BRUISING IN CATTLE TRANSPORTED BY RAIL AT VARIOUS LOADING RATES

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SUMMARY

In four trials, involving 596 cattle, the bruising of cattle transported by rail at various loading rates was compared. In three trials, bullocks were loaded at 17, 18 and 19 animals per K waggon, respectively. In the fourth, cows were loaded at 20 and 21/K, There was no consistent effect of loading rate on mean bruise score, although both the 17 and 19/K groups had higher scores than the 18/K group in trials I and II, while the reverse trend applied in trial III. No differences occurred in trial IV. One death occurred; a bullock among the 19/K group in trial II.

INTRODUCTION

The number of cattle loaded onto the standard Queensland railway (K) waggon is based largely on experience, particularly that of stock carriers and train drovers. For adult cattle, the rates vary from 16 to 25 for steers and bullocks, and from 19 to 24 for cows. Rates depend on the average size and liveweight of the cattle, although it rarely takes account of their horn status. The effect of loading rate on bruising has long been a source of conjecture. There is a temptation, especially on shorter journeys, to include an extra beast and reduce freight costs. On the other hand when cattle are transported long distances, one beast is sometimes omitted to increase the space for other animals. The effect on bruising of various loading rates for cattle transported by rail from western Queensland to coastal abattoirs was examined in four trials.

MATERIALS AND METHODS

In three trials, bullocks were loaded at 17, 18 and 19 animals per railway K waggon. The fourth trial involved cows loaded at 20 and 21/K. Handling procedures at the property, during transit and at the abattoir were similar to those adopted normally for commercial cattle.

Trial I - 162 hornless Shorthorn bullocks were sent 1070 km solely by rail, a 39 h journey, directly to a northern abattoir. There were 3 K/treatment. The bullocks rested for 36 h before slaughter.

Trial II - 162 horned Brahman crossbred and Shorthorn bullocks were walked 22 km to the nearest railhead and rested overnight with water available. They were railed 944 km, a 33.5 h journey, directly to the same abattoir as in the previous trial. There were 3 K/treatment. The bullocks rested for 30 h before slaughter.

Trial III - 108 horned Shorthorn bullocks were transported at the normal loading rate 390 km by road (a 9 h journey) to the nearest railhead and rested for 48 h, with feed and water available. They were railed 1530 km, a 86 h journey that included a 36 h rest midway. There were 2 K/treatment. After a 48 h resting period, the bullocks were slaughtered at a southern abattoir.

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Trial IV - 85 horned and 79 hornless Brahman crossbred and Shorthorn cows were transported at the normal loading rate 190 km by road to the nearest railhead and rested overnight with water available. They were then railed 965 km, a 36 h journey. There were 4 K/treatment. Half the cows in each group were rested once for 31 h during the rail journey, while the others continued directly to a far northern abattoir. Half the cows in each sub-group were slaughtered after resting 36 h and the others after 54 h.

At slaughter, the bruising of each carcass was assessed using the method of Anderson and Horder (1979). Individual trimmed carcass weights were recorded. These data were analysed by standard analysis of variance techniques.

RESULTS

The mean bruise scores are shown in Table 1. There was no consistent effect of loading rate on mean bruise score. Both the 17 and 19/K rates produced more bruising than the 18/K rate in trials I and II, while the reverse trend applied in trial III. No differences occurred in trial IV. Loading rate had no consistent effect on the distribution of bruises over the carcass other than the tendency for the proportion of butt bruising to decrease as the loading rate increased (Fig. 1). In trial IV, the horn status and travelling schedule of the cows did not significantly affect mean bruise score, nor were the interactions of these main effects with loading rate significant.

Table 2 shows the relation between loading rate and carcass weight density (CWD). The floor area of the waggon is 23.8 m^2. While CWD increased with increasing loading rate, the increments between loading rates were highly variable both within and between trials.

One animal in the 19/K group of trial II died in transit and was removed during a subsequent routine inspection stop. Two other animals in this group were visibly distressed.

