

Comparative performance of Vanaraja chicken under backyard and intensive system at climatic conditions of Meghalaya

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ABSTRACT

Present study was conducted to evaluate the growth performance of Vanaraja chicken under backyard and intensive system at agroclimatic conditions of Meghalaya. Day-old chicks (525) of Vanaraja were procured from Project Directorate on Poultry, Hyderabad. Transit loss of day-old chicks was about 0.76%. After 6 weeks of brooding, 300 Vanaraja chicks were distributed to 15 farmers belonging to 6 villages of East Khasi hills and Ri-Bhoi districts of Meghalaya (12 females and 8 males to each farmer). The growth performance of Vanaraja birds were studied in terms of average body weights at fourth day, 2, 4, 6, 8, 10, 12, 16 and 18 weeks of age for male, female and combined sex under intensive system of rearing. There was significant difference in body weights between male and female birds from 2 weeks onwards. Feed conversion ratio and mortality percentage up to 6 weeks of age under intensive system was 2.64 and 3.84% respectively. The comparative performance of Vanaraja birds under backyard system and intensive system of rearing was studied between 6-12 weeks of age. Although performance of Vanaraja chicken in terms of body weight was significantly better under intensive system as compared to backyard system but the cost of rearing from 6-12 weeks of age was less in backyard system as compared to the intensive system. Therefore, it was found that it is economical to rear the Vanaraja birds under backyard system using little external inputs as compared to high input intensive system.

Key words: Backyard, Intensive system, Performance, Vanaraja chicken

The demand for poultry products like chicken and eggs apart from pork and beef is very high in northeast hill region as the majority of the people in this region are non-vegetarians. Efforts are being made to increase the productivity of backyard poultry farming by introducing superior germplasm like dual purpose Vanaraja chicken. Vanaraja chicken has better production potential, disease tolerance, good scavenging behaviour, multi colour plumage for camouflage and longer shanks to escape from predators. And it has been developed by crossing random bred meat control population as the female line and Red Cornish population as the male line at the Project Directorate on Poultry, Hyderabad (Chandra *et al.* 2004). It is a promising dual-purpose germplasm suitable for backyard farming (Kumaresan *et al.* 2005, Ghosh *et al.* 2005, Suresh *et al.* 2005). However, little information is available on the comparative performance of Vanaraja chicken under backyard and intensive system of rearing in high rainfall areas of Meghalaya and its cost effectiveness under both the systems. Therefore, present study is being carried out to evaluate the comparative performance of Vanaraja chicken

and their cost effectiveness under intensive and backyard system of rearing in agroclimatic conditions of Meghalaya.

MATERIALS AND METHODS

Day-old (525) chicks of Vanaraja chicken were procured from the Project Directorate on Poultry, Hyderabad. All chicks were wing banded and provided electrolytes and vitamin supplements in clean drinking water to overcome the transit stress. Birds were brooded in deep litter system using sawdust as litter material up to 6 weeks of age under intensive system at institute farm. Standard managerial practices were followed throughout the rearing period. *Ad lib* drinking water and chick starter ration providing approximately 19.00% crude protein and 2800 Kcal/kg ME (calculated) on dry-matter basis was provided to the chicks up to 8 weeks of age. Subsequently the controlled feeding regime (80g/bird/day) was followed from 8 weeks of age with grower ration having 2500 Kcal/Kg ME and 16% crude protein (calculated). Birds were vaccinated against Ranikhet disease on fifth and 30th days using Lasota strain of Ranikhet disease virus and against Gumbaro (IBD) disease on 14th day using intermediate strain. Performance of the Vanaraja chicken was assessed by collecting data on body weights at

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fourth day, 2, 4, 6, 8, 10, 12, 16 and 18 weeks of age under intensive system, daily feed intake and feed conversion ratio up to 6 weeks of age, mortality and transit loss.

