

Original Research Article

Impact of Storage Period on Egg Fertility and ~~hatchability Mortality~~ in Chabro Breeds of Poultry

Abstract

An investigation was conducted to study the effect of storage period on fertility and hatchability in large, medium and small sized eggs of Chabro breed. The study was conducted at poultry farm of SKN College of Agriculture, Jobner. ~~For the present study, a~~ total of 297 eggs were collected ~~and used~~ for this study. These eggs were grouped into three egg size categories ~~based on weight~~ i.e. ~~s~~Small (38-44 g), medium (45-52 g) and large (53-59 g). To study the impact of ~~storage incubation~~ period, eggs were stored at 21 °C temperature for three different time periods (fresh, 3 day and 6 day). It was observed that egg fertility ~~was~~ increased ~~in eggs stored for 0th days while it and~~ decreased ~~for those stored for 0th days~~ ~~day~~ as compared to ~~those that were not stored~~ (0th day). For small egg ~~size~~class, egg fertility ~~were~~as 95.55, 96.02 and 92.13% respectively, ~~for the 0, 3 and 6 days~~ of storage. Similarly, for medium-sized egg ~~class~~, fertility ~~were~~as 95.17, 95.64 and 90.28% ~~while~~and for large sized egg ~~class~~, it was 91.11, 92.15 and 87.41% respectively, ~~for the 0, 3 and 6 days~~ of storage. Embryonic mortality increased with increase in storage duration. For small egg ~~size~~class, egg mortality was 20.95, 17.56 and 24.87% respectively, ~~for the 0, 3 and 6 days~~ of storage. Similarly, for medium-sized egg ~~class~~, mortality was 10.15, 8.45 and 12.63%, ~~while~~and for large sized egg ~~class~~, it was 29.30, 20.14 and 33.41% respectively, ~~for the 0, 3 and 6 days~~ of storage.

Key words: Fertility, mortality, breed, egg weight, Chabro

1. Introduction

Poultry is currently India's fastest-growing agricultural sector. The primary goal of modern hatcheries around the world is to produce high-quality chicks. To grow this sector, basic information on the influence of storage period and egg weight on fertility and mortality is required. Fertility in poultry refers to the percentage of incubated eggs that are fertile.

Comment [U1]:

Comment [U2]: Your study is on STORAGE PERIOD and not INCUBATION PERIOD.

Fertility tests are used to determine a bird's genetic and reproductive fitness, as well as to assess the economic efficiency of parent stocks. Fertility and mortality are influenced by a variety of environmental factors. Improper temperature and humidity, male/female ratio, and prolonged storage period are only a few of them. Many researches (King'ori et al., 2007, Yadav et al. 2021) have found that the length of storage has a significant impact on fertility and mortality. Egg storage for longer than 7 days results in a delay in embryo growth, a change in metabolic rate, and a decrease in fertility (Petek and Dikmen, 2006 and Yassin et al., 2008). As a consequence, precise knowledge of fertility in relation to egg weight and storage period can help in the selection of fertile eggs in a logical manner. As a result, the purpose of this study was to see how ~~the~~ storage duration affected the fertility of large, medium, and small sized eggs ~~of from the~~ chabro breed of poultry.

2 Material and Method

Study Area

The experiment was carried out in the Poultry Farm of the S.K.N. College of Agriculture at Jobner, Jaipur (Rajasthan, India). This region's climate is typically semi-arid, with temperature extremes in both summer and winter.

Experimental procedure

~~After collection of eggs, all the eggs were sampled and eggs with visible external abnormalities were screened out. In this process extra large or very small eggs and abnormal eggs will be discarded.~~ A total of 207 eggs were collected for this study. At commencement of the study, the eggs were weighed individually using sensitive weighing balance and later grouped into three egg size categories as follows: Small (38-44 g), medium (45-52 g) and large (53-59 g) eggs of different sizes. ~~To study the impact of incubation period,~~ eggs were stored at 21°C temperature for three different time periods (fresh, 3 days and 6 days). All experimental eggs were incubated in an automated sanitized electrical incubator at 99.50° F-99.75° F (37.5°C) with 60-65% relative humidity and turning hourly. Candling was done on 18th day to determine infertile eggs and dead in germs ~~respectively. By using these data, fertility and hatchability were calculated for each strain.~~

Fertility of Eggs

The percentage of fertility was calculated on the basis of total eggs set:

Comment [U3]: Which one is correct SKN OR S.K.N. You wrote SKN in the Abstract.

