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AN EVALUATION OF GRASSLANDS ROA TALL FESCUE AND GRASSLANDS MARU PHALARIS FOR DAIRYING

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Abstract

The suitability of Grasslands Roa tall fescue (*Festura arundinacea* Scherb) and Grasslands Mar" phalaris (*Phalaris aquatica* L) for dairying in a grass grub prone environment was evaluated. Pasture growth studies (1981-1984) showed Roa and Mar" to produce 16% more drymatter (DM) than ryegrass but the seasonality of growth differed. Roa was more productive in spring and Maru in late-autumn and early winter. The Increased tolerance to grass grub and greater DM production suggested that these grasses may be more suitable to dairying than ryegrass.

Since 1964 dairy production has been compared from two pasture systems; one comprising 66% Roa/white clover and 33% Maru/white clover and the other. a 30 year old ryegrass/white clover pasture, each stocked at 3.7 and 4.3 cows/ha. Results from the farmlet study highlighted the superiority of DM production from Roa and Maru pastures but total milkfat production was similar irrespective of pasture type or stocking rate. Roa/Maru pastures produced more milkfat in autumn, but this only compensated for less production over summer.

The present work highlights the danger that herbage production data may not accurately predict animal productivity

Keywords: Dairy production, ryegrass, pasture production, pasture composition, sodium levels

INTRODUCTION

In the early 1970s grass grub and dry summers were identified as the major limitation to increasing dairy production in South Taranaki.

Grasslands Roa tall fescue *(Festuca arundinacea* Scherb) and Grasslands Maru phalaris (Phalaris *aquatica* L) were identified by Kain & Atkinson (1977) and East et a/ (1979) as having tolerance of damage from grass grub with Roa being more tolerant than Maru. These grasses also have the ability to survive summer droughts and were reported by these authors to be more productive than ryegrass. However, there is a need to evaluate the suitability of Roa and Maru pastures for dairying in Taranaki in an environment where pastures are susceptible to grass grub attack.

A brief summary of pasture growth studies and a preliminary report on the first three years (1984-1987) of a farmlet study comparing Roa/Maru pastures with ryegrass pastures are presented:

EXPERIMENTAL

Pasture Growth Study

On one ha paddocks of each cultivar the growth of Roa/white clover, Maru/white clover and old established ryegrass/white clover was evaluated over a four year period 1982-I 986. In each paddock three replicate harvests were made at 28 day intervals using the rate of growth technique proposed by Lynch (1966). Throughout the period the paddocks were rotationally grazed by dairy cows.

Farmlet Study

In spring 1983, twelve one hectare paddocks were randomly selected from 48 one hectare paddocks of old ryegrass/white clover and cultivated and sown into grass grub tolerant grasses, Roa tall fescue and Maru phalaris. Eight hectares were sown to Roa tall fescue (25 kg/ha) and Pitau white clover (3 kg/ha) and four hectares sown to Maru phalaris (12 kg/ha) and Pitau white clover (3 kg/ha). This area comprising 66% Roa tall fescue/white clover and 33% Maru/white clover will be referred to hereafter as the Roa/Maru (RM) farmlet.

At the same time a control (c) farmlet of twelve one ha paddocks of existing pasture (at least 30 years old) was randomly selected and all paddocks of ryegrass, Roa and Maru, were sub-divided into 0.54 and 0.46 ha paddocks to form low stocked (LS) and high stocked (HS) farmlets carrying 3.7 and 4.3 cows/ha respectively.

On June 1 1984, 24 cows of mixed age (Rising 2 year - 5 year and older) and mixed breed (Jersey, Friesian and Jersey x Friesian) were randomly allocated to each of the four farmlets, to commence the three year evaluation.

A management policy comprising criteria for conservation, supplementary feeding, drying off and culling was established and applied to each farmlet according to the feed situation. Rotation lengths varied over the year but at any point in time were the same for all farmlets. A 30 day rotation was used over the lactation period and a 90-120 day rotation over the winter dry period.

