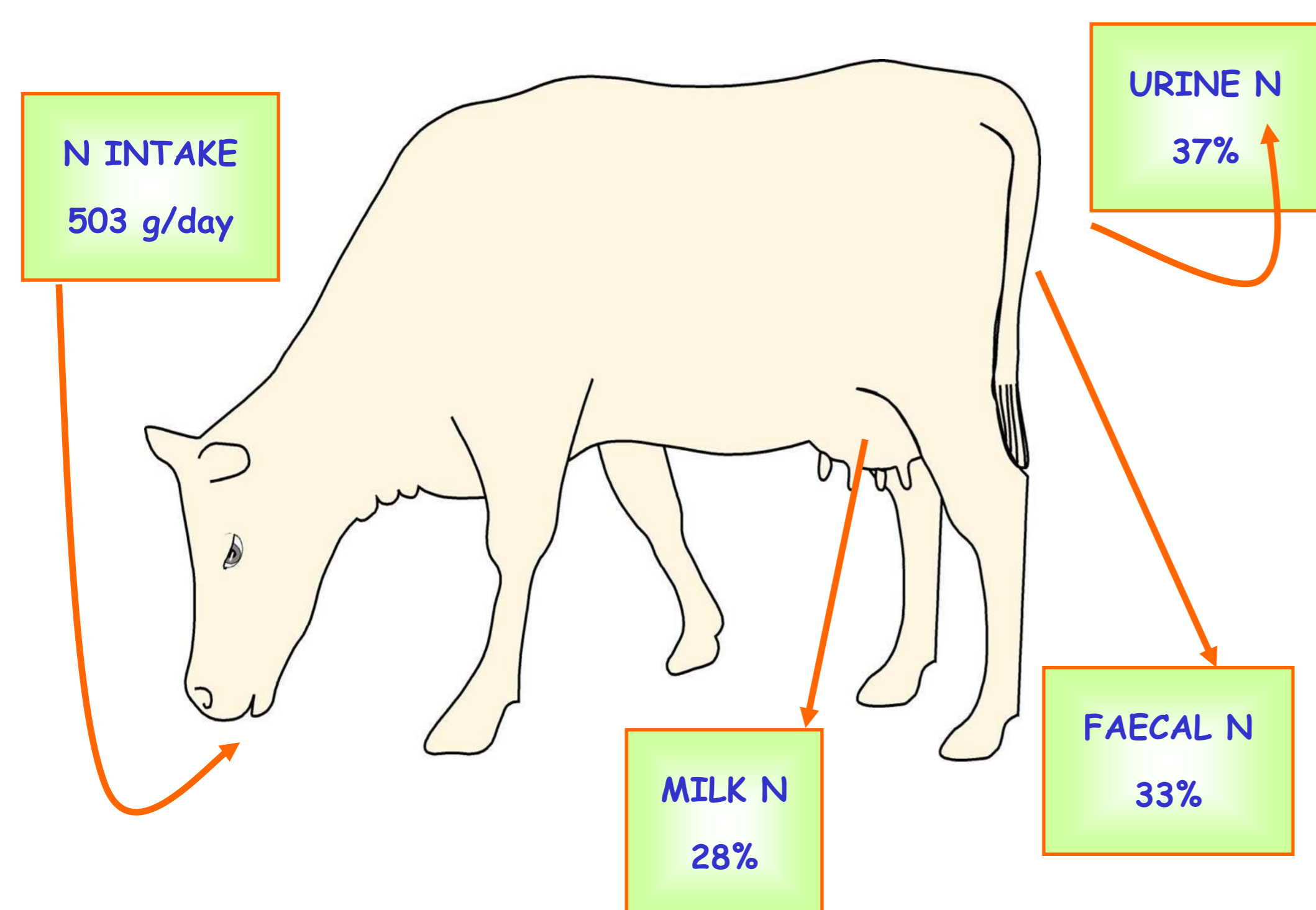
