GENETIC PARAMETERS OF SANGA CATTLE IN DEVELOPING AREAS

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SUMMARY

Heritabilties for, and correlations between birthmass, 100-day corrected mass,205-day corrected weaning mass 365-day corrected mass and 540-day corrected mass were estimated using Harvey, 1987 on the performance data of 1437 Pedi calves. The Heritabilities of 0.19 ± 0.06, 0.08 ± 0.04, 0.09 ± 0.05 and 0.14 ± 0.06 were estimated for birthmass, 100-day corrected mass, 205-day corrected weaning mass, 365-day corrected mass, 540-day corrected mass. The genetic, phenotypic and environmental correlations between birthmass and 100-day corrected mass were medium(0.3) and correlations for the other traits decrease as calves became older. The correlation between other traits varied between 0.44 to 1.17.

INTRODUCTION

For higher efficiency of selection for increased production in a beef breeding herd, it is necessary to investigate the genetic,parameters of the production traits. Pedi cattle are indigenous to Southern Africa and are located in the Sekukhuneland area of the Northern Transvaal. The term "Sanga" is applied to, all those types of African cattle, including the Pedi, which have resulted from cross-breeding of humpless Longhorn with Cervico-thoracic humped (neck humped) and /or thoracic-humped (chest humped) Zebu cattle(Faulkner & Epstein, 1957). The value of Sanga cattle to produce and reproduce in stressful environments has been known to animal scientists since the early part of the 20th Century (Schutte, 1935 and Ward, 1978).

MATERIALS AND METHODS

Records of 1437 Pedi calves from the farm Stellenbosch were used in this study to estimate genetic parameters of birthmass(BM) ,100-day corrected mass(100M), 205-day corrected weaning mass(205M), 365-day mass(365M) and 540-day mass(540M). Stellenbosch has a dry mountainous mixed bushveld grazing on generally acid soils with marked nutritional depressions during winter. Stellenbosch has an average rainfall 478mm with a range

of 318-1182mm. Data were analysed using Harvey's LSML program 1987. The model used included fixed effects of year, sex; linear and quadratic regressions of the dependent variables on month of birth and age of dam; and sires as a random effect.

RESULTS AND DISCUSSION

All effects were significant ($p < 0.05$, $p < 0.01$ and $p < 0.001$) for BM, 100M and 365M. Only the effects of sire and the linear regression of 540-day mass on month of birth were not significant in 205-day mass and 540-day mass respectively (Table 1).

All heritabilities in this study were low this indicates that the environment had a large effect on the performance of the animals(Table2). Preston & Willis (1970) reported average heritabilities of 0.38 and 0.27 for birthmass and weaning mass respectively. These values varied from close to zero to 0.99 for birthmass and to 0.68 for weaning mass. The heritability for post-weaning growth is reported to be above 0.50 (Preston & Willis, 1970). The low heritability of 100M and 205M may be caused by the maternal environment, which is not genetic(Brown & Gaculu,1964).
The genetic and phenotypic correlations estimated in this study are similar to those reported by Preston & Willis(1790). The correlation between BM and 100M; and 205M is medium and the correlations decrease as calves become older. These results are in agreement with those reported by Hunlun (1985) and Swanepoel (1986), and indicate that selection for growth will have little effect on the mature mass.

REFERENCES

BROWN, C J & GACULA, M, 1964. Estimates of heritability of beef cattle performance traits by regression of offspring on sire. J. Anim. Sci. 23, 321-324.
FAULKNER, D E & EPSTEIN, H, 1957. The indigenous cattle of the Britsh Dependant Territories in Africa. Publication No. 5 Her Majesty's Stationery Office, London.
HUNLUN, C, 1985. Die invloed van prestasie toetsing op die produksie van speenkalwers. Kanhym Rooivleisproduksiedag, 1985.
PRESTON, T R & WILLIS, M B, 1970. Intensive beef production. Pergamon Press. Oxford, New York, Toronto, Sydney.
SCHUTTE, D J, 1935. Factors affecting the growth of range cattle in sei-arid regions. Onderstepoort J. Vet. Sci. 26, 21-26
SWANEPOEL, F J C, 1986. Genetiese en omgewingsparameters van 'n vleisraskudde. Ph. D (Agric) Proefskrif, UOVS.
WARD, H K, 1978. Indigenous cattle research - a review. Proc. of the Rhodesian Branch of the South African Soc. Anim Prod

Table 1. Mean squares for BM, 100M, 205M, 365M and 540M

Effect	DF	BM	100M	205M	365M	540M
SIRES	44	26.2***	199.8*	358.4NS	614.8**	1153.8***
SEX	1	964.1***	16617.3***	67183.8***	67433.8***	25366.3***
YEAR	8	171.0***	2177.1***	4228.6***	9829.1***	11696.4***
REGRESSIONS						
MONTH(L)	1	476.5***	40023.1***	8460.9***	43662.6***	163.5NS
MONTH(Q)	1	395.4***	17881.2***	5607.8***	24098.8***	9909.8***
AGEDAM(L)	1	168.6***	9608.8***	21819.6***	15293.3***	8463.2***
AGEDAM(Q)	1	234.0***	7139.3***	19751.6***	12737.9***	13415.5***
RESIDUAL	1379	10.7	128.6	263.2	371.5	563.3

*** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, NS = not significant

TABLE 2. Heritabilities and genetic, phenotypic and environmental correlations of BM, 100M, 205M, 365M and 540M

		BM	100M	205M	365M	540M
BM	h^2	0.19 ± 0.06				
	r_g		0.39	0.27	0.11	-0.19
	r_p		0.33	0.27	0.25	0.16
	r_e		0.33	0.38	0.28	0.23
100M	h^2		0.08 ± 0.04			
	r_g			1.03	0.92	0.65
	r_p			0.68	0.60	0.46
	r_e			0.66	0.57	0.44
205M	h^2			0.05 ± 0.04		
	r_g				1.17	0.47
	r_p				0.73	0.51
	r_e				0.70	0.52
365M	h^2				0.09 ± 0.45	
	r_g					0.77
	r_p					0.58
	r_e					0.56
540M	h^2					0.14 ± 0.06

h^2 - heritability, r_g - genetic correlation, r_p - phenotypic correlation, r_e - environmental correlation