Johnstown Castle dairy calf-to-beef update

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Summary

- Early maturing dairy-beef heifers have the ability to finish from pasture during the second grazing season, resulting in lower slaughter ages, concentrate inputs and housing requirements, than steer systems.
- Dairy-beef heifers consuming perennial ryegrass (PRG)-only, PRG + Clover, and multispecies swards (MSS) achieved carcass weights of 250, 258, and 255 kg, at 20, 19.7, and 19.1 months, respectively.
- Additional research is required to identify the potential of pasture type, animal maturity, and age of slaughter in improving the economic and environmental efficiency of heifer based dairy-beef production.

Introduction

With improved use of animal genotypes, pasture composition, and improved grassland management, dairy-beef heifer systems have the opportunity to save on input and housing costs by slaughtering animals from pasture, during the second grazing season. Dairy-beef systems which can minimise inputs (fertiliser and feed), slaughter animals younger, and that maintain high levels of carcass output have improved economic and carbon efficiency. Heifer systems, using high carcass merit animals, legume rich swards and improved grassland management practices have the potential for high levels of physical, financial and environmental performance.

Results from 2022 study on the slaughter performance of dairy-beef heifers

In 2021, 120 reared dairy × beef heifer calves were purchased at approximately 16 weeks of age, and were assigned to one of three pasture treatments 1) PRG-only, receiving 150 kg N/ha, 2) PRG + clovers (red and white), receiving 75 kg N/ha, and 3) MSS (PRG, red and white clover, plantain, and chicory) swards receiving 75 kg N/ha. The calves were balanced across treatments based on breed, date of birth, and weight on arrival. The calves were housed in November when the grazing conditions began to deteriorate. During the first winter period, the calves were fed silage offered ad libitum along with 2 kg/head of concentrate. The yearlings were turned out to pasture in March, and were drafted for slaughter when they reached a target carcass fat score of 3+. Those not slaughtered off grass were housed in October and commenced their finishing diet of 4 kg/head of concentrate and ad libitum grass silage until slaughter (Table 1).

All groups achieved a similar carcass performance, despite differences in slaughter age and the level of concentrate fed to achieve adequate carcass fatness. The PRG + CLOVER and MSS treatments resulted in 20 and 4%, respectively, more heifers being drafted for slaughter by the end of the second grazing season compared with PRG-only treatment. This was likely due to greater dry matter intake and superior sward nutritive quality. Thus, the finishing concentrate requirement was lower for the PRG + CLOVER and MSS treatments, which represents a significant saving in costs associated with feed and housing. During the first grazing season, heifers consuming the PRG-only, PRG + CLOVER, and MSS herbage achieved an average daily gain (ADG) of 0.82, 0.79, and 0.84 kg, respectively. Correspondingly, during the second grazing season, ADG values were 1.10, 1.22 and 1.15 kg, respectively. On average, during the 2022 grazing season, a 227-day grazing season was achieved.

Table 1. *2022 Slaughter performance of dairy-beef heifers managed on perennial ryegrass (PRG)-only swards, PRG plus red and white clover swards, and multispecies (MSS) swards*

Slaughter Performance	PRG-only	PRG + CLOVER	MSS
Age at slaughter (months)	20.0	19.7	19.1
Drafted off grass	74%	89%	77%
Finishing concentrate (kg)	56.2	25.6	43.0
Carcass weight (kg)	250	258	255
Carcass conformation	O=	O=/+	O=
Fat score	3+	3+	3+

Current dairy-beef research at Teagasc Johnstown Castle

Clover-based swards have shown benefits in terms of animal intake and performance, sward nutritive value, and increased biological nitrogen fixation in both dairy and beef systems. Similarly, multi-species swards have shown potential to increase sward dry matter production under reduced chemical nitrogen application rates. Traditionally, early maturing animals can be finished from pasture while late maturing animals generally require an indoor finishing period. The maturity of beef cattle can also influence their suitability to a particular finishing system. Hence, specific research is required to explore the differences between grass, grass-clover and multi-species swards for dairy-beef heifers.

A new study was designed in 2023 to investigate the interactions between animal maturity and pasture type at different slaughter ages, which was motivated by the policy ambition to reduce the national slaughter age by three months. In this study, female calves from HF cows mated to Early (Hereford and Angus) and Late (Belgium Blue and Limousin) maturing sires, were bought from dairy farms at approximately three weeks of age. All calves are being reared on milk replacer (0.5 kg/hd/day, from 30 days of age) and have ad-lib access to concentrates up to weaning, at a targeted weaning weight of 90 kg. Post weaning, calves will be assigned to one of three pasture treatments 1) PRG-only, receiving 150 kg N/ha, 2) PRG + clovers (red and white), receiving 75 kg N/ha, and 3) MSS (PRG, red and white clover, plantain, and chicory) swards receiving 75 kg N/ha. The calves assigned to each pasture treatment will be balanced for live weight, age, maturity, breed and sire. The system will be stocked moderately at 2.4 LU/ha. All animals will be finished in a serial slaughter arrangement at 16, 19 or 21 months (Table 2).

Table 2. *Preliminary 2023 data from the early (Hereford and Angus) and late (Belgium Blue and Limousin) maturing dairy-beef heifer calves*

Breed	Early maturing		Late maturing	
	Hereford	Angus	Belgium blue	Limousin
Date of birth	18/02/23	28/02/23	24/02/23	18/02/23
Age at arrival (days)	21	23	20	29
Weight on arrival (kg)	55.9	53.4	53.6	55.4

Conclusions

Although all treatments achieved a similar carcass performance in 2022. The incorporation of legumes and herbs into PRG swards resulted in a greater proportion (+ 20% for the PRG + CLOVER treatment and + 4% for the MSS treatment) of heifers being drafted by the end of the second grazing season compared with the PRG-only treatment, avoiding the need for an indoor finishing period.