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Teagasc suckler beef research and demonstration herds (Comparison of early and late maturing terminal sire breeds)

Adam Woods[1], Michael Fagan[1], Liam McWeeney[1], and Matthew Murphy[2]

[1]*Teagasc, Grange Animal & Grassland Research and Innovation Centre, Dunsany, Co. Meath.*
[2]*Newford Herd, Athenry, Co. Galway.*

Summary

- The Derrypatrick Herd at Grange is a 100-cow research demonstration herd with the objective of evaluating alternative suckler calf-to-beef production systems.
- The current study involves a comparison of late-maturing and early-maturing terminal sire breeds and a comparison of steer, heifer and bull finishing systems.
- Animal performance levels were high in all three suckler beef finishing systems.
- The Newford Herd was established by Dawn Meats and Teagasc in 2015 in association with partners the Irish Farmers journal and McDonalds and aims to:
- Demonstrate the most innovative technologies in beef production to improve productivity and profit levels on Irish farms.
- Transfer knowledge regarding the efficient operation of a grass-based suckler farm onto a greater number of beef farms.
- Demonstrate best practice in management and, environmental and animal welfare sustainability.

The Derrypatrick Herd

The Derrypatrick Herd at Grange is a 100-cow research demonstration herd on 65 ha of intensively-managed grassland. The primary objective of this herd is to evaluate alternative suckler calf-to-beef production systems. The current study involves a comparison of late-maturing (Charolais and Limousin) and early-maturing (Angus) breed terminal sires (see Table 1) and a comparison of steer, heifer and bull finishing systems. The current study began in spring 2013; the existing Derrypatrick Herd was bred to either early- or late-maturing breed sires. All purchased heifer replacements were selected on the basis of high Replacement Index. Because of the change in market requirements, all bulls (both late- and early-maturing) were slaughtered at less than 16 months of age. The expected slaughter ages of the steers from the early- and late-maturing breed sires were 22 and 24 months, respectively. The corresponding expected slaughter ages for the heifers were 18 and 20 months. In this paper the results from the first year of a three-year study are presented.

Table 1. Star rating of sires of 2013 born Derrypatrick progeny

Stock bulls	Star rating across breed	Star rating within breed	Progeny born per bull	Terminal Index value	Carcass sub-index value
AA1	**	****	9	67	+13 kg
AA2	****	*****	19	111	+25 kg
AA3	***	*****	16	97	+20 kg
Average	3.2	4.8	44	96	+20.7 kg
CH1	*****	*****	18	147	+34 kg
CH2	***	*	18	88	+31 kg
LM	**	*	12	87	+22 kg
Average	3.5	2.5	44	109	+29.9 kg

Animal performance at slaughter

The performance of the steers, heifers and bulls at slaughter for both the early- and late-maturing genotypes is summarised in Table 2. The late-maturing breed steers and heifers had greater carcass weight (+22kg and +28kg, respectively) and required longer to finish (+78 days and +57 days, respectively) compared to their early-maturing breed counterparts. Age and live weight at slaughter were similar for the early- and late-maturing breed bulls, but the carcass weight of the late-maturing bulls was 15kg greater due to a higher kill-out percentage (57.2% and 59.5% for early- and late-maturing breeds, respectively). Carcass conformation score was greater for the late-maturing bulls, whereas carcass fat score was greater for the early-maturing animals.

Table 2. Slaughter traits for progeny of the Derrypatrick Herd in 2015.

Gender	Breed type	Age (days)	Weight (kg)	Conf. score[1]	Fat score[1]	Carcass weight (kg)	KO (%)	Price (€/kg)[2]
Steer	Early	585	649	7.69	9.46	361	55.6	4.15
Steer	Late	663	668	8.45	8.09	383	57.4	4.05
Heifer	Early	570	574	7.82	10.64	311	54.2	4.19
Heifer	Late	627	596	8.60	8.48	339	57.0	4.24
Bull	Early	465	664	9.38	8.85	380	57.2	4.35
Bull	Late	469	664	10.30	7.20	395	59.5	4.41

