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THE RELATIONSHIP BETWEEN TEMPERAMENT SCORE AND FLIGHT SPEED, AND PRE AND POST WEANING GROWTH OF ANGUS, HEREFORD, LIMOUSIN AND SIMMENTAL SIRED WEANER CATTLE BRED FROM ANGUS AND HEREFORD DAMS

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SUMMARY

Data from 206 autumn born calves from Angus and Hereford cows sired by Angus, Hereford, Limousin and Simmental bulls (22 bulls from each breed) was used to examine effect of temperament score or flight speed on growth rate and liveweight. At weaning on 12/12/2000 all calves (mean age and liveweight ± se; 275±1.5 days, and 314±2.7 kg, respectively) were scored for temperament by 3 independent scorers, and timed for flight speed, on three separate occasions. Just prior to feedlot entry on 24/7/2000 the steer weaners (mean age and liveweight ±se; 482.2±2.1 days and 437 ±4.1 kg, respectively) were again scored and measured for flight speed. The relationships between growth rate from birth to weaning, liveweight at weaning and the two measures of temperament were examined, together with effects of those measures on feedlot performance, and liveweight of steers after a 94 day feeding period. There was no effect ($P>0.05$) of either temperament score or flight speed on liveweight, or growth rate in the Angus or Simmental sired progeny. Both temperament score and flight speed had a significant effect ($P<0.05$) on the Limousin sired cattle (those with higher temperament scores tended to grow faster), and the growth rate of the Hereford sired cattle was also affected by score ($P<0.05$).

Keywords: Temperament score, flight speed, bull breed.

INTRODUCTION

Cattle temperament is a trait that some breed societies are now measuring as a means to breed more docile cattle leading to less stress on both handler and animal. Subjective scoring techniques such as that used by Grandin (1993) are being used to describe/measure temperament by these societies. An objective measure such as flight speed as described by Burrow and Dillon (1997) has also shown to be an accurate measure of temperament.

Whilst temperament of cattle can effect ease of handling and management, an association between temperament has been shown to affect meat quality traits such as bruising and tenderness. In a study using Bos indicus-cross feedlot cattle Voisinet *et al.* (1997b) found that cattle with excitable temperaments have tougher meat and a higher incidence of borderline dark cutters. In another study, Voisinet *et al.* (1997a) has also reported that feedlot cattle with calm temperaments have higher average daily gains than cattle with excitable temperaments. Fell *et al.* (1999) reported that the stress and behavioural response present at weaning may provide the best opportunity to predict the ability of cattle to adapt to an intensive feeding environment.

The objective of the study was to determine if temperament, as measured subjectively by temperament score or objectively by flight speed, had an influence on pre weaning growth, weaning weight or feedlot

performance of progeny sired by either Angus, Hereford, Limousin or Simmental bulls from both Hereford and Angus dams.

MATERIALS AND METHODS

Two hundred and six autumn born Angus (Ang), Hereford (Her), Limousin (Lim) and Simmental (Sim) sired steer and heifer progeny (51, 50, 56, and 49 progeny from each of the sire breeds, respectively) from Hereford and Angus cows were represented in this study at the Pastoral and Veterinary Institute, Hamilton. Twenty-two sires from each of the sire breeds listed above were represented. The cattle were weaned on 30/12/1999 at 314 ± 2.7 kg liveweight (mean ± se). Three weeks post weaning on 20/1/2000 they were scored for temperament (Sc1), and again on 2/2/2000 (Sc2), 9/2/2000 (Sc3), and just prior to entry to a feedlot on 24/7/2000 (Sc4).

At each time of assessment animals were scored for temperament by three independent scorers, using a one to five numeric scale (1 being more docile) while they were being weighed. The temperament score method used was as described by Grandin *et al.* (1993). At each time of temperament assessment, flight speed (measured in seconds) of each animal (Fs1, Fs2, Fs3, and Fs4 respectively) was also measured, on exit from the weighing scales, by electronically timing the time required for each animal to travel between 2 light sensors spaced 1.7 metres apart. Faster times indicated animals with poorer temperament (Burrow *et al.* 1999). On each assessment day no husbandry procedures were carried out, the animals were handled in a similar manner, and scorers maintained similar position and distances from the cattle. After weaning, cattle were supplemented with silage at pasture until the steers entered a feedlot, where they were fed for a period of 93 days. Weaning weight (Weanwt) (adjusted for age) and liveweight change from birth to weaning (GthB-W), and feedlot growth rate (FlotGth) and liveweight (adjusted for age) at feedlot exit (Flotwt) were recorded.

RESULTS AND DISCUSSION

On each occasion of measurement, there was no significant difference between scorer, thus the mean scores on each measurement time were used. Data was initially analysed with general linear regression, using the model y = x + calf sex + dambreed + sirebreed + calf sex.dambreed + calf sex.sirebreed + dambreed.Sirebreed + calf sex.dambreed.sirebreed, (where y is either weaning weight, growth rate to weaning, feedlot endweight, or feedlot growth rate, and x is temperament score, or flight speed). This model was used to test for interactions between temperament, calf sex, dambreed, or sire breed. There was no significant interaction with either calf sex or dambreed and temperament, and these terms were dropped from the model. Significance of the interaction between the temperament term being tested, (either flight speed or temperament score) and sirebreed was tested as sire breed has been shown to significantly influence growth rate and liveweight (Graham *et al.* 2000). It was necessary to transform (Log base e) both the flight speed and temperament score data, thus the coefficient and s.e values are shown in the body of Table 1 are log transformed values.

