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EFFECT OF BIO-STIMULATION AND CLOPROSTENOL ON PERCENTAGE OF ESTRUS SYNCHRONY AND CONCEPTION IN EWES

U. Adamu[1] and S. Sidi[1]
[1]Department of Theriogenology and Animal Production, Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto.
Corresponding Author: +2347038940355, +2348077612855, edzu1973@gmail.com

ABSTRACT

This study examined the effects of biostimulation on estrus synchrony rates and conception rates in ewes. Twelve matured pre-partum ewes, weighing between 21 and 31 kg and 1 – 2 years of age were used for this study. The animals were assigned to four treatment groups (A,B,C and D) each consisting of three (n = 3) animals. Estrus manifestations were seen in group A, B, C and D as 100, 66.7, 66.7 and 0% respectively. The percentage conception in the groups confirmed through ultrasound scan were Percentage synchrony was highest in group A, with all the animals being synchronized after the second dose of cloprostenol were administered. In groups B (single dose of cloprostenol with introduction of a ram) and C (double doses of cloprostenol without introduction of ram) percentage synchrony were same. Bio stimulation had a synergistic effect on cloprostenol and their combination will reduce cost of synchronization and is therefore recommended for synchronization programs.

Key words: Biostimulation, estrus synchronization, percentage conception

INTRODUCTION

There is limited information on methods for estrus synchronization in sheep and goats in Nigeria. Small ruminant, have been reported to form an integral part of the cultural life and system of the Nigerian peasantry (Ajala, 2004). Shaib *et al* (1997) stated that the pressing need to increase the production of domestic food animals, which are conventional sources of animal protein, so as to overcome the acute shortage of animal protein in a developing country like Nigeria cannot be over emphasized.

The reproductive performance of sheep and goats indigenous to the tropics in general is low particularly due to insufficient data available and poor nutrition and management. Some of the factors responsible for this low reproductive efficiency include irregular estrous cycles, poor sign of estrus, and low fertility rates. Uda and Balami are one of the most widespread breeds in Northern Nigeria (Momoh *et al*., 2013).

There is a lack of comprehensive studies that investigate the synergistic effects of bio-stimulation and Cloprostenol on both estrus synchronization and conception rates in ewes. This gap in knowledge limits the ability of farmers and researchers to develop improved reproductive management protocols that maximize the potential for successful breeding outcomes. Thus, this study was conducted to determine the efficacy of EAZI-BREED™ CIDR® and cloprostenol on estrus synchronization and superovulatory response of eCG and subsequent fertility and fecundity in Uda and Balami ewes and also to evaluate the effect of bio-stimulation and Cloprostenol on estrus synchrony and conception rates in ewes.

Treatment with intravaginal sponge impregnated with fluorogestone acetate, FGA or intravaginal device containing progesterone (controlled intravaginal drug release), CIDR®, for a period of 10-16 days and intramuscular injection of eCG at intravaginal device removal have been successfully used to improve the reproductive performance in ewes (Haresign, 1992; Kohno *et al*, 2005).

MATERIALS AND METHODS

Experimental Animals and Treatment Groups

Twelve matured cycling ewes between 12 and 24 months and two matured rams between 18 and 24 months aged. The ages of the animals were estimated based on their dental eruption pattern (Rotimi *et al*., 2020; FAO, 2012; Dereje *et al*., 2013). The animals were purchased from available animal markets in Sokoto and its environs. The ewes after purchase were scanned using ultrasound machine to rule out pregnancy and animals found pregnant were replaced with some others and ascertained not pregnant before the commencement of the experiment. The rams were examined for their breeding soundness. The ewes were separated from the rams and conditioned for 2 months. During the period, feed and water were provided *ad libitum.*

Group A. Consists of three Uda ewes separated from rams for 2 months. Animals were administered two doses of cloprostenol at 125µg/animal 11 days apart. A ram was introduced at the beginning of experimentation.

