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Ramesh Kumar Mishra
Scientist, JNKVV, Krishi Vigyan Kendra Katni, Madhya Pradesh, India

Arpita Shrivastava
Scientist, JNKVV, Krishi Vigyan Kendra Katni, Madhya Pradesh, India

AK Tomar
Scientist, JNKVV, Krishi Vigyan Kendra Katni, Madhya Pradesh, India

S Vaisampayan
Senior Scientist & Head, JNKVV, Krishi Vigyan Kendra Katni, Madhya Pradesh, India

Corresponding Author:
Ramesh Kumar Mishra
Scientist, JNKVV, Krishi Vigyan Kendra Katni, Madhya Pradesh, India

Performance of Kadaknath chicken in backyard farming system in Katni District

Ramesh Kumar Mishra, Arpita Shrivastava, AK Tomar and S Vaisampayan

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Abstract
In India, poor rural farmer mostly rear poultry in backyard of their houses. The study was conducted to see the adoptability, production and economic performance of Kadaknath chicken in comparison to existing nondescript chicken reared in backyard poultry farming in Katni district of Madhya Pradesh. A total of 75 day old Kadaknath chicks were purchased from Department of Poultry Science, NDVSU, Jabalpur and randomly distributed to five farmers (15 chicks to each) who were already involved in backyard poultry farming with 10-15 nondescript local chicken. Similar farming practices were followed for both Kadaknath and existing nondescript bird. The data regarding adult body weight (g), age at 1st laying (wk), egg production (no/bird/year), egg weight (g), mortality (%), cost involved (Rs), profit (Rs) and benefit cost ratio (B:C Ratio) were recorded during the study. The data obtained regarding adult body weight (1298.00±1.32g), body weight gain (1266.40±1.32g), age at 1st laying (23.20±0.90 wk), egg production (96.00±1.00) and benefit cost ratio (7.00±0.83) for Kadaknath were significantly higher (p<0.05) over the data recorded for non descript local chicken regarding adult body weight (1186.00±1.30g), body weight gain (1155.60±1.30g), age at 1st laying (25.00±0.89 wk), egg production (61.00±0.99) and benefit cost ratio (4.79±0.78) for. However non significant (p<0.05) difference were found in chick weight and mortality percent among both the breed. On the basis of present findings we can conclude that Kdaknath breed of chicken is economical and able to produce higher meat and egg per bird per year than existing nondescript chicken in backyard rearing system as practiced by rural poultry farmers of Katni district of Madhya Pradesh.

Keywords: Kadaknath, backyard, body weight, egg production, economics

Introduction
Poultry farming is one of the fastest growing industries. It has gained its importance in rural, periurban and urban areas as both for livelihood and business oriented enterprise (Sreenivas *et al*., 2013) [12]. In India rural farmers involved in poultry farming mostly rear poultry in backyard of their houses. Since backyard poultry rearing required very less investment hence women and aged people of family taking care of native non decrypt birds in their backyard. The villagers can meet their nutrient requirements through meet and egg produced from poultry at their houses. The Kadaknath breed of poultry is well known for their tropical adoptability and disease resistance. Kadaknath is being reared by tribal communities in its breeding tract of Jhabua and Dhar district of Madhya Pradesh, India. The meet of this breed is black in colour for which it is also known as Kalamasi. It has delicious flavor, contains 25.47% protein and believed to have aphrodisiac properties (Mohan *et al*., 2008) [4]. Therefore a study was conducted to see the adoptability, production and economic performance of Kadaknath chicken in comparison to existing nondescript chicken reared by landless and small farmers in backyard farming in Katni district of Madhya Pradesh.

Materials and Methods
Katni is situated at 23.83^0 latitude and 80.40^0 longitudes at 392 MSL in the southern part of second agro-climate zone, including Kymore plateau and Satpura hills of Madhya Pradesh. The climate of the district resembles to that of tropical regions with hot summer and cold winters. The temperature goes up to 48 ºC during summer while it falls to 4 ºC in winter.

