Advances in Biological Sciences Research, volume 18
9th International Seminar on Tropical Animal Production (ISTAP 2021)

Post Partum Estrus of Brahman Cross Cows Inseminated with Limousine Straw in Smallholder Farm

Rahmat Anwar[1], Sigit Bintara[2], I Gede Suparta Budisatria[3], Diah Tri Widayati[2], and Endang Baliarti[3,*]

[1]*Post Graduate Student of Faculty of Animal Science, Universitas Gadjah Mada*
[2]*Department of Animal Breeding and Reproduction, Faculty of Animal Science, Universitas Gadjah Jl. Fauna No. 3, Bulaksumur, Yogyakarta 55281 – Indonesia*
[3]*Department of Animal Production, Faculty of Animal Science, Universitas Gadjah Mada Jl. Fauna No. 3, Bulaksumur, Yogyakarta 55281 – Indonesia*
[*]*Corresponding author. Email: bali_artir@ugm.ac.id*

ABSTRACT
This study aimed to examine the postpartum estrous of Brahman Cross (BX) cows inseminated with a Limousine straw on smallholder farms. Ten BX cows were about five years old with a bodyweight between 365-430 kg in the last month of pregnancy was used in this study. Observations started from nine months of pregnancy until the first estrous after partus. The parameters observed included bodyweight at calving, bodywight every month during lactation to the first estrous, and duration between calving to the first estrous. The results showed the body weight at the last month of pregnancy was 410 ± 0.23 kg/head, the bodyweight immediately after calving was 384 ± 0.22 kg, the bodyweight at the first month of lactation period was 369 ± 0.22 kg, the second month was 361 ± 0.22 kg, and the body weight at the postpartum estrous was 354 ± 0.22 kg. The daily bodyweight changes after calving were -0.56 ± 0.10 kg/day, -0.23 ± 0.34 kg/day and -0.24 ± 0.22 kg/day, respectively. Postpartum estrous occurred 120 ± 1.4 days after calving. This research concluded that postpartum estrous Brahman Cross on smallholder farmer's level was relatively good and produced calf with a good body weight.

Keywords: *Postpartum Estrous, Brahman Cross, Community Livestock, Intensive Management System.*

1. INTRODUCTION

The Indonesian government has launched a beef self-sufficiency program intending to meet domestic beef needs independently by rolling out the 2014 Beef and Buffalo Self-Sufficiency Program (PSDSK 2014). This beef cattle development program includes five main activities, which to some degree will intersect with the reconciliation of import policies and revitalization of domestic cattle marketing. The five main activities are: (a) provision of local feeder/beef; (b) increasing productivity and reproducibility of local cattle; (c) prevention of slaughter of productive female cattle; (d) provision of local cattle breeds; and (e) regulation of domestic beef stock which also includes feeder cattle stock, distribution, and marketing of beef and meat [1].

To increase the beef cattle population in Indonesia, the Government of Indonesia imports cows from Australia, including the Brahman crossbreed (BX). This breed of cattle was chosen to suit the tropical climate conditions in Indonesia because it contains the blood of Bos Indicus, which is formed from Brahman cattle and Bos Taurus cattle. Brahman cattle were formed from Ongole cattle, Khrishna Valley, Gizard from Indicus boss, crossed with Hereford, Shorthorn belonging to Boss Taurus. BX cattle can adapt to the tropics, are resistant to poor-quality feed, and have Bos taurus blood which have a larger body frame. Thus, it is expected that the BX cows will not interfere with their reproductive performance and have larger calves than local Indonesian cattle.

In Indonesia, the management of BX cows is partly handed over to farmers, with a maintenance system as generally done by farmers; cows are kept in cages with their necks tied to poles or floors, and the feed provided does not take into account the physiological conditions needs. As cattle farming is not the primary job, attention to cattle farming management is not fully given [2]. With such maintenance characteristics, the performance, particularly reproduction, can not be optimized [3,4]. One of the reproductive performances of a cow is post-partum estrus. The short length of PPE affects reproductive efficiency [5].

