Scholars Journal of Agriculture and Veterinary Sciences **e-ISSN 2348–1854**
Sch J Agric Vet Sci 2016; 3(1):58-61 **p-ISSN 2348–8883**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjavs.2016.v03i01.011

Effect of feeding different levels of proteins on growth, feed consumption and mortality in growing khaki Campbell duck

S. R. Mohanty[1], L. K. Babu[1], S. K. Sahoo[2], C. R. Pradhan[1], B. Panigrahi[1] and S. K. Joshi[1*]
[1]Department of Livestock Production and Management, College of Veterinary Science and Animal Husbandry, O. U. A.T – 751003, Bhubaneswar, Odisha, India
[2]Regional centre, Central Avian Research Institute, Bhubaneswar, Odisha, India

***Corresponding Authors**
Name: S. K. Joshi.
Email: suman42.joshi@gmail.com

Abstract: A feeding experiment was carried out to study the effect of feeding different levels of protein during growing phase (9-16 weeks) on growth, feed consumption and mortality in Khaki Campbell ducks. Two hundred seven (207) growing ducks (8 weeks of age) of either sex were divided into three treatment groups (viz. T_1, T_2 and T_3) with three replicates in each group. There were 23 ducks (16 females and 7 males) in each replicate pen. During the growing period (9-16 weeks of age) the ducks in the three treatment groups were provided with is caloric diet having 14, 16 and 18% protein with ad lib, Provision of feed and water. The significantly ($p < 0.01$) higher growth rate along with lower feed consumption in treatment with 16% protein diet compared to other two treatments (14% and 18% protein). Further, the mortality ranged from 1.67 to 3.33% during growing stage, which was within normal range. The results indicated that a diet with 16% protein was adequate for growing ducks of 9-16 weeks of age.
Keywords: Protein, growth, feed consumption, mortality, growing, Khaki Campbell duck

INTRODUCTION

In India, duck farming occupies an important position next to chicken farming. They form about 4.2% of the total poultry population and contribute about 2 to 3% of the total eggs [1]. There are about 27643 thousand ducks in India. The major concentrations of ducks are found in the coastal regions of eastern and southern states of our country. West Bengal has the highest duck population followed by Assam, Tamil Nadu, Andhra Pradesh, Bihar, Kerala, Orissa, Jammu & Kashmir and Tripura. Duck farming is popular among small and marginal farmers, agricultural laborers as well as poor sections of the community as ducks require lesser attention and supplement their feed by foraging, eating fallen grains in harvested paddy fields, insects, snails, earthworms, small fishes and other aquatic materials in lakes and ponds, thus incurring less feeding cost. Further, ducks are quite hardy, more easily brooded and resistant to common avian diseases. In places like marshy riverside, wetland and barren moors where chickens or any other types of stock do not flourish well, duck rearing can be a better alternative. There continues to be increased demand for animal protein to meet the nutritional requirements of growing population of humans [2]. The introduction of improved duck varieties like Khaki Campbell and Indian Runner breeds with production up to 300 eggs per bird per year has gone a long way in overcoming the production drawbacks associated with the indigenous duck breeds, but at the same time it needs extensive study and research work on balanced feeding ration for the improved duck varieties to cater to their increased production potential [3]. Feed is an important and critical input for the poultry industry as it accounts for 60-70% of production cost[4]. Maximum productive and reproductive efficiency can be obtained by feeding balanced ration according to their requirements, which varies with age and level of production of the ducks [5]. Thus, establishment of standard and practical feeding protocol for ducks is highly essential in supplying the required levels of protein and energy. Further, a higher and earlier body weight gain in birds with higher level of protein compared to those with lower level of protein has necessitated a need for more research work in this field [6]. The amino acid L-Valine played an important role in the body weight gain and feed efficiency in growing White Pekin ducks[7]. Similarly, lysine and phytase significantly affected the growth performance of ducks during growing period [8]. Keeping in view, the present work was being undertaken to assess the nutrient requirement of improved duck varieties for different purposes and ages, particularly with respect to prevailing geo-climatic condition of Odisha.

