Short Communication

Fertility and fecundity rate in progesterone impregnated intravaginal sponge and eCG administered non-descript goats

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ABSTRACT

The efficacy of estrus synchronization for improving the fertility and fecundity was studied in 428 non-descript goats in Kanchipuram district (Tamil Nadu) selected based on clinical and ultrasound examination for synchronization. Non pregnant does were inserted with intravaginal progesterone sponge containing 300 mg of progesterone on day 0 and administered Inj. Cloprotenol sodium (Pragma) 125µg on day 10. The sponge was removed on day 11 of insertion followed by intramuscular injection of 200 I.U. of eCG (Inj.Folligon). Timed Artificial Insemination was done twice at 12 and 24 h interval using Tellicherry frozen semen. Among the synchronized does,359 does were confirmed pregnant by 30-45 days post insemination using transrectal ultrasonography with a conception rate of 83.87% and fecundity rate of 2.038. The study concludes that the progesterone based intravaginal sponge in combination with eCGcan be effectively used for estrus synchronization programme to improve conception rate and fecundity in non-descript goats at farmers flocks.

Key Words: Fertility, Fecundity, Goats, Intra-vaginal progesterone device, eCG

INTRODUCTION

In the last decades, synchronization protocols are based on controlled internal drug release (CIDR) or intravaginal polyurethane sponges impregnated with progesterone (P_4), or their synthetic analogues (progestogens) mainly medroxyprogesterone, melengestrol and fluorogestone acetate forms, along with equine chorionic gonadotropin (eCG) and prostaglandin $F_2\alpha$ ($PGF_2\alpha$) or even estrogenic pharmacologic active substances are found to be effective in small ruminants (Abecia *et al*., 2011).

Combination of progesterone with eCG stimulates the ovarian follicular growth and circulating estradiol levels thereby improving the synchronization

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and estrus response rate in both cyclical and non-cyclical females (Quintero-Elisea *et al*., 2011; Lone *et al*., 2016). Under this background, the present study was conducted to investigate the efficacy of estrus synchronization by using progesterone impregnated intravaginal sponges and fixed time artificial insemination (FTAI) protocol in improving conception rate and fecundity rate in non-descript goats.

MATERIALS AND METHODS

The present study was conducted on non-descript goats in 15 selected villages of Kanchipuram district in Tamil Nadu, India. A total of 1556 non-descript goats were screened and 428 goats were selected for further studies.Apparently healthy multiparous goat of 2-6 years of age having approximate body weight ranging from 20-35 kgs of first to fourth parity were having Body Condition Score (BCS) of more than 2.5 andfree from other infections were randomly selected. Pregnant goats and goats with poor body score were not included in this study. The selected does were dewormed with a single dose of Fenbendazole suspension @ 5mg/kg body weight and supplemented with TANUVAS mineral mixture @ 10g/day orally for one month prior to start of study (Fig. 1). Re-examination was carried out after one month using real time Ultrasonography (Sonascape S2V, China) to rule out early pregnancy (Fig. 2a and2b). Then the does were inserted with Intravaginal progesterone Sponge (ICAR-CSWRI, Avikanager, India) containing 300mg of progesterone (Fig. 3 and 4) as per standard procedure and marked as day 0.The animals were given Inj. Cloprostenol sodium (Inj.Pragma, Intas, India) total dose of 125 µg on day 10.The sponge was removed on day 11 of insertion and 200 I.U. of eCG (Inj.Folligon, Intervet, Canada) was administered intramuscularly on the same day. Timed Artificial Insemination was done twice at 12 hours interval with Tellicherry breed frozen semenonday 13 (Fig. 5).

Fig. 1. Deworming of selected goats

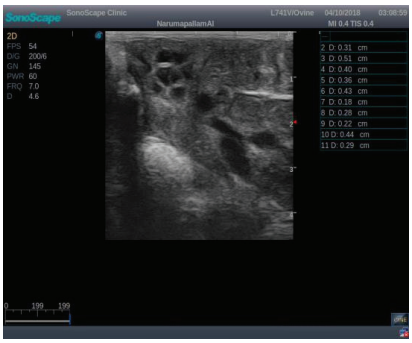


Fig. 2a&2b. Ultrasonic view of ovaries with multiple follicles in non -pregnant doe

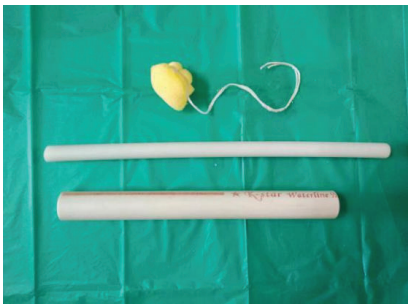


Fig. 3. Intravaginal progesterone sponge with applicator

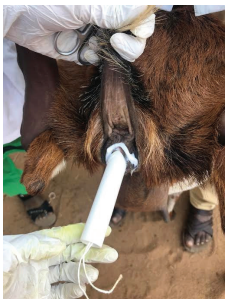


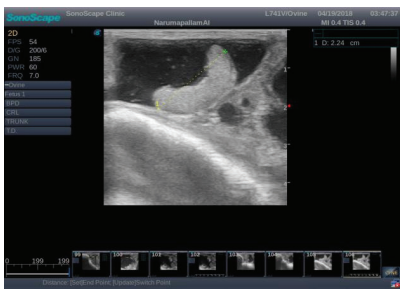
Fig. 4.Intravaginal progesterone sponge insertion

Fig. 5. Artificial insemination using Tellicherry frozen semen

Pregnancy verification was done on 30-45 days post insemination using transrectal ultrasonography (Fig. 6 and 7) and pregnancy was confirmed based on visualization of either gestational sac or concave or C-shaped placentome (Fig. 8a and8b). All data were collected and analyzed. The conception rate was calculated as number of does confirmed pregnant to the number of does mated and the fecundity rate was calculated as the number of kids born to the number of does mated.

