

**Animal Science Research Centre - Beef Unit Trial Results – 2011 (c)**

**Effect of once or twice per day milk replacer feeding systems on performance of purchased 3 week old dairy-bred beef calves to 12 weeks**

**Introduction:**

As farms and herd sizes expand in the face of low commodity values and an attempt to benefit from economies of scale there is increasing pressure on the time of stockmen with more animals being kept per person. The development of low labour systems is therefore vital in this situation. The introduction of a once-a-day milk feeding system that does not affect performance or health should significantly reduce labour requirements but could also increase time for stockmanship tasks to enable early identification of disorders such as scour and pneumonia and hence facilitate rapid treatment and minimise mortality. In a study by Marsh and Collinson (2008) at Harper Adams, calves were placed onto a once-a-day feeding system at 5 days old using a specifically formulated calf milk replacer containing 300g/kg oil and 200g/kg protein. The calves on a twice-a-day system gained significantly ( $P<0.01$ ) more weight than the once-a-day fed calves from start to 3 weeks, however from birth to 12 weeks of age there were no significant differences in DLWG.

The objective of this experiment was to investigate the effect of rearing purchased (approx 3 weeks old) dairy-bred beef calves on either a once or twice per day milk replacer feeding system on the performance and health to 12 weeks.

**Materials & Method:**

40 Jan/Feb 2011 born Holstein (28) and Continental x Holstein (12) bull calves purchased at 11 to 29 days old (mean 20.5 days). This would therefore be similar to purchasing calves from markets. The calves were randomized according to age, breed and weight to the following treatments and housed in individual pens:

Twice Calves fed warm whey, skim and buttermilk based milk replacer (Shine Flying Start [20% CP, 14% Oil], Bonanza Calf Nutrition) mixed at 37°C at 120g per 880ml of water and fed at 2.5 litres twice per day (5 litres [600g milk powder] per day) to weaning.

Once Calves fed warm skim and buttermilk based milk replacer (Shine Once-a-Day [20%CP, 15%Oil], Bonanza Calf Nutrition) mixed at 37°C at 200g per 800ml of water and fed at 3 litres per day (600g milk powder) in one feed to weaning.

Both groups of calves were therefore fed 600g milk replacer per day. The calves were offered *ad lib* early weaning concentrates (Primecalf Sprinter Pellets, Carrs Billington) from the start and weaned when eating 1.2kg of concentrates for 3 consecutive days. Fresh water and straw were offered *ad lib* to both treatment groups. The calves were moved into group pens at weaning.

## Results:

Table 1: Daily live weight gains (kg)

DLWG (kg)	Once	Twice	Sig
Start - 3 weeks	0.461	0.289	***
Start - 6 weeks	0.674	0.606	NS
6 - 12 weeks	1.127	1.003	=0.096
Start -12 weeks	0.901	0.806	=0.121

NS = not significant, \* =  $P < 0.05$ , \*\* =  $P < 0.01$

The once and twice-a-day calves were weaned at 27.3 and 29.2 days respectively. The once-a-day calves gained an extra 3.6kg in weight from start to 3 weeks.

Table 2: Live weights (kg) and last rib girth measurement at 12 weeks

Livewt (kg)	Once	Twice	Sig
Start	56.5	56.7	NS
3 weeks	66.2	62.8	=0.148
6 weeks	84.8	82.2	NS
12 weeks	132.2	124.4	=0.132
Last rib girth at 12 weeks (cm)	140.6	136.5	=0.141

There were no differences in coat bloom or faecal scores, or incidence of health (hydration score, cough score, nasal discharge and eye discharge score) between the treatments.

Table 3: Feed intakes (kg) and Feed Conversion Ratio (FCR)

Feed intakes (kg)	Once	Twice
Milk replacer	16.4	17.5
Concs - start to wean	185.2	173.7
FCR	2.66	2.82

Water intakes were significantly reduced ( $P < 0.05$ ) with the twice-a-day fed calves. However when water intake was measured taking into account the water provided by the reconstituted milk replacer there were no differences in fluid intake. Since there were no differences in calf hydration scores it can be concluded that this had no significant effect on health.

Table 4: Financial performance and labour costs

Feed costs (£)	Once	Twice
Shine Once a Day @ £1,700/t	27.88	
Shine Flying Start @ £1,500/t		26.25
Primecalf Sprinter Pellets @ £250/t	42.96	40.30
Feed costs/calf (£)	70.84	66.55
Feed cost per kg gain (p)	93.6	98.3
Labour/calf to weaning (mins)	71.0	122.6
Labour cost (@£10/hour) per calf to weaning (£)	11.83	20.43

Labour requirements to weaning were reduced by 42% with the once-a-day system.

### **Discussion & Conclusions:**

- Calf performance was very good exceeding the recognised targets for rearing calves to 12 weeks of 115kg.
- The calves fed once-a-day recorded significantly ( $P<0.001$ ) increased DLWGs from start to 3 weeks (461 v. 289g). They were weaned 1.9 days earlier and gained an extra 3.6kg in live weight. It was noted that there was an increase in the incidence of nutritional scour with the twice-a-day system from start to 3 weeks which could explain the increase in DLWG for the once-a-day reared calves.
- The DLWGs from weaning to 12 weeks and from start to 12 weeks were also higher ( $P=0.096$  and  $P=0.121$  respectively) for the once-a-day calves which was close to statistical significance. Both groups of calves achieved target DLWGs.
- Concentrate intakes from start to 12 weeks were increased by the once-a-day feeding system and they consumed an extra 11.5kg per calf of starter pellets. The increased concentrate intake with reduced incidence of nutritional scour would explain the increased live weight gain.
- The once-a-day reared calves recorded an increased rumen girth measurement which is an indication of improved rumen development. It could be assumed that this was due to the increased concentrate intake.
- There were no detrimental effects on calf health with feeding milk replacer once-a-day to 3 week old calves. Water intakes were significantly reduced ( $P<0.05$ ) with the twice-a-day fed calves. Since there were no differences in hydration scores it can be concluded that this had no significant effect on health.
- Feed costs per calf were increased by £4.29 with the once-a-day system however feed costs per kg gain were reduced by 4.7p based on the costs prevailing at the time of the study. Labour was reduced by 42% with the once-a-day system resulting in a saving in labour costs of £8.60 per calf. This would negate the increase in overall calf feeding costs resulting in an increased margin worth £4.31 per calf for the once-a-day system.
- The benefits of once-a-day feeding to 3 week old calves in this trial do not support the findings from our previous study which showed poorer performance for calves introduced to once-a-day feeding at just 5 days of age. This difference is largely due to the older calves being accustomed to eating concentrates so they are able to respond by increasing their daily concentrate intake when changed to once-a-day feeding. The recommendation is to change to once-a-day feeding only when calves are consuming at least 0.25kg of concentrates per day at around 3 weeks of age.
- Once-a-day feeding systems can be recommended for purchased calves at 3 weeks old.

### **References:**

- Marsh, S.P. and Collinson, A.R. 2008. Effect of rearing dairy-bred beef calves on once or twice per day milk feeding systems to weaning at 6 weeks old. *Proceedings of the British Society of Animal Science*. Paper 191
- Marsh, S.P., Rees, T.R. and Faulkner, C.L. 2011. Effect of once or twice per day milk replacer feeding systems on performance of purchased dairy-bred calves to 12 weeks. *Proceedings of the British Society of Animal Science*. Paper 96

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