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Reproductive Performance in Dorper Ewes Synchronized at Estrus During non Breeding Season in Tropical Conditions

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Abstract: With the objective to evaluate reproductive response in Dorper ewes were studied during non-breeding season under tropical conditions of Mexico. Ewes were randomly assigned to one of three treatments: T1 (n = 20): continuous breeding; T2 (n = 15): 65 mg Medroxiprogesterone Acetate (MPA)+500 I.U. equine Chorionic Gonadotrophin (eCG) at sponge removal+controlled breeding and T3 (n = 16): 100 μg of gonadotropin releasing hormone (GnRH) (Day 0) +7.5 mg of luprostiol (Day 5) and 100 μg of GnRH (Day 6.5). Estrus percentages were 65, 93.3 and 25% for T1, T2 and T3, respectively. The average pregnancy percentage was 43.7% with the higher value for T2 and the lower for T3 and the prolificacy percentage was 100% for all the treatments. It is was concluded that intravaginal sponges impregnated with 65 mg of medroxiprogesterone acetate used during 12 days, plus 500 I.U. of eCG, efficiently synchronized estrus in Dorper ewes whereas the ovsynch scheme presented low pregnancy and prolificacy percentage.

Key words: Medroxiprogesterone, eCG, reproduction, ewes, ovsynch, prolificacy, pregnancy

INTRODUCTION

The Soconusco region, Chiapas has an inventory of 52,000 head of sheep widely distributed in the 16 municipalities of which it is made up. Among the principal exploited breeds there are Pelibuey, Blackbelly, Katahdin and Dorper, the latter being one of the greatest impact during the last years. The use of different reproduction techniques, such as heat synchronization, semen freezing and artificial insemination with fresh or frozen semen allow multiplying and dissemination of high genetic value.

Estrus synchronization protocols in ewes, integrated by intravaginal devices impregnated with natural progesterone or progestagens combined with ovulation inductors (Keefe and Wichte, 2000; Mehmet and Kuran, 2003) and prostaglandins (Mann and Haresign, 2001) are the most efficient tools there are for making a planned reproduction management having a consequence of higher estrus detection percentage, gestation and reduction of days open for which it is possible to obtain three lambs in the course of 2 years. The Dorper breed comes from the cross of a Dorset with a Persian black head which produces bigger animals than the hair breeds originating from tropical regions however, in scientific literature, there is no information that justifies the cross of this breed with the endemic breeds of Soconusco, Chiapas. Likewise, there is no information on the response of the Dorper breed being submitted to reproduction programs of estrus synchronization and artificial insemination in tropical conditions. Because of the aforementioned, the present study had the objective of assessing reproductive efficiency of the Dorper genotype synchronized to estrus with different hormonal schemes during the period of low fertility in the Soconusco region, Chiapas, Mexico.

MATERIALS AND METHODS

The present study was carried out on Las Delicias farm located in the municipality of Metapa de Dominguez, Chiapas (14°50'08 N and 92°11'28 W) with an altitude of 100 m above sea level. The predominant climate is warm-humid with rainfalls in the summer, annual mean temperature of 25°C and annual mean precipitation of 2200 mm.

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About 51 ewes of a Dorper breed having approximate weight of 34±6.4 kg and minimum of 60 days postpartum. The ewes fed on meadows sown with Andropogon grass (*Andropogon gayanus*) and African star grass (*Cynodon plectostachyus*). In the evening, they received 300 g of supplement based on ground sorghum, coffeebean hulls, molasses/urea and chicken manure. The ewes were assigned to a completely randomized unbalanced design with three treatments and different number of replications where the replication was represented by one ewe. Treatment 1 (T1) was considered as control where the ewes remained constantly with the male during the time of the experiment. An intravaginal sponge impregnated with 65 mg of Medroxiprogesterone (MPA) was introduced to treatment 2 ewes (T2) during 12 days and at removal, 500 I.U. equine chorionic gonadotrophin were applied. On the next day, the ewes were exposed to three males of the same breed of proven fertility and treatment 3 (T3), the ewes received a dose of 100 μg releasing Gonadotrophin Hormone (GnRH) intramuscularly, 5 days afterwards, 7.5 mg of Luprostiol and 36 h later, a second dose of GnRH were applied. The sheep showing premature estrus during the hormonal treatment were naturally breed with the male every 6 h until the completion of three services. The variables of the study were onset of estrus, distribution of estrus, estrus percentages, pregnancy percentages and prolificacy percentages. Data were analyzed using the GLM procedures of SAS for a completely randomized design and the proportion variables with the t student test (SAS, 1999).

RESULTS

In Table 1 the percentage of estrus with different estrus synchronization protocols that occurred in Dorper ewes in conditions of tropical climate can be observed. About 25% (4/16) of the T3 ewes presented premature estrus before finishing the treatment with GnRH and Luprostiol (after the first GnRH dose or after that of Luprostiol) whereas the other 75% of the same group of ewes did not present estrus during the time they were under observation. The percentage of estrus presentation was 65 (13/20), 93.3 (14/15) and 25% (4/16) for T1, T2 and T3, respectively existing differences ($p<0.05$) among treatments. Figure 1 shows that four ewes had signs of estrus before 24 h ten sheep from 24-48 h, eight from 48-72 h and thirteen ewes after 72 h. For the estrus onset variable in hours, differences ($p<0.05$) were found among T1, T2 and T3 since the removal of sponges and the synchronized estrus. Although, the percentage of synchronized estrus was similar in the three treatments, the females treated with GnRH tended to show larger

