

## **NRM – Orphaned Lamb Trial – 2003**

Commissioned by:	NRM New Zealand	
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On the properties of:	Mr David Grant	Rangitata, South Canterbury
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### **Aim of the Trial**

1. To investigate an economic way to rear orphaned lambs using a commercial lamb milk replacer (LMR) plus ad lib concentrates over a 14 week rearing period in two large sheep farming properties in the South Canterbury region.
2. The protocol is aimed to rear newborn lambs on a minimal amount of milk replacer and to encourage the early intake of a highly palatable, high energy concentrate, plus grass to produce a saleable lamb at 14 weeks of age.
3. The products used were:
  - OVITOP – a whey based LMR from DENKAVIT Holland
  - MOOZLEE – a modified steam flaked texture feed produced by NRM for the calf rearing market.
4. To assess the viability of a restricted milk feeding system to wean lambs off milk by 30 days of age.
5. To stimulate early ruminal development by the use of concentrates, hay/straw and grass to become a fully functional ruminant after day 30.
6. To develop the principles of an intensive lamb rearing system. The requirements for housing, pen sizes, lambs/pen, teat feeding systems, bedding, ventilation, drainage, water and trough space.
7. To address the animal health and welfare issues. To quantify the survivability and mortality rates, and the occurrence, treatment and prevention of the diseases of the young lamb.
8. To assess the labour/staff requirements and the social implications of orphaned lamb rearing under commercial conditions and seasonal pressures to produce a lamb for the store/weaner market.
9. To develop a practical lamb rearing system for the increasing number of multiple births (twins, triplets, quads) in New Zealand sheep breeding systems.
10. To increase both the number of lambs and the total kilograms of liveweight weaned per ewe in one season.
11. To utilise an often wasted resource and so increase the 'bottom line' for sheep farmers.

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## Background

The Economic Survey Quarterly Report March 2002 showed that the total number of ewes mated in New Zealand to be 30.1 million producing 36.0 million tailed lambs and a lambing percentage of 119%. About 10% (4 million) of these lambs are lost in the first week (prior to tailing) and then it is estimated that a further 10% of these tailed lambs will be lost prior to weaning.

The trend in New Zealand sheep farming is to increase the lambing and scanning percentages annually with high fecundity breeding ewes and so a 150-200% lambing percentage is becoming the norm. So the trend of multiple births will dramatically increase – see Chart 1

