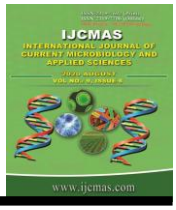
Int.J.Curr.Microbiol.App.Sci (2020) *9*(8): 2422-2428

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 9 Number 8 (2020)**
Journal homepage: http://www.ijcmas.com



Original Research Article https://doi.org/10.20546/ijcmas.2020.908.277

Comparative Assessment of Performances of *Vanaraja, Kamrupa* and *Desi* Chicken Reared by Tribal Community of Lower Brahmaputra Valley Zone of Assam

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Keywords

Vanaraja, Kamrupa, Desi chicken, Body weight, Mortality, fertility, Hatchability

Article Info

Accepted:
20 July 2020
Available Online:
10 August 2020

A B S T R A C T

A study was undertaken to assess different productive and reproductive performances of *Desi*, *Kamrupa* and *Vanaraja* chicken under traditional system amongst tribal community of Lower Brahmaputra Valley Zone of Assam. Information on mean body weight at various ages groups, age at first egg, annual egg production, mortality rate, fertility and hatchability were obtained from farmers under the study. Significant (P≤0.05) differences were observed amongst the three breeds of chicken in terms of body weight, egg production and egg weight. The age at first egg was significantly (P≤0.05) higher in *Desi* chicken compared to *Vanaraja* and Kamrupa. But, no significant (P≤0.05) differences were found among all three groups of birds in terms of fertility, hatchability and mortality from 31st-52nd weeks of age except at the early age group. These evaluated performances of birds will help farmers to rear the right choice of chicken for their livelihood and also for sustainable backyard chicken farming in their locality.

Introduction

Rearing of *Desi* chickens under backyard system is a common phenomenon among the resource poor and underprivileged families in rural India, particularly among the tribal masses. Backyard poultry is a manageable and encouraging enterprise to improve the socio-economic and nutritional status of rural people especially landless and poor families with low initial investment and high economic return (Chakrabarti *et al.*, 2014) as well as it has been given more emphasis for improving rural livelihood (Singh *et al.*, 2018). These birds support them substantially for their livelihood and nutritional security.

They produce meat and egg, which are the only sources of high quality animal protein among the villagers. Moreover, indigenous chickens are hardy, resistant to most of the common avian diseases, require almost no inputs and adapt well in harsh climatic condition. However, their production potential is much lower due to inferior genetic makeup. Further, the consumers prefer to purchase local egg and meat than commercial broilers and eggs. Local eggs and meat always fetches a premium price over the commercial counterparts. Hence, there is a huge gap between demand and supply of local poultry egg and meat among consumers. Keeping this point in mind, different multicoloured improved birds like *Vanaraja*, *Gramapriya*, *Kamrupa etc*. have been developed by different ICAR research stations, SAUs', private agencies etc. in India. These multicoloured birds perform much better even up to three times in terms of egg and meat under similar backyard condition. Under such circumstance, evaluation of such improved chicken under traditional field condition is the need of the hour to recommend farmers better birds under agro-climatic condition of Assam for sustainable economic improvement in rural farmers. There is scanty of information on production and productivity of *Kamrupa and Vanaraja* birds in Lower Brahmaputra Valley Zone of Assam. Hence, the present study was undertaken to know various productive and reproductive performances of these birds i.e Vanraja, Kamrupa and Desi birds under traditional system amongst tribal community of Lower Brahmaputra Valley Zone of Assam.

Materials and Methods

Study area

The study was carried out during the period from December, 2018 to November, 2019 in the tribal dominated areas of Lower Brahmaputra Valley Zone of Assam.

Selection and sampling

A total of 150 farmers were selected randomly from 15 selected villages, 10 farmers from each village for the study under the Tribal Sub-plant Project. Day old chicks numbering ten each of *Vanaraja and Kamrupa* were supplied to each farmer, selected on the basis of their experience in keeping a minimum 10-15 numbers of *Desi* chicken in their backyard. The *Vanaraja* and *Kamrupa* chicks were brooded under hover brooder up to 21days of age. During the said period, they were provided with *ad libitum* broiler pre-starter crumbs and clean potable drinking water. As per standard vaccination schedule, the chicks were vaccinated against *Ranikhet* and Gumboro diseases. The chicks were let loose during day time after proper brooding and were given supplemental feeding for a week until they were able to feed through natural feed resources.

Data collection

The data on body weights at hatch, 4, 8, 20, 40 and 52 weeks of age, age at first egg, egg weights at 32, 40 and 52 weeks of age, egg production up to 32, 40, 52 and 72 weeks of age were recorded for the study. Mortality rate was recorded at 0 to 5, 6 to 30 and 31 to 52 weeks of age.

