legume species grazing trial 66LG11 (Lake Grace) (2225Ex) and the legume species grazing management trial 68MO23 (Moora) (2393Ex).

Low Oestrogen Species Grazing Trials:

Series 2:

The comparison of agronomic performance and animal performance of Daliak subclover with Dwalganup and Geraldton subclovers. (Seaton Park subclover replaced Geraldton at Eneabba). No replication at any one site and the grazing pressure is 2 ewes per acre for the three trials.

Germination Count (Plants per sq. meter) - June 1969

	Daliak	Dwalganup	Geraldton	Seaton Pk	Yamina Cherleri
Eneabba	253	264		342	
Bullaring	1600	1670	1297		
Pingrup	360.25	255.5	408		21.5

The Eneabba site was skim ploughed in an attempt to knock back the regrowth and poison weeds. During 1969 the continued presence of poison on the site has prevented the experimental animals from being placed on the plots.

Pasture growth at Bullaring and Pingrup was very poor and as a consequence no pasture sampling was undertaken at Pingrup. Yamina cherleri was non-existent.

Pasture Productivity under the cages - Bullaring 2/10/69

	gms DM/M ²	Seed Yield (lb/ac)	% Cultivar	Ratio Foliage : Burr
Daliak	155.4	0.52	89	37.0 : 1
Dwalganup	224.1	0.55	93	32.6 : 1
Geraldton	105.5	0.99	91	15.3 : 1

The plots were sampled for seed yields in December 1969 and again early March 1970, after considerable cyclonic rains.

Seed Yields (Kgm seed per Hectare)

	Daliak		Dwalganup		Geraldton	
	Dec	Mar	Dec	Mar	Dec	Mar
Bullaring	118.6	26.6	*	78.65	127.96	16.50
Pingrup	81.77	34.1	84.27	25.1	144.19	48.7

* Missing sample

From these seed yields, it is obvious that a very high percentage of seed germinated following the rains in February. It is considered that sufficient seed remains for a reasonable regeneration at the commencement of the season.

The experimental sheep (2-tooth hoggets) were placed onto the Bullaring plots on 22nd May at 63 lbs body-weight average.

	22/5	2/12	Remarks
Daliak	62.6	99.5	No handfeeding was necessary
Dwalganup	63.2	97.9	Sheep removed for mating
Geraldton	62.9	91.7	during February 1970

At shearing:- Daliak = 1.2 lbs G.F.W./head above Geraldton
 Dwalganup = 0.6 " " " "
 Geraldton = 0

At Pingrup, the sheep were placed on the plots on 18th April at 54 lbs bodyweight average:

	18/4	27/10	Remarks
Daliak	53.8	80.4	Handfeeding commenced 6th June
Dwalganup	54.0	81.3	and discontinued 10th July.
Geraldton	54.1	72.1	Sheep removed from cherleri
Yamina ch.	54.0	73.2	plot 18th August; From other
			plots 19th September.

Mating was to have commenced on all sites during February, this was done with the Pingrup trial, but due to farmer's error was not done up until April at Bullaring. Attempting to get the farmer to mate the animals during April 1970.

Series 3:

The comparison of Uniwager subclover with Geraldton subclover and Beenong cherleri on the basis of the agronomic and animal performances. No replication at any site and the grazing pressure is $1\frac{1}{2}$ ewes per acre.

Germination Count (plants per sq. meter) - June 1969

	Uniwager	Geraldton	B. cherleri
Gutha	2,362	2,241	619 *
Kirwan	2,426	2,082	869
Nokaning	976	1,254	681 **

* Germination and nodulation very poor

** Poor germination count, due to lack of adequate opening rain.

No pasture samples were taken during the season because of the extremely poor productivity on all plots.

Seed Yields (Kgms seed/Hectare) in Dec. 1969 and March 1970

	Uniwager		Geraldton		B. cherleri	
	Dec	March	Dec	March	Dec	March
Gutha	No	data	available	yet		
Kirwan	27.47	2.62	24.34	20.22	65.54	2.62
Nokaning	1.56	0.75	24.97	9.74	8.74	0.37
Probable Germination 1970	(plants per square meter)					
Kirwan		48		286.8		77
Nokaning		15		123		11.6

Each plot was very bare due to wind erosion, and at Merredin, it was estimated that $\frac{1}{2}$ inch of topsoil was lost.

