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Comparative study on productive performance and hatching traits of three age groups of indigenous Mushki Aseel chickens

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ABSTRACT

The purpose of study was to compare three different age groups of Mushki Aseel, an indigenous chicken breed maintained at Indigenous Chicken Genetic Resource Center (ICGRC), Department of Poultry Production, University of Veterinary and Animal Sciences Lahore for the duration of 4 weeks. For this, 24 birds (21 females and 3 males) of three different age groups (40, 70 and 100 weeks) were maintained respectively. Seven females and one male were placed in one treatment unit and stud mating system was used. The experiment was conducted according to Completely Randomized Design (CRD). The data thus obtained were statistically analyzed by analysis of variance (ANOVA) techniques. Means were compared using Fisher's LSD (Least Significant Difference) test by using SAS (Statistical Analysis System), version 9.1. The body weight of third production cycle was significantly higher than 2nd and 1st while 2nd production cycle showed significantly higher egg number and egg weight. Feed intake was also significantly higher in case of 2nd production cycle. No significant differences were observed regarding Calories, Protein, Ca, P, lysine & methionine intake. Significant differences were observed in hatchability, hatch of fertile, and fertility, showing highest values for 1st production cycle. Significantly lower number of infertile eggs, dead in shell and dead germs was observed in 1st production cycle.

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1. Introduction

The involvement of rural poultry in total eggs and poultry meat production of the country is about 32.15 and 15.38 %, respectively (Anonymous, 2006) which shows a significant role of rural poultry in the production of high quality animal protein for ever increasing population of the country. This 32.15 and 15.38 percent share is generally from, Dasi, Naked neck (GANJI) and Aseel. In Pakistan, Aseel is a recognized native breed and used either as a backyard poultry in the rural areas or as a game bird. Rural poultry, which is characterized with poor production capability, is an important economic activity in about 80 percent of rural household in Pakistan (Anonymous, 2003). The weight of a 2-year-old adult male is between 3-4 kg while that of a hen between 2-3 kg. With 36-60 eggs per year, are on the bank of extinction and are presently limited only to hobbyists and cock-fighters (Bhatti et al., 1991).

Mushki Aseel is native variety of Pakistan and found all over Pakistan especially in areas of Punjab and Sindh. Plumage color of Mushki Aseel is greenish black, having pea comb, black shanks, red wattles and ear lobes. The body weight of mature male and female is 2570 and 1870g respectively. Mushki hens may lay 49 eggs per year with an average egg weight of 45g. However in Pakistan no work is done on Aseel therefore, present study is designed to investigate the productive performance and hatching traits of Mushki variety of Aseel from three different age groups with the following objectives.

1. To get baseline information about the production performance and Hatching traits of Mushki variety of Aseel.
2. To study the effect of age on production performance and hatching traits of Mushki Aseel chicken.

2. Materials and methods

The experiment was conducted in identical cage units for a period of 4 weeks. Twenty one birds from 3 different production cycles were equally distributed into 7 replicates of each production cycle comprising 1 bird in each replicate. The birds were housed in a well-ventilated enclosure having concrete floor, plastered walls and pre-cast concrete slab ceiling. Ceiling Fan and Air-Cooler was provided to keep the temperature comfortable for birds. The birds were kept in three-tiered laying cages with slopping wire floors and dropping trays to facilitate egg collection and removal of droppings. Daily feed allowance of 150 grams per bird was offered in separate feeding troughs. After 2 hours feeder was removed and residue was weighed to calculate feed and nutrient intake. Egg production was recorded daily and egg collection was practiced twice a day, early in the morning and in the evening. Individual eggs were marked (pen number, egg weight and date was written). Each and every egg was weighed using electronic balance capable of measuring up to 0.1 g. Egg mass was calculated by dividing total egg mass with total egg number from each hen during the experimental period of four weeks. Feed per dozen eggs, Feed per Kg egg mass was calculated by dividing the total feed consumed by dozens of egg. The eggs at the end of the research were set and hatching performance was studied. Hatch of fertile, fertile eggs, infertile eggs, Dead germ, dead in shell chicks were studied after egg break out. Experiment was conducted according to Completely Randomized Design (CRD). The data were analyzed using SAS (Statistical Analysis System) version 9.1. One-way ANOVA single factor (Steel et al., 1997) was conducted along with Post hoc analysis using Fisher's LSD (Least Significant Difference) Test.

3. Results and discussion

3.1. Body weight

Significant differences ($P < 0.05$) were observed in the body weight among three age groups. The birds of 3rd production cycle remained the heaviest throughout the experimental period followed by 2nd and 1st production cycle. Similarly, significant differences were also observed in body weight at different ages by Haunshi et al., (2011). The average weight was found to be 1670g at 40 weeks of age contrary to the findings of Singh, (undated) as 1853g at 40 weeks of age.

