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THE POTENCY OF BUNIDA F1 AND THEIR CROSSBREED (BUNIDA F2) AS SUPERIOR LOCAL CHICKEN

Potensi BUNIDA F1 dan Hasil Silangannya (BUNIDA F2) sebagai Ayam Lokal Unggul

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ABSTRACT
High market demands for animal protein have encouraged the optimization of local chicken genetic resources. This research aims to determine the potency of BUNIDA F1 chickens and their crossed-breed (BUNIDA F2). Five BUNIDA F1 hens at 12 months of age are inseminated with Bresse's semen until they get 50 eggs. The eggs are incubated at 37-38°C and 60-70% humidity. The egg's fertility and embryo development were observed on the 4th, 7^{th,} and 18th days of incubation with the candling method. The parameters observed were egg weight, egg fertility, hatchability, and hatching weight. The results show BUNIDA F1 potencies are 54.12 ± 2.70 g egg weight, 82.59 ± 5.11% fertility rate, 71.14 ± 10.67% for hatchability, and hatching weight of BUNIDA F2 is 37.86 ± 1.97 g. It can be concluded that BUNIDA F1 and BUNIDA F2 have the potency to be developed into superior local chickens.

Keywords*: BUNIDA F1, BUNIDA F2, Crossbreed, Local chicken, Superior genetic*

ABSTRAK
Tingginya kebutuhan masyarakat terhadap protein hewani menyebabkan harus dilakukannya pengoptimalan terhadap sumber genetik lokal. Ayam BUNIDA F1 merupakan ayam hasil persilangan antara ayam lokal Merawang dan ayam eksotik Bresse. Penelitian ini bertujuan untuk mengetahui potensi ayam BUNIDA F1 dan turunannya berupa hasil kawin silang (BUNIDA F2). Sebanyak 5 ekor ayam betina BUNIDA F1 umur 12 bulan diinseminasikan semen ayam Bresse hingga di dapatkan 50 butir telur. Telur selanjutnya diinkubasi pada suhu 37-38 °C dan kelembaban 60-70%. Fertilitas dan pertumbuhan embrio dinilai melalui peneropongan telur pada hari ke 4, 7, dan 18 hari proses inkubasi. Parameter yang diamati adalah bobot telur, fertilitas, daya tetas, dan bobot tetas. Hasil menunjukkan bahwa potensi ayam BUNIDA F1 antara lain rataan bobot telur 54.12 ± 2.70 g, fertilitas telur 82.59 ± 5.11%, dan daya tetas 71.14 ± 10.67%. Sedangkan bobot tetas ayam BUNIDA F2 adalah 37.86 ± 1.97 g. Dapat disimpulkan bahwa ayam BUNIDA F1 dan turunannya (BUNIDA F2) memiliki potensi untuk dikembangkan sebagai ayam lokal unggul.

Kata kunci: *Ayam lokal, Ayam silangan, BUNIDA F1, BUNIDA F2, Genetik unggul*

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INTRODUCTION

Poultry is an important sector of animal protein provision for the Indonesian population, which are meat and eggs. The increasing human population every year involves the demand for livestock products also, especially chicken meat and eggs. The Indonesian Ministry of Agriculture (2022) It reported that the import number of chicken meat in 2022 is 22,651 tons. This number which is increasing from 16,537 tons in 2021. This condition showed that Indonesia was still dependent on imported products to supply the domestic market. A strategy to overcome this problem is utilizing the potency of local genetic resources through local chicken genetic development to be superior chickens. Bresse Unggul Universitas Djuanda (BUNIDA) F1 chicken is a crossbreed chicken from Merawang (local chicken) and Bresse (exotic chicken). The crossing between local and exotic chickens can produce a breed with superior performance and increase the progeny's body weight (Taye *et al.,* 2022).