The temperament scores (mean ± se) averaged over the four assessment times for the Ang, Her, Lim and Sim sires were 1.6±0.05, 1.6±0.05, 2.0±0.05 and 1.8±0.05 respectively, and the mean flight speed (mean ±se, seconds) were 1.3±0.04, 1.4±0.05, 1.2±0.05, 1.3±0.05 respectively. The mean temperament scores recorded in this study, particularly those of the Her progeny were similar to those reported by Hearnshaw and Morris (1984), however the standard error of the means indicate that the

present study has a smaller range. There was no significant effect of any of the temperament measures on growth or liveweight of either the Ang or Sim progeny, however, although inconsistent, temperament score and flight speed influenced both growth rate and liveweight of Lim sired progeny. There was only a significant effect of score on the Her progeny P<0.05. Table 1 shows those terms that were significant (P<0.05). Although the analysis showed significant effects, the variance accounted for in most instances was small, and in most instances the relationships indicated that animals that had higher temperament scores and moved the fastest grew faster and were heavier.

Table 1 Coefficients (±se) and the % variance (%var) accounted for (adjusted R^2), of the different temperament measures, for the sirebreeds, that had a significant influence on weaning weight (Weanwt ; kg), growth rate from birth to weaning (GthB-W; kg/day) liveweight after feedlot feeding (Flotwt;kg) and feedlot growth rate (FlotGth;kg/day)

		Sc1		Sc2		Sc3		Sc4		Fs2		Fs4	
Mean ± se [A]		1.8±0.03		1.7±0.04		1.7±0.04		1.7±0.05		1.3±0.03		1.2±0.02	
Sire		**Coeff**	**se**	**Coeff**	**se**	**Coeff**	**se**	**Coeff**	**se**	**Coeff**	**se**	**Coeff**	**se**
	Weanwt												
Lim	**a**			296.2	±12.3	294.7	±12.11						
	b			45.1	±17.42	45.7	±16.47						
	%var			10.1		11.7							
	GthB-W												
Her	**a**	0.87	±0.035			0.88	±0.028						
	b	0.116	±0.059			0.11	±0.054						
	%var	4.1				4.9							
Lim	**a**			0.86	±0.038	0.85	±0.037						
	b			0.14	±0.054	0.15	±0.051						
	%var			11		13.8							
	Flotwt												
Lim	**a**			498.6	±26.54			518	±11.7			558	±9.21
	b			77.4	±35.92			72.9	±19.7			-79.3	±32.5
	%var			19.9				29.7				13.1	
	FlotGth												
Her	**a**							1.28	±0.05				
	b							-0.35	±0.13				
	%var							22.0					
Lim	**a**							1.03	±0.05	1.16	±0.03	1.17	±0.04
	b							0.25	±0.08	-0.24	±0.11	-0.26	±0.13
	%var							21		11		8.5	

[A] The means are means of the untransformed data

This relationship was consistent with and tended to have a greater influence in the Lim cattle. This is contrary to findings of others, who showed that increased temperament score (Voisinet *et al.* 1997a) or faster flight speed (Burrow and Dillon 1997) resulted in decreased average daily gains. Whilst

there was a range in score (1 - 5) and flight speed (0.5 to 5.4) across the sirebreeds, the mean scores and flight speeds recorded in this study indicate that the animals were relatively docile, which may account for the low value of the variance accounted for. Burrow and Dillon (1997) showed that animals having a flight speed of <0.7 sec. could generally be regarded as temperamental, while animals having a flight speed ≥0.9 could considered as docile. In this present study, a maximum of 7% of animals recorded a flight speed ≤0.7 over the series of tests, with up to 88% having a flight speed of ≥0.9, and thus being classified as docile. Of two cohorts of cattle tested by Burrow and Dillon (1997), the cohort that had 69% of cattle with flight speed scores of ≥0.9 showed no relationship between temperament and feedlot growth. Although there were only small differences between breeds, the Lim progeny tended to have higher temperament scores at 2.0±0.05, with a mean flight speed of 1.2±0.05. The data in the table indicates that these cattle tended to be more responsive in terms of the liveweight/growth rate and temperament relationships.

The cattle used in this study had been tagged and weighed at birth, and were yarded together with their dams on six occasions during mating over a 35 day period in June whilst a synchronised AI program was carried out. They were also yarded between joining and weaning for a 200 day liveweight. The early and pre weaning handling (and by default, training) of these cattle may have led to a more docile temperament, thus decreasing any inherent differences present, (Fordyce *et al.* 1988; Kerr and Wood-Gush 1987).

Fordyce *et al.* (1988) found no effect of temperament on liveweight. Whilst the results in the present study are inconclusive, they do indicate that although not large, breed differences in temperament, liveweight and liveweight change response do exist. More importantly it seems that appropriate early pre weaning handling of breeds of cattle that are recognised as being more temperamental, could produce more docile animals that are not disadvantaged when they are put into a feedlot environment.

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