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Full Length Research Paper

Production and price of indigenous naked neck and full feathered chicken reared under rural scavenging system in Bangladesh

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A total of 63 farm families and 63 consumers from Gazipur and Mymensingh districts were randomly selected to assess the production and local market price of indigenous naked neck (Nana) and full feathered (nana) chickens reared under rural scavenging system. Data were collected through personal interviews using semi-structured and pre-tested interview schedules for the period of July to December, 2009. Clutch size, egg production and hatchability at set eggs were statistically similar between Nana and nana chickens. However, Nana chicken tended to be higher at 1.67% clutch length, 3.4 eggs/hen/year and 0.42% hatchability than that of nana counterpart. Nana had significantly (P<0.05) higher egg weight by 5% compared with nana chicken. Price per kg live bird was almost similar between Nana and nana chicken (P>0.05), with Nana males sold at 10.57% higher price in comparison with that of nana chicken (P<0.01). Genotype and sex independently did not influence live weight (P>0.05). Genotype and sex interacted significantly (P<0.05) for live weight. Preference for Nana chickens was 58.73% for producers and 53.96% for consumers, whereas 41.26% producers and 46.03% consumers disliked Nana chickens. The reasons for liking Nana include better appearance, larger size, exotic looks rarity, larger egg size and high vigor. Dislike for Nana chicken is based on superstition, dull and sickly appearance, lower disease resistance, generally rarity, shortage of roosters, and higher feed requirement. Therefore, indigenous chickens may show potentials for productive adaptability, and Nana chicken might be suitable for production of egg and meat in tropical climate.

Key words: Chicken, full feathered, naked neck, production, price, rural scavenging system.

INTRODUCTION

Of the different section of agriculture, poultry has played a significant role in the present economy of Bangladesh contributing to GDP and employment generation in rural and urban areas. It provides high quality nutrition to humans in addition to manure, feather and their by-products, which also contribute to the GDP. Rural scavenging poultry have significantly been contributed to the livelihoods of poor households: economically as starter capital, as a means to recover from disasters, as an accessible protein source and for disposable income, and as expense of children education, socio-culturally for mystical functions, hospitality and exchange of gifts to strengthen social relationships (Aklilu et al., 2008). Despite tremendous growth of the poultry industry using exotic species, indigenous chickens constitute about 80% of the total population (DLS, 1998). About 89% of the rural households have organic backyard poultry with an average of 6.8 birds per household (Haque et al., 2003). Such local non-descriptive chicken constitute an important source of meat and egg preferred by all classes of

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people. Because of their pigmentation, leanness (high protein and low fat content), taste, firmness and suitability for special dishes, they fetch premium prices almost double to those of exotic chickens (Horst, 1991; Mafeni, 1995; Islam and Nishibori, 2009; 2010). Rearing of indigenous naked neck (Nana) and full feathered (nana) chicken requires very low input with better adaptability and survival rate in tropical climate compared to the broiler or exotic chicken (Barua and Howlider, 1990; Dana et al., 2010; Islam and Nishibori, 2010). Indigenous chickens are reared in scavenging system with no extra feeds, housing, vaccines, medicine or management. Scavenging chickens thrive on residual grains in the yard, kitchen wastes, insects, earthworm and so on (Islam and Nishibori, 2009).

The Nana chickens are available in rural areas of Bangladesh and are well adapted to tropical climate (Islam and Nishibori, 2009; 2010). The higher adaptability of Nana chicken to tropical climate results in increased growth, egg production and feed conversion compared to other chickens (normal and E24 birds) (Fraga et al., 1994; Ajayi, 2010). They are also superior to nana counterparts in terms of growth, egg production, and meat yield traits (Barua and Yoshimura, 1997; Islam, 2006; Islam and Nishibori, 2009; Islam and Nishibori, 2010). In addition, Nana chickens produce bigger size egg, and show higher survivability (Barua and Howlider, 1991; Bairagi et al., 1992; Howlider et al., 1995; Islam and Nishibori, 2009). They produce higher total meat and breast meat than their nana counterparts (Merat, 1986; Bairagi et al., 1992; Barua et al., 1998; Islam et al., 2002), but requiring less dietary protein because of their reducing mass feather which is why they have no or poor evidence of feather picking and cannibalism. Finally, the meat of Nana chicken is leaner than that of broilers (Paul et al., 1990).