The study was carried out at the farmer houses in Pipraudh, Bichhiya and Banda village of Katni district which were the operational villages of Krishi Vigyan Kendra. For the study total 75 day old Kadaknath chicks were purchased from Department of Poultry Science, NDVSU, Jabalpur and randomly distributed to five farmers (15 chicks to each farmer) who were already involved in backyard poultry farming with 10-15 nondescript local chicken. The farmers were well trained regarding poultry farming and management before distribution of chicks. Similar farming and other practices were followed for both Kadaknath and local nondescript bird. The birds were vaccinated as per schedule given in Table 1.

The data regarding day old chick weight, adult body weight at 40 weeks of age, egg production per bird per year, egg weight at 40 week of age, mortality, gross cost, net income and benefit cost ratio were recorded during study. The recorded data were analyzed with suitable statistical procedure.

Table 1: Vaccination schedule for birds

Age (day)	Vaccine used	Dose	Administration route
1	Marek's	0.2 ml	S/C at neck
7	F1 strain (RD)	1-2 drops	I/O
14	Gamboro (IBD)	1-2 drops	I/O
21	Lasota (RD)	-	Drinking Water
56	Fowl Pox	0.2 ml	I/M
70	R_2B	0.5 ml	I/M

Results and Discussion

Chick body weight

The data regarding day old chick weight presented in table 2 revealed non-significant (p<0.05) difference in Kadaknath (31.60±0.93g) and nondescript local chicken (30.40±0.93g). The higher chick weight in Kadaknath may be associated with greater egg weight of Kadaknath compare to nondescript hen. Our finding was in line with finding of Thomas *et al*. (2023) [13], they have reported 29.43±0.58g weight of day old chick of Kadaknath. In contrary, Dinesh *et al*. (2024) [1] noticed less body weight in chick of Kadaknath (28.15 g) as compare to chick of native breed (30.15 g) at day old age.

Data in table 2 regarding adult body weight was found significantly higher (p<0.01) in Kadaknath (1298.00±1.32g) compare to local nondescript chicken (1186.00±1.30g). The higher adult weight probably attributed to higher growth rate of Kadaknath. Higher growth rate in Kadaknath over indigenous breed was also reported by Ranabijuli *et al*. (2020) [6] in his study.

Body weight gain: Body weight gain of Kadaknath was also differ high significantly (p<0.01) which was higher in Kadaknath (1266.40±1.32g) however it was 1155.60±1.30g in nondescript chicken. Similarly, Ranabijuli *et al*. (2020) [6] reported higher body weight in Kadaknath (1227.22 g) and lesser in indigenous chicken (807.61 g) at 180 days. However, Dinesh *et al*. (2024) [1] recorded 1410.10 g and 1595.20 g body weight for Kadaknath and native breed respectively at 40 weeks of age. The superiority of weight gain in Kadaknath over non-descript chicken may be attributed to genetic potential of the breed.

Age at 1st laying

The dada regarding age of 1st laying of birds were showed highly significant (p<0.01) difference among two breeds. The age of 1st laying by bird was recorded shorter in Kadaknath (23.20±0.90 w) compare to nondescript (25.00±0.89 w). Sharma *et al*. (2012) [9] and Shinde *et al*. (2023) [10] also noticed early start of laying in Kadaknath (22±1.12 w) and late in local breed (24.00±2.43 w). Contrary Dinesh *et al*. (2024) [1] reported early (141 days) in native birds and late in Kadaknath (168 days). Thomas *et al*. (2023) [13] also noticed 169 days of start of egg laying in Kadaknath. The variation in days of 1st egg laying as noticed by various researcher may be attributed to growth and light intensity received by birds during growth period.