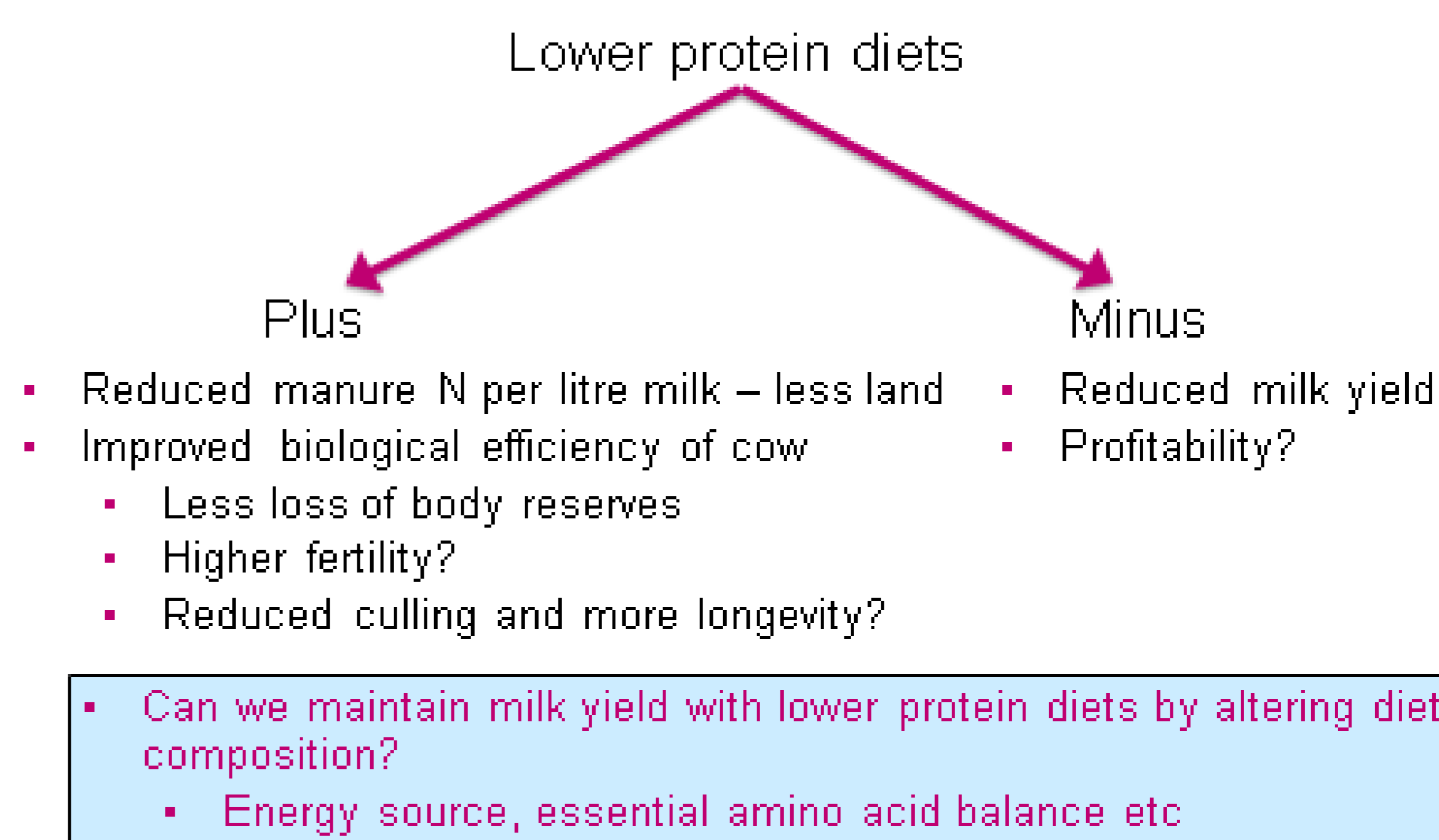


