Research Paper

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Egg production performance of progenies of Australorp with three different strains of White Leghorn

Veterinary Science

KEYWORDS : White Leghorn, Australorp, Austra-white, egg production

Prasoon, S.	M.V.Sc. Holder,, Department of Poultry Science, College of Veterinary and Animal Sciences, Mannuthy
Anitha, P.	Senior scientist, AICRP on Poultry for eggs, College of Veterinary and Animal Sciences, Mannuthy
Vimal, A. M.	Hatchery Manager, College of Veterinary and Animal Sciences, Mannuthy
Harikrishnan, S.	Ph.D. Scholar, Department of Poultry Science, College of Veterinary and Animal Sciences, Mannuthy
Arun, R. U.	Assistant Professor, Faculty of Poultry Science, Kerala Veterinary and Animal Sciences University

ABSTRACT

An experiment was conducted at Department of Poultry Science, College of Veterinary and Animal Sciences, Mannuthy to evaluate and compare the production performance of progenies of Australorp with F, N and P strains of White Leghorn (viz., AW-F, AW-N and AW-P) under deep litter system of rearing. The mean age at sexual maturity was significantly (P<0.05) earlier in AW-P (147.40 days) than AW-F (162.60 days), meanwhile for AW-N birds it was comparable to other two groups (153 days). The mean age at 50 per cent production was significantly (P<0.01) earlier in AW-P (165.60 days) and AW-N (169.60 days) birds than AW-F (179.40 days) birds. Egg production up to 40 weeks of age was significantly (P<0.05) higher in AW-N (54.52 per cent) and AW-P (61.74 per cent) birds than AW-F birds (46.94 per cent). Overall feed conversion ratio per dozen of eggs produced in AW-N (2.13) and AW-P (1.93) was significantly (P<0.05) higher than that of AW-F (2.53) birds. The results revealed that AW-N and AW-P birds can perform better than AW-F under deep litter system upto 40 weeks of age.

Introduction

Backyard system of poultry rearing is an integral part of rural household management system in India, which plays an important role in family economy. Backyard poultry requiring hardly any infrastructure set-up is a potent tool for upliftment of the poor. It has also been noticed that the demand for rural backyard poultry is quite high. In India there is high demand for egg since per capita availability of egg is 51 (Anon., 2012) which is very less against the actual per capita requirement of 180 eggs (Anon., 2010). Most of the rural households especially women have been traditionally rearing poultry under backyard system for egg and meat production to meet their family requirement by fetching subsidiary income.

In Kerala, Austra-White (Australorp x White Leghorn) birds are extensively used for egg production under backyard rearing.. Gramalakshmi (Austra-White) is a crossbred layer chicken evolved by crossing Australorp male with White Leghorn female belonging to 'F strain' in University Poultry and Duck Farm, Mannuthy. The White Leghorn pure strains, 'N' and 'P' maintained at All India Co-ordinated Research Project (AICRP) on poultry, Mannuthy have undergone intense selection over 26 generations and proved their high production potential under intensive system of rearing. The production performance of Austra-White birds using these pure strains as female parent has not been evaluated so far.

So, The present study was undertaken to evaluate and compare the production performance of crossbred birds produced by using Australorp male with three strains of White Leghorn females viz., F, N and P under deep litter system.

Materials and Methods

Three groups of experimental birds required for the study were produced by mating Australorp male with three different strains of White Leghorn females viz., F, N and P strains maintained in the University Poultry and Duck Farm. Austra-White female chicks hatched out were reared in deep litter system under standard management conditions. At 16 weeks of age, 60 females from each cross were randomly selected and grouped into five replicates of 12 birds each. A total of 180 birds were tested for egg production traits from 21 to 40 weeks of age.

Experimental birds were fed standard layer mash as per BIS (1992). Shell grit was offered ad libitum. Nipple drinkers were used to give water ad libitum. Ingredients and proximate composition (as per AOAC, 1990) of the layer mash are presented in Table 1.

Parameters recorded during the study were; age at sexual maturity, 50 per cent egg production, egg production from 16 to 40 weeks of age, egg weight, feed consumption, feed conversion ratio and livability. The data collected on various parameters were analyzed statistically using Completely Randomized Design as per the method described by Snedecor and Cohran (1994).

