PERFORMANCES OF VILLAGE CHICKEN FOLLOWING CROSS BREEDING WITH DIFFERENT BREEDS OF CHICKEN

Takdir Saili[1,*)], Rusli Badaruddin[1], La Ode Nafiu[1]

[1]*Department of Animal Science, Faculty of Animal Science, Halu Oleo University, Indonesia*

Abstract

The performances of village chicken in South-east Sulawesi, Indonesia were typically small and light weight, and low productivity of both egg and meat. However, they more resistant to disease compared to other breed of chicken such as commercial broiler or layer. Therefore, in this research the more productive breed of cocks were used. The objective of this research was to improve productivity of the village chicken using different breeds of cock. Bangkok-crossed breed chicken, commercial broiler and village chicken were used to mate the hen of village chicken using artificial insemination. Variables measured were egg fertility, egg hatchability, and day old chick weight of village chicken crossed by different breeds. Duncan multiple range test was applied to compare the averages of each data. The results showed that the higher egg fertility and hatchability were obtained when crossing the hen of village chicken and bangkok-crossed breed cocks, although no statistical differences was showed between breeds of cock. The average of day old chick weight was also higher in a group of village chicken hen crossed by bangkok-crossed breed cocks compare to other breeds, but no significant differences was showed. It was concluded that the bangkok-crossed breed cocks tended to be a good candidate for increasing the productivity of village chicken.

Keywords: Village chicken, crossed breed, artificial insemination, Bangkok

*)Correspondence: takdir69@yahoo.com

INTRODUCTION

Indonesia is a well known country which has large biodiversity, included domestic (native or village) chicken that distributed widely across Indonesia peninsula. The existed native chicken in Indonesia is probably derived from red jungle fowl (*Gallus gallus*) and green jungle fowl (*Gallus varius*) or the cross breed of these two varieties (Iswanto, 2005)[1]. This unknown pedigree leads to the different terminology of domestic chicken in each region across Indonesia. According to Nataamijaya and Dwiyanto (1994)[2], there are 27 sub varieties of domestic chicken in Indonesia that have been identified based on their morphological characteristic differences. Some of them have local name such as Nunukan chicken (Borneo island), Pelung chicken (West Java), Kedu chicken (Central Java), etc. (Anonymous, 2002)[3]. The rest have never been identified well, so they are generally called village chicken or village chicken. The recent

study on genetic variability of some village chickens in Indonesia showed a higher degree of genetic differentiation compare to Myanmar native chicken (Maa *et al*., 2012)[4].

South-East Sulawesi Province is one of the province in Indonesia situated in eastern Indonesia peninsula where most of the people especially people living in remote area are fond of keeping village chicken for different purposes. The performances of these chickens are typically small and light weight, and low productivity of both egg and meat. However, this village chickens have high resistance to endemic diseases compare to the introduced breed such as commercial broiler or laying hen. This is possibly because they have been familiar with the local environment and adapted well to environmental changes. Moreover, the chicken flavor is more favorable which possible make its prize more expensive (Solihati *et al.*, 2006)[5]. Therefore, it is now necessary to improve the productivity of this village chicken by cross breeding them with high productive chicken such as commercial broiler or bangkok-crossed breed chicken. Commercial broiler is a breed of chicken which has high meat productivity and good in feed conversion (Murtidjo, 2008[6]; Riyadi 2009[7]). While bangkok-crossed breed chicken is a cross breed chicken derived from Thailand which has high productivity and more resistant to disease compare to village chicken (Anonymous, 2013a)[8].

The research will provide quantitative data relate to productivity improvement of village chicken such as fertility and hatchability of egg produced by village chicken crossed by either commercial broiler, bangkok-crossed breed chicken or by village chicken. Day old chick weight was also measured.

MATERIAL AND METHODS

The research was conducted at Poultry Breeding Station of Animal Science Faculty of Haluoleo University for 10 months. Twelve hens of village chicken aged approximately eight months and weighted ±1.0 kg were used in this experiment. Besides, six cocks were also used which consisted of 2 heads village chicken (aged 11±1.41 months, and weighted 2.48±0.11 kg), 2 heads bangkok-crossed breed chicken (aged 12.5±0.71 months, and weighted 3.35±0.21 kg) and 2 heads commercial broiler (aged 8±0.00 months, and weighted 6.40±0.14 kg) to mate the hen of village chicken using artificial insemination method. All chicken were collected from farmer around Kendari, except commercial broiler provided by supplier, and all chicken were fed by commercial feed which has 2776.70 ME and 16.05% crude protein. Three groups were made and each group consisted of 4 hens of village chicken and 2 cocks of different breed for each group and they all were kept individually in cages. Artificial insemination was applied 2 times a week during the experiment to produce fertile egg. Egg collection and weighting were conducted in each clutch and then incubated for 21 days using local incubator machine under the condition of 38.5^{o}C and 70% of humidity. The eggs were turned manually three times a day

from day 4 to day 18 of incubation.