Fertility and hatchability were studied using 500 numbers of eggs and 250 numbers from each variety of *Vanaraja* and *Kamrupa*, respectively. The eggs were collected within a period of one week from different stocks and were set in incubator. The fertility was tested on 7^{th} day of incubation by electric bulb and infertile eggs were removed from the incubator. Hatchability rate on TES and FES was calculated after 21 days of incubation period.

Statistical analysis

The data so collected were tabulated and analyzed by using SPSS version 17.0 as per standard statistical methods (Snedecor and Cochran, 1994) and expressed in mean±SE. Duncan Multiple Range test of SPSS was performed for mean statistical significant difference.

Results and Discussion

Productive and reproductive performance of *Vanaraja, Kamrupa* and *Desi* chicken are tabulated in Table 1. Weight of Vanarja, Kamrupa and Desi chicks at hatch are 36.12±0.34, 30.21±0.40 and 24.27±0.51, respectively. At 52nd week of age, weight of Vanarja, Kamrupa and Desi birds are 3490.77±11.24, 1957.34±9.71 and 1408.35±8.12, respectively. Weight of the above birds at 4th, 20th, 40th and 52nd weeks of age are presented in Table 1.

Age at first egg in Vanraja, Kamrupa and Desi birds are 186.51±1.32, 189.20±1.08 and 197.30±1.02, respectively (Table 1).

Numbers of eggs produced by Vanraja, Kamrupa and Desi birds at 32nd weeks of age are 33.23±0.12, 21.98±0.06 and 11.23±0.04, respectively and at 72nd weeks of eggs are 162.02±1.02, 140.50±0.80 and 76.31±0.70, respectively (Table 1).

Egg weight at 32nd weeks of age of the birds under study is 47.82±0.22, 38.40±2.30 and 27.85±0.04, respectively. Weight of the eggs produced by the birds at 72nd weeks of age are 61.24±1.08, 48.23±1.31 and 41.14±1.03, respectively (Table 1).

Higher mortality rates were observed in the above mentioned improved varieties during early part of their life (0-30th weeks of age) whereas lower mortality rate at later part of life (31-52nd weeks of age). No significant ($P \leq 0.05$) difference among the three groups of birds were noticed in terms of fertility and hatchability (Table 1).

Body weights

The data on mean body weights showed significant ($P<0.05$) difference amongst *Vanaraja, Kamrupa* and *Desi birds*, at similar ages (Table 1). The mean body weights were significantly ($P<0.05$) higher in *Vanaraja* followed by *Kamrupa* and *Desi* in similar ages. The higher mean body weights recorded in *Vanaraja* and *Kamrupa* birds than *Desi* chicken might be due to superior germplasm utilized in the development of *Vanaraja* and *Kamrupa*. Islam *et al.,* (2014) also reported similar mean body weights in case of *Vanaraja* and indigenous chicken in backyard system of rearing. Kalita *et al.,* (2016) also observed similar body weight trends in *Kamrupa* with ages under similar condition. Daida *et al.,* (2013) reported much lower body weight in *Vanaraja* at 20 weeks of age. However, Bharali *et al.,* (2020) reported comparatively higher that body weight of Vanaraja birds at 40th week of age (3080.55 ± 143.22 grams). The differences in body weights within same germplasm might be due to different managemental condition, supplemental feeding etc.

Age at first egg production

The mean age at first egg recorded in *Vanaraja* (186.51±1.32 days), *Kamrupa* (189.20±1.08 days) birds were significantly ($P \leq 0.05$) lower than *Desi* (197.30±1.02 days) bird (Table 1). The significant difference of mean age at first egg among *Desi, Vanaraja and Kamrupa* might be due to differences in the genetic constituent. The present findings agreed with the results of several workers (Islam *et al.*, 2014; Sarma *et al*., 2018 and Choudhary *et al*., 2019) in case of *Vanaraja*.

The age at first egg in *Kamrupa* chicken observed in the present study was almost similar with Kalita *et al.*, (2016). Deka *et al.*, (2014) also recorded lower mean age at first egg in *Vanaraja* (178.13±0.79 days) and indigenous chicken (191.25±1.46 days) under backyard system. Besides, Bharali *et al.*, (2020), Kumar *et al.*, (2018), Sree *et al.*, (2017) and Saikia *et al.*, (2017) reported lower age of Vanraja hen at first egg laying as 162.55 ± 11.43 days, 179.3 days, 152 days and 181.05±1.52, respectively.