How Low Can We Go? Long Term Implications of Feeding Low Protein Diets



Mills et al 2009

Where to Now With Dietary Protein?



Variation in N Use Efficiency in Dairy Cattle

	Milk N efficiency			
	USA (n = 167)		EU (n = 287)	
	Low	High	Low	High
Milk N efficiency	0.22	0.33	0.21	0.32
DM intake (kg/d)	23.2	23.8	17.9	18.9
3.5% FCM (l/d)	31.8	38.2	26.8	31.2
Forage (g/kg DM)	534	526	665	569
Forage CP (g/kg DM)	179	154	200	148

Lower (low) and upper (high) quartile for N efficiency

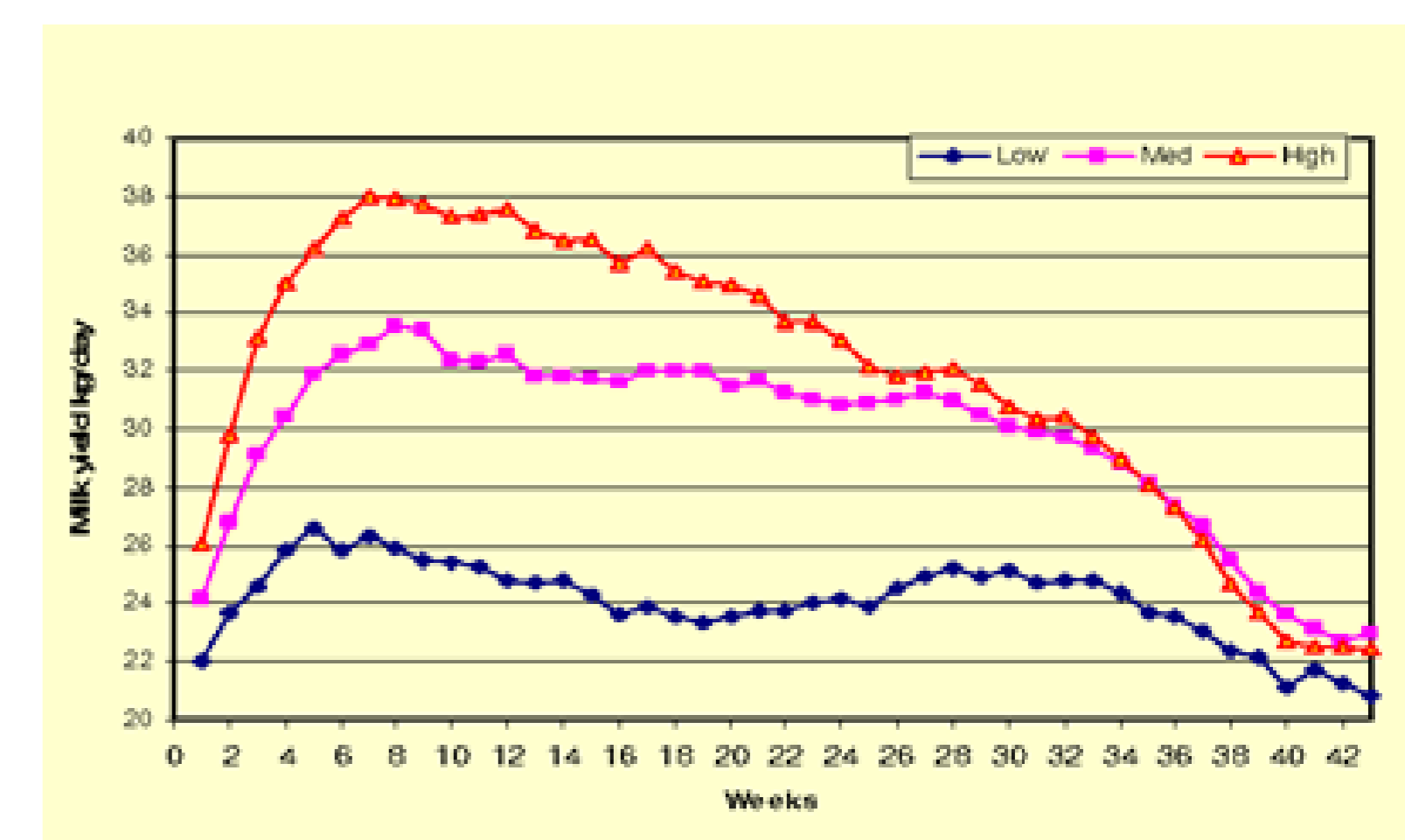
Calsamiglia et al. (2010)

Dietary protein and nitrogen use efficiency - entire lactation study (Wisconsin)

	Dietary CP treatment			
	15.4-16.0	17.4-16.0	17.4-17.9	19.3-17.9
	-----kg or g/d-----			
Milk yield	10,056	10,832	11,095	11,132
Intake N	178	189	214	214
Milk N	51.2	48.9	51.5	53.0
Manure N	127	140	162	161
N efficiency, %	28.8	25.8	24.1	24.7

