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

**Evaluation of 13% versus 16% crude protein creep rations for Autumn born
suckled calves**

Introduction and Objective:

The benefits of feeding creep to suckled calves are well recognised with improved growth rates, efficient feed conversion and minimising growth checks at weaning. However there is a paucity of information on the effect of different formulations of creep feed for suckled calves. The objective of this experiment was to evaluate 13% versus 16% crude protein (CP 'as fed') creep feeds with autumn born suckled calves.

Animals & Timing:

A study was carried out by James Evans at Craven Arms in Shropshire supervised by Simon Marsh of Harper Adams University. James keeps some 130 autumn and 180 spring calving Stabiliser suckler cows. The majority of heifer calves that are not retained as herd replacements are sold for breeding at 13-14 months old. Bull calves not sold for breeding are intensively finished at 14 months old @ 340-360kg carcass weights. The study involved 38 Sept-Oct 2013 calved pure-bred Stabiliser cows with Stabiliser calves with 20 bull and 18 heifer calves randomized according to cow live weight condition score, calf sex and weight to the following treatments:

Comparison:

13% CP Creep

Calves offered *ad libitum* creep via hoppers formulated to contain 13% CP (as fed) based on 57.5% rolled barley, 25% sugarbeet feed, 10% Promol Natural, 5% molasses and 2.5% minerals

16% CP Creep

Calves offered *ad libitum* creep via hoppers formulated to contain 16% CP (as fed) based on 47.5% rolled barley, 25% sugarbeet feed, 20% Promol Natural, 5% molasses and 2.5% minerals

Promol Natural is a proprietary concentrate containing 42%CP from feedstuffs including soyabean meal and rapeseed meal.

The trial commenced on the 22nd of November 2013 and ended on the 26th of March 2014 prior to turn-out when the calves were weaned. The trial duration was therefore 124 days with the calves some 60 days old when creep was introduced. The cattle were group housed in straw-bedded yards. The cows were fed *ad lib* grass silage (30.8% DM, 10.6ME, 12.7%CP) plus 0.5kg rolled barley and 100g of GP minerals/cow/day. On the 6th of February the barley was withdrawn following pregnancy diagnosis with 98% of the herd scanned PD+. Calves had access to the grass silage.

Results:

Table 1: Animal performance (kg)

	13%	16%	Sig
Calf wt at start	126	126	NS
Calf wt at weaning	305	324	*
DLWG	1.45	1.60	**
Calf age at weaning (days)	184	185	NS
Adjusted calf 200 day wt	328	348	*

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

It was observed that the calves fed the 16% CP creep had an improved coat bloom however this was not assessed to quantify this statement.

Table 2: Cow live weights (kg), efficiency and condition scores (CS)

	13%	16%	Sig
Cow wt at start (22/11/13)	665	656	NS
Cow wt at end (26/03/14) [124 days]	636	605	NS
Cow efficiency (kg calf 200d wt/100kg cow wt)	51.6%	57.5%	
Cow CS at start (22/11/13)	2.74	2.72	NS
Cow CS at end (26/03/14)	2.36	2.28	NS

The recognised target for suckled calf production is to achieve a 200 day calf weight which is 50% of the cow live weight. Very few producers achieve this target. It was however exceeded in this study with the 13% and 16%CP creep fed calves recording 200 day weights of 51.6% and 57.5% respectively of the cow live weight. This is exceptional performance by James Evans and his herd of Stabilisers which it must be noted are a maternal and not terminal breed type. The study also confirms that Stabiliser cows are medium sized.

Creep intakes were recorded and shown in table 3.

Table 3: Creep intakes (kg) and feed conversion rate (FCR)

Creep intakes	13%	16%
Total intake/calf	390	439
Daily intake/calf	3.15	3.54
Creep FCR	2.17	2.21

The FCR was calculated by dividing daily creep intake by DLWG and do not take into account other feeds consumed i.e. milk and silage. It can be noted that the calves offered 16% CP creep consumed an extra 0.4kg of creep per day however the creep FCR was similar for both treatments. Creep intakes could be considered as relatively high compared to 'industry standards' but then DLWGs would also be considered to be very high compared to 'industry standards'.

The performance of the bull and heifer calves in each group was analysed and the results shown in tables 4 and 5.

Table 4: Bull calf performance (kg)

Bull calves	13%	16%	Sig
Calf wt at start	135	138	NS
Calf wt at weaning	315	351	*
DLWG	1.45	1.72	*

Table 5: Heifer calf performance (kg)

Heifer calves	13%	16%	Sig
Calf wt at start	115	111	NS
Calf wt at weaning	294	290	NS
DLWG	1.44	1.44	NS

It can be noted that there was a significant improvement in performance with the bull calves offered the 16% CP creep with DLWGs increased by 0.27kg and weaning weights by 36kg. Increasing the creep CP content with heifer calves had no significant effect on performance.

