

PRODUCTION AND ECONOMIC PERFORMANCE OF PRATAPDHAN CHICKENS FOR BACKYARD FARMING IN SIROHI DISTRICT OF RAJASTHAN

PANKAJ LAVANIA¹ and M.P. VERMA^{2*}

¹Department of Animal Production, College of Agriculture (AU, Jodhpur) Mandor, Jodhpur-342304, India

²Department of Animal Production, College of Agriculture (AU, Jodhpur) Sumerpur, Pali-306902, India

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ABSTRACT

The present study was conducted to evaluate the production performance and economics of Pratapdhan chickens for backyard farming under sub-humid ecosystem of Sirohi district of southern Rajasthan. A total of 560 Pratapdhan poultry chicks were procured from Maharana Pratap University of Agriculture & Technology (MPUA&T), Udaipur and distributed among 28 tribal selected farmers for rearing in backyard poultry system. The overall mean body weights of Pratapdhan chickens at 8, 10, 12, 14, 16, 18, 20 and 40 weeks of age were 515.06±9.97, 698.90±16.32, 951.78±18.24, 1139.32±26.96, 1372.73±43.51, 1542.87±49.61, and 1721.82±46.35 and 2244.13±51.22 g, respectively. Differences in body weights between male and female chickens were found to be significant. The mortality in Pratapdhan chicken during the period from 6 to 20 weeks and 21 to 40 weeks of age was recorded 12.20 and 5.09 per cent, respectively. The average age at first egg laying was recorded 157.46±1.19 days while age at sexual maturity was recorded 173.36±2.71 days. Mean egg weight at 28 weeks was 46.37±0.26 g whereas at 40 weeks of age it was 53.49±0.21g. The value for different egg quality traits clearly indicated that the eggs produced from Pratapdhan are of superior quality. The benefit cost ratio was recorded 1:3.92 per family for rearing under backyard farming system.

Keywords: Economics, Egg, Pratapdhan, Production, Tribal, Quality

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Backyard poultry, a traditional system of poultry keeping is a part of livestock rearing practiced by rural folks since time immemorial. It is a type of organic farming with no harmful residues in eggs and meat and advantageous and provides supplementary income in shortest possible time with very minimum capital investment. The productivity of indigenous birds in terms of egg production is only 70-80 eggs per bird per year and meat production is also very poor. However backyard poultry production can be easily boost up with improved varieties of chicken and can promise of meat and egg. The growing demand for indigenous poultry products and low investment in backyard poultry sector provides opportunity for the rural farmers and women to have supplementary income generation for the family (Kumar *et al.*, 2020). However, the problems of low weight gain, less number of eggs per bird and high mortality of chicks with indigenous birds are some of the hindrances in backyard poultry which need to be overcome through introduction of improved variety of birds with better performance level. In order to improve the livelihoods and nutritional security of tribal families through backyard poultry rearing MPUA&T, Udaipur, Rajasthan has developed a variety for backyard rearing named Pratapdhan. Moreover, it is an egg type bird with laying capacity 160-180 eggs per annum. However, very scant information is available on the performance of Pratapdhan chicken under backyard system of rearing in field condition of sub-humid ecosystem. Keeping these facts in view, an attempt was

made to evaluate the production performance and economics of Pratapdhan chicken for backyard farming in field condition of sub-humid ecosystem in southern Rajasthan. Therefore, the present study was carried out on Pratapdhan backyard poultry in tribal area of Sirohi district of southern Rajasthan.

