

EVALUATION OF ARTIFICIAL INSEMINATION PROGRAM ON LOCAL CATTLE IN PANTE BIDARI DISTRICT, EAST ACEH REGENCY, ACEH PROVINCE

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ABSTRACT

The purpose of this study was to analyze the success of the artificial insemination (AI) program in local cattle in Pante Bidari District, East Aceh Regency, Aceh Province. It was conducted in five villages: Alue Ie Mirah, Buket Bata, Grong-Grong, Meunasah Tunong, and Paya Demam Empat. The survey method was employed in this study. The respondents were selected by using purposive sampling method. There were 40 breeders and 3 inseminators included as the respondents. To be involved in the study, the breeders had to meet certain criteria, such as having an experience of breeding local cows, at least twice using the AI system. As for the inseminators, they were required to have a permit from the East Aceh Livestock Service. The results showed that the conception rate (CR) was 76.45%; the service per conception (S/C) was 1.22; the calving interval (CI) was 12.70 months, and the calving rate (CvR) was 89.92%. This study concluded that the implementation of the artificial insemination program in Pante Bidari District, East Aceh Regency, has been running effectively.

Key words: artificial insemination, calving interval, calving rate, conception rate, service per conception

ABSTRAK

Penelitian ini bertujuan mengetahui keberhasilan program inseminasi buatan pada sapi lokal di Aceh. Penelitian ini dilakukan di Pante Bidari Kabupaten Aceh Timur Provinsi Aceh, yaitu Desa Alue Ie Mirah, Buket Bata, Grong-grong, Meunasah Tunong dan Paya Demam Empat. Metode survei digunakan dalam penelitian ini. Responden yang digunakan adalah peternak sapi lokal dan inseminator. Responden ditetapkan dengan menggunakan metode purposive sampling. Sebagai responden ditetapkan 40 peternak dan 3 inseminator. Peternak responden harus memenuhi kriteria memelihara minimal dua ekor sapi lokal yang telah beranak 2 (dua) kali dan sistem perkawinan dilakukan secara inseminasi buatan (IB). Inseminator telah memiliki surat izin melakukan inseminasi buatan. Hasil penelitian menunjukkan bahwa rata-rata nilai conception rate (CR) sebesar 76,45%, service per conception (S/C) adalah 1,22, jarak beranak (calving interval) sebesar 12,70 bulan, dan calving rate sebesar 89,92%. Disimpulkan pelaksanaan program inseminasi buatan di Pante Bidari Kabupaten Aceh Timur telah berjalan dengan baik.

Kata kunci: inseminasi buatan, calving interval, conception rate, calving rate, service per conception

INTRODUCTION

Beef cattle are a type of livestock that has been the main source of meat production after chicken. The demand for food from livestock, especially beef, in the last few decades has continued to increase along with the increase in population despite quite large fluctuations between time and regions. In 2019, meat consumption in Indonesia was 686,270 tons; 58 of which was supplied from local livestock while 42% of which was imported from abroad. The population of beef cattle in 2019 in Indonesia reached 18.12 million heads (Ditjenak 2019). This indicates that domestic meat production is still insufficient to meet the needs of meat consumption. The performance recovery of the livestock-origin food industry sector should be prioritized by optimizing and empowering local resources through the development of appropriate technological innovations. Beef cattle agribusiness to produce superior cattle in this case has a large opportunity to fulfil the domestic beef demand (Tawaf 2018). This is based on the fact that more than 99% of domestic cattle producers are community farms. The demand for meat increases along with the increase in population, and the availability of the local beef cattle resources is quite inadequate (Rusdiana and Praharani 2018).

