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Animal Science Research Centre - Beef Unit Trial Results – 2014 (d)

Evaluation of calf coats (Holm & Laue) on the performance and health of artificially reared winter born beef calves to 12 weeks

Introduction:

When exposed to low ambient temperatures calves will utilise chemical and physical thermoregulatory methods to conserve and produce body heat (Davis and Drackley, 1998).These methods utilise the body's energy reserves and nutrition. It is explained that during prolonged periods of low ambient temperatures immune function can be indirectly affected as the nutrition and energy available for support is limited (Nonnecke *et al.,* 2003). This can then lead on to the animal being predisposed to ill health. Additionally exposure to low ambient temperatures has been associated with weak calf syndrome (Olson *et al.,* 1980b; Raswon *et al.,* 1989b), respiratory illnesses (Nonneck *et al.,* 2009) and scours (Hannien *et al.,* 2003). Poor health of calves pre and post weaning can lead to great economic losses (Nonnecke *et al.,* 2009). Calf coats have been produced as a means to provide calves protection from low ambient temperatures. It is suggested that these coats can reduce heat loss up to 52% (Rawson *et al.,* 1989a), however there has been little investigation in to their effects on the health of calves.

At Harper Adams University 2 batches of calves are reared per year in the beef unit with one in October and the second in January. Invariably there are always more health and performance issues with the latter group. The objective of this study was to investigate the effects of calf coats on the performance and health of artificially reared December - February born dairy-bred beef calves.

Materials & Method:

40 Dec/Feb 2013-14 born Holstein (n = 30) and Continental x Holstein (n = 10) bull calves purchased at a mean age of 17.3 days. This would therefore be similar to purchasing calves from markets. The calves were randomized according to breed, age and weight to the following treatments and housed in individual straw bedded pens:

Control — Calves fed warm whey and vegetable protein based milk replacer (Wynngold Bloom [23% CP, 20% Oil], Wynnstay Group Plc) mixed at 40-45^{o}C (and fed at 39^{o}C) at 187.5g per 812.5ml of water and fed at 2 litres twice per day (4 litres per day) via a teat from a Wydale feeder offered at head height. Calves were offered *ad lib* early weaning concentrates (Start 'n' Wean, Wynnstay Group Plc [18% CP]) and gradually weaned at day 42. Calves experiencing 'a chill' or ill-thrift were placed under a heat lamp. The calves were moved into a group pen at weaning until 12 weeks.

Calf coats — Calves fed 'as per' the control group with calves fitted with Holm & Laue calf coats until weaning at day 42. The calves were moved into a group pen at weaning until 12 weeks.

The calves were offered *ad lib* fresh water and straw on arrival.

Results:

Table 1: Live weights (kg)

Treatment	Control	Coat	s.e.d	P Value	Sig
Start	47.9	48.1	1.80	0.929	NS
1 week	51.3	52.4	1.90	0.597	NS
3 weeks	58.9	60.9	2.46	0.425	NS
Weaning (6 wks)	75.0	78.1	2.85	0.289	NS
12 weeks	121.2	126.8	2.88	0.092	**Trend**
Increase in livewt	73.3	78.7			

NS = not significant

The calves with coats recorded increased 12 week weights and gained an extra 5.3kg in weight from start to 12 weeks.

Table 2: Daily live weight gains (g)

Treatment	Control	Coat	s.e.d	P Value	Sig
Start - 1 weeks	486	610	62.4	0.078	**Trend**
1-3 weeks	543	611	66.7	0.307	NS
3-6 weeks	765	816	71.4	0.475	NS
Start - weaning	644	713	43.7	0.122	NS
Wean - 12 weeks	1101	1161	53.5	0.267	NS
Start -12 weeks	873	937	38.1	0.097	**Trend**

The calves with coats recorded higher DLWGs from start to 1 week and start to 12 weeks.

Table 3: Last rib girth measurements (cm)

Treatment	Control	Coat	s.e.d	P Value	Sig
Start	84.8	85.8	1.82	0.594	NS
6 weeks	103.3	107.6	1.81	0.021	*
12 weeks	128.3	132.4	2.52	0.109	NS
Increase in rib girth	42.5	46.6			

Last rib girth measurements are an indication of rumen development. It can be seen from table 3 that the calves with coats recorded significantly improved rumen development which is presumably attributed to the higher growth rates and development of the calf.