The experimental sheep, 2 tooth hogget ewes were placed onto the plots during April 1969 at $1\frac{1}{2}$ sheep per acre.

		10/4	1/10	Remarks
Gutha:	Uniwager	75.2 lbs	96.2 lbs	Handfeeding?
	Geraldton	75.0	99.16	
	B. cherleri	75.2	93.8	
Kirwan:	Uniwager	16/4	14/10	Sheep removed from plots in Oct, and running with farmer's flock
	Geraldton	24.9 kgms	42.5 kgms	
	B. cherleri	25.3	40.1	
Nokaning:	Uniwager	22/4	14/11	Sheep removed from plots in Nov. & running with farmer's flock
	Geraldton	26.6 kgms	44.7 kgms	
	B. cherleri	26.6	41.5	

The average bodyweight of animals grazing the Uniwager plots is slightly higher at Kirwan and Nokaning, although the Geraldton plot gives the best bodyweight at Gutha. One possible cause may be that the less amount of foliage produced from Uniwager compared to Geraldton (as observed in field), created a slower soil moisture loss and the Uniwager remained greener for a longer period. The differences in bodyweight would not be significant.

The animals were commenced to mate during February at Kirwan and Nokaning. No information has been received from Gutha.

Tornafield Medic Comparisons: (Watheroo and Lake Grace)

The comparison of agronomic and animal performance of Tornafield Medic with Daliak and Dwalganup subclovers, at two grazing pressures; 2 and 2½ wethers per acre.

Selected two sites, both predominately yellow sand to depth (i.e. greater than 12 inches) where subclover does not persist particularly well. Soil pH ranges from 6.1 at the surface to 6.8 at 6 inches depth.

Scott Bros. Watheroo; deep yellow sand to loamy sand carrying native pine vegetation. Gravel formation at 4 feet depth.

T. Griffin, Lake Grace; coarse yellow sand overlying gravel at 6 to 12 inches depth carrying Mallee vegetation. Plots seeded 30th April, with the subclovers and medic double seeded at 7½ lbs. seed per acre. The Watheroo trial was seeded on 6th May, the subclovers at 12 lbs. per acre and the medic at 10 lbs per acre.

Germination Count (plants per sq. meter) - July 1969

	Watheroo *	Lake Grace
Tornafield	97.8	131.8
Daliak	114.4	108.0
Dwalganup	117.8	122.5

* Some sandblast of seedlings and poor nodulation of subclovers.

Percent Seeding Emergence Compared with Number of Seeds Sown:-

	Tornafield	Daliak	Dwalganup
Watheroo	37%	53%	47.1%
Lake Grace	36.5	40	39.5
Percent germination of seed used.	90	79	?

The early plant growth of Tornafield was far superior to Dwalganup (next best) and Daliak. Two months after seeding, the Tornafield plants were at 6 to 12 trifoliolate leaf stage compared to the 2 to 5 trifoliolate leaves of subclovers. On observation, Tornafield was two to three times better in growth and cover than the subs. Daliak subclover showed a lot of nodulation problems at Watheroo. Trouble with caterpillar infestation at Watheroo as well. Seed yield results (December 1969) are not yet available.

Legume Species Grazing Trial (Lake Grace)

Comparison of six pasture treatments (Cyprus B. medic, Geraldton subclover, Kondinin rose clover, Yamina cherleri, a mixture of those four and volunteer pasture) under two grazing pressures, $1\frac{1}{2}$ and 2 dry ewes per acre. Agronomic performance and animal performance per acre are the parameters.

From the commencement of this trial (1966), Barley grass has been the major pasture component in all treatments. In 1968 and 1969 the grazing pressure was increased during the growing season to $2\frac{1}{2}$ and $3\frac{1}{2}$ dry ewes per acre, in an effort to reduce the barley grass component.

% Botanical Composition (Sept. 1968).

