

Length of Hatching, Hatching Weight and Sex Ratio in Domestic Chickens Crossed with Three Types of Roosters

Soleman Nggauhar Oktavianus

Department of Animal Husbandry, Faculty of Science and Technology, Universitas Kristen Wira Wacana Sumba, East Sumba Regency, Province of Nusa Tenggara Timur, Indonesia

Email: soleman96.nggauhar@gmail.com

Abstract

The aim of the study was to determine hatching time, hatch weight, and sex ratio of domestic chickens crossed with various good males. The research was conducted in Mbatakapidu Village, Kota Waingapu District, East Sumba Regency for two months. This study used 30 native chickens aged 10 months in addition to three bangkok, ciliper or plucker, and pakhoy chickens. Parameters observed included: hatch time, hatch weight, and sex ratio. Data were analyzed using the ANOVA test. The results showed: 1) the average hatching time of native chickens crossed with three roosters: Pakhoy took 18.87 days, Ciliper took 18.53 days, and Bangkok took 18.53 days. 2) hatching weight of three roosters crossed with native chickens was 34.23 g for Bangkok, 33.18 g for Ciliper, and 31.72 g for Pakhoy. (3) The average sex ratio of DOC native chickens crossed with three roosters is Bangkok: male DOC is 20.41 percent, while female DOC is 44.90 percent. Caliper or Plucker: 14.29% male DOC, 33.67% female DOC, and Pakhoy: 7.00% male DOC and 27.55% female. The effect on the three observed parameters was determined by crossing native chickens with three roosters. Sex ratio had no effect on determining the sex of DOCs resulting from crossing native chickens with three roosters, however the use of three roosters had an effect on hatching time and weight. The sex ratio shows a very weak correlation with hatching time and hatching weight. To increase the productivity of free-range chickens it is important to cross them with several roosters.

Keywords: Length of Hatching, Hatching Weight and Sex Ratio



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).

INTRODUCTION

One of the efforts to increase the potential of livestock commodities in the supply of animal protein to meet the needs of the community is the development of free-range chicken farms. Free-range chickens have advantages and potential to produce meat and eggs. NTT free-range chicken meat production reaches East Sumba Regency where free-range chicken egg production reaches 135,215.00 tons per year and free-range chicken meat production reaches 76,5964.00 tons per year (BPS Sumba Timur 2020). The free-range chicken rearing system is only used as a side business with the intention of taking the meat and eggs as additional family nutrition and selling when needed, which is another obstacle in the development of free-range chickens. Chickens are usually allowed to roam (unbar) in gardens or yards to find food because breeders rarely feed their chickens, so the rearing system is usually traditional and has not been managed with good breeding practices.

Free-range chickens are able to incubate their eggs but produce few eggs, while free-range chickens from crosses with roosters are able to produce many eggs but lose their ability (Suharno and Amri, 1999). This causes the regeneration of free-range chickens which can only be achieved through artificial hatching using hatching machines. The exterior characteristics of free-range chicken eggs produced by crossing elders are very diverse, including the size and weight of the eggs. Because egg weight is one of the factors that influence hatching time, hatching weight, and sex ratio, Nugroho (2003) states that egg weight is a measure that is often used in selecting hatching eggs. However, breeders often select eggs for incubation without

considering the external qualities of the eggs or their weight, and many breeders may even select eggs that are too heavy or too light. The purpose of this study was to determine the sex ratio, hatching weight, and length of time native chickens were mated with three different types of roosters.

RESEARCH METHODS

This research was conducted for 2 months from February to March 2022 in Mbatakapidu Village, Kota Waingapu District, East Sumba Regency, NTT. Main Ingredients Free-range chicken eggs collected from intensive rearing are the main components of the eggs used. The eggs used in this study were 112 eggs aged 5 days and came from 30 female native chickens. There were 14 eggs used for each treatment unit. This study used two automatic incubators with a capacity of approximately 56 eggs per unit, scales to weigh the eggs, and newly hatched DOCs, a bowl to hold water. Placing a container filled with water at the bottom of the egg allows humidity adjustment to about 56 percent and a source of electrical energy.

