The Pharma Innovation Journal 2023; SP-12(12): 2359-2361

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(12): 2359-2361

www.thepharmajournal.com
Received: 12-10-2023
Accepted: 16-11-2023

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Brooding management in semi-intensive poultry farming: A technology merge

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Abstract
A Front line demonstration programme on brooding management had been conducted in different semi-intensive Vanaraja poultry units of Angul district, Odisha under the technical supervision of Krishi Vigyan Kendra, Odisha University of Agriculture and Technology. Mostly the farmers rearing Vanaraja breed were included in the demonstration programme. The selected poultry farmers under the demonstration were provided each with 30ft long fibre chick guard with tin brooder and the performance was compared with normal farmer's practice. The control and demonstration units had been separated by using fence. Birds were weighed at '0' day and subsequently on 4 week, 8 week, 12 week and 16 weeks. Higher level of chickens' survival and performance was observed in demonstration flock.

Keywords: Poultry chicks, brooding management, weight gain

Introduction
Good management means the judicious combination of all the available resources and their proper utilization to earn maximum return on the total cost invested on poultry farm. This is also important for chick survival and that is positively co-related with the profit from poultry farms (Prasad, 2015) [1]. Different types of daily management practices are also responsible for a profitable farming. Among them, brooding management plays an important role to prevent early chick mortality. Thermoregulatory mechanism is not fully developed in newly hatched chick and it requires about 15 days to develop this mechanism. Hence, newly hatched chicks are unable to maintain the body temperature properly for the first few weeks of life. Brooding period is mainly responsible to optimize the body temperature of chickens. The birds perform their all normal activities in the right body temperature. When brooding temperature is more than 28 °C the survival and grow rate of chicken is better (Baarendse *et al.,* 2006; Leksrisompong *et al.,* 2009) [2, 3]. Due to improper brooding management and lack of awareness among the farmers there is a large scale of early chick mortality. Proper brooding management is a positive factor in reducing usages of antibiotics in poultry farm leading to prevention of antibiotic resistance pathogenic bacteria (Cohen, 2009; Vanduijn *et al.,* 2011) [4, 5]. Analyzing the above circumstances the present research was conducted to study the effect of brooding management in semi-intensive poultry farming in rural condition.

Materials and Methods
Experimental site and study design
A Front line demonstration programme had been conducted at 10 different semi-intensive poultry units of Angul district, Odisha under the technical supervision of Krishi Vigyan Kendra, Odisha University of Agriculture and Technology. Mostly the farmers rearing Vanaraja breed were included in the demonstration programme. The flock size was 100 in each demonstration. Similarly, control group (Farmer's practice) was also from the same poultry units. The control and demonstration units had been separated by using fence. The selected poultry farmers under the demonstration were provided each with 30ft long fibre chick guard with a height of 16 inch. They were trained on preparation of tin brooder. Training was also provided on brooding management on chicks.

Housing Management
The chicks were kept in deep litter housing system. The poultry house was properly disinfected with disinfectant. Before arrival of chicks, the poultry house was coated with limestone and allowed to dry over 24 hours.

Rice husk was used as litter material and spread on the floor upto 2 inch thickness. Over the litter newpaper was spread. The chicks were kept over newspaper for three days in order to avoid eating of litter material. The newspaper was changed on daily basis for three days. The temperature was maintained throughout the brooding period @ 2 watt/ chick using electric bulb. The bulb was fitted in the tin brooder.

Arrangement of brooders

In control group the chicks were brooded in deep litter system using only electric bulb. While in demonstration group tin brooder of 250 chicks capacity had been used along with fibre chick guard. The chick guards were connected in circular fashion with diameter of 4 feet to accommodate 100 chicks. The demonstration was conducted in the month of December to January. During the experiment, the environmental temperature was very low in Angul district hence, additional 3 hours heating was required at day time besides night period and brooders were fixed according to chicks' behavior in the brooding area and need. After completion of first week chick guard was removed.

