

## **The Reproductive Efficiency of Filial Ongole (PO), Limousin and Simmental Crossbred Cows at Situbondo District**

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**ABSTRACT:** The efficiency of reproduction is very important to be maintained on cows, because they will produce offspring on their lifetime. Cross breeding is a method that usually used to increase the beef cattle population on the farm. Nevertheless it causes the performances of reproduction will reduces in some population. The objective of this research was to evaluate the reproductive efficiency of beef cattle which were raised by the farmer in the source breeding area at Situbondo District. The materials used in this research were 333 cows of Filial Ongole cattles (PO), Limousin and Simmental Crossbred cattle at the third and fourth parity condition which were resulted by artificial insemination (AI) and taken from the AI acceptor record card. The research variable observed was the reproductive performance of PO cows, Limousin cows, and Simmental cows including Conception Rate (CR), Service per conception (S/C), Days open (DO), Calving Interval (CI) and Index Fertility (IF). The data were analyzed by using descriptive analysis and unpair t-test comparison. The results showed the average of CR, S/C, DO, CI and IF at the third parity were 64.28%; 1.42±0.58; 125.28±24.20 of days; 411.06±24.05 days; 45.27 on PO cows; 61.86 %; 1.39±0.51; 114.24±16.31 of days; 399.79±16.51 of days; 55.37 on Limousin cows; 65.04 %; 1.40±0.58; 113.10±19.05 of days; 398.30±18.85 of days; 58.42 on Simmental cows. Meanwhile the average value of CR, S/C, DO, CI and IF at the fourth parity condition were 65.17%; 1.41±0.59; 123.94±21.49 of days; 409.54±22.02 of days; 47.21 for PO cows; 67.79 %; 1.37±0.58, 116.46±20.54 of days; 402.44±21.17 of days; 58.48 for Limousin cows; and 60.19 %; 1.46±0.59; 116.46±16.11 of days; 398.56±16.56 of days; 53.22 for Simmental cows. The value of DO and CI between Simmental cows and Limousin cows did not show any significant difference ( $p>0.05$ ), meanwhile those value showed the significant difference ( $p<0.05$ ) on Simmental and Limousin cows with PO cows. It can be concluded that with a good breeding maintenance management, the reproduction on Limousin and Simmental crossbred is more efficient than PO cows.

**Keywords:** Reproductive efficiency, Artificial Insemination, Conception Rate, Service per conception, and Calving Interval

### **INTRODUCTION**

The national population of beef cattle from the year 2007 is about 11,159,789 million heads, in order to fulfill the needs of higher demand for meat the population of beef cattle is still not sufficient, it can be seen from the number of cattle imported from Australia is about 700 to 800 thousand per year. One of the policies that have been made to overcome this problem is by crossing the local cattle with cattle imports that aims to increase the production of local cattle with having a good adaptability

The presence of crossing policy causes the population of Simmental beef cattle and Limousin (*Bos taurus*) is increasing and interesting in the society. Both of cattle breed are expected to increase the productivity of livestock because there are combination of the characteristic traits from the two of breed or more. Moreover the heterosis (*hybrid vigour*) displayed by crosses between of cross breeding from the offspring and the parent will increase the production of the characteristic traits, but not the reproduction (Astuti, 2004).

One of the government's policy to increase the productivity of beef cattle in Indonesia is performed by crossing program. The policy is conducted with crossing the PO cows with

breed of Limousin and Simental (*Bos taurus*). Crosses with utilize only the heterosis can improve the production characteristics, but not the reproduction. While in Indonesia the reproductive performance are still relatively low due to lack of the farmer knowledge about the problems of reproduction and also many of PO cows is crossed with Limousin and Simental that maintained in the society. Based on the facts above came the idea that the presence of crossing will causes the joined traits between two crossed breed, especially the traits of production and adaptability which will affects the reproductive efficiency, so that need the evaluation of the reproductive efficiency of the various beef cattle breeds. Therefore, this study is expected to provide an overview the reproductive efficiency on PO cows, Limousin and Simental crossbred in sub district Panji and Kapongan of Situbondo district.

## MATERIALS AND METHODS

Research was conducted in sub district Panji and Kapongan of Situbondo district. Materials used in this research were 112 heads of filial ongole (PO) cows, 118 heads of Limousin crossbred cows and 113 heads of Simental crossbred cows at the third and fourth parity condition which were resulted by artificial insemination (AI) and has a record reproduction such as AI card acceptor.

### Research Methods

The method used in this research was case study method. The data were taken from primary and secondary data. Primary data were obtained from interviews to farmers and inseminator by using questionnaires directly, while the secondary data were obtained by taking the data from the recording of reproduction (AI card acceptor) Department of Animal Husbandry Regional Level II.

