Production performances of native breeder female chicken under intensive management system in Tamil Nadu

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Abstract
A study was undertaken to assess the production performances of native breeder chicken under intensive management system in three district of Tamil Nadu viz, Erode, Tiruppur and Coimbatore. A total of 45 farms, 15 farms from each district were selected for the study purpose by adopting simple random sampling and the data were collected through a semi-structured interview schedule as well as self-observation. The selected farms were classified as small (15 farms), medium (15 farms) and large (15 farms) with the capacity ranged from up to 1500, 1501 to 3000 and above 3000 birds. The mean age and body weight at sexual maturity of native female parent was 170.96 ± 1.92 days and 1.83 ± 0.05 kg. The average daily feed intake per native female parent was 5.44 ± 0.16 and 9.10 ± 0.32 kg respectively. The average egg weight and annual egg production of native female parent was 46.51 ± 0.91 gm and 101.83 ± 3.21 eggs per annum. The average number of settable egg was 97.65 ± 4.62 and hatchability rate per native breeder was 73.16 ± 1.05 per cent in Tamil Nadu.

Keywords: Hatchability, native chicken, production performance, settable egg, sexual maturity

Introduction
Native chicken is a mixture of different breeds and believed to have descended from the domesticated red jungle fowl. Native chicken are well known for their adaptability to local agro-climatic condition, hardiness, ability to utilize locally available feed, minimum requirement of care and management and less input technology \(^1\). It was estimated that around 30 per cent of the total poultry population was contributed by native chicken and producing around 11 per cent of total egg production \(^2\). India houses 19 recognized indigenous poultry breeds \(^3\) and they serve as a cheap source of animal protein through their meat and eggs. It is roughly estimated that 10 native hens can provide the same income as a woman earns from a day’s work \(^4\). Because of the high price fetched by the meat and egg of native hens, the farmers shifted their method of rearing from backyard to intensive rearing. Western district of Tamil Nadu adopted intensive native chicken rearing and act as a main hub for selling the meat, chick and egg to all over Tamil Nadu. Many studies had witnessed the production performances of desi chicken especially meant for meat purpose under backyard system, but not in parent farms. Documentation of the production potential of native breeder chicken reared under intensive management system in Western districts of Tamil Nadu is essential. Besides we can also utilize these production parameters for selecting the female parents in desi chicken farming as well. Hence, this study was taken up to give first hand information about the production potential of various native breeder chicken farms in Tamil Nadu to the needy scientific community and entrepreneurs.

Materials and Method
The study was purposefully undertaken in Western agro-climatic zone of Tamil Nadu which comprises of Erode, Tirupur and Coimbatore districts, as these districts are the main pockets supplying native chicks and hatching eggs all over Tamil Nadu. The commercialization in native chicken also took place in this district only. The farms having more than 200 birds and breeder native chicken farms which have been in continuous production for at least one year were identified and selected for the study purpose.
A total of 45 farms, 15 farms in each district were selected by simple random sampling and the data were collected through a semi-structured interview schedule as well as self observation. The selected farms were classified as small (15 farms), medium (15 farms) and large (15 farms) with the capacity of 200 to 1500, 1501 to 3000 and above 3000 birds. The data in relevant to production parameters of female parent like egg weight, age and body weight at sexual maturity, feed consumption, feed efficiency per kg of egg mass and per dozen of egg, annual egg production, settable eggs for hatching purpose and hatchability were collected from all categories of farms. The data obtained on various parameters studied during this interview schedule were subjected to statistical analysis (Chi-square test) as described by Snedecor and Cochran [5] (1989) to assess the impact of various farm size on production parameters of breeder chicken in Tamil Nadu.

Result and Discussion

The results of production parameters of female parent are presented in Table 1.

1. Age at sexual maturity
Mean age at sexual maturity of native breeder female chicken was 170.96 ± 1.92 days, which is lower in small farms followed by medium and higher in large farms. No significant difference was found on age at sexual maturity between different farm size groups. Delay in the sexual maturity of large farms favoured to get optimum sized hatching eggs which increased the number of settable eggs and later gave good quality chicks might be reason. The result of the findings is in accordance with Singh and Kumar [6] and Singh et al. [7]. The age at sexual maturity of native female breeder chicken was early than those as reported by Kumaresan et al. [2], Jha et al. [8] and Das et al., [9] who reported that the scavenging nature of native birds, poor nutrition and management practices are the contributing factor for delay in sexual maturity and higher as reported by Mohan et al. [10] and Haunshi and Doley [11]. Doley et al., [12] found that the age at sexual maturity of indigenous chicken was significantly lesser (162.44 days) under intensive system of management. Khan et al [13] indicated that early sexual maturity of Fayoumi chicken may be obtained due to the supply of balanced feed and also the duration light.

