

Original Research Article

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Fertility and Hatchability of Indigenous *Siruvidai* Chicken of Tamil Nadu

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ABSTRACT

Siruvidai and *Peruvidai* chicken are the major indigenous chicken ecotypes of Tamil Nadu state, India. A study was conducted to assess the fertility and hatchability of *Siruvidai* chicken hatching eggs incubated in a homestead incubator. The fertility, hatchability and embryonic mortality were recorded. The eggs failed to hatch out were break opened to determine the stage of embryonic mortality. The average fertility rate ranged from 85.00 to 91.67% in different hatches with the average value of 88.41%. The hatchability on total egg set ranged from 81.71 to 85.87% and the overall mean was 84.19; whereas the hatchability on fertile egg set ranged between 92.73 and 98.75 with the mean value of 95.28%. The breakopen study of unhatched eggs revealed 2.57% early embryonic mortality (range: 1.25 – 3.64%), 0.84% mid embryonic mortality (range: 0.00 to 1.82%) and 1.31% of late embryonic mortality including dead in shell (range: 0.00 to 2.11%). The total embryonic mortality was 4.72% with the values ranging from 1.25 to 7.27%. The results indicated good reproductive performance of indigenous *Siruvidai* chicken and efficient hatching of its eggs when homestead incubator is used.

Keywords

Fertility,
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Introduction

The smallholder chicken sector is traditionally based on extensive production systems where the birds find most of their feed through scavenging. The twentieth livestock census results (DAHD, 2019) indicates that the total Poultry in the country is 851.81 Million in 2019, with the increase of 16.8% over previous census (729.2 Million in 2012); whereas, the total backyard poultry in the country was 317.07 Million in 2019,

increasing 45.8% over previous census. Indigenous chicken contributes to more than 20% of total egg production in India. These birds are also known for their adaptive superiority in terms of their resistance to endemic diseases and other harsh environmental conditions (Nwakpu *et al.*, 1999). Therefore more attention should be given to study and characterize the lesser known and largely neglected ecotypes/ breeds like *Siruvidai* chicken so as to plan for conservation and posterity. This non-descript

ecotype of Tamil Nadu state of India gained a lot of interest in the recent years and small scale farmers involved in breeding of this germplasm is increasing. However the detailed characterization of this chicken with respect to its egg and hatchability traits is generally unavailable. This information must necessarily precede their genetic improvement for commercial traits. The objective of the present work is to characterize the Siruvidai chicken for hatchability performance.

Materials and Methods

A study was conducted to evaluate the fertility, hatchability and embryonic mortality pattern in indigenous *Siruvidai* chicken of Tamil Nadu. The study was conducted in Thanjavur district, Tamil Nadu, India. The eggs used for this study was collected from *Siruvidai* hens reared under backyard system of management in a farm for the last 6 years from generation to generation. The base population of these birds was originally collected from local farmers from the breeding tracts in the surrounding area. The sex ratio practiced in the farm was 1:5. The eggs were collected and stored at room temperature and set in a small homestead automatic setter cum hatcher with total setting capacity of 1000 eggs. The temperature was maintained at 100⁰ F and relative humidity at 65%. The eggs were set at weekly interval. The eggs set were turned at hourly interval during first 18 days of incubation. On completion of 18 days of incubation in setter trays, the eggs were transferred to hatcher trays and placed horizontally to continue the incubation. The hatched out chicks were pulled on 21st day. The unhatched eggs were break-opened to examine the cause for the failure of hatching. From the breakopen study, number of infertile egg, embryonic mortality at early (0 - 7 days), mid (8 - 14 days) and late (15 -21 days) periods of incubation were recorded. The data was

entered in Microsoft Excel worksheet and the average values of fertility, hatchability on total egg set, hatchability on fertile egg set, embryonic mortality during early, mid and late incubation periods were calculated.