Table 1. Ingredients and nutrients composition of layer mash fed to experimental birds.

Ingredients	Per cent
Yellow Maize	53.87
De-oiled rice bran	9.39
Wheat bran	8.00
Soya bean meal	10.30
Calcite powder	7.00
Di-Calcium phosphate	1.16
Unsalted Dried Fish	9.7
DL-Methionine	0.04
[1]Premix	0.30
Salt	0.24
Total	100

Calculated composition	
Dry matter	89.2
Crude Protein	18.3
Crude fibre	6.4
Ether Extract	2.1
Nitrogen Free Extract	58.8
Total Ash	14.4
Acid Insoluble Ash	1.6
Calcium	3.1
Available phosphorus	0.5
Calculated ME (kcal/kg)	2642

Results and discussion

Age at sexual maturity (ASM): The mean age at sexual maturity was 162.60, 153.00 and 147.40 days whereas age at 50 per cent production was 179.40, 169.60 and 165.60 days in AW- F, AW-N and AW-P respectively. The mean age at sexual maturity was significantly (P<0.05) lower in AW-P than AW-F, while ASM in AW-N was comparable to other two groups. AW-N and AW-P birds attained 50 per cent egg production significantly (P<0.01) earlier than AW-F birds. Age at sexual maturity (ASM) recorded for AW-F in the present study is in agreement with the reports of Radhakrishnan and Ramakrishnan (1982), Sridharan (1998) and Marathe (2012) but lower than that reported by Babu *et al*. (1988) and Ajithbabu (2010). Age at 50 per cent production recorded for AW-F agrees with the report of Sridharan (1998), Sasikumar (2003) and Marathe (2012) and higher than the reports of Radhakrishnan and Ramakrishnan (1982) and Babu *et al.* (1988). The early sexual maturity of AW-N and AW-P observed in the present study is due to the early sexual maturity of the respective female parents (Beena, 1995 and AICRP, 2012).

Egg production: Results of hen housed egg production from 21 to 40 weeks of age revealed that AW-F, AW-N and AW-P birds produced 65.73 (46.94 per cent), 76.34 (54.52 per cent) and 86.45 (61.75 per cent) eggs respectively during the period. Overall egg production of AW-N and AW-P was significantly (P<0.05) higher than AW-F. Even though the AW-N and AW-P crosses were statistically comparable with respect to egg production, the increase in egg number for AW-P birds was to the tune of 10.11 eggs. AW- P birds produced 20.72 eggs more than that of AW-F birds during the experimental period.

On perusal of the week wise egg production data (Fig. 1), it was observed that the egg laying in AW-P and AW-N commenced at 20 and 21 weeks of age, respectively while the birds in AW-F started at 22 weeks of age. Correspondingly the egg production in AW-P and AW-N birds reached 50 per cent at 25th and 26th week but in AW-F only at 29 weeks of age. There after the egg production in AW-F birds increased and reached peak production at 32 weeks of age. From 29th week onwards the egg production gradually increased in these groups and reached peak at 31 and 32 weeks of age. The improved strains of White Leghorn (N and P) used as female line is responsible for the increased egg production in AW-N and AW-P birds.

The result obtained for weekly egg production in AW-F birds in the present study is in close agreement to that reported by Marathe (2012) who observed peak production of 75.94 per cent at 30 weeks of age with overall egg production of 50.47 per cent from 23 to 40 weeks of age. Hen housed egg production of AW-F recorded in this study is lower than that reported by Sridharan (1998), Sasikumar (2003) and Marathe (2012), but higher than the report of Babu *et al.* (1988) in Austra-White birds reared under deep litter system.

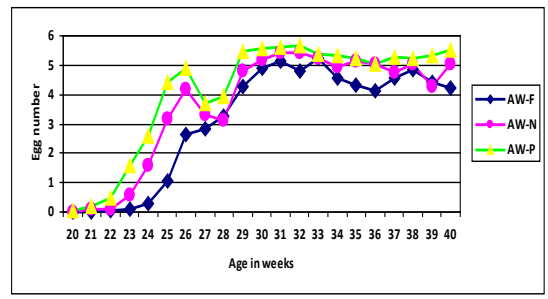

Fig. 1. Week wise hen housed egg production in Australorp x White Leghorn crosses from 20 to 40 weeks of age

Egg weight: The overall mean egg weight during the period from 21 to 40 weeks of age was 49.68, 50.16 and 51.06 g in AW-F, AW-N and AW-P, respectively without any significant difference. The mean egg weight recorded for AW-F birds in the present study is higher than that reported by Babu *et al*. (1988), Sridharan (1998) and Sasikumar (2003) for the similar crossbreds under deep litter system and is in accordance with that reported by Marathe (2012).

