Attention to detail and good nutrition key to calf rearing success

@CalfChat
Time to talk about calf rearing!

Calves at a Warwickshire dairy farm are achieving their potential thanks to good nutrition and exceptional rearing protocols.

Peter Royle and his sons, Mark and James, operate an all-year round calving system with 330 Holstein cows.

Cows are milked either through a robot or through a conventional parlour, averaging 11,200 litres/year with milk supplied to Tesco via Arla.

Sexed semen is used across the herd and for cows inseminated to beef sires the emphasis is on the British Blue.

All calves are reared, either as dairy heifer replacements for calving at two years, or as beef animals.

On average, one calf is born every day, resulting in 50-60 calves being reared on milk at any one time.

Calves are initially reared on the dairy farm where they are born, before being transported at 10 days old to the rearing unit.

After receiving the dam's transition milk, calves are introduced to Transformula, a transition milk replacer designed for use after colostrum feeding.

It is made with low heat skim milk and buttermilk along with five plant oils and whey protein, and is easily digested by the baby calf.

Key Points:

- Calves on milk average 0.8kg DLWG on 0.7kg/day of calf milk
- Weaning at 8-9 weeks
- Beef animals liveweight, 700-720kg at 14-15 months
- Dairy heifers calve down at 2 years

Transformula has played a key role in achieving rearing targets, with fewer cases of calf scours and, as a consequence, less performance setback.

With fewer sick calves to care for, labour inputs have reduced too. Overall, the calf is in a better position for the next phase of rearing.

As a follow on feed from Transformula, the Royles have been using Shine Twice a Day milk replacer for over 18 months - this product is designed to encourage dry feed intake.

Shine Twice a day is the first calf milk powder to use Sunflower oil as an alternative to palm and soya oil.

The use of sunflower will enhance the ease of mixing and make the product ideal for all systems especially cold mixing.

Trial work has shown performance and health to be comparative with the current fat blend. The new Shine formula will also satisfy the requirement of some supermarket buyers who define the use of no palm or soya in feed.

BONANZA calf nutrition

Mollie Phipps (Bonanza) with Mark Royle

During those 18 months, calf growth weights have improved with daily liveweight gain (DLWG) averaging 0.8kg/head and calves weaning at eight to nine weeks old.

As calves thrive on consistency, they are fed the same concentration of milk powder throughout the rearing system and the water heater used for the replacer mix is set permanently at 39°C to ensure each feed is the same.

Calf Rearing Feed Plan:

Day	Product	Litres/day	Concentration
0	Colostrum	4	Tested 22b%+
1-5	Mothers transition milk	5	
6-10	Transformula	5	140g/L
11- weaning when calves are eating 1.5kg meal /day consecutively	Shine	5	140g/L
Wean 8-9 weeks of age	Shine	5-0	Drop 1/2L every 2 days

Attention to detail is vital too

The Royles ensure that every calf receives its allocation of milk twice a day, observing each pen of calves drinking and identifying slow drinkers.

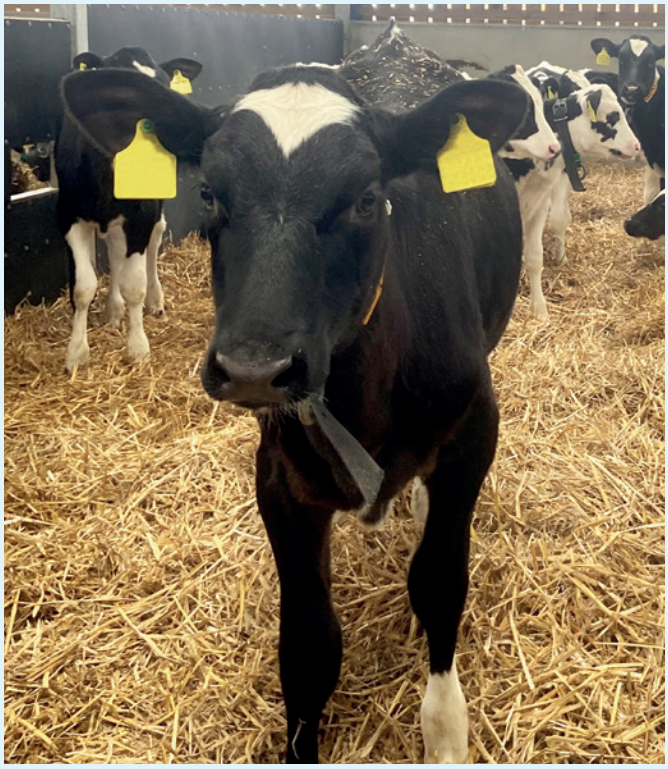
While the dairy heifers are returned to the dairy farm at four months old to be reared on, beef animals remain at the rearing unit for finishing when they receive a diet of maize, biscuit meal, barley, rapeseed, minerals and Agri-king maximiser, a ration that is 15% protein and 40% starch.

