

Clonakilty Update: The effect of tetraploid and diploid swards sown with and without white clover on the productivity of spring milk production systems

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Summary

- White clover inclusion can increase milk (+ 728 kg milk and + 58 kg milk solids per cow) and grass dry matter (**DM**) production (+ 1.5 t DM/ha) in intensive grass-based milk production systems
- Perennial ryegrass ploidy does not affect milk or grass DM production

Introduction

The focus of this paper will be on the results of the first three years of the Clonakilty Agricultural College research experiment. The experiment was established in Clonakilty Agricultural College in 2012 and 2013. Seventy five percent of the experimental area was reseeded in 2012 and 25% in 2013. Four separate grazing treatments were sown on the experimental area; a tetraploid only sward (**TO**), a diploid only sward (**DO**), a tetraploid plus clover sward (**TC**) and a diploid plus clover sward (**DC**). Four diploid (Tyrella, Aberchoice, Glenveagh and Drumbo) and four tetraploid (Aston Energy, Kintyre, Twymax and Dunluce) perennial ryegrass cultivars were sown as monocultures with and without white clover around the farm, thus creating a separate farmlot of 20 paddocks for each treatment. In the clover paddocks, a 50:50 mix of chieftain and crusader white clover was sown at a rate of 5 kg/ha. There are 30 cows in each treatment group and treatments are stocked at 2.75 cows/ha, receive 250 kg of nitrogen (**N**) fertiliser/ha and target concentrate supplementation is 300 kg/cow for each treatment. Each farmlot is walked weekly to monitor average farm cover (using PastureBaseIreland) and when surpluses are identified, they are removed in the form of baled silage. The objective of the experiment is to compare milk and grass production from tetraploid and diploid swards sown with and without clover. When discussing the effect of grass-only (the mean effect of T and D; **GO**) versus grass-clover (the mean effect of TC and DC; **GC**) swards the terms GO and GC are used.

Grass production

There was no difference between TC and DC in terms of the proportion of clover in each sward and the profile of clover in both swards was consistent with the expected pattern of clover growth i.e. the proportion of clover in the sward is low in the spring and then increases to a peak in August and September. The average clover proportion was 24% and 26% for TC and DC swards, respectively during the three years of the experiment. The effect of clover inclusion in the sward on daily grass growth during the three years of the experiment is illustrated in Figure 1. Daily grass growth rates for GO and GC swards were similar from January to May. However, from June to September GC swards had a 12 kg DM/ha per day greater mean daily grass growth rate compared with GO swards. In October and November, there was no difference in mean daily grass growth rate between the GO and GC swards. As a result, grass DM production was 15.5 t DM/ha on the GO swards and 17.0 t DM/ha on the grass-clover swards over the three years.

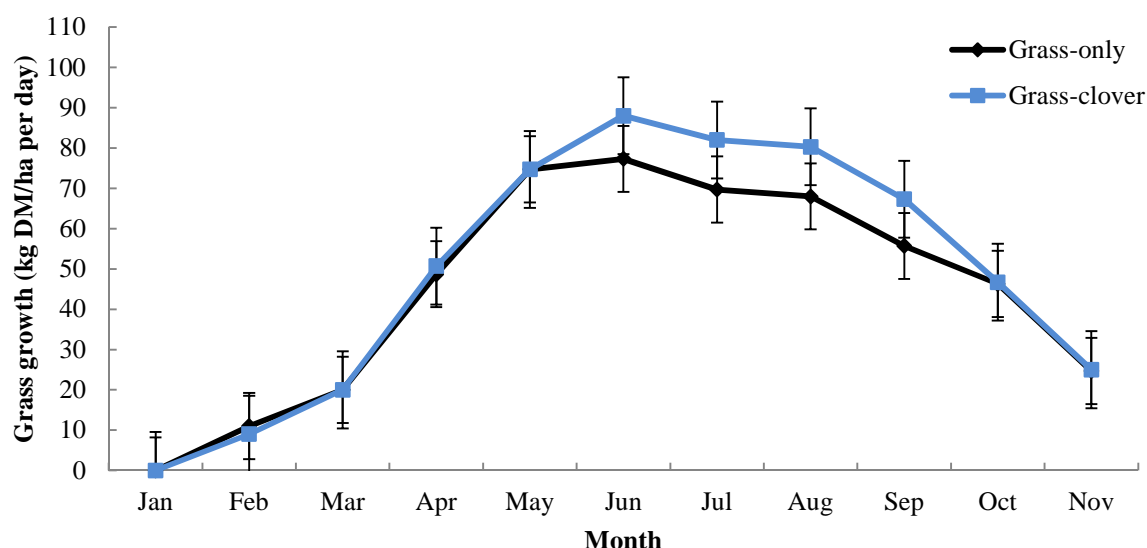


Figure 1 The effect of sward type (grass-only and grass-clover) on mean daily grass growth rates for each month over three years (2014 – 2016)

Milk production

Average annual concentrate supplementation across all treatments was 321 kg DM/cow during the three years of the experiment. Average annual silage supplementation during lactation to the GC cows was significantly greater (431 kg DM/cow) compared with the GO cows (328 kg DM/cow). The effect of treatment on milk production during the three years is presented in Table 1. Ploidy had no effect on any of the milk production variables. Clover inclusion had a significant effect on all milk production variables with the exception of fat and protein content. Both milk and milk solids yield per cow and per ha were greater for cows on GC treatments compared with GO treatments. Cows on GC treatments produced 728 kg more milk and 58 kg more milk solids than cows on the GO treatments which resulted in an extra 2,001 kg and 160 kg of milk and milk solids per ha, respectively. Neither ploidy nor clover inclusion had an effect on body weight or body condition score.

Table 1 The effect of treatment¹ on milk production variables over three years (2014 – 2016)

	TO	DO	TC	DC
Milk yield (kg/cow)	5,086	5,110	5,842	5,809
Fat (%)	4.65	4.64	4.62	4.63
Protein (%)	3.79	3.73	3.73	3.73
Milk solids yield (kg/cow)	429	426	487	484
Milk yield (kg/ha)	13,987	14,053	16,066	15,975
Milk solids yield (kg/ha)	1,180	1,172	1,339	1,331

¹TO = tetraploid only; DO = diploid only; TC = tetraploid + clover; DC = diploid + clover

Conclusion

Perennial ryegrass ploidy did not affect milk or grass DM production. However, white clover inclusion had a significant effect on both. Both milk (per cow and per ha) and grass DM production were greater on the GC swards compared with the GO swards. The experiment demonstrates the potential of white clover to improve the productivity of grass-based production systems in Ireland.