



Comparison of Body Dimension of Bali Polled and Horned Cattle in South Sulawesi

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Abstract

The objective of this study was to know the differences of body dimension of Bali polled and horned cattle. A total of 100 samples of Bali cattle were used in the present study; including 11 Bali polled cattle and 89 Bali horned cattle. Measurement of body dimension were performed using a stick for withers height, hip height, and body length, while for chest girth was using measuring tape, and for body weight was using weight scales. The results of this study showed that mean value of withers height of the male Bali polled cattle was 108.80 ± 3.70 cm while the Bali horned cattle was 105.76 ± 3.81 cm. For the female Bali polled and horned cattle, the withers height were 107.67 ± 4.68 cm and 109.96 ± 2.99 cm, respectively. The mean value of hip height of the male polled cattle was 108.40 ± 3.44 cm while the horned was 105.09 ± 3.60 cm, and the female horned cattle was 108.79 ± 2.71 cm, while the polled cattle was 108.00 ± 3.23 cm. The mean value of body length the male polled cattle was 105.80 ± 4.15 cm and longer than the male horned cattle (102.81 ± 6.47 cm), and the female horned cattle was 108.04 ± 5.35 cm while the polled cattle was 107.50 ± 9.99 cm. The mean value of chest girth the male polled cattle was 136.40 ± 10.99 cm and longer than horned cattle (132.19 ± 6.39 cm), and the female horned cattle was 137.72 ± 7.51 cm and longer than polled cattle (136.67 ± 8.85 cm). The mean value of body length of male polled was 158.8 ± 14.75 cm, while the horned cattle was 148.19 ± 20.44 cm, and the female polled cattle was lighter than horned cattle. The polled cattle (female) was 155.33 ± 34.68 cm while horned cattle 161.92 ± 19.58 cm. It can be concluded that no difference of body dimension measurements between Bali polled and horned cattle.

Keywords: Bali polled cattle; beef cattle; body dimension; South Sulawesi; Comparison.

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1. Introduction

In order to improve the ease of working and to reduce the possibility of injury both to producer and cattle, breeding cattle in the herds practically should be dehorned. Animals in the feedlot with horns increase the level of bruising by 50% compared to those without horns, and the bruises are typically in the loin area, which is the most expensive part of the carcass. Before the domestication of cattle, horns were important for the survival of the wild species. Horns are no longer needed for the survival after domestication, especially in the modern livestock. In cattle industry, absence of horns has a significant economic impact, since horns are a major cause of bruising and other injuries, which generate veterinarian costs and reduce the value of carcasses [1,2,3]. Dehorning older calves is not ideal as the wound takes longer to heal, thereby increasing the risk of infection [3].

Cattle that naturally do not grow horns are termed polled, a trait inherited in an autosomal dominant fashion [4]. Polled animals are usually easier to handle, safer to work with and are less aggressive among each other [5]. On the modern industrial livestock management practices, polled cattle reduce the cost and time for dehorning and relieving stress on cattle. Some countries have established rules of animal welfare against dehorning, so breeding of cattle polled becomes more profitable.

Bali cattle are domestic beef cattle in Indonesia; both sexes carry horns and have small body. In South Sulawesi province there was a phenomenon of Bali cattle found in polled, that was not unusual. Bali cattle developed into the main beef cattle in Indonesia, the presence of polled trait is expected not to reduce the benefits that are owned by Bali cattle. Assessment of the circumstances of individual beef cattle that are to be selected as finisher or stock, principally based on age, the body shape, the power of growth, and temperament. Measures vital body parts of cattle can describe the ability to perform production for livestock, such as withers height, hip height, body length, chest girth and body weight. It is therefore, the objective of this study was to know the differences of body dimension of Bali polled and horned cattle.

2. Materials and Methods

2.1. Cattle Population and Sampling

The total number of Bali cattle used in the present study were 100 samples, including polled ($n = 11$) and horned ($n = 89$). Samples were taken from Livestock Laboratory, Faculty of Animal Science, Hasanuddin University.

2.2. Examination for body

Body dimension were measured using a measuring stick for withers height, hip height, and body length, while for chest girth was using measuring tape, and for body weight was using weight scales.