3.2. Feed and nutrient intake

Non-significant differences ($P > 0.05$) were observed in feed and nutrient (Calories, Protein, Calcium, Phosphorus, lysine and Methionine) intake among three production cycles. The birds of 2nd production cycle

remained highest in feed and nutrient intake followed by the birds of 3rd and 1st production cycles. Similarly, some scientist reported significant effect of age on feed consumption and the aged birds consume more feed than young birds (Mehta et al., 1986). Whereas other researches noticed non-significant differences in feed consumption in pullets and layers (Applegate et al., 1999 ; Schafer et al., 2005 and Yasmeen et al., 2008). In this study feed intake per bird was recorded 450, 610 and 525g at 40, 70 and 100 weeks of age respectively. However, Gupta et al., (2000) showed weekly feed intake per bird as 124, 300, 540, 650 and 750g at 1, 2, 3, 4 and 5 months of age.

Table 1

Comparison of production performance and hatching traits in three age groups of Mushki Aseel chicken.

Traits	Production cycles		
	1 st cycle	2 nd cycle	3 rd cycle
Production performance			
Body Wt. (g)	1635.29 ± 23.09 ^c	1837.71 ± 43.70 ^b	2134.86 ± 79.58 ^a
Egg (#)	3.85 ± 1.42	5.28 ± 1.23	3.85 ± 1.37
Egg Wt. (g)	45 ± 0.81 ^{ab}	41.03 ± 3.00 ^b	47.00 ± 0.88 ^a
Egg mass (g)	168.57 ± 62.70	236.14 ± 50.84	176.42 ± 64.19
Feed intake	1394.29 ± 49.57	1812.86 ± 88.17	1770.00 ± 225.15
FCR/Dozen egg	5651.43 ± 2459.49	4229.20 ± 325.65	6353.93 ± 1884.17
FCR/Kg egg mass	11.25 ± 5.18	7.59 ± 0.46	11.20 ± 2.87
Nutrient intake			
Calories	3201.54 ± 192.92	4089.74 ± 190.48	3904.77 ± 516.43
Protein	200.58 ± 7.205	200.58 ± 7.209	245.09 ± 31.11
Calcium	42.90 ± 1.54	55.77 ± 2.69	54.49 ± 6.93
Phosphorus	5.29 ± 0.19	6.88 ± 0.33	6.72 ± 0.85
Lysine	8.63 ± 0.31	11.22 ± 0.54	10.97 ± 1.39
Methionine	4.03 ± 0.14	5.25 ± 0.25	4.93 ± 0.62
Hatching traits			
Hatchability %	46.30 ± 1.90 ^a	21.3 ± 0.3 ^b	13.75 ± 0.45 ^c
Fertility %	89.95 ± 1.05 ^a	78.00 ± 0.4 ^b	61.10 ± 1.10 ^c
Infertile eggs %	12.80 ± 1.70 ^a	21.95 ± 0.35 ^b	46.90 ± 0.20 ^a
Hatch of fertile %	49.85 ± 0.15 ^a	28.50 ± 0.90 ^b	25.75 ± 0.75 ^b
Dead germ %	7.30 ± 0.60 ^a	36.00 ± 0.90 ^a	34.55 ± 1.25 ^b
Dead in shell %	12.15 ± 1.05 ^c	21.80 ± 0.20 ^b	33.90 ± 0.90 ^a

Note: Different superscripts on different values represent significant differences among their means ($P \leq 0.05$).

3.3. Egg number and egg mass

Non-significant differences ($P > 0.05$) were observed in egg number throughout the experimental period, whereas 2nd production cycle was numerically high in egg production followed by the birds of 1st and 3rd production cycles. Non-significant differences ($P > 0.05$) were also observed in cumulative egg mass production. In present study Aseel has annual egg production of 48 which was less than 92 as recorded by Gupta et al., (2000). In this study average egg weight of Aseel was recorded 45g with a slight difference to the earlier findings of Singh et al., (2000) who noticed it as 41g while Mohan Singh et al., (2000) recorded it as 47g.

3.4. Hatching traits

Significant differences ($P < 0.05$) were observed in Hatchability %, fertility % and hatch of fertile % throughout the research while hens of 1st production cycle were higher in Hatchability % followed by the bird of 2nd and 3rd production cycles. Significant differences ($P < 0.05$) were observed in Infertile Eggs % and dead in shell % throughout the research while hens of 3rd production cycle were higher in Infertile Eggs % followed by the bird of 2nd and 1st production cycles. The results are in line with the earlier findings of Brotherstone et al., (2000) and Brommer and Rattiste, (2008) who observed significant differences in case of broiler breeder. Fertility of Aseel was noticed as 77% however other researchers showed fertility of Aseel as 55% and 66% (Acharya and Kumar, 1984 and Galal et al., 2000). In the present experiment significant differences ($P < 0.05$) were observed in Hatchability %.

However, non-significant differences were observed by El-Sheikh, (2007). Hatchability of Aseel was found 27% contrarily Acharya and Kumar, (1984) and Mohan et al., (2008) recorded 45 and 67%.

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