MATERIALS AND METHODS

Khaki Campbell grower ducks (8 weeks of age) of either sex (n =207) were divided into three treatment groups with three replicates in each. There were 23 ducks (16 females and 7 males) in each pen. The ducks in the treatment groups were provided with is caloric diets having 14, 16 and 18 per cent crude proteins with ad lib, Provision of feed and water. The

birds were given wet mash from 9th week onwards up to 19th weeks including the interim shuffled up period (Table I).

Table I: Composition of duck ration (9 –16 weeks)

Feed ingredients	Parts per quintal		
	T_1 (14%CP)	T_2 (16%CP)	T_3 (18%CP)
Wheat	47.00	51.00	55.00
Soyabean meal	8.00	11.00	13.00
Rice polish	17.00	15.00	13.00
Deoiled rice barn	25.00	20.00	13.00
Fish meal	0.00	0.00	3.00
Mineral mix (BIS)	2.50	2.50	2.50
Shell girt	0.50	0.50	0.50
Total	100	100	100
L – Lysine	0.13	0.14	0.00
DL- Methionine	0.13	0.12	0.00
CP % *	14.14	16.11	18.00
ME (Kcal / kg)**	2568	2614	2660
L – Lysine %**	0.7445	0.7295	0.8455
DL – Methionine %**	0.3459	0.3477	0.3411
Cost / kg feed (Rs.)**	14.12	14.57	15.49

*Estimated Value ** Calculated Value

The feed and drinking water were supplied ad lib. And necessary health care measures were adopted. Weekly body weight, daily feed consumption and daily mortality during experimental period were recorded. The data were subjected to standard statistical analysis as per Snedecor and Cochran [9] and Analysis of Variance (ANOVA) was used for analysis of data.

RESULTS AND DISCUSSION

Growth

The weekly mean body weight of ducks during the experiment period is presented in Table II. The eighth week body weights of ducks under different treatments ranged from 1269.4 ± 9.36 to 1277.6 ± 34.06 g. There was no significance difference in the initial body weight of ducks. The live weight of ducks increased steadily up to 11th weeks of age reaching the lowest body weight of 1378.0 ± 9.32 g in T_3 (18% protein diet) and highest body weight of 1409.2 ± 8.98 in T_2 (16% protein diet), although the difference were statistically not significant. The findings are in line with those of Kingori *et al.;* [10] who stated that live weight gain increases with increasing protein content of feed in indigenous chickens. After 11th weeks of age, there was slight growth reduction and the body weight maintained almost uniformly in different treatment groups up to 15th weeks of age. During 16th week, the body weight was higher in T_2 (1451.40±35.30 g) than T_3 (1365.37±15.32 g) and T_1 (1362.83±4.86 g). Padhi *et al.;* [11] also observed similar body weight at 11th weeks of age. The overall mean body weight gains of the ducks was significantly higher ($p<0.05$) in T_2 (174.03 ± 9.76 g) compared to T_3 (105.27 ± 4.71 g) followed by T_1 (86.08 ± 4.18 g).

Table II: Weekly mean body weight (g) of ducks under different treatments during growing (9- 16 weeks)

Age	14% CP (T1)	16% CP (T2)	18 % CP (T3)	Remarks
8th wk body weight	1276.76±37.23	1277.60±34.06	1269.36±9.36	NS
11th wk body weight	1403.09±15.38	1409.17±8.98	1378.03±9.32	NS
15th wk body weight	1384.61±19.50	1390.05±12.59	1337.13±19.60	NS
16th wk body weight	1362.83±4.86	1451.40±35.30	1365.37±15.32	NS
Overall Weekly mean body weight gain (8th-16th wk)	86.08^b ± 4.18	174.03^a ± 9.76	105.27^b ± 4.71	**

Means bearing different superscripts in a row differ significantly *($P<0.05$) ** ($P<0.01$)

