Reproductive Performance of Friesian Holstein Dairy Cows in the First Lactation at the BBPTU-HPT Baturraden

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DOI: https://dx.doi.org/10.51244/IJRSI.2026.1306000059

Received: 03 June 2026; Accepted: 08 June 2026; Published: 22 June 2026

ABSTRACT

This study aimed to determine the reproductive performance of Friesian Holstein dairy cows during their first lactation through the parameters of days open, Service Per Conception, and calving interval at BBPTU-HPT Baturraden, Banyumas Regency, Central Java. This study was conducted in February 2026 using a census method, covering the entire population of first-lactation Friesian Holstein cows in 2022, 2023, and 2024. The data used were secondary data obtained from livestock reproduction records, including livestock identification numbers, date of birth, date of first mating, gestation length, calving date, S/C, Days Open, and calving interval. The data was analyzed descriptively using minimum, maximum, mean, standard deviation, and coefficient of variation, and then compared with ideal standard values. The research results showed that the service per conception rate was 1.52 ± 0.5 times, the days open was 171,9 ± 67.1 days, and the calving interval was 14.7 ± 2.3 month. The coefficient of variation values indicated low to high variability. Based on the result at the study, it can be concluded that the service per conception value generally met the ideal standards, whereas the days open and calving interval values had not yet reached the ideal standards.

Keywords: Holstein Friesian, Reproductive Performance, First Lactation, Service per Conception, Days Open, Calving Interval

INTRODUCTION

Dairy cattle are livestock that produce milk and have significant economic and social value. According to data from the Central Statistics Agency (BPS, 2025), the dairy cattle population in Indonesia reached 499,360 head in 2025. Meanwhile, the demand for fresh milk continues to increase in line with population growth and rising public awareness of nutritional needs. However, domestic milk production has not yet been able to meet national demand, resulting in continued dependence on imported milk as a raw material for the dairy industry. One of the major factors contributing to low milk production is suboptimal reproductive performance and reproductive management in dairy cattle.

Reproductive performance is an important factor affecting milk production and the overall efficiency of dairy farming operations. Proper reproductive management can shorten the interval from calving to the first postpartum estrus, thereby increasing the likelihood of successful conception and subsequent pregnancy. Effective reproductive management contributes to improved reproductive efficiency, which in turn supports optimal milk production and helps meet the growing nutritional demands of the population.

Effective reproductive management in dairy cattle has a significant impact on future productivity, particularly in first-lactation cows, as this period plays a crucial role in determining reproductive efficiency and milk production throughout the animal's productive life. During the first lactation, cows undergo substantial physiological

adaptations to restore reproductive function after calving while simultaneously supporting increased milk production. Therefore, monitoring key reproductive parameters, including service per conception (S/C), days open (DO), and calving interval (CI), is essential for evaluating reproductive performance and overall herd productivity.

Optimal reproductive management during early lactation plays a crucial role in the success and profitability of dairy farming operations. Poor reproductive efficiency can result in various adverse consequences, including increased costs associated with herd maintenance and veterinary treatment, as well as prolonged intervals between successive lactations. In contrast, maintaining good reproductive performance enables cows to conceive sooner after calving, thereby shortening the calving interval and supporting continuous and efficient milk production.

Balai Besar Pembibitan Ternak Unggul dan Hijauan Pakan Ternak (BBPTU-HPT) located in Baturraden, is a technical implementation unit under the Directorate General of Livestock and Animal Health, Ministry of Agriculture of Indonesia. BBPTU-HPT Baturraden covers an area of 241.06 hectares and maintains a population of more than 1,799 Friesian Holstein (FH) dairy cattle. Reproductive management at BBPTU-HPT is designed to support reproductive success through the implementation of various modern reproductive technologies and management practices, including artificial insemination, estrus synchronization, routine pregnancy diagnosis, and comprehensive reproductive record-keeping systems that facilitate the monitoring and evaluation of reproductive performance.

The effectiveness of reproductive management can be evaluated using several reproductive performance indicators, including age at first calving, days open, service per conception (S/C), and calving interval. Although numerous studies have investigated reproductive performance in dairy cattle, most have focused on cows in later lactation stages or on overall herd performance in smallholder dairy farms. Therefore, this study was conducted to evaluate the reproductive performance of Friesian Holstein (FH) dairy cows during their first lactation at BBPTU-HPT Baturraden. The findings of this study are expected to provide valuable information on the reproductive performance of first-lactation dairy cows and serve as a basis for evaluating and improving reproductive management practices at BBPTU-HPT Baturraden.

