Improving Summer/Autumn Feed Quality in New Zealand Hill Country

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Presenter Information

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Introduction

Pasture management in spring has a strong influence on pasture quality in summer and autumn in New Zealand hill country pastures. Manipulation of defoliation frequency and intensity during mid-late spring can impact summer and autumn pasture quality and quantity (Orr *et al.* 1988). Summer/autumn management is mainly concerned with maintaining herbage quality in summer wet areas and controlling animal pressure in summer dry areas for drought management and winter feed stocks (Clark 1994). Deferred grazing to transfer pasture growth from late spring into summer and autumn deficits is difficult due to detrimental effects on pasture quality, plant density and species composition (Sheath *et al.* 1987). Various grazing management models have been published to inform hill farmers of pasture management considerations during this period (Smith and Dawson 1977; Sheath and Bircham 1983; Sheath *et al.* 1987).

It has previously been shown that management of late spring surpluses to restrict reproductive growth will increase summer pasture quality through a reduction in accumulated stem and dead material and an increase in clover content (Sheath *et al.* 1987). However, there is no information on the longevity of these effects. This trial aimed to determine the effect of different defoliation intensities during spring on herbage quality and composition throughout the subsequent summer-autumn period.

Methods

In 2011, simultaneous experimental plots were set up in four climatically distinct hill country farming environments: summer dry (Cheviot, North Canterbury; 42.88°S; 173.15°E), summer dry-moist (Poukawa, Hawkes Bay; 39.80°S; 176.7°E and Ballantrae, Manawatu; 40.31°S; 175.85°E), summer moist-wet – (Ngaroma, South Waikato; 38.25°S 176.70°E). These sites had a range of average summer (December to February) rainfalls (150 – 320 mm) and modelled summer soil water deficits (-45 to -28 mm; Scotter *et al.* 1979). Areas of medium fertility (pH > 5, Olsen P > 10-17 µg/g, region specific) and moderate slope (15-25°) without extensive tracking were chosen on farms where good farmer cooperation was assured.

The experimental period was separated into two phases; a spring 'prevention' phase (September to December) and a summer/autumn 'maintenance' phase (January to April). The trial consisted of four spring defoliation treatments (Fig. 1) replicated three times on two aspects (north and south) with 5m × 5m plots at each of the four sites. Maintenance phase defoliation was to a common height. Defoliation was achieved with a rotary lawn mower or line trimmer, at 3 weekly (20 to 25 day) intervals during spring with summer cutting frequency being climate dependent. Cut pasture was removed from the plot. Pasture quality samples were cut to ground level prior to cutting plot treatments, dried at 65°C for 24 hrs, ground and analysed for metabolisable energy content (ME) with standard NIR spectroscopy techniques for pasture quality.

