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Growth Performance of *Merawang*aranb Chickens with Different Genetic Compositions

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Abstract

*Merawang*arab chicken is a local chicken produced by two local chicken strains, *Merawang* and arab chickens. This study aimed to analyze the growth of crosses between sixth generation *Merawang*arab chickens with different genetic compositions of *Merawang* (M) and arab (A) during 12 weeks of rearing. This research used the results of crossing Arabian chickens with *Merawang* chickens with different genetic ratios, namely 25% M, 50% M, 62.5% M, and 75% M. Variables included feed consumption, body weight, body weight gain, and feed conversion. The research results showed that the different genetic compositions of the sixth generation of *Merawang*arab chickens did not affect the growth performance during 12 weeks of rearing except for different feed consumption. Body weight at 12 weeks of age for each type of chicken were 856.8 ± 274.2 (23% M), 858.9 ± 195.4 (50% M), 863.7 ± 156.9 (62.5% M), and 854.0±172.9 (75% M). The growth performance of the sixth generation of *Merawang*arab chickens was still diverse and can be selected to improve the performance of merwangarab chickens.

Key words: different genetic composition, growth performance, Merawangarab chicken

INTRODUCTION

The development of local chickens is needed to support livestock businesses and efforts for food independence, but currently many chicken farms are still operated individually using traditional rearing systems. In several developing countries, local chicken farming businesses are important in increasing people's income because these businesses involve a large portion of the poor population (Sonaiya 2007).

The research results of Darwati *et al*. (2018) that *Merawang*arab chickens are a cross between two local chicken strains, *Merawang* and arab an effort to develop the genetic quality of chickens. The weight of male and female first generation *Merawang*arab chickens aged 12 weeks reached 1,099 ± 121.4 g and 976.5 ± 63.5 g. Nuraeni *et al*. (2019) stated that the *Merawang* chicken is a local Indonesian chicken, precisely originating from Bangka Belitung, this chicken has the potential to be developed into a meat type and laying chicken with egg production of 125 eggs per year (Nuraeni *et al*. 2019). Arab chickens have the potential as local laying hens and can produce 190-250 eggs per year with an egg weight of 30-35 g per egg (Alwi *et al*. 2019).

The aim of developing Merawangarab crossbred chickens was to develop local chickens with optimal function in terms of meat type and layers to utilize the potential of local chickens in Indonesia. This study evaluated the growth performance of crosses in sixth generation offspring with differences in genetic composition with genetic ratios, namely M (*Merawang*) 25%, 50%, 62.5%, and 75% aged 1-12 weeks.

METHOD

Time and Location of Research

The research was carried out from September 2022 to December 2022. The research was conducted at the Breeding and Genetics Field Laboratory, Faculty of Animal Husbandry, Bogor Agricultural Institute.

Tools and materials

The equipment used is a brooding cage, folding iron cage, brooder, 40-60 watt lamp, feed container, drinker, hatching machine, an egg try, scales with an accuracy of 0.1 g with a 2 kg and 5 kg capacity.

The materials used are chickens from crossing *Merawang*arab chickens with different genetic ratios: 25% *Merawang* chickens, 50% *Merawang* chickens, 62.5% *Merawang* chickens, and 75% *Merawang* chickens. Maintenance started from 1 week to 12 weeks of age. The sixth generation of chickens was obtained from intense mating 5th generation chickens at the Breeding and Genetics Field Laboratory, Faculty of Animal Husbandry, Bogor Agricultural Institute. The DOC in *Merawang* was 25%, 50%, 62.5% and 75%, respectively 25; 82; 59; and 34 birds.

Feed for cross-bred chicks uses 100% starter phase commercial broiler feed at DOC until three weeks of age. Next, they are given a mixed commercial broiler feed with rice brain tailored to each growth stage.

Procedure

Maintenance

Chicken rearing from DOC to 4 weeks is carried out in brooder cages. After 4 weeks of age, they are moved to a cage for enlargement. Disease prevention is done by administering the ND vaccine via eye drops. Vitamins are given until the chicken is 2 weeks old. Furthermore, vitamins are given before and after the weighing process.

