Bio-Security, Health and Safety

In the interest of safety and disease bio-security, visitors to the Grange Open Day are asked :

- To use disinfection footbaths provided (on entering and leaving the event)
- Park in designated areas
- Stay on the Open Day route
- Not enter fields/paddocks/pens which contain cattle
- Not to handle cattle

Derrypatrick Herd Up-Date

Event

September 13th 2012

Special Need Assistant can be provided on the day

Beef Open Day at Grange:
June 27th 2012

Contents

Introduction

On behalf of Teagasc, it is a pleasure to welcome visitors to the beef open day at Grange.
The main focus of the day is on beef production from the suckler herd. Efficient beef production from the national suckler herd is of major importance and is central to economic prosperity in beef farming. Indeed, targets set in the Harvest 2020, require a significant contribution from the suckler sector. The main focus of open day is on the **progeny** of the suckled herd, while a separate open day will be held in September, to focus on the Derrypatrick suckler cow herd.
Progeny form the suckler herd can be produced in a combination of either steer and heifer or bull and heifer systems. Over the last 4-5 years there has been a big interest in the production of bulls rather than steers, while traditionally steer production predominated. Challenges and opportunities posed by bull production will be addressed today and the returns from the production of either bulls/heifers or steers/heifers will be outlined.

- The positive and negative aspects of bull production will be discussed and a range of blueprints will be summarised.
- The option of producing steers (and heifers) from the suckler herd (as opposed to bulls and heifers) will be presented in an integrated systems context.
- In addition, the economics of the different production system options will be presented.
- Information on the feeding of alternative (to grass silage) forages to cattle will be summarised.
- Irish beef supplies varied markets, each with their own differing specifications (age, weight, fat cover, gender, etc). The requirement for these markets will be addressed as will the challenges (and opportunities) facing the export meat sector in the immediate future.
- Grassland management remains a key production factor giving Ireland the potential to be competitive in feeding cattle. Key grassland management practices will be outlined on the grassland demonstration stand.
- The drafting of animals for sale such that they meet the market specifications is a critical farm decision. Pointers will be given in selecting animals for sale and special emphasis will be placed on selecting young suckled bulls for sale.
- Other research relating to cattle will be summarised in poster format and the staff involved will be available to discuss their work.
- ICBF have a stand at the open day.
- While there is a separate Derrypatrick open day in September, the animals in the Derrypatrick herd will be on display also.

For both bio-security and Health and Safety reasons, we ask that you stay on the planned route and that you do not enter either fields or pens within sheds which contain livestock. Many of the animals on display are bulls, so extra caution is needed.

We wish everyone an enjoyable, productive and safe day.

E. G. O'Riordan and B. Smyth

Producing bulls from the suckler herd

Edward G. O'Riordan and Mark McGee
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Introduction

Over the last few years there has been a considerable change in the way male cattle are produced in Ireland. Traditionally steer production predominated with approx. 5% of the national male cattle being slaughtering as bulls. However, by the end of 2011, the proportion of male cattle reared as bulls had increased to almost 25%. Compared with steers, bulls have an inherent growth rate and lean meat production advantage, on reaching puberty. This advantage, in the order of 10-20%, is mainly due to the benefits of the male hormone testosterone produced by the intact testes.

However, suckler bull production systems to date, usually involve more "intensive" indoor feeding, invariably based on feeding high levels of concentrates. Unlike more "extensive" steer (or heifer) production systems, current systems of production for weaned suckler bulls generally have no or limited store (restricted growth) period, do not avail of subsequent compensatory growth, and generally do not include grazed grass as part of the growing-finishing phase. As grazed grass is considerably cheaper than alternative feeds, particularly concentrates, bulls produced from forage-based systems, especially systems involving grazed grass, is desirable from a cost of production perspective.

Recent research at Grange has examined the effects of producing weaned suckler bred bulls on systems incorporating forage, including grazed grass, in the growing-finishing phase with the aim of lowering costs of production, while simultaneously maintaining good animal performance and meeting market requirements.

Bull production systems

Even though the EU is deficient in beef production and beef prices remain favourable, there is nevertheless a need to produce carcasses that fall within a specified age and weight range and with an adequate level of finish (fat cover). There are, nevertheless, quite a range of markets that accept a range of carcass weights and fat covers. However, producers of bulls should be clear in the market requirements for their targeted production system.

There are a number of weaned suckler bull beef production systems capable of producing animals over a wide range of slaughter ages and weights. Depending on the markets, carcass weight and fatness, and slaughter age requirements, these systems can range from *ad libitum* concentrate feeding where bulls are produced at about 14 to 17 months of age, to systems incorporating a store period of growth followed by an accelerated finishing period where bulls are produced at about 15 to 19 months of age or greater. Any store period or time at grass as yearlings inevitably means that these bulls are older at slaughter. Thus, depending on the weanling starting weight, bulls from the suckler herd can be finished at 15 to 22 months of age and at carcass weights within the range of 350 to 450 kg.

In any production system, and particularly for bulls, knowledge of the market requirements must be known at the outset. In this respect, carcass weight, fat cover and colour, meat colour and age are critical issues for bull production. Equally well, matters related to human safety, and behaviour and handling of bulls must be considered.

Profitability is determined by the difference between receipts and costs. In weaned suckler–bred bull systems, receipts are determined by carcass value, which in turn, is largely influenced by carcass weight

and grade. Costs of producing the animal are largely determined by weanling purchase price (or suckler cow production/maintenance costs if the weanling is retained on the farm of birth), feed input costs, level of performance, veterinary costs and animal losses. Intensive finishing of bulls to produce a finished carcass at a young age invariably involves high inputs of concentrate.
In an effort to minimise the lifetime concentrate input, and thus reduce costs, a series of recent studies at Grange have focused on the role of grazed grass in the diet of suckler bulls.

Bulls from a grass based system (2009, 2010 and 2011)

Spring-born, recently weaned suckler bulls, mainly out of Charolais and Limousin sires, weighing approximately 340 kg live weight at purchase in November, were housed for the first winter and offered high digestibility grass silage (>730g/kg DMD) *ad libitum* plus 1.5-2.0 kg concentrates/head daily. Mean live weight gains over the 3 winter periods were circa. 0.5 to 0.7 kg/day and mean live weight at turnout to pasture in March was 410 to 430 kg. Depending on actual housing and turnout dates, approximately 200 to 250 kg concentrates was fed over the first winter period.
During the 2009 and 2010 grazing season, bulls spent from 3 to 6 months at grass and were then finished indoors on *ad libitum* concentrates. During 2011, bulls were grazed for 3 months at pasture before housing indoors for finishing on *ad libitum* concentrates.

Performance at grass

Yearling bulls were grazed in group sizes of 38 (in 2009) and 30 (in 2010 and 2011) at a stocking rate of 3.3 to 3.8 bulls/ha. No supplements were fed at grass. Bulls were rotationally grazed on perennial ryegrass dominant swards, which were grazed to a stubble height of under 5 cm. Performance at grass was disappointing during 2009 (very wet season) and gains of only 0.9 kg/day were achieved over the first 100 to 170 days of the grazing season. Daily live weight gain of the bulls decreased markedly as the grazing season advanced. In contrast to 2009, performance during the grazing season was much improved in 2010. Daily live weight gains of over 1.3 kg were observed over the first 140 days at grass and gains of 1.0 kg were observed over a 210 day grazing season. Similarly, during 2011, daily live weight gains at grass approached 1.3 kg. In all 3 years, bulls were housed indoors for finishing on reaching approximately 550 kg live weight.

Performance indoors while finishing

Bulls were accommodated in a slatted floor shed, for a duration of 80 to 150 day finishing period depending on target final carcass weight. On housing, they were offered grass silage to appetite and supplementary barley-based concentrates. The concentrate allowance was increased gradually over a 3-week period to *ad libitum* – grass silage was also offered *ad libitum.* In 2009 when bulls were lighter at housing, mean daily live weight gain indoors was 1.7 to 1.9 kg/day (including the build-up phase) and animals reached final live weights of 725 to 730 kg within 100 days of housing. In 2010 and 2011, when bulls were heavier at housing, they gained 1.6 to 1.8 kg/head/day over the 100 day finishing period reaching slaughter weights of 740 to 760 kg live weight.

Carcass weight and finish

At the end of the 100 day finishing period, bulls attained average carcass weights of 410, 420 and 415 kg in 2009, 2010 and 2011, respectively. In 2009 carcasses attained a fat class score of 3 (on 5 point scale) and were graded as fat class 3= in 2010 and 2011 (15 point scale). Generally, achieving an acceptable carcass fat cover on finishing continental bulls has not proven difficult.

Feed inputs

Average concentrate intake for the first 3 weeks (adaption phase) of the finishing phase was approximately 4.5 to 5.5 kg/day (fresh weight). Total concentrate intake during the finishing period was approximately 1,200 kg/head (fresh weight) in 2009 and approximately 1350 kg/head in 2010 and 2011. Silage consumed during the first winter plus the finishing phase was estimated to be 5 tonnes/bull.

Bull age

Assuming the calf is born in mid-March, and, spends 100 days at grass at the yearling stage followed by a 100-day finishing period, the bull is, in the best case scenario, 18 to 19 months of age at slaughter.

Financial performance

While bull beef is potentially an efficient system of male animal production, due to the inherent growth potential of the intact male, financial margins can, nevertheless, be modest. At current input prices, feed costs alone are likely to approximate to almost €600/head. Between animal purchase, feed, veterinary costs and livestock losses, production costs may mount to €1,500/head. Selling a carcass of 400 kg (at €4.25/kg) generates a gross receipt of €1,700, leaving a 'gross' margin of approximately €200/head (not all variable costs included and no fixed costs).

Summary

Based on the performance over the last three years, it is suggested that spring-born weanling bulls weighing 340 kg in early November can achieve carcass weight of 400 to 420 kg at about 18 to 19 months of age. Carcasses in this weight range were deemed to have an adequate fat cover. Feed inputs approximate to 5 tonnes of silage (fresh weigh) and 1,300 to 1500 kg concentrates. While animal performance is in general excellent, financial gross margin is quite poor.

KEPAK GROUP

Grass-based suckler calf-to-beef systems

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Introduction

In Irish suckler calf-to-beef systems, male calves may be produced as steers or bulls. Steer production has predominated (and still does). However, there is currently considerable interest in suckler bull beef production and recently the share of male cattle reared as bulls has increased rapidly. Bulls are usually slaughtered at a younger age than steers.

Males produced as bulls are inherently more efficient for beef production than steers of similar breed, age, reared and slaughtered in the same way. Differences in favour of bulls are generally more pronounced at higher feeding/feed energy levels and with increasing slaughter weight.

Unlike suckler steer/heifer systems, traditional production systems for suckler bull beef generally have no store (restricted growth) period and do not include grazed grass as part of the growing-finishing phase. After weaning, these systems usually involve "intensive" indoor production based on feeding high levels of concentrates until slaughter. This however, is a high cost-of-production system. For this reason suckler beef production blueprints at Grange for steer/heifer and bull/heifer systems are forage-based, with the underlying aim of maximising animal production off grass.