Fig. 6. Pregnancy diagnosis- Gestational sac and multiple fluid pockets

Fig. 7. Pregnancy diagnosis- Gestational sacs of twin fetuses



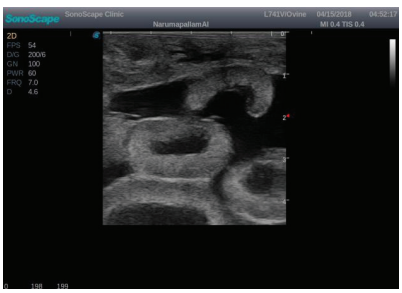


Fig. 8a&8b. Concave or C- shaped placentome

RESULTS AND DISCUSSION

In initial screening out of 1556 goats, 21 (1.35%) were repeat breeders, 678 (43.57%) were pregnant, 77 (4.95%) were in estrum, 204 (13.11%) had poor body condition (Table 1). In the present study, all the animals (100%) responded for estrus synchronization and exhibited estrus and all the does were inseminated with Tellicherry breed frozen semen. The present study shows that out of 428 animals synchronized, 359 goats were tested positive for pregnancy with a conception rate of 83.87%. Furthermore, 63 (17.55%) does delivered singleton, 219 (61%) does delivered twins and 77 (21.44%) does delivered triplets (Table 2).

Table 1: Does screened for Estrus synchronization protocol under field condition at Kanchipuram district

S. No.	Attributes	Total and percentage
1	No. of animals screened	1556 (100%)
2	No. of animals pregnant at the time of initial screening	678(43.57%)
3	No. of animals with poor body condition	204 (13.11%)
4	No. of animals at estrum	77 (4.95%)
5	No. of repeat breeder	21 (1.35%)
6	No. of animals with metritis	6 (0.38 %)
7	No. of hermaphrodite animals	1 (0.064%)
8	No. of animals selected after initial screening	569 (36.56%)
9	No. of animals pregnant at second screening	141 (24.78%)
10	No. of animals selected for estrus synchronization after second screening	428 (75.22%)

Table.2. Effect of intravaginal progesterone device and timed AI on conception rate in non-descript goats

S. No.	Attributes	Details
1	No. of animals screened	1556
2	No. of animals synchronized	428 (100%)
3	No. of animals responded for estrus synchronization and percentage	428 (100%)
4	No. of animals AI done	428 (100%)
5	No. of animals confirmed pregnancy	359 (83.87%)
6	Conception rate	83.87%
7	No. of kids born	732
	a) No. of animals kidded single kid	63 (17.55%)
	b) No. of animals kidded twins	219 (61%)
	c) No. of animals kidded triplets	77 (21.44%)
8	Fecundity rate	2.038

In the present study, the estrus response following progesterone and eCG treatment was observed to be 100%. This finding is in line with the reports of Luther *et al*. (2007) and Kavitha *et al*., (2018) who also reported estrus response of 100%, using progesterone intravaginal sponge whereas De *et al*., (2015) reported a lesser estrus response of 79.4% using AVIKESIL sponges in ewes. The progesterone impregnated intravaginal sponges act as an artificial corpus luteum and elevated the progesterone level in circulation upon its insertion thus suppressing the pulsatile release of GnRH and LH and arrest the follicular activity. Consequently, the drop

in circulatory concentration of progesterone after progesterone implant withdrawal promote the release of GnRH, followed by FSH and LH release leading to resumption of ovarian cyclicity (Zerbe *et al*., 1999). Therefore, combination of progesterone impregnated intravaginal device, $PGF_2\alpha$ and eCG enhances the intensity of estrus behavior and eCG also increases the fecundity rate.

Vinoles *et al*., (2001) recorded 67.0%, in ewes synchronized with MAP intravaginal sponge *in situ* for 12 days followed by eCG injection and only 60.0% conception rate reported by Martemucci and D'Alessandro (2010) in ewes synchronized with 40 mg of FGA intravaginal sponges *in situ* for 14 days followed by 400 IU of eCG at the time of sponge withdrawal. However, Dogan *et al*.,(2018) reported a lower conception rate (27.8%) using norgestomet ear implants plus an intramuscular injection of 500 IU of equine chorionic gonadotropin (eCG) and 125 µg cloprostenol ($PGF_2\alpha$), 48 h prior to progestagen removal.

The conception rate in the present study was recorded to be 83.87% which was higher as compare to previous reports indicating that the progesterone based intravaginal device for estrus synchronization programme and Timed Artificial Insemination protocol along with eCG treatment were effective in improving the conception rate and fecundity rateto 83.87% and 2.038 respectively. Hence, present study concludes that progesterone impregnated intravaginal sponge combined with eCG could be effectively employed for Timed insemination and to improve the conception rate and fecundity rate economically.

Hence upgrading the local goat breeds with 3 kidding in every two years under field conditions can thus be achieved by hormonal interventions.

ACKNOWLEDGEMENTS

The authors thank Govt. of Tamil Nadu and India for providing the necessary fund through NADP to carry out this research work. The authors are also thankful to the Director of Clinics and Professor and Head, Department of Clinics, Madras Veterinary College for providing the necessary facilities.

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