

# The milk production benefits of incorporating white clover in grass swards

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## Summary

- Dairy cows grazing grass-white clover swards have higher daily milk yield (+1.1-1.3 kg per cow) and milk solids yield (+0.07-0.11 kg per cow) compared with cows grazing grass-only swards.
- Increased milk yield is associated with higher dry matter intake by cows grazing grass-white clover swards compared to cows grazing grass-only swards (+0.5-1 kg DM per cow per day) in summer and autumn.

## Introduction

The sustainability of Irish milk production systems is underpinned by the efficient conversion of grazed grass to milk. Irish pasture-based milk production systems are amongst the most efficient in the world, converting a low cost, home-grown feed source, grass, into milk. Dairy cows convert a human in-edible protein source (pasture) into a human edible protein (milk). Sustainable grass-based systems require the introduction of white clover to reduce the use of chemical nitrogen fertiliser, achieved through the nitrogen fixing capacity of white clover (see McCarthy *et al.* elsewhere in this publication). Another benefit of white clover for the dairy farmer is increased milk production. A number of grazing systems experiments have been undertaken since 2013 at Moorepark and Clonakilty examining the role of white clover in pasture-based milk production systems. This paper will summarise the research findings in terms of milk production.

## Results

Milk production is influenced by the dry matter intake (DMI) of the dairy cow and the quality of the feed ingested (Table 1). Data from Moorepark shows that, on average, cows grazing grass-white clover swards with an average annual white clover content of 21% had 1.0 kg/cow greater total DMI compared to cows grazing grass-only swards. At Clonakilty, cows grazing grass-white clover swards (average clover content of 16%) had 0.5 kg/cow greater total DMI compared to cows grazing grass-only swards. The increased DMI occurred in summer and autumn, when sward neutral detergent fibre (NDF) content (fibre) was lower in grass-white clover swards compared to grass-only swards (Table 2). Lower fibre content allows faster passage rate of feed through the cows rumen, promoting greater DMI.

Cows grazing grass-white clover swards at Moorepark and Clonakilty had higher milk yield (+1.2 kg/cow per day) and milk solids yield (+0.09 kg/cow per day) compared to those grazing grass-only swards (Table 1). The milk constituents were similar (fat and protein %), and so the increased milk solids yield was as a result of increased milk volume.

**Table 1.** Average dry matter intake and milk production from cows grazing grass-only and grass-white clover swards, and sward quality parameters, at Moorepark and Clonakilty

	Grass-only	Grass-white clover
<b>Moorepark research</b>		
Dry matter intake (kg per cow)	16.3	17.3
Milk yield (kg per cow per day)	20.5	21.6
Milk solids yield (kg per cow per day)	1.74	1.81
Fat (%)	4.83	4.89
Protein (%)	3.71	3.69
<b>Clonakilty research</b>		
Total dry matter intake (kg per cow)	16.7	17.2
Milk yield (kg per cow per day)	19.1	20.4
Milk solids yield (kg per cow per day)	1.61	1.72
Fat (%)	4.79	4.75
Protein (%)	3.84	3.84

**Table 2.** Sward quality parameters, at Moorepark and Clonakilty, in grass-only swards in spring (May), summer (July) and autumn (September)

	Spring		Summer		Autumn	
	Grass-only	Grass-white clover	Grass-only	Grass-white clover	Grass-only	Grass-white clover
<b>Moorepark Research</b>						
Sward clover content (%)	-	18.9	-	31.3	-	37.7
Crude protein content (%)	21.2	20.8	20.7	21.7	24.1	24.5
NDF content (%)	34.9	34.4	39.6	36.4	39.8	36.2
Organic matter digestibility (%)	86.1	86.2	82.4	82.2	82.5	82.1
<b>Clonakilty Research</b>						
Sward clover content (%)	-	9.0	-	14.2	-	23.7
Crude protein content (%)	19.7	21.6	18.0	21.3	17.5	21.1
NDF content (%)	36.0	35.3	41.4	39.6	41.2	36.9
Organic matter digestibility (%)	78.9	78.8	78.6	78.8	77.5	78.0

## Conclusions

Incorporating white clover in grassland swards results in increased dairy cow DMI and increased milk yield and milk solids yield compared to cows grazing grass-only swards.

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