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PRE WEANING GROWTH OF BALI CALVES AT *BALAI PEMBIBITAN TERNAK UNGGUL SAPI BALI*

PERTUMBUHAN PRA SAPIH PEDET SAPI BALI DI BALAI PEMBIBITAN TERNAK UNGGUL SAPI BALI

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ABSTRACT

Balai Pembibitan Ternak Unggul is a breeding center established by the Government of Indonesia (GOI) to perform preservation, breeding, breeding stock production and development, and also the distribution of breeding stock of Excellent Bali cattle at national level. In the production of excellent breeding stock through the performance test and progeny test. Pre-weaning growth is one of the important indicators for the population growth. The study was aimed to identify the pre-weaning calf growth rate of Bali cattle in 2010-2011, born from performance-test-passing-dams that were collectively reared with progeny-test-passing sires. Materials used were 84 pre-weaning Bali calves. This was a survey method-based descriptive analysis research. The results showed that in terms of the performance of pre-weaning growth, the birth weights of male and female calves were 18.37±1.65 kg and 18.27±1.29 kg, respectively. The weaning weights of male and female calves were 93.53±21.00 kg and 87.66±12.04 kg, respectively, with weaning time of 205 days. The average of daily weight gain (ADG) were 0.37±0.10 kg/head/day (male) and 0,34±0,06 kg/head/day (female). It was concluded that the pre-weaning calf growth rate of Bali cattle at the BPTU Bali in 2010-2011 were moderately high since they were born from the dams and the sires passing the performance test and progeny test.

(Keywords: Pre-weaning growth, Bali cattle)

INTISARI

Balai Pembibitan Ternak Unggul merupakan balai yang didirikan pemerintahan Indonesia untuk melaksanakan pelestarian, pemuliaan, pembibitan produksi dan pengembangan serta penyebaran hasil produksi bibit Sapi Bali Unggul secara nasional dan untuk menghasilkan bibit unggul dengan cara seleksi performance test dan progeny test, pertumbuhan pra sapih merupakan salah satu indikator yang penting bagi perkembangan populasi. Penelitian ini bertujuan untuk mengetahui tingkat pertumbuhan pra sapih pedet Sapi Bali yang lahir tahun 2010-2011, berasal dari induk yang telah lulus performance test dan dipelihara bersamaan dengan pejantan di ranch yang telah lulus Progeny test. Materi yang digunakan 84 ekor pedet pra sapih Sapi Bali, analisis deskriptif dengan metode survey digunakan dalam penelitian ini. Hasil penelitian menunjukkan pertumbuhan pra sapih diperoleh berat lahir jantan 18,37±1,65 kg dan berat lahir betina 18,27±1,29. Berat sapih pedet jantan 93,53±21,00 kg dan pedet betina 87,66±12,04 kg, dengan waktu sapih 205 hari. Rata-rata PBBH yang diperoleh pedet jantan dan betina sebelum disapih 0,37±0,10 kg/ekor/hari dan 0,34±0,06 kg/ekor/hari. Berdasarkan hasil penelitian disimpulkan tingkat pertumbuhan pra sapih pedet sapi Bali di BPTU Bali pada tahun 2010-2011 cukup tinggi karena pedet yang lahir berasal dari jantan dan betina yang lulus seleksi Performace test dan Progeny test.

(Kata kunci: Pertumbuhan pra sapih, Sapi Bali)

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Introduction

Bali cattle, *Bos sondaicus,* is one of Indonesian native cattle and it has been domesticated from wild cattle (Ngadiyono, 2012). According to Paat and Salam (1991), Bali cattle can be considered as the best beef cattle in the future with its high production and reproduction capacity among other local livestock and with important role in supporting agro-business in rural area, as well as its main role of meat production.

It is reported that the Bali calf production is decreasing compared to the slaughtering and the death rate of Bali cattle (Talib *et al*., 2003). One of intensive effort to produce Bali calves is conducted by establishing several breeding centers, e.g. the *Proyek Pembibitan dan Pengembangan Sapi Bali* (P3Bali, Bali Cattle Breeding and Development Project based on the Decree of Minister of Agriculture no. 776/Kpts/Um//12/1976). In 1977 through *Bank Rakyat Indonesia*, the GOI provided people with cattle loan as efforts to encourage the P3Bali program, that recently serves as *Instalasi Populasi dasar*/IPD (Basic Population Installation). In 2007, based on the Decree of Minister of Agriculture no. 13/Pemerintah/OT.140/2/2007, the P3 Bali formally changed into the *Balai Pembibitan Ternak Unggul* (BPTU) Sapi Bali. This BPTU for Bali Cattle has main role to carry out preservation, breeding, breeding stock, production, and development, and distribution the products of the excellent pure Bali cattle nationwide. In addition, the specific goal is to improve the excellent sires in improving the genetic quality of Bali cattle in Indonesia.

