

THE INFLUENCE OF ABATTOIR LAIRAGE CONDITIONS ON THE BEHAVIOUR AND BRUISING OF CATTLE

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SUMMARY

Each of 4 consignments of prime cattle were divided into 2 groups and kept overnight in similar sized lairage yards of contrasting quietness. Cattle that were rested over-night in a "noisy" yard close to unloading facilities and droving operations were significantly more active than cattle rested in a "quiet" yard on the periphery of the lairage area (activity scores; 2.2 v 1.6; $P < .05$ respectively) and had significantly higher bruise score and more bruises (8.1 v 4.4; $P < .05$ and 2.4 v 1.6; $P < .01$ respectively). It was concluded that the lairage environment can have an appreciable influence on the level of bruising and that those animals most vulnerable to bruising should occupy the quietest yards.

INTRODUCTION

Handling, transport conditions and distance travelled to the abattoir are believed to be major factors determining the level of bruising of slaughter cattle (Korn 1975). The histological ageing of bruises has indicated that a major proportion of bruising can occur after the cattle arrive at the abattoir and the high degree of variability in bruising between consignments of similar cattle (McCausland and Millar 1982) suggests that the bruising may be a consequence of factors within the lairage system.

Previous research (Barnett et al. 1984), indicated that cattle that exhibit chronic physiological stress (elevated blood corticosteroid concentrations) over several days prior to slaughter are more predisposed to bruising than unstressed animals. Thus, part of the variability in bruising observed by McCausland and Millar (1982) and the often inconsistent results of experimental work reviewed by Wythes and Shorthose (1984) may be due to the differences in the level of stress to which the animals are exposed during lairage.

During other work in abattoirs, it was observed that cattle in lairage yards close to areas of continual activity such as unloading and droving operations seemed much more restless than cattle placed in quieter lairage yards. This experiment was undertaken to study the effect of position of lairage yards on cattle behaviour, bruising and meat quality.

EXPERIMENTAL METHOD

Four consignments of 36, 61, 49 and 41 prime cattle were transported 260, 240, 450 and 260 km respectively from farm direct to abattoir. The cattle were received at the abattoir between 1700 and 1900 h and held in lairage until 0730 h the next morning. On arrival, each consignment was placed in a holding yard for 10 to 15 min and then randomly divided into two groups and allotted to

either a "noisy" or "quiet" lairage treatment yard.

The same yards were used for each consignment:-

"Noisy" yard - close to unloading facilities with continuous droving operations past the yard between approximately 1700 and 2200 h.

"Quiet" yard - on the periphery of the lairage area with little movement of other stock taking place nearby.

Treatment groups in each consignment were handled by the same stockman and were removed from their yards at approximately 0730h for slaughter at approximately 0830h with groups taken in random order on the same slaughter chain.

The behaviour of cattle in the yards was monitored by using video cameras mounted above the yards and connected to recorders fitted with time/date generators. Each yard was illuminated at night with three 500 watt flood lights. Records were continuous for the first 3 h and then for 30 min periods at approximately 90 min intervals. Behaviour was assessed by viewing 5 min segments of the complete video records at 9 times normal speed to enhance behavioural differences and scored (0 for no movement to 5 for continuous movement).

All carcasses were assessed immediately after hide pulling for the level of bruising using the Australian Bruise Scoring System (Anderson and Horder 1979). The ultimate pH of meat was estimated by taking a 1-2 g core sample of the *M longissimus dorsi* approximately 30 min post-slaughter and using the freeze-thaw technique described by Warner et al. (1986).