The major constraints accounting for the low productivity of backyard chickens are non-availability of nutrients as required in the diet, quality feed, low survivability due to attack of predators, some diseases outbreak and substandard housing (Bulbul, 1983; Ukil, 1992). Very little research has been done to compare the information on the production status of Nana and nana chickens reared under rural scavenging or semi-scavenging systems. Therefore, the present study was undertaken to investigate and compare the production status and local market prices of rural scavenging Nana and nana chickens.

MATERIALS AND METHODS

The present study was conducted based on field level survey data from farmers.

Selection of study area

Keeping the objectives of research in mind, the present study was carried out at pre-selected areas of two districts in Bangladesh; Gazipur district: Naga, Vaoraid and Pirojali village, and Mymensingh district: Tarakanda bazaar in Fulpur Upazila, Choto bazaar, Boro bazaar, Pagla bazaar and Sutiakhali bazaar in Mymensingh Sadar Upazila.

The study areas were selected considering the availability of different categories poultry farms, good transportation access, better cooperation from the owners of poultry farms, and no study of this nature was done previously in those areas.

Sampling technique and duration of data collection

Random sampling technique was followed in selecting 63 producers and 63 consumers in Gazipur and Mymensingh districts, respectively. Data were collected through several visits for the period of July to December, 2009.

Preparation of the survey questionnaire

Survey questionnaire was developed to determine the identification of farmers, number of Nana and nana chickens, live weight of Nana and nana chickens, egg production and egg weight of Nana and nana chickens, clutch size of Nana and nana chickens, hatchability of egg from Nana and nana chickens, preference of Nana and nana chicken by consumers, price of live Nana and nana chickens, problems in rearing of Nana and nana chickens and making future research plan to improve productivity of Nana and nana chickens reared under scavenging and semi-scavenging systems. The Nana chicken was considered instead of NaNa in this study because of its availability in rural areas.

Methods of data collection and processing of data

The primary data were collected from selected poultry owners by conducting personal interviews. Before asking the individual questions, each owner of poultry farms was informed in brief, the aims and objectives of the study. The schedules were filled in from the replies given by owners. Some parameters like egg weight and body weight were recorded directly by the researchers. The collected data were edited and coded, then summarized and scrutinized carefully and thereafter, recorded in master sheets.

Analysis of data

The collected data were analyzed using Genstat statistical computer package program (Genstat Discovery Edition 1, VSN international Limited, 5 Waterhouse, Waterhouse street, Hemel Hempstead, HP1 1ES, UK, 2003) through completely randomized design (CRD) to compare among genetic groups and sexes. Least significant difference (LSD) was calculated to isolate the significant differences.

RESULTS

The present research assessed the production status (clutch size, egg production, egg weight and hatchability of set eggs), economic return (price and live weight of chicken), rearing preferences (as per farmers opinion), merits and demerits of indigenous naked neck (Nana) and full feathered (nana) chickens as elucidated below.

Table 1. Effect of genotype on clutch size, egg production, egg weight and hatchability of eggs.

Variable	Genotype			SED and Significance +
	NaNa (105)	nana(242)	Mean (348)	
Clutch size (days)	15.18	14.93	15.00	0.282^{NS}
Egg production (egg/hen/year)	70.65	67.24	68.27	1.956^{NS}
Egg weight (g/egg)	44.17	42.07	42.71	0.670^{**}
Hatchability (%) at set eggs	87.40	86.98	87.11	1.364^{NS}

The values in parentheses indicate the number of chicken involved $^{+}$ **P<0.01, ^{NS}P>0.05, All SED's are against 548 degrees of freedom.

