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## Serradella line evaluation — stage 2

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EXPERIMENTAL SUMMARIES

(1987)

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**SERRADELLA LINE EVALUATION - STAGE 2 85AL55/4985 EX**  
(Continuing Trial)

**AIM:** To evaluate 23 promising serradella lines in terms of herbage and seed production and regenerative ability.

**TRAIL SITE:** D. Egan, South Stirlings.

**DESIGN:** Randomised Block.

**SOIL TYPE:** Coarse grey-white sand 30 cm deep over lateritic base.  
pH (CaCl<sub>2</sub>) 0- 5 cm - 4.70.  
5-10 cm - 4.23.

**FERTILIZER:** 200 kg/ha superphosphate topdressed May 1987.  
100 kg/ha super/potash 3:1 spread September 1, 1987.

**RESULTS:**

Line	Visual Ranking Mean 8/10/87	Rank	Seed Yield Jan '88	Mean Rank
1. DP 6	29.0	11***	595	6
2. MC 1	29.5	10	508	10
3. MC 2	40.5	3	741	2
4. M 115	32.0	6	384	13
5. Uniserra	29.0	11***	323	17
6. M 167	20.5	16	329	16
7. GM 065.2	30.0	9	564	7
8. GT 046	23.0	15	269	19
9. CPI 47250 (Tauro)	31.0	7**	501	11
10. GM 016	25.0	13	609	5
11. GM 107	14.5	20	410	12
12. GM 134.1	9.5	22	38	22
13. GM 034	19.0	17	114	21
14. GM 065.1	14.0	21	230	20
15. GT 047.1	37.5	4*	747	1
16. Pitman	31.0	7**	518	9
17. CPI 47251	18.5	18	377	14
18. CPI 50774	24.5	14	345	15
19. CPI 50484	17.5	19	316	18
20. 65 046.1	42.5	1	727	3
21. CP 019	37.5	4*	688	4
22. CP 52.1	41.0	2	526	8
23. 47261	5.0	23	10	23

Visual ranking is based on a arbitrary scale and is dependent on growth and density characteristics of each individual line.

**SEED YIELDS:** kg clean seed.

**THIRD YEAR ASSESSMENT:**

After three years there are large differences in the persistence and productivity of lines in this trial. The later maturing lines have surprisingly been prominent in a shorter season environment, and with very dry springs over the last two years. However, MC2 has performed very well both visually and in terms of seed production and appears a likely Uniserra replacement.

Several later maturing varieties were outstanding, particularly GS 046.1 and GT 047.1. Other promising varieties include GP 019 and CP 52.1. The pinnatus and perpusillus lines are obviously not suited to this environment and comprise a small proportion of the third year sward.

# SERRADELLA LINE EVALUATION - STAGE 3 85AL56/4985 EX

(Continuing Trial)

**AIM:** To evaluate five promising lines selected from variety trials, on a large plot scale, in terms of herbage, seed production and regenerative ability.

**TRIAL SITE:** D. Johnson, South Stirlings.

**DESIGN:** Randomised Block.

**SOIL TYPE:** Deep grey-white sand.  
pH (CaCl<sub>2</sub>) 0- 5 cm - 4.75.  
5-10 cm - 4.29.

**FERTILIZER:** Topdress 200 kg/ha at break.  
Topdress 100 kg/ha September 1, 1987.

## RESULTS:

Line	Visual Rating			Mean Seed Yield (kg/ha)
	8/10/88	16/11/87	7/12/87	
1. O. Compressus DP6	27.0	26.0	27.5	235
2. O. Compressus Uniserra	25.0	19.5	17.5	127
3. O. Compressus M167	26.0	17.5	20.5	275
4. O. Compressus Tauro	19.5	24.0	26.5	264
5. O. Pinnatus GM134.1	15.5	19.5	16.0	48
6. O. Perpusillus GMO34	9.5	15.0	7.5	164
7. O. Compressus Pitman	31.5	19.5	25.0	219
8. Mixture	28.0	24.0	24.0	202

Visual ranking is based on an arbitrary scale and is dependent on growth and density characteristics of each individual line.

