



Effects of replacing grass silage with maize silage or concentrates on lamb output from housed pregnant ewes

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Introduction

- Grass silage is the most common forage offered to ewes during late pregnancy
- Cost of producing high quality grass silage has increased significantly in recent years
- Maize silage can be a cost-competitive alternative to grass silage

Relative forage costs on NI dairy farms (2008)

	<i>Utilised DM yield (t/ha)</i>	<i>Cash cost (£/t DM)</i>
Grazed grass	5-10	85-42
3-cut grass silage	8-13	107-66
Maize silage (under plastic)	10-15	79-52
Fermented WCW	8-13	106-65
18% Dairy mix	-	236

(Source: Kilpatrick et al. (2001), updated with 2008 input costs)

Introduction

- Grass silage is the most common forage offered to ewes during late pregnancy
- Cost of producing high quality grass silage has increased significantly in recent years
- Maize silage can be a cost-competitive alternative to grass silage
- Limited information on which to base feeding strategies for pregnant ewes offered maize silage-based diets
- Alternatively, high grain diets could eliminate the costs of growing, conserving and feeding forages on sheep farms altogether



Aims of study

To evaluate the effects of replacing grass silage with either maize silage or concentrates on:

1. Ewe performance
2. Lamb performance

Materials and Methods (1)

- 104 twin-bearing ewes (80 kg, BCS 3.8) mated to a range of sire breeds
- Housed and shorn 7 weeks prior to lambing
- 4 treatments:
 1. Precision chop grass silage & 0.55 kg/d concentrates **(GS)**
 2. Maize silage & 0.55 kg/d concentrates **(MS)**
 3. 50:50 (DM basis) mix grass/maize silage & 0.55 kg/d concentrates **(GS/MS)**
 4. 1.55 kg/d concentrates & 0.05 kg/d chopped straw **(C)**
- Concentrate CP level varied (158-293 g/kg DM) to balance total dietary intake of metabolizable protein (130 g/d)
- Diets offered for 6 weeks prior to lambing

Forage quality

	<i>Grass silage</i>	<i>Maize silage</i>
VCODM (g/kg)	278	337
DOMD (g/kg)	670	-
NCGD (g/kg DM)	-	680
ME (MJ/kg DM)	10.7	11.0
CP (g/kg DM)	121	84
NDF (g/kg DM)	600	440
pH	3.9	-
NH₃-N (g/kg total N)	95	-
Starch (g/kg DM)	-	243

(Predicted by NIRS)

Materials and Methods (2)

- Measurements:
 - ❖ DM intake
 - ❖ Ewe LWT and BCS (6, 4 and 2 weeks pre-lambing, 24-h and 6 weeks post-lambing, weaning)
 - ❖ Metabolic status (2 weeks pre-lambing)
 - ❖ Lambing difficulties (1 = no assistance, 4 = vet assist)
 - ❖ Lamb sex & weights at birth, 6 weeks old and weaning
 - ❖ Lamb growth rate to weaning
 - ❖ Lamb mortality

- Data analysed by Analysis of Variance (ANOVA) with diet as a fixed effect and covariates for crossing sire breed, lamb sex and age at weaning

1. Effects of feeding system in late pregnancy on forage intake, ewe live weight & body condition

	<i>Forage DMI (kg/d)</i>	<i>Total DMI (kg/d)</i>	<i>Pre-lambing LWT change (kg)</i>	<i>Pre-lambing BCS change</i>
Grass silage	1.03 ^a	1.50 ^b	-6.1	-0.46
Grass/maize silage	1.18 ^b	1.64 ^c	-4.2	-0.52
Maize silage	1.15 ^b	1.62 ^c	-5.4	-0.50
Concentrates	-	1.21 ^a	-7.4	-0.44
s.e.d	0.046	0.041	1.36	0.155
Sig.	**	***	NS	NS

2. Effects of feeding system in late pregnancy on ewe metabolic status 2 weeks before lambing

	Albumin (g/l)	Total protein (g/l)	BHB (mmol/l)	NEFA (meq/l)	Urea (mmol/l)
Grass silage	29.3	66.8	0.66	0.44	4.19
Grass/maize silage	30.0	66.7	0.70	0.41	3.87
Maize silage	29.1	65.4	0.72	0.27	3.68
Concentrates	29.6	67.2	0.63	0.35	3.73
s.e.d	0.66	1.50	0.084	0.117	0.334
Sig.	NS	NS	NS	NS	NS

3. Effects of feeding system in late pregnancy on ewe performance at lambing

	<i>% mortality at birth</i>	<i>Total lamb birth weight (kg)</i>	<i>Lambing difficulty score</i>	<i>Prop. ewes lambed unaided</i>
Grass silage	3.8	10.8	1.46 ^a	0.69 ^{ab}
Grass/maize silage	4.1	10.8	1.53 ^{ab}	0.80 ^{bc}
Maize silage	6.1	10.4	1.93 ^b	0.52 ^a
Concentrates	1.8	10.8	1.10 ^a	0.93 ^c
s.e.d	3.77	0.44	0.229	0.116
Sig.	NS	NS	**	**

4. *Effects of feeding system in late pregnancy on ewe performance at weaning*

	<i>Lambs weaned</i>	<i>Total weight weaned (kg)</i>
Grass silage	1.62	57.8
Grass/maize silage	1.84	64.1
Maize silage	1.60	55.1
Concentrates	1.77	60.4
s.e.d	0.150	4.87
Sig.	NS	NS

5. Effects of feeding system in late pregnancy on lamb performance prior to weaning

	<i>Birth weight (kg)</i>	<i>Weaning weight (kg)</i>	<i>Daily LWG birth-weaning (g/d)</i>
Grass silage	5.4	33.6	244
Grass/maize silage	5.4	35.4	257
Maize silage	5.2	33.8	245
Concentrates	5.5	34.2	250
s.e.d	0.18	0.97	8.0
Sig.	NS	NS	NS

Conclusions

- Substituting grass silage with maize silage increased forage DMI:
 - ❖ 50% forage DM: +0.15 kg/d
 - ❖ 100% forage DM: +0.12 kg/d
- Linear increase in lambing difficulties with increasing inclusion of maize silage
- A smaller proportion of ewes offered the all-grain diet were assisted at lambing compared with those offered silage-based diets
- Feeding system had no significant effects on the nutritional status of ewes, lamb viability or ewe and lamb performance
- Maize silage or concentrates can replace grass silage in ewe rations
- Supplementary feed rates with maize silage-based diets should be reduced to reflect its higher intake characteristics

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