PREDICTION OF CARCASS MUSCLE USING SHIN AND SHANK MEASUREMENTS

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In the U.S.A. shin muscles in cattle are sometimes visually appraised to indicate the degree of muscling in the live animal and the carcass. The technique appears logical because the shin muscles are covered by a relatively thin layer of skin and have only minimal deposits of fat. This paper examines the relationship between shin and shank measurements, and carcass muscle.

The right side of 60 beef carcasses (15 each of Hereford (H), Brahman (B), Brahman x Hereford Fl (BH) and Simmental x Hereford Fl (SH)) was totally dissected into muscle, bone, fat and connective tissue after circumference and length measurements were made on the shin and shank at anatomically defined positions. The weights of the trimmed shin (foreleg) and shank (hindleg) muscles were recorded. Simple and multiple regression analyses were used to examine the value of the various shin measurements predicting total side muscle (Table 1).

Table 1. Prediction of total side muscle showing significance of independent variables (predictors) in regression equations ($n = 60$)

HCW, hot carcass weight; SMW, weight of shin muscles

Predictor	Total side muscle (kg)			Total side muscle (%)		
	Significance	R^2	r.s.d.	Significance	R^2	r.s.d
Shin circumference	**	0.13	9.77	*	0.08	4.28
Shin length	n.s.	0.004	10.47	n.s.	0.05	4.35
Shin circumference + shin length	**, n.s.	0.16	9.71	**, *	0.16	4.12
Shin circumference + HCW	*, **	0.53	7.25	**, **	0.19	4.04
HCW	**	0.49	7.46	*	0.07	4.30
SMW	**	0.24	9.15	**	0.29	3.75
SMW + HCW	**, *	0.63	6.42	**, **	0.42	3.43

*$P < 0.05$; **$P < 0.01$; n.s. not significant.

Within-breed analyses showed that, of the shin measurements, only the constants in the equations shin length + hot carcass weight (HCW) in SH cattle, and shin circumference + HCW in BH cattle, were significant, the former predicting carcass muscle weight ($R^2 = 0.81$, r.s.d. = 4.71 kg) and the latter predicting percentage carcass muscle ($R^2 = 0.38$, r.s.d. = 2.48%). The equation using weight of shin muscles (SMW) + HCW in Herefords was the only relatively accurate predictor of carcass muscle weight ($R^2 = 0.74$, r.s.d. = 3.35 kg) and percentage carcass muscle ($R^2 = 0.72$, r.s.d. = 1.95%). Shank measurements gave very similar findings.

Shin measurements, both breed-ignored and within-breed were poor predictors of carcass muscle. Only SMW + HCW gave relatively accurate prediction, indicating that dissection of the shin is necessary to obtain a satisfactory result.