

**EFFECT OF STORAGE, PRE-HEATING AND TURNING DURING HOLDING PERIOD ON THE HATCHABILITY OF BROILER BREEDER EGGS**A. MAHMUD AND T. N. PASHA<sup>1</sup>Department of Poultry Production, <sup>1</sup>Department of Food & Nutrition, University of Veterinary and Animal Sciences, Lahore, Pakistan**ABSTRACT**

Two hundred forty fertile eggs of an average weight of 52-55g were taken from 32 weeks old broiler breeder flock. These eggs were divided into four groups i.e. A (Without turning and preheating), B (No turning but preheated), C (Turned but without preheating), and D (given both treatments preheating and turning) with 60 eggs in each group. The eggs were stored with broad end upward at 16-20°C and 65-75% humidity. After storage for 5 days, the pre-heating of eggs of groups B and D was performed in an incubator where hot air at 30°C temperature was circulated for 6-7 hours to provide gradual warmth to the eggs before setting in the same incubator. The temperature of the incubator was maintained at 37.6°C with relative humidity of 70%. The eggs of groups C and D were turned on hourly basis at an angle of about 45° till 17 days of incubation. The hatchability values of eggs of groups A, B, C and D were 88.30 ± 0.30, 76.30 ± 0.30, 83.30 ± 0.30 and 79.90 ± 0.10%, respectively. Statistical analysis of the data by Chi-square test showed non-significant differences among treatments.

**Key words:** Holding period, pre-heating, turning, hatchability, broiler breeder.

**INTRODUCTION**

The fate of broiler chicks largely depends upon the quality of hatching eggs. Various breeding practices and handling of eggs from egg laying to hatching, particularly pre-incubation storage condition, temperature, along with the age of breeding flock have been the most common variables used to manipulate fertility, hatchability, livability and quality of day old chicks (Tona *et al.*, 2001).

Hatching eggs are collected at a breeding farm, stored for sometimes there, or directly transferred to the hatchery. Here these are stored for certain limit of time under specific environmental conditions. This transitional stay of eggs before incubation is known as holding period. The main objective of holding period is to maintain the fertility of hatching eggs.

The egg is a perishable entity and can not be stored for longer period (12-15 days) if not handled properly. Most of the hatcheries store eggs for considerable length of time due to fluctuating prices and demand of day old chicks in the market. Therefore, the need is to adopt such strategies during this period to maintain optimum potential of hatching eggs which ultimately lead to profitable hatchability.

The present study was planned to investigate the effect of storage period, pre heating and turning of eggs during holding period on their hatchability.

**MATERIALS AND METHODS**

A total of 240 fertile eggs (52-55g in weight) were collected from 32 weeks old breeding flock. These were

stored for 5 days with broader end upward at 16-20°C and maintaining humidity at 65-70%. These eggs were divided into 4 groups A, B, C and D, with 60 eggs in each group. Eggs of group A were neither turned nor preheated before setting in the incubator and treated as control. Eggs of group B were preheated for 6-7 hours until the temperature reached 30°C before setting in incubator but these were not turned. The eggs of group C were not preheated but turned for 6-8 times each day during storage period before setting in the incubator. The eggs of group D were pre heated and turned simultaneously during holding period.

For preheating, eggs were placed in an incubator where the hot air was circulated and warmed gradually. These eggs were warmed from storage temperature up to room and then incubation temperature. This process of pre warming lasted for 6-7 hours.

For turning, the eggs were stored with small end down and slanted at an angle of 40 to 45 degrees. They were placed on egg flats and one end of the flat was elevated to give the proper slant. In this way the eggs were turned by elevating alternate ends of the flat each day, for 6-8 times.

After giving the above treatment during the holding period, these eggs were set in the incubator with broad end upward. The temperature of incubator was maintained at 37.6°C with relative humidity of 70%. These eggs were turned at an angle of 45° after every hour till 17 days of incubation. On day 17, each egg was candled for any infertile/clear egg/dead in shell. On 18<sup>th</sup> day, these eggs were shifted to the hatcher, where temperature was adjusted at 35.6°C and relative humidity at 80%. After 21 days, hatchability percentage

was calculated. The data obtained were subjected to Chi-square test to see the significance of difference in hatchability among different groups (Steel and Torrie, 1980).

## RESULTS AND DISCUSSION

The highest hatchability was observed in control group A ( $88.30 \pm 0.30\%$ ), where the eggs were neither preheated nor turned when compared with all other treatment groups (B, C and D). The lowest hatchability was observed in group B ( $76.30 \pm 0.30\%$ ) where eggs in storage were preheated for 6-7 hours at  $30^{\circ}\text{C}$  prior to incubation but not turned (Table 1). However, the data revealed that hatchability percentage was non-significantly different among four groups. These results are not in line with Tona *et al.* (2005), who reported that turning affected the hatchability as embryos from unturned eggs had lower weights and higher remaining albumin weights than those from turned eggs.

**Table 1: Hatchability (%) of eggs of different experimental groups**

Treatment	Hatchability (%)
A	$88.30 \pm 0.30$
B	$76.30 \pm 0.30$
C	$83.30 \pm 0.30$
D	$79.90 \pm 0.10$

Mean values between groups do not differ from each other.

However, Meijerhof (1994) reported that pre-incubation treatments may have negative influence on hatchability if not properly managed. The shock of warming eggs too rapidly causes moisture to condense on the shell.

Eggs should be warmed slowly before being placed in the incubator. The same practice was adopted to give warmth treatment to eggs of groups B and D. Even the results of this study indicated that there was no need of pretreatment before putting the eggs in the incubator.

In spite of the insignificant results, it could be suggested that turning of eggs can slightly improve hatchability (Group C) but hatchability was reduced when eggs were only preheated (Group B).

The storage of eggs prior to setting in the incubator might improve embryo growth in terms of hatchability within all groups. This is because egg storage might improve embryo by better utilization of carbohydrate (Christensen *et al.*, 2003).

## Conclusion

The study showed that turning and pre heating during holding period do not affect hatchability if the eggs are obtained from younger flock and are stored not more than five days.

## REFERENCES

- Christensen, V. L., J. L. Grimes, M. J. Wineland and G. S. Davis, 2003. Accelerating embryonic growth during incubation following prolonged egg storage 2. Embryonic growth and metabolism. *Poult. Sci.*, 82: 1869-1878.
- Meijerhof, R., 1994. Theoretical and empirical studies on temperature and moisture loss of hatching. Washington State Univ. Dissertation No. 1774. <http://library.wur.nl/wda/abstracts/ab1774.html>.
- Steel, R. G. D. and J. H. Torrie, 1980. Principles and Procedures of Statistics 2<sup>nd</sup> Ed., McGraw-Hill Inc., New York, USA.
- Tona, K., F. Bamelis, W. Couke, V. Bruggeman and E. Decuypere, 2001. Relationship between broiler breeder's age and egg weight loss and embryonic mortality during incubation in large-scale conditions. *J. Appl. Poult. Res.*, 10: 221-227.
- Tona, K., O. Onagbesan, V. Bruggeman, K. Mertens and E. Decuypere, 2005. Effects of turning duration during incubation on embryo growth, utilization of albumin, and stress regulation. *Poul. Sci.*, 84: 315-320.