CALF NUTRITION

New Zealand

BONANZA
calf nutrition

Getting the basics right and staying in control – key to calf rearing in New Zealand

Back to basics with calf rearing in New Zealand

During their recent visit to New Zealand Bonanza's Christine Cummins and Amanda Dunn met with and visited several different people and facilities from research and farm advisors to key dairy and beef calf rearing units. Although New Zealand has a large land mass and a greater variety in weather, there are certain consistencies up and down the country when it comes to calf rearing.

Focusing on the basics pays dividends

As with all calf rearers, the focus in New Zealand is on rumen development and successful weaning. But with a large land mass comes larger farms, with an average dairy herd size of 400 on the North Island, and 600 on the South Island.

Not getting the basics right, first and foremost, poses great management challenges and an increased risk and cost to the herd.

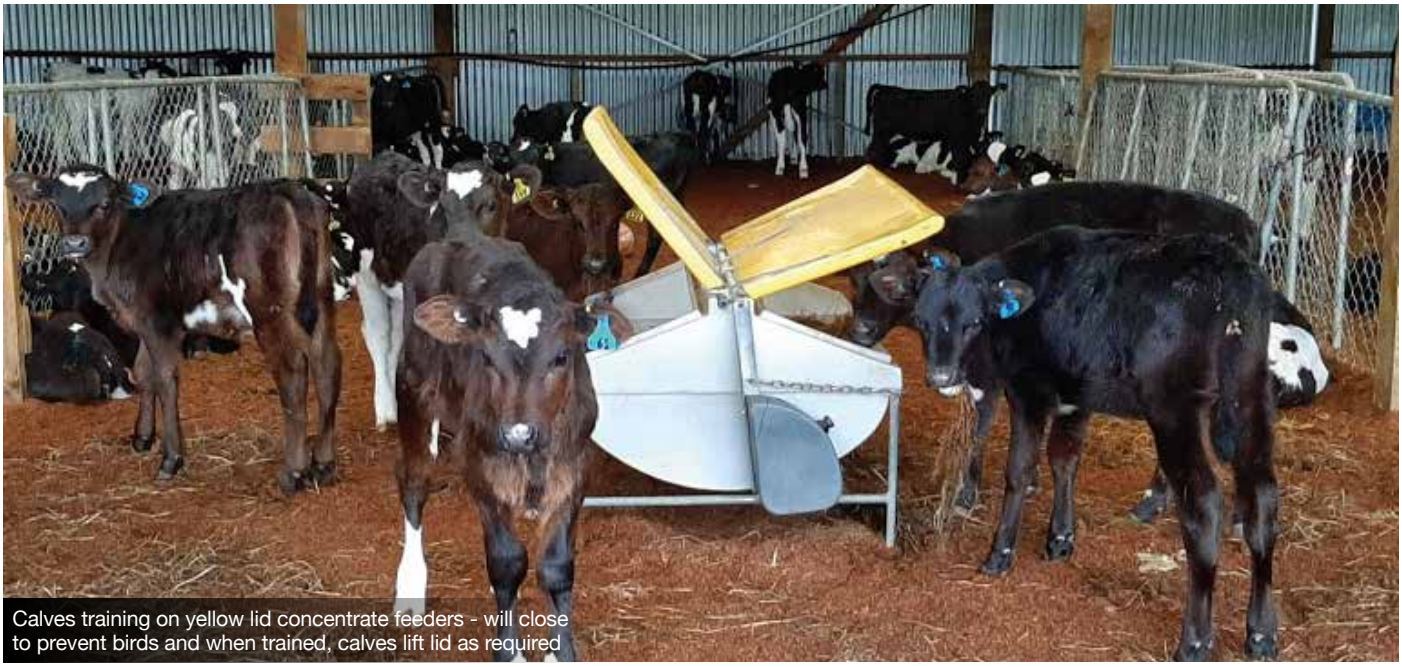
Consistent care and attention

Throughout New Zealand, it's clear that calf welfare is taken extremely seriously. By focusing on the basics of consistent care and attention, New Zealand farmers are maximising the health and growth of their calves.

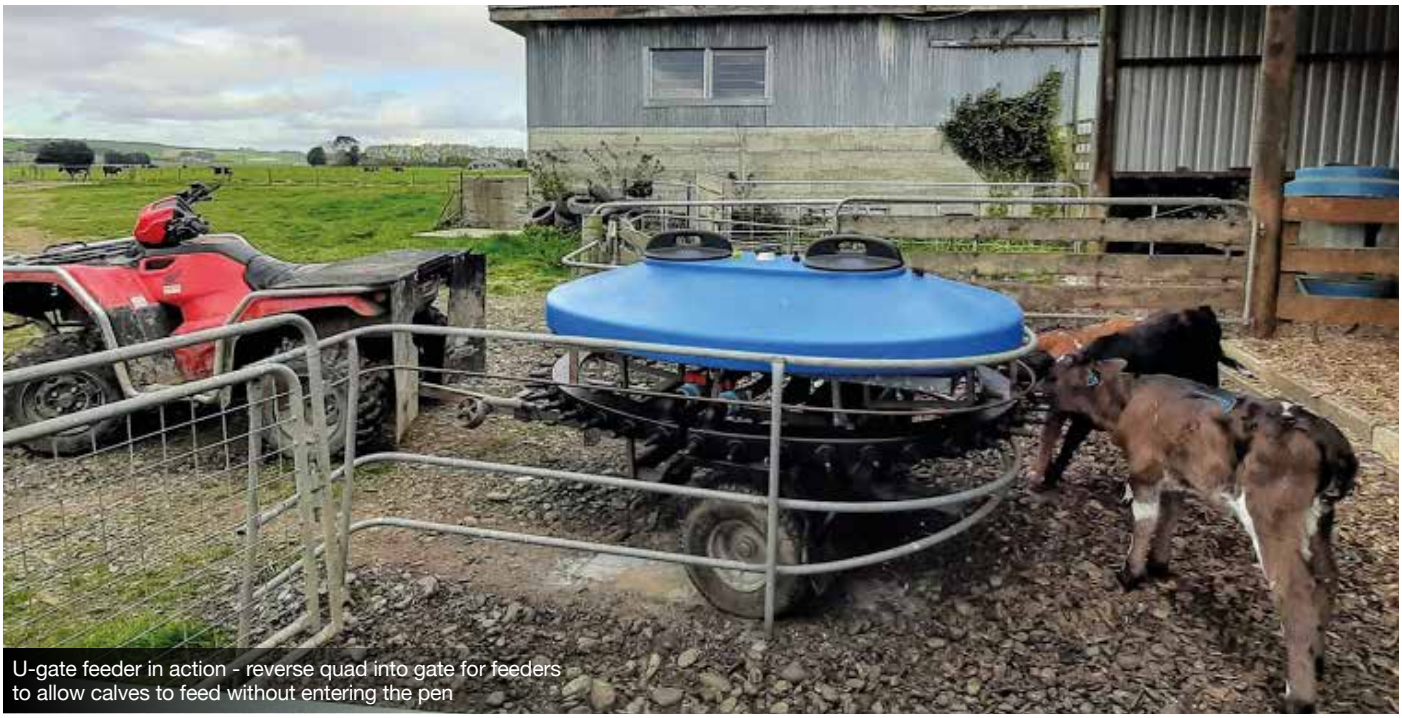
They do this through specific management practices that have been tried and tested, covering all aspects of the calf's early life – from housing and bedding to transition milk and biosecurity.

