

Project number: 6164

Funding source: Teagasc, ABP Food Group

Date: Jan 2017

Project dates: Apr 11 to Dec 2015

Alternative finishing strategies for Angus and Hereford dairy crossbred cattle.



Key external stakeholders:

Beef farmers, meat factories, producer groups, breed societies and consultancy agencies.

Practical implications for stakeholders:

The main outcome is that economically sustainable pasture based blueprints of production are available for early maturing dairy crossbred heifers and steers.

- Early spring born heifers that are finished off pasture had acceptable carcass weight, conformation and fat scores. Although April born heifers that were finished indoors did have a greater carcass weight; fat score was greater and wintering finishing costs illustrated that finishing heifers indoors was less profitable than low input systems.
- Early spring born early maturing steers can be finished off pasture before the second winter. This finishing strategy was more profitable than the traditional indoor system.
- The optimum production system for late born early maturing steers was pasture based finishing during their third season at pasture. Late born steers finished indoors during the second winter had low carcass weight and were less profitable.

Main results:

- Low input pasture based finishing strategies for heifers and steers produced carcasses with an acceptable weight, conformation and fat score.
- Economic analyses showed that while carcass weight was greatest for indoor finishing systems for both heifers and steers, overall farm profit was superior for low input pasture based finishing systems.

Opportunity / Benefit:

Low input pasture based production systems were estimated to equate to an increased profit of almost +€12,000 and €14,000 for heifer and steer systems, respectively, on a 40 hectare unit.

Collaborating Institutions:

ABP Food Group, Certified Irish Angus, Irish Hereford Prime, Irish Angus and Hereford Breed Societies

Teagasc project team: Dr. Robert Prendiville (PI),
Paul Crosson,
Brendan Swan
Padraig French

External collaborators: Paul Matthews-ABP Food Group,
Charles Smith-Certified Irish Angus,
Michael Cleary-Irish Hereford Prime,
Larry Feeney-Hereford Breed Society
Cathal McCormack - Irish Angus Cattle Society

1. Project background:

Currently, approximately 60% of national dairy herd are bred to dairy bulls to generate replacements. The remainder are bred to beef breeds. With their ease of calving and short gestation attributes, early maturing breeds (Angus and Hereford) represented 30% of calves born from the dairy herd in 2015. Typically, early maturing beef crossbred animals generated from the dairy herd achieve a commercially acceptable level of carcass fatness at a young age and are, therefore, suitable for systems of production which are grass based producing saleable carcasses at relatively low slaughter weight. Early maturing dairy male calves are usually finished as steers while heifers are finished off pasture at the end of the second grazing season or retained for breeding in the suckler herd.

Previously, Keane et al. (2009) established blueprints of production for early maturing dairy crossbred heifers and steers. A 19-month production system was identified for early maturing spring born crossbred heifers slaughtered off pasture at the end of the second grazing season while early maturing spring born steers were finished indoors during their second winter. However, national statistics show that approximately 20% of early maturing heifers are slaughtered from 18 to 21 months of age while 42% are greater than two years of age at the time of slaughter (McHugh, personal communication). Similarly, 26% of early maturing male cattle are slaughtered at 22 to 25 months of age while 36% are greater than 30 months at slaughter (McHugh, personal communication). Such systems greatly reduce the stocking rate potential of the farm and increase the costs of production. Consequently, the aim of this project was to develop sustainable systems of production that are profitable for producers and marketable for processors.

2. Questions addressed by the project:

- What are the optimum production systems for early and late spring born early maturing dairy beef crossbred heifers and steers?
- What are the most profitable early maturing dairy crossbred heifer and steer production systems?

3. The experimental studies:

This study was conducted at the Johnstown Castle Research Centre from 2011 to 2015. Each spring 128 early maturing dairy crossbred calves were artificially reared on-site and subsequently randomised across a 2 breed type (Angus and Hereford × Holstein-Friesian) * 2 gender (heifers and steers) * 2 birth month (February and April born) factorial arrangement of treatments (Figure 1). Age at slaughter varied depending on the production systems (heifers and steer systems) that were investigated. Heifers were slaughtered at 19 or 21 months of age. February born steers were slaughtered at 21 or 23 months of age while April born steers were slaughtered at 21 or 26 months of age. With the exception of April born heifers and steers slaughtered at 21 months of age and February born steers slaughtered at 23 months of age, animals were slaughtered off pasture. Animals that were slaughtered off pasture were supplemented with 2.5 kg of concentrate DM for 60 days pre-slaughter while those finished during the indoor finishing period were offered grass silage ad-libitum plus 5 kg concentrate DM.