Clutch size, egg production, egg weight and hatchability of Nana and nana chicken

Clutch size (days), egg production (eggs/hen/year) and hatchability (%) of set eggs did not differ statistically between Nana and nana chicken (P>0.05). However, Nana chicken had tendencies to have increased clutch length (1.67%), egg production (3.4 eggs/hen/year) and hatchability at set eggs (0.42%) compared to the nana chicken (Table 1). The egg production of Nana and nana chickens obtained range from 48 to 144 per hen per year in the current study. Genotype affected egg weight (P< 0.01). The egg weight of Nana chicken was higher by 5% than that of nana chicken.

Price and live weight of indigenous naked neck and full feathered chicken

Price of live bird is an important factor to the farmers to determine the profitability in rearing of Nana and nana chicken. In the current study, genotype did not affect the price of live bird (P>0.05) (Table 2). Regardless of genotype, price of live bird was significantly different between sexes (P<0.01). The males were sold at 10.57% higher prices in comparison with that of females. Interaction of genotype and sex did not influence the price of live chickens.

Genotype or sex did not influence live weight in the current study (P>0.05). However, there was a tendency towards increased live weight in Nana chicken compared to nana chicken. Accordingly male tended to have greater live weight compared to females. Live weight was affected by the interaction of genotype and sex of chicken (P<0.05).

Preferences of producers and consumers for Nana chicken

It has been found that producers of village poultry like to achieve good body weight and sell their chicken at high prices. On the other hand, consumers like to buy chicken at low prices. Therefore, producers always considered rearing birds from which they can get maximum benefit. Percentage of liking and disliking of producers and consumers for Nana chicken, and the rearing of that are presented in Tables 3 and 4. Among producers and consumers, most of them like Nana chicken for their large body and egg weight (37.84%). Few persons disliked Nana chicken because of their superstition.

DISCUSSION

Clutch size, egg production, egg weight and hatchability of Nana and nana chicken

Despite no significant difference observed between Nana and nana chicken for clutch length, Nana tended to have increased clutch size in comparison to nana chicken as supported by Chen and Boichard (2003); Chen et al. (2008). They found increasing clutch length in Nana chicken compared to the nana chicken. Boichard et al. (1996) reported increasing clutch length yearly by 0.71 days in Nana and 0.38 days in nana chicken supporting the present findings. Nana had a tendency to produce more eggs by 3.4 eggs/hen/year compared to nana chicken, consistent with the results of Merat (1986), Islam (2000), Chen and Boichard (2003). Islam and Nishibori (2010) reported significantly higher egg production in indigenous Nana chicken than that in nana chicken, as corroborated by the present findings. The significantly heavier egg weight was found in Nana chicken than that in nana chicken consistent with Merat (1986), Islam (2000), Chen et al. (2002), Islam and Nishibori (2010). Islam (2000) reported the egg weight of 40.50 and 37.90 g/egg in Nana and nana chicken, respectively. Chatterjee et al. (2007) reported the egg weight of Nana chicken as 54.39 g which was higher than in the present study (44.17 g in Nana and 42.07 g in nana chicken).

Genotype did not alter hatchability at set egg. Nevertheless, Nana had the tendencies to increase hatchability of set eggs as supported by Bairagi et al. (1992). They reported statistically similar hatchability of fertile eggs from NaNa and nana chicken. Islam et al. (2001) found statistically similar hatchability of fertile eggs of NaNa and nana chicken.

Table 2. Effect of genotype and sex on price and live weight of chicken.

Variable	Genotype (G)	Sex (S)			SED and Significance level+		
		Male	Female	Mean	G	S	G × S
Price (TK/kg live bird)	NaNa	214.8 (66)	198.1 (105)	204.5 (171)			
	nana	214.5 (140)	192.2 (242)	200.4 (382)	2.46^{NS}	2.35^{**}	3.71^{NS}
	Mean	214.5	194.0	201.7			
Live weight (g/bird)	NaNa	966.1 (66)	1010.8 (105)	993.5 (171)			
	nana	990.4 (140)	961.4 (242)	972.0 (382)	16.15^{NS}	15.44^{NS}	24.38^{*}
	Mean	993.5	976.5	978.7			

The values in parentheses indicate the number of chicken involved. **TK=Taka**, + **P<0.01, *P<0.05, ^{NS}P>0.05, All SED's are against 548 degrees of freedom.

