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Effect of season on reproductive performance of TANUVAS Aseel chicken maintained under semi-intensive system

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Abstract

The present study was conducted to assess the effect of season on reproductive performance of TANUVAS Aseel chicken. The fertility rate during South West monsoon, North East monsoon, Winter, Summer and overall were 90.31 ± 0.44 , 90.72 ± 0.69 , 92.03 ± 0.61 , 92.75 ± 0.63 and 91.26 ± 0.32 , respectively. Season had no significant influence on fertility rate. The fertile hatchability during South West monsoon, North East monsoon, Winter, Summer and overall were 85.04 ± 0.76 , 84.92 ± 0.87 , 85.54 ± 1.03 , 82.67 ± 1.19 and 84.59 ± 0.48 , respectively. Season had no significant influence on fertility hatchability. The Hatchability on set egg during South West monsoon, North East monsoon, Winter, Summer and overall were 76.82 ± 0.87 , 77.06 ± 1.14 , 78.76 ± 1.38 , 76.67 ± 1.23 and 77.20 ± 0.55 , respectively. Season had no significant influence on hatchability on set egg. The early embryonic mortality during South West monsoon, North East monsoon, Winter, Summer and overall were 10.12 ± 0.42^a , 11.27 ± 0.85^a , 9.79 ± 1.05^a , 13.45 ± 1.07^b and 11.09 ± 0.43 , respectively. Season had highly significant influence ($P < 0.01$) on early embryonic mortality but no influence on late embryonic mortality.

Keywords: TANUVAS Aseel, fertility, hatchability, season

Introduction

In India most of the rural people are involved in native chicken rearing to meet out the protein requirement. Native chicken rearing plays an important role in improving the economic status of the rural farmers. Aseel is one of the most important native breed of India mostly reared in Andhra Pradesh, Orissa, Madhya Pradesh and Rajasthan. This breed is able to thrive under adverse climatic conditions. The reproductive performance of chicken such as fertility and hatchability plays an important role in profitability of the breeder farm. Several researchers had mentioned that seasonal variation may affect the fertility and hatchability of chicken egg. Hence, the present study was conducted at TANUVAS Regional Research and Educational Centre, Pudukkottai in to assess the effect of season on reproductive performance of TANUVAS Aseel chicken.

Materials and Methods

The present study was conducted to assess the effect of season on reproductive performance of TANUVAS Aseel chicken at Regional Research and Educational Centre, Pudukkottai. The birds were maintained under semi-intensive system. The birds were fed with concentrates and *ad libitum* water. The eggs were collected twice daily during morning and evening. The eggs laid from June, 2019 to May, 2020 were utilized to study reproductive performance of TANUVAS Aseel chicken. The fertility and hatchability performance of Aseel chicken were analysed for different seasons such as Winter (January and February), Summer (March to May), South-West monsoon (June to September) and North-East monsoon (October to December). The collected eggs were stored in egg store room at 18°C . Eggs were set for hatching once in a week. The eggs were removed from store room after one week and kept at ambient temperature for one hour before setting into the setter. The eggs were transferred to hatcher on eighteenth day of incubation. The hatching was completed by the end of 21st day of incubation. Unhatched eggs were broken out and recorded early embryonic mortality (dead germ) and late embryonic mortality (dead in shell). The fertility rate, hatchability on set egg and fertile egg hatchability were calculated as follows

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$$\text{Fertility rate \%} = \frac{\text{Number of fertile eggs}}{\text{Total number of eggs set for incubation}} \times 100$$

$$\text{Hatchability on set egg \%} = \frac{\text{Number of hatched eggs}}{\text{Total number of eggs set for incubation}} \times 100$$

$$\text{Fertile egg hatchability \%} = \frac{\text{Number of hatched eggs}}{\text{Total number of fertile eggs set for hatching}} \times 100$$

The data were statistically analysed according to Snedecor and Cochran (1989) [6].

Result and discussion

The result of the effect of season on reproductive performance of TANUVAS Aseel chicken is presented in the table. The fertility rate during South West monsoon, North East monsoon, Winter, Summer and overall were 90.31±0.44, 90.72±0.69, 92.03±0.61, 92.75±0.63 and 91.26±0.32, respectively. Season had no significant influence on fertility rate. Similar to the present findings, Al Alami *et al.* (2017) [2]

reported that seasons had no significance differences in the fertility % of chicken egg. In contrary, Pandian *et al.* (2017) [5] reported that season has highly significant influence on fertility rate in turkey egg. The mean fertility rate in the present findings were higher than the fertility rates reported by Rajkumar *et al.* (2017) [4] and Ajeet Kumar Verma *et al.* (2018) [1] in Aseel chickens. Since there is no significant variation in the fertility rate during different seasons which indicates that TANUVAS Aseel reared under semi-intensive system is better adopted to the farm conditions.