It is recognised that due to having many beef breeds (and their crossbreeds), numerous possible production systems and an incalculable number of potential combinations of these, it is not possible to generate blueprints for all commercial situations. However, the principles outlined are applicable to most production systems. In any production system, and particularly for bulls, knowledge of market requirements must be known at the outset. Equally well, matters related to human safety, and behaviour and handling of bulls must be considered.

Key principles of Grange Suckler Beef Production Systems

Suckler calf-to-beef production systems operated at Grange encompasses the following;

- *A breeding programme focused on cows with good maternal traits bred to sires of high genetic merit*.
    - The breeding policy exploits breed differences (& genetic selection within breeds) and hybrid vigour or heterosis (advantage to crossbreds over the average of the parent breeds). The advantages of hybrid vigour from crossbreeding are due to a combination of; enhanced reproductive performance, lower calf mortality and higher calf growth. Cow maternal traits (reproduction and milk) are very important.
    - Research shows that the advantage expected from using a cross-bred suckler cow as opposed to a purebred in terms of kg of calf weaned per cow put to the bull is about 13%. In addition, using a sire from a third breed (of equivalent high genetic merit) increases the weight of calf weaned per cow put to the bull by approximately a further 8 %.

- *High physical output of healthy, high-performing animals producing quality carcasses in technically efficient systems.*
    - High stocking rates are operated within spring-calving, grass-based systems.
        - Economic analysis of calf-to-beef production system comparisons at Grange (e.g. 210 vs. 170 kg organic Nitrogen/ha) has shown that where individual animal performance remains high, stocking rate is the main driver of farm profitability.
    - Exploit animal compensatory growth potential.
    - Animals / carcasses produced are suitable for the high-priced continental EU markets i.e. lean carcasses of good conformation.

- *Maximising the quantity of high quality grazed grass in the annual feed budget, while also providing sufficient grass silage for the indoor winter period.*
    - Due to the considerably lower comparative cost of grazed grass as a feedstuff, maximising the proportion of high digestibility, grazed grass in the annual feed budget, while simultaneously achieving high animal performance and providing sufficient grass silage of appropriate digestibility for the indoor winter period, is essential.
        - Grassland management revolves around a flexible rotational grazing system, with the objective of providing high nutritive value grass – leafy swards of high digestibility.
        - In terms of grass conservation, a silage harvest system is operated with the objective to produce high nutritive value grass silage for the progeny (~ >720 g/kg dry matter digestibility - DMD) and moderate nutritive value silage for the cows (~660 g/kg DMD). Typically, about fifty percent plus of the land area is closed for first-harvest and about forty percent for second harvest.

Cow-calf Component of Grange Suckler Calf-to-Beef Production Systems

The production systems operated at Grange are spring-calving in order to optimise the proportion of grazed grass in the diet. Mean calving date coincides with the start of the grass growing season. Cows and calves are rotationally grazed together during the grazing season (~March to ~November). The diet of the cow is confined to high nutritive value grazed grass or moderate digestibility grass silage *ad libitum* (plus minerals/vitamins) with the exception of first-calvers who receive 2.0 kg of concentrate from calving until turnout to pasture.

Male calves are castrated in August (steer production). The only concentrates offered to calves pre-weaning is that required (recommended) under the Suckler Welfare Scheme and this allowance (~1.0 kg/head/day) is introduced at approximately 4 weeks prior to the expected weaning date. In this regard, for calves to achieve high pre-weaning live weight gains, having a cow type with sufficient milk production is essential. At the end of the first grazing season the weanling progeny are housed indoors.

Steer / Heifer Production

The feeding strategy for the steer and heifer weanlings during the first winter following weaning is designed to exploit compensatory growth potential during the subsequent grazing season. To achieve this, they are offered first harvest grass silage (high digestibility >720 g/kg dry matter digestibility) *ad libitum* plus 1 kg of a barley-based concentrate per head per day. The objective is to grow the animals at ~0.5 to 0.6 kg live weight per day (store period) and to avail of compensatory growth subsequently, when grazing more cheaply produced, higher nutritive value grass herbage.

At the end of the first winter yearlings are turned out to pasture in early to mid-March and steers and heifers are rotationally grazed, separately.

Heifers are housed around mid-September and finished indoors over ca. 60 days on high digestibility grass silage *ad libitum* plus 3-4 kg of a barley-based concentrate per head per day. Age at slaughter is circa. 20 months. [Alternatively, on systems where stocking rates are lower e.g. 170 kg Organic N/ha, heifers may be finished off grass at the end of the second grazing season, usually with concentrate supplementation].

Steers remain at grass until October, following which they are housed indoors and finished on high digestibility grass silage *ad libitum* plus 4-5 kg of concentrate per head daily, over ca. 150 days. Age at slaughter is ca. 24 months. Target weights for heifers and steers are presented in **Table 1.**

Table 1: Target weights at key times for female and male progeny

	Target weights (kg)			
	Heifer (20 mth)	**Steer (24 mth)**	**Bull (15.5 mth)**	**Bull (18.5 mth)**
Weaning	295	315	320	320
Yearling	375	390	-	400
Start of finishing period	510	585	-	515
Slaughter	565	700	620	675
Carcass	310	395	360	399

Bull / Heifer Production

Instead of steer production, the male progeny can be produced as bulls at ca. 15.5 months or 18.5 months of age. In these systems, heifer production is the same as outlined for the steer/heifer system above.

In the 15.5 month bull system, weaned bulls receive high digestibility grass silage *ad libitum* plus supplementary concentrates, increasing gradually to approximately 5 kg per head daily. The finishing period is eight months.

In the 18.5 months of age system (as currently operated in the Derrypatrick herd) yearling bulls are turned out to pasture in early to mid-March and rotationally grazed in groups of 25-30 for about 90-100 days after which, they are housed indoors. Following housing, bulls are gradually introduced to barley-based concentrates *ad libitum* plus ~1 kg grass silage DM/head daily until slaughter 90 days later. High live weight gains can be achieved with late-maturing breed suckler-bred bulls, rotationally grazing pasture for the first part of the grazing season. This is followed by exceptionally high performance during the subsequent indoor finishing period. For example, results from yearling suckler bulls in the Derrypatrick herd at Grange in 2011 showed mean live weight gains in excess of 1.3 kg/day from March to July while grazing pasture and circa 2.0 kg/day during the indoor finishing period. Grange research to date indicates that on grass-based systems, these animals require a finishing period indoors on a high concentrate diet, primarily in order to reach target carcass fat scores. Target weights for bulls (& heifers) in these systems are presented in **Table 1.**

Production System Feed Budgets

The annual feed budget for these calf-to-beef systems comprises between 57-64% grazed grass, 26-28% grass silage and 8 (steers) to 15% (15.5 month bulls) concentrates. The calf-to-weanling component comprises approximately 73% grazed grass, 26% grass silage and 1% concentrates.

Obviously, these proportions are largely constrained by the prevailing environment, as dictated by geographical location, climate/weather, soil type etc. and thus, will differ accordingly.

Production System Gross Margins

Gross margins for the three suckler beef production systems outlined above (i.e. producing males as steers at 24 months of age or as bulls at either 15.5 or 18.5 months of age and in all cases, heifer at 20 months of age), when operated at a high or a moderate stocking rate (SR), are summarised in **Figure 1**. The high SR system is operated at ~225 kg organic N per ha, with 200 kg fertiliser N per ha and 2 silage harvests. The moderate SR system is operated at 170 kg organic N per ha, with 90 kg fertiliser N per ha and 1 staggered silage harvest. A Nitrates derogation is required for the high stocking rate. In this economic analysis, concentrates are costed at €285/tonne, fertiliser N at €305 (CAN) and €405 (Urea)/tonne and, a beef price of €4.25/kg carcass is assumed.

At the high SR, carcass output per hectare is ca. 625 kg for the bull systems and 565 kg for the steer system. Corresponding carcass output is 25% lower at the moderate SR.

Gross margin per hectare for the bull production systems is about 6 to 14% higher than the steer system. The effect of stocking rate on gross margin is a multiple of this. Sensitivity to beef price is high with gross margin changing by about €60/ha per €0.10 change in carcass price.

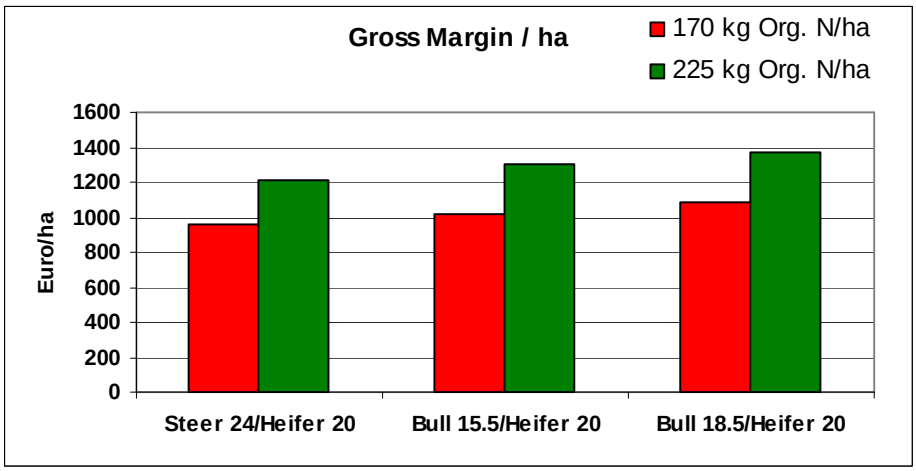

Figure 1: Gross margins (€/ha) for suckler calf-to-beef production systems at two (170 vs. 225 kg Organic Nitrogen / ha) stocking rates

An overview of the financial performance of alternative suckler beef production systems

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Introduction

Although the economics of suckler beef production is largely driven by factors outside the farm gate, most notably beef price, there is much that remains under the farmer's control which can influence the level of profitability attained by beef cattle systems. The key drivers of profitability for suckler beef production systems have been outlined previously by the present authors. In brief, the five key areas underpinning farm profitability for Irish suckler beef farms as follows:

- The selection and operation of an appropriately planned **production system**.
- Operating at high stocking rates and consequently producing **high levels of beef output**.
- Having a compact calving period and a **calving date** which optimises the capacity of the production system to attain live weight gain from grazed grass.
- The development and application of **excellent grassland management skills** to ensure that high quality herbage is presented to cattle at all times and that the grazing season is as long as is practically possible. The management of grassland to ensure high levels of animal productivity is discussed by Kelly and Dukelow in this booklet.
- Ensuring high levels of **animal productivity** in terms of live weight and reproductive performance. In other words, beef output per livestock unit (LU) must be high – animal productivity have genetic and management factors which are discussed elsewhere in this booklet.

There are numerous production systems operated on suckler beef farms throughout Ireland, based on local markets, tradition and demographics. Furthermore, stocking rates vary significantly with more profitable and commercially focussed farms typically operating at higher stocking rates. Thus, in this present article the focus is on the financial performance of alternative suckler beef production systems with regard to age at sale and stocking rates.