All the essential biosecurity issues are in place across every farm visited, and great attention is paid to the farm safety and calf origin. Calf health is monitored regularly, with calf weight gain aids prevalent across the country. Rearers in New Zealand had all set their own targets for weight gain, and daily monitoring, was a key factor in identifying any issues early and supporting calves that were showing problems.

Jersey calves with solid barriers between pens to minimise risk of disease spread



Calves training on yellow lid concentrate feeders - will close to prevent birds and when trained, calves lift lid as required



U-gate feeder in action - reverse quad into gate for feeders to allow calves to feed without entering the pen

Space also plays an important factor to calf welfare, and housing was another simple aspect that was prioritised across the country

Separate housing for beef and heifer replacement calves

Utilising all the available space

Space also plays an important factor to calf welfare, and housing was another simple aspect that was prioritised across the country.

As is best practice, all bull calves and heifer calves were kept in separate housing to minimise labour effort when bull calves are moved off farm at an early age.

This also helps to reduce any stress caused to the remaining calves and maintain a more stable environment through minimal contamination – one that's less likely to attract any bacteria or infections that could challenges their immune systems.

Again, it's about focusing on the basics to reduce risk

Separating calves also increases available space in the housing sheds, another factor that was prominent across New Zealand, with at 3m2 per calf common on the farms the Bonanza team visited.

Calves thrive in spaces where they can run around and play, where sheds aren't overcrowded or full of wet bedding and ammonia. There is more cubic metres of air per calf and less stress.

There's a wealth of anecdotal evidence to show growth rates improve (0.6 kg/day vs 0.9 kg/day) and calves are more content with this additional space – something British and Irish farmers should take note of.

New Zealand calves have low pneumonia rates too, in part because of the low stocking rate in housing sheds and in part because of the design of open sheds and shelters. All calves are encouraged to get

fresh air as early as possible, with deep sheds used that allow air to flow without creating draughty or breezy conditions.

Simple and efficient feeding methods

A priority on simplicity and efficiency, and getting all the basics right, extended to feeding methods too.

There were many simple techniques used by farmers across New Zealand to help ensure calves were getting all the feed they required. These included:

- One person designated to feed the calves to ensure consistency for the calves.
- Grouping calves according to drinking speed, to minimise competition
- Using designated people to feed calves, to keep the process consistent and identify any problems with feeding sooner
- Introducing teat feeders on a trail feeder inside the pen, to get calves used to changes gradually
- Deploying U-gates so trail feeders could be reversed directly against the pen without needing to drive around, reducing time spent moving calves in and out of pens and preventing contamination of the pen via the feeder wheels
- Using ad-lib concentrate feeders with a lid, to prevent birds accessing the feed alone, with calves quickly learning to lift the lids.

Perhaps most importantly, the vast majority of farms visited in New Zealand prioritised the once a day feeding method to keep practices simple and effective.

CMR type	Healthy	Treated with antibiotics	Removed to sick pen	died
Skim Milk	67	10	2	1
Whey Protein	49	25	3	4
Whey & Soya protein	37	44	7	4
p value	0.001	0.001	0.16	0.35

Table 1. *Effect of dietary and feeding regime treatments on calf health (number of calves) during a salmonella challenge in Experiment One.*

The focus on once a day feeds

Across New Zealand, everyone was in agreement that rumen development is a crucial aspect to successful calf rearing. And the best way to drive this development was through once a day feeds.

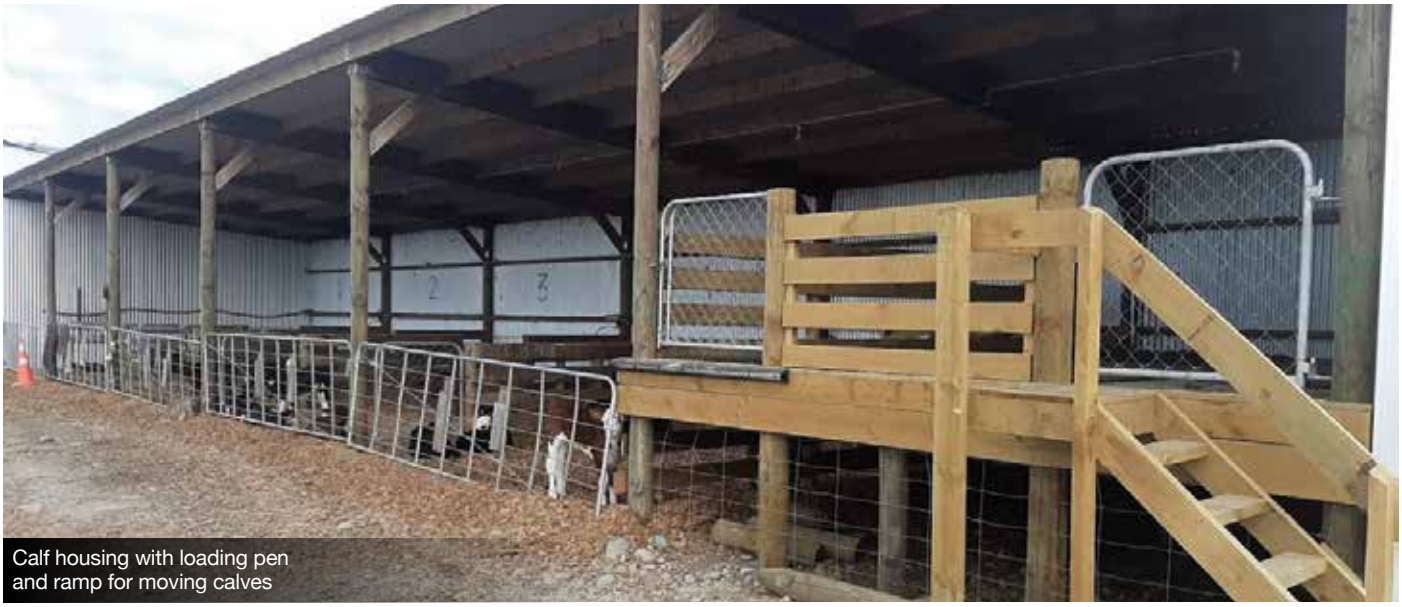
This gave calves the time to explore and learn to eat concentrate feeds that help develop the rumen.

With constant access to other feed and water throughout the day, calves don't wait around for the second feed, but instead develop new tastes earlier, consume more alternate feeds, and successfully develop their rumen sooner.

The one a day method also reduces labour, which is vital given the size of farms in New Zealand.

CMR type	Skim	Whey protein	Whey & Soya protein	P value
Initial wt	41.9	41.2	41.1	-
5 week wt	61.2	59.3	58	0.14
10 week wt	86.5	84.2	79.4	0.01
13 week wt	101.8	99.2	92.4	0.001
number of calves not weaned at 42 days	3	3	11	-
wt gain 0-13 weeks	626	602	530	0.004

Table 2. *Effect of dietary treatment on calf live weight and liveweight gain in Experiment Two.*



Calf housing with loading pen and ramp for moving calves

Prioritising development & protection

The Bonanza team found that with the once a day feeds, the preference was for skimmed milk replacer, as it relates more closely to whole milk in terms of protein digestibility.

