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Reproductive performance of Mahabubnagar local goats under different estrus synchronization protocols

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Abstract

A study was conducted to document various reproductive parameters in Mahabubnagar local goats using different estrus synchronization protocols. A total of 100 healthy and non-pregnant does aged between 2 - 5 years located at Livestock Research Station, Mahabubnagar were selected and randomly allotted into 5 groups each with 20 does. First group does were kept as control without giving any treatment. Group II does were treated with GnRH on day 0, PGF₂α on day 7 and GnRH on day 9. Group III does were treated with PGF₂α on day 0, 7 and GnRH on day 9. Group IV does were inserted with vaginal sponges for 9 days, administered PGF₂α on day 8, on 9th day sponges were withdrawn and GnRH was administered. Group V does were inserted with vaginal sponges for 9 days and PMSG was administered after removal of sponges. The reproductive performance of does was estimated in terms of pregnancy rate, kidding rate, litter size and twinning rate. The performance traits were higher in does treated with different estrous synchronization protocols than the control group. The overall mean pregnancy rate, kidding rate, litter size and twinning rate observed in the present study were 71%, 91.5%, 1.33 and 33.85%. Significantly higher pregnancy rate, litter size and twinning rates were observed in Group V does were treated with Sponge and PMSG than the control and other three protocols.

Keywords: Local goats, estrus synchronization, GnRH, PGF₂α, PMSG and vaginal sponges

Introduction

The Mahabubnagar local goats are an important part of the livelihood for the farmers of Mahabubnagar, Gadwal, Nagar Kurnool, and wanaparthy districts of Telangana. The variety of animals was spread widely with a common name of Palamuru Mekalu. These animals were raised for meat production and it is a prolific goat which originated in foot hills of Nallamala forests (Kumar *et al.* 2018) ^[1]. The number of kids born per animal (litter size at birth) and available for finishing (litter size at finishing), are the profitable factors in goat farming. The reproduction performance in local goats is low/marginal because of low genetic value, prominent seasonal breeding tendency and uncontrolled reproduction. Goat reproductive cycles are seasonal and that can be controlled using different methods of estrus synchronization protocols, which were simple, cost-effective, and significant in goat breeding to attain more kid crop (Zhao *et al.*, 2010)^[2]. The Controlled goat reproduction offers a choice for kidding at a precise season of the year, reduction in kid mortality, constitution of homogeneous feed lots for mothers and kids, easy management and efficient genetic selection in the flocks (Fatet *et al.* 2011) ^[3]. Synchronization of estrus can be achieved by administering exogenous progesterone or by pre mature luteolysis by means of luteolytic agents. Single or combined use of hormones such as progestagens, estrogens, melatonin, PGF₂α, PMSG, HCG and GnRH can be used for synchronization of estrus. In the present study four different estrus synchronization protocols were utilized to estimate the various reproduction parameters in Mahabubnagar local goats

Materials and Methods

Present study was conducted at Livestock Research Station, Mahabubnagar, PV Narasimha Rao Telangana Veterinary University (PVNRTVU), Telangana, India. A total of 100 healthy and non pregnant does and 10 breeding bucks aged between 2 to 5 years were selected for the experiment. The selected does were divided into 5 groups consisting of 20 in each group.

Group I does were not treated with any treatment protocol and checked for the estrus response from 9th day. Group II (GPG) does were treated with GnRH (10 µg) on day 0, PGF₂α (125 µg) on day 7 and GnRH (10 µg) on day 9 intramuscularly and checked for the estrus response from

9th day. Group III (PPG) does were treated with PGF2 α (125 μ g) on day 0, PGF2 α (125 μ g) on day 7 and GnRH (10 μ g) on day 9 intramuscularly and checked for the estrus response from 9th day. Group IV (SPG) does were inserted with vaginal sponges (Avikesil-S) and kept insitu for a period of 9 days. Inj. PGF2 α (125 μ g) was given intramuscularly on day 8 i.e. 24 hours prior to sponge removal. On 9th day sponges were withdrawn and Inj. GnRH (10 μ g) was administered intramuscularly and checked for the estrus response from 9th day.

