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**Animal Science Research Centre - Beef Unit Trial Results – 2017 (a)**

**Evaluation of progeny from Simmental bulls with either top 1% or top 10%  
Terminal Indexes**

**Introduction and Objective:**

Previous studies at Harper Adams University with progeny from Limousin, Angus and Simmental bulls with different Beef Values/Terminal Indexes have shown significant improvements in performance with calves sired by the higher index bulls (Marsh & Pullar, 2002; Marsh *et al.*, 2007; Marsh *et al.*, 2008; Marsh 2012 & 2016). To expand the database to confirm that 'EBVs work' additional studies with Simmental sires have been carried out on a Harper Adams Beef Focus Farm. In 2015 a trial was carried out to evaluate a bull noted for his terminal characteristics (top 1% terminal index) against a bull with very good maternal traits but with a significantly lower terminal index (top 60%). See Harper Adams trial report 2016(a) for further details. The objective of this second study with Simmentals was to compare the performance of progeny from top 1% and top 10% terminal index sires.

**Animals & Timing:**

The trial commenced in the winter of 2014 with 60 cows from Mr Ian Willison's commercial autumn calving suckler herd in Nottinghamshire being inseminated with either a top 1% or top 10% terminal index Simmental bull. The calves were therefore born in the autumn of 2015 and the bull calves were intensively finished at just over 1 year old.

**Comparison:**

The following Simmental bulls were chosen for evaluation:

Dirnanean Bradley (Terminal Index +137 – top 1%)  
Omorga Volvo (Terminal Index +93 – top 10%)

The top 1% bull (Bradley) is a true 'curve bender' bull with easy calving and exceptional growth rate EBVs. His Calving Ease Direct EBV is +7.2 (top 1%) with a short gestation length of -2.0 days (top 5%) and outstanding EBVs for growth (+97kg for 400 days in the top 1% and +104kg at 600 days as a 'Top Breed Value'). Bradley's Eye Muscle Area EBV is +5.5 which is also in the top 1% for the breed. His Fat Depth EBV is -1.2mm making him a 'lean bull'. Not only does he have superb EBVs he is also very appealing to the eye having won the Simmental breed class at the Royal Highland Show in 2014.

The top 10% bull (Omorga Volvo) is a harder calving bull with a Calving Ease Direct EBV of -5.7 (top 90% i.e. bottom 10% for the breed) but very high growth figures of +75kg for 400 days putting him in the top 5%. His Fat Depth EBV is 0.0mm which is

breed average. Full details of the bulls EBV's from Simmental BREEDPLAN blup data for January 2017 are shown in appendix 1.



Dirnanean Bradley (TI +137 - top 1%)



Ormorga Volvo (TI +93 – top 10%)

Back in 2013 Ormorga Volvo was rated as a top 1% bull. EBVs and indexes change over time which is inevitable with the increase in data (accuracy) and breed improvement within the Simmental. Bulls with EBVs with high accuracy experience minimal change. With continuous breed improvement a bull will inevitably see his index fall.

### Herd Management:

The suckler herd at Ian Willison's Williamswood Farm comprises of some 90 cows of predominantly Simmental x British Blue breeding. Home-bred replacement heifers calve at 21-23 months old. Calving takes place indoors starting in mid-late July with the majority of the herd calving during August. Once mothered-up the cow and calf are turned out ASAP. Housing usually takes place in mid-end October. Winter nutrition for the cows is based on maize and grass silage with creep feed for the bull calves offered from 4 weeks old. The bull calves are weaned when the cows are turned out in April and they are intensively finished on good quality maize silage and blend TMR. Cows with heifer calves are turned out in mid-March and the calves are weaned in June. The heifer calves are not fed creep post-Christmas. Surplus heifers not required for home bred replacements are sold at a premium (due to the farms high herd health status) for use as recipients in ET programmes to a local pedigree breeder at 15 months old.