Research Procedure

1. Cage preparation. The cages to be used are 6 x 2 m in size, with each cage divided into length and width of 2 x 2 m and the number of cages used is 3 cages.
2. Preparation of Hatching Eggs. The hatching eggs that will be used in this study come from productive free-range chickens that are reared intensively. The number of eggs during the maintenance period, a total of 112 eggs, each treatment unit required 112 eggs, and where 14 eggs were used for each unit to be hatched.
3. Preparation of hatching machine. The automatic incubator that is used is an automatic incubator that is made simple. Then the automatic incubator is cleaned before use. At an incubator temperature of 37.00°C to 38.00°C, humidity control is achieved by placing a container filled with water at the bottom of the egg rack to achieve a humidity of about 56%.



Figure 1.

4. Laying eggs in the incubator. After the weight of the eggs is determined, they are then placed in egg racks which are separated by separators for each type of male. Eggs are placed horizontally on the rack, and the eggs are rotated by moving the rack in the incubator for three hours and six seconds each day for 18 to 19 days. After the eggs are placed in the incubator, they are incubated for 18 to 19 days.
5. Incubation Stage (Hatch). At temperatures ranging from 37.00°C to 38.00°C degrees Celsius and relative humidity of 50 to 56%, the incubation period lasts 18 to 19 days. From the first day of incubation to the 18th to 19th day the eggs are turned at least three times per hour. Candling is done on the fifth day to determine the development of the egg embryo.
6. The stage of collecting data on hatching time, hatching weight and sex ratio. Before the eggs are put into the incubator, data collection and recording is carried out, especially the number of eggs that have been prepared, then written down based on observations during the hatching process.

The research method that can be carried out on the title "Hatching Length, Hatching Weight and Sex Ratio in Domestic Hens Crossed with Three Types of Roosters" is as follows: the method used is a randomized block design with the research method that can be used is experimental with a factorial design. The independent variables are three types of roosters and the dependent variables are hatching time, hatching weight, and sex ratio. The population used was cross-breed chickens from three different types of roosters. Samples are taken randomly based on data that has been written from the population. Data can be collected through direct observation of cross-breed chickens. Data on hatching time, hatching weight and sex ratio can be measured and recorded for each cross-breed chicken. The data that has been collected can be analyzed using the analysis of variance technique (ANOVA) to test the differences in the average length of hatching, hatching weight and sex ratio in free-range chickens from three different types of rooster. In addition, a correlation analysis can also be performed to determine the relationship between hatching duration and hatching weight with the sex ratio in domestic-crossed chickens.

RESEARCH RESULTS AND DISCUSSION

Length of Hatching, Weight of Drops and Ratio of Males to Females Crossed with Males of Bangkok

The average length of hatching of native chickens from crosses with Bangkok chickens can be seen in Table 1 below:

Table 1. Average Length of Hatching, Hatching Weight and Bangkok Male Ratio

Male Type	Research Variable		
	Old Hatching	Berat Tetas	Old Hatching
Bangkok	18,53	34,23	Female
Ciliper	18,22	33,18	Female
Pakhoy	18,87	31,72	Female

The results showed that the sex ratio of chickens had no effect, while crosses between native chickens and bangkok males had an effect on hatching duration and hatching weight. According to . (Wiesje & Rajab, 2015), sex is influenced by genetics and parental age, puberty, temperature in the environment, and diet or rations. In the crosses of bangkok chickens with village females. The average length of hatching, hatching weight and sex ratio obtained were 18.53 days and 34.23 grams, respectively.