They spent time with calf researcher Paul Muir from On-Farm Research Ltd, on Pouwaka research farm. He conducted a large study comparing curding vs non-curding milk replacers and their effect on weight gain and calf health.

The results found that skim-based milk replacers that form a curd contributed to greater weight gains and a greater ability to fight disease. You can find the full peer-reviewed research paper at www.bonanzacalf.ie)

Paul confirmed that the basics are essential for good calf health and rapid rumen development, and that includes curding milk replacer, access to clean, fresh water and the use of transition milk.

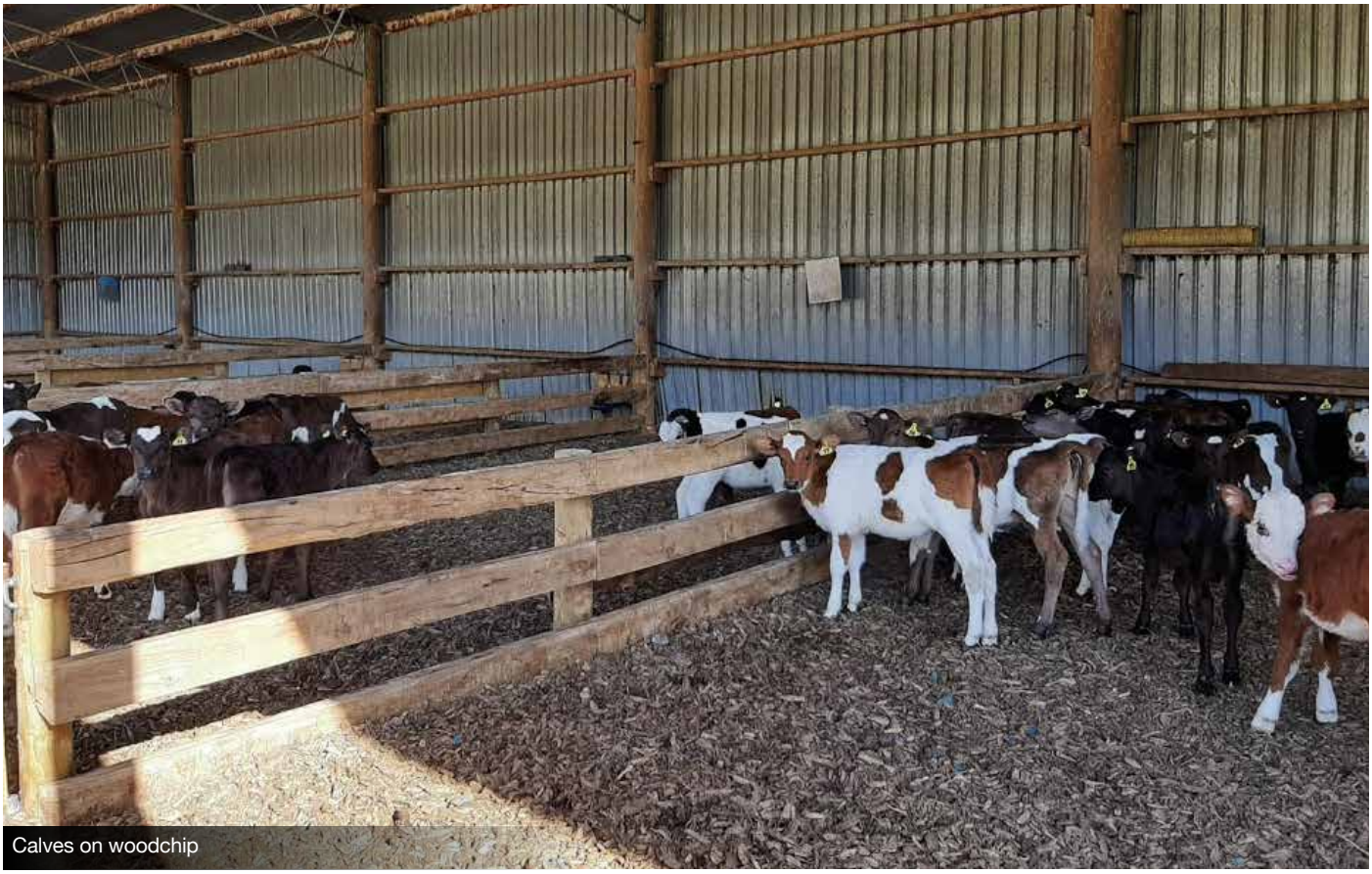
That corresponds with what the Bonanza team saw across the country. Every farm visited used transition milk. This milk, produced immediately after colostrum, has a higher fat content and is full of antibodies, nutrients, vitamins and minerals. These line the gut of calves, protecting it from common diseases and promoting its development.

It's another basic strategy, but one that pays dividends. Calves fed transition milk are more likely to resist challenges such as viruses like rotavirus and protozoa like cryptosporidium, thanks to the constant flow of protection.

Once daily fed calves grazing near Methven at the foot of Mt. Hutt in Canterbury

By focusing on this protection and all the other small, basic factors that contribute to the calves early development, farms in New Zealand are thriving.

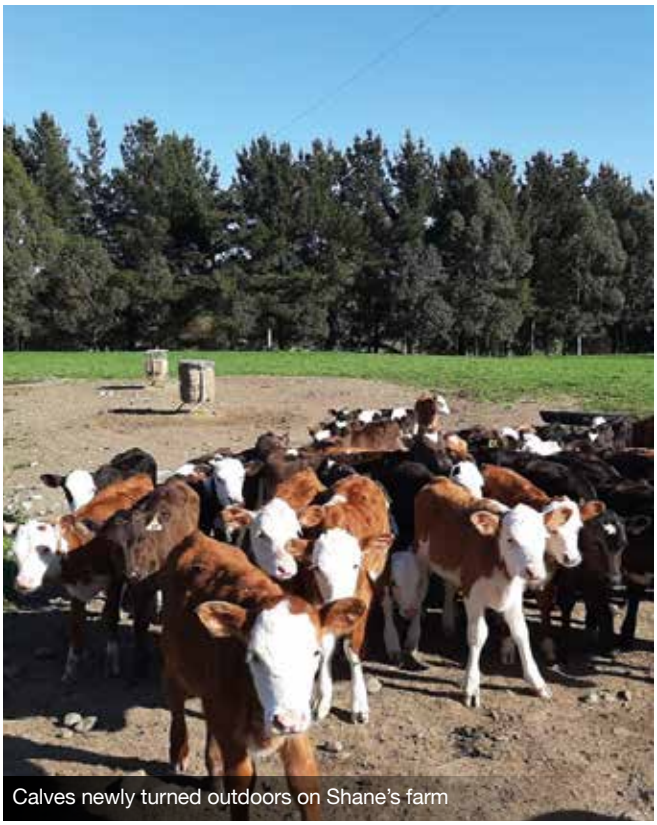
The clear message from farms visited on this recent trip was that keeping things simple is key