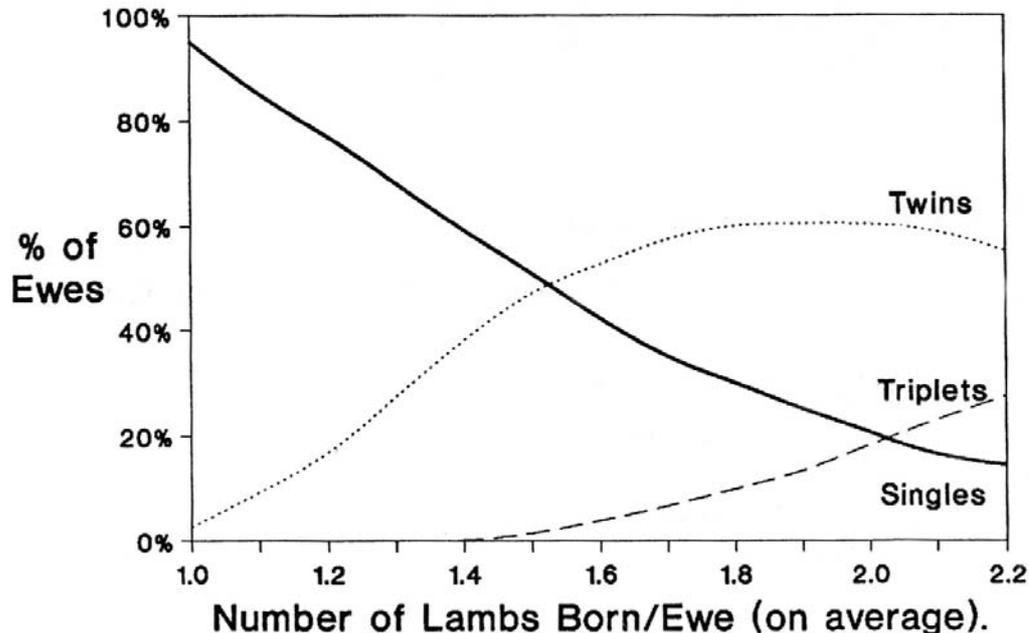
### Chart 1

#### 1.4.8 Lambs Born: Proportions of Singles, Twins and Triplets

(Source: M.A.F.)

Figure 1.13 (below) shows the influence of lambing percentage on the numbers of singles, twins and triplets born.

**Figure 1.13: Proportion (%) of Ewes Producing Singles, Twins and Triplets**



Although the number of live lambs born has increased, the reduced survival rate has meant that this potential is not being captured. In fact, the increased fecundity of the ewes may now have outstripped the ewes' mothering and milking ability.

For example, Dr Paul Muir states that in the Poukawa elite flock 25% of the triplets die before 12 weeks of age. Similar figures from Dr Morris and Dr Paul Kenyon at Massey University stated that the survivability of triplets to be only 68% (32% mortality) and those were some 0.9kg lighter than a twin and approximately 2kg lighter than a single lamb.

A further case study in the Rural News September 2003 reported a Southland farmer's ability to increase the scanning percentage of his flock by 3% annually to 176% - but that lamb losses to tailing were 18%-25%.

There seems to be little point in increasing the number of lambs born if the survivability of these lambs is lost.

Each year 'unseasonal' storms and persistent cold and rain have claimed a large number of newborn lambs during the peak lambing period. It was reported in the NZ Farmers Weekly October 2003 that up to one-third of the 86,000 lambs born during a two-day Canterbury snow storm would have died.

A similar percentage (Farmers Weekly September 2003) was lost from the East Coast of the North Island during four days of persistent rain. It was reported by farmers that the smaller twins and triplets were the main casualties. In the high country these figures could easily be much higher.

The need to develop an orphaned lamb rearing system for New Zealand is urgently required. Why should these compromised lambs be left to die in the paddock? The potential is there to rescue these new born lambs for both economic and welfare reasons.

In Europe intensive indoor lamb and kid rearing has been done for many years. Milk intakes are high using about 10-15kg LMR (lamb milk replacer) and mortality rates often reaching 30%. The cost per lamb is high and so this would be uneconomic for New Zealand conditions.

New Zealand's aim is to develop low milk (LMR), high concentrate, early wean system similar to that used for the dairy beef calf industry.

## **PART I**

### **Lamb Rearing System**

#### **Objective**

To devise a cost effective system for the artificial rearing of orphaned lambs using a commercial whey based lamb milk replacer (LMR / OVITOP) on a restricted milk feeding system with ad lib concentrates (MOOZLEE) plus grass until weaning at 14 weeks in line with the main flock.

#### **A. Rearing Facilities**

The trial was conducted on two South Canterbury farms during the usual lambing period from August to December 2003.

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Lambs reared in hay sheds and implement sheds not previously used by adult sheep. Any contact with sheep yards and woolsheds were to be avoided at all costs.

Lambs were allocated about 0.5m<sup>2</sup> each and with 10-12 per pen. Pens were made from straw bales and wire gates.

Bedding – straw or shavings.

Sheds disinfected with 'VIRKON' prior to commencement and then weekly thereafter.

Water – unrestricted access to drinking water.

Meal troughs 2 x 1.5 metres of V shaped.  
Wooden troughs per pen places at ground level.

Ad lib straw or hay obtained from the straw and hay bales used as walls for the individual pens.

