

THE ACCURACY OF RUMP P8 FAT THICKNESS AND TWELFTH RIB FAT THICKNESS IN PREDICTING BEEF CARCASS FAT CONTENT IN THREE BREED TYPES

D.C. TAYLOR^A, E.R. JOHNSON^B and L. KNOTT^B

^A Dept of Animal Production, The University of Queensland, Gatton, College, Lawes, Qld 4343

^B Dept of Farm Animal Medicine and Production, The University of Queensland, PO Box 125, Kenmore, Qld 4069

SUMMARY

The prediction of carcass fat percentage using fat thickness measurements at the 12th rib and the rump P8 site was investigated in Hereford, Brahman and Brahman x Hereford F1 steers. The carcasses used in this work had a commercially representative range in carcass weights from 92-361 kg, 12th rib fat thicknesses from 0-31mm, P8 fat thicknesses from 0-27mm and carcass fat contents from 10.6-32.8%. Although some minor differences were evident in the slopes of the regression lines which related fat thickness to carcass fat content, it was concluded that the 2 fat thickness measurement sites used provided similar accuracy for the prediction of carcass fat percentage in each of the 3 breeds.

Keywords: cattle, breeds, fat thickness, carcass fat, prediction

INTRODUCTION

It is 35 years since Murphy *et al.* (1960) reported on the close association between a fat thickness measurement at the 12th rib and the cutability of a beef carcass. This was followed by a number of reports relating fat thickness at the 10th or 12th rib to carcass fat content (eg Ramsay *et al.* 1962; Brungardt and Bray 1963; Butterfield 1965; Charles 1974).

More recently attention has been directed to identifying and evaluating other sites on the beef carcass where the fat thickness measurement may be taken (eg Johnson and Vidyadaran 1981; Meehan and Taylor 1988; Taylor *et al.* 1992). These studies have concluded that there are many sites on a beef carcass where fat thickness measurements may be taken to give a reliable prediction of carcass fat content.

Some breed differences have been reported (Johnson and Ball 1988; Ball and Johnson 1989) in the relationship between fat thickness at either the 12th rib or the P8 site and carcass yield. Hopkins *et al.* (1993) reported that breed type influenced the relationship between fat thickness measurements taken at the 12th rib site and at the P8 site.

The current study was undertaken to determine if the relationship between fat thickness and carcass fat content was influenced by breed type. The three genotypes used in this study represent those most commonly used for commercial beef production in Australia.

MATERIALS AND METHODS

The 78 carcasses used in this study were derived from 26 Brahman, 27 Hereford and 25 Brahman x Hereford F1 steers which were all grass-fed. The steers were slaughtered and dressed using conventional procedures with care being taken with skinning, particularly at the fat thickness measurement sites. The procedures described by Taylor *et al.* (1992) were used to measure the fat thickness at the rump P8 site and the 12th rib site. One side of each carcass was dissected into bone, muscle, fat and connective tissue and the weights of each of these tissues were recorded.

Statistical analysis was carried out on the data using standard analysis of variance and linear and quadratic regression procedures.

RESULTS

The general carcass characteristics for the 3 breed types are shown in Table 1.

Table 1. Carcass characteristics of the 3 breed types

Trait	Hereford		Brahman		BrahxHer	
	Mean	Range	Mean	Range	Mean	Range
Carcass wt. (kg)	227.8	92-361	242.6	118-337	225.0	98-346
R12 FT (mm)	6.5	0-17	7.3	0-31	4.1	0-11
P8 FT (mm)	9.3	1-27	8.6	0-19	6.8	1-18
Carcass fat (%)	20.8	10.8-32.8	19.2	10.6-30.8	17.3	10.8-25.7

R12 FT - fat thickness at 12th rib ; P8 FT - fat thickness at rump P8.

When linear regression analysis was applied to the data to test the relationship between the fat thickness measurements and carcass fat percentage for all 78 carcasses and for the individual breeds, the information contained in Table 2 was produced.

Table 2. Relationship between fat thickness measurements and carcass fat content for all carcasses and for the individual breeds

	R12 F T ^A		P8 F T ^A	
	RSD (%)	R ²	RSD (%)	R ²
All carcasses	3.03	0.70	3.13	0.68
Hereford	3.63	0.54	3.43	0.59
Brahman	2.86	0.82	2.60	0.85
BrahxHer	2.12	0.69	2.46	0.59

^AAll regressions significant ($P < 0.001$).

When quadratic regression analysis was applied to the data, results similar to those achieved by linear regression (Table 2) were produced, indicating that there was no advantage using quadratic procedures.

Figures 1 and 2 illustrate the relationship between the fat thickness measurement and carcass fat content for the 3 breeds used in this study.

