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Reproductive and productive efficiency indices of BV-300 layer breeder reared on deep litter cum slatted floor

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Abstract

The study was conducted with thirty thousand BV-300 layer breeder female along with 12% males at Phoenix Poultry, Raipur (C.G.) to find out the reproductive and productive indices of BV-300 layer breeder reared on deep litter cum slatted floor. The feeding of birds was adjusted to fulfill the nutrient requirement (NRC, 1994) as per their age and egg production. To evaluate the reproductive performance of BV-300 breeders, Hatch Day Breakout Analysis was carried out. All reproductive failures are enumerated, totaled and the percentages calculated. For the optimum performance of BV-300 layer breeder chicken Standard managemental, vaccination and deworming schedule were followed for rearing. The average Hen day production, settable eggs, Feed intake/bird/day and average egg weight was 79.51%, 88.05%, 80.77%, 116.71g and 55.00g. However, the reproductive efficiency indices like fertility, hatchability, hatch of fertile, spread, estimated hatchability and sample index was 94.23%, 80.77%, 92.59%, 7.32, 90.05% and 2.81. From the study, it could be concluded that the BV-300 layer breeder exhibits reproductive and productive performance as per their standard values and is suitable for layer chicks and egg production.

Keywords: BV-300 layer breeder, fertility, hatchability, hen day production, feed intake and egg weight

Introduction

India is the world's 3rd biggest producer of eggs and annual growth rate of commercial layer is 6-8% [5]. In contrast to the other livestock sector, the poultry industry in India is more scientific and well organized. It is also continuously adopting modern technologies for pure line breeding, latest managemental practices, environmentally controlled houses, improved vaccines, medicines, poultry processing units, processed chickens, hatching egg export and excellent feed quality. Breeding and feed management practices have improved through education, training, competition and expansion. To maintain the growth rate of commercial layer (6-8%), layer breeder has also be increased to maintain this growth rate.

The White leghorn, Minorca and Ancona are the egg producing type of poultry there for belongs to the category of layers breed. They are good egg producer and not broody in nature [11]. The single comb white Leghorn is used for the purpose of egg production commercially. They have white eggs shells and have yellow skin. The commercially available strains of white Leghorn are BV-300, Hy-line, Lohmann and Bovans etc. It is important to have general and reproductive failure data for accurate analysis and inferences. This may be helpful for evaluation of reproductive efficiency by flock and breed helpful in diagnosis problems arise in the hatchery or on the breeder farm. So, the study was conducted to find out the reproductive and productive indices of BV-300 layer breeder reared on deep litter cum slatted floor.

Materials and methods

Thirty thousand BV-300 layer breeder female along with 12% males were reared at Phoenix Poultry, Raipur (C.G.) India. The birds were reared in a high raised deep litter cum slatted floor. The birds were equally distributed in pens (50''×28'') with 12% males in each. The feeders and drinkers were arranged in two rows, so that they were easily approachable to the birds. At the both sides of pens, there was arrangement of next boxes, where birds lay hatching eggs. Feeding of birds was done twice a day *i.e.* in the morning and in the evening. The clean drinking water after sanitation was available throughout the day. The feeding of birds was

adjusted to fulfill the nutrient requirement ^[16] as per their age and egg production. The standard vaccination schedule was maintained in chicks, growing and in laying stage. The deworming was done regularly to make the birds free from worms. The good quality shell grit was provided in separate pots to fulfill the calcium requirement for the formation of egg shells in laying birds. The laying stage was divided into two phases *i.e.* Phase I (19 to 40 weeks) and Phase II (from 41-72 weeks). The ingredient composition of Phase I and Phase II were given in Table 1 and chemical composition of Phase I and Phase II were given in Table 2. The drinkers were cleaned daily while feeders were cleaned weekly. The water tanks and pipe lines were also cleaned weekly using appropriate chemicals. The artificial light was given to birds when achieving appropriate body weight and egg production

reached to 85% and this light was increased by ½ hours/week and increasing up to 16½ light hours/day. Strict bio-security was maintained at the farm to prevent the spreading of diseases. The hatching eggs from the nest boxes were collected at 8:00 AM and subsequently after every two hours and these eggs were cleaned immediately. After cleaning eggs were graded as hatchable eggs or crack egg or commercial egg (small sized egg). After grading, eggs were sent to the hatchery immediately. In summers to overcome the heat-stress sprinkler were used above the shed and gunny clothes were maintained in the sides of sheds and wetting it with water to lower down the temperature of shed. In-side the shed fine mist producing foggers were arranged in two rows with the provision of electrolytes and vitamin C in drinking water. The feed samples were analyzed for proximate principles ^[1].

