International Journal of Zoology Studies
www.zoologyjournals.com
ISSN: 2455-7269
Received: 14-10-2023, Accepted: 29-10-2023, Published: 15-11-2023
Volume 8, Issue 4, 2023, Page No. 28-31

Performance of Bali calves resulting from artificial insemination with frozen Limousin and Simmental Semen

Sri Gustina[1*], Darling[1], Agustina[1], Hasbi Hasbi[2]
[1] Department of Animal Science, Faculty of Animal Science and Fisheries, Universitas Sulawesi Barat, Jl. Prof. Dr. Baharuddin Lopa, Tande Timur, Majene, Indonesia
[2] Department of Animal Production, Faculty of Animal Science, Hasanuddin University, Jl. Perintis Kemerdekaan, Makassar, Indonesia

Abstract
Artificial Insemination (AI) is a reproductive technology that can improve the genetic quality of livestock in a short time, can produce calves with good quality in large numbers by utilizing superior bulls. This research aimed to determine the performance of Bali calves resulting from artificial insemination with Limousin and Simmental bulls. The parameters observed were birth weight, and body dimensions included shoulder height, body length and chest size. Data were analyzed using T-test. The results showed that the chest size of Simmental calves was significantly higher ($P<0.05$) in both males and females compared to Limousin. Body length and shoulder height of Simmental and Limousin calves were not significantly different ($P>0.05$) for both males and females. Meanwhile, the body weight of Simmental was significantly higher ($P<0.05$) in males compared to Limousin, but was not different ($P>0.05$) in females. In conclusion, the performance of Simmental calves was better than Limousin for both males and females based on chest size, but based on birth weight only for males.

Keywords: Artificial insemination, body dimensions, birth weight

Introduction

Indonesia has various types of local cattle such as Madura, Pesisir, Aceh, and Bali cattle [1]. Bali cattle have several advantages compared to the other four types of cattle. These include fertility (conception rate), body weight, percentage and carcass quality that is better than other cattle [2], as well as having high adaptability [3].

Bali cattle are Indonesian germplasm as a result of domestication of bulls (*Bos-bibos* bull) and have great potential to supply animal protein needs [4]. The quality of Bali Beef production depends on its growth because high production can be achieved with fast growth [5]. In general, the factors that influence growth, especially in calves before weaning, are parity and sex, and after weaning it is influenced by location, season, sex, parity and type of bull [6].

Bali cattle have special features in terms of reproductive, carcass percentage and quality of meat and skin, but have limitations in terms of growth speed and body weight [7]. The genetic potential of Bali cattle must be increased so that they can develop optimally. The success of increasing the beef cattle population in Indonesia is the result of UPSUS SIWAB programs which was launched by the government in the last four years. One of the programs is free artificial insemination (AI) services for breeders. The success of AI is greatly influenced by the quality of the frozen semen used from selected bulls and the ability of AI acceptor breeders to recognize the signs of heat in their cows [4].

Artificial insemination (AI) is a biotechnology in the livestock reproduction that allows to mate female without a male. It concerns the genetic quality of livestock in the future. The advantages of AI in Indonesia include a faster increase in genetic quality because it uses semen from superior bulls, it can save costs on maintaining other bulls, and the transmission of venereal diseases from inseminated cattle can be prevented [8]. The AI program not only includes the introducing of semen into the female genital tract, but also the expertise and skills of the inseminator in detecting estrus, sanitizing equipment, handling frozen semen, correct thawing, as well as the ability to perform AI where the inseminator plays a major role in successful implementation of AI.

Birth weight is an indicator of livestock productivity which can be estimated based on the linear size of the calf body [1]. Birth weight is one of the factors that can influence the appearance of the calf, and becoming the first information on the potential development of cattle on their productivity [9]. Calf with a large birth weight and born normally will be better able to maintain their lives.

Bulls are something that must be considered to increase population and productivity in beef cattle farming. Birth weight is also closely related to the males, where only certain males can produce high birth weights. Research by Galuh *et al.* [10] on the influence of males as a source of semen on reproductive performance obtained results the average birth weight was 16.55 ± 1.81 kg.

The birth of a calf is an important factor in the production activities of a cattle farming business. There is a need to evaluate the birth of calves to support good production management. The success of the livestock sector depends on the reproductive ability. Therefore, this research was conducted on the appearance of calves resulting from artificial insemination with different bulls.