MATERIALS AND METHODS

This study was conducted in February 2025 at the Balai Besar Pembibitan Ternak Unggul dan Hijauan Pakan Ternak (BBPTU-HPT) Baturraden, Banyumas Regency, Central Java, Indonesia. The study population consisted of first-lactation Friesian Holstein (FH) dairy cows with complete reproductive records.

Materials

This study utilized secondary data obtained from the reproductive records of first-lactation Friesian Holstein (FH) dairy cows maintained at BBPTU-HPT Baturraden. The study sample consisted of 27 cows that met the criteria of having complete reproductive records during the period of 2022–2024. The collected data included animal identification number, date of birth, first calving date, conception service date, service per conception (S/C), days open (DO), and calving interval (CI). The collected data were tabulated and verified to ensure the consistency and completeness of the records prior to descriptive statistical analysis. The use of first-lactation reproductive data was intended to provide an overview of the reproductive performance of dairy cows during their first lactation period and to serve as a basis for evaluating reproductive management practices at BBPTU-HPT Baturraden.

Observed Variables

The variables observed in this study were as follows:

1. Service per Conception (S/C): the average number of services or inseminations required for a cow to achieve conception, expressed as the number of services per pregnancy.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

2. Days Open (DO): the interval between calving and the successful service that results in conception, expressed in days.
3. Calving Interval (CI): the period between two consecutive calvings of the same cow, expressed in days.

Data Analysis

The reproductive performance data were tabulated and analyzed descriptively. Descriptive statistical parameters, including the mean, minimum value, maximum value, standard deviation, and coefficient of variation, were calculated to evaluate the reproductive performance of first-lactation dairy cows.

1. Minimum Value
   The minimum value represents the lowest observation in the dataset and indicates the lower limit of the reproductive performance parameter.

2. Maximum Value
   The maximum value represents the highest observation in the dataset and indicates the upper limit of the reproductive performance parameter.

3. Mean
   The mean represents the average value of all observations and provides a measure of the central tendency of the reproductive performance parameter.

$$\mu = \frac{\Sigma \text{ xi}}{N}$$

Where :
$\Sigma\ xi$ = Sum of al observations
N = all observations
i = 1,2,...N
μ = Mean Value

The mean represents the average value of a reproductive performance parameter and was used to describe the overall reproductive performance of first-lactation Friesian Holstein dairy cows at BBPTU-HPT Baturraden.

4. Standard Deviation (SD)

$$\sigma = \sqrt{\frac{\Sigma\ (xi\ -\ \mu\ )^{2}}{N}}$$

Where:
σ = Standard Deviation

μ = Mean Value

xi = Nth sample value

N = all observations

Standard deviation is a statistical measure used to quantify the dispersion of observations around the mean. A larger standard deviation indicates greater variability in the data, whereas a smaller standard deviation indicates that the observations are more closely clustered around the mean.

5. Coeffisientt of Variation

$$KV = \frac{\sigma}{\mu}\ X\ 100\%$$

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Where:

KV = Coefficient of variation

σ = Standard deviation

μ = Mean value

The coefficient of variation is a measure of relative variability, calculated by dividing the standard deviation by the mean and multiplying the result by 100 %. It is expressed as a percentage and is used to assess the degree of variation in reproductive performance parameters among first-lactation Friesian Holstein (FH) dairy cows at BBPTU-HPT Baturraden.

RESULT AND DISCUSSION

General Desciption of the Study Site

Balai Besar Pembibitan Ternak Unggul dan Hijauan Pakan Ternak Baturraden is one of the Technical Implementation Units under the Directorate General of Livestock and Animal Health, Ministry of Agriculture of the Republic of Indonesia. This institution plays a strategic role in the development of the livestock sector, particularly in the provision of superior breeding stock and the development of forage crops. Since its establishment in 1953 as the parent institution of Baturraden Livestock Park, it has undergone several changes in organizational structure and functions, eventually becoming the Great Livestock Breeding Center for Superior Forage and Animal Feed (BBPTU-HPT) Baturraden. Its main responsibilities include the maintenance, production, breeding, development, and marketing of superior dairy cattle and dairy goat breeding stock.