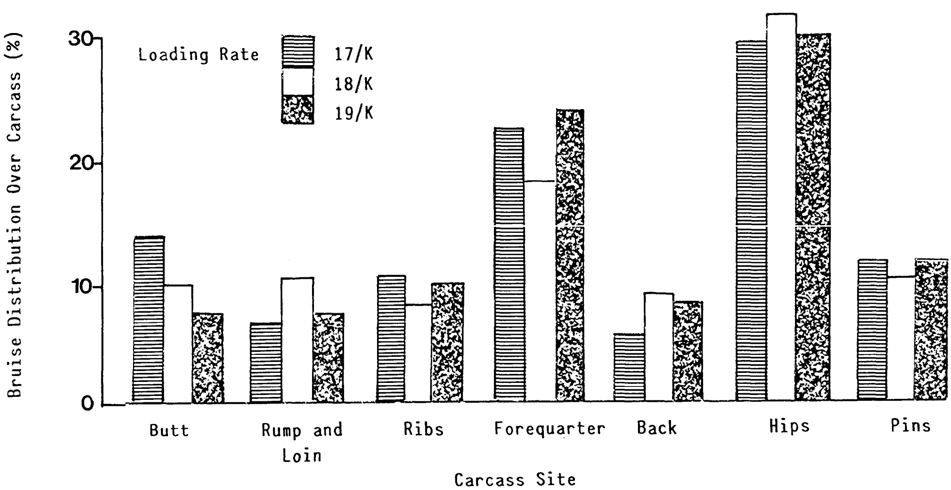

Fig. 1 The distribution of bruises by carcass site for various loading rates for bullocks, trials I, II and III

TABLE 1 The effect of loading rate on mean bruise score of cattle. transported by rail and the mean carcase weights for each trial

Trial	No. and type of animals	Bruise score (pts)			Carcass weight (kg)
	Bullocks	17/K	18/K	19/K	All groups
I	162	13.5[a]	10.3[a]†	15.7[a]	264
II	162	12.9	10.2	11.8	283
III	108	4.2	6.0	5.3	253
	Cows	20/K	21/K		All groups
IV	164	11.8	11.9		177

† Within a trial, mean bruise scores with a common script vary at $P < 0.05$.

TABLE 2 The relation between loading rate and carcass weight density (kg carcass weight/m[2] K waggon floor area)

Trial	Type of Animals	Carcass weight density (kg carcass weight/m[2] K waggon floor area)		
		17/K	18/K	19/K
I	Bullocks	187	205	209
II	Bullocks	208	216	229
III	Bullocks	185	188	201
		20/K	21/K	
IV	Cows	150	156	

DISCUSSION

The two noteable features of our results are the lack of any consistent effect of loading rate on bruising over the range studied and the high variability in CWD. Nevertheless for all bullocks, there was some general tendency for bruise score to increase with increases in CWD, indicating that further research is warranted. In retrospect it could be argued that these cattle were unsuitable for a study involving various loading rates. We would refute this strongly, since our results demonstrate very clearly the difficulty in determining suitable loading rates for cattle with a wide range in age and carcass weight at turn off. Our cattle were typical of those sold from many parts of northern Australia. Variations in CWD, horn status, mode of transport and the level of bruising make it difficult to attribute differences between trials to any particular factors.

The actual effect of loading rate on CWD must depend mainly on the size of the extra animal excluded or included, since naturally, a large animal will occupy much more space than a small one. Even if it was desirable to draft cattle into similar size (liveweight) categories, it would not be practical with cattle from extensive areas. Sale consignments can involve up to 500 cattle of mixed ages and yard facilities for drafting are scarce. Thus the present practice of determining loading rate according to the average size of the animals would seem to be a sound one. In the absence of other evidence this recommendation probably applies to cattle from intensive areas, because the effect of the extra animal will be similar, despite the relatively uniform age, size and carcass weight of cattle.

Our study did not attempt to resolve the question of particular loading rates for groups of cattle of various average carcass weight, but some comment would seem appropriate. Given the common CWD of 201 to 208 for the bullocks, 'normal' loading rates for bullocks with expected average carcass weights of c. 250 kg, c. 260 kg and c. 280 kg may be 19, 18 and 17/K, respectively. Further research is certainly needed on this aspect of transportation.

The death in trial II was the most serious effect of loading rate and occurred at the highest CWD studied in all trials. This death illustrates the problems resulting from an animal going down in an already crowded waggon and the train observer (BA) considered that the early removal of the dead animal prevented further casualties. An increase in the bruising of its companions could have resulted if the animal had remained in the waggon, as the others attempted to retain their footing and avoid the dead animal. The long horns on these bullocks may have contributed, since horned cattle exhibit intense avoidance behaviour during inspection stops (Meischke 1975; Ramsay et al. 1976). The death rate of 0.17% in our trials is comparable with the 0.10% recorded in a recent Queensland rail survey of 97 000 cattle (Jarrett et al. 1982).

It must be stressed that our findings relate only to cattle sent by rail. The extent to which they apply to road transportation is unknown, since most stock crates have at least one internal partition and many have three (J.W. Lapworth, pers. comm.). The loading rate of each compartment must be assessed separately and altering numbers by one beast represents a much greater change in CWD than in rail waggons without partitions.

In considering the wisdom of increasing loading rate, or CWD, it is necessary to weigh up the reduction in freight costs against possible higher bruising and the risk of mortality. On the basis of these results it would seem preferable to continue to use the present 'normal' loading rates until further evidence is available on the effects of various loading rates and CWD on bruising and mortality rates of cattle transported by rail.

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