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INFLUENCE OF STRAIN, SEX AND AGE OF CHICKEN ON THE INTENSITY OF GROWTH AND MEAT QUALITY CHARACTERISTICS

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An experiment was conducted at the Poultry Experiment Station, University of Agriculture, Faisalabad on 120 day-old chicks with 60 chicks (30 male and 30 female) of Hubbard strain and 60 chicks (30 male and 30 female) of Indian River strain to determine the influence of strain, sex and age of chicken on the intensity of growth and meat quality characteristics. The results revealed that birds of Hubbard strain gained significantly ($P<0.05$) more weight than those of Indian River strain. Weight gain was significantly ($P<0.01$) better in males than females in both the strains alongwith significant interaction ($P<0.05$) between strain and sex. The results on feed consumption and feed conversion interaction were non-significant. The dressing percentage increased with increase in age in both strains and sexes; males of both the strains attained better weight than females at 42 and 49 days of age.

INTRODUCTION

Meat has been used by man as an article of diet since the appearance of life on this planet. Meat is primarily a protein food of high biological value. Besides protein, it contains many other nutrients such as fat, vitamins and minerals. All over the world, the broiler industry had made a phenomenal growth during the last few decades. As a consequence of intensive research, the quantity and quality of meat has also been improved steadily. The main emphasis in research has been given to increased growth and efficiency through improved environment and breeding practices. However, work on these lines has not gained much appreciation in Pakistan. A study was, therefore, planned to see the influence of strain, sex and age of broiler chicken on growth performance and meat quality characteristics.

MATERIALS AND METHODS

In all 120 day-old chicks, 60 each (30 male and 30 female of each strain) of two commercial broiler strains, namely Hubbard and Indian River were purchased from their local hatcheries. These chicks were reared at the Poultry Experiment Station, University of Agriculture, Faisalabad. The chicks were wing-banded for identification. According to the strain and sex, each group of 30 chicks was randomly divided into 3 sub-groups of 10 chicks each. The chicks in each sub-group were reared in separate pens measuring 120 x 75 cm which were disinfected and cleaned before the start of the experiment. About two inch layer of sawdust was used as litter which was stirred daily during the experiment to keep it dry. The brooding temperature was maintained at about 35 °C during first week and reduced almost 3 °C every week until fifth week, after which chicks

were reared at room temperature. Twenty-four hours light, clean water and commercial starter and finisher feed *ad libitum* was provided throughout the experimental period. The chicks were vaccinated against Newcastle disease at one week of age through intraocular route and by intramuscular injection at the age of 4 weeks. The following data were recorded:

1. Day-old chick weight
2. Weekly weight
3. Weekly feed consumption of each sub-group
4. Mortality, if any

thus recorded were analysed for significance (Steel and Torrie, 1981).

The following statistical model was adopted:

$$Yi_{jk} = U + a_i + B_{ij} + ni_{jk}$$

where

1, 2 = (The number of sexes)
J = 1, 2 (Number of strains)
K = 1, 2, 3 (Number of replications)
U = Overall mean
a_i = Effect of sex
b_j = Effect of strain
E_{ij} = Random error
n_{ijk} = Sampling effect

Table 1. Average weight gain, feed consumption and feed conversion ratio of two different broiler strains at 0-49 days

Description	Hubbard		Indian River	
	M	F	M	F
Weight gain per chick (g)	1949.3	1661.6	1798.7	1663.4
Feed consumed per chick (g)	4332.5	4309.0	3976.2	4225.2
Feed conversion ratio	2.53	2.52	2.45	2.46

Table 2. Analysis of variance of data on weight gain of two different broiler strains at 0-49 days of age

Source of variance	Degree of freedom	Sum of squares	Mean squares	F. value
Strain	1	16606.082	16606.082	6.5891*
Sex	1	134154.489	134154.489	53.2311**
Strain x Sex	1	17434.565	17434.565	6.9179*
Error	8	20161.813	2520.227	
Total	11	188356.949		