Production systems

The current Grange Derrypatrick system involves finishing bulls and heifers at approximately 18.5 and 20 months of age, respectively. This system is replicated on many farms nationally; often with age at finish either earlier (with higher concentrate feeding levels) or later (with a longer grazing period in the second grazing season) than this. Rather than taking progeny to slaughter, production systems commonly practised on suckler beef farms involve selling progeny at earlier stages in the animal's lifecycle. Two such alternative systems are calf to weanling and calf to store systems. Calf to weanling systems involve selling the progeny shortly following weaning of the calf from its mother. In contrast, in calf to store systems, the progeny are sold at a later "store" stage normally either at the end of the first indoor winter feeding period or following a period at grass during the second grazing season.

The present analysis assumed a grass based spring calving (mean calving date 12 March) suckler beef production system based on a mature continental crossbred cow herd. The grazing season commenced in mid February for yearlings and early March for suckler cows. Heifer replacements were bred from within the herd with a 20% replacement rate assumed. A more detailed description of this system is

provided by McGee et al. elsewhere in this booklet. The system was evaluated with regard to alternative stages of sale:

1. An integrated suckler calf to beef system (BEEF) mirroring the Grange Derrypatrick system.
2. A suckler calf to store system (STORE); in this case progeny were sold at the store stage following a 105 and a 180 day period at grass in second grazing season for bulls and heifers, respectively.
3. A suckler calf to weanling system (WEAN); in this case progeny were sold shortly after weaning at 8 months of age at the end of the first grazing season.

Current prices assumed in the analysis are those prevailing in spring 2012 (Table 1). Given the significant volatility in beef and cattle prices in recent years and its importance on farm margins, three alternative price scenarios were evaluated representing current prices and the highest and lowest prices for the 24 month period January 2010 to December 2011. The production systems were evaluated at two stocking rates; moderate stocking rate (170 kg organic nitrogen (N)) and high stocking rate (225 kg organic N). In all cases, excellent levels of management were assumed. The summary of financial performance for these systems is presented in Table 2.

Results per cow calving

Variable costs, in particular concentrates and grass silage, were higher for the BEEF systems than for the STORE or WEAN systems. Fixed costs were also higher for the BEEF systems and therefore total costs were 15% and 30% greater than the STORE and WEAN systems, respectively. Similar to the costs of production incurred for the three systems, the value of output was also greater for the BEEF systems, in this case being 17% and 34% greater than the STORE and WEAN systems, respectively, in the current price scenario. Therefore, margins were greater for BEEF systems relative to the other systems. The higher levels of profitability for BEEF systems relative to the alternative systems was similar for the 2010-2011 high price and low price scenarios.

In terms of the impact of stocking rate, variable costs were the same for moderate and high stocking rate scenarios with the exception of grassland costs; in the case of grassland costs, these increased somewhat at higher stocking rates reflecting diminishing returns in terms of herbage produced per unit of nitrogen applied. In contrast, fixed costs were lower at the higher stocking rate; this is a common feature of higher turnover businesses where fixed costs are apportioned over a greater quantity of output. Total costs were approximately 3% lower for the high stocking rate scenarios. Output value per cow calving was the same at moderate and high stocking rates since animal productivity (live weight gain and reproductive performance) was assumed to be constant at both stocking rates. Therefore, margins were greater for the high stocking rate scenarios.

Table 1. Price assumptions used in the analysis of the financial performance of alternative suckler beef production systems.

Urea fertiliser	€405/t
CAN fertiliser	€300/t
Silage contractor	€240/ha
Concentrates	€240/t
Beef price – current	€4.25/kg carcass weight
Beef price – 2010-2011 high[1]	€4.13/kg carcass weight
Beef price – 2010-2011 low[1]	€3.07/kg carcass weight
Store price – current	€2.32/kg live weight (€1176/head)
Store price – 2010-2011 high[2]	€2.30/kg live weight (€1166/head)
Store price – 2010-2011 low[2]	€1.65/kg live weight (€837/head)
Weanling price – current	€2.60/kg live weight (€819/head)
Weanling price – 2010-2011 high[3]	€2.32/kg live weight (€731/head)
Weanling price – 2010-2011 low[3]	€1.75/kg live weight (€551/head)

[1]Beef prices taken from Bord Bia (http://www.bordbia.ie/industryservices/Archive/cattle/Pages/Prices.aspx); accessed 18 June 2012. [2]Store cattle prices taken from CSO (http://www.cso.ie) and adjusted for suckler bred and bull cattle; accessed 18 June 2012. [3]Weanling prices taken from ICBF (Andrew Cromie, Personal Communication).

Table 2. Summary of financial performance for suckler beef production systems selling progeny as finished cattle (BEEF) at 18.5 and 20 months of age for bulls and heifers, respectively, as store cattle (STORE) following a period grazing during the second grazing season and as weanlings (WEAN) shortly after weaning at the end of the first grazing season. Each system is evaluated at moderate (MOD; 170 kg organic N/ha) and high (HIGH; 225 kg organic N/ha) stocking rates.

	BEEF MOD SR	BEEF HIGH SR	STORE MOD SR	STORE HIGH SR	WEAN MOD SR	WEAN HIGH SR
Cows calving / ha	1.45	1.95	1.60	2.10	1.90	2.50
Cattle sold / ha	1.10	1.40	1.20	1.55	1.40	1.90
Costs summary (€/cow calving)						
Concentrates	188	188	85	85	40	40
Grassland[1]	67	99	72	107	58	87
Grass silage[2]	237	237	219	218	193	192
Veterinary	46	45	45	45	44	44
Other variable costs[3]	59	59	53	53	51	51
Fixed costs	371	310	352	294	294	246
Total costs	969	938	826	802	680	660
Output value (€/cow calving)						
Current prices	1342	1342	1117	1117	887	887
2010-2011 low prices[4]	969	969	794	794	597	597
2010-2011 high prices[4]	1304	1304	1107	1107	792	792
Margins (€/cow calving)						
Current prices	373	404	291	315	208	228
2010-2011 low prices[4]	0	31	-31	-8	-82	-63
2010-2011 high prices[4]	335	366	282	305	112	132
Margin (€) per hectare						
Current prices	542	777	460	658	395	573
2010-2011 low price	0	59	-50	-17	-157	-158
2010-2011 high price	487	704	444	637	213	332

[1]Grassland costs include fertiliser, lime and a proportion of reseeding costs. [2]Grass silage costs include contractor, fertiliser, polythene and a proportion of reseeding costs. [3]Other costs include breeding, slurry application, transport and straw costs. [4]Prices assumed are outlined in Table 1.

Results per hectare

An important aspect of profitability for any enterprise is to maximise returns to the most limiting resource. For beef cattle systems in Ireland the most limiting resource is normally (but not always) land and therefore, the objective should be to maximise financial returns per hectare. A key element of suckler beef systems is the capacity to vary stocking rate by selling progeny at different stages in the life-cycle. This is evident in Table 2 whereby at a moderate stocking rate, there were 1.5 cows calving per hectare for the calf to beef system and 1.9 cows calving per hectare for the calf to weanling system. In other words, to maintain output it is necessary to increase cow numbers for calf to weanling systems relative to systems taking progeny to slaughter. The results indicate that on a per hectare basis, the BEEF systems evaluated in this analysis returned the highest margins. For all price scenarios, WEAN systems returned lower margins. It is important to note that increasing stocking rate (i.e. cow numbers) is only an effective strategy to improve profitability where margin per cow is positive; otherwise profitability decreases with increasing stocking rate unless scale efficiencies can be obtained.

Concluding comments

There are a myriad of production systems which are operated by Irish suckler beef farmers and many alternative sale options within these systems. Although it is clear that the prevailing beef or cattle price has a critical bearing on farm margins, there are some trends that remained broadly consistent when comparing the results presented in this article. Firstly, it was evident that, of the systems evaluated, the calf to beef systems were more profitable than the two alternatives. However, this difference was marginal in the case of calf to store systems indicating that relatively modest price changes could alter this relationship. The advantage in favour of systems taking progeny through to a sale point following a period at grass in the second grazing season, illustrates the importance of maximising the proportion of grazed grass in the annual feed budget whilst also availing of compensatory growth during the second grazing season. Calf to weanling systems were least profitable for the price scenarios evaluated. It is important to bear in mind that the prices assumed are average national prices and where a higher price is achieved (for example for weanlings exported live to continental EU markets) the relativities will be different. It is recommended that where sale options arise (perhaps due to a price rise for weanling or store cattle), a partial budget should be developed to investigate the relative margin attainable by either selling at that stage or retaining until a later stage in the animal's life cycle. A second feature of the results is the advantage in favour of the higher stocking rate scenarios where margin per cow is positive. This is consistent with previous research conducted at Teagasc, Grange and is also referred to in the chapter by McGee et al. (in this booklet).

Maize and cereal silages for finishing cattle

Padraig O'Kiely
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High yields of quality ***grass*** ensiled with minimal losses and produced with restrained input costs support sustainable systems on many farms. Besides providing winter feed, grass silage also facilitates grazing management, permits efficient and hygienic recycling of animal manures and can be used to help reduce the internal parasite challenge to grazing cattle.
Alternative forages are worthy of consideration on some farms, and need to be considered in terms of relative total costs of production, relative revenues from the sale of beef, and ultimately farm profits.

Experiments with ***maize*** silage have shown its nutritive value for beef cattle to range from being inferior (Table 1) to good grass silage to being superior (Table 2), with the difference in nutritive value relativity being predominantly determined by the content of developed grain. The digestibility of the forage portion of the crop (i.e. stover) would also influence nutritive value. Thus, highly digestible maize silage of high grain (i.e. starch) content can support rates of carcass gain by beef cattle that are superior to what are achieved with good grass silage, but often with a lower efficiency of converting forage dry matter (DM) to carcass.
A minimum target of 13 tonnes harvested DM per hectare (in the absence plastic mulch) should be expected for commercially viable crops, with subsequent conservation losses being restricted to below 15%. Target harvested crop DM concentration would be 30% DM with a corresponding starch concentration of at least 25% of the DM.

Experiments with ***whole*** (small grain – wheat, barley or triticale) ***crop cereal*** silage conserved using conventional technologies indicate that:

- The nutritive value of whole-crop cereal silage for beef cattle can range from being inferior (Table 3) to good grass silage to being superior (Table 4), with the difference in nutritive value relativity being predominantly determined by the content of developed grain (Table 5). Again, the digestibility of the straw component of the crop also has to be important.
- Elevating the cutting height of the cereal crop can increase the feed value of the whole-crop silage (by reducing its content of straw and therefore increasing the proportion of grain present) (Table 6).
- Harvesting should not take place until after the cereal grain has progressed beyond the milky-ripe growth stage – not until it has at least reached the soft-cheddar consistency (i.e. above 35% DM)
- The crop nutritive value is effectively constant from the "soft-cheddar" stage until the cereal grain has reached the hard-cheddar consistency (approx. 55% DM) (Tables 3 and 4) – this is a window of almost three weeks
- It could be speculated that allowing the crop ripen so that its DM concentration increases beyond 60%DM would allow grains to fill with starch, but this would produce grains that, if not processed, would be more likely to pass through the animal undigested. The straw component of this more mature crop would likely have diminished digestibility. Such a crop could benefit from processing the grain.
- Whole crop wheat, barley or triticale silages should ideally be produced from crops that would have yielded at least 8 tonnes harvested grain DM/hectare. Depending on the system adopted,

the crop would be between 40 and 55% DM. Conservation losses should be limited to below 15%, producing aerobically stable silage with negligible mould presence.

