

Improvement of Breeding Management towards Productivity of Alabio Duck in Swamp Land, South Kalimantan

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ABSTRACT

Alabio duck is a local duck and germplasm from South Kalimantan that lives and breeds in swamp agroecosystems. The necessity of Alabio duck breeds or day old duck (DOD) and duckling as a potential broodstock increases every year. The necessity of Alabio duck breed hasn't been fulfilled properly because the low hatchability and the mortality of eggs wrapped still high, so productivity of DOD is low. The ways to increase of Alabio breeds could be done by improving the management of brood and drake rearing, improving feed management and hatching technique. This study was carried out in Hulu Sungai Utara District, South Kalimantan from January to December 2018. The aims of this study was to determine the improvement of nursery management toward productivity of alabio duck. Parameters observed were egg production performance, hatching performance (germination, hatchability, mortality), institutional system, economic analysis, development potency and feasibility of Alabio duck farming system. The results of this study show that the performance of broodstock Alabio duck laying eggs in 22 weeks, feed consumption is 150 grams/head/day, egg production is 75.80% and the peak production reaches 85.90%, and the egg weight is 63.81 gram/egg. The hatching performance for 3 times of hatching periode is egg germination 80-95%, egg hatchability 70-75%, hatch weight/DOD 45-50 gram, and embrio mortality 20-23%. From this study, it could be concluded that the improvement of nursery management is by improving feed management, cage management, selection breed based on good parent production of duck. Bussines development of hatching, rearing, breeding, and laying of Alabio duck is feasible to be used as bussines activities that could increase farmers' income.

Keywords: Alabio duck, Breeding, Management, Swamp-land, South Kalimantan

1. INTRODUCTION

Alabio duck (*Anas platyrhynchos* Borneo) is a local duck from South Kalimantan that lives and breeds in swamp agro ecosystem area. This duck has the advantage of producing eggs by using local feed. Alabio ducks are laying ducks that egg production can reach 275 eggs per head/year if intensively reared and the egg shell is gray-green color and egg weight is between 50-70 grams [1]. Furthermore, Alabio ducks have advantages in terms of slaughter weight, carcass weight and carcass percentage, as well as the percentage of chest and thigh weight compared to other local ducks such as Cihateup ducks [2].

Alabio ducks are dual-purpose local ducks type because it is capable to produce high eggs, average of 214.72 eggs/head/year and the body weight can reach 1257.3 gram per head in 7 and 8 weeks [3] [4]. So that it has potential as a meat producer compared to other local ducks in Indonesia. Likewise with rejected ducks, the weight of rejected Alabio ducks is greater than rejected Mojosari ducks, which are 1,370 g and 1,280 g, respectively [5].

The market demand of duck products (eggs and meat) has recently been increasing, along with the increasing public interest in consuming these products. The problem faced by farmers is the high price of commercial feed for ducks so that the profits obtained in

duck farming are low, both for laying ducks and slaughter ducks (male duck). The potential of local feed ingredients is quite overflow in the location of the Alabio duck development center which has not been identified and utilized optimally. Most breeders use local feed ingredients that are directly given to ducks without prior processing so that the digestibility of these feed ingredients is still low. The aims of this study was to determine the improvement of nursery management toward productivity of Alabio duck.

2. MATERIALS AND METHODS

This study was carried out in Hulu Sungai Utara District (Cinta Bertani Farmer Group), South Kalimantan from January to December 2018. A total of 240 Alabio ducks consisting of 200 ducks and 40 drakes (10:2) were divided into 20 cage plots. Each plot contained 10 ducks and 2 drakes. Feeding activity was given 2 times a day with an amount of 150 g/head/day, while drinking water was given ad libitum. Feed ingredients and nutrient of laying Alabio ducks are presented in Table 1 and Table 2. Improvement of nursery management were carried out by improving the feed formulation and selecting hatching eggs that produced by collecting eggs from cage plots with egg production above 75%. Hatching eggs were collected for 6 days from incubator machine. The parameters observed were the performance of the alabio ducks

