

Induction of estrus using PGF_{2α} in non-descript hilly goats

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ABSTRACT

The present study was aimed to evaluate the efficacy of PGF_{2α} injection on induction of estrus in 48 healthy hill goats. The PGF_{2α} (Dinoprost tromethamine-7.5 mg/goats) was injected intramuscularly in half of the goats (n=24) and rest 24 goats were kept as control and they were exposed to buck only. The behavioural estrus was observed following buck parading twice only. The non-responders were injected with another similar dose of PGF_{2α} 10-11 days after the first one. The first and second PGF_{2α} injection induced estrus in 9/24(37.5%) and 9/15(60%) goats, respectively with an overall induction of estrus in 18/24 goats (75%) in comparison to only 5/24 (21%) goats in control. Most of the goats (11; 61.11%) exhibited estrus within 72 hours with an average of 108.22±27.39 and 95.77±22.26 hrs to first and second injection of PGF_{2α} respectively. The goats observed in estrus were served to buck of high vigour on two occasions leading to pregnancy in 16/18 (88.88%) goats. The results indicated that PGF_{2α} could be used effectively to induce estrus in hilly goats with high fertility.

Key words : Induction, estrus, goats, PGF_{2α}

Induction of estrus has been a valuable tool for the controlled breeding especially in species where estrus detection is difficult e.g. goat, buffalo. The induction of estrus using timed hormonal treatments seems to be more convenient (Whitley and Jackson, 2004). Prostaglandin based estrus induction controls the estrous cycle by terminating the luteal phase through regression of the corpus luteum. The double injection PGF system 10-11 day apart is the most widely used approach in goats and sheep and it is as effective as the progestogen treatment (Kusina *et al.*, 2000; Wildeus, 2000). Estrus induction/synchronization with PGF_{2α} resulted induction of estrus into more than 70% of the goats into estrus with a reasonable degree of fertility (Ishwar and Pandey, 1992; Freitas *et al.*, 2004). Information on the induction of estrus in the native hill goats is meager. In the present study, the effect of single and double injection of PGF_{2α} on estrus expression and subsequent fertility in the native hill goats has been reported.

The study was conducted at Indian Veterinary Research Institute, Mukteswar campus (>7500' MSL). Forty-eight hill goats (n=48) ranging between 1.5 to 2.0 years of

age with good health and disease free status maintained at experimental animal shed were selected. The animals were divided randomly into two groups; Treatment group (n=24) and Control group (n=24) without hormonal treatment and only exposed to buck for male effect. The does were housed in adjacent pens but separated from the buck's pen. In treatment group PGF_{2α} (Dinoprost tromethamine-7.5mg/goat) was injected intramuscularly in all 24 goats and behavioral estrus was observed. The non-responders were injected with another similar dose of PGF_{2α} 10-11 days after the first one. The detection of estrus was performed using buck parading twice a day. First mounting of the buck was considered as the beginning of the estrus. Does in estrus were taken into separate pen and exposed to an intact buck of high vigor at least on two occasions for breeding.

Results pertaining to the effect of PGF_{2α} on onset of estrus and fertility are presented in Table 1.

In the present study, the first PGF_{2α} injection induced estrus in 9/24 goats (37.5%), however, second injection induced estrus in 9/15(60%) non-responders with an overall induction of estrus in 18/24 goats (75%) in comparison to 5/24 goats (21%) in control. Most of the goats in the treated groups (11; 61.11%) exhibited estrus within 72 hours with an average of 108.22±27.39 and 95.77±22.26 hrs to first and second injection of PGF_{2α}.