To overcome these challenges, the government launched several programs with an aim to increase the local cattle population as the main source of beef by banning the act of slaughtering productive local female cattle and importing various breeds of cattle, both in the forms of live cattle and frozen semen. AI is one of the programs aiming to improve the genetic quality of the local cattle in Indonesia (Rusdiana and Soeharsono 2018; Rusdiana and Talib 2019). Artificial insemination (AI) is a reproductive technology capable to improve the genetic quality of an animal in a short time by utilizing as many superior males as possible. AI is the intentional insemination of superior male semen into the cervix of a female cow in heat with many advantages, such as preventing infectious reproductive diseases, providing more accurate recording, reducing the costs, and preventing accidents caused by males. AI has achieved much progress and applied to other types of livestock (goats, horses, pigs) and various types of poultry. Some factors that influence the success of AI are the quality of the semen used, human resources involved (inseminators and breeders), and the physiology of female livestock (Kusumawati and Dwi 2017). Improvements in AI activities in Indonesia are still continuously being made to increase the livestock population, quality, and production (Diwyanto and Inounu 2009). However, the

success rate of AI, in general, is still lower than that of natural mating.

East Aceh Regency is one of the development areas for agriculture, plantations, and livestock in Aceh Province. This makes the area highly strategic for the development of beef cattle agribusiness. There is still much land available for cattle grazing, pasture, and forage for agricultural by-products. It also has good climatic conditions, number of breeder families, and cattle population in each livestock area.

East Aceh district has implemented the AI program. One of the districts that runs this program intensively is the Pante Bidari district. The population of beef cattle in Pante Bidari District had declined by 87.29% from 2017 to 2019 (Dinas Perkebunan dan Peternakan Kabupaten Aceh Timur 2020). For this reason, a study is required to investigate the implementation of AI in the district. The purpose of this study was to determine the success rate of the AI program and the challenges related to the AI implementation in Pante Bidari District, East Aceh Regency. It is also expected that the current study can provide an overview of the strengths and weaknesses of the AI implementation in Pante Bidari District, East Aceh Regency, Aceh Province.

MATERIALS AND METHODS

This study was conducted in Pante Bidari District, East Aceh Regency, Aceh Province. It involves five villages: Meunasah Tunong, Alue Ie Mirah, Paya Demam Empat, Grong-Grong, and Buket Bata. The survey method was employed. The respondents were selected by using the purposive sampling method. There were 40 breeders and 3 inseminators selected as the respondents. To be included in the study, the breeders had to have an experience of breeding at least two local cows that have calved two times using AI system. As for the inseminators, they were required to have a permit issued by the East Aceh Livestock Service. The locations of this research were also chosen purposively; all of which had the largest population of beef cattle in Aceh and were physically reachable by the inseminators in Pante Bidari District. The respondents consisted of 40 breeders and 3 inseminators.

The data were collected through interviews and direct interviews with beef cattle breeders in Pante Bidari District. The interviews used a question guide in the form of a questionnaire that had been prepared in advance. The data collected in the study comprised profiles of the breeders, such as their education levels, occupations, age, length of experience of breeding, knowledge of signs of estrus, knowledge of mating systems, and knowledge of livestock reproduction characteristics, including age of puberty, conception rate, service per conception, calving interval, and calving rate.

Data Analysis

Data analysis was conducted to prove the hypothesis of this study. All of the data and information collected were tabulated based on the data category.

Then, the mean value and standard deviation were identified using Microsoft Office Excel software.

RESULTS AND DISCUSSION

General Review

Pante Bidari District is one of the districts in East Aceh Regency with an area of 233.25 km². It consists of 3 settlements and 25 villages with a total population of 25,949 people (BPS, 2020). Dinas Perkebunan dan Peternakan Kabupaten Aceh Timur (2020) reported that the cattle population in this district in 2019 was 38,663 heads. There are two livestock farming techniques generally applied here, namely semi-intensive livestock farming technique (95%) and intensive livestock farming technique (5%). The semi-intensive technique includes allowing the cattle to graze during the day in the pasture and penning them at night, whereas the intensive technique includes continuous penning.

