

# Maximising subterranean clover in Marlborough's hill country is key to weaning 80% of sale lambs prime

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## Abstract

Pre-weaning lamb growth rates have dramatically increased on the hill country property Tempello, from 258 g/head/day in 2001 to 350 g/head/day in 2007. Total kilograms of lamb liveweight weaned off the Corriedale and Corriedale/Poll Dorset flock area has increased from 60 tonnes to 76 tonnes, despite a reduction in ewe numbers. This has been achieved through a \$315,000 investment in sub-division, fertiliser and water reticulation, coupled with a management shift towards maximising subterranean clover. Clover content in the sward of up to 50% in spring is achieved through letting subterranean clover establish in autumn. Ewes are not grazed on the blocks following germination until at least five leaves are present. Cattle and ewes are used to graze grass cover off paddocks in early winter (May and June) so that clover can compete. Paddocks are then spelled for up to 2 months prior to lambing, to let clover grow. Short-rotation ryegrass is used to feed some ewes during this time.

**Keywords:** grazing management, hill country, lamb production, subterranean clover, summer dry

## Introduction

Tempello covers 4800 ha of the hills between the Wairau and Awatere Valleys. Around 2,600 ha of the property are effective. It typically has fast spring growth but a slow summer pasture growth curve. Summers are typically hot and dry (average rainfall 450 to 550 mm/yr).

The Grigg family has farmed Tempello since 1913. Large extensive blocks have been sub-divided over time and pasture fertilised and improved. Mt Barker sub clover was broadcast with limited amounts of fertiliser in the 1950s but management remained relatively extensive until the Land Development Loans in the 1970s. These enabled the Griggs to fly on grass and Woogenellup subterranean clover seed. More recently the focus has been to nurture the existing clover so it builds its own seedbank. This is because the risk of failure following broadcasting seed onto hill country is too great.

In 1999 the blocks were large (100 ha) and this meant poor pasture utilisation (of around 30%). Grass was shading out and dominating clover and producing

seedhead early. Pasture was wasted and sheep performance was variable.

A fencing, fertiliser and water reticulation programme began in 1999 and went through the years when the Griggs were in the Meat & Wool New Zealand Monitor Farm programme (2003-2005). Management has become intent on optimising conditions for sub clover establishment in autumn and dominance in spring. A high legume diet means high milk production and rapid lamb growth.

The area targeted for sub-division was 400 ha of medium to steep hill country and one of the better parts of the farm. The mid-micron ewe flock (around 2,100 ewes) stay within this oversown top-dressed pasture area throughout the bulk of the year. In late winter the twinning ewes spend 1 month being break-fed on 20 ha of short rotation ryegrass on flats. For a month in autumn, ewes sometimes graze 200 ha of bracken and danthonia on the steeper high country.

Because of the regular summer dry, the policy is to sell all lambs at weaning by late November. The more weaned lambs that go prime, the better the returns. Of the arable country at Tempello (around 60 ha total), 13 ha has been converted into vineyards so there is little scope to finish weaned lambs on crops. Nor is there a financial incentive to do so.

The hill country property is currently wintering 9,000 stock units with 50% cattle (made up of Angus/Hereford cows, calves and trading steers/heifers) and 50% sheep (Corriedale and Corriedale/Poll Dorset ewes, Merino ewes, Merino wethers, hoggets). Merinos are run on a totally separate area of the farm from the Corriedales (known as the Taylor Pass and Islands Country).

## Methods

### Fencing/water

A 400 ha area of hill country was sub-divided from 100 ha blocks to between 50 ha to 5 ha paddocks (average size of 20 ha). Thirty km of fencing was put in between 2000 and 2005. All fences were permanent electric with warratah/post construction. This enables further temporary electric fence sub-division to force cows and ewes to graze blocks hard over winter. Central sheep yards were built, to allow better monitoring of stock. Total development costs were \$248,000 (including yards of \$8,000).

Lack of water in dams during 1997/98 and 2000/01 droughts meant 600 ha of the farm could not be grazed over summer. Pipes and troughs were installed over the 400 ha of previously dam-reliant blocks. Pump and infiltration trenches were needed. This cost \$75,000.

