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A STUDY OF ADJUSTMENT FACTORS
FOR THE WEANING WEIGHTS OF
HEREFORD AND ANGUS CALVES

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ABSTRACT

From the files of the Beef Cattle Weight Gain Performance Recording Scheme of the New Zealand Meat Producers Board and the New Zealand Wool Board, the weaning weights of 7771 Hereford calves born in 18 herds, and 16666 Angus calves born in 37 herds, from 1964 to 1972, were analysed. Objectives of the study involved estimation of the effects of age and sex of calf, and age of dam, in order that methods of adjustment currently used in the National Beef Recording Service for these environmental influences could be evaluated.

Each calf was classified according to herd, year of birth, age-of-dam group, and sex, with age at weaning as a covariate. The data were analysed within breeds by least squares to investigate the main effects of these five factors and the first-order interactions among herd, year, age-of-dam group, and sex effects. The importance of each interaction was examined by comparing the proportionate reduction in intra-class residual variation after all main effects had been fitted.

The results of the analyses of main effects indicated that for each breed, all effects contributed to more than a 2 percent reduction in intra-class residual variance. The results of the interaction analyses showed that only the herd \times year interaction for Hereford calves, and the herd \times year and herd \times sex interactions for Angus calves, contributed to at least a 2 percent reduction in residual variance after all main effects had been fitted.

Within-subclass linear regression coefficients of weight on age at weaning for Hereford and Angus calves, were 0.70 ± 0.01 and 0.62 ± 0.01 kg/day, respectively. Least-squares estimates for sex indicated that the weaning weights of Hereford and Angus males were heavier than those of females by 29.8 and 25.6 kg, respectively. Estimates for age of dam indicated that the weights of Hereford calves out of dams of 2, 3, 4, 5 and, 10 years of age and older, deviated from the weights of Hereford calves out of mature dams (6 to 9 years-old) by 33.3, 17.6, 8.7, 3.8 and 2.2 kg, respectively. The corresponding deviations for Angus calves were 22.7, 15.2, 7.9, 5.4 and 1.4 kg. Estimates for age-of-dam effects were also obtained by best linear unbiased estimation procedures from the records of 7698 Hereford calves out of 2901 dams, and 14198 Angus calves out of 5086 dams. Differences in the estimates of deviations of non-mature from mature dam age groups

derived by least squares and by best linear unbiased estimation, were in general relatively small.

In relation to the procedure currently used in the National Beef Recording Service, alternative adjustment procedures derived for age at weaning involved additive and multiplicative applications of linear regression of weight on age for each breed. The current procedure, for both breeds, was the least effective in reducing the dependence of adjusted weight on age, whilst the procedure additively applying linear regression of weight on age was the least effective in reducing intra-class residual variance.

Adjustments determined for age-of-dam effects by least squares and by best linear unbiased estimation, were considered to differ only slightly from current industry adjustment factors, with the exception of factors applicable to Angus calves out of 3-year-old dams. Examination of the variances within age-of-dam groups, and of the reductions in residual variances within herd-year-sex subclasses, indicated the applicability of additive, rather than multiplicative, adjustment factors for each breed.

Comparisons of additive and multiplicative adjustment factors for sex effects were varied. Multiplicative adjustments were more appropriate in equalizing variances within sex groups, whilst additive adjustments were more appropriate in reducing residual variance within herd-year subclasses.

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