THE INFLUENCE OF GONADOTROPIN HORMONE FOR IMPROVEMENT LITTER SIZE OF PALU LOCAL SHEEP

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ABSTRACT

The aim of this study was to increased of the litter size and reproduction performance with superovulation and artificial insemination treatments. The results obtained who performed estrus synchronization in ewes with the percentage of estrus occurring were 100%; 90.8% and 92%, respectively, Based on the data, it could be seen that the treatment of gonadotropin hormone in sheep gave estrus effect to all ewes in the study. The results showed that almost all ewes that were treated three times showed good estrus responses, indicated by the emergence of all parameters. Of all the ewes treated with gonadotropin hormones showed that pregnancy. This indicates a positive response to the given hormone. Gonadotropin hormone will stimulate ovulation in the treated ewes. Based on the results of the study, it was obtained that 9 ewes were pregnant with twins of 26 pregnant ewes. The low rate of twin pregnancy was caused by the follicular maturation process not followed by sufficient secretion of LH, so that superovulation did not occur in all treated ewes.

gonadotropin, ewe, palu local sheepl *(key words)*

I. INTRODUCTION (*HEADING 1*)

Palu Local Sheep (PLS) Palu was one of the native livestock of Central Sulawesi. PLS has physical characteristics that characterize it, namely having a fat tail, white, hornless, coarse hair and able to adapt to dry climates (Rusiyantono et.al., 2015)[1]. Palu Local Sheep (PLS) was one of the sheep breeds that there was in Indonesia the spread from East Java to eastern Indonesia including Nusa South East. Fat tail sheep was prolific so very opportunity to produce more children of one every birth. Generally The sheep on the island of Lombok were PLS showing the level of various fertility. Lamb could gave birth to one child up to four tails per birth, so that sheep were classified as animals polytocus. The prolific nature of the PLS does not appear, it was caused by climatic conditions and lack of feed availability. The main factor constraining the t prescribed, although the various table text styles are provided. population growth rate PLS was still slow. One of the determinants of the low population rate was the low prolificity rate. As an effort to increase twins birth and performance, it was necessary to grading-up using superior seeds. The implementation of AI could be carried out if livestock the female has shown signs of estrus. Lust sheep was difficult to identify because of the large number of cases of anestrus and quiet heat (silent heat) which causes difficulty introduction of estrus detection in ewes so that was occurs insemination and failure of fertilization. The way to overcome the difficulty of detecting estrus was by estrus synchronization. Estrous synchronization was an attempt to synchronize the reproductive conditions of donor sheep and recipient. Estrous synchronization generally uses hormone prostaglandin F2α (PGF2a). The use of techniques estrus synchronization would be able to increase efficiency production and reproduction, reducing time and facilitate the observation of estrus detection, determine the schedule expected birth, lowering the age of puberty on the heifer, labor saving and efficiency inseminator cause it can mate livestock at the same time the same one. The success of the estrus synchronization program was one of affected by parity. Parity was a stage a lamb herd gave birth to a calf.

II. MATERIAL AND METHODS

A. *Materials*

This study used 28 Palu Local Sheep (PLS), aged 1.5 to 2 years, which had normally estrus cycles

B. *Methods*

Methods used in research this was an experimental method with Design Completely Randomized (CRD) with four synchronization treatment and seven replications so that obtained 28 experimental units.

Estrous synchronization was carried out with inject PGF2α (Estron™ bioveta) intramuscularly in the neck. lamb on P0 treatment was given injection without PGF2α (NaCl physiological), P1(0.25 ml PGF2α), P2 (0.50 mlPGF2α), and P3 (0.75 ml PGF2). Observation of estrus was carried out the day after PGF2α injection with observation frequency twice per day at 06.00 until 10:00 and 15:00 until hours 17.00. The observation technique was carried out by visually and assisted by a ram. Observations were based on estrus symptoms arising according to the set score. Lamb showing symptoms of estrus inseminated with frozen ram semen.

