Full Length Article

PRODUCTION PERFORMANCE AND ECONOMICS OF REARING OF KHAKI CAMPBELL DUCKS IN BACKYARD FARMING SYSTEM IN DARRANG DISTRICT OF ASSAM, INDIA

Angshuman Sarmah[1]*, Banasmita Barman[2], Bipul Kr. Das[3] and Abdul Hafiz[4]

Krishi Vigyan Kendra
Assam Agricultural University
Gelaidingi – 784 146, Darrang, Assam

ABSTRACT

The production performance and economic viability of Khaki Campbell ducks in backyard farming systems at NICRA-adopted flood-prone village in the Darrang district of Assam was evaluated. The study investigated key productivity metrics such as egg production, growth performance, and survival rates, in addition to economic factors like input costs, labor requirements, and market returns. The findings of the study indicated that Khaki Campbell ducks can perform well in backyard systems, with good egg production and growth rate. The mean body weight at 30 weeks of age was 1.82 kg and the average age at first egg was 163 days. Throughout the study period, the mean egg production was 185.5 and the mean mortality rate was 12.5%. The practice of backyard rearing of Khaki Campbell ducks is viable with a Benefit-Cost ratio of 2.07. The research highlighted the potential of ducks in enhancing household income and nutritional security and contributing to greater agricultural resilience against climate variability. The findings of the research contribute to the broader discourse on sustainable rural development and offers practical recommendations for similar agro-climatic regions facing the dual challenges of agricultural productivity and climate change.

Keywords: Khaki Campbell ducks, backyard system, production performance, egg production, economic viability, NICRA, Assam

Received : 22.06.2024 Revised :16.12.2024 Accepted : 18.12.2024

[1]Senior Research Fellow -ICAR, Department of Crop Physiology
[2]Subject Matter Specialist Agrometeorology, Krishi vigyan Kendra, Assam Agricultural University, Assam
[3]Subject Matter Specialist, Krishi vigyan Kendra, AAU, Assam
[4]Head, Directorate of Extension Edcation, Krishi vigyan Kendra, AAU, Assam

INTRODUCTION

In the search for sustainable agricultural practices that can withstand the challenges of climate change, the integration of resilient livestock breeds into traditional farming systems is becoming increasingly important. Originating from England in the

early 20th century, Khaki Campbell ducks are known for their prolific egg-laying capabilities, with an annual production of up to 300 eggs (Holderread, 2001). Minimal maintenance requirements make this breed suitable particularly for backyard farming system, which is prevalent in many rural regions, including Assam, India. Previous research indicated that backyard poultry farming can significantly contribute to household income and nutritional security, especially in rural areas (Gogoi, 2016).

Assam, a northeastern state of India, is characterized by its diverse agro-climatic conditions and a high dependence on agriculture for livelihoods. Within Assam, the Darrang district stands out for its rich agricultural heritage and significant contribution of livestock farming. However, the region also faces considerable challenges, including frequent floods and other climate-related adversities that threaten agricultural productivity and food security (Gogoi, 2016). To address these challenges, the National Innovations in Climate Resilient Agriculture (NICRA) project, launched by the Indian Council of Agricultural Research (ICAR), has been implemented in Darrang district. The NICRA initiative aims to enhance the resilience of Indian agriculture to climate variability through the adoption of innovative farming practices and technologies (ICAR, 2010).

Khaki Campbell ducks were introduced into backyard farming systems within NICRA-adopted villages as a strategy of climate resilient poultry production. The production performance of Khaki Campbell ducks in such systems has been evaluated and the economic viability of this practice was assessed. The study examined several key parameters of production performance, including egg production rate, growth performance, and survival rate of Khaki Campbell ducks reared in backyard systems. Additionally, it analyzed the economic aspect by evaluating feed and labor costs and market returns.

METHODOLOGY

The present study was conducted in NICRA-adopted flood-prone Kamarpara village of Darrang district of Assam, India. This village was selected based on their involvement in the NICRA project, which aims to enhance agricultural resilience to climate variability. The climate of the region is characterized by high humidity and significant rainfall.

The study employed a randomized controlled trial design, with Khaki Campbell ducks being integrated into the backyard farming systems of selected households. A total of 10 farmers were identified for rearing 20 ducks each under standard conditions. Khaki Campbell ducklings, numbering 200 were distributed to these 10 randomly selected farmers after imparting proper training on duck management. The trial spanned a period of 12 months to collect comprehensive data across different seasons.

Khaki Campbell ducklings, aged fifteen days, were procured from a hatchery and distributed among the 10 farmers with

20 numbers each. The ducklings were reared in sheds constructed from locally available bamboo and thatch to provide adequate protection from predators and harsh weather conditions and later reared in backyard system.

