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# EFFECT OF EGG WEIGHT ON THE PERFORMANCE OF THREE COMMERCIAL BROILER STRAINS

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The experiment was conducted on 182 chicks hatched from three egg weight groups, belonging to three commercial broiler strains, in order to study the effect of egg weight and strain on the performance of broilers. The chicks hatched from large eggs on an average apparently showed higher weight gain, consumed more feed and indicated some advantage in respect of feed efficiency as compared to those hatched from medium and small egg weight groups, but the differences were statistically non-significant. The mortality percentage was apparently higher in chicks hatched from small eggs than those hatched from large and medium eggs, however, the differences were non-significant. The monetary return per broiler was higher in case of chicks hatched from large eggs than those hatched from other two egg weight groups.

## INTRODUCTION

Broiler production has considerably expanded during the last two decades since the start of commercial poultry industry in Pakistan. Further expansion of the industry depends upon many factors like the availability of low priced day-old quality chicks, more efficient and economical poultry feeds, enhanced growth and round the year marketing facilities.

The quality of chicks, however, has not been generally uniform as a result of inadequate quality control measures especially with the increase in the number of hatcheries in the country. It is generally assumed that the weight of the egg detemines the weight and quality of chick at hatching time, and is an aid in altering the post-embryonic growth of any species of birds. Jalal *et al.* (1972) and Ghani (1983) observed a significant effect of egg weight on day-old chick weight. Chicks hatched from larger eggs had the highest weight than those hatched from medium and small eggs.

According to some reports, however, the small sized chicks hatched from

smaller eggs may compensate in the first few weeks of their life (Godfrey and Williams, 1955). Skoglund and Tomhave (1949) found initial weight and weight at 2 weeks increased with increasing egg weight, that beyond second week this relationship was not always consistent. The estimated cash income from broilers hatched from larger eggs was higher than that from any other group. Joya *et al.* (1979) recorded significant differences in feed efficiency of broiler chicks belonging to four commercial strains.

Various commercial hatcheries in the country providing day-old chicks belonging to different broiler strains, in general, claim a uniform standard and betterperformance of the chicks supplied by them. The present project was, undertaken to study the effect of egg weight and strain on the performance of broiler chicks in terms of growth rate, feed efficiency, mortality and economics of three strains under local conditions.

## MATERIALS AND METHODS

The study was conducted at the Poultry Experiment Station, University of Agriculture, Faisalabad on 162 chicks hatched from three different egg weight groups i.e., $EW_1$ (56-60g), $EW_2$ (51-55g) and $EW_3$ (45-50g), belonging to three commercial broiler strains namely Pilch, Hypeco and Indian River from day-old to 8 weeks of age. All the chicks were wing-banded for identification, and 54 chicks from each strain comprising 18 chicks from each egg weight group, were further randomly divided into 3 sub-groups (replicates) of 6 chicks each. Each replicate was reared separately in pens of 0.9 x 0.6sq. metreis size on deep litter Continuous light was used with provision of feed and water *ad-libitum*. The chicks were vaccinated intraocularly against Newcastle disease at the age of one week and intramuscularly at 4 weeks of age. The chicks were fed broiler starter ration upto 5 weeks and broiler finisher ration upto 8 weeks age. The following data were recorded:

1. Day-old and weekly body weight per chick upto 8 weeks age.
2. Weekly feed consumption of each sub-group.
3. Mortality.

The average weekly growth rate and feed efficiency were calculated on the basis of above data. Economics was also worked out over the experimental period of 8 weeks. The data thus collected were subjected to the analysis of

variance (Steel and Torrie, 1981).

## RESULTS AND DISCUSSION

*Weight gain:* The average day-old body weight, average final body weight and average weight gain of experimental chicks in different egg weight groups and strains are given in Table 1. The chicks hatched from larger eggs had higher body weight and average weight gain than those in other two groups. As regards strains, Hypeco chicks showed better weight gain than those of Pilch and Indian River chicks. There were, however, non-significant differences in weight gain of chicks among various egg weight groups and strains (Table 2). These results were in agreement with those of Bondari and Kazemi (1975). They reported that egg size did not have a significant influence on rate of growth. The results of the present study in respect of strain effect, however, differed from those of Joya *et al.* (1979) who observed significant difference in weight gain among the chicks of different broiler strains. This difference could be due to different strains used and the environments under which the chicks were reared.

Table 2. *Analysis of variance of data on weight gain, feed consumption, feed efficiency and mortality of broiler chicks*

| Source of variation | Degree of freedom | Mean squares of | | | |
|---|---|---|---|---|---|
| | | Weight gain | Feed consumption | Feed efficiency | Mortality |
| Egg weight groups | 2 | NS 0.0040 | NS 0.0100 | NS 0.0036 | NS 0.335 |
| Strians | 2 | NS 0.0006 | NS 0.0185 | NS 0.0020 | NS 0.000 |
| Strains X egg weight groups | 4 | NS 0.0135 | NS 0.0603 | NS 0.0053 | NS 0.167 |
| Error | 18 | 0.0049 | 0.0265 | 0.0018 | 0.185 |

NS = Non-significent.

