

EFFECTS OF A CHALLENGE INFECTION WITH HAEMONCHUS CONTORTUS
ON THE BEHAVIOUR OF PENNED VERSUS Paddock SHEEP

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Psychosocial stress is known to interact with the immune system (Jankovic 1989). This study examined behavioural effects of a worm challenge with and without the stressful situation of feedlotting. Sixty four non-pregnant two-year-old Merino ewes which were selected from a large flock were randomised on live weight into eight groups of eight sheep. Four groups grazed ample good quality pasture and four groups were fed a maintenance ration of pellets in a feedlot situation ($1.4 \text{ m}^2/\text{sheep}$). Two groups of the penned and grazing sheep were drenched with *Haemonchus contortus* (750 infective larvae) twice weekly for eight weeks. An arena test (Fell and Shutt 1989) was performed four times per week during weeks 2, 5 and 8. This test measures the approach behaviour of sheep, in groups of four, confined in a $13 \times 3 \text{ m}$ arena with a human standing in the arena between the test animals and a larger group of sheep in an adjacent pen. Faecal egg counts and haematological parameters were used to monitor the infection.

Table 1 Effects of a worm challenge and a feedlot situation on sheep behaviour in relation to a human in the arena test

	Mean distance from human (m)		Distance travelled during test (m)	
	Penned	Paddock	Penned	Paddock
Worms	3.8 ^a	3.4 ^a	40.9 ^a	16.7 ^c
No worms	4.6 ^b	5.4 ^c	31.2 ^b	18.0 ^c

Means with dissimilar superscripts are significantly different ($P < 0.01$)

There was no evidence of parasitic disease. Low faecal egg counts (750 egg/g) indicated that the ewes had an acquired immunity to the challenge infection. There were, however, marked behavioural differences associated with the parasitic treatment and the feedlot situation. An analysis of variance indicated a highly significant ($P < 0.001$) effect of the worm treatment on the distance sheep kept from the human and the distance they walked during the test. This effect occurred from week 2 onwards. Penned sheep were more active in the arena, walking twice the distance of paddock sheep during the test, and were also much less gregarious as indicated by a greater distance between individual animals during the test. There was a positive correlation (0.57, $P < 0.01$) between the initial live weight of individual sheep and their distance from the human in the arena, but the randomisation on live weight will have removed any liveweight effects on group means. Possible mechanisms whereby a worm challenge affects behaviour and the connection between behaviour and immunity require further investigation.

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