Comment [U4]: Kindly provide information on how the eggs were collected. Were they collected in a single day and weight and incubated simultaneously at the 0th, 3rd and 6th day.

Comment [U5]: Is the study on IMPACT OF INCUBATION PERIOD or IMPACT OF STORAGE PERIOD on the fertility and hatchability.

Fertility rate (%) = (No. of fertile eggs ÷ No. of egg incubated) ×100

Mortality of Eggs

Mortality rate was determined in each replicate by dividing the number of unfertilized egg to the total number of fertile eggs.

Mortality = (No. of unfertilized eggs ÷ Total no. of fertile eggs) ×100

Statistical analysis

Data obtained were subjected to statistical analysis using Completely Randomized Design (CRD). Consequently, a level of (P<0.01) was used as the criterion for statistical significance.

Comment [U6]: Which statistical software was used to analyze the data or was the analysis done manually. Also you did not talk about regression model of any Trend Line equation as reported in your Results and Discussion.

3 Result and Discussion

3.1 Effect of storage period on fertility

The effect of the storage period on egg fertility is presented in Fig 1. It was observed that egg fertility was higher in eggs stored for on 3 daysrd day as compared to those not stored 0th day, considering for all egg sizesweight classes but the percent increase was small (0.48-1.12%).

Comment [U7]: You need to be consistent with the use of size, class and weight for comprehension sake by your reader.

In contrast to this, a decline in fertility was noticed in eggs stored for 6 daysdecreased on 6th day as compared to those not stored 0th day for considering all egg sizesweight classes and percent decrease was 3.7-5.4%. For small egg sizeclass, egg fertility was 95.55, 96.02 and 92.13% respectively, for on 0, 3 and 6 days of storage. Similarly, for medium-sized egg class, fertility was 95.17, 95.64 and 90.28% while and for large sized egg class, it was 91.11, 92.15 and 87.41% respectively, for on 0, 3 and 6 days of storage. The fertility and hatchability were found to declinebe decreased as storage duration increased. Petek et al. (2005) reported fertility of quail eggs at 1, 3, 5 and 7 days to be were 89.52, 92.93, 89.34 and 86.71, respectively, which show a decrease in fertility of eggs with long storage. A similar result was observed by Yadav et al (2021) in the Kuroiler breed of chicken.

Comment [U8]: Can you provide scientific reasons why this is so.