After 6 weeks of brooding, 300 Vanaraja chicks were distributed to the 15 farmers belonging to 6 villages/blocks from districts East Khasi hills and Ri-Bhoi districts @ 12 females and 8 males to each farmer. At regular interval field visit were made to study the performance of birds at farmers backyard. The farmers allowed birds for scavenging in their backyard during daytime and provided shelter during nighttime. Birds met some portion of their nutritional requirement by scavenging in the backyard in the form of insects, worms, tender leaves of grasses and seeds of weeds etc., Farmers fed Vanaraja chicken with feed ingredients like crushed maize, broken rice (approximately 30 g/bird), kitchen waste, leaves of cabbage and cauliflower, lettuce and other crop byproducts etc., to meet rest of the nutrient requirements. The performance of Vanaraja birds at household level were assessed by collecting data on body weight at biweekly interval at 8, 10 and 12 weeks of age, mortality from 6 to 12 weeks of age and cost of production.

The cost of production of Vanaraja chicken kept under intensive system was calculated from feed cost, cost of labor and medicine. The average daily feed consumption under intensive system from 6 to 12 weeks of age per bird per day was 80 g. The cost of balanced feed was Rs 1070/100 kg. The cost of labor was Rs 65/150 birds/day (institute approved rate) and 10% of the total cost was included to cover the cost of medicine and other miscellaneous items. On the basis of these, the total cost of production of a Vanaraja chicken per day from 6–12 weeks of age under intensive system of rearing was computed. While the cost of birds kept under backyard system of rearing was only the cost of supplementary feed, since farmers did not provide any medicine or extra labor for management of birds. Means and standard errors of the production traits were calculated using standard statistical procedures as described by Snedecor and Cochran (1989) and analysis of variance (one way) was carried out using computer software to compare the mean of body weights of birds under intensive system and backyard system.

The study was conducted from June to September of 2004. Day-old chicks were procured in June when rainfall recorded was 432.2 mm, and highest rainfall was recorded in July (747.3 mm) with overall rainfall of 1633.7 mm during 4 months experimental period. The average maximum and minimum temperature during the period was 26.92 °C and 19.87°C respectively. Relative Humidity was constantly above 85% in the morning (highest 89.8% in July) while it was between 70–79% in the evening (highest 79.4 in July and September).

RESULTS AND DISCUSSION

Out of (525) day-old chicks transported from Hyderabad to Barapani, 4 birds died on the way resulting in transit

mortality of 0.76%, the noteworthy feature is that the transit loss in transportation of day-old chicks is very minimal compared to the average transit loss (7.78%) of fertile eggs during transportation due to breakage as reported in other studies (ICAR Research Complex NEH 2004).

Growth performance of Vanaraja chicken under intensive system

The mean body weights of male, female and combined sex at fourth day, 2, 4, 6, 8, 10, 12, 16 and 18 weeks of age under intensive system of rearing were given in Table 1. Analysis of variance revealed that there was no significant difference between male and female birds for fourth day body

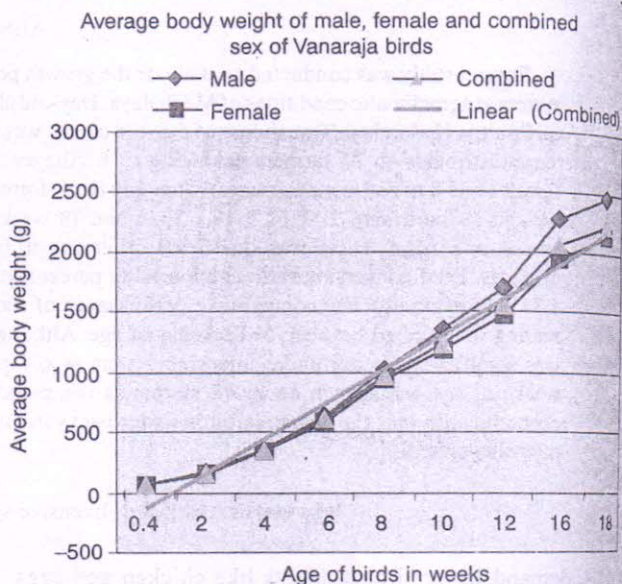


Fig. 1. Trend line of body weights of male, female and combined sex of Vanaraja birds.

