HARPER ADAMS University College

ANIMAL SCIENCE RESEARCH CENTRE

TRIAL REPORT CR32 – 16 August 2011

For Bonanza Calf Nutrition

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

Summary

Forty purchased Holstein and Continental cross Holstein bull calves with a mean age of 20.5 days were individually penned and bucket fed 600g of milk replacer either once or twice per day. The once-a-day calves were fed a skim based milk replacer containing whey and butter oil (Shine Once a Day, Bonanza Calf Nutrition) mixed at 200g per 800ml of water and fed at 3 litres per day. The twice-a-day calves were fed a whey based milk replacer containing skim and butter oil (Shine Flying Start, Bonanza Calf Nutrition) mixed at 120g per 880ml of water and fed at 2.5 litres twice per day. The calves were offered *ad lib* early weaning concentrates (Primecalf Sprinter Pellets, Carrs Billington) straw and water and weaned when eating 1.2kg of concentrates for three consecutive days. Calf performance was subsequently monitored to 12 weeks.

Overall performance was very good exceeding the recognised target for rearing calves to 12 weeks of 115kg.

The calves fed once-a-day recorded significantly higher ($P<0.001$) 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 daily live weight gain (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 fed 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.

Water intakes were significantly reduced ($P<0.05$) with the once-a-day fed calves consuming 26 litres less of water. Since there were no differences in hydration scores it can be concluded that this had no significant effect on health. It could be assumed that with the twice-a-day fed calves consuming overall an extra 37 litres of water which includes water consumed in their milk, that there would have been an increase in urine production and hence increased requirement for straw bedding.

There were no detrimental effects on calf health (hydration score, cough score, nasal discharge and eye discharge score) with feeding milk replacer once-a-day to 3 week old calves.

Feed costs per calf were increased by £4.35 with the once-a-day system however feed costs per kg gain were reduced by 4.7p with the once-a-day system based on the costs prevailing at the time of the study. Labour was reduced by 42.1% 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.

Introduction:

Calf rearing systems play a critical role in ensuring a productive and profitable cattle enterprise. The time from birth to weaning represents the most critical phase for cattle and is the period of greatest stress and metabolic challenge. Successful calf rearing depends on the integration of nutrition, environment and health management skills. 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.

During the 1960s and 1970s, research was carried out to see whether once-a-day feeding of calves was feasible. It was concluded that feeding calves once-a-day decreased labour requirements by as much as 40% (Davis and Drackley, 1998). Thicket *et al.,* (1988) concluded that for the best results a top quality milk replacer is needed for a once-a-day feeding regime, so a large meal forms a clot in the abomasums.

The concept of feeding calves once-a-day is to get them eating concentrates

from an early age, leading to quicker rumen development. Calves are then able to be weaned sooner when they are eating 1kg of concentrates which is usually around day 45 (Murphy, 2009). Stanley *et al.,* (2002) studied the effect of feeding milk replacer once or twice per day with Holstein and Jersey heifer calves. The calves were fed the same quantity of milk replacer with the once-a-day calves having a 30% reduction in water to reconstitute the powder. Feeding once-a-day was shown to have no significant effect on performance. This supports work by Ackerman *et al.,* (1969) and Willet *et al.,* (1969).

In a study on once-a-day feeding at Harper Adams Marsh and Collinson (2008) found that from birth to 3 weeks, calves on a twice a day system gained significantly ($P<0.01$) more weight than the once-a-day fed calves, however from birth to 12 weeks of age there were no significant differences in DLWG.

Work carried out by Muir *et al.,* (2003) in New Zealand found that calves fed on a once-a-day system achieved 0.56kg daily live weight gain and averaged 63.5kg when weaned at 5 weeks. Then between weaning and 12 weeks of age had an average growth rate of 0.75kg and averaged 100kg live weight.

Once-a-day feeding has been implicated in making calves more prone to stress and infection and claims have also been made that feeding a large quantity of milk or replacer in one feed promotes scouring. However in a trial conducted by Willet *et al.,* (1969) found that feeding calves once-a-day did not cause an increase in the number if digestive disorders or decrease calf vigour.

Once-a-day feeding systems have the advantage of saving labour. Gleeson *et al.,* (2006) found that the time taken to feed calves twice-a-day was significantly longer than calves fed once-a-day. This supports work carried out by Dawson and Moss (2009) who found that 60% less time was spent feeding calves on a once-a-day system relative to calves fed on standard twice-a-day system ($P<0.05$). Assuming labour costs are £12/hour and the rearing period of the calves is a six week period this is equivalent to a reduction in labour costs of £1,273 for a 50 calf rearing system over a 6 week period.

