

PERFORMANCE OF CROSSES BETWEEN EXOTIC AND LOCAL
TANZANIAN CHICKEN

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SUMMARY

A strain of exotic chicken (egg type) was crossed with the local Tanzanian type over two generations. The first crossbred generation (F_1) grew faster and reached sexual maturity at an earlier age than any of the parental strains, but was intermediate in egg number and egg weight. In the next generation, F_2 (from $F_1 \times F_1$) was below midparent mean in growth rate, but much above both parents¹ in egg number. Backcrosses were similar to the sire breed in growth rate and intermediate between the sire breed and F_2 in egg number and egg weight.

INTRODUCTION

The objective of the experiment described in this paper was to investigate the prospects of improving the productivity of the Tanzanian chicken by crossbreeding with high-performing exotic stock.

MATERIAL AND METHODS

In 1983 two exotic strains of chicken, one specialized egg type and one specialized meat type, were imported from England and raised at the University Farm outside Morogoro, Tanzania. After attaining sexual maturity, the birds were placed in mating pens with about five females and one cock. Females of both strains were mated with both egg type and meat type cocks, and also with cocks of the local chicken. At the time of hatching, local chicks were collected in neighbouring villages and brought to the University Farm for comparison.

In the second phase 15 different genetic groups were produced, namely the three parental strains, the three F_2 crosses, the six backcrosses, and three three-breed crosses with 50% of their inheritance from one of the strains and 25% from each of the others. The traits studied included body weight at 4, 8, 12 and 16 weeks of age, age at sexual maturity, egg number and egg weight. The present paper is confined to the crosses between the local chicken and the exotic egg strain.

Morogoro town is located at 7°S , about 550 m above sea level. The variation in daylength throughout the year is slight. Maximum daily temperature ranged from 25° to 35°C during the experiment.

The birds were reared in pens intermingled by sex and genetic group. At 16 weeks of age, the pullets were transferred to battery cages (phase 1) or laying pens (phase 2). The feeding regime in phase 1 was *ad libitum* with a compound formulated to meet the nutritional requirements of the birds. In phase 2 the feeding was restricted to about 85% of estimated voluntary intake, and the feed was below recommended standards in energy, protein and other nutrients. The management can be characterized as rather intensive in phase 1 and moderately extensive in phase 2.

RESULTS

An extract of results obtained in the first phase is presented in Table 1.

Table 1. Performance of local Tanzanian chicken, exotic egg type strain, and their F_1 cross.

Genetic group	Body wt. at 12 wk., g		Age at sexual maturity, days	Egg number ¹⁾		Egg wt., g
	Males	Females				
Local	597	490	195	52.0	38.2	
Exotic	833	654	185	61.7	54.5	
F_1	920	693	170	55.3	46.4	

¹⁾ Number of eggs in 90 days from 1st egg.

The chicks of the exotic strain grew 30 to 40% faster than the local stock, produced nearly 20% more eggs, and eggs which were 40 to 50% heavier. In age at sexual maturity the difference between the two strains was small and non-significant. F_1 crosses grew faster and matured earlier than any of the parental breeds, ¹ but were intermediate between parents in egg number and egg weight.

Results from the second phase are reported in Table 2.

Table 2. Performance of local Tanzanian chicken, exotic egg type strain, and their F_2 crosses and backcrosses.

Genetic group	Body wt. at 12 wk. g		Age at sexual maturity, days ¹⁾	Egg number ²⁾		Egg wt., g
	Males	Females		2)	3)	
Local	866	636	>224	42.5	67	41.7
Exotic	795	663	>224	35.5	108	53.5
F_2	799	607	218	60.0	118	46.5
3/4 local	846	674	212	53.0	84	44.3
3/4 exotic	798	644	210	49.5	101	48.7

¹⁾ Recorded as age at 50% lay.

²⁾ Egg number per 100 hen days in week 32.

³⁾ Egg number to 62 weeks of age.

In this phase the local chicks were similar to the exotic strain in growth, and produced more eggs in early life, but were less persistent and laid smaller eggs. Neither of the parental strains had reached 50% lay (considered to be the criterion of sexual maturity) at 32 weeks. F_2 crosses performed slightly below midparent mean in growth rate and egg size, but more than 50% higher in egg number. Backcrosses were approximately halfway between F_2 and the sire breed in most traits.

DISCUSSION

The good growth rate of the local chicken in phase 2 might suggest that their poor performance in the first phase was due to unfavourable environment before and during their transfer from the villages to the experimental site. The merits of the local birds are supported by the

performance of backcrosses, the backcross to the local strain grew faster than the exotic backcross. The poor persistency of the local chickens for egg production is in line with earlier experience. The reversed ranking of the parental strains might also to some extent be ascribed to genotype x environment interaction.

The most remarkable finding is the large egg number in F_2 . The group comprised 40 birds, but the precision of the result can not be calculated as individual records are lacking (recorded on pen basis). At face value the result is at variance with the findings of Sheridan and Randall (1977) in White Leghorn x Australorp crosses. It is also in sharp contrast to the disappointing performance of F_2 in crosses between tropical and temperate cattle for milk production (Syrstad 1989). More research is therefore required before the formation of a new (synthetic) strain derived from crossbred foundation can be recommended as a wise strategy for improving the productivity of chicken in Tanzania.

REFERENCES

- Sheridan, A.K. and Randall, M.C. 1977. *Brit. Poultry Sci.* 18: 69-77.
Syrstad, O. 1989. *Livest. Prod. Sci.* 23: 97-106.