Calves on woodchip

Dairy farmer maximising profit from Jersey-type calves with strict rearing rules

Shane & Nicola Shedbolt, Palmerstown North Region, New Zealand



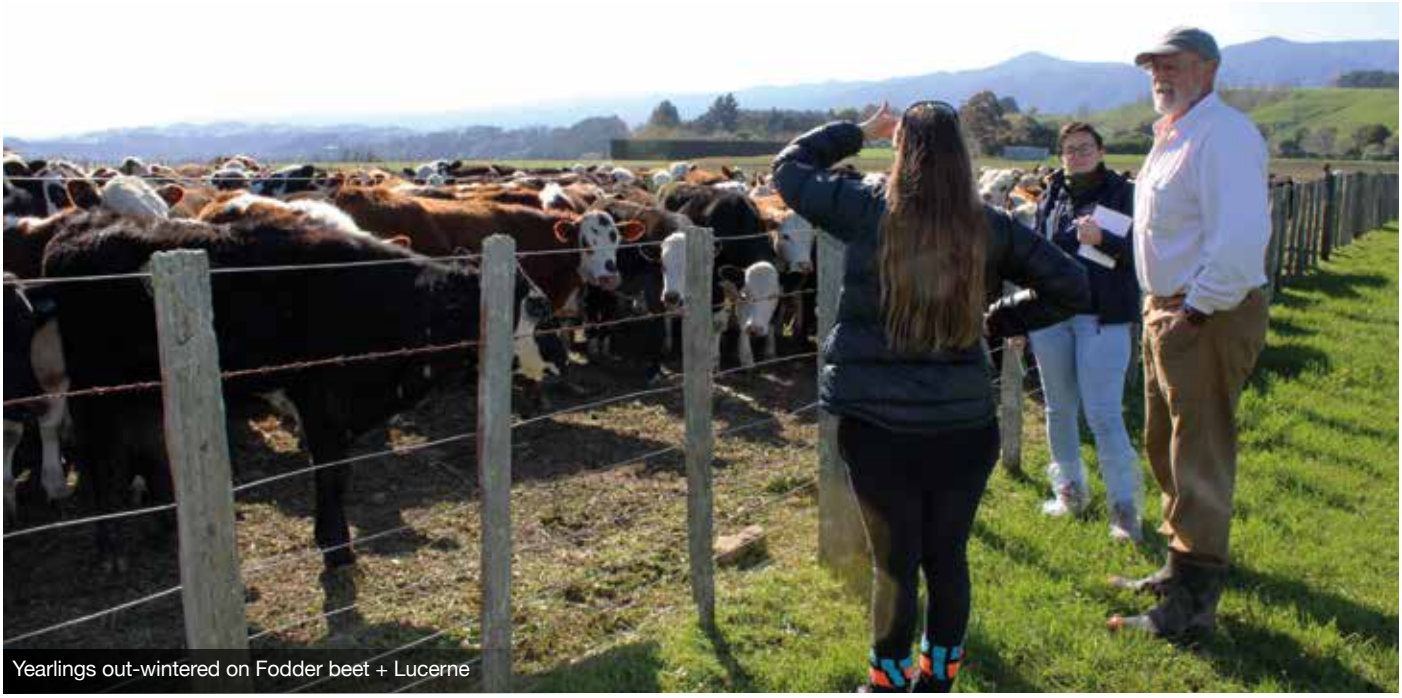
Calves newly turned outdoors on Shane's farm

Rearing non-dairy replacements to the same standards as dairy-replacements results in the successful rearing of beef animals at a 1100-cow dairy farm. Shane Shedbolt, who farms with his wife Nicola near Palmerston North, New Zealand, produces milk from spring and autumn calving herds.

He began rearing all his non-replacements for the beef market because the type of cows that make up his herd – crossbred cows which are sired to a Jersey or Friesian – produce bull calves which aren't sought after by rearers. According to rearers, the traits of dairy bull calves with this colouring means they don't perform as well at slaughter. Shane therefore decided to achieve a better return by rearing the non-replacements to beef himself.

The carcass on these Jersey-type animals is lighter but they finish quickly. Shane's animals are slaughtered at between 20–36 months, including bull beef, steers and heifers, with carcass weights ranging from 270kg for a Jersey to 320kg for a Friesian carcass.

Open housing with protective barrier at calf level



Yearlings out-wintered on Fodder beet + Lucerne

During the 2018/2019 winter, his beef animals averaged $1600. To ensure the system is profitable, Shane has some strict rearing rules. All calves - dairy heifer replacements and beef - are treated the same and reared together.

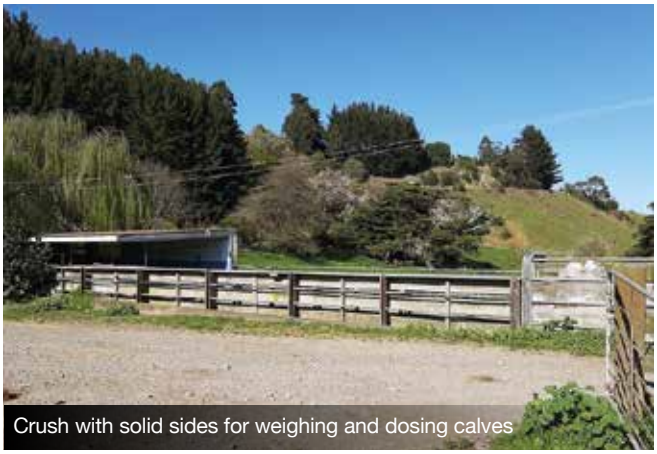
Newborn calves are collected at least once daily and given 2.5 litres colostrum on arrival, regardless of time of birth. The first milking from cows is stored if it is good quality. Calves are fed two litres of transition milk twice daily for approximately a week, after which they are moved from the starter shed to a different yard, where they are fed 500g milk replacer daily.

Provided the weather is good, calves are moved out to grass when they are eating approximately 1kg of a 16% crude protein concentrate pellet. Shane believes that skim powder is best for calves as the protein is digested similarly to whole milk.

