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**Animal Science Research Centre - Beef Unit Trial Results – 2018 (c)**

**Evaluation of the replacement of cereals with a high energy forage with  
intensively finished weaned spring born South Devon suckled steers**

**Introduction and Objective:**

With producers in some parts of the country unfortunately having issues marketing suckler bred bulls and incurring penalties for heavy weight (380+kg) carcasses it was therefore appropriate to evaluate intensive finishing systems for late maturing breed spring born suckled steers.

Since feed is the main variable cost of finishing beef cattle and with the recent volatility in cereal prices it was also considered necessary to evaluate the effect of replacing cereals with a high energy forage.

The target for intensively finishing suckler bred steers is a carcass weight of 325-335kg at 13-14 months old. For bulls the target would be a 380kg carcass at 14 months old. If you consider that these targets for carcass weights for steers are relatively low I would comment that we intensively finished some  $\frac{3}{4}$  bred Limousin steers back in 2003 at Harper Adams on a cereals/whole crop trial and recorded carcass weights of 275-285kg grading R/-U4L. See Harper Adams beef trial report 2003(b) for further details. Since 2003 there has been a marked improvement in the genetic merit of our cattle and the Limousins involved in the study were bred by bulls with average Beef Values

I am unaware of any recent trial work of intensively finishing suckler bred steers therefore the objective of this experiment was to evaluate replacing cereals with good quality maize silage with weaned spring born late maturing breed (South Devon) suckled steer calves.

**Animals & Timing:**

The trial commenced in November 2017 with 34 eight month old South Devon suckler bred steers weighing approximately 379kg. The calves were purchased direct from WJ Wright & Son, Oxey Farm, Tilton, Leicestershire, and bred by sires with top 1-10% Quality Beef Index/EBVs. A further 30 male calves from the same age group with higher EBVs were retained as entire bulls by the breeder. The calves were from South Devon dams and were weaned 3 weeks prior to delivery having been vaccinated (2 doses of Rispoval4 at 2 weeks apart), their backs clipped out and offered creep feed. They were vaccinated with Bravoxin to give protection from clostridial diseases. The calves were allocated into two balanced treatment groups in a randomized block design according to live weight and Quality Beef Index of the sire.

## Management:

### 1. Cereals

*Ad libitum* 13% Crude Protein (15% CP/kg DM) concentrates based on rolled barley, sugar beet pulp, soyabean meal, distillers dark grains, molasses and minerals containing 36% starch in the DM, plus *ad libitum* straw.

### 2. Maize Silage + Cereals TMR

*Ad libitum* 15% CP/kg DM TMR based on 50% good quality maize silage with 50% from concentrates on a DM basis. The concentrates were formulated from rolled barley, soyabean meal, distillers dark grains and minerals and contained 19% CP. The maize silage had an excellent analysis of 37.4% DM, 11.7ME MJ/kg DM, 8% CP in DM and 35.8% starch in DM. The TMR analysed 46.8% DM, 12.1 ME with 34.2% starch in the DM.

The diets were formulated to be iso-nitrogenous i.e. to supply similar quantities of protein, and also a similar quantity of minerals. Prior to commencement of the trial the cattle were fed 14% CP concentrates (Wynnstay Primebeef) and maize silage. The control rations were fed via hoppers and gradually introduced over a 10-14 day period. The maize silage TMR ration was fed as a TMR from troughs. The cattle were group housed in straw-bedded yards (8.6m x 4.6m per pen) with 3 pens per treatment with 5-6 calves per pen.

Full details of the concentrate rations are shown in appendix 1.



Picture left of the South Devon calves taken in August. Picture right calves on trial at HAU in February

## Results:

Table 1: Animal performance (kg)

(Kg/steer)	Cereals	Maize:Cereals	P Value	Sig
<b>Start wt</b>	379	379	0.989	NS
<b>Slaughter wt</b>	617	650	0.002	**
<b>Days to slaughter</b>	185	193	0.205	NS
<b>DLWG</b>	1.29	1.40	0.092	Trend
<b>Age at slaughter (days)<sup>1</sup></b>	434 (14.2mo)	441 (14.4mo)	0.827	NS

<sup>1</sup> Age in brackets = months

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

The cattle were slaughtered at ABP Shrewsbury and carcasses classified by Video Image Analysis (VIA).

Table 2: Carcass characteristics

	<b>Cereals</b>	<b>Maize:Cereals</b>	<b>P Value</b>	<b>Sig</b>
<b>Carcass wt (kg)</b>	333.9	350.6	0.017	*
<b>Kill out (%)</b>	54.2	53.9	0.773	NS
<b>Carcass Daily Gain (kg)</b>	0.85	0.90	0.309	NS
<b>Carcass DG from birth (kg)</b>	0.76	0.80	0.142	NS
<b>Conformation<sup>1</sup> (1-15)</b>	8.12 (R=)	8.38 (R=/R+)	0.630	NS
<b>Fat class<sup>1</sup> (1-15)</b>	9.39 (3+/4-)	9.56 (3+/4-)	0.225	NS
<b>Liver score<sup>2</sup> (1-5)</b>	1.62	2.00	0.510	NS

<sup>1</sup> EUROP carcass classification: Conformation: P=-1 and E+=15, Fat class: 1- =1 and 5+=15.

<sup>2</sup> Liver assessment: 1= Healthy liver and 5 = Severe abscesses (due to acidosis).

