

Correlation Between Body Weight and Body Size of Crossbred Chickens Aged 1-5 Weeks

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ABSTRACT

This research was conducted from November 2019 until January 2020, on the Haji Lamuse road, Lorong Semeru, Lepo Lepo Village, Baruga sub-district, Kendari City. The purpose of this study was to determine the relationship of body weight and body measurements of chickens from Bangkok laying male and female crosses aged 1-5 weeks. The material used in this study was 120 female chickens. The equipment used in this study includes measuring tape, scales, slide calipers, stationery, and cameras. The measured variables consisted of body weight and body measurements (body length, shank length, tibia length, femur length, chest circumference, and half-length). The results showed that chicken body size, body length are those that have a close and high relationship with bodyweight as indicated by the correlation coefficient namely; age 1 week 0.55, age 3 weeks 0.73, and age 5 weeks 0.70.

Keywords: Bangkok and laying hens, crosses, body size, correlation

1. INTRODUCTION

Laying hens have advantage of producing large amounts of eggs. Currently, the quality of laying hen has fast growth, early sexual maturity, and faster peak production. In addition, laying hens also have large body shells. However, laying hens have lighter body weight and low meat production because they are selected for egg production purposes and not for meat production [1]. In addition, laying hens also have large body shells. However, layer hens have lighter bodyweight and low meat production because laying hens are selected for egg production purposes and not for meat production.

Bangkok chicken is a type of local chicken originating from Thailand and known as a fighting chicken. Bangkok chicken has the advantage of high adaptability because it is able to adapt to environmental conditions and climate change, has a large, compact body shape, and has good muscle structure. Besides, Bangkok chicken is very popular with the community [2].

Currently, technology has developed to improve the genetic quality of local chickens by crossing them with purebred chickens. This crossbred is expected to rise to heterotic traits where the resulting seeds inherit superior traits from both parents. Through crossing, it is hoped that it can bring out complementary traits in the offspring and can increase the productivity of local chickens.

The effect of crosses between male laying hens and female Bangkok chickens will be observed through the results of the crosses that produce superior seeds, which are characterized by greater body weight and body size. Body size can be used as a trait in finding a good breed of livestock so body measurements are also important to study. The larger skeleton in normal size, it is expected that the more attached muscles will be resulting in a larger piece of carcass.

The body measurements (body length, shank length, tibia length, femur length, breast circumference, beak length) in chickens are quantitatively measurable traits [3]. The body size of chickens is also measured to estimate their body weight.

Chicken raised for the purpose of producing meat with an estimated correlation value that important is the relationship between body weight and body morphology. The relationship or correlation between variables is given the values of the correlation coefficient. The correlation is categorized as high if the correlation coefficient is 0.50–1.00; moderate value 0.25–0.50; low value 0.05–0.25; and very low values 0.00–0.05 [3].

The purpose of this study was to determine the relationship between body weight and body measurements in cross-produced chickens from rooster layer and Bangkok females.

2. MATERIALS AND METHODS

This research was conducted from November 2019 to January 2020, on Jalan Haji Lamuse, Lorong Semeru, Lepo Lepo Village, Baruga Sub-District, Kendari city. The materials used in this study were 120 hens from the crosses of laying males with Bangkok females. The equipment used in this study included measuring tape (to measure the quantitative properties of chickens), scales (to weigh chicken body weight), calipers (to measure bone length) tarsometatarsus (*shank*), stationery (to record observations), and camera (documentation tool). The variables measured were body weight and body measurements (body length, shank length, tibia length, femur length, chest circumference, and beak length).

The relationship between body measurements and body weight used simple correlation method according to [4] with the following formula:

$$\text{Simple Correlation Coefficient (r)} \\ r = \frac{\sum X_1 Y - \frac{(\sum X_1)(\sum Y)}{n}}{\sqrt{\left\{ \sum X_1^2 - \frac{(\sum X_1)^2}{n} \right\} \left\{ \sum Y^2 - \frac{(\sum Y)^2}{n} \right\}}}$$

Information:

- r : correlation
- X : body measurements
- Y : body weight
- n : number of sampel

The coefficient of determination is also calculated to show the strength of the relationship between two variables [5] with the following formula:

$$\text{Coefficient of determination (R}^2\text{):} \\ R^2 = (r)^2 \times 100\%$$

Information:

- R = coefficient of determination
- r = Correlation

3. RESULTS AND DISCUSSION

3.1 Body Weight and Body Measurement

The variabls used in this study are body weight and body measurements which include body length, shank length, tibia length, femur length, chest circumference, and beak length. The average data of these variables are presented in Table 1.

