A STUDY OF THE GROWTH AND MATERNAL PERFORMANCE OF NGUNI AND CROSSBRED BRAHMAN AND SIMMENTAL CATTLE IN SWAZILAND

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ABSTRACT

Growth data extracted from the calf (1832) and cow (1333) record files of the Data Processing Unit - Ministry of Agriculture and Co-operatives in Swaziland were analysed. The study considered records of calves born during the period 1975 to 1978 in three Government breeding stations: Mpisi (Station 1), Lowveld (Station 2) and Highveld (Station 3). Husbandry and management procedures employed on the stations have been standardised and cattle are raised on natural pastures.

The breeds and crossbreds involved were Nguni (N), Brahman (B), Simmental (S), and B x N, S x N crosses and grades. The breed groups were not represented in all stations. The calf-breed groups were:- Station 1 (444): N (108), B (121), ¾-B (114), and ⅞-B (101). Station 2 (916): N (138), ½-B (423), ¾-B (308), and ⅞-B (47). Station 3 (472): N (155), S (182), ¼-B (46), ½-S (45), ¾-S (17) and ⅞-S (27).

The birth weight (BWT), weaning weight adjusted to 210-days (WWT), and 18-month weight adjusted to 540-days (18-MTH WT) of a total of 1832 animals were analysed within stations by least squares to investigate the effects of breed/cross, sire (within breed), breed of dam, year, month of birth, age of dam, sex, and breed x year, breed of dam x year, and sire x breed of dam interactions. The results indicated that breed of calf

had a highly significant effect on all the traits at each station, ($P < 0.01$). In Station 1, the breeds ranked: $\frac{3}{4}$-B, $\frac{5}{8}$-B, B, and N for the three weights. The crossbreds were up to 3.4, 29.1 and 32.5 kg heavier than the N, and 1.9, 14.0, and 11.5 kg heavier than the B in BWT, WWT, and 18-MTH WT, respectively. Straightbred B were 6 to 9 percent superior to the N in growth to 18 months. Breed x year interactions were non-significant.

In stations 2 and 3, the interaction of breed with year was important for all traits. Some rank changes occurred between the crossbreds in each of these stations, but the crossbreds were generally heavier than the straightbreds. In Station 2, the $\frac{1}{2}$-B were, on average, 4.3, 27.3, and 46.1 kg heavier than the N in BWT, WWT, and 18-MTH WT, respectively. The $\frac{3}{4}$-B were heavier ($P < 0.01$) than the $\frac{1}{2}$-B in WWT and there were no consistent differences among the crosses in 18-MTH WT. In Station 3, $\frac{1}{2}$-S were, on average, 3.6, 24.3, and 33.0 kg heavier than the N in BWT, WWT, and 18-MTH WT, respectively. Straightbred S and $\frac{7}{8}$-S were up to 10.6 kg (38%) heavier ($P < 0.01$) than the N at birth and $\frac{1}{2}$-S were up to 11 percent superior to $\frac{1}{2}$-B in growth to 18 months.

Sire effects were non-significant for BWT and WWT, but highly significant for 18-MTH WT in Station 1. In Station 2, sire effects were highly significant for

all traits. Breed of dam effects were significant for BWT and WWT in Station 1, and for WWT only in Station 2. Progeny of crossbreds were heavier ($P < 0.01$) than those of straightbreds. Breed of dam x year and sire x breed of dam interactions were not significant.

Results on the effects of the environmental factors have indicated that year, month of birth, age of dam, and sex are important sources of variation in growth to 18 months of age. A compact calving season and regulation of the breeding season to prevent cows from calving down after November was recommended.

Comparisons of the maternal performance of the cow-breeds indicated that crossbred cows were 7 to 25 percent superior to straightbreds in weight of calf weaned. Brahmans were 9 percent better than N cows. There were no significant differences between $\frac{1}{2}$-B and $\frac{3}{4}$-B cows.

Heritabilities and genetic correlations were estimated by the paternal half-sib method. Heritability estimates were in the range 0.06 to 0.29, 0.09 to 0.12, and 0.18 to 0.53 for BWT, WWT, and 18-MTH WT, respectively. Genetic correlations were all positive, but most of the values were greater than 1. Pooled phenotypic correlations were 0.27, 0.21 and 0.67 for BWT-WWT, BWT-18-MTH WT, and WWT-18-MTH WT, respectively.

Repeatability of WWT was estimated within cow-breed by the intra-class correlation (Station 1) and the regression of later on earlier records (Station 2) methods. The estimates ranged from 0.24 to 0.39.

Investigation of the feasibility of changing the performance testing age from 18 to 14 months in the breeding stations indicated that there was insufficient data on which reliable genetic parameter estimates could be based. More work is required to provide an answer to this problem.

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