Feed is given 2 times a day, namely morning and evening. Drinking water was provided ad libitum during maintenance. Commercial feed for starter phase broilers with 19.21% crude protein in crumble form. 100% commercial feed is given to day old chicks (DOC) up to 3 weeks of age. Chickens > 3-4 weeks old are given a mixture of 80% commercial feed with 20% rice bran. Chickens aged > 4-5 weeks are given a mixture of 70% commercial feed with 30%

rice bran. Chickens aged > 5-12 weeks are given a mixture of 60% commercial feed with 40% rice bran.

Data Analysis

The design used was a randomized block design (RAK) for 4 types of crosses with 5 hatching periods for chickens 25% M, 50% M, 62.5% M, and 75% M. Data analysis was used to compare growth between chickens 25% M , 50% M, 62.5% M, and 75% M sixth generation. Measurements were carried out every 1 week for 12 weeks. The data were analyzed for variance with a confidence interval of 95% and 99% and if the results were significantly different, Tukey's multiple comparison test was carried out. The experimental design model according to Mattjik and Sumertajaya (2013) was as follows:

$$Yij = \mu + \tau i + \beta j + \varepsilon ij$$

Yij: observation of body measurements on the i-th type of chicken (raw 25%, 50%, 62.5% and 75%) and the jth period (periods 1,2,3…6);
μ : average observation value;
τi: influence of chicken type at level i;
βj : effect of the period on the jth kef level; And
εij : influence of experimental error on the ith type of chicken and the jth period.

Variable

The measured variables were body weight, weight gain, feed consumption, feed conversion, and mortality. An explanation of these variables was as follows:

1. Body weight (g per week per bird), body weight is weighed every week of maintenance;
2. Increase in body weight (g per bird per week), obtained by calculating the difference in body weight at the end of the week minus the body weight of the previous week;
3. Feed consumption (g bird per week), obtained by calculating the difference in the amount of feed given and the remaining feed remaining in 1 week; and
4. FCR (feed conversion ratio) is obtained by comparing feed consumption to body weight gain.

RESULTS

The growth performance of the sixth generation of *Merawang*arab chickens is presented during 12 weeks of rearing and is presented in Table 1.

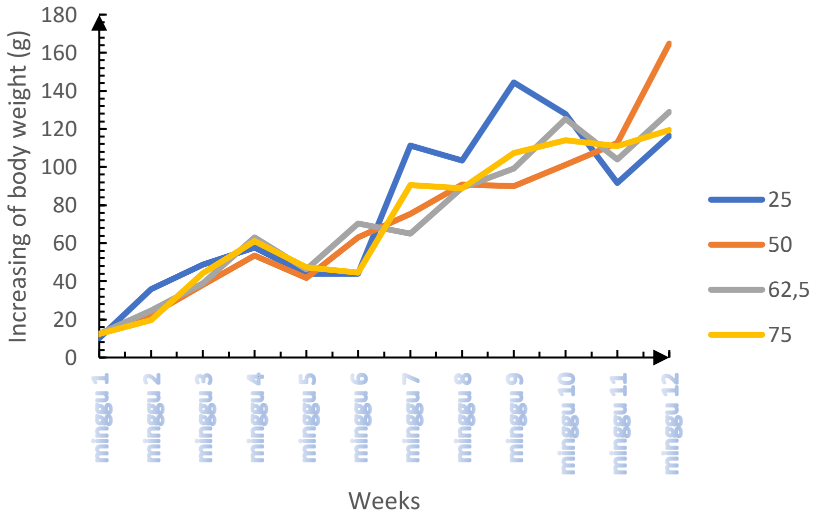
Table 1 The growh performance of the sixth generation of *Merawang*arab chickens

Average Performance	x̄±sd			
	Genetic composition of *Merawang* chicken			
	M 25%	M 50%	M 62,5%	M 75%

Feed consumption for 12 ewwks	3212,1±148,3[c]	4283,5± 216,7[a]	3668,6±190,7[b]	3813,9±185,9[b]
Body weight at 12 weeks	856,8±274,2	858,9±195,4	863,7±156,9	854,0±172,9
PBB for 12 weeks	828,4± 42,9	837,3±43,0	837,5±37,9	825,2±39,3
FCR	5,6±2,5	6,2±1,8	5,6±2,4	5,8±1,7

The average performance of *Merawang*arab chickens during the 12 weeks of growth period from 1-12 weeks of age did not differ except for feed consumption, merangarab chickens with a genetic composition of 50% M had the highest feed consumption among the four types of *Merawang*arab chickens in this study. However, FCR as an indicator of feed efficiency for 12 weeks of maintenance was not different (same) for 25% M, 50% M, 62,5% M, 75% M.

