Growth performance of Hansli × CSML birds under intensive and semi-intensive systems of management

Abhijeet Champati, Lipismita Samal, Nrusingha Charan Behura, Soubhagya Muduli and Popalghat Haresh Kashinathrao

Abstract
The study was conducted to evaluate the growth performance of Hansli × CSML birds under intensive and semi-intensive systems of management. 186 day old chicks were brooded up to 6 weeks of age and then divided and reared separately under the two systems. The mean body weight, feed intake and FCR of birds at the end of 20th week of age, under intensive system were significantly higher (P≤0.05) than that under semi-intensive system. Mortality during 0-6 weeks of age (chick stage) was recorded as 3.22%. Mortality recorded during 7-20 weeks (grower stage) under intensive system was lower than that under semi-intensive system. From the study, it was concluded that, with humble supplementation and availability of scavenging feed resources, semi-intensive system of chicken rearing, is more favourable for the small holder poultry keepers.

Keywords: Crossbred, intensive, poultry, semi-intensive

Introduction
In India, poultry production is characterized by the simultaneous existence of the traditional extensive production systems like backyard and free-range and the modern intensive production systems like deep-litter and cage rearing. In urban and peri urban areas, commercial rearing of poultry is mainly done under intensive system (deep litter and cage system) [3]. In rural areas, the local chickens are preferred over exotic chickens for their meat and eggs. However, they are poor performers in terms of growth rate and production. Crossbred poultry have higher feed efficiency and lower mortality as compared to purebreds and these two factors play a very important role in increasing profits in poultry production [5]. Hence, a commercial cross between native and improved birds would be an ideal replacement for the underperforming native chicken in the scavenging poultry production systems. These crossbred birds are similar in appearance to the local birds and provide significant returns with low inputs and therefore, are readily accepted by the rural farmers.

Keeping in view the above facts, the present study was aimed at assessing the effects of two different management systems (intensive-deep litter and semi-intensive) on growth performance of Hansli × CSML birds.

Materials and Methods
Location of study
The experiment was conducted in the poultry farm of the AICRP on “Poultry Breeding”, Faculty of Veterinary Science and Animal Husbandry, Orissa University of Agriculture and Technology, Bhubaneswar.

Experimental design and genetic stock
Adult Hansli males and Colour synthetic male line (CSML) females at the age of 40 weeks were housed in breeding pens and their eggs were collected and hatched. One hundred eighty six (186) day old chicks of Hansli X CSML cross were collected randomly. The chicks were distributed into 6 replicate groups having 31 chicks per replicate group. All the chicks were wing banded and day-old body weight of chicks were recorded. The chicks in all six replicate groups were maintained for a period of six weeks (nursery period) on similar feeding (20 % CP and 2866 kcal/ kg ME, ad libitum feeding) and management conditions.

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On completion of 6th week, one hundred eighty (180) birds were randomly divided into two groups of 90 birds each and each group was sub divided into three replications having 30 birds each. The two groups were reared separately under two systems of management- intensive and semi-intensive. The birds under intensive system were raised on deep litter with a floor space @ 2.5 ft²/bird while birds under semi-intensive system were provided coop floor space @ 2.5 ft²/bird and pasture run space @ 15 ft²/bird. The pasture area predominantly was covered with grasses and low plants like *Cynodon dactylon* (Doob grass), *Talinum triangulare* (water leaf) and *Tridax procumbens* (Bisalyakarani). The pasture run space was securely fenced around to avoid danger of predators. Birds under intensive system were fed *ad libitum* diet containing 18% CP and 2822 kcal/kg ME [1] while birds under semi-intensive system were fed 50% of the amount allocated to birds under intensive system and allowed to scavenge in pasture.

Body weights of all birds were recorded at dayold and at weekly interval up to 20 weeks of age. The feed consumption of the experimental birds was recorded on weekly basis by subtracting the left over feed at the end of the week from the total feed offered during the week. Cumulative feed consumption was calculated by adding the feed consumption from 1st week up to the desired week. For semi-intensive system, only the formulated feed consumption was taken into consideration as there was no way of knowing their consumption during scavenging.

**Data analysis**

Data collected in the above experiment were statistically analyzed using SPSS (V 25.0) computer package. Data was subjected to t-test to know the significance level of different parameters. The differences between means were declared significantly at P≤0.05.

**Ethical approval**

All applicable international, national and/or institutional guidelines for the care and use of animals were followed.

**Results and Discussion**

**Body weight**

Body weight (g) of Hansli × CSML birds at different ages reared under intensive and semi-intensive system of management is presented in Table 1. In the study, the mean body weight of Hansli × CSML birds was recorded as 40.46±0.14 g and 429.50±4.37 g at day old and 6th week of age, respectively. The present findings were in accordance with the findings of various authors who reported comparatively lower bodyweight [6, 8, 10, 13, 20].

The final bodyweight of birds under intensive and semi-intensive system were recorded as 2665.28±36.97 g and 1716.07±39.76 g, respectively. The body weight of birds under intensive system was found to be significantly (P≤0.05) higher than birds under semi-intensive system throughout the experimental period. This may be due to lower concentrate feed intake accompanied with scavenging by birds under semi-intensive system. These findings were in agreement with the findings of many authors who studied the effect of the housing system on the final bodyweight and reported that chickens reared under semi-intensive system obtained a lower bodyweight as compared to chickens under intensive system [11, 12, 14]. The difference in results and findings might be credited to the variations in breed-strain of birds, feed supplement, management system, pasture availability and various environmental factors.