Table 1: Ingredient Composition of feed

Particulars	Phase I (%)	Phase II (%)
Maize	45.0	47.0
Soybean cake	28.0	27.4
DORB	7.2	8.5
RP	6.0	6.0
Shell grit	7.0	7.0
LSP	2.0	2.4
DCP	1.8	1.7
Salt	0.45	0.45

Table 2: Chemical Composition of feed

Particular	Phase I	Phase II
DM (%)	89.02	90.73
ME(Kcal/kg)	2532.50	2625.07
CP (%)	17.50	17.52
EE (%)	2.64	2.72
CF (%)	3.90	4.03
Ca (%)	3.71	3.83
P (%)	0.728	0.719

To evaluate the reproductive performance of BV-300 breeders, Hatch Day Breakout Analysis was carried out. All reproductive failures are enumerated, totaled and the percentages calculated. From these data, reproductive efficiency measures such as fertility, percentage hatchability of fertile eggs, spread between fertility and hatchability, estimated hatchability and the sample index were calculated ^[14] and presented in Table 4. The formulas used for measuring reproductive efficiency of BV-300 breeders are as follows:

1. Fertility (%) = $100 - (\text{No. of Infertile eggs} \div \text{Sample Size}) \times 100$
2. Hatchability (%) = $(\text{No. of eggs hatched} \div \text{No. of eggs set}) \times 100$
3. Hatch of fertiles (%) = $(\text{Hatchability} \div \text{Fertility}) \times 100$
4. Spread = Fertility - Hatchability
5. Estimated hatchability (%) = $100 - \text{Reproductive failures} (\%)$
6. Sample Index = $\text{Estimated hatchability} (\%) - \text{Hatchability} (\%)$

Results and Discussion

Production and reproduction performance indices of layer breeder (BV-300 Strain) offered Corn-Soya based diet is presented in Table 3 and Table 4, respectively. Feed intake was found directly related with the Hen day production percent of birds. The average feed intake during laying period was 116.71 ± 2.80 g on *ad libitum* feeding. Similar findings are also reported by Abbas *et al.* (2010) and Anderson (2002) in Hy-Line chicken and Renema *et al.* (1999). The hen day production during laying cycle was goes upto 91.89%, while average hen day production during laying cycle was 79.51% which is comparable to Petitte *et al.* (1982) and Yuan *et al.* (2009). Average settable eggs of Layer breeder BV-300 strain was 88.05%, while it goes up to 98.82. The range of hatchability was 74.40% to 93.00%, which was depend on the age of the bird and size of the egg as described by Mbajiorgu (2011) and Kidd *et al.* (1992). The average egg weight was 55.00 g during laying period, which is comparable to Abiola *et al.* (2008).

Table 3: Production Performance of Layer Breeder (BV-300 Strain)

Age(wk)	Hen day production (%)	Settable eggs (%)	Feed Intake/bird/day (g)	Avg. egg weight (g)
19	23.80	-	55.89	48.50
20	39.31	-	58.32	48.50
21	47.21	-	60.50	49.50
22	67.28	-	75.42	50.00
23	75.81	60.53	75.71	50.50
24	67.94	72.89	87.57	50.50
25	79.60	78.51	94.85	51.00
26	83.91	81.36	115.00	51.00
27	86.51	84.28	116.14	51.00
28	90.31	91.88	121.28	52.00
29	91.89	95.56	120.85	52.00
30	91.31	96.88	119.28	52.00
31	88.68	94.69	116.00	53.00
32	90.43	95.72	121.14	53.00
33	90.27	96.91	122.14	53.00
34	90.35	96.74	120.00	53.50
35	88.54	97.32	116.00	53.50
36	90.77	97.73	121.14	53.50
37	84.38	97.69	122.14	54.00
38	73.42	97.46	120.00	54.00
39	85.16	96.52	116.00	54.00
40	89.07	97.64	116.00	54.00
41	89.16	97.78	113.85	55.00
42	88.47	98.56	114.00	55.00
43	84.68	98.40	117.80	55.50
44	85.08	98.11	121.14	55.50
45	84.96	97.00	117.00	55.50
46	84.68	94.68	119.70	55.50
47	84.72	96.41	116.28	56.00
48	83.69	96.12	116.71	56.00
49	84.39	96.21	124.14	56.00
50	85.22	96.45	124.14	56.00
51	82.36	96.00	128.13	56.00
52	81.56	96.30	137.00	56.50
53	82.03	96.75	140.56	56.50
54	82.17	98.48	142.00	56.50
55	80.54	97.95	137.14	56.50
56	79.49	97.75	142.42	57.00
57	82.95	97.67	143.00	57.00
58	82.10	96.64	143.42	57.00
59	80.68	96.24	143.85	57.50
60	81.44	98.01	143.42	57.50
61	80.16	98.06	137.14	57.50
62	80.38	98.44	134.00	58.00
63	79.80	98.76	134.71	58.00
64	78.43	98.74	128.71	58.00
65	79.19	98.79	130.42	58.00
66	79.31	98.51	128.00	58.00
67	77.37	98.56	125.28	58.00
68	76.52	98.68	124.25	59.00
69	76.81	98.76	122.00	59.00
70	73.41	98.82	116.85	59.00
71	64.67	98.49	116.14	60.00
72	61.25	98.70	114.14	61.50
Average \pm SEM	79.51 \pm 1.71	88.05 \pm 1.02	116.71 \pm 2.80	55.00 \pm 0.41

However, the reproductive efficiency indices of BV-300 like fertility was 94.23%, which was similar to the fertility of Babcock white (95.26%) as reported by the Anderson (2010) and Reddy *et al.* (1999) in White Leghorn. The average hatchability of layer birds was 80.77%, which is lower than reported by the ledur *et al.* (2000) in White Leghorn and similar to Sharma *et al.* (2012) in Krishna-J Birds. However, contrary to this Farooq *et al.* (2001) suggested that

hatchability is reduced with reduced fertility in COBB 500 Broiler Chickens. Taking this further might also mean that hatchability will be improved with improved fertility. The Hatch of fertile, spread, estimated hatchability and sample index was 92.59%, 7.32, 90.05% and 2.81. However, these values were differ from standard values described by Bell and Weaver (2002) but were not significantly different.