Geographically, BBPTU-HPT Baturraden is located on the southern slopes of Mount Slamet at Jl. Peternakan No. 1, Kemutug Lor Village, Baturraden District, Banyumas Regency, Central Java. The operational area of the center consists of several farm units, namely Tegalsari, Limpakkuwus, Manggala, Kambing Perah, and Munggangsari. These locations are situated at an elevation of approximately 600–725 m above sea level, with temperatures ranging from 18 to 30°C, relative humidity of approximately 70–80%, and relatively high annual rainfall. BBPTU-HPT Baturraden covers a total area of 241.06 hectares. The dairy cattle barns at Tegalsari Farm cover an area of 34.18 hectares, while Limpakkuwus Farm and Manggala Farm cover 96.79 and 100 hectares, respectively. These agroclimatic conditions are considered suitable for dairy cattle production, particularly for Friesian Holstein dairy cows, which require a relatively cool environment for optimal productivity.

Dairy cattle management at the center is carried out at three farms, namely Tegalsari Farm, Limpakkuwus Farm, and Manggala Farm. Management practices follow established standard operating procedures (SOPs) and are intended to ensure that the cattle remain clean, healthy, and comfortable while maintaining both the quality and quantity of production. The following presents the dairy cattle population at BBPTU-HPT Baturraden.

Table 1. Dairy Cows Population di BBPTU-HPT Baturraden

No	Cattle Category	Population (head)	Persentage (%)
1	Bull	88	4,9%
2	Cow	1.150	63,9%
3	Young bull	123	6,8%
4	Heifers	159	8,8%
5	Male Calves	134	7,4%

6	Female Calves	145	8,1%
	Total Population	**1.799**	**100%**

The dairy cattle population at BBPTU-HPT Baturraden totals 1,799 head, consisting of 88 bull, 1,150 adult females (cow), 123 young males (young bull), 159 heifers, 134 male calves, and 145 female calves. The population is dominated by adult female cattle, which account for 1,150 head or 63.9% of the total population. The high proportion of adult female cattle indicates that livestock management at BBPTU-HPT Baturraden is primarily focused on milk production. In contrast, adult male cattle account for only 4.9% of the total population, as they are maintained primarily for reproductive purposes. According to Annashru et al. (2017), the number of bulls on dairy farms is generally kept to a minimum due to the additional costs associated with their maintenance. These costs include feed provision, health care, and more specialized housing management compared with female cattle.

The heifer population consisted of 159 head (8.8%), while the young bull population consisted of 123 head. Heifers are young female cattle that have not yet calved and are being prepared as replacement breeding stock. According to Putri et al. (2020), the rearing of young cattle aims to produce prospective breeding cows and bulls, support optimal growth, and prepare them for future productive and reproductive functions. The population also included 145 female calves and 134 male calves. The relatively balanced proportion of male and female calves indicates that the reproductive process is proceeding well.

Based on the observations, conditions at BBPTU-HPT Baturraden are conducive to dairy cattle farming in terms of the environment, husbandry management, and livestock population. The husbandry system implemented at BBPTU-HPT Baturraden supports livestock productivity through proper management of feeding, reproduction, health, and barn sanitation. Suitable environmental conditions and well-organized husbandry practices are key factors supporting the reproductive performance and productivity of dairy cattle.

Dairy Cattle Management

Dairy cattle management is a key factor in ensuring the success of a livestock enterprise, particularly in producing high-quality breeding stock and maintaining optimal productivity. BBPTU-HPT Baturraden implements an intensive dairy cattle management system supported by adequate facilities and infrastructure. Management practices are carried out according to the animals' age groups and physiological status, including calves, heifers, pregnant cows, lactating cows, and bulls.

The housing system primarily utilizes group pens for lactating cows, allowing greater freedom of movement, thereby enhancing animal comfort and reducing stress. Individual pens are used for bulls to minimize fighting, prevent injuries caused by aggressive behavior, and maintain their physical condition and reproductive performance. In addition, calves are housed in individual pens to facilitate health monitoring, prevent disease transmission, simplify the monitoring of milk and feed intake, and support adaptation. Housing conditions are designed with good ventilation, adequate drainage, and sufficient lighting to ensure animal comfort.

