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Performance Of The Simmental Ongole Crossbred Cow Estrus In To Use PGF2α and GnRH Hormone Injection

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ABSTRACT

The purpose of this study was conducted to determine the effect of the hormone PGF2α and GnRH in the onset of estrus Simmental Ongole crossbred cow. This research has been conducted in the Jatikuwung Farm, Department of Animal Husbandry, Faculty of Agriculture, Universitas Sebelas Maret. The experiment uses design Complete randomized design (CRD) treatment was repeated 3 times using nine cows. Treatment consisted of P1= PGF2α 0.5 doses and GnRH 1.50 doses, P2 = PGF2α 1 doses and GnRH 1 doses, and P3 = PGF2α 1.5 doses and GnRH 0.5 doses. After the first injection of hormones PGF2α all visualizations observed estrous cow once every 07.00 a day for 11 days. The second PGF2α injected simultaneously on all cows after the eleventh day of the first PGF2α injection. Observations visualization estrous done eight times a day. Estrus detection was done by using heat detector. GnRH injection performed on the second day after the second PGF2α injection and estrous observations made every two hours interval. Cows are showing signs of estrous directly mated with artificial. The second injection of PGF2α implemented 11 days after the first PGF2α injection and three days later injected GnRH. Both of them is done intra muscular injection. The results of this study indicate that all cattle estrus (100%), the average onset of estrus P1, P2 and P3 were 18±19.05, 21±12.49 dan 18±19.05 hours after the second injection PGF2α. Estrus detection results using a heat detector P1 = 253.33 ± 40.42, P2 = 276.67 ± 15:28, and P3 = 300.00 ± 10,00. The mean erectile uteri is P1 = 3:00 ± 0:00, P2 = 2:33 ± 1.15 and P3 = 2.66. ± 0:57. Conclusion of the study is the difference in dose of PGF2α and GnRH response estrus appearance the same. The most economical is the use of injection PGF2α 0.5 doses and of GnRH 1.5 doses.

Keywords: Simmental-ongole crossbred, Estrus, PGF2α, GnRH, Heat detector

INTRODUCTION

Increased productivity of beef cattle can be done through improving the efficiency of livestock reproduction by artificial insemination program (IB). One way that can support the success of IB is the accuracy in detecting estrus. The signs of estrus in cows are often difficult to recognize because of the many cases of anestrus, silent heat, resulting in the difficulty of improper estrous recognition or detection, so it is not appropriate to determine the onset of estrus and artificial insemination on time. (Riyanto, *et al.* 2014). Riyanto, *et al.*., (2014) explains that inadequate timing of insemination will reduce pregnancy success rates. The estrus sign can be observed visually and using an estrus detection device. Detection of estrus can be seen from visual observation on vulva color, estrus detection using heat detector tool and besides estrus can be

assessed from cervical tension. Observations of estrous detection can also be performed using a heat detector tool (Riyanto, *et al.* (2014) and Riyanto, *et al.* (2015). One way to maximize reproductive efficiency is to use the hormones PGF2α and GnRH. The PGF2α hormone is luteolytic, acting as a vasoconstrictor in the blood vessels. This leads to drastic blood flow resistance to the corpus luteum, thus reducing the blood flow for a long time will cause the regression of the corpus luteum. GnRH hormone will further stimulate the secretion of Follicle Stimulating Hormone (FSH) and Luteunizing Hormone (LH) from the anterior pituitary. Both of these hormones are responsible for follicle growth and maturation. The follicles eventually produce estrogen hormones that can cause the sign of estrus.

