

The relationship between standards of excellence for breed characteristics in Afrikaner cows and the pre-weaning performance of their progeny

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The effect of the standard of excellence for breed characteristics in Afrikaner cows on the pre-weaning performance of their calves was investigated. According to an analysis of variance, the standard of excellence for the head and horns had a statistically highly significant ($P < 0,01$) effect on the weaning mass of the calf and increase in mass from birth to weaning, while that of the hind quarters was highly significant ($P < 0,01$) on weaning mass and significant ($P < 0,05$) on increase in mass. According to a regression equation, the average weaning mass decreased by 2,32 kg for each point increase in standard of excellence for the head and horns and by 1,57 kg for the hind quarters.

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Die invloed van die standaard van voortreflikheid van raskenmerke van Afrikanerkoeie op die voorspeense prestasie van hul nageslag is ondersoek. Volgens 'n variansie-analise het die standaard van voortreflikheid van die kop en horings 'n statisties hoogs betekenisvolle ($P < 0,01$) invloed op die speenmassa en massatoename vanaf geboorte tot speen gehad, terwyl dié van die agterkwart hoogs betekenisvol ($P < 0,01$) was op speenmassa en betekenisvol ($P < 0,05$) op massatoename. Volgens 'n regressievergelyking het die speenmassa met 2,32 kg afgeneem met elke een-punt-toename vir voortreflikheid van kop en horings en met 1,57 kg vir elke een-punt-toename ten opsigte van die agterkwart.

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Introduction

Registered breeds of cattle have standards of excellence to compare animals with the ideal in their respective breeds. These standards relate to phenotypically observable characteristics such as colour, horns, type, and general conformation. Considerable attention is directed at breed characteristics by both breeders and breed societies for the purpose of improving the general appearance of their cattle, promoting greater uniformity within breeds, and as a measure of breed purity (Heyns, 1976). Despite the importance attached to breed characteristics and their standards of excellence, their implications in terms of production performance was never questioned by the breed associations. Every breeder wants to breed and sell cattle with high standards of breed characteristics and improve the level of production. The objective of the present study was to obtain reliable estimates of the relationship between the standard of excellence for breed characteristics in the Afrikaner cow and the pre-weaning performance of their progeny.

Procedure

Data from 1052 bull and heifer calves from 27 sires was collected over a period of 25 years from the registered Afrikaner cattle herd at the Glen Agricultural Research Institute. Owing to unequal numbers in the subclasses, the least-squares method of analysis of variance was used (Harvey, 1960). A computer program compiled by the US Department of Agriculture, Beltsville, Maryland, was adapted for use with the data. Cattle eligible for registration were scored annually by an official of the Afrikaner Cattle Breeders Society. Cows and calves from the herd were weighed every fortnight and the weaning mass of the calves adjusted to 205 days of age.

Results and Discussion

The average effects of the standards of excellence for breed characteristics in the Afrikaner cows on the pre-weaning performance of their progeny was tested by means of analysis of variance (Table 1).

It is clear that not all the standards of excellence for breed characteristics of the dam had a statistical influence on the pre-weaning performance of the calves. General appearance had a significant effect on birth mass ($P < 0,05$) while those of the head and horns and hind quarters of the dam were highly significant ($P < 0,01$) on weaning mass and had a significant effect ($P < 0,05$) on increase in mass from birth to weaning.

Regression equations of the pre-weaning mass of the calves on standard of excellence for the breed characteristics of the

Table 1 The effect of standards of excellence for breed characteristics on pre-weaning performance of calves

Source	DF	F-values		
		Birth mass	Weaning mass	Increase birth - weaning
General appearance	6	2,28 ^a	1,71	<1
Linear regression	1	1,53	<1	<1
Deviation	5	2,02	2,04	1,34
Character	6	<1	1,74	1,18
Linear regression	1	1,63	7,70 ^b	4,25 ^a
Deviation	5	1,27	<1	1,41
Quality	6	1,39	1,43	1,14
Linear regression	1	1,23	1,97	<1
Deviation	5	<1	1,83	1,64
Heads and horns	6	2,01	3,13 ^b	2,63 ^b
Linear regression	1	1,92	10,23 ^b	7,29 ^b
Deviation	5	<1	1,71	1,70
Fore quarter	6	1,59	<1	<1
Linear regression	1	1,74	<1	<1
Deviation	5	1,32	1,62	1,27
Middle quarter	6	1,04	1,45	1,43
Linear regression	1	<1	<1	<1
Deviation	5	<1	2,03	1,79
Hind quarter	6	1,00	4,38 ^b	2,13 ^a
Linear regression	1	1,45	11,22 ^b	3,94 ^a
Deviation	5	<1	2,17	1,85
Error	1009			
Total	1052			

^a $P < 0,05$; ^b $P < 0,01$.