The does identified in estrus with presence of teaser buck were separated immediately from the flock and placed in a pen and allowed for mating with breeding buck. The does were monitored until kidding. In the present study, the traits estimated to analyze the reproductive performance were pregnancy rate, kidding rate, litter size and twinning rate. The pregnancy rate was calculated by the number of does conceived divided by the total number of does treated multiplied by hundred and expressed in per cent. The kidding rate was calculated by no. of does having birth divided by number of pregnant goat multiplied by 100 and expressed in percentage. Litter size was calculated by total number of kids born divided by the total number of does having birth. Twinning rate was calculated by the total number of twin births divided by the total number of does having birth multiplied by hundred and expressed in terms of per cent. The statistical analysis of nonparametric parameters were analyzed with Chi-square test and expressed in percentage.

Results

The number of animals treated, number of animals mated, number of animals pregnant and pregnancy rate (%) were detailed in table 1 and depicted in figure 1. The overall pregnancy rate observed in the present study was 71 per cent. The pregnancy rates were 50, 80, 80, 60 and 85 per cent in control, GPG, PPG, SPG and SP groups, respectively. The pregnancy rates were significantly ($p < 0.05$) higher in does treated with different estrous synchronization protocols than the control group.

The overall mean kidding rate observed in the present study was 91.5%. The mean kidding rate was 80, 100, 100, 83.3 and 88.2 per cent in control, GPG, PPG, SPG and SP groups, respectively. The kidding rates were higher in does treated with different estrous synchronization protocols than the control group (Table 2). Higher kidding rates were observed in GPG and PPG groups than the control.

The overall litter size observed in the present study was 1.33. The mean litter size observed in control, GPG, PPG, SPG and SP groups were 1.25, 1.31, 1.37, 1.30, and 1.40, respectively. The litter size was higher in does treated with different estrous synchronization protocols than the control group (Table 3) and the highest litter size was observed in SP group.

The overall twinning percentage observed in the present study was 33.85 per cent. The mean twinning percentage was 25.00, 31.20, 37.50, 30.00 and 40.00 in control, GPG, PPG, SPG and SP groups, respectively. The twinning percentage was significantly ($p < 0.01$) higher in does treated with different estrous synchronization protocols than the control group (Table 4; Figure 2) and the highest twinning% was observed

in SP group (40%).

Table 1: Effect of different estrus synchronization protocols on Pregnancy rate (%) in local goats

Sl. No.	Treatment	No. of animals treated	No. of animals pregnant	Pregnancy rate (%)	Chi-square value
1	Control	20	10	50 ^d	10.25* ($p < 0.05$)
2	GPG	20	16	80 ^b	
3	PPG	20	16	80 ^b	
4	SPG	20	12	60 ^c	
5	SP	20	17	85 ^a	
Overall		100	71	71 (71/100)	

Table 2: Effect of different estrus synchronization protocols on kidding rate (%) in local goats

Sl. No.	Treatment	No. of animals pregnant	No. of animals having birth	Kidding rate (%)	Chi-square value
1	Control	10	8	80	0.97 ($p < 0.01$)
2	GPG	16	16	100	
3	PPG	16	16	100	
4	SPG	12	10	83.3	
5	SP	17	15	88.2	
Overall		71	65	91.5	

Table 3: Effect of different estrus synchronization protocols on Litter size in local goats

Sl. No.	Treatment	No. of animals having birth	No. of Kids born	Litter size
1	Control	8	10	1.25
2	GPG	16	21	1.31
3	PPG	16	22	1.37
4	SPG	10	13	1.30
5	SP	15	21	1.40
Overall		65	87	1.33

Table 4: Effect of different estrus synchronization protocols on twinning percentage (%) in local goats

Sl. No.	Treatment	No. of animals having birth	No. of animals Produced twins	Twinning percentage	Chi-square value
1	Control	8	2	25.00 ^e	32.18** ($p < 0.05$)
2	GPG	16	5	31.20 ^d	
3	PPG	16	6	37.50 ^b	
4	SPG	10	3	30.00 ^c	
5	SP	15	6	40.00 ^a	
Overall		65	21	33.85	