In addition to intensive housing, BBPTU-HPT Baturraden also maintains grazing areas for heifers and culled cows. Cattle in these grazing areas are regularly monitored, vaccinated, and treated with anthelmintic drugs to interrupt the parasite life cycle in the grazing environment, maintain their health, and ensure good physical condition. The use of grazing areas provides livestock with more space for movement, thereby increasing physical activity and reducing stress. In addition, the utilization of forage from grazing land can help reduce feed costs, provided that forage availability is sufficient to meet the animals' nutritional requirements. In feed management, BBPTU-HPT Baturraden utilizes forage produced on-site, including elephant grass, Pakchong grass, odot grass, and legumes.

BBPTU-HPT Baturraden implements preventive livestock health measures through vaccination, vitamin supplementation, parasite control, barn sanitation, and regular health examinations. These routine health examinations aim to detect diseases at an early stage so that appropriate treatment can be provided promptly.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

Milking is carried out using a herringbone milking system with strict adherence to hygiene standards. Before milking, the udder is cleaned to minimize bacterial contamination of the milk, and after milking, the milk is immediately processed and stored according to established standards to maintain its quality. In addition to focusing on production, BBPTU-HPT Baturraden also conducts livestock breeding activities to produce high-quality dairy cattle. These activities are carried out through selection based on production performance, reproductive performance, and animal health status. Continuous breeding is expected to improve the genetic quality of livestock from one generation to the next.

Reproductive Manajement

Reproductive management is a key aspect of dairy cattle husbandry at BBPTU-HPT Baturraden. Reproductive success influences calf production, husbandry efficiency, and the sustainability of genetic improvement. Reproductive management is carried out through estrus detection, artificial insemination, pregnancy diagnosis, and regular reproductive record-keeping. Reproductive records are maintained to monitor reproductive efficiency and evaluate the success of the breeding program.

Estrus detection is the initial stage that determines the reproductive success of dairy cattle and is performed daily by observing changes in the animals' behavior and physical condition. The breeding method applied at BBPTU-HPT Baturraden primarily utilizes artificial insemination (AI) using semen obtained from the Singosari Artificial Insemination Center. The use of artificial insemination aims to improve the genetic quality of livestock through the use of semen from selected superior bulls and to reduce the risk of transmission of reproductive diseases (Hadi et al., 2024).

The average age at first mating at BBPTU-HPT Baturraden is 17–18 months, while the age at first calving ranges from 26 to 27 months. These values are relatively consistent with those reported in Japan. Kusaka et al. (2023) reported that approximately 38% of dairy cows in Japan calve for the first time at 24–26 months of age. However, over the past decade, 24% of cows have calved for the first time at more than 27 months of age. These differences may be attributed to variations in age at first mating, body weight attainment, farm management practices, growth rate, and female fertility.

Pregnancy diagnosis is conducted approximately 60 days after artificial insemination or 6 months after calving. The purpose is to confirm conception and evaluate the reproductive status of the cow (Christi et al., 2023). Pregnancy diagnosis is performed by a veterinarian using ultrasonography (USG). As calving approaches, a drying-off program is implemented for lactating cows at approximately 7 months of gestation, and the cows are moved to a calving pen. The drying-off procedure involves intermittent milking for approximately 3 weeks, depending on milk production levels at the end of lactation. During the drying-off period, intramammary mastitis treatment is administered to the udder to prevent mastitis infection.

Service per Conception (S/C)

Service per conception (S/C) represents the number of inseminations required for a cow to achieve pregnancy. According to the benchmark for dairy cattle raised under tropical conditions, an S/C value ranging from 1.6 to 2.0 is considered indicative of good reproductive performance. Lower S/C values indicate higher fertility, as fewer inseminations are required to achieve conception, whereas higher S/C values reflect reduced fertility and lower reproductive efficiency. The S/C values of first-lactation Friesian Holstein dairy cows at BBPTU-HPT Baturraden are presented in Table 2.