All groups were at pasture for the first grazing season, housed at the end of the first grazing season and turned out to pasture for the second grazing season in early February/March. Animals were rotationally grazed on a paddock system as described by O'Donovan et al. (2002). To ensure that response to concentrate supplementation was not confounded with differences in herbage allowance, each grazing group were allocated herbage of similar pre-grazing height and mass. Grassland measurements were carried out as described by Curran et al. (2010) and grass budgeting was carried out to aid management decisions. Surplus herbage was removed as baled silage. Animals were weighed fortnightly throughout the study.

Economic Analysis

The economic analysis undertaken is based on the animal performance data generated at the Johnstown Castle research farm; average daily gain (ADG) during the first season at pasture, ADG during the first winter, ADG for the second grazing season, ADG during the second winter (finishing/ store period) and ADG during the third season at pasture. Variable costs and sales values were based on actual system inputs and outputs where possible and evaluated on current prices. A base price of €4.00/kg carcass was assumed and was modified depending on carcass conformation and fat score for the respective production systems. Fixed costs include depreciation and interest on buildings/facilities and overheads. Default parameters for the model included a calf purchase price of €240 and €270/head for heifer and bull calves, respectively, milk replacer price of €2200/ton, calf rearing concentrate price of €300/ton and finishing concentrate price of €250/ton. No imputed cost for labour was included as family labour was assumed to be freely available.

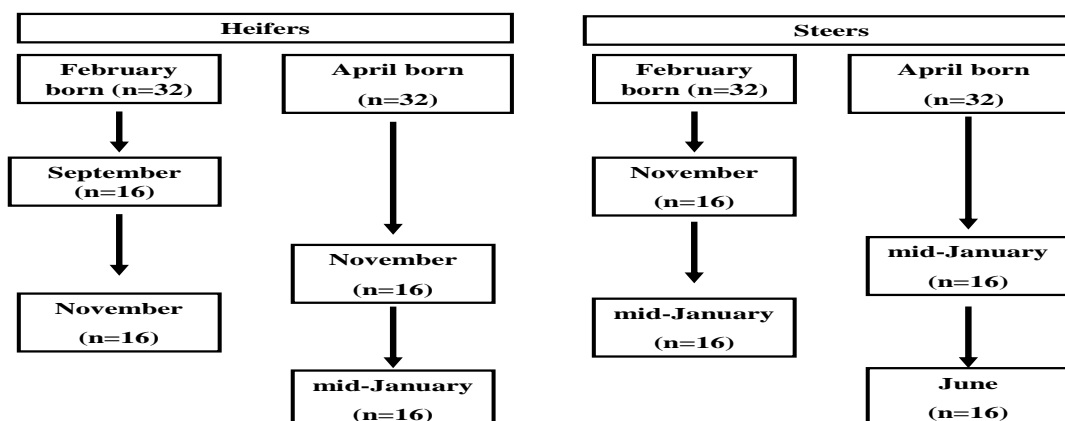


Figure 1: Finishing treatments for early maturing dairy calf to beef systems.

4. Main results:

Performance and profitability of heifer production systems

February born heifers in the 19 month production system were 450 kg at slaughter yielding a carcass of 234 kg. Live weight and carcass weight for heifers in the 21 month production system were 476 kg and 247 kg, respectively. Carcass conformation and fat scores were O= and 3= for the heifers slaughtered at 19 months and O+/3= for heifers slaughtered at 21 months of age. Gross margins were €339 and €358 for February born heifers slaughtered at 19 and 21 months of age, respectively. Net margins per head were similar for both production systems; €177 and €196 for heifers slaughtered at 19 and 21 months of age, respectively. April born heifers in the 19 month production system had a live weight at slaughter and carcass weight of 446 kg and 234 kg, respectively. April born heifers in the 21 month production system had a live weight and carcass weight of 518 kg and 257 kg, respectively. Carcass conformation for heifers in both production systems were predominately 'O+'. Fat score was three units greater for April born heifers that were slaughtered at 21 months of age and finished indoors than those slaughtered off pasture (3- and 4- for April born heifers slaughtered at 19 and 21 months of age). Gross margin per head was €27 greater for April born heifers finished indoors at 21 months of age than the 19 month production system. However, net margin per head and per hectare were €78 and €325 greater for the 19 month production system; €182/head and 104/head and €637/hectare and 312/hectare for April born heifers slaughtered at 19 and 21 months, respectively.