2. Body weight at sexual maturity
Average body weight at sexual maturity of native female parent were 1.72 kg ± 0.08, 1.79 kg ± 0.11 and 1.99 kg ± 0.09 in small, medium and large farms respectively, with an average of 1.83 ± 0.05 kg and difference between body weight at sexual maturity was found to be non-significant on different farm size groups. The result of this finding was higher than those reported by Khan et al., [13], Vij et al., [14], Das et al., [8], Iqbal and Pampori [15], Singh and Kumar [6], Kalita et al., [16] and Sankhyan et al., [17]. Body weight at sexual maturity was higher in large sized farms than small which is directly proportional to age at sexual maturity. Most of the large sized farms reared their birds under cage system, where the movement of birds was restricted and delaying of age at sexual maturity of breeder chicken to get optimum egg size for better hatchability was the reason for the higher body weight in large sized farms than medium and small sized farms.

3. Feed consumption
The average daily feed intake per female parent native chicken was 119.07 gm ± 4.03, 117.40 gm ± 2.68, and 110.13 gm ± 3.41 in small, medium and large farms respectively with an average of 117.59 gm ± 1.95 and did not show significant difference among different farm size groups. This result was in agreement with Ershad [18] Venukopalan [19] reported that the feed consumption of female broiler breeders was about 150 to 180 grams of feed per bird per day which was higher than this study. Large farms consumed less feed than medium and small which might be due to cage rearing and pellet feeding which had led to low wastage and well balanced feeding practices.

4. Feed efficiency
The amount of feed intake to produce dozen eggs in native breeder chicken was 5.44 ± 0.16 which is in agreement with Jha and Prasad [20]. These results were higher than those reported by Ershad [18], Prabakaran [21], Satheeskumar [22] and Faruque et al. [23]. The amount of feed intake to produce one kg egg mass was 9.10 ± 0.32 kg in Western districts of Tamil Nadu. Farm size did not significantly influence on feed efficiency per dozen eggs and per kg of egg mass. The above result was lower than Anjum et al., [24] recorded, where the average feed conversion efficiency per dozen eggs and feed efficiency of per kg of egg was 14.73 and 27.91 respectively in desi hens.

5. Egg weight
The present study indicated that mean egg weight of native breeder female chicken was 46.51gm ± 0.91. This finding was higher than those reported by Singh et al., [25], Singh and Kumar [6], Kalita et al. [16] and Anjum et al., [24]. Khan et al [25] reported that the potential reason for producing the heaviest eggs might be attributed to the higher body weight of respective birds as it is reported that body weight and egg weight are positively correlated. However, Singh et al., [17] observed that the weight of first egg of native chicken of Himalayas as 38.82 and 49.20 grams at the age of 25 and 55 weeks respectively and a significant increase in egg weight was associated with the maturity of the bird’s reproductive system.

6. Annual egg production per bird
The average annual egg production of breeder native chicken in selected districts were 97.13 ± 4.40, 100.83 ± 3.27 and 105.00 ± 2.06 in small, medium and large farms respectively with an average of 101.83 ± 3.21 and the difference between various farm size being non-significant. The finding of this study is in agreement with Mohan et al. [10] where the total egg production of Kadaknath hens under intensive management system up to 52 weeks was 105 eggs per hen. Higher annual egg production reported by Ershad [18], Khan et al., [13], Iqbal and Pampori [15] and lower annual egg production was recorded by Kumaresan et al. [2] and Singh and Kumar [6]. Kalita et al., [16] indicated that low genetic potentiality, poor management practices, lack of proper health care, poor nutrition and housing could be attributed as reasons behind low egg production.

7. Settable eggs
The average number of settable eggs per native breeder chicken in selected districts was 97.65 ± 4.62 and the difference between various farm sizes being non-significant.
Delay in sexual maturity and better body weight of breeder female had led to reduction of small sized eggs ultimately providing higher number of settle egg in large farms.