Drainage – none was required but pens should, if possible, have a sloping floor of sand or clay.

Ventilation – shed to be closed on three sides facing away from the prevailing wind. The straw bales provided wind and rain shelter at ground level. Wind cloth could be used on the wire gates to further reduce draughts and rain.

### **B. Lamb Selection**

No selection was made. Any orphaned lambs were picked up and taken to the rearing shed. These included singles, twins, triplets and those rescued by caesareans. The weight ranges varied enormously from 2.3kg to 8kg.

Weak or comatose lambs were tube fed with LMR or colostrum (if available) and placed into a 'hot box' for the first 12 hours. New lambs were placed in the allocated pen immediately. No special nursery pen was used. After two days lambs were regrouped according to size and suckling ability. Lambs then stayed in their groups until moving out to pasture at 14 days of age. When on pasture 3 or 4 groups of lambs would be mixed into groups of 30-50 depending on the teat feeding system available.

No attempt was made to increase the (colostrums) immunoglobulin status of these lambs.

N.B. The major difference between this trial and good calf rearing is that we are dealing with a high risk neonates with:

1. low body weight
2. already compromised with low or no immunoglobulin protection
3. done in conjunction with general farming and lambing pressures.

It is known that calves with no or low immunoglobulin status are some nine times more likely to scour or die and have mortality rates of up to 30%. Daily growth rates are also significantly reduced in these animals. It is likely that orphaned lambs would be similarly affected. Lambs were bottle fed at the start and learned to suckle very quickly – no more than two days. Lambs

were then bottle fed in a rack system on one farm and multiple fed via a multiple feeder on the other farm.

### C. Milk Feeding

The objective was to achieve once a day feeding as soon as possible.

#### **General Advice – lambs need at least 10-15% of their body weight in milk daily, so**

Lambs 5+ kg	-	800mls/day
Lambs 4kg	-	600mls/day
Under 4kg	-	500-600mls/day

**Mixing rate** - 200g/litre

**Temperature** - 'hot' 35-40 degrees C

#### **Daily schedule:**

Day 1 – 10	250mls 3 x daily
Day 11 – 21	400mls 2 x daily
Day 22 – 30	600 – 800mls once a day

Lambs to be placed outside with access to good quality grass 1200-1800kg DM/Hectare 4-6 inches long – when they were consuming 100g of MOOZLEE / lamb /day – usually at about 3 weeks of age.

MOOZLEE was available ad lib from day one. Keep fresh and topped up twice a day.

Lambs to be weaned off milk when they were consuming 200g/day of MOOZLEE or 10-12kg of body weight.

MOOZLEE **must** be continued to be fed in conjunction with grass at the rate of 400-800g/day until 20kg of weight 8 – 10 weeks.

Lambs to be rotated around paddocks of high quality pasture to encourage grass intake.

**Meal feeding** – MOOZLEE. A high quality steamed flaked meal with an 18% PR and a ME of 12.5 MJME and containing a coccidiostat. The palatability of this product is impressive and lambs started to eat this product by day 2. By week 10 the lamb intakes easily reached 700g/day and had to be restricted to this level.