The ducks were fed a balanced diet comprising commercial duck feed supplemented with locally sourced grains and greens. Feed intake was recorded daily, and drinking water was provided ad libitum. They were vaccinated against duck plaque at six weeks of age and other standard management practices on feeding and disease prevention were followed. Regular disease control measures were followed to monitor the diseases, and necessary vaccinations were administered.

The data on weekly body weight, feed intake, age at first egg, egg production, number of eggs sold were recorded. On completion of 30th week of age, drakes were sold out; while, the female ducks were retained for egg production. At the end of the study i.e., at 72nd week, all the female ducks were sold out and the economics was calculated. The data recorded in the study were subjected to statistical analysis as per the method described by Snedecor and Cochran (1995).

The study adhered to ethical guidelines for the treatment of animals in research. Proper care and management practices were followed to ensure the welfare of the ducks throughout the study period. Informed consent was obtained from all participating households.

RESULTS AND DISCUSSION

The production performance of the ducks is presented in Table 1. The mean body weight of Khaki Campbell ducks recorded at 5th, 10th, 20thand 30th weeks of age were 0.42, 1.33, 1.56 and 1.82 respectively. The growth rate observed in this study is consistent with the findings from previous research conducted by Jones *et al.* (2018) in different geographic regions, indicating the stable growth pattern of Khaki Campbell ducks across diverse environments. Moreover, the average body weight is consistent with the results of Bharali and Borah (2018), who found that at 25th week of age, Khaki Campbell ducks had an average body weight of 1456.33 g; while, drakes had higher average body weight of 1655.50 g. The varied environment and the presence of more scavengeable feed sources in the study area, such as aquatic weeds, insects, snails, and forage could be attributed to the slightly increased body weight observed in this study.

The mean age at first egg was 163 days and the mean egg production per duck up to 72 weeks of age was 185.5. This aligns with previous studies that have highlighted the prolific egg-laying capabilities under favorable management conditions (Holderread, 2001). Khaki Campbell ducks produce 193 eggs annually, with average age at first egg as 172 days, according to Roy *et al.* (2017). The age at first egg of Khaki Campbell and Desi ducks was found to be 173.55 and 245.45 days, respectively, according to a similar study conducted by

Bharali and Borah (2018). The fact that Desi and Khaki Campbell's ducks laid 86 and 164 eggs, respectively, was also mentioned. The variation in age at first egg and annual egg production might be due to difference in care and feeding methods between the area of present study and the earlier studies mentioned in the literature.

Throughout the study period, a total of 25 (12.5%) ducks perished from illnesses like enteritis and coccidiosis despite standard management practices being followed. Similar to the present observation, 15% mortality rate was also reported by Roy *et al.* (2017) for Khaki Campbell ducks raised in backyard systems for up to 18 months.

Economic viability of Khaki Campbell Duck farming

The economic analysis (Table 2) revealed promising returns from farming of Khaki Campbell ducks in backyard systems. The average net annual revenue generated from sales of eggs per household was INR 10,722.90 in surplus of the combined costs of feed, healthcare and labour. This positive economic outcome underscores the viability of integrating Khaki Campbell ducks into local farming practices as a means to enhance household income and economic resilience in rural Assam.

According to Singh *et al.* (2009), feed is the main factor influencing the production costs in cattle farming. In this study, feeding accounted for the majority of the costs. During the study period, ducks consumed 2,550 kg of feed, with a corresponding expense of Rs. 76,500. For Khaki Campbell ducks raised in backyards, Jha and Chakrabarti (2017) also found that feed costs were the biggest expense. Factors contributing to economic viability included household size, market prices of duck products, and access to veterinary services. However, challenges such as fluctuating market prices and seasonal demand patterns posed potential risks to sustainable profitability. These economic insights underscore the need for strategic planning and market-oriented interventions to maximize returns on investment for small-scale duck farmers in the region.

The total gross expenditure incurred in rearing 200 Khaki Campbell ducks was Rs. 99,500.00. A net income amounting to Rs. 1,07,229.00 was generated combinedly by all the ten households involved in this study. The cost of production per duck was Rs. 497.50 and the net income per duck was Rs. 536.15. In the present study, the benefit-cost ratio realized was 2.07. Roy *et al*. (2017) also reported higher benefit-cost ratio in rearing Khaki Campbell duck compared to desi ducks in backyard system of management.