**THIRD YEAR ASSESSMENT:**

After periods of heavy stocking pressures during the year, the serradella's as a whole have persisted well on this deep sandy site. Several interesting points arise after the third year of the trial:

- i) the previous marked superiority of Tauro has been much reduced, possibly due to the run of dry seasons.
- ii) the poor performance of Uniserra in suited environs, whereas Pitman has performed reasonably in an environment to which it is not targeted.
- iii) the virtual elimination of Pinnafus from the trial area and only a marginally better performance from Perpusillus.

EVALUATION OF LEGUME PASTURES UNDER GRAZING 86AL71/5300 EX  
(Continuing Trial)

**AIM:** To evaluate and compare the production characteristics of a serradella, balansa and subterranean clover based pasture, grazed at three stocking regimes.

**TRIAL SITE:** M. Dovey, Manypeaks.

**SOIL TYPE:** Duplex soil - sand over gravel.

**FERTILIZER:** Topdressed in May with 200 kg/ha super.  
Topdressed in September with 100 kg/ha 3:2 super potash.

**INSECTS:** Sprayed 80 ml/ha Rogor June 6, 1987.

**TREATMENTS:**

- Pasture -
1. Sub.clover (Karridale, Junee, Trikkala)
  2. Serradella (Tauro, Pitman, MC2)
  3. Serradella deferred (25% of treatment plot sown to sub.clover onto which spring deferment occurs)
  4. Balansa (Paradona)

Set Stocking Rates -

High	12 DSE/ha
Medium	96 DSE/ha
Low	8 DSE/ha

**RESULTS:**

1. Sheep Production - the largest gains in liveweight were consistently achieved on the sub.clover based pastures. The superiority of sub.clover increased over the summer months in terms of liveweight (Figure 1), though levels of dry matter on serradella plots were higher. The sheep were not able to utilise the low quality serradella residue (Table 3). Sheep grazing the balansa plots were removed in January as plots were severely denuded, and further grazing would constitute an extreme erosion risk.



There were no wool production differences between treatments from May - September.

2. Pasture Production - the mid-April break realised an extremely good germination of serradella and balansa and an adequate germination for sub.clover. Serradella clearly outproduced the other species in terms of growth rate and total dry matter levels (Figure 2), under the 1987 seasonal conditions. [Serradella and sub.clover having similar initial plant densities].

Balansa production was very low in 1987 following an extremely productive first year stand in terms of dry matter and seed production. Balansa does not appear suited to a dry year, or a dry spring, and its use as an annual pasture species appears limited. Kabatiella was again noted, and observed leaf reddening and poor nodulation suggest rhizobial problems.

#### **SEED YIELDS:**

Sub.clover produced very high seed yields under grazing - an increase of 1000 kg/ha over 1986 when ungrazed (Table 2). Serradella produced good levels of seed production, but levels would include some 1986 production. Balansa seed yields reflected dry matter performance and seed yields dropped sharply.

The most interesting aspect pertains to summer seed yield depressions. Sub.clover seed yields were reduced on average by 55%, serradella seed yields by 40% and balansa seed yields by 46% over a maximum period of two months. The high level of sub.clover seed usage over serradella (reflected by mean liveweights) can be attributed to:

- i) accessibility - low levels of dry matter, clover seed encapsulated in accessible round burr.
- ii) sheep experience - trained to search for burr over summer.
- iii) high palatability.

#### **PLANT REGENERATION:**

The opening March rains caused a major sub.clover germination and balansa (estimated 45% of germinable seed reserves), whereas only 5-7% of serradella germinated (through high levels of residues and hardseededness).

**DRY MATTER QUALITY:**

- Data revealed:
- rapid quality breakdown of serradella residues.
  - balansa has very good digestibility characteristics,  
but protein content is deficient relative to sub.clover.
  - Sub.clover maintains quality for the greatest length of  
time.