## PART II

### **Results Animal Performance**

#### **Total Lambs Reared**

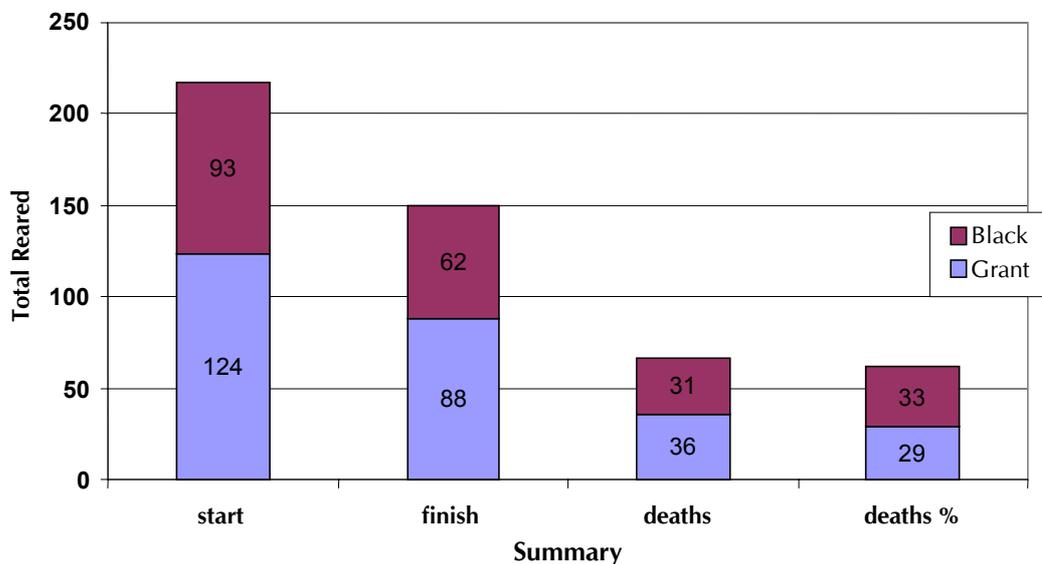
A total of 217 lambs entered the trial and 150 lambs were reared to weaning.

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**Mortality/Survival Rate**

The overall mortality rate was 31%. See Graph 1. Or a survival rate of 69%.