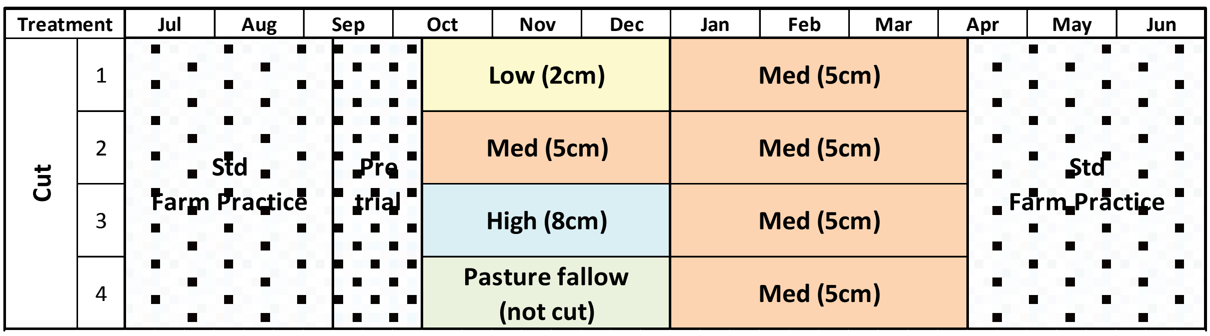

Figure 1. Yearly plan of treatments and plot maintenance

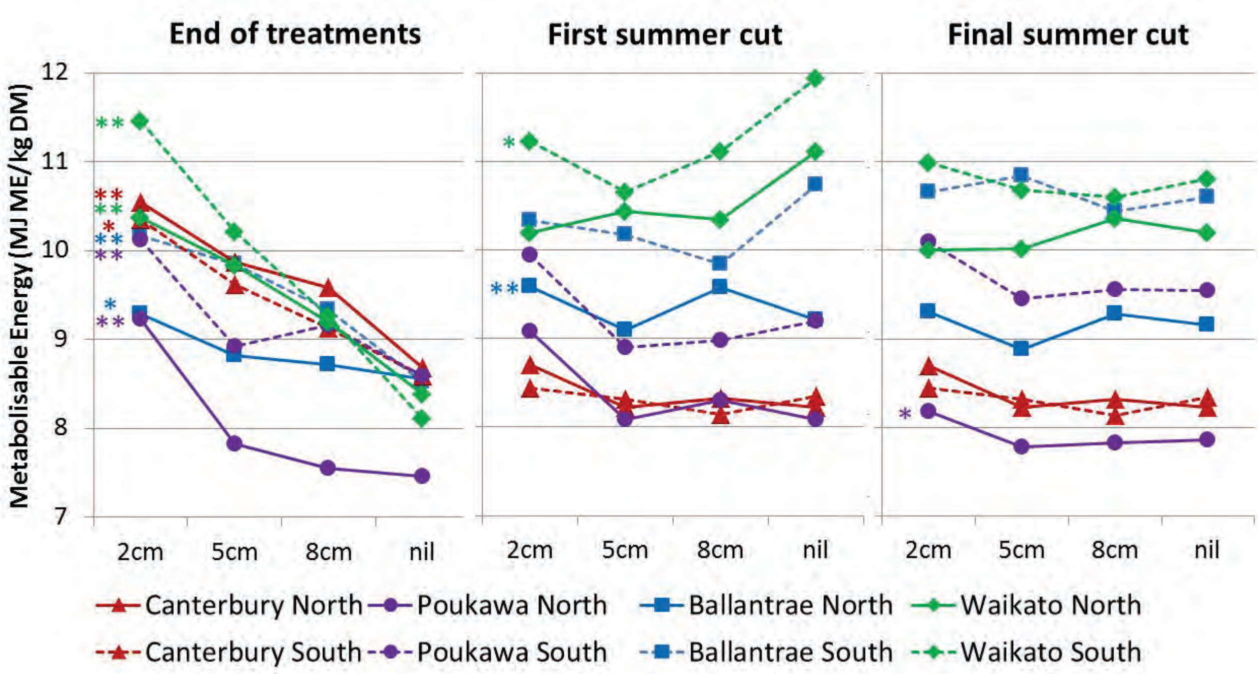

Figure 2. Metabolisable energy content of ground level pasture samples subjected to varying height treatments in spring, followed by uniform cutting management during summer. Statistical significance of treatment effects indicated by asterisks for each site×aspect combination **: P<0.01; *: P<0.05.

Results

The ME of 'pre-graze' pasture samples are shown in Figure 2 for the end of the spring prevention phase treatment and two points during the maintenance phase common cutting regime. At the end of the prevention phase the most intense defoliation regime resulted in significantly higher pasture ME than with less intense defoliation. However, these differences reduced and then largely disappeared by the end of the maintenance phase.

Conclusion

ME content of pasture at the end of the spring prevention phase followed the expected, and published (Orr *et al.* 1988), trend; intense grazing = high quality, lax grazing = low quality. The effect of cutting treatments on ME rapidly equalised under standard cutting heights in the maintenance phase. Defoliation by cutting results in idealised and indiscriminate removal of material not readily removed under grazing. This may overemphasize the speed at which ME equalisation was observed. While there were no significant shifts in summer/autumn pasture quality following one year of spring grazing management, over time a shift in pasture composition may occur.

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