Table 2. Service per Conception (S/C)

Lactation	**Number of cows** (times)	**Minumum value** (times)	**Maximum value** (times)	**Mean** (times)	**Standard Deviation**	**Coeffisient of variation (%)**
1	27	1	2	1,52	0,5	33,5

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

Based on the data presented in Table 2, the descriptive analysis of 27 dairy cows from 2022 to 2024 showed that the average service per conception (S/C) value was 1.52, indicating a high level of fertility among first-lactation Friesian Holstein (FH) dairy cows at BBPTU-HPT Baturraden. This result is better than that reported by Atabany et al. (2011), who found an average S/C value of 1.99 in dairy cattle at BBPTU-HPT Baturraden. The ideal S/C value ranges from 1.65 to 2.0 (Ananda et al., 2019). Values exceeding this range indicate low fertility, which may result in prolonged days open and extended calving intervals. The S/C value obtained in this study indicates that the artificial insemination process was effective and that the probability of successful fertilization was relatively high.

The average service per conception (S/C) value of 1.52 during the first lactation indicates that the cows required only one to two artificial inseminations to achieve conception. This value is considered favorable and falls within the ideal range, indicating that most cows were able to conceive relatively quickly. Reproductive success at BBPTU-HPT Baturraden is influenced by regular reproductive management, proper implementation of artificial insemination, and good semen quality. Wahyudi et al. (2013) stated that reproductive success is also influenced by the age of the cattle. As cattle mature, their reproductive success tends to increase. Early lactation represents an adaptation period during which cows are still recovering their reproductive function after calving while simultaneously maintaining milk production.

The coefficient of variation (S/C) for the first lactation was 33.5%, indicating that the data on the number of mating attempts required for pregnancy in this study were relatively diverse and exhibited a considerable degree of variation. This variability suggests that the reproductive performance of the livestock at the study site differed substantially among individuals. Some animals were able to conceive after a single insemination, whereas others required more than one insemination to achieve pregnancy. These findings indicate that reproductive efficiency, as measured by the S/C parameter, still varies among animals within the study population.

Days Open

Days open (DO) is defined as the interval between calving and the successful conception that results in the next pregnancy. This parameter is widely used as an indicator of reproductive efficiency in dairy cattle. A prolonged DO reflects reduced reproductive efficiency because it delays the subsequent calving, whereas an excessively short DO is also undesirable, as the reproductive organs may not have fully recovered postpartum. Under normal management conditions, the optimal DO is generally considered to range from 85 to 120 days. The days open values of first-lactation Friesian Holstein dairy cows at BBPTU-HPT Baturraden are presented in Table 3.

Table 3. Days Open

Lactation	**Number of cows** (head)	**Minumum Value** (days)	**Maximum value** (days)	**Mean** (days)	**Standard Deviation**	**Coeffisient of variation** (%)
1	27	44	308	171,9	67,1	39,7

Analysis of the data in Table 3, based on the entire population of first-lactation dairy cows sampled, indicates that the open period of FH dairy cows at BBPTU-HPT Baturraden ranges from 44 to 308 days, with an average of 171.9 ± 67.1 days. The data reveal a wide variation in the open period, both in terms of the minimum and maximum values. The average open period for first-lactation FH cows at BBPTU-HPT Baturraden is longer than that of FH cows at Ultra Peternakan Bandung Selatan, which is 129.6 days. This value indicates that the open period at this research site is relatively high compared to the normal range. According to Temesgen et al. (2022), the ideal open period ranges from 85 to 120 days after calving, which serves as a period for early detection of reproductive abnormalities and an indicator of reproductive efficiency. The length of the open period will affect the length of the calving interval.

Factors that can influence the length of the open period include delayed estrus following calving and postpartum reproductive disorders (Reswati et al., 2014). At the study site, the primary factor contributing to the prolonged open period of 308 days was silent estrus, meaning that the cows did not exhibit signs of estrus, resulting in delayed mating because the estrus phase was missed. Silent estrus occurs due to abnormalities in the estrous

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VI June 2026

cycle and ovulation, making estrus detection difficult. A prolonged open period typically spans 3–4 estrus cycles. If estrus is not detected for an extended period, the cow is treated with prostaglandin (PGF2α) or undergoes estrus synchronization; when signs of estrus reappear after 2–4 days, artificial insemination is immediately performed. BBPTU-HPT Baturraden generally performs pregnancy diagnosis (PKB) 60 days after AI to confirm pregnancy. According to Hadi et al. (2024), prolonged open periods during the first lactation are common because, early in lactation, cows are still adapting to milk production and reproductive processes.