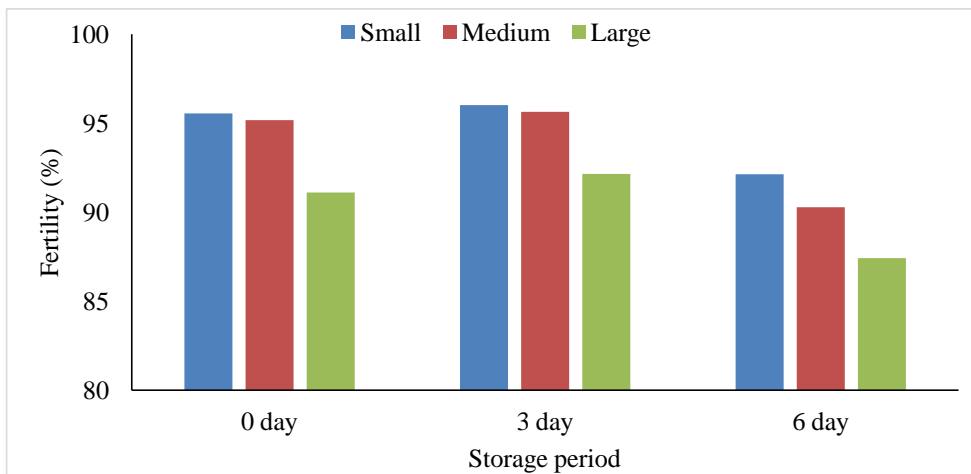


Fig 1: Effect of storage period on egg fertility in Chabro breed

3.2 Effect of storage period on mortality

The effect of storage period on mortality is given in Fig 2 and the data revealed that embryonic mortality increased with increase in storage duration. Embryonic mortality was found to be higher in eggs stored for 0-6th days of storage as compared to those not stored 0 day and the percent decrease was 12.3-19.6%. For small egg size class, egg mortality was 20.95, 17.56 and 24.87% respectively, for 0, 3 and 6 days of storage. Similarly, for medium-sized egg class, mortality was 10.15, 8.45 and 12.63% and for large sized egg class, it was 29.30, 20.14 and 33.41% respectively, for 0, 3 and 6 days of storage. Fresh eggs had a The significant rate of embryonic mortality recorded in eggs that were not stored, which could be attributed to internal egg causes. Alsobayel et al. (2017) found that embryonic mortality of Baladi eggs held for 5, 10, and 15 days was 16.40 %, 30.40 %, and 33.87 %, respectively. In their study. Reijrink et al. (2009) and Khan et al. (2014) found that embryonic mortality increases as storage time increases.

Comment [U9]: Internal egg causes like what and what.

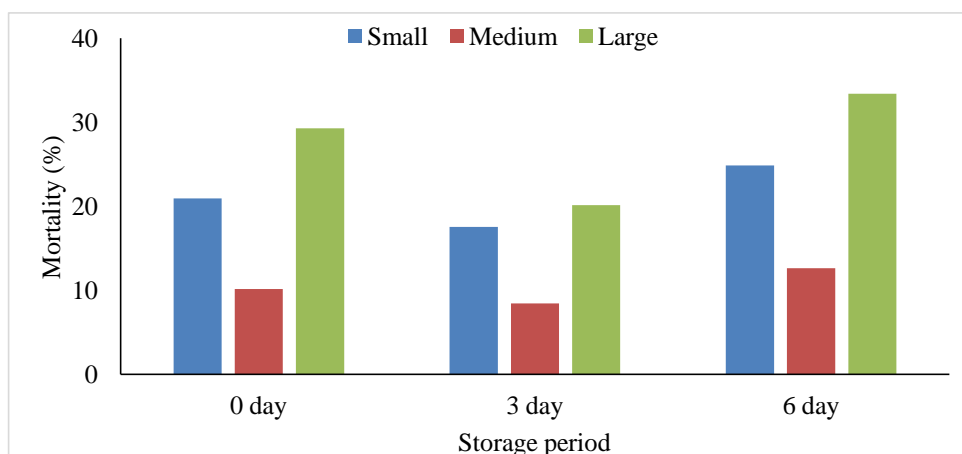


Fig 2: Effect of storage period on embryo mortality in Chabro breed

The regression equations and R^2 of exponential, linear, polynomial, Logarithmic, polynomial and power models are represented in Table 1. The relationship between egg fertility and embryo mortality was highest for polynomial equation ($R^2=0.47$) followed by Linear and logarithmic. Least correlation was observed for power equation with $R^2=0.35$.

Comment [U10]: These did not reflect in your Materials and Methods. You did not tal about regression equation or any modelling equations.

Table 1: The regression equation between egg fertility and embryo mortality

Trend line name	Regression equation	R^2
Exponential	$y = 121730e^{-0.095x}$	0.36
Linear	$y = -1.8959x + 195.71$	0.44
Logarithmic	$y = -175\ln(x) + 812.49$	0.44
Polynomial (2 nd order)	$y = 0.1136x^2 - 22.828x + 1159.4$	0.47
Power	$y = 3E+18x^{-8.755}$	0.35

4. Conclusion

An investigation was conducted to study the effect of storage period on fertility and mortality in large, medium and small sized eggs of Chabro breed. The egg fertility was higher ~~in eggs stored for on~~ 3rd days ~~of storage~~ as compared to 0 day ~~while a and declined~~ ~~decreased was recorded for eggs stored for on~~ 6 days ~~of storage for all the egg sized classes~~. Similarly, ~~it was noticed that~~ mortality ~~was also~~ increased with the increase of storage duration. Overall mortality was lowest for medium sized egg ~~class when~~ compared to small and large sized ~~classes~~.

Reference

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