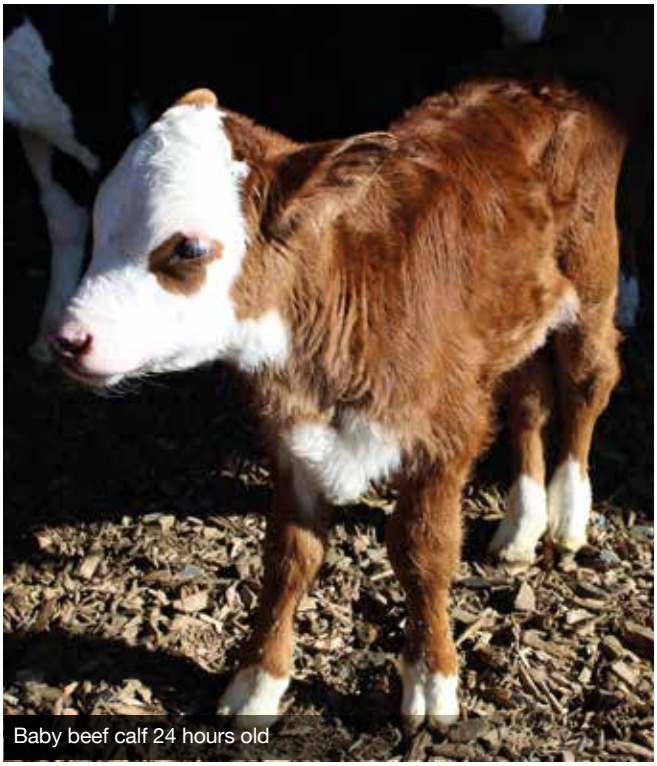
Healthy calves are fed once daily to ease labour and promote rumen development

Healthy calves are fed once daily to ease labour and promote rumen development. Young calves are housed in small groups of up to eight per pen and are not fed antibiotic/waste milk. They have a sufficiently developed rumen by the time they are weaned at 85kg. Post-weaning, they remain on concentrates and grass until they are 100kg.

The milk replacer costs $95/bag (€55) and calves consume approximately 1.5 bags each. The calf



Crush with solid sides for weighing and dosing calves



Baby beef calf 24 hours old

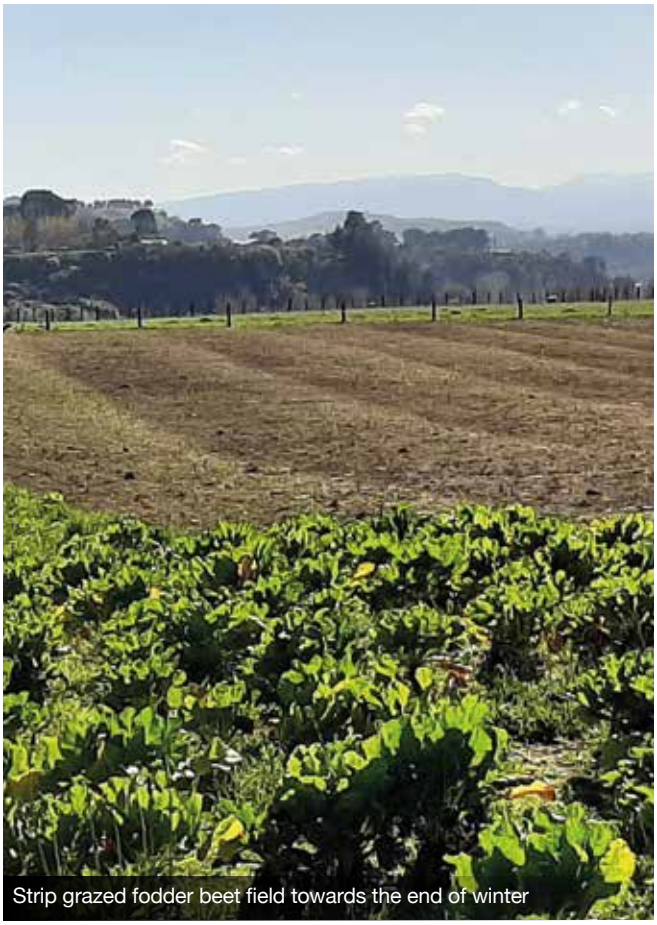
pellets cost $968/tonne (€560) and calves consume approximately 120 - 150kg each. Until they are 100kg, calves are weighed twice weekly. Thereafter, they are fed a grass-only diet.

For their first winter, the weanlings are offered grazed fodder beet and lucerne bales every second day before they are finished on grass. There is a focus on good grassland management from day one, even when calves are still on milk, says Dr Christine Cummins, of Bonanza Calf Nutrition, who visited Shane's farm.

"Shane likes to have a cover of 800kg/DM before putting calves out and feeds them hay after turnout.

He is focussed on calf health, rather than getting them to eat grass only; as the hay is a stable feed, like pellets, it helps to keep their dung more consistent and the calves more content," she explains. Low covers can be kept cleaner and only leafy, highly digestible grass is in the sward at this stage of growth. Shane aims to have calves eating 1kg concentrates before they are turned out to grass.

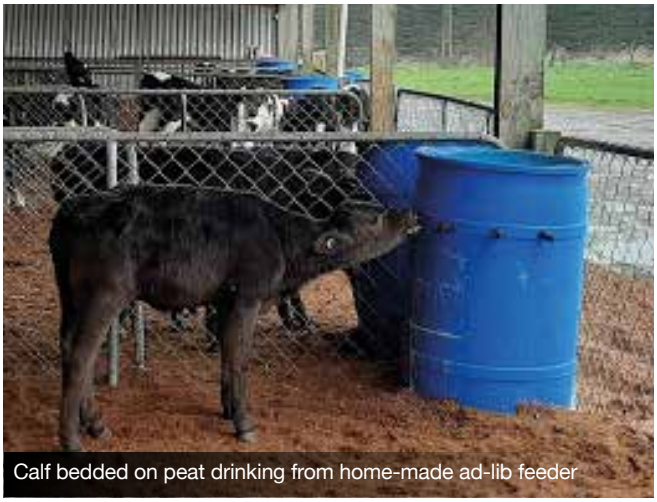
He incentivises his share milkers to rear beef calves to the same standard as heifer replacements by paying them $100 (€60) per calf. To ensure calves receive optimum care, the payment is only made when it achieves targets, including weighing 85kg. "He finds this system works well," says Christine.



Strip grazed fodder beet field towards the end of winter

Calves are vaccinated against clostridiums and leptospirosis and are drenched for coccidiosis at 100kg liveweight. In addition to vaccination, calf housing is sprayed regularly with disinfectant. "Calf health is a crucial element of Shane's system and prevention is his preferred approach," says Christine. "At the time we visited, there were no deaths of calves 24 hours of age and older out of 200 births."

Teat feeder with mixer being prepared for once a day milk feeding



Calf bedded on peat drinking from home-made ad-lib feeder

Shane Shedbolt with Christine and Amanda

Calf health is a crucial element of Shane's system and prevention is his preferred approach

Encouraging rumen development key to calves at rearing unit achieving 100kg at 10 weeks