The minimum value in this study, based on the data presented in Table 3, was 44 days. This value is relatively low compared to the ideal range. This condition indicates that rebreeding occurred shortly after calving. Although this can improve reproductive efficiency, there is concern that an excessively short open period may not provide sufficient time for the cow's reproductive organs to fully recover and for complete uterine involution to occur. This condition can affect the physiological status of the cattle, increase the risk of reduced reproductive performance in the subsequent period, and potentially shorten the lactation period, which could ultimately reduce milk production in the next lactation (Hanifah et al., 2019).

The coefficient of variation of 39.7% indicates that the days open data in this study exhibited a relatively high level of variability among individual animals. Differences in the reproductive performance of each cow were likely influenced by the recovery of reproductive organs, the accuracy of estrus detection, and the body condition of the animals after calving.

Calving Interval (CI)

Calving interval (CI) is defined as the period between two consecutive calvings in the same cow. This interval includes the postpartum recovery period, the time required to achieve conception, and the subsequent gestation period until the next calving. Calving interval is an important indicator of reproductive and economic efficiency in dairy farming. A prolonged CI may result in economic losses due to reduced lifetime productivity and increased breeding and management costs. Conversely, an excessively short CI may adversely affect the health and reproductive performance of the cow, as insufficient time is available for physiological recovery after calving. Under optimal management conditions, the ideal calving interval ranges from 12 to 13 months (365–400 days). The calving interval values of first-lactation Friesian Holstein dairy cows at BBPTU-HPT Baturraden are presented in Table 4.

Table 4. Calving Interval

Lactation	**Number of cows** (head)	**Minumum Value** (months)	**Maximum Value** (months)	**Mean** (months)	**Standard Deviation**	**Coeffisient of variation** (%)
1	27	10,4	19,2	14,7	2,3	15,6

Based on the data presented in Table 4, the results of the descriptive analysis show that the average calving interval was 14.7 ± 2.3 months, which is considered high compared to the ideal calving interval of 12–13 months or 365–400 days. According to Budiyanto et al. (2023), a calving interval of more than 14 months or 400 days is considered problematic and may be detrimental to farmers. The calving interval is the sum of the days open and the gestation period. The high percentage of first-lactation cows with an open period exceeding 120 days contributes to an extended calving interval (Sembada et al., 2020). The average gestation period of the studied population was 273.5 days, contributing to the average calving interval observed in FH cattle at BBPTU-HPT Baturraden.

The average calving interval at BBPTU-HPT Baturraden is relatively long, as reported by Krisnamurti et al. (2019), who found that the average calving interval for FH cows at BBPTU-HPT Baturraden was 505.85 days (16.86 months). The prolonged calving interval in first-lactation FH cows at BBPTU-HPT Baturraden is attributed to a relatively long open period resulting from the failure to detect postpartum estrus and subsequent delays in artificial insemination (AI). Additionally, some cases indicate that conception requires more than one AI attempt (service per conception > 1), which further extends the time required to achieve pregnancy. Another

contributing factor is the occurrence of postpartum reproductive disorders, in which the reproductive organs have not fully recovered, thereby hindering the return of the estrous cycle and reducing conception success.

Reproductive disorders can also be influenced by the condition of the reproductive organs at first mating. According to Zainudin et al. (2014), heifers can be bred at 13–15 months of age, provided that feed management, husbandry practices, target body weight, and sexual maturity requirements are met. Puberty or sexual maturity is marked by the onset of estrus and ovulation, indicating that the animal is physiologically mature and ready for breeding. Additionally, the first lactation serves as a transitional and adaptive period between readiness for milk production and the recovery of reproductive organs after calving, which influences the duration of the open period and the calving interval.

The coefficient of variation for the calving interval in this study was 15,6%, indicating that the calving interval data were relatively homogeneous, with a minimum value of 11 months and a maximum value of 19 months. The minimum calving interval may have resulted from early breeding after calving and a shortdays open period, whereas the maximum value may have been influenced by several factors, including failure to detect the first postpartum estrus, more than two services per conception, infertility or sterility, inaccuracies during artificial insemination, and failure of the first breeding after calving (Awan et al., 2016). The calving interval is influenced not only by the number of services per conception (S/C) but also by the length of the days open period. In addition to affecting the calving interval, the days open period and the interval between calving and subsequent breeding also influence the length of the lactation period and total milk production during a single lactation.

