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Reproduction Performance of Bali Cow at Three Areas of Bali Province

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ABSTRACT: Reproduction traits of Bali cattle such as service per conception, calving rate and calving interval and fertility of semen are as successful parameter on breeding program (natural or artificial). Data of Bali cattle reproduction like breeding season, birth season, services per conception, calving interval, and days open were used to study reproduction ability of the dam. Result of research showed that service per conception was 1.23±0.31; 1.02±0.09; 1.2 ±0.27; calving interval was 12.53±0.83; 12.53±0.83; 13.33 ±1.86; days open was 106±25.01; 130.24±38.31; 110±32.33 for the herd from Karang Asem, Tabanan and Pulukan, respectively. Breeding season and birth season were happened along the year. Breeding season was on July to December and it reached the peak on September. Birth of calves was on April to October and it reached the peak on July.

Keywords: Bali cattle, reproduction traits, breeding season, birth season.

INTRODUCTION

Beef cattle were grown to produce meat and other products which were utilized by human beings. Meat is an important food source to fulfill the need of protein of human. Meat demand in Indonesia was increased by 6%~8% each year, especially in densely populated areas such as Java. The fulfillment of the meat is partially supplied by local beef cattle such as Bali, Ongole, Madura, and some other breeds. Bali cattle represent the greatest percentage (26.92 percent) among all cattle breeds, which means that the contribution of Bali cattle to meeting the needs for the meat is very significant. However, the performance of Bali cattle in producing meat has not yet reached a maximum so that efforts are still needed to optimize it.

The advantages characteristics of the Bali cattle breed are its high fertility, high meat quality, low fat percentage (Bugiwati, 2007), its survival and capacity to perform under poor environmental and climatic conditions in harsh dry land areas such as in eastern Indonesia (Toelihere, 2002). In beef cattle production such as Bali cattle, selective breeding mainly has been purposed to improve production trait such as average daily gain (ADG), growth rate and very rare in reproduction trait. However, reproduction traits appear most economically important in meat production whatever the production system. Economic losses from impaired reproductive traits such as fertility are main cause of the production loss as a result of prolonged calving interval, increased insemination costs, reduced return from calves born and higher replacement costs (Bagnato and Oltenacu, 1994).

In fact, reproductive traits dramatically affect productivity. Reproduction traits such as service per conception, calving rate and calving interval of cow and fertility of bulls were as successful parameter in breeding program. Some studies refer to reproduction traits noted that service per conception of Bali cow was 1.8 – 2.0 (Mastika, 2002); calving rate was about 64 – 78% (Bamualim dan Wirdahayati, 2002). Study in reproduction traits of Bali cattle is still needed to improve productivity of them. The aim of the research is to study reproduction performance of Bali cow in term of service per conception, calving interval and days open. Breeding season and birth season are also investigated to determine the peak of breeding and birth season of Bali cattle in certain area.

MATERIALS AND METHODS

Data

138 Bali cows were used as samples to study service per conception, calving interval and] days open. Data were gathered from the farmers who lived in three districts namely Karang Asem, Tabanan and Pulukan. The total number of recording of Bali cows which from Karang Asem, Tabanan and Pulukan were about 61, 47, and 30, respectively. A summary of data structure for each district is presented in Table 1.

Table 1. The number of data for each district at certain age

Age	Districts		
	Karang Asem	Tabanan	Pulukan
PI0	22	10	0
PI2	7	13	0
PI4	13	8	16
PI6	2	2	7
PI8	17	14	7

Note: PI= Permanent Incicy; PI0=1.5 years old; PI2= >1.5 – 2 years old; PI4= >2 – 3 years old; PI6= >3 – 4 years old; PI8= > 4 years old.

The data were used to calculate service per conception, calving interval and days open of Bali cows.

Management of animals

The data was from the database of the Bali breeding center of the Animal Husbandry Organization of Bali Province. For the genetic improvement of Bali breed in its growth performance, the project was started in 1976 by the Agriculture Ministry of Indonesia. In this project, bulls were selected at 1 year of age from village breeding center (Tabanan and Karang Asem). Then, the bulls were assigned to flocks in Pulukan to participate in performance test under supervision of Bali Breeding Center. In these flocks pedigree information and other information related to growth traits were recorded carefully. This information was collected from flocks and recorded in the database of Bali Breeding Center for investigating the amount of success of the Bali project. In the Bali breed, the mating period was from July to December by artificial insemination and natural mating. Calving was commenced in April to October. During the calving season, the calves were outdoors together with the dams until weaning.

The calves were weighed and ear tagged within 12 hours of birth. The identities of newborns and of their parents, date of birth, sex, and birth weight were recorded. The length of the suckling period was not the same for all calves. During the suckling period, calves were additionally fed with king grass and concentrate from industry. Most of calves were weaned in May. After weaned, calves were put in different flocks separated to their dams. At 18 months of age animals were treated the same way to test their performance.

Data Analysis

Based on the data, some variables were calculated as follows:

1. Service per conception. Royal *et al.* (2000) stated that service per conception (S/C) is a measure of the fertility of a herd; the number of services required to affect a pregnancy.
2. Days Open (DO) is the period between calving and conception in cows. Called also calving-to-conception interval (Atabany *et al.,* 2011).
3. Calving interval (CI) is the average time interval between successive calvings (Iskandar and

Farizal, 2011).

All variables were analyzed to describe reproduction performance through general average and standard deviation of each area.

RESULTS AND DISCUSSION

Reproduction performance of Bali Cow

Table 2 showed reproduction performance of Bali cow such as service per conception, calving interval and days open.