The animals achieve an average DLWG of 1.5kg/head, hitting weights of 700-720kg at 15-16 months. The average kill out percentage is 55.9% and most achieve an R grade.

Comment

The Royles demonstrate that calf performance is not about feeding level but about attention to detail, good husbandry, good housing and using the right milk replacers and advise. Often we find increasing milk feeding rates reduces calf performance before and after weaning, especially if the basics are not done right

Changes to housing and feeding combat dairy farm's calf cryptosporidium outbreaks



Making changes to the rearing system and introducing a milk replacer formulated to develop a baby calf's immune and digestive systems has helped a Leicestershire dairy farm prevent outbreaks of cryptosporidium in their heifer replacements.

Brian and Rob Sercombe run a herd of 200 Holstein Fresian cows in an all year round calving system with milk averaging 9,500 litres/cow/year and sold to Muller on a liquid milk contract.

For breeding, 80% of the semen used is sexed and the remainder of cows are inseminated to a British Blue or Aberdeen Angus.

Heifer replacements calve at 26 months of age, from July to October.

The father and son had on-going battle with cryptosporidium - although regular monitoring of the calves' immune status recorded antibody levels above 5.2g/l of IgG, the disease was a concern.

The cause was identified in the management of calves in their first days of life. After receiving colostrum they were removed from the calving shed to join the youngest batch of calves on a machine feeder, a group ranging in age from one day to 30 days and older.

The issue with cryptosporidium in calves was seen at around seven days old, says Mollie Phipps of Bonanza Calf Nutrition.

"A common issue seen on farms that introduce machines to their rearing system is higher disease outbreaks if there is mixing and housing calves of variable age ranges and more calves sharing the same teat," she says.

Mollie suggested changing the system, to allow baby calves to be reared in an environment slightly away from the older calves and from areas with higher disease burdens, in smaller groups on teat feeders.

The calves are now reared in this group until they are two weeks old, at a point when they have started to develop their own active immunity.

Having the addition of an area to rear the baby calves results in a "domino effect of positives", Mollie explains.

"Stressors and bullying within the group are reduced and so too is the disease burden and spread, feed refusals and assistance required when feeder training."

Key Points:

- Calves are reared in small groups until they are two weeks old away from older calves and higher disease burdens
- From day 2 -10 calves are fed Transformula a low heat skim and buttermilk transition milk replacer with added immune stimulants, prebiotics and probiotics for feeding baby calves.
- After two weeks the calves are put onto the feeder where Compumate a specific powder formulated for machine feeders is fed through the machine

With stronger calves entering the machine-fed group there is less bullying between older and younger calves; this in turn reduces stress among the calves with fewer being pushed down the pecking order.

"Reduced stressors and a reduced number of mixed age group calves on the feeder at once will in turn reduce the disease burden and spread within the pen," Mollie advises.

The most common period for a calf to succumb to cryptosporidium and rotavirus is a week old, but it can be from 3-14 days.

At that point, calves that haven't received adequate colostrum followed by transition milk and are housed under stressed situations, are more likely to contract disease.

Calves that are introduced to the machine at a younger age are more likely to need guidance onto the teat multiple times compared to older calves.

A Danish study* on 90 calves looking at the effect of age of introduction to feeders found that calves introduced at six days old were more likely to require assistance and had not consumed their full allocation of milk compared to calves introduced to the feeder at 14 days old.

In the Sercombes' system, calves are fed five litres at 140g/l per day of Transformula – a transition milk replacer designed for use after colostrum feeding. Fed from two days old until they leave the smaller groups at 10 days old to go onto the machine feeder.

Transition milk is produced by the cow from day two to five and is key to encouraging the production of acid and enzymes in the calf and the full closure of the gut wall.

But unlike cows milk, Transformula is dried under low temperatures and ensures the baby calf is not exposed to high bacterial counts that can be found in stored raw cow's milk and which can remove antibodies from the milk and have pathogenic effects, says Mollie.

**Jensen et al (2007)*

"Transformula is made with low heat skim milk and buttermilk along with five plant oils and is easily digested by the baby calf," she says.

