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Effect of Na gene on egg quality in upgraded local fowls of Bangladesh*

M E HAQUE[1], M A R HOWLIDER[2] and Q M E HUQUE[3]

Bangladesh Agricultural University, Mymensingh 2202 Bangladesh

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Limited research has been undertaken with indigenous chicken particularly with Bangladeshi local Naked-neck chicken. The present study was undertaken to compare the egg quality parameters of Bangladeshi local Naked-neck (Na) chicken and their crosses with high- yielding exotic breeds. In an experiment, a total of 28 eggs taking 4 from each of 7 genotypes; Naked-neck Local (NaD), Rhode Island Red (RIR), White Leghorn (WL), Fayoumi (Fy), NaD × RIR, NaD × WL and NaD × Fy were taken. The eggs were collected from the birds of 52 weeks of age, which were housed in individual cages and maintained under identical management and feeding regimes. Each egg weight, albumen and yolk indices, Haugh unit scores and shell thickness were determined as per standard procedure (Heiman and Carver 1936, Haugh 1937, Chowdhury 1988). Per cent yolk, albumen and shell was calculated from the weight of yolk, albumen and shell and egg weight. All data were analyzed in a completely randomized design (CRD). The significant differences were identified using Duncan multiple range test (Gomez and Gomez 1983). The egg quality parameters were regressed on egg weight for their relationships.

Pure breeds

Highest ($P < 0.05$) yolk weight was found in RIR, lowest in NaD and intermediate in WL and Fy (Table 1). Significantly different ($P < 0.05$) dry yolk weight was found only in RIR when compared with other genotypes. Yolk index was almost similar in all genotypes. Highest ($P < 0.05$) per cent yolk was found in Fy and lowest was in WL. Albumen index was superior in WL followed by RIR, NaD and Fy.

Cross breeds with NaD

Among crossbreds (NaDRIR, NaDWL and NaDFy) NaDRIR had highest ($P > 0.05$) yolk per cent. Highest ($P < 0.05$) albumen weight was found in NaDWL followed by NaDRIR and NaDFy. Albumen index was superior ($P < 0.05$) in NaDFy followed by NaDWL and NaDRIR. Highest shell thickness ($P < 0.05$) and per cent shell ($P < 0.01$) were found in NaDWL and NaDFy, respectively. Highest ($P < 0.05$) Haugh unit score was also found in NaDFy. The differences among genotypes observed for shell thickness and albumen and yolk quality were agreeable with Pandey *et al.*(1986), Baker and Curtiss (1958) and Salah Uddin and Howlider (1991). The results of this study showed that the Na genotypes are superior to the crossbred chickens with respect to egg quality parameters.

The correlation between egg weight and shell thickness among the genotypes were significant ($P < 0.05$) in NaDWL but nonsignificant and inconsistent to other genotypes (Table 1). For each gram increase in egg weight the shell thickness is increased by 0.023 mm. Dry yolk weight and per cent yolk were significantly ($P < 0.05$) correlated to egg weight in NaDRIR. Significant ($P < 0.05$) correlation for dry yolk weight with egg weight was also found in NaD. For each gram increase in egg weight the dry yolk weight increased by 0.09g in NaDRIR but decreased by 0.1g in NaD. Per cent yolk also decreased by 0.69% with the increase of 1g of egg weight (Table 1). Dry albumen weight also had significant ($P < 0.05$) correlation with egg weight in NaDRIR. For 1g gram increase in egg weight the dry albumen weight increased by 0.088g. Egg weight had no significant relation to yolk and albumen weight, yolk and albumen indices, per cent albumen, per cent shell and Haugh unit regardless of genotype.

The present study showed that birds having Na inheritance had superior albumen index, Haugh unit score, highest shell thickness and per cent shell. Birds having Na inheritance also had significant correlation of shell thickness, dry yolk weight, dry albumen weight and per cent yolk with egg weight. So, incorporation of Na gene has improved the egg quality of fowls.

SUMMARY

Egg quality traits of local naked neck (Na) and their crosses

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Present address: [1] Senior Scientific Officer, Bangladesh Livestock Research Institute, Savar, Dhaka 1341 Bangladesh.

