Evaluation of Naked neck X Polish cap cross for growth, egg production and egg quality traits under intensive system of rearing

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ABSTRACT

A study was conducted in an ornamental crossbred chicken population (Naked neck x Polish cap) which was developed at Naveed Exotic Poultry Birds, Hyderabad, India. A total of 1,000 chicks were hatched and reared under standard management up to 72 weeks of age. The body weights at 8, 20 and 72 weeks were 600 ±1.67, 1300 ± 8.59 and 2120 ± 5.68g in males and 550 ± 2.17, 1200 ± 7.71 and 1600 ± 5.23g in females, respectively. The AFE was 180 days with annual egg production of 250 ± 0.32 eggs and clutch length of 5 days. The mean egg weight was 43.10 ± 0.17g, shell, albumen and yolk weights were 3.86 ± 0.01, 26.37 ± 0.08 and 12.67 ± 0.05g, respectively. The shell thickness was 0.33 ± 0.005 mm, specific gravity was 1.12 ± 0.007, albumin and yolk indices were 0.078 ± 0.002 and 0.428 ± 0.001 respectively. The haugh unit score was 81.5 ± 0.30 with thick albumin and white shell color. Fertility, hatchability on TES and FES were 86.5, 72.17 and 83.43% respectively. The feed conversion efficiency in males was 3.92-4.13 and in females 4.19-4.57, at adult stage. Mortality was 4.5%, 2.5% and 11.5% during chick, grower and layer phases. The plumage color was white, black, brown and multicolor with fast feathering, white skin, pea red comb, white and red mixed ear lobes. The birds are known for their ornamental appearance. They are resistant to disease in general with good adaptability to tropical climate and has no broodiness.

Key words: Naked neck polish cap cross, Morphology, Performance, Age at first egg, egg production, Egg weight, Egg quality traits.

INTRODUCTION

Indigenous chicken are known for their hardiness, adaptability, survivability under varied environmental conditions and are good scavengers with appreciable immunity to endemic diseases but with low production potential. In this regard, Naked neck bird was found to be one of the best bird as indigenous stock in rural areas of certain regions like Bangladesh (Barua *et al.,* 1992). The exotic polish cap is a breed of poultry originated from Poland and is considered to be one of the best ornamental birds with large attractive distinctive crest. The crest is fairly feathery and neat, rounded in females and more extravagant and pointed in males. However, they suffer from heat stress resulting in impairment in their performance. Incorporation of Naked neck gene in these birds helped in enhancing heat tolerance. Naked neck and Polish cap were crossed for eight generations such that its crossbred progeny show good egg production potential without broodiness, better heat tolerance, disease resistance and good ornamental purpose bird.

MATERIALS AND METHODS

A fancy poultry bird was developed with an aim to promote, encourage, preserve and conserve the exotic bird by crossing 'Polish cap' breed males with 'Naked neck' female birds for eight generations. The birds utilized in the present study were 1000 and were from eight generations obtained in twenty hatches. Chicks were maintained under standard managemental conditions as a closed population and selected for ornamental purpose by using crossbreeding and selection. Body weight at different ages (8, 20 and 72 weeks), Feed consumption, age at first egg, egg weight, annual egg production, morphological characteristics, fertility and hatchability in terms of total egg set (TES) and fertile egg set (FES), egg quality traits and mortality were recorded. Growth, production and reproduction traits were analyses in the crossbred progeny as per Snedecor and Cochran (1989).

RESULTS AND DISCUSSION

Performance: The mean body weight of Naked neck and Polish cap cross (crossbred progeny) at various age groups are presented in Table 1. Overall mean body weight at 8, 20 and 72 weeks body weights were 600 ± 1.67, 1300 ± 8.59 and 2120 ± 5.68g in males while that of females is 550 ± 2.17, 1200 ± 7.71 and 1600 ± 5.23g respectively. The mean body weight at 8 weeks of age was almost comparable with the means of Aseel x RIR, their reciprocal cross and Brown Cornish (Bhardwaj *et al.,* 2006). Kadaknath x RIR and Aseel x RIR (Mandal *et al.,* 2007). Vanaraja and Gramapriya (Prasad *et al.,* 2011) but higher than those of natives and exotics such as Aseel, Kadaknath, White Leghorn and Dahlem Red (Chatterjee *et al.,* 2007b; Pratap *et al.,* 2010 and Prasad *et al.,* 2012). Males were significantly heavier than females and similar differences between male and female were also reported by (Pratap *et al.,* 2010 and Singh *et al.,* 2011). At 20 weeks age, the average body weight was 1300 ± 8.59 g in males and 1200 ± 7.71g in females which were lower than Vanaraja and Gramapriya (Prasad *et al.,* 2011) but almost consistent with crosses of natives and exotics cross by Gupta *et al.* (2006) in Aseel x RIR, Kadaknath x RIR, Prasad *et al.* (2012) in Dahlem Red, Singh *et al.* (2011) in Nicobari types.

TABLE 1: Mean body weight (g) of Naked neck polish cap at various ages

Age in week	Male	Female
Day old	42 ± 0.37	40 ± 0.37
8	600 ± 1.67	550 ± 2.17
20	1300 ± 8.59	1200 ± 7.71
72	2120 ± 5.68	1600 ± 5.23

The body weight at 72 weeks of age was 2120 ± 5.68 and 1600 ± 5.23g in males and females respectively. Sexual dimorphism observed in present study is in agreement with the findings of Malik *et al.* (2009), Malik and Singh (2010).

Morphological characters: The morphological characters observed were pea red comb, white skin color, varying plumage colors (black, brown, white) and pattern (solid, stripped, patchy) with black

and brown eye color and white and black shank color. This variation is attributable to the parental breeds involved in the cross. The photographs of the crossbreds are presented in Figures. 1, 2 & 3.