The incubator was used for hatching in this study (Nafiu et al., 2014). Because the age of the eggs used is uniform, which is approximately 5 days, the hatching time for native chicken eggs incubated in the incubator is 18.53 days or 19 days. According to Prathama et al. (2016), embryo pipping can be affected by a longer or shorter incubation period, accelerating the 18-day hatching time. Analysis of the results of variance showed that the results of crossing chickens had no significant effect ($P > 0.05$) on the hatching variable, the three males used in this study were not significantly different, so the hatches were almost the same. This is in accordance with La Ode et al. (2014) found that the uniform age of eggs affects the length of the incubation period and the hatching period. The average hatching weight during the study ranged between 30.40 grams and 34.23 grams. This is not different from research (Irma Susanti a, 2015) which shows that the average hatch weight is 30.25 g, and 31.41 gr. Ahyodi et al. claim that, 2014. Eggs that are not too big or too small will hatch better if they are of average weight. According to (Nafiu, L.O., Rusdin, M. and Aku, AS, 2015) Free-range chicken eggs usually hatch after an incubation period of 21 days, but after crossing with Bangkok males, their hatching time is relatively shorter, namely 18.53 days. Meanwhile, hatching weight according to (Mulyadi, Y, & Mariani, Y, 2021) said that the average hatching weight of chickens resulting from crosses

between Bangkok chickens and native chickens was 32.16 grams to 34.23 grams, which is the average hatching weight.

According to the research findings, males (20.41 percent) and females (44.90 percent) determine the sex of DOCs that hatch using the feather sexing method by observing the growth of their feathers. The primary feathers, which are also present on the wings, are then compared to those of the DOC. It has up to 95% accuracy if this method is used. Khalid et al. say that, 2016. Wet acid in the female genital tract is said to affect the sex ratio. Differences in sex ratios have important implications for the dynamics and survival of livestock. Percentage of male and female DOC The results obtained in this study did not differ from the results of having more daughters than males. (Kostaman et al, 2021).

Length of Hatching, Weight of Drops and Ratio of Males to Females Crossed with Ciliper or Plucker Males

The average length of hatching of native chickens from crosses with Caliper or Plucker chickens can be seen in Table 2 below.:

Table 2. Average Hatching Duration, Hatch Weight and Ratio of Ciliper or Plucker Males

Male Type	Research Variable		
	Old Hatching	Berat Tetas	Old Hatching
Bangkok	18,53	34,23	Female
Ciliper	18,22	33,18	Female
Pakhoy	18,87	31,72	Female

This research shows that the results of crossing native chickens with Ciliper or Plucker males are not different from the results of crossing Bangkok chickens. Hatching time, weight and sex ratio of chicks had no effect on the average length of hatching, weight or sex ratio obtained in crosses. Ciliper and free-range chickens, incubation period 18.22 days, hatch weight 33.18 grams, because the ages of the eggs used are uniform, the hatching of native chicken eggs that have been crossed with ciliper or male pluckers takes 18.22 days or 18 days. The time it takes for the eggs to hatch is 18 days. Based on the average hatching weight during the study which ranged between 30.40 grams and 33.18 grams which was not different from the study (Sarini Paputungan, 2017). The hatching weight of DOC native chickens crossed with cilipers was 33.18 grams. According to (Junaedi, J. and Hastuti, H, 2021) Free-range chicken eggs usually hatch after an incubation period of 21 days, but after crossing with hens or male cilipers or pluckers the incubation period is relatively shorter, namely 18.22 days and the average weight According to (Irmaya, et al. 2021), the hatching of chickens resulting from crosses between Bangkok chickens and free-range chickens is 30.40 grams to 33.18 grams, which is the average hatching weight.

The results of the study found that the sex ratio of DOC from crosses between domestic and caliper chickens had no effect on the sex ratio (sex) of males (14.29%) or females (33.67%). The feather sexing method is used to determine the sex of the DOC by comparing the growth of the feathers on its wings with the primary feathers that are also present on the wings. (Wiesje & Rajab, 2015) said (DOC) was the dominant female for all hatched eggs. Based on the results of the analysis it can be concluded that three roosters have no effect on the sex of DOC domestic chickens.