Superovulation. Superovulation was done by injecting GnRH on the ninth day after showing onset of estrus.

Artificial Insemination. lamb showing symptoms of estrus inseminated with frozen ram semen. Technique insemination was done by opening technique vagina using a

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speculum and so on insert the insemination gun into the vagina. Semen deposition is performed at the mouth of the cervix. AI success evaluation is carried out 17 days Then, where are the cattle that don't showing symptoms of estrus is declared pregnant.

Research variable

(i) The intensity of estrus. Intensity observation estrus was assessed by score (0) no showing symptoms of estrus, score (1) no estrus clear, score (2) moderate estrus, and score (3) estrus clear. Criteria for the assessment score on the intensity estrus are: a) Score (1) does not show estrus symptoms; b) score (2) less clear estrus with signs, the vulva is slightly red and slightly swollen, no mucus, and no showing symptoms of silence on the ride; c) Score (3) estrus looks moderate with vulvar signs red, swollen, a little mucus, and rising fellow; and d) Score (4) estrus looks very clear with red vulvar markings and swollen, a lot of mucus, and silent when climbed fellow. (ii) Percentage of estrus, i.e. the number of cattle in estrus divided by total goats treatment multiplied by 100%. (iii) Length of estrus (hours): period of time during which lamb show signs of estrus. calculation starts from lamb showing symptoms of estrus to estrus end. (iv) Service per conception (S/C): namely the number of IB services divided by the number of livestock pregnant multiplied by one hundred percent. (v) Number pregnancy (%) is the number of goats pregnant divided by the number of lamb mated multiplied by 100%.

III. RESULT AND DISCUSSION

Percentage of Estrus

The results showed that goats in treatment P2 and P3 higher percentage of estrus i.e. 100% each of the treatments P1 is 75% Table 1.

Variabel	Treatment			
	P0	P1	P2	P3
Response Of Estrus	50	75	100	100
Intensity Of Esturs (score)	1,02 ± 0,12	2,24 ± 0,03	3,79 ± 0,23	3,83 ± 0,24
Duration of Estrus	25,90 ± 0,12	26,50 ± 2,40	27,50 ± 3,50	27,44 ± 7,13

Low rate of treatment (P0 and P1) was estimated because not all lamb have CL that matured during PGF2α administration. As It was known that PGF2α is only effective in lysing Mature CL present in the luteal and phase will have no effect on the CL is growing (Siregar et al, 2001)[2]. Wildeus (2000) explained that in CL the mature, there are receptors that will form a bond with the hormone PGF2α so that the luteolytic function of the hormone can occur. Besides, it was also possible due to lack of dose administered, status individual animals, and there was no CL in ovaries. Wurlina et al. (2005)[3] stated that administration of PGF2α in animals only would be effective if in the ovary there was CL. Ovaries in the absence of CL cause PGF2α did not function perfectly because absence of target cells (lutein cells) that could be lysed. Based on this, it could it was estimated that the goats that show the estrus response in this study was goats in the luteal phase, while the goat that did not show the estrus response was not expected to be at luteal phase. The resistance of the corpus luteum to PGF2α was caused by paracrine and interactions autocrine interactions between endogenous PGF2α, oxytocin and progesterone (Okuda and Uenoyama, 1999[4]; Sinda, et al. 2017[5]). In treatment P2 and P3 were treatment with the highest estrus response. Results This study was almost the same as the report Siregar et al. (2001)[6] who obtained 100% estrus percentage in local lamb induced with PGF2αintramuscular and intravulvar. Nuti et al. (1992)[7] that all goats (100%) showed that estrus after administration of PGF2α on the 12th day after estrus due to administration. The first PGF2α. Symptoms of estrus is the result of the action of hormones prostaglandins. In both groups This treatment shows good results better than the report of Siregar et al. (2001)[2] which produces 80 percent estrus percentage after a single injection of prostaglandins. While the second injection is done 10 days then will produce 100% estrus. Nuti et al. (1992)[7] also reported the same thing. This shows that the goats used in this study had good response to administration of PGF2α with a dose of 0.50 ml and 0.75 ml individually intramuscular. However, this result shows higher percentage of estrus compared to with that reported by Semiadi et al, (2003)[8] using an internal controlled implant drug release for goats (CIDR-G) in goats shows the percentage of estrus is only 85.71 percent. Lysis of the corpus luteum caused by by injection of the hormone estrone because of work PGF2α vasoconstriction causes decreased blood flow to the corpus luteum drastically. Hamdan et al. (2004)[9] stated corpus luteum regression would be followed by decrease in progesterone concentration. Decrease Progesterone levels would stimulate the pituitary anterior release FSH and luteinizing hormones (LH). These follicles would produce the