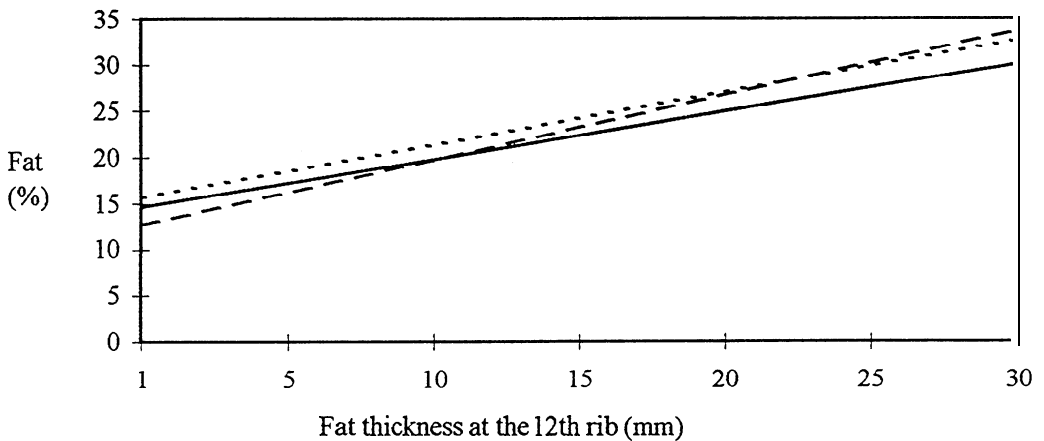


Figure 1. The relationship between total carcass fat and fat thickness at the 12th rib in 3 breeds of cattle (----- Brahman Hereford — Brahman x Hereford)

DISCUSSION

It is evident from the data presented in Table 1 that commercially representative ranges in carcass weights, fat thicknesses and cattle breed types were used in this study. When the relationship between the measurement of fat thickness at each of the sites studied and carcass fat content was analysed it was apparent that the 12th rib site and the rump P8 site are very similar in their ability to predict total carcass fat percentage. This is in accordance with the findings of Johnson (1987), who reported that the 12th rib site and the rump P8 site performed equally well in the prediction of fat content of lightweight carcasses.

There was no clear indication from the results presented in Table 2 that one of the fat thickness measurement sites was superior or inferior to the other in predicting carcass fat content between the breed groups studied. There were some differences in the slopes of the regression lines for the 3 breed groups, as shown in Figures 1 and 2, but analyses of regression show that both 12th rib and rump P8 fat thickness measurement positions were of approximately equivalent value in predicting carcass fat content in these 3 breeds. Charles and Johnson (1976) reported that at a constant 12th rib fat thickness Hereford carcasses had

significantly less total dissected fat than Friesian and CharolaisX carcasses, but the slope of the regression lines between these 2 variables was similar for the breed types studied.

The work reported by Hopkins *et al.* (1993) investigated the relationship between the measurements of fat thickness at the 12th rib and at the P8 sites in breed types representing British beef, beef cross and dairy. They found some differences between the breed types in this relationship, but did not relate either of the fat thickness measurements to dissected carcass fat as has been done in the current work.

ACKNOWLEDGEMENTS

This study was financed by grants from the Meat Research Corporation. We are indebted to Mrs P. Allen and Mr D. P. Meehan for technical assistance.

REFERENCES

- BALL, B. and JOHNSON, E.R. (1989). *Aust. J. Exp. Agric.* 29: 483-87.
BRUNGARDT, V.H. and BRAY, R.W. (1963). *J. Anim. Sci.* 22: 177-82.
BUTTERFIELD, R.M. (1965). *Res. Vet. Sci.* 6: 24-32.
CHARLES, D.D. (1974). *Res. Vet. Sci.* **16**: 89-94.
CHARLES, D.D. and JOHNSON, E.R. (1976). *J. Anim. Sci.* 42: 332-41.
HOPKINS, D.L., BROOKS, A.A. and JOHNSTON, A.R. (1993). *Aust. J. Exp. Agric.* 33: 129-33.
JOHNSON, E.R. (1987). *Aust. J. Exp. Agric.* 27: 613-17.
JOHNSON, E.R. and BALL, B. (1988). *Proc. 34th ICOMST*, Brisbane. 71-73.
JOHNSON, E.R. and VIDYADARAN, M.K. (1981). *Aust. J. Agric. Res.* 32: 999-1007.
MEEHAN, D.P. and TAYLOR, D.G. (1988). *Proc. Aust. Soc. Anim. Prod.* **17**: 440.
MURPHY, C.E., HALLETT, D.K., TYLER, W.E. and PIERCE, J.C. (1960). *J. Anim. Sci.* **19**: 1240.
RAMSAY, C.B., COLE, J.W. and HOBBS, C.S. (1962). *J. Anim. Sci.* **21**: 193-95.
TAYLOR, D.G., JOHNSON, E.R. and PRIYANTO, R. (1992). *38th ICOMST*, Clermont-Ferrand. 979-82.