

# Value and potential of white clover for sheep production

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## Abstract

The Gardyne Family farm a 710 hectare property at Chatton near Gore in Southland. The property is intensively farmed with 9,375 stock units, sheep and beef being carried at rates of 17.5 su/ha on the cropping property and 12.5 su/ha on the Pyramid Hill grazing property. White clover is the key to animal, crop and herbage production supplying nitrogen for highly productive pastures, building organic matter levels for the cropping rotation, and providing very high quality feed for finishing young stock. Management techniques to maximise clover production are essential and include: (i) use of adequate P, K and S fertiliser to ensure Olsen P levels above 20, (ii) set stocking the grazing block from lambing to weaning to generate maximum clover yields, (iii) returning older grass dominant pastures to cropping to harvest the fertility build up and restore a clover-dominant pasture, and (iv) maintaining adequate pasture cover to allow the pasture plants to express their potential. The Gardyne family use and experience the benefits of the regionally bred Grasslands Demand white clover on their property. Establishment of new cultivars is discussed, and suggestions made for further research.

**Keywords:** beef, cropping, fertiliser, Grasslands Demand, pasture establishment, pasture management, sheep, Southland, stocking rates, white clover

## Introduction

White clover is the vital ingredient in our mixed farming operation. I believe it is New Zealand farmings greatest competitive advantage and it is important that we continue to increase our understanding and husbandry skills with white clover.

I am in partnership in a 710 hectare sheep, cattle and cropping property run by the C.K. Gardyne Trust. The Trust carries 5,000 Romney ewes, 1,000 Perendale ewes, 1,500 ewe hoggets, 180 yearling steers and heifers, 25 breeding cows, 130 hectares of cereal crop and 16 hectares of swedes on our own land, and another 50 hectares of lease cereal crop. There are 9,375 stock units (su) on pasture at 12.5 su per hectare on 'Pyramid Hill' and 17.5 su per hectare on 'Viewbrae' and 'Carslae' properties.

The partnership involves my parents, myself and wife Elspeth, my brother John and his wife Joanne. The properties are managed on a day to day basis in two units, with ourselves being responsible for Viewbrae (222 ha) and Pyramid Hill (121 ha), and John and Joanne responsible for Carslae (364 ha).

The Gardyne Trust farms two distinct types of land. The Viewbrae and Carslae properties are on gentle rolling country with good soils and have areas of cereal crops and greenfeeds which utilise the fertility built up by pasture and assist with livestock wintering. The cereals complement the growth curve with new pasture established in the early autumn, and older pasture are not put into cereals or swedes until October or November. New pastures, following the crops, are very clover dominant so pastures are vigorous and stock health is very good. In contrast the Pyramid Hill property is easy hill country where we cannot use cereals to create clover dominant pasture. All pasture renovation is done with the direct drill. To create clover dominance for finishing lambs and fixing high levels of nitrogen, we ensure that good soil fertility levels and correct grazing management are maintained.

The farming practice on these properties is intensive, seeking to integrate and balance land usage by sheep, crop and cattle, to achieve maximum output. White clover plays a critical role in this process by:

- supplying nitrogen for highly productive pastures
- building organic matter levels for the cropping rotation
- providing very high quality feed for finishing young stock.

## Management objectives

1. To manage for optimum white clover growth during December and January.
2. Fertiliser use and grazing management are optimised to maximise white clover growth and to ensure high nitrogen fixation is achieved. This leads to better grass production in the critical autumn and winter period.
3. To finish lambs on a diet with a high percentage of white clover so that there is no need to supplement the animals with minerals or vitamins.

## Management of Pyramid Hill property

Pyramid Hill is 12 kms north west of Viewbrae on easy hill country with a Black Ridge soil type, and altitude between 140 and 280 metres. It tends to have a summer dry period and carries 1,000 Perendale ewes, 25 breeding cows. One-third is cultivated grass paddocks, the remainder being **oversown** tussock country, broken in nature with matagouri cover as well.