Materials and Methods

This study used 28 calves resulting from artificial insemination. The parameters measured were the calf's body dimensions consisting of body length, shoulder height, chest

size, and birth weight. Body dimension measurements are carried out by the procedure:

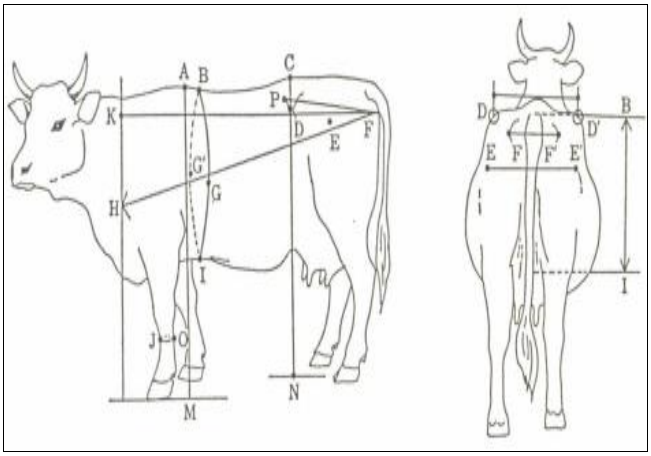

Fig 1: Body Dimension Measurement. H-F: Body Length, A-M: Shoulder Height, B-G-I-G-B: Chest Size

1. Body Lenght

Body length is measured straight using a measuring stick from the elbow (humerus) to the tuber ischii.

2. Shoulder Height

Shoulder height is measured using a measuring stick by measuring the perpendicular distance from the highest point of the shoulder to the ground or floor.

3. Chest Size

Chest size is measured using a measuring tape on the chest just behind the elbow, perpendicular to the body axis [11].

Data Analysis

The research data were analyzed using the independent sample T-test. Analysis was carried out using SPSS version 20 for Windows software.

Results and Discussion

Chest Size

Chest size is directly related to the chest and abdominal space so that most of the animal's body weight comes from the chest to the hips. The larger the chest size, the heavier the body weight. Body dimension measurements are generally used for the testing livestock performance. Marwadewi *et al*. [12] reported that selection to improve the genetic quality of cattle was most effectively carried out by measuring body dimensions. The results of chest size measurements in this study are presented in Figure 2.

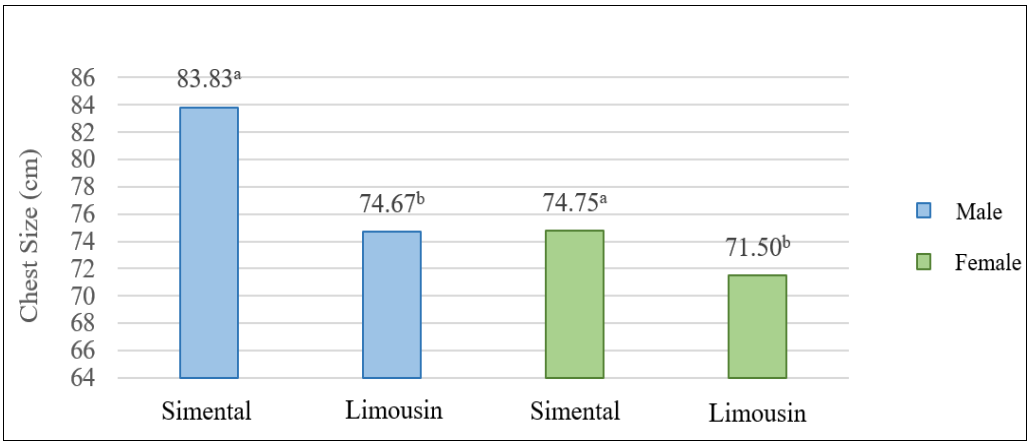

Fig 2: Chest Size Measurement Results

The average chest size of Simmental calves was significantly higher (P<0.05) in both males and females compared to Limousin. The average chest size of male and female Simmental calves was 83.83 and 74.75 cm respectively while Limousin were 74.67 and 71.50 cm respectively. These results showed that there are differences in the chest size of males and females and there are differences between the chest size of the both bulls. This is in line with previously reported by Yulianto *et al*. [13] that crossing between Bali cows and Simmental, Limousin, Brahman and PO bulls had a significant effect on the performance of the crossbred calves, starting from body weight, body weight gain and body dimensions (chest size, body length, and shoulder height). Simmental-Bali cattle have the best body weight, growth rate and body dimensions. Furthermore, Aryogi and Pamungkas [14] reported that differences in vital measurements of calves after weaning could be expected to be due to the influence of the mother's nutrition during calf feeding. Crossing Bali cows with Simmental bulls produces better offspring than crossing Bali with Limousin, Brahman and PO in terms of weaning weight, one year old weight and body size [15].

