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Birth Weight and Growth Weight of Bali Cattle Calf

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Abstract. Research on birth weight and calf growth rate of Bali cattle was carried out in Abian Village, Semarang, Badung, to know the birth weight, body weight gain, and the average calf bodyweight for Bali cattle aged 0-8 months. Using the observational method of Balinese cattle calves from birth to 8 months of age consisting of male and female calves taken randomly. Cows that give birth to calves are weighed and monitored continuously for up to 8 months, monitored and weighed once a month for 8 months. The number of cows observed was 40 calves each, 20 female calves, and 20 male calves. The results showed that the birth weight of Balinese calves varied, both in male and female calves. The birth weight of female calves is 14.50 kg and male calves 16.40 kg, there is a tendency that male calves birth weight is greater than the birth weight of female calves. The calf growth rate of female Bali cows was 0.29 kg/day while males 0.30 kg/day did not have a significant difference between different sexes. The average increase in body weight of male and female calves at the age of 7 months decreased due to weaning. It can be concluded that calf birth weight of Bali cattle is 15.45 + 0.99 kg, where the birth weight of male Bali cattle calves is always heavier than calf calves in Bali cattle. The calf weight gain of Bali cattle varies with the highest body weight gain at 7 months of age

Keywords. birth weight. Bali cattle calf, growth rate

1. Background

Calves are aged 1-8 months where the growth begins to enter an accelerated phase, in this phase, they will grow optimally if they are supported by good feed and suitable to needs, the environment, and good maintenance management (Ismirandy, 2018). This growth period is very crucial and needs special attention, because it will determine profits for the farmer. Therefore, breeders must know the knowledge about the growth of their livestock.Growth is a process of increasing size, volume, and mass which is irreversible due to cell enlargement and an increase in the number of cells due to the process of cell division (Karnaen, 2007; Hardiono, et. al., 2016). Overall body growth is generally measured by increasing body weight, while body size can be determined by measuring shoulder height, body length, and chest circumference. The combination of weight and body size is commonly used as a measure of growth (Rachma, 2011). The growth patterns of calf Bali weaning still vary widely due to the implementation of the management pattern of the given feed, as well as sex. Growth is a change in body size which includes changes in live weight, including changes in body components such as muscle, fat, bone, and organs, body shape, and composition that can be measured in terms of length, volume, or mass. The growth of animal body parts has increased differently. With every increase in body weight, there is a difference in the proportion of organs and muscle tissue, bone, and fat. All food substances in animal growth will be prioritized for bone growth, muscle tissue than fat. Growth can be expressed

quantitatively because growth can be known by looking at the changes that occur in the living thing concerned (Rachma, 2007; Saharia, 2017). Bone growth is very important for livestock growth because bone growth and development will determine the body size of livestock. The growth of livestock undergoes two phases; (1) body weight increases until it reaches adult body weight, which is called growth, and (2) changes in the conformation and shape of the body as well as various functions and abilities to do something into a full form which is called development (Sulistyowati, 2009). The growth of cattle is determined by various factors, especially the type of cow, gender, age, ration, or feed is given, and processing techniques. Among local cattle, Ongole and Bali cattle have high body weight gain (Astiti, 2019). The growth rate of livestock is influenced by age, breed, environment, and time of maintenance. The growth rate is influenced by sex, hormones, feed, genes, climate, and parent health. Large type cattle have a higher growth rate than small type cows. This difference in growth rate results in the slaughter weight for large type cattle to be higher than for small type cattle.

Based on the description above, we conducted research to know:

1. the birth weight of Balinese calves' cattle
2. the calf body weight gains every month.
3. the average weight body of Bali's calf

2. Research Methodology

The research was conducted in the Selat village of Badung Regency. The research object was farmer community calves located in the Selat village. Using the observational method of Balinese cattle calves from birth to 8 months of age consisting of male and female calves taken randomly. The number of cows observed was 40 calves each, 20 female calves, and 20 male calves. In practice, the mothers are taken from the Simantri herd, mated by artificial insemination. Cows that give birth to calves are weighed and monitored continuously for up to 8 months, monitored and weighed once a month for 8 months. The scale used is the Turbo brand scale with a capacity of 150 kg. the measurement results are added up and averaged and analyzed by T-test.