Table 3. Preference of producers and consumers for Nana chicken.

General impression	Reason	Producers (37) (58.73%)	X^2	Consumers (34) (53.96%)	X^2
Liking for NaNa chicken	1. Looking good and larger in size	8 (21.62%)	9.35^{NS}	8 (23.52%)	5.71^{NS}
	2. Look like foreign and rare availability	7 (18.92%)		9 (26.47%)	
	3. Look foreign and larger size	5 (13.51%)		4 (11.76%)	
	4. Larger size and higher egg weight	14 (37.84%)		10 (29.41%)	
	5. Larger size and highly vigorous	3 (8.10%)		3 (8.82%)	
X^2		0.07^{NS}		0.07^{NS}	

^{NS} P>0.05.

Table 4. Disliking of producers and consumers for Nana chicken.

General impression	Reason	Producers (26) (41.26%)	X^2	Consumers (29) (46.03%)	X^2
Disliking for NaNa chicken	1. Superstition	11 (42.30%)	9.37^{NS}	11 (37.93%)	12.08^{*}
	2. Looking dull and looking sick	5 (19.23%)		8 (27.58%)	
	3. Lower disease resistance	3 (11.53%)		6 (20.68%)	
	4. Rare and male shortage	5 (19.23%)		3 (10.34%)	
	5. More feed required	2 (7.69%)		1 (3.44%)	
X^2		0.09^{NS}		0.09^{NS}	

* P<0.05, ^{NS} P>0.05.

Price and live weight of indigenous naked neck and full feathered chicken

In the present study the price of live Nana and nana chicken was Bangladeshi Taka 204.50 (US$ 2.92) and 200.40 (US$ 2.86), respectively. Consumers prefer Nana because of heavier and yielding higher meat compared to nana counterparts may be the reasons for the variation of its price as partially supported by Dana et al. (2010). They reported the market price of chickens varied based on the weight of birds. In this study, live weight was not significantly different for the effect of genotype or sex, but the interaction effect of genotype and sex was significant for live weight as supported by Galal (2008) who reported non significant difference for live weight of Nana and nana chickens or between sexes. He found the significant difference between NaNa (homozygous naked neck) and nana chicken, and in interaction of genotype and sex for live weight at 8 weeks of age. He also reported that introducing Na gene in susceptible strain will increase immuno-competence of chicken. Nana chicken in the present study was heavier by 2.2% than that of nana counterpart as reported by Buyse et al. (1994); Hasan et al. (2006). Higher weight of 12.68 and 18% of Nana chicken than nana counterpart was reported by Hasan et al. (2006) and Islam et al. (2000), respectively.

Liking and disliking of producers and consumers for Nana chicken

Based on the opinion of the producers and consumers, larger body, egg size, and higher dressing yield of Nana chicken were observed compared to the nana chicken, in agreement with Bairagi et al. (1992), and Islam and Nishibori (2009). They reported the higher body weight, egg production and egg weight in Nana than that in nana genotype. Naked neck chicken required lower protein in the diet due to their featherlessness (Islam, 2000). So, this type of bird may be reared on cheaper diets.

Conclusions

The present findings reveal that indigenous chickens may have potential for productive adaptability in tropical climate. Of the two types of indigenous chicken, naked neck appeared to be promising and superior to full feathered chicken in terms of live weight and egg weight. Naked neck chicken had the tendency to have increased egg production, hatchability and price in comparison with full feathered chicken. Based on the opinions of the farmers, the major constraints in improving the production of Nana chicken were superstition (sick or wild bird etc.), shortage (rare) of male, looking dull (not active) and more feed requirement. However, Nana chicken may be useful for improving productivity in tropical climate.

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