Characteristics of the Respondents

Forty-three people were involved as the respondents, comprising 40 breeders and 3 inseminators living in 5 selected villages in Pante Bidari district, East Aceh district. They were selected purposively based on their age, length of husbandry, last education, main occupation, and the number of livestock owned. Their characteristics are presented in Table 1.

The survey results show that 85% of breeders were between 38-64 years old while 15% of them were over 64 years old. In other words, the majority of the respondents were in productive age. According to the Undang-Undang tentang Ketenagakerjaan No. 13 of 2003 Chapter I Article 1 paragraph 2, working age starts from the age of 15 years to the age of 64 years. Success can be influenced by a person's age and his/her ability to work and achieve good results.

Table 1 shows varying levels of the respondents' education; most of whom are elementary to junior high school graduates (80%), while 10% of them are high school graduates, and only 2.5% finished university. This indicates that most of the respondents still have a low level of education. The levels of breeders' formal education affects the application of technology and innovation (Mulyawati *et al.* 2016). This is in accordance with the statements of Basyir *et al.* (2020) that the level of education affects the performance of workers.

From the results of this study, it was found that 23 respondents (57.5%) had a main job as a breeder, 3 of them (7.5%) worked as traders, 8 of them (20%) were civil servants or workers in the private sector, while 6 of them (15%) had other types of work. The main occupation of the respondents is directly related to the amount of free time they have. The amount of time allocation for a job can affect performance. Most of the livestock businesses in Indonesia are carried out as a part-time business to earn some extra money for savings and to meet the needs that require large costs.

The livestock farming experiences of the respondents also varied: 2 people had 1-5 years of experience (5%); 11 people were experienced for 6-10 years (27.5%); 7 people had 11-15 years of experience (17.5%), and >15 years of experiences for 20 people (50 %). This shows that the number of experienced respondents was high, indicating that most of them had adequate knowledge in farming livestock. This is in line with the statement of Mulyawati *et al.* (2016), in which the length of experience affects a person's knowledge. For breeders, the more the experience in farming livestock, the easier it is for them to set priorities in business and make an evaluation when necessary to achieve optimal results.

The respondents' participation in this study was assessed from the time of their participation in the AI

program, the continuity of AI breeding livestock, and the use of AI to mate all or some of the livestock. The results showed that 25 respondents (62.5%) had used the AI program for 1-5 years, 14 respondents (35%) had applied the AI program for 6-10 years, and 1 person (2.5%) had implemented the AI program for more than 15 years. Thus, it can be said that the implementation of the AI program in Pante Bidari District, East Aceh Regency, was highest in the range of 1-5 years. However, a longer period of the AI implementation is expected to reach a complete stage. From the data collected, it was found that 29 respondents (72.5%) occasionally carried out AI, while the respondents performing AI on all of their own livestock were 25 people (62.5%).

The respondents supported the AI program in Pante

Table 1. Characteristics of the respondents in Pante Bidari District, East Aceh Regency (n= 40)

Respondents' characteristics	Number of respondents	% of Total respondents
Age		
38 - 64	34	85%
>60	6	15%
Last Education		
None	3	7.5%
Elementary	22	55.0%
Junior high	10	25.0%
Senior high	4	10.0%
D3	0	0.0%
S1	1	2.5%
Main Job		
Farmer	23	57.5%
Breeder	0	0.0%
Trader	3	7.5%
PNS/private/honorary	8	20.0%
Other	6	15.0%
Number of Livestock		
1 - 5 heads	39	97.5%
6 - 10 heads	1	2.5%
11 - 15 heads	0	0.0%
>15 heads	0	0.0%
Livestock Farming Experience		
15 years	2	5%
6 - 10 years	11	27.5%
11 - 15 years	7	17.5%
> 15 years	20	50%

Table 2. Characteristics of the inseminators in Pante Bidari District, East Aceh Regency (n= 3)

