

Original Research Article

Evaluation of Reproductive Parameters of Dual Purpose Three Way Cross (Jharsim) Chicken under Different Management Systems

Niraj Kumar, Sushil Prasad, Ravindra Kumar* and Shailendra Rajak

Department of Livestock Production and Management, ICAR-All India Co-ordinated Research Project of Poultry, Ranchi Veterinary College, BAU, Ranchi- 834006, Jharkhand, India

*Corresponding author

ABSTRACT

The present study was conducted on 600 day old 'jharsim' chicks to evaluate the reproductive performance under different management systems. The average values of fertility percentage of eggs in the birds under farm, semi-intensive and backyard systems are 85.65%, 79% and 69% respectively. The fertility and hatchability percentage of Jharsim birds under farm condition was observed to be better than that of semi-intensive and backyard system. The mean values of hatchability percentage on total egg set (TES) basis of eggs under farm condition of management were observed to be 74.5 percent. The corresponding values of hatchability percentage on fertile egg set (FES) were observed to be percent 90.85 percent. The effects of different management systems on egg weight, shape index, yolk index, Albumin index and shall thickness (mm) were significant. The blood cholesterol was also observed to be significantly different in all systems of management.

Keywords

Jharsim,
management,
Poultry, three way
cross

Introduction

Poultry production systems in India are characterized by the simultaneous existence of the traditional extensive system of backyard production and the modern intensive system of production. Backyard poultry farming is being practiced in many countries in rural and tribal areas where the basic infrastructure for industrial poultry farming is lacking. Backyard poultry serves as an inexpensive means for households to generate highly nutritious food items at minimal cost (Pica-ciamarra & Otte 2010). In addition to indigenous fowl, crossbreds produced using exotic breeds are being utilized for backyard poultry farming (Padhi *et al.*, 2012). Different pure lines are being

developed through selection and are being crossed to develop crossbreds for backyard poultry farming (Padhi *et al.*, 2012). Understanding the importance of backyard rural poultry farming, recently a new variety Jharsim is developed by three way cross, which have better result in less input.

Broiler strain was selected for crossing with Desi birds for faster growth and more body weight resulting in better return from the crossbred and the three way cross (Jharsim) bird was produced by crossing two way female with exotic male. The variety have rapid growth rate, egg production, high efficiency of feed utilization. Rapid growth,

good body type and superior breast fleshing are more desirable in chickens raised for dual purpose poultry. Growth rate and egg production is one of the most important factors affecting the efficiency of feed utilization in raising of chickens, but there is no standard rate of growth for a breed due to considerable variation of growth rate among strains within the breeds.

Materials and Methods

The present study was conducted on six hundred (600) day-old chicks of Jharsim bird. The brooding of the chicks was done for two months on standard managerial conditions. All the chicks were maintained under standard management conditions at Hatchery Unit, Ranchi Veterinary College, Kanke, Ranchi up to eight weeks of age (brooding period). After 8th week they were transferred to deep litter, semi-intensive and backyard system of management. Birds of deep litter and semi-intensive system were maintained at All India Coordinate Research project Ranchi and birds of backyard system were maintained at nearby village from the college.

After two months of brooding period birds were randomly divided into three groups. In each group two hundred (200) birds were kept. Under deep litter, the birds were kept under standard feeding, healthcare and management practices in open sided house up to 50 per cent egg production. Under semi-intensive system birds were provided with housing with nests. A wire net camp attached to the house where these chicks can walk freely. The birds which were supplied to the farmers for their evaluation under backyard system were housed only at night. Under backyard system, birds were provided with some amount of supplementary feed in the form of kitchen waste, broken rice or wheat in the morning and allowed to walk to

a distance in search of feed and these birds used to come back at dusk.

Results and Discussion

Age at first lay

The average values of age at first lay in DBN birds were found to be 160 days, 171 days and 181 days respectively in deep litter, semi-intensive and backyard system of management (Table 4.). The present findings are in close agreement with the Reddy *et al.*, (1972). The birds of deep litter and semi-intensive system of management started laying eggs at an early age than that of birds backyard system of management might be due to better feeding and managerial condition of birds maintained under deep litter and semi-intensive system of management.

Egg production

In the present study, the average hen day egg production at 40 weeks age was recorded as 35.06, 33.04 and 31.01 in Deep litter, semi intensive and backyard system of management, respectively. However, corresponding value, in hen housed egg production under different system of management was recorded 32.78, 30.85 and 28.79, respectively. The finding of the present study indicated that hen day and hen house egg production was recorded better in deep litter system followed by semi-intensive and backyard system of management might be due to improved feeding and managerial condition. Hen day egg production is an excellent indicator of how well the live birds are laying. The present findings are in close conformity with the observations of Niranjana *et al.*, (2008) and Khawaja *et al.*, (2013) who reported higher egg production in crosses than that of native fowls.

