

## **PERFORMANCE ANALYSIS IN QUANTITATIVE LOCAL DUCKS IN KEDIRI REGENCY EAST JAVA**

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### **ABSTRACT**

The livestock sector is one of the potentials in Indonesia, including duck farming. The duck population in Kediri District in 2022 amounted to 367,987 heads. This research was conducted in 5 subdistricts in Kediri District including Mojo Subdistrict, Ringinrejo Subdistrict, Wates Subdistrict, Ngasem Subdistrict, and Gampengrejo Subdistrict. The variables observed in this research include quantitative traits (femur length, tibia length, shank length, shank circumference, wing length, sternum length, chest width, and chest depth). The differences in the results of this study are influenced by environmental factors and genetics. The conclusion of this study is that the morphometric measurement interval (quantitative traits) of local ducks in each sub-district in Kediri District varies greatly because it is influenced by several factors including the environmental conditions of each sub-district, feed consumption, maintenance methods, and age. The measurement results show that local ducks in Kediri District are still cultivated by farmers and have a variety of sizes. The suggestion of this research is that morphometric measurements (quantitative traits) of local ducks should be carried out in all sub-districts in Kediri District so that it can be known that the body size of ducks in Kediri District is very diverse.

**Keywords:** Ducks; morphometric; quantitative

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## INTRODUCTION

The livestock sector is one of the potentials in Indonesia, including duck farming. The duck population in Kediri District in 2022 amounted to 367,987 heads, this figure shows that the duck population in Kediri District has increased by 1% from the previous year (Badan Pusat Statistik Provinsi Jawa Timur, 2023). Ducks are one of the dual-purpose poultry animals that are cultivated with the main purpose of producing meat and eggs. In addition, ducks are one of the waterfowl because they have aquatic properties (like water). The characteristics of ducks include having dense feathers that contain oil all over their body, having webbed and short legs, and can produce eggs in a longer period of time when compared to other poultry. Ducks have a low mortality rate because they have strong immunity (Fatmona et al., 2023). These factors make farmers in Indonesia choose ducks to cultivate them as farm animals.

Ducks are divided into 3 groups including laying ducks, broiler ducks, and ornamental ducks. Based on these groups, ducks can be utilized according to their characteristics. Some types of ducks found in Kediri Regency are local ducks and have their own characteristics. Characterization is the first step to breeding livestock, one of which is ducks, which has the aim of identifying important traits (having economic value), namely body weight or typical characteristics of the livestock concerned. Duck characteristics can be done by identifying the morphometrics of livestock. Morphometrics are quantitative traits that can be used to increase duck productivity.

Quantitative traits of ducks include femur length, tibia length, shank length, shank circumference, wing length, chest width, and chest depth. These quantitative traits can characterize the body shape of ducks which is useful for standardizing the traits possessed by ducks. Morphometric identification (quantitative traits) is useful for classifying by identifying the

characteristics of a breed of livestock. However, until now the activities of characterizing and identifying local ducks in Kediri District have not been carried out so that basic information about morphometric characteristics is not yet available. The purpose of this study was to determine the quantitative characteristics (morphometrics) of local ducks in Kediri District as a basis for breeding.

## MATERIALS AND METHODS

### Research Location and Time

This research was conducted in 5 subdistricts in Kediri District including Mojo Subdistrict, Ringinrejo Subdistrict, Wates Subdistrict, Ngasem Subdistrict, and Gampengrejo Subdistrict starting on September 1 - September 30, 2024. The determination of the research location was carried out deliberately with consideration of the number of local duck farming populations in Kediri District. The location of the research site this time has the potential for the development of local duck livestock

### Research Materials

This study used 250 local ducks with details of each sub-district consisting of 50 female local ducks from 5 sub-districts in Kediri District, namely Mojo District, Ringinrejo District, Wates District, Ngasem District, and Campurejo District. The tools used for this research are measuring tape and camera.

### Research Methods

Sampling was conducted using purposive sampling method, namely farmers who raise local ducks in Mojo District, Ringinrejo District, Wates District, Ngasem District, and Campurejo District, Kediri Regency, East Java because it is one of the areas that has the largest local duck population in East Java Province.

