

The number of service per conception of Indonesian Friesian Holstein with artificial insemination in Selo, Boyolali, Central Java, Indonesia

A M Wicaksono¹, A Pramono¹, A Susilowati², Sutarno², N Widyas¹, S Prastowo¹

¹ Animal Science Departement, Faculty of Agriculture, Sebelas Maret University, Surakarta, Indonesia

² Department of Bioscience, Graduate Program, Sebelas Maret University, Surakarta, Indonesia

E-mail: prastowo@staff.uns.ac.id

Abstract. Boyolali is an area in Central Java Indonesia, it has large number of Indonesian Friesian Holstein (IFH; dairy cattle). To improve its population as well as genetic quality of milk production, artificial insemination (AI) is widely applied as mating program. The success of AI can be evaluated from the number of service per conception (S/C), represent a number of service using AI to achieve one pregnancy. Its mirroring mating management and reproductive efficiency in dairy cattle, estimated in herd during specific time and location. For that, this study aims to estimate S/C in Selo, Boyolali during October 2016 to January 2017. Data were gathered with 95% confidence level. Sample size were 367 IFH, visited and selected purposively based on criteria one-time partus, 3 y.o and have complete AI record. Animal data were collected in reproduction and mating management. In addition, 124 dairy farmer who have minimum 5 years experiences in rearing IFH cow were interviewed as respondent in estrus detection, followed with 2 skilled inseminators for AI performing time data. Result shows that S/C is 1.71, this mean one pregnancy need 1.71 times AI services. In the estrus detection, most of dairy farmers were able to observe estrus sign in vulva color, size and the present of mucus by visual. Moreover, AI was performed in 9 to 12 hours after the sign of estrus observed. It is concluded that AI of IFH in Selo, Boyolali has been successfully applied, however there are still rooms to improve the reproduction efficiency through mating management in regard to lower S/C.

1. Introduction

The application of AI in Indonesian dairy cattle has brought a huge impact in genetic and economic perspective. Genetically, AI supporting the dissemination of high genetic quality of selected bull and in economic view, its increase milk production capability. Milk production depend on the ability of cow to pregnant then initiate lactation cycle, however decline in reproduction efficiency of high milk production become a main issue [1]. In dairy cattle, reproductive efficiency can be estimated using S/C data. Previous study shows decline of S/C represent reducing herd fertility [2,3]. Moreover, fertility is highly influenced by management and environmental factors [4] for example mating management, estrus detection, insemination time, feed and season [3].

Selo Boyolali is one of area in Central Java Indonesia which has big number of IFH (8,192 heads; Boyolali statistical bureau 2016) [5]. It has mild climate, 1,200 – 1,500 m above sea level, ambient



temperature 17-20°C and rainfall intensity 2,448 mm (<https://id.climate-data.org/location/26748/>) therefore suitable for IFH rearing. Since years ago, mating system in this area has been rely on AI which performed by skilled and certified local inseminators according to the government policy. In the other side semen used for AI is provided by the government, therefore the genetic of IFH could be maintained. It is widely known that reproduction is key component in enhance population as well as milk production. However, the efficiency must be measure time to time for evaluation purpose. For that, this paper aims to evaluate IFH reproductive efficiency by S/C, following the explanation in the related factor in Selo Boyolali. Result could be beneficial for strategic planning to enhance dairy cattle herd fertility.

2. Methods

A ground survey was done during October 2016 – January 2017 in Selo Boyolali using confidence level 95%. According to that, 367 heads of IFH were selected as sample size. Three locations in Selo Boyolali named Samiran (latitude, longitude, altitude) -7.498938, 110.470918, 1,474 m, Jeruk at -7.481306, 110.490056, 1257 m and Tarubatang at -7.493889, 10.481361, 1,426 m (<http://www.mapcoordinates.net/en>) were selected. In addition, 124 dairy farmers were visited to gather estrus observation data, as well as 2 skilled inseminators for AI performing time data. To estimated S/C, number of total AI performed during January to October 2016 were calculate then divided with total number of pregnant cows in the same period in the same cows used as sample in this study. Estrus data were presented in percentage and AI performing time was in hours after estrus signs were observed.