Table 1. Feed ingredients of laying Alabio ducks

No	Feed ingredient	Percentage (%)
1	Rice bran	30
2	Corn	17
3	Palm meal	25
4	Snail	16
5	Dried fish	10
6	Vitamin/Top mix	1
7	Mineral	1
Total		100

Table 2. Feed nutrient of laying Alabio ducks

No	Feed nutrient	Amount
1	Crude protein (%)	22.33
2	Crude fat (%)	5.90
3	Crude fiber (%)	10.10
4	Calcium (%)	2.51
5	Phosphor (%)	1.73
6	Metabolic energy (kkal/kg)	2,847.33
7	Price (Rp/kg)	3100

(early laying age, feed consumption, egg production, egg weight and brood mortality), hatching performance (fertility, hatchability, hatching weight of DOD and embryo mortality), and the performance of hatchling ducks.

3. MATH AND EQUATIONS

3.1 Performance of Alabio ducks breeder

The performance of Alabio ducks as a result of the study conducted in the "Cinta Bertani" farmer group in Rantau Karau Hulu Village is presented in Table 3.

In Table 3, the performance of Alabio ducks during the research is described by improving maintenance management that is by providing adequate feed both in terms of quality and quantity and the good cage system. The feed given ranges from 150-200 grams per head per day. Feeding was done 2 times a day namely at 7 am and 4 pm.

Table 3. Performance of Alabio ducks breeder

Parameter	Average
Early egg of laying (week)	22
Feed consumption (gram/head)	150.00
Peak production of egg (%)	85.50
Egg production (%)	75.80
Egg weight (gram/piece)	63.81
Mortality (%)	2.50

3.1.1 Early egg of laying

At 22 weeks, some of the ducks have started to produce; this is faster than the results of previous research that the average age at first laying Alabio ducks is 24.27 weeks [6]. This is presumably because the feed provided is quite good in quality and quantity. The feed provided is formulated with local ingredients of good quality both in terms of physical and nutritional content. In addition, ducks have been kept intensively / kept in cages since they were DOD. Ducks that are kept intensively will get lighting (either from the sun or lamps) and relatively more temperatures when compared to shepherds/*angon* rearing. Research has proven that the ideal temperature and lighting will constantly stimulate the ducks to sexual maturity.

3.1.2 Feed consumption

Feeding was given as much as 200 grams/bird/day, the rest of the feed that was in the feed was weighed to determine the feed consumption. The average total feed consumption during the study was 150 grams per head per day. The feed consumption of Alabio ducks is higher than other local ducks. Alabio ducks have higher

consumption than Cihateup ducks [7]. The high feed consumption is also influenced by the level of egg production so that to fulfill the nutritional needs used for basic life and production, it requires more feed consumption. Other factors that influence consumption are nutritional content of feed and feed formulation.

3.1.3 Egg production

The average egg production ranges from 40.5 to 95% (67.77%). The results of this study are higher than the research the use of fermented tree snail flour which is 22.7% [8]. Furthermore, the production of Alabio duck eggs with protein feed is 19.1% and energy is 2,700 kg/kcal is 56.78%, 64.63 % and 66.86% [9];[10]. The height of egg production as a result of this study is suspected to have a complete nutrient content of the feed, especially protein content [11]. The ability to produce duck eggs is influenced by genetic and environmental factors. One of the environmental factors that greatly affect the productivity of ducks is feed. The consumption of energy and protein content of the ration influences egg production, because the formation of eggs results from the large consumption of energy and protein in the ration

Environmental factors that influence duck productivity such as duck health, feed quality and stability, cage conditions, temperature & climate and stress level. With the natural characteristic of ducks as animals that are anti-change/disturbed, if one of these factors is disturbed, the egg productivity will be disrupted or even stop for long time. In other words, environmental factor has very important role in the length of the productivity of laying ducks. If the ducks are sick, the feed changes, the cage is muddy and smelly, heavy rain/flood or stress will certainly reduce the number of eggs produced.

