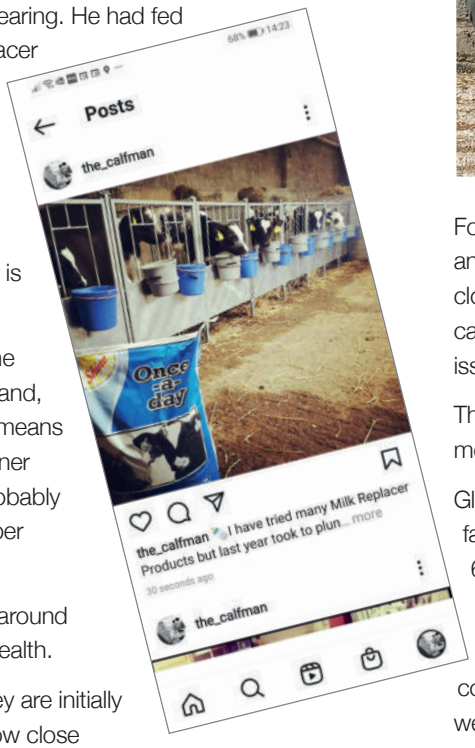
Calves weaning up to 10 days earlier on Shine Once-a-Day milk replacer.

Robert Martin and his son-in-law, Glen Crooks, run a beef enterprise near Moy, rearing 150 calves a year. These are mostly finished but some heifers are retained as suckler replacements and sold as bulling heifers.

The business buys mostly Hereford and British Blue calves from four different farms but also some Aberdeen Angus, Limousin, Simmental, and Charolais Culards too.

Glen is in charge of the calf rearing. He had fed several twice-a day milk replacer formulas before giving Shine Once-a-Day a go.



Although Shine's skim-based formula is more expensive than a whey milk replacer, Glen says this cost is recovered in multiple ways.

"Feeding once a day gives me more time to rear the calves and, weaning on dry feed intake, means I am weaning 8-10 days sooner than before so the cost is probably no higher than using a cheaper powder."

The rearing system revolves around keeping calves in optimum health.

When they arrive on-farm they are initially housed in single pens, to allow close observation and to get them used to drinking from a teat.

They are introduced to Shine Once-a-Day and Super Gro pellets from Thompsons (Belfast).

The pellets were recommended by Thompsons representative, Barry Chambers, who describes them as the best on the market for the health of young calves.

Pellets, straw and water are all fed ad lib.

Glen says keeping calves healthy and content is the key focus.

There are solid barriers between every two calf pens and a footbath is used by anyone entering each calf house - Glen will only enter a pen if he has to, and wears surgical gloves when doing so.

There is no sharing of teats and all are boiled-washed and disinfected after each feed.

All calves are vaccinated and receive a multi vitamin injection while they are in the individual pens. Glen regularly inspects each calf pen and the calf's back end for any sign of looseness.

For the next stage in the rearing process, calves are moved to another shed and grouped in pens of six. They continue to be closely monitored but, as Glen points out: "The back of the calf rearing job is broken in the single pens with little or no issues thereafter."

The feeding regime begins on the source farm where calves are mostly fed cow's milk.

Glen transitions them onto Shine Once-a-Day when they arrive on farm. Eventually, when they are old enough, they will progress to 600g of powder in three litres of liquid in a single morning feed.

Calves remain at this level until the weaning protocol begins. Glen starts weaning when calves are consuming 1.5kg of concentrates a day, with weaning normally completed at nine weeks; at that stage calves are eating 2kg of concentrates a day.

Glen is quick to point out that once-a-day milk feeding doesn't mean he only see his calves once a day.

"It is quite the opposite, I have more time to conduct thorough daily health checks, to bed more regularly and to always hit my vaccination targets. I have no excuse," he says.

Calves, Glen adds, have a "great bloom". "They get on to roughage and concentrates sooner, thus weaning 8-10 days earlier," he says.

In French trial work conducted in 2013, Glen's observation that calves eat more dry feed was shown to result in better rumen development at weaning (see below).

INRA trial 2013 (using Shine OAD)

	OAD	TAD	Sig	% Increase
Papillae Density	84.8	64.7	0.006	30%
Papillae Absorption area	98.1	62.4	0.002	57%

Pre-weaning feeding regime key to post-weaning health and growth

Farmers are being urged to review their calves' pre-weaning milk feeding regime to support health and performance post-weaning.

All calves should be offered an ad lib ration, fresh water and roughage from the earliest possible age.

But getting milk feeding right is key to encouraging dry feed intake before and after weaning, says Dr Amanda Dunn of Bonanza Calf Nutrition.

Studies have now shown that it is not only a calf's daily intake of dry feed pre-weaning that it important but its total intake.

"This is because the daily intake may not actually be digested effectively as the rumen is not developed," says Dr Dunn.

When this happens, the calf goes through a period of negative energy after weaning and this could result in inflammation in the gut from the undigested feed as well as health challenges from diseases such as coccidiosis and pneumonia.

Changing the milk feeding regime before weaning can be more effective in improving post-weaning health than making tweaks to housing, says Dr Dunn.

Most calves on a twice a day system are offered three litres of milk in a single feed - on machines that volume may be less.

But Tables 1 and 2, which show the results of trials, demonstrate that calves can drink six litres in one feed and, in other research, 65% of the adlib intake in the morning feed.

