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Performance of native chickens under intensive system

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Abstract

To evaluate the performances of Desi (ND), Hilly (H) and Naked Neck (NN) of 756 day-old chicks were used (n = 404 ND, n =132 H and n =220 NN). The body weight of the native genotypes differs significantly (P<0.01) at all ages except day-old. The age at sexual maturity, egg weights at sexual maturity and egg production were similar while body weight at sexual maturity and egg weight at 36 week of age differs significantly (P<0.001) among the genotypes. The age of sexual maturity of ND was 156 days while that of NN was 151days. The egg weight at 36 weeks of age was 43.8±3.3gm in NN and 40.5±2.4 gm in H. Egg production during 24 to 36 weeks of age was 50.5±11.6, 49.4±9.6 and 53.4±10.9% in ND, H and NN respectively. The mortality was slightly higher in ND than that of H and NN.

Keywords: Chicken, Native, Genotypes and Performance

Introduction

Rural Poultry production are mainly native birds contribute significant amount of total products in Bangladesh. It is a low input –low output production system, which involves little care since the birds are scavengers, and supplied with little or no supplemental feed. Production performance of native chicken is very low as compared to high yielding strains kept under intensive system. But it generates income for rural women, landless poor and marginal farmers. It provides cash income and valuable animal protein, which significantly contributes to family nutrition and food security. In Bangladesh, there are about 142 million chickens and 14 million ducks (Anonymous, 2000) are traditionally reared by women and children. The native chickens represent more than 70% of the total poultry where more than 74% households keep this bird (Huque and Paul 2001). Gueye (1999) reported that native chicken contributes about 28% of the total protein supply in Bangladesh and holding second place to milk products which contributes 38%. About 86 per cent of poultry meat and 75 percent of eggs are produced by native chicken maintained by rural farmers in free -range system.

FAO (1984), suggested a thorough study of native chicken and conserving them, if found worthy. Little information is available about native chicken on its production performance. Therefore, the conservation and evaluation of native chicken is of great importance to the welfare of the rural people. Therefore, present work was undertaken to evaluate the performance of Desi (ND), Hilly (H) and Naked Neck (NN) genotypes under intensive system.

Materials and Methods

The study was conducted from July 2004 to October 2005 to identify the best genotype of native chicken under intensive management. A total of 756 day-old chicks were used in this study comprising of 404 ND, 132 H and 220 NN. The total numbers of chicks used in this experiment were collected from two hatches.

Day-old chicks collected from the two hatches were individually weighed and distributed in previously cleaned and disinfected pens into the brooder, which were cleaned and disinfected earlier. The conventional brooding system was followed by using electric bulbs. Brooding was done by fitting 100 watts electric bulbs and then heat was decreased gradually by lifting up the bulbs as per requirement of the temperature. One thermometer and a dry and wet bulb hygrometer were hanged in the brooder to record temperature and relative humidity. During brooding period, starter ration was provided to the chicks. Cool clean drinking water was supplied all the times. The birds were housed in an open sided semi gable type roof with concrete floor. Fences were made from galvanizing wire net. Selection was performed two times i.e. first time at 16 weeks of age on the basis of body weight and second time at 40 weeks of age on the basis of egg production, egg weight, sexual maturity and body weight using selection index method. The similar management practices were followed for all the birds. All the chicks were vaccinated as per following schedule given in Table 1.

Table 1. Vaccination schedule for the experimental birds

Age (day)	Name of Vaccine	Route of administration
4th	Newcastle-Live vaccine	Eye/Oral drop
11th	Gumboro killed oil adjuvant	Subcutaneous-half dose
14th	Gumboro-Live vaccine	Eye drop
21th	Newcastle-Live vaccine (Lasota)	Eye/Oral drop
30th	Newcastle- killed oil adjuvant	Subcutaneous-half dose
35th	Fowl pox –Live vaccine	Wing web Method
70th	Fowl pox –Live vaccine	Wing web Method
120th	Newcastle- killed oil adjuvant	Subcutaneous-half dose

Diets: The composition of the diets is shown in Table 2. Feed was supplied adlibitum during all stages of production. Fresh clean drinking water was also available all the times. Feeders were cleaned weekly while waterers were cleaned twice a day. Refused feed were measured everyday in the morning.