hormone estrogen which would manifest estrus symptoms. Opinion that different proposed by Salazar et al. (1976) which stated that the decrease in concentration Progesterone induced by PGF2α was caused by morphological changes of the luteal tissue through conversion of acetate to cholesterol. Decrease Progesterone levels would stimulate The anterior pituitary releases FSH and LH. These two hormones were responsible for process of folliculogenesis and ovulation, so that follicular growth and maturation occurs. The follicles finally produce the hormone estrogen manifesting symptoms of estrus (Hafez and Hafez, 2000)[10]. The action of the hormone estrogen was to increase the sensitivity of the genital organs females characterized by changes in the vulva and transparent mucus discharge (Lammoglia et al., 1998)[11].

Intensity Of Estrus

Observation of visualization of estrus response consists of a silent ride, redness of the vulvar mucosa, vulvar swelling, and mucus viscosity quantified in score form (Santoso et al, 2014)[12] The results showed that livestock that received P2 and P3 treatments showing symptoms of estrus with a high intensity higher, namely a score of 3 than the P1 treatment and control, which were scores of 2 and 1. Very clear estrus intensity at P2 and P3 were thought to be due to the secretion of FSH high concentration so that the formation process follicles are doing well. Physiologically. There were a relationship between high concentration FSH from the anterior pituitary to the amount of follicles that develop to the de-follicular phase Graaf (Rusdin and Ridwan, 2006)[13]. The estrus behavior would be actualized through the intensity of estrus and these conditions will depend on the concentration of estrogen secreted by the Graafian follicle during estrus. Based on the observations made in experimental animals, using the effect that differ according to the dose used againstestrus intensity. Treatment of P0 and P1, estrus intensity on average each showing signs that were not clear and on the 2 treatments there is one livestock that does not estrus and impact on the average intensity estrus. The signs of moderate estrus are: by looking at the visible vagina secrete clear and viscous liquid, visible mediocre, not too revealing behavior that was different from usual, when inserted stud bully (Teaser) to in the female cage, the male shows Symptoms of wanting to ride a female after kissing the vaginal part but the female cattle don't showing symptoms of silence ascended. Ferradis (2010)[14] stated that the onset of symptoms estrus such as swelling and redness of the vulva depending on the high and low levels Estrogen in the blood produced by mature follicle. When linked with the P0 treatment group which only rely on natural LH without influence hormone PGF2α, as a hormone that responsible for the development and Follicle maturation will of course be proportional directly proportional to the secretion of estrogen produced, so that in the end it affects estrus intensity. In line with that reported by Rajamahendra and Sianangama, (1992)[15] where the intensity of estrus in goats PE not treated with non-hCG more low on hCG administration which shows estrus intensity is more pronounced. The role of hCG (human chorionic gonadotrophine) in livestock Among other things, extending the life span corpus luteum, increased progesterone synthesis by the corpus luteum, induces ovulation in the entire estrus cycle, and helps formation of the accessory corpus luteum when given at the beginning of the luteal phase (Rajamahendra and Sianangama, 1992).