Bali cattle at the BPTU for Bali Cattle are mostly reared under ranch and rotation system. The livestock will be transferred from one to another ranch when less availability of grass is found in one ranch and it is also based on the performance or body condition score of livestock reared in one paddock. However, the newly-arrived livestock from the community should be firstly reared in a barn to adapt with the new environment. The new arrivals are intended to replace the BPTU's-assessment –based unfeasible cattle to be good dams.

After five year of its establishment, several programs and activities were launched; however, no through study has been conducted on the performance of the BPTU for Bali Cattle. In 2009 it was reported that performance of the Bali dams and calves had not been optimal as indicated by the longer first delivery period of the dams of $\pm$ 40 months, calving interval of $\pm$ 18 months, and calf birth of $\pm$ 70% (Putra *et al.,* 2008). In addition to this report, no other report has been developed on the Bali cattle productivity at BPTU. Therefore, this research was conducted on the Bali calf growth at the Breeding Center Pulukan. This research was carried out to identify the pre-weaning calf growth rate of Bali cattle at BPTU for Bali cattle in 2010-2011.

The benefits of this research involve to describe the pre-weaning calf growth rate of Bali cattle at BPTU for Bali cattle in 2010-2011, born from performance test-passing dams and progeny test-passing sires. It was expected that this research was able to provide description on the Bali cattle production management, particularly the pre-weaning growth both at the Breeding Centers and among the common breeders as well. Data gathered are beneficial for evaluating whether there has been improved productivity than the previous time. Furthermore, it is expected that this research provides the bureaucratic decision makers and academicians with scientific information and serves as a scientific reference in terms of the Bali cattle production.

Materials and Method

Period and site

This research was done in January to March 2012 at the BPTU Bali cattle at Jl. Gurita III, Pegok, Sesetan, Bali. The Breeding Center is located in Jl. Raya Gilimanuk-Denpasar km 70, Payangan Village, Pekutatan Sub-district, Jembrana District, Bali.

Materials

Materials in this research were 84 of pre-weaning Bali cattle calves and recording data on Bali cattle reared collectively in ranch or paddock at the BPTU for Bali cattle. Number animal used in the study was presented at Table 1.

Methods

This was a descriptive analytical research using survey method in two stages. The first stage was two weeks observation of the field condition and collecting information on total dams of Bali cattle in the Breeding Center and identifying the available recording. The second stage was the implementation of the research, or the data collection stage. The quantitative technique was used to obtain factual and objective data in line with the research objective. The variables observed were: birth weight, weaning weight, weaning age, average daily gain (ADG) and parity.

Data analysis

Data collected were analyzed using descriptive analysis in terms of mean and standard

Table 1. Number of Bali calves used in the study

Number of parity	Male	Female	Total
1	10	11	21
2	3	5	8
3	10	9	19
4	1	3	4
5	7	4	11
6	10	7	17
7	2	2	4
Total	43	41	84

deviation and frequency distribution analysis. Technique adopted to analyze the difference of weaning weight, birth weight and average daily gain between male and female calves was independent sample t-test. The effects of dam parity on birth and weaning weight were analyzed using one way analysis of variance.

Results and Discussion

Performance of pre-weaning growth

The growth of pre-weaning calves was evaluated based on the birth weight, weaning weight, weaning age, and average daily gain (ADG).

Birth weight. The birth weight of the calves is presented on Table 2. There was a direct effect between the dam parity on the calf birth weight. The dam parity parent provides the significant value of 0.000, identifying that there was difference in average calf birth weight by parity. The highest average birth weight was 19.63 kg, which was the calf of second parity, with the lowest and highest birth weights of 17 kg and 25 kg, respectively. While the lowest average birth weight was 17.43 kg, which was the first parity, with the lowest and highest birth weights of 16 kg and 20 kg, respectively. Sutan (1988) reported that the age of the dam and its parity affected the calf birth weight. In general, the dams calving at older age had calves with higher individual birth weight, compared to those calving at the younger age. This is true because the younger dams will also grow steadily during their first pregnancy; hence, it competes with their fetus for the nutrients consumed (Toelihere, 1985).