Respondents' characteristics	Number of respondents	% of Total respondents
Age		
23-64	3	100%
>64	-	-
Time on Duty		
15 years	1	33.3%
6 - 10 years	1	33.3%
> 10 years	1	33.3%
Last Education		
Senior high	-	-
D3	2	66.6%
S1	1	33.3%
Main Job		
PNS/honorary	1	33.3%
Employee	2	66.6%
Breeder	-	-
SIMI		
With SIMI	-	-
Without SIMI	3	100%

Bidari District because it could help them obtain semen from superior males and the desired breeds of cattle. Besides, they could increase the cattle's weight gain. According to Ahmad (2020), by using the AI service, breeders can acquire superior seeds and large fast offspring, increase the cattle's body weight and milk production, in addition of increasing the cattle population. This implies that the breeders were relatively comfortable with the use of the AI program in mating their livestock because it resulted in a high birth rate. The semen used by the respondents and the inseminators came from the local office with various types of cattle, namely Aceh, Bali, Brahman, Simental, Angus, Limosin, Brangus, and many more.

Fifty-five percent of the respondents had an adequate understanding of the signs of estrus shown by livestock and 45% of them had a good understanding of the signs of estrus shown by livestock. According to Abidin *et al.* (2012), the signs of estrus in cattle are clear mucus discharge from the genitals, mounting, being quiet when mounted by other cattle, restlessness, moaning, decreasing appetite, and lifting the tail up. The skill of the breeders in recognizing signs of estrus affects the timeliness of reporting to the inseminators and the timeliness of AI by the inseminators. According to Ardhani *et al.* (2020), an understanding of estrus signs affects the success of AI. Accuracy and efficiency of estrus detection are among the main keys to successful management of artificial insemination.

Characteristics of the Inseminators

There were three inseminators involved in the study. Their characteristics are presented in Table 2. The survey results revealed that their age was in the productive category despite having different years of service. However, it is expected that these differences would not negatively impact the results of the AI implementation.

Two inseminators had Diploma 3 (D3) (66.6%), while the other had an undergraduate degree (33.3%). This suggests that most of the inseminators had a good level of knowledge. In addition, all inseminators worked at the East Aceh Livestock Service in Pante Bidari District. They did not have a SIMI (100%), and worked in accordance with a permit from the East Aceh Livestock Service. These indicate that the implementation of AI had been running here in a structured manner. According to the Ditjennak (2019), to be able to implement AI on livestock, insemination technical officers must have an inseminator SIPP, and those who do not own this must have an assignment letter from the Head of the Provincial or Regency/City Service issued by the agency handling local livestock and animal health functions.

System and Working Capacity of the Inseminators

The system and working capacity of the inseminators in this study consisted of a service system and reporting the implementation of AI. They are presented in Table 3 below. The AI service system category comprised an active service system (the

inseminator visited the breeder), passive service system (the breeder visited the inseminator) and a semi-active service system (a combination of active and passive systems).

From Table 3, it is noticeable that all inseminators applied the active and passive service systems. In other words, the inseminators visited the location after receiving reports from breeders, and occasionally visited breeders to evaluate the results of the AI implementation. This reflects the inseminators' great attention to the breeders and their attempt to deliver the services in a structured manner. The ability of detecting estrus signs, timeliness of AI, the ability of the inseminators, and the quality of semen and oocytes have a significant impact on the success of the AI program (Saacke 2008; Roelofs *et al.* 2010). The inseminators reported the progress regularly. Likewise, in the upsus siwab program, the inseminators were required to do daily reporting by informing the number of artificially inseminated cattle directly to the relevant agency. From the table, it is also clear that all inseminators required less than 1 hour to prepare the AI tools. The number of acceptors that can be served by an inseminator was more than 5 cattle per day. This indicates a very good performance and capacity. The skills of an inseminator are one of the important factors that determine the success of the AI program (Fania *et al.* 2020; Amidia *et al.* 2021; Salan *et al.* 2021)

Artificial Insemination Program Success Rate

The success rate of the AI program in this study can be assessed by measuring the pregnancy rates, mating rates per pregnancy, and birth spacing or calving interval. According to Feradis (2010), the success of AI in Indonesia is generally based on the percentage of the conception rate and service per conception. Salan *et al.* (2021) added that the important reproductive performances for reproductive efficiency are service per conception, calving interval, and calving rate.