Tabel 2. Reproduction performance of Bali cow

No	Parameter	Karang Asem	Tabanan	Pulukan
1.	Servis per conception	1.23 ± 0.31	1.02 ± 0.09	1.2 ± 0.27
2.	Calving interval (months)	12.53 ± 0.83	13.34 ± 1.28	13.33 ± 1.86
3.	Days open (days)	106 ± 25.01	130.24 ± 38.31	110 ± 32.33

It could be noted from Table 2 that service per conception, calving interval and days open of Bali cow at three area (Karang Asem, Tabanan and Pulukan) were in ideal condition. Detailed information for every year of service per conception (S/C), life birth (%) and calving interval (days) at village breeding center (Tabanan and Karang Asem) in last ten years was summarized in Table 3. Other important information like breeding season and birth season was graphically in figure 1.

Tabel 3. Reproduction performance of Bali cow at village breeding center in last ten years

Year	S/C	Life birth (%)	Calving interval (days)
1	1.13	80.60	400.00
2	1.19	80.75	396.00
3	1.30	80.76	396.00
4	1.18	78.80	385.78
5	1.30	*	396.00
6	1.18	79.80	385.78
7	*	75.80	395.78
8	1.20	79.95	388.00
9	*	75.26	385.98
10	1.15	79.75	386.83
Mean	1.2 ± 0.06	78.11 ± 2.37	391.62 ± 5.59

Noted: * data not available

Table 3 showed that the mean of S/C in last ten years was about 1.2 ± 0.06, it meant that the cow had good fertility. The mean of life birth and calving interval was about 78.11 ± 2.37 and 391.62 ± 5.59, respectively. From figure 1 it could be concluded that the evident of breeding and birth was along the year. Breeding season was on July to December and reached the peak on September. Birth season was on April to October and reached the peak on July.

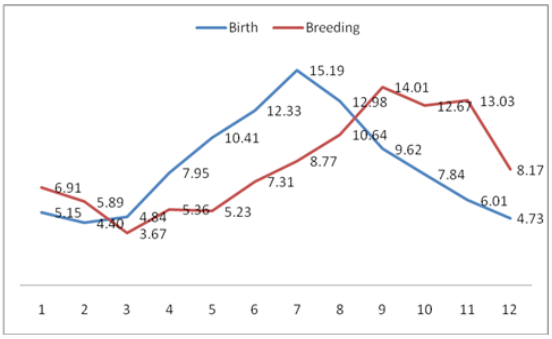

Figure 1. Breeding season and birth season in last ten years

High fertility of Bali cow at Tabanan and Karang Asem as village breeding center(with considering of S/C, calving interval dan days open) due to Bali cow have been adapted to tropical environment for long time ago. Feeding of Bali cow also played role important for basic live and reproduction need. It was correlated to successfully of pregnancy. The high fertility of Bali cow was also supported by shorter calving interval which almost every year calve were born.

High breeding season on July to December related to rainy season at Tabanan. According to Anonymous (1997) the rainy season at Tabanan was started on October and reached the peak on January and hot season was started on April and reached the peak on August. The breeding season on those months was correspondence to highly rainfall which resulted on high quality and quantity of grass. The effect of tropical climate was indirectly on productivity of livestock through feeding, healthy and management (Keman, 1986). On the hot season, cattle which raised in Tabanan were fed by low quality and quantity of grass due to difficulties to get grass in a good quality and quantity.

Instinctively livestock will adapt to environment in order to get the most kind and helpful to them. Livestock adapt to the environment depends on the needs of the water and food they get (Critchfield, 1979). Rainfall, either directly or indirectly is important to the effects on plant growth and disease (Lawlor, 1997). Calf births are on May to September is about 60.52%. It is different to sub tropical area which is 50% calf births are on March to May. By looking at the rainy season and hot season in Tabanan, it appears that the higher rainfall the lower percentage of births. As with any other living creature, Bali cattle instinctively looks adjust and adapt to the environment. In the high rainfall the disease from insects, ticks and mites will grow faster than the low rainfall (Lawlor, 1997).

The percentage of births is the number of offspring born along year divided by the number of cow multiplied by 100. The average of the percentage of births during the 10 years is about 78.11 ± 2.37%. This figure is still within the limits of reproductive efficiency which are considered good for cow. Reproductive efficiency of cattle is considered good when the pregnancy rate may reach 65-75%, calving interval is no more than 12 months (365 days), the time of birth to re-pregnancy is about 60-90 days, service per conception (S/C) is 1.65 and the birth rate is 45-65% (Hardjopranyoto, 1995) . The average of birth percentage in this study is in accordance to those reported by Pane (1990) in South Sulawesi, NTT, NTB and Bali is about 76%, 70% , 72% and 69%, respectively ; Sumbung et al. (1978) in South Sulawesi is about 79-85%; Djagra and Arka (1994) in Bali is about 83-85% .

Calving interval over the last 10 years also indicates that the reproductive efficiency of cows in village breeding center is good. The calving interval is shorter than those reported by Komariah et al. (1982) in Bali (1.32 years); Darmadja (1980) in Bali and South Sulawesi is about 555 days and 388 days; but it is longer than that reported by Sumbung et al. (1978). Shorter calving interval is related to the guidance conducted by field personnel, the availability of both male for mating natural or semen for artificial insemination and the issuance of unproductive barren cow. Hafez

(2000) states that calving interval depends on the efficiency of estrus detection and fertility of sire and dam. In addition weaning age, days open, body condition, estrus detection, diagnosis of pregnancy and disease control are some of the factors that can affect calving interval.

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