Feed consumption

The average daily feed intake per bird under different treatments is presented in Table III. There was a significantly higher feed consumption observed with the ducks under T_1 compared to T_2 and T_3 during 11^{th},13^{th} and 14^{th} weeks of age but the differences between T_2 and T_3 were statistically non significant. The overall daily feed intake during the period from 9 to 16 weeks of age ranged from 91.59 ± 0.55 to 106.18 ± 3.37 g with a significantly higher value in T_1 than T_2 and T_3 but the differences between T_2 and T_3 was found to be non significant. The superiority in growth rates of ducks in T_3 than T_2 or T_1 might be due to more consumption of protein from the ration which might have contributed to higher growth rate. The present findings are in agreement with the Gowd *et al.;* [12] who reported the optimal growth rate of Khaki Campbell ducks at 16% protein level from 9^{th} to 20^{th} weeks of age and Bandong *et al.;* [13] who reported optimal growth rate of ducks at 16% protein level from 13^{th} weeks to age at first laying. The results of the present study are also in agreement with the findings of Dowarah *et al.;* [14] who reported that highest level of protein has significantly positive effect on growth rate of Japanese Quails. But the findings were not in agreement with the works of Zakaria [15] and Thongwittaya *et al.;* [16] who did not find any difference in body weight gain or feed efficiency with the varying dietary crude protein levels (16, 18 and 20%) in grower stock. The overall daily feed intake during the period from 9 to 16 weeks of age ranged from 91.59 ± 0.55 to 106.18 ± 3.37 g with a significantly higher value in T_1 than T_2 and T_3 but the differences between T_2 and T_3 was found to be non significant. This might be due to higher growth rate of bird up to 10 weeks of age. The cumulative feed consumption per duck during the period from 9 to 16 weeks ranged from 5129 g to 5946 g (on dry matter basis) with the significantly lowest value in T_3 (18% protein diet) followed by T_2 (16% protein diet) and T_1 (14% protein diet). The significantly higher growth rate along with significantly lower feed consumption in T_2 (16% protein diet) compared to other two treatments (T_1 and T_3) indicated that grower rations with 16% protein might be sufficient for the birds during this period. The present finding was in agreement with Gowd *et al.;*[12] who reported that grower diet with 16% protein with 2800 Kcal ME/kg appears to be optimal, but the results were not in line with the work of Zakaria [15] who reported a non significant effect of varying dietary crude protein (16%, 18% or 20%) on grower ducks.

Table III: Average daily feed intake (g) per bird under different treatment

Age (weeks)	14% CP (T_1)	16% CP (T_2)	18 % CP (T_3)	Remarks
9^{th}	126.67 ± 7.63	123.24 ± 14.88	116.58 ± 5.41	NS
10^{th}	114.72 ± 4.66	106.34 ± 4.09	102.34 ± 0.94	NS
11^{th}	113.79^{a} ± 4.18	98.56^{b} ± 2.18	87.89^{c} ± 0.99	**
12^{th}	99.72 ± 0.56	96.63 ± 4.78	87.76 ± 0.71	NS
13^{th}	103.99^{a} ± 2.49	87.42^{b} ± 4.00	86.97^{b} ± 1.30	**
14^{th}	100.24^{a} ± 4.31	81.59^{b} ± 2.62	78.62^{b} ± 0.64	**
15^{th}	101.12 ± 5.26	90.97 ± 1.98	89.52 ± 0.68	NS
16^{th}	89.28 ± 3.75	87.98 ± 0.48	83.15 ± 3.38	NS
Overall	106.18^{a} ± 3.37	96.68^{b} ± 2.86	91.59^{b} ± 0.55	*
Total Feed consumed per bird	5946.06^{a} ± 185.96	5413.77^{b} ± 160.28	5129.12^{b} ± 30.83	*

Mortality

In the present study, it was found that mortality ranged from 1.67 to 3.33% during growing stage which was within normal range indicating that the different levels of protein supplementation in diet could not influence the health condition of ducks. The present finding agreed with the reports of Panda and Mohapatra [17].

CONCLUSION

Significantly higher growth rate along with significantly lower feed consumption in treatment with 16% crude protein diet compared to other two treatments of 14% crude protein and 18% crude protein indicated that grower rations with 16% crude protein might be sufficient for the birds during the growing period (9-16weeks)of Khaki Campbell ducks.

