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Effect of strain and pre-incubation storage period on the hatchability and embryonic mortality in Turkey

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Abstract

A study was conducted to determine the effect of strain and pre-incubation storage period on the hatchability and embryonic mortality in turkey. A total of 1345 eggs of Beltsville Small White, Nandanam Turkey - 1 and Desi turkey at 38 weeks of age were stored at 15^o-18^o °C and 75% RH for 0-7 days. Optimum incubational conditions were maintained throughout the incubation period. The results revealed that the strain had a significant (P<0.05) influence on total hatchability, fertile hatchability and embryonic mortality in turkeys. The pre incubation storage period also had a significant (P<0.05) influence on total hatchability but not on fertile hatchability and embryonic mortality in turkeys. It can be concluded that Nandanam turkey- I showed better hatching performance than Beltsville Small White and Native turkeys and turkey hatching eggs could be stored up to 6 days at 15^o-18^o C and 75% RH for obtaining good hatchability.

Keywords: Turkey, strain, pre-incubation egg storage, hatchability

Introduction

Egg storage is a normal practice after egg collection and often a necessity in commercial incubation process. Fertility and hatchability constitute a major problem for turkey breeding enterprises (Ozcelik *et al.*, 2009) [1]. Breeder factors that affect hatchability include strain, health, nutrition and age of the flock, egg size, weight and quality, egg storage duration and conditions (King'ori, 2011) [2]. Proper care of hatching eggs at the farm and hatchery complex is essential for obtaining good hatchability. Few studies have been published about the hatching performance of turkey birds under humid tropical climate of Tamil Nadu, India. Hence, the present study was undertaken to find out the effect of strain and pre-incubation storage period on the hatchability and embryonic mortality in turkey.

Materials and Methods

A study was conducted at the Poultry Research Station, Tamil Nadu Veterinary and Animal Sciences University, Chennai, to examine the effects of strain and pre-incubation storage period on the hatching performance of turkey. Totally 1345 eggs of Beltsville Small White, Nandanam Turkey - 1 and Desi turkey at 38 weeks of age were stored for 1,2,3,4,5,6 & 7 days at 15^o. 18^oC and 75% RH in the normal broad end up position without turning. After the assigned period of storage, hatching eggs were moved to ambient temperature, kept for one hour and then set for incubation. The setter was maintained at a temperature of 99.5°F and relative humidity of 55% for first 24 days of incubation. The eggs were turned at hourly interval by an automatic turner. On 25th day of incubation, the eggs were transferred to hatcher, in which 98.5°F temperature and 72 % relative humidity were maintained. Hatching started on day 27 and was completed by the end of the 28th day of incubation. Number of poults hatched was recorded. Unhatched eggs were examined for early and late embryonic mortality. From the data, total hatchability, fertile hatchability and embryonic mortality were calculated. The data were analyzed statistically as per Snedecor and Cochran (1994) [3].

Results and Discussion

The results of the effect of strain and pre-incubation storage period on the hatchability and embryonic mortality in turkey are presented in table. The strain had a significant (P<0.05) influence on total hatchability, fertile hatchability and embryonic mortality.

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The effects due to strain and pre-incubation storage period were found to be significant ($P<0.05$) on mean percent total hatchability. The overall mean per cent total hatchability was 49 % and the eggs stored for 1-6 days had significantly ($P<0.05$) higher mean per cent total hatchability than the eggs stored for 7 days. Similar results were also reported by Fassenko, *et al.* (2001) [4] in turkeys and Mousa-Balabel and Saleem, (2004) [5] in broilers. The mean per cent total hatchability was significantly ($P<0.05$) higher in Nandanam Turkey -1 (53.8%) than Beltsville Small White (46.6%) and Native turkeys (46.5%), respectively. Mean per cent hatchability on total egg set observed in this study was higher than the values reported by Mroz *et al.* (2004) [6] and Khan *et al.* (2013) [7] and lower than the value (56.61%) reported by Ozcelik (2006) [8] and Anna Anandh *et al.* (2012) [9] in Broad Breasted Bronze turkeys (77.38%).

The effect due to strain was found to be significant ($P<0.05$) on fertile hatchability. However pre incubation storage period did not have any significant influence. Similar observations were also recorded by Mahmud *et al.* (2011) [10] and Ruiz and Lunam (2012) [11] in broiler breeders. The overall mean fertile hatchability was 57.9% and was significantly ($P<0.05$) higher

in Nandanam Turkey - 1 (65.4%) than Beltsville Small White (53.5%) and Native turkeys (54.7%), respectively. Mean per cent hatchability on total egg set observed in our study was higher than the value (37.65%) reported by Khan *et al.* (2013) [7] and lower than the value (64.15%) reported by Ozcelik *et al.* (2006) [8] and Anna Anandh *et al.* (2012) [9] in Broad Breasted Bronze turkeys (81.00%).

The overall mean per cent embryonic mortality was 42% and the strain had significant ($P<0.05$) effect. However, the pre incubation storage period did not have significant effect. This is in agreement with the finding of Mahmud *et al.* (2011) [10] in broiler breeders. Nandanam Turkey -1 had significantly ($P<0.05$) lower embryonic mortality than other strains. Anna anandh *et al.* (2012) [9] also observed a maximum of 17.44 per cent dead in germ and 21.47 per cent dead in shell in Broad Breasted Bronze turkeys. Mean per cent embryonic mortality observed in this study was lower than the value reported by Khan *et al.* (2013) [7]. Variations in embryonic mortality may be due to imbalanced nutrition, stressful conditions the parent flock was exposed to, or any other fault in incubation and hatching requirements/equipments.

Table 1: Effect of strain and pre-incubation storage period on hatching performance of turkey

Parameters	Number of Eggs Set	Total Hatchability%*	Fertile Hatchability%	Embryonic Mortality%
Over All Mean		49.0	57.9	42.0
Egg Storage Period				
1	166	46.0 ^a	53.4	46.6
2	186	52.8 ^a	62.3	37.7
3	203	49.4 ^a	59.2	40.8
4	205	54.3 ^a	64.0	36.0
5	208	54.1 ^a	62.6	37.4
6	197	47.8 ^a	57.9	42.1
7	180	38.4 ^b	45.9	54.1
Strain*				
Beltsville Small White	425	46.6 ^b	53.5 ^b	46.6 ^b
Nandanam Turkey- 1	455	53.8 ^a	65.4 ^a	34.6 ^a
Native Turkey	465	46.5 ^b	54.7 ^b	45.2 ^b

*Mean bearing different superscripts within the columns differ significantly ($P<0.05$)

Summary

The results of the present study suggested that the strain had a significant ($P<0.05$) influence on total hatchability, fertile hatchability and embryonic mortality in turkeys. The pre incubation storage period also had a significant ($P<0.05$) influence on total hatchability but not on fertile hatchability and embryonic mortality in turkeys. It can be concluded that Nandanam turkey- I showed better hatching performance than Beltsville Small White and Native turkeys and turkey hatching eggs could be stored up to 6 days at 15^o-18^o C and 75% RH for obtaining good hatchability.

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