DRYLAND GRAZING EVALUATION OF GRASSLANDS GALA GRAZING BROME

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ABSTRACT
Grasslands Gala grazing brome (*Bromus stamineus*), was evaluated for seasonal production and persistence under dryland conditions. Gala was compared with cultivars from three different *Bromus* species and a high endophyte ryegrass, under three sheep grazing managements which varied in duration and intensity. Seasonal herbage yields indicated that Gala persisted under all managements, but was more productive under short and medium rotation grazing than long rotation lax grazing. Results of this five year evaluation indicate that Gala compares favourably with existing cultivars, with its broad range of tolerances making it a desirable option as a perennial in temperate dryland pastoral systems.

KEYWORDS
Bromus, grazing, dryland, pasture production

INTRODUCTION
Grasslands Gala grazing brome, the first released cultivar from *Bromus stamineus* (B. stamineus Desv.), was bred from plant material collected in central Chile, where it is grazed as a natural grassland on light dry soils.

Gala is related to the prairie grasses (*B.willdenowii* Kunth.) (Demanet and Contreras, 1988), but has a more prostrate habit and supports approximately twice as many tillers per unit area. Gala flowers earlier with fewer aftermath seed heads. Its seed is of similar size but supports a larger awn, and is resistant to smut (*Ustilago bullata*) (Stewart, 1992).

Early observations suggested Gala is a palatable, winter active, drought and Argentine stem weevil (ASW) (*Listronotus bonariensis*) tolerant perennial, which may tolerate hard grazing (Stewart, 1992, 1993). These are all attributes relevant to New Zealands dryland grazing systems. Sheep liveweight trials showed that Gala produces quality forage in all seasons (Sutherland, 1994).

The three *Bromus* cultivars already available in New Zealand lack versatility in aspects critical to dryland management, and remain relatively minor species in a pastoral industry which favours the more versatile perennial ryegrasses. Grasslands Tiki smooth brome (B. *inermis* Leyss.) is summer active and can tolerate hard grazing, but is winter dormant. Grasslands Hakari mountain brome (B. *sitchensis* Trin.) is summer active, but can be depleted by hard grazing. Grasslands Matua prairie grass (*B. willdenowii* Kunth.) has strong winter production, but can be depleted by set stocking.

This paper reports on the evaluation of the seasonal production and persistence of Gala under three dryland sheep grazing managements, assessing its performance relative to that of existing *Bromus* cultivars and a perennial ryegrass, to identify its role in dryland systems.

METHODS
Gala was compared with the three existing Grasslands *Bromus* cultivars, Matua, Hakari and Tiki, and a perennial high-endophyte ryegrass, Grasslands Pacific (*L perenne* L.).

The trial was sown in autumn, 1991 near Lincoln, New Zealand, (average annual rainfall 660 mm) into a 3.5 ha block of medium/ light soil (pH = 5.7, Olsen P = 15). A randomised complete block design was used with each of the 5 species sown into 3, 0.2 ha fenced replications.

All species were sown as pure grass swards with equal numbers of viable seeds (Gala 31 kg/ha, Matua 30 kg/ha, Hakari 22 kg/ha, Tiki 15 kg/ha, and Pacific at 10 kg/ha). Nitrogen was applied seasonally as urea at 50 kg N/ha, and superphosphate was applied in alternate years at 125 kg/ha (9%P).

Three sheep grazing managements, two at the extremes of frequency and severity and a more moderate management typical of that used in N.Z. dryland systems were imposed on sections of each species replication over several years. Grazing began in the spring following the autumn establishment.

1. **A long rotation lax grazed** management (3 years data) involved 4 grazings per year (one at the end of each season), and allowed pastures to accumulate approx. 2000 kg/ha dry matter (D M) before being grazed to a residue of approx. 600 kg/ha over a 30 day period.

2. **A short rotation hard grazed** management (3 years data) involved approx. 12 grazings a year, and allowed pastures to accumulate approx. 500 kg/ha D M before being grazed to a nil residual over 2 days.

3. **A medium rotation moderate grazed** management (2 years data) involved approx. 6 grazings and a 60 day spring set stocking period and allowed pastures to accumulate approx. 1200 kg/ha before being grazed to about 500 kg/ha. Growth during the spring set stocked period was measured using exclosure cages.

Data were statistically analysed for each season by calculating the mean D M for each species, then carrying out an analysis of variance with 3 or 4 treatments and 2 or 3 years treated as blocks.

RESULTS AND DISCUSSION
An excellent establishment was achieved in all species, with Gala seedlings first to emerge ahead of Matua, Pacific, Hakari, then Tiki. Gala displayed similar vigour to Matua and Pacific and more than Hakari during the first winter. Gala was the first species to flower.

Long rotation lax grazed. Mean seasonal pasture yields did not differ between the four main species (Tiki excluded) between the spring, summer and autumn grazings (Fig. 1). However, trends indicate Pacific produced the highest yields for all seasons followed by Matua and Gala in spring and winter and Hakari during the summer and autumn. Hakariís winter dormancy resulted in it producing the least during winter. Tiki (data excluded) which is strongly winter dormant produced adequately for the first two autumns only, after which it was deleted from the trial due to the ingress of weeds; all other species persisted strongly.