Measurements. Milk yield was recorded weekly and milk analysed for fat, protein and lactose.

Pastures were assessed visually throughout the year and calibrated by cutting quadrats to ground level. Growth rates were determined from the corrected data, thus allowing herbage mass before and after grazing and rate of DM disappearance to be calculated. Fully analysed pasture data is available for the 1984185 and 1985/86 seasons.

At weekly intervals during spring, summer and autumn, pasture in paddocks to be grazed was sampled to ground level and herbage dissected into green and dead matter.

RESULTS

Pasture Growth Study

The growth rate data showed Maru superior in late autumn and early winter and Roa in spring and early summer (figure 1) but annual production of Roa and Maru was similar and 18% greater than ryegrass. Annual pasture production as measured by the rate of growth technique was 14.3, 16.9 and 16.8 tonne DM/ha respectively for ryegrass, Roa and Maru pastures.

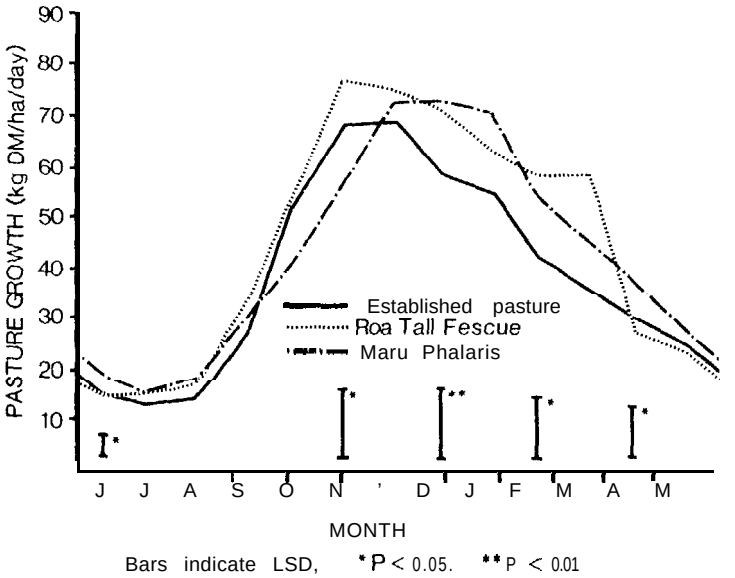

Figure 1: Comparison of rate of growth of old established pasture, Roa tall fescue and Maru phalaris (1983-1986).

Farmlet Study

Pasture Production. Annual pasture production recorded under grazing using the difference technique showed greater production than recorded using rate of growth (Table 1) but the relative difference between ryegrass and Roa/Maru pastures was similar, 17%. The greater productivity of these pastures was reflected in the higher average pre-grazing herbage mass recorded in summer and autumn (Table 3, Fig. 3).

Animal Performance. Although pasture production and the herbage mass before grazing was higher for Roa/Maru pastures, milkfat production (Table 2) did not reflect this. Over three years, pasture type had no influence on milkfat production on the HS treatments. Whereas at the lower stocking rate in 1984/85, milkfat production was similar on both pastures, in 1985/86, (an extremely favourable season for dairying), milkfat production was significantly lower on Roa/Maru pastures, and in 1986/87 when a cold, wet winter/spring period and summer drought severely affected pasture growth, milkfat production was significantly greater on Roa/Maru pastures.

The pattern of milkfat production from the two pasture types (Fig. 2) has differed consistently over the three years despite differences in stocking rate, pattern and level of DM production. In spring, milkfat production on both pastures was similar but in summer was greater on ryegrass and in autumn greater on Roa/Maru.

Over the lactation period the average herbage mass before grazing and the average rate of DM disappearance (Table 3) was significantly greater on Roa/Maru than ryegrass pastures.

The difference between the two pastures in herbage mass before grazing increased from spring to autumn (Fig. 3) but this was not associated with any apparent deterioration in the parameters of pasture which reflect quality. In the Roa/Maru pastures there was more green leaf (clover + grass leaf) and less dead matter than in ryegrass pastures especially over summer and autumn.

