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Article

The Egg-Turning Technique on The Hatching Performance of Hybrid Duck Eggs

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Abstract: This research aimed to determine different egg-turning techniques on the hatching performance of hybrid duck eggs. The materials for this research include water, hatching eggs of hybrid ducks, and manual hatching machines. This research used the T-test with 2 treatments and 6 replications, including T1 (swipe egg-turning) and T2 (manual egg-turning), each replication consisting of 10 hatched hybrid duck eggs. The parameters observed included the percentage of mortality, the percentage of hatchability, and the hatching weight of hybrid ducks. Analysis of the resulting data uses an analysis of variance (ANOVA) with the SPSS (Statistical Package for Social Science) application. Data that had significant differences were then tested further using the DMRT test (Duncan Multiple Range Test). The results showed that the egg-turning technique had no significant effect on the hatching performance of hybrid duck eggs, including mortality, hatchability, and hatching weight. The conclusion of the research was the regular turning times with differences in egg-turning techniques did not influence the hatchability of the duck hybrid.

Keywords: egg-turning, ANOVA, hybrid duck eggs

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1. Introduction

Hybrid Duck is one of the potential animal protein sources in Indonesia that has a rapid growth rate with a short rearing period of 45 days and can reach more than 3 kg live weight. A hybrid duck is the result of a crossing between a Peking duck (male) and a Khaki Champbell duck (female) to create a Day Old Duck (DOD) of final stock broiler duck's quality. The characters of Peking Ducks and Khaki Ducks Campbell have a good performance in producing meat with rapid daily gain. The consumption of duck meat is a growing trend in the world, the data show duck meat production in the global increased by 94,7% in the last decade.

Duck also plays an important income for rural communities. Most farmers duck in Indonesia are raising it in a traditional method, which is characterized by low productivity and the availability of feeds depending on the season [1]. In terms of enhancing duck meat production, the breeding nature of the duck is not profitable, so need for an improved breeding method to increase the duck population [2][3]. The research of [4] showed that the performance of local egg ducks can be improved with intensive breeding, selection, and improved management. Egg fertilization is a primary factor in the hatching of poultry eggs. The hatching eggs without the mother hen need a good incubator system to manage the fertilized eggs which later develop into a normal chicken [5].

The profitability of incubators is determined by controling their physical environment. Thus, providing the ideal conditions for embryonic development, during artificial incubation, was crucial to improve productivity and economic independence.

The eggshell temperature also must be monitored to determine the relative heat production of the growing embryo throughout the incubation period [6]. Turning eggs, for example, is a physical parameter that can affect the success of incubation and the quality of chicks. Turning eggs is one of the parameters to determine the physical quality that can influence the hatching performance of hybrid duck eggs. This parameter also has an important role in embryonic growth because it defines the absorption and metabolization of the albumen and yolk nutrients in the embryo and prevents embryo adherence to the inner shell membrane [7][8][9].

Optimum turning of eggs during artificial incubation has been of interest since the first observations of the natural incubation habits of ducks [10]. Considerable research has been directed at the determination of the times during incubation when turning eggs was most critical to obtain maximum hatchability. One of the turning egg aims is to clean the eggshell, which is the outer part of the egg that still contains bacteria, especially excreta, so it has the potential to be a source of pathogenic bacteria that can interfere with embryo growth. The bacteria Staphylococcus aureus and Salmonella sp. are often found in hatching eggs. These two bacteria can cause hatching failure caused by the death of the embryo.

An irregular egg-turning process can cause the heat to hit the egg to be uneven so that the embryo will stick to the shell and ultimately cause the embryo to die. Based on the description, a current study was done to know the influence of the different turning egg techniques of duck hybrid (Anas platyrhynchos domesticus) against the hatching performance of duck eggs including mortality, hatching weight, and percentage of hatchability.

2. Materials and Methods

The materials used in this research were 120 hatching duck eggs which had been stored for 5 days. . The traditional hatching machine used is made from plywood and ram wire as a barrier, the water container used to optimize the temperature is made from a tub.

2.1 Experimental design

The tudy uses the experimental method with the T-Test consisting of 2 treatment groups and 6 times tests. The treatments are:

T1 : Flip the eggs simultaneously
T2 : Manual egg-turning

2.1.1. Providing treatment

This research consisted of 2 treatments and 6 replications. Weighing hatching weight is done after dry duck feathers, and egg-turning is carried out in the morning (07.00), afternoon (13.00), and evening (20.00).