Table.1 Productive and reproductive performance of *Vanaraja*, *Kamrupa* and *Desi* chicken

Parameters	*Vanaraja*	*Kamrupa*	*Desi*
Body weights (g) at			
Hatch weight	36.12±0.34 [a]	30.21±0.40 [b]	24.27±0.51[c]
4th week	539.12±23.17 [a]	220.61±11.10 [b]	164.29±5.18 [c]
8th week	756.34±5.42 [a]	502.12±3.20 [b]	365.13±2.64 [c]
20th week	1690.27±11.32 [a]	1320.34±9.34 [b]	778.13±4.21[c]
40th week	2958.52±12.18 [a]	1850.20±10.30 [b]	1240.41±8.21[c]
52nd week	3490.77±11.24 [a]	1957.34± 9.71[b]	1408.35±8.12 [c]
Age at first egg (days)	186.51±1.32 [a]	189.20±1.08 [a]	197.30±1.02 [b]
Egg production numbers up to			
32nd week	33.23±0.12 [a]	21.98±0.06 [b]	11.23±0.04 [c]
40th week	52.07±0.31[a]	41.34±0.32 [b]	25.62±0.16 [c]
52nd week	87.28±1.01[a]	80.40±0.62 [b]	41.47±0.53 [c]
72 week	162.02±1.02 [a]	140.50±0.80 [b]	76.31±0.70 [c]
Egg weight (g)			
32nd week	47.82±0.22 [a]	38.40±2.30 [b]	27.85±0.04 [c]
40th week	53.97±0.24 [a]	41.50±0.21[b]	31.08±0.08 [c]
52nd week	57.80±0.27 [a]	43.60±0.10 [b]	35.98±0.14 [c]
72nd week	61.24±1.08 [a]	48.23±1.31[b]	41.14±1.03 [c]
Mortality (%)			
0-5th week	11.33±1.42 [a]	7.85±1.16 [b]	8.04±0.86 [b]
6-30th week	3.24±0.23 [a]	2.04±0.43 [b]	1.84±0.33 [b]
31-52nd week	1.08±0.04 [a]	1.21±0.11[a]	1.04±0.23 [a]
Fertility (%)	91.21±6.43[a]	90.71±5.41[a]	90.40±4.97 [a]
Hatchability on TES (%)	89.13±4.12[a]	88.53±4.20 [a]	88.32±2.75 [a]
Hatchability on FES (%)	92.16±1.32[a]	91.43±1.24 [a]	91.16±2.12 [a]

Means bearing similar superscripts in a row do not differ significantly.

Egg production

The mean egg production differed significantly (P≤0.05) amongst *Desi*, *Vanaraja* and *Kamrupa* chicken, which might be due to differences in the genetic makeup of birds. The mean egg production was significantly higher in *Vanaraja* followed by *Kamrupa* and *Desi* chicken at different ages under backyard system. The egg production up to 52nd week of age in *Vanaraja* reported in the present study was in accordance with the finding of Choudhary *et al.*, (2019). Similarly, mean egg production in *Desi* chicken at 72 weeks of age was also corroborated the finding of Sarma *et al.*,

(2018). However, lower corresponding value of egg production (149.47± 4.46 numbers) in *Vanaraja* up to 72 weeks of age was recorded by Niranjan *et al.,* (2008). Kalita *et al.,* (2016) recorded much lower annual egg production in *Kamrupa* than the present findings, which might be due to availability of feed resources in the study areas.

Egg weight

The data on mean egg weight also showed significant (P≤0.05) difference amongst *Desi, Vanaraja* and *Kamrupa* birds (Table 1). The weight of *Vanaraja, Kamrupa* and *Desi* eggs were 57.80±0.27, 43.60±0.10 and 35.98±0.14 respectively at 52nd week of age. The present findings were in accordance with the findings of Islam *et al.,* (2014) in *Vanaraja* and indigenous chicken and Niranjan *et al.,* (2008) in *Vanaraja* chicken. In contrast to the present findings, Deka *et al.,* (2014) reported much lower egg weight in *Vanaraja* (51.08±0.36) and 59.06 ± 0.42 g at 40 and 72 weeks of age respectively and it was 36.12 ± 0.62 and 41.07 ± 0.48g at 40 and 72 weeks of age respectively in indigenous chicken under backyard system These variation in egg weight might be due to supplemental feeding, genetic make-up and differences in management. Higher egg weight at 40th week (57.06 g) and 72nd week (62.35 g) was recorded by Niranjan *et al.,* (2008b) in *Vanaraja* chicken. The mean egg weight observed in Kamrupa chicken in the present study was much lower than the weight recorded by Kalita *et al.,* (2016) at 40 weeks of age.