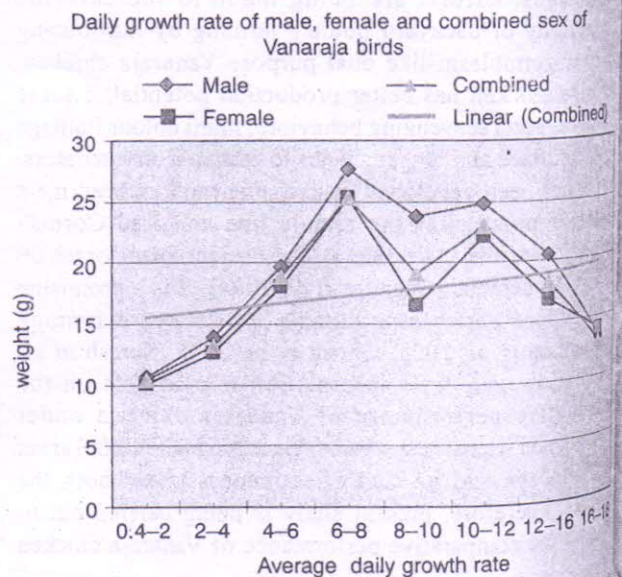


Fig. 2. Trend line of growth rate of male, female and combined sex of Vanaraja birds.

Table 1. Sex-wise performance of Vanaraja chicken under intensive system of rearing at agroclimatic conditions of Meghalaya

Age	Body weight (g)		
	Male	Female	Combined
4th Day	56.97 ± 0.46	56.65 ± 0.45	56.81 ± 0.32
2nd Week	163.87 ± 1.35 ^a	157.74 ± 1.54 ^b	160.73 ± 1.04
4th Week	359.80 ± 3.59 ^a	335.04 ± 3.57 ^b	346.93 ± 2.59
6th week	634.69 ± 5.97 ^a	586.96 ± 5.24 ^b	610.39 ± 4.12
8th week	1022.46 ± 14.46 ^a	940.59 ± 9.63 ^b	964.89 ± 8.47
10th week	1355.23 ± 23.52 ^a	1178.93 ± 11.39 ^b	1236.81 ± 12.34
12th week	1703.89 ± 29.28 ^a	1481.42 ± 17.01 ^b	1553.15 ± 16.73
16th week	2277.27 ± 41.96 ^a	1949.24 ± 26.14 ^b	2061.30 ± 25.48
18th week	2462.98 ± 47.57 ^a	2144.88 ± 26.69 ^b	2241.84 ± 25.82
Daily G. R. (4 day– 2 weeks)	10.69	10.11	10.39
Daily G. R. (2–4 weeks)	13.99	12.66	13.30
Daily G. R. (4–6 weeks)	19.63	17.99	18.82
Daily G. R. (6–8 weeks)	27.69	25.26	25.32
Daily G. R. (8–10 weeks)	23.77	16.47	19.05
Daily G. R. (10–12 weeks)	24.90	22.16	22.97
Daily G. R. (12–16 weeks)	20.48	16.71	18.14
Daily G. R. (16–18 weeks)	13.26	13.97	12.89
Daily G. R. (2–18 weeks)	20.53	17.74	18.58

weight (Fig. 1). However, there was significant difference in average body weights of male and female birds from second week onwards. The growth rate at different intervals varied considerably in male and female under intensive system of rearing. The growth rate was highest in males as compared to the females up to 18 weeks of age. Daily growth rate reached its peak in the period of 6–8 weeks of age in both male (27 g) and female (25.2 g) subsequently it started declining (Fig. 2). Sexual dimorphism for body weight in chicken is very well recognized and reported in literature (Singh *et al.* 1998, Padhi *et al.* 1998, Hanashi 2002). Chandra *et al.* (2004) observed significant effect of sex on fourth and sixth week body weight of Vanaraja under intensive system, in their study, it was observed that the males showed faster rate of growth as compared to the females. This may be attributed to the sexual dimorphism in favour of males, higher rate of cell multiplication than in females and favourable influence of androgenic hormones on the growth rate of males (Chandra *et al.* 2004). The average body weight of Vanaraja chicken (combined) at the age of 6 weeks, that is at the time of distribution of birds to farmers was 610.39 ± 4.12 g and feed conversion ratio (FCR) at 6 weeks of age was 2.63. These observations were in agreement with the reported findings of Kumaresan *et al.* (2005) who found that the average body weight of Vanaraja chicken at 6 weeks of age was 625.42 g and FCR at 6 weeks of age was 2.58 under intensive system of rearing at agroclimatic conditions of Mizoram. Whereas Ghosh *et al.* (2005) observed that average

body weight and feed conversion ratio under intensive system of management were 810.1g (508.2 g to 1000 g) and 2.64, respectively, at 6 weeks of age under agroclimatic conditions of Arunachal Pradesh.