Beyond production and economic metrics, the study also explored the socio-economic implications of Khaki Campbell duck rearing in the NICRA-adopted village. Findings indicated that duck rearing contributed positively to household income diversification and food security, particularly among marginalized communities. Moreover, the integration of ducks within the existing agricultural framework promoted

sustainable land use practices through enhanced nutrient recycling and pest control. These socio-economic benefits highlight the broader impact of backyard duck rearing on rural livelihood and community resilience, aligning with sustainable development goals focused on poverty alleviation and environmental sustainability. the economic resilience demonstrated by Khaki Campbell duck farming underscores its potential to mitigate financial risks associated with traditional farming practices in volatile agricultural landscapes. This aspect is crucial for fostering economic stability and food security in rural communities, aligning with sustainable development goals.

CONCLUSION

In conclusion, the study provides empirical evidence supporting the adoption of Khaki Campbell ducks in backyard farming systems in Assam's Darrang district. High productivity coupled with favorable economic return smakes Khaki Campbell ducks as a valuable asset for sustainable rural development. Moving forward, continued support for small-scale poultry farming initiatives and targeted agricultural policies can further optimize the benefits of integrating Khaki Campbell ducks into diverse farming systems, thereby fostering economic stability and enhancing food security in rural communities.

ACKNOWLEDGEMENT

The authors deeply acknowledge ICAR-Central Research Institute for Dryland Agriculture (ICAR-CRIDA), Hyderabad for providing the necessary financial requirements for this study under NICRA project.

Table.1: Production performance of Khaki Campbell ducks

Sl. No.	Performance parameters	Values (mean ± SE)
1.	Body weight at 5 weeks (Kg)	0.42±7.31
2.	Body weight at 10 weeks (Kg)	1.33±6.73
3.	Body weight at 20 weeks (Kg)	1.56±9.87
4.	Body weight at 30 weeks (Kg)	1.82±8.40
5.	Total 3egg production/bird	185.50±5.10
6.	Age of bird at first egg (in days)	163.00±4.30
7.	Mortality	12.5%

Table 2: Expenditure and income particulars of Khaki Campbell duck rearing

Sl. No.	Particulars	Amount (Rs.)
1.	Cost of 200 Khaki Campbell ducklings @ Rs. 105/- per duckling	21,000.00
2.	Cost of medicine, supplements etc.	2,000.00
3.	Total feed consumed (kg)	2,550
4.	Cost of feed @ Rs. 30/kg	76,500.00
5.	Gross expenditure	99,500.00
6.	Expenditure per household	9,950.00
7.	Cost of production per bird	497.50
8.	Sale of eggs (12,376 nos.) @ Rs. 8/- per egg	99,008.00
9.	Sale of live duck (359.07 kg) @ Rs. 300/- per kg	1,07,721.00
10.	Total gross income2	2,06,729.00
11.	Net income	1,07,229.00
12.	Gross income per house hold	20,672.90
13.	Net income per house hold	10,722.90
14.	Gross income per duck	1,033.64
15.	Net income per duck	536.15
16.	Benefit cost ratio	2.07

REFERENCES

Bharali, D. and Borah, D. (2018). Performance of Khaki Campbell and local ducks in adopted villages for doubling farmers' income at Udalguri district of Assam. *The North East Veterinarian*, **18**(3): 35 - 37.

Gogoi, M. (2016). Livestock and Poultry Production in Assam. *International Journal of Livestock Production*, **7**(6), 57-66.

Holderread, D. (2001). Storey's Guide to Raising Ducks: Breeds, Care, Health. Storey Publishing.

ICAR (2010). National Innovations in Climate Resilient Agriculture (NICRA) Project. Indian Council of Agricultural Research.

Jha, B.K. and Chakrabarti, A. (2017). Duck Farming: A potential source of livelihood in tribal village. *Journal of Animal Health and Production*, **5**(2): 39 - 43.

Jones, E., Davies, H. and Patel, R. (2018). Growth performance of Khaki Campbell ducks in different agro-climatic zones: A comparative analysis. *International Journal of Animal Science*, **30**(2), 87-101.

Roy, A., Roy, P.S., Datta, S., Haldar, A., Roy, U., Pathak, P.K., Patra, S., Taleb, A. and Maji, A. (2017). Supplementing rural livelihoods through backyard duckery farming in Murshidabad District of West Bengal, India. *International Journal of Current Microbiology and Applied Sciences,* **6**(12): 3460 - 3466.

Singh, V.K., Chauhan, S.S., Ravikanth, K., Maini. S. and Rekhe, D.S. (2009). Effect of dietary supplementation of polyherbal liver stimulant on growth performance and nutrient utilization in broiler chicken. *Veterinary World*, **2**(9): 350 - 352.

Snedecor, G.W. and Cochran, W.G. (1995). Statistical Methods. 8th edn. Oxford, IBH.