2.3. Parameter of the study

Parameters measured in the study were withers height, hip height, body length, chest girth and body weight. Withers height of the Bali cattle was measured vertically from the bottom of the front foot to the highest point of

the shoulder between the withers [6]. Hip height was measured from vertical distance from a fixed point to the top of the highest sacral vertebrae subtracted from the vertical distance from the fixed point to the ground [7]. Body length was measured from point of the shoulders to the point of the buttocks (pinbone) [6]. Chest girth was measure from the circumference of the body immediately behind the shoulder blades in a vertical plane, perpendicular to the long axis of the body [6]. Body weight was measure from the fasted live body weight in kilograms [6].

2.4. Data analyses

The data in this study was tabulated using Excel program and analyzed using software SPSS 15.0 for Windows. All data were presented as mean \pm standard deviation (SD). Descriptive statistics were used to describe the differences of measurement of Bali polled and horned cattle. A t-test analysis was used to determine the differences between mean values of body dimension.

3. Results

The body dimensions were measured to know the characteristic differences between Bali polled and horned cattle. The results of measurement between Bali polled and horned cattle are presented in Figure 1 - 5.

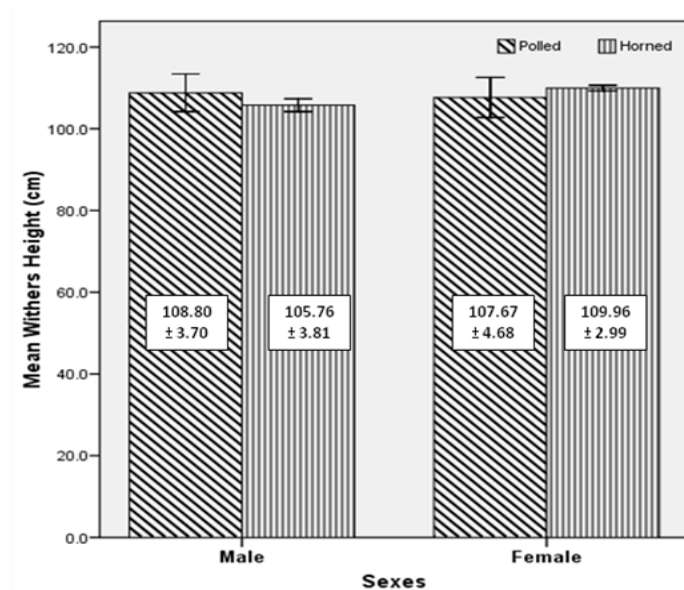


Figure 1: Comparison the mean of withers height between Bali polled and horned cattle

Figure 1 shows that mean value of withers height of the male polled cattle was 108.80 ± 3.70 cm while the horned was 105.76 ± 3.81 cm and on the female polled cattle was 107.67 ± 4.68 cm while the horned was 109.96 ± 2.99 cm. Descriptively, the mean value of polled cattle had higher than the mean value of horned, while in the female, Bali horned cattle had higher than Bali polled cattle. Analysis of T test (t-test independent sample) shows that the mean value did not showing any significant difference (p -value > 0.05). This indicated that there was no difference between Bali polled and horned cattle for withers height measurement.

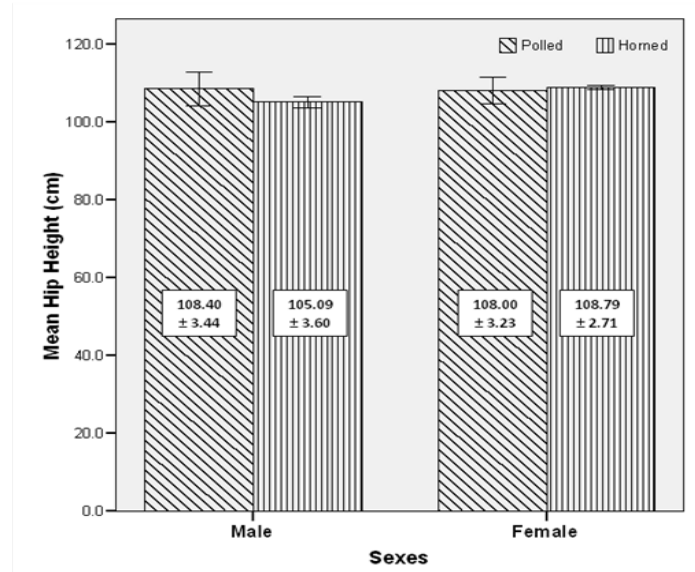


Figure 2: Comparison the mean of hip height between Bali polled and horned cattle

