

HETEROSIS IN EXOTIC BREEDS OF PIGS IN A NIGERIAN HERD.

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SUMMARY

Data on one thousand, three hundred and twenty-three litters of Large White and Landrace pigs and their crosses were analysed to estimate the degree of heterosis in a continuously-bred Nigerian swine herd. Heterosis was low in the first crossbred litters and was generally higher in the backcross litters. Results depended on the nature of the litter characters and extent of dissimilarity between parents.

INTRODUCTION

Hybrid vigour, the superiority of the crossbred offspring over the purebred parents, arises from increased variation and increased heterozygosity that are both natural consequences of the mating of individuals of different breeds. Misin (1964) found that fertility, litter, size, and growth rate were lower for crossbreds. Fahmy and Holtmann (1977) observed that differences between pigs sired by purebred and crossbred boars were negligible for growth rate. This paper reports the degree of heterosis in a herd of continuously-bred European type pigs under hot humid conditions.

MATERIALS AND METHODS

Records of 1323 litters farrowed between 1960 and 1975 were used in this study. The litters were of four different genotypes: Large White (LW), Landrace (LR), 1/2 LW - 1/2 LR and 3/4 LW - 1/4 LR. No attempt was made to intensely select animals as continuous breeding was the practice in the herd, and piglets were farrowed all year round. Management details were as described by Adebambo and Dettmers (1977) and Ikeobi and Ngere (1994).

Litter traits studied included litter sizes and weights, piglet weights and survival, and weight gains before weaning. Analyses were done using the General Linear Models procedure (SAS, 1985) with sire, dam, and genotype as the main effects while the means were compared using Duncan's (1955) method.

Table 1 : Heterosis in litter characteristics

	LR - LR	LW - LW	1/2LW - 1/2LR	% Heterosis	3/4LW - 1/4LR	% Heterosis
Piglet weight (kg):						
at day 0	1.34	1.22	1.25	-2.34	1.23	-0.41
at day 21	4.73a	3.11b	4.03ab	2.81	—	—
at day 35	6.21	5.99	5.85	-4.10	—	—
at day 56	9.36	8.10	8.76	0.29	9.53	13.25
Survival rate (rad):						
at birth	1.53	1.55	1.56	1.30	1.57	0.96
at weaning	1.02b	1.00b	0.90b	-10.89	1.57a	75.42
Piglet daily gain (g):						
day 0 - 21	161.43a	90.00c	132.38b	5.30	—	—
day 0 - 35	139.14	136.29	131.43	-4.56	—	—
day 21 - 35	105.71c	205.71a	130.00b	-16.51	—	—
day 35 - 56	150.00a	100.48c	138.57b	10.64	—	—
day 0 - 56	143.21ab	122.86c	134.11bc	0.81	148.21a	15.35
Litter Size :						
at day 0	8.48	8.47	9.02	6.40	9.50	8.66
at day 21	8.07	7.40	7.75	0.19	—	—
at day 35	7.37	7.34	7.47	1.50	—	—
at day 56	6.13b	6.12b	5.74b	-6.29	9.00a	51.83
Litter Weight (kg) :						
at day 0	11.20	10.17	11.06	3.51	11.34	6.83
at day 21	37.62a	22.69b	30.10ab	-0.18	—	—
at day 35	44.66	44.30	43.02	-3.82	—	—
at day 56	60.55b	52.54b	53.81b	-4.84	85.77a	61.31

Among the genotypes, means in the same row bearing the same letter are not significantly different ($p > .05$).

Some values have been reported in earlier papers (Ikeobi, 1993; Ikeobi and Ngere, 1994).

RESULTS AND DISCUSSION

The effect of genotype was significant for piglet and litter weights at day 0, 21, and 56 ($P < 0.01$) and for piglet survival at birth and at weaning. Preweaning gains were also significantly influenced by genotype.

The means of the different litter characters for the different genotypes and the percent heterosis are shown in Table 1. Heterosis in the F1 crossbreds was generally low and in some cases negative. It was 6.40% for litter size at birth and decreased as rearing progressed. Heterosis in the 3/4 LW - 1/4 LR litters was higher than that in the 1/2LW - 1/2 LR litters, and generally increased as rearing progressed, reaching the highest value of 75.42% for piglet survival at weaning.

The low heterosis obtained in the F1 hybrids was probably due to the very high degree of similarities of the purebred parents in performance more so when animals were continuously-bred and attempt was not made to intensely select them. Brewbaker (1964) observed that the superiority of a hybrid would depend on the extent of genetic dissimilarity of the parents. This also would explain the generally higher level of heterosis obtained in the 3/4 LW - 1/4 LR litters.

Also, heterosis has been known to apply to traits of fitness which guarantee an individual's influence on the next generation. In this study, heterosis in survival rate at weaning was very high in the 3/4 LW - 1/4 LR litters because survival is a fitness character.

It will therefore appear that in a continuously-bred swine population in which selection is absent, progress in crossbreeding between Large White and Landrace pigs would be more appreciable through backcrossing to one of the parents than would be obtained in the F1 hybrids.

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