Results and Discussion

The incubation results and the findings of breakopen studies of unhatched eggs of indigenous *Siruvidai* chicken is presented in Table 1.

A total of 376 indigenous *Siruvidai* eggs were incubated in three hatches of 164, 120 and 92 eggs. Among 376 eggs 332 eggs were fertile. The fertility values in individual hatches varied from 86.59 to 91.67% with mean value of 88.41%. This is in close agreement with the earlier reports on indigenous chicken of India (90.40%; Islam *et al.*, 2014) and Uganda (91.6%; Trail, 1962). The results indicated that the fertility was comparatively better in *Siruvidai* chicken than that of previously reported values of 76.33% in indigenous chicken of Assam (Kalita *et al.*, 2012), 79.55% in Tellicherry chicken of Kerala state in India (Kumar *et al.*, 2013) and 70.81% in indigenous chicken of Bangladesh (Desha *et al.*, 2015).

Out of 376 eggs set, 315 eggs hatched out. The hatchability (%) value on total egg set ranged from 85.00 to 85.87% in different hatches with overall mean of 84.19%. The overall hatchability on total egg set observed in this study was higher than the earlier report of 67.05% in Tellicherry breed of chicken (Kumar *et al.*, 2013). A closer value of 87.52% has been reported in indigenous birds of Assam (Islam *et al.*, 2014). However, a very low value of 41.36 and 58.75 hatchability (%) on total egg set were recorded in indigenous (Kalita *et al.*, 2012) and crossbred with indigenous (Kalita *et al.*, 2013) birds. The hatchability of eggs from the fertile eggs set in different hatches in this

study ranged from 92.73 to 98.75%, with overall value of 95.28%. On perusal of literature, the hatchability on fertile egg set observed in this study was higher compared to that 83.4% in European breeds of Uganda (Trail, 1962) and 84.29% in Tellicherry breed of Kerala, India (Kumar *et al.*, 2013).

The eggs failed to hatch (n=61) were break-opened to identify the cause of non-hatching. A total of 44 eggs were found infertile. The hatchwise fertility rate (%) revealed an overall value of 88.41 with values ranging from 86.59 to 91.67 in different hatches. The overall hatches calculated on fertile egg set (%) was 95.28 with values ranging from 92.73 to 98.75 in different hatches.

The early embryonic mortality (2.57%) was

Table.1 The fertility, hatchability and embryonic mortality parameters of indigenous *Siruvidai* chicken

Hatch No	No of eggs	Fertility (%)	Hatchability TES (%)	Hatchability FES (%)	Embryonic mortality (%)			
					Early (<7 days)	Mid (8 - 14 days)	Late (15 - 21 days)	Total
1	164	86.59	81.71	94.37	2.82	0.7	2.11	5.63
2	120	91.67	85	92.73	3.64	1.82	1.82	7.27
3	92	86.96	85.87	98.75	1.25	0	0	1.25
Overall	376	88.41	84.19	95.28	2.57	0.84	1.31	4.72

It is concluded from this study that indigenous *Siruvidai* chicken of Tamil Nadu possess good reproductive traits as indicated by good fertility and hatchability compared to other similar indigenous chicken populations. Although, the *Siruvidai* chickens are known for their mothering ability and broodiness, the eggs hatch well when incubated by artificial incubation in small homestead incubators.

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higher compare to embryonic mortality during mid (0.84%) and late (1.31%) periods. The total embryonic mortality was 4.2%. The total embryonic mortality observed in this study was comparable to that of Tellicherry chicken in natural incubation (14.95%) and artificial incubation (15.72%) as reported by Kumar *et al.*, (2013).

However, the embryonic mortality pattern was different with high incidence during early embryonic life (7.71%) in this study compare to 3.13% in earlier report (Kumar *et al.*, 2013). The late embryonic mortality also showed a reverse pattern of low incidence of 3.93% in this study compare to 8.39% in earlier report (Kumar *et al.*, 2013).

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