



THE EFFECT OF BODY WEIGHT ON THE SIZE OF THE SCROTUM OF BALINESE CATTLE

Pedro Armengol Josua Efi, Reni Ratni Dapawole*, Muh. Akramulloh
Universitas Pertahanan RI
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Abstract

This study aimed to determine the effect of body weight on scrotal circumference in Bali bulls. Bali cattle are one of Indonesia's indigenous genetic resources with high adaptability, good productivity, and an important role in national beef production. The study employed a descriptive method through observation and evaluation of exterior performance. The research sample consisted of 10 Bali bulls grouped by age, namely 1–2 years and 3–5 years, with five animals in each group. The parameters observed were body weight and scrotal circumference. Body weight was measured using a manual scale, while scrotal circumference was measured using a measuring tape at the largest part of the scrotum. Data were analyzed using regression and correlation analyses with IBM SPSS version 25.0. The results showed that the average body weight of Bali bulls was 260.80 ± 7.80 kg, while the average scrotal circumference was 25.60 ± 3.27 cm. Regression analysis revealed a very strong positive relationship between body weight and scrotal circumference, with a correlation coefficient (r) of 0.976 and a coefficient of determination (R^2) of 0.952. These results indicate that 95.2% of the variation in scrotal circumference was influenced by body weight, while the remaining 4.8% was affected by other factors such as age, genetics, nutrition, health status, and management practices. The regression equation obtained was $Y = 250.054 + 5.910X$. Based on the findings, it can be concluded that body weight has a highly significant effect on the scrotal circumference of Bali bulls. An increase in body weight is associated with an increase in scrotal circumference. Therefore, body weight can be used as one of the selection criteria for superior breeding bulls to support the improvement of productivity and genetic quality of Bali cattle.

Keywords: Bali bulls, body weight, scrotal circumference, correlation, reproduction.

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh bobot badan terhadap ukuran lingkar skrotum pada sapi Bali jantan. Sapi Bali merupakan salah satu plasma nutfah asli Indonesia yang memiliki kemampuan adaptasi tinggi, produktivitas yang baik, serta berperan penting dalam penyediaan daging nasional. Penelitian ini menggunakan metode deskriptif dengan kegiatan observasi dan evaluasi performa eksterior. Sampel penelitian terdiri atas 10 ekor sapi Bali jantan yang dikelompokkan berdasarkan umur, yaitu umur 1–2 tahun dan 3–5 tahun, masing-masing sebanyak 5 ekor. Parameter yang diamati meliputi bobot badan dan lingkar skrotum. Bobot badan diukur menggunakan timbangan manual, sedangkan lingkar skrotum diukur menggunakan pita ukur pada bagian terbesar skrotum. Data dianalisis menggunakan analisis regresi dan korelasi dengan bantuan program IBM SPSS versi 25.0.

Hasil penelitian menunjukkan bahwa rata-rata bobot badan sapi Bali jantan adalah $260,80 \pm 7,80$ kg, sedangkan rata-rata lingkar skrotum sebesar $25,60 \pm 3,27$ cm. Analisis regresi menunjukkan adanya hubungan positif yang sangat kuat antara bobot badan dan lingkar skrotum dengan nilai koefisien korelasi (r) sebesar 0,976 dan koefisien determinasi (R^2) sebesar 0,952. Hal ini menunjukkan bahwa 95,2% variasi lingkar skrotum dipengaruhi oleh bobot badan, sedangkan sisanya dipengaruhi oleh faktor lain seperti umur, genetik, nutrisi, kesehatan, dan manajemen pemeliharaan. Persamaan regresi yang diperoleh adalah $Y = 250,054 + 5,910X$. Berdasarkan hasil penelitian dapat disimpulkan bahwa bobot badan berpengaruh sangat nyata terhadap ukuran lingkar skrotum sapi Bali jantan. Semakin tinggi bobot badan sapi Bali jantan, maka semakin besar ukuran lingkar skrotumnya. Oleh karena itu, bobot badan dapat digunakan sebagai salah satu indikator dalam seleksi calon pejantan unggul untuk mendukung peningkatan produktivitas dan mutu genetik sapi Bali.