Body Length

The body length of Simmental and Limousin calves was not significantly different (P>0.05) for both males and females. The average body length of Simmental calves based on male and female was 73.67 and 67.75 cm respectively, while male and female Limousin was 66.63 and 64.50 cm respectively (Figure 3).

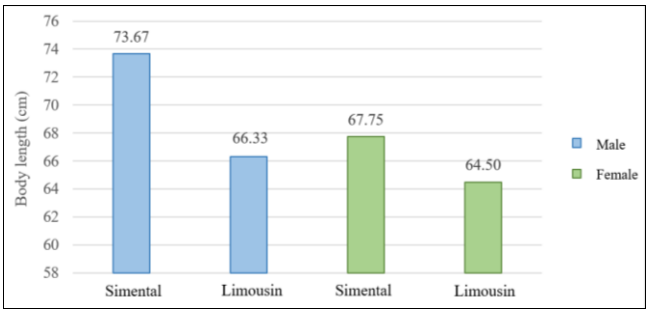

Fig 3: Body Length Measurement Results

The results of this study indicated that the type of bull does not affect the body length of the calves. These results are different from those previously reported by Depison [15] that

there were differences in body sizes and weights of Bali calves resulting from mating with Simmental and Limousin bulls. Suranjaya *et al*. [6] further explained that the factors that influence growth, especially in calves before weaning, are parity and sex and after weaning are influenced by location, season, sex, parity and type of bull. The growth of cross-bred cattle will be influenced by the bull used in mating/insemination of the cattle [16].

Shoulder Height

The shoulder height of the Simmental and Limousin calves was not significantly different (P>0.05) for both males and females. The average shoulder height of Simmental calves based on male and female was 74.67 and 71.50 cm respectively, while male and female Limousin were 71.33 and 70.75 cm respectively (Figure 4).

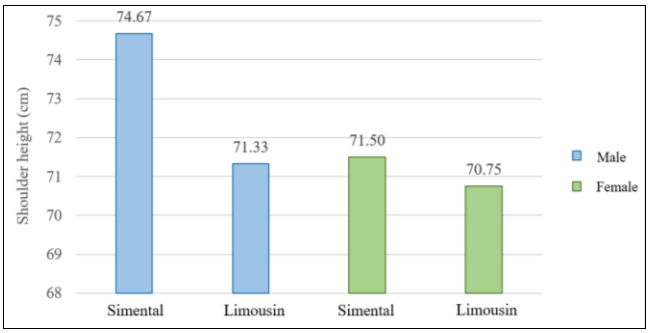

Fig 4: Shoulder Height Measurement Results

The results of this study showed that the type of bull does not affect the height of the shoulder calves. Different things were previously reported by Depison [15] that crossing Bali with Simmental bulls produced better offspring than crossing Bali - Limousin, Brahman and PO in terms of weaning weight, one year old weight and body size. Suranjaya *et al*. [6] further explained that the factors that influence growth, especially in calves before weaning, are parity and sex and after weaning are influenced by location, season, sex, parity and type of bull.

Birth Weight

The birth weight of Simmental calves was significantly higher (P<0.05) in males than in Limousin, but not different (P>0.05) in females. The average birth weight of Simmental calves based on male and female was 36.61 and 31.21 kg respectively, while Limousin male and female were 35.65 and 30.93 kg respectively (Figure 5).

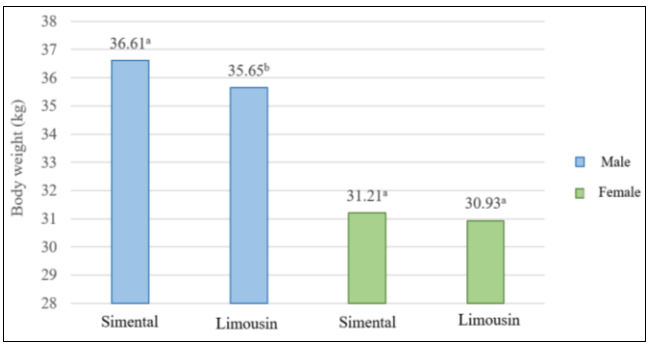

Fig 5: Birth Weight Measurement Results

The results of this study indicated that male influences calf birth weight in Simmental bull, whereas female gender does not. Differences in birth weights of Simmental and Limousin calves is due to the influence of the bull breed. The Simmental bull breed is able to produce a high birth weight compared to the birth weight of Limousin. Hartatik *et al*. [17] stated that different breeds of bulls will influence the vital statistics and birth weight of the calves produced. The choice of breed of cattle is closely related to what will be produced. Birth weight is an important factor in the growth of calves. Cattle with a large birth weight and born normally will be better able to maintain their lives [18].

