STAGE FERTILITY PROFILE OF THREE TYPES OF LOCAL CHICKENS IN INDONESIA (PELUNG CHICKEN, KAMPUNG CHICKEN AND CEMANI CHICKEN)

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STAGE FERTILITY PROFILE OF THREE TYPES OF LOCAL CHICKENS IN INDONESIA (PELUNG CHICKEN, KAMPUNG CHICKEN AND CEMANI CHICKEN)

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ABSTRACT

This study aims to determine the fertility, hatchability, and quality of DOC produced from three species of Indonesian local chickens, namely Pelung Chicken (PC), Kampung Chicken (KC), and Cemani Chicken (CC). The method used in this research is experimental, each 10 eggs are taken from each local chicken. All eggs are hatched in hatching machines at a temperature of 37°-38°C for 21 days. After 21 days the number of eggs that hatched and did not budge was observed, after that the weight of the DOC was calculated and the quality was observed. The results of PC, KC, CC egg weights were analyzed using the *Anova* method. The results showed the percentage of PC fertility rates were 80%, KC 70%, and CC 30%. The hatchability produced is 80% AP, 70% AK, and 30% AC. The results of the average weight of eggs AP, AK, and AC significantly different; AP has the highest egg weight of 52.5000 ± 1.95789^a, then AC 41.6000 ± 3.50238^b and AK 41.1000 ± 2.42441^c. The results of the average DOC weights of the three local chicken species AP, AK, and AC were significantly different; the highest average DOC weight was produced by AP, 40 ± 17.18024^a, then AC 31 ± 15.26106^c and AK 29 ± 14.52813^b. Pelung chicken is the most superior type of local chicken based on the results of the analysis of the percentage level of fertility, hatchability, and DOC quality. The weight of a local chicken egg has no effect on the fertility of the egg, but the weight of the egg influences the weight of the DOC Produced.

Keywords: Cemani Chicken, Kampung Chicken, Pelung Chicken, DOC, fertility

INTRODUCTION

The development of chicken livestock in Indonesia is currently very rapid, both those raised by farmers and the general public, as an effort to use the yard or to increase income. The development of the livestock subsector has several very important functions in national development, namely as a function of providing quality animal food, in the form of meat, eggs, and milk [1].

Chicken farming is a type of breeding method that develops in the community environment. The types of chickens that developed in the community are currently divided into two, namely purebred chicken and free-range chicken. Broilers are types of chicken that have a high meat productivity style, for example broilers or broilers. Free-range chickens (not race) are types of chickens that are often found in the community environment, these chickens are better known as local chickens [1].

Free-range or local chickens are usually kept freely by allowing chickens to roam in the yard. Local chicken is a very wide distribution area, maintained by almost all rural communities in the home yard [1].

Pelung Chicken is a superior chicken typical of Cianjur City, West Java. Pelung chicken is one of the genetic resources of local livestock that has a distinctive sound, crowing, relatively large body size with long legs [2]. Chicken Cemani or Chicken Kedu is a superior local chicken from Kedu, Temanggung, Central Java. The advantage of Cemani Chicken is that it is used as an ornamental chicken, besides it can also spawn 215 eggs / year [3]. Kampung Chicken is the result of domestication of red jungle fowl (*Gallus gallus*) which is now scattered in various regions. The advantage of Kampung Chicken is that it is used as a consumption material, both for meat and eggs. Each type of chicken has its own potential, both as a producer of meat, eggs, melodious sounds, fighting chickens, and a beautiful appearance [4].

Egg weight does not only affect the hatchability of eggs hatched using a hatching machine but also affects the hatching weight [5]. The other factors that cause fertility, hatchability and hatching weight are sex ratio, natural marriage and crossbreeding [6].

Hatching is generally done by farmers themselves using two methods, namely natural hatching and artificial hatching. Natural hatching is done by incubating by the mother itself or can also be helped incubating by another parent. This incubation can occur if the egg incubation in the poultry has emerged. Artificial hatching is done by using a device commonly referred to as a hatching machine. Artificial hatching systems using modern hatching machines can produce DOC in greater numbers and guaranteed continued hatching compared to natural hatching [7].

Each type of chicken has DOC (Day Old Chick) quality and different hatching potential. DOC is one day old chicks. In general, there are currently only a few local

chicken breeders who know the fertility potential, hatchability, and quality of DOC, especially Indonesian local chicken species [8].

This research is expected to be useful for Indonesian local chicken breeders, especially Pelung Chicken, Kampung Chicken, and Cemani Chicken breeders to have a nation of superior broilers and laying hens so that they can meet the consumption needs of the community. This research is the first step to look for a nation of Indonesian local chicken in terms of fertility, hatchability, and DOC quality.

