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THE EFFECT OF PLACENTA EXPULSION TIME AND POSTPARTUM INTERVAL TO FIRST ESTRUS ON DAYS OPEN OF ONGOLE CROSS COWS

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Abstract

The research was conducted in Breeding Centre and Artificial Insemination Development (BCAID) of Beef Cattlein Ciamison 30 first partum of Ongole Cross Cows (OCC) that had previously been artificially inseminated. The research was aimed to obtain a reproductive recommendation of the effect of placenta expulsion time and postpartum interval to first estrus on the days open formulation. The parameters observed were the placenta expulsion time, postpartum interval to first estrus, and days open. Data were analyzed by path analysis. The results indicated that placenta expulsion time and postpartum interval to first estrus, simultaneously, had no significant effect on the days open. However, partially, postpartum interval to first estrus had a significant effect (P <0.05) on the days open with the effect of 13.675 percent.

Key words: placenta, estrus, days open, Ongole Cross, Cow

INTRODUCTION

Days open is the time interval between partum and the next pregnancy [10, 15]. Days open is an indicator of the reproduction efficiency of a livestock. A long period of days open indicates that cattle reproduction is less efficient and cause significant loss to the breeder as it reduces income. Susilawati and Affandy (2004) stated that the length of calving interval is mostly due to a long days open. This could be caused by: (1) the calve has not weaned yet which resulted in no symptoms of postpartum interval to first estrus; (2) delayed mating; (3) un success artificial insemination that resulted in higher service per conception.

Days open affected by many factors, which are placenta retention, uterine infection, and ovarian cysts [5, 12]. Han and Kim (2005) stated that placenta retention may decrease fertility in two ways: (1) through direct influence with unknown mechanisms and (2) indirect effects through endometritis. Retention of placenta causes uterine infection, there for it takes time to heal and ready for the next pregnancy [11]. Placenta retention that has not immediately treated could reduce fertility of the herd, because the days open becomes longer.

The interval time between the calving and postpartum interval to first estrus is called the postpartum anestrus period (PAP). PAP is a condition that occurs after a parturition where the herd fails to show the signs of estrus and ovulation [6]. PAP is associated with an inactive ovary, no follicular development and no adult follicles to be ovulated [17]. PAP is influenced by many factors, including age, breed, extended of uterine involution, maternal health status, nutrition and suckling [1].

Indonesia has many local beef cattle; one of them is Ongole Cross Breed (OCB). The OCB are widespread and the largest part of the population is found in Java, especially in East Java. OCB is a local breed from a success grading up program since 1930 from Ongole bull and local Java cow [4]. OCB cow have several advantages, these are: (1) adaptable to different environments, there for

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it could reared easily (2) powerful, so it could utilized as a drought cattle, (3) their reproduction cycle could easily recover after calving, (4) The bull has a good libido as well as the semen quality, (5) easy to resell, as it meat is preferred by consumer, (6) having higher live weight compared to other local Indonesian cattle.

Several studies have been done to find out the reproductive performance of Ongole Cross cows and their crosses [2, 13, 18]. This study aims to determine the effect of reproductive performance placenta expulsion time and postpartum interval to first estrus onthe days open in Ongole Cross cows.

MATERIAL AND METHODS

The research was conducted on 30 Ongole Cross Cows that have been had first calving, which intensively reared in BCAID of Beef Cattle in Ciamis. The cows were artificially inseminated with Ongole bull. Parameters observed included the placenta expulsion time, postpartum interval to first estrus and days open. Furthermore, to know the effect of placenta expulsion time and postpartum interval to first estrus on days open formulation it then analyzed by Path Analysis [19]. For computation used SPSS 16 program, path coefficient obtained from Standardized Coefficients β, direct effect calculated from $(PYXi)^2$.100% and indirect effect is calculated from Pyxi.Pyxj.rxixj.100%

RESULTS AND DISCUSSION

Performance of Postpartum Reproduction

The postpartum performance of Ongole Cross cows that were observed in this research are presented in table 1.