During those 30 days rearing period vaccinations to all the birds were done. Ranikhet disease vaccine (F strain/ La Sota strain) was done on 7th day and booster dose on 28th day of age. Infectious bursal disease or Gumboro disease vaccine was done on 14th day. Multivitamin suspensions were given to all chicks during firsts 10 days. During the initial 3 days chicks were feed with sooji. After 3 days chicks were provided with commercial broiler poultry starter feed @15 gm per day per bird up to 15 days followed by 20 gm per chick per day up to 30 days. Body weight gains on weekly basis were recorded. Birds were weighed on '0' day and subsequently on 4 week, 8 week, 12 week and 16 weeks. Mortality percentage and weight gain were recorded.

Results and Discussion

The weight gain performances of birds are presented in Table 1. The live weight gain performance on 0 day, 4 week, 8 week, 12 week and 16 week day of Vanaraja birds in Demonstration were 34.20 gm, 356.71 gm, 701.40 gm, 1322.20 gm and 1940 gm respectively (Table 1). Similarly in case of farmers' practice the 0 day, 4 week, 8 week, 12 week and 16 week live body weight were 34.23 gm, 234.90 gm, 564.97 gm, 1021.85 gm and 1756 gm respectively. It was observed that the average live body weight of birds were increased gradually from beginning to 16th week of age. There was no significant difference (p>0.05) of initial weight of day old chicks in both demonstration flock and farmer's practice. But significantly (p>0.05) higher body weight gain was observed in demonstration flock than that of farmer's practice on 4 week, 8 week, 12 week and 16 week. According to Buys *et al.* (1999) [6] the improvement in body weight gain was due to the proper brooding technique. In this study the decreased weight gain in farmer's practice might be due to the fluctuation in brooding temperature (Ahmad, 2008) [7] and improper brooding management. Similarly, more weight gain in demonstration method might be due to less stress and healthy birds as a result of proper temperature management in these treatments.

The overall mortality of birds under 16weeks age group in case of farmer's practice was 13.6%, where as in case of demonstration it was 6.51% and the highest mortality was recorded during 0-4 weeks period in both practices. The details of mortality percentage were presented in table.2. It was observed that artificial brooding management practices leads to lower mortality compared to farmer's practices. Extreme heat or cold can affect the performance of chickens by reducing body weight gain and egg production, in addition to increasing mortality and susceptibility to disease. The influence of this type of stress during the brooding period can have devastating effects on the immunity and future performance of the flocks. The main cause of mortality may be due to temperature fluctuation during brooding leading to increased stress and decreased immunity in birds and hence more prone to diseases and death of the birds (Renwick and Washburn, 1982; Ahmad *et al.*, 2008) [8, 7].

Table 1: Live body weight performance (in gms.) under Farmer's practice and Demonstration in different weeks.

Technology details	0 day	4 week	8 weeks	12 weeks	16 weeks
Farmers' practice	34.23±0.23	234.90±3.13^{a}	564.97±4.84^{a}	1021.85±7.60^{a}	1756.0±18.56^{a}
Demonstration	34.20±0.22	356.71±5.74^{b}	701.40±7.64^{b}	1322.20±19.43^{b}	1940.0±15.83^{b}

N.B. Values differ significantly between the groups, if contain different superscripts within the same column at the specific day of observation (p<0·05).

Table 2: Percentage of mortality under Farmer's practice and Demonstration in different weeks.

Technology details	0-4 week	4-8 weeks	8-12 weeks	12-16 weeks
Farmers' practice	9.8±1.52	1.76±0.89	1.12±0.01	0.91±0.47
Demonstration	3.8±0.77	1.45±0.52	1.05±0.01	0.21±0.44

Table 3: Economics of Farmer's practice and Demonstration

Sl. No.	Major parameters			Economics of Farmer's Practice (Rs.)				Economics of demonstration (Rs.)			
1.	Farmers' practice	Demonstration	% change	Gross Cost	Gross Return	Net Return	B:C ratio	Gross Cost	Gross Return	Net Return	B:C ratio
2.	Average body weight at 16 weeks-1.76 kg	Average body weight at 16 weeks-1.94 kg	10.22%	8125/-	26,030/-	17,905/-	3.2	9025/-	31001/-	21,976/-	3.4

Conclusion

In conclusion, higher level of chickens' survival and performance was observed in demonstration flock. This brooding management technique is very much effective and usable to achieve success in rural areas where farmers' practicing semi-intensive poultry farming with improved dual purpose birds.

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