**Survival Rate : Combined 2003 : Graph 1**

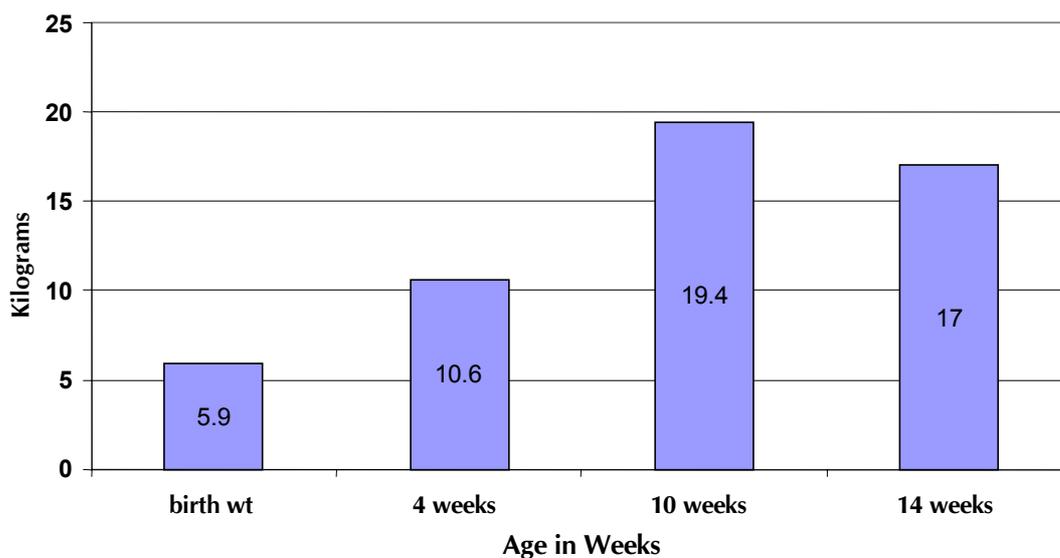


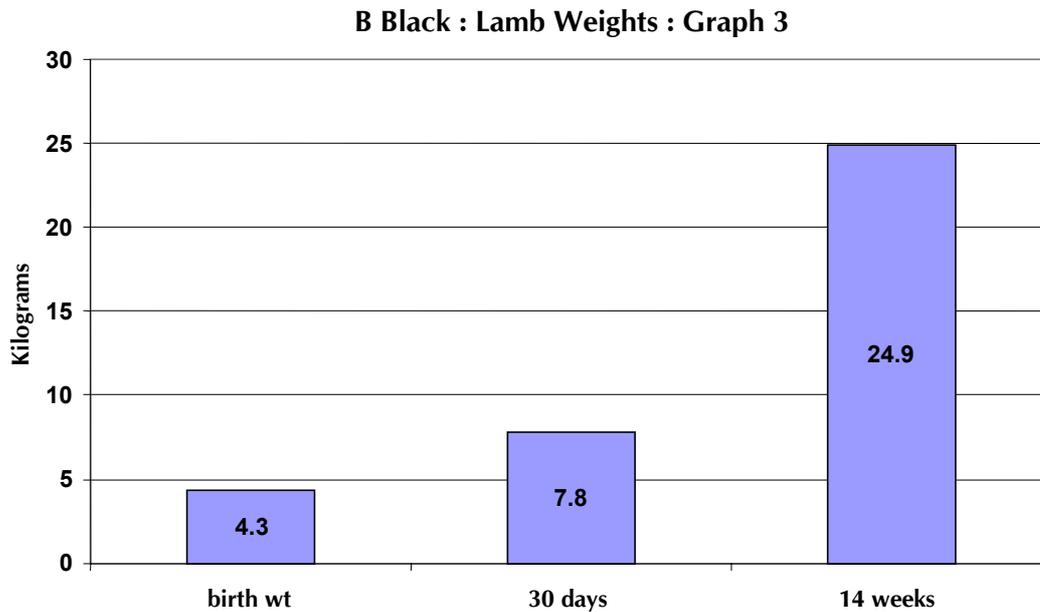
The mortality rate will be discussed later.

