A TACTILE METHOD MODIFIED TO ASSESS THE FINISH OF BEEF CATTLE IN MARKETABLE CONDITION IN NORTH QUEENSLAND

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SUMMARY

Three methods of assessing the fat finish of marketable beef cattle were compared using *Bos indicus* crossbred cattle. The methods were: the Queensland Livestock Market Reporting Service, the National Beef Recording Scheme and a modified tactile method (MT) of the Meat and Livestock Commission. None of the three methods was able to predict accurately the fat depth at the 13th rib of the carcass. The highest correlation between finish score and fat depth was $r = 0.568$ for one operator using the MT method. However, when data from the MT method were examined it was found that mean fat depth at the 13th rib increased ($P < 0.05$) with increasing finish score in two of the three liveweight categories studied. It is suggested that scoring individual animals on finish is no more accurate than weighing and allocating them to finish categories on the basis of liveweight.

INTRODUCTION

Assessment of fat depth or finish in the live animal is generally subjectively based. Two methods of visual appraisal in common use are the National Beef Recording Scheme method (NBRS) and the Livestock Market Reporting Scheme method (LMRS).

The tactile method of the Meat and Livestock Commission of Great Britain and Northern Ireland (MLC) employs some element of objectivity. Four key locations, namely, the tail head, loin, ribs and chine, are palpated and an assessment of finish made. A modified MLC method (MT) has been developed for use with Brahman cross cattle in north Queensland. Only the loin and ribs are palpated.

There is little documented evidence on how accurately assessments of finish in live animals using the above techniques relate to actual depth of fat over the rib-eye on the carcasses at slaughter. We examined this relationship in beef animals in north Queensland.

MATERIALS AND METHODS

Seventy-eight *Bos indicus* crossbred steers of mean liveweight 452.2 ± 7.1 kg (± SE) and aged 2.5 to 4.5 years were assessed for fat finish by each of three different methods; the MT, LMRS and NBRS. A total of seven operators used the various methods, as shown in Table 2.

Description of the three body condition methods

The LMRS method ranks animals into one of five categories on the basis of a standard visual guide and description of five key sites on the body. A score of 1 is very lean and 5 is very fat. The NBRS method uses a scale of eight points with emaciated being 1 and very fat being 8.

The MT method is described in Table 1. Finish at each handling point is assessed by varying pressure on the two points on the left side of each animal.

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TABLE 1 Description of classes for the two handling points of the modified tactile method

Fat class	Transverse processes of the loin	The spring of the ribs
1	End of transverse process of vertebrae very prominent; individual bones felt as deep corrugations.	Ribs are prominent, clearly visible and are felt as deep corrugations.
2	End of transverse processes prominent. Individual bones are felt as corrugations.	Some fat cover is detectable ove the bones but individual ribs are felt easily as corrugations
3	End of transverse processes slightly rounded by fat, felt with light pressure.	Thin layer of fat is felt over the bones. Individual ribs felt with light pressure.
4	Ends of individual transverse processes are felt only with moderate pressure.	Distinct layer of soft fat is felt over the bones. Individua ribs are felt only with moderat pressure.
5	Transverse processes are felt only with firm pressure.	Thick soft fat covers ribs. Individual ribs are felt only with firm pressure.
6	Individual transverse processes cannot be felt.	Rib cage is smooth to the touch with a tendency to patchiness. Individual ribs cannot be felt.

Procedure

Animals were yarded, weighed unfasted and their finish assessed by each method on day 1. They were transported to the meatworks on day 2, slaughtered or day 3 and carcass weights collected. Subcutaneous fat depth was measured 24 h post-slaughter between the 12-13th ribs on each side of the carcass using the Australian Beef Carcass Appraisal System.

Statistical analysis

Serial and partial correlations were calculated using the formulae of Snedecor and Cochran (1967). Analysis of variance was carried out on fat depth measurements for each liveweight range. Differences between score means were tested using the least significant difference method.

RESULTS

The mean carcass fat depth at the 12th rib was 4.49 ± 0.30 mm (± SE) with a range of 1-14 mm. Correlations between finish score and subcutaneous fat depth were moderate to low in this observation (Table 2).

When partial correlation was adjusted for breed as well as final liveweigh this gave similar results to those in Table 2. A simple correlation coefficient of $r = 0.539$ ($P < 0.01$) was found between final liveweight and fat depth.

TABLE 2 Partial correlations (r), adjusted for full liveweight before slaughter of 12th/13th rib subcutaneous fat depth with finish score using three methods and a number of operators

Method	Partial correlations Operator						
	A	B	C	D	E	F	G
NBRS	0.525	-	0.442	0.493	-	0.370	-
LMRS	0.420	0.494	0.465	0.474	-	-	-
MT	-	-	-	-	0.548	0.473	0.564

When $r \geq 0.222$, then $P < 0.05$
When $r \geq 0.289$, then $P < 0.01$

As the MT method gave slightly better correlations between finish score and fat depth, the mean fat depth for a given score over three liveweight ranges is given in Table 3. Mean fat depth increased as the score increased and the difference between scores was significant ($P < 0.05$) in the two heavier liveweight ranges. There were small differences between operators, but these were not significant.

TABLE 3 Finish assessed by three operators using the MT method for four categories compared with the mean subcutaneous fat depth for three final liveweight ranges

Liveweight range (kg)	Fat depth (mm) Score 2	3	4	5	SD
290-400	1.65[†] (5)[‡]	1.82 (7)	3.13 (2)	-	0.68
401-480	1.00[a] (1)	2.48[a] (12)	5.17[b] (15)	6.22[b] (9)	1.84
481-560	-	3.85[a] (5)	5.57[ab] (14)	7.66[b] (8)	2.52

[†] Means within a row without the same superscript differ significantly ($P < 0.05$).
[‡] Number of animals.

DISCUSSION

In our study, none of the operators using any of the methods of assessing finish in the live animal was able to predict accurately the carcass fat depth of individual animals. They were no more accurate with any one method than with any other. There was considerable variation between operators in their ability to assess animals, with the range in correlations between finish and carcass fat depth being 0.37 to 0.56. This result agrees closely with Holland (1979) who reported low correlations of 0.20 to 0.52. The inaccuracy in our assessments was possibly due to lack of experience of the operators rather than any inherent flaws in the three methods. This conclusion is supported by previous work of Lewis *et al.* (1968). They found that experienced operators were able to detect 75% of the variation in fat depth whereas inexperienced personnel were only half as effective. Alternatively, our cattle had too narrow a range of fat depths for differences to be detected between animals.

Merely weighing animals was as accurate as scoring them on finish. Thus allocating animals on the basis of liveweight may be as accurate as the use of any of these scoring methods. Under commercial conditions it is easier to weigh animals than to appraise them individually, particularly using the MT method. It is noteworthy that while carcass fat depth is highly correlated with carcass composition (Ramsey *et al.* 1962; Butterfield 1965), it was only moderately related to liveweight. Furthermore our value of 0.54 tends to be higher than most, with reported correlations varying from 0.23 (McReynold and Arthaud 1970) through 0.31 (Shelby *et al.* 1963) to 0.52 (Wood *et al.* 1979).

Recent work using the MLC tactile method indicated that body condition scoring of cows was a useful adjunct to their nutritional management (Frood and Croxton 1978). As our MT method has not been investigated in cows, further research would seem warranted.

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