



**Simon P. Marsh, Principal Lecturer, Harper Adams University, Newport,
Shropshire, TF10 8NB**

Animal Science Research Centre - Beef Unit Trial Results – 2018 (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 and Harper Adams Beef Focus farms with progeny from Limousin, Angus and Simmental bulls with different Terminal Indexes/Beef Values 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 & 2017). The 2017 trial evaluated the performance of progeny from top 1% and top 10% terminal index sires. See Harper Adams trial report 2017(a) for further details. The objective of this experiment was to repeat the 2017 study to prove the reliability of EBVs.

Animals & Timing:

The trial commenced in the winter of 2015 with Simmental x British Blue cows from Mr Ian Willison's 105 head 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 2016 and the bull calves were intensively finished at just over 1 year old in 2017.

Comparison:

The following Simmental bulls were again 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 EBVs 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 105 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. Cows are served by AI during October and November and then a sweeper bull is put with the cows. 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 together 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 200 days (bull calves)

Sire	Bradley (Top 1%)	Volvo (Top 10%)
Gestation Length (days)	285	287
Calving Ease (1-6) ¹	1.7	1.2 (2 assists/19 cows)
Birth wt (kg)	45.5	50.9
200 day wt (kg)	346	352
DLWG (kg)	1.50	1.50

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

Volvo calves recorded heavier birth weights but an improved (easier) calving ease score contrary to the sires EBVs. DLWG to 200 days was identical which is also contrary to the EBVs.

The mean calf birth weight and 200 day weights for all the bull and heifer calves from the herd was 45.5kg and 319kg respectively equating to a DLWG of 1.37kg equating

to an efficiency factor of 48.9% based on the mean cow weight of 653kg when the cows were weighed in mid-March.

The bull calves were weaned when the cows are turned out in early April and intensively finished on good quality maize silage and blend TMR fed on a 40:60 ratio on a dry matter basis. The blend was formulated from barley, beet pulp, biscuit meal, distillers, hipro soya, maize gluten, molasses & minerals with the TMR containing 54 % DM, 12.4ME, 16.1% CP (in DM) and 28% starch (in DM). The silage and blend intakes averaged 13.5kg (4.1kg DM) and 7.2kg (6.3kg DM) per head per day respectively. The bulls were slaughtered at ABP York.

Table 2. Slaughter performance of the bull calves

Sire	Bradley (Top 1%)	Volvo (Top 10%)
Slaughter age (months)	12.5 (381)	12.4 (379)
Slaughter wt (kg)	671	652
DLWG wean to slaughter (kg)	1.86	1.70
DLWG from birth (kg)	1.65	1.59
Carcase wt (kg)	382.5	371.9
Carcase DG from birth (kg)	1.01	0.98
Conformation score (1-15) ¹	11.3 (U=)	10.8 (U=)
Fat class (1-15) ¹	7.8 (3=)	8.1 (3=)
Carcase price (p/kg Base @ £3.50/kg)	3.65	3.64
Carcase value (£)	1,396	1,354

¹ 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 growth and carcass EBVs of the sires. Bradley has significantly higher 400 and 600 day weight EBVs and his sons recorded higher DLWGs from weaning to slaughter (+0.16kg), lifetime DCGs (+0.03kg) with an extra 10.6kg of carcass. The calves from Bradley recorded higher conformation scores and slightly lower fat classifications. Only 1 of the 38 bulls recorded carcass weights above 420kg. The penalties for heavy weight carcasses at ABP are -15p/kg for 420-430kg carcasses, -30p/kg for carcasses between 430-440kg and -45p/kg for 440-450kg carcasses.

The performance of the 2016 batch of calves was very similar to the 2015 batch of bulls. In comparison the Bradley bulls again had higher DLWGs from weaning to slaughter (+0.16 & +0.19kg), lifetime DCGs (+0.03kg & +0.03kg) with a higher carcass weight (+10.6kg & +12.7kg) indicating consistency of performance with EBVs.

With a base carcass price of £3.50/kg the increase in carcass value of the Bradley sons was worth an extra £42 per bull calf taking into account penalties for heavy weights.

Conclusions:

- Overall performance of the Simmental 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 which mirrored the

growth and carcass EBVs for the bulls, and mirrored the results from the 2016 study.

- The bulls were finished at just over 12 months old which almost produces a 'cycle of perfection' with the old calf being slaughtered when the new one is born.
- This is now the 7th study carried by Harper Adams to compare the performance of progeny from bulls with different Terminal Indexes. All seven have shown that with bulls with reasonably high levels of accuracy that EBVs work with significantly improved performance recorded from bulls with better figures.

March 2018

References:

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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)*.

Marsh, S.P. 2016 Evaluation of progeny from Simmental bulls with either top 1% or top 10% Terminal Indexes. *Harper Adams University, Animal Science Research Centre - Beef Unit Trial Results – 2017 (a)*.

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.