3.Result and Discussion

The birth weight of Bali cattle calves varies, both for male and female calves. The birth weight of female calves is 14.50 kg and male is 16.40 kg. The range of birth weight for Bali cattle calves from the research results is not much different from the birth weight of Balinese cattle kept in BPTU Bali cattle, which is 16.5 kg in males and 16.3 kg in females (Wisnuputra, 2008). Bali cattle birth weight reaches 14 ± 2.9kg in the maintenance of a village breeding center (Panjaitan, 2013). The average birth weight of male calves in Bali tends to be higher than that of female calves. The tendency for male calves to be heavier than female calves is caused by sex hormone which functions as a growth hormone by spurring body cells to develop and enlarge like other growth hormones. The tendon growth of male livestock tends to be greater than the tendon growth of female livestock. This is a reflection of the difference in overall body size influenced by sex (Setiyono, et. al., 2017)

Table 1. Average weight and increase of calf body weight Bali cattle

Age (Month)	Average Body Weight (Kg)		Average Increase in Body Weight (Kg)	
	Female	male	Female	Male
0	14,50	16,40	-	-
1	24,60	29,60	10,10	13,20
2	33,30	40,30	8,70	10,70

3	**41,90**	**48,70**	**8,60**	**8,40**
4	**51,10**	**58,10**	**9,20**	**9,40**
5	**57,30**	**65,30**	**6,20**	**7,20**
6	**65,20**	**74,20**	**7,90**	**8,90**
7	**71,10**	**80,20**	**5,90**	**6.00**
8	**79,30**	**91,10**	**8,20**	**8,20**
	Growth	**Per Month**	**8,99**	**9,00**
	Growth	**Per Day**	**0,29**	**0,30**

One of the indicators to determine the growth rate is body weight. The calf growth rate of female Bali cows is 0.29 kg/day while lazy are 0.30 / day. There was a difference in the growth rate of male and female calves. Male calves grew faster at 0.01 kg/day than female calves. The fast growth rate of male calves is because male Bali calves with an age range of 0 - 6 months have no significant growth of head, neck, body, and tail length ($p > 0.05$) faster than female Bali calves.

This is because androgens stimulate salt accumulation in the bones which causes bone growth to increase. Calves at the age of 0 - 6 months have not yet reached sexual maturity so that the influence of hormones has not been effective in affecting growth speed, (Dharma, 2015). The growth rate of male calves is faster than female calves because the birth weight of male calves is heavier than female calves, which causes male calf growth to be faster. After all, the bones and muscles of the male calves are heavier. The growth of dairy cattle calves is the same as beef calves from birth to 5-6 months of age, which is more rapid in the direction of body frame formation or reinforcement. This can be detected from the increase in the vital size of livestock such as chest circumference, gumba height, and body length (Sulistyowati et. al., 2009)

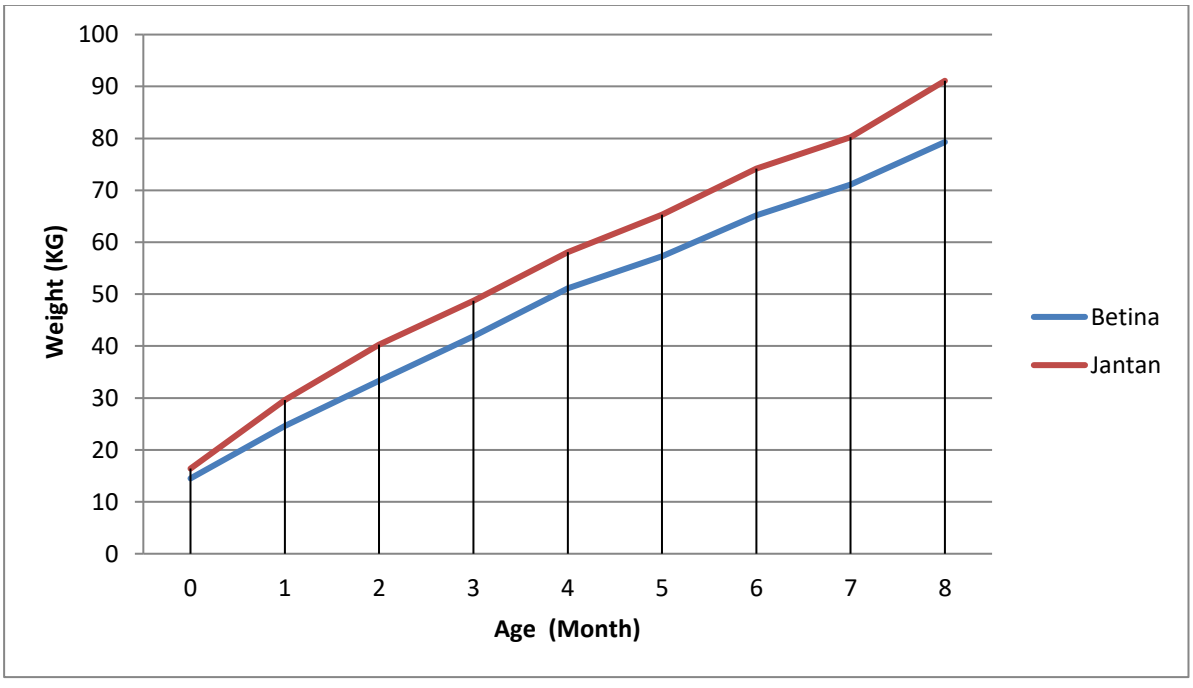

Figure 1.Graph of calf growth rate for female and male Bali cows

The difference in body weight of male and female calves is clear in Figure 1. At 7 months of age, male and female calves experienced a decrease in body weight gain. The average increase in body weight of male calves at the age of 6 months was 8.9 kg/month and at the age of 7 months was 6