This bare land block was purchased in 1970 and required considerable subdivision and fertiliser usage. Initial Olson P levels were 11-12 but now range from 20 to 40. Emphasis was also placed on using a higher S content fertiliser. The increased soil fertility and better subdivision have had a marked impact on animal production. Ewes average 140% lambing and 85% lambs are finished on property to an average weight of 17 kg by late March. Cows and calves also achieve good weights and calving percentages. White clover is the key component to good stock performance.

The management of this property complements the rest of our operation and avoids daily attendance to feed stock and lamb ewes. The Perendale ewes are pre-lamb shorn and then set stocked for lambing in the second week of September. Set stocking from lambing to weaning favours clover stolon development and growth (Hay and Baxter 1990). Weaning occurs in early December when ewes are mobbed- up and lambs are given ample scope on both the **oversown** tussock and pasture. The white clover is dominant in pastures for the next two months, allowing finishing lambs to very good weights and injects the nitrogen needed to keep the pastures in good order. Management is simplified on this farm as no supplementary feed is made or used, saving the hassle and expense of conserving and feeding out. The aim is to manipulate our stock management to fit the natural pasture growth curve by:

- moving replacement ewe lambs to Viewbrae in late May/early June to be wintered on swedes
- sending all lambs for slaughter before the end of March
- ensuring 50% of lambs are terminal sire to increase growth rates
- set stocking over spring to control grass growth
- weaning in early December.

The last two points are important in achieving white clover dominance over summer.

Weaning was brought forward a month to early December, 6-7 years ago. This has had a dramatic impact on the properties performance. Weaning in early January used to suit us well when we brought the lambs home to finish as it allowed us time to build up feed at 'Viewbrae'.

However on the negative side, the stock were right on top of the feed at weaning, and if it happened to be dry at that time, we missed the optimum period when the grasses have slowed, for significant white clover **herbage** levels to build up.

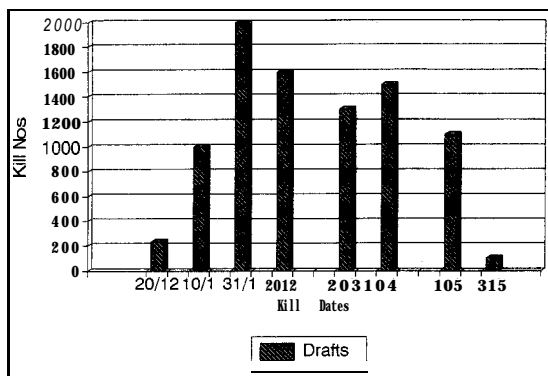
## Management of Viewbrae and Carslae properties

Viewbrae is 16 kms north of Gore on a gentle rolling Crookston soil type at an altitude of 150 to 180 metres. It has the grain drying complex and winters 1,800 ewes, 80 yearling MS cattle, 750 ewe **hoggets** and grows 8 hectares swedes and 52 ha cereal crop.

Carslae is 8 kilometres north east of Viewbrae on 270 hectares of gentle rolling Waikoikoi silt loam, 90 hectares is dredged river flats, being stony and dry. Altitude is between 120 and 150 metres. It carries 3,200 Romney ewes, 110 yearling steers, 750 ewe **hoggets** and grows 8 hectares swedes and 78 hectares cereal crop.

Both these properties have approximately 25% of their area in cereal crops. The crop rotation has been shortened enabling a higher turnover of new pasture, resulting in more white clover dominant pastures to finish lambs on. During the last season we sent 9,000 lambs to the works (Figure 1) at an average weight of 16.39 kg (Southland average is 13.5 kg). Approximately 3,000 of these were bought in lambs, so this result is very satisfying. This was achieved without mineral supplements (other than selenium in fertiliser), injections or expensive drenches. The high proportion of white clover in our pastures is the main reason for this level of performance. We have found that if the white clover **herbage** levels have built up to approximately 15-20 cm, these paddocks can be set stocked at 50 lambs/ha, and achieve around 300 grams **liveweight/day** over the months of January and February. Achieving very good white clover growth levels also produces vigorous pastures.