MATERIALS AND METHODS

The investigation was based on the Front Line Demonstrations (FLD) conducted for promotion of backyard poultry farming in Sirohi district under Tribal Sub Plan (TSP) program. The study was conducted in the area of Pindwara and Abu Road blocks of Sirohi district, situated in the South Western part of the Rajasthan in the year of 2018-19. A total of 560 Pratapdhan poultry chicks 6-8 weeks old age were procured from Maharana Pratap University of Agriculture & Technology (MPUA&T), Udaipur. Twenty eight units were distributed among selected beneficiaries from tribal community belonging to BPL families of Sirohi district of Rajasthan. Each unit comprised 20 birds (16 females and 4 males bird) of each identified farmers. Pratapdhan poultry birds are dual purpose and have found great acceptance and good adaptability to local conditions. Attractive multi color feather pattern, as rural people like colored birds (Tailor, 2013). It produces brown shell egg and has broody characteristic. The BNR cross developed from BN cross (PB-2 × Native) × RIR at AICRP, Udaipur center was released as a dual purpose variety, Pratapdhan for rural poultry. The chicks were brooded up to 6 weeks of age in

*Corresponding author: mpverma_78@rediffmail.com

deep litter system with ad lib. starter feed and drinking water. The chicks were vaccinated against Marek's disease and New Castle disease (Ranikhet). Farmers provided shelter to the birds at night time and allowed free scavenging in backyard during day time. They were provided ad libitum drinking water and feed ingredient like crushed maize and broken rice to the birds @ 30 g/bird/day with kitchen waste and crop byproducts so as to fulfill the nutrient requirements. The performance of birds at household level was assessed by collecting data on the basis of body weight at fortnight interval from 8th week up to 20 weeks of age and thereafter at 40 weeks of age, mortality from 6 to 40 weeks of age. The other traits, age at first egg laying, age at sexual maturity, egg production up to 72 weeks of age were also recorded. Egg production 'Data Card' was distributed to farmers to record daily egg production. Egg weights at 28 and 40 weeks of age were recorded by Mettlor and Toledo balance (nearest to 0.01 g accuracy) and egg mass was calculated using north's egg mass formula. Fresh 20 eggs of Pratapdhan chickens at 40 weeks of age were collected randomly from different farmers flock and were used to study egg quality traits, viz. egg width, egg length, shape index, albumin weight, albumen index, yolk weight, yolk index, shell weight, shell percentage and shell thickness. The shell thickness was measured at 3 locations of the egg, viz. broad and narrow ends and equator. Length and breadth of egg, albumen and yolk were measured using digital Vernier calipers (least count 0.01 mm) and heights of albumen and yolk were measured by spherometer (least count 0.01 mm). The shell thickness was measured using screw gauge (least count 0.01 mm). Shape index was calculated as per Schultz (1953) and the specific gravity was measured using brine

floatation technique (Hamilton, 1982). The data for the different traits were analyzed using standard statistical procedures as described by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Growth and reproductive traits

The means of body weight and other economic traits at different ages of Pratapdhan chicken under field conditions are presented in Table 1. The overall mean body weights (pooled) at 8, 10, 12, 14, 16, 18, 20 and 40 weeks of age were similar to the reported by Kumar *et al.* (2008). The body weights of Pratapdhan chickens in present study were higher at different ages than the finding reported by Malik and Singh (2010) in CARI Nirbheek chickens. The difference in body weights may be due to differences in agro-climatic conditions, availability of feeding materials and management practices adopted by the farmers. The average daily body weight gain of males and females during the period of 8th to 20th weeks of age was recorded 15.36 g and 12.14 g, respectively. The highest daily body weight gain was recorded during the period of 10-12 weeks of age (18.06 g) and it was lowest at 16-18 weeks of age (12.15 g). The lowest growth rate of chickens during 16-18 weeks of age may be due to incidence of seasonal diseases. Similar findings were observed by Haunshi *et al.* (2009) in different strain/breed of poultry birds under different agro climatic conditions.

The average age at first egg laying and age at sexual maturity in Pratapdhan chickens were recorded 157.46±1.19 and 173.36±2.71 days, respectively. The age at first egg laying and sexual maturity in present study are more or less comparable with those reported by Tailor (2013) for in Pratapdhan poultry birds.