The results of the study in (Table 1) show that with the increasing age of the crossbred chickens, the body weight, and body measurements increase. The increase in chicken body weight will also be followed by an increase in body measurements.

3.2 Correlation Coefficient

The correlation between body weight and body measurements (body length, shank length, tibia length, femur length, chest circumference, and beak length) of this study is presented in Table 2.

The relationship between body weight and body sizes in the study shows a low to high positive correlation. The high positive correlation is showed between body weight -body length), and body weight - chest circumference at the (age of 1-5 weeks). In other hands, the low correlation is showed between body weight -shank length at 3 and 5 weeks of age), body weight - tibia length at 1 week of age), body weight - femur length at 3 and 5 weeks of age), and body weight - beak length (age 1-5 weeks).

The results show that body length and chest circumference have a very strong and positive relationship to body weight of laying male and female cross-breed hens. This is because the back is a part of the body in chickens that consists of bone tissue. The back is a part of the body of a chicken that has a larger bone frame than other parts of the body. Rahayu et al. [6] state that the back is the attachment place for the wing muscles and contains a lot of bone tissues. Soeparno [7] states that the back is a part that is dominated by bones and has less potential to produce meat.

Chicken breast has more meat muscles that attach to the breastbone than any other parts of the bone. According to Yaman et al. [8] in chickens, the muscles that respond the most to food conditions are the pectoralis muscles (chest muscles) followed by the thigh muscles. Williamsom and Payne [9] stated that the use of measurements of chest circumference and body length can provide an accurate indication of the bodyweight of an animal. negative correlation is when one trait increases and another trait decreases. Laidding [10] stated that livestock can differ from each other independently, the correlation between the measured traits can be positive if increase in one trait. The analysis which the body sizes of an animal.

Table 1. The description data of body weight and body measurements of crossbred chickens aged 1-5 weeks

Parameter	Age (Week)		
	1	3	5
Body Weight (gram)	37.63±2.77	70.97±12.64	179.59±55.21
Body Length (cm)	4.73±0.54	5.71±0.91	7.26±1.86
Shank Length (cm)	2.31±0.60	2.91±0.63	4.06±0.77
Tibia Length (cm)	2.91±0.77	3.67±0.86	4.94±1.13
Femur Length (cm)	2.66±0.61	3.33±0.59	4.56±0.87
Chest Size (cm)	6.24±1.22	7.39±1.60	8.84±2.27
Beak Length (cm)	1.05±0.62	1.26±0.58	1.40±0.53

Table 2. The correlation between body weight and body sizes of crossbred chickens aged 1-5 weeks.

Parameter	Age (Week)		
	1	3	5
Body Weight – Body Length	0.55	0.73	0.70
Body Weight – Shank Length	0.27	0.16	0.17
Body Weight – Tibia Length	0.17	0.38	0.44
Body Weight – Femur Length	0.26	0.20	0.21
Body Weight – Chest Size	0.56	0.50	0.67
Body Weight – Beak Length	0.16	0.18	0.21

Table 3. The results of the analysis of the determination coefficient (%) between body weight and body sizes of crossbred chickens aged 1-5 weeks.

Parameter	Age (Week)		
	1	3	5
Body Weight – Body Length	29.73	53.95	49.24
Body Weight – Shank Length	7.54	2.41	2.96
Body Weight – Tibia Length	2.82	14.21	19.70
Body Weight – Femur Length	6.89	3.96	4.57
Body Weight – Chest Size	31.60	24.99	45.18
Body Weight – Beak Length	2.56	3.26	4.36

3.3 Determination Coefficient

The value of the coefficient of determination aims to predict how much the independent variable (X) contributes to the dependent variable (Y) or between the crossbred chickens, are presented in Table 3 X variable (body length, shank length, tibia length, femur. body weight of the Y variable and body size, which is the length, chest circumference and length. beak of crossbred chickens, are presented in Table 3.

The coefficient of determination on the results of the variability of the variable size of the chicken's body is presented in Table 2, which shows that body size has a relationship and influence on body weight in chickens.

The value of the coefficient of determination shows that the bodyweight of the crossed chickens using seven independent variables is observed, then the body length and chest circumference are the best predictors compared to shank length, tibia length, femur length, and beak length. The high percentage of determination of body weight and chest circumference is in line with the results of the correlation coefficient.

4. CONCLUSION

Based on the above changes, this study concludes that the body size of the chicken, the body length, have a close relationship and height with bodyweight as

indicated by the correlation coefficient, namely; age 1 week 0.55, age 3 weeks 0.73, and age 5 weeks.

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