PGF2α hormone will regenerate the corpus luteum, resulting in progesterone levels going down. Low levels of progesterone will have an impact on the rise of the FSH hormone that will stimulate the development of the follicle until it matures and will eventually cause the symptoms of estrus in the cow (Hafizuddin *et al.* 2011). The combination of the use of PGF2α hormone followed by the use of the hormone Gonadotropin releasing hormone (GnRH) which serves to increase the rate of follicular development for estrus (Sunarto, *et al.* 2014) and the optimization of follicular development to spur the process of ovulation (Putro, 2013). Based on this description it is necessary to do research on the effect of hormone PGF2α and GnRH with different doses on the appearance of estrus Simmental Ongole Crossbred cow for estrus determination based on visual observation and heat detector tool.

MATERIALS AND METHODS

This research was conducted at Jatikuwung Farm Livestock Study Program, Faculty of Agriculture, Sebelas Maret University.This study has used 9 heads of Simmental Ongole Crossbred who have BCS 3.5 (1-5), has been birth at least 1 time, aged <6 years old, and not in a state of pregnant. Cow estrus synchronization has been done using a synthetic hormone preparations PGF2α by Lutaprost® and GnRH synthetic by Conceptase®. Injection intervals of the first and second injection PGF2 α for 11 days and GnRH injection is done after 48 hours of the second PGF2α injection (Sunarto, *et al.* 2014). PGF2α and GnRH hormone injection, both carried out by intramuscular injection. During the 11 days of estrus detection is done 3 times a day (morning, afternoon, evening) visually and by vaginal smear method. After injection of GnRH within 24 hours was observed estrus detection every 3 hours. After the signs of estrus arise carried out the implementation of IB activities. Observation or examination of the uterine erection is performed during the execution of IB.

The onset of estrus is the time of estrus occurrence after the second injection of the PGF2α hormone, until it shows estrus signs such as the color change of the vulva and estrous detection using a heat detector tool, calculated in hours (Riyanto, et al., 2014). Scoring of uterine erections is performed at the time of artificial insemination (Toelihere, 1981). The variation of the uterine erection (on the cervical part) is measured using a score that includes: Score 1 = not tense, less elastic and less elastic, Score 2 = less tense, less elastic and less elastic, and Score 3 = tense, elastic

and elastic (Rahmawati, 2015). Scoring of uterine erections is performed at the time of artificial insemination (Toelihere, 1981). The variation of the uterine erection (on the cervical part) is measured using a score that includes: Score 1 = not tense, less elastic and less elastic, Score 2 = less tense, less elastic and less elastic, and Score 3 = tense, elastic and elastic (Rahmawati, 2015). Estrus detection by using the tool of brand Draminski Heat Detector. The tip tool has two cathode ring inserted into vagine then press the contact button on the tool three times to appears and can be viewed on the monitor, the numbers look a scale of 100-500 and the lower numbers indicate the cow estrus (Riyanto *et al.* 2014). Observation of the number of cows that successfully estrus after given hormonal injection treatment that is by calculating the percentage of estrus in cattle that issued signs of estrus that clearly reaches 100%, then the treatment of hormone injection was successful (Tagama, 1995).

The experimental design used in this study was to use a Completely Randomized Design of direct and descriptive analysis. There were 3 treatments done in this research, each treatment was repeated on 3 different female cows treated. The treatment was as follows: P1: 2 injection PGF2α 0.5 dose + 1 injection GnRH 1.5 dose, P2: 2 injection PGF2α 1 dose + 1 times GnRH 1 dose, P3: 2 injection PGF2α 1.5 doses + 1 injection GnRH 0.5 doses . The data were then analyzed by anova if it showed any real effect then continued with Duncan Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

The number of estrus cows, estrus onset, estrus marks based on the heat detector and the erectile state of the research results can be seen in Table 1.

