Effect of silage species and concentrate crude protein level on early-lactation milk production in grazing dairy cows

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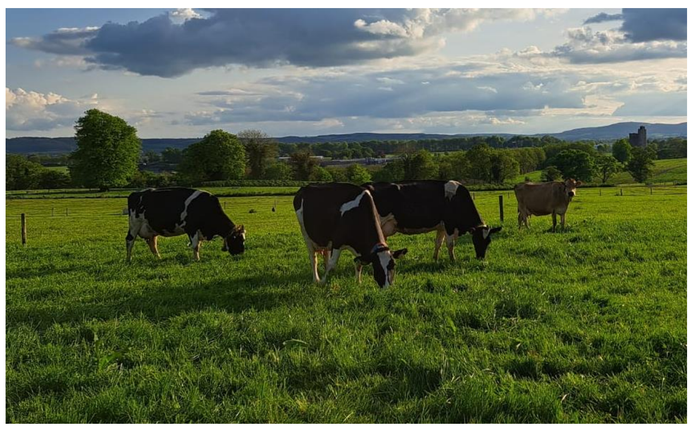
Introduction

- Perennial ryegrass (PRG)-red clover (RC) swards have the potential to maintain herbage production at reduced inorganic nitrogen application
- In indoor feeding systems, dry matter intake and milk production were shown to improve when RC silage was fed to dairy cows
- RC silage could maintain animal performance at reduced concentrate crude protein (CP) levels due to its high CP concentration

The **objectives** of this study were to investigate the effect of **silage species** and **concentrate CP level** on animal performance in early-lactation, grazing dairy cows



Materials and Methods

- Silages were harvested in August, 2022. The PRG-RC silage comprised of 64% RC
- Five-week experiment (March-April, 2023)
- Eighty Holstein-Friesian x Jersey dairy cows, assigned to 1 of 4 dietary treatments (n=20)
- The treatments were:

	AM	PM	Concentrate CP
GS-HP	Pasture	**PRG** silage	**17%** CP
GS-LP	Pasture	**PRG** silage	**9%** CP
GRCS-HP	Pasture	**PRG-RC** silage	**17%** CP
GRCS-LP	Pasture	**PRG-RC** silage	**9%** CP

- Cows were allocated 7 kg DM cow^{-1} of silage
- All groups were fed 3.56 kg DM cow^{-1} of concentrate
- Milk yield was recorded daily and milk composition weekly

Results

Table 1. Effect of silage species and concentrate CP level on milk production and milk composition of grazing dairy cows

	Diet[1]					*P*-value[2]		
Item	**GS-HP**	**GS-LP**	**GRCS-HP**	**GRCS-LP**	**SEM[3]**	**Sil**	**Conc**	**Sil*Conc**
Milk yield, kg d^{-1}	24.2	22.6	24.3	22.7	0.39	0.97	< 0.01	0.86
Protein, g kg^{-1}	33.8	33.5	33.8	33.9	0.34	0.50	0.80	0.47
Fat, g kg^{-1}	52.2	53.1	49.7	50.2	0.68	< 0.01	0.25	0.66
Protein yield, kg d^{-1}	0.80	0.76	0.82	0.77	0.01	0.28	< 0.01	0.79
Fat yield, kg d^{-1}	1.25	1.19	1.19	1.14	0.03	0.02	0.03	0.86
Milk solids yield, kg d^{-1}	2.07	1.96	2.00	1.90	0.04	0.06	< 0.01	0.92

[1]GS = PRG silage; GRCS = PRG-RC silage; HP = High CP concentrate; LP = Low CP concentrate; [2]Sil = = Silage species; Conc = Concentrate CP level; Sil*Conc = interaction between silage species and concentrate CP level ; [3]SEM = standard error of the mean.

- **Reducing concentrate CP level reduced milk yield, milk fat and milk protein yields**
- **Cows fed GS had higher milk fat concentration and yield when compared to cows fed GRCS**
- **There was no interaction between silage species and concentrate CP level**

Conclusion

- Cows fed GRCS maintained milk yield and milk protein. However, GRCS reduced milk fat, when compared to GS
- Feeding a 9% CP concentrate reduced milk production in early-lactation dairy cows at grazing
- Future work should investigate feeding various levels of RC silage to grazing dairy cows

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