PPE is influenced by a variety of variables. In addition to the feed ratio factor, the condition of the cow's body after calving is very influential. If the body condition of the cow after calving decreases, the PPE is extended [5]. The nutrition needs of the cow after calving increase in order to meet the maintenance needs, besides fulfilling the milk production to assure the calf can grow optimally. If the nutrients during lactation are insufficient, the cow's body energy reserve will be depleted, causing a decrease in body condition score (BCS) and body weight. Excessive weight loss will affect the production and activity of primary reproductive hormones, which causes disruption of follicle development in the ovary and directly affects post-partum estrus [6].

2. MATERIALS AND METHODS

2.1. Materials

Ten BX cows, about 5 years old with a bodyweight between 365-430 kg in the last month of pregnancy was used in this study.

2.2. Methods

Each cow was placed in a cage tied with a rope individually, each equipped with a feed and drink container. The feed was given in the form of 12 kg of fermented corn cobs, 8 kg of corn straw, and 15 kg of king grass (as fed).

The weight, height, body length, chest circumference were measured at the beginning of the experiment. The calf's birth weight and body size were recorded immediately after born. Weighing and body measurements were carried out once a month. Cow and calf were weighed when the calves were three months old, and the cows were observed until they showed signs of estrus after weaning at 90 days. During the study, feed consumption was recorded.

3. RESULTS AND DISCUSSION

3.1. Cow Feed Consumption

Feed consumption of the BX cows can be seen in Table 1.

Table 1. Average feed consumption of the cows

	First month	Second month	Third month
Fermentation of corn cobs (kg)	11.79±0.27	11.76±0.24	11.78±0.26
Dry corn stalks (kg)	7.17±0.22	7.19±0.21	7.17±0.20
King grass (kg)	14.72±0.43	14.71±0.36	14.73±0.27

The feed was given in the form of 12 kg of fermented corn cobs, 8 kg of corn straw, and 15 kg of king grass. The results (Table 1) showed that the average consumption of cows after calving to wean (90 days) was not significantly different from the first until the third month of lactation .

3.2. The BX Cow's Body Weight

Data on body weight and size of BX cows inseminated with Limousin straw on smallholder farms can be seen in Table 2.

3.3 Daily Body Weight Changes

During the lactation period in this study, the cow and the calf were kept in the same cage, which allowed unrestricted access to milk suckling by the calf, leading to a significant decrease in the cow's body weight to fulfill the milk production needs evidenced by decreasing bodyweight of the cow from post-partum onwards recorded in this study.

Table 2. Changes in body weight and size of BX cows during pregnancy, shortly after giving birth, and shortly after weaning.

Parameter	BX cows physiology status		
	During pregnancy	Immediately after calving	Immediately after weaning
Body weight (kg)	410.47±23.11	384.79±22.64	354.60±22.93
Height (cm)	128.70±5.67	128.70±5.67	128.70±5.67
Body Length (cm)	163.40±30.54	163.40±30.54	163.40±30.54
Bust (cm)	170.50±3.24	167.50±3.24	165.10±6.90

According to Affandhy et al. [7] the critical point for the reproduction of cows is during pregnancy and the beginning of lactation. Feed intake that enters the cow's body is used to meet three main needs, including milk production, recovery of post-calving conditions and meeting basic living needs. Addition by Montiel and Ahuja [8], undernutrition is the main factor that inhibits livestock production, especially in the tropics and causes long estrus after calving. Changes in nutrition and the condition of the endocrine status of the parent after giving birth can affect the level of muscle protein degradation which is characterized by a decrease in body weight in some livestock. There is a limit of 25% body weight loss without changing the main body function [6] .

Data of BX cow body weight was shown in Table 3.

Table 3. Body weight and siz BX cow

Parameter	Body weight	changes
Pregnancy bodyweight after birth	384.79±22.64	-
First month	371.02±22.40	-0.56[a] ±0.10
Second month	362.60±22.93	-0.45 [a] ±0.94
Third month	354.60±22.93	-0.24 ±0.55

Previous research by [9] reported that the calf's feeding pattern strongly influenced daily weight loss. Free-feeding calves resulted in a higher daily weight loss of the cow than the calves were sucking milk 30 minutes/day (-0.29 ± 0.38 kg/head/day VS -0.23 ± 0.4 kg/head/day). In this research, the post partum daily weigh lost of BX cow was negatively correlated with the Limousin-BX (Limbra) calf daily weight gain, with the average daily gain in the first month was 0.643±0.10 kg, in the second month was 0.643±0.10 kg and in the third month was 0.632±0.4 kg.