Short rotation hard grazed. Pacific produced more than Matua in spring, at a similar level to Gala and Matua in summer and autumn, but less in winter. Gala produced at a similar level to Matua in all seasons, but observations, (supported by tiller counts) indicated the Matua pastures were becoming depleted and weed infested by year

3. Hakari (data excluded) suffered substantial tiller mortality and like Tiki, which displayed slow tiller replacement, became weed infested and was deleted after the first year. These results highlight the persistence of densely tillered Pacific and Gala under hard grazing.

Medium rotation spring set stocked. There were no significant differences between species in any season except winter, when Pacific out produced Matua (P 0.05). However trends indicate Pacific produced more than Gala which in turn produced more than Matua in all seasons. Matua became depleted under spring set stocking, and although there was some recovery in autumn and winter the pastures became infested with annual weeds. Hakari pastures became severely depleted and weed infested, but its winter dormancy precluded any cool season recovery and it was deleted after one year.

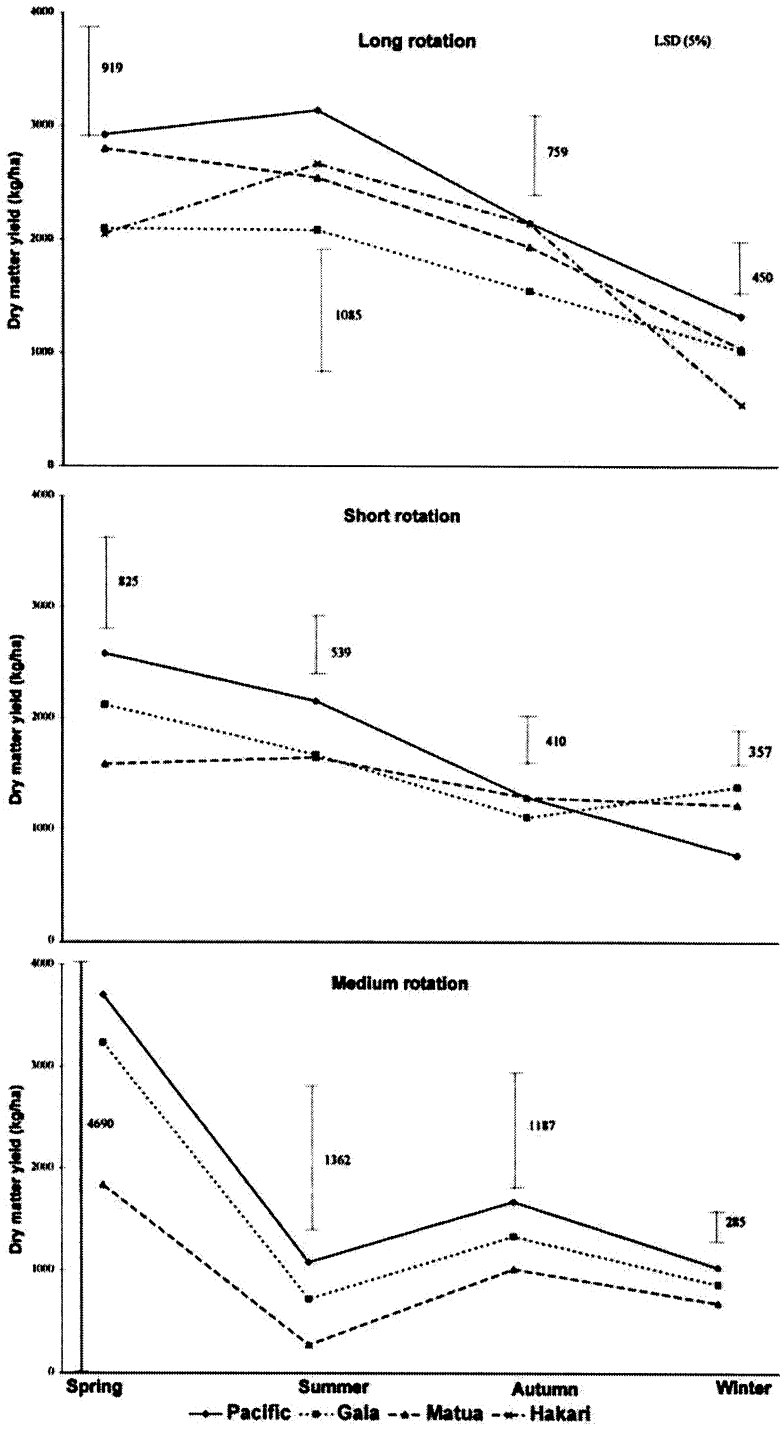
DISCUSSION

These results demonstrate the versatility and persistence of Gala grazing brome, and highlight a combination of desirable characteristics which were not found together in any of the species with which it was compared.

Gala established quickly and performed as a winter-active perennial with good year-round production, its densely tillered habit ensuring its persistence. These attributes are enhanced by Gala's inherent palatability, and once established, its tolerance of Argentine stem weevil, drought and hard summer grazing.

This broad range of tolerances and demonstrated ability to perform under a variety of managements makes Gala a desirable option as a general-purpose perennial on free draining soils in temperate dryland sheep systems.

Figure 1
Seasonal dry matter yields under three grazing managements (LSD 5%).



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