### Results:

Table 1. Calving characteristics and growth rates to weaning

Sire	Bradley (Top 1%)		Volvo (Top 10%)	
	Bull	Heifer	Bull	Heifer
Gestation Length (days)	286	284	286	284
Calving Ease (1-6) <sup>1</sup>	1.38	1.34	1.14	1.07
Birth wt (kg)	46.9	46.4	48.8	47.6
200 day wt (kg)	357	312	372	319
DLWG (kg)	1.55	1.33	1.61	1.36

<sup>1</sup> Calving Ease Score: 1= Unassisted, 2= Easy Pull, 3 = Hard Pull, 4= Surgical, 5= Abnormal Presentation, 6 = Elective Surgery.

Calf performance was very good and there was zero mortality. Volvos calves recorded slightly heavier birth weights but did not have a higher (worse) calving ease score contrary to the EBVs. Cow condition score does have a significant impact on

calving difficulty and Ian's cows are typically at condition score 2.5 at calving. Volvo's calves (bull and heifer average) had higher DLWGs (+0.05g) and 200 day weights (+11kg) which is contrary to what the EBVs would have predicted!

The mean calf 200 day weight for the herd was calculated to be 335kg (1.44kg ave DLWG) equating to an efficiency factor of 50.2% based on the mean cow weight of 667kg when the cows were weighed at weaning.

The bull calves were weaned when the cows are turned out in April and intensively finished on good quality maize silage and blend TMR. The blend was formulated from barley, beet pulp, biscuit meal, distillers, hipro soya, maize gluten, molasses & minerals with the TMR containing 57% DM, 12.6ME, 16.5% CP (in DM) and 29% starch (in DM). The silage and blend intakes averaged 10kg (2.9kg DM) and 9kg per head per day respectively (10.65kg DM/bull/day) equating to a ration with 27% silage and 72% blend on a DM basis. The bulls were slaughtered at ABP York.

Table 2. Slaughter performance and carcass grades of the bull calves

Breeds	Bradley (Top 1%)	Volvo (Top 10%)
<b>Slaughter age (months)</b>	12.5 (380d)	12.4 (378d)
<b>Slaughter wt (kg)</b>	689	667
<b>DLWG wean to slaughter (kg)</b>	1.82	1.63
<b>DLWG from birth (kg)</b>	1.69	1.64
<b>Carcass wt (kg)</b>	394.7	382.0
<b>Carcass DG from birth (kg)<sup>1</sup></b>	1.04 (0.98)	1.01 (0.95)
<b>Conf score (1-15)<sup>2</sup></b>	10.4 (U-/U=)	10.2 (U-)
<b>Fat score (1-15)<sup>2</sup></b>	8.2 (3=)	9.4 (3+/4-)
<b>Carcass value (£)</b>	1,385	1,340

<sup>1</sup> DCG in brackets deducts 24kg for the bull calf birth carcass weight.

<sup>2</sup> ABP EUROP carcass classification: Conformation: P=-1 and E+=15. Fat class: 1=-1 and 5+=15.

The AHDB Beef & Lamb target for intensive finishing suckler bulls is a 350kg carcass at 14 months old. Ian Willison's bulls significantly exceeded these targets. The performance of the Bradley sired bulls was outstanding. It is clearly shown in table 2 that the finishing performance of the bulls mirrored the EBVs of the sires. Bradley has significantly higher 400 and 600 day weight EBVs and his sons recorded higher DLWGs from weaning to slaughter (+0.19kg) and lifetime DCGs (+0.03kg) with an extra 12.7kg of carcass. The calves from Bradley recorded lower fat classifications which again mirrors the EBVs since Bradley has a Fat Depth EBV of -1.2mm compared to Volvo's 0.0mm. The lowest fat classifications recorded by the Bradley sons was 2+ which is not penalised by ABP. Only 3 of the 30 bulls recorded carcass weights above 420kg which includes just one bull over 440kg. The penalties for heavy weight carcasses at ABP are -4p/kg for 420-430kg carcasses, -8p/kg for carcasses between 430-440kg and -12p/kg for 440-450kg carcasses which are relatively small penalties.

The performance from Volvo's bull calves was still very respectable indeed. Some 27% of the bulls graded fat class 4- and higher so could therefore be killed younger at lighter carcass weights. 43% of Volvo's sons were at fat class 4- compared to 12.5% of Bradley's sons.

