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Comparing Response of Estrus Synchronization in the Heifers and Cows on Estrus Initial, Duration of Estrus and Pregnancy Rate Bali Cattle

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Abstract | The objective of this study was to evaluate on the estrus initial, duration of estrus and pregnancy rate following of prostaglandin F_2 alpha injection in heifers and cows. A total of 60 Bali cows were divided into two group, first group was contain 30 heifers and second group comprise 30 cows. The weight of cows were 300 ± 6.87 and 365 ± 8.14 kg, aged approximately 2 years and 3-6 years for heifers and cows, respectively. All the heifers and cows were normal cycling with showing regular cyclic activities and having active of corpus luteum. The parameters in this study was determine including the time required for onset of estrus, duration of estrus and pregnancy rate. The result showed that percentage estrus response, duration of estrus and pregnancy rate were non significant difference ($P > 0.05$) between heifers and bali cows after estrus synchronization with single dose of prostaglandin $F_2\alpha$. It was concluded that injection of PGF 2α on heifers and bali cows was similar result on the time required for onset of estrus, duration of estrus and pregnancy rate.

Keywords | Cows and heifers, Prostaglandin $F_2\alpha$, Estrus synchronization, Duration of estrus, Pregnancy rate.

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INTRODUCTION

Bali cattle cow is a type of local breed cow that is potential for the development of cattle population in Indonesia. One of the essential factor for improve reproductive performance in both heifers and cows is estrus synchronization to be continue artificial insemination (AI) program. Successful management of replacement on cows is necessary to ensure their continued long-term reproductive performance, which provides a reduce input costs and ultimately enhance production efficiency. Mousel et al. (2012) revealed that there are several reports indicate that it takes five years or five calves to recover these development costs. Furthermore, Roberts et al. (2015) stated that reproductive management of heifers a sole challenge in managing a beef industry because this cluster of females typically experiences the highest of reproductive failure. Therefore, estrus synchronization is tool for reduce the problem.

In order to increase the efficiency of reproductive of local breeds like bali cattle, estrus synchronization one of methods to improved (Malik et al., 2013). Estrus synchronization is a management practice that can help beef producers increase production efficiency and economic returns in the relative minimum possible time. Estrus synchronization then proceed with an artificial insemination (AI) program will be able to shorten the calving intervals on cattle as well as to get more uniform calf crop. Additionally, estrus synchronization in cattle assists the practice of the on time AI (Kasimanickam et al., 2009).

There are various procedures can be used for synchronization of estrus in cows. One of the technique application of estrus synchronization is use of Prostaglandin $F_2\alpha$ (De Arajo Berber et al., 2002; Neglia et al., 2003; Holm et al., 2008). The most commonly used method of estrus synchronization of lust is to use PGF 2α which serves to regulate the corpus luteum (Jainudeen et al., 2000). Hormone

PGF₂α reasons lysis of the corpus luteum (CL) in the ovary starting from 5 until 17 d of the estrus cycle, and can be used to synchronize any female's estrus cycle from day 7 onwards (Wright and Malmo, 1992). The injection of prostaglandin F₂α to make estrus is unpredictable time, but normally varies since 2 to 5 days in heifers or conditional on the phase of the follicular wave at the time of treatment (Kastelic et al., 1991; Wenzel, 1997; Macmillan et al., 2003).

The use of prostaglandin F₂α to estrus synchronization on the cows has been widely reported the results but how use of injection PGF₂α in heifers on Bali cattle breed. It is hypothesized that induction of estrus following of prostaglandin F₂α injection would improve efficiency reproduction in cows and heifers. The objective of this study was to comparing response of estrus synchroninize in the heifers and cows on estrus initial, duration of estrus and pregnancy rate Bali cattle

MATERIAL AND METHODS

ANIMALS

Location of the present study was conducted at district of kuala kapuas Province Central Kalimantan, Indonesia. A total of 60 local breed Bali cows were used for the present study. All the cows were divided into two groups, each group was contain of the 30 heifers and 30 cows. The average body weights were 300±6.98kg and 365±8.14 kg, aged of 18 months to 2 years and 3-6 years for heifers and cows cattle, respectively. All the cows were of standard cycling with performance regular cyclic activities and having active of ovari. The average body value of cows between 5-6 on a scale of 1 to 9. Rating the body condition is done in a subjectively given to cows to describe overall condition including fat cover and flesh over the ribs, loin and tail head adopted by Roche et al. (2009). Status of reproduction in all cows non-pregnant was confirmed based on recording of farm and palpation of rectal. The cows are placed in cages and graze on similar grasses. The addition feed of cows was given rice bran approximately 2kg/day/head, and raised under a similar grazing system (various kinds of grass).

EXPERIMENTAL DESIGN

All cows non pregnant in group one and two were injected prostaglandin F₂α with 25 mg Dinoprost® (Glandins, Tad Pharmazeutisches werk GmbH, West Germany) intramuscularly (i.m). The second injections of prostaglandin F₂α in group one and two was given at 11 days after the first injection with same of dosage and method.

ESTRUS DETECTION

The local breed balicows and heifers were detected in the paddocks after first and second injection of prostaglandin

F₂α. All cows were observed continuously for discharge of vaginal mucus and standing to be mounted by another cow was taken as an indication estrus, and number of mounts performed at least 2-3 mounts (Malik et al., 2012).

The average time required for onset of estrus was described after first or second prostaglandin F₂α injection. While, the average duration of estrus starting from estrus response until finish of estrus shown in the cows. All cows that have been synchronized, then AI by an officer insemination with frozen semen bali cattle found from central of AI (Banjarbaru, South Kalimantan-Indonesia) approximately 72 hours after a second injection (17). The percentages of pregnancy rate was showed by palpation of rectal around 60 days after insemination.

