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EVALUATION OF SYSTEMS OF STRAIHGT- AND CROSSBREEDING IN BEEF CATTLE IN THE R.S.A.

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SUMMARY

Results from various straight- and crossbreeding trials conducted in South Africa were reviewed. The conclusion is drawn that in some instances, initial crossbreeding followed by inter se mating of crossbred cattle give the same if not better results than continued crossbreeding. This facilitates rangeland improvement as it limits the number of pastures needed during the breeding season.

INTRODUCTION

Crossbreeding is known to improve lowly heritable, but economically important traits (Stonaker, 1973) such as adaptability, fertility and milk production (Bonsma, 1973; Venter, 1977; Venter & Maree 1978). Crossbreeding programmes utilizing maximum heterosis can become complicated and difficult to manage for ranchers, especially where rangeland management is of high priority. The question arises if crossbreeding, followed by inter se mating of crossbred cattle and coupled with selection and performance testing, cannot preserve heterosis and simplify management. The Bonsmara breed was developed in such a way (Bonsma 1983) and as performance testing was compelled since its inception, such trends could be evaluated.

MATERIAL AND METHODS

Different straight- and crossbreeding results (Lombard, 1971; Mentz, 1977; Venter, 1977, Paterson, Venter and Harwin, 1980, Van Zyl 1982; Coertze, unpublished) have been analyzed.

RESULTS AND DISCUSSION

Reproduction:

Africander and Africander types are the most populous in South Africa, and show good mothering ability. However, they, and probably other Zebu types are subject to lowered reproduction rates and lactation anestrus (Marincowitz, 1978). Table 1 illustrates the influence of dam type on production (Mentz, 1977).

Liveweight at partus and liveweight changes (Table 2) to the end of the breeding season are important factors determining reconception (Steenkamp, Van der Horst & Andrew, 1975; Venter, 1977).

The superior reproductive performance of Africander crosses is evident (Table 1) although the near absence of dystocia in Brahman crossbred cows makes this particular cross preferable under that specific conditions. In this study however, some Brahman bulls caused a higher incidence of dystocia.

Weaning and early post-weaning mass;

Table (4) illustrates the influence of breed of sire and dam type on weaning performance under intensive (Paterson et al. 1980), semi-intensive (Lombard, 1971) and extensive (Venter, 1977 and Van Zyl, 1982) conditions.

Under extensive conditions, Brahman x Africander and Simmental x Africander were superior to other crosses in kilogram weaner/hectare, due to adaptability, increased milk production and low incidence of dystocia (Table 1). Under intensive conditions, Charolais bulls with Simmental cows showed superior performance, although the dual purpose (DP), which was an inter se bred population, compared favourably as a dam line (table 4). The relative performance of four breeds under extensive conditions (table 4) show that the synthetic (Bonsmara) compare favourably with crossbreds and Simmentals. Bonsmara calves even reached higher weaning masses than crossbreds under intensive conditions. The superior performance of crossbred sired calves to three-breed crosses (Table 4) supports the idea that inter se matings of crossbreds can be advantageous.

Although selected crossbred bulls performed significantly ($P < 0,05$) better than purebred Bonsmaras under growth test conditions, the actual differences were relatively small (Table 3).

The superior performance of Simmental and Brahman crosses (Table 1) indicate that these types can be valuable in producing adapted, high producing cows where unfavourable environmental conditions limits beef production, and is in agreement with the results obtained in Australia (Frisch, 1976).

CONCLUSIONS

Crossbred cattle normally perform better than purebreds, but synthetics eg. the Bonsmara breed, created especially for certain environments, are able to at least match the performance of crossbreds. Brahman and Simmental crosses perform best under extensive conditions and may be utilized in a composite breeding programme. The role of indigenous African types eg. the Nguni in such composite breeding programmes, demands further investigation.

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Table 1 The relative production potential of purebred and crossbred Africander cows on a 1 000 ha farm (Mentz, 1977).

	Africander x	Brahman x Africander	Charolais x Africander	Hereford x Africander	Simmental Africander
Stocking rate (no of cows on 1000ha)	92,3	86,8	77,8	84,0	84,4
% cows that calved	62,9	92,4	86,2	92,0	93,4
% normal births (without dystocia)	81,0	100	85,7	83,0	90,5
% calves produced (without dystocia)	50,9	92,4	73,9	76,4	84,5
Average weaning mass/ calf (kg)	169,3	186,9	198,2	185,8	202,0
Total weaning mass/ herd (kg)	7954	14990	11395	11924	14406
Weaning mass/ha (kg)	7,5	14,99	11,40	11,92	14,41
Relative yield	100	189	143	150	181

Table 4 Weaning mass by sire breed and dam type

Author	Sire	Dam	Weaning mass	Corrected Age
Venter, 1977	A	A	189,10 ± 2,55	
	H	H	179,15 ± 2,70	196
	BO	Bo	216,15 ± 2,54	196
	S	S	212,25 ± 2,62	196
				196
Lombard, 1971	H	AxSH	212,30 ± 1,58	
	DP	AxSH	213,76 ± 2,07	205
	A	AxSH	187,98 ± 3,62	205
	CB	AxSH	218,56 ± 2,04	205
				205
Paterson et al, 1980	C	British	207	
		Bos indicus	209	205
		C	208	205
		S	219	205
		DP	207	205
				205
	H	British	180	
		Bos indicus	188	205
		C	188	205
		S	189	205
		DP	186	205
				205
	S	British	201	
		Bos indicus	202	205
		C	215	205
		S	204	205
		DP	204	205
				205
Van Zyl, 1982*	BO	BO	186,68 ± 3,14	
		BO	194,85 ± 2,37	205
		BO	200,19 ± 1,89	205
		BO	199,47 ± 14,96	205
		BO	179,70 ± 4,98	205
				205

* Different herds
A = Africander; BO = Bonsmara; C = Chaolais; CB = Crossbred; DP = Dual purpose (Inter se); H = Hereford; S = Simmental.

Table 2 Livemass of productive cows of different breeds (Venter, 1977)

Breed	N	Calving	Beginning breeding season	End of breeding season	Weaning	Difference (Weaning-Calving)
Africander	175	411,56 ± 3,98	414,76 ± 4,27	456,01 ± 4,41	458,31 ± 4,80	44,45
Hereford	148	385,56 ± 4,52	393,85 ± 4,85	445,22 ± 5,01	450,22 ± 5,45	64,66
Bonsmara	197	434,81 ± 3,49	434,89 ± 3,74	479,48 ± 3,87	482,88 ± 4,21	48,07
Simmental	162	418,67 ± 3,87	413,93 ± 4,16	463,44 ± 4,29	471,38 ± 4,67	52,71

Table 3 Weaning and early postweaning performance of Bonsmara and crossbred bulls (Coromandel Farms, unpublished).

Breed***	N	Weaning mass	ADG* (g ± SE)	ADA** (g ± SE)
Bonsmara	12	222,42 ± 5,50	1284 ± 66,88	990,83 ± 37,10
Crossbred	28	242,57 ± 4,09	1387 ± 37,33	1039,79 ± 16,13
% Difference		9%	8%	5%

* Average daily gain
** Average daily gain per day of age
*** Crossbreds selected out of 200 male calves. Bonsmaras no selection.