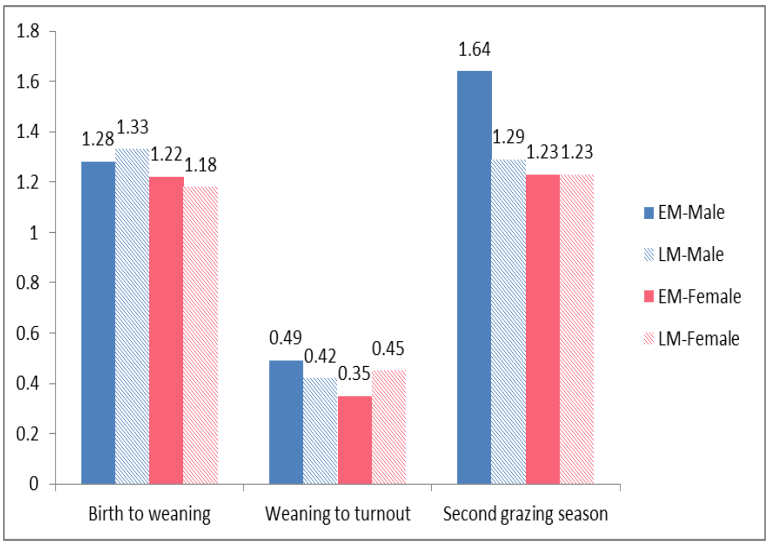
[1]Conformation and fat scores on a 1-15 scale. [2]Price includes early-maturing 'bonus'.

Average birth weight was 4 and 3kg greater for the late-maturing breed bull and heifer calves, respectively, compared with their early-maturing counterparts.

Implication of genotype for feeding system

The lifetime concentrate consumption of the early- and late-maturing breed steers, heifers and bulls from the Derrypatrick Herd are summarised in Table 3.

Figure 1. Average daily live weight gain of early-maturing (EM) and late-maturing (LM) genotype male and female cattle during the key stages of the production lifecycle.
Male = bull until weaning, and steer thereafter.



Steers and heifers were slaughtered based on target fat score and those that did not meet the required level of finish (fat score, 3=) at the end of the second grazing season were housed and finished on a grass silage and concentrate diet. At the end of the grazing season 92% of the steers and 100% of the heifers in the early-maturing genotypes were slaughtered before housing. In contrast 36% and 48% of the corresponding late-maturing genotype animals were slaughtered before housing. The quantity of concentrate supplement consumed per animal was 529 and 360kg less for the early-maturing breed steers and heifers, respectively, compared to their late-maturing contemporaries. For the bulls, the amount of concentrate supplement consumed per animal was 156kg higher for the early-maturing compared to the late-maturing breed type. The results indicate that both production system (i.e. steers, heifers or bulls) and animal genotype (i.e. early- or late-

maturing) have a significant effect on the composition of the annual diet in terms of proportions of grazed grass, silage and concentrates.

Table 3. Concentrate supplementation level and slaughter date.

Gender	Breed-type	Concentrate fed (kg)	Slaughtered off pasture before second winter (%)
Steer	Early	293	92%
Steer	Late	822	36%
Heifer	Early	195	100%
Heifer	Late	555	48%
Bull	Early	2,015	n/a
Bull	Late	1,859	n/a

The preliminary results from this study highlight a number of key findings. Firstly, very high animal performance was obtained in all three suckler beef finishing systems. Secondly, early-maturing genotypes could significantly reduce farm fixed costs as they don't require housing for a second winter, albeit with lower levels of beef output.

The results reported here are from the first year of three-year study, and the results for the following two years are required before definitive conclusions can be drawn. A detailed financial appraisal needs to be completed, including sensitivity analysis of beef prices, concentrate costs and farm pasture utilisation.

The Newford Herd

The Newford Herd was established by Dawn Meats and Teagasc in 2015. The 100-cow suckler calf-to-beef demonstration herd is located at Teagasc in Newford, Athenry with farm manager, Matthew Murphy, charged with the day-to-day running of the herd. The overriding aim is to generate a high profit grass-based suckler calf-to-steer and –heifer beef production system. There is also a focus on quantifying the labour required to operate a 100-cow unit, while also developing benchmarks and production targets for a herd utilising a breeding policy and cow type that differs from the majority of Irish suckler enterprises. This is a new initiative to transfer knowledge on the efficient operation of a grass-based suckler farm onto a greater number of beef farms. A number of objectives have been set by Dawn Meats and Teagasc with partners the Irish Farmers Journal and McDonalds:

- To establish a 'stand-along' 100 cow spring-calving suckler unit to demonstrate the most innovative technologies in beef production and to improve productivity and profit levels on Irish farms.
- To demonstrate the potential of a moderately-large suckler beef farm to provide a viable family farm income when operated to the highest level of technical efficiency.
- To develop and demonstrate world-best practice in suckler beef farm systems in terms of management, and environmental and animal welfare sustainability, while setting new benchmarks for achievable performance and aid in the transfer of the successful technology to beef farms throughout Ireland.
- To provide additional training and educational opportunities for advisors and suckler beef farmers.

