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Animal Science Research Centre - Beef Unit Trial Results – 2019 (a)

Evaluation of Simmental progeny from a top 1% Terminal Index bull compared to a Danish bred polled bull with a top 10% Index

Introduction and Objective:

Previous studies at Harper Adams University and Harper Adams Beef Focus Farms with progeny sired by Limousin, Angus, Simmental and Hereford bulls with different Terminal Indexes have shown significant improvements in performance with calves sired by higher index bulls (see reference list in the appendix). The objective of this experiment was to compare the performance of progeny bred from Simmental bulls with either a top 1% or top 10% Terminal Index. The latter is a very easy calving homozygous polled Danish bred bull.

Animals & Timing:

The trial commenced in the winter of 2016 with Simmental x British Blue cows from Mr. Ian Willison's 115 head commercial autumn calving suckler herd in Nottinghamshire being inseminated with either of the above Simmental bulls. The calves were therefore born in the autumn of 2017 and the bull calves were intensively finished at just over 1 year old in 2018.

Comparison:

The following Simmental bulls were chosen for evaluation:

Woodhall Ferrari 14 (Terminal Index +126 – top 1%)
Sneumgaard Imperator (PP) (Terminal Index +92 – top 10%)

The top 1% bull (Ferrari) has a Calving Ease Direct EBV of -3.9% (top 80% i.e bottom 20% for the breed) and Calf Birth Wt EBV is +5.4kg placing him in the Top 95% (i.e. bottom 5%) for the breed so in theory should be a harder calving bull. His Carcase Wt EBV (+69kg) and Eye Muscle Area EBV (+6.4 sq cm) are in the top 1%. He has a Fat Depth of -1.3mm (i.e. leaner than breed average) placing him in the top 99% of the breed so his progeny should be lean.

Sneumgaard Imperator is a very easy calving bull with a Calving Ease Direct EBV of +13.4% (top 1%) with good growth rates with figures of +74kg for 400 days putting him in the top 10% and Carcase Wt of +55kg (Top 10%). He has a Fat Depth of +0.6mm (i.e. fatter than breed average) placing him in the top 10% of the breed so his progeny should be easily fleshed, and suited to forage based finishing systems. His daughters should also therefore carry good condition beneficial for fertility.

In Denmark dehorning of calves can only be carried out by a veterinary surgeon. Therefore there is significant interest and development in polled breeding in this country.

Full details of the bulls EBV's from Simmental BREEDPLAN blup data for March 2019 are shown in appendix 1.

Woodhall Ferrari 14 (TI +126 - top 1%)

Sneumgaard Imperator (TI +92 - top 10%)

Please note that 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 usually see his index fall.

Herd Management:

The suckler herd at Ian Willison's Williamwood Farm comprises of some 115 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 August with the majority of the herd calving during September. Once mothered-up the cow and calf are turned out ASAP. Housing usually takes place in early-mid November. 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 for 6 weeks from mid-November and then a sweeper bull is put in 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 mid-July. 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

Sire	**Ferrari (Top 1% Index)**		**Imperator**	
Calf Sex	**Bull**	**Heifer**	**Bull**	**Heifer**
Gestation Length (days)	293	288	288	287
Calving Ease (1-6)[1]	1.50	1.0	1.32 (15.8% assistance)	1.0
Birth wt (kg)	54.0	48.0	45.3	39.7
200 day wt (kg)	405.4	305.8	387.1	286.0
DLWG (kg)	1.76	1.29	1.71	1.23

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

Ferrari's calves recorded heavier birth weights with Imporator having an improved (easier) calving which mirrored the EBVs of the sires. The 200 day weights (average of bull and heifer calves) for Ferrari were 19kg heavier but due to the lighter calf birth weights for Imperator the DLWGs were relatively similar. Calf performance completely mirrors the EBVs of the bulls. The bull calves DLWGs of 1.71-1.76kg were very impressive.