A financial appraisal was carried out based on the prevailing costs of the feeds and value of weaned calves at the time of the study. The ration costs were based on the following feed prices: rolled barley @ £140/t, sugar beet pulp @ £185/t, Promol Natural £700/t, molasses @ £140/t, minerals @ £480/t plus £10/t mill & mix charge. The 13% and 16% CP ration costs were £216 and £272/t respectively.

Table 6: Financial performance – all calves (£)

	13%	16%	Difference (£)
Promol Creep feed costs (£/t)	225.75	281.75	56.00
Creep feed cost/calf (£)	88.04	123.69	35.65
Value of calf @ £2.50/kg	763.50	808.75	45.25
Calf value minus creep (£)	675.46	685.06	9.60

As can be seen in table 6 the increasing the creep CP content to 16% with Promol Natural increased the cost of the creep by £56/t. With an increased creep intake and higher ration costs, creep feed costs were increased by £35.65 per calf with the 16% CP creep. If the calves are valued at weaning at £2.50/kg the increase in weight gain with the 16% CP creep is worth £45.25 thus negating the increase feed costs and increasing the margin per calf by £9.60 per head. Based on current gross margins for suckled calf production this increase in margin is significant.

A financial analysis for the bull calves shows that increasing the CP from 13 to 16% had a very positive effect on the margins increasing the margin by £57.95 per bull calf. These calculations assume similar creep intakes for the bulls and heifers.

Promol Natural is supplied in 25kg bags which is therefore convenient and easy to use and can be purchased in small (0.5-1 tonne) lots. An alternative approach would be to purchase soyabean meal in 5 tonne bulk deliveries. Assuming an on farm price of £387/t for Hipro soya the feed costs for the 13% and 16% rations would have been £194.45 and £219.15/t. The increase in margin for the 16% creep fed calves would be £24.88.

Discussion & Conclusions:

- Overall performance of the cows and calves was excellent with calves recording DLWGs from birth to weaning of 1.51kg which is markedly higher than lowland suckled calf producers recorded by EBLEX (2013) of 1.11kg to weaning. James Evan's calves weighed 315kg at weaning at 184 days old (equating to a 200 day weight of 338kg) compared to the average EBLEX recorded producers calves weighing 295kg at weaning at 229 days old. Top 1/3rd EBLEX recorded producers calves weighed 293kg at 230 days old.
- The study confirms that Stabiliser cows are medium sized (605-665kg) with the calves fed either 13% or 16%CP creep rations recording adjusted 200 day weights of 51.6% and 57.5% of the cow weight. This exceeds the recognised target of 50% which very few suckled calf producers achieve.
- There was a significant improvement in DLWG (1.45kg versus 1.60kg) and weaning weight (+19kg) with offering calves 16%CP creep in this 124 day feeding trial. This improvement in performance is assumed to be due to an elevated protein supply and slightly higher creep intake (3.15 versus 3.54kg/calf/day).
- Growth rates were significantly improved with the bull calves (1.45 versus 1.72kg) however there was no effect with increasing the CP content of the creep ration with the heifers. Suckled calf producers should therefore manage cows with bull calves in a separate management group and feed a creep containing at least 16% CP, with heifers fed a 13%CP creep.
- There were no significant differences in cow liveweight or condition score change.
- It was noted that the calves offered 16% CP creep had an improved coat bloom score. This should increase their value if calves are sold at weaning.
- Based on the costs prevailing at the time of the study increasing the CP content of the creep from 13% to 16% increased creep feed cost per calf by £35.65 however the increase in value of the weaned calf was worth £45.25 leaving a net margin increase for the 16% CP creep of £9.60 per calf. This could be increased to £24.88 per calf if soyabean meal is used instead of Promol Natural in the creep ration purchased in 5t bulk deliveries and similar effects on calf performance are recorded.
- It is suggested that future studies should be carried out on creep rations containing different starch contents in an attempt to encourage frame growth and also creep rations with a higher (18%) CP content. A study should also be carried out to justify the merit of feeding creep to Stabiliser heifer calves.

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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., Montgomery, A.J. and Evans, J. 2017. Growth response to creep feeds containing different protein levels in autumn born suckled calves. *Advances in Animal Biosciences*: 8. Paper 10.

July 2014



Creep gate at Walcot Farm



Stabiliser cows and calves at Walcot Farm