Table 1
Performance of Pratapdhan chicken from 8 weeks to 40 weeks of age (Mean± SE)

Traits	Male	Female	Pooled
8 week body weight (g)	545.55±9.32 ^a	484.57±11.26 ^b	515.06±9.97
10 week body weight (g)	782.49±12.91 ^a	615.30±17.31 ^b	698.90±16.32
12 week body weight (g)	1056.56±23.10 ^a	786.61±19.49 ^b	951.78±18.24
14 week body weight (g)	1222.64±35.59 ^a	970.86±28.53 ^b	1139.32±26.96
16 week body weight (g)	1510.46±49.34 ^a	1235±42.33 ^b	1372.73±43.51
18 week body weight (g)	1696.74±62.43 ^a	1389±41.32 ^b	1542.87±49.61
20 week body weight (g)	1879.43±61.52 ^a	1564.21±46.57 ^b	1721.82±46.35
40 week body weight (g)	2446.72±54.43 ^a	2041.54±49.43 ^b	2244.13±51.22
Age at first egg laying (days)	-	157.46±1.19	-
Age at sexual maturity (days)	-	173.36±2.71	-
Per cent mortality from 6 to 20 week of age	10.63	13.76	12.20
Per cent mortality from 21 to 40 week of age	4.48	5.71	5.09

Mean bearing different superscripts differ significantly (p<0.05).

Mortality

The mortality in Pratapdhan chicken during the period from 6 to 20 weeks and 21 to 40 weeks of age was recorded 12.20 and 5.09 per cent, respectively (Table 1). However, there was no mortality after 40 weeks of age. The per cent mortality in present study was lower than reported by the RAU Bikaner and GAU, Anand centre under NATP on small farm rural poultry production. However, Malik and Singh (2010) reported lower mortality for CARI Nirbheek chickens under field conditions of Tripura region.

The causes of mortality in the present study were mostly physical injuries, fighting and cannibalism during scavenging and predators. The results of study indicate that livability percentage of these chickens was well within the standard range which could probably be due to presence of good immune competence and disease resistance of these chickens and proper management practices followed by farmers (Reddy *et al.*, 2002).

Egg production and quality traits

The egg production and egg quality parameters of Pratapdhan chicken are presented in Table 2. The average hen day egg production up to 40 and 72 weeks of age was recorded as 54.94±0.41 and 167.89±1.42, respectively. These results are in accordance with the findings by Kumar *et al.* (2008) and by different NATP centers whereas; lower

Table 2

Egg production and egg quality parameters of Pratapdhan chicken (Mean± SE)

Parameters	Mean± SE
40 weeks of egg production	54.94±0.41
72 weeks of egg production	167.89±1.42
Egg weight at 28 weeks of age (g)	46.37±0.26
Egg weight at 40 weeks of age(g)	53.49±0.21
Increase in egg weight (g)	5.56±0.11
Egg mass (40 weeks of age)	2630.72±0.16
Egg width (cm)	4.16±0.013
Egg length (cm)	5.47±0.023
Shape index	76.69±0.45
Shell thickness	0.339±0.006
Specific gravity	1.095±0.001
Albumen weight (g)	29.66±0.48
Albumen percentage	55.44±0.23
Yolk weight (g)	18.74±0.23
Yolk percentage	35.03±0.29
Shell weight	4.81±0.06
Shell percentage	9.53±0.11
Shell color	Light to dark brown

annual egg production was recorded by Malik and Singh (2010). The mean egg weight at 28 and 40 weeks of age were recorded 46.37±0.26 and 53.49±0.21g, respectively. Weight of eggs increased 5.56±0.11 g from 28 to 40 weeks of age. The average egg mass of Pratapdhan chicken was recorded 2630.14±0.16g at the age of 40 weeks.

The means of egg width (cm), egg length (cm) and shape index were 4.16±0.013, 5.47±0.023 and 76.69±0.45, respectively. The results of the present study are in consonance with the findings reported by Malik and Singh (2010) in Nirbheek, Haunshi *et al.* (2009) in Gramapriya, Vanaraja and Miri type, Chatterjee *et al.* (2007) in White Nicobari. However, lower value for the shape index was observed by Padhi *et al.* (1998) in Nicobari. Significant genetic variation for shape index in different breeds or strains was reported by Chatterjee *et al.* (2007).