### **Sub clover management**

Sub clover is well adapted to the climate and soils of Tempello. A plan to exploit the full potential was initiated by Dick Lucas from Lincoln University, consultant Peter Anderson and David Grigg.

The regular summer drought means that pastures are normally eaten out before autumn rains. This ensures sub clover seedlings will have space when its new population is re-establishing after the summer dry.

Autumn is the first key stage. Sub clover seed germinates with autumn rains following summer drought. Sometimes some soft seed germinates as early as January (if it rains) but this often dies if no follow-up rain arrives (known as false strike). Thankfully, the 'hard-seed mechanism' allows the plant to keep some seed in reserve. Hard seeds do not germinate straight away in early autumn but germinate late autumn or even the following year.

Building up a seedbank from existing plants is the most reliable method of ensuring clover content. Key to getting high numbers of clover plants surviving through to spring is not over-grazing seedlings in autumn. Stock are kept off paddocks until seedlings have three to five leaves visible on most plants. This usually means ewes will need to be mob stocked on a sacrifice paddock and fed supplements during tugging. Good early March rain is a rarity.

At Tempello, supplements have been fed during March tugging 8 out of 9 years due to lack of green pasture until midway through tugging (1999 to 2007). It is common for rains not to arrive until April/May. The Griggs continue feeding supplements to mob-stocked ewes until the sub clover is well established and resist the urge to give ewes the green pick.

In June, blocks are bared off by cattle (to 900 kg DM). Cattle are ideal as they cannot get close enough to graze the sub clover.

Blocks are then given a 2-month reprieve before set-stocking on 20 August. To allow this spell, the Griggs break-feed twinning ewes on autumn-sown short rotation ryegrass or Omaka barley on the flats in July/August. Singles are wintered on the sunny faces of the developed hill country. To make up for grazing sub clover in these blocks over late winter, they are grazed only lightly in spring and often not at all in summer.

### **Reap rewards in spring**

In spring it is time to reap the rewards. A typical sub clover content at Tempello would be 40% to 60% of the

dry matter on offer. At this level, ewes get the benefit of a high-legume diet and milk fantastically. To set up good milking, the Griggs target a ewe condition score pre-lamb of above 3.5 (on a 1 to 5 scale). Feeding crop pre-lambing to ewes carrying twins in August on the flats is important to achieving this condition score.

Ideal pasture covers immediately pre-lamb are 1,400 kg DM/ha for twins and 1,200 kg DM/ha for singles. Cows and calves are stocked with the ewes during lambing, to help keep the pasture groomed.

Ewes are Corriedale (about 1/3) or Corriedale/Poll Dorset (about 2/3). Some of the ewes had a 1/3 Highlander influence (introduced 2005 for 1 year). A Black-face/Texel-cross ram is the terminal sire.

Every few years, clover is allowed to flower in a block during spring so that increased seed numbers are added to the seedbank. If blocks seem short on clover, these are the areas that will be left ungrazed during flowering in spring, if the season allows.

### **Fertiliser**

A capital dressing of 2 t lime/ha was initially applied. Since then the developed area has had an annual dressing of 200 kg superphosphate/ha. Olsen P levels are 15–18 and sulphate sulphur is 7–10. The 2006 soil test showed the pH was low to moderate (5.5 to 5.8) but 2 t lime/ha has since been applied to most of the area.

### **Sub clover cultivars**

Successful hill country development usually involves a balanced investment in fertiliser, subdivision, grazing management and seed of legumes and grasses. However, on Tempello it was considered that the resident sub clover was sufficiently widespread on both sunny and shady faces to rely on appropriate grazing management to increase its productivity. After 6 years of more intensive management, there are about equal proportions of Mount Barker and Woogenellup sub clover cultivars in the spring herbage. The later flowering Mt Barker tends to be more common on shady faces and Woogenellup, which flowers about 2 weeks earlier, contributes more on the sunny faces.