Table 2 Regressions of pre-weaning mass of calves on standards of excellence of their dams

	Weaning mass	Increase
General appearance	$Y = 190 + 0,32x$	$Y = 158 + 0,28x$
Character	$Y = 223 - 3,86x$	$Y = 188 - 3,36x$
Quality	$Y = 200 - 0,93x$	$Y = 173 - 1,46x$
Head and horns	$Y = 210 - 2,32x$	$Y = 177 - 2,14x$
Fore quarter	$Y = 196 - 0,29x$	$Y = 162 - 0,18x$
Middle quarter	$Y = 184 + 1,07x$	$Y = 151 + 1,39x$
Hind quarter	$Y = 203 - 1,57x$	$Y = 169 - 1,11x$

dams are given in Table 2.

It is clear that for each one-point increase in standard of excellence for character of the cow, the weaning mass of her calf decreased by 3,86 kg; 2,32 kg for head and horns; 1,57 kg for hind quarters; 0,93 kg for quality and 0,29 kg for front quarters. The decrease in mass increase from birth to weaning was more or less of the same magnitude. The rest of the characteristics showed a slight increase in pre-weaning performance. The growth of the calves was plotted against the standards of excellence for each characteristic of the dams and is presented in Figure 1.

Although some of the regressions were not significant, the decrease in growth of the calves with the increase in standards of excellence for the characteristics of their dams was clearly evident.

These results agree with those of Frey, Frahm, Whiteman, Tanner & Stephens (1972) who worked with pure-bred Aberdeen Angus cattle. Correlations between breed characteristics

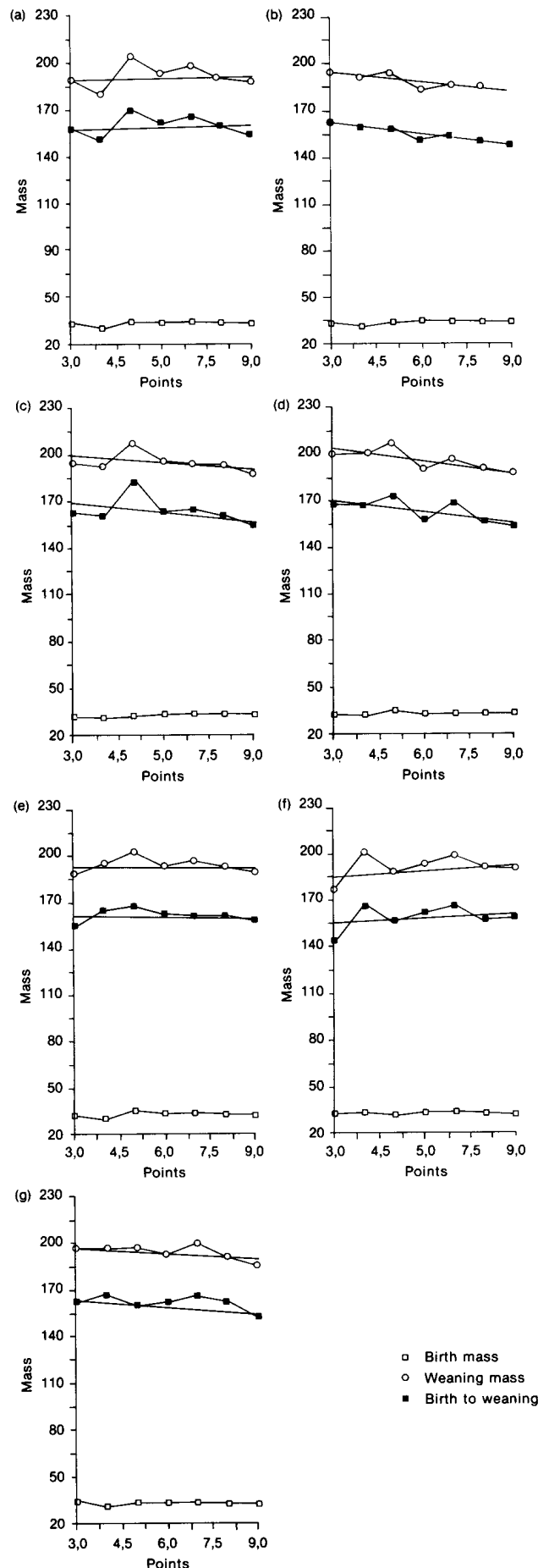


Figure 1 The pre-weaning performance of calves and breed characteristics of the dams: (a) General appearance; (b) character; (c) quality; (d) head and horns; (e) fore-quarter; (f) middle-quarter; (g) hind-quarter.

of the dam and birth mass and weaning mass varied from 0,08 to 0,07 and 0,18 to 0,04 respectively. Marlowe, Freund & Graham (1962) found a low correlation between points for conformation of the dam and weaning data of their calves.

It is evident that if too much emphasis is placed on the standards of excellence for breed characteristics of the dams, pre-weaning performance of their calves will decline. Since there was no statistically significant correlation when considering all the data, and evidence suggests a negative relationship between standards of excellence for breed characteristics of dams and pre-weaning performance of their calves, selection for each should be practiced independently. In contrast, the commercial breeder is not so much interested in the standards of excellence for breed characteristics but in performance. Especially where cross-breeding is practiced with

pure-bred animals, a high performance is of greater value than breed characteristics. Breeding standards should be changed if they have a negative effect on performance.

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