The higher birth weight of Simmental calves compared to Limousin is thought to be due to an increase in the effect of heterosis due to the crossing of 3 breeds. The greater the proportion of Bos Taurus blood appears to cause the calf's body weight to increase at birth. A similar thing was reported previously by Philips [19] that the calf's birth weight is greatly influenced by its genetics or the race of its two parents, so that increasing the proportion of Bos taurus blood from 50% in crossing cows of two breeds to 75% in three breeds, will genetically produce calves with higher birth weights.

Conclusion

The performance of Simmental calves is better than Limousin for both males and females based on chest size, but only for males based on birth weight.

References

1. Pradana IMYW, Sampurna IP, Suatha IK. The growth of body height dimensions of bali calves. Buletin Veteriner Udayana,2014:6(1):82-85.
2. Hasbi H, Sonjaya H, Baco S, Amalia R, Gustina S. Characteristic of libido and testosterone concentration of Polled and Horned Bali bulls after GnRH injection. JITV,2021:26(3):108-114.
3. Zafitra A, Gushariyanto, Ediyanto H, Depison. Characteristic of morphometric and body weight Bali cattle and Simbal in Bangko Meragin District. Majalah Ilmiah Peternakan,2020:23(2): 66-71.
4. Dewantari M, Oka AA. The performance of Bali calves resulted from artificial insemination using semen from different Bali bulls. Majalah Ilmiah Peternakan,2020:23(1):39-42.
5. Sampurna IP, Suatha IK. The allometric growth of long and circular body dimension of Bali cattle. Jurnal Veteriner,2010:11(1): 46-51.
6. Suranjaya IG, Ardika IN, Indrawati RR. Factors affecting Bali cattle productivity at the project of Bali cattle development and breeding centre in Bali. Majalah Ilmiah Peternakan,2010:13(3): 83-87.
7. Crisdayanti S, Depison, Gushairiyanto, Erina S. Identification of Bali cattle and Brahman ceross cattle morphometric characteristics in Pamenang Barat sub-district Merangin district. Jurnal Peternakan Sriwijaya,2020:9(2):11-20.
8. Setiawan D. Artificial insemination of beef cattle UPSUS SIWAB program based on the calculation of non-return rate, service per conception and calving rate in the North Kayong regency. The International Journal of Tropical Veterinary and Biomedical Research,2018:3(1):7-11.
9. Aprily NU, Sambodho P, Harjanti DW. Calving evaluation of dairy cattle in balai besar pembibitan ernak unggul dan hijauan pakan ternak baturaden. Jurnal Peternakan Indonesia,2016:18(1):36-43

10. Galuh RKP, Ardika IN, Artiningsih NM. The effect of different sires as a source of semen on reproduction performance of Bali cattle in Bali cattle breeding centre sobangan. Journal of Tropical Animal Science,2014:2(2):262-273.
11. Wagyu Registry Association. Hand book of Wagyu improvement. Wagyu Registry Association. Kyoto, 1992.
12. Warmadewi DA, Oka IGL, Ardika IN. The effectiveness of body dimension selection on female Bali cattle. Majalah Ilmiah Peternakan,2017:20(1):16-19.
13. Yulianto E, Nafiu LO, Zulkarnain D. Performance of crossing Simmental, Brahman, PO, Limousin with Bali Cow in East Kolaka Regency. JITRO,2021:8(3):232-238.
14. Aryogi AY, Pamungkas D. Profile and potency of Ongole cross breed bull for candidate of the new strain producer. Prosiding Seminar Nasional Teknologi Peternakan dan Veteriner, 2006, 62-69.
15. Depison D. Bali calf performance hybrid with some of the bulls in Batanghari District, Jambi Province. Agripet,2010:10(1):37-41
16. Susanti I, Ihsan MN, Wahjuningsih S. Effect of male breed on AI calf growth at Subdistrict Bantur Malang Regency. Journal of Tropical Animal Production,2015:16(1):41-47.
17. Hartatik T, Mahardika DA, Widi TSM, Baliarti E. Characteristic and performance of Limousin-Madura Grade and Madura Cows in Sumenep and Pamekasan Regencies. Buletin of Animal Science.2009:33(3):143-147.
18. Prasojo G, Arifiantini I, Muhamad K. The correlation between the gestation period, birth weight and new born calves sex after artificial insemination of Bali cattle. Jurnal Veteriner,2010:11(1):41-45.
19. Phillips A. Genetic effects on the productivity of beef cattle. Australia Agote, 2001