kg/month. This also happened to female calves at the age of 6 months, the bodyweight gained was 7.90 kg/month and at the age of 7 months was 5.90 kg/month. The decrease in body weight gain for male and female calves occurs at the age of 7 months because at the age of 7 months the calves experience weaning so that all the nutritional needs of the calves come from the feed provided by the breeders. Calves no longer get milk from their mother. The weaning period had a very significant effect (P <0.01) on daily weight gain after weaning and weight per year as well as parent reproduction which included first marriage after childbirth, days open and calving interval (Sutanto et.al., 2008).

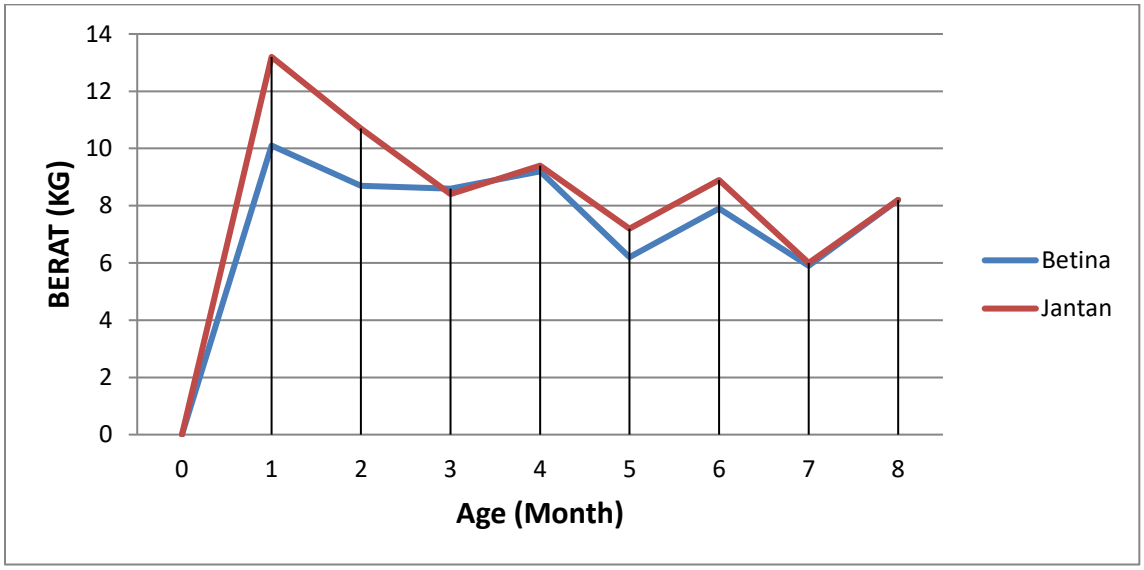

Figure 2. Graph of Average Increase in Body Weight per month for male and female calves

Figure 2 shows the fluctuations in calf body weight gain in Bali cattle, where in the first month of birth, the calf body weight gain in Bali cattle shows the highest body weight gain, this is because calves are in the first phase starting from the age of 1/3 of the end of pregnancy. until the age of adult sex (puberty) is reached. Cows from the age of 3 months before birth to the age of puberty, namely 7-8 months. In this phase, it is the growth phase that has the fastest growth rate so that it can be seen the growth speed.

In general, the maximum average daily gain (Average Daily Gain) reached at the time of puberty is called the maximum growth rate (Syaiful et. al., 2020). Fast growth does not always mean the condition of cattle before puberty, because adult livestock is healthy but have a thin body condition due to stress due to the influence of food, climate, can also grow quickly after getting repaired. This is known as accelerated growth or compensatory growth.

The growth rate for each animal will not always be the same and this is due to the influence of several factors, including feed, hormone, sex, and environment. In ideal environmental conditions the shape of the post-birth growth curve for all livestock species is similar, that is, following the sigmoid growth curve pattern. A sigmoid growth curve is formed, because age does not increase body weight, but provides opportunities for livestock to grow to maturity and interact with the environment. The growth rate is initially very slow, then rapid, then gradually decreases or slows down and stops after reaching adulthood (Hardiono, et.al, 2016).

4. Conclusion

The calf birth weight of Bali cattle is 15.45 + 0.99 kg, where the birth weight of male Bali calves is always heavier than that of female Bali cattle. The Bali cattle calf weight gain varies, the highest body weight gain is at the age of 7 months. To get a better picture of the growth curve it would be better if this research was continued until growth was constant.

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