2.1.2. Research parameters

- Mortality percentage can be done during hatching time (eggs do not hatch). Mortality = Number of dead embryos/ Number of fertile eggs x 100%
- The percentage of egg hatchability is calculated by calculating the number of eggs that successfully hatch from the number of fertile eggs. Hatchability percentage is defined as the percentage of eggs that hatch from fertile eggs so it can be calculated using the following formula :
  Hatchability Percentage = Number of eggs hatched/ Number of eggs incubated x 100%
- Hatching weight is obtained from the results of weighing baby birds that have hatched at the age of 1 day.

2.2 Data analysis

The data was analyzed by using a T test with the help of the SPSS (Statistical Package for Social Science) application. Data that had significant differences were then tested further using the DMRT (Duncan Multiple Range Test) (P Value < 0.05).

3. Results and Discussion

The research results show that treatment turning egg in a way swipe and manual no show significant influence (P >0.05) on the hatching performance of hybrid ducks which includes mortality, percentage of hatchability, and hatching weight of hybrid ducks. The results of the research on the hatching performance of hybrid ducks are shown in Table 1.

Table 1. Hatching performance data of hybrid duck eggs with different egg-turning techniques

Parameters	T1	T2	P-Value
Mortality (%)	10.00 ± 10.95	23.33 ± 16.33	0.128 ^{ns}
Hatchability (%)	90.00 ± 10.95	76.67 ± 16.33	0.128 ^{ns}
Hatching Weight (Grams)	50.42 ± 4.86	49.76 ± 4.22	0.613 ^{ns}

The differences in egg turning methods in the current study did not have a significant effect on the percentage of hybrid duck deaths. Because death is influenced by several factors, including 80% humidity and a temperature of 37 0 Celsius in the incubator. If temperature and humidity are optimal so number of mortality can be pressed and if temperature and humidity are not optimal then will enhancement the mortality percentage.

The mortality percentage of the research was 10 and 23.33%. [11] was explained that the level of cleanliness and the amount of microbial contamination in the hatching eggshells influence the mortality percentage. The presence of microbes on the surface of the eggshell can penetrate the egg and can cause contamination of the embryo. This causes the death of the embryo in the hatching process. The dirty duck eggs will be easily contaminated with bacteria that enter through the pores of the shell and cause the death of the embryo. Turning egg teaching with swipe and manual can maintain the eggshells from microbes that can reduce mortality percentage.

The swipe and manual turning eggs techniques had no significant difference in the hatchability of the duck hybrid. The percentage of hatchability was in inverse comparison with the percentage of mortality egg, if its mortality was low in a way automatically the hatchability was high. The average hatchability of hybrid duck eggs in this study was generally high there was 90 and 76.67%. Hatchability is influenced by improved embryo mortality, which occurs primarily on the second and third days of incubation. The turning eggs by 90° four or twenty-four times a day was able to increase hatching by 1.7 and 3.1%, respectively, compared to non-turned eggs [12].

The higher percentage of the hatchability of this research caused by the regular turning times, although the differences in turning egg techniques did not influence the hatchability of the duck hybrid. The egg turning twice a day, 24 times during the 12-day storage period, contributes to the faster development of embryos in the initial incubation period [13].

The research results show that swabs and manual turning egg treatments showed no significant effect (P>0.05) on hatching weight. Embryo development during the hatching period was affected by several factors there are breeder age, egg weight, egg composition, and incubation conditions. Egg weight affects egg content and yolk absorption and, therefore, embryo development during the incubation period [14]. Turning the egg is important for preventing the adhesion of the embryo to the inner shell membranes and optimizing the development of the extraembryonic membranes. The hatchability of egg ducks also affected by turning angle or turning frequencies becomes a source of early, mid, and late embryonic mortalities. Turning an egg can prevent improper

adhesions of the embryo to the inner shell membrane or of allantois to the yolk sac early in embryonic development [15]. Both hatchling quality and chick weight influence the growth performance of day-old chick [16].

4. Conclusions

The egg-turning techniques which are swipe and manual egg-turning with regular turning times did not influence the hatching performance of hybrid duck eggs which includes mortality, hatchability, and hatching weight of the duck hybrid.

Conflicts of Interest: The authors declare no conflict of interest.

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