

DIVERGENT SELECTION ON TEMPERAMENT AFFECTS VOCAL AND LOCOMOTOR ACTIVITY IN ISOLATED NEWBORN LAMBS

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Temperament is defined as the reactivity of animals in response to a strange, novel and potentially frightening situation. It can be assessed by exposing isolated individuals to an unfamiliar environment, such as the “open-field” test. Measurement of temperament is highly repeatable and related to production characteristics. Selection for “calmness” and “nervousness” in sheep over 15 years at the University of Western Australia has been shown to affect maternal behaviour and rearing ability (Murphy *et al.* 1996; Murphy, 1999) as well as some characteristics of colostrum (Hart *et al.* 2006), calm mothers having better potential than nervous mothers. This paper reports that differences in temperament between the lines can be detected in newborn lambs.

Thirty lambs (14 born from calm ewes and 16 from nervous ewes) were tested in a square pen for 5 minutes immediately after being separated from their mother. The pen was 2.5 x 2.5 m and the sides were covered with hessian. The floor was divided into 4 zones of equal size. At the beginning of the test lambs were put in zone 1 in a standing position, facing the centre of the arena. The following variables were recorded: (i) number of high- and low pitched bleats, (ii) number of zone boundaries crossed during the test, (iii) time spent in each zone, (iv) number of escape attempts, (v) latencies to vocalise, to leave zone 1, and to attempt to escape from the pen.

All lambs vocalised within seconds after being released but calm lambs emitted less high-pitched bleats than lambs (Table 1). The number of low-pitched bleats did not differ between the 2 lines. Calm lambs were less prone to leave zone 1 and crossed significantly fewer limits of zones. They also took longer before making the first attempt to escape from the pen and the total number of escape attempts was much lower.

Table 1. Mean (s.d.) vocal and locomotor activity in an open-field test of one-week-old Merino lambs born from 2 lines of ewes selected for “calmness” or “nervousness”

Variables	Calm		Nervous		P values
Male/female ratio	8/6		6/10		
Age (days)	8.0	(1.7)	7.6	(1.4)	0.52
Vocal activity					
Latency to bleat (sec.)	7.1	(6.5)	7.3	(14.2)	0.345
Number of low-pitched bleats	3.6	(3.8)	2.9	(3.8)	0.618
Number of high-pitched bleats	52.1	(35.0)	87.6	(25.6)	0.005
Locomotor activity					
Latency to leave zone (sec.)	73.3	(73.0)	36.3	(23.1)	0.053
Number of limits of zones crossed	19.6	(12.7)	54.0	(26.3)	<0.001
Latency to jump	197.1	(113.3)	103.2	(103.9)	0.025
Number of escape attempts	7.4	(12.1)	22.7	(21.8)	0.023

Significant differences can be detected between the 2 lines showing that temperament is fully established at a very early age. Like weaned and adult sheep (Murphy 1999), one-week-old lambs born from calm mothers displayed a lower vocal and ambulatory activity. This does not necessarily mean that they were less vigorous but would rather suggest a lower level of distress and agitation during the isolation procedure. In fact, lambs from the nervous line appeared to express more readily a panic-like response and this, very soon after the test started. Because the temperament of the ewe can influence her maternal behaviour (Murphy *et al.* 1996) it would be worth checking if the temperament of the young also influences early interactions with the mother.

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