

MANAGEMENT OF MULTISPECIES WITH REDUCED N COMPARED TO HIGH N GRASS MONOCULTURES

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Graphical Hypothesis



Methodology

Experimental timeframe: 2020 to 2021 inclusive

Farmlet experiment:

Annual herbage yields, botanical compositions and herbage quality was measured from a six species multispecies sward (MSS; 92N) a perennial ryegrass-white clover sward (PRG-WC; 90N) and a perennial ryegrass monoculture (PRG; 205N). Farmlets measured 8ha each, were stocked at 2.5 LU/ha and rotationally grazed at the 1ha scale by beef steers originating from the dairy herd.

Plot-scale experiment:

Annual herbage yields, botanical compositions and herbage quality was measured from a six species multispecies sward (MSS; 90N) a perennial ryegrass-white clover sward (PRG-WC; 90N) and a perennial ryegrass monoculture (PRG; 250N). Swards were investigated under two different rotation lengths (21 days vs. 28 days) and two different post-cutting residuals (4cm vs. 6cm).

Key Findings – Farmlet experiment

- MSS(92N) produced higher annual herbage yields than PRG-WC(92N) and PRG(205N; Figure 2).
- MSS had similar a digestibility value and a higher ash content than PRG-WC and PRG.
- No inter-sward type difference in weed burden.

Key Findings – Plot-scale experiment

- On a 21-day rotation, PRG(250N) and MSS(90N) produced similar herbage yields (both higher than PRG-WC).
- On a 28-day rotation, MSS produced higher herbage yields than PRG and PRG-WC.
- Increasing rotation length negatively affected the digestibility of PRG but had no effect on MSS or PRG-WC.
- Post-cutting height did not effect sward yield or herbage nutritive value.
- The herb component of the MSS sward declined under cutting from 2020 to 2021.

Conclusions

- MSS produce higher yields than PRG and PRG-WC.
- MSS yields more on a 28-day rotation than 21-day.
- MSS use = more sustainable production systems.

Background

- Swards containing mixtures of grasses, legumes and herbs can increase N use efficiency, improve animal performance and health, increase herbage yields, suppress weeds, provide habitat for invertebrates and reduce GHG emissions.
- Benefits are induced by interspecific interactions between differing plant functional traits such as canopy and root structure and temporal growth patterns (Figure 1).
- Little information is available regarding appropriate management strategies for these swards to ensure on-going performance i.e. stable herbage yield and nutritive value under rotational grazing systems.

Figure 1 Differing plant functional traits above and below ground

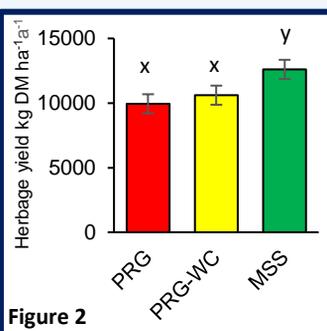
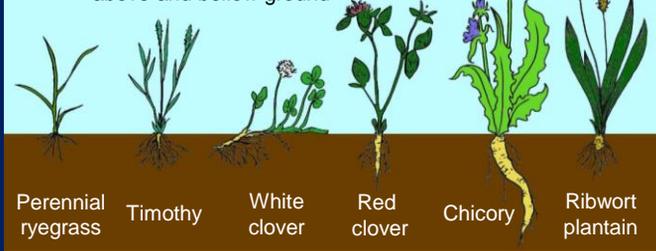
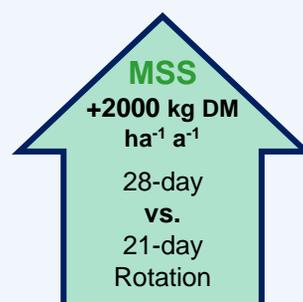


Figure 2



* For N application, N: kg N ha⁻¹ a⁻¹

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