3.4 Post Partum Estrus

Postpartum estrus (PPE) of BX cows at 90 days of calf weaning was 120.7±1.4 days. The average postpartum estrus of the study was shorter than the results of the study of [10], which were 158.6 days, and by [11] which were 4.14±0.39 months and 3.64±1.96 months. Crosses between BX and Limousines resulted in large calf which affected the suckling index, so that it would have an impact on PPE after giving birth.

The main factors affecting PPE are nutritional status and weaning. However, there are several other factors that influence PPE, including breed, age, number of calf, milk production, calving season, availability of males, uterine status, distocia and livestock health [3,4]. Calf weaning is a factor that affects the postpartum interval. Early calf weaning will support the mother to immediately estrus and mate again due to hormonal mechanisms, namely negative feedback because milk suckling does not occur. The cessation of the milk suckling process will stimulate the hypothalamus to stimulate the anterior pituitary to secrete GNRH which will affect the secretion of FSH and LH resulting in the formation of follicles and the occurrence of estrus [12,13]. Research results showed that PPE of BX cows was considered in a good category.

3.5 Calf Body Weight

The results showed that in Limbra calf birth weight was 26.17±0.38 kg, a change in bodyweight in the first month was 45.48±0.67 kg, the second month was 64.79±0.96 and the third month was 84.10±1,25 kg. The average daily gain in the first month was 0.643±0.10 kg, the second month was 0.643±0.10 kg and the third month was 0.632±0.4 kg. Data on body weight and size of the calf on smallholder farms can be seen in Table 4.

3.6 Birth Weight

High birth weight will tend to produce high weaning weight and weaning growth. The results showed that the birth weight of Limbra was 26.17 ± 0.38 kg, which was higher than that reported by [14], 25.20 ± 1.91 kg. According to BIF [15], calf birth weight has a relationship with the cow's weight which can be used as a good indicator to avoid difficulties during calving.

3.7 Weaning Weight

Weaning weight (90 days) of Limbra calves in this study was 84.10 ± 1.25 kg, higher than the results of [14] which was 81.90 kg. Bodyweight and weaning age

Table 4. Bodyweight and body size of Limbra Calf.

Measurement	Birth	Weaning (90 day)	Changes		
			First month	Second month	Third month
Body weight (kg)	26.17±0.38	84.10±1.25	45.48±0.67	64.79±0.96	84.10±1.25
Height (cm)	75.54±0.68	92.46±0.98	83.84±0.68	89.46±0.96	92.46±0.98
Body Length (cm)	64.24±0.68	90.96±0.98	71.54±0.68	79.46±0.98	90.96±0.98
Bust (cm)	72.84±0.68	92.56±1.27	81.74±0.68	90.96±0.98	92.56±1.27
ADG			0.643±0.10	0.643±0.10	0.632±0.4

vary depending on the size and rate of growth of cattle [16,17]. In smallholder farm, the calf weaned in 205 days, as the weaning weight is defined as the weight when the cow is weighed at 205 days old. Weaning at an earlier age will have a lower percentage of weaning weight compared to calves that are weaned at 205 days because weaning at an early age causes low feed consumption so that only a small amount of nutrients is absorbed [18].

4. CONCLUSION

This study revealed that the cross between Brahman cross cows and Limousine straw on community livestock farmer produced big calves, which affected cow weight loss and the length of postpartum estrus, regardless of the fact that PPE was still categorized as good (120.71.4 days). This indicated a promising future for BX-Limousine crossbreeding to increase the national population.

ACKNOWLEDGMENTS

The author would like to thank the Universitas Gadjah Mada, who has supported this research financially through student Final Project Recognition 2021, and to the farmer who has given permission and provided research material.

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