[2]Professor, Department of Poultry Science, Bangladesh Agricultural University Mymensingh 2202, Bangladesh.

[3]Director General, Bangladesh Livestock Research Institute, Savar, Dhaka 1341 Bangladesh.

Table 1. Various egg quality parameters (y) and their regressions on egg weight (g, x) for different genotypes of fowl

Parameters	Genotypes						
	NaD	NaDRIR	NaDWL	NaDFy	RIR	WL	Fy
Egg weight (g) **	45[a]	49.75[ab]	51.50[abc]	48.50[ab]	58[c]	53.75[bc]	46.75[ab]
Yolk weight							
Mean (g)*	14.25[a]	15.75[ab]	15.50[ab]	15.25[ab]	18.50[c]	16.25[ab]	16.50[b]
Corr. coff (r)	0.12	0.34	0.14	0.23	0.45	0.71	0.20
Dry yolk weight							
Mean (g)**	7.75[a]	8.50[a]	8.00[a]	8.50[a]	9.75[b]	8.50[a]	8.50[a]
Corr. coff (r)	0.97*	0.96*	0.20	0.45	0.74	0.84	0.14
Yolk index							
Mean	0.40	0.39	0.38	0.41	0.41	0.40	0.40
Corr. coff (r)	0.40	0.30	0.76	0.30	0.84	0.70	0.77
Per cent yolk							
Mean*	31.87[abc]	32.07[abc]	30.12[a]	31.45[abc]	31.79[abc]	30.20[ab]	35.30[c]
Corr. coff (r)	0.55	0.97*	0.21	0.50	0.58	0.49	0.02
Albumen weight							
Mean (g)*	18.25[ab]	22.00[abcd]	22.75[bc]	20.25[ab]	25.50[cd]	22.25[bc]	26.50[a]
Corr. coff (r)	0.49	0.85	0.83	0.41	0.86	0.92	0.81
Dry albumen weight							
Mean (g)*	2.25[ab]	3.50[c]	3.25[abc]	2.75[abc]	3.50[c]	2.75[abc]	2.25[a]
Corr. coff (r)	0.27	0.96*	0.19	0.23	0.27	0.68	0.73
Albumen index							
Mean*	0.08[bcd]	0.09[bcd]	0.10[abc]	0.11[a]	0.09[bc]	0.10[abc]	0.06[d]
Corr. coff (r)	0.37	0.18	0.89	0.38	0.61	0.78	0.19
Per cent albumen							
Mean*	40.98[ab]	43.99[b]	44.15[b]	41.74[ab]	43.70[b]	41.31[ab]	35.27[a]
Corr. coff (r)	0.92	0.46	0.52	0.16	0.73	0.94	0.40
Shell thickness							
Mean (mm)**	0.33[bc]	0.30[a]	0.37[c]	0.31[a]	0.31[a]	0.33[ab]	0.31[ab]
Corr. coff (r)	0.18	0.83	0.95*	0.77	0.94	0.61	0.14
Per cent shell							
Mean**	12.74[b]	12.20[b]	13.09[b]	13.41[b]	12.47[b]	12.45[b]	9.61[a]
Corr. coff (r)	0.36	0.10	0.88	0.30	0.66	0.14	0.24
Haugh unit							
Mean*	84.56[ab]	85.32[ab]	86.42[ab]	90.31[ab]	80.40[abcd]	84.06[bc]	71.14[d]
Corr. coff (r)	0.41	0.24	0.86	0.48	0.83	0.24	0.55

[abcd]Means with different superscripts in the same row differ significantly (*P <.05, **P < 0.01).

with high yielding exotic chicken, viz. Rhode Island Red (RIR), White Leghorn (WL) and Fayoumi (Fy) were studied at the age of 52 weeks. Superior albumen index and Haugh Unit were found in NaDFy genotype. NaDRIR genotype had highest yolk per cent. Highest shell thickness and per cent shell were in NaDWL and NaDFy respectively. Significant (P<0.05) correlation between egg weight and shell thickness was in NaDFy. Dry yolk weight and per cent yolk were significantly correlated to egg weight. Birds having Na inheritance had superior egg quality and thus it can be concluded that incorporation of Na gene to exotic breeds might improve egg quality of chicken.

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