Kata kunci: sapi Bali jantan, bobot badan, lingkar skrotum, korelasi, reproduksi.

I. INTRODUCTION

Efforts to improve genetic quality and increase the productivity of local cattle continue to be carried out to meet national meat needs. One of the local cattle that is of concern to the government, especially the East Nusa Tenggara government, is the Balinese cow. Balinese cattle are one of the original cattle nations in Indonesia which is the result of direct domestication from wild bulls (Nugraha *et al.*, 2021). Balinese cattle are known to be very adaptive, productive, able to digest low-quality feed well, and have superior carcass quality (Varliutina, 2025).

The Balinese cattle development program can be carried out by improving the genetic quality produced through mating with superior males. The role of males is one of the strategic factors to improve the performance of their offspring. The advantages of a male can be seen from the size of his testicles. The size of the testicles is measured by measuring the circumference of the scrotum. The circumference of the scrotum can be used as one of the parameters for male selection. The body weight of the cow is also one of the factors in the development of testicular size and scrotal circumference in addition to being influenced by genetic factors, nutrition, maintenance management, and the age of livestock. Some studies state a relationship between testicular growth (through scrotal circumference) and Body Weight (BB). Body Weight of Bulls is closely related to the size of the testicles, males with larger testicular volume and scrotal circles produce more spermatozoa (Khairi, 2016). In addition, the circumference of the scrotum is also related to age and body weight. Cows from various nations have scrotal development that goes according to the overall growth and development of the body (Nuhrawi *et al.*, 2022).

II. LITERATURE REVIEW



Balinese cattle come from bulls (*Bibos bulls*) that have been domesticated centuries ago. Balinese cattle have several synonyms, namely *Bos javanicus*, *Bos sondaicus*. Now the most commonly used is *Bibos sondaicus*. Balinese cattle have their own peculiarities, such as high reproduction and good fertility. The scrotum is a leather sac located in the ventral part of the bull's body, between the two hamstrings, which serves as a place to hang and protect the testicles. This structure has an important role in the reproductive system because it keeps the testicular temperature lower than body temperature, so that the spermatogenesis process can take place optimally. (Tyamato, 2019)

III. RESEARCH METHODS

The research uses a descriptive method that includes observation and evaluation of exterior performance. The observed parameters are Body Weight, scrotal circumference. The parameters observed in this study covered the circumference of the Scrotum (cm). The data obtained from the results of the research were analyzed using Variety Analysis (ANOVA) in accordance with the design used, namely the Complete Random Design (RAL). If the results of the analysis show a real difference between treatments ($P < 0.05$), then proceed with the Duncan Follow-Up Test to find out the difference between treatments. Data processing is carried out using IBM SPSS software version 25.0. The research procedure is carried out through several stages such as

Preparation of tools and materials

The preparation stage of tools and materials includes tools used in data collection such as measuring tapes, calipers and cameras for documentation.

Determination of Research Cattle

Male Balinese cattle raised by breeders are selected based on age groups, namely 1–2 years, 3–5 years. Each age group consists of 5 cows, so the total sample used in this study is 10. Cows and put in a clamp cage that has been fitted with a manual scale to be weighed, and the results of the Body Weight measurement (BB).

Scrotal Circumference Measurement

Scrotal circumference measurements are carried out using a tape measure. The measurement is carried out by circling the measuring tape on the largest part of the scrotum. Measurement results are recorded in centimeters (cm).

Data Logging

All results of scrotal circumference measurements on the data record sheet that has been prepared. In addition, the documentation of research activities was carried out using cameras.

IV. RESEARCH RESULTS

Data Analysis

The results of the study on the correlation between Body Weight (BB) and Scrotum Circumference Size of Balinese cattle can be presented in table 1 below.