Table 2. Composition of experimental diets

Ingredient Composition	Starter (0-4 wks)	Grower (5-16 wks)	Layer (17-36 wks)
Maize	50	55	55
Rice polish	16	13	12
Soya bean meal	25	23	20.25
Protein concentrate (60% CP)	6	5	5
Oystershell	1	2	0
Dicalciumphosphate	1.25	1.25	2
Calcium Carbonate	0	0	5
Lysine	0.1	0.1	0.1
Methionine	0.1	0.1	0.1
Vitamin-mineral premix	0.25	0.25	0.25
Common salt	0.3	0.3	0.3
Total	100	100	100
Calculated nutrient composition			
ME, Kcal/kg	2859.4	2862.9	2808.7
Crude protein (%)	20.2	18.9	17.8
Calcium (%)	1.1	1.3	3.1
Phosphorus (%)	0.6	0.5	0.8
Lysine (%)	1.1	1.0	1.0
Methionine(%)	0.3	0.3	0.3
Crude fat (%)	-	-	5.1
Crude fibre (%)	-	-	3.0

Individual body weight at day-old, 1st week, 4th week, 8th week and 12th week , the body weight at sexual maturity, age at sexual maturity, egg weight at sexual maturity and egg production, feed intake and weekly egg weight was recorded.

Data were analyzed by using univariate GLM procedure of SPSS 10.0 for Windows (SPSS Inc.1998) computer programme. Correlation and regression analyses were done according to Snedecor and Cochran (1989).

Results and Discussion

Body weights of Desi, Hilly and Naked Neck birds are shown in Table 3. The average initial body weight of day old chicks of Desi, Hilly and Naked Neck were 31.2, 30.5 and 31.7g, respectively and the difference was non-significant while the body weight of chicks at 1, 4, 8 and 12 weeks differ significantly ($p<0.01$). The body weights of chicks differ significantly ($p<0.01$) between hatches at all except 4 week. The interaction effect of hatch and genotypes were significant ($p<0.01$) at all ages except 4 week of age.

Table 3. The effect of genotypes and hatch on body weight of native chicken

Age period		Genotype			Mean	F value level of significance		
	Hatch	ND	H	NN		Genotype	Hatch	Genotype × hatch
Day-old weight (g)	1st hatch	30.7	29.9	30.9	30.6	2.72^{NS}	21.91***	0.430^{NS}
	2nd hatch	31.8	31.3	31.7	31.7			
	Mean	31.2	30.5	31.7	31.1			
1st week weight (g)	1st hatch	51. 7	51.1	52.8	51.9	6.545**	77.43***	8.627***
	2nd hatch	49.7	45.8	46.9	48.2			
	Mean	50.8	49.0	50.9	50.3			
4th week weight (g)	1st hatch	186.7	168.6	182.0	182.0	24.31***	2.322^{NS}	1.073^{NS}
	2nd hatch	187.2	159.8	178.4	180.3			
	Mean	186.9	165.1	180.4	181.2			
8th week weight (g)	1st hatch	495.2	443.4	507.6	488.5	5.478**	15.511***	9.459***
	2nd hatch	465.5	458.0	437.6	456.0			
	Mean	481.9	449.0	476.0	474.3			
12th week weight (g)	1st hatch	787.5	733.0	894.2	794.3	9.471***	32.00***	9.610***
	2nd hatch	728.9	705.3	717.5	721.5			
	Mean	774.9	729.4	825.5	776.9			

