

CALM DAIRY EWES PRODUCE MORE MILK THAN NERVOUS DAIRY EWES

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To develop a sustainable sheep milking industry in Australia, it is important to identify a means of selecting the sheep most likely to be efficient producers. Stress during milking reduces milk production and affects milk composition by increasing the secretion of catecholamines that inhibit the milk ejection reflex (Barowicz 1979). When this happens, only the milk contained in the cisterns of the udder can be collected and, since this milk has a low concentration of fat, the result is milk with a lower fat content (Labussiere 1988). Sart *et al.* (2004) confirmed that non-dairy ewes with calmer temperaments produce better quality milk. We assessed the temperament of dairy ewes and measured the milk production and milk composition of 2 groups of ewes with either a 'calm' or a 'nervous' temperament. This was to test the hypothesis that calmer dairy ewes would have a lower stress response to machine milking, and therefore they would produce more milk in a dairy environment, in which the milk ejection reflex is not always stimulated (Marnet *et al.* 1998).

The temperaments of 95 dairy ewes of mixed breed and age were tested using the 'isolation box test'. This test measures the effect of isolation on the level of agitation of sheep by recording their movements and vocalisations. This allowed the classification of 2 distinct groups of 'calm' (n=16) and 'nervous' sheep (n=16) from the extreme scores. After lambing, the milk production of individual sheep was measured fortnightly over 10 weeks with Tru Test Milk Meters (Tru Test Distributors, Auckland, New Zealand). Milk samples were also analysed to determine their fat and protein concentration with a Milko Scan 133 (Foss Electric, Denmark).

There was an interaction between time and temperament on milk production ($P < 0.05$), and over the 10 weeks of recording, 'calm' ewes produced 462 ± 36 g/day while 'nervous' ewes averaged 394 ± 33 g (Table 1). However, there was no interaction between time and temperament or an effect of temperament on the percentage of fat or protein in the milk ($P > 0.05$).

Table 1. Daily production (mean \pm standard error) and composition of milk (\pm standard error) from 'calm' (n=16) and 'nervous' (n=16) dairy sheep over 10 weeks of lactation

Lactation period	Milk production (g/day)		Fat (%)		Protein (%)	
	Calm	Nervous	Calm	Nervous	Calm	Nervous
Week						
2	250 \pm 33	377 \pm 56	3.7 \pm 0.3	4.1 \pm 0.3	4.9 \pm 0.1	4.9 \pm 0.2
4	657 \pm 105	434 \pm 52	5.7 \pm 0.6	5.7 \pm 0.7	5.6 \pm 0.2	5.5 \pm 0.2
6	301 \pm 67	171 \pm 45	6.4 \pm 0.5	6.2 \pm 0.4	5.7 \pm 0.2	5.6 \pm 0.2
8	581 \pm 70	549 \pm 93	7.0 \pm 0.3	6.8 \pm 0.2	6.0 \pm 0.2	5.7 \pm 0.3
10	527 \pm 53	532 \pm 82	7.3 \pm 0.3	7.4 \pm 0.3	5.9 \pm 0.2	6.0 \pm 0.2
Time	P<0.001		P<0.001		P<0.001	
Temperament	P=0.42		P=0.99		P=0.54	
Time x Temperament	P=0.04		P=0.89		P=0.92	

Our hypothesis that 'calm' ewes would produce more milk than their 'nervous' flock mates was therefore supported. This demonstrates that milk production, a function of factors such as nutrition, breed and age, is also influenced by temperament. The secretion of catecholamines in both groups should be measured to further test our hypothesis. However, ewe temperament did not affect the level of fat or protein in the milk. This may be because fat is highly variable in ewe's milk, while protein is passed freely into the cistern without dependence on the milk ejection reflex.

In conclusion, selection based on temperament may offer producers a means of selecting sheep more likely to yield more milk throughout their lactation, and this trait could be included when breeding dairy sheep.

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