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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 crossbreeds 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),  $\frac{1}{2}$ -B (114), and  $\frac{3}{4}$ -B (101). Station 2 (916): N (138),  $\frac{1}{2}$ -B (423),  $\frac{3}{4}$ -B (308), and  $\frac{5}{8}$ -B (47). Station 3 (472): N (155), S (182),  $\frac{1}{2}$ -B (46),  $\frac{1}{2}$ -S (45),  $\frac{3}{4}$ -S (17) and  $\frac{5}{8}$ -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:  $\frac{1}{2}$ -B,  $\frac{1}{4}$ -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  $\frac{1}{4}$ -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  $\frac{1}{4}$ -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  $\times$  year and sire  $\times$  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 H 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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## TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT	ii
ACKNOWLEDGMENTS	vi
TABLE OF CONTENTS	viii
LIST OF TABLES	xi
LIST OF FIGURES	xiv
<u>Chapter</u>	
ONE	INTRODUCTION
	2
TWO	EFFECTS OF TEMPERATURE
	9
	2.1 Factors influencing the growth Performance of Beef cattle
	9
	2.1.1 Factors influencing pre- weaning growth traits
	10
	(i) Genetic Factors
	11
	(ii) Non-Genetic Factors
	21
	2.1.2 Factors influencing post- weaning growth traits
	43
	(i) Genetic Factors
	44
	(ii) Non-Genetic Factors
	49
	2.2 Genetic and Environmental Relationships Among Some Beef Cattle Growth Traits
	59
	2.2.1 The heritability of growth traits
	58
	(i) The Heritability of Pre-weaning Growth Traits
	61
	(ii) The Heritability of Post-weaning Growth Traits
	72
	2.2.2 The genetic and phenotypic relationships between beef cattle growth traits
	79

	<u>Page</u>
(i) The Genetic and Phenotypic Relationships between Pre-weaning Growth Traits	82
(ii) The Genetic and Phenotypic Relationships between Pre-weaning and Post-weaning Growth Traits	89
(iii) The Genetic and Phenotypic Relationships between Post-weaning Growth Traits	93
2.2.3 The repeatability of pre-weaning performance	98
<b>THREE MATERIALS AND METHODS</b>	<b>105</b>
3.1 Materials	105
3.1.1 The breeding stations	105
3.1.2 Source of data - The data processing unit system	108
3.1.3 The data	110
(i) Data Extracted from the Calf Record Files	110
(ii) Data Extracted from the Cow Record Files	112
3.2 Statistical Methods	113
3.2.1 Analysis of growth records	113
(i) Introduction	113
(ii) The Mathematical Models and Solutions to the Least Squares Equations	114
(iii) Estimation of Phenotypic Correlations	121
(iv) Estimation of Genetic Correlations and Heritabilities	122

	<u>Page</u>
3.2.2 Analysis of the cow records	130
(i) The Mathematical Model and Analysis Procedures	130
(ii) Estimation of Repeatability	131
(a) The Variance Component Technique	131
(b) The Regression Method	134
 FOUR RESULTS AND DISCUSSION	 136
4.1 Environmental Influences on Birth Weight, Weaning Weight, and 18-month Weight	136
4.1.1 Birth weight	136
4.1.2 Weaning weight	144
4.1.3 18-month weight	145
4.1.4 Discussion	146
4.2 Genetic Influences on Birth Weight, Weaning Weight, and 18-month Weight	152
4.2.1 Station 1	152
4.2.2 Discussion	157
4.2.3 Station 2	161
4.2.4 Discussion	168
4.2.5 Station 3	170
4.2.6 Discussion	177
4.3 Maternal Performance of Nguni, Brahman, and Crossbred Cows	185
4.3.1 Station 1	185
4.3.2 Station 2	189
4.4 Heritability, Genetic and Phenotypic Correlations and Repeatability Estimates	192
4.4.1 Heritability	192
4.4.2 Genetic and phenotypic correlations	197

	<u>Page</u>
4.4.3 Repeatability estimates	201
4.5 The Association Between 14- and 18-Month Weight	207
FIVE CONCLUDING DISCUSSION	212
BIBLIOGRAPHY	222
APPENDICES	246