Mortality

The significantly (P≤0.05) higher mortality rates were recorded in the above mentioned improved varieties than the *Desi* chicks during early part of their (0-30th weeks of age). The lower mortality rate in *Desi* chicks than the improved chicks might be due to more hardiness and proper natural brooding by their broody mother whereas the higher mortality rate in improved chicks, Vanraja and Kamrupa might be due to faulty brooding arrangements like cold shock and huddling The mortality at later part of life (31-52nd weeks of age) was mostly due to predators in all the cases and no significant (P≤0.05) difference were noticed among three groups (Table 1). The present findings were well in agreement with the findings of Bhattacharya *et al.,* (2005), Niranjan and Singh (2005) and Islam *et al.,* (2014) who had reported the mortality rate in the range of 0-15 percent for birds reared under similar conditions. But, Zuyie *et al.,* (2009) reported much lower mortality in *Vanaraja* chicken. Also, much lower mortality rate was reported by Kalita *et al.,* (2016) in *Kamrupa* than the present findings up to 40th week of age.

Fertility and Hatchability

While recording, per cent fertility and hatchability, there was no significant (P≤0.05) difference among the three groups of birds (Table 1). The present findings were in accordance with the findings of Islam *et al.,* (2014). Kalita *et al.,* (2012) and Deka *et al.,* (2017) also reported higher rate of hatchability as as 81-100%) and 89.07±4.11, respectively in indigenous chicken of Assam. In contrast to the present findings, *Roy et al.,* (2018) reported lower hatchability of fertile eggs in Vanaraja birds (85.22%) and indigenous birds (86.98%). Besides, Kumar *et al.,* (2005) reported lower hatchability as 72.6 per cent in *Vanaraja* birds under traditional system of rearing in Manipur. Kalita *et al.,* (2016) also reported similar fertility and hatchability in *Kamrupa* in Assam.

From the present study, it may be concluded that *Vanaraja* and Kamrupa birds are well suited and adapted to our agro-climatic

condition of Assam, especially Lower Brahmaputra Valley Zone of Assam and can be reared by farmers in small scale backyard system along with *Desi* birds. Thereby, such initiatives can usher livelihood, nutritional and food security to the farmers as well as sustainable production.

Acknowledgement

The authors are thankful to the Directorate of Research, (Vety.), AAU, Khanapara, Guwahati-22 for their necessary continuous support and guidance to carry out the research work. The authors are also thankful to the farmers for providing various data for the study.

References

Bhattacharya, M., Buragohain, R., Ahmed, F. A., Pathak, P. K. and Ghosh, M. K. 2005. Laying performance of *Vanaraja* birds in high altitude areas of Arunachal Pradesh under backyard system of rearing. Proceedings of XXIII Annual Conference and National Symposium of Indian Poultry Science Association. 2-4 February, Hyderabad, India, 2: 369 (Abstr.).

Bharali, D., Borah, D., Rajbonshi, P. and Dutta, L. J. 2020. Study on Adaptability, Productive Performance and Constraints of Vanaraja Birds in Backyard System of Rearing at Udalguri District of Assam, India. International Journal of Current Microbiology and Applied Sciences, 9 (3): 986-99.

Chakraborti, A., Dey, A. and Barari, S.K. 2014. Backyard Poultry farming-a source of better livelihood for rural farmers. Krishisewa. http://www.krishisewa.com/article/livestock/410-backyard poultry farming.html/12.04.2019.

Choudhary, R.K., Roy, M.K. and Sohane, R.K. 2019. Livelihood upliftment of tribal farmers through backyard poultry farming intervention in Kishanganj district of Bihar. Journal of AgriSearch, 6: 90-92.

Chutia, H. (2010). Study on some productive and reproductive traits of indigenous chicken of Dhemaji district of Assam. M. V. Sc. Thesis, Assam Agricultural University, Khanapara, Guwahati, Assam, India.

Daida K, Preetham VC, Reddy VR and Rao STV. 2013. Growth performance and liveability of Rajasree birds on farm and field level. In Compendium 2: XXX IPSACON, National Symposium on Poultry Production: Feed, Food and Environmental Safety, 22-23 November, 2013, CARI, Izatnagar, Bareilly, India. pp.218.

Deka, P., Sarma, M., Nath, P. J., Borgohain, R., Mahanta, J. D., Deka, B. and Phukon, M 2014. Production performance of *Vanaraja* bird under traditional system of rearing in Assam. International Journal of Livestock Research, 4(2): 81-85.

