

## Animal Science Research Centre - Beef Unit Trial Results – 2010 (c)

### Grain maize for finishing beef cattle

#### **Introduction:**

There is growing interest in feeding grain maize to cattle due to its high energy (14.5 ME MJ/kg DM) and starch (71% in DM) content. A relatively high proportion (35%) of the starch is rumen undegradable compared to 15% for rolled barley which should help minimise problems with rumen acidosis. The majority of grain maize currently being grown in the UK is fed to high yielding dairy cows however there is increased interest in its use in beef cattle finishing diets. The objective of this experiment was to compare the effect of feeding either crimped grain maize or rolled barley to dairy-bred bulls.

#### **Stock:**

36 Jan-Feb 2009 born dairy-bred bulls weighing 360kg @ 8.5 months old. There were 26 Holstein and 10 Beef x Holstein bulls. Slaughtered March-May 2010.

#### **Treatments (both formulated to contain 140g CP/kg DM):**

##### Barley Mix

*Ad libitum* Barley Mix containing 84.5% rolled barley, 4% soyabean meal, 4% rapeseed meal, 5% molasses, 2.5% minerals.

##### Grain Maize

*Ad libitum* Crimped Grain Maize Mix containing 86% crimped grain maize, 6% soyabean meal, 6% rapeseed meal, 2% minerals. The Crimped Grain Maize Mix contained 66.0% DM.

Straw was offered *ad lib* from racks. The grain maize was grown under plastic mulch, harvested on the 19<sup>th</sup> of October and ensiled with 3l/t inoculant (Pioneer 11A44) mixed at double strength. Yields of 6.6t and 9.8t/ha for the barley and maize (@ 65% DM) respectively were assumed for the costings.

The Barley Mix and Crimped Grain Maize Mix cost £122/t and £115/t respectively. On a dry matter basis this was £147/t and £174/t. Costing were based on the following feed prices at the time of the study: rolled barley @ £102.5/t, crimped grain maize @ £99/t, soyabean meal @ £273/t, rapeseed meal @ £134/t, molasses @ £155/t, minerals @ £256/t.

#### **Results:**

Table 1: Animal performance (kg/bull)

(kg/bull)	Barley	Grain Maize	Sig
Start wt	359	359	NS
Slaughter wt	565	571	NS
Days to slaughter	154.2	141.3	NS
DLWG	1.34	1.51	**
Age at slaughter (months)	13.53	13.14	=0.019

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

Table 2: Carcase characteristics

	Barley	Grain Maize	Sig
<b>Carcase wt (kg)</b>	287	295	NS
<b>Kill out (%)</b>	50.8	51.6	NS
<b>Carcase DG (kg)</b>	0.782	0.909	**
<b>Conformation<sup>1</sup></b>	3.1 (O+)	2.9 (O+)	NS
<b>Fat class<sup>1</sup></b>	3.3	3.4	NS
<b>Liver score<sup>2</sup></b>	2.06	1.22	=0.060

<sup>1</sup> EUROP carcase classification: Conformation: P+=1 and E=7, Fat class: 1=1 and 5H=7.

<sup>2</sup> Liver assessment score: 1= Healthy liver and 5 = Severe abscesses

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

Feed intakes (kg/bull)	Barley	Grain Maize
<b>Total concentrate intake</b>	1,619	1,596
<b>Total dry matter intake</b>	1,362	1,053
<b>FCR (kg feed DM/kg gain)</b>	6.59	4.98

The FCR's appears relatively high for the barley fed bulls (7.84:1 fresh feed wt) compared to the EBLEX target of 5.4:1 but it must be taken into consideration that the trial did not include the period of growth from 110kg to 360kg. During this rearing phase dairy-bred bulls at Harper typically record an FCR of 3.5:1.

Table 4: Financial performance

(£/bull)	Barley	Grain Maize
<b>Carcase Value (March/April 2010)</b>	745	761
<b>Margin over Feed<sup>1</sup></b>	547	579 (+32)
<b>Feed cost/kg live wt gain</b>	0.96	0.86

<sup>1</sup> Feed costs based on the prices prevailing at the time of the study (2009)

#### Discussion & Conclusions:

- Overall performance of the bulls was very good, both achieving and exceeding recognised targets for cereal beef production.
- Replacing barley with grain maize will result in increased daily live weight and carcase gains with an improved FCR.
- In the experiment the crimped grain maize fed bulls recorded higher carcase weights (+7.7kg) and were slaughtered 13 days earlier. If the bulls had been fed crimped grain maize from 3 months old it would be expected to further reduce days to slaughter.
- The bulls fed grain maize recorded lower (P=0.060) liver damage scores. Liver abscesses are associated with mild acidosis from feeding high starch based diets. It could be assumed that the reduced incidence of liver abscesses was due the higher proportion of by-pass starch in grain maize. It is suggested that the improved performance with the grain maize fed bulls could be due to improved efficiency of energy utilisation together with a reduced incidence of rumen acidosis.
- The bulls fed grain maize recorded an increased margin over feed costs worth £32 per head with a 10.4% reduction in feed costs per kg gain based on the costs prevailing at the time of the study. If grain maize had been grown without the use of plastic mulch the margin over feed would have increased to £57 per bull.
- Grain maize offers significant potential to improve cattle performance, reduce feed costs and increase margins provided good (10t/ha @ 65%DM) crops can be grown.

#### Reference:

Marsh, S.P., Bletcher, T.H. and Vickers, M. 2011. An evaluation of crimped maize grain for finishing beef cattle. *Proceedings of the British Society of Animal Science*. Paper 84

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