Growth performance of Vanaraja chicken under backyard system

The average body weight of Vanaraja birds under backyard system at 8, 10 and 12 weeks of age are given in Table 2. The growth rate of birds under backyard system was highest in the period of 6 to 8 weeks of age (12.95 g) and lowest in 8–10 weeks of age (10 g). Similarly under intensive system of management the growth rate was highest between 6 to 8 weeks of age (25.32 g) and lowest in 8–10 weeks of age (19.05 g). The average daily growth rate under backyard and intensive system of management from 6 to 12 weeks of age was 12.02 g and 22.45 g respectively. There was significant difference in average body weight of Vanaraja chicken at 8, 10 and 12 weeks of age at intensive and backyard system of rearing. Better growth rate under intensive management system may be due to better feeding of chicks with balance ration and scientific management of birds reared under intensive system. The lowest growth rate of birds in both the systems during 8–10 weeks of age may be because of outbreak of coryza simultaneously both at backyard system and intensive system during that time.

Incidence of diseases: An outbreak of infectious coryza was observed both at intensive system as well as under

Table 2. Comparative performance of Vanaraja chicken under intensive system and backyard system in agroclimatic conditions of Meghalaya

Parameters	Intensive system (Institute farm)	Backyard system (Farmers field)
8th week body weight (g)	964.89 ± 8.47 ^a	791.76 ± 9.39 ^b
10th week body weight (g)	1231.56 ± 12.82 ^a	933.17 ± 13.35 ^b
12th week body weight (g)	1553.15 ± 16.73 ^a	1115.36 ± 17.16 ^b
Weight gain (6–8 weeks) g	354.50	181.37
Weight gain (8–10 weeks) g	266.67	141.41
Weight gain (10–12 weeks) g	321.59	182.19
Weight gain (6–12 weeks) g	942.76	504.97
Daily GR (6–8 weeks) g	25.32	12.955
Daily GR (8–10 weeks) g	19.05	10.10
Daily GR (10–12 weeks) g	22.97	13.01
Daily GR (6–12 weeks) g	22.45	12.02
Mortality % (6–12 weeks)	Nil	3.17%

Figures bearing different superscript (row-wise) differ significantly ($P < 0.01$); GR, growth rate.

backyard system of farmer field. The clinical signs recorded were nasal discharge, swelling of the sinuses, severe foamy lacrimation and conjunctivitis along with reduction in the feed intake. The sick birds were treated with enrofloxacin @ 5 mg/kg body weight orally for 7 days. The birds were able to recover completely within 7 days. However, no mortality observed during the outbreak of disease under both under backyard and intensive systems of management.

Mortality: The mortality percentage up to 6 weeks of age under intensive system was 3.84%. After distribution of birds to the farmers 3.17% mortality from 6 to 12 weeks of age was recorded under backyard system of rearing. However, there was no mortality in intensive system of rearing during that period. The mortality observed at field conditions was mostly due to physical injuries, fighting and cannibalism during scavenging but mortality due to infectious causes was not observed in field conditions.

Cost effectiveness: The cost of rearing Vanaraja bird under intensive system from 6 to 12 weeks of age was Rs 1.43/bird/day. Whereas the cost of rearing Vanaraja in Backyard system from 6 to 12 weeks of age was Rs 0.25/bird/day considering the cost involved in supplementary feeding (quantity of crushed maize and broken rice was about 30 g/bird/day). Similar observations were made by Chatterjee *et al.* (2002); they found that the cost of production of Nicobari fowl under backyard system was less than that of intensive system during 4 to 11 weeks of age at Andaman and Nicobar Islands. In both the studies, it was observed that the cost of feed is the major factor influencing the cost effectiveness of poultry production. So it is concluded from the present study

that although the performance of Vanaraja chicken under intensive system of rearing is better as compared to backyard system of rearing but it is very much economical and viable to rear the Vanaraja chicken under backyard system of rearing at agroclimatic conditions of Meghalaya even during rainy season using little external inputs like crushed maize, broken rice, kitchen waste, vegetable wastes and allowing birds for scavenging as natural vegetation will be in abundance almost round the year.

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