The sodium content (Table 4) was significantly lower on Roa/clover pastures and in some summers and autumns (range in these seasons for Roa, 0.085 - 0.165%) may have been inadequate to meet the requirements for lactation.

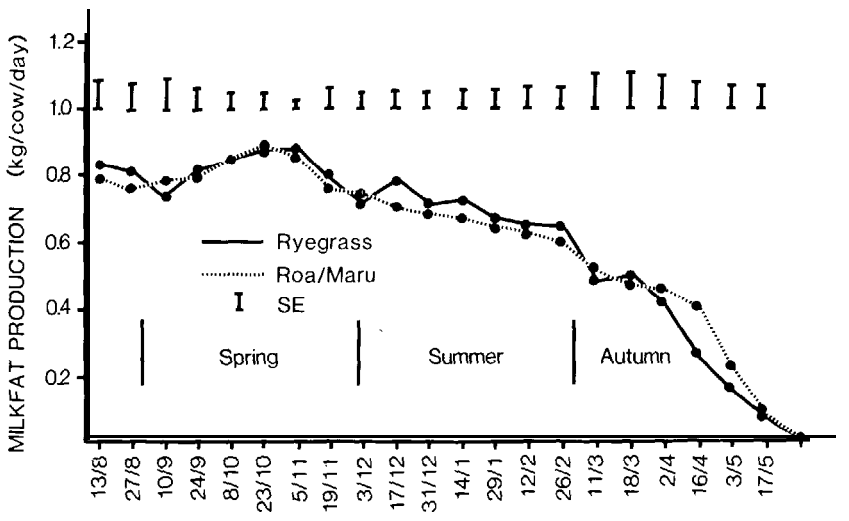

Figure 2: Average fortnightly milkfat production (1984-1987) for ryegrass and Roa/Maru farmlets.

Table 1: Pasture production (tonne DM/ha)

	Treatment				Significance of main effects	
	CLS	CHS	RMLS	RMHS	SR	Species
1984/85	16.9	15.6	19.7	18.9	NS	..
1985/86	16.2	16.1	18.8	17.9	NS	**
Average	16.5	15.8	19.3	16.4		

** $p < 0.01$

CLS Control 3.7 cows/ha; CHS Control 4.3 cows/ha; RMLS Roa/Maru 3.7 cows/ha; RMHS Roa/Maru 4.3 cows/ha.

Table 2: Animal performance [kg milkfat)

		CLS	CHS	RMLS	RMHS
1984/85	/cow	187 Aa	1976 Aab	188 Aa	169 Ab
	/ha	664	734	667	705
1985186	/cow	222 Aa	180 Cc	200 Bb	182 Cc
	/ha	821	774	740	783
1986187	/cow	153Ab	117 Cc	167 Aa	118 Cc
	/ha	566	503	618	507
Average	/cow	187	158	185	156
	/ha	684	670	675	665

For each row means without a letter in common differ significantly at the 5% level (lower case) or 1% level (upper case) according to Duncans Multiple Range Test.

Table 3: Average grazing parameters recorded on pastures grazed by lactating cows in the 1984/85 and 1985/86 seasons

						Significance	
		CLS	CHS	RMLS	RMHS	SR	Species
Pre-Graze	(t DM/ha)	3.3	3.2	3.7	3.6	NS	**
Post-Graze	(t DM/ha)	2.0	1.6	2.2	2.0		*
DM Disappearance	(kg DM/cow/day)	13.6	13.3	14.7	14.4		*

Significance: * $p < 0.05$
** $p < 0.01$

Table 4: Average sodium levels (%) recorded seasonally (1984-1987) in ryegrass/clover, Roa clover and Maru clover pastures

Sampling Time	Pasture Type Ryegrass/clover	Roa/clover	Maru/clover
Autumn	.29 b	.13 a	.32 b
Winter	.33 b	.22 a	.44 c
Spring	.26 b	.16 a	.36 c
Summer	.25 b	.12 a	.27 b

- For each row means without a common letter differ significantly at the 5% level according to Duncans Multiple Range Test.
- Minimum requirements for lactation 0.120 % sodium.