The growth rate of *Merawang*arab chickens during rearing from 1 week to 12 weeks of age is presented in Figure 1



*Merawang*arab with different genetic compositions had almost the same growth pattern but varied between types. At week 11, body weight gain decreased except 50% M consistently increased.

DISCUSSION

Feed Consumption

The feed consumption of the four types of *Merawang*arab chickens and the composition of *Merawang* chickens were statistically significantly different. Chickens with a genetic composition of 50% M consume the most feed among the four types of *Merawang*arab, whereas chickens with a genetic composition of 25% M have low feed consumption.

The feed consumption performance in this study was higher than that of the previous generation *Merawang*arab cross breed parents (Nurcahya *et al*. 2022), free-range chickens in the study by Eriko *et al*. (2016). Diversity of feed consumption in the four types of crossbred chickens. *Merawang*arab chickens have low diversity in each type of chicken.

Body Weight

The body weight of the sixth generation was not much different from the performance of the previous generation with the same feed treatment. The body weight of *Merawang*arab chickens was higher than that of ketarras chickens (the offspring of arab chickens with arras chickens) namely 753.23 ± 49.13 g and higher than arabian chickens 815.60 ± 66.15 g (Gunawan *et al*. 2018) which is one one local chicken which is the parent of the *Merawang*arab cross breed of chickens.

The coefficient of variation in body weight of *Merawang*arab chickens of the sixth generation aged 12 weeks with a genetic composition of 25% M (32%), 50% M (22.75%), 62.5% M (18.17%), and 75% M (20 .24). The body weight of 12 week old *Merawang*arab chickens can still be selected to improve the genetic quality of *Merawang*arab chickens, thereby increasing the performance of *Merawang*arab chickens.

BODY WEIGHT GAIN

Body weight gain of *Merawang*ara chickens, the genetic composition of 25% M, 50% M, 62.5% M, and 75% M in this research was not significantly different as presented in Table 1. The growth of this cross-bred local chicken was lower compared to the previous generation in Darwati *et al*. (2017), the influence of heterosis is high in the first generation. However, the body weight gain of these crossbred chickens was higher than that of super kampung chickens in Pakaya *et al*. (2019), ketarras chicken (Gunawan *et al*. 2018).

The coefficient of diversity of *Merawang*arab chickens at 12 weeks of age with different compositions was 25% M (24.42%), 50% M (48.4%), 62.5% M (42.79%) and 75% M (41.78 %). Based on the coefficient of diversity at 12 weeks of age, selection can be carried out to improve the genetic quality of *Merawang*arab chickens. The increase in body weight of *Merawang*arab chickens with a genetic composition of 25% M, 50% M, 62.5% M, and 75% M in this study had *Merawang*arab chickens 50% and 75% more likely to be developed than two merangarab 75% M and 25% M compared with ketarras chickens (chickens descended from arab chickens with cedar chickens) aged 12 weeks which had a body weight gain of 645.07 ± 46.28 g (Gunawan ***et al***. 2018), the body weight gain of *Merawang*arab chickens in this study was greater. This can happen because of the differences in the genetic composition of *Merawang*arab chickens and ketarras chickens and body weight gain is closely related to feed consumption and feed containing nutrients that can meet the livestock's needs during the growth period. The growth rate of *Merawang*arab chickens is presented in Figure 1.

The growth patterns of the four types of *Merawang*arab chickens vary. Fluctuations in growth rate are influenced by various factors, including the quality of feed each week being different. *Merawang*arab chickens with a genetic composition of 50% M appear to increase consistently. In the other three types of *Merawang*arab in the 11th week, growth decreased from the previous week and increased again in the 12th week.

FCR

The FCR values of the four *Merawang*arab with different genetic compositions were not statistically significantly different. The FCR in the sixth generation is higher than the previous generation.

A low feed conversion value indicates that feed use efficiency is good (Allama *et al*. 2012). A small feed conversion value indicates that the more efficient the animal's ability to digest feed, the less feed is needed to achieve an increase per one kilogram of body weight (Hidayat 2012).

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