	Mean
Geraldton :	55%
Kondinin :	35
Yamina :	5
Cyprus :	(Frost affected, majority of plants killed off in August)
Mixture :	Ger 19 Kon 25 Yam 4
Volunteer :	Barley grass 70 Woolly clover 30

Pasture production (grazed area) - Sept. 1968

	$2\frac{1}{2}$	$3\frac{1}{2}$ sh/ac	
Geraldton	46.7 cwt/ac	41.2 cwt/ac*	*NB: Approx. 60% of pasture production is Barley grass.
Kondinin	46.8	35.7	
Yamina	35.4	36.6	
Mixture	38.0	53.5	
Volunteer	42.7	33.1	

The plots were observed during June and July 1969 and it was noted that pasture production was very poor on all plots, with very little difference between them. It was estimated that only 2 cwts. dry matter per acre had been produced under the cages. The only treatment effect appears to be stocking rate, where the heaviest rate has completely bared the paddocks. By September, when the sheep were removed from the plot, all pastures had been consumed.

Mean Pasture Productivity (lbs/acre) after 5 mths growth under Cages - Sampled 1/10/69

	Yield	Grass%	Pasture Composition %	
			Woolly Clover	Legume
Cyprus	468.9	90	-	10
Geraldton	558.8	97	-	3
Kondinin	480.9	96	-	4
Yamina	511.2	98	-	2
Mixture	402.0	(Medic >	Ger >	others)
Volunteer	463.5	100		

It was interesting to note the ecological change within the volunteer pasture brought about by the increased grazing pressure from $1\frac{1}{2}$ and 2, to $2\frac{1}{2}$ and $3\frac{1}{2}$ sh/ac.

	1967	June 1968	August 1968
Barley grass	85%	80%	40%
Woolly clover	15	20	60

Equally interesting was the result that after 5 months without grazing, during 1969, the barley grass component again repressed the Woolly clover into a negligible component of the pastures.

After two poor seasons (1968 and 1969) for seed production, it was thought worthwhile to check on the pasture regeneration (from old seeds) this season. After the cyclonic rains in February, a pasture seedling count was conducted:

		<u>Mean No. plants per sq. meter</u>
Cyprus		2,409.7
Geraldton		3,736.0
Kondinin		812.6
Yamina		376.7
Mixture	Cyp	748.0
	Ger	1,342.8
	Kond	148.0
	Yamina	266.4

It would seem that Cyprus B. medic and Geraldton subclover were successful competitors against the infestation of barley grass within the conditions of the trial. Certainly far better adapted to these conditions than Kondinin rose clover or Yamina cherleri.

During the 1969 season, the sheep bodyweights fell from March (range of 101 to 105 lbs) to August (range from 82 to 90 lbs). The sheep were removed from all plots in September. The volunteer pastures and the Yamina cherleri pastures gave the heaviest liveweight per head (overall) from March to June. Then the sheep on volunteer pastures dropped suddenly in bodyweight to finish second lowest in August. No real difference separated the legume species pastures in animal liveweight per head when they were taken off the trial.

1969 was the end of the first pasture phase of this trial. The area is to be cropped during 1970.

Legume Species Grazing Management Trial (Moora)

The comparison of animal performance per acre of several pasture species and management regimes at four levels of grazing pressure. The pasture treatments are:-

- Geraldton subclover and Yellow serradella mix (seeded at 5 lbs/acre each)
- H.R. lucerne (seeded at 4 lbs/ac)
- Mixture of Geraldton, Serradella and lucerne, Sandplain lupins and Sweet (alkaloid-free) sandplain lupins (seeded at 15 lbs/ac).

Grazing management treatments:

Annual pastures, set stocked
 Annual pastures, 4 paddock rotational grazing
 Lucerne " " " "

Lupins used as special summer standing feed.
 (i.e. after the subclover has matured, the sheep are removed from them and placed into the lupin subplot (25% of plot area) for summer feed).

Grazing pressures; 1.5, 2, 2.5 and 3 sheep per acre.

1969 produced a reasonable germination of the annual pastures, with excellent dense sandplain lupin plots. The sweet sandplain lupins were quite dense, but not as productive as the sandplain lupins. The loss of the alkaloid also appears to manifest a loss in growth.

Plant count (plants per sq. meter) - 9/7/1969

Lucerne treatment	23.2	76%*
Serradella (with Geraldton mix)	15.6	
Lucerne (in mixture)	7.8	80%*

* Percent loss of viable lucerne plants during the 1968/69 summer.

