



Reproduction Performance of Imported Dairy Cows and First Offspring in BBPTU-HPT Baturraden

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Abstract. The research was conducted from April to August 2020 at BBPTUHPT Baturraden, Purwokerto. This study analyzed and compared the reproduction performance of imported dairy cows (G0) and their first offspring (G1) in the first lactation. This research material used production data and quality of first lactation milk and reproduction of 50 imported dairy cattle (G0) and 50 first offspring (G1) for 2012-2020. This research method was a survey. The variables observed were the age of the first partus, service per conception (S / C), days open, and calving interval. Data were analyzed using an unpair test (independent t-test) to compare the mean between G0 and G1 on each variable. The results showed that the average reproduction performance of G0 is not different from G1 for all variables, i.e., age of first partus, S/C, days open and calving interval of 772.48 days; 2.20 times; 209.94 days; and 488.21 days for G0 and 793.31 days; 2.39 times; 245.91 days and 494 days for G1. The conclusions of the reproduction performance of imported dairy cows (G0) and their first offspring (G1) are relatively the same (G1).

Keywords: Reproduction, Performance, Dairy Cows, Imported, First Generation

1 Introduction

The condition of Indonesia's national dairy industry is still very low to meet the increasing demand for milk from the community. Domestic milk demand reaches 2.6 million tons annually, but domestic livestock farming can only supply $\pm 30\%$ of milk demand, and $\pm 70\%$ comes from imports [1]. Dependence on imported milk is still quite high due to the low population and productivity of national dairy cattle and the increasing level of milk consumption by the Indonesian people. In dairy cattle, reproduction plays an important role in the success rate of milk production because the milk production period of dairy cows begins after the first calving. Improving reprod-

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uctive performance is one way to increase livestock productivity. A normal reproductive process will be followed by better dairy cattle productivity [2].

The Center for Superior Livestock and Animal Feed Breeding (BBPTUHPT) Baturraden is a National Dairy Cattle Breeding Institution that has the task of carrying out breeding, maintenance, production, and marketing of superior dairy cattle seeds, which include certified superior female and male seeds. In 2012, BBPTUHPT Baturraden imported 400 Fries Holland (FH) female cattle from Hawthorn, Victoria (Australia), as the superior stock population for further development and selection. The country of origin of the import can affect dairy cattle's production, reproduction, and comfort levels due to differences in their original environment in cold areas and different maintenance management in tropical countries where the cattle are developed. Hawthorn is located in a subtropical climate with an average temperature of 15-25 °C and rainfall of 443-465 mm/year [3], while Baturraden has a tropical climate with a temperature of 18-30 °C, humidity of 70-80%, and rainfall of $\pm 6,000$ mm/year. Due to differences in environmental conditions of origin of the cattle and the environment where the cattle are developed, evaluation of the reproductive performance of imported cattle is essential [4]. High milk production can be achieved if environmental conditions, maintenance management, and provision of quality feed support genetic potential. After being bred in Indonesia, the performance of the offspring of imported cattle also needs to be analyzed. Based on the description mentioned, this study was conducted to determine the reproductive performance of imported FH dairy cattle and their first offspring in the first lactation at BBPTUHPT Baturraden.

2 Materials and Methods

2.1 Location and Time of Data Collection

This research was conducted in April - August 2020 at The Center for Superior Livestock and Animal Feed Breeding (BBPTUHPT) Baturraden, Purwokerto, Central Java. The materials used were records of production and reproduction of the first lactation of 50 imported dairy cows (G0) from Australia in 2012 and 50 of their first offspring (G1). The study used a survey method by tracing secondary data from records of the first lactation production and reproduction of dairy cows at BBPTU-HPT Baturraden in 2012 - 2020. The determination of samples was carried out using the purposive sampling method, namely the selection of samples with special criteria, namely, the cows that were in their first lactation.

2.2 Variables Observed

The parameters observed include:

- First calving age: the cow's age on the first partus.
- Service per conception (S/C): the number of matings per pregnancy
- Days open: the time interval from calving to the next pregnancy.
- Calving interval: the time interval from calving to the next calving (partus).

The data obtained were analyzed using an independent t-test to compare the means between G0 and G1 for each parameter.