Group B. Consists of three Uda ewes separated from rams for 2 months and were administered a single dose of cloprostenol at 125µg/animal. A ram was introduced at the beginning of experimentation

Group C. Consist of three Uda ewes separated from rams for 2 months and were given two doses of cloprostenol at 125µg/animal 11 days. The group had no ram introduced.

Group D. Consist of three Uda ewes separated from rams for 2 months. Animals in this group were given placebo (0.5ml of normal saline i.m) with no introduction of ram.

Estrus Synchronization.
Intramuscular administration of cloprostenol at a dose rate of 125µg was given as described for the groupings above.

Estrus Detection
The treated ewes were visually observed for behavioral estrus manifestations three times daily, 08:00am, 12:00pm and 06:00pm (Akusu, 2003) for five days. Two intact rams (n=2) were used to aid estrus detection. Standing to be mounted by other female and mounting by the males (homo and heterosexual mounting) were taken to be the primary and sole criteria to judge evidence of estrus. Other secondary signs of estrus such as clear mucus discharge, restlessness, tail wagging, frequent bleating, reddened and swollen vulva, frequent adoption of urination posture were also noted and taken into account (Zakari,1981).

Plate I: Post synchronization exhibition of edematous vulva by ewe on heat following treatment

Estrus Behavior and Efficacy of Synchronization.
The following estrus behaviors were measured:
Estrus response (%); Ihis was expressed as the number of ewes that showed standing estrus and subsequently mated, to the total number of ewe in each treatment, expressed in percentage.
Breeding; Following display of standing heat, the ewe was subjected to natural mating with a ram in all the groups. There was no specific number of times, ewes on heat were mated.
Pregnancy diagnosis to determine percentage conception were conducted as stated in the methodology.

Plate II: Post synchronization mating and exhibition of "standing heat" by animal after treatment

Percentage conception (%); Post breeding ultrasound scanning (USS) was conducted three times on all animals starting from twenty-five days post breeding and subsequently on weekly basis for five times. An animal was considered pregnant if a distinct, intrauterine, sharply defined anechoic round or oval structure was observed in the uterine lumen, or if a visible conceptus (anechoic elongated structure) or embryo was seen in the uterine lumen.

RESULTS

Three criteria were used in detecting the animals on heat, they include swelling of the vulva, vaginal discharge and standing heat.

Percentage synchrony

In group A, there was 100% synchrony and 66.7% synchrony in group B. In group C a synchrony of 66.7% was achieved. The control group (Group D) recorded no estrus.