Conception Rate Value

Conception rate (CR) is the percentage of pregnant cattle at the first mating or insemination. In accordance with the statement of Prasojo *et al.* (2010), the conception rate is the percentage of pregnant cattle at the first mating with diagnosis per rectal presented in numbers. The low value of CR can cause an economic loss to breeders because they need to do artificial insemination more than once, thus affecting the calving interval. The CR value of local beef cattle in Pante Bidari District, East Aceh District, is shown in Table 4.

Table 4 provides information on the average CR value in Pante Bidari District, namely 76.45%. This indicates a very good level of fertility in cattle and implementation of AI in the Pante Bidari District, East Aceh Regency. The CR value in this study was better than the those of Kastalani *et al.* (2019) on beef cattle in Sabangau District, Palangka Raya City, and Saputra *et al.* (2021) on Krui cattle in Pesisir Selatan District, Pesisir Barat Regency, which were 62% and 58.43%, respectively.

According to Hardjopranto (1995), the ideal conception rate for a cattle population is 60-75%. The higher the CR value, the more fertile the cattle, and vice versa. According to Bhagat and Gokhale (2016), there are several factors that influence the CR value in cattle breeding in rural areas, including the levels of education of the breeders, the economic status of the breeders, the type of livestock, parity of the livestock, the order of AI, and the male cattle as the source of the of semen. The ideal CR value in this study was supported by many factors, including adequate experience of the breeders (2 people with 1-5 years of experience (5%), 11 people with 6-10 years of experience (27.5%), 7 people with 11-15 years of experience (17.5%), and 20 people with >15 years of experience), the skills of the breeders in recognizing the signs of estrus (with 45% of breeders having a good skill in detecting signs of estrus and 55% having a fairly good skill), the active and passive services delivered by the inseminators, duration of preparation of AI tools that was less than one hour, and the number of acceptors (more than 5 heads per day) (Table 3). Moreover, the quality of frozen semen used contributed to the success of the AI program in this district. As stated by Fatah *et al.* (2018), the quality of frozen semen affects the pregnancy rate after artificial insemination in female Aceh cattle.

Service per Conception Value

Service per conception (S/C) is the number of conception mating or inseminations until pregnancy occurs. The results of the study on S/C are presented in Table 5. Table 5 shows that the S/C value of local beef cattle in Pante Bidari district was in a good category, i.e. 1.22 services, which was not significantly different from the S/C value of AI beef cattle in Juli District, Bireun Regency of 1.23 services (Novita *et al.* 2019). This value was also better than the S/C value in the research of Fauzi *et al.* (2020) on Krui cattle in Pesisir Selatan District, Pesisir Barat Regency with 1.53±0.71 services. Meanwhile, according to Nurpika *et al.* (2021) the value of S/C in cattle in Kuantan Singingi Regency was 1.12 services. According to Jainudeen and Hafez (2008), the normal value of S/C ranges from 1.6 to 2.0 services; hence, the S/C value of local beef cattle in AI in Pante Bidari District can be categorized as very good. This may be due to the good level of the respondents' knowledge about the signs of estrus, contributing to the timeliness of reporting to the inseminators. Besides, the inseminators carried out active and passive services. The respondents also had sufficient working experience and can prepare the insemination equipment in less than one hour.