Table 1: Percentage of estrus presentation and onset in Dorper ewes synchronized with different protocols under tropical conditions

	Treatments[1]		
Parameters	T1	T2	T3
Estrus (%)	65[a]	93[a]	25[ab]
Onset of estrus (h)	70.58±33.03[a]	39.78±13.57[b]	

[1]T1: Control; T2: 65 mg of MPA+500 I.U. of eCG+Controlled breeding; T3: 100 μg of GnRH+7.5 mg of LuprostiolI+100 μg of GnRH+Controlled breeding; [a,b]Different literals in the same row differ ($p \geq 0.05$); *Onset of estrus was not measured because mating at fixed time was used

Table 2: Reproductive performance in Dorper ewes synchronized with ovsynch schemes under tropical conditions of Mexico

	Treatments[1] (%)		
Parameters	T1	T2	T3
Pregnancy	40[a]	60[a]	18.6[ab]
Prolificacy	100[a]	100[a]	100.0[a]

[1]T1: Control; T2: 65 mg of MPA+500 I.U. of eCG+Controlled breeding; T3: Ovsynch, [a,b]Different literals in the same row differ ($p \geq 0.05$)

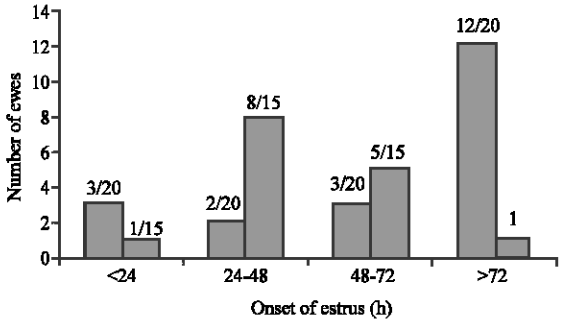

Fig. 1: Distribution and onset of estrus in T1 and T2 Doper ewes synchronized wit ovsynch schemes; T1: Control group. T2: 60 mg of MPA+500 I.U. of eCG+Controlled breeding

grouping of estrus between 36 and 48 h after sponge removal. Mean gestation percentage for the three experiments was 43.7% with the higher value for T2 and the lower for T3 with differences ($p<0.05$) among treatments while the mean percentage of prolificacy was 100% for T1, T2 and T3 without differences ($p>0.05$) among treatments (Table 2). The aforementioned allows deducing that the low percentage of estrus and prolificacy obtained in T3 was probably due to the utilized Dorper ewes not being entirely adapted to the tropical regions of Mexico therefore, it is inferred that they were submitted to heat stress, provoking a reduction in ovulation rate with negative consequences in gestation and prolificacy.

DISCUSSION

The percentage of estrus of this study are similar to the ones mentioned by Simonetti *et al.* (2002) applied

sponges impregnated with 60 mg of MPA and 375 I.U. of eCG and detected 93.4% of estrus after removing the sponges. In a study carried out by Martinez-Tinajero, synchronizing estrus presentations with CIDR with 300 mg natural progesterone during 12 days in combination with 200 I.U. of eCG, 100% estrus occurrence in F1 ewes (Damara×Merino) were found. Likewise, Ortega had a response of estrus presentation by 89.5% in Katahdin ewes, treated with intravaginal sponges containing 60 mg MPA during 14 days, plus application of 250 I.U. of eCG on the 12th day of the treatment. Vinoles *et al.* (2001) reported estrus presentation percentage by 90% in Polwarth ewes, synchronized with intravaginal sponges soaked with 60 mg MPA plus 250 I.U. of eCG injected intramuscularly after removal of the sponges).

Estrus synchronization in ewes is possible by insertion of intravaginal sponges during 12 day which at their removal induce estrus appearance simulating an effect of drastic reduction of P_4 levels in the blood and luteolysis followed by the onset of follicular activity and appearance of estrus, 1 or 2 days afterwards as reported previously for small ruminants. The results of estrus variables in hours are similar that found Kridli *et al.* (2003) where intervals are reported varying between a range from 40-50 h of estrus presentation after removal of the intravaginal device. Thatcher mention that in sheep injecting $PGF_{2\alpha}$ 7 days after the first GnRH injection causes regression of corpora lutea or luteinized follicles because if a corpus luteum resulted from the first GnRH application, the 7 days interval usually will provide enough time for the corpus luteum to mature and be sensitive to $PGF_{2\alpha}$ after 48 h applying a second dose of GnRH should provoke LH release and ovulation of a dominant follicle.

The aforesaid does not agree with the results of the present study, since the sheep having been submitted to ovsynch protocol based on GnRH and $PGF_{2\alpha}$ were those which showed lower gestation and prolificacy percentages. Hopkins *et al.* (1980) and Chemineau (1993) observed that in sheep as well as in goats exposed to heat stress during their reproductive period, severe reductions in gestation and prolificacy percentage may be produced. On the other hand, Nagatani *et al.* (1998) indicate that different environmental stimuli and nutrition are considered among the most important factors regulating animal reproductive function for which possibly the gestation percentages obtained in this experiment seem to be influenced by the genotype of the ewes in this study and their interaction with the environment where they had been managed.

CONCLUSION

It is concluded that the combined use of an intravaginal sponge impregnated with 65 mg of medroxiprogesterone acetate during 12 days, plus 500 I.U. of eCG, efficiently synchronizes estrus in Dorper ewes.

RECOMMENDATIONS

It is recommended to carry out further research into Dorper ewes with ovsynch protocol related to GnRH dose and body condition and their effect on ovulation and prolificacy rate in tropical conditions of Mexico.

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