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# Productive Behavior of Lyallpur Silver Black and Rhode Island Red Breeds of Poultry

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## ABSTRACT

A study was conducted to compare the productive performance of locally evolved Lyallpur Silver Black (LSB) and Rhode Island Red (RIR) breeds of poultry. A total of 42 birds (24 weeks of age) comprising 36 females and six males of each breed were divided in to six experimental units/replicates (six females and one male/replicate). Each replicate was placed in a separate breeding pen provided with a trap nest. The birds were fed *ad libitum.* The data on body weight, feed consumption, daily egg production, egg weight, egg shell thickness and mortality were recorded. RIR layers exhibited significantly more body weight, better egg production and feed efficiency and produced heavier eggs than those produced by LSBs. However, the difference in the feed intake values was found to be non significant. The LSB layers produced thicker shelled eggs and showed better livability than their counterparts.

**Key Words:** Lyallpur Silver Black; Rhode Island Red; Poultry

## INTRODUCTION

Rural poultry contributes 60.02% of total eggs and 36.4% of chicken meat production in Pakistan (Anonymous, 1999) and thus it plays an important role in supplying eggs and meat to the rapidly growing human population. The indigenous birds maintained by the rural people are non descript locally called as "Desi" and have been reported to produce 0.98 kg of meat at six months of age and laying an average of 46 eggs in a year (Yaqoob *et al*., 1965). However, capacity of Desi hens is 70-80% per year in ideal conditions (Ahmad *et al*., 1969).

Various breeds of poultry have been developed in the World in order to obtain maximum eggs and meat production. Some breeds have been imported in Pakistan for production of eggs and meat. However, low livability of imported poultry breeds in Pakistani climatic conditions is one of the important deterrent factors in the way of developing and popularizing profitable poultry keeping, particularly in rural areas. Although such breeds are being maintained in the country but the production potential have not been achieved according to the international standards.

Among the breeds imported in Pakistan, Rhode Island Red (RIR) has gained more appreciation than the others due to its good egg production ability. Moreover, its long stay in Pakistan has made it well adapted to the local environmental condition. Basically, it is a dual purpose breed of American class and is getting more popularity in the rural areas.

A native breed Lyallpur Silver Black (LSB) was evolved by crossing the local chickens with three imported breeds namely, White Leghorn, White Cornish and New Hampshire. The objective was to develop a breed that could survive under environmental conditions of rural areas as well as be capable of producing more eggs per year as compared to only 50 eggs of Desi. LSB can produce 150 eggs per year (Siddiqi *et al*., 1979).

Consequently, it was decided to compare the genetic potential of LSB with RIR regarding various aspects of performance and economics of production.

## MATERIALS AND METHODS

The project was executed at Poultry Research Centre, University of Agriculture, Faisalabad. A total of 42 mature birds (24 weeks of age) comprising 36 females and six males of each breed were divided in to six experimental units/replicates, having six females and one male. Each replicate was placed in a separate breeding pen provided with a trap nest for identification of egg. All birds were leg-banded for identification.

The birds were maintained for a period of 20 weeks under similar management conditions like temperature, humidity, ventilation, floor space and light. A commercial layer mash (Table I) was fed *ad libitum* to the birds at calculated basis and fresh water was made available to them throughout the experimental period.

The data regarding initial body weight, final body weight, feed consumption, egg production, egg weight, and egg shell thickness and mortality were recorded. The eggs were weighed individually once a week. Random samples of two eggs from each group were taken fortnightly. The eggs were broken to check their shell thickness. Egg production, egg weight, feed consumption and efficiency on per bird basis in each experimental unit was worked out and analyzed for variation between breeds by Analysis of Variance Technique. Similarly, data on egg