Objective

The objective of this experiment was to investigate the effect of rearing purchased 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 and Method

The experiment was carried out in the Animals Department calf unit at Harper Adams University College, Newport, Shropshire, TF10 8NB.

The trial commenced in January 2011 with 28 Holstein and 12 Continental cross Holstein bull calves sourced from an 800 cow commercial dairy unit in Shropshire purchased at 11 to 29 days old. This would therefore be similar to purchasing calves from markets.

The calves received colostrum within 6 hours after birth and fed 4 litres of waste milk (split into 2 feeds per day) prior to arrival at Harper Adams. On arrival the calves were given 8g/day of multi-vits (Jolivo, The Calf Company, see appendix 1 for details) for 5 days (40g in total) and were placed into individual pens. They were allocated in a randomized block design according to live weight and breed to the following treatments with 20 calves per treatment:

Twice — Calves fed warm whey, skim and buttermilk based milk replacer (Shine Flying Start [20% CP, 14% Oil], Bonanza Nutrition) mixed at 37^{o}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. The calves were weaned when eating an average of 1.2kg per day of early weaning concentrates over three consecutive days.

Once — Calves fed warm skim and buttermilk based milk replacer (Shine Once-a-Day [20%CP, 15%Oil], Bonanza Nutrition) mixed at 37^{o}C at 200g per 800ml of water and fed at 3 litres per day (600g milk powder) in one feed to weaning. The calves were weaned when eating an average of 1.2kg per day of early weaning concentrates over three consecutive days.

See appendix 2 for the declared specification and analysis of the milk replacers.

The calves were moved into group pens at weaning to completion of the trial at 12 weeks.

The calves were offered 18% CP early weaning concentrates (Primecalf Sprinter Pellets, Carrs Billington) *ad lib*. See appendix 3 for the declared specification and analysis. Fresh water and straw were offered from racks and fed *ad lib* to both treatment groups.

The calves were faecal scored (see appendix 4), hydration scored (see appendix 5 for details), calf cough scored (see appendix 6 for details), nasal discharge scored (see appendix 7 for details) and eye discharge scored (see appendix 8 for details) at the start and weeks 1, 2, 3, 4, 5, 6 and 12. Coat bloom was scored (1= dull, 3 = normal, 5 = shiny) at the start, weaning and 12 weeks.

The calves were bedded on straw. They were dehorned at 3 weeks and vaccinated with 5ml of Rispoval4 (Pfizer Animal Health) at 3 and 6 weeks. At weaning they were placed into group pens (Once and Twice a Day) to 12 weeks and fed *ad lib* Primecalf Sprinter Pellets and straw offered from racks.

Results & Discussion:

The mean age of the calves at the start of the trial was 20.5 days and

therefore representative of market purchased calves. The calves were weaned when eating 1.2kg of concentrates for three consecutive days and as shown in table 1 the calves reared on the once-a-day system were weaned after 27.3 days (approximately 4 weeks) on milk which was 1.9 days earlier than calves reared on the twice-a-day system.

Table 1: Calf age

Age (days)	Once	Twice	s.e.d	Sig
Age at start	19.1	21.9	2.86	NS
Days to weaning	27.3	29.2	2.20	NS

NS = not significant, * = P<0.05, ** = P<0.01, *** = P<0.001

Overall performance was very good exceeding the MLC (1999) target for rearing purchased calves to 12 weeks of 115kg. The calves fed once-a-day recorded higher 3 week, weaning and 12 week weights and gained an extra 8kg in live weight from start to 12 weeks compared to the twice-a-day calves however this was not statistically significantly different.

Table 2: Calf performance (live weight)

Livewt (kg)	Once	Twice	s.e.d	Sig
Start	56.5	56.7	1.96	NS
3 weeks	66.2	62.8	2.33	=0.148
6 weeks	84.8	82.2	4.37	NS
12 weeks	132.2	124.4	5.55	=0.132

Feeding milk replacer once-a-day resulted in significantly higher (P<0.001) DLWGs from start to 3 weeks. 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 6 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.