Table 1 Placenta expulsion time, postpartum interval to first estrus and days open of ongole cross cows

No.	Statistic parameters	Placenta expulsion time(hour)	Postpartum interval to first estrus (day)	Days open (day)
1	Mean	3.60	104.10	168.40
2	Standard deviation	0.86	45.79	77.80
3	Coefficient variation	23.75	43.98	46.20
4	Minimum	3.00	30.00	42.00
5	Maximum	6.00	189.00	410.00

Placenta expulsion in this research was rapid and normal; the average time was 3.60 ± 0.86 hours. Ismudiono et al. (2010) suggested that placenta expulsion of normal beef cattle is about 1 - 8 hours, whereas Jainudeen and Hafez (2000) state that in normal conditions the duration of placenta expulsion time in cattle is 6-12 hours, if more than 12 hours it is said as placenta retention. Postpartum interval to first estrus takes a long time, on average 104.10 ± 45.79 days. Postpartum interval to first estrus should be less than 60 days in order to reach the ideal calving interval of 12 months [9]. The days open observed in this research was 168.40 ± 77.80 days. According to Ahmadzadeh et al. (2011), a good days open is 80-85 days to obtain a 12 month of calving interval.

The Simultaneous Effect of Placenta Expulsion Time and Postpartum Interval to First Estruson the Days Open

The results of the analysis to determine simultaneously effect of placenta expulsion time and postpartum interval to first estrus on the days open is shown in the Model Summary in Table 2

Table 2 The simultaneous effect of placenta expulsion time and postpartum interval to first estrus on the days open

Model Summary

Model	R	R square	Adjusted R square	Std. Error of the estimate
1	.378[a]	.143	.079	74.65173

Predictors: (Constant), placenta expulsion, postpartum first estrous

The R square number (r^2) of the model summary is 0.143, can be used to determine the magnitude of simultaneously effect of placenta expulsion time and on the days open by calculating the coefficient of determination (KD) using KD = r^2.100% [19], resulting of 14.3 percent. It means that, the variability in the days open which can be explained by using the variable of placenta expulsion time and the postpartum interval to first estrus is 14.3 percent, while the rest of 85.7 percent is caused by other variables outside the model. The results of this research indicate that the small contribution of placenta expulsion time and postpartum interval to first estrus on days open. The other indicate that there are many other factors that affect the days open.

The results of analysis to find out simultaneously effect of placenta expulsion time and postpartum interval to first estruson days open presented in table 3.

Table 3 Analysis of variant (ANOVA) simultaneously effect of placenta expulsion time and postpartum interval to first estrus on the days open

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	25067.416	2	12533.708	2.249	.125[a]
	Residual	150467.784	27	5572.881		
	Total	175535.200	29			
a. Predictors: (Constant), Placenta expulsion time, postpartum interval to first estrus						
b. Dependent Variable: Days open						

The result of Variant Analysis (ANOVA) is used to find out the effect of placenta expulsion time and postpartum interval to first estruson the days open simultaneously, shown in table 3. It appears that the value of the signification number P (Sig.) > 0,05. This means that simultaneously there is no significant effect of the placenta expulsion time and the postpartum interval to first estruson days open. Variations in the days open are more influenced by the other factors than the placenta expulsion time and postpartum interval to first estrus. Some factors that affect days opens are suckling, first mated after calving, service per conception and age at first mated [21] placenta retention, uterine infection, ovarian cyst [5], endometritis [12].

Partial effect of placenta expulsion time and postpartum interval to first estrus on days open

The result of data processing with Path Analysis to determine the partial effect of the placenta expulsion time and postpartum interval to first estruson days open is presented in table 4.

Table 4 Partial effects of placenta expulsion time and postpartum interval to first estrus on days open

Model	Standardized coefficients	t	Sig.
	Beta (β)		
Constant		2.006	.055
Placenta expulsion time (X_1)	-.091	-.509	.615
Postpartum interval to first estrus (X_2)	.373	2.089	.046

a. Dependent variable: Days open

Based on the result of t test in Table 4, it can be seen that the effect of the placenta expulsion time on the days open can be known by comparing the significance level (Sig.) of the research with Sig. 0.05, the result shows that Sig. research 0.615> 0.05.The number P> 0.05, it means that there is no effect of placenta expulsion time on the days open. This is because the duration of placenta expulsion time in this researches normal and fast at 3.60 ± 0.86 hours, there for variability in days open is not caused by placenta

expulsion time. Placenta expulsion time affects the days open in a condition when placenta retention occurred, that is when placenta did failure within 12-24 hours after calving [7]. Gunay et. al., (2011) recorded that 46 percent of cows with placenta retention suffered from endometritis, that leads to a longer days open.