At 42nd and 49th day of experiment, one bird from each sub-group was picked randomly and slaughtered and carcass weight was recorded. The experimental data

RESULTS AND DISCUSSION

Weight gain: The initial average day-old 49th day weight according to strain and sex

is given in Table 1. When the recorded data on weekly weight gain were subjected to statistical analysis (Table 2), the results revealed that chicks belonging to Hubbard strain gained significantly ($P<0.05$) i.e. 2.11% more weight than those of Indian River strain. These results are substantiated by the findings of Joya *et al.* (1979) and Verma *et al.* (1983) as they observed significant effect of strain on weight gain. Weight gain was also significantly ($P<0.01$) affected by sex and the males gained 5.99% more than females of both the strains. The males of the Hubbard and Indian River gained 7.97 and 3.91% more weight than their females, respectively. The interaction between strain and sex was also significant ($P<0.05$). These findings are in agreement with the results of Mahapatra *et al.* (1984), Pandey *et al.* (1985) because they all reported a significant effect of sex on liveweight among different broiler strains.

Feed consumption: With increasing age the individual consumes more feed due to increased body size and requirements. The average feed consumption per replicate upto 49 days of age in both the strains and sexes is given in Table 1. It was observed that as the Hubbard strain gained 2.11% more weight, it also consumed 4.88% more feed than chicks of Indian River strain. The males and females of Hubbard strain consumed 8.63 and 0.98% more feed than Indian River males and females, respectively. In Hubbard strain, males consumed 4.68% more feed than females but in Indian River, females consumed 3.84% more feed than males. However, when the data regarding weekly feed consumption were subjected to statistical analysis (Table 2), the results revealed that the differences observed among two strains and sexes alongwith their interaction were non-significant (Table 3). Similar findings which substantiated these results were reported by Soniya and Okeowo (1983), Sinha and Verma (1984).

Feed conversion ratio (FCR): The feed conversion ratio per chick of both the strains and sexes is given in Table 1. It was observed that FCR increased with increasing age in both the strains. The data also indicated that males and females of Hubbard strain showed better FCR than males and females of Indian River strain. The results of statistical analysis revealed that slight differences observed due to strain and sex alongwith their interaction were non-significant (Table 2). These results coincide with the findings of Joya *et al.* (1979) and Sinha and Verma (1984). They reported non-significant differences in FCR among different broiler breeds.

Table 3. Average dressing percentage per chick of two different broiler strains at 42 and 49 days of age

Age in days	Hubbard		Indian River	
	M	F	M	F
42	74.09	73.67	73.97	73.40
49	75.07	73.91	74.67	74.28

Carcass Characteristics

Dressing percentage: The dressing percentage of birds belonging to Hubbard and

Table 4. Analysis of variance of data on dressing percentage of two different broiler strains at 42 and 49 days of age

Source of variance	Degree of freedom	Sum of squares	Mean squares	F. value
Strain	1	0.085	0.065	0.033
Sex	1	2.426	2.426	1.228
Strain x Sex	1	0.140	0.140	0.071
Age	1	2.947	2.947	1.492
Strain x Age	1	0.048	0.048	0.024
Sex x Age	1	0.122	0.122	0.062
Strain x Sex x Age	1	0.315	0.315	0.159^{NS}
Error	16	31.606	1.975	
Total	23	37.668		

NS = Non-significant.

Indian River strains for males and females at 42 and 49 days of age are presented in Table 3.

It was observed that dressing percentage increases with the increase in age in both the strains and sexes. It was also observed that males of each strain had a better dressing percentage than females. The results revealed non-significant differences among the strains at 42 and 49 days of age alongwith different interactions (Table 4). These results are supported by the findings of Joya *et al.* (1979), Merkley *et al.* (1980) and Khanna and Panda (1983). They observed non-significant difference in dressing percentage among various strains.

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