The average birth weight of a male calf was higher than that of females, i.e. 18.37±1.65 kg/head compared to 18.27±1.20 kg/head. According to Sutan (1988), the male calf weight was higher due to the one day longer pregnancy time might cause the additional calf birth weight of 0.45 kg. According to Suardi (2003) in Rusdiana (2011), the male calf birth weight was faster in growth than the female was due to the more activeness of male fetus in absorbing the dam's nutrition than the famale one.

Birth weight may be affected by the placental weight. The higher plancental weight, the more active the cells can grow and develop, and the more active the blood vessels function (Tambing *et al*., 2000). Then, Alexander (1964), in Putra (1999) stated that there was a positive correlation between placental weight and fetus weight, and when a decline was found in the placental size during pregnancy it might produce lower weight. In addition, Cantet *et al*. (1964), which cited by Putra (1999) stated that the calf birth weight variability of 36-65% was affected by sex, age of dams and the order of calf birth.

The results of Taylor's study (2006) suggested that sex served as a significant source of variation ($P<0.001$), in terms of variation of birth weight, weaning weight, 12 month weight, 18 month weight, that significantly ($P<0.05$) affected the weight of pre-weaning and post-weaning. The male calf weight showed 3.05; 13.75; 123.37 and 238.99 kg heavier weight than the female calves, at birth, weaning, at 12 months and 18 months of ages, respectively, and it also showed more rapid growth weight levels of 0. 07 kg/day from birth to weaning weight, and of 0.65 kg/day from the weaning time until 12 months of age. The effect of season on birth weight, weaning weight, and the weight of the 18-month, and pre-weaning growth rate was significant ($P<0.001$).

In addition, Sutan (1988) in Prosejo *et al.* (2010) stated that there were some factors having relationship and affected the calf birth weight, including dam breed, calf sex, pregnancy duration, dam parity or age, and dam feeds during pregnancy. Astawa (1990) stated that the average birth weight of Bali cattle in Bali was 16 kg and much higher than that of its counterparts in East Nusa Tenggara,

Table 2. Birth weight (kg) of Bali calves at BPTU Sapi Bali

Number of parity	Male	Female	Total
1	17.30±0.82	17.55±1.13	17.43±0.98
2	21.67±3.51	18.40±1.52	19.63±2.77
3	18.00±0.94	18.11±1.05	18.05±0.97
4	18.00±0.00	19.33±1.15	19.00±1.15
5	19.00±0.82	18.50±1.00	18.82±0.87
6	18.40±1.58	19.14±0.90	18.71±1.36
7	18.50±0.71	17.50±0.71	18.00±0.81
Total	18.37±1.65	18.27±1.20	18.32±1.44

West Nusa Tenggara, and South Sulawesi with total of 11.9±1.8 kg, 12.7±0.7 kg, and 12.3±0.9 kg, respectively.

Weaning weight. The weaning weight of Bali calves is presented in Table 3. There was not any effect of dam parity on Bali cattle weaning weight. The highest average weaning weight was 102.50 kg as the calf from the seventh parity, and the lowest and the highest weaning weights of 93 kg and 114 kg, respectively, while the lowest average weaning weight was 85.75 kg, that was from the fourth parity, with the lowest and the highest birth weights of 79 kg and 92 kg, respectively.

The average weaning weight gained for male and female Bali cattle were 93.53±21.00 kg and 87.66±12.04 kg. In the previous research by Putra *et al*. (2008), the average cattle weaning weight at BPTU for Bali Cattle was 79.92±6.43 kg. This indicated an increase in weaning weight at BPTU for Bali Cattle. Milk production of the dams provided significant effect on the calf growth and weaning weight. The higher milk production of the dams was, the better growth of the calves was (Giffort, 1953 cit. Baliarti, 1986).

According to Warwick and Legates (1979), the weaning weight depended on the innate calf grow capacity, in addition to the ability of the dams in raising their calves. The dam factor plays an important role in affecting the weaning weight, in addition to the calf's potential. Increasing weaning weight indicated successful selection process on dams and sires at the BPTU Bali Cattle compared to those of other breeding center's performance test selection, the dams at BPTU Bali Cattle were those belonged to actual good physical classification. Commonly, Bali cattle with its good external appearance will affect the productivity and quality of the calf production (Guntoro, 2009). Furthermore, increasing weaning weight also indicated succesful progeny tests program conducted at BPTU for Bali Cattle in improving the average weaning weight as the basis of superior sire production.

The calf birth weight at BPTU for Bali Cattle was quite higher and it was one of factors affecting the calf weaning weight level at BPTU for Bali cattle, in consistent with Acker's statement (1963), that calves with higher birth weight will indicates faster growth level, and hence, higher weight level.