### Research Variables

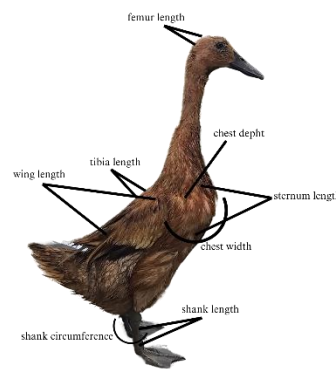
The variables observed in this research include quantitative traits (femur length, tibia length, shank length, shank

circumference, wing length, sternum length, chest width, and chest depth). The method of measuring quantitative trait variables using

a measuring tape in units (cm) which Fatmona et al. (2023), presented in the following description:



**Figure 1.** Local Duksc in Kediri District



**Figure 2.** Morphometric Local Duck

1. Femur length, measurements were taken along the femur (cm).
2. Length of the tibia, measurements were taken from the patella to the tip of the tibia (cm).
3. Length of shank, measurements are taken along the tarsometatarsus bone (cm).
4. Shank circumference, measurements are taken by wrapping the measuring tape around the center of the tarsometatarsus bone (cm).
5. Wing length, measured by stretching the wing, then measured from the base of the humerus to the tip of the phalanges (cm).
6. Sternum length, measured from the tip of the front sternum bone to the tip of the back (cm).
7. Chest width, measured from shoulder height to sternum bone (cm).
8. Chest, measurements are taken from the right lumbar vertebrae to the left lumbar vertebrae.

### Data Analysis

Data analysis used to analyze the quantitative traits of local ducks in this study used descriptive statistical analysis by calculating the mean value, standard deviation, and diversity (Steel and Torrie, 1993).

**RESULTS AND DISCUSSION**

Morphometric measurements (quantitative traits) in Kediri District conducted in this study include femur length, tibia length, shank length, shank circumference, wing length, sternum length, chest width, and chest depth. The differences in the results of this study are influenced by environmental factors and

genetics. Research by Tamzil et al. (2023) stated that each component of the livestock body has a different growth rate because it is influenced by several factors including environmental factors and genetics. The average results of quantitative trait measurements of local ducks in Kediri District can be seen in Table 1.

**Table 1.** Morphometric Data of Local Ducks in Kediri District

Variable	District Name					Average Total
	Mojo	Ringinrejo	Wates	Ngasem	Gampengrejo	
Femur Length (cm)	6.97	6.41	7.02	7.88	7.49	7.15
Tibia Length (cm)	8.93	8.86	9.31	9.52	10.90	11.88
Shank Length (cm)	5.71	5.32	5.08	5.08	5.41	26.60
Shank Circumference (cm)	3.93	3.89	3.98	4.01	4.00	3.96
Wing Length (cm)	23.04	21.12	21.12	20.42	19.29	21.00
Sternum Length (cm)	10.27	9.50	10.12	10.01	10.20	10.02
Chest Width (cm)	11.00	8.24	9.36	10.20	9.92	9.74
In The Chest (cm)	5.66	7.21	8.00	10.20	9.48	40.55

Based on Table 1, the morphometric data (quantitative traits) of local ducks in 5 sub-districts of Kediri District can be expressed as follows: (1) the shortest femur length was in Kecamatan Ringinrejo at 6.41 cm and the longest was in Kecamatan Ngasem at 7.88 cm; (2) the shortest tibia length was in Kecamatan Ringinrejo at 8.86 cm and the longest was in Kecamatan Gampengrejo at 10.90 cm; (3) the shortest minimum shank length was in Kecamatan Wates and Kecamatan Ngasem at 5.08 cm and the longest was in Kecamatan Mojo at 5.71 cm; (4) the shortest minimum shank circumference was in Kecamatan Ringinrejo at 3.89 cm and the longest was in Kecamatan Ngasem at 4.01 cm; (5) the shortest wing length was in Gampengrejo subdistrict at 19.29 cm and the longest was in Mojo subdistrict at 23.04 cm; (6) the shortest sternum length was in Ringinrejo subdistrict at 9.50 cm and the longest was in Mojo subdistrict at 10.27 cm; (7) chest width was shortest in Ringinrejo subdistrict at 8.24 cm and longest in Mojo subdistrict at 11.00 cm; (8) chest depth was shortest in Mojo

subdistrict at 5.66 cm and longest in Ngasem subdistrict at 10.20 cm.

The total mean morphometric measurements (quantitative traits) of local ducks in Kediri District are as follows (1) femur length has a mean of 7.15 cm; (2) tibia length has a mean of 11.88 cm; (3) shank length has a mean of 26.60 cm; (4) shank circumference had an average of 3.96; (5) wing length had an average of 21.00 cm; (6) sternum length had an average of 10.02 cm; (7) chest width had an average of 9.74 cm; and (8) chest depth had an average of 40.55 cm.

