

Reproductive Performance of Cows in Kulon Progo Regency, Special Region of Yogyakarta

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Abstract

Kulon Progo is an area that has mountainous areas and plays a role in achieving the target of meat self-sufficiency in the Special Region of Yogyakarta Province (DIY). This research aims to determine the influence of cattle breeds on reproductive performance as an indicator for improving genetic quality and livestock productivity in achieving these targets. The choice of cattle breeds as research subjects is because cattle breeds are one of the factors that influence the efficiency of cattle reproductive performance. This research used a sample of 47 cattle to look at values of Days Open (DO), Estrus Post-Partum (EPP), and Calving Interval (CI) and used 65 cattle for Conception Rate (CR), and Service/Conception (S/C) at the mountainous area of Kulon Progo, DIY. The research used a survey method by collecting primary data obtained from interviews guided by questionnaires and through anamnesis. The results of this study showed that the average DO was 142.27 days and 152.14 days, respectively and the average CI for PO and SimPO cattle was 503.18 and 498.21 days respectively, for the CR rate in PO cattle was 34.09% and SimPO cattle 23.80% and the S/C value for PO cattle was 2.16 times and SimPO 2.43 times. Based on the data, it can be concluded that the reproductive performance of cattle seen from beef cattle breeds in mountainous areas does not show a significant influence between PO and SimPO breeds.

Keywords: Cattle breeds; PO; SimPO; reproductive performance; Kulon Progo

Introduction

Beef cattle are large ruminant livestock that play an important role as a superior commodity. The production of this livestock is expected to be able to meet national meat needs through the meat self-sufficiency program in Indonesia by the Director General of Livestock and Animal Health, Ministry of Agriculture (Jumaryoto et al., 2020). The beef cattle population in Indonesia in 2018 was 17,466,792 heads. However, Indonesia still has to import beef, amounting to 35.95% of national beef consumption needs (Rusdiana, 2019). Kulon Progo is an area that has a large mountainous area

starting from Girimulyo, Samigaluh, Kokap and Kalibawang Districts which are 2 in the north and Nanggulan District in the central part. The two sub-districts that were the sampling areas in this research were Kalibawang and Nanggulan sub-districts. Kalibawang District is a highland area with an altitude of 500-1000 meters above sea level, and Nanggulan District is dominated by hilly areas with an altitude of 400-500 meters above sea level (Anonymous, 2020). Kulon Progo is also one of the districts that plays a role in achieving the target of meat self-sufficiency in the Special Region of Yogyakarta Province (Anonymous,

2017). Based on BPS Kulon Progo (2018), there are 51,976 beef cattle in Kulon Progo. The reason for choosing a mountainous area as a place for beef cattle research is the public's low interest in raising beef cattle and scientific research on beef cattle is not usually developed in mountainous areas, so through this research, it is hoped that it can contribute knowledge to the public and also breeders regarding the influence of race on the reproductive performance of beef cattle.

Many factors influence the efficiency of cattle reproductive performance, including internal factors such as the breed of cow and the condition of the cows and external factors such as the environment (altitude), breeder management, feed nutrition, and inseminators (Rohayati and Christi, 2017). Cow breed is one of the main factors that can provide an overview of the reproductive performance of an animal. Meanwhile, Bova et al (2014) stated that several main environmental factors influence the endocrine system, which then affects livestock at the physiological system level. Priyo et al (2020) said that the difference in pregnancy status of PO and SimPO cows is based on the length of the estrous cycle and follicle size. The estrus cycle of PO cows is faster than SimPO, namely 20.10 ± 0.36 days, while SimPO cows are 22.78 ± 1.15 days and the dominant follicle size of PO cows is smaller than SimPO. According to Keskin et al (2016), female cows with high pregnancy status have small dominant follicles. The physiological response of cows in hot situations is influenced by two important factors, namely breed and climate challenges. Cows have a good ability to adapt to climate change (Saiya, 2014). The research results of Beatty et al (2006) show that the breed of PO cattle (*Bos indicus*) is known to be more tolerant to hot conditions and more adaptive than *Bos taurus* cattle (SimPO) because these cattle resulting from the Simmental cross have a physiological system that tends to be suitable in sub-tropical areas. Based on the description above, it is necessary to carry out research to determine the influence of different breeds of cattle on the reproductive performance of beef cattle in the mountains, with the hope that from the two breeds we can identify the breed that has good physical and reproductive qualities.