**Growth Rates**

See Graphs 2,3,4,5

**D Grant : Lamb Trial 2003 : Graph 2**





### Observations of Growth Rate

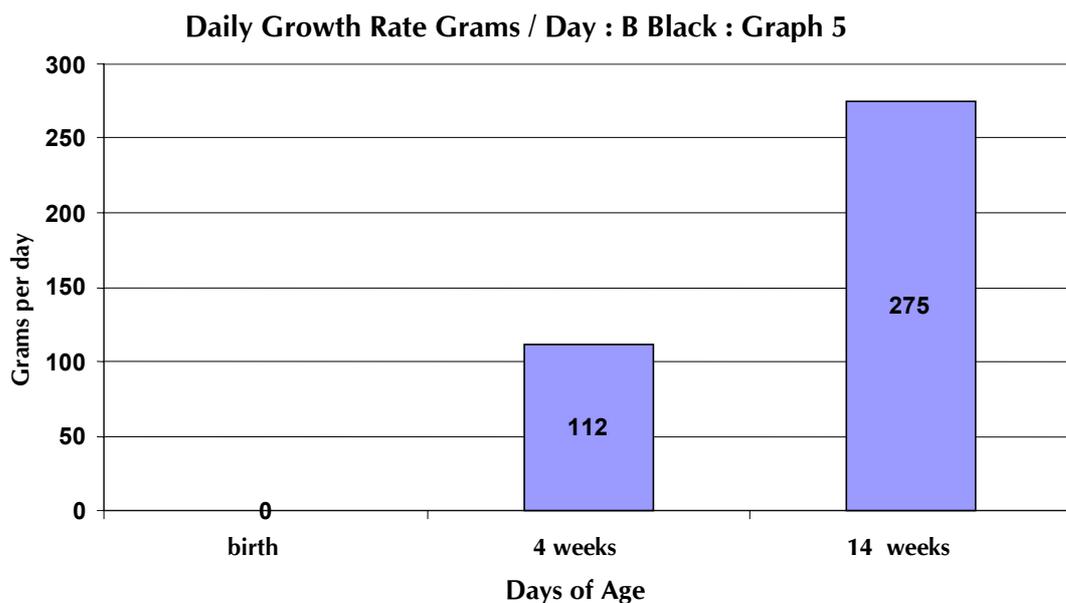
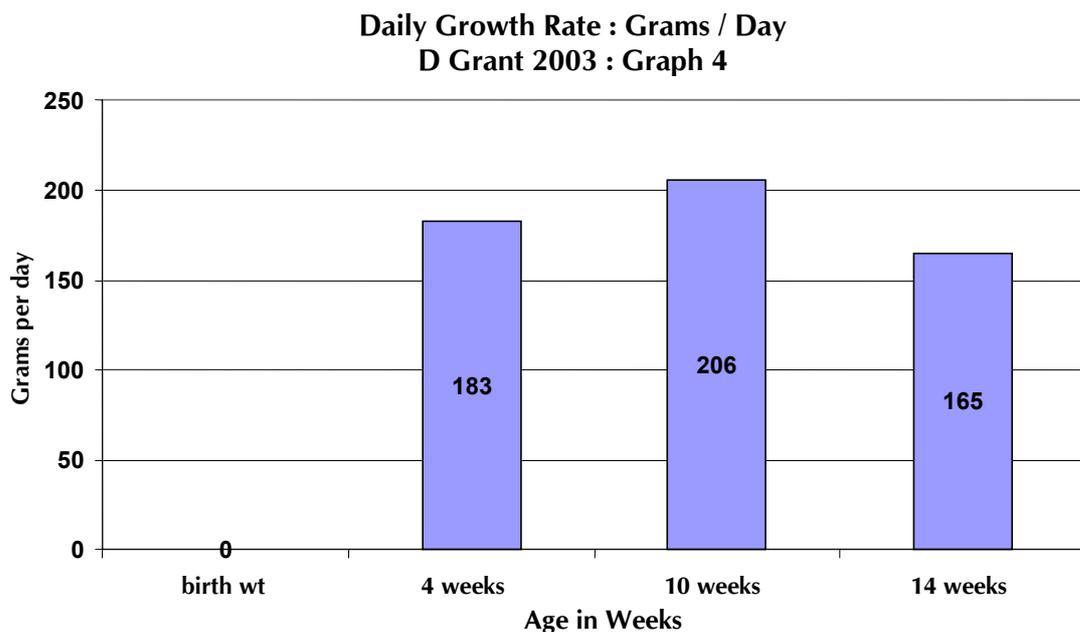
There is a marked difference between the final weaning weights between the two properties. The difference is due to the fact that the proposed protocol was not adhered to. In the case of Grant's, the lamb weights and daily growth rates were on a par with Black's until 10 weeks of age but were then mob grazed with 400 other lambs and given no further concentrates.

### Daily Growth Rates

Again, there is a marked difference between the daily growth rates between the two farmers. Early growth rate from birth to 2 weeks of age was about 100g/day. At 4 weeks the daily gains show a huge variation:

Grant	-	183g/day
Black	-	112g/day

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Both farmers had not given the lambs access to pasture as requested and in the case of Black the milk feeding regime had also been restricted.

**Post weaning** – on MOOZLEE and grass. The daily rate was as expected at between 206g and 275g/day, the growth rate being dependent on the amount of MOOZLEE supplemented. These figures compare favourably to that reported by Dr Paul Muir who recorded pre-weaning growth rates 145-160g/day and post-weaning weight gains at 240-270g/day.

## 1. Costs

See Tables 1, 2 and 3

**Table 1:** OVITOP

	<b>Litres/ lamb total</b>	<b>Volume mls /day</b>	<b>KG per lamb total</b>	<b>Cost \$5.10/kg</b>
GRANT	26.7	600	5.3	27.00
BLACK	24	530	4.8	24.50

### OVITOP LMR

The total LMR used was about 5kg/lamb to weaning. This included the milk used on lambs that died during the trial. Cost of OVITOP - \$25/lamb.