- Whole-crop cereal silages of high nutritive value can be successfully made from wheat, barley or triticale, provided that they are harvested at the correct stage and have a high content of grain. However, they generally have poorer feed conversion efficiency compared to maize silage (Table 7).

Table 1. Low quality maize silage (low starch content) vs. good quality grass silage for finishing cattle

	Maize silage	50:50	Grass silage
Silage DM intake (kg/day)	6.1	7.1	6.1
Live weight gain (g/day)	1068	1377	1385
Carcass weight gain (g/day)	633	787	870
DM intake/carcass gain	13.5	12.3	10.0

Source: *Teagasc, Grange*

Table 2. High quality maize silage (high starch content) vs. good quality grass silage for finishing cattle

	Maize silage	50:50	Grass silage
Silage DM intake (kg/day)	6.8	6.8	5.1
Liveweight gain (g/day)	979	950	846
Carcass weight gain (g/day)	737	698	653
DM intake/carcass gain	13.0	13.6	12.0

Source: *Teagasc, Grange*

Table 3 Low quality whole-crop wheat silage (low grain yield) vs. good quality grass silage for finishing cattle

Crop DM% at harvest	Whole-crop wheat silage at two growth stages		Grass silage
	35% DM	50% DM	
Silage DM intake (kg/day)	5.1	5.8	5.0
Liveweight gain (g/day)	889	921	1051
Carcass gain (g/day)	575	577	747
DM intake/carcass gain	13.7	14.8	10.2

Source: *Teagasc, Grange*

Table 4. High quality whole-crop wheat silage (high grain yield) vs. good quality grass silage for finishing cattle

	Whole-crop wheat silage at two growth stages		Grass silage
	36% DM	51% DM	
Silage DM intake (kg/day)	6.3	6.0	4.8
Liveweight gain (g/day)	987	869	866
Carcass gain (g/day)	695	636	596
DM intake/carcass gain	13.1	13.7	12.6

Source: *Teagasc, Grange*

Table 5. Whole-crop wheat (low, medium or high grain content) silages, grass silage or *ad libitum* meals for finishing cattle

	Whole-crop wheat silage			Grass silage	Meals *ad libitum*
	Low grain	Med. grain	High grain		
Silage DM intake (kg/d)	8.0	8.8	8.4	6.6	1.3
Total DM intake (kg/d)	10.6	11.4	11.0	9.2	10.9
Live weight gain (g/d)	840	1075	1043	929	1335
Carcass gain (g/d)	577	708	757	664	915
DM intake/carcass gain	18.3	16.1	14.5	13.9	11.9

Source: *Teagasc, Grange*

Table 6. Impact of elevating the cutting height when making whole-crop triticale silage for finishing cattle

	Whole-crop triticale silage	
Cutting height of crop	Low cut	High cut
Silage dry matter (DM) intake (kg/d)	7.1	7.7
Total DM intake (kg/d)	9.6	10.3
Live weight gain (g/d)	790	934
Carcass gain (g/d)	422	491
DM intake/carcass gain	16.8	15.7

Source: *Teagasc, Grange*

Table 7. Maize silage, whole-crop wheat silage, whole-crop barley silage or *ad libitum* meals for finishing cattle

	Maize silage	Whole-crop wheat silage	Whole-crop barley silage	Meals *ad libitum*
Silage DM intake (kg/d)	6.6	7.2	7.2	1.3
Total DM intake (kg/d)	9.2	9.8	9.8	9.5
Live weight gain (g/d)	1235	1254	1151	1473
Carcass gain (g/d)	781	741	736	939
DM intake/carcass gain	12.0	13.5	13.6	10.3

Source: *Teagasc, Grange*

Market prospects for Irish beef and livestock

Bord Bia

Joe Burke

Medium term outlook remains positive for the Irish beef sector. Global beef supply remains tight. Finished cattle availability in the EU and other major beef producing countries will be slow to recover, and opportunity exists to grow Irish beef output and exports.

European beef supplies staying tight

Overall production of beef in the EU has been in gradual decline over recent years, as national herds contracted and calf births fell. Current forecasts from the various member states indicate that production will fall by a further 0.8% in 2012, to approximately 7.1 million tonnes. Along with the recent fall off in slaughtering, we have seen a dramatic decline in EU beef imports. Imports into Europe totaled just 323,000t last year, which was 15% below 2010 levels (See Figure 1). Import statistics for the first 2 months of 2012 indicate a further 9% decline, with shipments from the two principal suppliers, Brazil and Uruguay, collectively 6% lower. In addition, there has been a surge in demand for EU beef on International markets. EU exports of beef and live cattle were equivalent to 635,000t for 2011, an increase of over 30% on the previous year. As a consequence, the European beef market effectively became a net exporter of over 310,000t.

Lower Irish cattle supplies to continue

In terms of Irish finished cattle availability, the year to date has been characterised by tightening across most categories of animals. Up to the beginning of June, total disposals were some 15% lower at 410,000 head. The strongest decrease to date has been evident in steer and heifer disposals, which were 28% and 17% lower, respectively. The prospects for the remainder of 2012 point to ongoing tight finished cattle availability, as demonstrated by a recent analysis from the Department of Agriculture's AIM database (Figure 2).

Figure 1. Evolution of EU Beef & Live Cattle Import & Export Volumes ('000 tonnes carcass weight equivalents)

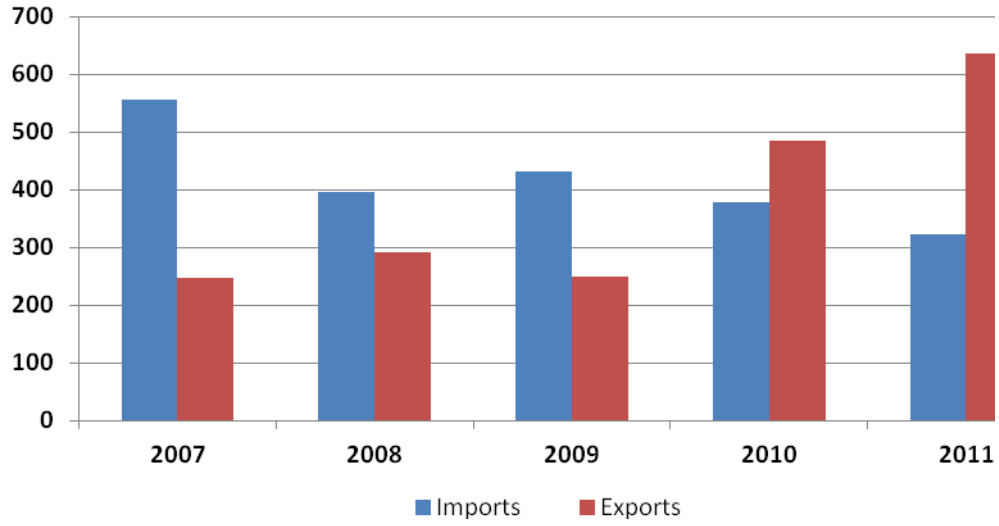
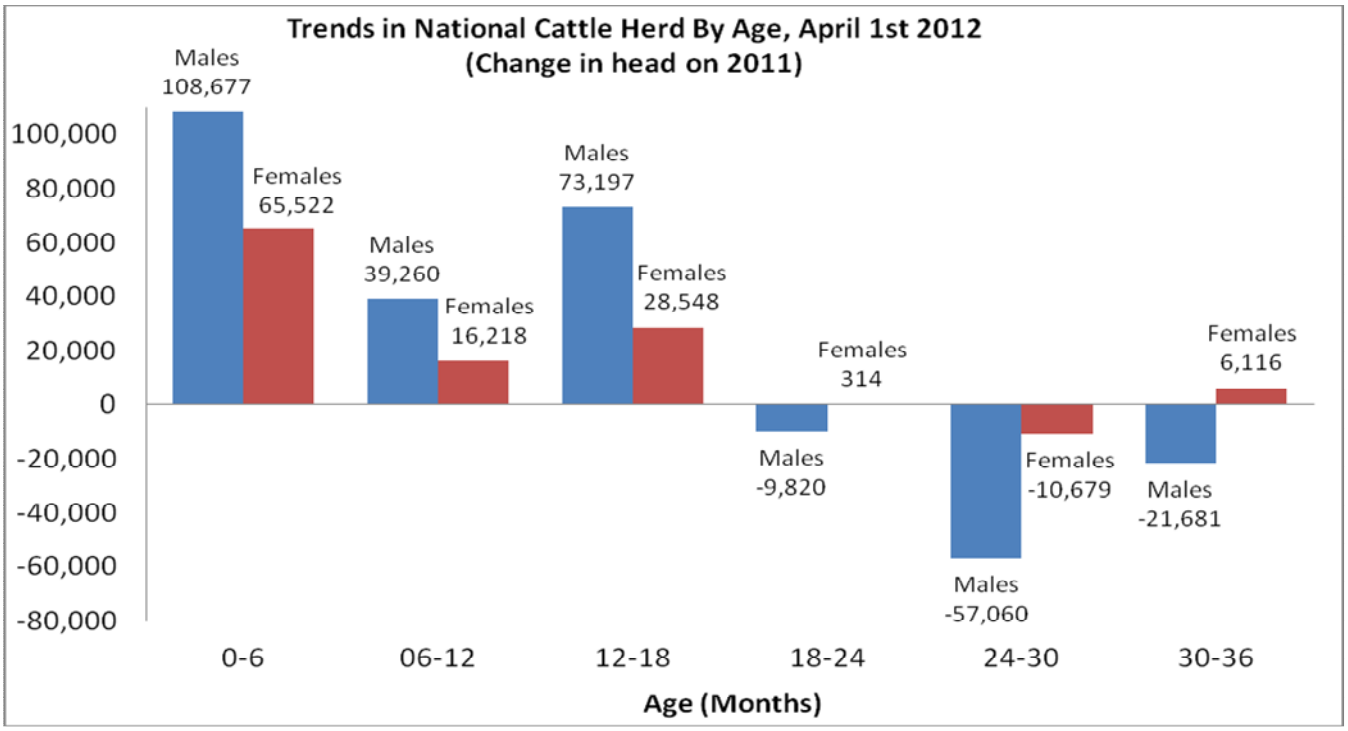


Figure 2. Recent trends in cattle numbers



Supplies of animals approaching slaughter age remain tight. Male animals in the 18-30m age category collectively are 66,880 lower. This comes as a result of strong live exports during 2010 as well as a significant increase in the popularity of young bull production. For the year, cattle throughput at export meat plants is expected to fall by 100-120,000 head.

There has been an increase of over 229,667 in the number of animals aged less than 12 months. This is a reflection of the slower live export trade over the past year, along with the fact that in 2011 calf births increased by almost 100,000, or 5%. Even more dramatically, there has been a 14% increase in calf births during the first 4 months of 2012 (+157,000 head – Source ICBF).

Live exports decline

Up until the end of May 2012, total live cattle exports were 54% lower at 65,255 head. Calf exports have fallen by 68% to date with the Netherlands, Spain and Belgium all experiencing dramatic declines. Weanling exports are running some 46% lower, reflecting the reduced price competitiveness of Irish cattle in many markets.