Farm overview

The farm is located at Newford, Athenry on a stand-alone unit close to the Teagasc Mellows Campus. Farm size is 55.8 ha (138 acres) and it is split into 3 blocks. Much of the land can be described as being free-draining with about 8 ha (20 acres) requiring drainage works to be carried out. Ten ha (25 acres) of the farm were reseeded in October 2014 and a further 9 ha (17.5 acres) were reseeded in Spring 2015. In the forthcoming years it is envisaged that 10% of the land area will be reseeded each year. Perennial ryegrass monocultures Glenveagh, Abergain, Aberchoice and Abergreen were sown and their performance will be analysed over the duration of the project. Soil fertility is quite good with an average pH 6.14; 97% of the farm is in Index 3 or 4 for phosphorus and 51% of the farm is in Index 3 or 4 for potassium. Cattle will be housed in slatted floor accommodation during the winter months with straw-bedded loose housing being used to house some of the weanlings. Some existing sheds were converted in spring 2015 to calving pens and loose pens for cows at calving time.

Farm system

The farming system is a suckler calf-to-beef system with steers finished at 20-24 months and heifers finished at 20-22 months. When the first production cycle of animals is completed, it is projected that heifers and steers will be finished at 320 and 350 kg carcass weight, respectively. The farm will be stocked quite high at 200 kg organic nitrogen/ha (approximately 2.7 LU/ha). The system is projected to deliver a gross margin of approximately €1190/ha by 2020. Cow type is an early-maturing (Angus/Hereford) crossbred from the dairy herd with high Terminal Index bulls being used to produce progeny to be slaughtered. Replacements will continue to be purchased from the dairy herd for the duration of the project. Replacement heifers will be purchased as calves, contract-reared and then brought back onto the farm close to calving at 24 months of age. While some may question this replacement strategy and cow type it is important to be cognisant that, with the expansion in the dairy herd, this type of replacement will be readily available to suckler farmers and this demonstration farm will be able to show their suitability or non-suitability for a suckler to beef system. Contract rearing of the replacement heifers will allow the farm to generate maximum output, while keeping the system simple with a minimum of stock groups grazing on the farm. In 2016 calving took place from 20 February to 30 April. As the farm is managed by one labour unit, minimising calving difficulty is extremely important. When selecting terminal sires and a limit of <7% calving difficulty was set. Other criteria for AI sires were 5 stars on the Terminal Index, >30 kg carcass weight and >70% reliability on the calving index.

Over the coming years regular updates on progress being made on the farm will be provided on the farms website www.newfordsucklerbeef.ie and also through Teagasc and Irish Farmers Journal publications.

The above article was adapted and reproduced courtesy of Teagasc.

Footnote comment from Simon Marsh, Principal Lecturer – Beef Cattle Specialist, Harper Adams University.

The results make for 'interesting reading' when you complete a financial appraisal with current carcase prices, feed costs and additional variable costs for extra days taken to reach slaughter. It could create much debate amongst pedigree breed enthusiasts! However the results from the Derrypatrick Herd should be viewed with some caution, as stated in the article, that it is the first year of the study with relatively modest numbers of calves reared from the 100 cow herd and that only 3 Angus, 2 Charolais and 1 Limousin bulls sired the calves. It must also be noted that the 3 Angus bulls were all 4 and 5 star rated whereas 1 of the Charolais and the Limousin bull were only rated as 1 star within their breed selected for similar calving ease to the Angus.

In 'the long term' the results should take into account the numbers of calves weaned per 100 cows put to the bull per breed type and resultant calving index of the cows.

It must also be noted that when comparing production systems that extensive steer based production system results in lower stocking rates i.e. reduced herd size, which can impact on output and herd margins compared to intensive bull systems.

It is not the policy of Harper Adams University or the National Beef Association to promote any particular breed. Strengths and weaknesses of every beef breed in the UK can be highlighted. Pick the breed type suitable for your farm and market.