

Pasture improvement needs and options for New Zealand sheep and beef farms

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Introduction

In recent years in New Zealand, sheep and beef farming has been outcompeted for prime land. This means that the government and industry targets to increase sheep and beef production have to be achieved on farms with significant constraints on pasture production. They are increasingly restricted to hilly and other locations with variable climates and soils, and landscape constraints on farming practices. Thus there are limits on the ability to improve pasture production – whether by pasture renewal or through means like grazing management, fertiliser use, or weed and pest control.

Sheep and beef farmers want to improve the growth of young animals under these conditions and the New Zealand Government has set a target to double exports of primary products by 2025. The challenges lead to the formation of a research programme to improve production from permanent pastures on sheep and beef farms. Through Beef + Lamb New Zealand they have identified the following aspects as priorities for improvement - early spring feed supply, summer-autumn feed quality and integrated management of land units that differ in the amount and seasonal pattern of forage production.

To explore new options, a research programme has been established with the following targets.

- Improving early spring feed supply. Target: identify forage opportunities with potential to increase the weight of lamb weaned by twin rearing ewes by 10 kg (or increase spring live weight gains of rising 2 year old cattle by 0.3 kg/day). To achieve this, experiments have been initiated with the aim of increasing the amount of feed grown between 15th August and 15th October by 400kg DM/ha.
- Improving summer-autumn feed quality. Target: identify forage opportunities with potential to increase the summer-autumn weight gain of lambs by 50 g/d (or 0.3 kg /d for rising 1 and 2 year old cattle). To achieve this, experiments have been initiated with the aim of increasing the quality of

feed grown between 1st January and 31st March by 1.0 MJME/kg DM.

- Improving integration between land management units. Target: to identify forage opportunities with potential to increase profit of hill farms by 10%. To achieve this, means of increasing the efficiency of utilisation of feed from land management units that differ in feed production patterns are being modelled.

Forage Improvement

Projects established to improve early spring feed supply and summer-autumn feed quality address the following topics

- Establishment of new plant genetics into uncultivable hill country, in South Waikato, Southern Hawkes Bay, Hawkes Bay and North Canterbury
- Winter pasture management, in East Otago and Mid Canterbury.
- Spring management strategies for lucerne, in Central Canterbury
- Legume-grass combinations, in Central Canterbury
- Novel legumes, in Hawkes Bay, North and Central Canterbury
- Spring pasture management to improve summer autumn feed quality, in South Waikato, Southern Hawkes Bay, Hawkes Bay and North Canterbury.

Research sites were selected to provide a variety of soil, landscape and climate conditions. Effects of site conditions, years and experimental treatments (plant types, management practices) on the establishment and production a range of forages are being determined. The findings will be used to increase our understanding of they interact to influence forage production. This will enable management guidelines to be customised to particular sets of conditions across the range found on sheep and beef farms. It is intended that customised solutions will be evaluated in future projects.

Initially Projects 1, 2, 5 and 6 will use small plot experiments. Promising treatments will be evaluated in larger plot with measurement of animal production and environmental impacts. Projects 3 and 4 are farmlet-scale grazing experiments in which variation in productivity will be recorded over 4-5 years. All projects record climate, soil and plant measurements. Projects 3 and 4 also measure ewe and lamb production.

Integrated farm planning

A new tool to optimise profit by improved integration of land management units that differ in forage production amounts and seasonal patterns is being developed. It will explore solutions for Beef + Lamb New Zealand's hill country farm classes - South Island High, South Island Hill, North Island Hard Hill and North Island Hill. It is a linear programme. Version 1 optimises sheep, beef cows, dairy grazers and deer enterprises on any number of Land Management Units. Fortnightly outputs include animal numbers, weights and sales, supplementary feed made and fed or sold, pasture cover, and profit. It is intended in later versions to add beef production by rising 1 and 2

year old cattle, the ability to set limits to environmental footprints, outputs across years with varying pasture growth, and to evaluate the tool using real farm data.

Results

Progress on five of the topics is reported in the following posters at this Congress: (1) successful establishment of oversown chicory and plantain on uncultivable hill country (Douglas *et al.*); (2) improving Summer/Autumn feed quality in New Zealand hill country (Rennie *et al.*); (3) establishment and growth of legumes on uncultivable hill country in East coast New Zealand (Knight *et al.*); and (4) the dilemma of using sward height as a management tool for intensively grazed sheep pasture in spring (Stevens *et al.*).

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