### MOOZLEE

Approximately 20kg of MOOZLEE per lamb at a cost of about \$17.

The difference between the two being the variation by the farmers from the Original protocol.

**Table 2:** Concentrates Moozlee

	<b>Intake Grams /Day</b>	<b>Total Kgs /Lamb</b>	<b>Costs \$ / Lamb \$0.88/Kg</b>
GRANT	400	16	14.08
BLACK	564	22.6	19.90

### Total Costs – About \$42/lamb

**Table 3:** Total Costs

	<b>Ovitop \$5.10 /Kg</b>	<b>Moozlee \$0.88 /Kg</b>	<b>Total Cost</b>	<b>Cost / Kg Lw Gain</b>
GRANT	\$27.00	\$14.08	\$41.08	\$2.41 /KG
BLACK	\$24.50	\$19.90	\$43.90	\$1.76

An important difference is in the cost/kg liveweight gain of \$2.41/kg v \$1.76/kg

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In this case, Black using more of the concentrate and for a longer period achieves a much better weaning weight and a significant saving in cost/kg liveweight gain.

The message is clear. To maximise the growth rates and to reduce the costs the aim must be to:

1. feed milk for about 4-5 weeks
2. feed ad lib MOOZLEE pre and post weaning until at least 20kg of weight
3. access to good quality pasture from an early stage is vital for an economic result.

Much has been speculated about the use of a cheaper concentrate in order to cut costs. I think that this is a false cost saving. The high palatability, digestibility and the addition of a coccidiostat are vital in stimulating early concentrate intake and ruminal development.

### 2. Animal Health

A brief look at the incidence of the neonatal diseases seen during the rearing periods, its prevention and treatments.

On arrival, each lamb was:

1. tagged and weighed
2. spray navel with iodine
3. a prophylactic dose of 1ml of long acting penicillin
4. check eyes – for in turned eyelids (ENTROPION)
5. joints – for joint ill (navel infections)

#### a) *Entropion*

Turning in of one or often both eyelids (looks like Pink Eye). Lambs will quickly become blind and lost. I suspect that this could be a major reason for mis-mothering on a farm.

The incidence seen in our trial showed that some 20% of the lambs were affected.

Treatment – untwist the lids and apply powder or pink eye ointment twice a day for 3 days.

#### b) *Navel Infection or Joint Ill*

Lambs are often lame in one or more joints have a fever and will often die.

Treatment – 1ml penicillin injection daily for a **minimum** of 5 days.

This is a major cause of deaths in the first week.

#### c) *Scabby Mouth*

This is a highly infectious and very contagious virus to other lambs and staff. If the history of the farm is that no scabby mouth is present – do nothing.

If scabby mouth is endemic, vaccinate all lambs at the time of entry into the shed.

Treatment – VIRKON or IODINE SPRAY.

#### d) *Scours – Nutritional*

Due to over-feeding, cold feeding or the wrong mixing rates.

Treatment – reduce milk intake for one day or remove from milk and feed a good quality electrolyte.

N.B. We observed no nutritional scours with the whey based OVITOP on either farm.

**e) Scours – Infectious Cryptosporidiosis, E Coli, Salmonella**

An early diagnosis is essential. Take samples and send to lab/vet clinic.

Treatment – remove from milk and give ad lib electrolytes and antibiotics. The use of antibiotics in the milk as a prevention is contraindicated.

No antibiotics were fed in our trial and no infectious scours were seen.

**f) Abomasal Bloat**

Lambs become acutely bloated about 1-3 hours after feeding. There is acute depression, pain, colic and lambs quickly die if left untreated.

It occurs most commonly at 2-4 weeks of age whilst still drinking milk. The main cause is due to sudden gorging, uneven intakes, cold milk or leaking teats.

Prevention – look for cause.

Treatment – 1 teaspoon baking soda or deflate with a needle (see vet).