3.1.4 Egg weight

The average of egg weight that is produced from this study is 67.5 grams/piece. Egg weight has a relation with egg production. The higher the egg production there is a tendency for the eggs to shrink so that the egg weight also decreases. The results of the study of feed based on local feed; there is a difference between the eggs produced from the feed formulations. It is suspected that there is a difference in the level of production, where the higher the egg production, there is a tendency for smaller egg sizes which are identical to the weight which is also small. Egg weight is influenced by environment, genetics, feed, egg's composition, egg laying period, poultry age and brood weight [12].

3.1.5 Broodstocks Mortality

Mortality is generally caused by *prolapse* due to oversized eggs, where the eggs are retained in the uterus for several days and come out with the uterus, and cause

the death. The mortality of broodstocks is 2.50%. It is thought to be due to the egg size being too large, where during the mixing process the feed ingredients are mixed evenly so that they accumulate and are consumed by how many ducks causes the abnormal egg formation process.

3.2 Hatchery performance

The hatching of eggs is carried out for 3 periods, to be subsequently sold as hatching eggs whose hatching is carried out by DOD-producing breeders. The eggs hatched from the collection for 5-6 days had the highest production from each cage unit with a production range of 50-100% (5-10 eggs). There are 10 units of cages from 20 units whose eggs are taken to be incubated. The hatchery performances are presented in Table 4.

Table 4. Hatchery performances of Alabio ducks

Parameters	Average
Hatching egg weight (gram)	55 - 75
Fertility (%)	80 - 95
Hatchability (%)	70 - 75
Hatch weight/DOD (gram)	45 - 50
Embryo mortality (%)	20 - 23

Source : primary data processed

3.2.1 Fertility

Fertility percentage is calculated based on the number of eggs that germinate in the first candling divided by the number of eggs entered in the incubator. Based on the results of observations, the average number of eggs that is germinated ranging from 80-95%. The high percentage of fertility is thought to be an ideal drake-to-duck ratio (5:1) so that almost all eggs are fertilized. In addition, the maintenance system is carried out intensively which affects the natural mating process. In an intensive system, ducks are kept in cages with available feed and water so that the nutritional intake received by ducks is in accordance with their needs. The mating process will be easier because drake and duck are kept in one cage that has a certain area so that it is easier for drake to reach duck.

The other factors that influence the high percentage of fertility of egg hatches is the egg weight that hatched is similar (60-65 gram/piece). The percentage of fertility decreases with increasing weight of hatched eggs [13]. The percentage of fertility in this study is higher than the fertility of Alabio duck eggs hatched using an incubator which is 79.18% [14]. The average fertility of duck eggs in production and hatchery centers in Blitar Regency, East Java ranges from 86.46-90.49% [9] and

the fertility of other duck eggs during the five hatching periods is 89.31% [15]. Factors that affect egg fertility are the ratio of drake and duck, broodstocks feed, age of drake and duck eggs [16], number of broods mated with one male and age of broodstocks [17].

3.2.2 Hatchability

Hatchability of the number of eggs that hatch compared to the number of fertile eggs is expressed in percent. The hatchability of eggs produced in this study is 70-75%. [18] reported that high and low hatchability depend on the quality of hatching eggs, hatchery facilities and implementer skills, and the length of egg storage. Storing eggs for 1-3 days obtain a higher average hatchability (73.43%) compared to storage for 5-7 days [19]. Other factors that affect the high and low hatchability are egg weight, egg storage time and fertility. The weight of the eggs used in this treatment range from 55-65 grams. Hatched eggs should weight 65-75 g/piece [20]. Hatchability is also influenced by egg preparation, genetic factors, temperature and humidity, parent age, egg hygiene, egg size, nutrition and egg fertility.

