

The Study of the Calving Interval of Tropical Cows Based on the Age of Jabres Cattle in Tropical Country

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Abstract

A calving interval is the time between the birth of one calf and the subsequent birth of the next calf from the same cow. An ideal calving interval for dairy cattle and beef cattle is one year. The 82 days that a cow is not in gestation is a critical moment in the calving interval cycle that will be expected. Jabres cattle (Java-Brebes) is a local breed of cattle of Bantungkawang District, Brebes City, Province of Center Java that has been cultivated for generations. Jabres cattle have the advantage of a good reproductive system, but no comprehensive data can analyze the reproduction performance. The calving interval can be used as a measure of reproductive efficiency. This study aims to determine the effect of age on the calving interval. This study used 70 samples of Jabres cattle, which were grouped into three groups based on age, namely, <5 years with a total of 25 cattle, 6-10 years with a total of 25 cattle, and ages 11 years and over with a total of 20 cattle. The research was conducted by interviewing farmers using questionnaires and direct observation in the field carried out with local inseminators, veterinarians, and breeders. The data taken were age and distance to give birth. The data obtained was then analyzed using the one-way ANOVA method to determine the significance of differences between groups. The results showed that the average calving interval at <5 years, 6-10 years, and >11 years, respectively, was 13.36 ± 1.777 , 13.76 ± 2.006 , and 13.50 ± 1.792 months. Jabres cattle are cattle that have unique reproductive performance characteristics, up to the age of 14 years, they can still become pregnant. This research data proves that age in Jabres cattle does not affect the quality of their reproductive physiology. The conclusion from the results of this study is that the age variations of Jabres cattle do not show a significant difference in the calving interval.

Keywords: Age; Calving Interval; Jabres Cattle

Introduction

The classic parameter for monitoring the status of a reproductive program is been calving interval. Although a short calving interval might be the *goal* of a reproductive program, it is totally inadequate as a *monitoring parameter*. The calving interval has severe momentum. The calving interval is the standard for the success of a farm management process, the target is one year one calf with the calculation of 9 months 10 days of gestation, 2 months of postpartum estrus, 2 months of estrus, and artificial insemination, for a total of 12 months.

One of the determining factors for the success of a livestock business or beef cattle cultivation is feed, in addition to genetic and management factors. Feeding that is not by livestock needs, both in terms of quality and quantity, will have an impact on the performance of livestock production and reproduction. The efforts of the government of 2 Brebes Regency to increase the population and genetic quality of Jabres cattle are carried out through the implementation of the Artificial Insemination (A.I.) mating system and the development of natural mating intensification (InKA) by providing superior bulls of the Jabres cattle type to livestock groups (Utomo, 2016).

Shortened calving intervals will benefit both the productivity and profitability of the herd and can be beneficial from a labor point of view, with a shorter calving interval meaning less work for the farm. Because an average cow's gestation length is 283 days, depending on an individual farm's voluntary waiting period there is a small window when the animal needs to conceive again to maintain a 12-month calving interval. This requires fertility to be paramount to these objects with semen fertility, daughter fertility, and gestation length all key to achieving your goals. The same aims are desirable for heifers to ensure animals enter the production herd at the correct time and give the opportunity for a tight block calving pattern if required (John F *et. al.*, 2007; Joly *et. al.*, 1995).

Results of previous research suggested that reproductive traits such as age at first calving and calving interval might affect various economic traits and consequently influence the productive life and profitability of cows. In conclusion, regard of the age at first, calving must be taken with the optimum age at first calving for maximum lifetime profit being 22.5 to 23.5 months. Moreover, considering the negative genetic correlation of the first calving interval with lifetime profit, it should be reduced against the present trend of increase. Moreover Age at first calving is an important factor in reducing the cost of rearing replacements in dairy herds (Ettema and Santos, 2004). According to Moran (2010), many factors influence the quality of estrus, including race, age, physical and physiological conditions, environment, and nutritional aspects. However, dystocia is detrimental to reproduction, and younger, smaller heifers and older over-conditioned heifers have a higher risk of dystocia (Ettema and Santos, 2004).

Cows raised traditionally by small breeders have varying estrus quality due to various factors. In general, the quality of estrus can be seen through the appearance of estrus, including changes in the vulva, vulvar mucus, and uterine tension. The quality of estrus affects the fertility of cows, which shows that the better the quality of estrus, the better the fertilization (Chaesario, 2015). Based on their presentation, Ratnawati *et. al.*, (2017) added that the quality of estrus can be essential in detecting signs of estrus because it can determine the time

of A.I., pregnancy, and reduce the calving interval. This research aims to determine the effect of age and length of estrus postpartum on the Calving Interval (CI) in Jabres cattle in Brebes central Java and Peranakan Ongole (PO). The facts in the field require a scientific study related to the features of Jabres cattle, so we carried out this study using Jabres cattle's samples from traditional breeders such as currently managed Jabres cattle