The lucerne and lupin pastures made tremendous growth during 1969, sporadic rainfalls during spring and summer has allowed the lucerne to maintain growth. The annual pastures were obviously below possible production but except for the early maturing were adequate for animal production.

Some problem was encountered with black Aphids on the sweet lupins (for the second year) and Climbing Cutworms on all lupins.

With the poor start to the season, and a delay in fencing the plots, the grazing treatments were deferred until the 19th August. When the sheep were allocated onto the plots, the grazing pressure was reduced (as a descension to the season) to 0.9, 1.2, 1.5 and 1.8 wethers per acre.

Mean Animal liveweights (kgs per head)

	29/9/69	25/11/69*	21/1/70
Sub+Serra.(set stocked)	46.8	48.8	47.8
Sub+Serra.(rotation)	42.3	44.2	44.2
Lucerne -(rotation)	46.0	50.5	56.3
Luc.+Sub+Serra (rotation)	45.5	52.4	53.2
Sub.+Serra & Sandplain lupins	44.5	47.1 *	46.8
Sub+Serra & Sweet " lupins	43.8	45.8 *	48.4
Lucerne & Sandplain lupin	45.0	49.8 *	49.3

* The sheep were put into the lupin subplots, 25/11/69, and were removed, after the cyclonic rains on 4/2/1970.

There is strong evidence of lupinosis in the animals on the lupin pastures. Two sheep have died from diagnosed lupinosis and severe bodyweight losses have shown up during February and March. Blood samples taken on 11th February, showed L.D.H. values two to four times

higher than normal in those sheep grazing lupins, indicating liver tissue breakdown. These sheep have been handfed from March onwards.

Shearing took place at the end of March, and preliminary fleeceweights showed the lucerne treatments shearing 11.5 lbs G.F.W. per head as against approximately 8 lbs G.F.W. per head for the other treatments. These yields are for 8 months fleece growth.

Pasture Species Evaluation

All legume species trials seeded in 1969 in the wheatbelt region showed extremely low germination figures. What did germinate, suffered from nodulation problems which appeared widespread. As a result, none of the new legume species evaluation trials were considered worthy of close investigation after the germination count was taken. The summary presented now, is derived from observations and some figures on the trials seeded in 1968 and continuing in 1969. The report is very brief since a complete summary will follow when all seed yields have been calculated.

ZONE A (Average rainfall exceeds 16 inches)

The early growth showed Kondinin rose, French serradella and Jemalong medic as the best with Lake Claremont and Dwalganup subclovers figuring prominently as well. The trials were located at Dandaragan (sand over gravel), Moora (yellow loamy sand) and Badgingarra.

ZONE B (Average annual rainfall between 13½ to 16 inches)

Early growth and germination showed Yellow serradella, Kondinin rose, Dwalganup and Harbinger to be the best. However, by August, the early maturity of Daglish and Geraldton subclovers indicated that they would set more seed than any other species or cultivar. Harbinger medic, on Wodgil sand at Bullaring did very well. Lake Claremont and Shenton Park A subclovers performed well. Generally rose clover and cherleri performed poorly.

At Eradu, on the sandplain of that name, the medics (Harbinger, Cyprus and Tornafield) performed the best, particularly Tornafield with respect to maintaining green production under moisture stress. Dwalganup, Lake Claremont and Shenton Park A subclovers did well in early growth ratings.

ZONE C (Average annual rainfall less than 13½ inches)

At Corinthian, Geraldton was outperforming Northam A and W.A. Serradella. The cherleri and rose clover performances were poor. At Perenjori, the order of performance was Dwalganup - Mt. Helena A - Geraldton, Shenton Park A, Lake Claremont and Daglish subclovers.

At Mt. Madden, the site exerted a large influence upon cultivar performance, so while medics performed the best at Hogen's (grey sandy loam), the subclovers at Pingelly's (yellow sandy loam over gravel) gave the best performance. These subclovers were Dinninup, Seaton Park and Mulwala, however one cannot expect that these cultivars would be the best later on in the season.

It is obvious from the above that the summary is not complete. The seed yield data must be obtained for any reliable information about the influence the drought had on the new cultivars' performance. This information will be presented in a more detailed summary, on each trial, in the future.