3.2.3 DOD hatching weight

The average of hatching weight resulting from this study is 36.88 grams. The hatching weight with that weight is normal assuming the wasted material from the egg weight is around 45%. Hatching weight is positively correlated with egg weight. The greater egg weight, the greater hatching weight because it has the positive correlation between egg weight and hatching weight [21]. Likewise, hatching weight of Alabio ducks is influenced by egg weight [2]. The egg weight used in this study as breeder is 40.65–43.92 grams. The diverse of hatching weight will result the duck growth and slaughter weight are diverse too.

3.2.4 Embryo mortality

The mortality of Alabio duck egg embryos in this study is between 20–23%. The high percentage of embryo mortality is thought to be due to the condition of hatching eggs that there is no special treatment (e.g. soaking in a disinfectant solution, so that microorganisms can easily enter the egg through the pores of the shell and can cause embryo mortality. This is in accordance with previous research [22] that stated one of the reasons of high rate of embryo mortality is the egg hygiene factor. Many embryos die on days 26-28 due to high temperatures and low humidity during the hatcher period. Days 26-28 or the Hatcher period is a critical period for development of embryo, and at that time (day 26-27) the embryo tries to crack the shell. The high temperature causes embryo death or embryo growth abnormalities while humidity affects the normal growth of the embryo and maintains fluid in the egg and weakens the eggshell.

3.3 The performance of DOD

The results of hatching carried out 3 times resulted in 300 DOD for each hatchery which is distributed to members/cooperators (Mr. Sarkani). The second hatchery produces 350 DOD which is distributed to 2 cooperators (Mr. Toni and Anwar) and the third hatchery produces 300 DOD which are distributed to the co-operator (Mrs. Ainun).

The next hatchery activities will be carried out by breeders who carry out hatchery business in Mamar Village, South Amuntai Sub-District, on average between 800-1000 eggs. Until late of December, 10,000 eggs have been hatched and produced around 6,000 DOD and most of them will be distributed to registered communities in “Program Bekerja” Ministry of Agriculture.

Table 5. Performance of Alabio ducks in Cinta Bertani farmer group

No	Parameter	Average/co-operators*			
		1	2	3	4
1	Body weight DOD (gram)	40.42	38.47	36.60	39.50
2	Body weight DOD age 1 month (gram)	141.54	179.80	160.13	129.94
3	Body weight DOD age 2 month (gram)	1,100	900	950	1,150
4	Body weight DOD age 3 month (gram)	1,200	1,175	1,195	1,205
5	Feed consumption (gram/bird)	1,949.58	2,132.19	1,997.36	2,035.38
6	Average daily gain (gram/bird)	12.88	12.63	12.87	12.95
7	DOD mortality (%)	1	1.5	1	1

Description: * 1) Mr. Sarkani; 2) Mr. Toni; 3) Mr. Anwar; 4) Mrs. Ainun

Performance of Alabio ducks aged 1 day - 3 months that carried out in the "Cinta Bertani" farmer group in Rantau Karau Hulu Village is presented in Table 5.

In table 5, the average of DOD body weight of alabio ducks in this study is higher than in the previous study, which weight 35.46 g/head, this is thought to have something to do with the increased amount of feed consumption. When it is compared with the results of the study reported by previous research, this result is higher [23], because it is suspected that the using of feed during maintenance is better in supporting the growth of ducks. This study has small mortality rate of only about 1%. It is also suspected because during the egg formation process, the nutrients of feed are sufficient to produce healthy duckling.

4. CONCLUSIONS

Based on the results of study improvement of breeding management with selection based on the production of broodstock eggs obtain good quality of DOD (low mortality, low variety, and fast growth). Utilization of local feed ingredients for broodstock Alabio ducks, does not increase performance production of ducks, but provide high eggs production. Based on the feasibility analysis of hatchery, rearing, laying, and consumption eggs, it is feasible to be used as a business activity.

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