For all calves bred from the herd including those from the sweeper bull the mean calf birth weight and 200 day weights was 44.7kg and 336kg respectively equating to a DLWG of 1.46kg equating to an efficiency factor of 51.5% based on the mean cow weight of 653kg when the cows were weighed in mid-March. The target cow efficiency factor is 50% which very few suckler producers achieve.

Table 2. Herd calving characteristics and growth rates to 200 days

	All calves inc from sweeper bulls		
Calf Sex	**Bull**	**Heifer**	**Average**
Gestation Length (days)	288	287	287.5
Calving Ease (1-6)	1.35	1.20	1.26
Birth wt (kg)	47.1	42.3	44.7
200 day wt (kg)	378	294	336
DLWG (kg)	1.66	1.26	1.46
Efficiency (kg calf/100kg cow wt)	57.9	45.0	51.5

The bull calves were weaned when the cows are turned out in early April and intensively finished on a blend and good quality maize silage TMR fed on a 60:40 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 13.6kg (4.2kg DM) and 7.0kg (6.2kg DM) per head per day respectively. The bulls were slaughtered at Foyles at Melton Mowbray.

Selection for slaughter was simply based on age. When a bull had reached 1 year old and when a trailer load of 6 bulls were ready they were sent to slaughter with the youngest 365 days old.

Table 3. Slaughter performance of the bull calves

Sire	**Ferrari (Top 1% Index)**	**Imperator**
Slaughter age (months)	12.6 (384)	12.3 (374)
Slaughter wt (kg)	725	683
DLWG wean to slaughter (kg)	1.71	1.76
DLWG from birth (kg)	1.75	1.71
Carcase wt (kg)	413.1	389.5
Carcase DG from birth (kg)	1.08	1.04
Conformation score (1-7)[1]	5.0 (-U)	4.0 (-U)
Fat class (1-7)[1]	2.9 (3)	3.0 (3)

[1] EUROP carcase classification: Conformation: P+=1 and E=7. Fat class: 1=1 and 5H=7.

The AHDB B&L target for intensive finishing suckler bulls is a 350kg carcase at 14 months old with a lifetime dcg of 0.82kg. Ian Willison's bulls significantly exceeded these targets. The performance of the progeny from both bulls was outstanding. It is

clearly shown in table 3 that the finishing performance of the bulls mirrored the growth and carcase EBVs of the sires. Ferrari has a significantly higher Carcase Wt EBV (+69 v +55kg) and his sons recorded higher carcase weights of some 23.6kg. Despite this lower carcase weight the Imperator sons recorded relatively similar DLWGs due to their lighter birth weight and being slaughtered 10 days earlier. Carcase conformation and fatness scores were similar.

17% of bulls recorded carcase weights above 420kg. The penalties for heavy weight carcasses at Foyles are -5p/kg for 400-420kg carcases, -20p/kg for carcasses between 420-450kg and -30p/kg for >450kg carcasses. A 6p/kg bonus is paid for carcasses weighing 320-380kg. With a base carcase price of £3.50/kg the increase in carcase value of the Ferarri sons was worth an extra £60 per bull calf taking into account penalties for heavy weights. The extra feed cost for 10 days later finishing would reduce the cost benefit to £39/calf. See table 4.

Table 4. Slaughter value and feed costs

Sire	Ferrari (Top 1% Index)	Imperator
Carcase price (p/kg Base @ £3.50/kg)	3.53	3.59
Carcase value (£)	1,457.85 (+60.92)	1,396.93
Increase in feed costs (£)	+21.43	

Daily feed cost are based on 4.2kg DM maize silage @ £96/t DM and 7.0kg Blend @ £248/t which equates to a daily feed cost of £2.14 per bull.