This follows a drop of more than 35% in live exports during 2011 to 215,000 head. These animals are evident in the AIM profile above and are expected to lift finished cattle availability from 2013.

Consumer demand sluggish

Reduced beef supplies combined with a lower level of price promotion has led to a slowdown in beef consumption across a number of European markets. Latest data from the UK shows that for the latest quarter to 13th May, the volume of beef sold at retail level was 5% lower than a year earlier. This was on the back of a 12% increase in the average retail price.

Figures for France show a drop of over 1% in household beef purchases relative to a year earlier while the Spanish market recorded a 2% increase in red meat sales increase during the first 3 months of 2012.

With the European economy at a standstill combined with ongoing tight supplies, beef consumption across the Eurozone is likely to remain under pressure for the rest of the year.

UK market shows best price prospects

The UK remains in a deficit beef position, with the latest European Working forecast meeting indicating that the UK will need to import 358,000 tonnes in 2012. The majority of this requirement will be met by Irish exporters.

To date this year, supplies of finished cattle in Britain have been 8% lower, while Northern Ireland has seen its numbers decline by 9%. This scarcity has helped lift UK producer prices, with R3 steers there equivalent to €4.21/kg (excl VAT) for the week ending 2nd June, compared to a European average for R3 males of just €3.81/kg. The average price paid in Ireland for R3 steers for that week was €4.01/kg.

Sustainability

One of the key selling points of Irish beef lies in the sustainability of its production. Bord Bia is currently launching a new 'umbrella brand' initiative for Irish food, which will encompass beef. Sustainability will be at the core of this programme which will enhance the reputation of Irish food across all of the main target markets. It is well documented that Irish agriculture is among the best performers in Europe in terms of the carbon footprint of its dairy, beef, pork and other meat sectors. Building further on this reputation, members of Bord Bia's BLQAS scheme now undergo a sustainability survey at the time of completing their farm audit. While each farm's results are confidential, producers receive feedback to allow them to further improve their environmental performance. This is broken down into relative performance in terms of Enteric Fermentation, Manure Management, Fuel & Electricity Usage and Daily Live Weight Gain. Equally, recommendations are made in terms of improving carbon footprint on each particular farm. This will

include measures such as Extending the Grazing Season, Incorporating more Clover into Swards, Improving cow Fertility in Suckler Herds and Reducing Age to Reach Slaughter weight.

Because Quality Assured producers account for almost 80% of total cattle supplies, the positive results coming out of these surveys allow us to provide a very positive picture on the sustainable performance of Irish beef as a whole. The sustainability message is central in building the reputation of Irish beef as a natural and premium product, and is at the heart of Bord Bia's promotion with customers.

Customer requirements/market specifications

With 96% of our beef now destined for the European market and growing proportion going direct to major multiples and foodservice operators as well as high end premium outlets, specifications and eating quality are more important than ever. Many of these customers have individual specifications, however in broad terms the requirement is for quality assured prime steers, young bulls and heifers under 400kg (For the UK market young bulls must be under 16months, while older ages are acceptable in some continental markets).

Very few customers will buy all of the beef coming from an individual carcass. More typically, the cuts may go to numerous different customers in several different markets once de-boned. For example, a batch of carcasses might end up as topside, silverside and flank for UK, rib for France/Belgium, fillet and knuckle for Spain, rump for the home market, chuck for Holland, LMC and blade for Italy, VL's for Sweden and so on. It depends on the carcass specification, the time of year, promotions that may be taking place, availability of domestic beef and consumer spending power in the respective markets. With this in mind, our production systems should enable beef to meet the requirements of most of our important markets.

UK market

The UK accounts for over 50% of Irish beef exports. In that market, the specification required by the major retailers (and large manufacturing customers) is steer and heifer beef, farm quality assured, from animals aged less than 30 months, carcass weight 260 – 380kg, at least conformation 'O' or better and fat class 3, 4- or 4=.

Irish market

Retailers in the Irish market tend to have similar requirements to their UK counterparts, although they tend to favour heifer beef over steers.

Continental market

For the continental markets, there is a wider variation with regard to the specifications demanded. The **Italians** tend to favour beef which is similar to their domestically produced product. That is, lean fresh beef with little or no marbling that is bright red in colour, with white fat cover. (The highest price is achieved for beef coming from specially-finished young bulls and heifers. Bulls should be <20months, 340-420kg, conformation R+/U, fat class 2+, 3, 4-. Heifers should be <24 months, 300-380kg, conformation R/U, fat class 3, 4-, 4=.)

Spanish customers tend to prefer smaller cuts from carcasses between 270 and 360kg, light fat cover and conformation 'O=' or better. In the **Netherlands**, several retailers have developed an appreciation for Irish steer beef, which they stock in preference to other EU beef. (Typically, their ideal range for carcass weight is between 320 and 400kg, conformation R/U and fat class 3/4-. They expect this to be steer or heifer beef.)

Table 1. Age at finish, carcass weight, and fat class and conformation distribution for prime cattle slaughtered in 2011

	Av. Age at Finish (months)	**Av. Carcass Wt (kg)**
Steers	29	363
Young bulls	20	367
Heifers	26	302

CONFORMATION CLASS					
	E	**U**	**R**	**O**	**P**
Steers	0.1	8.5	42.8	42.1	6.5
Young bulls	1.0	39.2	37.0	20.0	2.7
Heifers	0.1	7.4	55.1	34.8	2.7

	FAT CLASS						
	1	**2**	**3**	**4-**	**4=**	**4+**	**5**
Steers	0.9	10.8	55.7	16.5	10.7	4.0	1.1
Young bulls	4.2	46.3	46.2	2.5	0.6	0.1	0
Heifers	1.1	9.1	46.8	19.3	13.6	7.0	3.2

Source: Department of Agriculture, Fisheries and Food

Management tools to increase grass utilisation on beef Farms

Pearse Kelly and Karen Dukelow,
Teagasc Cattle, Specialists

Introduction

There are now a number of management tools which are being successfully employed on beef farms that are resulting in significant gains in the quantity of grass grown and utilised. This facilitates increased stocking rates and hence increased output at very little extra annual costs. What these tools are and how they are used are outlined below. Before a grass farm can be run to its full potential it is important to have: (i) a rotational grazing system, (ii) a proper water supply, (iii) an adequate soil fertility, and, (iv) a planned reseeding programme, in place.

Closing in the Autumn

The management calendar starts in the autumn each year. Closing date and how the farm is grazed out in the months of October and November has a direct effect on the amount of grass available and how the farm will be grazed the following February and March. The plan must be to close a set amount of the grazing area each week until the whole grazing area is closed. In the following spring some of the farm will have considerably more grass than other parts. The first fields/paddocks closed in the autumn should be the ones that will be grazed first in the spring.

The ***60:40 Autumn Planner*** is the tool now being used by progressive beef farmers to plan the last grazing rotation. With this planner they aim to start closing paddocks from early October and to have 60% of the whole farm closed by the 10th November. The remaining 40% is closed between then and housing. A consistent amount is closed each week until the 60% is achieved. Therefore, over a five week period, 12% of the farm would be closed every seven days. By the time all of the stock is housed , the farm should have an adequate cover of grass going into the winter. A target average cover at closing for the whole farm is 500 – 600 kg DM per ha (approximately 6 cm in height). The paddocks closed first might be have 800 – 900 kg with the last closed paddocks having covers of 200 – 300 kg DM/ha. By having a set area of the farm to graze each week it helps to make decisions on whether the last rotation is being grazed too fast or too slow, especially in October and early November. If too little of the area is being grazed the rotation needs to be speeded up. This can mean leaving out some stock longer than was intended or grazing some lighter covers before heavier covers. If the rotation is being grazed too fast extra stock need to be housed earlier than was planned.

Spring rotation planner

The way the first round of grazing is completed in spring can have a direct effect on the next two to three grazing rotations, so it is critical that it is managed properly. Where turnout is **too late** all of the silage ground may not be grazed before the target silage closing date. It can also lead to the last paddocks to be grazed in the first rotation having very heavy covers and these are often not grazed out properly. This can then lead to a lower quality of grass in the following rotations. If this surplus grass is taken out in April (as round bales) to solve the problem, it can sometimes lead to a very short second grazing rotation which may lead to a deficit of grass, if growth rates are poor in the weeks

that follow. When turnout is **too early** or the first round of grazing is completed too quickly there can be a shortage of grass for the second rotation and this may lead to cattle being re-housed or silage ground grazed again leading to either a delayed first cut, or having lower yields on the original planned silage cutting date.

To avoid both these scenarios the ***Spring Rotation Planner*** is the grassland management aid to use on beef farmers. Like the 60:40 Autumn Planner it is based on grazing a set area of the farm each week until all of it is grazed. On dry early farms, the plan is for the first round of grazing to last 50 to 60 days, starting in early to mid-February and ending in early to mid-April. On wetter, later farms a 50 day first rotation starting and ending slightly later should be aimed for. By having such a long first rotation the paddocks grazed first in Spring (those closed first in the autumn) will have adequate rest time to have enough re-growth when the second rotation begins in April. Some grazing paddocks should be grazed before the silage ground is grazed as these will be the first to be grazed in the second rotation. As a general rule of thumb, beef farms with a reasonable amount of dry land should aim to have 30% of the farm grazed by the 1st March, 60% grazed by the 17th March, and, the remaining 40% grazed by the 10th April. The number and type of stock turned out at different stages will drive the daily and weekly herd feed demand for grass. Where the target area to be grazed by a certain date is not being achieved more stock need to be turned out. If the target is being exceeded, grazing needs to be slowed down. This may involve feeding some silage at grass, if conditions allow, re-housing some stock or delaying your planned turnout date for other stock.

Pre- and Post-grazing heights

To achieve maximum weight gain in beef cattle and milk production in suckler cows the objective must be to supply them at all times with a constant supply of leafy grass that is highly digestible and low in stem and fibre. The higher the covers that cattle graze each rotation the more grass that is left behind as the year progresses and the more stem that builds up in the sward which leads to lower weight gains. Grazing very low covers to an extremely tight post-grazing height has a negative effect though on annual yield of grass and should also be avoided. Recent research work at Teagasc Grange has shown tight grazing to have a negative affect on animal performance at grass. In the first rotation, it is desirable to graze swards to 3.5 to 4 cm to remove all the old dead material and to allow light to the base of the sward thus encourages tillering and thickening of the sward.

