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THE VALUE OF REGRASSING WITH IMPROVED PASTURE CULTIVARS IN WAIKATO

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Abstract

The pasture and animal productivity of established high producing pastures in the Waikato has been compared with newly sown pastures based on recently released herbage cultivars. The established pastures were a mixture of Nui perennial ryegrass, *Paspalum dilatatum* and Huia white clover. The new cultivars tested were Ellett perennial ryegrass, Wana cocksfoot and Roa tall fescue, each sown with Pitau white clover.

The main advantages of the new pastures containing Ellett were in increased autumn and winter herbage production, higher stock carrying capacity and lower hay requirements. The Ellett pastures had higher ryegrass content and lower weed levels than the older pastures. Wana cocksfoot when grown with Ellett ryegrass increased in content over the experimental period, especially under less intense grazing pressure although some frost damage was evident in winter with a possible lowering of herbage nutritive value of the mixture. Tall fescue pastures only showed occasional merit in summer-autumn periods under the less intensive grazing regime.

Keywords: established pastures, Nui ryegrass, Ellett ryegrass, Wana cocksfoot, *Paspalum dilatatum,* Huia white clover, Pitau white clover, Roa tall fescue, steer liveweight gains, seasonal herbage yields, herbage yields, herbage botanical composition.

INTRODUCTION

The benefits of using improved herbage cultivars are generally extrapolated from data derived from experiments where the new cultivars have been compared with sowings of older, standard cultivars. Such trials supply good information for farmers when new pastures are being developed or where older pastures require replacement due to adverse effects of climate or insect attack. Little published information is available however which enables a farmer to decide when his older producing pastures require replacement with newer perennial plant material. Evaluation programmes of this nature require, ultimately, animal grazing studies, since the grazing factor is absent in many of the small-plot mowing trials which are merely a low cost means of screening out inferior plant material. Further it is clearly desirable to subject pastures to a range of grazing pressures in any experiment whether this be done via differential stocking rates, classes of livestock, intake levels or levels of herbage offered.

This paper describes the preliminary results of a grazing evaluation study conducted near Hamilton Airport where existing high producing pastures are being compared with those based on new sowings of Ellett perennial ryegrass (*Lolium perenne* L.), 'Grasslands Wana' cocksfoot *(Dactylis glomerata* L.) and 'Grasslands Roa' tall fescue *(Festuca arundinacea* Shreb.).

MATERIALS AND METHODS

Treatments

Established 'Grasslands Nui' ryegrass/Paspalum *(P. dilatatum* Poir.)/'Grasslands Huia' white clover (*Trifolium repens* L.) pasture (sown in 1975/6) was compared with

the following pastures which were sown in early April 1981.

1. Ellett ryegrass (broadcast at 17 kg/ha).
2. Ellett ryegrass (broadcast at 3.2 kg/ha and Wana cocksfoot at 4.7 kg/ha).
3. Roa tall fescue (drilled at 10.5 kg/ha).

'Grasslands Pitau' white clover was broadcast in each pasture at the rate of 2 kglha.

From March 1982 onward these four pasture types were subjected to the following cattle grazing intensity treatments.

1. A cattle intake of 2.5-2.7 kg DM per day per 100 kg liveweight (high intake treatment).
2. A cattle intake of 2.0-2.2 kg DM per day per 100 kg liveweight (low intake treatment).

Both treatments were anticipated to allow for animal liveweight gain to be achieved whilst still placing the pastures under some pressure at the low intake level. Such a rigid management meant that the younger animals were probably being slightly overfed in winter and underfed in spring relative to normal farm practice in the Waikato.

The total area of each treatment was 1.3 ha, divided into 6 paddocks, giving a total of 48 paddocks in the trial which was sited on a Horotiu sandy loam. The mean soil pH was 5.7, Olsen P 24 and K level 9.

Grazing management

The experiment was grazed with Friesian steers, which enter the trial in March of each year at 7 months of age. A number of steers remained on each treatment from March till slaughter in late summer/early autumn in the following year (core animals). In winter those animals received some lucerne hay where necessary to keep their intakes at the required level. At other times of the year additional steers of the same age were used to ensure that the stock were fed at the appropriate level. The cattle were weighed at about fortnightly intervals and liveweight gains measured for all animals in each treatment. Carcass weights and composition were determined for all core animals at the end of each year.