Conclusions:

- Overall performance of the Simmental bulls was outstanding exceeding the AHDB targets for intensive finishing suckled bulls.
- The performance of the calves mirrored the EBVs of the bulls.
- The calves from Ferrari, the top 1% index bull recorded 23.6kg heavier carcase weights but were slaughtered 10 days older. After deducting increased feed costs this was worth £39/bull. The financial benefit of a slightly easier calving with Imperator bred calves and benefits of not dehorning needs to be taken into consideration. This probably makes up the shortfall for the lower carcase weight.
- 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 9th study carried by Harper Adams to compare the performance of progeny from bulls with different Terminal Indexes. All nine have shown that with bulls with reasonably high levels of accuracy that EBVs work with significantly improved performance recorded from bulls with better figures.

Footnote comments from Ian Willison, Williamwood Farm:

"I cannot statistically prove this but at weaning I thought that the Ferrari calves had more frame whereas the Imporator calves were very fleshy and the heifers were wider than Ferrrari heifers. I also think that the Imporator bulls will have eaten less to finish. The Ferrari calves had a higher mortality rate and had a negative effect on the following conception rate of the cows. This is the first year we have calved to very easy calving bulls all with positive Calving Ease EBVs and with all females we had an incredibly easy calving and the conception rates have subsequently been fantastic after calving with 85% holding to first service AI so most cows should calve in first 3 weeks next year. Give me a POSITIVE easy calving bull every time. There is also tremendous scope within the double plus calving bulls (i.e. Positive Calving Ease Direct and Daughters) to produce all types of male and female progeny to fulfil the role of the ideal suckler herd. On the subject of exceptional performance whilst

everybody 'bangs the drum' about the importance of high EBV bulls, the results at Williamwood cannot happen without FEMALES that are made from generations of high EBV genetics whatever the breed. I cannot stress enough the importance of having the right FEMALE for your farm."

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References:

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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. 2017. 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).*

Marsh, S.P. 2018. 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 – 2018 (a).*

Marsh, S.P. 2018. Evaluation of suckler-bred progeny sired by Hereford bulls with either top 35% or top 60% Terminal Indexes. *Harper Adams University, Animal Science Research Centre - Beef Unit Trial Results – 2018 (d).*

All of the above references can be sourced on the NBA website (go to Resources>Technical Information>Beef Breeding)

Appendix Simmental bull EBV's – March 2019 blup

	Woodhall Ferrari (Top 1%)			Sneumgaard Imperator (Top 75%)			
	EBV	**Accuracy (%)**	**Percentile Band**	**EBV**	**Accuracy (%)**	**Percentile Band**	**Breed Avg. for 2017**
Calving Ease Direct (%)	-3.9	80	Top 80%	+13.4	89	Top Value	-0.6
Calving Ease DTRS (%)	-3.3	64	Top 90%	+2.0	69	Top 15%	-0.2
Gestation Length (days)	-0.4	80	Top 30%	-1.7	86	Top 5%	+0.0
Birth Wt (kg)	+5.4	90	Top 99%	-0.2	94	Top 5%	+2.5
200 Day Wt (kg)	+49	82	Top 1%	+44	91	Top 5%	+33
400 Day Wt (kg)	+93	80	Top 1%	+74	89	Top 10%	+60
600 Day wt (kg)	+97	76	Top 1%	+77	81	Top 15%	+66
Milk (kg)	+10	41	Top 5%	+6	41	Top 45%	+6
Scrotal Size (cm)	+0.4	68	Top 60%	+1.5	84	Top 5%	+0.5
Carcase Wt (kg)	+69	67	Top 1%	+55	71	Top 5%	+43
Eye Muscle Area (sq cm)	+6.4	54	Top 1%	+3.6	56	Top 50%	+3.7
Fat Depth (mm)	-1.3	64	Top 99%	+0.6	68	Top 10%	-0.1
Retail Beef Yield (%)	+3.1	61	Top 1%	-0.2	65	Top 95%	+0.7
IMF (%)	-0.7	55	Top 95%	+0.4	60	Top 5%	-0.1
Terminal Index (GBP)	+126		Top 1%	+92		Top 10%	+72
Self Replacing Index	+127		Top 1%	+132		Top 1%	+80

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 especially on forage based systems.