Table.1 Age at first lay, Egg production up to 40 weeks age and Age of 50% egg production of the birds reared under different management system

Parameters	Treatment groups			
	T ₁ (Deep Litter)	T ₂ (Semi-Intensive)	T ₃ (Backyard)	
Age at first egg production (days)	160	171	181	
Total egg Production	HD	35.06	33.04	31.01
	HH	32.78	30.85	28.79
Age at 50% egg production	195	203	220	

Table.2 Egg quality traits in the DBN bird reared under different management systems

Parameters	Treatment groups			F-value
	T ₁ (Deep Litter)	T ₂ (Semi-Intensive)	T ₃ (Backyard)	
Egg weight (g)	45.63±32 ^a	44.47±15 ^b	39.30±.19 ^c	201.79**
Yolk index	25.025±19 ^a	24.218±.03 ^b	23.808±0.07 ^c	26.84**
Shape index	74.975±217 ^a	73.967±0.08 ^b	72.792±0.107 ^c	54.99**
Shell thickness (mm)	0.338±.006 ^a	0.310±0.003 ^b	0.278±0.0087 ^c	19.46**
Albumin index	5.233±0.0401 ^a	4.908±.03 ^b	4.65±0.01 ^c	90.02**

Different superscript within a row differ significantly (**p<0.01).

Table.3 Fertility percent of DBN birds under different management system

Genetic Groups	Eggs set (No.)	Fertile eggs (No.)	Fertility (%)
DBN birds	200 (Deep litter)	165	85.50
	200 (Semi intensive)	158	79
	200 (Backyard)	138	69

Table.4 Percent Hatchability of DBN birds under different management system

Genetic Groups	Eggs set (No.)	Fertile eggs (No.)	Chicks hatched (No.)	Hatchability (%) on	
				TES	FES
DBN birds	200 (deep litter)	164	149	74.50	90.85
	200 (semi intensive)	156	139	69.50	89.10
	200(backyard)	142	118	59	83.09

Table.5 Mortality percentage of DBN birds during whole experimental period under different systems of Management

Parameters	Nursery Management	Treatment Group		
		T ₁ (Deep Litter)	T ₂ (Semi-Intensive)	T ₃ (Backyard)
No. of Birds housed	600	200	200	200
No. of Birds died	12	08	06	06
Mortality (%)	02	04	03	03
Survivability (%)	98	96	97	97
Overall Mortality	5.33			

However, The age of 50% egg production was recorded earlier in deep litter system i.e. 195 days followed by 203 days in semi-intensive and 220 days in Deep litter systems of management.

The present findings are in close agreement with the findings of Sah (1982), Singh *et al.*, (2002), Khawaja *et al.*, (2013). The difference in present findings might be due to difference in genetic factors, type of birds and other environmental factors.

Egg quality traits

Egg quality traits in different management system had significant effect on egg weight, yolk index, shape index, Shell thickness and Albumin index. The average value of weight of egg laid under deep litter, semi-intensive and backyard system of management were 45.63±0.32, 44.47±0.15 and 39.30±0.19 respectively. The present findings are in close conformity with those reported by Mahapatra and Pandey (1989). The mean values of yolk index of egg under different systems of management were 25.02±0.19, 24.21±0.03 and 23.80±0.07 respectively. The present findings are in close conformity with the findings of Johari and Singh (1968).

The average values of albumin index of eggs under deep litter, semi-intensive and backyard system of management were

5.23±0.04, 4.98±0.03 and 4.65±0.01 respectively. The present findings are in close agreement with the findings of Singh (2003) and Bharambe and Garud (2012).

Shell with shell membrane per cent of egg was observed to be significantly higher under semi-intensive system (13.14±0.42) followed by deep litter (11.63±0.44) and backyard system (10.77±0.37) of management (Table 4.10). The present findings are in close agreement with the findings of Tandron *et al.*, (1998). Shell thickness under deep litter, semi-intensive and backyard system of management were 0.33±0.06, 0.31±0.01 and 0.27±0.01 mm respectively. The present findings are in close agreement with findings of Khawaja *et al.*, (2013).

The egg quality traits of eggs laid by birds of deep litter system were better than that of semi-intensive and backyard system of management.

Mortality

The mortality percentage of DBN birds under different systems of management was found to be within normal range. The overall mortality was 5.33 percent. This indicated that DBN birds have better adaptability in semi intensive and backyard system of management.

References

- Bharambe, V. Y., Garud, P. K., 2012. Comparative performance of some improved. Poultry crossbred under konkan Region of Indian Journal of Hill farming 25 (1): 48 – 52.
- Johari, D.C. and Singh, B.P. 1968. Studies on internal egg quality of eggs. Indian Vet. J., 45: 139-143.
- Mahapatra, C.M. and Pandey, N.K. 1989. Estimation of egg shell strength from egg weight, shape index, specific gravity and egg surface area in different breeds of chicken. Indian J. Anim. Sci., 59 (1): 181-183.
- Niranjan, M., Sharma, R.P., Rajkumar, U., Reddy, B.L.N., chatterjee, R.N. and Battacharya, T.K. 2008. Comparative Evaluation of Production Performance in Improved Chicken Varieties for Backyard Farming. International Journal of Poultry Science 7 (11):1128-1131.
- Padhi, M.K., Rai, R.B., Senani, S and Saha, S.K. 2012. Assessment of egg quality in different breeds of chicken. Indian journal of poultry science 33:112-113
- Sah, K.M. 1982. A study on some economic traits of reciprocal crosses of white leghorn and Desi-birds under farm and village condition. M.V.Sc. Thesis, Birsa Agricultural University, Kanke, Ranchi -6.
- Singh, C.B. 2003. Backyard poultry farming and farm women in central Himalayas. Indian Poult. Sci. Assoc., OAS, 8: 48.
- Singh, U.B.; Chhikara, B.S. and Raheja, K.L. 2002. Evaluation of average performance of some economic traits made long term selection programme over various generations. *Indian J. Poult. Sci.*, 37: 130-134.