**Table I. Ingredients and chemical composition of the experimental rations**

| Ingredients | Inclusion level (%) |
|---|---|
| Corn | 40 |
| Rice broken | 17 |
| Rice polishing | 6 |
| Wheat bran | 2 |
| Cotton seed meal (untreated) | 4 |
| Sunflower meal | 3 |
| Corn gluten meal (30%) | 2 |
| Corn gluten meal (60%) | 5.3 |
| Fish meal | 6 |
| Blood meal | 1 |
| Dicalcium phosphote | 0.7 |
| Limestone (ground) | 4.5 |
| Molasses (cane) | 2 |
| Soybean oil | 1 |
| Vitamin/mineral premix | 0.5 |
| **Chemical composition** | |
| Crude protein (%) | 17.00 |
| Metabolizable Energy (Kcal/kg) | 2899.80 |
| Crude fiber (%) | 3.97 |
| Calcium (%) | 2.05 |
| Phosphorus (%) | 0.33 |

shell thickness, initial body weight and final body weight and mortality were also statistically analyzed. The differences between the means were compared by Least Significant Difference test (LSD) as described by Sokal and Rholf (1995).

## RESULTS AND DISCUSSION

**Body weight.** Average initial body weight was 1200.05 and 1539.72 g in LSB and RIR birds, respectively (Table II). Whereas, average final body weight was 1349.48 and 1875.50 g in the respective breeds. Both the breeds showed increase in their body weights during the experimental period. But LSB birds showed less increase in weight than those of RIR. Similar findings have also been observed by Stino *et al*. (1982) where cross bred RIR breeds showed high body weight than other breeds studied.

As body weight of a bird is affected both by its genetic make up and advancement of age, therefore, increase in body weight may be attributed to genetic potential and advancement in age of the breed. However, the layers were not expected gain during production cycle.

**Feed consumption and efficiency.** Statistical analysis of the data did not show any difference ($P<0.05$) in the feed consumption values between the breeds as well as in weeks (Table II). However, minimum feed intake by LSB (699.08 ± 6.12 g) and RIR (707.48±4.34 g) was recorded at 20$^{th}$ week of the experiment. Whereas, maximum feed intake was 755.80±1.83 and 804.40±4.77g in the respective breeds.

As regards the feed conversion ratio per dozen of eggs is concerned, it was significantly ($P<0.05$) different among the breeds and weeks. RIRs exhibited better feed conversion (2068.16) as compared to LSBs (2925.65). Similar trend was observed when the feed conversion ratio was calculated on the basis of egg mass produced by the birds.

The results of the present study are partially in line with those observed by Hassan *et al.* (1962), who observed better feed efficiency in RIR birds than *Fayoumi* breed. Whereas, poor feed efficiency in LSB has also been observed by Ahmad *et al*. (1972), and Bokhari and Chaudhry (1972), as compared to White Leghorns.

Better feed efficiency of RIRs as regards egg mass production was due to the production of heavier eggs than those of LSBs. Therefore, efficient utilization of feed by RIRs may be attributed to more egg weight and low feed intake than the LSBs.

**Egg production.** Statistical analysis of the data showed significant difference between breeds and weeks as well as their interaction. The data on total egg production indicated that RIRs laid significantly ($P<0.05$) more eggs than LSBs. Per cent production of both the breeds was also calculated and the data revealed 69.44 and 49.24% production in the respective breeds.

Hen day egg production of RIRs birds was also higher (69.44%) than those of LSBs birds (49.24%). Similar trend was observed when the egg production was calculated on hen-housed basis (50.12% vs. 42.81%).

