Reproduction Performance of Ongole Grade Cows and Its Crossbreds in Pacitan Regency, East Java Province, Indonesia

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Abstract. This study aimed to determine the reproduction performance of Ongole grade cows and its crossbreds in Pacitan district, East Java province, Indonesia including the age of first mating (AFM), the age of first calving (AFC), service per conception (S/C), postpartum oestrus (PPO), postpartum mating (PPM). The research method was a direct research conducted in the field and using survey method with purposive sampling. This research was conducted in 2010 using reproduction data on Ongole grade cows (PO) and its crossbreds. The crossbreds were LimPO (LimousinxPO) and SimPO (SimmentalxPO). During observation, this study used 35 heads of each breed. Data were analyzed descriptively. Reproduction performance analysis result of PO, LimPO, SimPO cows respectively obtained; 1) AFM were 1.86±0.39 years; 1.74±0.25 years; 1.79±0.28 years, 2) AFC were 2.95±0.44 years; 2.73±0.28 years; 2.72±0.29 years, 3) S/C were 1.71±0.87; 1.42±0.56; 1.55±0.66, 4) PPO were 4.14±1.23 months; 4.00±1.09 months; 4.63±1.16 months, 5) PPM were 5.27±1.54 months; 4.42±1.30 months; 4.63±1.57 months.

1. Introduction
Cattles have an important role as a source of meat, milk, and labor. Cattles also have high values, a role in certain religion and traditions, as savings, and as an honor in the society in tropical countries [1]. Beef consumption per capita per year in Indonesia in 2016 was 0.417 where beef production in 2016 was 518,500 tons and in 2017 there were 531,800 tons. The population of beef cattle in Indonesia in 2017 was 16,599,000 head and beef cattle population in East Java Regency was 4,545,780 tails. The increase in beef cattle population in Indonesia is 3.79% [2]. One effort to increase the population is to improve the reproductive performance of cattle. Population increase and livestock production depend on reproductive success, if reproduction is not regulated as well as possible, the production level will be low. Reproduction performance observed included the age of first mating (AFM), the age of first calving (AFC), service per conception (S/C), postpartum oestrus (PPO), and postpartum mating (PPM). Reproduction performance can be used to calculate the estimated livestock population in the future. Pacitan Regency is one of the districts in East Java Province and there are 12 districts. Pacitan Regency is one of the areas in East Java that has begun to develop beef cattle farms and the research on reproduction performance of beef cattle is rarely done. Based on the description above, research on reproduction performance of beef cattle in Pacitan Regency is carried out. The purpose of this study was to obtain information about the reproduction performance of beef cattle in Pacitan Regency, East Java.
2. Materials and Methods

Research has been carried out in Pacitan Regency, East Java Province in 2010 using the survey method by taking samples from a population and using questionnaires as a data collection tool. The sampling method used is purposive random sampling method. The research material used was 134 beef cows. The breeds of beef cattle used in this study were Ongole Grade or Peranakan Ongole (PO) cattle, SimPO (SimmentalxPO) cattle, LimPO (LimousinenxPO) cattle and PO cattle in the community farms in Pacitan. The cows have given birth at least once. The data taken included the age of first calving (AFC), the age of first mating (AFM), service per conception (S/C), postpartum oestrus (PPO), and postpartum mating (PPM). Data were analyzed descriptively by calculating the mean and standard deviation.

3. Results and Discussions

Reproduction performances included AFC, AFM, S/C, PPO, and PPM of PO cattle, LimPO cattle, and SimPO cattle in Pacitan Regency, East Java Province can be seen in Table 1.

Table 1. Reproduction Performance of Ongole Grade Cows (PO cattle) and Its Crossbreds (LimPO cattle and SimPO cattle) in Pacitan Regency, East Java Province

|                              | PO Cattle | LimPO Cattle | SimPO Cattle |
|------------------------------|-----------|--------------|--------------|
| Age first mating/AFM (years) | 1.86±0.39 | 1.74±0.25    | 1.79±0.28    |
| Age first calving/AFC (years)| 2.95±0.44 | 2.73±0.28    | 2.72±0.29    |
| S/C (times)                  | 1.71±0.87 | 1.42±0.56    | 1.55±0.66    |
| PPO (months)                 | 4.14±1.23 | 4.00±1.09    | 4.63±1.16    |
| PPM (months)                 | 5.27±1.54 | 4.42±1.30    | 4.63±1.57    |

3.1 Age of First Mating (AFM)

The overall mean for AFM in PO, LimPO, and SimPO cattle were 1.86±0.39, 1.74±0.25, dan 1.79±0.28 years of age, respectively. AFM in our study was in conformity with AFM reported by [3] that AFM of PO cattle was 22-28 months or 1.83-2.33 years of age. This result was lower than the result of [4] that the AFM in Bali cattle was 23.20±0.28 months or 1.93 years of age and higher than dairy cattle was 1.43-1.58 years of age [5] and 1.35 years of age [6]. According to [7], AFM in beef cattle is expected at the age of 18-22 months or 1.5-1.83 years. AFM includes from the birth to heifers for the first insemination when the heifers had reached breeding maturity [6].