### Research Variables

The research variables observed were the reproductive performans of PO cows, Limousin and Simental crossbred cows including Conception Rate (CR), Service per Conception (S/C,) Days Open (DO), and Calving Interval (CI).

### Data Analysis

The data obtained were tabulated and analyzed descriptively. The fertility index (FI) was calculated according to Brand de Kruif (1975), quoted by Matheij (1982) by the formula:

$$\begin{aligned} \text{FI} &= \frac{\% \text{ of pregnancy after first AI} - (\text{DO} - 125)}{\text{The number of insemination per conception}} \\ &= \frac{\text{CR} - (\text{DO} - 125)}{\text{S/C}} \end{aligned}$$

The number of CR, S/C, DO and CI were valculated by the formula below:

$$\text{CR} = \frac{\text{The number of pregnant cows at the first AI}}{\text{The number of all cows inseminated}} \times 100\%$$

$$\text{S/C} = \frac{\text{The number of cows inseminated until pregnant}}{\text{The number of pregnant cows}}$$

DO = the interval between partus or the period between partus until pregnancy (when the next estrous cycle after breeding the estrous did not appear, then the cows was declared as a pregnant cow)

CI = the period between partus and the the next partus or previous

## RESULTS AND DISCUSSION

Service per Conception (S/C) of PO cows, Limousin dan Simmental crossbred cows  
 S/C is the amount of insemination needed by cows to causes the pregnancy (Gebeyehu, Asmarew, and Asseged, 2000). The average value of the S/C were shown in Table 1.

**Table 1.** The mean value of S/C of PO, Limousin and Simmental crossbred cows

No	Breed	N	P 3	P 4	Mean±SD
1	PO	112	1.42±0.58	1.41±0.59	1.42±0.01
2	Limousin crossbred	118	1.39±0.51	1.37±0.58	1.38±0.01
3	Simmental crossbred	103	1.40±0.58	1.46±0.59	1.43±0.04
	Mean±SD		1.40±0.01	1.41±0.03	1.41±0.03

Note: P3 = third parity  
 P4 = fourth parity

Table 1 showed the value of the S/C in the category of ideal, this because the cows were showed the visible signs of estrous when inseminated. According to Gebeyehu et al. (2000) reveals that the range of the S/C value normally is ranges between 1.62, then it will have a range of DO about 60 to 90 days to keep the CI in about 365of days. According to corah and Lusby (2007) the calves weaning should be at the age of 90 days. Astuti (2004); Aryogi, Arasyd, and Mariono (2006) mention that the value of S/C from the smallest to the biggest is about 2.9 and 2.23 in PO cows respectively. Limousin and Simental crossbred cows in Indonesia had almost the same value of S/C with the PO cows, because Limousin and Simental crossbred cows was the resulted of crossbreeding with PO cows that has been adapted to the environmental conditions in Indonesia.

### **Conception Rate (CR) of PO cows, Limousin and Simmental crossbred cows**

Table 2 showed the average value of CR amounted to 63.72% at the third parity and 64.38% at the fourth parity. The CR value was within the normal ranges when compared to Touchberry opinion (2003) that the CR value is 60% to maintain the calving interval remains of 365 days. Therefore, it was suggested to keep the DO average time of 90 days. Although the value of CR in the observation was still in the normal category, but the CI value was long namely more than 365 days.

**Table 2.** the mean value of CR of PO cows, Limousin and simmental crossbred cows

No	Breed	N	P3 (%)	P4 (%)	Mean (%)
1	PO	112	64.28	65.17	64.37
2	Limousin crossbred	118	61.86	67.79	64.83
3	Simmental crossbred	103	65.04	60.19	62.62
	Mean (%)		63.73	64.38	64.06

Note: P3 = third parity  
 P4 = fourth parity

The best CR value at fourth parity was found 67.79% on Simmental crossbred cows, while at the third parity 3 the best CR value was 65.04% on PO cows. It was described that Simental crossbred cows at fourth parity and PO cows at third parity has a good characteristics of estrous signs which can be seen from the card acceptor, thus the farmer can detected the estrous cows easily. According to Bormann, Totir, Kachman (2006) the capabilities of cows for pregnant cows at the first insemination were strongly depended on the environmental variation. Moreover, feed

nutrients received by cows before and after birth also affected the CR value, because the deficiency of nutrients before partus causes the delayed estrous cycle.

**Days Open (DO) of PO cows, Limousin and Simmental crossbred cows.**

The average value of the DO were  $117.54 \pm 6.72$  days at third parity and  $118.95 \pm 4.31$  days at fourth parity. This value showed that DO long in the research location was still not efficient, because according to Smith (2002), the average time of partus to pregnant on cows is about 60-90 days. More DO long showed the reproductive efficiency was low and it would not be profitable to farmer. DO is an indicator of the reproductive efficiency of livestock. Inefficient DO at research location was caused by cows insemination at the third or fourth estrous. The average value and the unpaired t-test resulted of DO can be seen in Table 3.