The results of the present study agree with the findings of Ahmed *et al.* (1973), and Bokhari and Chaudhry (1972). The results of the studies conducted by

**Table II. Overall performance of LSB and RIR Breeds**

| Description | Lyallpur Silver Black | Rhode Island Red | Mean ± SEM |
|---|---|---|---|
| Initial Body weight(g) | 1200 | 1540 | - |
| Final body weight(g) | 1349 | 1876 | - |
| Body weight (g) | 1282.55±11.90[b] | 1737.50±19.56[a] | 1510.02± 27.44 |
| Egg Production (%) (hen day basis) | 49.24±1.43[b] | 69.44±1.50[a] | 59.34±1.23 |
| Egg production (%) (hen housed basis) | 42.81±1.10[b] | 50.12±1.35[a] | 46.46±0.92 |
| Egg No./bird/week | 3.58±0.15 | 3.85±0.12 | 3.72±0.10 |
| Egg weight (g) | 47.23±0.34[b] | 53.10±0.30[a] | 50.17±0.30 |
| Egg Mass (g)/bird/week | 163.13±4.75[b] | 256.21±6.47[a] | 209.67±5.03 |
| Feed intake (g)/bird/week | 736.39±1.91 | 734.34±3.17 | 735.37±1.85 |
| FCR/Dozen eggs | 2925.65±133.9[b] | 2068.16±141.5[a] | 2496.91±101.11 |
| FCR/kg mass of eggs | 4.961± 0.17[b] | 3.077± 0.13[a] | 4.02± 0.125 |

Means not sharing a letter in common in a row differ significantly (P<0.05)

these workers also indicated reduced number of egg laid by LSBs than the RIRs.

The higher production in RIR may be due to its superior genetic constitution which had been set up after long services of breeding as compared to LSB, which is a dual purpose breed and has recently been evolved. Therefore, more production of RIR may be attributed to better genetic potential of this breed than that of LSB.

**Egg weight.** The statistical analysis was the data showed a significant difference between breeds as well as weeks. Egg weight of RIR was significantly (P<0.05) higher as compared to LSB.

Minimum egg mass (g) produced/bird/week by LSB (114.23±16.41 g) and RIR (102.16±21.30 g) was recorded at the start of the experimental whereas, maximum by LSB (202.78±21.77 g) and by RIR (315.62±16.37 g) was recorded at $16^{th}$ and $12^{th}$ week of the, experiment. As the eggs produced by RIRs were heavier than those produced by LSBs, therefore, obviously egg mass produced/bird/week by RIRs bird was higher (256.21±6.47 g) than those produced by LSBs (163.138 ± 4.75 g).

The results of the present study are compatible with those observed by Sadiq (1968), Ahmad *et al*. (1972), and Bokhari and Chaudhry (1972) who observed smaller egg size of LSB's than their counterparts. Higher egg weight of RIR birds may be due to their superior genetic make up because of continuous selective breeding produced through a long time. Therefore, heavier egg weight of RIR's than those of LSBs may be attributed to better genetic potential of this breed.

**Egg shell thickness.** Statistical analysis of the data showed significant (P<0.05) difference between the breeds. LSB birds produced thicker shelled egg (0.383 mm) as compared to RIRs (0.367 mm). The results of the present study are compatible with those presented by Ahmad *et al.* (1972) where LSB Birds produced thicker shelled eggs than white Leghorns.

This difference in egg shell thickness between the two breeds might be due to genetic peculiarities of the two breeds, because the ability to produce eggs is an inherited (25% heritable) character. The production of thicker shelled eggs by LSB may be attributed to its ability to inherit this character in the progeny.

Contrary to findings of the present study, Mahmood *et al.* (1984) reported non significant difference between LSB and Fayoumi breeds which might be due to the difference in the breed compared in this study.

**Mortality.** Complete mortality records were maintained during the experiment. There was much higher (28.57%) mortality in case of RIRs than LSBs (16.67%). It may be referred to higher disease resistance and adaptability of LSB in the local climatic conditions. Hence, per cent mortality was lower in LSB as compared to RIR.

These results agree with the findings of Sadiq (1968), Bokhari and Chaudhry (1972) and Mahmood *et al*. (1984), who noticed less mortality in the native breed. Therefore, better survival of LSBs may be attributed to its adjustment with the local climatic conditions.

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