**Effect of grass-only and grass-clover based swards on the growth performance of suckler-bred heifers and steers finished at 19.5 months of age**

**Application**

Incorporating red and white clover into grass swards can reduce the requirement for chemical nitrogen fertiliser and increase animal live weight gain within a suckler calf-to-beef system.

**Introduction**

Grazed grass-white clover is recognized as a cost-efficient feed source for beef cattle production systems (Doyle et al., 2024). The inclusion of clover species in pastures, particularly white and red clover, provides the dual benefit of biologically fixing nitrogen (N) and reducing dependency on chemical fertilisers. Although white clover is optimized for grazing systems, red clover is more suited for silage production. Research has shown that cattle grazing grass-white clover swards achieve approximately 0.1 kg greater live weight gain during the second grazing season compared to grass-only swards (Doyle et al., 2024; Fitzpatrick et al., 2024). Despite these advantages, there is limited research on the long-term performance of suckler beef cattle raised on grass-only versus grass-clover systems from birth-to-finish. The present study evaluates the growth performance and carcass traits of suckler cattle produced on perennial ryegrass-only (GO) or perennial ryegrass-clover (GC) systems, incorporating grazed white clover and red clover silage.

**Materials and methods**

This research was conducted at Teagasc Grange Beef Research Centre between February 2023 and October 2024.{NOTE:06} Eighty spring-born Aberdeen Angus- and Charolais-sired calves, from Limousin × Holstein-Friesian dams were assigned to two different pasture farm-treatments; GC or GO. Calf mean date of birth was 26 February 2023, and mean birth weight was 45 kg. Treatments were balanced for sire breed, calf sex, calf weight, date of birth, and dam parity and live weight. All cows and calves were turned out to pasture on 3 April 2023. The GO progeny grazed perennial ryegrass-onlyswards with their dam up to ca. 7.4 months of age, following which they were weaned, and four weeks later were housed and offered grass-only silage *ad libitum +* 1.25 kg dry matter (DM) concentrate/head for 155 days. At the end of the indoor winter they were turned out to pasture (12 April 2024) and grazed perennial ryegrass-only swards for their ‘second’ grazing season; heifers were grazed separately to steers. Management of the GC progeny was the same except that they grazed perennial ryegrass-white cloverswards and were offered grass-red clover silage during the indoor winter. All animals were finished at pasture (10 October 2024) at a mean age of 19.5 months. On average, the GO and GC land areas received 145 and 75 kg of chemical N fertiliser per hectare, respectively. Male calves were castrated at ca. 6 months of age***.*** Pre-grazing herbage mass, sward pre- and post-grazing height, and clover composition were determined as described previously (Fitzpatrick *et al.,* 2024). Animal live weight was measured at birth, at the start and end of the grazing seasons and every three weeks in between. Post-slaughter, carcasses were weighed and conformation and fat score were determined. Data were analysed using the GLM procedure in SAS; the model had fixed effects for pasture treatment, sex, sire breed, dam parity and their interactions.

**Results**

Mean white clover content in the grazing swards for GC cattle was 11% and 22% during the first and second grazing season, respectively. Red clover content was 14% and 59% for silage harvests 1 and 2, respectively.

There was no interaction between pasture treatment and sex (P > 0.05). The GC cattle tended to be heavier than GO cattle at housing post-weaning (+12 kg; P= 0.06), and were heavier at turn-out to pasture in spring (+27 kg; P< 0.01), and at finishing (+27 kg; P< 0.01), leading to an 18 kg heavier carcass weight (P< 0.001) (Table 1). Average daily live weight gain to 200-days of age (1.20 vs. 1.26 kg) and during the first winter (0.54 vs. 0.62 kg) was lower (P < 0.05) for GO than GC cattle, but live weight gain did not differ during the second grazing season (1.03 vs. 1.02 kg). There was a positive live weight gain response to grass-white clover during the first grazing season, and to grass-red clover silage during the first indoor winter, but no response to grass-white clover during the second grazing season.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 1.** Effect of grass-only or grass-clover production system on growth and carcass traits of heifers and steers. | | | | | | |  |  |
| **Sex** | **Heifers** | | **Steers** | | **SEM** | **P-value** | |
| **Pasture treatment (PT)** | **Grass-only** | **Grass-clover** | **Grass-only** | **Grass-clover** |  | **PT** | **Sex** |
| *Live weight (kg)* |  |  |  |  |  |  |  |
| Birth | 41.4 | 41.5 | 46.6 | 45.7 | 0.96 | 0.758 | 0.002 |
| Housing | 312 | 315 | 322 | 344 | 5.0 | 0.064 | 0.005 |
| Turn-out to pasture | 393 | 411 | 406 | 442 | 6.2 | 0.001 | 0.009 |
| Final | 571 | 592 | 598 | 630 | 6.9 | 0.004 | 0.001 |
| *Carcass traits* |  |  |  |  |  |  |  |
| Carcass weight (kg) | 299 | 308 | 313 | 340 | 3.9 | 0.001 | 0.001 |
| Conformation score (1-15) | 7.76 | 8.14 | 6.81 | 7.61 | 0.137 | 0.001 | 0.001 |
| Fat score (1-15) | 8.35 | 8.48 | 6.27 | 6.80 | 0.174 | 0.153 | 0.001 |

**Conclusion**

Incorporating red and white clover into a perennial ryegrass sward in a suckler calf-to-beef system increased beef cattle live weight gain and carcass weight, while reducing chemical N fertiliser requirement.

**Acknowledgements**

The authors gratefully acknowledge the funding from Teagasc.

**Reference**

Doyle, P., O’Donovan, M., Crosson, P. and Tubritt, T. (2024). In: Proceedings of Climate Adaptation Conference, Cork, Ireland, 12-16.

Doyle, P., Bennett, P., O’Donovan, M. Byrne, N., Kelly, A.K., Crosson, P. and McGee, M. (2024). In: Proceedings of Teagasc National Beef Conference 2024, Leitrim, Ireland, 7–16.

Fitzpatrick, E., Fox, R., Cardiff, J. and Byrne, N. (2024). Grassland Science in Europe 29, 148-150.

.