The S/C value describes the fertility level of female cows. The higher the S/C value, the lower the

Table 3. The inseminators' system and work capacity of Pante Bidari District, East Aceh Regency (n= 3)

Category	Number of respondents	% of Total Respondents
Service System		
Active	-	-
Passive	-	-
Active and Passive	3	-
Reporting		
Yes, regularly	3	100 %
Yes, irregularly	-	-
Do not report	-	-
AI tool preparation time		
< 1 Hour	3	100 %
1 hour	-	-
Number of Acceptors Per Day		
1 - 2 heads	-	-
3 - 4 heads	-	-
> 5 heads	3	100 %

Table 4. Conception rate (CR) value of AI local cattle in Pante Bidari District, East Aceh Regency (n= 90)

No.	Village	Number of AI livestock	Avg. (%)
1	Alue Ie Mirah	22	71.87
2	Buket Bata	19	81.25
3	Grong-Grong	15	78.57
4	Meunasah Tunong	14	71.42
5	Paya Demam 4	20	79.16
Total		90	
Avg.			76.45±4.50

Table 5. Service per conception (S/C) value of AI local cattle in Pante Bidari District, East Aceh Regency (n= 90)

No.	Village	Number of livestock	Avg.
1	Alue Ie Mirah	22	1.22
2	Buket Bata	19	1.18
3	Grong-Grong	15	1.21
4	Meunasah Tunong	14	1.28
5	Paya Demam 4	20	1.2
Total		90	
Avg.			1.22±0.04

fertility of the female cows in the group. On the contrary, the lower the value, the higher the fertility of the female cattle in AI program (Rohayati and Christi 2017). According to Johnson *et al.* (2006) the skills of an inseminator affect the value of S/C on the results of artificial insemination. One factor that influences the level of artificial insemination is the skill of an inseminator. The implementation of AI in Pante Bidari District was performed by experienced inseminator officers with D3 and S1 educational backgrounds. In addition, the inseminators in the research area were assigned directly by the District Livestock Service Office and had PKB (Pregnancy Examination) expertise. The AI implementation in Pante Bidari District was carried out by inseminator with >10 years of experience and young inseminators with newly gained knowledge from their last educational institution. The inseminators in the research area also had an insemination assignment letter from the District Livestock Service which certainly had proven their ability, had a PKB (Pregnancy Examination), semen handling expertise obtained from formal or non-formal education, and the training held by the District Office. According to the Kementan (2016), technical implementation of AI in the field requires officers with special skills. AI is carried directly at a breeder's place out after the inseminator officer received the breeder's report. Susilawati (2013) adds that inseminator skills in AI techniques include thawing, semen deposition, and AI timing. The thawing process is carried out with water. During the thawing, it is recommended that the water temperature be increased slowly to reduce the death rate of sperm cells because the effects of thawing is the same as those of freezing. Annashru *et al.* (2017) suggest that AI is carried out 0-4 hours after there are signs of estrus. However, according to Kusumawati *et al.* (2018), the timing of AI should be just before ovulation. For example, if the cow shows signs of estrus in the afternoon, the AI should be carried out next day in the morning. The implementation of AI is not advised during the day because cervical mucus thickens during this period. However, it is

recommended to do in the morning, afternoon, and evening because cervical mucus becomes watery during these certain periods. This is why the implementation of AI during the day has a lower success rate than that in the morning, afternoon, and evening. Spermatozoa are also highly susceptible to sun heat; therefore, the implementation of AI during the day is not profitable.

Calving Interval

The calving interval (CI) is a reproductive performance that a breeder and inseminator should know because the regularity of the CI once a year ensures the continuity of livestock production (Do *et al.* 2011). CI describes the reproductive ability of a cow to produce calves in a measure of time in a period. The CI in local beef cattle in Pante Bidari District is shown in Table 6.

Table 6 shows that the CI of local cattle in Pante Bidari District, East Aceh Regency, was 12.70 months. This figure was in a fairly good condition from the standard CI value set by the Direktorat Jenderal Peternakan (1991), namely 365 days. The duration of CI based on Ministerial Regulation No. 19/Permentan/OT.140/2/2010 concerning General Guidelines for Program Swasembada Daging Sapi (PSDS) 2014 is 15-21 months with an average of 17.5 months. The CI value in Pante Bidari District was better than that reported by Sari and Said (2020) on Bali cattle at the Sekolah Peternakan Rakyat Field Station, accounting for 457.25 ± 8.75 days or 15.02 months, and on the Ongole crossbreed cow in Ratahan District, Southeast Minahasa Regency, which was 442 ± 13.49 days or around 14.52 month (Ratulangi *et al.* 2021).