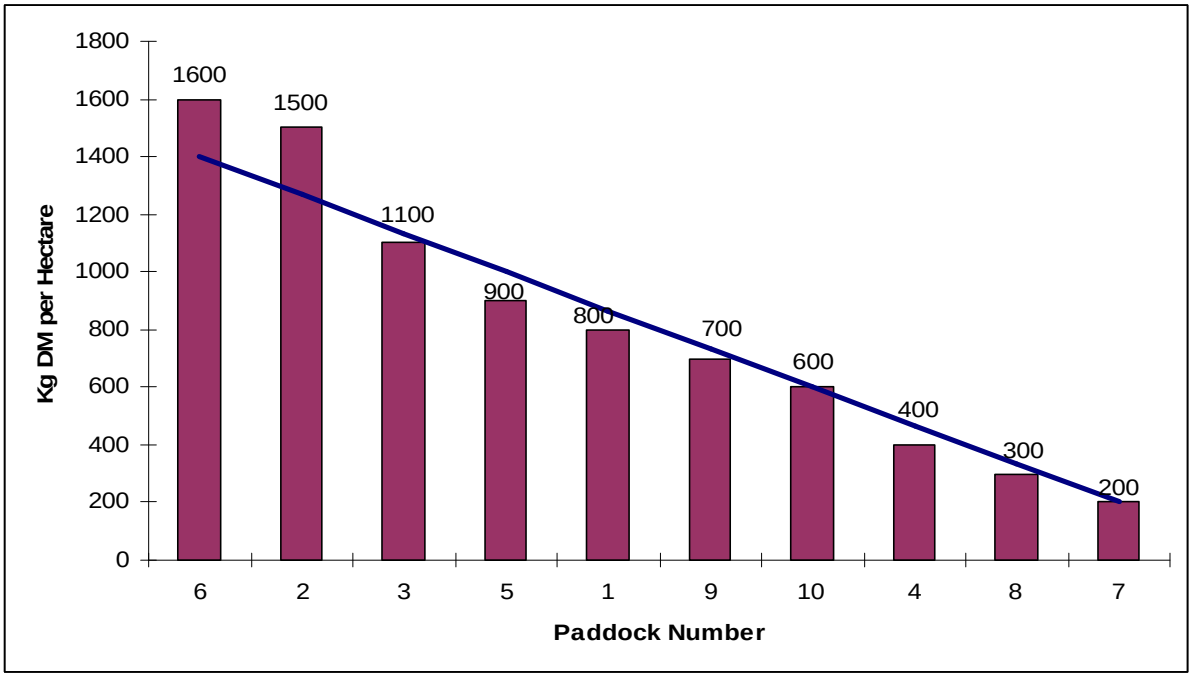
Target pre-grazing grass covers for cattle are in the range 1,200 - 1,600 kg DM/ha (9 to 10 cm) if swards are to be grazed out correctly. Paddocks with higher covers should be considered for cutting as baled silage, particularly if there is enough grass on the rest of the farm. On lowly stocked farms the pre-grazing cover should be less at 1,200 - 1300 kg DM/ha. As the grazing season progresses, towards the autumn, slightly higher covers will have to be built up (1,800 kg DM per ha or greater) if a bank of grass is to be accumulated before growth rates declines. This bank of grass is important so that stock can graze for longer in the autumn. During the main growing season the post-grazing sward heights can be kept tight at 4.5 –5 cm.

The grass wedge

During the main grazing season the objectives must be to, provide a constant supply of grass to the grazing animals, and to keep the quality of the grass on offer at its highest. Both objectives are interlinked. Where there is too much grass available the quality can deteriorate rapidly, however, constantly grazing very low covers to maintain quality can lead to a situation where grass quickly run out. The ***Grass Wedge*** is the latest approach to be used to address these situations and is an importantly aid to recognise, in advance, when grass surplus or deficit is likely to happen in the coming weeks. It requires walking the farm weekly and making an estimate of grass cover in each paddock. This can be done by using a plate meter, the cut and weigh method, or, by eyeballing

swards and making an informed decision. The method used is not important, the most important point is that each paddock is walked and a figure recorded and that use is made with these figures.
There are number of easy-to-use grass computer programs that can generate the grass wedge or it can be done manually on a sheet of paper just as quickly. The end result is the same. The chart below shows the estimated grass cover (kg DM/ha) on the vertical axis and the paddock numbers along the bottom axis. The paddock with the highest cover is shown first, on the left, followed by the next highest and so on until the last bar is the paddock with the lowest cover. A feed demand line is then drawn, starting at about 1,400 kg DM/ha on the left, and that is the target cover to be grazed. The line is drawn from that point (1,400 kg DM/ha) to the target post-grazing cover (e.g. 200 kg DM/ha) on the lowest pasture cover paddock (last bar on right). In an ideal situation the pasture covers on all paddocks exactly matches the demand line.

Figure 1. Example Grass Wedge



If there are a lot of bars above the demand line the farm will have surplus grass and the needs to consider taking out surplus grass. It is good practice to take these out as soon as possible to allow them to start growing again for the next rotation. While the quantities of bales made per hectare can be low, their quality should be excellent.
If there are a lot of bars below the demand line there is either a current grass shortage, or will be a shortage a short period of time. Likewise, paddocks due for immediate grazing might have the target covers, but if paddocks in the middle of the wedge are well below the target line, then future (10-14 days) grass supply might be limited. Thus the feed wedge concept allows an insight into future grass supply and therefore allows the farmer to take action to remedy the situation.

Drafting of young bulls for slaughter

Jonathan Forbes
Kepak Group

Introduction

The selection of animals for slaughter in any beef system is one of the key areas that influences producer profitability and market acceptability. The ability to accurately identify and select animals 'fit for slaughter', based on level of finish, results in the producer maximising returns through optimising the QPS grid and 'in specification' bonus schemes, optimising animal conformation grade, maximising kill out percentage and, also avoids the additional feed cost of an unnecessary prolonged feeding period.

While the drafting of animals is the final stage in a production system, the profitability of a system will be determined by a range of factors encountered earlier in the production cycle. So there are many considerations to be taken into account before engaging in selecting of animals for slaughter. Answering some simple questions, can give strong indications as to how the cattle are potentially finished before one even considers looking at the animals. A knowledge of the animal's age, weight and breed; feed type (energy, protein, mix of ingredients etc) use, feed regimes and its management, pre-intensive finishing period, length of time on feed, housing management (type stocking rate and group size), are some of the questions which are useful indicators before even considering 'jumping' in the pen to assess animals.

Because of the large genotype and phenotype variation of animals, there is increased need to assess animals and select animals for slaughter more regularly.
The wide variation of finishing systems employed on farms also leaves it more difficult to offer very prescriptive, generic advice in terms of offering guidelines in selecting animals for slaughter. The feed management of the animal before the intensive finishing period also affects the performance during the final 100 to 120 day period. A poor plane of nutrition (and especially in young bulls) will result in a prolonged build-up period on feeding before the intensive finishing period. Housing conditions and management can affect level of performance in all beef animals. The specific guidelines outlined below when selecting young bulls for slaughter can apply to steers, heifers and cows. The article will make specific reference to young bull selection; however, the points noted are the same as would be observed when selecting all categories. The main difference is the weighting that would be applied to some of the areas when selecting young bulls over the other categories of beef.

General outline

Assessing young bulls for slaughter is probably the most technical of all the sex-codes, as we are generally less experienced at doing so. Indeed, young bulls generally don't 'show' the same levels of fat cover by 'region or volume' on their bodies. And so, assessing the young bull for fat cover to meet market specification is the most critical point for consideration. A trained eye is adequately able to assess visually fat cover on a bull, whereas if there is uncertainty, young bulls can be removed from pens and assessed in a safe environment by 'hand' to determine fat-score. Below are the regions used to assess and determine fat cover.

Cod region

Observed from behind the animal, the fat deposits in the upper regions of the scrotal sack, where it enters the body of the animal, should be observed. If we were to manually handle this area of the young bull, we would feel a layer of fat around the spermatic cord. An animal with potential to perform further will generally have an unfilled cod region. The ‘un-wrinkling’ or ‘fullness’ of the scrotal sack determines adequate fat cover and in general can be observed in the animals pen when the animal is seen in motion. In general, this is last area of the young bull to deposit fat and if the animal is judged satisfactory in this assessment area, then he may be selected for slaughter.

Tail head

Typically very easily identified in traditional breeds of animals of all sex-codes, however, the tail region is less useful when it comes to assessing fat cover in the well bred, extreme muscled continental bulls. At each side of the tail head region, a deposit of fat is laid down and can be felt by pinching between fingers and thumb. On the typical ‘U’ grade cattle this is not easily observed or felt and we need to assess other key points on the live animals.

Brisket

Observed from the front of the animal between the forelegs, and quite easily identifiable in all breeds. The fat deposits in this area and creates almost swollen appearance, and allows variable assessment to be made on animal.

Toploin

A most valuable part of the animal and we use hand assessment to feel along the lower back. Can be manually assessed by cupping the hand and gently pressing your fingers on area to feel for fat cover – in general a layer of soft fat tissue should separate your pressed fingers from bone material.

Behind the Shoulder

Similar to examining the loin area, the hand is pressed gently against the hide behind the shoulder. Again, a softness of fat cover can be detected.

Across the Ribs

The hand is once again pressed gently over the ribs and soft fat tissue covers the bone rib structure. Bare ribs indicate minimal fat cover. Similarly, when animal is seen in motion, it is easy to detect layer of fat visually as animal moves left or right.

Flank Area

Most easily identified when an animal is moved forward, the flank area is situated where the belly meets the hind leg of the animal. A clearly defined fat deposit is evident in this area of a fit animal to denote such.

Hollow in back

Animals well finished can be observed with having hollow appearance in their back – situated anywhere behind shoulder to middle back. It is generally spoken that an animal fit for is capable of holding a ‘mugfull’ of water in this hollowed area without spilling it!

Animal Bioscience Beef Research Programme

Producing quality beef for the consumer

Aidan P. Moloney
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Purchasers of beef at all points in the production chain (e.g. factory or retail buyers, processors, restaurateurs, individual shoppers, etc.) can be considered as beef consumers. Each consumer may therefore have a different definition of beef quality and beef farmers need to understand the preferences of their particular target consumer. The thrust of the meat quality research programme is to provide beef farmers with the information to allow them produce beef that is suitable for specific markets.

Appearance

The appearance or colour of beef has an important influence on the decision to purchase beef, either as a carcass or as an individual cut of meat e.g. some EU markets require carcasses that have white fat and bright red or pink meat colour while individual purchasers generally prefer bright red beef. Diet can change fat colour and in general, cattle fed a high concentrate ration will have the whitest carcass fat while cattle finished off grass will have the most yellow.

Age appears to be a more important determinant of muscle colour than diet with younger animals having muscle that is lighter and less red in colour. Minimising pre-slaughter stress is important, particularly for bulls, to ensure that muscle does not become dark.

Eating quality

Tenderness is considered to be a major determinant of the enjoyment that comes from eating beef. If beef is tough, it doesn't matter how good its flavour is, consumers will not enjoy it!

With regard to on-farm influences:

- The composition of the diet has little effect on tenderness.
- Growth rate before slaughter does not greatly influence beef tenderness.
- When slaughtered at a constant fatness there is little difference between breeds in tenderness.
- The marbling or visible fat in meat explains only a small proportion of the variation in tenderness.
- Older animals, and bulls compared to steers, tend to have tougher meat.

However, post-slaughter management of the carcass, such as rate of cooling, electrical stimulation and, in particular, ageing/hanging can have a big influence on tenderness.

Populations of consumers are often culturally adapted to a particular *flavour* profile in the meat that they eat e.g. grass-finished beef is poorly accepted in the US. In our studies, grazed grass resulted in higher "greasy" and "fishy" flavours when compared to a concentrates/straw or a grass silage/concentrate ration. However, the changes were relatively small in the context of a score that ranged from zero to 100. Trained consumers rated meat from the grass-fed group as slightly less tender, and tended to prefer the concentrate-fed beef but the difference was again small.