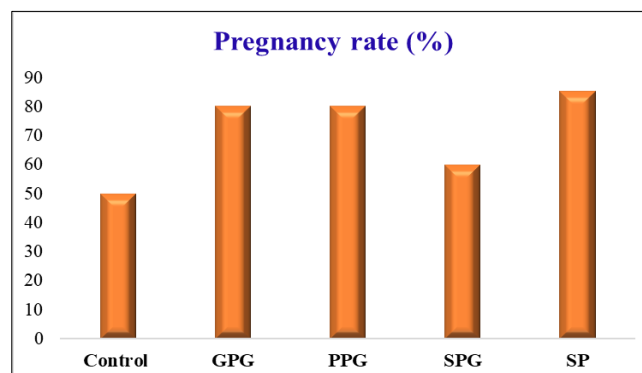


Fig. 1: The pregnancy rate (%) in different group of does

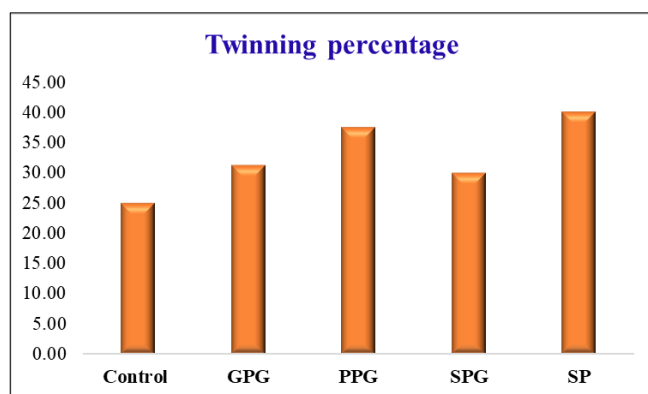


Fig 2: Twinning percentage in different group of does

Discussion

Pregnancy rate

In the present investigation pregnancy rates were 50, 80, 80, 60 and 85 per cent in control, GPG, PPG, SPG and SP groups, respectively. The pregnancy rates were significantly ($p < 0.05$) higher in does treated with different estrous synchronization protocols than the control group, which indicates that the estrous synchronization protocols were effective in achieving higher pregnancy rates in the does. The pregnancy rate observed in the GPG group was 80%; this result was similar with the findings of Senthil Kumar *et al.* (2016) [4] in Tellicherry goats (80%), Cinar *et al.* (2017) [5] in hair goats (85%) whereas, lower findings were reported by Holtz *et al.* (2008) [6] in Boer goats (58%), Riaz *et al.* (2012) [7] in Beetal and Dwarf does (60%). The pregnancy rate observed in the PPG group was 80%; this result was similar with the findings of Riaz *et al.* (2012) [7] in Beetal and Dwarf does (78%), whereas, lower findings were reported by Parmar *et al.* (2020) [8] as 44.44%. In the present study, pregnancy rate observed in SPG group was 60%; this result was similar with the findings of Pietroski *et al.* (2013) [9] in Saanen goats. The pregnancy rate in SP protocol was 85%; the finding was similar with the reports of Sen and Onder (2016) [10] in Saanen goats (80%), whereas lower findings were reported by Holtz *et al.* (2008) [6] in Boer goats (50%), Amle *et al.* (2017) [11] in Sangamaneri (68%) and Osmanabadi (57.14%) goats.

Kidding rate

The Kidding rate (%) in the present study was 80, 100, 100, 83.3 and 88.2, respectively in control, GPG, PPG, SPG and SP protocols. The kidding rates in does treated with different estrous synchronization protocols were higher as compared to control. Whereas, Amle *et al.* (2017) [11] reported 63.64% in Sangamaneri and 71.43% kidding rate in Osmanabadi goats in SP protocol. 100% kidding rate was reported by Parmar *et al.* (2020) [8] in Surti goats and Biradar *et al.* (2019) [12] in Malabari goats.