RESULTS

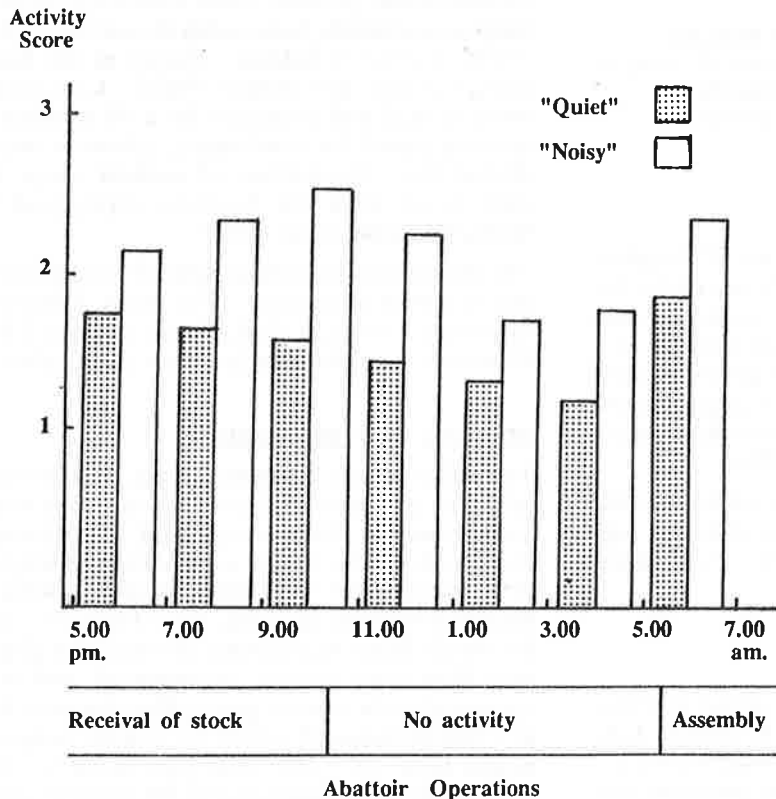
The overall means for hot carcass weight and fat depth at the 12/13th rib were 206 kg and 7.3 mm respectively; the ranges for the 4 consignments were 180 to 242 kg and 3.6 to 9.4 mm respectively. There were no differences between treatments in carcass weight and fat depth.

The cattle in the "Quiet" treatment had significantly ($P.05$) lower activity scores than cattle in the "Noisy" treatment (1.6 v 2.2; *sed* 0.15 respectively) and the difference was most marked during the stock receipt

Table 1. The effect of "Quiet" and "Noisy" lairage yards on bruise score and number of bruises of 4 consignments of cattle.

	Yard	Consignment				Mean	<i>sed</i>
		1	2	3	4		
Bruise score	"Quiet"	1.3	0.6	6.7	8.8	4.4	0.10
	"Noisy"	4.9	2.1	14.4	11.1	8.3	
	Mean	3.1	1.4	10.6	10.0		
Bruise number	"Quiet"	0.7	0.2	2.6	2.7	1.6	0.20
	"Noisy"	1.2	0.7	3.8	3.9	2.4	
	Mean	0.95	0.45	3.20	3.30		

Figure 1. The influence of "quiet" and "noisy" lairage yards and abattoir operations on the activity of cattle.



period (Fig.1). There were no differences in activity scores between consignments of cattle.

Cattle from the "Quiet" treatment had significantly ($P < .05$) lower bruise scores and ($P < .01$) number of bruises than cattle from the "Noisy" treatment (Table 1). Treatment had no effect on the ultimate pH of muscle (5.3 v 5.4 for "Quiet" and "Noisy" treatments respectively). There were significant differences in bruise score ($P < .01$) and number of bruises ($P < .001$) between consignments (Table 1).

DISCUSSION

The results of this experiment demonstrate that the level of bruising in cattle can be influenced by the environment within the abattoir lairage area.

Although no attempt was made to determine the age of bruises it is probable that the difference in bruising between treatment groups was due to the environmental difference between yards. Behaviour records showed no evidence that differences in bruising between treatments occurred during lairage, despite the significant differences ($P < .05$) in activity score and thus the differences due to treatment probably occurred during assembly and handling prior to slaughter.

The observations of Barnett et al. (1984) suggest that the difference in bruising between treatments may be due to cattle from the "Noisy" treatment having a greater propensity to bruise as a result of greater stress prior to slaughter.

The differences in bruising between consignments probably reflects the differences in on-farm and transport management prior to arrival to the abattoir, since all consignments were handled and treated similarly after arrival. Despite the 9 fold difference in bruising between some of the consignments, the response of cattle to the treatments was similar in all consignments. Casual observations of cattle during handling and assemble for slaughter suggested that the heavily bruised consignments of cattle were more difficult to handle.

CONCLUSION

Although handling and transport management factors prior to arrival at the abattoir have a major influence on the overall level of bruising, this study demonstrates that if cattle are given an environment in which they can rest undisturbed for at least 12 h prior to slaughter, the level of bruising can be reduced by as much as 40 percent over animals not given these opportunities. It is suggested that with appropriate planning of receival times and allocation of yards within the lairage area, the level of bruising of prime cattle in particular could be significantly

reduced with little or no increase in cost.

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