Healthiness

Health and wellness is becoming a big driver of change in consumer markets. Beef is generally recognised as a good source of protein, minerals and anti-oxidants but there is also a perception that beef has too much fat and that fat is made up of “unhealthy” fatty acids. Medical authorities, in recognising the relationships between dietary fat and the incidence of human disease advise a decrease in the consumption of saturated fatty acids and an increase in the consumption of monounsaturated and polyunsaturated fatty acids (PUFA). Within the PUFA, increasing the intake of omega-3 fatty acids is particularly encouraged. Conjugated linoleic acid (CLA) is a fatty acid that may protect against cancer and other diseases. Animal nutrition is the major factor influencing meat fatty acid composition. Feeding grass and/or concentrates containing linseed or fish oil, result in beneficial changes in the content of omega-3 PUFA and CLA in beef. A major challenge is to prevent dietary PUFA from being digested in the rumen. When PUFA were protected from hydrogenation in the rumen, muscle was obtained that complied with the European Food Safety Authority definition of a “source” of omegas-3 PUFA. Collaborative studies with UCD demonstrated that beef enriched with CLA had beneficial effects in mouse models of obesity and diabetes.

This research provides information to enhance the nutritive value of beef and to facilitate the marketing of beef as a food that is more in line with human health requirements.

Provenance

Recent food scares have highlighted the concern among consumers about where their food comes from and how it has been produced. There is therefore a need for direct methods to authenticate the provenance of food. Research is in progress to identify the chemical “signature” that a particular ration leaves in meat. To date, this technology can distinguish between beef that comes from maize silage-fed cattle compared to grass silage-fed cattle and between meat from heifers fed grazed grass, grass and concentrates or concentrates, and the country of origin of the beef. Tissues such as hair and hooves “remember” the changes in the ration during animal growth and can be used as a forensic record of cattle management.

Conclusions

The expectations of the customer/consumer at each point in the supply chain must be satisfied. This requires information on the requirements and/or preferences of each consumer group in the production chain. To sustain the beef industry, beef farmers must also be adequately rewarded for meeting market specifications especially if it is more expensive to produce novel or “enhanced” beef. Information is now available to allow farmers to more consistently meet consumer requirements. Research is addressing authenticity of beef such that claims as to the nutritional history of cattle and the geographical origin of beef can be proven.

Reducing feed costs for Irish beef cattle

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Ireland is the largest exporter of beef in Europe, with a pasture based beef industry, worth in excess of €1.5 billion annually and accounting for almost 30% of gross agricultural output and 20% of Irish Agri-Food exports. However, ever increasing input costs are hindering the economic efficiency of Irish beef cattle production. Indeed, despite recent increases in the value of cattle and beef, average family farm income for Irish cattle rearing farms is currently less than one third of the average industrial wage. In beef cattle the provision of feed accounts for between 65 and 80% of the total costs of production. Thus, strategies to reduce costs without compromising overall feed efficiency or animal performance are of particular interest to the sector. An ongoing research programme at Grange aimed at examining the biological control of feed intake and efficiency in beef cattle, including suckler cows, is contributing significant new knowledge on these economically important traits.

The ability of growing animals to exhibit compensatory growth (CG) after a period of restricted feeding is widely recognized and this phenomenon has been universally exploited under pastoral based production systems, in order to redistribute feed input from periods of high (indoor overwintering) to low cost (pasture). Indeed, Grange data suggest that savings of up to €100 in lifetime feed costs per animal in a 24 month old calf to beef system have been achieved where CG is fully attained. Although, significant genetic variability is evident for the trait, the difficulties in widespread measurement coupled with a general lack of knowledge on the underlying biology have prevented adequate exploitation within breeding programmes.

Despite its importance to the profitability of extensive beef cattle production systems worldwide there have been few studies that have examined the genomic control of feed efficiency or indeed CG in cattle. The CG phenomenon has been associated, to-date with increased feed efficiency, lower maintenance energy requirements, and, changes in circulating concentrations of metabolic hormones. Currently, our group at Grange, through a project funded by Science Foundation Ireland (SFI), is examining the effect of the CG phenomenon in cattle on a range of biological/physiological traits including gene expression profiles in both muscle and liver tissue. We have also recently completed an experiment where we have looked at the effect of CG on animal performance, carcass and meat quality traits across two contrasting cattle breeds. Despite significant effects on growth rate and cost savings, animals managed to exploit CG had similar meat quality to those maintained on a consistently high plane of nutrition.

Improved nutrient digestion has been identified, in energetically efficient compared with inefficient cattle, indicating improved ruminal fermentation and/or post-ruminal digestion and absorption. Indeed recent work from our own group suggests differential expression patterns for the expression of genes controlling nutrient absorption in the duodenum of dairy cows varying in feed efficiency. Thus, a more comprehensive knowledge of the molecular control of gastro-intestinal metabolism and nutrient absorption, in particular, should facilitate the identification of biomarkers that, following appropriate further validation, could be used as part of a genomic selection programme. Indeed it is widely accepted that traits such as feed efficiency and CG potential, which are not typically recorded on a widespread basis, profit most from genomic selection approaches.

A new direction for beef breeding

Nóirín McHugh
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Summary
A revision of the Suckler Breeding Value (SBV) breeding index is currently under construction which will result in the formation of three new indexes providing a more balanced breeding objective for Ireland.

The ICBF beef €uro-star system was introduced to Ireland in 2007 and has resulted in an increase in genetic gain for all the major beef breeds especially for terminal traits such as live-weight and carcass traits. However, the important role of an efficient suckler cow at farm level was masked somewhat as a large amount of the relative emphasis was placed on terminal traits (88.5% emphasis) compared to maternal traits (i.e. milk and fertility traits 11.5% emphasis). The observed deterioration in milk and fertility performance of the national suckler herd over the last decade indicated that a shift in the beef breeding objective was required. This has resulted in the construction of three new €uro-star indexes:

1. **Terminal index** for the identification of sires suitable for breeding high profit animals for slaughter. This index will replace the current weanling export sub-index and carcass sub-index
2. **Maternal index** for the identification of animals (sires and/or suckler female replacements), suitable for breeding. This index would include maternal cow traits but also terminal traits reflecting the contribution of the dam to the carcass merit of her progeny.
3. **Dairy beef index** for dairy farmers to identify beef bulls that will yield a high value live calf with little associated calving difficulty with an acceptable short gestation length.

How to use the indexes
Prior to using any index, each farmer must determine the most suitable animal for their production system. For example, farmers solely targeting the weanling or finishing markets should pay particular attention to the terminal index when choosing parents. These animals may not be suitable for the selection of replacement females. In contrast, farmers breeding for replacements should consider using the maternal index. Irrespective of the type of animal that is needed, careful attention should be placed on the star rating of the animal and the reliability associated with the index and traits of interest. The higher the reliability of the given index the greater the information that is known about the animal and the greater confidence is attributed to the published index value. Fluctuations in published proofs may occur with low reliability animals and should therefore be used sparingly.

Impact of the new indexes
Table 1 highlights the impact on genetic gain on the top 100 AI bulls on the key profit traits. The results indicate that selection on the maternal index will reduce the genetic gain on the terminal traits (carcass weight and grade), but will increase considerably the rate of genetic gain for direct calving difficulty, calving interval and maternal milk yield. Relationships between maternal milk yield and measured milk yield on 106 beef cows show that maternal milk yield is an excellent indicator of true milk yield. The new terminal index will facilitate further increases in genetic gain for the carcass traits while maintaining calving difficulty at a reasonably low level.

Table 1. Impact on key profit traits from selecting top 100 AI bulls on; (i) the current SBV, (ii) the new Terminal index and, (iii) new the Maternal index.

	Calving difficulty (%)	**Carcass weight** (kg)	**Carcass conf** (1-15)	**Calving interval** (days)	**Maternal milk** (kg)	**Maternal calving diff** (%)
SBV	6.4	28.4	1.73	0.5	5.9	6.6
Terminal	6.7	28.3	2.3	2.8	0.4	9.9
Maternal	3.8	18.6	1.3	-2.9	11.4	7.5

Conclusion

Genetic evaluations remain an important tool that allow beef farmers to make more informed breeding decisions and has the potential to increase profitability at farm level. The new indexes developed provide tools for more tailored breeding decisions.

Animal health research at the Animal & Bioscience Research Department (ABRD)

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Achieving and maintaining excellent herd and flock health are critical to maximising production efficiency and achieving the targets set out in the Food Harvest 2020 report for the Agri-Food sector. The Teagasc ABRD currently operates a number of animal health research programmes that cover both basic and applied research and aim to provide knowledge that will underpin future improvements in herd health. Research at the ABRD covers an array of animal health challenges, including respiratory disease, internal parasites, tuberculosis and mastitis and is focussed on improved diagnostics, vaccination, breeding for disease resistance and on animal health planning and management. Researchers at the ABRD have a number of research programmes that are using the latest cutting-edge technologies to search the cattle and sheep genome for genetic variation that controls complex traits such as resistance to roundworms, TB and mastitis. This information can subsequently be incorporated into breeding programmes, allowing selection for disease resistant animals. In collaboration with Animal Health Ireland, Teagasc is focussed on providing blueprints for disease control, animal health planning and management and biosecurity measures. In particular Teagasc researchers have worked with Animal Health Ireland (AHI) to develop farm guidelines for mastitis control within the AHI CellCheck programme. Teagasc also actively researches the causes of mastitis including management factors, the host immune response and the role of the infecting pathogen. Identification of the major mastitis pathogens and the impact of control measures on these pathogens is another area of research at the Teagasc ABRD. Vaccination strategies and the development of new vaccines and increasing the efficacy of existing vaccines is also a focus of Teagasc ABRD animal health research. Sustainability is of great importance to Animal Health and so the Teagasc ABRD has active research programmes both in the area of anthelmintic resistance and antibiotic resistance. These programmes aim to identify the level of resistance in Ireland and the associated economic impact and develop and promote practices that will delay the development of drug resistance and increase the lifespan of therapies currently used in animal health management. Teagasc ABRD animal health research aims to develop tools and strategies that will confer improvements in animal health and productivity with less reliance on farmer or veterinary intervention.

Weaning the suckler calf – animal health and welfare implications

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Within spring-born, grass-based suckler beef production systems calves are generally reared with their dam at pasture for approximately 8 months until the end of the grazing season in autumn. At this time they are weaned. Weaning of beef calves is a necessary husbandry practice involving separating the calf from its mother, resulting in a breaking of the maternal-offspring bond and removal of milk from its diet. Additionally, the weaning procedure is generally compounded by other stressors/practices occurring around the same time, e.g. change of environment (outdoors to indoors), change of forage diet (grazed grass to conserved forage with or without concentrates), and transport/marketing. Weaning therefore can be a multi-factorial stressor, in which, nutritional, social, physical, and psychological stress are combined.
A series of research studies at Teagasc Grange have demonstrated that:

- The process of weaning is stressful for the suckler calf (and to a lesser degree the cow too) as indicated by conventional blood indicators of stress i.e. physiological, haematological and immunological variables.
- Stress has an adverse effect on the immune system with alterations in immune function evident for at least 7 days after weaning. Similarly, the use of molecular techniques (i.e. real-time (RT)-qPCR, RNA-seq), has shown that the expression of a number of key genes regulating immune function in the calf are impaired up to 7 days after abrupt weaning.
- Impairment of immune system function is likely to have a profound impact on the health of calves in terms of susceptibility to infection/disease during this time and also response to vaccination.
- Suckler calves that were abruptly weaned and returned to familiar pasture had a less marked stress response compared to calves that were abruptly weaned, housed indoors and offered a new diet of grass silage plus supplementary concentrates. As housing was also shown to be a stressful event for suckler calves, delaying this practice until after weaning reduces the magnitude of the stress response.
- Suckler calves, particularly bulls, were shown to benefit from a weaning strategy where they were allowed visual, oral and olfactory contact with the dam but were prevented from suckling for a number of days prior to total separation.
- Suckler calves supplemented with concentrates prior to weaning had a lesser reduction in some immune cells (i.e. gamma delta T lymphocytes), started consuming meal faster when housed indoors and spent more time lying down (rather than standing and walking) post-weaning compared with non-supplemented calves.
- Reducing the cumulative effect of multiple stressors around weaning time results in a less marked stress response in the calf.