This research aims to determine the influence of PO and SimPO beef cattle breeds on reproductive performance as seen from DO, CR EPP, CI, and S/C in the mountainous areas of Kulon Progo Regency, DIY.

Materials and Methods

The material used in this research is a sample of recording data from 47 female beef cattle to see DO, EPP and CI and 65 heads for CR and S/C research carried out on several small farms and/or groups of cattle kept in the area. mountains, precisely in Kalibawang District and Nanggulan District, Kulon Progo Regency, DIY with the majority of feed in the form of ramban leaves and straw, the location of the pen is close to residential areas, cows aged 2 to over 10 years. The research time was carried out for one month, including collecting data from breeders in the form of data processing and writing.

Research methods

The research method used is a survey method with primary data collection. Primary data was obtained from interviews based on prepared questionnaires and through anamnesis. The variables observed in this study were DO, CR, EPP, CI, and S/C. Quantitative analysis data, namely data obtained from figures from questionnaires, anamnesis, and interviews with breeders in the form of data on livestock owners, types of cows, 20 ages of cows, BCS, cow recording data, AI frequency, pregnancy status, EPP, fallow period cows and calving frequency. The cattle breeds used are divided into two categories, namely, PO and SimPO cattle. After collecting data based on



Figure 1. Survey process in the Kalibawang area, Kulon Progo



Figure 2. The purposive sampling conducted



Figure 3. Interview with farmers at the Maju Jaya Livestock Group

breed, a total sample of 47 cows was obtained to observe the duration of EPP, DO and CI, consisting of 33 PO cows, 14 SimPO. As well as a total of 65 samples to observe the CR and S/C of beef cattle consisting of 44 PO cattle, 21 SimPO cattle. The survey, sampling, and interviews taken from locations are shown in Figure 1,2 and 3.

Data analysis

Primary data is tabulated for calculations based on parameters using the Microsoft Excel

program to obtain average values and standard deviations which are processed using Statistical Product and Service Solution (SPSS) computer software. The data is input and analyzed using the Independent sample T-test which aims to see how much influence the independent variable has on the dependent variable individually. The significance value (Sig.) is the benchmark for making decisions on the Statistical Product and Service Solution (SPSS) output with a confidence level of 95%.

Results and Discussion

Based on research conducted in Kulon Progo Regency regarding reproductive performance in beef cattle based on breed, namely Ongole crossbreed cattle (PO) and Ongole crossbreed Simmental cattle (SimPO). Figure 4 shows the physical appearance of PO and SimPO cattle in Kulon Progo.

Observation and calculation of reproductive performance such as Days Open (DO), Estrus Post Partum (EPP), Conception Rate (CR), Calving interval (CI), and Service per Conception (S/C) were carried out for 1 month and obtained results in the form of DO for PO cattle 233.18 days and SimPO 228.21 days. The length of EPP for PO cows is 142.27 days and SimPO is 152.14 days, and the birth interval or CI for PO cows is 503.78 days and SimPO is 498.21 days in Table 1.