*P<0.05; **P<0.01; ***P<0.001: ND= Desi; H=Hilly; NN= Naked Neck

Reproductive performance of Desi (ND), Hilly (H) and Naked Neck (NN) chickens are shown in Table 4. The age at sexual maturity, egg weight at sexual maturity, feed intake and egg production were not significantly affected ($P>0.05$) by genotypes while the body weight at sexual maturity and egg weight at 36 weeks of age (Table 4) differ significantly. The heavier body weight at sexual maturity was found in H (1461.2 ±251 g) and the lowest weight in NN (1310.5 ±136 g). The age at sexual maturity of NN genotype (151 days) was 5 days earlier than that of ND (156 days). The age at sexual maturity is not consistent with the observation of Barua (1992); Huque et al. (1990); Sazzad (1986). They reported that NN and ND came to sexual maturity at 234 and 175 days, respectively. The relationship between the age at sexual maturity and egg production reveals negative relationship (Figure 1). The highest egg weight at 36 weeks of age was observed in NN (43.8±3.3gm) and the lowest weight in H (40.5±2.4 gm). This result is in agreement with the observation of Khatun *et al. (2005)* and Huque (1999). They found that egg weight was higher in Naked Neck followed by Desi. Number of eggs produced per hen up to 36 weeks of age was 50.0±13.2, 51.4±10.8 and 54.1±13.2 respectively; for ND, H and NN.

Table 4. Reproduction performance different native genotypes

Parameter	Genotypes			F value & level of significance
	ND	H	NN	
	Mean ±SD	Mean ±SD	Mean ±SD	Genotype
Age at sexual maturity (days)	156.1±16.1	154.5±16.2	151.1±15.9	2.27^{NS}
Body weight at sexual maturity (g)	$1431.1±204^{b}$	$1461.2±251^{a}$	$1310.5±136^{c}$	12.16^{***}
Egg weight at sexual maturity (g)	29.2±1.8	28.4±1.7	29.1±1.8	2.70^{NS}
Egg weight at 36 weeks of age (g)	$42.6±3.7^{b}$	$40.5±2.4^{c}$	$43.8±3.3^{a}$	13.747^{***}
Egg production no. (1^{st} egg – 36 weeks)	50.0±13.2	51.4±10.8	54.1±13.2	$2.36.^{NS}$
Egg production (24 - 36 weeks) (%)	50.5±11.6	49.41±9.6	53.4±11.0	2.42^{NS}
Egg production (24 -36 weeks) (no.)	42.4±0.9	41.5±1.3	44.9±1.1	2.42^{NS}
Feed consumption at laying stage (g/b/d)	83.7±1.1	84.8±1.4	83.1±1.7	2.014^{NS}

abc values with superscript within the same row differs significantly; NS=Non-significance, *P<0.05; **P<0.01; ***P<0.001: ND=Desi; H=Hilly; NN= Naked Neck

The egg production percentage up to 36 weeks of age was highest in NN (53.4 ± 11.0) followed by ND (50.5± 11.6) and H (49.4± 9.6) respectively but difference was non-significant among the genotypes. The daily feed consumption by the different genotypes was almost similar and difference was non-significant among the genotypes.