Table 1. The number of estrus cows, estrus onset, estrus marks based on heat detector and uterine erectile states in varying treatment of PGF2a and GnRH injection

Parameter	Treatment			P value
	P0	P1	P2	
Cow estrus number (%)	100	100	100	0,05
Onset estrus (hours)	18±19.05	21±12.49	18±19.05	0,05
Estrus baseon heat detector :				
Cow estrus	253.33±40.41	276.67±15.28	300.00±10.00	0,05
Cow non estrus	422.00±65.38	405.00±43.14	388.00±20.81	0,05
Estrus baseon erecticle uteri	3.00±0.00	2.33±1.15	2.66±0.57	0,05

P1: 2 injection PGF2α 0.5 dose + 1 injection GnRH 1.5 dose, P2: 2 injection PGF2α 1 dose + 1 times GnRH 1 dose, P3: 2 injection PGF2α 1.5 doses + 1 injection GnRH 0.5 doses

All cows in this study were estrus (100%) after hormone injection were all treated. The estrus view is very clear based on estrus detection using heat detector and uterine erection state. This according to Partodiharjdo (1987) states that a cow having a functional corpus luteum arises three days later after PGF2α injection, the percentage of lust will be higher if PGF2α is in a double

system with a gestational range of between 11-12 days. Tagama (1995) states the effectiveness of PGF2α is given in the mid-phase luteal phase when the corpus luteum is working to secrete the hormone progesterone. In this phase the corpus luteum is very sensitive to PGF2α so that the corpus luteum will regress and is followed by the occurrence of estrus.

The onset of estrus of this study was much faster than that of Ramadhan (2014) using 1 dose of PGF2α with ¼ dose of GnRH and ¼ dose of GnRH resulting estrus onset consecutive 60.15 ± 6.97 hours, and 48.70 ± 16.15 hours after second injection in PO cattle. According to Partodiharjo (1992), the difference in average yield onset can be caused by the existence of local regulatory mechanism or counter-current mechanism that the closer the application of PGF2α to the corpus luteum the faster the occurrence of estrus. This mechanism will cause PGF2α to flow into the uterine vein of the media, penetrate the venous wall and adjacent ovarian artery, and from the ovarian artery to the ovaries to lyse the corpus luteum

The use of heat detectors is performed daily on every observation of the research. The cow is not estrus if the number seen on the heat detector monitor shows a number above 300 (0 - 500). The heat detector indicates a range with an estrous range of 210 - 310, and when the cattle are not estrus, the average number is 360 - 497. The result is still in the same range as the previous research conducted by Rahmawati (2015) Using the same PGF2α and GnRH hormones have the average number on the heat detector tool when the estrus cow is 110-370 in the Holstein Friesian dairy cow. Detection results using the heat detector at the time proestrous and estrous showed a low the numbers of 200 - 350 whereas the currently metestrous and diestrous between 350 - 600 and then decreased during proestrous and estrous (Riyanto, *et al.* 2015). According to Riyanto, *et al.,* (2014) when estrus, the cervix will release a lot of mucus. The more and thicker the mucus is released, the lower the number indicated on the heat detector the closer it is to estrus. Riyanto, *et al.,* (2015) Riyanto, *et al.*, (2015) when estrus, the cervix will release a lot of mucus. The more and thicker the mucus is released, the lower the number indicated on the heat detector the closer it is to estrus.

The observation of the uterine erection was performed at the time of artificial insemination. Partodihardjo (1992) when estrogen changes caused by the estrogen hormones become more pronounced, the fallopian tubes swell, the epithelium thickens. The fallopian tube wall contracts. Erectile cervix, the condition is very chewy and tense, blood circulation to the uterus increases, cervical mucosa grows rapidly and the uterine gland secretes mucus secretion from the cervix. The results of this study are still in the same range of numbers as Rahmawati (2015) study using PGF2α 0,5 doses, 1 dose and 1.5 doses and GnRH 1.5 doses, 1 dose and 0.5 doses in PFH dairy cows Erect uteus is on score 2 to 3.

CONCLUSION

Conclusion of the study is the difference in dose of PGF2α and GnRH response estrus appearance the same for Simmental Ongole crossbred cow. The most economical is the use of injection PGF2α 0.5 doses and of GnRH 1.5 doses estrus Simmental Ongole crossbred cow

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