A number of health scores were recorded. Coat bloom score was significantly improved (effect of treatment P=0.007; effect of time P<0.01; treatment x time interaction P=0.245) in calves with coats and faecal score reduced (P = 0.003) i.e. improved. There was also a lower incidence of scours in calves with coats (25.0% *vs.* 57.1% P=0.04). There were no significant effects of calf coats on measures associated with respiratory disease (cough score, nasal discharge, ear score and eye discharge score) or the incidence of treatment for respiratory disease (45.0% *vs.* 47.6%; P=0.86).

Table 4: Feed intakes (kg) and Feed Conversion Ratio (FCR)

Treatment	Control	Coat	s.e.d	P Value	Sig
Milk replacer	27.9	27.9	0.00	1.00	NS
Concs - start to wean	17.7	13.4	2.76	0.179	NS
Concs - wean to 12 weeks	143.8	138.9			
Concs - total	161.5	152.3			
FCR - start to weaning	1.93	1.61	0.68	NS	NS
FCR - start to 12 weeks	2.71	2.42			

The calves without coats consumed 9.2kg more feed from start to 12 weeks. It is assumed that the increased feed intake with the calves without coats is due to feed required for maintenance and warmth due to the cold weather associated with January and February.

The temperatures within the calf house were recorded by a data logger. The mean temperatures for January, February, March and April were 6.6^{o}C, 7.3^{o}C, 9.5^{o}C and 11.6^{o}C respectively. The months of January to April 2014 were regarded as relatively mild compared to 'normal'. This is the first occasion temperatures have been recorded in the Harper Adams calf unit so comparisons to previous years cannot be made.

Table 5: Financial performance – feed costs per calf and per kg gain (£)

Feed costs (£/calf)	Control	Coat
CMR @ £1,707/t	47.63	47.63
Start n Wean @ £315/t	50.87	47.97
Feed costs/calf (£)	98.50	95.60
Feed cost per kg gain (£)	1.41	1.28

Total feed costs per calf were reduced by £2.90 per calf and feed cost reduced by 13p/kg gain with coats.

Discussion & Conclusions:

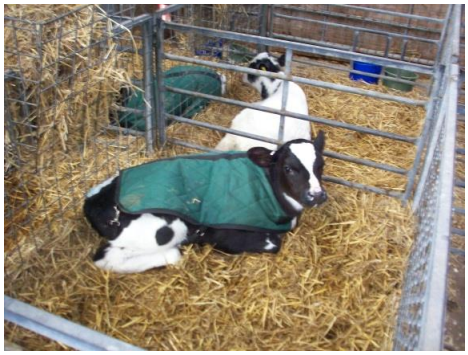
- Overall performance of the calves was good achieving and exceeding the recognised target for rearing calves to 15 weeks old of 122kg.
- Calves with coats recorded higher DLWGs from start to 1 week and start to 12 weeks. Overall the calves with coats gained an extra 5.3kg from start to 12 weeks, despite relatively mild weather being recorded from January to April during the course of the trial.
- Coat bloom score was improved with coats together with an improved faecal score and reduced incidence of scour.
- The calves with coats recorded lower concentrate feed intakes and due to the calves improved performance this resulted in an improvement in the FCR.
- Total feed costs per calf and per kg gain were reduced by £2.90 per calf and 13p/kg respectively with coats.

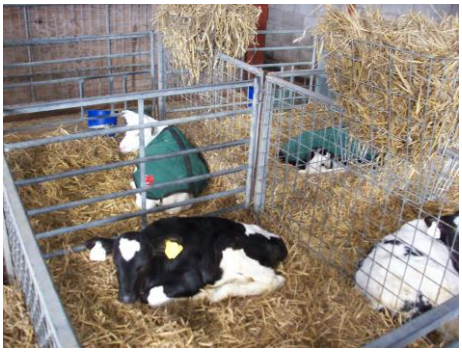
It can be concluded that calf rearers should use calf coats with December to February born calves. Coats may also help calves with transition to a new unit and with rearing systems based on outdoor hutches.

Acknowledgement:
Financial support from Wynnstay Group Plc is gratefully acknowledged.

Reference:
The above work was presented as a conference paper at the British Society of Animal Science annual meeting in 2017. The reference is as follows:
Marsh, S.P., Bleach, E.C.L. and Clift, J. 2017. Evaluation of calf coats on the performance and health of artificially reared winter born beef calves to 12 weeks. *Advances in Animal Biosciences:* 8. Paper 29.

August 2014





Calf coat (Holm & Laue) trial at Harper Adams