MATERIALS AND METHODS

The study was conducted at the researchers chicken farm located in Nglarangan Hamlet, Selosari Village, Kandat District, Kediri Regency, East Java. Sampling of hatching weights was carried out randomly by 30 eggs originating from Indonesia. Fertility and hatchability data are obtained directly from the results of research that has been done. Egg samples used in this study were 30 local chicken eggs with 3 different types, namely 10 eggs of Kampung Chicken, 10 eggs of Pelung Chicken, and 10 eggs of Cemani Chicken with one hatching period. The data that has been obtained is then analyzed descriptively. The analysis is done by calculating the minimum and maximum, average values, standard deviations, coefficient of variation and estimation of parameters.

Research Procedure

Sampling was obtained from different places. Pelung chickens are taken from Pelung Wlingi chicken breeders, Kampung chickens from researchers' owned chickens and Cemani Chickens from Kasembon chicken breeders. The age of chicken eggs taken ± 2 days with the weight of Kampung Chicken eggs around 38-45 grams, Pelung Chicken eggs around 50-53 grams, and Chicken Cemani eggs around 42-44 grams. After that the study was carried out with the following stages:

1. Preparation Stage

The study was conducted for 20 days, from March 3 to 23, 2019. The research was conducted with three treatments and ten replications.

- Pelung Chicken   = 10 eggs
- Kampung Chicken   = 10 eggs
- Cemani Chicken   = 10 eggs

2. Hatching Stage

The hatching stage is the last three days of incubation. During this stage eggs no longer should be turned. Ideally Eggs should be placed flat for this stage and the incubator should be set out so as to be safe for when the chicks hatch as they will spend the hours after they hatch in the incubator.

- Hatching machine temperature 37°-38°C
- 4 eggs rotated per day

3. Data Analysis

The research method used in this research is to use ANOVA analysis and Completely Randomized Design (CRD). According to the linear model used for CRD is [9] :

$$Yij = \mu + \acute{a}i + \sum ij$$

The formula as follows :

Yij = The results of observations on treatment i test and j test

μ   = Mean value of expectation

ái   = Effect of treatment on i test

∑ij = Effects of i test error and j test

i   = 1, 2, 3, 4

j   = 1, 2, 3, 4

Observed parameters

a. Fertility Profile

Describe the amount of fertility of the three types of chicken eggs, by calculating how many possible eggs that can hatch and those that do not hatch.

b. Hatching Power

Calculate and describe the hatchability of eggs by looking at the number of eggs that hatch, hatching time, the quality of DOC produced from three different types of chicken eggs.

c. DOC quality

Calculate DOC weights produced from three different types of chicken eggs so that they can assess the quality of DOC weights. DOC weight is obtained by weighing

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the newly hatched DOC with dried feathers, then the hatch weight is calculated when the DOC after hatching [10].

RESULTS

A. Fertility

Fertility profiles of three types of Indonesian local chicken namely Pelung Chicken (PC), Kampung Chicken (KC), and Cemani Chicken (CC) obtained the results that the percentage of fertility (F) highest to lowest, namely PC types by 80%, KC by 70%, and CC by 30%, while the percentage of chicken eggs that were TF (Not Fertile) from highest to lowest was CC by 70%, KC by 30%, and PC by 20% (Figure 1).
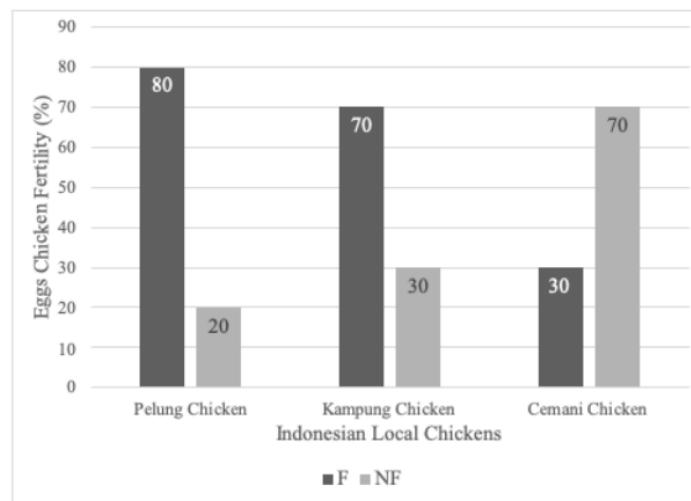

Figure 1. The amount of fertility of the three types of chicken eggs, Pelung Chicken (PC), Kampung Chicken (KC), and Cemani Chicken (CC). The graphic represent F means Fertile and NF means Not Fertile

Based on these data the type of PC has the highest fertility rate. PC has hatchability and DOC quality is better compared to other types of chicken. Pelung Chicken fertility is classified as good, almost the same as Kampung Chicken. If the Pelung Chicken is mated through artificial insemination the level of fertility is higher than that of natural mating. Fertility of native chickens is also quite good although it does not use artificial insemination system [11].