Deka, B.C., Deka, C.K., Islam, R., Hussain, M and Paul, A. 2017. Production performance of improved backyard rural poultry in NICRA village of Dhubri district of Assam. International Journal of Chemical Studies, 5(3): 802-804.

Islam, R., Kalita, N. and Nath, P. 2014. Comparative performance of *Vanaraja* and Indigenous chicken under backyard system of rearing. Journal of Poultry Science and Technology, 2 (1): 22-25

Kalita, N., Islam, R., Pathak, N. and Chutia, H. 2012. Hatchability and mortality of indigenous chicken of Assam. Indian Veterinary Journal, 89: 35-36.

Kalita N, Pathak N and Ahmed M. 2016. '*Kamrupa*'- A new dual chicken variety for farmers of Assam and North- East India. Indian Journal of Animal Sciences, 86: 686-690.

Kumar, Sanjay., Kumar Sushil and Kumar , A.K. 2018. Comparative Evaluation of Grampriya and Vanraja with Local Desi Bird in Dumka District *Int.J.Curr.Microbiol.App.Sci* Special Issue-7: 3700-3705.

Kumar, S., Ngachan, S. V., Sunder, G. S. and

Devi, N. K. 2005. Production performance of *Vanaraja* birds under traditional system of rearing in Manipur. In: Proc. of 23rd Annual Conf. and National Symp. IPSACON, held on Feb, 2-4; Hyderabad, India, 2: 382

Kumaresan, A., Bujarbaruah, K. M., Pathak, K. A., Chhetri, B., Ahmed, S. K. and Haunshi, S. 2008. Analysis of a village chicken production system and performance of improved dual purpose chickens under a subtropical hill agro-ecosystem in India. Tropical Animal Health and Production, 40: 395-402.

Niranjan, M., Sharma, R. P., Rajkumar, U., Reddy, B. L. N., Chatterjee, R. N. and Bhattacharya, T. K. 2008. Comparative evaluation of production performance in improved chicken varieties for backyard farming. International Journal of Poultry Science, 7: 1128- 1131.

Niranjan, M. and Singh, N. P. 2005. Performance of Gramapriya under intensive and free- range conditions of Tripura. Proceedings of XXIII Annual Conference and National Symposium of Indian Poultry Science Association. 2-4 February, Hyderabad, India, 2: 366 (Abstr.)

Roy, Amitava., Datta Sanjoy., Roy, Partha Sarathi., Biswas, Sukanta and Mishra, Sidharth Prasad. 2018. Comparative Assessment of Production and Hatchability Performance of Vanaraja, Rhode Island Red and Indigenous Poultry Birds under Backyard Rearing System at West Bengal. International Journal of Livestock Research. 7(8): 296-303.

Saikia, A.K., Gogoi, G and Neog, M. 2017. Productive and Reproductive Performance of Vanaraja Birds Reared by Tribal Community of Dhemaji District of Assam. J Krishi Vigyan 6(1): 162-165.

Sarma, M., Islam, R., Borah, M.K., Sharma, P., Mahanta, J.D., Kalita, N. and Bhattacharyya, B.N. 2018. Comparative performance of *Vanaraja*, *Srinidhi* and *Desi* chicken under traditional system among tribal community of Assam. Indian Journal of Animal Research, 52(10):1518-1520.

Snedecor, G. W. and Cochran, W. G. 1994. Statistical Methods. *6th Edn, Oxford and IBH Publishing Co. Calcutta.*

Singh, Simran., Chakraborty, D., Altaf, Sahil., Taggar, R.K., Kumar, N and Kumar, D. 2018. Backyard poultry system: A boon to rural livelihood. International Journal of Fauna and Biological Studies, 5(1): 231-236.

Sree, E. K., Nirmala, T. V and Reddy, R.V.S.K. 2017. Comparative performance of different varieties of chicken under backyard system of rearing in tribal and rural areas of west Godavari District, A.P. International Journal of Science, Environment and Technology, 6(2):1100 – 1104.

Zuyie, R., Sharma, V. B., Bujarbaruah, K. M. and Vidyarthi, V. K. 2009. Performance of *Vanaraja* birds under intensive system of rearing at different altitude in Nagaland. Indian Journal of Poultry Science, 44 (3): 411-413.

How to cite this article:

Mihir Sarma, Jitendra Saharia, Prasanta Boro, Juripriya Brahma and Islam, R. 2020. Comparative Assessment of Performances of *Vanaraja*, *Kamrupa* and *Desi* Chicken Reared by Tribal Community of Lower Brahmaputra Valley Zone of Assam. *Int.J.Curr.Microbiol.App.Sci.* 9(08): 2422-2428. doi: https://doi.org/10.20546/ijcmas.2020.908.277