Table 1 Average $\pm$ SD Body Weight and Scrotum Circumference

Balinese Male Cow	
Size	Rataan $\pm$ SD
Body Weight	260.80 $\pm$ 7.800
Lingkar Skrotum	25.60 $\pm$ 3.273

Source: Primary Data Processed 2026

The body size of livestock can be used to determine body weight. One practical method is to use a chest circumference. There are several formulas for estimating the body weight of livestock using chest circumference, namely Schoorl, Winter, and Denmark. The formulas can be used for cows, goats, sheep, pigs and buffaloes. In this study, body weight was measured using a manual weighing device in the clamp cage. So, based on the formula for estimating the weight of the Bali Cattle Agency in the results of this study, the average is $260.80 \pm 7,800$.

1. The Relationship Between Body Weight and Scrotal Circumference of Male

Balinese Cattle

Body weight and scrotal circumference are two parameters that have a close relationship in the growth and development of male Balinese cattle. Along with increasing body weight, there is a growth of overall body tissues, including the development of reproductive organs such as the testicles and scrotum. Therefore, male Balinese cows that have a higher body weight generally tend to have a larger scrotal circumference.

The circumference of the scrotum reflects the size and development of the testicles. Larger testicles usually contain more seminiferous tubules, which are where spermatozoa formation occurs. Thus, males with large scrotum circumference generally have a higher sperm production capacity than males with small scrotal circumference.

Since testicular growth goes hand in hand with body growth, an increase in body weight is often followed by an increase in scrotal circumference.



Curve Drawing 1. The relationship between body weight and scrotal circumference

From the results of this study, it was obtained that the average testicular circumference was $260.80 \pm 7,800$ cm, and based on regression analysis, a positive correlation was obtained on body weight or a real effect with ($r = 0.976$). R Square 0.952 which means that the magnitude of the variation in scrotal circumference can be influenced by Body Weight of 95.2%, with a Regression Equation $Y = 250,054 + 5,910 X$. The results of this study are in line with a study (Varliutina, 2025) on Balinese cattle with a Body Weight of 350-500 kg there is a correlation between Body Weight and scrotal circumference with a coefficient of 0.99 which shows that Body Weight has a very strong influence on the size of the scrotum circumference.

In male Balinese cows, the positive relationship between body weight and scrotal circumference showed that cattle that had good body growth tended to have better reproductive organ development. However, the relationship is not only influenced by body weight, but also by other factors such as age, genetics, nutritional status, health, and maintenance management.

Practically, the measurement of body weight and scrotal circumference can be used as the basis for the selection of prospective males. Male Balinese cows with optimal body weight and standard scrotal circumference generally have better reproductive potential so that they are more suitable for selection as breeding males. Therefore, an analysis of the relationship between body weight and scrotal circumference is important to support breeding programs and increase the productivity of Balinese cattle. Several studies have shown that there is a positive correlation between body weight and scrotal circumference in beef cattle, including Balinese cattle. This means that the higher the body weight of the livestock, the larger the circumference

of the scrotum. This correlation makes the circumference of the scrotum one of the simple and effective indicators in assessing the reproductive potential of males in the field. Research by Arifin *et al.*, (2025) states that there is a significant positive correlation between scrotal circumference and body weight in Boer goats, with a correlation value of 0.75. This suggests that goats with greater body weight tend to have larger scrotal circumference

V. CONCLUSION

Based on the results of the study, it can be concluded that there is a very strong positive relationship between body weight and scrotal circumference size in male Balinese cows. The results of the analysis showed that the difference in body weight had an effect on the size of the scrotal circumference of cattle. The average body weight and scrotal circumference obtained in this study were 260.80 ± 7.80 kg and 25.60 ± 3.27 cm, respectively. The higher the body weight of a male Balinese cow, the larger the size of the scrotum circumference. These findings show that body weight can be used as one of the indicators in assessing the development of reproductive organs as well as as the basis for the selection of superior male candidates to support the improvement of productivity and genetic quality of Balinese cattle.

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