CONCLUSIONS

Based on the results of this study on first-lactation Friesian Holstein dairy cows at BBPTU-HPT Baturraden, it can be concluded that the average service per conception (S/C) value of 1.52 ± 0.5 times was within the normal range and close to the ideal value, indicating a relatively good level of fertility. However, the average days open (DO) of 171.9 ± 67.1 days and calving interval (CI) of 14.7 ± 2.3 months were higher than the recommended range. These findings indicate that the reproductive performance of first-lactation Friesian Holstein dairy cows at BBPTU-HPT Baturraden still requires improvement. Therefore, reproductive management practices should be optimized to improve reproductive parameters and achieve the recommended reproductive performance standards.

REFERENCES

1. Ananda, H. M., Hidajati, N. o., Hariadi, M., Samik, A., & Restiadi, T. I. (2019). Hubungan Antara Umur Dengan Calving Interval, Days Open, Dan Service Per Conception Sapi Perah Friesian Holstein (FH). Ovozoa: Jurnal of Animal Reproduction, 8(2), 115-120.
2. Annashru, F. A., Ihsan, M. N., Yekti, A. P. A., & Susilawati, T. (2017). Pengaruh perbedaan waktu inseminasi buatan terhadap keberhasilan kebuntingan sapi Brahman Cross. Jurnal Ilmu-Ilmu Peternakan, 27(3), 17–23. https://doi.org/10.21776/ub.jiip.2017.027.03.03
3. Armengol, R., Fraile, L., & Bach, A. (2023). Key performance indicators used by dairy consultants during the evaluation of reproductive performance during routine visits. Frontiers in Veterinary Science, 10. https://doi.org/10.3389/fvets.2023.1165184
4. Atabany, A., Purwanto, B. P., Toharmat, T., & Anggraeni, A. (2011). The impact of days open on milk performance of friesian holstein cows in Baturraden, Indonesia. Media Peternakan, 34(2), 77–82. https://doi.org/10.5398/medpet.2011.34.2.77
5. Awan, J. S., Atabany, A., & Purwanto, B. P. (2016). Pengaruh Umur Beranak Pertama Terhadap Performa Produksi Susu Sapi Friesian Holstein di BBPTU-HPT Baturraden Effect of first calving Friesian Holstein age on milk yield performance at BBPTU-HPT Baturraden.
6. Badan Pusat Statistik. 2019. Jumlah Populasi dan Produksi Susu Segar Sapi Perah Menurut Provinsi 2009-2018. Badan Pusat Statistik, Jakarta.
7. Badan Pusat Statistik. 2025. Statistik Peternakan Indonesia 2021-2025, Jakarta.
8. BBPTU-HPT Baturraden. (2025). Laporan Tahunan. Balai Besar Pembibitan Ternak Unggul dan Hijauan Pakan Ternak Baturraden, Kementrian Peternakan.