Length of Hatching, Weight of Drops and Ratio of Males to Females Crossed with Males of Pakhoy

The average length of hatching of native chickens from crosses with Pakhoy chickens can be seen in Table 3 below:

Table 3. Average Length of Hatching, Hatching Weight and Pakhoy Male Ratio

Male Type	Research Variable		
	Old Hatching	Hatch Weight	Sex Ratio
Bangkok	18,53	34,23	Female
Ciliper	18,22	33,18	Female
Pakhoy	18,87	31,72	Female

Based on the findings of this study, the results of crossing free-range chickens with Pakhoy males were comparable to Bangkok and Caliper chickens in terms of hatch weight, hatch time and sex ratio. Sex is influenced by parental genetics, puberty, environmental temperature, and rations in crosses between Pakhoy chickens and village females which have an average length of hatching, hatching weight, obtained in crosses is 18.87 days of hatching, and hatching weight of 31.72 grams . Because the ages of the eggs used were uniform, the incubation time for native chicken eggs crossed with Pakhoy chickens in the incubator was 18.87 days. The time needed for eggs to hatch is influenced by the age of the eggs, which is 5 days. Meanwhile, based on the average hatch weight during the study, DOC had a hatch weight of 31.72 grams. The average weight ranged from 30.00 grams to 31.72 grams in this study. According to (Betty Herlina, R. N, 2022) The average hatching time for native chickens is 21 days, but after being crossed with males, Pakhoy has a relatively shorter hatching time of 18.87 days. And the hatching weight of chickens resulting from crosses between bangkok roosters and domestic chickens showed an average hatching weight, that is, the average hatching weight varied from 30.00 grams to 31.72 grams.

The results of the study found that the sex ratio of DOC resulting from crossing native chickens with Pakhoy males had no effect on the male (7.14%) and female (27.55%) sex ratios. The same method is used to determine the sex of the DOC: feather sexing is performed by observing growth. The primary feathers on the DOC wings are then compared to the wing feathers. The type of feed affects sex by 50:50. (Ruhana, S.M., Nuraini, N. and Badaruddin, R, 2021) said this is shown from the results of this study. strong say good feather sexing can be used as an indicator to determine the sex of the chicken. Sexually includes the quality characteristics of poultry, which is not true. (Tariffan, I. N., & Allaily, A, 2020) said there are several methods to determine the sex ratio in poultry, including Vent sexing and then performing a laparotomy (autopsy) to prove the accuracy of the two methods . Ventilation Sex is carried out according to the Masui method, ie. H. places the head of the tail between the middle and ring fingers of the left hand, then the stool is cleaned and placed somewhere. With the pressure of the right thumb and forefinger which is smooth but strong.

Correlation of hatching duration, drop weight and ratio of male to female crosses with three roosters

Based on the analysis of Annova Sex ratio, showing a very weak correlation between hatching time and cross-hatching weight of the three types of males and females of free-range chickens, it did not show a linear relationship between sex ratio, hatching weight and hatching time based on the P value correlation test (> 0.05). The R value is 0.105^a and R-squared (R²) is 0.011%. This shows that there is no significant effect of hatching time and hatching weight on the sex ratio.

CONCLUSION

The results of crossing native chickens with bangkok males had an effect on hatching duration and hatching weight, the results showed that the sex ratio of chickens had no effect. This study found that neither males (14.29%) nor females (33.67%) were affected by the sex ratio (sex) of DOCs from crossing native chickens and three roosters. The results of crosses

between free range chickens and pakhoi males were comparable to bangkok and caliper chickens in terms of hatching weight, hatching time and sex ratio, according to this study.