The success of the AI implementation in the current study was also supported by the adequate knowledge of the breeders in detecting the signs of estrus, their length of experience in breeding, good S/C values, and the inseminators' skills. The research findings of Rosa *et al.* (2020) show that the value of S/C and an inseminator's skills have a positive effect on CI (Setiawan *et al.* 2021). Al-Amin *et al.* (2017) adds that

Table 6. Calving interval (CI) value of local cattle in Pante Bidari District, East Aceh Regency (n = 90)

No.	Village	Number of livestock	Avg. (month)
1	Alue Ie Mirah	22	12.5
2	Buket Bata	19	12.75
3	Grong-Grong	15	13
4	Meunasah Tunong	14	12.71
5	Paya Demam 4	20	12.56
Total		90	
Avg.			12.70±0.20

Table 7. Calving rate (CvR) value of local female cattle in Pante Bidari District, East Aceh Regency (n= 90)

No.	Village	Number of livestock	Avg. (month)
1	Alue Ie Mirah	22	95
2	Buket Bata	19	92.7
3	Grong-Grong	15	100
4	Meunasah Tunong	14	100
5	Paya Demam 4	20	96.87
Total		90	
Avg.			96.91±3.18

the calving interval is influenced by the length of days open, the length of the dry period and the length of lactation. Ball and Peters (2004) state that reproductive efficiency is good when a cow produces one calf in one year. According to Iswoyo and Widyaningrum (2008), the interval between calving in cows is ideally 12 months, 9 months of pregnancy, and 3 months of lactation. However, in reality, the interval between calving and remating is generally quite long. Based on the literature, it can be concluded that the calving interval in the study was fairly ideal, which was under 13 months.

Calving Rate Value (CvR)

Calving rate (CvR) is a percentage of children born from one mating (whether in the first mating, second mating, and so forth). The difficulty in determining young pregnancy and the number of embryonic deaths or abortions and the infrequent demand for pregnancy examinations mean that the absolute reproductive value of a female can only be determined after the birth of a live and normal child. The CvR value of local beef cattle in Pante Bidari District can be seen in Table 7.

The results showed that the CvR value of local female cattle in Pante Bidari district was in the very good category with an average of 96.87%. This result was higher than that reported by Setiawan (2018) in North Kayong District, West Kalimantan, namely 64-92%. Likewise, the study results on Bali cattle in Badung Regency and Tabanan Regency showed that the CvR values were 56.75% and 40.98% respectively (Suranjaya et al. 2019), while the research in Logas Tanah Darat District and Singingi Hilir District, Kuantan Singingi Regency, Riau Province had the CvR values of 58.70% and 42.69%, respectively (Pratami et al. 2019).

The value of CvR depends on the efficiency of the inseminator's work, male fertility, female fertility during insemination, the health of female reproductive organs, and the female cattle's ability to carry children in the womb until the time of birth. CvR is an ideal way of assessing the results of insemination because its success is measured from presence of a calf standing next to its mother. The CvR value can also provide an idea of the potential maintenance efforts made in an area, where a good CvR gives an overview of good maintenance as well (Ikun, 2018).

Ball and Peters (2004) stated that a large population of fertile female cattle inseminated with fertile semen could produce a CvR of 62%. The rate of CvR is influenced by the fertility of female cattle and male cattle or male semen. Susilo (2005) states that the factors causing birth failure and lowering the CvR rate are embryonic death, abortion, and fetal mummification during pregnancy.

CONCLUSION

This study concluded that the implementation of the artificial insemination program in Pante Bidari District, East Aceh Regency, has been running effectively.

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