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Dairy farm sustainability =  $\searrow$  environmental impacts and N losses



**Fresh grass** = Low-cost on-farm feed of good quality, providing environmental services  
But great variability of composition and availability throughout the year



**Fresh grass + Maize silage**  $\rightarrow$  **Effects on cow N utilisation ???**

Frequently associated with conserved forages

**What are the effects of increasing maize silage proportion in a fresh grass diet on cow N excretion and efficiency ?**

4 diets :



0 %	100 %
17 %	83 %
34 %	66 %
51 %	49 % (DM basis)

7 lactating Holstein cows, Latin square **4 diets**  $\times$  3 periods of 3 weeks

*Ad libitum* feeding (ray-grass + maize silage) **without concentrate**

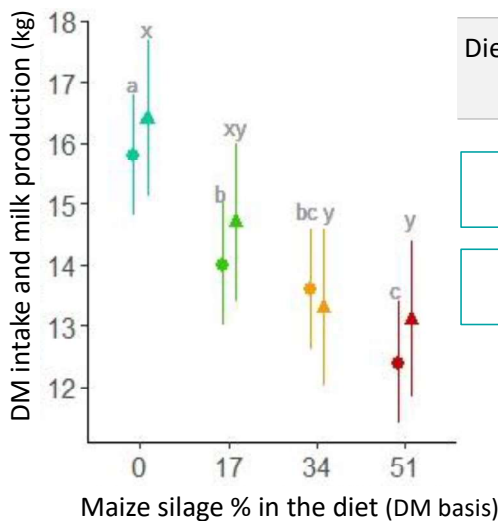
**Individual measurements** : Intake, milk, faeces, urine amounts (kg) and N concentration (g/kg)



**Very low grass crude protein** (CP) concentration

Maize silage % in the diet (DM basis)

	0	17	34	51
Diet CP concentration (g/kg DM)	107 <sup>a</sup>	99 <sup>b</sup>	92 <sup>c</sup>	86 <sup>c</sup>
	<b>Low</b>	$\longrightarrow$		<b>Very low</b>



**Milk protein concentration and N milk**  $\searrow$  for diet including maize silage (-1.9 g/kg and -20 g/day) compared to diet without maize

**N efficiency**  $\nearrow$  for diet with 51 % of maize silage (40 %) compared to the 3 others (34%)

**+10 % maize silage in diet =**



N intake  
**- 20 g N/day**

N urine  
**- 5.0 g N/day**

N faeces  
**- 5.5 g N/day**

$\nearrow$  maize silage in the diet  $\searrow$  DM intake ( $\bullet$ ) and milk production ( $\blacktriangle$ )

a, b, c = P value intake < 0,05 ; x, y = P value milk < 0,05

**Increasing the % of maize in unusually low-N grass diets induced very N-deficient diets on which N efficiency was increased and losses to the environment were minimal**