Dr Dunn says this is unsurprising as newborn calves are expected to drink four litres of colostrum, the equivalent to six litres of milk.

Nature developed the milk feed, with its clotting protein and fat matrix, to be perfectly suited to infrequent feeding - a calf in the wild would lie still in the undergrowth hiding from potential predators while slowly digesting its feed over the course of a day.

In contrast, a calf offered three litres is always waiting for its second feed.

If the feed is a whey-based powder, the milk leaves the stomach in an hour compared to whole milk or a skim-based powder which can be digested in the calf's stomach over a period of up to 10 hours, slowly realising protein, fat, calcium and vitamins.

Table 1. Saldana et el 2019
(Pen State university. Calves fed 6L of cows milk/day in 1 or 2 feeds and were offered calf starter, water and straw adlib. No difference was found in health or inflammation scores during the trial.*

**Inflammation is an indicator of stress in calves*

Item	1x milk feed/day	2x milk feeds/day
Number of calves	24	24
ADG (kgs) 7 weeks	0.587	0.530
Milk intake/day (milk solids) kgs	0.75	0.75
Average calf starter intake/ day (kgs)	0.242	0.199
Total daily dry matter intake (kgs)	0.992	0.949

This is why the older calf that is fed one meal, 6-7 litres equivalent, of a skim-based feed is as content as a twice-a-day fed animal, says Dr Dunn.

These also score as highly in welfare and stress tests before weaning, and better after weaning because they consume more dry feed and their rumens are better developed.

By introducing Shine Once-a-Day four weeks before weaning, calves will be more content throughout the day and will consume more nutrients to set them up for whatever post-weaning feeding regime they are introduced to.

Table 2 INRA farm trial 2014.
Cow's milk fed through feeder compared to cow's milk mixed with Shine Once-a-day and fed once-a-day.

	450L Whole Milk	205L Whole Milk combined with Shine Once-a-day
Weight gain at 10 Weeks	52.5 kg	52.5 kg
Concentrate intake	34 kg	58 kg
Growth from con-centrates	0.75	0.75
Feed efficiency of concentrates: 2.7	12.6 kg	21.5 kg
Growth from Straw	1 kg	1 kg
Growth from Milk	38.9 kg	30 kg
Intake of Milk solids	58 kg	37 kg


Dr. Amanda Dunn

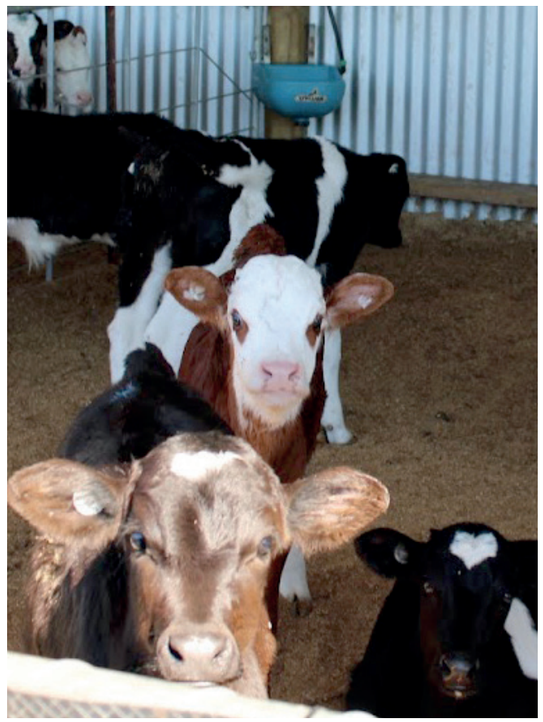
There are also labour savings association with once-a-day feeding.

Dr Dunn says that, in practice, this is greater than that achieved using computerised feeders, equating to 100 hours on a farm that rears 100 calves a year.

"This time saved can be used to further reduce labour and cost by keeping on top of hygiene and calf health," she says.

Last year, over 350,000 calves were reared using the Shine Once-a-Day method and the number continues to grow year on year.

This is why the older calves fed one concentrated meal (e.g. Shine Once-a -day fed at 20% solids in a volume of 3-4L liquid (600-800g)) are as least as content as a twice-a-day fed animal, says Dr Dunn.



Recently published UK trial showed no advantage to Twice a day milk feeding after 28 days

A recent UK study comparing the performance and health of calves fed milk at different frequencies indicated no significant differences.

The study compared once a day milk feeding and twice daily feeding.

Several welfare measurements were also taken throughout the pre-weaning and post-weaning period and this demonstrated no significant differences either.

Calf behaviour ,such as bouts of lying down, were monitored. Results showed calves fed twice daily spent less time laying down compared to calves fed once a day in the post-weaning period.

This indicated that calves fed once a day were either more satisfied or had spent more time eating more concentrates pre-weaning compared with calves fed twice daily, says Dr Dunn.

There was a tendency for calves fed milk once a day to have elevated BHBA (β-hydroxybutyric acid) compared to calves fed twice daily.

These higher levels may potentially point to the start of earlier ruminal fermentation.

Other areas explored in the study included infrared thermal imaging to record calves' temperature, which can fluctuate as a result of external stressors.

There was again no difference between feeding systems.

Overall, and including haematological variables, blood metabolites and physiological and behavioural measures, there were no differences noted.

This, says Dr Dunn, suggests that there is no welfare gap between calves fed milk once daily or twice.

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