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Male suckler cattle production

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Summary

- Late-maturing breeds predominate in Irish suckler beef production systems.
- Growth rates in weanlings will respond to winter concentrate supplementation, but subsequent compensatory growth on well managed pasture offsets the economic advantage of higher supplementation levels.
- Concentrate supplementation of yearling cattle at pasture in spring generally improves animal performance, but is often insufficient to meet the input cost of the concentrates provided cattle are on well managed grass.
- In well-managed summer/autumn pastures the animal live weight response to concentrate supplementation is often only breakeven in economic terms.
- To achieve the same carcass weight as late-maturing breed bulls, early-maturing breed animals needed to be heavier at slaughter due to a lower kill-out proportion and, had a higher carcass fat score and a longer duration to slaughter than late-maturing breed types.

Introduction

Irish beef production is largely pasture-based where, collectively, grazed and conserved pasture account for almost 90% of the lifetime feed consumption. To coincide with the onset of the grazing season, the national suckler herd is predominantly spring-calving. In an integrated spring-calving suckler calf-to-beef research production system, progeny spend the first 6 to 8 months at pasture, are then weaned and housed for the winter for a 'store' period. During this store period, they are generally offered grass silage *ad libitum* and, depending on the silage nutritive value, 1-3 kg concentrates/head/day. Yearlings return to pasture for a second grazing season and, in the case of steers, are housed in the late autumn for finishing at about 24 months of age on a diet comprising about 50:50 grass silage:concentrate mixture on a dry matter (DM) basis. Nationally, however, mean slaughter age of steers is 28-29 months, which means many cattle spend some or most of a third grazing season at pasture. As levels of animal growth in one period of the production cycle can have an influence on live weight gain at a later stage, optimisation of animal performance at the various stages of the cycle is a challenge for producers. In practice, many weanlings leave their farm of birth during their first year of life and subsequently, may move again to other farms before final finishing. Steer production predominates in Ireland but more recently about 25% of male progeny are finished as bulls. Suckler herd progeny account for approximately 45% of the national male kill and late-maturing breeds and their crossbreds predominate.

The focus on this paper is on post-weaning performance of suckler bred male cattle. Firstly, it examines recent results from Teagasc Grange on the effects of weanling bull winter growth rate on subsequent performance at pasture and during finishing, secondly, it examines the role and response to concentrate supplementation at pasture in spring and autumn and how this influences animal performance and, thirdly, it compares the growth and carcass traits of early and late-maturing breed bulls reared on contrasting production systems.

Weanling cattle performance

Research studies at Grange have determined that the optimum winter growth rate for steers destined to return to pasture for a second grazing season is in the region of 0.5 kg live weight gain/day, if they are to subsequently optimise compensatory growth on cheaper produced grass. In other words, there is little point in over-feeding weanlings in winter as, during the subsequent grazing season, cattle that gained less over the winter have the highest live weight gain at pasture. This ability of animals 'restricted during the winter' to subsequently compensate at pasture means that the majority of the winter weight difference, due to higher levels of supplementation, disappears by the end of the grazing season. However, unlike steers, the optimal first-winter growth rate for young suckler bulls to exploit subsequent compensatory growth at pasture is not clear.

Recent research at Teagasc Grange has addressed this issue and is summarised in Table 1. At the end of a 120 day first winter suckler bulls offered grass silage to appetite and supplemented with either 4 or 6 kg concentrates daily were 26 and 65 kg heavier, respectively, than those supplemented with 2 kg concentrates. At pasture, average daily live weight gain was greatest for animals that received the lowest amount of concentrates during the previous winter. By housing time (in July), there was no difference in live weight between the 2 and 4 kg winter supplemented groups, however, the 6 kg winter supplemented group were still 32 kg heavier. Thus, the additional 32 kg live weight gain for the 6 kg concentrates supplementation level (relative to 2 kg of concentrates) resulted in a ~15:1 response (if concentrates cost £160/t therefore 15kg costs £2.40 to gain 1kg live weight). At slaughter, there were no significant differences between the three winter supplementation levels for carcass weight, kill-out proportion, or carcass fat score. Carcass conformation score was not improved by the increased first winter concentrate feeding levels.

Table 1. Effect of growth rates during the first winter on subsequent live weight gains, carcass weight, kill-out proportions and, fat and conformation scores in young bulls.