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Table 1. Effect of PGF_{2α} on onset of estrus and fertility

Parameters	Group I (Treatment Group)	Group II (Control Group)
Total number of goats studied (n=48)	24	24
Onset of natural estrus	-	05(21.0%)
Responded to first PGF _{2α} injection	09(37.50%)	-
Non- responders	15	19
Responded to second PGF _{2α} injection	09(60.00%)	-
Overall response/ Induction of estrus	18(75.00%)	05(21.0%)
Exhibited estrus with in 72 hrs	11(61.11%)	-
Average period to induce estrus with first PGF _{2α} injection (hrs)	108.22±27.39	-
Average period to induce estrus with second PGF _{2α} injection (hrs)	95.77±22.26	-
Average duration of estrus (hrs)	24-36	24-36
Goats pregnant	16(88.88%)	04(80.0%)

respectively. Behavioral sign of estrus were similar for the does with the natural estrus and induced estrus. Duration of estrus in treated and control groups did not differ significantly. Pregnancy rate in does based on non-return rate were 88.8 % and 80 % in treated and control group, respectively. Romano (1998) found that cloprostenol given intramuscularly were effective in synchronization with 100% does exhibiting estrus at approximately 60.5 hrs after treatment and a 75% pregnancy rate. Kusina *et al.* (2000) also found that two intramuscular injections of 125 µg of cloprostenol administered 10 days apart were as effective as the progestogen treatments. No significant difference between PG and vaginal sponge methods for induction of estrus was noticed by Kusina *et al.* (2000) and Wildeus (2000). No difference was also observed in estrus response and timing of estrus and LH surge in dairy goats treated with cloprostenol on day 6 and 12 of the estrous cycle. The mean time from injection of PGF_{2α} to behavioral estrus was 46 to 48 hr, with 95 to 100 % induction of estrus in does (Nuti *et al.*, 1992). Prostaglandin resulted higher fertility in black Bengal goats in comparison to progesterone treatments with or without PMSG (Ishwar and Pandey, 1992). In Boer goats synchronized outside the normal breeding season, the estrous response was lower ($P < .01$) in a double PGF injection system (13-20%) than the sponges and sponges plus PGF (87-100%) (Greyling and Van Niekerk, 1991), confirming the lack of efficacy of PGF during the anestrus and transitional season. The findings in the present study also supports that PGF_{2α} is luteolytic in goats, however, variation in response may be due to effect of season and environment. Half of the induced (50%) goats showed first sign of estrus with in 48 hrs of the PGF_{2α} injection. It can be concluded that 7.5 mg PGF_{2α} (Dinoprost tromethamine) is luteolytic in hilly

goats and two dose regimen 10-11 days apart is an effective method for induction of estrus with high fertility in this species.

REFERENCES

- Freitas, V.J.F., Rondina, D., Lopes Junior, E.S., Teixeira, D.I.A. and Paula, N.R.O. (2004). Hormonal treatments for the synchronization of estrus in dairy goats raised in the tropics. *Reprod. Fert. Dev.*, 16: 415-420.
- Greyling, J.P.C. and Van Niekerk, C.H. (1991). Different synchronization techniques in Boer goat does outside the normal breeding season. *Small Rumin. Res.*, 5: 233-243.
- Ishwar, A.K. and Pandey, J.N. (1992). Oestrus synchronization and fertility in Black Bengal goats following administration of progesterone/prostaglandin and gonadotropins. *Res. Vet. Sci.*, 52: 141-146.
- Kusina, N.T., Tarwirei, F., Hamudikuwanda, H., Agumba, G. and Mukwena, J. (2000). A comparison of the effects of progesterone sponges and ear implants, PGF_{2α} and their combination of efficacy of estrus synchronization and fertility of Mashona goat does. *Theriogenology*, 53: 1567-1580.
- Nuti L.C., Bretzlaff, K.N., Elmore, R.G., Meyens, S.A., Rugila, J.N., Brinsko, S.P., Blanchard, T.L. and Weston, P.G. (1992). Synchronization of estrus in dairy goats treated with prostaglandin F at various stages of the estrous cycle. *Am. J. Vet. Res.*, 53: 935-937.
- Romano, J.E. (1998). Effect of two doses of cloprostenol in two schemes for estrous synchronization in Nubian goats. *Small Rumin. Res.*, 28: 171:176.
- Whitley N C and Jackson D J. 2004. An update on estrus synchronization in goats: A minor species. *J. Anim. Sci.*, 82(E. Suppl.): 270-276.
- Wildeus, S. (2000). Current concepts in synchronization of estrus: Sheep and goats. *J. Anim. Sci.*, 54: 1-11.