Weaning age. Weaning is the period of withdrawing the calf from the cow. In this research, all Bali dams underwent the weaning period at the age of 205 days. The average weaning age in this research was higher than the research finding of Hasbullah (2003), i.e. in the range between 149.50±41.86 days to 151.52±44.78 days.

Hardjosubroto (1992) stated that the average weaning age of beef cattle was 7.47±1.76 months. Weaning time will affect the animal productivity. Earlier weaning period may lead to 1) decreasing body weight of the dams due to the separation-caused stress and reduced feeding consumption because of searching for the calf, 2) higher calf mortality rate, and 3) increasingly required management. Prolonged weaning time is frequently less economical and it will lead the decreasing dam's reproduction level (Diggins *et al*., 1979).

Average daily gain (ADG). Data on the ADG of pre-weaning Bali calves are presented in Table 4. The results showed that there was not any effect of dam parity on Bali cattle ADG. The highest pre-weaning ADG was 0.415 kg as the calf from the seventh parity, and the lowest and the highest pre-weaning ADGs of 0.37 kg and 0.47 kg, respectively, while the lowest average pre-weaning ADG was 0.328 kg, that was from the fourth and the fifth parities. In the fourth parity, the lowest and the highest pre-weaning AGDs were 0.29 kg and 0.36 kg, respectively; while in the fifth parity the lowest and the highest pre-weaning AGDs were 0.26 kg and 0.42kg, respectively.

Average daily gain (ADG) of pre-weaning Bali male calf of 0.37±0.10 kg/calf/day was higher than that of female calf of 0.34±0.06 kg/calf/day. According to Muzani *et al*. (2007) the pre-weaning ADG is between 0.45 kg to 0.48 kg. The difference

Table 3. Weaning weight (kg) of Bali calves at BPTU Sapi Bali

Number of parity	Male	Female	Total
1	89.30±20.94	90.91±15.12	90.14±17.67
2	97.67±14.36	91.40±13.94	93.75±13.44
3	93.50±23.75	88.22±10.29	91.00±18.35
4	92.00±0.00	83.67±4.16	85.75±5.38
5	89.71±11.57	79.75±8.34	86.09±11.25
6	95.80±28.36	83.71±12.76	90.82±23.48
7	111.50±3.54	93.50±0.71	102.50±10.60
Total	93.53±21.00	87.66±12.04	90.67±17.37

Table 4. Pre weaning average daily gain (kg) of Bali calves at BPTU Sapi Bali

Number of parity	Male	Female	Total
1	0.35±0.10	0.36±0.07	0.35±0.08
2	0.37±0.06	0.36±0.07	0.36±0.06
3	0.37±0.11	0.34±0.05	0.36±0.09
4	0.36±0.00	0.32±0.02	0.33±0.03
5	0.35±0.06	0.30±0.04	0.33±0.05
6	0.38±0.14	0.31±0.06	0.35±0.12
7	0.46±0.02	0.38±0.01	0.42±0.05
Total	0.37±0.10	0.34±0.06	0.35±0.08

in ADG of the pre-weaning was affected by the average weaning weight, environmental condition, and rearing management (Muzani *et al.,* 2007).

The ADG at Bali Cattle BPTU was lower compared to what the findings of Mappigau (1989); i.e. it was suspected that is was caused by the less milk production of dams for the calves. In lactating dams, feeding is prioritized for milk production, in which the higher metabolic activity of udder gland requires more sufficient nutrient supply to synthesize milk (Mepham, 1976; Coller, 1985).

Requirements of nutrient increases with the increasing milk production. At the beginning of lactation during the first weeks of calving, the lower appetite and dry matter intake is not able to fulfill the needs of the calves, hence, less nutrient input is found compared to its output in milk, faeces and urine. To meet this needs, livestock will mobilize energy and proteins from its tissue reserves (Sutardi and Djohari, 1979); therefore such a condition will result in lower milk production, leading to the lower level of pre-weaning average daily gain (ADG).

Conclution

Based on the results of this research it is concluded that the pre-weaning calf growth at the *Balai Pembibitan Ternak Unggul* for Bali Cattle were indicated by the birht weights of males and females of 18.37±1.67 and 18.27±1.20, respectively; and the weights of male and female pre-weaning weights of 93.53±21.00 and 87.66±12.04, respectively; also, pre-weaning average daily gain (ADG) of male and female calves were 0.37±0.10 kg/head/day and 0.34±0.06 kg/head/day, respectively.

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