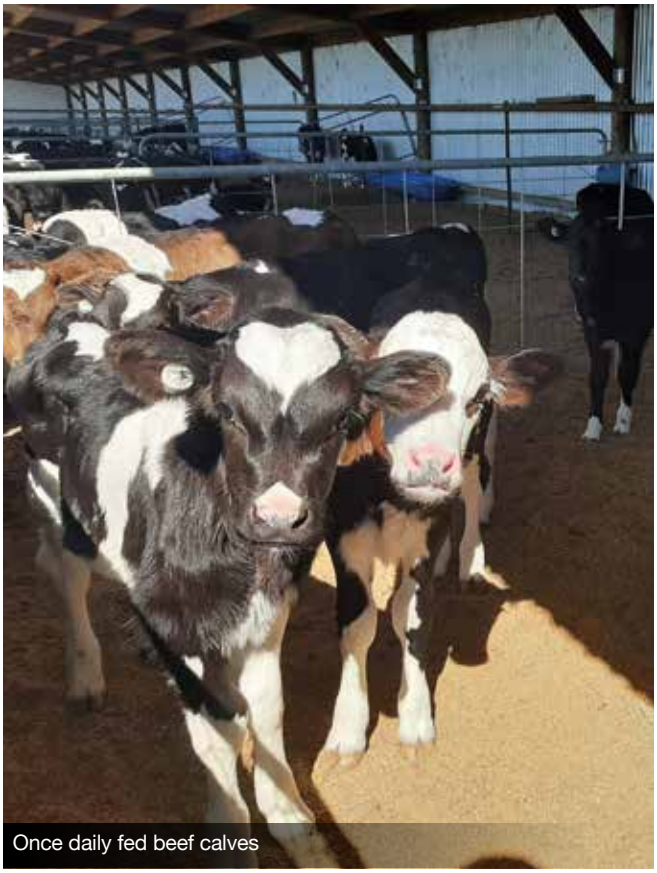
Katrina Glass, Methven, New Zealand

Friesian bull calves reared on a once a day milk replacer feeding system at a large-scale unit are achieving average daily liveweight gains (dlwg) of 1kg in their first 10 weeks of life.

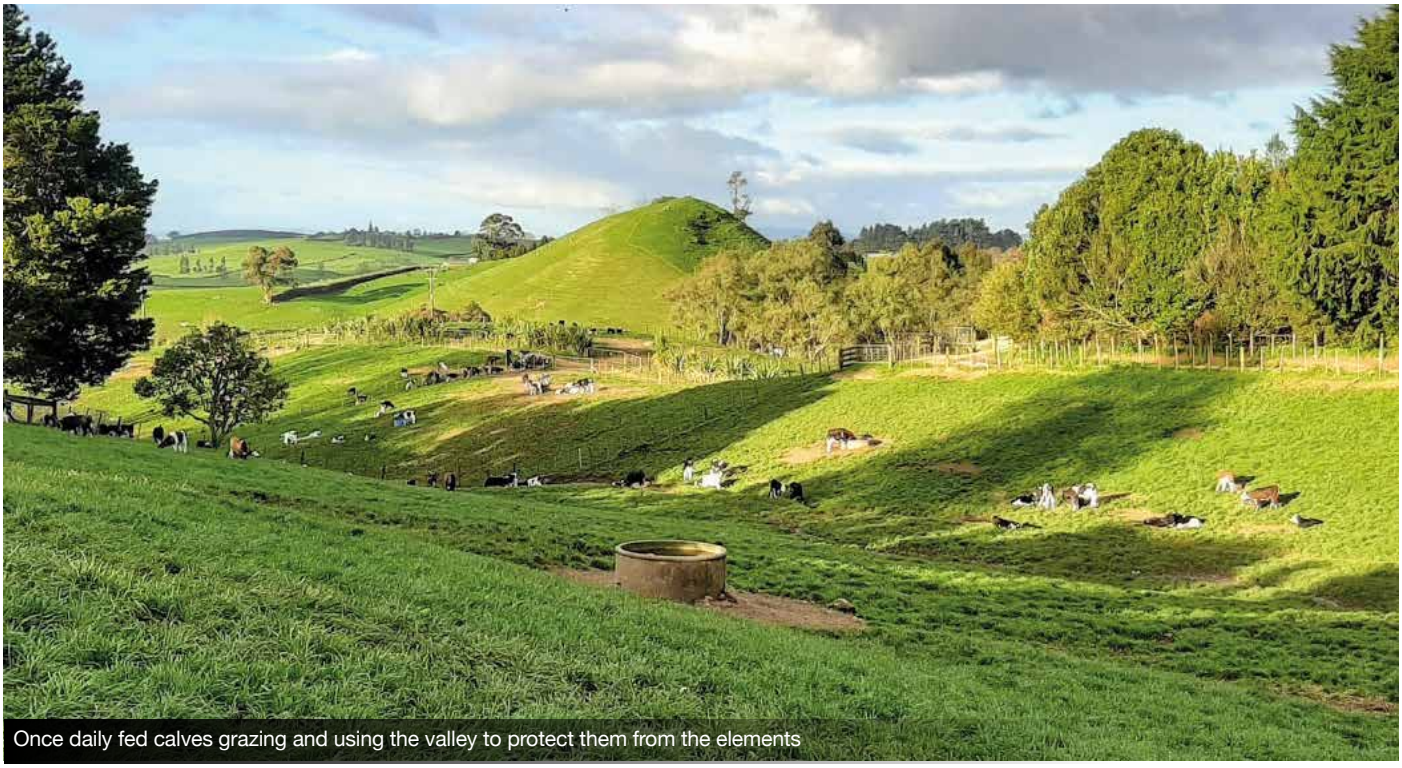
Dr Amanda Dunn, of Bonanza Calf Nutrition, visited the unit in Methven, in the Canterbury region of New Zealand, to learn how calf selection, attention to detail at feeding, early weaning and a simple system were key to success at this 2,000-calf unit.

Contracts for Friesian bulls are pre-arranged and selection is based primarily on colour – all calves must have a white forehead and white legs; they arrive at the unit when they are four days old and weighing less than 35kg.

The owner and main calf rearer, Katrina Glass, has been purchasing from the same farms for the last 12 years and has built up a good relationship with the farmer suppliers; they understand her requirements in terms of colostrum intakes and calf condition. “Keeping track of the source of calves is important for Katrina as she can look at any trends in lack of feed training, weakness, morbidity and mortality,” says Amanda.



Once daily fed beef calves



Once daily fed calves grazing and using the valley to protect them from the elements

Calves that have not received adequate colostrum are rejected. “Colostrum is a vital feed to provide calves with their first source of nutrients and immunity,” Amanda explains. “Calves that do not receive adequate levels at the correct timing after birth will struggle greatly in terms of their health and lifelong performance.”

Upon arrival, calves are housed in pens of 12 on sawdust bedding – this is sprayed with disinfectant every time a pen is emptied.

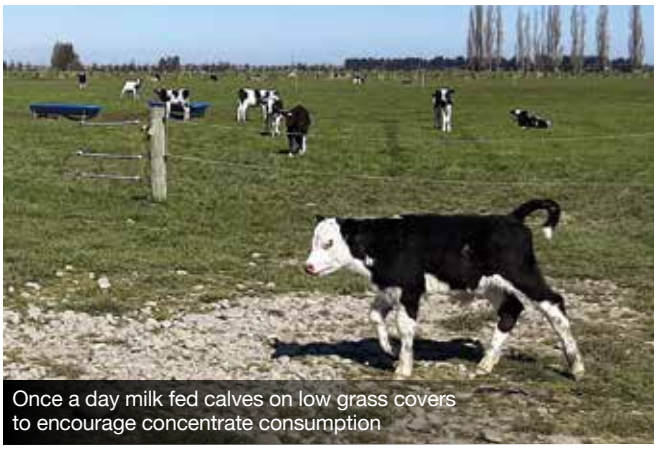
From the day after they arrive, calves are fed milk replacer at a lukewarm temperature once daily at a rate of approximately 450g/calf/day. At 10 days of age, calves are grouped in mobs of 48 and turned out to grass when they are fed 450g of milk replacer/head using a 60-teat trail feeder and 20% crude protein concentrate ad lib.