Duration Of Estrus

The duration of estrus in P0 treatment was 25,90 ± 0,12 hours shorter than P1, P2 and P3 which was 26,50 ± 2,40, 27,50 ± 3,50, 27,44 ± 7,13 hours respectively;. It was not clear whether the relationship between PGF2α concentration and length the estrus period in the treatment, especially in treatment P2 and P3. Dewi et al. (2011)[16] in his report mentioned that the duration of estrus in animals could be affected by body condition score and LH surge. Late LH surge during cattle estrus due to low concentrations of estrogen in the blood will affect the old the time of estrus. A part from that, the factor others such as nation, age, season and the presence of the ram also determines the length of estrus time in each animals (Suharyati, 1999).[17] Nutritional deficiency will result in inhibition of LH secretion as a result of decreased hormone secretion release of LH (LH-RH) from the hypothalamus (Rasad, 2006[18] in Dewi et al., 2011).

Service per Conception

Service per conception was the number AI services to livestock until it happens pregnancy (Susilawati, 2011)[19]. Service per high conception would result in length of birth interval compared with the condition of the goats that were have a normal interval of 6 months (Hartatik et al al., 2009)[20]. The results showed that Lowest Service per Conception generated by lamb that received P1 treatment while the highest in the P2 and P3 treatments (Table 2). Low S/C in livestock that received P1 treatment due to the level of high fertility reflected by less number of AI services for produce pregnancy. Davendra and Burns (1994) mention that the S/C for all goat breeds in Bangladesh was at 1.23. S/C value that normal ranges from 1.6 to 2.0, the lower the value, the higher the fertility female animals in the group. On the other hand, the higher the S/C value, the lower the fertility value of the female group. Some females are inseminated up to four or five times and even less that inseminated up to 9 times (Toelihere, 1981).

Table 2. The average of service per conception and number of pregnancy

Variabel	Treatment			
	P0	P1	P2	P3

Number of Inseminated	7	7	7	7
Service per conception	1.5	1,5	1,25	1,25
Number of pregnancy (%)	50	75	100	100

Service per conception was getting higher causes the length of the calving value intervals (Zainuddin et al., 2015)[21]. This matter caused by several factors, one of which is parental age which was directly related to the physiological status of the animal. Livestock that too young when first breeding would be difficult the occurrence of pregnancy due to development The physiology of the animal is not perfect.

Number Of Pregnant

Of all the sheep treated with hormones showed signs of pregnancy. This indicates a positive response to the given hormone. Gonadotropin hormone would stimulate ovulation in the treated sheep. Breeding that were carried out after the sheep showed signs of lust, responded positively, this was indicated by the pregnancy of all treated sheep. Pregnancy rate was strongly influenced by several factors, including fertility female cattle, inseminator skills, time IB, as well as the quality of the sperm used. On small ruminants in general success insemination was still low, this was because by the relative size of the female reproductive organs small, including the size of the cervix (Nalley et al., 2011)[22]. 3. Twin pregnancy Based on the results of the study, it was obtained that 3 lamb were pregnant with twins of 14 pregnant sheep. This result was far below what was expected. This situation is because even though there is a process of follicle maturation but it was not accompanied by an adequate amount of LH hormone, a state of superovulation/multiple ovulation is not obtained.

Table 3. Persentage of Twin

Variabel	single	twin
number of litter	18	9

The absence of multiple ovulation in some livestock (80%) in this study and also in the study conducted by SUTAMA et pl. (1994) in the same goat breed, was a common phenomenon in young cattle as has been reported in sheep (EDEY et al., 1977; CHU and EDEY, 1978). In adequate follicular development and/or lack of the hormone responsible for ovulation may be a contributing factor to the failure of ovulation even though the cattle show signs of normal estrus. On endoscopic observation, it was found that some of the developing follicles did not ovulate. This was an indication that PMSG injection was quite responsive to the ovaries, but because the long half-life of PMSG results in continued follicular growth and there are indications that the remaining follicles will continue to develop into follicular cysts (Hedis et al., 2011)[23]

Conclusion

Increased reproductive efficiency of Palu local sheep could be through the introduction of the hormone Gn RH

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