Materials and Methods

The research was carried out in a mountainous area of livestock owned by residents in Cikamuning Village, Bantarkawung District, Brebes Regency, Central Java. The samples used were 70 female Jabres (Java Brebes) cattle. The material used to determine the effect of age on calving intervals is data on female cows that have given birth at least twice and their age. The research was carried out by collecting primary data through survey methods, farmer interviews and physical examination. Preliminary data was obtained through interviews with breeders using a prepared questionnaire including the owner's name, address, age of livestock, parity, and number of A.I. The research was accompanied by a local veterinary paramedic. The data analysis used in this research is descriptive statistical analysis. The data obtained was analyzed using Statistical Product and Service Solution (SPSS). Data was obtained from 3 groups based on age and calving interval.

Results and Discussion

According to land use, it is divided into paddy land and dry land. The average amount of rainfall in this district in 2014 was 195 mm. Topographically, area is 161 meters above sea level, with an average rainfall of 195 meters and a tropical climate, making this sub-district very potential for development in the livestock sector. The potential for livestock food is so abundant and spread in almost every village that this sub-district is developing various types of livestock businesses, both large and small livestock.

This situation may give a matching environment for the physiological reproduction of cattle. Previous study cows had increased ovarian volume and decreased follicular population as

they aged, the follicular growth pattern and corpus luteum functionality appear to be unaffected by age (Rafael H. *et.al.*2023). Increased ovarian volume and decreased follicular population as they age, the follicular growth pattern and corpus luteum functionality appear to be unaffected by age. The condition of increasing age does not affect the process, in this case, the author speculates that genetic factors influence the results of reproductive performance. Previous research shows that the older they get, the more their physiological condition declines, but this is not the case with this Jabres cow. Further research is needed to prove this. From the results of the data, it can be found that the increase in age over a certain period of time shows that the performance of the reproductive organs and physiology of Jabres cattle is still normal and there is no visible decline in several variables that support the length of the calving interval.



Figure 1. Brebes Javanese Cow or Jabres Cattle (personal documentation)

An earlier age at puberty in livestock can benefit farmers in raising livestock, as shown by the production of calves. The age of puberty for Jabres cattle is still in the good category. The minimum age for puberty is 14 months, and the maximum is 20 months. Generally, puberty is reached at the period of 12 months for cattle raised in Indonesia, with variations of 10-15 months. In general, puberty depends on the interaction of age, body weight, body condition, and season (in sub-tropical areas) so that livestock that grow will reach puberty earlier. This research used 70 female cow samples to see the effect of age on calving interval (Madureira, *et al* 2015). Table 1 shows the relation between periods and the calving interval of Jabres cattle in Brebes.

Table 1. Description of the Calving Interval (CI) for various ages of Jabres cattle in the Brebes regency

No	Age (year)	Sample size	Calving interval (months)
1	< 5	25	13.36± 1.777
2	6-10	25	13.76± 2.006
3	>11	20	13.50± 1.792

Based on Table 1, the average EPP from ages 3 – 4 years, 5 – 6 years, 7 – 8 years respectively is 122.73 ± 45.40 days, 161.84 ± 49.64 days, $192 \pm 45, 16$ days. From the results of this research in Table 1 it is known that the age of the Jabres cow mother has no effect on the calving interval of Jabres cows. This shows that the factors that influence the calving interval include post-partum estrus, uterine involution, and post partum ovarian development going well even though the older the parent is. Furthermore, The author got the calculation results using the one-way Anova calculation method. Based on the calculations, it shows no significant differences ($P>0.05$) between age groups and CI in the table above. Calving Interval is the number of days or months between one birth and the next, which greatly influences the reproductive efficiency of dairy cows (Prasetiyo *et. al.*, 2015). According to Ismaya (2014) and Lestari, *et al*, 20150, CI is the time required for several cows from the first calving to the next calving, divided by the number of mothers. In this study, the average CI of 70 samples at Brebes Regency, Central Java, was $13.36 \pm 1,777$; 13.76 ± 2.006 ; $13.50 \pm 1,792$ months. Based on the research results obtained, it is not yet ideal, according to Hadi and Ilham (2004) that the ideal CI is 360 days or around 12 months, namely 270 days of pregnancy and 90 days of breastfeeding, Ball and Peters (2004), also added that reproductive efficiency is said to be It is good if a mother can produce calves in one year. However, even compared to ideal standards, this calving interval in Indonesia is still relatively good, it is further known that up to a high age (11 years and above), it still shows very good reproductive system performance good reproductive system is characterized by a normal estrus cycle and pregnancy followed by birth (Remnant, *et. al.*, 2015).