3.2 Age of First Calving (AFC)

The overall mean for AFC in PO, LimPO, and SimPO cattle respectively 2.95±0.44, 2.73±0.28, and 2.72±0.29 years of age. Our study is higher than [8, 9] which is normal because according to [7] AFC in beef cattle is expected at the age of 27-31 months of age or 2.25-2.58 years of age. AFC in Bali cattle was 1,104.51±23.82 days of age or 3.03 years of age [10]. AFC in crossbred cattle was 1,242.75±16.46 days or 3.40 years of age [8]. AFC in Hereford cattle was 24-38 months or 2.00-3.17 years of age [9]. AFC of beef cows in Hungary was 2.71 years [11]. The optimum age at which beef cattle should first calf is 24 months of age [12]. When AFC below 22 months of age, the incidence of difficult calving becomes higher [5]. Calving too early is often detrimental to performance as the heifers are not physically developed enough and more susceptible to dystocia. Also, a later calving is sometimes proposed for specific breeds or management systems [13]. AFC is influenced by several factors, including the species and breeds of livestock, the age of the livestock, the quality of the feed eaten, the detection of oestrus by the breeder, the season at birth, and the management of the reproduction [7].

3.3 Service per Conception (S/C)
Service per conception (S/C) is one of the traditional historical measures of reproductive efficiency [14]. S/C is a number that shows the number of inseminations to produce pregnancy from a number of artificial insemination services needed by female livestock until pregnancy occurs [15]. S/C is the number of matings needed by all female cattle in a population divided by the number of pregnant cows [7]. The overall mean for S/C in PO, LimPO, and SimPO cattle respectively 1.71±0.87, 1.42±0.56, and 1.55±0.66. S/C in our study was in conformity with S/C reported by [16] that S/C for PO, LimPO, and SimPO cattle were 1.38±0.38, 1.74±0.07 and 1.45±0.20, respectively. The results for S/C of this study were 1-2 and in accordance with those reported by [7, 17] which the number of service per conception should be 1 to 2. S/C in PO cattle is 1.82±0.88 [3], 1.42±0.70 [18], and 1.18±0.39 [19]. S/C of Bali cattle is 1.65±0.87 [10]. If S/C is 3 or more then the cows must be examined for reproduction health. According to [20] S/C is influenced by the accuracy factor to detect oestrus, the condition of the livestock itself, and the accuracy of inseminator in inseminating livestock. A high S/C values are often found in the parent from crossing with superior livestock such as Simmental or Limousine while in PO cattle relatively lower [21]. If S/C is low, the fertility value of the female cow will be higher and if the S/C value is high, the lower the fertility level of the female cows [22]. According to [23], low livestock fertility has a correlation with management, lust detection, IB service time, technicians, and males used. [24] mentioned that along pascapartus anestrus (PPA) is a major cause of low fertility in cattle at the tropic countries.

3.4. Post-Partum Oestrus (PPO)
The overall mean for PPO in PO, LimPO, and SimPO cattle were 4.14±1.23, 4.00±1.09, and 4.63±1.16 months after calving, respectively. PPO of PO cattle in our study was lower than [16] was 6.75±4.68 months after calving. PPO of LimPO and SimPO cattle in our study were higher than [25] report that beef cows which had been observed in Nottingham University were 60 days or 2 months and [16] were 3.93±0.40 and 3.56±0.73 months after calving, respectively. The timing of PPO in cattle varies depending on feed, season, and time of uterus involition [7]. PPO is affected by the condition of the mother after giving birth. Low feed conditions will affect the recovery of the body after childbirth which will also result in inhibition of egg formation [21]. PPO usually occurs 40-50 days after calving [7].

3.5. Post Partum Mating (PPM)
The overall mean for PPM in PO, LimPO, and SimPO cattle were 5.27±1.54, 4.42±1.30, and 4.63±1.57 months after calving, respectively. PPM in our study was higher than PPM reported by [16] that PPM for PO, LimPO, and SimPO cattle were 4.42±1.23; 3.79±0.51, and 3.85±0.70 months after calving, respectively. Postpartum mating can be done since the cows show symptoms of oestrus after calving but there are also those who delay the mating until the next oestrus cycle depends on the cow's condition [7].

4. Conclusions
Based on the results of this study, we can conclude that reproduction performances in Ongole Grade cows and its crossbreeds showed good results.

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