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Egg quality is a character that can be assessed, seen and observed through outward appearance of eggs, to determine good quality and can not be seen from the cleanliness of the skin, texture and shape of the egg [12]. Many other factors affect egg quality, one of which is genetic selection or parent background can contribute to an increase in late embryonic malposition and death. In addition, egg handling before incubation can be a limiting factor for hatching [13].

Based on the results of research that has been done, one of the three types of local chicken eggs studied has a genetic level that is less supportive for hatching, namely CC, besides the temperature used in hatching also affects the CC hatching, if you want to get maximum results, it should not be equated by hatching other types of chicken eggs. More specific research is needed to find out the factors that influence the low CC hatching.

B. Hatchability

The results of the average weight of eggs AP, AK, and AC significantly different; AP has the highest egg weight of 52.5000 ± 1.95789 [a], then AC 41.6000 ± 3.50238 [b] and AK 41.1000 ± 2.42441 [c] (Table 1).

Table 1. ANOVA Test Egg Weight of three types of Indonesian local chickens

No.	Type of Chicken / Treatment	Egg Weight
1.	Pelung Chicken	52.5000 ± 1.95789 [a]
2.	Kampung Chicken	41.1000 ± 2.42441 [c]
3.	Cemani Chicken	41.6000 ± 3.50238 [b]

The results of the analysis of each of the 10 Indonesian local chicken eggs hatchability were PC eggs having egg weights between 49 - 55gr/egg, KC eggs between 38 - 45gr/egg, and CC eggs between 35 - 46gram/egg. The standard weight for Pelung Chicken eggs is 47.6gr/egg, According to Afrizal (2007) the standard weight of Kampung Chicken eggs is 32.84gr / gg [14], and the standard weight for Chicken Cemani eggs is 41-49gr/egg [15]. Based on this statement, it can be concluded that PC and KC eggs have hatchability above the previous standard (*very good*), whereas CC eggs have hatchability in accordance with standards (*good*).

Hatchability produced by PC eggs, KC, and CC obtained a percentage of 80% in AP egg types, 70% in AK egg types, and 30% in AC egg types. Based on the results of research on the hatchability of three types of Indonesian local chickens it can be concluded that the AP has a higher hatchability than the hatchability of other types of chickens, while AC has the lowest hatchability compared to other types of eggs. It can be seen from the results of 10 AP eggs that hatched as many as 8 eggs, while in the type of AC eggs that hatched as many as 3 eggs. Based on the exposure to the results of the fertility test AC has a low fertility rate it also affects the hatchability of eggs.

Egg hatchability could be influenced by egg preparation, genetic factors, temperature and humidity, age of the mother, egg cleanliness, egg size, egg nutrition and fertility [17]. This statement is further strengthened by the results of research conducted by Addo *et al*. (2018), in his study found that the long storage of eggs and environmental temperature further reduce the development of chicken egg embryos [13]. The embryonic development and hatchability are more influenced by embryo temperature than air temperature [18].

C. DOC Quality

Analysis of DOC quality can be seen from the weight of DOC produced by each type of local chicken when it hatches. The result of DOC quality analysis based on DOC weights using ANOVA analysis can be seen in the following table.

The results of the average DOC weights of the three local chicken species AP, AK, and AC were significantly different; the highest average DOC weight was produced by AP, 40 ± 17.18024^a, then AC 31 ± 15.26106^c and AK 29 ± 14.52813^b.

The highest average weight is AP DOC weight, then the lowest average chicken DOC hatch is AC DOC. Based on data from the analysis of the quality of DOC and egg weight three types of Indonesian local chickens, it can be concluded that egg weight has an influence on the weight of the DOC produced. The good quality of DOC is minimum weight of 37gram /chicken [19].

Table 2. Results Of Weighted DOC Analysis Using ANOVA Test Of Three Indonesian Local Chicken Species

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No.	Type of Chicken / Treatment	Egg Weight
1.	Pelung Chicken	40 ± 17.18024^a
2.	Kampung Chicken	29 ± 14.52813^b
3.	Cemani Chicken	31 ± 15.26106^c

CONCLUSION

Pelung Chicken has greater or better hatchability and DOC compared to native chicken and also cemani chicken. The average egg weight is not the only factor influencing the hatchability of the egg. Because what is influenced by the average egg weight is the average DOC weight. Factors that affect egg hatchability include fertility, genetic, optimal embryonic temperature. This allows the air conditioner to require different temperatures for hatching. Egg sequences of three types of native Indonesian native chicken based on the highest to lowest average are Pelung Chicken, Cemani Chicken, and Kampung Chicken. Further research is needed for the optimal temperature hatching and genetic Cemani Chicken.

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