The variables measured included egg fertility, egg hatchability and day old chick (DOC) weight. The fertile egg was observed at day 7 of incubation using candling box equipped with electric light, whereas hatchability and DOC weight were calculated and measured using electrical balance, respectively, following 21 days of incubation. All data collected from each group were tabulated, presented as a mean and then compared the averages between groups using Duncan Multiple Range Test (Steel and Torrie, 1980)[9].

RESULTS AND DISCUSSION

Fertility

Village chicken egg was collected in periods of three clutches. All eggs in each clutch were then incubated using hatching machine for 21 days under the condition of 38.5^{o}C and 70% humidity. On day 7 of incubation eggs were performed candling to determine the fertile egg. Through candling, the condition of air cell, yolk, and albumen were possible being evaluated. It also can detect the bloody whites, blood spots, or meat spots, and enables observation of embryo development. The developing embryo indicated by the existence of a small reddish area with blood vessels extending away from it. This is the embryo floating around inside the egg, looking like a huge red spider. If the embryo dies, the blood draws away from the embryo and forms what is called a blood ring (Anonymous, 2013b)[10]. The results of this observation were presented in Table 1.

Table 1. Egg fertility of village chicken crossed by different cock breeds

Cock breeds	No. of egg	No. of fertile egg	% Fertility
LVC[(a)]	18.75±1.50	16.00±1.83	85.17±3.40
BCB[(b)]	20.50±1.73	17.50±1.29	85.47±3.25
CBR[(c)]	17.00±0.82	14.25±0.96	83.79±3.08

[(a)] Village chicken
[(b)] Bangkok-crossed breed chicken
[(c)] Commercial broiler

The data showed that egg fertility of LVC crossed by BCB (85.47%) was greater than CRB (83.79%) and LVC (85.17%). However, none of them showed statistically differences based on statistical test. The results were similar to the average of egg fertility of village chicken (85%) reported by Rasyaf (2003)[11]. Whereas, Muryanto *et al*. (2012)[12] reported that egg fertility of village chicken was 83.4% and its cross breed was 84.4%. The high egg fertility obtained in this research might be caused by the proper sex ratio of mating in which one cock only served two hens. In this condition, the fertility of sperm produced by cock could maintain in good condition, so the fertile egg could be produced. In

free-range system, one cock served 6 – 10 hens (Mulyono, 2004)[13] Sutiyono *et al*. (2006)[15] in commercial egg layer crossed breed by village chicken (46.51%). King'ori (2011)[16] reported that fertility and hatchability are trait that influenced by both genetic and environmental facrors such as good selection, proper post-lay handling of fertile eggs and the correct incubation process. While Abiola *et al*. (2008)[17] reported that turning frequency during incubation could affect the hatchability of egg. In this research, the egg turning was conducted three times a day in order to make the temperature throughout the egg would similar, so the embryo could develop well during incubation.

Hatchability

Hatchability expressed hatching rates of egg following the incubation. Hatchability data of egg of LVC hen crossed by different cock breeds were presented in Table 2. The data showed that LVC hen crossed by BCB cocks could produce egg with high hatchability (70.08±4.96%)compare to LVC cock (68.44±3.62) and CBR cock (66.46±5.04), although no significant differences were observed. The average of egg hatchability gained in this research (68.32%) was similar to egg hatchability reported by Bachari *et al*. (2006)[14] in village chicken (68.33%) but higher than reported by

Table 2. Hatchability of egg of village chicken crossed by different cock breeds

Cock breeds	No. of fertile egg	No. of hatched egg	Hatchability (%)
LVC[(a)]	16.00±1.83	11.00±1.83	68.44±3.62
BCB[(b)]	17.50±1.29	12.25±0.96	70.08±4.96
CBR[(c)]	14.25±0.96	9.5±1.29	66.46±5.04

[(a)] Village chicken
[(b)] Bangkok-crossed breed chicken
[(c)] Commercial broiler

Table 3. Egg and DOC weight of village chicken crossed by different cock breeds

Cock breeds	Egg weights (g)	DOC weights (g)
LVC[(a)]	40.25 ± 2.69	30.38 ± 4.38
BCB[(b)]	42.51 ± 2.99	35.36 ± 5.43
CBR[(c)]	45.35 ± 3.47	34.67 ± 6.63

[(a)] Village chicken
[(b)] Bangkok-crossed breed chicken
[(c)] Commercial broiler

Day Old Chick (DOC) Weight

Day old chick weigh was measured a couple hours following hatching process in which the chick feathers had been dried. The averages of DOC weight obtained from this research were presented in Table 3.

The average of DOC weight obtained from BCB group was higher compare to other groups, but no significant difference was showed between groups. This DOC weight (35.36 ± 5.43 g) was similar to DOC weight reported by Bachari *et al.* (2006)[18] in village chicken (35.51 g). The egg weight loss was 22% in averages with the higher loss occurred in LVC group (25%), while the lower one observed in BCB group (17%).

CONCLUSSION

It seemed that BCB chicken might be a good candidate for increasing the productivity of village chicken. In the future research, factors relate to disease resistant of this crossed breed village chicken should be taken into consideration as an important variable to measure for proving whether or not the heritability of disease resistant trait of village chicken is high in crossed breed of village chicken.

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