STATISTICAL ANALYSIS

The quantities of local breed bali cows and heifers that exhibited estrus after injected of PGF₂α, percentage of pregnancy rates were evaluated use Chi-square analyses and Frequency Procedure of SAS software version. 9.1.3 (SAS, 2006).

RESULTS

Based on the results of current study the average time required for onset of estrus in local breed bali cows and heifers following the first and second injections were 61.25 ± 4.92 (cows) and 62.65 ± 3.24 (heifers), respectively (Table 1). The average time required for onset of estrus later first and second injection were non significantly different (P>0.05) among local breed bali heifers and cows. Furthermore, the average duration of estrus in cows and heifers after first and second prostaglandin F₂α injection were non significantly different (P>0.05) between Bali cows and heifers (Table 2). Whereas, the percentage of pregnancy rates results are summarised in Figure 1. No significant differences (P>0.05) could be demonstrated in pregnancy rates between the Bali cows and heifers. However, there was tendency for cows on pregnancy rate to be higher 23/30 (76.6%) when compared to heifers 21/30 (70%).

DISCUSSIONS

The results of this study indicated that the average time required for onset of estrus after first PGF₂α injection in local breed bali cows was no significantly as compared to heifers see Table 1. The present results strengthened finding reported by Patil and Pawshe (2011). Furthermore, the average time required of estrus after second injection prostaglandin F₂α in local breed bali cows was also no significantly with compared to heifers. On the other hand, Berardinelli and Adair (1989) revealed that the effect of

Table 1: The average time required for onset of estrus in cows and heifers after first Prostaglandin F2 α injection.

Injection	Response	Estrus Proportional	%	Time required of estrus (h)
First (heifers)	Estrus	16/30	53.33	62.65 \pm 3.24
	Non estrus	14/30	46.44	
Second (heifers)	Estrus	30/30	100	63.65 \pm 3.24
	Non estrus	0	0	
First (cows)	Estrus	17/30	56.66	61.25 \pm 4.92
	Non estrus	13/30	43.33	
Second (heifers)	Estrus	30/30	100	62.15 \pm 4.92
	Non estrus	0	0	

Table 2: The average duration of estrus in cows and heifers after first and second Prostaglandin F2 α injection.

Injection	Estrus Proportional	%	Duration of estrus (h)
First (heifers)	16/30	53.33	17.60 \pm 2.84
Second (heifers)	30/30	100	18.01 \pm 4.12
First (cows)	17/30	56.66	19.14 \pm 2.52
Second (heifers)	30/30	100	20.10 \pm 1.04

prostaglandin F2 alpha varies depending upon the stage of the luteal phase at the time of injection. When prostaglandin F2 α is given through the mid between 10 to 14d and late 15 to 19d phase of luteal estrus synchrony is increased. This is due to increasing sensitivity of the corpus luteum (CL) to prostaglandin F2 α as the CL matures. while, in the later days of the luteal phase, endogenous prostaglandin F2 α from the uterus, which begins to produce prostaglandin F2 α on d 15 may augment the exogenous dose of PGF2 α (Shemesh and Hansel, 1975).

One of parameter in the present study is duration of estrus. The average duration of estrus recorded in the local breed bali cows and heifers after first prostaglandin F2 alpha injection was 19,14 \pm 2,52h and 17,60 \pm 2,84h, respectively (Table 2). The duration of synchronization estrus in bali cows was higher than bali heifers. However, there was no significant difference in cows and heifer for duration of estrus. The length of estrus recorded in the present studies was almost the same with result of studies by Pawshe (1990) that the length of synchronized estrus was 18.25 \pm 0.4h. Furthermore, Orihuea et al. (1983) verified 15.4 \pm 4.9h in cows synchronized with PGF2 α injection. Further, Wettemann et al.(1998) repoted that dutarion of estrus in beef cows during the summer ranging from 2-19h with average 10.8 \pm 5.6 h.

The pregnancy rates in the present studies, percentage of pregnancy rate bali cows after prostaglandin F2 α injection was higher than heifers. However, there was no significant difference between cows and heifers for pregnancy rate. The results of estrus synchronization in the present study were strengthened finding reported by Malik et al. (2013) and Nirwan et al. (2015) that the pregnancy rate after second prostaglandin F2 α injection in Bali cows and Aceh Cattle were 77.41% and 80%, respectively.

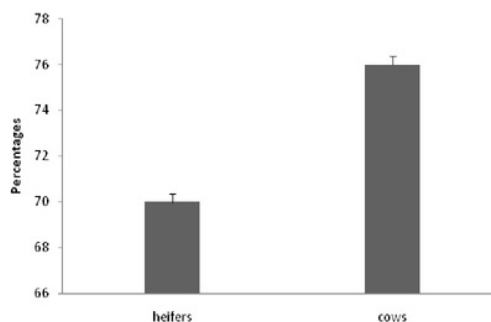


Figure 1: The pregnancy rate in cows and heifers after injection of prostaglandin F2 α

CONCLUSION

Based on the results in this study, it may be concluded that induction of estrus and pregnancy rate following single dose of prostaglandin F2 α injection resulted in similar results of estrus response, duration of estrus and pregnancy rates in bali cows and heifers.

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AUTHORS CONTRIBUTION

Abd Malik and Hepy S in the experiment wrote the manuscript and supervisor in the field. M. Syarif Djaya and Neni Widaningsih carried out the statistical analysis.

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