	Winter supplementation level (kg concentrate/head/day)			Sig.
	2	4	6	
Live weight gain (kg/day)				
Indoor winter period	0.79	1.01	1.27	*
Pasture	1.20	0.95	1.03	**
Carcass weight (kg)	389	382	378	NS
Kill-out proportion (g/kg)	556	552	553	NS
Carcass conformation score (1-15)	9.8	9.4	9.0	*
Carcass fat score (1-15)	6.8	6.5	6.2	NS

In a consequent similar study, where suckler bulls were offered 3 or 6 kg concentrates as a supplement to grass silage over a 127 day indoor winter period and subsequently returned to pasture, it was found that bulls fed 6 kg concentrates during their first winter were 30 kg heavier at slaughter (13:1 response), resulting in a 20 kg heavier carcass, than animals which received 3 kg concentrates for the first winter. This additional 3kg of concentrates fed over 127 days equates to 381kg in total which if priced at £160/t costs £60.96 to produce an extra 20kg carcass which if valued at £3.40/kg equates to £68.

Steers and bulls compared

Upon reaching puberty, bulls are inherently more efficient than steers, due to naturally-occurring male steroid hormones. In a recent study at Grange, weaned, spring-born, late-maturing breed suckler bulls and steers (about eight months old, 360 kg) were compared in each of two contrasting production systems; forage (grass)-based or concentrate-based. At the end of a 'store' winter period, during which all animals were fed grass silage to appetite plus supplementary concentrates, half of the bulls and steers were offered a high concentrate diet, whereas the remainder were turned out to pasture for 98 days (growing phase), following which, they were then rehoused and offered the high concentrate diet. Mean slaughter age for all animals was 19 months. Apart from live weight at the end of the first winter, where bulls and steers were of similar weights, and, fatness at slaughter, where steers were fatter, bulls had significantly greater growth rate carcass weight and conformation score

(Table 2). For the grass-based system, daily live-weight gain of bulls was approximately 0.2 kg greater than steers whilst grazing, with this advantage increasing further when subsequently finishing indoors. On the 15-point carcass classification scale, bulls were one score leaner and one score better in conformation, than steers.

Table 2. Effect of gender and diet on growth and carcass traits of suckler bulls and steers finished at 19 months old.

Gender	Bulls		Steers		Significance		
	Diet	Grazed	Conc.	Grazed	Conc.	Gender	Diet
Live weight: end of winter (kg)		438	464	433	468	NS	***
Live weight gain: growing (kg/day)		1.49	1.82	1.28	1.64	**	***
Live weight gain: finishing (kg/day)		1.79	1.33	1.51	0.87	***	***
Slaughter weight (kg)		711	728	651	683	***	NS
Kill-out proportion (g/kg)		571	575	559	560	**	NS
Carcass weight (kg)		406	419	364	382	***	NS
Carcass fat (1-15)		6.7	7.9	7.9	8.6	*	**
Carcass conformation (1-15)		9.9	10.2	8.9	9.1	**	NS

Concentrate supplementation at pasture: spring/summer for 12 month old bulls

A study was undertaken to examine the effects of concentrate supplementation level at pasture in spring/summer on performance of suckler-bred weanling bulls. They were offered either zero, 2.7 kg or 5.3 kg concentrates/head daily for 100 days. At the end of the grazing period bulls were housed and finished on an *ad libitum* barley-based concentrate diet and slaughtered at an average age of approximately 19 months. After 100 days at pasture, the zero concentrate supplemented animals were 17 kg and 36 kg lighter than those getting 2.7 kg and 5.3 kg concentrate/day, respectively. During the finishing phase, highest growth rates occurred in the animals that were unsupplemented at pasture. At slaughter, the low and high pasture supplementation levels were 7 kg and 24 kg live weight heavier than the unsupplemented group. The respective additional carcass weight produced for 2.7 v 0 kg, 5.3 v 0 kg and 5.3 v 2.7 kg (fed at pasture) were 6 kg, 20 kg and 14 kg. Overall, it was concluded that concentrate supplementation at pasture increased animal live weight, however, the scale of the differences were such that the economics of concentrate supplementation were marginal.