Grazing rotation length varied from 3-4 weeks in spring to a maximum of 10-11 weeks in winter but at any point in time the grazing rotation length was the same for all 8 treatments.

Pasture production and apparent cattle intakes were measured with pre- and post-grazing cuts using sickle-bar and reel mowers. Post-grazing cuts were taken with reel mowers only. The daily pasture growth rate during grazing was assumed to be equal to the daily pasture growth rate measured since the previous grazing.

Botanical composition changes were monitored by annual point analysis (in winter). Fertiliser applications were 30% potassic superphosphate at the rate of 500 kg/ha applied in autumn.

RESULTS AND DISCUSSION

Although the annual yields of pastures containing Ellett were significantly higher in 1982/83 and 1983184 (Table 1) the most marked differences between pasture types occurred in autumn and winter and results presented in this paper will be confined to these periods. An increasing difference between the established Nui/Paspalum pasture and the pastures containing Ellett with or without Wana is evident. Autumn and winter yields of Roa pastures were intermediate between those of the Nui/Paspalum pasture and those containing Ellett although in late winter/early spring the Roa pastures equalled or exceeded the yields of the three other pasture types. There were no significant interactions recorded and main effect means only are presented.

Table 1: MEAN ANNUAL, AUTUMN AND WINTER HERBAGE YIELDS (kg DM/ha) (Standard Error of Difference (SED) in brackets)

Season	Pasture Type					Grazing Treatment		
	Nui/ Paspalum	Ellett	Ellett/ Wana	Roa	SED	High Allow-ance	Low Allow-ance	SED
Autumn 81	2380	510	315	620	(119)	–	–	–
Winter 81	1650	2590	1990	1270	(120)	–	–	–
Annual 1981-82	13920	13330	13960	12880	(280)	–	–	–
Autumn 82	2460	2460	2590	2700	(130)	2790	2405	(90)
Winter 82	1330	1600	1580	1480	(110)	1660	1335	(80)
Annual 1982-83	12930	13390	13640	12860	(300)	14310	12100	(220)
Autumn 83	1860	2360	2365	2140	(100)	2270	2090	(70)
Winter 83	1580	2120	2050	1830	(85)	2000	1800	(60)
Annual 1983-84	14440	15700	15970	15150	(280)	16100	14530	(190)

Winter 1982 was cold with an unusually high number of frosts. These conditions depressed pasture growth and as the maximum grazing rotation length was only 7.5 weeks standing herbage feed reserves became low and it was necessary to remove some of the core animals for a short period out of the Nui/Paspalum and the Roa pastures. In addition substantial quantities of lucerne hay were fed (Table 2).

Table 2: WINTER HAY FEEDING LEVELS.

Year	Pasture Type				Grazing Effect	
	Nui/ Paspalum	Ellett	Ellett/ Wana	Roa	High allowance	Low allowance
			(kg DM/ha)			
1982	210	230	290	250	230	260
1983	115	0	10	80	50	60
1984	120	70	85	80	110	70
			(kg DM/steer)			
1982	80	55	70	80	70	70
1983	30	0	5	20	15	15
1984	40	20	20	20	30	20

In winter 1983 the grazing rotation length was extended to 10-l 1 weeks, resulting in a greater availability of pasture herbage and a lower hay requirement. In 1983 no hay was fed to the low intake groups on the Ellett and the Ellett/Wana pastures (Table 2) in addition to carrying more animals per hectare in these treatments (Table 3). In 1984 the maximum grazing rotation length in winter was 9.5 weeks. The quantity of hay fed was somewhat higher than in 1983, but still well below the levels of 1982.

By subtracting an allowance for the hay fed to the cattle in each treatment the net stocking rate could be calculated for each treatment for the autumn-winter period (Table 3). In 1982 and 1983 values for the 'older' pasture were appreciably lower than for all other pasture types. In winter differences in the stocking rate were substantial in the low intake treatments in both years, with the pastures containing Ellett ahead of the other treatments. In the high intake treatments a similar effect was recorded which increased gradually over the duration of the experiment.