It contains a range of oligosaccharides that are key to developing a baby calf's digestive and immune system - these can be found in other calf milks but only at low levels.

"The levels included in Transformula are comparable to the calf tubes and pastes available in the market," Mollie points out.

In 2020, the Sercombes built a new calf shed and installed a new Forster Technic machine for calf rearing, using Compumate, the only milk replacer designed for machine feeding.

Compumate is formulated to provide calves with a range of feed ingredients and additives including skim milk, buttermilk, plant oils and polyphenols, omega 3 oil, egg protein, vitamin C and vitamin E, to help keep calves healthy during the feeding period.

Compumate is sweetened and contains milk flavours to aid training on the teat while the plant oils encourage dry feed intake, an important consideration as calves get older.

Rearing calves for long term health and performance is multi-layered

Colostrum management, intake of concentrates and body condition at calving in combination play an important role in first lactation milk production and cow longevity, according to recent research.

Every rearer knows that a first feed of good quality colostrum gives a calf the best start, and research backs this up.

A recent study followed a group of heifers from birth to the end of their first lactation and examined the short and long term effects of the initial serum total protein intake.

This showed that animals fed high quality colostrum with a serum total protein of six decilitre or higher produced on average 1150-1500 litres more in their first lactation compared to those who received lower initial serum total protein.

Feeding transition milk, or the transition milk replacer, Transformula, is key to encouraging the production of acid and enzymes in the calf, promoting gut health and the full closure of the gut wall to reduce the calf's vulnerability to pathogens, says Mollie Phipps, of Bonanza Calf Nutrition.

The next thing to consider is concentrates. Several research studies have shown that increased intakes pre-weaning is positively associated with increased milk production at first lactation.

"This demonstrates that improved growth must come from both milk replacer AND dry feed," says Mollie.

A recent study, Quigley et al, 2019, measured the nutrient digestibility in calves fed on different starter and milk programs, to understand the nutrient availability and growth in animals fed moderate to high levels of milk replacer and the composition of fibre and starch in the starter feed.

This showed that the intake of the non-fibre carbohydrate (NFC), that is the starch, sugars and other non-fibrous carbohydrate fractions, is very important to the young rumen.

"The fermentation of feed products that produce butyrate and propionate are essential for rumen development," says Mollie.

"NFC is the most likely feed component to produce butyrate and propionate because it is most rapidly fermented in the young rumen therefore, in the study, the cumulative intake of NFC was identified as one of most important factors to a calf

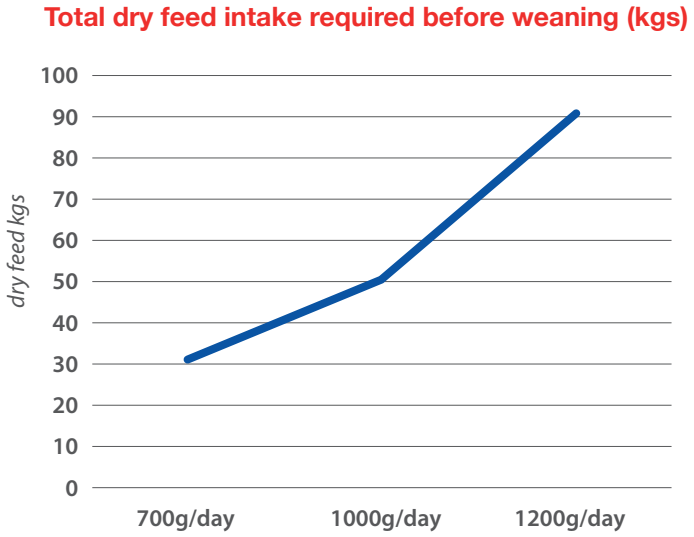


Figure 1 *Amount of calf milk fed per day*

**Study based on feeding 600-700g of milk replacer per day, higher amounts of milk replacer will equate to a higher cumulative intake i.e. 50kg of concentrate feeding 1kg of milk replacer a day*

because the development of the rumen is in response to all of the concentrates consumed by the calf, not just what is consumed over one day."

It is estimated that calves should consume 30kg* of concentrate over the rearing period until weaning – the point where the gastrointestinal tract, the rumen in particular, will be mature enough to extract the amount of energy from the concentrates as it would if it was a mature animal.

"I would therefore advise feeding approximately 600-750g of skim-based milk replacer a day with an inclusion of a multi-fat blend to maximise protein digestibility, and ultimately the liveweight gains."

