**Application**

Identifying late-maturing suckler steers with greater genetic potential for carcass fat deposition can help achieve a market acceptable fat score at an earlier age when produced on grass-white clover or multi-species swards.

**Introduction**

Reducing cattle finishing age is a means of mitigating greenhouse gas emissions from beef production (Taylor et al., 2020); however, achieving an adequate carcass fat score (≥6.0, 15-point scale) on grass-based systems at a young age is challenging, particularly for late-maturing breed types, which predominate in Ireland (Regan et al., 2018). Exploiting within-breed genetic variance in carcass fatness may be a means of identifying more suitable genotypes within late-maturing breeds (Drennan and McGee, 2008). The inclusion of herbs (e.g. chicory/plantain) in grass-white clover swards may be a strategy to further improve animal growth (and thus fatness), herbage productivity, as well as mitigate environmental impacts from grass-based beef production (Sheridan et al., 2022). The objective of this study was to compare growth and carcass characteristics of late-maturing suckler steers genetically divergent for carcass fatness, produced on grass-white clover and multi-species sward systems and finished at 19-, 23- or 26-months of age.

**Materials and methods**

Over two weanling-to-beef production system cycles, weaned Charolais crossbred suckler steers genetically divergent in carcass fat score (Estimated Breeding Value; Lean-EBV, top 5% vs. fat-EBV, bottom 25%) were randomly assigned to one of two pasture types; 1). Perennial ryegrass-white clover (GC) and 2) multi-species (MS, perennial ryegrass, white and red clover, chicory and plantain) and finished at 19-, 23-, or 26-months of age (FA). The EBV for carcass fat score (scale 1-15) for the lean-EBV and fat-EBV steers were -0.55 and 0.14 in production cycle 1, and -0.58 and 0.17 in production cycle 2, respectively. During their first winter, steers were offered silage *ad libitum* and 1.5 kg/animal daily of a barley-based concentrate, following which they were turned-out to pasture in spring. The 19-FA were finished at the end of the second grazing season. For the second winter, steers were offered their respective silages *ad libitum* and the 23-FA and 26-FA groups received 5 kg and 1 kg concentrates/animal daily, respectively. The 23-FA were finished at the end of the second winter, while the 26-FA underwent a short (~ 2 months) third grazing season. Steer live weight was determined regularly and carcasses were weighed and graded for conformation and fat score. Data for each production cycle were analysed separately using linear models. The statistical model contained the fixed effects of pasture type, carcass fat-EBV, slaughter age and their interactions.

**Results**

For both production cycles, fat-EBV steers had a greater carcass fat score, lower kill-out proportion and similar carcass weight compared to lean-EBV steers (Table 1). There was no effect of pasture type on any of the carcass traits measured, expect for carcass fat score in production cycle 1 where MS had a lower fat score than GC (Table 1). For production cycle 1, 19-FA had a lower final and carcass weight compared to 23-FA and 26-FA, which did not differ (Table 1). Carcass fat score was lowest for 19-FA and greatest for 26-FA. For production cycle 2, 19-FA had the lightest final weight, 23-FA was heavier, followed by 26-FA, which was heaviest. Carcass weight was lighter for 19-FA compared to 23-FA and 26-FA, which did not differ. Kill-out proportion was greatest for 23-FA, lowest for 19-FA, with 26-FA being intermediate. Carcass fat score and conformation score was lower for 19-FA compared to 23-FA and 26-FA, which did not differ.

**Table 1**. Effect of EBV for carcass fatness, pasture type and finishing age on carcass traits at slaughter for production cycle one and two.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Carcass fat-  EBV | | Pasture type (PT) | | Finishing age (mths)  (FA) | | | SEM | P-value | | |
|  | Lean | Fat | GC | MS | 19 | 23 | 26 |  | EBV | PT | FA |
| *Production cycle 1* | |  |  |  |  |  |  |  |  |  |  |
| Final wt. (kg) | 668 | 680 | 671 | 676 | 616b | 702a | 704a | 7.9 | NS | NS | \*\*\* |
| Carcass wt. (kg) | 388 | 382 | 384 | 386 | 348b | 401a | 406a | 4.7 | NS | NS | \*\*\* |
| Kill-out proportion (g/kg) | 582 | 561 | 572 | 571 | 566 | 571 | 577 | 3.4 | \*\*\* | NS | NS |
| Conformation score (1-15)\* | 9.3 | 8.6 | 8.9 | 8.9 | 8.7 | 9.2 | 8.9 | 0.22 | \*\* | NS | NS |
| Fat score (1-15) | 6.6 | 8.4 | 8.0 | 6.9 | 6.3c | 7.6b | 8.6a | 0.22 | \*\*\* | \*\*\* | \*\*\* |
| *Production cycle 2* | |  |  |  |  |  |  |  |  |  |  |
| Final wt. (kg) | 599 | 617 | 606 | 610 | 509c | 636b | 678a | 8.4 | NS | NS | \*\*\* |
| Carcass wt. (kg) | 330 | 327 | 329 | 329 | 269b | 351a | 366a | 5.2 | NS | NS | \*\*\* |
| Kill-out proportion (g/kg) | 551 | 529 | 542 | 538 | 528b | 551a | 541ab | 3.9 | \*\*\* | NS | \*\*\* |
| Conformation score (1-15) | 8.7 | 7.4 | 8.3 | 7.9 | 7.1b | 8.6a | 8.5a | 0.25 | \*\*\* | NS | \*\*\* |
| Fat score (1-15) | 4.0 | 6.2 | 4.9 | 5.3 | 2.8b | 6.0a | 6.5a | 0.26 | \*\*\* | NS | \*\*\* |

\* Carcass fat-EBV × pasture type × FA interaction

**Conclusion**

Fat-EBV steers achieved greater carcass fat scores and a similar carcass weight compared to lean-EBV steers. Pasture type had little effect on carcass traits except for production cycle 1whereby MS had a lower fat score than GC. Carcass weight, fat and conformation scores were lower for 19-FA than 23-FA and 26-FA.

**References**

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