BUNIDA F1 chicken is a crossbreed chicken between local Merawang and exotic Bresse, it has the potency of a local broiler chicken (Rizkiah *et al.,* 2023). Bresse chickens who mated naturally with Merawang rooster reported having an egg weight average of 48.3 g, fertility of 63.19%, and hatchability of 66.66%. Merawang chicken is a dual-purpose local chicken because it produces meat and eggs. This chicken comes from Bangka Belitung, with body weight in 4 weeks reaching 1.5 kg and played the first egg at 5.5 months of age, 125 eggs/year production, and highly adaptive (Herlina *et al.,* 2016; Nuraini *et al.,* 2020). Bresse chicken is an exotic chicken from France and is famous for its high meat quality. An adult bresse chicken has 1.5-3.0 kg in carcass weight (Verrier *et al.,* 2005).

The crossing between BUNIDA F1 and Bresse to generate F2 (75% Bresse genetics) was conducted to increase body weight to get a new chicken strain with superior genetics of local chicken. Therefore, to raise the goal of developing local chicken genetics, it is necessary to evaluate the reproductive performance and early growth of this crossbreed chicken. Fertility, hatchability, and hatching weight are important parameters to represent progeny genetic potency (Iswati *et al.,* 2017). The results of this study are perhaps to provide scientific information on Indonesian superior local chicken development; it can contribute to improving national food security and reduce the import of chicken meat number at the end.

MATERIALS AND METHODS

Location and Time

The research was conducted in July-August 2024 at a location in BSA Integrated Farming, Mega Mendung Subdistrict, Bogor District, West Jawa, Indonesia.

Materials

Five BUNIDA F1 hens chicken with age 12 months and Bresse rooster chicken at 15 months. We used BR-21® commercial feed (PT. Sinta Prima Feedmill, Indonesia) with the composition of 20-22% crude protein, 5% crude fat, 5% crude fiber, 8% ash, and 0.5% phosphor. Drinking water was provided *adlibitum*. NaCl physiologys to diluted fresh semen.

Methods

Five BUNIDA F1 chicken was inseminated by Bresse's semen. Semen is collected twice a week every 3-4 days by massage method. The fresh semen was diluted with physiological NaCl in a 1:3 ratio. Next, the liquid semen was deposited in the hen's reproductive system using a 1 cc syringe (Rizkiah *et al.,* 2023). The eggs were collected and weighed, then incubated in a hatching machine at 37-38°C and 60-70% humidity. Egg candling was done on 4^{th}, 7^{th}, and 18^{th} incubation days. The hatched chicken could be removed from the hatching machine. The parameters observed were egg weight, egg fertility, hatchability, and hatching weight. BUNIDA F1 of eggs weight and BUNIDA F2 hatching weight parameters were measured using digital scales. Egg fertility was calculated based on the total fertile eggs divided by the total eggs and then multiplied by 100%. Hatchability is calculated from the total hatched eggs divided by the total fertile eggs and multiplied by

100% (Kostaman *et al.,* 2020). We used four cycles of repetitions (at least producing 50 eggs). Data was analyzed with a descriptive method using the SPSS software version 25.

RESULTS AND DISCUSSION

The results show the egg weight average in the four cycles period is 54.12 g (Table 1). The egg weight in other local chickens is 47.82 g for KUB-1 chicken (Paldi *et al.,* 2023), 35.55 g for Tolaki chicken (Eki *et al.,* 2015), and 51.06 g for Sentul chicken (Syamsudin *et al.,* 2016). The egg weight of cross-breed Bresse and Merawang chicken reported was 48.3 g (Rizkiah *et al.,* 2023). This result shows that the egg weight of BUNIDA F1 is higher than that of several other local chicken breeds. The egg weight may influenced by genetics. The egg weight is a performance characteristic inherited from their ancestor, and the value may be different in every chicken strain (Safitri and Purdiyanto, 2023). Egg weight was affected by various factors, such as breed and age (Dirgahayu *et al.,* 2016), feed nutrients (Rahayu *et al.,* 2020), environment, health, and management (Luthfiana *et al.,* 2020). BUNIDA F1 is a cross-breed chicken from local chicken Merawang and exotic chicken Bresse (Rizkiah *et al.,* 2023).