Table 3: Daily Live Weight Gains (DLWG)

DLWG (kg)	Once	Twice	s.e.d	Sig
Start - 3 weeks	0.461	0.289	0.0447	***
Start – 6 weeks	0.674	0.606	0.0658	NS
6 - 12 weeks	1.127	1.003	0.0725	=0.096
Start -12 weeks	0.901	0.806	0.0595	=0.121

Increased rumen girth is an indication of rumen development. As shown in table 4 the once-a-day fed calves recorded a higher rumen girth measurement at 12 weeks however this was not statistically significant.

Table 4: Rumen girth measurements

Rumen Girth (cm)	Once	Twice	s.e.d	Sig
Start	94.2	93.0	1.81	NS
6 weeks	116.6	114.6	2.83	NS
12 weeks	140.6	136.5	2.69	=0.141

As shown in table 5 there were no significant (P>0.05) differences between the treatments for heart girth, wither height, hip height and hip width.

Table 5: Calf measurements at 12 weeks old (cm)

12 weeks (cm)	Once	Twice	s.e.d	Sig
Heart Girth	115.1	115.4	2.08	NS
Wither Height	97.4	98.5	1.33	NS
Hip Height	103.2	103.3	1.05	NS
Hip Width	37.4	38.1	0.79	NS

As can be seen from table 6 there was no significant differences (P>0.05) between the treatments for coat bloom score.

Table 6: Coat bloom scores

Coat score (1-5)	Once	Twice	s.e.d	Sig
Start	3.33	3.24	0.127	NS
6 weeks	3.58	3.50	0.105	NS
12 weeks	3.35	3.36	0.124	NS

Coat bloom score: 1= dull, 3 = normal, 5 = shiny

Individual feed intakes were recorded from start to weaning with group intakes recorded from weaning to 12 weeks.

There was no difference in concentrate intakes from start to weaning however the once-a-day fed calves consumed an extra 10.7kg of concentrates from weaning to 12 weeks and overall consumed an extra 11.5kg. Since the calves were group housed from weaning to 12 weeks this difference in intake could not be statistically analysed.

Table 7: Feed intakes and feed conversion ratio (FCR)

Feed intakes (kg)	Once	Twice	s.e.d	Sig
Milk replacer	16.4	17.5		
Concs - start to wean	13.3	12.5	0.769	NS
Concs - wean to 12 weeks	171.9	161.2		
Concs - total	185.2	173.7		
FCR	2.66	2.82		

It could be assumed that the increased concentrate intake with the once-a-day milk feeding resulted in improved rumen development. The higher concentrate intake would explain the increased (+8kg) live weight gain to 12 weeks and improved rumen girth measurement. There was an improvement in feed conversion ratio (FCR) with the once-a-day feeding system.

Water intakes were recorded and the results in table 8 show that the once-a-day fed calves drunk significantly less ($P<0.05$) water than the twice-a-day fed calves consuming 26 litres less of water. Due to logistical problems water intakes were only recorded for 18 calves, hence the relatively modest level of statistical significance.

Table 8: Water and milk intakes (litres)

Liquid intake (litres)	Once	Twice	P Value	Sig
Water	37.3	11.3	0.020	*
Milk (excl CMR)	65.5	128.5		
Total	102.8	139.8		

It could be assumed that with the twice-a-day fed calves consuming overall an extra 37 litres of water which includes water consumed in their milk, that there would have been an increase in urine production and hence increased requirement for straw bedding.

The results in table 9 show no significant ($P = 0.584$) differences between the treatments for faecal consistency. It can be noted that the faecal scores were higher in week 2 due to an incidence of nutritional scour recorded with some of the twice-a-day fed calves.

Table 9: Faecal scores

Faecal score (1-4)	Once	Twice
Start	1.20	1.25
Week 1	1.47	1.72
Week 2	1.43	1.42
Week 3	1.20	1.16
Week 4	1.10	1.07
Week 5	1.15	1.10
Week 6	1.05	1.05
Week 12	1.00	1.10

There were no significant differences in hydration scores (see table 9) between the treatments indicating that the lower water intake with the once-a-day fed calves was not causing any issues with regards to health. It can be noted that the twice-a-day calves recorded higher (worse) hydration scores in weeks 1 and 2 which coincides with the incidence of nutritional scour recorded with some of the twice-a-day fed calves

Table 9: Hydration scores

Hydration scores (1-5)	Once	Twice
Start	1.10	1.35
Week 1	1.07	1.25
Week 2	1.12	1.07
Week 3	1.08	1.05
Week 4	1.02	1.07
Week 5	1.00	1.00
Week 6	1.00	1.00
Week 12	1.00	1.00

As shown in table 10 there were no significant differences (P = 0.339) in cough score between the treatments. Despite this, an increase in coughing was observed in calves fed once-a-day from the start to week 3, reaching a score of 0.29, with a gradual reduction over the milk fed phase. Slightly more coughing was seen in calves in the once-a-day group in week 12, with a score of 0.15 compared to 0.05 with the twice-a-day calves.