Calves are consuming 0.5kg pellets when they are three weeks old. They will eventually be eating up to 4kg of concentrate per head when they are approaching 100kg; each calf consumes approximately 70kg of concentrate during their time at the unit. Feeding such a high level of concentrate at grass is uncommon in a New Zealand-based system but Katrina strives to meet targets using this feed method.

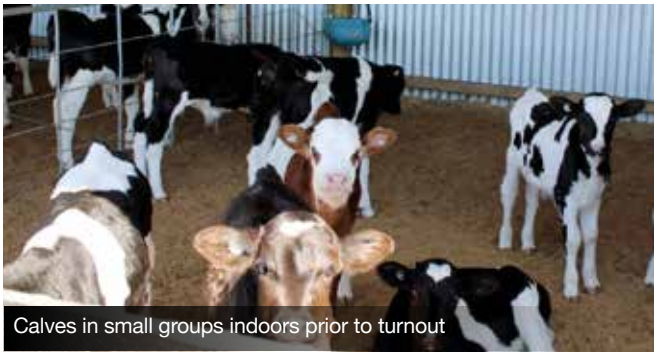
“She is confident that it has a key role to play in calves achieving their growth rate targets. Concentrates, along with grass, will greatly encourage rumen development in these young calves,” says Amanda.

At 1.3%, the mortality level is very low, with most losses occurring within the first four days.

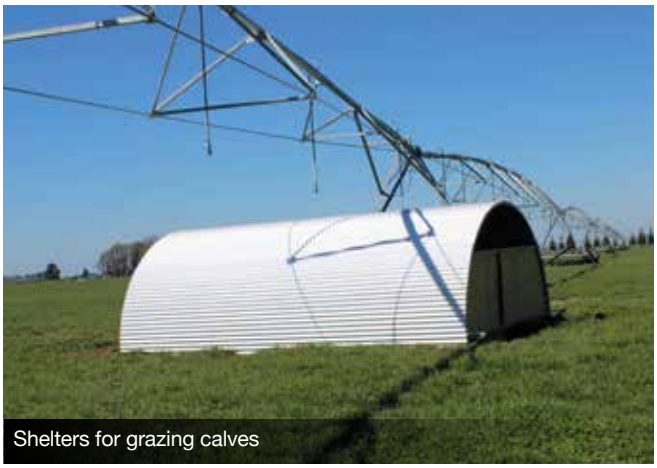
Calves are weaned when they hit a target of 65kg at approximately six weeks of age. Calves are weighed regularly; which Katrina regards as key since she only has a very short rearing window. “It is crucial that weight is monitored to ensure targets are met to make it as efficient as possible,” says Amanda. Dehorning and vaccination take place simultaneously to make the groups easier to manage and to help calves successfully reach their targets.



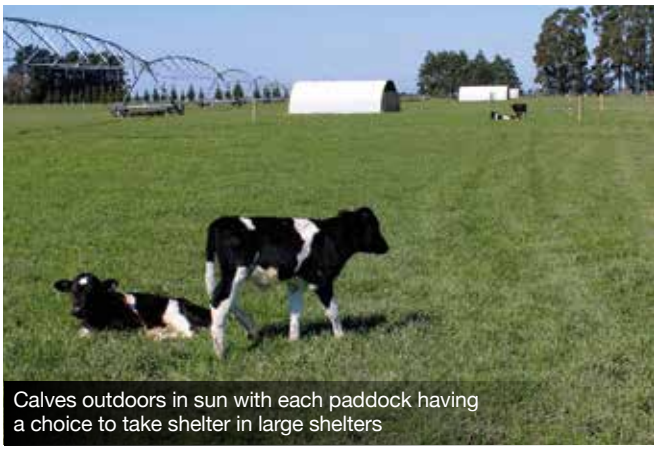
Once a day milk fed calves on low grass covers to encourage concentrate consumption



Calves in small groups indoors prior to turnout



Shelters for grazing calves

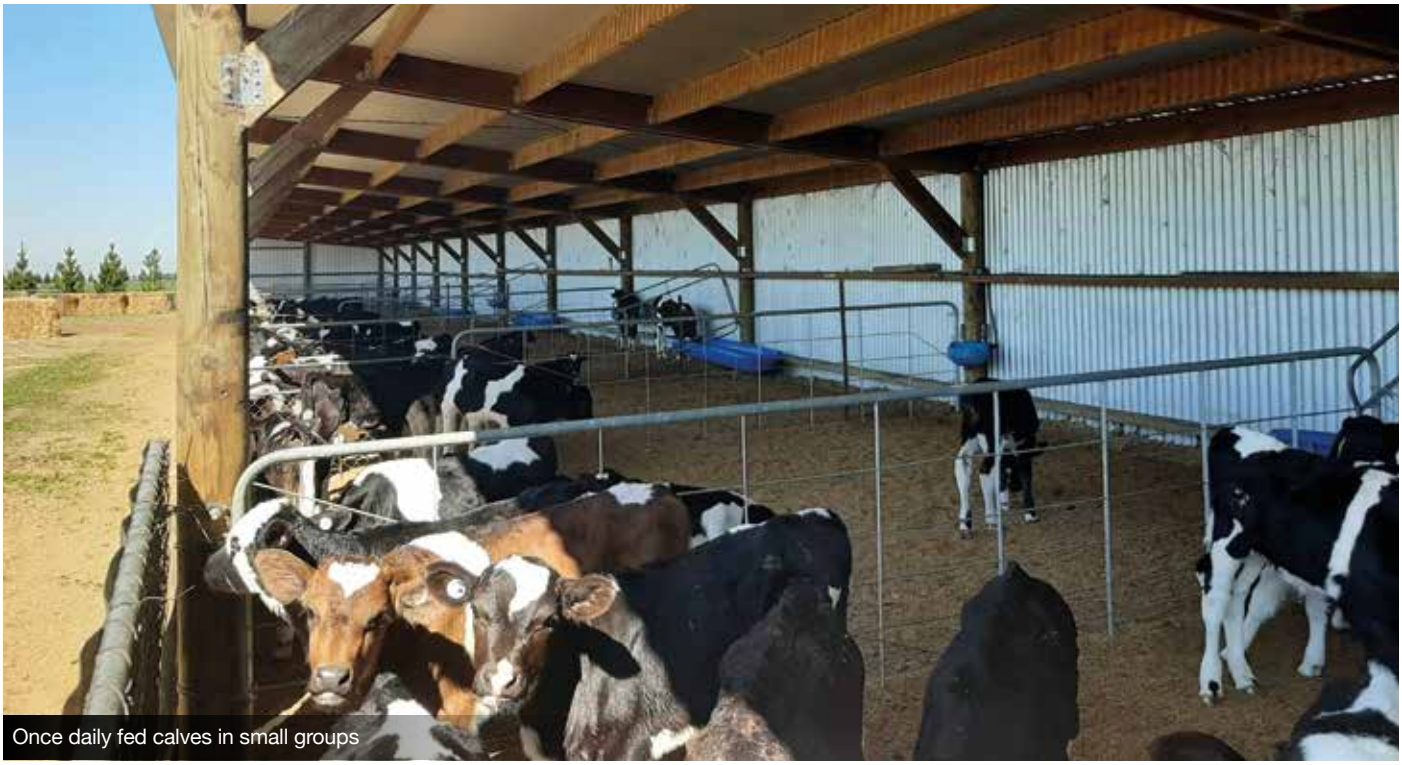


Calves outdoors in sun with each paddock having a choice to take shelter in large shelters

At 939mm/year, annual average rainfall in Methven is similar to UK and Ireland and the temperature ranges from 3-10°C during September, which is spring in New Zealand and equivalent to March in UK and Ireland.

