PRODUCTIVE BEHAVIOUR OF LAYERS OF WHITE LEGHORN AND LYALLPUR SILVER BLACK BREEDS IN THE FIRST AND SECOND LAYING YEARS

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An investigation was initiated to compare various aspects of performance of White Leghorn and Lyallpur Silver Black hens in their first and second laying years. One day old chicks of each breed were raised upto maturity and one hundred pullets each of White Leghorn and Lyallpur Silver Black breeds were randomly divided into two groups of fifty hens each. The birds in the pullet year were more viable, had significantly higher feed intake, exhibited better feed efficiency and laid higher number of eggs as compared to the second year of production. Heavier eggs were recorded in the second year than the first laying year. As regards breeds, White Leghorn consumed more feed, had better feed efficiency and laid eggs which were higher in number and heavier in weight as compared to the Lyallpur Silver Black.

INTRODUCTION

With the introduction of improved types of poultry in the tropical areas, the farmers have recognized the differences in the income producing potentials of various breeds but they have been unable to plan effectively the replacement of their flocks, since the problem is affected simultaneously by many physical and economic variables. In the developed countries of the world most of the egg production is limited to one year after birds attain maturity. It is a common belief that they become uneconomical during the second year of production. This is true of developed countries but culling at such a high rate after a year may not be feasible in less developed ones. The second year of productive life may lead to economical production, particularly in locally evolved breeds as compared to the imported ones. Consequently, it was decided to study the comparative behaviour of chicken for various aspects of performance during their first and second laying years in White Leghorn and Lyallpur Silver Black breeds.

MATERIALS AND METHODS

One day old chicks of White Leghorn and Lyallpur Silver Black breeds

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were taken and raised separately in thermostatically controlled battery brooders, upto eight weeks on the same feeding regime. They were transferred to grower sheds and were kept there upto 24 weeks of age, when they were shifted to laying houses. The layers of each breed were randomly divided into two groups, each group consisted of fifty birds. One male was allowed to run for every 10 females. Birds were kept on deep litter system and saw dust was used as litter material. Standard waterers, feeders and other equipment was used. A 60 watts unshaded bulb was hung about 7½ feet above the floor in the centre of each room. Sixteen hour light was provided to the layers throughout the experiment. Water and self prepared mash was given to the birds *ad libitum*. The formula of feed was kept undisturbed in both the laying years. Fortnightly feed consumption was recorded and was worked out by calculating the difference between the offered and the refused feed during the experimental period. The records of egg production (daily) egg weight (weekly) and mortality were maintained.

RESULTS AND DISCUSSION

The average fortnightly feed consumption per bird in White Leghorns was 3.77 pounds in the first while it was 3.28 pounds in the second laying years. The Lyallpur Silver Black layers consumed 3.42 and 3.02 pounds of feed in the first and second laying years respectively (Table 1). The feed consumption was found to be significantly higher in first year when the data were subjected to analysis of variance. These data agree with the results of Vogt (1967) who reported a depressing effect of age on feed consumption. The probable reason could be the lowered metabolic rate in the birds of second year, as increase in age causes a decline in the thyroxine output (Turner, 1948), which in turn brings about a reduction in the basal metabolic rate callingforth, therefore, for reduced intake of nutrients. The White Leghorns consumed significantly ($P < 0.01$) more feed than Lyallpur Silver Blacks which might be due to their genetic differences.

TABLE 1: *Average fortnightly performance of Layers in their first and second laying years in White Leghorn and Lyallpur Silver Black breeds.*

Performance characteristics	White Leghorn		Lyallpur Silver Black	
	First year	Second year	First year	Second year
Feed consumption (lbs)	3.77	3.28	3.42	3.02
Feed efficiency	6.82	7.26	6.96	7.49
Egg production	7.81	6.50	6.31	5.00
Egg weight (gms)	46.32	56.23	44.33	53.29
Mortality (%)	5.00	7.40	7.00	9.60

Feed efficiency was worked out as the pounds of feed required to produce one dozen of eggs in the first and second laying years. The feed efficiency of 6.82 and 6.96 was obtained with White Leghorns and Lyallpur Silver Blacks in first year while it was 7.26 and 7.49 in second year of the corresponding birds respectively (Table 1). The age caused a significant ($P < 0.01$) effect on the feed efficiency (Table 2). The results are in accordance with those of Mueller and Heidenreuter (1960) who recorded a better feed efficiency in younger birds.