The mean albumin weight (g), albumin per cent was observed 29.66±0.48, 55.44±0.23 respectively. These results are in accordance with the findings of Chatterjee *et al.* (2007) for White Nicobari, Malik and Singh (2010) for CARI Nirbheek. However, lower albumin ratio was reported by Padhi *et al.* (1998) in Nicobari fowl. The average weight of yolk and yolk per cent were recorded as 18.74±0.23g and 35.03±0.29, respectively. The results of present study are in accordance with the findings of Padhi *et al.* (1998) in White and Brown Nicobari fowl and Malik and Singh (2010) for CARI Nirbheek. Lower yolk per cent was reported by Padhi *et al.* (1998) in Black Nicobari and WLH and Chatterjee *et al.* (2007) in Nicobari fowl. However, higher yolk per cent was reported by Padhi *et al.* (1998) in naked neck and Chatterjee *et al.* (2007) in naked neck, barred desi and Frizzle fowl. The differences for yolk weight, yolk per cent in different study may be due to different breed/strain effect and differences in climatic conditions.

The means of shell weight, shell per cent and shell thickness (mm) were recorded as 4.81±0.06, 9.53±0.11 and 0.339±0.006, respectively. These finding are in agreement of the results reported by Malik and Singh (2010) in Nirbheek, Haunshi *et al.* (2009) in Gramapriya, Haunshi *et al.* (2013) in Kadaknath chickens and Singh *et al.* (2020). However, Padhi *et al.* (1998) in naked neck showed lower value. Higher estimates for shell thickness were reported by Haunshi *et al.* (2009) in Miri type chicken. The specific gravity of Pratapdhan chicken eggs was recorded 1.095±0.001. More or less similar specific gravity was reported in Nicobari fowl by Padhi *et al.* (1998) and in improved strains such as Gramapriya and Vanaraja by Haunshi *et al.* (2009). The shell color was observed light to

Table 3
Economics of pratapdhan chickens per family under backyard production.

Particulars	Cost involved
Cost of chicks (Rs.)	1,500
Cost of feeding (Rs.)	22,020
Cost of medicines and miscellaneous (Rs.)	3005
Total cost of rearing (Rs.)	26525
Av. no. of eggs produced	1987
Av. no. of eggs consumed at home	415
Av. no. of eggs sold	1,091
Av. no. of eggs hatched by broody hen	346
Total income from eggs (sold and consumed)	10,542
Total income from birds (sold and consumed)	93,600
Gross income	1,04,142
Net income	77,617
B:C Ratio	1:3.92

dark brown. It is considered as a good characteristic of egg for obtaining higher price in market.

Economics of Pratapdhan chickens

A partial budget analysis measures was used in those items of expenditure and incomes. Therefore, the Cost of chicks, cost of feeds, medicines and imputed value of family labour cost in miscellaneous has been considered. The cost of feeds, medicines was calculated on basis of market rate prevalent during the study period i.e. @ Rs. 2000/q. for poultry feed and Rs. 75 per chick at 6 weeks of age. Selling price of eggs and chicken received by farmers during study period was taken Rs. 7/egg and Rs. 300/bird after forty weeks of age. The recurring cost i.e. cost of feeding and medicines and income from sale of eggs and chickens are presented in Table 3. The results of study revealed that the average expenditure on rearing of Pratapdhan chicken per respondent was calculated Rs. 26,525. The total gross and net income earned from sale of eggs and birds for rearing of pratapdhan chickens were Rs. 1, 04,142 and 77617, respectively. The benefit cost ratio was recorded 1:3.92 per family, which appears to be very much economical and viable for rearing under backyard farming system. These findings are in agreement of the results reported by Jha and Chakrabarti (2017) in improved breed of poultry Divyan Red.

CONCLUSION

In conclusion Pratapdhan bird performs better under scavenging conditions to uplift socio-economic status of BPL families belonging to ST community. A significant

increase in subsidiary income by sale of eggs and male birds was observed. It was also noticed that there was significant increase in consumption of eggs and meat among beneficiaries' families. Beside the sale of eggs and chicken, the farmers were also generating the income by continuing the enterprises by reproducing the chicks by using hens for brooding.

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