Sub clover on the steepest north-west faces is sparse. An earlier flowering cultivar of sub clover may be better adapted to those drier sites. One attempt to establish the early flowering sub cultivar Dalkeith on a steep sunny face was not successful and indicated the high risk associated with broadcasting sub clover seed on to sunny faces in dry hill country.

Both Mt Barker and Woogenellup are classed as superseded cultivars in Australia and in theory more modern cultivars would be desirable. If the resident sub clover population had been sparse the additional cost of broadcasting seed in autumn would have been a necessary

**Table 1** Tempello sale lamb performance, 2001 – 2007 (Corriedale and Corriedale/Poll Dorset ewes)

Year	Ewes mated	No Lambs sold	tLW sold from 600 ha	Gross lamb sales (\$000)	Lambs sold store	Store lamb \$/head	Lambs sold prime	Prime lamb \$/head	Ave \$/lamb (ave 80 d old)	Ave weaning weight (kg)*	% sale lambs sold prime at weaning
2001	2671	2290		\$147					\$64**	27	50%
2002	2353	2400	60	\$108					\$45	25	12%
2003	2285	2300	76	\$138					\$60	33	75%
2004	2060	2215	69	\$119	911	\$33.50	1304	\$68	\$54	31	59%
2005	2160	2479	67	\$104	2068	\$37.50	411	\$65	\$42	27	17%
2006	1947	2036	66	\$131	370	\$43.00	1666	\$69	\$64	32.5	75%
2007	2054	2382	76	\$130	365	\$22.00	2017	\$60.40	\$55	32	85%

\*Assumes 4 kg birth weight \*\* Some sold after weaning

**Table 2** Tempello ewe and lamb (both ewe and ram) performance, 2001 – 2007 (Corriedale and Corriedale/Poll Dorset ewes)

Year	Ewe weight at tupping (kg)	% lamb survival to sale/ewes mated	Ave lamb weaning weight (kg)	kg lamb weaned/ewe	LW gain from birth to sale (g/head/day)*	Ave weaning age (d) ***	Comments
2001	60	108	27	29	258	93	
2002	63	128	25	32	273	77	Spring drought
2003	65	128	33	42	402	72	
2004	68	134	31	41.5	337	80	
2005	67	141	27	38	328	73	Spring drought
2006	68	140	32.5	45.5	356	80	Good spring, all gone by 1st Dec.
2007	68	136	32	43.5	350	80	Killed down to 13.5 kg CW as paid better than store, poor spring.

\*\*\* Usually lambs on the farm for only 80 days. Lambing date has ranged from 20 August to 8 September.

component of the development plan to provide the essential legume base for the pasture. A prolonged period of moist weather after seed is spread is required for successful sub clover establishment.

## Results

### More meat

Despite ewe numbers dropping from 2,670 in 2001, to 2,350 in 2002 to around 2,100 nowadays and being replaced with cattle, total kilograms of lamb liveweight sold has increased from 60 t LW to 76 t LW. Sale lambs include all ram lamb and cull ewe lambs. This production came off the 400 ha developed area, plus a short period of grazing on another 200 ha of bracken hill (Table 1). As the Corriedale and Corriedale/cross flock numbers have declined they have been replaced with 120 extra cows (from 100 to 220); and also after 2005 all Corriedale ewes have been grazed on the home block rather than some being grazed elsewhere (i.e. stocking rate stayed around the same).

This improved tonnage has been possible by holding lambing percentage around 136% to 141% while keeping lamb kilograms weaned/ewe topped above 41 kg (in 3 of the 4 years). The best year was 2006 with 46 kg of lamb weaned/ewe topped. This was in turn made possible by an average pre-weaning lamb growth rate of 356 g/head/day (Table 2).

### Improved pre-weaning lamb growth rates

Before subdivision, spring pasture was difficult to control and grass seedheads could often get knee high. It would quickly develop seedhead and become rank and of low quality. Clover was suppressed. In this situation, lamb weaning weights of 27 kg LW at 90 days were typical (average pre-weaning growth rate of 255 g/head/day) as seen in 2001. The Griggs considered this to be unacceptable.