**Table 1: Body weight (g) of Hansli × CSML bird at different ages reared under intensive and semi-intensive system of management**

<table>
<thead>
<tr>
<th>Age</th>
<th>Body weight (g) Nursery management</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Day old</td>
</tr>
<tr>
<td></td>
<td>Intensive system N Semi-intensive system N</td>
</tr>
<tr>
<td>Day old</td>
<td>40.46±0.14</td>
</tr>
<tr>
<td>6th week</td>
<td>704.71±8.10</td>
</tr>
<tr>
<td>8th week</td>
<td>583.15±8.71</td>
</tr>
<tr>
<td>12th week</td>
<td>4211.29±26.61</td>
</tr>
<tr>
<td>16th week</td>
<td>4211.29±26.61</td>
</tr>
<tr>
<td>20th week</td>
<td>2665.28±36.97</td>
</tr>
</tbody>
</table>

a, b Mean with different superscripts in a row differ significantly (P<0.05)
N= number of observations

**Food consumption**

Feed consumption (g) of Hansli × CSML bird at different ages reared under intensive and semi-intensive system of management is presented in Table 2. The feed consumption per bird at the end of nursery period (0-6 weeks) was 809.47±2.65 g. Analyzing the mean feed intake per bird, significantly higher feed intake was observed under intensive system (9391.50±44.37 g) than that of semi-intensive system (5138.28±16.72 g) of management at the end of 20 weeks of age. Birds under semi-intensive system took their feed by grazing and scavenging and were provided with less amount of feed as supplement. The present findings corroborated the findings of Sanka and Mbaga (2014) [12] and Patel et al. (2018) [13], who reported feed consumption of birds under intensive system to be higher than that of semi-intensive system. However, the present findings were not in agreement with the findings of other authors [9, 18], who reported that management systems have no significant effect on the feed consumption in broiler chicks.

**Table 2: Feed consumption (g) of Hansli × CSML bird at different ages reared under intensive and semi-intensive system of management**

<table>
<thead>
<tr>
<th>Age (in weeks)</th>
<th>Cumulative feed intake (g) (N=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intensive system Semi-intensive system</td>
</tr>
<tr>
<td>0-8</td>
<td>1615.54±17.09</td>
</tr>
<tr>
<td>0-12</td>
<td>4246.89±20.22</td>
</tr>
<tr>
<td>0-16</td>
<td>6872.29±26.84</td>
</tr>
<tr>
<td>0-20</td>
<td>9391.50±44.37</td>
</tr>
</tbody>
</table>

a, b Mean with different superscripts in a row differ significantly (P<0.05);
N= number of observations

**Feed conversion ratio**

Feed conversion ratio of Hansli × CSML bird at different ages reared under intensive and semi-intensive system of management is presented in Table 3. The feed conversion ratio of Hansli × CSML birds at the end of nursery period (0-6 weeks) was 2.13±0.02. At the end of 20th week of age, FCR of birds under intensive and semi-intensive systems were recorded as 3.62±0.05 and 3.13±0.05, respectively. Significantly higher FCR was recorded for birds under intensive system as compared to semi-intensive system throughout the experimental period. The present findings corroborated with the findings of many previous authors [11, 12, 14, 15, 16] who reported that birds reared under semi-intensive system had lower FCR indicating better feed conversion.
efficiency as compared to birds reared under intensive system. The difference in results might be due to difference in breed of birds, amount of feed consumed, type and availability of pasture, management and environment conditions.

Table 3: Feed conversion ratio of Hansli x CSML bird at different ages reared under intensive and semi-intensive system of management

<table>
<thead>
<tr>
<th>Age (in weeks)</th>
<th>Intensive system</th>
<th>Semi-intensive system</th>
</tr>
</thead>
<tbody>
<tr>
<td>8th</td>
<td>2.46±0.03</td>
<td>2.31±0.03</td>
</tr>
<tr>
<td>12th</td>
<td>2.84±0.03</td>
<td>2.53±0.03</td>
</tr>
<tr>
<td>16th</td>
<td>3.20±0.04</td>
<td>2.74±0.04</td>
</tr>
<tr>
<td>20th</td>
<td>3.62±0.05</td>
<td>3.13±0.05</td>
</tr>
</tbody>
</table>

a, bMean with different superscripts in a row differ significantly (P<0.05)
N= number of observations

Mortality
The mortality of Hansli x CSML birds during 0-6th week of age was 3.22 %. During 7-20th week of age mortality under intensive and semi-intensive system was 0 % and 4.44 % respectively. The present findings were in accordance with the findings reported by Kalio et al. (2012) [3] and Abalaka et al. (2013) [13] that the mortality rates for birds under intensive system (3.3 and 7.36 %) were lower than that of semi-intensive system (5 and 39.05 %), respectively. Mortality in semi-intensive system was due to predator attacks, which was in agreement with the findings of various workers [14, 17, 19] who stated that risk of predation is a major constraint in rural chicken production conditions.

Conclusion
Rearing system has a significant influence on growth performance and feed efficiency of birds. Birds under semi-intensive system consumed relatively less supplementary feed and resulted to have better feed conversion efficiency as compared to birds under intensive system at all ages. This implies that, with modest supplementation and assuming availability of scavenging feed resources, semi-intensive system of chicken rearing, is more favourable for the small holder poultry keepers.

Acknowledgment
The authors are very much obliged to the post graduate department of Poultry Science, Orissa University of Agriculture and Technology (OUAT), Bhubaneswar, Orissa, for providing the necessary facilities to carry out this research work.

References