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## **Dairy calf-to-beef production for Spring born calves: a real alternative**

Brian Murphy<sup>1,2</sup>, Brendan Swan<sup>2</sup> and Robert Prendiville<sup>1</sup>

<sup>1</sup>*Teagasc, Grange Animal & Grassland Research and Innovation Centre, Dunsany, Co. Meath.*

<sup>2</sup>*Teagasc, Johnstown Castle, Co. Wexford.*

### **Summary**

- Research at Teagasc, Johnstown Castle has evaluated alternative production systems and finishing strategies for Holstein-Friesian bulls and steers and early-maturing breed steers and heifers from the dairy herd.
- Rearing males as bulls has inherent efficiencies due to their higher growth potential but the profit generation of these systems is highly sensitive to changes in concentrate price.
- Farmers must also be aware of market preferences with regard to bull beef production systems and, therefore, close communication with meat processors is essential.
- By increasing the utilisation of good quality grazed pasture in place of concentrate input and focusing on high output per hectare the profitability of the production system can be increased.
- Acceptable carcass weights and grades can be achieved by finishing steers and heifers at pasture either at the end of the second grazing season or during the third grazing season.
- Future research at Johnstown Castle will evaluate the effect of stocking rate on animal performance and farm profitability.

### **Introduction**

The most recent figures from the Central Statistics Office show that the national dairy herd has expanded to over 1.2 million cows. The majority of these cows (57%) are bred to dairy sires, 30% bred to early-maturing breed sires (18% Angus and 12% Hereford, respectively) and approximately 9% are bred to continental breeds (Limousin, British Blue, Simmental and Charolais). Approximately 340,000 male dairy bred calves were born in 2016. Currently, steer beef dominates beef production in Ireland, while bull beef represents approximately 20% of the national male slaughterings (Bord Bia, 2016). Given the low value for male dairy calves and the use of sexed semen on some dairy farms, it is possible that there may be an increase in the proportion of beef crossbred calves coming from the dairy herd. Research carried out at Teagasc Johnstown Castle has, to date, focused on modifying/establishing blueprints of production for Holstein-Friesian and early-maturing dairy beef crossbred calves (males and females). While all systems are focused on incorporating grazed pasture into the animals' feed budget, alternative strategies are being investigated to examine the performance of finishing animals on grazed grass diets. The key drivers of profitability in all beef production systems are stocking rate and carcass output. Therefore, producers must identify production systems specific to their farm that maximises stocking rate and make best use of the facilities available on farm.

### **Current research at Johnstown Castle**

In 2010 research began on dairy calf-to-beef production systems at Teagasc Johnstown Castle. Since then studies have been carried out to investigate the effects of concentrate supplementation during the first season at pasture, to explore opportunities for reducing the reliance on concentrates during the finishing period and to investigate methods of optimising pasture utilisation within production systems. This research has evaluated a range of production systems for both dairy bred bull and steer and early-maturing (Angus and Hereford) steer and heifer production systems. Current research at Johnstown Castle is evaluating Holstein-Friesian 15-month and 19-month bull systems and, 21-month and 24-month steer production systems. Alternative finishing strategies are also being investigated for early-maturing breed dairy crossbred beef production systems. The production

systems below represent the main blueprint systems arising from the research carried out at Johnstown Castle over the past six years.

## 1. Male dairy calf-to-beef production systems

*15-month Holstein-Friesian bull system:* Current market specifications dictate that dairy bulls must; be slaughtered at less than 16 months of age; achieve a carcass weight of 270 kg or greater; achieve a carcass conformation score of O= or greater; and achieve a carcass fat score of 2+ or greater. Previous research showed that these targets are difficult to achieve. Central to achieving these market specifications is a calf that has good weight for age. Results from Johnstown Castle demonstrated that spring-born Holstein-Friesian calves that gained 0.9 kg/day during their first season at pasture and weighed approximately 250 kg at housing, can reach the target weight specification for this system. Bulls were finished on an *ad libitum* concentrate diet and grew at approximately 1.4 kg/day. Total concentrate input for this system was 1.8 tonne dry matter (DM). Research over the last number of years in Johnstown Castle has shown that approximately 39% of the dairy bulls slaughtered at 15 months of age met the required carcass weight with 52% achieving the required fat score. More recently, in 2015, Holstein-Friesian bulls slaughtered at Johnstown Castle had an average carcass weight of 283 kg and a conformation score of O+ but were under-finished, with an average fat score of 2=.