After subdivision and therefore controlling grass height in summer and winter, sub clover was able to flourish. A 15 cm cushion of green clover leaves covered the ground in spring, with green grass poking through. This was achieved in 2003, 2004, 2006 and 2007 and, as a result, pre-weaning growth rates were 402, 337, 356 and 350 g/head/day respectively over all sale lambs. In 2005 there was a severe spring drought yet 328 g/head/day was achieved as subterranean clover was still present (Table 2).

### Lambing percentage up from 108% to 140%

At the same time, lambing percentage lifted by 30 percentage points in 4 years from 110% average to a peak of 141% and 140% in 2005 and 2006 respectively. Ewes currently lamb starting 23 August but have started lambing as late as 8 September in the past.

### Higher weaning weights

Prior to fencing and management changes to generate more clover, a grass-dominant spring produced lambs that were 27 kg LW at weaning. This was only 3 kg heavier than lambs grown in a severe spring drought (24 kg average LW in 2002) when pasture was brown.

By 2004 following development, the average weaning weight was 31 kg. Around 59% went prime at weaning. The trend to increased lamb weaning weights has continued.

In 2006, 75% of lambs went prime at weaning with average weaning weight of 32.5 kg LW. In 2007, 85% went prime at weaning, although some drafts went down to 13.5 kg carcass weight (29 kg liveweight) as the killing schedule was better than store prices. The lambs were sold at less than 81 days of age.

### Lamb weaned/ewe mated from 29.6 to 45.5 kg

Sheep for Profit™ data shows that the Tempello flock produced 29.6 kg of lamb per ewe mated in 2001. This lifted by 11.9 kg to 41.5 kg by 2004. The spring drought of 2005 meant lambs were sold early and light, costing around 5 kg of liveweight/ewe. In 2007, spring was also late but ewes still milked well, producing 43.5 kg of lamb/head.

### Higher ewe weaning weights

The Griggs target to wean ewes at their ideal topping weight (65 kg). This means ewes just have to be maintained through summer. It is expensive to try to fatten ewes when feed is short. This policy has been achieved every year since 2004.

## Discussion

### Profitability

The bumper lamb schedule of 2001 has not been matched (except perhaps for a short time in November 2006). This pushed the lamb cheque in 2001 to \$147,000.

But better performance per head has helped cushion fall-off in lamb schedule prices since 2001. Despite 600 fewer ewes in 2007 and lower schedule prices, the Tempello lamb cheque was only \$17,000 less.

Since development, a higher proportion of lambs have been sold prime by 80 days of age (85% in 2007). This means the Grigg's lamb sales can target the schedule spring high (October/November) from a late August lambing. Earlier weaning also means cull ewes can be sold earlier, freeing up feed for other ewes.

Prior to fencing and management changes, sale lamb weaning weights were around 27 kg LW. After changes, sale lambs in 2006 and 2007 weaned at an average of 32 kg LW. This makes a massive difference to profitability.

As an example, at \$4.30/kg CW for a late October/early November lamb, this extra 5 kg LW makes the

difference between producing a 27 kg store lamb at \$35 and an 'early season' prime lamb at \$69. In 2007 this difference between store and prime prices was very marked. The advantage was \$34/head. Over 2,200 sale lambs this is a considerable \$74,800/yr of extra income. Over the 400 ha of Tempello where the Corriedale and Corrie/cross ewes are predominately run, this is an extra \$187/ha. This level of return from lamb is important as feed costs during tupping and during dry periods can be high at Tempello (around \$10,000 to \$30,000/yr).

#### **Better utilisation**

As well as more meat produced per ewe, benefits from the development include less need to feed supplements to ewes. Analysis showed that 10 km of fencing in 2003 allowed an extra 65 days of grazing for 1,000 ewes because of better utilisations. This was worth \$13,000 (at \$0.20 of feed/ewe/day if supplementary feeding).

#### **Conclusions**

The capital development on 'Tempello' has enabled more intensive grazing management to exploit the spring production potential of sub clover. If the development programme had not improved flock performance, the Griggs acknowledge that economic returns from lamb sales would not have covered expenditure given current costs of running a ewe flock and recent poor lamb prices.

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