Table 10: Cough scores

Cough scores (0-3)	Once	Twice
Start	0.05	0.15
Week 1	0.13	0.15
Week 2	0.25	0.13
Week 3	0.29	0.12
Week 4	0.15	0.05
Week 5	0.05	0.05
Week 6	0.05	0.05
Week 12	0.15	0.05

There were no significant differences in nasal discharge (P = 0.886) between the treatments as shown in table 11.

Table 11: Nasal discharge scores

Nasal discharge (0-3)	Once	Twice
Start	0.10	0.10
Week 1	0.13	0.12
Week 2	0.08	0.10
Week 3	0.15	0.06
Week 4	0.02	0.02
Week 5	0.00	0.05
Week 6	0.00	0.00
Week 12	0.05	0.05

There were no significant differences in eye discharge (P = 0.985) between

the treatments. The mean score was higher for the twice-a-day calves at the start and table 11 shows that the scores for both treatments follows a similar pattern over time remaining slightly raised until week 3 with a gradual improvement to week 5 where they remained low.

Table 11: Eye discharge scores

Eye discharge (0-3)	Once	Twice
Start	0.05	0.30
Week 1	0.28	0.22
Week 2	0.25	0.22
Week 3	0.28	0.25
Week 4	0.24	0.13
Week 5	0.00	0.00
Week 6	0.00	0.00
Week 12	0.05	0.06

Although there were no differences between treatments on ear score (P = 0.162) there was a time effect (P<0.01). Table 12 demonstrates how ear scores followed a similar pattern for each treatment from start to week 2, where they gradually improved to week 5 and remained „normal" for the duration of the experiment.

Table 12: Ear scores

Ear scores (0-3)	Once	Twice
Start	0.15	0.35
Week 1	0.23	0.35
Week 2	0.27	0.38
Week 3	0.22	0.30
Week 4	0.08	0.16
Week 5	0.00	0.00
Week 6	0.00	0.00
Week 12	0.00	0.06

A financial appraisal was carried out to calculate total rearing costs and cost per kg gain based on the feed costs prevailing at the time of the study.

Table 13: Financial performance

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

As shown in table 13 feed costs per calf were increased by £4.29 with the once-a-day system, however feed cost per kg gain were reduced by 4.7p.

A major benefit of once-a-day feeding systems as opposed to twice-a-day could be lower labour costs from decreased feeding time. The labour costs of the two feeding systems in this experiment were recorded for a batch of 32 calves and are summarized in table 14. The once-a-day system represents a 42.1% time saving in labour compared to the twice-a-day system. A result comparable to that suggested by Otterby and Linn (1981) but lower than that reported by Marsh & Collinson (2008) who recorded a reduction in labour input of 49.7%. Assuming labour is valued at £10 per hour, feeding once-a-day gives substantial savings of £8.60 per calf with the once and twice-a-day calves requiring a total of 71.0 and 122.6 minutes to weaning respectively.

Table 14: Labour requirements and costs

Labour requirements and costs	Once	Twice
Daily total for 16 calves (mins)	42	67
Per calf/day (mins)	2.6	4.2
Days start to weaning	27.3	29.2
Per calf to weaning (mins)	71.0	122.6
Assuming labour @ £10 per hour		
Labour cost per calf to weaning (£)	11.83	20.43
Labour saving per calf (%)	42.1%	
Labour saving per calf to weaning (£)	8.60	

This reduction in labour costs of £8.60 would negate the increased feed cost of £4.29 per calf leaving an extra margin worth £4.31 per calf for the once-a-day system.