## Value of Research

Project Title: Balansa Clover and New Serradella Species For Deep Acidic Sands

Years: 1986 - 1990

Source of Funding: Wool Research and Development Fund

Goals: To develop management recommendations for improving the persistence and stability of legume components in pastures, with specific references to the deep acid sands on the south coast.

Progress Toward Achieving Goals:

- i) Generation of production data for serradella and balansa in comparison to sub-clover, under differing grazing management regimes.
- ii) Seed dynamics information under aforementioned grazing strategies, and management strategies such as spring deferment 51 serradella
- iii) The identification of productive and persistent serradella lines from overseas collection trips.

Expected Changes in Agricultural Practice: A trend away from the sub-clover legume monoculture philosophy for 'any' pasture toward species selection and mixtures dependent on soil type and rainfall zone. It is unreasonable to assume superior adaptation of sub-clover across the wide range of environments encountered on the south coast.

Actual Changes in Agricultural Practice: A marked increase in interest in alternative legume species, strongly reflected by sales information data from seed merchants.

Realization by farming community of the need to employ different management strategies for different seasonal production patterns and quality characteristics of serradella, balansa and sub-clover.

Estimates \$ Value of Charges: Are based on the use of new varieties with increased production of 0.5 DSE/ha in their respective niches, assumed.

Species	South Coast Sales (tonne)		Sown ha	Increased Value
	1987	1988		
Balansa	50	8	29,000	\$632,250
Serradella (new varieties)	18	22	13,333	\$541,490
				TOTAL \$1,173,740

Assumptions:

- i) Pasture response to balansa confined to year of sowing.
- ii) 4.5 kg wool/DSE.
- iii) Wool price 1987 Nett 450 c/kg.  
Wool price 1988 Nett 700 c/kg.

Project Costs:

Industry Funding 1987	\$24,555
1988	\$29,760
CRF (40% L.Cransberg) 87/88	\$80,000
TOTAL	\$134,315

Fig 1:

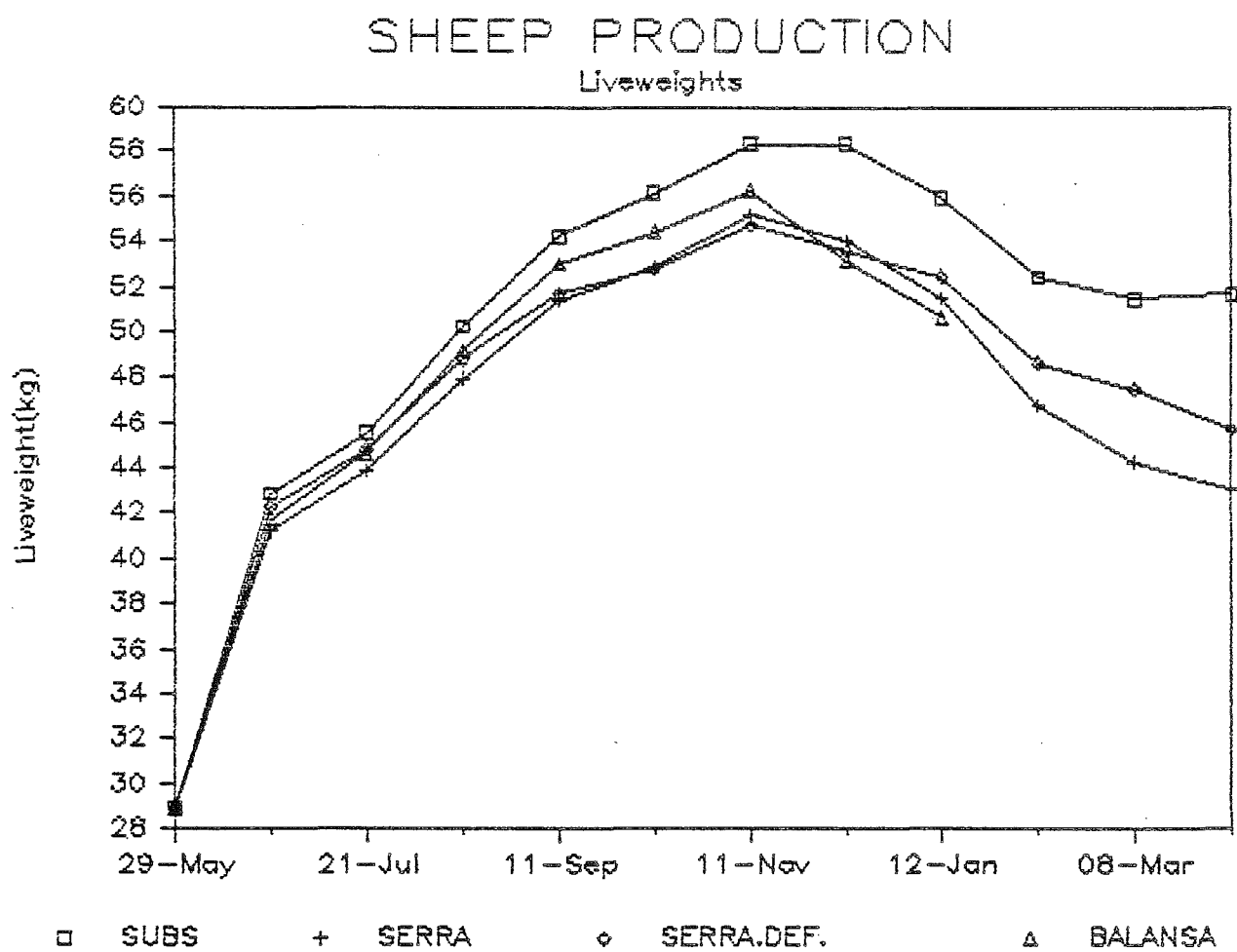


Fig 2:

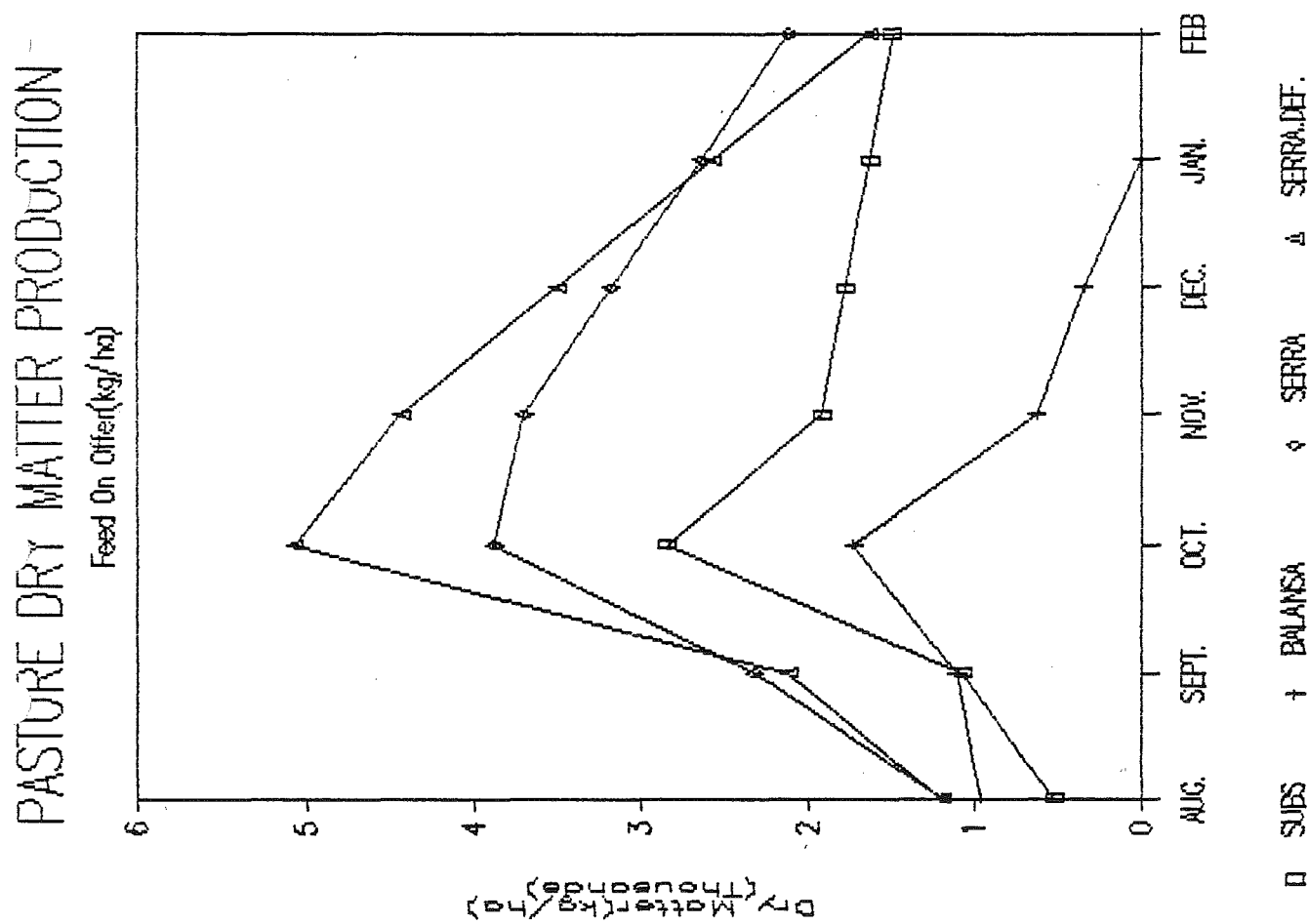


Table 1:

		SEED YIELDS (kg/ha)		
		Jan 87	Jan 88	April 88
SUB-CLOVER-----				
	H	335	1244	589
	M	342	1489	653
	L	407	1342	591
	AVE	361	1358	611
SERRADELLA				
	H	732	651	520
	M	798	1197	594
	L	927	988	561
	AVE	819	945	558
SERRA-DEF				
	H	886	696	523
	M	703	1095	679
	L	872	1175	600
	AVE	820	989	600
BALANSA				
	H	709	179	110
	M	748	312	153
	L	734	209	115
	AVE	730	233	126

Table 2:

## PLANT REGENERATION

## TREATMENT MEANS:

	27/3/87	14/4/87	30/3/88
SUB-CLOVER			
H	8	901	6580
M	6	842	7370
L	7	1061	6980
AVE	7	935	6977
SERRADELLA			
H	4	914	566
M	25	1369	887
L	6	1315	713
AVE	12	1199	722
SERRA-DEF			
H	6	1326	527
M	13	1362	765
L	5	1479	703
AVE	8	1389	665
BALANSA			
H	126	14580	9010
M	75	11710	13990
L	129	13040	11570
AVE	110	13110	11523

*NB Figures quoted in plants/m<sup>2</sup>*

Table 3:

SUMMER DRY MATTER QUALITY (1986/7)

SERRADELLA	20TH DEC	6TH FEB	17TH MAR
DIGESTIBILITY	52.7	44.7	40.0
CRUDE PROTEIN	12.8	6.2	5.8
BALANSA			
DIGESTIBILITY	57.6	60.2	52.0
CRUDE PROTEIN	10.3	8.1	5.8
SUB-CLOVER			
DIGESTIBILITY	52.0	52.8	45.7
CRUDE PROTEIN	11.8	11.2	8.2

N.B. GRAZING OCCURRED AT ARTIFICIALLY HIGH STOCKING RATES.