He stated that once a day milk feeding is most popular with calf rearers because it is a minimal cost system with minimal labour to successfully achieve target 100kg weight

Katrina’s confidence in her feeding system is supported by extensive research conducted by Paul Muir of On-Farm Research, formerly known as



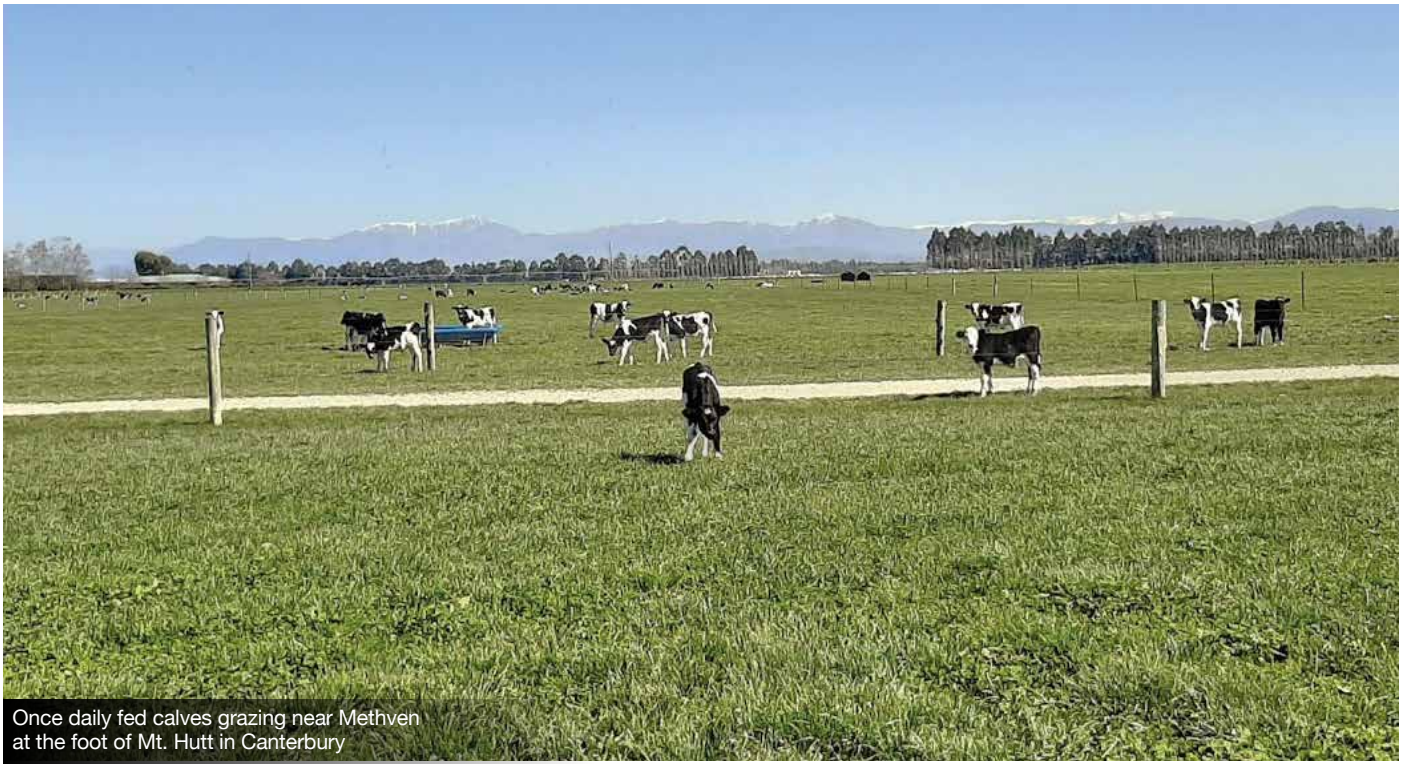
Once daily fed calves in small groups

Poukawa, who reared up to 1000 calves a year for 20 years. “He stated that once a day milk feeding is most popular with calf rearers because it is a minimal cost system with minimal labour to successfully achieve target 100kg weight,” says Amanda.

Curding of milk is key to the success of the system, his research showed. “Calves can be weaned early without stress to the system as their rumens develop early, calves can easily consume 1.5 kg of concentrates at 5-6 weeks of age and grazing grass,” says Amanda.

“Paul commented that calves can be weaned from five weeks after date of arrival using a target weight gain of approximately 20kg during the milk feeding period and that they are eating concentrates. On twice daily milk feeding systems, calves are often not weaned until they are 10 or 11 weeks of age.”

Curding of milk is key to the success of the system



Once daily fed calves grazing near Methven at the foot of Mt. Hutt in Canterbury

Dr. Amanda Dunn
& Dr. Christine Cummins

Why Shine Once-a-Day is the best option for healthy growing calves world wide

INRA Trial 2013

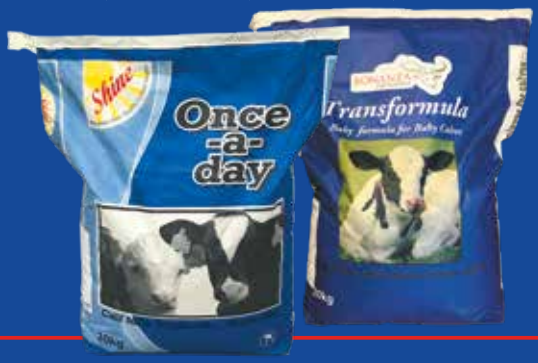
	OAD	TAD	Sig	% increase
Papillae Density	84.8	64.7	0.006	30%
Papillae Absorption Area	98.1	62.4	0.002	57%

Irish trials on Once a day Milk feeding (Moorepark 2007)

Treatment	TAD56	OAD56	OAD42
Initial weight (kgs)	42.4	42.2	42.4
42 day weight (kgs)	64.9	66.4	63.6
70 day weight (kgs)	90.7	89.5	89.5
At 420 days (kgs)	353	357	361

UK Beef Trials 2012

	OAD group	TAD group	Difference
Starting weight (kgs)	56.5	56.7	-
Weaning Age (days)	46.0	51.0	-5 days
12 week weight (kgs)	132.2	124.3	+7.8kgs
DLWG 0-12 week weight (kgs)	0.9	0.81	+11%
Dry feed intake (kgs)	185.2	173.7	+11.5%
Final weight (kgs)	585.0	573.0	+2%
Age at slaughter (months)	13.43	13.49	-2 days
At 420 days (kgs)	995.0	983.0	+12kgs



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