BIBLIOGRAPHY

- Ahyodi, F., K. Nova dan T. Kurtini. 2014. Pengaruh bobot telur terhadap fertilitas, susut tetas, daya tetas, dan bobot tetas telur kalkun. *Jurnal Ilmiah Peternakan Terpadu*. 2(1).
- Betty Herlina, R. N. (2022). Program Studi Peternakan Fakultas Pertanian Universitas Musi Rawas. Pengaruh Berat Telur Ayam Kub Terhadap, Fertiliyas, SUSUT, 10, 1-10.
- BPS Sumba Timur, 2020, Badan Pusat Statistik, Kabupaten Sumba Timur.
- Irma Susanti a, T. K. (2015). Pengaruh Lama Penyimpanan Terhadap Fertilitas, Susut Tetas. *Jurnal Ilmiah Peternakan Terpadu*, 3(4), 85-190,
- Irmaya, D., Depison, D., & Gushairiyanto, G. (2021). Quantitative characteristic of Indonesian native chickens at the age of 4 months. *Livestock and Animal Research*, 19(1), 108. <https://doi.org/10.20961/lar.v19i1.43150>
- Junaedi, J. and Hastuti, H. (2021) "Karakteristik Telur Tetas Ayam Kampung dan Ayam Persilangan Kampung-Bangkok yang Ditetaskan dengan Mesin Tetas". *Ternak Tropika Journal of Tropical Animal Production*, 22(1), pp. 52-62. Available at: <https://doi.org/10.21776/ub.jtapro.2021.022.01.7>
- Kholid, M., Rukmiasih, dan R. Afnan. 2016. Nisbah Jenis Kelamin Hasil Penetasan Telur Itik Cihateup dan Alabio. *Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan*, 4(2):269-274.
- Kostaman, T., S. Sopiyan, D. S. Kumalawati, T. Susanti, dan M. Purba. 2021. Performa dan penyebaran itik unggul Balitbangtan untuk mempercepat pembibitan itik di masyarakat. *Prosiding Seminar Nasional Teknologi Peternakan dan Veteriner*. 512-524. Doi: 10.14334
- La Ode, Nafiu. Muh. Rusdin, dan Achmad Selamat Aku. 2014. Daya Tetas Dan Lama Menetas Telur Ayam Tolaki Padamesin Tetas Dengan Sumber Panas Yang Berbeda. *Jurnal Ilmu dan Teknologi Peternakan Tropis*. Vol.1 No.1, Hal. 32-42.
- Mulyadi, Y., & Mariani, Y. (2021). Peningkatan Bobot Badan Ayam Buras Lokal Cianjur Melalui Perkawinan Silang Dan Seleksi Bobot Tetas Di Tingkat Kelompok Ternak Ayam "Pusaka". *Agripteke (Jurnal Agribisnis Dan Peternakan)*, 1(2), 51-59.
- Nafiu, L.O., M. Rusdin, dan A.S. Aku. 2014. Daya Tetas dan Lama Menetas Telur Ayam Tolaki pada Mesin Tetas dengan Sumber Panas yang Berbeda. *Jurnal Ilmu dan Teknologi Peternakan Tropis*, 1(1): 32-44.
- Okatama, S.O., S. Maylinda, dan V.M.A. Murgiantiningsih. 2018. Hubungan Bobot Telur dan Indeks Telur dengan Bobot Tetas Itik Dabung di Kabupaten Bangkalan. *J. Ternak Tropika*, 19(1):1-8.
- Sarini paputungan, L. J. (2017, Januari). Pengaruh Bobot Telur Tetas Itik Terhadap Perkembangan. *Jurnal Zooteke ("Zooteke" Journal, Vol. 37 No. 1, 96 - 116.*
- Tarigan, I. N., & Allaily, A. (2020). Pengaruh perbedaan grade Telur Pada ayam lokal pedaging Unggul (ALPU) dan Kamaras Terhadap fertilitas Dan Sex ratio. *Jurnal Ilmiah Mahasiswa Pertanian*, 5(3), 1-6. <https://doi.org/10.17969/jimfp.v5i3.14728>
- Wiesje, H. M., & Rajab. (2015). Indetifikasi Jenis Kelamin Anak Ayam Buras Berdasarkan Bobot dan Indeks Telur Berbeda. *Agrinimal*, Vol. 5, 6-10.