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Reproduction Performance Evaluation after Estrus Synchronization of Pasundan Cow in Garut and Bogor Regions

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Abstract. *Forty Pasundan heifers were used in this study to know the reproductive performance of Pasundan cattle after being induced by prostaglandin hormone (PGF2α) and gonadotropin-releasing hormone (GnRH). Experimental cows in each region were divided into 2 groups, namely group 1. A total of 10 experimental cows were vigorously synchronized using a combination of prostaglandin hormones (PGF2α, dinoprosttromethamine) at a dose of 5 ml/head intramuscularly 2 (two) times with an interval of 11 days. Group 2. The treatment was the same as in group 1, but on the 9th day, 2.5 ml /head of gonadotropin realizing hormone (GnRH, gonadorelin) was injected intramuscularly, to uniform fertility conditions and increase fertility. Cows in heat are immediately artificially inseminated 2 times with an interval of 6 hours. Pregnancy examinations were performed on the 60th and 150th -day post-insemination using the rectal palpation method. The observed variables were 1). service per conception (S / C), 2).conception rate (CR.), 3). calculating rate (Cr), 4). calf birth weight. The results showed that the reproductive performance of Pasundan cattle in the Pesisir Selatan area (Garut) after being induced by PGF2α and GnRH were service per conception (1.2 and 1.0 times), conception rate (90.0% and 100%.), Calving rate (70.0% and 90.0%), calf birth weight (21.38 ± 0.27 kg and 21.63 ± 1.15l) was higher than that of Pasundan cattle in the northern Priangan region (Bogor), respectively Service per Conception (1.3 and 1.1 times), Conception Rate (70.0% and 80.0%), calving rate (70.0% and 70.0%), calving birth weight (19.00 ± 2.12 kg and 20.29 ± 1.92 kg). It can be concluded that the reproductive performance (service preconception, conception rate, calving rate, and birth weight) of Pasundan cattle in the South Coast (Garut) region was significantly higher than that of cattle in North Priangan (Bogor) after being induced with the hormone Gonadotropin-releasing hormone (GnRH) and prostaglandins (PGF2α). The reproductive performance (service preconception, conception rate, calving rate, and birth weight) of Pasundan cattle induced (GnRH) was significantly higher than induced PGF2α)*

Keywords: Pasundan Cows, Synchronization of estrus, Reproductive performance

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I. Introduction

Pasundan cattle are a genetic resource for local Indonesian cattle from West Java and developed in the forest buffer zone communities along the North Priangan region and also in the South Coastal region of West Java, which is feasible to develop because they have long been familiar and adapted to the physical and social environment. Pasundan cattle are kept from generation to generation so that they have been integrated with the life of the breeder community for hundreds of years and are used as a source of capital (Indrijani et al. 2012). In practice, in the community, negative selection and inbreeding often occur, this can reduce the performance of livestock, both genetic and productivity. The fact the field of reproductive failure is one of the main factors that can cause a delay in estrus in Pasundan cattle so affects the population development rate of Pasundan cattle. Several indicators used to predict the suboptimal reproductive function of Pasundan cattle include the high incidence of silent heat in Pasundan heifers, the relatively low success of artificial insemination (IB), and the length of the calving interval due to the absence of estrus more than 3 months after giving birth. (Setiawati et al., 2018). The incidence of anesthesia in cattle can be caused by various factors including hormonal disturbances, environmental changes, poor feed management, and disease (Prabowo, 2010)..Luteinizing Hormone (LH) from the anterior pituitary which inhibits the maturation of de Graaf's follicles or removal of the corpus luteum either manually or physiologically the administration of a luteolytic hormone preparation.Because progesterone can inhibit the release of LH, follicle growth, heat, and ovulation (Sumiyoshi et al., 2014). One method of synchronizing estrus by shortening the luteal phase is usually using a prostaglandin hormone (PGF2α) by lysing CL so that estrus occurs again (Kasimanickam et al., 2006). The use of GnRH in the synchronization protocol is common in both cattle and buffalo. This is intended to stimulate the development of the dominant follicle so that ovulation occurs. (Sianturi et al., 2012). Synchronization can be applied by administering a dose of 5 ml PGF2α

and 250 µg GnRH for female cattle weighing around 400 (Suartini et al., 2013). Efforts to increase the reproductive efficiency of Pasundan cattle are expected to be carried out by utilizing the reproductive technology package application through heat synchronization. Lust synchronization is an attempt by breeders to bring up heat simultaneously in a group of female livestock. The physiological basis of arousal synchronization is the inhibition of release of Based on the description of the background and problems in the Pasundan cattle, this study aims to determine the description of the reproductive performance of Pasundan cattle including service perconception (S/C), conception rate (CR), calving rate (Cr), and calving birth weight. . after synchronized lust with prostaglandin hormone (PGF2α) and gonadotropin-releasing hormone (GnRH).