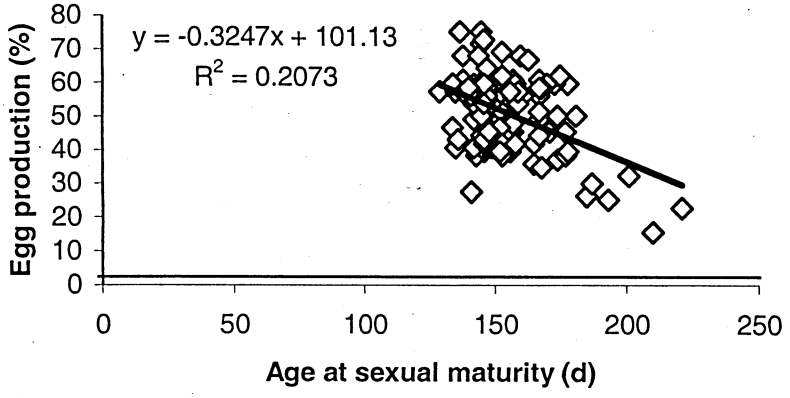


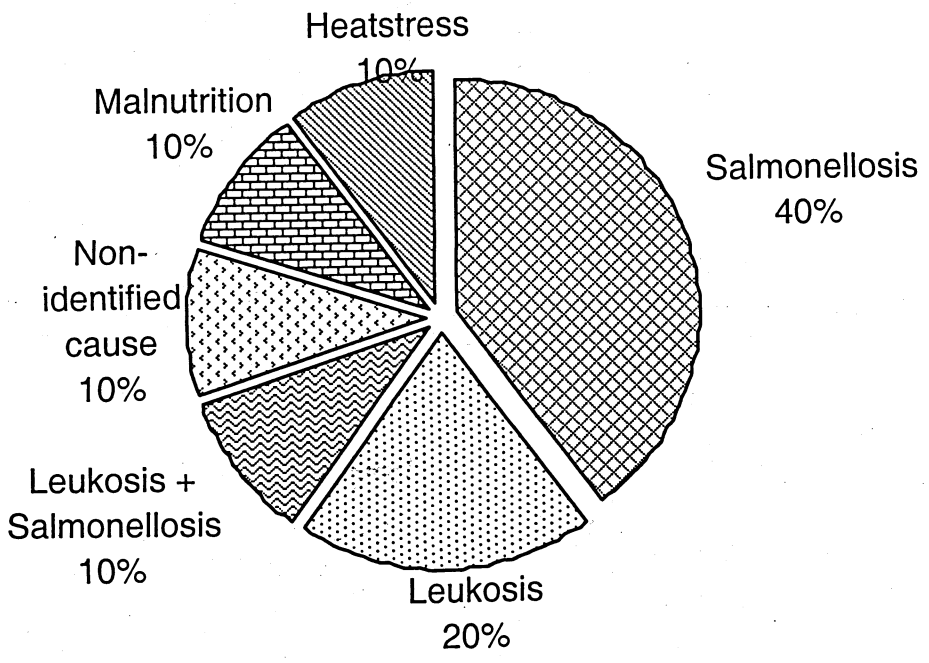
Fig. 1. Relationship between age at sexual maturity and egg production (%) (y= -0.3247x + 101.13; R2 = 0.2073; F = 26.41; P<0.001

Mortalities of birds during brooding, growing and laying periods are shown in Table 5. Native genotypes lost many chicks during the brooding period, which indicate poor viability of the chick. But mortality rate of native genotypes in brooding, growing and laying period were 0-2.0%, 0-6.9% and 0-5.7 % respectively. The mortality rate of ND was slightly higher than that of H and NN. The mean mortality during brooding period (0-4 wks) was 0.7, 1.6 & 1.4% respectively in ND, H & NN. The mean highest mortality was found in ND (4.8 %) at growing stage (5-16 wks). Out of 10 birds died, 4(40%) died due to Salmonellosis, 2(20%) died due to Avian Leukosis, 1(10%) died due to Salmonellosis plus Leukosis, 1 (10%) died due to non-identified causes, 1(10%) died due to malnutrition and 1(10%) died due to heat stress (figure 2). The many researches indicated that the incidence of New Castle Disease, Salmonella, *E Coli*, Fowl Cholera, Fowl Pox, IBD and Coccidiosis are major diseases of native chickens in Bangladesh. The incidence of Leukosis was found in the present study of native chickens, which was not reported earlier.

Table 5. Mortalities of different genotypes of native chicken in brooding, growing and laying period (%)

Age period	Hatch	Genotypes		
		ND	H	NN
0-4 weeks	1st hatch	1.4 (222)	1.3 (79)	0.8 (119)
	2nd hatch	0 (182)	1.9 (53)	2.0 (101)
	Mean	0.7	1.6	1.4
5-16 weeks	1st hatch	6.9 (233)	1.0 (97)	0.8 (121)
	2nd hatch	2.7 (182)	0 (52)	1.0 (99)
	Mean	4.8	0.5	0.9
17-24 weeks	1st hatch	0.9 (115)	0 (96)	1.2 (86)
	2nd hatch	5.4 (56)	0 (52)	0 (35)
	Mean	3.1	0	0.6
25-36 weeks	1st hatch	3.5 (114)	2.5 (80)	2.4 (85)
	2nd hatch	1.9 (54)	0 (15)	5.7 (35)
	Mean	2.7	1.3	4.0

*The values in the parenthesis indicate the number of observation



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