3 Result and Discussion

The results of dairy cattle reproductive performance at BBPTU-HPT Baturraden are presented in Table 1. The analysis showed no significant difference ($P>0.05$) in reproductive performance between G0 and G1 in all parameters. Age of first calving, S/C, empty period and first calving interval were respectively 772.48 ± 49.19 days; 2.20 ± 1.08 times; 209.94 ± 100.06 days; and 488.21 ± 95.82 days for the G0 cattle population and 793.31 ± 76.23 days; 2.39 ± 1.18 times; 245.91 ± 116.63 days and 494.00 ± 127.70 days for the G1 cattle population. The reproductive performance of G0 cattle was better than that of G1 cattle, although not significantly different. This is because the influence of G0 cattle feed consumption is higher than that of G1 cattle, and the quality of G0 cattle feed is also better than that of G1 cattle. The quantity and quality of feed will affect the reproductive performance of livestock. Without good feed and in adequate quantities, even though the livestock is superior, it will not show its superiority. The completeness of nutrients in ruminant livestock feed can accelerate puberty in cattle, first estrus after giving birth, pregnancy, birth weight, weaning weight, and the cow's condition during lactation. In male livestock, completeness of nutrients in livestock feed can maintain the quality of sperm produced. Sufficient feed is needed for normal endocrine function [5,6].

Table 1. Reproductive Performance of Imported Cattle (G0) and Their First Offspring (G1)

Parameter	Generations		P-value
	G0	G1	
First calving (day)	772.48±49.19	793.31±76.23	0.113
Days open (day)	209.94±100.06	245.91±116.63	0.111
Calving interval (day)	488.21±95.82	494.00±127.70	0.864
Service per conception (times)	2.20±1.08	2.39±1.18	0.422

The age of first calving for G0 cattle is 25.75 months, while for G1 cattle, it is 26.44 months. The age of first calving of G0 and G1 cows is still within the normal range, as stated by Krisnamurti et al. [7], that the normal range of age of first calving is 24-28 months. Several other experts suggest a lower age of first calving, namely 22 - 24 months [8] or 23 - 25 months [9].

Service per Conception (S/C) of G0 and G1 cows were 2.2 and 2.39, respectively. This S/C value is above the normal standard, which ranges from 1.6 to 2.0. The lower the S/C value, the higher the fertility of female livestock, and vice versa [8]. Livestock conditions can affect high reproductive efficiency. This will not be achieved if livestock suffer from reproductive disorders that cause their reproductive performance to decrease. One of the reproductive disorders at BBPTUHPT Baturraden that causes high

S/C values is delayed ovulation because it can cause repeated mating in livestock. According to Bisinotto et al. [10], delayed ovulation is a condition that is delayed ovulation due to low LH hormone in the blood, which causes an extension of the follicular phase so that the follicles that should experience ovulation and enter the luteal phase are delayed or do not occur at all.

Furthermore, the high S/C value at BBPTUHPT Baturraden is also caused by the presence of ovarian hypofunction reproductive disorders. Ovarian hypofunction is a condition in the ovary that does not experience follicle and corpus luteum growth, with a smooth ovarian surface so that its working capacity decreases from normal [11]. As a result, there is no estrus because the follicles do not develop (anestrus) after the anterior pituitary gland fails to secrete Follicle Stimulating Hormone (FSH) in sufficient quantities for the growth and formation of follicles in the ovaries. Ovarian hypofunction often attacks dairy cows with high milk production. The clinical symptoms are that the cow does not show signs of estrus, and when palpated rectally, the ovaries' size will be smaller than their normal size.

In addition to reproductive disorders, high S/C rates can also be caused by missed estrus detection. This can be seen from several data where the S/C is low (1-2), but the empty period is long (> 400 days). Estrus detection at BBPTU-HPT Baturraden is carried out three times a day: in the morning at 07.00-12.00, in the afternoon at 16.00-18.00, and at night at 21.00-22.00. However, due to limited personnel and the large number of cattle being kept, some cattle are placed in tie stalls (tied) so that interaction between livestock is not possible, and standing estrus in livestock is not observed (silent heat).

The average days open in G0 and G1 cows are still above normal from the range recommended by Jainudeen and Hafez [12] to maintain the reproductive efficiency of dairy cows: the days open must be maintained for 85 days. According to Prabowo [13], the days open for the first lactation are 115 days; improvement is needed if the days open are more than 120. The longer the days open, the longer the calving interval, which ultimately reduces the efficiency of its productive period.

The calving interval of imported G0 cows is 16.27 months, and its first generation G1 cows is 16.47 months. The calving interval figure is the sum of the days open and the gestation period. The diversity of calving intervals is mostly determined by the diversity of the days open, while the gestation period does not provide much diversity [11]. The calving interval in G0 and G1 cows is also above normal. The longer the days open, the longer the calving interval. Too long a calving interval will reduce the number of calves born and milk production during its lifetime. Jainudeen and Hafez [12] stated that the optimum first calving interval is 13 months, while subsequent calving is 12 months.

4 Conclusion

The findings indicate that the reproductive performance of G1 is comparable to G0, suggesting stable genetic potential and management conditions. However, the slightly longer days open in G1 highlight the need to optimize management practices further.

Future recommendations include addressing environmental or management factors affecting G1, conducting long-term studies on subsequent generations, refining breeding programs, and exploring advanced reproductive technologies to enhance performance across generations.

Disclosure of Interests. The authors have no competing interests to declare that are relevant to the content of this article.

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