FIGURE:1 Black Naked neck polish cap cross

FIGURE: 2Brown Naked neck polish cap cross

FIGURE: 3 White Naked neck polish cap cross

Age at first egg: Age at first egg (AFE) influences the egg production and is negatively correlated with egg production and body weight. The AFE of 162-168 days observed in the present study is almost comparable with AFE of other birds *Viz.,* Dahlem Red (Prasad *et al.,* 2012), CARI – breeds (Malik *et al.,* 2009; Malik and Singh, 2010).

Annual egg production: The annual egg production was 250 ± 0.32 eggs. A clutch length of 5 days is recorded (Table 2). Annual egg production in the present study is higher than Naked neck (Rajkumar *et al.,* 2011), Dalhem Red (Prasad *et al.,* 2012) and most of synthetic varieties / crosses reported by various authors.

Egg weight: In general, egg weight of indigenous birds was found to be low as compared to exotic layer (or) broiler. Yakuba *et al.* (2008) reported an egg weight of 43.40g in Naked neck chicken from Nigeria under free range conditions. Similar egg weight of 43.10 ± 0.17g is recorded in the present study (Table 2). The egg weight increases as age advances and the variations in egg weight among different genetic groups were reported by Chatterjee *et al.* (2007) and Niranjan *et al.* (2008). The variation in egg weight may be due to variation in feed consumption, feeding schedule and local environmental conditions. Egg weight obtained in the present study is higher than that of Kadaknath (Parmar *et al.,* 2006) but lower than that reported in Indian White Leghorn (Mathivanam and Selvaraj, 2003) under field conditions in India.

Egg quality traits: The egg quality traits such as Shell weight (3.86 ± 0.01g), Albumin weight (26.37 ± 0.08g), Yolk weight (12.67 ± 0.05g), Shell thickness (0.33 ± 0.005mm), Specific gravity (1.12 ± 0.007), Albumin index (0.078 ± 0.002), Yolk index (0.428 ± 0.001) and Haugh unit score (81.5 ± 0.30) were recorded. The shell color was white with thick albumin (Table 2).

Shell weight (3.86 ± 0.01g) recorded in the present study was lower than that reported by Choudhuri *et al.* (2014) in Nicobari and Nishibari under different systems of rearing. Shell thickness (0.33mm) obtained in the present study is equal to that reported by Parmar *et al.* (2006) in Kadaknath.

In the present study, the Yolk weight was recorded as 12.67 ± 0.05g which was lower than the values reported for Kadaknath (Parmar *et al.,* 2006), Naked neck, Barred desi, Frizzle fowl (Chatterjee *et al.,* 2007b). Yolk index was almost similar to that of Nicobari varieties of Andaman (Padhi *et al.,*1998) but higher than the value of Kadaknath (Parmar *et al.,* 2006).

Albumin weight (26.37 ± 0.08g) of this crossbred is more or less similar to the findings reported by Chatterjee *et al.* (2007a) in indigenous fowl of Andaman but higher than the findings by Parmar *et al.* (2006) in Kadaknath (20.74g). Albumin Index and Specific gravity values were found to be in their normal range 0.078 ± 0.002 and 1.12 ± 0.007.

Haugh unit score of 81.5 ± 0.30 observed in the present study is lower than that of White Leghorn strains (59.62 to 71.62) reported by Chatterjee *et al.* (2007b) but was almost equal to that of Kadaknath (Parmar *et al.,* 2006) under field conditions in India. Haugh unit score is a measure of albumen quality that determines egg quality.

TABLE 2: Egg quality traits of Naked neck polish cap cross bred

Egg quality traits	Mean
Annual egg production	250 ± 0.32
Egg weight (g)	43.10 ± 0.17
Shell weight (g)	3.86 ± 0.01
Albumen weight (g)	26.37± 0.08
Yolk weight (g)	12.67± 0.05
Shell thickness (mm)	0.33± 0.005
Specific gravity	1.12±0.007
Albumen index	0.078 ±0.002
Yolk index	0.428 ± 0.001
Haugh units	81.5 ± 0.30

Fertility: Fertility was 86.5% in the present study which was higher than the findings of Rajkumar *et al.* (2011) in Naked neck; Bharadwaj *et al.* (2006) in brown Cornish, Aseel and Kadaknath; Singh *et al.* (2011) in Nicobari and Malik and Ghosh (2008) in CARI type breeds, Vanaraja and Garmapriya.

Hatchability: Hatchability in terms of total eggs set and fertile eggs set was 72.17% and 83.43% respectively. Higher hatchability was reported in Aseels, Kadaknath and RIR (Bharadwaj *et al.,* 2006), Naked neck (Rajkumar *et al.,* 2011) CARI breeds, Vanaraja and Gramapriya (Mallik and Ghosh, 2008) while lower hatchability was reported in Gramapriya by Rajkumar *et al.* (2012).

Mortality: Mortality at chick phase (0-8 weeks), grower phase (9-20 weeks) and layer phase (20-72 weeks) was 4.5, 2.5 and 11.5% respectively. Niranjan and Singh (2005) reported that the mortality was 5.46% in Gramapriya birds from brooding to laying under intensive and free-range conditions.

From the results of the study, it can be concluded that the Naked neck polish cap crossbred will turn out as a potential ornamental bird in view of the colorful plumage, attractive crest etc. Further, the results indicate that the production and reproductive potential of the bird is also comparable with other crossbreds/strains/varieties. Hence, this bird can be propagated as an ornamental bird. In view of the comparable production levels, it will also give reasonably good economic benefits to the farmer or fancy bird rearer.

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