Table 4: Reproductive efficiency indices of Layer Breeder (BV-300 Strain)

Age (wk)	Fertility (%)	Hatchability (%)	Hatch of fertile (%)	Spread	Estimated hatchability (%)	Sample Index
23	90.20	74.40	82.48	15.80	80.60	6.20
24	88.50	79.70	90.05	8.80	81.65	1.95
25	89.70	80.10	89.29	9.60	80.50	0.40
26	91.50	83.70	91.47	7.80	88.04	4.34
27	92.60	85.60	92.44	7.00	90.55	4.95
28	94.50	86.49	91.52	8.01	91.50	5.01
29	94.20	88.00	93.41	6.20	89.10	1.10
30	95.80	89.90	93.84	5.90	93.75	3.85
31	93.40	89.10	95.39	4.30	89.40	0.30
32	96.70	91.90	95.03	4.80	94.40	2.50
33	95.90	90.15	94.00	5.75	92.50	2.35
34	95.80	90.00	93.94	5.80	93.50	3.50
35	96.10	91.56	95.27	4.54	93.20	1.64
36	96.10	92.40	96.14	3.70	94.10	1.70
37	95.90	92.10	96.03	3.80	93.50	1.40
38	81.20	93.00	114.53	4.50	93.22	0.22
39	96.70	92.50	95.65	4.20	95.80	3.30
40	95.90	92.10	96.03	3.80	94.80	2.70
41	96.10	91.00	94.69	5.10	94.80	3.80
42	95.70	90.00	94.04	5.70	94.50	4.50
43	95.40	90.90	95.28	4.50	94.42	3.52
44	96.20	91.00	94.59	5.20	95.40	4.40
45	97.80	90.90	92.94	6.90	94.20	3.30
46	95.70	88.20	92.16	7.50	88.50	0.30
47	95.30	87.10	91.39	8.20	87.25	0.15
48	96.80	88.50	91.42	8.30	91.83	3.33
49	95.60	90.00	94.14	5.60	92.50	2.50
50	96.10	89.40	93.02	6.70	90.20	0.80
51	95.10	88.10	92.63	7.00	92.10	4.00
52	95.60	89.70	93.82	5.90	93.40	3.70
53	96.20	91.00	94.59	5.20	94.65	3.65
54	95.30	89.00	93.38	6.30	94.32	5.32
55	95.30	88.60	92.96	6.70	92.43	3.83
56	94.80	89.90	94.83	4.90	93.43	3.53
57	95.30	87.10	91.39	8.20	88.15	1.05
58	94.60	88.10	93.12	6.50	92.37	4.27
59	94.90	87.10	91.78	7.80	87.17	0.07
60	95.70	86.10	89.96	9.60	89.50	3.40
61	94.90	86.30	90.93	8.60	86.35	0.05
62	94.60	86.50	91.43	8.10	92.43	5.93
63	93.90	85.20	90.73	8.70	88.48	3.28
64	94.30	85.30	90.45	9.00	87.28	1.98
65	94.60	85.80	90.69	8.80	87.42	1.62
66	93.60	83.20	88.88	10.40	83.46	0.26
67	95.10	84.10	88.43	11.00	88.37	4.27
68	93.60	81.60	87.17	12.00	83.30	1.70
69	92.60	79.50	85.85	13.10	83.35	3.85
70	91.60	80.20	87.55	11.40	82.15	1.95
71	89.30	81.30	91.04	8.00	88.13	6.83
72	89.50	78.50	87.70	11.00	80.44	1.94
Average \pm SEM	94.23 \pm 0.40	80.77 \pm 0.60	92.59 \pm 0.60	7.32 \pm 0.36	90.05 \pm 0.62	2.81 \pm 0.24

Conclusion

From the study, it could be concluded that the Corn-Soya based diet exhibits optimum performance for Layer Breeder (BV-300 Strain). The average Hen day production, settable eggs, Feed intake/bird/day and average egg weight was 79.51%, 88.05%, 116.71g and 55.00g. However, the reproductive efficiency indices like fertility, hatchability, hatch of fertile, spread, estimated hatchability and sample index was 94.23%, 80.77%, 92.59%, 7.32, 90.05% and 2.81. From the study, it could be concluded that the BV-300 layer breeder exhibits reproductive and productive performance as per their standard values in Indian agro-climatic conditions and is suitable for layer chicks and egg production.

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