3. Result and discussions

S/C in Selo Boyolali was estimated as 1.7, this mean to achieve 1 pregnancy need 1.7 times AI services. Best S/C is closer to 1 while higher represent more inefficient of herd fertility [2]. S/C depends largely on the breeding system used. Lower S/C can be found in AI compared to natural mating. According to the previous study, different locations resulted different S/C. For example in Bogor West Java S/C was 1.81 in Kebon Peder, 1.97 in Tajur Halang and 1.82 in Cibeureum [6], 1.6 in Mojosongo Boyolali Central Java [7], 2.93 in Malang East Java [8] and 1.87 in Bengkulu Sumatra [9]. These data represent different in rearing management and mating system used. This result is in line with the previous review where explaining the fertility is influenced by management and environment [4].

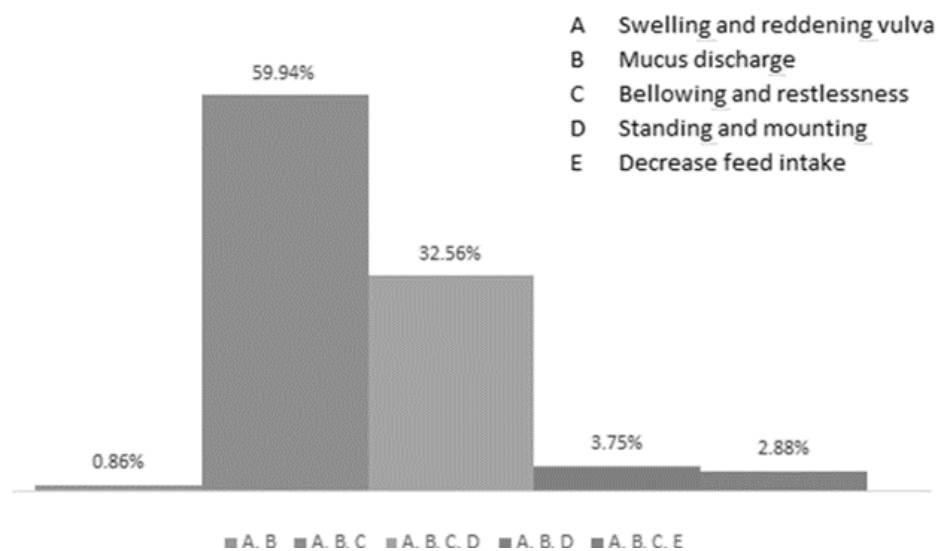


Figure 1. Estrus sign observed visually

S/C belongs to variables of cattle reproductive performance which represent mating management efficiency and involve intensive estrus detection. As resulted from interview, dairy farmer knowledge in estrus detection need to be improved more intense. The fact dairy farmer (Figure 1) are able to observe the estrus visually. Fail in observe estrus increase the fall of determine best time for insemination followed with reducing the possibility of fertilization [3,5]. When cattle are fail to pregnant at the first time of AI, the more AI service is needed during next estrus cycle which means increasing S/C.

Fertilization is depending on the service. To get pregnant, ovum need to be fertilized by sperm after ovulation and before that cow must be come into estrus. In this regards, estrus is the key player in determining S/C. A fail to detect estrus result in fail of conception [5]. Estrus is the most important element of cattle herd management, inadequate of estrus detection affect to the herd fertility. The fact, estrus can only observed visually by the dairy farmer [3,5]. However, some obstacles such as silent heat and in appropriate farm visit became factors belongs to failure of estrus detection. In this study, dairy farmers are able to detect the present of estrus sign by visual observation of vulva (redder, bigger and the present of cervical mucus) compared to non-estrus period. Taking into account, the dairy cattle farmer in Selo Boyolali has been experience in rearing for more than 5 years.

In dairy cattle, normally estrus last about 18 hours, and best time to inseminate is at 9-16 hours after the beginning of observed the signs of estrus as reported in the previous study [10]. In practical, dairy farmer and the inseminator in Selo Boyolali already know the best time to perform AI. If heat observed in the morning then the latest time for AI is in the afternoon. Meanwhile, if observed in the afternoon then latest time is the next morning. The range of AI time in this study was 9-12 hours. According to the inseminators, frozen semen was thawed in air temperature for 20-30 seconds before AI and deposit at cervix ring number 4.

All in all, reproductive performance of dairy cattle in Selo Boyolali categorized as good. Improving dairy farmer estrus detection could be a way to enhance the herd fertility. Moreover, the other factor such as mating management, nutrition and other factor which support good reproduction performance is needed.

4. Conclusion

It is concluded that, the implementation of AI in Selo Boyolali have been successfully. However, factors to improve reproduction efficiency are still open to manage. Improving fertility is not a single work, many factors interact. Enhancing estrus detection method, nutrition and recording would be a tool in reducing S/C.

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