**Table 3.** The mean values of DO of PO cows, Limousin and Simmental crossbred cows

No	Breeds	amount (n)	Parity 3	Parity 4
1	PO cows	112	125.28±24.20a	123.94±21.49a
2	Limousin crossbred	118	114.24±16.31b	116.46±20.54b
3	Simmental crossbred	103	113.10±19.05b	112.77±16.11b
	Mean±SD		117.54±6.72	118.95±4.31

Note: the superscripts (a,b) on the same column showed the significant differences (P<0.05).

DO value of Limousin and Simmental crossbred were shorter than PO cows. This data showed that breed of *Bos taurus* and *bos indicus* cattle have a different DO value. *Bos taurus* cattle in the studied area was derived from PO cows which were inseminated with straw of Limousin and Simmental cattles. It causes the Limousin and Simmental crossbred cows can adapt well in the studied location. Based on opinion of Astuti (2004) heterosis and environmental interactions are very important, therefore the cross of certain breeds that suitable in one environment is not necessarily suited to other environments. Jordan (2003) mention that heat stress on the environment will affect the estrous, so that will affect both the DO and CI. DO value on Limousin and Simmental crossbred cows were better than the PO cows, it proved that the estrous signs on Limousin and Simmental crossbred were good so the farmers could detect estrous easily Hafez (2000) reveals that DO can be minimized by thus increasing the efficiency of estrus detection, by mating cows between 55-85 days after partus. Some estrous cows can be detected by observing for two times a week and by using the tools of detection and periodiks table.

**Calving Interval (CI) of PO cows, Limousin and Simmental crossbred cows**

The average of CI value were more than one year which were not efficient. This happened because the interval of partus until conception back was too long. According to Winugroho (2002) longer calving interval is the problem of inefficiency productivity of beef cattle in Indonesia.

**Table 4.** The mean values of CI of PO cows, Limousin and Simmental crossbred cows

No	Breeds	N	Third parity	Fourth parity
1	PO cows	112	411.06±24.05a	409.54±22.02a
2	Limousin crossbred	118	399.79±16.51b	402.44±21.17b
3	Simmental crossbred	103	398.30±18.85b	398,56±16.56b
	Mean±SD		403.04±6.97	403.49±5.60

Note: the superscripts (a,b) on the same column showed the significant differences (P<0.05).

The Limousin and Simmental crossbred cows has a shorter CI than PO cows. This because

the farmer were waited the body of cows return to normal before mated, meanwhile the Limousin and Simmental crossbred cows were faster in the recovery of the body after partus compared to PO cows with a good feeding management. With the rapid recovery of the body after partus, the DO long will become shorter thus also affect the CI. According to Smith (2002) reveals that the average of Days Open is the overall indicator of an efficient reproductive status. If the DO value is 60-90 days, the CI value can be achieved in under 365 days.

#### **Fertility index of PO cows, Limousin and Simmental crossbred cows**

Based on Table 5 it can be seen that the fertility of Simmental crossbred cows were better than the Limousin crossbred cows and PO cows at the third parity, while at the fourth parity, the Limousin crossbred cows have a better fertility compared to Simmental crossbred and PO cows. The value of the highest fertility was still lower than the status value of normal fertility. Mattheij (1982) reveals that the status value of normal fertility is 60. The difference fertility status value of those breeds cattle were caused by the varians of S/C, CR and DO value.

**Table 5.** The mean of fertility index of PO cows, Limousin and Simmental crossbred cows

No	Breed	N	P3	P4
1	PO cows	112	45.27	47.21
2	Limousin crossbred	118	55.37	58.48
3	Simmental crossbred	103	58.42	53.22
Mean±SD			53.02±6.88	52.97±5.63

Note: P3 = third parity  
 P4 = fourth parity

The fertility value on PO cows, Limousin and Simmental crossbred cow were lower than normal rate (60). Meanwhile the value of S/C and CR in the study location were in the ideal category. The low of fertility value showed that the management of cows reproduction on the research location was not efficient.

## **CONCLUSIONS AND SUGGESTIONS**

### **Conclusion**

In the research location, Limousin and Simental crossbred cows have more efficient reproduction than PO cows.

### **Suggestion**

1. in maintenance of Limousin and Simental crossbred cows, the farmers suggested to improve the feed quality when the cows are 8 months pregnant until the calves stop nursing to speed up the recovery of the body after partus, because the both types of cows are less adaptive to feed poor.
2. in order to shorted the CI time, the farmers are advised to mated the cows during the second estrous and do not wait the calfs weaned in advances.

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