Table 3: THE MEAN AUTUMN-WINTER STOCKING RATES (steers/ha) (Standard Error of Difference SED in brackets)

Season	Pasture Type					Grazing Treatment		
	Null Paspalum	Ellett	Ellett/ Wana	Roa	SED	High Allow-ance	Low Allow-ance	SED
1982	5.9	5.4	6.2	6.0	(0.12)	5.4	6.8	(0.10)
1983	3.9	4.8	4.7	4.0	(0.12)	4.0	4.6	(0.10)

Point analyses show a steady increase in the percentage of cocksfoot in the Ellett/Wana pasture, the increase being faster in the high intake treatments than in the low intake treatments (Table 4). Poa species have been encouraged by the harder grazing in the low intake treatments, particularly in the Nui/Paspalum and the Roa pastures. The percentage of white clover was higher in the low intake treatments of all the newer pasture types and probably reflects the diminished competitive effect of the grass component with the higher grazing pressure (Goold 1982). The percentage of weeds has remained low in the newer pastures, and is markedly higher in the older Nui/Paspalum pasture. The lower winter pasture yield of this treatment may be a result of the lower ryegrass content and the higher percentage of weeds and Poa species and to some extent the presence of Paspalum. Relatively poor persistence of Nui pastures has previously been reported (Percival & Duder 1983).

Table 4: WINTER BOTANICAL COMPOSITION (% species content)

Main Effects		Ryegrass	Paspalum	Cocks-foot	Tall fescue	Poa Species	White Clover	Weeds
Pasture Type								
Nui/ Paspalum	1982	44	4			6	26	11
	1982	46	2			6	19	14
	1984	42	2			8	25	14
Ellett	1982	51				1	31	1
	1983	71				1	17	1
	1984	66				1	22	3
Ellett/Wana	1982	39		9		3	21	1
	1983	45		21		1	21	1
	1984	29		39		2	20	3
Roa	1982				30	4	48	2
	1983				47	4	30	3
	1984				50	7	26	4
Grazing Effect								
High Allowance	1982	45	4	9	29	3	36	3
	1983	54	2	26	53	2	18	5
	1984	46	1	48	55	3	19	5
Low Allowance	1982	44	4	9	30	4	35	4
	1983	54	2	15	41	4	25	5
	1984	44	2	29	45	6	27	7

Table 5: MEAN DAILY LWG PER STEER (kg)

Main Effects	Autumn-Winter Periods 1982	1983	1984
Pasture Type			
Nui/Paspalum	0.76	1 .00	0.67
Ellett	0.72	0.93	0.67
Ellett/Wana	0.74	0.90	0.60
Roa	0.71	0.92	0.60
Grazing Effect			
High Allowance	0.63	1.01	0.72
Low Allowance	0.63	0.66	0.56

Mean daily liveweight gains per steer are shown in Table 5. There is some variation between the 3 years and the effect of the lower intake treatments on indlvidual liveweight gains is usually quite marked. In the high intake treatments individual cattle growth rates In autumn and winter were lower in the Ellett/Wana and in the Roa pastures in 1983 and 1984. As the amount of cocksfoot In the mixture increased the pastures became more damaged by frost, increasing ?he proportion oi senescent herbage, and possibly making the cocksfoot less digestible than ryegrass. In the low intake treatments differences were small, probably as a result of the more leafy pasture produced under harder grazing and the greater proportion of white clover which would tend to mask any deficiencies of the grass component of the sward.

CONCLUSIONS

Although it takes some time to recover the loss of herbage dry matter Incurred in cultivating older pasture areas and replacing them with newer cultivars, the substantial benefits in superior autumn and winter pasture yields appear to make it still worthwhile. In pastures based on Ellett hayfeeding costs were reduced while stocking rates were raised.

The inclusion of Wana cocksfoot in a sward of Ellett is recommended on light, droughty soils, but the mixture should be grazed fairly hard to prevent it becoming clumpy and of lower digestibility in winter. However, environmental conditions of drought and insect pest attack which would additionally favour Wana have not been experienced in this trial so far and there may also be some advantage in having this *Lolium* endophyte-free species in a grass mixture. This could reduce the incidence of ryegrass staggers which has been 'of very minor significance in this study.

Routine soil and pasture counts have shown that populations of major insect pests have been low at this trial stie since 1977. The effect of these predators has not been an important factor therefore in determining the results to date. However, although the study Is long term, the interim results suggest that replacing older Waikato pastures with Roa tall fescue offers little advantage.

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