*Feed consumption:* The average feed consumption was apparently higher in chicks hatched from large eggs than those of the chicks hatched from medium and small eggs (Table 1). As regards strains, it was maximum in Hypeco chicks; the chicks of other two strains apparently showed less feed consumption. Statistical analysis, however, exhibited non-significant differences in feed

Table 1. *Average weight gain, feed consumption, feed efficiency, mortality percentage and economics of broiler chicks from day-old to 8 weeks age*

| Description | Egg weight groups | | | Strains | | |
|---|---|---|---|---|---|---|
| | $EW_1$ (56-60 g) | $EW_2$ (51-55 g) | $EW_3$ (45-50 g) | Pilch | Hypeco | Indian river |
| Average initial body weight per chick (g) | 43.4 | 40.4 | 37.4 | 42.0 | 39.6 | 39.6 |
| Average final body weight per chick (g) | 1674.6 | 1644.0 | 1626.3 | 1645.5 | 1657.6 | 1641.8 |
| Average weight gain per chick (g) | 1631.2 | 1603.6 | 1588.9 | 1603.5 | 1618.0 | 1602.2 |
| Average feed consumption per chick (g) | 4111.2 | 4049.5 | 4058.3 | 4042.5 | 4126.4 | 4051.1 |
| Feed efficiency (feed/gain) | 2.52 | 2.53 | 2.55 | 2.52 | 2.55 | 2.53 |
| Mortality (%) | 1.85 | 1.85 | 7.40 | 3.70 | 3.79 | 3.70 |
| Total cost per broiler (Rs.) | 19.24 | 19.05 | 19.07 | 19.02 | 19.28 | 19.05 |
| Sale price per broiler (Rs.) | 25.12 | 24.66 | 24.39 | 24.69 | 24.87 | 24.63 |
| Net profit per broiler (Rs.) | 5.88 | 5.61 | 5.32 | 5.67 | 5.59 | 5.58 |

consumption among chicks belonging to different egg weight groups and strains (Table 2). The results were in agreement with the findings of Skoglund and Tomhave (1949) and Jalal *et al.* (1972) who also observed non-significant effect of egg weight on feed consumption. As regards the effect of strains, the results differed from those of Joya *et al.* (1979) who reported significant differences in feed consumption among the chicks of various broiler strains.

*Feed efficiency*: The feed efficiency values of chicks belonging to various egg weight groups and strains ranged from 2.52 to 2.55 (Table 1) and were statistically non-significant (Table 2). The results were in accordance with those of Jalal *et al.* (1972) and Joya *et al.* (1979).

*Mortality*: The magnitude of mortality, on the basis of egg weight, was apparently higher in chicks hatched from small eggs as compared to those of chicks from other egg weight groups, but no difference was observed within strains (Table 1). The results were in line with those of Horn *et al.* (1980) who reported a non-significant effect of egg weight on mortality.

*Economic aspect*: The monetary return per broiler from chicks of EW, EW and $EW_3$ groups was Rs. 5.88, 5.61 and 5.32, respectively (Table 1).

It was Rs. 5.67, 5.59 and 5.58 in case of Pilch, Hypeco and Indian River chicks, respectively. The chicks hatched from large eggs returned more per broiler as campared to chicks hatched from medium and small eggs. As regards the effect of strains, the difference in net profit per broiler was comparatively much less between three strains. These results agreed with those of Proudfoot *et al.* (1982) who observed that broiler chicks hatched from small aggs returned less per bird.

## REFERENCES

ondari, K. and R. Kazemi. 1975. The influence of egg size on initial chick weight and subsequent broiler growth. Archive fur Geflugelkunde, 39 (4) : 135-137 (Anim. Breed. Abst , 44 : 1885, 1976).

Ghani, M.J. 1983. Effect of egg weight on hatchability in commercial strains of poultry (broilers) M.Sc. Thesis, University of Agriculture, Faisalabad.

Godfrey, G F. and C. W llia us. 1955. Unsuitability of the chick weight : egg

weight ratio as an indicator of post-natal growth. Poult. Sci. 34 : 164.

Horn, P., L. Papocsi, I. Csalava and G. Flattfalder. 1980. The influence of hatching egg size, age of the parents and sex of the broiler on subsequent performance during rearing. 6th European Poultry Conference, Hamburg (Anim. Breed. Abst., 50:4140, 1982).

Jalal, M. A., M. R. Chaudhry and K. N. Ahmad. 1972. Influence of egg weight on the chick weight and its subsequent growth performance upto 10 weeks of age in Lyallpur Silver Black. Pak. J. Sci. 24(1-2) : 29-32.

Joya, A. A., T. H. Shah, M. Fahim Ullah and A. R. Abid. 1979. Comparative study on the performance of various commercial broiler strains. J. Anim. Sci. Pakistan, 1(1-2) : 49-54.

Proudfoot, F. G., H. W. Hulan and K. B. McRae. 1982. Effect of hatching egg size from semi-dwarf and normal maternal meat parent genotype on the performance of broiler chickens. Poult. Sci. 61 : 655-660.

Skoglund, W. C. and A. E. Tomhave. 1949. Relationship between egg weight, initial chick weight and subsequent broiler growth. Bull. Del. Agri.Exp. Stat. No. 278.

Steel, R.G.D. and J. H. Torrie. 1981. Principles and Procedures of Statistics, 2nd edition. McGraw Hill Book Company, London.