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Introduction

The Agricultural Marketing Service proposed a revision to the yield grade standards to provide the industry with an option regarding the retention or removal of kidney and pelvic fat (KPF) depending on market requirements. The proposal was subsequently withdrawn. The present yield grades are determined by consideration of external fat thickness, hot carcass wt, ribeye area, and estimated percent KPF. The proposed revision would eliminate consideration of KPF in the determination of yield grades.

The present study used 2,550 observations of retail yield of carcasses obtained from steers with genetically diverse growth rates and fattening characteristics to: 1) examine by yield grade the frequency, mean yield grade, and mean cutability for the present USDA 1980 equation, the present USDA 1980 equation omitting KPF, and the proposed newly developed equation (USDA 1984); and 2) compare precision of the USDA 1980 equation and the proposed equation (USDA 1984) for estimating yield.

Procedure

Carcass sides from F_1 steers from the MARC Germ Plasm Evaluation Program were grouped as British (Angus, Hereford, Red Poll, or South Devon; n = 934), Continental (Charolais, Limousin, Chianina, Brown Swiss, Simmental, Gelbvieh, Maine Anjou, Pinzgauer, or Tarentaise; n = 1,214), Zebu (Brahman or Sahiwal; n = 269), or Jersey (n = 133) sire breeds with Hereford or Angus dams. Steers were fed *ad libitum* on a corn silage and concentrate diet that averaged 2.8 Mcal metabolizable energy/kg dry matter over the finishing period. Each year steers were slaughtered at one of three to five slaughter dates that ranged from 190 to 300 days postweaning.

Yield grade (Y) classifications for carcasses were determined by three equations: 1) the four-variable equation (Y_a) on which the present standards are based (USDA 1980) = 2.5 + 2.50 adjusted fat thickness (AFT), in + .0035 hot carcass wt (HCW), lb - .32 ribeye area (REA), in^2 + .2% kidney, pelvic, and heart fat (KPF); 2) Y_b = present equation with intercept changed to 3.2 and KPF coefficient omitted; and 3) Y_c (proposed; USDA 1984) = 3.0 + 2.50 AFT + .00186 HCW - .202 REA. Frequency distribution of carcasses within yield grades by each prediction equation was determined over all breed crosses and within each breed-cross grouping.

Results

Frequency, mean yield grade, and mean cutability for each estimating equation (a through c) by yield grade are given in Table 1. Average cutability of carcasses was 2 percentage points (44.9 *vs* 46.9) greater when KPF was omitted. Mean cutability within yield grade 1 was .7 of a percentage point greater for equation Y_c than for equation Y_b. Within yield grade 5, however, mean cutability was 1.0 percentage point less for equation Y_c than for equation Y_b. Only .1 of a percentage point difference in cutability was observed between equations Y_c and Y_b within yield grade 2. Therefore, cutability percentages of carcasses classified by equation Y_c tend to be greater in yield grades 1 and 2 and are less in yield grades 3, 4, and 5 as compared with equation Y_b.

Variation in cutability (SD) was similar among yield grade classes within equations, as well as among the three equations.

Frequency distribution of carcasses within yield grade scores differed among the three estimating equations (Table 1). Percentage of carcasses within yield grade 3 remained about the same among the three equations. However, increases in percentage of carcasses with yield grade 2 were observed for equations Y_b and Y_c (30.1 *vs* 37.7 and 43.4%). Equation Y_c produced a greater shift of carcasses into yield grade 2 than did equation Y_b. A shift in percentage carcasses from yield grade 1 to yield grade 2 was observed for equation Y_c. USDA (1984) evaluated the potential shift on a population of 5,846 carcasses. The proposed equation Y_c increased the frequency of carcasses within yield grade 3 by 10.5 percentage points, and there was a concomitant decrease in the number of carcasses in yield grades 1, 2, 4, and 5.

Correlations (not tabulated) between cutability (C) and yield grades indicate that estimative equations Y_a and Y_c were about equal in accounting for variation in percentage cutability, but equation Y_b accounted for slightly less variation. The correlations and standard deviations of cutability from regressions were: .825 and 1.47% for C_a on Y_a; .795 and 1.53% for C_b on Y_b; and .818 and 1.45% for C_c on Y_c. The correlation between cutability without KPF and cutability with KPF (C_a and C_c) was .982. Therefore, after removal of the avg effect of the 2% difference in cutability associated with KPF, the two methods (Y_a and Y_c) of computing cutability had similar accuracy as measures of yield; Therefore, changes in procedures for estimating yield of carcasses should be based on economic considerations.

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[2]The full report of this work was published in J. Anim. Sci. 63:1134-1139.

Table 1—Yield grade frequency (F,%), mean yield grade ($\bar{Y}$), and mean actual cutability ($\bar{C}$,%)

Yield grade	Estimating equation[a]											
	Equation a				Equation b				Equation c			
	F	$\bar{Y}$	$\bar{C}$	SD[b]	F	$\bar{Y}$	$\bar{C}$	SD[b]	F	$\bar{Y}$	$\bar{C}$	SD[b]
1	6.3	1.65	48.7	1.6	5.3	1.72	50.4	1.6	2.3	1.81	51.1	1.5
2	30.1	2.55	46.8	1.6	37.7	2.57	48.4	1.6	43.4	2.60	48.5	1.6
3	46.2	3.44	44.3	1.7	45.2	3.42	46.1	1.7	47.5	3.39	45.7	1.7
4	15.9	4.34	41.9	1.6	10.8	4.30	43.4	1.6	6.4	4.28	42.6	1.5
5	1.5	5.32	39.2	1.7	1.0	5.33	40.5	1.6	.4	5.32	39.5	1.2
Avg		3.23	44.9	2.6[c]		3.12	46.9	2.5[c]		3.08	46.9	2.5[c]

[a]Estimating equation Y_a = USDA (1980); Y_b = USDA (1980) with intercept adjusted to 3.2 and coefficient for KPF deleted; Y_c = USDA (1984) proposal.
[b]Standard deviation (SD) represents variation in cutability within a yield grade class.
[c]Standard deviation of individual observations about the overall mean.