TABLE 2: *Analyses of variance of fortnightly performance of layers in the first and second laying years in White Leghorn and Lyallpur Silver Black breeds*

Source of variation	d.f.	Mean squares of			
		Feed consumption	Feed efficiency	Egg production	Egg weight
Year	1	4.249**	9.874**	32.417**	9255.36**
Breed	1	9.499**	0.233**	12.693**	632.12**
Fortnights	25	2.020**	0.946**	31.917**	185.34**
Y X B	1	0.142NS	0.003NS	0.562NS	81.72**
B X F	25	0.012NS	0.003NS	3.430**	1.67NS
Error	154	0.312	0.026	1.077	10.16

** — Significant at one per cent level
NS — Non significant
Y — Years
B — Breed
F — Fortnights (Two weeks).

The probable explanation for the decline in feed efficiency observed in second year might be the lowered biological efficiency of the hen in transferring raw food material into eggs as compared to first year of their age when the metabolic rate is higher and feed is converted into egg more efficiently. A significant ($P < 0.01$) difference was observed in the two breeds studied with better feed efficiency in White Leghorns.

The average number of eggs per hen per fortnight in the first laying year of White Leghorn breed were 7.81 while in Lyallpur Silver Blacks the number was 6.31. A decline in egg production was noticed in the second laying year in both the breeds, the means being 6.50 and 5.00 eggs per hen per fortnight in White Leghorn and Lyallpur Silver Black breeds respectively. Analysis of variance revealed the first year production to be significantly ($P < 0.01$) higher as compared to the second year. The observations made by Anorova (1959) are in agreement with our results. He also observed reduced

number of eggs laid by yearlings than the pullets. The reason for decline in egg production might be one of the normal indications of senescence for which no single organ or group of organs could be entirely responsible as indicated by Insko and Steele (1944). However, the possible explanation for reduced egg production could be speculated on the ground that in advanced age the metabolic activities of the birds are lowered which effect the feed intake and efficiency of its conversion into eggs. The Lyallpur Silver Blacks, were found to lay significantly ($P < 0.01$) less eggs as compared to White Leghorns. This difference might be due to peculiarities of the breeds.

Observations on egg weight indicated a mean value of 46.32 and 44.33 grammes in first productive year of White Leghorn and Lyallpur Silver Blacks respectively. An increase was noticed in the second laying year with the mean of 56.23 and 53.29 grammes in White Leghorn and Lyallpur Silver Black breeds respectively. The analysis of variance revealed a significant ($P < 0.01$) difference in the two laying years. Similar results were reported by Cowen *et al.*, (1964) and Midtlid (1953). However, Jeffery (1941) concluded that egg weight was the result of the joint effect of age, environmental temperature and body weight of the birds. The lower egg weight in first year of production might be due to the heavy strain of production on the reproductive organs as compared to the subsequent year when production was reduced, causing, therefore, a higher deposition and consequently a larger egg size. The White Leghorns were found to lay heavier eggs than Lyallpur Silver Blacks. The probable explanation for this difference could also be the peculiarities of the breeds. Observations recorded during various fortnights showed significant differences indicating the effects of growth on all the productive traits.

A measurable difference in the mortality percentage was observed in first and second laying years showing a marked influence of age of birds on their viability. The average mortality percentage in White Leghorn in their first laying years was 5.0 per cent whereas it was 7.4 per cent in the second laying year. The corresponding figures for Lyallpur Silver Blacks were 7.0 and 9.6 per cent in the first and second productive year respectively. These data agree with the findings of Hays (1957) who recorded higher mortality in older birds. The probable explanation could be that after one year of production the birds were exhausted and when they were put in production in the subsequent year, the mortality rate increased as compared to the first laying year due to the stress of production on already exhausted birds.

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