Performance and profitability of steer production systems

February born steers that were slaughtered at 21 months of age had a live weight and carcass weight of 525 kg and 274 kg, respectively. February born steers finished at 23 months of age were housed after the second season at pasture and finished indoors on silage ad-libitum and 5 kg of concentrate supplementation. Live weight at slaughter was 607 kg and a carcass weight of 308 kg was achieved. Conformation scores were O= and O+ for February born steers slaughtered at 21 and 23 months of age, respectively. Carcass fat score was 3+ for both finishing systems. Gross margins were €435 and €493 for February born steers slaughtered at 21 and 23 months, respectively. However, capital costs were greater for the 23 month system (requiring an indoor finishing period) and therefore, net margin was €47/head and €254/hectare greater for the 21 month system compared to the 23 month production system.

April born steers finished indoors and slaughtered at 21 months of age had a live weight at slaughter and

carcass weight of 547 kg and 269 kg, respectively. April born steers finished outdoors during their third season at pasture had a live weight at slaughter of 621 kg and a carcass weight of 322 kg was achieved. Carcass conformation for steers in both production systems were predominately O+ with carcass fat classes of 3+. There were substantial differences in the profitability of the April born steer systems, however; in this case the advantage was in favour of the systems finishing at the older age with beef price rise favouring the later finish system. Gross margin per head were €365 and €607 for April born steers slaughtered at 21 and 26 months, respectively. Steers slaughtered at 26 months of age achieved heavier carcass weights with lower concentrate requirements. Indeed, approximately 67% of the slaughter weight was achieved from grazed grass as opposed to 55% for the 21 month system. Consequently, net margin per head and per ha was €242 and €454 greater for the 26 month system compared to the April born steer finished indoors at 21 months of age.

5. Opportunity/Benefit:

This project clearly illustrated the benefits of pasture based blueprints of production for early maturing dairy crossbred production systems. The results also show a substantial economic benefit.

6. Dissemination:

Research results were disseminated through a wide variety of forums including: the national press, open days, farm walks and the Teagasc advisory service.

Main publications:

Prendiville, R., Swan, B. and French, P. 2013. Effects of production system on early maturing dairy cross steers. EAAP, Book of abstracts no. 19 Nantes, France p 347.

Prendiville, R., Swan, B., and French, P. 2014. Comparative production performance of April born early maturing steers slaughtered at 21 and 26 months of age. Agricultural Research Forum, Tullamore Court Hotel, p 120.

Prendiville, R., French, P. and Crosson, P. 2014. Economic appraisal of April born early maturing dairy cross steers slaughtered at 21 and 26 months of age. Agricultural Research Forum, Tullamore Court Hotel, p 134.

Popular publications:

Early Maturing Dairy Calf to Beef Trial. 2012. Teagasc, Johnstown Castle Research Centre. Open day Booklet, October 12th, 2012.

Prendiville, R., Crosson, P., Swan, B. and French, P. 2013. Early Maturing Dairy Beef Systems. National Beef Conference, Newpark Hotel, Kilkenny, Co Kilkenny, p 15-21.

Prendiville, R. and Kelly, P. 2014. Dairy calf-to-beef production systems Beef 2014 'The Business of Cattle', Teagasc, Grange, Wednesday, June 18th page 20-23.

Swan, B. and Prendiville, R. 2014. Beef crossing of the dairy herd. Beef 2014 'The Business of Cattle', Teagasc, Grange, Wednesday, June 18th page 90.

Prendiville, R. 2011-2014. Angus and Hereford Breed Society Journals.

Prendiville, R. 2014. Profitable beef production from the dairy herd. Irish Farmers Journal, August 2014.

7. Compiled by: Robert Prendiville (PI), Paul Crosson, Brendan Swan and Padraig French