*19-month Holstein-Friesian bull system:* The blueprint for bulls slaughtered at 19 months of age included a 100-day period at pasture in the first part of the second grazing season followed by a 100-day indoor finishing period on an *ad libitum* concentrate diet. Bulls were 416 kg at housing and 613 kg live weight at slaughter. Carcass weight was 325 kg with conformation and fat scores of O+ and 3-, respectively. Concentrate input for this system was 1.2 tonne DM.

Alternative pasture-based finishing strategies were evaluated for the production of 19-month dairy bulls. Bulls were either supplemented with 5 kg concentrate DM per head daily for 100 and 150 days pre-slaughter. Bulls finished for 150 days at pasture had a carcass weight of 294 kg with conformation and fat scores of O= and 2=+, respectively. Bulls finished over a 100 day period achieved a carcass weight of 289 kg and identical conformation and fat scores to the 150 finishing group.

*21-month Holstein-Friesian steer system:* Finishing steers at the end of the second grazing season represents a viable alternative to indoor winter finishing. For this system to be successful steers must have a good live weight gain throughout their lifetime. Typically, Holstein-Friesian steers were turned out to pasture for the second season at 326 kg live weight and by mid-September were 483 kg. The blueprint for finishing steers in this system is 5 kg concentrate DM per head daily for 60 days pre-slaughter. Additionally, a longer concentrate feeding duration of 110 days pre-slaughter was investigated at Johnstown Castle. Results showed that steers finished over 60 days had a carcass weight of 275 kg with carcass conformation and fat scores of P+ and 2=+, respectively; those finished over 110 days had a similar carcass weight (276 kg) and conformation and fat scores.

*24-month Holstein-Friesian steer system:* Finishing steers at 24 months of age indoors on a combination of grass silage and 5 kg concentrate DM per head daily represents the traditional system where performance is predictable and repeatable. Steers were turned out to pasture for the second season at 321 kg live weight and housed the following November at 538 kg. Live weight gain during the indoor finishing period was 0.9 kg/day. Live weight at slaughter and carcass weight were 612 and 310 kg, respectively, and carcass conformation and fat scores were O- and 3=, respectively. Concentrate input during the finishing period was 440 kg DM.

## 2. Early-maturing breed production systems

*19-month heifer system:* Spring-born, early-maturing breed heifers can be finished off pasture from September to November with 2.5 kg concentrate DM supplementation daily for 60 days pre-slaughter. Target carcass weight is 235 kg. Carcass conformation and fat scores were O= and 3-/, respectively. Results from Johnstown Castle have shown that this target weight is repeatable and achievable.

*21-month heifer system:* This system is suitable for February-born heifers as they can be finished off pasture at the end of the second season with 2.5 kg of concentrate DM supplementation daily for 60 days pre-slaughter. Heifers in this system achieved a carcass weight of 247 kg and carcass grades

of O=3=. Finishing heifers indoors is less profitable than pasture-based finishing. Also, early-maturing breed crossbred dairy heifers that were finished indoors during their second winter were over-fat at slaughter. Results showed that all spring-born, early-maturing breed crossbred dairy heifers were fit to be slaughtered off pasture before their second winter.

*21-month steer system:* Early-spring-born (January/February) steers were slaughtered off pasture in November at 21 months of age after receiving 2.5 kg concentrate DM supplementation per head daily for 60 days pre-slaughter. Live weight at slaughter and carcass weight were 525 kg and 274 kg, respectively. Carcass conformation score was O= and carcass fat score was 3+.