The fertile hatchability during South West monsoon, North East monsoon, Winter, Summer and overall were 85.04±0.76, 84.92±0.87, 85.54±1.03, 82.67±1.19 and 84.59±0.48, respectively. Season had no significant influence on fertility hatchability. Similarly, Pandian *et al.* (2017) [5] reported that season had no significant influence on fertile hatchability in turkey egg. Rajkumar *et al.* (2017) [4] hatchability percentage 80.87% on fertile egg set which is lower than the present study.

Table 1: Effect of season on reproductive performance of TANUVAS Aseel chicken

Parameters	Different seasons				Overall
	South West monsoon	North East Monsoon	Winter	Summer	
Fertility rate (%)	90.31±0.44	90.72±0.69	92.03±0.6	92.75±0.63	91.26±0.32
Fertile hatchability (%)	85.04±0.76	84.92±0.87	85.54±1.03	82.67±1.19	84.59±0.48
Hatchability on set egg (%)	76.82±0.87	77.06±1.14	78.76±1.38	76.67±1.23	77.20±0.55
Early Embryonic mortality** (%)	10.12±0.42 ^a	11.27±0.85 ^a	9.79±1.05 ^a	13.45±1.07 ^b	11.09±0.43
Late Embryonic mortality (%)	4.84±0.40	3.81±0.22	4.67±0.33	3.88±0.23	4.34±0.18
Healthy chicks* (%)	99.13±0.08 ^a	99.16±0.16 ^a	99.15±0.10 ^a	99.50±0.05 ^b	99.23±0.04

*- Means bearing different superscript within a row differ significantly ($P < 0.05$)

** - Means bearing different superscript within a row differ significantly ($P < 0.01$)

The Hatchability on set egg during South West monsoon, North East monsoon, Winter, Summer and overall were 76.82±0.87, 77.06±1.14, 78.76±1.38, 76.67±1.23 and 77.20±0.55, respectively. Season had no significant influence on hatchability on set egg. In contrary to the present findings, Islam *et al.* (2008) [3], Pandian *et al.* (2017) [5] and Al Alami *et al.* (2017) [2] reported that season had significant influence on total hatchability. Islam *et al.* (2008) [3] reported that the highest average hatchability (%) was observed in winter (78.62%) followed by monsoon (76.70%) and summer (75.79%). Al Alami *et al.* (2017) [2] reported that the hatchability was significant decreased at summer season (59.33±4.30) compared with 79.16±4.6 at winter season. Ajeet Kumar Verma *et al.* (2018) [1] reported that the hatchability from set eggs was 55.70±2.31 percent in Aseel and Rajkumar *et al.* (2017) [4] reported that the hatchability percentage of 44, which were lower compared to the present findings.

The early embryonic mortality during South West monsoon, North East monsoon, Winter, Summer and overall were 10.12±0.42^a, 11.27±0.85^a, 9.79±1.05^a, 13.45±1.07^b and 11.09±0.43, respectively. Season had highly significant influence ($P < 0.01$) on early embryonic mortality. Early embryonic mortality was significantly ($P < 0.05$) higher in summer compared to other seasons but significant difference was not found between South West monsoon, North East monsoon and Winter. In contrary to the present findings, Al Alami *et al.* (2017) [2] and Pandian *et al.* (2017) [5] reported that seasons had no significance differences in early embryonic death. The higher early embryonic mortality in summer may be due to wide variation in environmental temperature affecting the egg quality.

The Late Embryonic mortality during South West monsoon, North East monsoon, Winter, Summer and overall were 4.84±0.40, 3.81±0.22, 4.67±0.33, 3.88±0.23 and 4.34±0.18, respectively. Season had no significant influence on Late Embryonic mortality. Similar to the present study Al Alami *et al.* (2017) [2] and Pandian *et al.* (2017) [5] reported that seasons had no significance differences in late embryonic death.

The healthy chicks hatched during during South West monsoon, North East monsoon, Winter, Summer and overall were 99.13±0.08^a, 99.16±0.16^a, 99.15±0.10^a, 99.50±0.05^b and 99.23±0.04, respectively. Healthy chicks hatched was significantly ($P < 0.05$) higher in summer compared to other seasons but significant difference was not found between West monsoon, North East monsoon and Winter. Ajeet Kumar Verma *et al.* (2018) [1] reported that normal chick percent was 98.15±1.65 which is lower compared to the present findings.

In this present study, the fertility rate and hatchability rate was not affected during different seasons. It can be concluded that the TANUVAS Aseel reared under semi-intensive system is well adopted to the environmental conditions of the farm.

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