The mean value of hip height of the male polled cattle was 108.40 ± 3.44 cm while the horned was 105.09 ± 3.60 cm, polled male cattle has heigher on hip height than horned cattle (Figure 2). The mean value of hip height of the female horned cattle was 108.79 ± 2.71 cm while the polled cattle was 108.00 ± 3.23 cm. Descriptively in Figure 2 shows difference of the mean value, however, analysis of T test (t-test independent sample) shows that the mean value did not showing any significant difference ($p\text{-value} > 0.05$). Figure 3 shows that mean value of body length the Bali horned cattle was longer than polled cattle (male and female). The mean value of body length the male polled cattle was 105.80 ± 4.15 cm and longer than the male horned cattle (102.81 ± 6.47 cm). Although the measurements were different, but T test analysis shows that the mean value did not differed significantly ($p\text{-value} > 0.05$). The female horned cattle were 108.04 ± 5.35 cm while the polled cattle were 107.50 ± 9.99 cm.

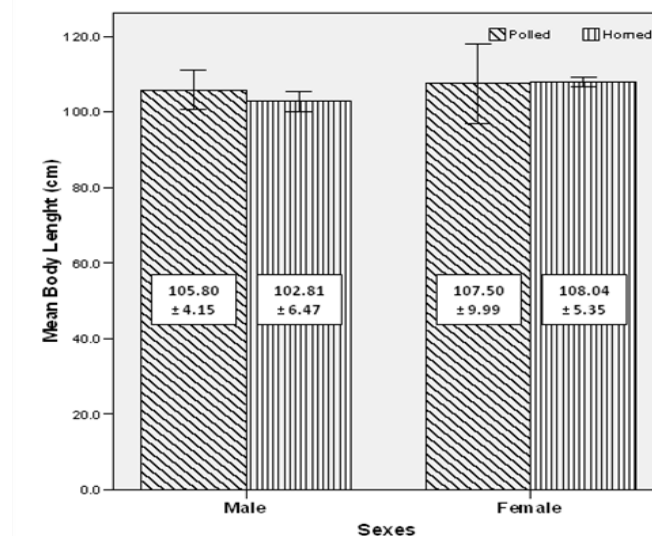


Figure 3: Comparison the mean of body length between Bali polled and horned cattle

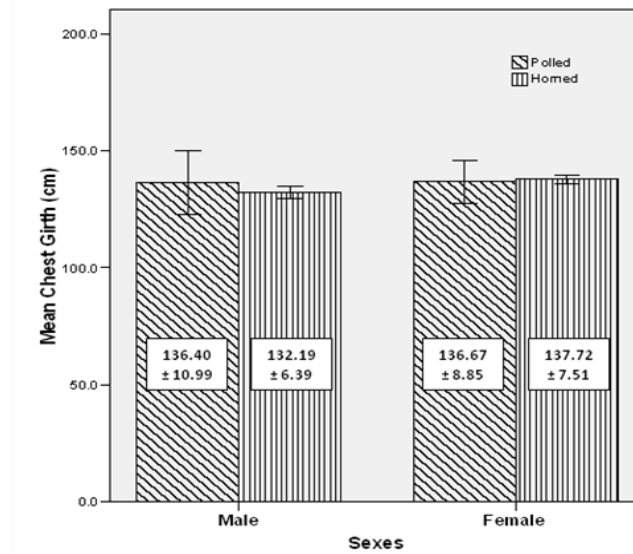


Figure 4: Comparison the mean of chest girth between Bali polled and horned cattle

Figure 4 shows that mean value of chest girth of the male polled cattle was 136.40 ± 10.99 cm and had longer than the horned cattle (132.19 ± 6.39 cm). The mean value of chest girth of the female horned cattle was 137.72 ± 7.51 cm and had longer than polled cattle (136.67 ± 8.85 cm). The mean value of chest girth the polled and horned cattle did not differed. Analysis of T test shows that the mean value did not differ significantly (p -value > 0.05). Similarly, Figure 5 shows that the mean value of body weight of the male polled cattle had heavier than horned cattle. The mean value of male Bali polled and horned cattle were 158.8 ± 14.75 kg and 148.19 ± 20.44 kg, respectively. While the polled and horned female cattle, the body weight were 155.33 ± 34.68 and 161.92 ± 19.58 kg, respectively.