In another study, spring-born suckled bulls spent 200 days at pasture where for the first 100 days they received either grass only or grass supplemented with concentrates which approximated to 50% of their daily DM intake. Supplemented animals grew at 1.69 kg live weight per day over the first 100 days compared with 1.44 kg/day for the unsupplemented group, and were, 25 kg heavier after 100 days (a live weight response of ~22:1). After 100 days at pasture, half of the unsupplemented animals were then offered pasture only or a concentrate supplement at pasture, which approximated to 50% of their daily DM intake. From day 100 to 200, the unsupplemented bulls had a daily live weight gain of 0.92 kg at pasture, while the supplemented group had a daily gain of 1.24 kg. When slaughtered, bulls supplemented for the final 100 days at pasture had a carcass weight that was 10 kg heavier than the grass-only bulls. This additional carcass weight came from both a higher slaughter weight (+20 kg live weight) and kill-out proportion (6 g/kg). Bulls that were supplemented throughout the grazing season (200 days of supplementation) had a carcass weight that was 9 kg heavier than those that were supplemented only for the final 100 days. The additional carcass weight was due to a better kill-out proportion (19 g/kg). It was concluded that the economics of pasture concentrate supplementation (for the conditions prevailing in this study) were, at best, marginal.

Late and early-maturing breed bulls

A challenge for late-maturing breeds (e.g. Charolais, Limousin) can be to achieve adequate carcass fat cover at a young slaughter age. In this context, early-maturing breeds (e.g., Aberdeen Angus, Herefords) may be suitable. A study was undertaken to determine growth and carcass characteristics of spring-born early- and late-maturing breed suckler bulls slaughtered at four carcass weights (Table 3 shows the average of the four carcass weights). Bulls were finished indoors on a high-concentrate diet and were slaughtered on reaching the appropriate live weight to achieve the target carcass

weight. To achieve the same carcass weight as late-maturing breed bulls, early-maturing breed animals needed to be heavier at slaughter due to a lower kill-out proportion and, had a higher carcass fat score, a longer duration to slaughter and were older at slaughter, compared to late-maturing breed types. Concentrate DM intake and daily live weight gain did not differ significantly between the breed types. However, early-maturing breed bulls needed 50 days extra feeding to reach a common carcass weight. Therefore, when slaughtered at a common carcass weight the data indicate that early-maturing breed animals were less efficient.

Table 3. Intake, growth, and carcass attributes of early and late-maturing breed suckler bulls.

	Breed type		Sig
	Early-maturing	Late-maturing	
Live weight at start (kg)	303	345	***
Slaughter weight (kg)	591	569	*
Kill-out proportion (g/kg)	548	572	***
Carcass weight (kg)	324	326	NS
Carcass fat score (1-15)	8.6	7.0	***
Carcass conformation score (1-15)	8.2	8.9	*
Days on farm	215	165	-
Concentrate intake (kg DM/day)	9.6	9.7	NS
Average daily live weight gain (kg)	1.5	1.5	NS

Total concentrate intakes were 2,064kg (9.7kg x 215 days) for the Early-maturing breed types and 1,600kg (9.6kg x 165 days) for the Late-maturing breed types.

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

In January 2017 I wrote an article on intensive finishing of late maturing breed weaned suckler bred steers aimed specifically for the NBA south west region where there are major issues with marketing bulls and the desire would therefore be to finish steers indoors and not turn them out to graze for a second summer. This article can be found on the NBA website (go to Resources>Technical Information>Beef systems). Predictions were made to intensively finish late maturing suckler bred steers on ad lib cereals at 13 months old at 325kg carcass weights or on silage and cereals (fed 50:50 on a DM basis) at 14 months old at 335kg carcass weights. It is interesting to note in table 2 that suckler bred steers that were store wintered then either grazed for 98 days and bought inside for ad lib cereal feeding, or not grazed and simply fed ad lib cereals (from at 12 months old) and finished at 19 months old produced carcass weights of 364 and 382kg respectively.

The 19 month bull system will not be viable in the UK due to the lack of market outlets for these cattle. Also consideration must be given to health and safety factors with the management of yearling bulls at grass. I can also foresee a lot of 'management issues' dealing with a mob of 12-15 month old bulls at pasture! Also the carcass weights produced by the bulls were in excess of 400kg so there also may be penalties for heavy weight carcasses by certain abattoirs.

The data in table 3 compares the performance of early and late maturing suckler bred bulls. The early maturing bred bulls would not be eligible for the supermarket beef premium schemes for native breeds. The work does not take into account or discuss the benefits of easier calving's (with subsequent benefits on cow fertility) and possibly reduced calf mortality with the early maturing breeds.