Wu & Satter 2000

Effects of Diet Protein Concentration - AFBI Study Over One Lactation



Law et al 2009; 2010

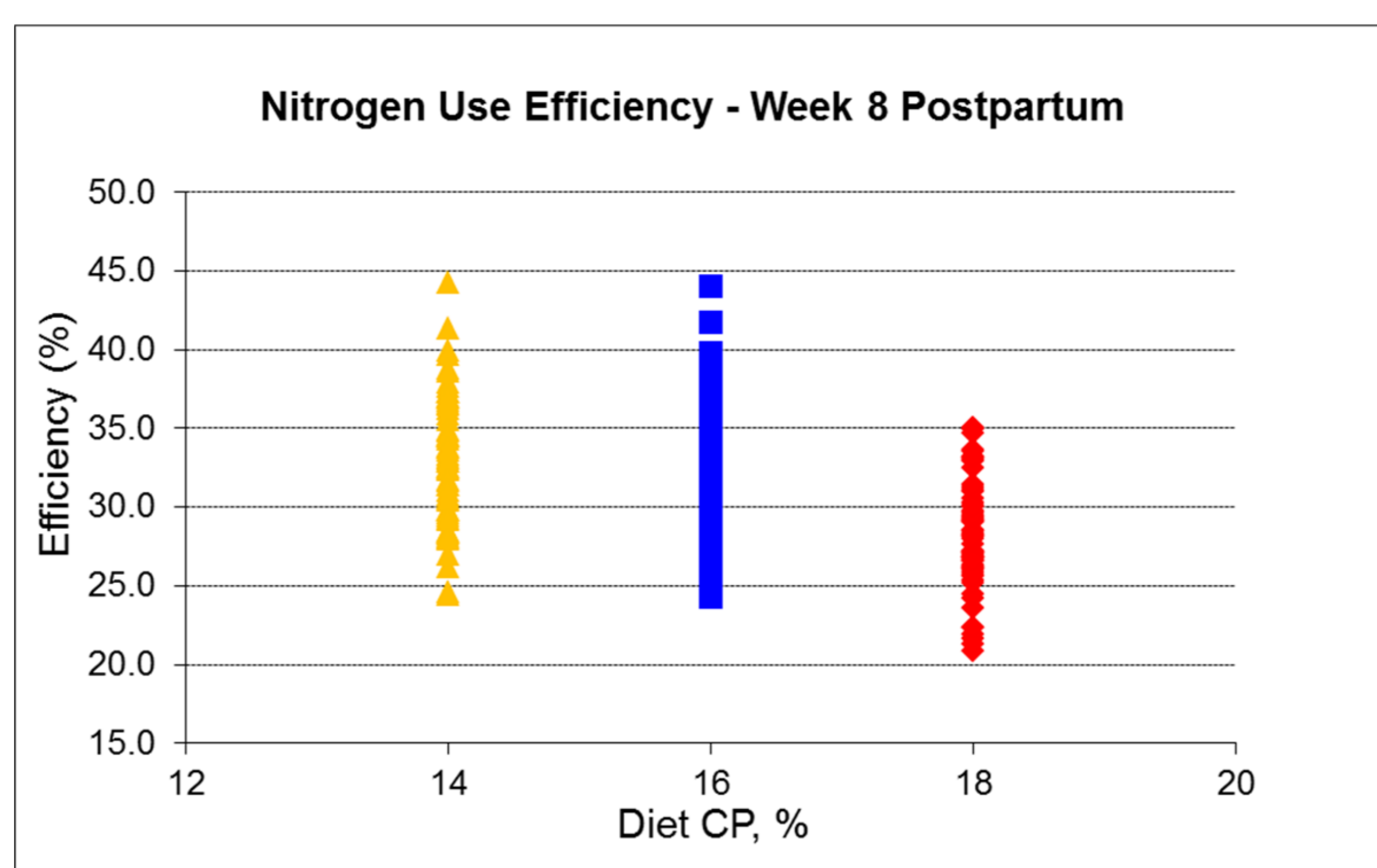
Defra Project AC0122 – preliminary results

Objectives:

To measure the longer-term effects of incremental reductions in protein concentration on:

- Feed intake, milk production and composition, and body condition
- Longevity (fertility and health)
- Feed conversion efficiency, manure output and excretion of nitrogen in urine and faeces
- The proportion of urinary nitrogen excreted as urea

- 210 heifers fed one of 3 diets differing in protein concentration (14, 16, 18% CP) for 3 lactations



Further work

- Aberystwyth University growing calves and lactating cows on grass silage
- SRUC – demonstration of optimum system

Initial Conclusions

- Reduction in milk yield less than expected
- Large animal variation in N use efficiency
- Responses in 2nd and 3rd lactation may differ