The research results in Table 1 show that the DO values in PO and SimPO cattle are far above the normal range. According to Setiawan et al. (2014), the ideal DO for beef cattle ranges from 85 to 115 days. The estrus cycle will also occur frequently if the DO value is higher. According to



Figure 4. PO cows (left) and SimPO (right)

Table 1. The influence of cattle breeds on the reproductive performance of beef cattle seen from DO, EPP, and CI in the mountainous areas of Kulon Progo

Breed	Quantity	Reproduction performance		
		DO (days)	EPP (days)	CI (days)
PO	33	233.18±21.01	142.27±14.14	503.18±21.01
SimPO	14	228.21±33.06	152.14±12.86	498.21±33.06

DO (Days Open); EPP (Estrus Post-Partum); CI (Calving Interval)

Riyanto et al (2015), the DO value for beef cattle is $23\ 172 \pm 19.21$ days or 5.73 ± 0.64 months. The duration of DO can be influenced by physiological factors such as EPP, factors management such as PPM (Post Partum Mating), and the S/C ratio itself. According to Toelihere (1981), the S/C value for good beef cattle is 1.6 to 2.0. In this study, the S/C for the two breeds, namely PO and SimPO cattle, was 2.93 and 4.05, respectively, indicating that these two cattle did not reach normal S/C in Indonesia. Based on the results of the analysis, calculations were carried out based on parameters using the MS program Excel to get the average value and standard deviation, which is processed with Statistical Product and Service Solution (SPSS) through the Independent Sample T-test to find out how big the independent variable is to the dependent variable individually with a confidence level of 95% to obtain a significance level for EPP, DO and CI, respectively 0.070; 0.855 and 0.855, while CR and S/C respectively obtained sig values of 0.322 and 0.652, all of which are $> \alpha$ (0.05), which means that age does not have a significant effect on all the variables studied.

Table 2. Influence of cattle breeds on reproductive performance of beef cattle seen from CR and S/C in mountainous areas in Kulon Progo

Breed	Quantity	Reproduction performance	
		CR (%)	S/C
PO	44	34.10±0.07	2.93±0.17
SimPO	21	23.81±0.09	4.05±0.25

CR (Conception Rate); S/C (Service per Conception)

Based on Tables 1 and 2, PO cattle show better reproductive performance values than SimPO. This is different from the research results of Christoffor and Baliarti (2008), which showed that the average EPP value for 30 PO and SimPO

cattle was 60 and 56 days, the S/C value for PO and SimPO cattle was 2.43 and 1.75, and the CR value for cattle. PO and SimPO are 28.57% and 56.25%, and the CI values for PO and SimPO cattle are 683 and 576 days. The difference in the results of this study is because the sampling location is in a mountainous area, which will affect the physiological system of the cow. The difference in descriptive results showing that the reproductive performance of PO cows is superior to SimPO is based on the differences in the estrous cycles of the two breeds. The estrus cycle for PO cows is 20.10 ± 0.36 days, and for SimPO cows 22.78 ± 1.15 days (Tiro and Baliarti, 2017). Priyo et al. (2020) explained that the reproductive characteristics of Simmental cows are different from PO cows in terms of the length of the estrous cycle and differences in the dominant size of the follicles. Keskin et al. (2016) added that female cows with a small dominant follicle size have a high pregnancy status. The research results of Priyo et al. (2020) show that the dominant follicle size of PO cows is smaller than that of SimPO cows, which means that PO cows have a higher pregnancy rate than SimPO.

The mountainous area as a research location is based on Indonesian Meteorological, Climatological, and Geophysical Agency (BMKG) data (2020) for Kalibawang and Nanggulan Districts, which have low air temperatures, namely around 23°C , with humidity±94% and high wind speeds can also affect the physiological response of livestock because the body will integrate responses adaptively to differences in environmental conditions then adaptation occurs in the form of physiological changes which cause livestock to become stressed so that livestock reproductive performance decreases. This statement is reinforced by Saiya (2014), stating that

climate is an important factor in the physiological system of livestock. Simmental cattle will show more obvious physiological changes than PO cattle when faced with conditions different from their original habitat. The response of cows to differences in environmental conditions will affect cow productivity, especially those related to reproductive performance.

Conclusion

Based on this research, it can be concluded that the PO and SimPO cattle breeds in the mountainous areas of Kulon Progo Regency, Yogyakarta do not differ significantly in the reproductive performance of cows. The research results show that the development of PO and SimPO beef cattle can be raised in the mountains.

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