II. Material And Methods

The sample of this study used 40 Pasundan cows, 20 each from Pasundan cattle farm in Pameungpeuk District, Garut Regency, and 20 from Cariu - Jonggol District, Bogor Regency. This research was to describe the reproductive performance of Pasundan cattle after synchronized in heat, including service per conception (S / C), conception rate (CR), calving rate (Cr), and calving birth weight. after synchronized in the heat with prostaglandin hormone (PGF2α) and gonadotropin-releasing hormone (GnRH). All experimental cows were adapted to the local environment and given basal food in the form of field grass while drinking water was given adlibitum. For each region, the cattle were divided into 2 groups, namely group 1. A total of 10 experimental cows were vigorously synchronized using a combination of prostaglandin hormones (PGF2α, dinoprosttromethamine) at a dose of 5 ml/head intramuscularly 2 (two) times with an interval of 11 days. Group 2 Cows in heat are immediately artificially inseminated 2 times with an interval of 6 hours. Pregnancy examinations were performed on the 60th and 150th- day post-insemination using the rectal palpation method. The observed variables were 1). service per conception (S / C), 2) .conception rate (CR), 3) .calving rate, 4). calf birth weight.

Data analysis

The data obtained were analyzed using the method of analysis of variance using nested patterns. If there is a significant effect of the treatment, it is followed by a further test of honest real difference .

III. Results And Discussion

Reproductive Performance

The reproductive performance of Pasundan heifers reared semi-intensively and extensively in the coastal areas of the south (Garut) and northern Priangan (Bogor), after estrus synchronization using Prostaglandin (PGF2α) and Gonadotropin-Releasing Hormone (GnRH), is presented in Table 1.Tabel 1. KinerjaReproduksiSapiPasundanPasca estrus synchronization of PGF2α and GnRH

Table 1. Reproductive Performance of Pasundan Cows Post estrus synchronization of PGF2α and GnRH Hormones

Wilayah / Hormon	**South Coast (Garut)**		**North Priangan (Bogor)**	
Kinerja Reproduksi	$PGF_2\alpha$	PGF2α +GnRH	$PGF_2\alpha$	PGF2α+GnRH
Servic perconseption (SC)Time	1.2	1.0	1.3	1.1
Conception rate, CR (%)	90.0	100.	70.0	80.0
Calving rate (%)	70.0	90.0	70.0	70.0
Average Birth Weight (Kg)	21.38 ±0. 27	21.63±1.15	19.00±2.12	20.29±1.92

The results (Table 1) show that the reproductive performance includes service per conception (S / C), conception rate (CR), calving rate (Cr), calving birth weight in Pasundan cattle in the Pesisir Selatan (Garut) region higher than in the region. North Priangan. The results of the analysis showed that the service per conception (S / C), conception rate (CR), calving rate (Cr) of Pasundan cattle in the induced Garut region (PGF2α + PGF2α) and (PGF2α + GnRH + PGF2α) were significantly different ($P < 0.01$).) higher than in the North Priangan area. This difference is thought to be influenced by different maintenance, feeding, and environmental management. The feed consumed by cows in the Bogor area is thought to be in a negative energy balance, as a result of the relatively higher environmental temperature in Bogor (21.8 - 30.4 0 Celsius) than in Garut (20-25 0 Celsius). High temperatures are thought to cause livestock to experience stress (Schüller et al., 2017). Stress will cause a decrease in feed consumption and digestibility so that the feed intake will decrease (Umiyasih et al., 2007). Negative Energy balance (NEB), the body will lack energy, so that the fat reserves will be used as an energy source. Lack of nutrition or insufficient feed input can have a direct effect on reproductive

efficiencies such as low reproductive performance and livestock productivity (Salem et al., 2006). The relationship between reproduction and nutritional status is very closely related, nutritional deficiencies are the main factor that hinders the reproduction of cows in the tropics (Haryanto et al., 2015).

If there is a lack of nutrient substrates, there will be the mobilization of food reserves such as fat (triglycerides) which are stored during pregnancy which will cause the accumulation of acetyl CoA and cannot enter the citric acid cycle, so that it will be converted into ketone objects such as acetone, β-OH butyrate as a result. condensation of 2 moles of acetyl CoA. Likewise, if protein metabolism occurs, the livestock is in a negative nitrogen balance which is indicated by an increase in blood urea nitrogen concentration. The same thing in the products of triglyceride fat metabolism will be converted into non-esterified fatty acid (NEFA) free fatty acids (Pradhan et al., 2008). High levels of non-esterified fatty acids (NEFA) have a toxic effect on follicles, oocytes, embryos, and fetuses and reduce the secretion of GnRH by the hypothalamus. High levels of non -esterified fatty acids (NEFA) have a toxic effect on follicles, oocytes, embryos, and fetuses and decrease GnRH secretion by the hypothalamus (Adewuyi et al., 2005). An imbalance in protein levels will interfere with the secretion of gonadotropin hormone (GnRH) (Saleh et al. al., 2011). Kohn ET AL., 2005) Ruminants generally require a lot of glucose for fetal growth and tissue growth such as placenta, udder, and milk production (Piccione et al., 2012). The low concentration of blood glucose and total protein causes disrupts of reproductive hormone function and reproductive tract function that is not optimal, leading to early embryo death and failure of fertilization which results in repeated mating (Khan et al., 2010).