Litter size and Twinning percentage

The mean litter size observed in control, GPG, PPG, SPG and SP groups were 1.25, 1.31, 1.37, 1.30, and 1.40, respectively. The litter size was higher in does treated with different estrous synchronization protocols than the control group. The mean twinning percentage was 25.00, 31.20, 37.50, 30.00 and 40.00 in control, GPG, PPG, SPG and SP groups, respectively. The twinning percentage was significantly ($p < 0.01$) higher in does treated with different estrous synchronization protocols than the control group. Twinning rate of 40% in control group,

25% in double PGF2 α group was reported by Parmar *et al.* (2020) [8] in Surti goats.

In conclusion, the results of the present investigation revealed that SP group, in which the does were implanted with intra-vaginal sponges for 9 days and 300 IU of PMSG injected intramuscularly at the time of removal of sponges, was the best in terms of pregnancy rate, litter size and twinning rate than the other protocols. Studies have to be conducted on large number of animals to confirm the efficacy of these treatment protocols for further confirmation.

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Conflict of interest

The authors have no conflict of interest to declare.

Appendix

GnRH: Gonadotropin Releasing Hormone

PGF2 α : Prostaglandin F2 Alpha

PMSG: Pregnant Mare Serum Gonadotropin

References

- Kumar DAP, Kunnath SK, Reddy KAK, Sreenivas D. Characterization of Local Mahbubnagar Goat under Field Conditions. *International Journal of Livestock Research*, 2018;8(6):322-327.
- Zhao Y, Zhang J, Wei H, Sun X, Mu B, Yu M, *et al.* Efficiency of methods applied for goat estrous synchronization in subtropical monsoonal climate zone of Southwest China. *Tropical animal health and production*. 2010;42:1257-1262.
- Fatet A, Pellicer-Rubio MT, Leboeuf B. Reproductive cycle of goats. *Animal reproduction science*. 2011;124(3-4):211-219.
- Senthil Kumar K, Selvaraju M, Napoleon RE, Doraisamy KA, Mohan B. Pattern of Oestrus and Fertility Rate Following Synchronization of Ovulation In Tellicherry Goats. *International Journal of Science Environment and Technology*. 2016;5:3289-3296.
- Cinar M, Ceyhan A, Yilmaz O, Erdem H. Effect of estrus synchronization protocols including PGF2 α and GnRH on fertility parameters in hair goats during breeding season. *Journal of Animal Plant Sciences*. 2017;27:1083-1087.
- Holtz W, Sohnrey B, Gerland M, Driancourt MA. Ovsynch synchronization and fixed-time insemination in goats. *Theriogenology*. 2008;69:785-792.
- Riaz H, Sattar A, Arshad MA, Ahmad N. Effect of synchronization protocols and GnRH treatment on the reproductive performance in goats. *Small Ruminant Research*. 2012;104:151-155.
- Parmar CP, Dharmi AJ, Patel JA, Belsare VP. Efficiency of different estrus synchronization protocols in Surti goats. *The Indian Journal of Veterinary Sciences and Biotechnology*. 2020;15:21-23.
- Pietroski ACCA, Brandao FZ, Souza JM, Fonseca JFD. Short, medium or long-term hormonal treatments for induction of synchronized estrus and ovulation in

- Saanen goats during the nonbreeding season. *Revista Brasileira de Zootecnia*. 2013;42:168-173.
10. Sen U, Onder H. The effect of estrus synchronization programmes on parturition time and some reproductive characteristics of Saanen goats. *Journal of Applied Animal Research*. 2016;44:376-379.
 11. Amle MB, Birade HS, Gulawane SU. Estrus response and conception rate in Sangamneri and Osmanabadi goat does using different estrus synchronization protocols. *International Journal of Advanced Veterinary Science and Technology*. 2017;6:308-315.
 12. Biradar V, Magnus Paul K, Simon S, Kurien MO, Lali F A, *et al*. Efficiency of three different protocols of oestrus synchronization in malabari goats. *The Pharma Innovation Journal*. 2019;8:143-146.