## LIST OF TABLES

<u>Table</u>	<u>Page</u>
2.1 The Birth weight of some Beef Cattle breeds	13
2.2 The Correlation between Weight of Dam and Birth weight of Calf	26
2.3 Correlations of Calf Average Daily Gain and Weaning weight with Dam's Milk Yield	31
2.4 Some Estimates of the Heritability of Birth weight	63
2.5 Some Estimates of the Heritability of Pre-weaning Growth rate (9 to 270 days)	66
2.6 Some Estimates of the Heritability of Weaning weight (6 to 9 months)	69
2.7 The Heritability Estimates of some Post-weaning Growth Traits	75
2.8 Some Estimates of Genetic and Phenotypic Correlation of Birth weight with Pre-weaning Growth and Weaning weight	83
2.9 Some Estimates of Genetic and Phenotypic Correlation of Birth weight with Post-weaning Growth Traits	85
2.10 Some Estimates of the Genetic and Phenotypic Correlation of Weaning weight with Pre- and Post-weaning Growth	87
2.11 Some Estimates of the Genetic and Phenotypic Correlation between Weaning weight with later weights	94
2.12 Some Estimates of the Genetic and Phenotypic Correlation between some Post-weaning Growth Traits	96
2.13 Some Repeatability Estimates of Weaning weight	102
3.1 Some Physical Features of the Three Main Ecological Regions of Swaziland	105
3.2 Number of Calf Records obtained from the Stations	112

<u>Table</u>	<u>Page</u>
3.3 The Distribution of Data obtained from the Cow Record Files	113
3.4 Factor and Subscript Descriptions	116
4.1 Analysis of variance for Birth weight, Weaning weight, and 18-month weight	137
4.2 Effects of Non-genetic Factors on Birth weight, Weaning weight and 18-month weight (deviation from Station Means)	141
4.3 Least Squares Means and Standard Errors for the Effect of Breed on Birth weight, Weaning weight and 18-month weight - Station 1	153
4.4 The Superiority in Birth weight, Weaning weight and 18-month weight shown by the Brahman and Brahman crossbreds over the Nguni - Station 1	154
4.5 Least Squares Means and Standard Errors for the Effect of Breed x Year Interaction on weights at Birth, Weaning and 18-months - Station 2	165
4.6 Least Squares Means and Standard errors for the Effect of Breed x Year Interaction on Birth weight, Weaning weight and 18-month weight - Station 3	175
4.7 Analysis of variance for Birth weight, Weaning weight and 18-month weight from Model 2	181
4.8 Effects of Sire and Breed of Dam on Birth weight, Weaning weight and 18-month weight (deviation from Station means in kg)	183
4.9 Analysis of Variance for Weight of Calf Weaned	187
4.10 Least Squares Means and Standard Errors for the Effect of Breed of Cow on Weight of Calf Weaned - Station 1	188
4.11 Least Squares Means and Standard Errors for the Effect of Breed x Year Interaction on Weight of Calf Weaned - Station 2	190

<u>Table</u>	<u>Page</u>
4.12 Estimates and Standard Errors for Heritability of Birth weight, weaning weight and 18-month weight	193
4.13 Estimates of the Genetic and Phenotypic Correlation between Weights at Birth, weaning and 18-month.	198
4.14 Intra-class Correlation Repeatability Estimates of Weight of Calf Weaned - Station 1	202
4.15 Regression Repeatability Estimates of Weight of Calf Weaned computed from Pairs of Records of Different Degrees of Adjacency and from Cows of Different Ages	204
4.16 Pooled Regression Repeatability Estimates of Weight of Calf Weaned - Station 2	206
4.17 Estimates of the Heritability and the Genetic and Phenotypic Correlations between 14- and 18-month weights.	209

## LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1a	Interaction between breed and year for birth weight - station 2	162
1b	Interaction between breed and year for weaning weight - station 2	163
1c	Interaction between breed and year for 18-month weight - station 2	164
2a	Interaction between breed and year for birth weight - station 3	172
2b	Interaction between breed and year for weaning weight - station 3	173
2c	Interaction between breed and year for 18-month weight - station 3.	174

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OF NGUNI AND CROSSBRED BRAHMAN AND  
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