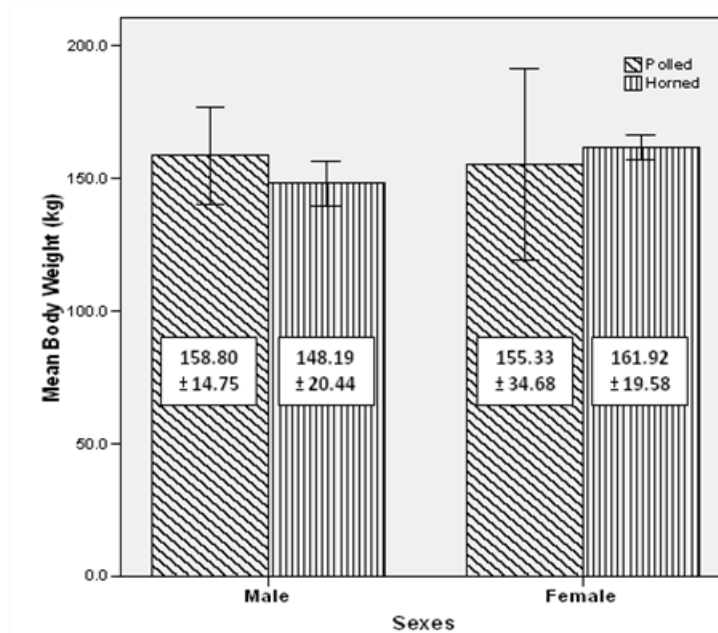


Figure 5: Comparison the mean of body weight between Bali polled and horned cattle

4. Discussion

The comparison of body dimension measurements between Bali polled and horned cattle did not show any difference ($p\text{-value} > 0.05$). Likewise, the phenomenon of polled trait in Bali cattle did not show any change in their production characteristics. Polled trait does not affect the negative change in Bali cattle growth that can be seen in Bali horned cattle. Bali horned cattle weight is relatively similar to Bali polled cattle weight at the same age range. Growth is a process that occurs in every living thing and can be expressed in measurements of body dimensions, body volume and body mass (body weight) [8]. Growth can be assessed as an increase in height, length, weight, and circumference, that occurs in young, healthy cattle, and fed, drank and got decent shelter [9].

Withers height, hip height, body length, chest girth can be used as information about the genetic relationships between individuals or breed, as obtained in Bali polled and horned cattle. The height of a beef animal at a given age could be used to predict of its growth curve [10]. Bali polled cattle have similarities in body dimension characteristics with Bali horned cattle, this indicated that Bali polled cattle have a strong genetic relationship with Bali horned cattle. Body dimension size is a unity that has an influence on growth. Growth of animals has three aspects, firstly, an increase in body mass (bodyweight) per unit of time; secondly, the changes in measurement of body dimension; and thirdly, the change in form or composition resulting from different growth rates of the component parts [8]. Body measurements may also serve as an important selective considerations and the heritability of the body measurements is relatively high [11].

Introduction of Bali polled cattle for beef production has mainly been conducted in order to improve production traits. The polled trait proved not to reduce the potential characteristic of Bali cattle such as size of withers height, hip height, body length, chest girth and body weight. The cost of commercial cattle production can be reduced effectively by developing and using polled cattle. Hornless cattle take up less room in feedlot, less feed bunk space, inflict less injury during transport, due to fighting and reduce bruising [12]. Dehorning in the feedlot increases the cost of production due to increased labor, occasional mortality due to the removal of horns. Based on the results and discussion, it can be concluded that no difference of body dimension measurements between Bali polled and horned cattle.

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