

Lucerne in high country soils

BOG ROY STATION – WAITAKI VALLEY

The lucerne trial undertaken at David and Lisa Anderson’s Bog Roy Station investigated whether lucerne can be grown successfully in South Island high country soils. The objective was to quantify seasonal lucerne production in what have previously been considered marginal soils.

This research was undertaken as part of The New Zealand Merino Company (NZM) and Lincoln University’s high country forage project. The overall goal of this work is to improve productivity and sustainability in high country grazing systems.

Soil types at Bog Roy

Bog Roy has varying altitude between 400 and 1,000 metres above sea level. The flat land varies from shallow, stony fluvoglacial soils, as a result of deposition from glacial meltwater, through to deep loess. Loess is sediment that has formed from the accumulation of wind-blown silt; this has been deposited over thousands of years from the prevailing westerly wind.

Bog Roy receives on average 380 to 400 millimetres of annual rainfall. The low rainfall results in Pallic soils which are naturally high in pH and phosphorus, but low in organic matter and sulphur (as shown in table 1 below).

Table 1: Soil tests conducted at Bog Roy Station (20/05/2013)

Site	pH	Olsen P (mg/L)	Sulphate S (mg/kg)
Cone Hill	6.0	9	3
Pillars	6.3	7	4

Soil pH is considered one of the most important factors in establishing lucerne. The Pallic soils at Bog Roy had an optimum pH to support lucerne growth and root development. Soil pH should be greater than 5.9 for successful nodulation to occur, and above 5.6 to support lucerne root growth.

The soils at Bog Roy were considered marginal for Olsen P and sulphate sulphur. Optimum levels of Olsen P for lucerne growth are 15 to 25 milligrams per litre, and for sulphate sulphur optimum levels are 10 to 15 milligrams per kilogram. However, the trial demonstrated that lucerne can be grown highly successfully in this challenging environment, with excellent livestock performance.

Livestock performance

The traditional production system at Bog Roy saw lambs retained through until the following spring, creating a high feed demand during the driest month of January and continued high demand for feed through the winter. The successful introduction of lucerne to Bog Roy has helped David and Lisa to match their feed supply with their feed demand, increasing the efficiency of the farming system.

With the new system, the pre-weaning lamb growth rate has increased from 205 to 235 grams/head/day (see table 2 below). This means the Andersons can now sell heavier lambs in early January (rather than keeping them through until the following spring). This has resulted in a lower demand for feed during the dry summer period, as well as the winter months. The key benefit is that there is less need for supplementary feed, reducing feed costs from \$10.33/stock unit to \$4.82/stock unit.

Further, ewe lamb replacements are reaching heavier pre-winter live weights. The average weight has lifted from 35 kilograms to 38 kilograms. This is resulting in both a higher two-tooth scanning percentage and weaning percentage, as shown in table 2 below.

Table 2: A comparison of the performance of young stock on native pastures (pre-2010) and the new lucerne based system (2013/14) at Bog Roy Station.

	Historic pastures (prior to 2010)	Lucerne based pastures (2013/14)
Lamb weaning weight (kg)	27.0	29.0
Lamb growth rate (g/hd/day)	205	235
Ewe lamb weight May (kg)	35.0	38.0
Two-tooth scanning (%)	111	129
Two-tooth weaning (%)	84	100

In addition to the livestock benefits of grazing stock on high-quality lucerne, by rotationally grazing their ewes on lucerne during the spring, the Andersons have been able to reduce the stocking rate on the hill country, allowing pasture cover to build up for later use.