The effect of postpartum interval to first estrus on the days open based on table 4. This research shows that Sig. research 0.046 <0.05. It means that there is a significant effect of the postpartum interval to first estrus on days open. It is suggested that the variability in the days openis due to the variability in the postpartum interval to first estrus. Some reasons of an estrus after calving are inactive ovaries, follicular development failure, and none of the growing follicles become mature enough to ovulate, silent heat, ovarian cyst, malfunctioning ovaries and corpus luteum persistent, due to hormonal disorders [1, 17]. Ergene (2012) recommends the application of Gonadotropin Releasing Hormone (GnRH) and Prostaglandin $F_{2\alpha}$($PGF_{2\alpha}$) effectively accelerate the postpartum interval to first estrus.

Direct, indirect and total effect of placenta expulsion time and postpartum interval to first estrus on the days open

The results of the correlation analysis between the placenta expulsion time and the postpartum interval to first estrus were presented in table 5.

Table 5 Results of correlation analysis between the placenta expulsion time with the postpartum interval to first estrus

Character		Placenta expulsion time	Postpartum interval to first estrus
Placenta expulsion time	Pearson correlation	1	0.070
	Sig. (2-tailed)		0.715
	N	30	30
Postpartum interval to first estrus	Pearson Correlation	0.070	1
	Sig. (2-tailed)	0.715	
	N	30	30

The results of correlation analysis between the placenta expulsion time with the postpartum interval to first estrus obtained correlation number of 0.070. The correlation between the two variables is not significant because the obtained Sig. of 0.715 (P> 0.05). A correlation number of 0.070 is used to calculate the indirect effect of the placenta expulsion time on the days open through the postpartum interval to first estrus, or the other way the through the placenta expulsion time. The results of the analysis of the direct, indirect and total effects of the placenta expulsion time and the postpartum interval to first estrus are presented in table 6.

Table 6 Direct, indirect and total effect of placenta and postpartum interval to first estrus on days open

Effect	Direct (%)	Indirect through :		Total (%)
		X_1(%)	X_2(%)	
$X_1 \rightarrow Y$	0.828	-	-0.238	0.590
$X_2 \rightarrow Y$	13.913	-0.238	-	13.675
Total				14.265

X_1 = Placenta expulsion time
X_2 = Postpartum interval to first estrus
Y = Days open

The results of the analysis in Table 6.show that the effect of extended placenta expulsion on the days open is 0.828% directly, and that of indirectly through the

postpartum interval to first estrus is -0.238%, and the total effect is 0.590%. This effect is very small, there for based on t test results in table 4 indicate that it has not has significant effect on the days open. That is, the days open is not affected by the placenta expulsion time. The cause of placental expulsion is not affected on the days open, since placenta expulsion time is normal and fast, averaging on 3.60 ± 0.86 hours. Normal placenta expulsion time is 1 - 8 hours [14], in case of placenta discharge interruption within 12-24 hours after fetal expulsion, it calls as having placenta retention. Placenta retention may cause a number of problems, as it allows pathogenic microorganisms to develop in the uterus, resulting in inflammation, fever and weight loss [3]. Placenta retention negatively affects the appearance of reproduction, the longer uterine involution, the longer of first mating period after calving, service per conception increases, the pregnancy rate decreases and the longer interval of days open [7]. The first estrus is late, the days open increases, the interval of birth is longer, the reproduction stops, even if very severe infection can cause death [3].

The postpartum interval to first estrus on days open was directly 13.913 percent, indirectly through the placenta expulsion time is -0.238 percent, resulting in a total effect of 13.675 percent. Based on the result of t test in Table 4, postpartum interval to first estrus give significant effect ($P < 0.05$) to the days open, meaning the variability in the postpartum interval to first estrus determine the variability in the days open. If the postpartum interval to first estrus longer, it can cause the days open becomes longer, because rebreed will take place if beginning with the signs of estrus in the female cow. In general, the postpartum interval to first estrus of cattle occurs 30-70 days after the birth of the fetus [14, 20]. The lateness of the postpartum interval to first estrus can be due to the low estrus intensity / silent heat [16]. Hormonally, if the progesterone level in the blood is more than 3 mg / ml, it allows the estrus cycle to begin [8]. The relationship between the postpartum interval to first estrus with the days open is Y = 0.373 X. Meaning that, if postpartum interval to first estrus increase 1 day, then the days open also will increase by 0.373 days.

CONCLUSIONS

1. Simultaneously, the effect of placenta expulsion time and postpartum interval to first estrus on days open is 14.3 percent, but not significant statistically.

2. Partially, the postpartum interval to first estrus has a significant effect on the days open of 13.675 percent.

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