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 highly significantly ($P<0.001$) increased DLWGs from start to 3 weeks weaning (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 significant effects on faecal score, hydration score, calf cough score, nasal discharge score, eye discharge score or coat bloom score. It can be concluded that there are 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 once-a-day fed calves consuming 26 litres less of water. Since there were no differences in hydration scores it can be concluded that this had no significant effect on health. It could be assumed that with the twice-a-day fed calves consuming overall an extra 37 litres of water which includes water consumed in their milk, that there would have been an increase in urine production and hence increased requirement for straw bedding.
- 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 with the once-a-day system based on the costs prevailing at the time of the study. Labour was reduced by 42.1% 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.

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Signed: _____

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Appendix 1

JOLIVO (The Calf Company)

JOLIVO is a multi vitamin supplement containing dextrose and sodium. The blend of vitamins contained in JOLIVO are claimed by the manufacturers to work in synchrony with the calves‟ metabolism, assisting the animal to get over illness as quickly as possible, with dextrose and sodium aiding rehydration.

Product Composition

Dextrose, Monocalcium phosphate, Wheat starch, Sodium chloride, Magnesium sulphate, Magnesium hydroxide, Additive premix.

Specification

Additives			
Vitamin A	620,000 U/kg	Vitamin B1	250 mg/kg
Vitamin D3	240,000 UI/kg	Vitamin B2	375 mg/kg
Vitamin C	3,500 mg/kg	Calcium pantothenate	625 mg/kg
Vitamin E	1,500 mg/kg	Vitamin B6	100 mg/kg
Vitamin K	100 mg/kg	Vitamin B12	1.5 mg/kg
Niacine	1,000 mg/kg	Folic acid	21 mg/kg
Sodium	20 g/kg	Manganese (sf. sulphate)	1.6 g/kg
Magnesium	10 g/kg	Iron (sf. fumarate, chélate d'acides aminés)	1 g/kg
Phosphorus	35 g/kg	Copper (sf. sulphate)	250 mg/kg
Calcium	32 g/kg	Cobalt (sf. carbonate)	12.5 mg/kg
Zinc (sf. sulfate)	1.8 g/kg	Selenium (sf. sélénite)	2.5 mg/kg
Sorbitol	22.5 g/kg	Methionin (sf DL méthionine)	25 g/kg

Feeding Instructions

Feed 8g/calf per day mixed with milk for 5 days

Appendix 2

Shine Flying Start (twice a day) milk replacer contains Whey powder, Skim milk powder, Palm oil, Buttermilk (stemming from dairy cream), Wheat gluten, Coco oil, Rapeseed oil, Delactosed whey, Pea protein concentrate, Wheat flour, Pea flour, Soya oil and inactive yeast extract.

Shine Once a Day milk replacer contains Skim milk powder, Whey powder, Palm oil, Buttermilk (stemming from dairy cream), Coco oil, Wheat gluten, Colza oil, Soya oil and inactive yeast extract.

Specification (declared) and analysis

	Once a day		Twice a day	
	Declared	**Analysed**	**Declared**	**Analysed**
Crude Protein (%)	20.0	19.1	20.0	19.5
Oil B (%)	15.0	17.7	14.0	17.7
Ash (%)	7.5	7.0	7.5	7.4

Appendix 3

Carrs Billington Primecalf Sprinter Pellets specification (declared) and analysis results

	Primecalf Sprinter Pellets	
	Declared	**Analysed**
Oil B (%)	4.5	6.5
Protein (%)	18.0	17.4
Fibre (%)	8.5	8.1
Ash (%)	9.0	7.4

The formulation of Primecalf Sprinter Pellets is shown below

Primecalf Sprinter Pellets	**%**
Wheatfeed	24.83
Barley	15.1
Citrus Pulp	10.0
Hipro Soya	10.0
Soya Hull	10.0
Maize Germ Meal	5.0
Ensus Wheat Distillers	5.0
Cane Molasses	5.0
Rapeseed Meal	4.1
Maize Gluten	4.0
Calcium Carbonate	2.49
AminoMax-R	1.5
Nustart Premix	1.0
Vegetable Oil	1.0
Salt	0.98

Oil B	4.5
Protein	18.0
Fibre	9.8
Ash	8.5
MER	11.0
Starch	17.1
Sugar	7.6

NDF	26.5
Vitamin A (iu/kg)	10,000
Vitamin D3 (iu/kg)	2,500
Vitamin E (iu/kg)	50.0
Copper (mg/kg)	15.0
Selenium (mg/kg)	0.5