The mean conception rate for hormone-induced Pasundan cattle (PGF2α GnRH + PGF2α) was higher than (PGF2α + PGF2α), namely the values for the Garut region were 100% vs 90% and in the Bogor area 80% VS 70%. The analysis showed that the conception rate (CR) of Pasundan cattle in the induced Garut area (PGF2α + PGF2α) and (PGF2α + GnRH + PGF2α) were significantly different (P <0.01) higher than in the Bogor area. The low conception rate of Pasundan cows in North Priangan (Bogor) is suspected of embryo death caused by non-infectious factors such as nutrition. The extreme level of feeding will interfere with the survival of the embryo, as well as the supply of special food nutrients, such as the provision of vitamins, trace elements can affect metabolism (Boland et al., 2001). The use of GnRH in cattle supported by adequate nutritional intake can increase ovulation (Iskandar, 2007). The GnRH hormone *basically* functions to stimulate the hypofunction of LH and FSH which work together to stimulate the follicle and the formation of the corpus luteum (Putro, 2008). The combination of PGF2α and GnRH increases the pregnancy rate compared to the single PGF2α method because of its ability to increase the concentration of progesterone through the formation of corpus luteum accessories (Budiyanto, 2012).

The calving rate on treatment (PGF2α + GnRH + PGF2α) in the South Coast (Garut) area was higher than (PGF2α + PGF2α). The results of the analysis showed that the calving rate (Cr) of Pasundan cattle in the Garut area which was induced (PGF2α + GnRH + PGF2α) was significantly different (P <0.01) higher than (PGF2α + PGF2α) This condition indicates that the use of GnRH on Pasundan cows that received food adequate feed, can increase the number of follicles and corpus luteum. The GnRH hormone *basically* functions to stimulate the hypofunction of LH and FSH which work together to stimulate the follicles and the formation of the corpus luteum (Iskandar. 2007.) On the other hand, GnRH is a pregnancy hormone and *mammogenic*plays an important role in the maintenance of pregnancy until it enters the postpartum period. GnRH can increase the secretion of pregnancy hormones, uterine growth, embryos and fetuses, birth weight, and weaning weight. growth and development of the mammary glands, and cow's milk production (Mabjeesh et al., 2013).

The mean birth weight of Pasundan calves in the Pesisir Selatan area (range 18-24 kg/head) was 21.51 ± 0.71 kg higher than North Priangan (range 17-22 kg/head) with an average of 19.95 ± 2.02 kg .. PGF2α). PGF2α). The analysis showed that the birth weight of Pasundan calves in the induced Garut region (PGF2α + PGF2α) and (PGF2α + GnRH + PGF2α) were significantly different (P <0.01) higher than in the Bogor area. This condition is thought to be due to environmental factors such as nutrition and inadequate temperature and maintenance management. Very high temperatures cause decreased appetite in livestock and affect the duration of grazing will result in decreased feed intake and ultimately affect productivity (Ogunjimi, 2008). The birth weight of the child will be lower if the nutritional intake is not good during pregnancy. (Gitonga PN. 2010). In the placental phase, fetal development is highly dependent on the availability of nutrients in the blood or the amount and quality of feed consumed by the mother (Prodanovic et al., 2012). The development of the zygote in the embryonic phase cannot be separated from the influence of the uterine microenvironment and the growth and development of the uterine glands as a producer of uterine milk which is a nutrient for embryonic development (Hermanto, 2005). The development of the uterine glands is under the regulation of steroid hormones (estrogen and progesterone) which are produced by the corpus luteum during pregnancy (Herbert et al., 2005). Embryo development can be inhibited and decreased by progesterone-dependent stimulation, as well as an abnormal endometrial expression which can be responded to by progesterone receptor function (Neto et al., 2017). Lack of nutrition decreases uterine blood flow and is accompanied by a decrease in fetal insulin and IGF-1 sequences with increased growth

hormone, adrenocorticotrophin, and corticosterone which will affect fetal growth and development. The concentration of urea in fetal glucogenesis is increased by the fetus from amino acids (Gilles, et al., 2018).

IV. Conclusions

Reproductive performance includes service preconception, conception rate, calving rate, and birth weight in Pasundan cattle after being induced with Gonadotropin-releasing hormone (GnRH) and prostaglandin (PGF2α). in the Pesisir Selatan area (Garut) it is higher than cattle in North Priangan (Bogor). Reproductive performance includes service preconception, conception rate, calving rate, and birth weight of Pasundan cows that are induced (GnRH) higher than that which is induced (PGF2α)

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