

The Reproductive Performance of Ongole Grade Cows at Smallholder Farmer with Different Housing Systems

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ABSTRACT

Ongole grade (OG) cows are mostly kept at the smallholder farmer level, carried out traditionally - for instance, on the cow's housing system, using individual tie-stall (ITS), or communal tie-stall (CTS) system. The housing system can affect the reproductive performance of the cows. This study aims to determine the better type of housing to be applied at the smallholder farmer level based on reproductive performance. Forty-three OG cows were divided into the ITS (n=20 cows) and CTS (n=23 cows) systems. Post-partum estrus (PPE), post-partum mating (PPM), weaning age (WA), service per conception (S/C), calving interval (CI), and calf crop (CC) as reproductive performance indicator were collected through farmer recording, then were analyzed using the independent sample t-test. The results showed that the type of communal tie-stall was significantly better on S/C, WA, CI, and CC. In conclusion, using a communal tie-stall housing system was better for OG cow's reproductive performance.

Keywords: *Reproductive Performance, Ongole Grade Cattle, Housing System, Smallholder Farmer*

1. INTRODUCTION

The average meat consumption in Indonesia is 2.72 kg/capita/yr and is projected to increase in the next few years along with the increase in population, income, and consumption of animal protein [1]–[3]. This condition requires an increase in livestock productivity to meet the needs of beef in the future. However, the majority of beef cattle breeding is at smallholder farmers. The majority of smallholder farmers are on the island of Java, with the breed of livestock is Ongole Grade (OG) cattle. Ongole Grade cattle have good adaptability to environmental and feed conditions in the territory of Indonesia [4]. Smallholder farmers mostly do maintenance of OG cattle with ownership of 1-5 heads [5]. The purpose of having cattle is as a saving or a side business so that farmers do not focus too much on raising cattle [6], [7]. Maintenance

is carried out with traditional methods with different approaches. Generally, smallholder farmers get knowledge of cattle maintenance from their parents. Older farmers have more experience than younger farmers [8], [9], which makes cattle management from one farmer to another different. Differences in management by breeders affect the reproductive performance of cattle [8], [10].

Differences in cattle maintenance can be seen in feeding, caring, and housing. The type of housing used in smallholder farmers is usually a group or individual system, with the cattle being tied all the time. The housing with a group system will make it easier for farmers to observe their cattle. In addition, cattle also have access to interact with other cattle. This condition will affect the reproductive performance of the cattle. In addition, smallholder farmers generally do not raise bulls,

whereas research [11] states that the presence of bulls can make cows express better sexual behavior, which certainly can improve the reproductive performance of cows. Reproductive performance can be seen from S/C, PPE, calving interval (CI), and calf crops [12], [13]. A good CI is around 12 months so that farmers can get a calf every year. However, this condition is still difficult to achieve with the traditional farming system. This research was conducted to determine the most appropriate type of housing at the farmer level to obtain better reproductive performance. Thus, it can be used to recommend a better housing system for smallholder farmers.

2. MATERIAL AND METHODS

This study used 43 OG cows that have calved at least once in a farmer group in Sleman Regency, Yogyakarta. Twenty OG cows were kept in individual tie-stall (ITS) or communal tie-stall (CTS) housing systems. Cows were mated using artificial insemination. The feed given to the cows was forage from the local area. Cows' productivity data was obtained from the recording results, including PPE, PPM, weaning age, S/C. The CI and calf crop (CC) were calculated using the formula:

Data on PPE, PPM, weaning age, S/C, CI, and CC were analyzed using the independent sample T-Test.

3. RESULTS AND DISCUSSION

The result of this research is described in Table 1.

Table 1. Ongole grade cow productivity

Parameters	Housing	
	ITS	CTS
Weaning age (month)	7.10 ± 1.80 ^a	4.43 ± 0.99 ^b
PPE (month) ^{ns}	4.15 ± 1.50	3.70 ± 1.02
PPM (month) ^{ns}	5.10 ± 1.45	5.48 ± 1.34
S/C (times)	4.95 ± 4.66 ^a	1.74 ± 0.96 ^b
CI (month)	17.02 ± 3.16 ^a	15.45 ± 1.60 ^b
CC (%)	72.37 ± 10.96 ^a	78.52 ± 8.72 ^b

^{a,b} Different superscripts denote significant differences between rows (P<0.05).

^{ns} Non-significant

Ongole grade cows in ITS and CTS housing systems showed significant differences in weaning age (P<0.05). The preference of the farmers influences weaning age. In the ITS system, farmers give the calf a longer time with its mother because it is still suckling. Meanwhile, the cattle in CTS, the farmers weaned the calf after the calf had an excellent performance. In addition, farmers also have better communication between farmers to exchange ideas about the best cow productivity. The weaning age of calves in ITS is still higher than the study [4] in

Kebumen, with a weaning age of 5.96±2.90 months. Faster weaning can increase the reproductive efficiency of the cows [14].

Weaning affects the longer ovulation time in the cows. Ovulation can occur 15-30 days after calving, but cows do not show estrus behavior [15]. In lactating cows, there is the production of the hormone prolactin, which affects the regulation of estrogen and progesterone to the hypothalamus. The estrogen plays a vital role in the estrus phase, with the appearance of visual signs of estrus [16]. The cows' PPE in the ITS and CTS system did not significantly differ (P>0.05). The study results [17] on OG cows showed no difference (3.45 months).

The results on cows' PPM between ITS and CTS system did not show significant differences. These results are longer than the results of the study [18], which is 4.33±0.38 months. Differences in PPM can be affected by the ability of estrus detection and delay in mating because the calf is still suckling. Farmers in this research chose not to mate their cows after the first sign of estrus appeared but to mate in the subsequent estrus, making the PPM longer.

There is a significant difference in the number of S/C in the ITS and CTS system. Ongole grade cows in Pacitan have an average of S/C of 1.71±0.87 times [19]. The S/C number in the CTS system ranged from 1 to 5 times, while the ITS system varied from 1 to 19 times. This condition is economically unfavorable for smallholder farmers, and the problematic cow should have been culled. However, farmers were happy with their cows and did not want to change them with other cows. Farmers use cow waste as fertilizer. It was speculated that the factors affecting the high S/C rate in the ITS system were the lack of communication between farmers, the cows experiencing silent heat, and the frequency of farmers to the farm. In the CTS system, farmers can observe each other cows and see cows in estrus. Farmers will notify cow owners when cattle are in estrus so that mating can be carried out on time and reduce the possibility of repeated mating. One of the factors that influence the high rate of repeated mating and S/C is the ability of farmers to detect estrus [11].

The calving interval for OG cows is 15.63 months [20]. The calving interval was affected by PPE, PPM, S/C, age at first mating, mating management [21][22]. This study showed that there were significant differences between the cows in the ITS and CTS system. Individual tie-stall housing systems have longer CI due to high S/C numbers. Longer calving intervals indicate lower reproductive efficiency [23].

The longer CI is the result of the high incidence of postpartum anestrus and high S/C rate. Calving interval affects the reproductive performance of the cows in one year [24]. The CC in the CTS system was significantly

higher than in the ITS system. The study results were still lower than the study [25] in OG cattle, 82.61%.

4. CONCLUSION

In conclusion, the maintenance of OG cows in a communal tie-stall housing system is better than the individual tie-stall housing system. This result can be a recommendation for cattle breeding development at smallholder farmers.

AUTHORS' CONTRIBUTIONS

BWP was doing research in the field. EB prepared a research proposal, was responsible for laboratory tests and was involved in data analysis, results, and discussion. SB, HM, and BAA was involved in data analysis, results, and discussion.

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