For the recently-weaned suckler bred calf, susceptibility to bovine respiratory disease (BRD) can be a serious problem. The underlying cause of BRD in weaned calves is extremely complex with the involvement of viruses, bacteria and mycoplasma. Viruses that have been mainly isolated from outbreaks of calf pneumonia are *infectious bovine rhinotracheitis (IBR), respiratory syncytial virus (RSV), parainfluenza-3 virus (PI-3 virus),* and bovine virus diarrhoea/mucosal disease (BVD/MD

virus). Predisposing factors affecting the calf's ability to fight infection are stress, overcrowding, inadequate ventilation, draughts, fluctuating temperatures, poor nutrition and/or concurrent disease.

Summary

Weaning is a multifaceted stress that results in a transitory weakening of the immune system and this can result in increased susceptibility to diseases, such as respiratory infections. Weaning management aims to reduce the number of stresses and/or alleviate the magnitude of the stresses identified above and, prepare the calf for weaning and associated practices around that time. Implementing pre-weaning practices, such as feeding supplementary concentrates, and post-weaning practices, such as deferring housing and dietary changes and, weaning calves next to the dam, resulted in a less marked stress response, in suckler beef calves.

The findings of this project, substantiated and contributed to the "appropriate weaning procedures and measures" of the "Animal Welfare, Recording and Breeding Scheme for Suckler Herds" as outlined by the Department of Agriculture, Food and the Marine http://www.agriculture.gov.ie/.

Irish Cattle Breeding Federation

Andrew Cromie
ICBF

Introduction

ICBF is focused on providing benefits to Irish cattle farmers, the cattle breeding industry & its member organizations. It does this by working with its members to deliver the following benefits;

- Increased levels of ancestry recording in non-pedigree cattle.
- Increased levels of performance recording in pedigree & non-pedigree cattle.
- The establishment of breeding objectives & selection criteria.
- Greatly increased availability of breeding indexes.
- Increases in the genetic merit of the semen available.
- Improved farm management as a consequence of having better information.

One of the most well known Beef Breeding Developments to be produced by ICBF is the Beef €uro – Star breeding Index for Beef cattle. This Index reflects how much Profit (€) a farmer can expect to realise from making a breeding decision.

€uro-Star Index

The €uro-Star Index is designed to help farmers increase returns from cattle breeding and is based on available data on all animals in the ICBF Cattle Breeding Database. The data comes from a range of sources within the beef industry, all of which are adding data on a continuous basis to the ICBF database.

€uro-Star Index - Explanation

Suckler Beef Value (SBV) Measure of the Overall Beef Value of an animal.

Weanling Export	Measure of genetic merit of a Bull to produce profitable Weanlings.
Beef Carcass	Measure of genetic merit of a Bull to produce profitable Carcasses.
Daughter Fertility	Measure of genetic merit of a Bull to produce daughters with good fertility.
Daughter Milk	Measure of genetic merit of a Bull to produce daughters with good milk production.

€uro – Stars	5 Stars = Top 20% of the Breed.
★★★★★	4 Stars = Between Top 40% & Top 20% of the Breed.
	3 Stars = Breed Average.
	2 Stars = Between Bottom 40% & Bottom 20% of the Breed.
	1 Star = Bottom 20% of the Breed.

€uro-Star Index – Data sources

Index	Information Source
Weanling Export	1. Individual On-Farm & Mart Weanling Weights (150-300 days old). 2. Individual Weanling price/kg from mart sales. 3. Linear Scoring information recorded by ICBF trained Scorers. 4. Calf Quality recorded by Farmer through Suckler Cow Welfare Scheme.
Beef Carcass	1. Carcass Weight, Conformation & Fat data from Irish Factories. 2. Feed Intake measured at Tully Bull Performance Test Centre. 3. Linear Scoring information recorded by ICBF trained Scorers. 4. Weaning Weight & Live Weight Information.
Daughter Fertility	1. Daughter Age at first calving from calf birth records. 2. Daughter Calving difficulty recorded through Animal Events. 3. Daughter Calving Interval from Calf birth records. 4. Daughter Survival to calve again from calf birth records.
Daughter Milk	1. On Farm & Mart Weaning Weights (150-300 days old).

Herdplus®

Herdplus ® is the ICBF Cattle Breeding Information Service for both Dairy & Beef Farmers. Herdplus® uses Cattle Breeding Information from 'Animal Events' (Calving Survey, Milk Recording, Insemination, Linear Score, Weight Recording, Slaughter data etc) to generate valuable reports for your herd. These reports will allow you analyse your own herd's performance as well as allowing you compare your results to National Average Figures.

To find out more about 'Herdplus', call ICBF today on 1850 – 600 – 900 or (www.icbf.com) .

Derrypatrick Herd Update

Denis Minogue
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Winter 2011- Spring 2012 Update: Winter feeding and calving

Mean cow live weight and body condition score (BCS) at housing was 690 kg and 3.0 (scale 0-5), respectively. Pre-calving, cows and heifers were restricted to approximately 6 kg DM/head /day of high digestibility (~72% DMD) second cut grass silage plus 100 g each of pre-calving minerals/vitamins daily. In terms of energy intake, this restriction met 75-80 % of their energy requirement during late pregnancy. Average BCS post-calving was 2.64.
Two to five days prior to calving, cows were removed from the slatted area and placed, on straw bedding, in individual calving pens.. Post-calving, they were offered the same silage *ad-libitum,* until turnout to pasture, and heifers (first-calvers) were offered an additional 2kg/head/day of concentrate. Cows remained in the calving pens for a number of days to allow for bonding with the calf. Cows were then moved back onto the slatted pens with their calves in a separate creep area at the back of the pens. Here, calves were given twice daily access for suckling. Calving commenced on 30 January and 7 February and finished on17 April and 1 May for heifers and cows, respectively. Mean calving date was12 March. Calving performance is summarised in Table 1.

Table 1: Calving performance 2012

Number calved	110
Live calves	99
Set of twins	1
Caesarean sections	2
Calf mortality - causes	
Stillborn	7
Deformity	1
Accidental death	1
Death within 24 hours	3
Calf mortality to date (%)	11
Live calves per 100 cows	**90**

The incidence of still-births was much higher than expected with 3 and 4 still-births occurring with first-calvers and cows, respectively. Post mortem results on all of the calves did not reveal any direct cause. One incidence could possibly be attributed to a twisted uterus (womb was inverted at calving).

Live weight, body condition score (BCS) and calving difficulty of the four cow breed types is shown in Table 2. In general, LF were lighter and thinner than the other three cow breed types. Calving difficulty score was lower for the CL and CS cow breed types, respectively than for the Lf or LS. There was no obvious difference in calf birth-weight between breeds. Calf average daily live weight gain from birth to late May was highest for LF and lowest CL.

Table 2: Performance of the four cow breed types and their calves

	Cow Breed Type			
	LF	**LS**	**CS**	**CL**
Live-weight (kg)				
Post calving	560	600	630	630
Late May	590	640	680	670
Body condition score (0-5)				
Post calving	2.54	2.64	2.66	2.71
Late May	2.73	2.96	3.00	2.96
Calving difficulty (1-5)	2.07	2.00	1.70	1.43
Calf birth-weight (kg)	51.5	49.1	50.3	50.1
Calf average daily gain (birth to late May) (Kg)	1.13	1.01	0.99	0.90

LF, Limousin x Holstein-Friesian; LS, Limousin x Simmental; CS, Charolais x Simmental; CL, Charolais x Limousin

Calved cows, yearlings and replacement heifers were turned out to grass on 9 March. In an effort to bring forward the mean calving date, the breeding season commenced on the 19 April for heifers and cows. All cows are being mated to Charolais stock bulls and replacement heifers to a Blonde d'Aquitaine stock bull. Pregnancy scanning will take place in early August.

Weanlings/ Yearlings

For the winter period, weanlings were offered high digestibility (~76% DMD), first cut grass silage *ad-libitum* plus a barley-based concentrate – bulls received 2 kg and heifers received 1 kg/head/day. The target of this store period is to grow the weanlings at approximately 0.5-0.6 kg live weight/head/day for the duration of the winter and avail of compensatory growth when turned out to pasture in spring. Mean growth rate for the bulls was 0.66 kg/day and for the heifers was 0.40 kg/day.

Grazing season – to date

Mild conditions in the early part of spring allowed turnout to grass on 9 March. Due to the very cold, wet weather in April, grass growth was very poor (<30 kg DM/ha/day). As a result of poor grass supply and grazing conditions all yearling stock (bulls and heifers) were housed on 14 May 2012. Up until this time, average daily gain at pasture, was 1.05 and 1.43 kg for heifers and bulls, respectively (Table 3). Heifers remained indoors for 10 days and were offered high digestibility (~72% DMD) grass silage *ad-libitum* plus 1.5 kg of concentrate/head daily. They were returned to pasture on 24 May. The yearling bulls, due to be housed around late June as per the production system, were kept indoors. They were adapted over ~20 days to a barley-based concentrate diet offered *ad-libitum* (plus 5 kg fresh silage /head/day). This means that the indoor finishing period for the yearling bulls will be extended by ~20-30 days.

Table 3: Post weaning performance of the progeny of the four cow breed types

		Cow breed type			
		LF	**LS**	**CS**	**CL**
Live weight (kg) (average of males and females)					
Housing (Nov 2011)		340	312	311	292
At grass (to May 2012)		470	440	441	418
Average daily gain (kg)					
Indoor winter period	Males	0.70	0.65	0.62	0.66
	Females	0.40	0.35	0.39	0.46
Pasture (9 Mar -14 May)	Males	1.43	1.54	1.56	1.28
	Females	1.02	1.09	1.14	0.95

LF, Limousin x Holstein-Friesian; LS, Limousin x Simmental; CS, Charolais x Simmental; CL, Charolais x Limousin

Average stocking rate for the farm is 2.8 LU/ha. Silage area was closed on 10 April. As a result of poor grass supply, approximately one third of the silage area was grazed in early May. The remaining silage area was harvested on the 5 June. A rapid increase in grass growth since 24 May has meant that grass surplus to grazing requirements was harvested as round bale silage (~80 round bales) Thirty hectares was closed for second cut silage on the 6June and expected harvest date is the first week of August.


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