The measurements were taken at 5 local duck farms located in each of the specified sub-districts, each 1 farm measured 10 local ducks. Based on the results of morphometric measurements (quantitative traits) of local ducks in Kediri District, it shows that the size of local ducks from the largest to the smallest are in Ngasem District, Gampengrejo District, Mojo District, Wates District, and Ringinrejo District. Measurement results from all subdistricts can be seen in Table 2.

**Table 2.** Morphometric Analysis of Local Ducks in Kediri District

Number	Morphometric	N	Min	Max	Average	(SD)	KK (%)
1	Femur Length (cm)	250	6	9	7,15	0,810	11,32
2	Tibia Length (cm)	250	8	11,5	9,50	0,984	10,35
3	Shank Length (cm)	250	4	6	5,32	0,455	8,55
4	Shank Circumference (cm)	250	3	4,3	3,96	0,166	4,18
5	Wing Length (cm)	250	18	26	21,00	1,633	7,78
6	Sternum Length (cm)	250	7,2	13	10,02	0,900	8,98
7	Chest Width (cm)	250	3	13	9,74	1,364	14,00
8	Chest (cm)	250	4	12	8,11	1,751	21,59

**Explanation:** *N=amount samples, Min=minimum size variable, Max=maximum sizel variable, SD=Standard Deviation, KK=Coefficient of Variation.*

Based on Table 1, the mofometric data (quantitative traits) of local ducks in 5 kecamatan of Kediri District can be expressed as follows: (1) minimum femur length is 6 cm, maximum femur length is 9 cm, average of 7.15 cm, and standard deviation of 0.810 cm with a coefficient of variation of 11.31%; (2) minimum tibia length is 8 cm, maximum tibia length is 11.5 cm, average of 9.50 cm, and standard deviation of 0.984 cm with a coefficient of variation of 10.35%; (3) the minimum shank length was 4 cm, the maximum shank length was 6 cm, the average was 5.32 cm, and the standard deviation was 0.455 cm with a coefficient of variation of 8.55%; (4) the minimum shank circumference was 3 cm, the maximum shank circumference was 4.3 cm, the average was 3.96 cm, and the standard deviation was 0.166 cm with a coefficient of variation of 4.18%; (5) the minimum wing length was 18 cm, the maximum wing length was 26 cm, the average was 21.00 cm, and the standard deviation was 1.6333 cm with a coefficient of variation of 7.78%; (6) the minimum sternum length was 7.2 cm, the maximum sternum length was 13 cm, the average was 10.02 cm, and the standard deviation was 0.9000 cm with a coefficient of variation of 8.98%; (7) The minimum chest width was 3 cm, the maximum chest width was 13 cm, the average was 9.74 cm, and the standard deviation was 1.364 cm with a coefficient of variation of 14.00%; (8) the minimum chest depth was 4 cm, the maximum chest depth was 12 cm, the average was 8.11 cm, and the standard deviation was 1.751 cm with a coefficient of

variation of 21.59%. The different sizes of each quantitative trait of local ducks in Kediri District are influenced by several factors including feed, age, and different maintenance management in each district. Research conducted by Deluku et al. (2024) stated that maintenance management includes (feed management, housing management, sanitation and biosecurity management, etc.) which will affect the size of the quantitative traits of local ducks, because farmers tend to do self-taught duck maintenance based on experience without any socialization from the sick service about good maintenance management. Statistical analysis is differences are shown in the size of the chest width and chest depth because the chest part of each farm animal can show variations in body size.

The chest is the part of the body that has more meat when compared to other bodies, so the growth rate of the sternum can be used as an indicator of the fatness or curves of an animal (Wulandari, 2012). Bone growth in livestock is influenced by daily protein consumption because it has benefits for the bone growth process. Protein has a role to perform the development of body tissues. Research conducted by Lamiyah et al. (2022) states that the daily protein consumption needs of ducks reach 16-17%, if the protein provided is less it will cause protein deficiency and inhibit the development of body tissues and vice versa if the excess protein will be broken down as an energy source so that it cannot be utilized to help bone growth.

## CONCLUSION

The conclusion of this study is that the morphometric measurement interval (quantitative traits) of local ducks in each sub-district in Kediri District varies greatly because it is influenced by several factors including the environmental conditions of each sub-district, feed consumption, maintenance methods, and age. The measurement results show that local ducks in Kediri District are still cultivated by farmers and have a variety of sizes. The suggestion of this research is that morphometric measurements (quantitative traits) of local ducks should be carried out in all sub-districts in Kediri District so that it can be known that the body size of ducks in Kediri District is very diverse.

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