Egg production

Data regarding egg production per year per bird presented in table 2 revealed highly significant difference (p<0.01) among two breeds. The number of egg per year per bird for Kadaknath recorded higher (96.00±1.00) over nondescript chicken (61.00±0.89) in a year. Shinde *et al*. (2023) [10] reported greater egg production in Kadaknath (58±1.32) in comparison of local breed (52±2.01). Thomas *et al*. (2023) [13] and Satpathy *et al*. (2020) [8] reported 92.05 and 105 egg per year respectively in Kadaknath. However, Rawat *et al*. (2015) [7] reported 126 eggs per bird per year in Kadaknath and 83.00 eggs in desi chicken. Contrary Dinesh *et al*. (2024) [1] found higher hen day egg production in native bird (85.33) and less in Kadaknath (78.56). The variation in egg production probably associated with availability of scavenging area to the birds. Singh *et al*. (2017) [11] also observed that availability of scavenging area mainly attributed to the higher egg production.

Table 2: Performance of Kadaknath and Nondescript local Chicken in backyard (per bird per year)

Parameters	Kadaknath	Nondescript	t-value
Day old chick weight (g)	31.60±0.93	30.40±0.93	1.66^{NS}
Adult body weight at 40 week (g)	1298.00±1.32	1186.00±1.30	5.22**
Weight gain up to 40 week (g)	1266.40±1.32	1155.60±1.30	5.07**
Age at 1st laying (week)	23.20±0.90	25.00±0.89	3.67**
Egg Production (no/bird/year)	96.00±1.00	61.00±0.99	24.74**
Egg weight (g)	44.20±0.95	42.00±0.97	2.4*
Mortality in a year (%)	13.33±1.08	17.33±1.05	1.50^{NS}
Economic Parameters			
Gross Income (Rs)	1888.80±1.49	1188.66±1.36	12.35**
Net Income (Rs)	1619.34±1.48	941.00±1.36	12.22**
B:C Ratio	7.00±0.83	4.79±0.78	11.97**

Note: ^{NS} Nonsignificant, * Significance at p<0.05, ** highly significance at p<0.01

Egg weight

Data in table 2 revealed that egg weight was found less in local chicken (42.0±0.97g) and greater in Kadaknath (44.20 ±0.95g). Jaishankar *et al*. (2020) [2] noticed 43.75g of egg weight in Kadaknath which was comparable with reports of Verma *et al*. (2023) [10] and Jena *et al*. (2018) [3]. Whereas Pathak *et al*. (2018) [5] reported lower egg weight in Kadaknath (36.37 g). Dinesh *et al*. (2024) [1] find heavier egg weight in native bird (45.33 g) than Kadaknath (43.87 g) but difference in egg weight was non significant.

Mortality percent

Observations on mortality percent in table 2 were 13.33±1.08% and 17.33±1.05% for Kadaknath and Nondescript birds respectively which were differ non significantly (p<0.05). Parameters on mortality percent are in line with finding of Sharma *et al*. (2012) [9] and Shinde *et al*. (2023) [10]. They observed higher mortality in local breed as compare to Kadaknath. Ranabijuli *et al*. (2020) [6] stated significantly higher mortality in native breed (30.0%) than Kadaknath (19.0%). The mortality in present study was mainly associated to predator and diseases. Rawat *et al*. (2015) [7] also noticed higher mortality because of predator (35.00%) and disease (21.00%) which holds top rank among other constraints faced by poultry farmers.

Economic Parameter

The gross income, net income and benefit cost ratio for Kadaknath were Rs.1888.80±1.49, Rs. 1619.34±1.48 and 7.00 respectively. However in Nondescript local bird gross income, net income and benefit cost ratio were recorded Rs.1188.66±1.36, Rs.941.00±1.36 and 4.79 respectively. The values for economic parameters of Kadaknath and nondescript chicken were differing highly significantly (p<0.01). The superior economic parameters of Kadaknath over local breed were also observed by Sharma *et al*. (2012) [9], Ranabijuli *et al*. (2020) [6], Satpathy *et al*. (2020) [8] and Shinde *et al*. (2023) [10] in backyard rearing system. The higher economic performance of Kadaknath in present study is mainly attributed to better egg production, higher growth, higher sale price and less mortality in back yard rearing system.

Summery and Conclusion

On the basis of present findings we can conclude that Kadaknath breed of chicken is economical and able to produce more meat and egg per bird per year than existing Nondescript local chicken in backyard rearing system practiced by rural farmers of Katni district of Madhya Pradesh.

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