*23-month steer system:* The 23-month steer production system represented the traditional systems for this breed type. Typically animals were finished indoors on grass silage offered *ad libitum* supplemented with 5 kg concentrate DM per head daily. Live weight at slaughter was 607 kg and carcass weight was 308 kg. Carcass conformation score in this production system was O+ and carcass fat score was 3+.

*26-month steer system:* Steers were housed and stored over the second winter on a grass silage only diet. These animals were turned out to pasture for a third grazing season and were slaughtered in June at 26 months of age. Live weight at slaughter was 621 kg and a carcass weight of 322 kg was achieved. Carcass conformation score was predominately O+ and carcass fat score was 3+.

### **Future research**

Future research at Johnstown Castle will investigate the impact of stocking rate and the influence of sire genetic merit on progeny performance. Three farmlets representing low, medium and high stocking rates have been established to determine the optimum stocking rate for dairy calf-to-beef heifer and steer systems. The systems of production will consist of the most profitable heifer and steer systems on a per hectare basis evaluated to date. Half of the heifers in the study will be finished off pasture in September and the remaining heifers will be slaughtered in November with approximate slaughter ages of 19 and 21 months, respectively. Similarly, steers will be finished off pasture; half in November at the end of the second grazing season and half in June during the third grazing season, at approximately 21 and 26 months of age, respectively.

Progeny from Angus, Hereford and Limousin sires of diverse genetic merit for calving ease and gestation length will be included in the study. Performance of the progeny from these sires will be evaluated.

### **Conclusions**

Research evaluating contrasting finishing strategies is identifying the optimum production systems for spring born Holstein-Friesian bulls and steers and, early-maturing steers and heifers from the dairy herd. Despite bull production systems having the potential to achieve higher outputs per hectare compared to steer production systems, price discounts on bulls greater than 16 months of age relative to steers, greatly reduces the profitability of these systems. Steer production represents a much lower risk option to producers as these systems are not as reliant on concentrate input and are thus, less sensitive to fluctuations in concentrate input costs, compared to bull production systems. Central to any successful dairy calf-to-beef production system is good grassland management and ensuring optimum animal growth with maximum pasture utilisation.

**The above article was adapted and reproduced courtesy of Teagasc.**

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

The 19 month bull system is unlikely to be viable in the UK due to the lack of market outlets for these cattle. Also consideration must be given to health and safety factors with the management of yearling bulls at grass. Section 59 of the Wildlife and Countryside Act 1981 states that bulls of a recognised dairy breed over 10 months old should not be grazed in fields crossed by public rights of way. I can also foresee a lot of 'management issues' dealing with a mob of 18-19 month old Holstein bulls at pasture!

The black and white steers finished at 21 months off grass recorded a carcass weight of 275kg. Most

UK abattoirs penalise light-weight carcasses with penalties of 40-90p/kg for carcasses below 260kg for O-to P- grades. With a mean carcass weight of 275kg approximately 30% would therefore be below 260kg and penalised. It is stated that concentrates will need to be fed for 60 days pre-slaughter however there still may be an issue with a lack of fat cover, especially with Holstein type steers which may demand relatively high levels of concentrates if grazing quality is inadequate.

You will note in the above article that the Early Maturing heifers finished at 19 months off grass have a target carcass weight of only 235kg. As discussed above some abattoirs heavily penalise light-weight carcasses. Consideration must therefore be given to marketing these cattle with the objective to sell them to either an independent butcher, boxed beef scheme or processor involved in a native breed premium scheme.

How much of a threat will it be to the UK beef industry with the recent expansion of the Irish dairy herd with more dairy bred beef calves being born? Some pundits predict a decline in the Irish beef suckler herd so it could balance out. Also the dairy bred calves (black and white males together with an increased number of native breed x Holstein steers and heifers) will have lower carcass weights than suckler bred calves.