Feed conversion ratio (FCR): The overall mean daily feed consumption from 21 to 40 weeks of age was 107g both in AW-F and AW-N birds and 108g in AW-P birds which is less than that reported for Austra-White birds by Babu *et al.* (1988), Sridharan (1998) and Marathe (2012).The data on feed conversion ratio (per dozen of eggs) during 25 to 40 weeks of age revealed that The overall mean FCR value recorded during 25 to 40 weeks of age was 2.53, 2.13 and 1.93 in AW-F, AW-N and AW-P birds respectively. Statistical analysis showed that both AW-N and AW-P was significantly (P<0.05) better than AW-F. The poor FCR in AW-F birds could be due to the lower egg production recorded in this group during the experimental period. FCR value for AW-F in the present study is in agreement with that reported by Sridharan (1998) for Austra-White birds. Compared to the present finding Sasikumar (2003) and Marathe (2012) reported a better feed conversion ratio for Austra-White birds under deep litter system. FCR value for AW-N and AW-P in the present study is comparable to the reports of Marathe (2012) and Sasikumar (2003) in Austra-white birds under intensive system.

Livability: The overall livability was 100 per cent in both AW-F and AW-P birds and 96.67 per cent in AW-N birds. The overall livability observed in AW-N birds in the present study agrees with the report of Radhakrishnan (1981), Sasikumar (2003) and Marathe (2012) in Austra-White birds. Since the eggs and birds are the source of income to farmers good livability is an essential trait required in birds for backyard rearing.

Table 2. Production parameters of Australorp x White Leghorn crosses (AW-F, AW-N, AW-P) from 21 to 40 weeks of age

Sl. No.	Observations	AW-F	AW-N	AW-P
3	Mean age at sexual maturity (days)*	162.60 ^{a}	153.00 ^{ab}	147.40 ^{b}
4	Mean age at 50 per cent production (days)**	179.40 ^{a}	169.60 ^{b}	165.60 ^{b}

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5	Hen Housed Egg Number (21 to 40 weeks)*	65.73 [b]	76.34 [a]	86.45 [a]
6	Hen Day Egg Number (21 to 40 weeks)*	65.73 [b]	78.83 [a]	86.45 [a]
7	Hen Housed Egg Percent (21 to 40 weeks)*	46.94 [b]	54.52 [a]	61.75 [a]
8	Hen Day Egg Per cent (21 to 40 weeks)*	46.94 [b]	55.63 [a]	61.75 [a]
9	Mean egg weight from 21 to 40 weeks (g) NS	49.68	50.16	51.06
10	Mean daily feed intake from 21 to 40 weeks (g) NS	107.02	107.05	108.41
11	Mean FCR from 25 to 40 weeks *	2.53 [a]	2.13 [b]	1.93 [b]
12	Mean livability per cent from 21 to 40 weeks NS	100.00	96.67	100.00

The mean values carrying different superscripts within the trait differs significantly

*** Significant (P<0.05)** **** Significant (P<0.01)**
NS- Not significant

Conclusion

Based on the production performance of three groups of Australorp x White Leghorn crossbreds tested under deep litter system, it was concluded that AW-N and AW-P birds had significantly (P<0.05) higher egg number, earlier sexual maturity and better feed conversion ratio than AW-F birds. Based on the study it could be suggested that the egg production of Austra-White birds can be improved by using 'N' and 'P' strains of White Leghorn maintained in AICRP, Mannuthy as female parents. Among the crossbred progenies evaluated, performance of AW-P birds was superior than AW-N in terms of egg number eventhough higher egg number was recorded for pure strain 'N' than 'P' tested under AICRP, Mannuthy. This indicates that 'P' strain birds have better combining ability than 'N' strain birds when crossed with Australorp male.

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