Special Note - Abomasal bloat became the major cause of deaths in our trial and was responsible for about 30% of our deaths. Why? It only occurred when more than 600mls were fed in one feed, i.e. close to weaning. The condition stopped when milk intakes were reduced below this amount or as soon as lambs were weaned from milk. A twice a day feeding regime until weaning should greatly reduce this risk.

The incidence of abomasal bloat is not related to the quality of the LMR as the condition also occurs on whole milk.

Recent research has indicated that clostridia bacteria or soil bacteria may be responsible for the rapid bloating and gas production. Vaccinating the lambs with a 5 in 1 vaccine at two weeks of age may help. The use of some modern gut modifiers (ACID PACK 4 WAY or BIOMOS) may help to alter the gut flora and prevent this condition.

**Ruminal Bloat** - Acidosis from over-feeding of concentrates. This was never seen but could occur on straight grain diets.

### 3. General Observations

It was amazing to see the "will to survive" in these lambs. Recovery from the cold and starvation was rapid and rewarding. The survival rate of lambs under 3-5kg and those that develop navel infections and joint ill within the first week is poor and these should be abandoned.

Tag numbers should be imprinted. Tag pens identification does not last in this sucking environment.

Teaching lambs to suckle was easy.

a) **Feeders** – rack feeders – LAMB BAR systems were excellent and reduced labour time. Best feed in batches of 10-12 for good observation of suckling speed and milk intake.

Multi feeders – these are suitable for use only after one week of age, but watch for slow feeders and fast drinkers. Rearrange into even drinking groups.

There is an urgent need for the development of a large multi feeder for in-paddock use. McInnes industry is developing a large multi-feeder that should be on the market for this

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lamb rearing season. A small Stallion feeder is on the market but is only suitable for small groups and only for young lambs.

Teats at 100mm centres are only suitable for lambs up to 5-8kg. 200mm centres are required for lambs above this weight.

Trough space – there must be enough room for **all** lambs to have access, especially post weaning. A minimum of 300mm per lamb.

Feeders and troughs should be sprayed often with VIRKON.

- b) **Beware** of all sharp objects, wire nails and plastic as lambs are very vigorous feeders.
- c) **Pasture** must be of good quality and the best available – similar to that in ewe/lamb paddock.

The monitoring of internal parasites and coccidiosis must be started at 6 weeks of age.

d) **Labour and Social Implications**

The labour cost in time/money is real. The good thing about lamb rearing is that it is suitable for all ages and no heavy lifting is required. Part-time staff should be easy to find. It does cut into the time of running a commercial farm but does save a lot on 'mothering up' problems.

There needs to be a change in the mindset of New Zealand farmers giving them an alternative way to deal with these orphans rather than blaming the weather or the season.

What is the point of aimlessly increasing the multiple birth numbers unless we are prepared to do something to also increase lamb survival.

## Conclusions

The results presented are perhaps typical of what can be achieved on an average farm.

This was truly a commercial trial and not what could be achieved under ideal conditions. A better result could easily be achieved next season with more attention to detail and more and better access to concentrates and good quality pastures

The mortality rate was higher than expected.

The aim was to get lambs to wean of milk and to consume concentrates as soon as possible.

Some of this was not achieved due to various social reasons and the pressure of time on two busy commercial farms. More could have been achieved with more care and a stricter adherence to the trial protocol.

The bottom line is that a practical feeding method of rearing orphaned lambs has been trialled and developed. This gives the New Zealand sheep farmer a viable alternative to increase the

survival rate of compromised lambs in adverse climatic conditions, and addresses some of the animal welfare concerns in our industry.

### **Acknowledgements**

I would personally like to thank David Grant and Paula, Barry and Helen Black for their support and commitment to this trial. I thank them for their hospitality and time during a hectic lambing season and with the collation of these results and their personal comments and observations. A special thanks to Peter Anderson” my right hand man” in the South Island for supervising the trial and collating a lot of the material.

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