Appendix 4

Harper Adams University College - Calf Faecal Scoring System

Score	Description
1	Normal faeces: Yellow to light brown colour, consistency pappy to greasy/fatty and viscous, without solid components.
2	Semi solid: Soft faeces, yellow to grey colour. More viscous than normal faeces, greasy/fatty. Paste like consistency, with solid components.
3	Liquid: Early stages of diarrhoea/scour. Runny/aqueous faeces, with undigested milk constituents. Nutritional scour likely to be due to excess milk supply with *ad-libitum* milk fed calves (whitish-grey faeces with undigested milk constituents).
4	Very liquid and copious: Nutrition or disease induced diarrhoea. Thin, malodorous with bubbly, foaming constituents. Often forcefully ejected. Calves constantly straining to pass faeces. Pain may be seen from drawn-in abdomen. Disease related scour i.e. *Rotavirus, Corona virus, E.coli, Salmonella* (grey-dark faeces). Faeces may contain some blood.

Notes:

The first faeces of the calf (meconium) which is greenish-black and viscous, formed by the calf before birth and usually excreted on the first day, should not be assessed on the above system.

Calves with constipation, with hard faeces in the form of small balls or pellets cannot be assessed on the above system.

Appendix 5

Calf Dehydration Score

Score	1	2	3	4	5
Skin pinch test	Returns to normal quickly	Returns to normal slowly (several seconds)	Skin folds	Weak body	Dead

Source: Based on Table below.

Table 9. Degree of Hydration in Calves

Treatment	% Loss Body Weight[1]	Body Fluid Loss (lbs)	Hours of Scouring	Skin Pinch Test (Neck or Rear Leg)	Calf Characteristics
Add soda & salt to milk	1%	0.9	1-5	Returns to normal quickly	Stands & eats alone
Electrolyte Remove Milk	5%	4.5	6-10	Returns to normal slowly (several seconds)	Depressed
Electrolyte Remove Milk	8%	7.2	11-18	Skin folds	
Intravenous fluids & electrolytes	10%	9.0	19-30	Stands up	Eyes begin to sink; will not nurse bottle
Intravenous fluids & electrolytes	12%	12.0	30-35	Weak body, legs	
Intravenous[2] fluids & electrolytes	15%	13.5	35-48	Ears cold	Calf down or dead

1. Assume 90-lb birth weight, large breed.
2. Calf usually dies.

Source: Ely, L & Guthrie L. 2000. *Raising Dairy Herd Replacements.* Extension Dairy Science. [Available from: http://pubs.caes.uga.edu/caespubs/pubs/PDF/B831.pdf] Accessed 03 November 2008.

Appendix 6

Calf Cough Score

Enter the pen or hutch, and squeeze the calf's trachea with some pressure while giving it a little shake. Listen for any coughs. Use the health-scoring chart to assign cough scores to each calf. For example, a calf that scores "0" does not cough, while one that scores "3" will have repeated spontaneous coughs after this procedure.

Score	0	1	2	3
	None	Induce single cough	Induced repeated coughs or occasional spontaneous cough	Repeated spontaneous coughs

Source: Linderoth, S. 2007. *Check calves from head to tail.* Dairy Herd Management. [Available from: http://www.dairyherd.com/directories.asp?pgID=724 &ed_id=6219] Accessed 03 November 2008.

Appendix 7

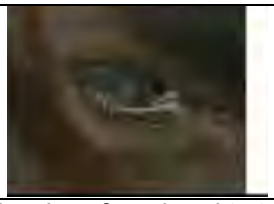
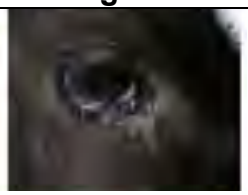
Nasal discharge score

Score	0	1	2	3
	Normal serous discharge	**Small amount of unilateral cloudy discharge**	**Bilateral, cloudy or excessive mucus discharge**	**Copious bilateral mucopurulent discharge**
				

Source: Linderoth, S. 2007. *Check calves from head to tail.* Dairy Herd Management. [Available from: http://www.dairyherd.com/directories.asp?pgID=724 &ed_id=6219] Accessed 03 November 2008.

Appendix 8

Eye discharge score

Score	0	1	2	3
	Normal	**Small amount of ocular discharge**	**Moderate amount of bilateral discharge**	**Heavy ocular discharge**
				

Source: Linderoth, S. 2007. *Check calves from head to tail.* Dairy Herd Management. [Available from: http://www.dairyherd.com/directories.asp?pgID=724 &ed_id=6219] Accessed 03 November 2008.