With a base carcass price of £3.40/kg the increase in carcass value of the Bradley sons was worth an extra £45 per calf taking into account penalties for heavy weights.

## Conclusions:

- Overall performance of the bulls was outstanding exceeding the AHDB targets for intensive finishing suckled bulls.
- The bull calves sired by the top 1% index terminal bull recorded significantly higher carcass daily gains, slaughter and carcass weights and were finished 29 days earlier which mirrored the EBVs for the bulls.
- The calves sired by the top 10% index bull with a breed average Fat Depth EBV recorded higher fat classifications compared to the top 1% index bull which has a very negative Fat Depth EBV. His calves initially recorded superior performance to 200 days but then slowed down from weaning to slaughter. The performance of the bull calves was still very respectable.
- This is now the 6<sup>th</sup> study carried by Harper Adams to compare the performance of progeny from bulls with different Indexes/Beef Values. All six have shown that with bulls with reasonably high levels of accuracy that EBVs work with significantly improved performance recorded from bulls with higher/better figures.

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## References:

Marsh, S.P. and Pullar, D. 2002 Production and carcass traits of progeny sired by Limousin bulls with high and below average beef values. *Proceedings of the British Society of Animal Science*. Paper 193.

Marsh, S.P., Vickers, M. and Wharton, N. 2007 Evaluation of progeny from beef bulls with either a Top 1% or Top 10% Beef Value. *Proceedings of the British Society of Animal Science*. Paper 152.

Marsh, S.P., Vickers, M. and Wharton, N. 2008 Evaluation of progeny from Limousin bulls with either a Top 1% or Bottom 1% Beef Value. *Proceedings of the British Society of Animal Science*. Paper 206.

Marsh, S.P. 2012 Evaluation of progeny from Angus bulls with Top 10% and Top 70% Terminal Indexes. *Harper Adams University, Animal Science Research Centre - Beef Unit Trial Results – 2012 (d)*.

Marsh, S.P. 2016 Evaluation of progeny from Terminal and Maternal Simmental bulls with top 1% and top 60% Terminal Indexes. *Harper Adams University, Animal Science Research Centre - Beef Unit Trial Results – 2016 (e)*.

## Appendix

Simmental bull EBV's – January 2017 blup

	Dirnanean Bradley (Top 1%)			Omorga Volvo (Top 10%)			Breed Avg. for 2015
	EBV	Accuracy (%)	Percentile Band	EBV	Accuracy (%)	Percentile Band	
Calving Ease Direct (%)	+7.2	86	Top 1%	-5.7	95	Top 90%	-0.6
Calving Ease DTRS (%)	+2.5	69	Top 10%	-0.7	93	Top 55%	-0.3
Gestation Length (days)	-2.0	74	Top 1%	-1.4	94	Top 5%	-0.1
Birth Wt (kg)	+5.4	96	Top 99%	+4.4	97	Top 95%	+2.3
200 Day Wt (kg)	+57	93	Top Value	+38	95	Top 10%	+31
400 Day Wt (kg)	+97	93	Top 1%	+75	95	Top 5%	+57
600 Day wt (kg)	+104	88	Top Value	+77	93	Top 10%	+61
Milk (kg)	+12	63	Top 1%	+10	84	Top 5%	+5
Scrotal Size (cm)	+1.1	90	Top 10%	+2.2	92	Top 1%	+0.5
Carcass Wt (kg)	+71	79	Top Value	+49	87	Top 10%	+40
Eye Muscle Area (sq cm)	+5.5	67	Top 1%	+5.9	76	Top 1%	+3.3
Fat Depth (mm)	-1.2	78	Top 99%	0.0	85	Top 45%	+0.0
Retail Beef Yield (%)	+2.9	76	Top Value	+1.5	82	Top 5%	+0.6
IMF (%)	-0.8	71	Top 99%	0.0	78	Top 35%	-0.1
Terminal Index (GBP)	+137		Top Value	+93		Top 10%	+67
Self Replacing Index	+157		Top Value	+106		Top 5%	+75

Note: Positive Fat Depths (or at least low negatives) are important for bulls used to breed herd replacements and also to finish cattle with adequate fat cover/finish.