8. Hatchability per cent
The farm size recorded non-significant influence on hatchability percentage and the hatchability rate of native breeder chicken which were 71.52 ± 1.26, 72.40 ± 0.68 and 75.58 ± 1.22 per cent in small, medium and large farms respectively with an average hatchability rate of 73.16 ± 1.05 per cent. The finding of the study is in agreement with Singh et al. [20], Vij et al. [19] and Doley et al. [18].

Table 1: Production performance of native female breeder chicken under intensive rearing in Western Tamil Nadu

<table>
<thead>
<tr>
<th>S. No</th>
<th>Production parameter</th>
<th>Small (n=15)</th>
<th>Medium (n=15)</th>
<th>Large (n=15)</th>
<th>Over all (n=45)</th>
<th>F – statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age at sexual maturity (days)</td>
<td>166.60 ± 3.75</td>
<td>171.27 ± 3.04</td>
<td>175.00 ± 2.98</td>
<td>170.96 ± 1.92</td>
<td>1.65NS</td>
</tr>
<tr>
<td>2</td>
<td>Body weight at sexual maturity (kg)</td>
<td>1.72 ± 0.08</td>
<td>1.79 ± 0.11</td>
<td>1.99 ± 0.09</td>
<td>1.83 ± 0.05</td>
<td>2.43NS</td>
</tr>
<tr>
<td>3</td>
<td>Feed consumption per female (g/day)</td>
<td>119.07 ± 4.03</td>
<td>117.40 ± 2.68</td>
<td>110.13 ± 3.41</td>
<td>117.59 ± 1.95</td>
<td>0.75NS</td>
</tr>
<tr>
<td>4</td>
<td>Egg weight (g)</td>
<td>47.67 ± 1.75</td>
<td>45.47 ± 0.96</td>
<td>46.40 ± 1.92</td>
<td>46.51 ± 0.91</td>
<td>0.48NS</td>
</tr>
<tr>
<td>5</td>
<td>Annual egg production per bird</td>
<td>97.13 ± 4.40</td>
<td>100.83 ± 3.27</td>
<td>105.00 ± 2.06</td>
<td>101.83 ± 3.21</td>
<td>0.29NS</td>
</tr>
<tr>
<td>6</td>
<td>Feed efficiency Per dozen egg</td>
<td>5.37 ± 0.37</td>
<td>5.09 ± 0.17</td>
<td>4.80 ± 0.27</td>
<td>5.44 ± 0.16</td>
<td>0.14NS</td>
</tr>
<tr>
<td></td>
<td>Per kg egg mass</td>
<td>9.38 ± 0.37</td>
<td>9.32 ± 0.26</td>
<td>8.60 ± 0.35</td>
<td>9.10 ± 0.32</td>
<td>0.73NS</td>
</tr>
<tr>
<td>7</td>
<td>Number of settable eggs / hen / year</td>
<td>92.13 ± 4.40</td>
<td>96.00 ± 6.19</td>
<td>104.83 ± 3.27</td>
<td>97.65 ± 4.62</td>
<td>2.43NS</td>
</tr>
<tr>
<td>8</td>
<td>Total hatchability (per cent)</td>
<td>71.52 ± 1.26</td>
<td>72.40 ± 0.68</td>
<td>75.58 ± 1.22</td>
<td>73.16 ± 1.05</td>
<td>2.86NS</td>
</tr>
</tbody>
</table>

NS - Non-significant

The findings of the present study are higher than those reported by Singh et al. [7] and Jha et al. [9]. Kalita et al. [16] recorded hatchability percentage of indigenous chicken under intensive management system as 63.52 per cent. Finding of the study was lower than those reported by Jha and Prasad [20] and Sannkhyyan et al. [17].

Conclusion
The study revealed that the native female parent was attains maturity at 170.96 ± 1.92 days with a body weight of 1.83 ± 0.05 kg by consuming around 117.59 ± 1.95 gm feed daily, produces 101.83 ± 3.21 eggs per annum with average egg size of 46.51 ± 0.91 gm and with 73.16 ± 1.05 per cent hatchability in Tamil Nadu. This study also helpful in selecting the female parent chicken based on its production parameters for desi chicken farming in Tamil Nadu.

References
1. Sharma RK. Role and relevance of rural family poultry in developing countries with special reference to India. Family poultry. 2007; 17(1, 2):35-40.