Figure 1: C.K. Gardyne Trust Lamb Kill 1994-1995.



## Use of new white clover cultivars

Three years ago we sowed our first area of Grasslands Demand white clover. We were keen to use this new cultivar because it had been bred locally at Gore and showed significant advantages over Huia (Widdup et al. 1989). Demand produced 10 to 40% greater yields compared to Huia over a 4-year period at Gore. The greatest advantage was during the spring/summer period. In the first year, seed was very limited so only a four hectare paddock was sown with Demand, the rest that year was sown with Huia. The main difference we observed was Demands ability to grow more vigorously later in autumn and earlier in spring. In August it is not unusual to see quite vigorous Demand white clover growth. In the last two years, all new pastures have been sown with Demand and we are following the first paddock to see how the Demand performs as the nitrogen levels build up and determine how well it competes with associated grasses.

## Establishing new pastures

We prefer autumn sowing after spring barley or autumn wheat has been harvested. With spring barley, land levelling and liming is done in the spring prior to sowing, so that after harvest, crop residue is burnt, and only a surface working is needed. Timing is of utmost importance. There is a big difference in establishment between pastures sown in early March (preferred) and those sown at the end of March. In mid April, 50–60 kg urea is the only fertiliser applied to encourage tillering and establishment, while P and K fertilisers are applied in the following October. Glyphosate is used prior to harvest to ensure a good clean seedbed, good control of rhizomatous weeds and a cleaner burn.

After autumn wheat harvest the main difference is ploughing and land levelling as there is more time available for this operation. Undersowing cereals has been used as it simplifies the process, but crop yields suffer and it can leave a patchy pasture.

Some paddocks previously in swedes and not suitable for cropping are sown in November. This is a common time for pasture sowing in our area. This timing normally gives good establishment, but does require some hard grazing pressure to control weeds.

Direct drilling can be used for pasture renewal in ground unsuitable for cropping. Recently all the pasture renewal at Pyramid Hill has been done this way. Timing has varied between November and the end of February. The earlier drilling achieves better clover establishment in the first season, and will give some good lamb feed by the end of January. On the negative side, spraying

off at that time doesn't control weeds such as Californian Thistle. Therefore we have sometimes delayed spraying until late January/early February to gain good control of Californian Thistle, rushes and cutty grass. The pasture does need to be kept hard grazed prior to spraying to stop the seeding of old pasture. Later sowings are not as well established going into winter and higher nitrogen applications are required.

Soil fertility, drainage, and weed control requirements must be addressed to ensure successful pasture renewal. Good soil fertility is critical in ensuring new clovers can function well and fix the nitrogen to give the increased fertility levels needed by the new grasses. Failure to correct poor soil fertility levels will quickly result in reversion to the previous poor pasture. We regularly use Molybdenum and strongly believe its negative points have caused some people to be overly cautious in its use. Strategic use of nitrogen fertiliser can be helpful. With autumn sowings, nitrogen encourages development of grass cover to protect clover from frost. A further spring application helps pasture to develop until the clover is established enough to start fixing its own nitrogen.

## The future

Future aspects of white clover production that warrant consideration are:

1. Development of rhizobia which fix nitrogen in cooler conditions. This would complement the new white clover cultivars that will grow more vigorously in cooler conditions.
2. Ensuring these rhizobia are competitive against naturalised rhizobia, so it can be used in ground which has had white clover.
3. The considerable ignorance as to white clover's vital role in our pasture system that still exists and even the fact that we put fertiliser on mainly for white clover in order that the grasses benefit from the N fixed.
4. How much potential nitrogen could be fixed under optimal conditions?
5. Improve understanding of the nutritive value of white clover which results in high animal growth rates.
6. Continue research into Californian thistle control.

I believe a suitable publication for farmers explaining white clover's importance and management practices that both help and hinder white clover production, would further lift livestock performance on our farms.

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## References

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