Table 3: Feed intakes (kg), feed conversion ratio (FCR) and ME intakes

	<b>Cereals</b>	<b>Maize: Cereals</b>
<b>Total silage intake (kg)</b>		2,347
<b>Daily silage intake (kg)</b>		12.2
<b>Daily silage intake (kg DM)</b>		4.5
<b>Total 19% CP Concs intake (kg)</b>		868
<b>Daily 19% CP Conc intake (kg DM)</b>		4.5
<b>Total 13% CP Concs (kg)</b>	1,562	
<b>Daily 13% CP Conc intake (kg)</b>	8.4	
<b>Total DMI (kg)</b>	1,336	1,649
<b>Daily DMI (kg)</b>	7.22	8.54
<b>FCR (kg concs/kg LWT gain)</b>	6.56	3.20
<b>FCR (kg DM/kg carcass gain)</b>	8.49	9.49
<b>Total ME supplied (MJ)</b>	17,094	20,218
<b>ME intake per day (MJ)</b>	92.2	104.5

Table 4: Financial performance (£)

	<b>Cereals</b>	<b>Maize TMR</b>	<b>P Value</b>	<b>Sig</b>
<b>Carcass price (£/kg)<sup>1</sup></b>	3.65	3.68	0.688	NS
<b>Carcass value (£)</b>	1,218.74	1,290.21	0.044	*
<b>Total feed cost per head (£)<sup>2</sup></b>	315.52	271.72		
<b>Daily feed cost (£/head)</b>	1.71	1.41		
<b>Margin over Feed (£/steer)</b>	903.22	1018.49		
<b>Feed cost/kg live wt gain (£/kg)</b>	1.33	1.01		
<b>Feed cost/kg carcass gain (£/kg)</b>	2.03	1.56		

<sup>1</sup> Carcass price standardised to the ABP price grid with a base price of £3.65/kg.

<sup>2</sup> Feed costs as follows: Maize silage @ £96/t DM (£35.52/t Fresh wt), 13% CP concs @ £202/t, 19% CP TMR concs @ £217/t.

All of the carcasses would be regarded as ideal for the processors and supermarkets.

Carcase value was significantly increased by £71.47 per steer with the Maize silage: Cereal TMR. Feeding Maize silage: Cereals increased the margin over feed by £115.27 and reduced the feed cost per kg gain by 32p (47p/kg carcass gain) due to significantly higher carcass weights and reduced feed costs, despite higher dry matter intakes.

Overall the steers returned a gross margin of £77 and £191 per head for the Cereals and Maize:Cereals treatments respectively. The costings were based on a calf purchase price of £805 (366kg @ £2.20/kg) per head.

### **Discussion & Conclusions:**

- Overall performance of the South Devon steers was very good with them being slaughtered at 14.3 months old with carcass weights of 334-351kg exceeding the recognised target for intensively finished suckler bred steers.
- The steers fed the Maize silage: Cereals TMR recorded significantly higher DLWGs (+0.11kg), slaughter weights (+33kg) carcass weights (+16.7kg) carcass daily gains (+0.05kg) and were finished 8.4 days later.
- Higher DM and ME intakes with the Maize: Cereal TMR would explain the higher DLWGs.
- Carcass classifications were similar and ideal for the meat trade. The low liver scores indicated minimal issues with acidosis.
- Based on the carcass prices prevailing at the time of the study carcass value was significantly increased by £71.47 per steer with the Maize: Cereal TMR treatment. With reduced feed costs of £43.80 the Margin over Feed was increased by £115.27.
- The earlier slaughter (8 days) of the steers fed *ad lib* cereals would result in a small reduction in variable and fixed costs. However the fixed costs for a system based on forage will require silage clamps, a feeder wagon and materials handler which will be significantly higher than one based on feeding cereals from hoppers.
- If farm resources are available to make, store and handle forage the replacement of 50% of cereals with **good quality high energy** maize silage must be considered.
- With some markets penalizing heavy weight carcasses with intensively finished suckled bulls, intensively finishing steers offers potential for respectable margins and to market carcasses that will be 'in spec'. Also handling bulls has its recognized management problems which finishing steers can potentially overcome. The South Devon steers finished on this trial were extremely placid and docile.

### **Acknowledgement:**

The author would like to extend his sincere thanks to The South Devon Herd Book Society for supporting this work and the staff at ABP Shrewsbury for their assistance with the liver scoring. This study was used by BSc IV Agric student Harry Billing as the basis for his Honours Research Project who assisted with feeding the cattle and recording the data.

### **Comment from the Caroline Poultney, Breed Secretary of the South Devon Herd Book Society:**

"The evaluation has clearly proved the versatility of the South Devon breed to be able to finish *early* with good weights and grades as steers as well as bulls, and clearly

proves that the South Devon is not late maturing. The Society is very grateful to Simon Marsh and to Harper Adams for their collaboration and for undertaking these influential feed trials.”

## Appendix 1

### Cereal feed formulation and analysis

	HAU 13% CP Beef Blend	HAU 19% CP TMR Balancer Blend
Rolled barley	69%	62.8%
Sugar beet	12%	
Hipro soya	6%	16.2%
Distillers	5.5%	16%
Molasses	5%	
Limestone	1.6%	3.2%
Salt	0.6%	1.2%
Healthcare supplement	0.3%	0.6%
<b>Nutrient Analysis (as fed)</b>		
Protein	13.0%	19.0%
Oil	2.7%	3.9%
Starch	36.2%	33.7%
Sugar	6.0%	3.4%
NDF	16.1%	16.5%
ME (in DM)	12.8MJ/Kg	12.9MJ/Kg
Price/tonne	£202/tonne	£217/tonne

**August 2018**