ACKNOWLEDGEMENT

The authors are thankful to the Dean, College of Veterinary Science and Animal Husbandry, Bhubaneswar and the Director of the Regional Centre, Central Avian Research Institute (CARI), Bhubaneswar for providing necessary facilities for the successful completion of this work in time.

REFERENCES

1. B.A.H.S; dahd.nic.in Livestock Census, Department of Animal Husbandry, Dairying & Fisheries, M/O Agriculture, 2012.
2. Joshi SK, Sahoo SK., Babu LK; Effects of feeding different levels of proteins on the mortality in khaki Campbell ducks during starter stage. Int. J. Sci. Res., 2014; 3: 142-144.
3. Mohanty SR, Sahoo SK, Babu LK, Pradhan CR, Panigrahi B, Joshi SK; Effect of feeding different

levels of proteins on egg weight, egg quality, fertility, hatchability and fatty acid profile of eggs in Khaki Campbell duck during laying period. Indian Vet. J., 2015; 92: 25-30.
4. Singh MK, Singh SK, Sharma RK, Singh B, Kumar S; Performance and carcass characteristics of guinea fowl fed on dietary Neem (Azadirachta indica) leaf powder as a growth promoter. Iran. J. Vet. Res., 2015; 16: 78-82.
5. Behera NK, Babu LK, Sahoo SK, Giri SC, Pati PK, Panigrahi B, Joshi SK; Effect of Feeding Different Levels of Protein on Mortality, Carcass Characteristics, Biochemical Parameter, Time Motion Study and Economics of Desi Ducks under Intensive System of Rearing. Asian Journal of Animal Sciences 2016; 10 (1): 106-112.
6. Jull MA; Poultry Husbandry, 3rd Edn. Tata McGraw Hill Publishing Co. Ltd. New Delhi, 1977.
7. Timmler R, Rodehutscord M; Dose response relationships for valine in the growing White Pekin duck. Poult. Sci., 2013; 82: 1755-762.
8. Attia YA; Performance, carcass characteristics, meat quality and plasma constituents of meat type drakes fed diets containing different levels of lysine with or without a microbial phytase. Archiv Fuer Tierernaehrung, 2003; 57: 39-48.
9. Snedecor GW, Cochran WG; Statistical methods, 8th edition. Lowa State University Press, Ames, Iowa, 1989.
10. Kingori AM, Tuitoek JK, Muiruri HK, Wachira AM; Protein requirements of growing indigenous chickens during the 14-21 weeks growing period. South African Journal of Animal Science, 2003; 33 (2): 78-82.
11. Padhi MK, Panda BK, Sahoo SK; Evaluation of growth and carcass characteristics of Moti ducks. Indian Vet. J., 2008; 85 (1): 54-56.
12. Gowd KPL, Reddy VR, Rao PV; Protein and energy requirements of Khaki Compbell grower ducks. Indian J. Anim. Sci, 1983; 53: 1271–1276.
13. Bandong FC, Alejar AL, Arboledga CR, Calvo DM, Coligado EC, Eduardo SL, *et al.;* The Philippines recommends for duck rising. The Philippines Council for Agriculture and Resources Research, 1977.
14. Dowarah R, Sethi APS, Brah GS, Sikka SS; Protein and Energy Requirements of Coloured Plumage Japanese Quails during Summer Season. Indian J. Anim. Nutr, 2013; 30 (1): 87-93.
15. Zakaria A; Advances in feeding and management of ducks in Indonesia. Sustainable animal Production proceeding of the sixth AAAP. Anim. Sci. Congress, 1992; 3: 47-53.
16. Thongwittaya N, Pleusamran P, Choktaworn N, Tasaki I; Energy and protein requirements of Khaki Campbell x Thai Native growing ducks. Asian-Australasian J. Anim. Sci., 1992; 5(2): 357–363.
17. Panda B, Mohapatra SC; Poultry Production. Publication Information Division. ICAR. Krishi Anusandhan Bhavan, New Delhi. 1st Edition. 1989; 152.
18. Kumar S, Singh PK, Prasad A, Chanramoni; Effect of graded level of dietary energy and protein on the growth Performance of cockerels. Indian J. Anim. Nutr, 2009; 26(1): 86-89.