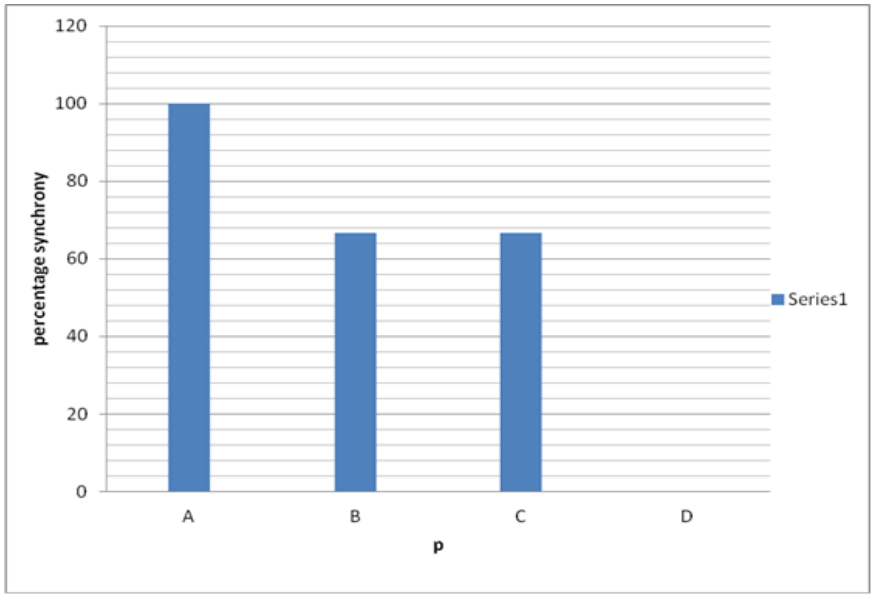

Figure 1: Showing percentage synchrony following different treatments in Ewes

Table 1: Percentage conception (%) following various treatments in Ewes

Groups (n=3)	Conception rate (%)
A	100
B	66.7
C	66.7
D	33.3

Plate VI: Ultrasonographic appearance of gravid uterus (arrow) post mating USS

DISCUSSION

Percentage synchrony

In this study there were 100%, 66.7% and 66.7% synchrony in groups A, B and C respectively. Response to estrus in group A with combination of biostimulation and two doses of cloprostenol 11 days apart was higher than groups B and C. In group B we introduced ram but administered a single dose of cloprostenol while in group C, two doses of cloprostenol 11 days apart was administered without

introduction of ram. This result disagree with Omontese *et al.* (2010) reported in Yankasa sheep using Eazi-BreedTM CIDR and FGA to synchronize estrus where he obtained 70% and 80%, respectively and that of Dogan *et al.* (2005) but agrees with the range of 62.5-100% quoted in treatment with FGA and MAP intravaginal sponges (Romano, 2002) or in combination with PGF2α (Lebouef *et al.,* 2003). The observed discrepancies in results may stem from variations in synchronization protocols, animal species studied, and environmental conditions. Notably, Groups B and C achieved comparable synchronization rates despite differing treatment regimens: Group B received a single cloprostenol dose combined with biostimulation (ram introduction), whereas Group C was administered two cloprostenol doses. The parity in synchronization between these groups suggests that biostimulation in Group B likely enhanced the efficacy of the single-dose protocol. This aligns with findings by Greyling & Van Der Nest (2000), who demonstrated that ram exposure elevates luteinizing hormone (LH) secretion in ewes, thereby inducing ovulation. Furthermore, prior studies confirm that male introduction accelerates puberty onset in ewe lambs, a phenomenon documented across multiple breeds, including Merino, Romney, Dorset, Southdown, Awassi, Corriedale, Préalpes, and Berrichon. In this study, the inclusion of intact males in Groups A and B likely contributed to their high synchronization rates (100% and 66.7%, respectively), underscoring the synergistic role of biostimulation in reproductive synchronization.

Percentage Conception

In this study the percentage conception at the end of the last USS was 100% for animals that were bred post synchronization in group A, 50% for group B and 50% for group C. This high percentage conception may be attributed to high ratio of male to female in the groups (1:6) as against the normal ration of 1:10 (Omontese *et al.,* 2010).

CONCLUSION

The study demonstrated that combining the ram effect (biostimulation) with cloprostenol produces a synergistic influence, enhancing the efficacy of cloprostenol in inducing estrus in Uda ewes. This combination not only reduced the required quantity of synchronizing agents but also lowered associated costs. Key physical indicators of estrus, including standing heat, vaginal discharge, and vulvar swelling, were consistently observed. The findings strongly suggest that integrating cloprostenol with biostimulation is a viable strategy for estrus synchronization, yielding both high synchrony rates and improved conception percentages. Furthermore, incorporating ultrasonography for early pregnancy detection in this species offers significant benefits for animal husbandry, particularly by shortening lambing intervals and optimizing reproductive management.

RECOMMENDATIONS

To optimize estrus synchronization protocols, a single injection of cloprostenol paired with biostimulation is recommended, as this approach minimizes the use and cost of hormonal agents. Further research should explore the effects of varying cloprostenol doses in combination with biostimulation to refine dosage guidelines. Additionally, investigating the application of this combined method in pre-pubertal and postpartum ewes could expand its utility across different reproductive stages. Finally, promoting early sonographic pregnancy detection is advised to enhance accuracy in breeding programs and support efficient herd management practices.

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