DISCUSSION

The greater availability of pasture resulting from the establishment of farmlets comprising 66% Roa tall fescue and 33% Maru phalaris pastures did not result in an increase in milkfat production. Lower animal performance recorded on Roa/Maru pastures over summer did not result from poor pasture control. Figure 3 shows that the mass of green herbage (including clover) available for grazing was higher on these pastures than on ryegrass and cows appeared to consume a greater amount of Roa/Maru pasture (Table 3). This suggests that the poor utilisation of Roa/Maru pastures for milkfat production over summer was not related to management but to some inherent aspect in either Roa or Maru affecting quality.

Similar conclusions can be drawn from the study by Goold and Van der Elst (1979) who

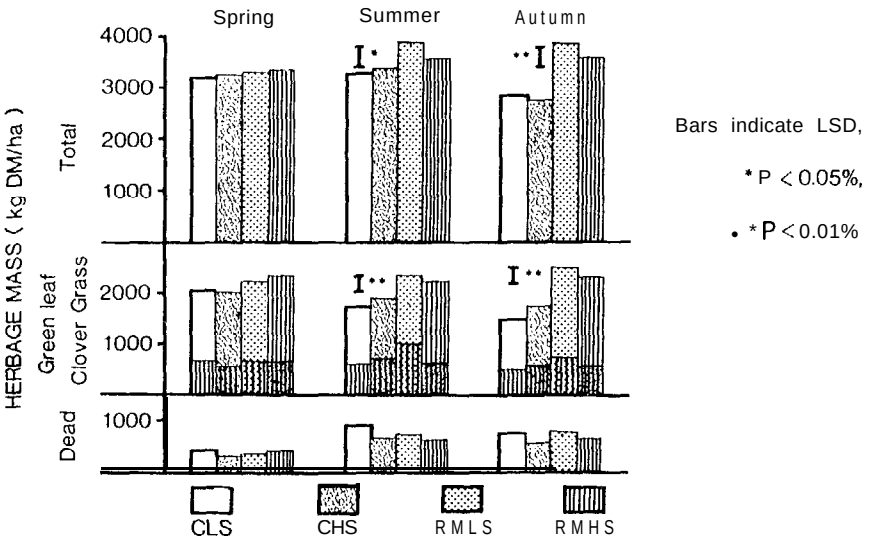

Figure 3' Yield components of pasture on the four farmlets before grazing over spring, summer and autumn (average 1984/85 and 1985/86 seasons).

reported higher average liveweight gains of steers grazing Roa compared with ryegrass over seven years. However, in February, Roa pastures grew 700 kg DM/ha more than ryegrass but on both pastures similar liveweight gains of 0.15 kg/head/day were recorded. Wilson (1975) compared liveweight gains of heifers grazing Roa and ryegrass pastures over winter and spring and recorded poorer performance on Roa.

Despite results reported in this paper and elsewhere suggesting that pastures with a high proportion of Roa tall fescue may, especially over summer, be utilised less efficiently for animal performance than conventional ryegrass/white clover pastures, no clear reason for this can be given.

There are indications from the information presented in Table 4 that sodium levels in Roa pastures over summer could be limiting milkfat production but given that only 66% of the pasture area was Roa/white clover it can be calculated that even over summer the average sodium level in the diet should have been adequate.

Although the answer to the problem of the poorer utilisation for milkfat production of Roa/Maru pastures is unknown the results of the three-year farmlet study highlight a very important concept. Mowing trials may demonstrate superior DM production but such trials may not predict animal productivity when such pastures are managed in an applied productive system. The information presented suggests that before commercial release of any new pasture species, comparative information on animal performance over a number of years needs to be quantified.

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