9. Budiyanto, A., Hartanto, S., Prasetya, I. D., Subroto, I., Asy'ari, Z. H., Sihombing, E. S. T., Mabel, Y. E., Orintamara, A. S., & Nasir, M. W. (2023). Karakteristik Calving Interval pada Sapi Jawa-Brebes di Kabupaten Brebes Jawa Tengah Indonesia. Jurnal Sain Veteriner, 41(1), 130. https://doi.org/10.22146/jsv.77833
10. Christi, R. F., Salman, L. B., & Alfikri, I. (2023). Evaluasi Performa Produksi Susu dan Reproduksi Sapi Perah Friesian Holstein DI BPT HMT Cikole Lembang. Jurnal Sumber Daya Hewan, 4(1), 1. https://doi.org/10.24198/jsdh.v4i1.48548
11. Christi, R. F., Tasripin, D. S., & Rinaldi, A. (2021). Performa Reproduksi Sapi Perah Fries Holland Pada Laktasi 1 Di PT. Ultra Peternakan Bandung Selatan. Composite: Jurnal Ilmu Pertanian, 3(01), 34–41. https://doi.org/10.37577/composite.v3i01.308
12. Hadi, S., Kustanti, N. O., & Esti, R. N. (2024). Evaluasi Reproduksi Sapi Friesian Holstein Pada Berbagai Paritas. AVES: Jurnal Ilmu Peternakan, 17(2), 21–30. https://doi.org/10.35457/aves.v17i2.3603
13. Hanifah, M. A., Wurlina., Hidayati, N., Hariadi, M., Samik, A., & Restiadi, T. T. (2019). Hubungan Antara Umur Dengan Calving Interval, Days Open, dan Service Per Conception Sapi Friesian Holstein (FH). *Ovozoa: Jurnal of Animal Reproduction,* 8(2), 115-120.
14. Kim, I. H., & Jeong, J. K. (2019). Risk factors limiting first service conception rate in dairy cows and their economic impact. Asian-Australasian Journal of Animal Sciences, 32(4), 519–526. https://doi.org/10.5713/ajas.18.0296
15. Krisnamurti, E., Purwanti, D., & Saleh, D. M. (2019). Penaksiran Heritabilitas Karakteristik Produksi dan Reproduksi Sapi Perah Friesen Holstein di BBPTU-HPT Baturraden. TERNAK TROPIKA Journal of Tropical Animal Production, 20(1), 8–15. https://doi.org/10.21776/ub.jtapro.2019.020.01.2
16. Kusaka, H., Yamazaki, T., & Sakaguchi, M. (2023). Association of age at first calving with longevity, milk yield, and fertility up to the third lactation in a herd of Holstein dairy cows in Japan. In Journal of Reproduction and Development 69(6). https://jlia.lin.gr.jp/info/archives1627/.
17. Putri, T. D., Siregar, T. N., Thasmi, C. N., Melia, J., & Adam, M., (2020). Factors Affecting the Success of Artificial Insemination on Cattle in Asahan District, North Sumatera. JURNAL ILMIAH PETERNAKAN TERPADU, 8(3), 111–119.
18. Pszczola, M., Aguilar, I., Misztal. I. (2009). Short Communication: Trend For Monthly Change in Days Open in Holstein. Journal Dairy SCI 92: 4689-4696.
19. Ramadhanty, D. (2021). Efisiensi Reproduksi Induk Sapi Perah Yang Mengalami Kawin Berulang. In Jurnal Sains dan Teknologi Industri Peternakan. 1(1), 18-20.
20. Reswati., Jaswandi., & Nurdin, E. (2014). Reproduction Performance of Dairy Cows in West Sumatra. Jurnal Peternakan Indonesia, I6(3).
21. Sembada, P., Ramadhan, I., Rizky, F. R., Mugniawan, A., & Hendrawan, R. R. (2020). Performa Produksi dan Reproduksi Sapi Perah di UPTD BPPIP-TSP Bunikasih (Production and Reproductive Performance Of Daily Cattle At UPTD BPPIP-TSP Bunikasih). Jurnal Sains Terapan, 10(2), 70–82. https://doi.org/10.29244/jstsv.10.2.70
22. Susilowati, S., Wurlina, W., Mulyati, S., Utama, S., & Meles, D. K. (2020). Pemberian silase, complete feed, dan growth promoter pada sapi perah kawin berulang terhadap Services per Conception dan produksi susu. Ovozoa Journal of Animal Reproduction, 9(2), 28. https://doi.org/10.20473/ovz.v9i2.2020.28-34
23. Temesgen, M. Y., Assen, A. A., Gizaw, T. T., Minalu, B. A., & Mersha, A. Y. (2022). Factors affecting calving to conception interval (days open) in dairy cows located at Dessie and Kombolcha towns, Ethiopia. PLoS ONE, 17(2). https://doi.org/10.1371/journal.pone.0264029
24. Wahyudi, L., Susilawati, T., & Wahyuningasih, S. (2013). Tampilan Reproduksi Sapi Perah Pada Berbagai Paritas Di Desa Kemiri Kecamatan Jabung Kabupaten Malang. In J. Ternak Tropika, 14 (2).
25. Yanuartono, Y., Nururrozi, A., Indarjulianto, S., & Purnamaningsih, H. (2019). Peran Protozoa pada Pencernaan Ruminansia dan Dampak Terhadap Lingkungan. TERNAK TROPIKA Journal of Tropical Animal Production, 20(1), 16–28. https://doi.org/10.21776/ub.jtapro.2019.020.01.3
26. Zainudin, M., Ihsan, M. N., & Suyadi, D. (2014). Efisiensi reproduksi sapi perah PFH pada berbagai umur di CV. Milkindo Berka Abadi Desa Tegalsari Kecamatan Kepanjen Kabupaten Malang. Jurnal Ilmu-Ilmu Peternakan, 24(3), 32–37.