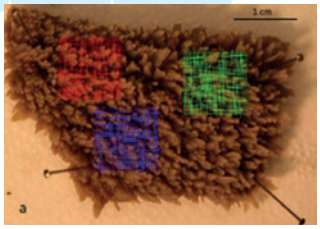
Calves will consume more starter feed, resulting in improved rumen development and the ability to gradually wean the calves at eight to nine weeks of age.

Another informative study, this time at Harper Adams University and comparing once a day and twice a day feeding, showed that calves that were fed once a day had 11.5% higher starter feed intakes within the first 12 weeks of life compared to twice a day fed calves.

This finding is important because increasing the calf's ability to absorb and utilise nutrients by increasing the papillae density by 30% and papillae absorption area by 57% creating a more efficient animal.

"Calves fed 1kg of milk replacer with the inclusion of higher fat look may look good on the outside but feeding an increased amount of fat will inhibit the dry feed intake because a higher fat quantity in the diet slows down the digestion rate," Mollie warns.

	OAD	TAD	SIG	% Increase
Papillae density	84.8	64.7	0.006	30%
Papillae absorption area	98.1	62.4	0.002	57%

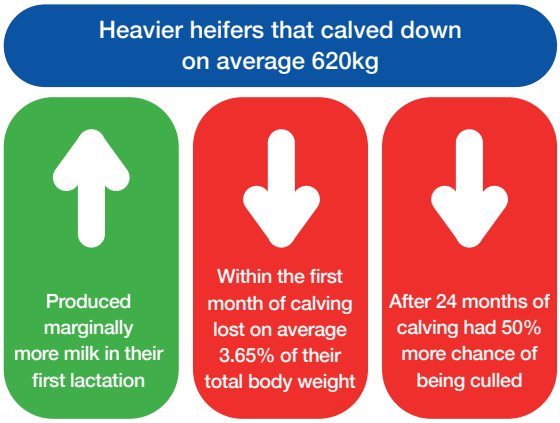


"These calves will not be as prepared to be weaned, resulting in a later ideal weaning age of approximately 12-14 weeks to account for catch up of rumen development."

Previous studies have shown that 'over-feeding' calves at a younger age can produces less productive and more costly animals, depressing the growth rates at three to seven months, impacting on targets such as service and later first calving.

Another consideration is body condition at calving

Research involving over 2,300 Holstein heifers looked at how bodyweight at first calving can affect milk yield and lifetime in the herd, heavier heifers calving down weighing on average 620kg were compared to lighter heifers calving down on average 474kg.



"Negative energy balance during the start of the lactation has been shown to increase culling rates due to the adverse effect on fertility," Mollie points out.

Milk replacers are better value than ever this year - Dr Christine Cummins


Dr Christine Cummins

Like all commodities this year, milk replacers, especially with a skim milk content, have risen in price sharply since January. How does using milk replacer compare with cow's milk. If we take cow's milk at 46p/L then the saving on using Shine fed twice a day is over **£40** per calf reared. Feeding Shine once a day will save a similar amount as calves tend to reach weaning dry feed intake much earlier than on cow's milk. It will also save 1 hours labour per calf reared so even at the minimum wage, this equates to **£50**/calf in total. Milky Way – our concentrated calf milk even at £64/bag will save nearly **£60**/calf reared, if fed as per the feeding instructions on the bag.

The price of non skim calf milks is tempting but the value of a good dairy heifer is increasing, so this is no time to skimp on quality as these animals will need to be around for many years to repay your investment and time.

It is worth looking at feeding rates as offering over 1kg calf milk/day will require an increase of 3000L of milk to pay back the extra rearing costs. Unfortunately independent research on milk or milk replacer shows no clear benefit from over feeding as its' not in the calf's interest to be a butter ball especially after weaning. Investing in rearing facilities or converting old sheds (contact completecalfconsultancy@btinternet.com) are better ways to improve calf performance.

Transformula will cost about the same as cows milk but the added oligosaccharides and polyphenols reduce the need to treat calves for cryptosporidia and scour. Using a transition milk replacer or your own transition milk will save labour and make calf rearing an easier and more enjoyable task. It also has a positive effect on cow longevity.

For beef calves, the cost of milk replacer has increased by **£20**/calf but the current cost of a calf compared to last year will offset this. For beef calves, encouraging dry feed intake is key to optimising calf rearing cost and maximising post weaning growth and rumen development.

BONANZA calf nutrition

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