Of course, this calving interval shows complete reproductive performance in the process

until a healthy calf is born. This long production time is of course very profitable for breeders, in this case traditional breeders because these cows are able to produce for a long duration so economically it is very helpful for traditional breeders.

Conclusion

Based on the research results, statistical analysis of 70 mother cow data. The samples obtained were divided into three groups based on age. The respective calving intervals were 13.36 ± 1.777 , 13.76 ± 2.006 , $13.50 \pm 1,792$ months, and the results of this study did not show a significant effect of age on the calving interval. However, this research provides results showing that up to the age of 11 years, Jabres cows can still give birth with normal reproductive performance.

References

- Ball, P.J.H. and Peters, A. R. 2004. *Reproduction in Cattle Third Edition*. Blackwell Publishing. United Kingdom Bearden.
- Chaerunnisa, C. Partisipasi Masyarakat dalam Program Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat di Kabupaten Brebes (Studi Kasus Desa Lengok dan Desa Tambakserang Kecamatan Bantarkawung). *Jurnal Politika*. Vol 5(2).
- Chaesario, T. F. 2015. Pengaruh Kualitas Estrus Terhadap Performa Reproduksi Sapi Potong di Wilayah Kerja Inseminator Gabus II Kabupaten Grobogan. *Skripsi*. Fakultas Kedokteran Hewan Universitas Gadjah Mada. Yogyakarta.
- Ettema JF, Santos JEP. Impact of age at calving on lactation, reproduction, health, and income in first-parity Holsteins on commercial farms. *J Dairy Sci*. 2004;87:2730–2742.
- Hadi and Ilham. 2004. Penampilan Reproduksi Sapi. Available at <http://ternaktropika.ub.ac.id>. Accession date 12 Februari 2017.
- Ismaya. 2014. *Bioteknologi Inseminasi Buatan Pada Sapi dan Kerbau*. Gadjah Mada University Press. Yogyakarta.
- John F,S S, Eicker S, Rapnick 2007 P Reproductive Health Programs for Dairy Herds: Analysis of Records for Assessment of Reproductive Performance, *Therio*,Pages 473-489.
- Jane, A.P. 2016. The Estrous Cycle of Cattle. *Animal and Dairy Science 22: 213-235*
- Jolly, P.D., McDougall,S., Fitzpatrick, L.A., Macmillan, K.L., Entwistle, K.W. 1995. Physiological Effect of Undernutrition on Postpartum Anoestrus in Cows. *Journal of Reproduction and Fertility Supplement 49, 477-492*
- Lestari, T.D., Ismudiono. 2014. *Ilmu Reproduksi Ternak*. Surabaya: Airlangga University Press
- Madureira, A.MM.L., Silper, B.F., Burnett, T.A., Polsky, L., Cruppe, L.H., Veira, D.M., Vasconcelos, J.L.M., Cerri, R.L.A. 2015. Factors Affecting Expression of Estrus Measured by Activity Monitors and Conception Risk of Lactating Dairy Cows. *Journal of Dairy Science Vol. 98 No. 10, 2015*
- Kepmentan. 2012. Keputusan Menteri Petanian Nomor 2842/Kpts/LB.430/8/2012 tanggal 13 Agustus 2012, Tentang Sapi Jabres sebagai salah satu rumpun sapi lokal, dan kekayaan Sumber Daya Genetik ternak lokal Indonesia.
- Moran, C., J. F. Quirke, dan J. F. Roche. 2010. Puberty in Beef heifers: *A review. Anim. Reprod. Sci.* 18:167-182.
- Rafael H. Alvarez ^a, Keila M.R. Duarte ^a, João B.P. Carvalho ^a, Cecília C. Rocha ^b, Gilmar A.A. Junior ^b, Eduardo Trevisol ^c, Alfredo J.F. Melo ^a, Guilherme Pugliesi ^b Ovarian morphology and follicular dynamics associated with ovarian aging in *Bos indicus* beef cows, *Animal Reprod. Scie* Vol. 254, July 2023, 107279
- Prasetyo, A. 2015. Status Fertilitas Induk Sapi Persilangan Limousin Pada Berbagai Paritas UniversitasBrawijaya. Malang.
- Ratnawati, D., D. A. Indrakusuma, L. Affandhy, F. Cowley, D. Mayberry, & D. Poppi. 2017. Strategi Manajemen untuk Meningkatkan Performs Produksi Reproduksi Sapi Brahman Cross (*Bos Indicus*) di Jawa Timur, Indonesia. *JITV*. 21: 231 - 237.

- Remnant, J.G., Green, M.J., Huxley, J.N., Hudson, C.D. 2015. Variation in the Interservice Intervals of Dairy Cows in the United Kingdom. *Journal of Dairy Science Vol. 98 (2): 889-897.*
- Utomo, B. 2016. Pengembangan Sumber Daya Genetik Sapi Jabres Untuk Produksi Daging. IAARD PRESS. Jakarta.