Tabel 1. Mean values of egg weight, fertility, hatchability of BUNIDA F1 and hatching weight of BUNIDA F2

Parameters	Period				Mean±SD
	1	2	3	4	
Egg weight (g)	53.60±2.63	53.73±2.49	54.07±2.70	55.18±3.12	54.12±2.70
Fertility (%)	90.00	80.00	78.57	81.81	82.59±5.11
Hatchability (%)	66.67	58.33	81.81	77.78	71.14±10.67
Hatching weight (g)	38.67±1.86	37.14±3.33	38.22±0.83	37.42±1.27	37.86±1.97

The fertility percentage is the total number of fertilized eggs compared to the total incubated eggs. The fertilized eggs can be seen by using candling, which displays the embryo development in the egg, the form of clearly visible red filamentous blood vessels as a sign (Safitri & Purdiyanto, 2023). Based on the egg fertility analysis, BUNIDA F1 have the average fertility percentage in four cycles periods of 90%, 80%, 78.57%, and 81.81%, with a total average of 82.59 ± 5.11% (Table 1). It was known that BUNIDA F1 have an average fertility percentage above 80%. The fertility of BUNIDA F1 is higher, which may be caused by the breeding method with artificial insemination technique. The egg fertility percentage from artificial insemination in poultry ranged from 73-87% (Mohan *et al.,* 2016). The artificial insemination method can increase the percentage of fertility (Heafiz *et al.,* 2023). Some factors that affect artificial insemination success are chicken strain (Dako *et al.,* 2018), age (Kostaman *et al.,* 2020), semen diluent (Pandia *et al.,* 2021), insemination dose, semen quality, semen deposition, and insemination time (Dirgahayu *et al.,* 2016), as well as age and health (Dako *et al.,* 2018).

Hatchability value is the percentage of hatched eggs from fertilized eggs. The average hatchability of BUNIDA F1 is 71.14% (Table 1). The hatchability in Gaok chicken is 73.25% (Sartika *et al.,* 2020), and 58.99% in local chicken (Asma *et al.,* 2021). The hatchability of the BUNIDA F1 in this study is still superior. The hatchability value is influenced by the selection of hatching eggs, such as egg shape, egg weight, shell condition, air space in the egg, egg age, and operational incubation machine (temperature, humidity, air circulation, egg rotation, machine cleanness) (Dako *et al.,* 2018). On the other hand, hatchability is influenced by genetics also (Safitri and Purdiyanto, 2023). The low hatchability is possible due to the egg's condition with soft cracks. The eggshell cracks allowed the microorganism contamination to enter the egg and cause embryonic death (Paputungan and Lambey, 2017).

The hatching weight average in this study is 37.86 ± 1.97 g (Table 1), with the lowest weight in 32 g and highest in 41 g.

Hatching weight results in this study are still higher than other local chickens, such as KUB 28.14-29.95 g (Lomboan *et al.,* 2022), BUNIDA F1 33.44 g (Rizkiah *et al.,* 2023), Merawang 31.81 g (Sari *et al.,* 2021), and Sentul chicken 2.53 g (Syamsudin *et al.,* 2016). The high value of hatching weight in BUNIDA F1× bresse rooster (BUNIDA F2 75% Bresse genetic) may affected by genetics. Genetic factors play an important role in influencing egg weight, yolk size, and hatching weight (Goto *et al.,* 2022). The amount of egg hatching weight is influenced by the amount of internal egg content, such as yolk and egg white, which makes a lot of food available during embryonic development (Paputungan and Lambey, 2017). Embryo development in eggs is affected by the availability of food reserves and the environment during the incubation period (Yuniarinda *et al.,* 2019).

CONCLUSION

Bresse Unggul Universitas Djuanda (BUNIDA) F1 chickens and their crossed-breed chickens with bresse roosters (BUNIDA F2) have the potential to be developed as superior local chickens.

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