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# Estrus presentation and distribution in ewes treated with intravaginal sponges impregnated with medroxyprogesterone acetate (MAP) in combination with pregnant mare serum gonadotropin (PMSG)

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## Apresentação e distribuição do estro nas ovelhas tratadas com esponjas intravaginais impregnadas com acetato de medroxiprogesterona (MAP) em combinação com gonadotrofina de égua prenhe (PMSG)

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**SUMMARY**

The objectives of this study were: 1) to determine estrus presentation and distribution following a conventional method of estrus synchronization (progestagen-PMSG treatment) in an ewe herd and 2) to analyze estrus presentation and distribution in adult ewes and ewe lambs. During spring a total of 300 cyclic Merino ewes, including 231 adult ewes and 69 ewe lambs were treated with intravaginal sponges impregnated with 60 mg medroxyprogesterone acetate (MAP). After 14 days sponges were removed and 375 IU pregnant mare serum gonadotropin (PMSG) were administered i.m. Estrus detection was performed with vasectomized rams. Ewes were inspected for the presence of marks at 4-hours intervals. Sponge losses, estrus synchronization and distribution were analyzed for adult ewes and ewe lambs. It was detected 1% (3/300) of sponge losses. Estrus synchronization rate was 92.93% (276/297) for the ewe herd, being 93.48% (215/230) for adults and 91.04% (61/67) for lambs ($p>0.10$). Estrus onset was detected from 28 to 68 hours following treatment in both classes of females. The interval between sponge removal and estrus onset was 46.88 ± 11.78 hours for the ewe herd, being 46.99 ± 12.22 hours for adult ewes and 47.31 ± 10.94 hours for ewe lambs ($p>0.10$). Statistical differences were found only for the intervals 34-38 ($p<0.10$) and 50-54 hours ($p<0.05$) between adult ewes and ewe lambs. It was concluded that the treatment used was effective for estrus synchronization in ewes.

**UNITERMS**: Ewes; Estrus synchronization; Medroxyprogesterone acetate; PMSG; Sponges.

## INTRODUCTION

Estrus synchronization has become a vital instrument in the management of reproduction in domestic animals. Its benefits include a planned breeding program and a reduction in labor costs in terms of estrus detection and care of the newborn[9].

Synchronization of estrus in sheep has been achieved with the use of intravaginal sponges containing synthetic progestagens such as medroxyprogesterone acetate (MAP; 6α-methyl-17α-0000acetoxy-pregne-4-ene-3.0-dione)[3,4,5,8] and fluorogestone acetate (FGA; 9α-fluoro-11β-hydroxy-17α-acetoxy- pregne-4-ene -3.0- dione)[2,4,5,8,14].

An intramuscular injection of a low dose of pregnant mare serum gonadotropin (PMSG) given at the end of the progestagen treatment has been established as resulting in a more precise and reliable synchronization of estrus since it advances the onset of estrus and induces a closer synchronization of these ovulations[5,6,8,9]. This precise synchronization is important for the possibility of application of set time artificial insemination[15].

The objectives of this study were: 1) to determine

estrus presentation and distribution following a conventional method of estrus synchronization (progestagen-PMSG treatment) in an ewe herd and 2) to analyze estrus presentation and distribution in adult ewes and ewe lambs.

## MATERIAL AND METHOD

### Animals and management

A total of 300 cyclic Merino ewes, involving adult ewes (n = 231) and ewe lambs (n = 69) were used in this study. The ewe lambs were born during the previous spring and were about 12 months old at the beginning of the present study. They were of the generally recommended breeding size (65% of expected adult body weight). The experiment was conducted during spring. The animals were managed under the same conditions on one farm. They were kept under natural field conditions, having access to good quality grasses and maintained in good health.

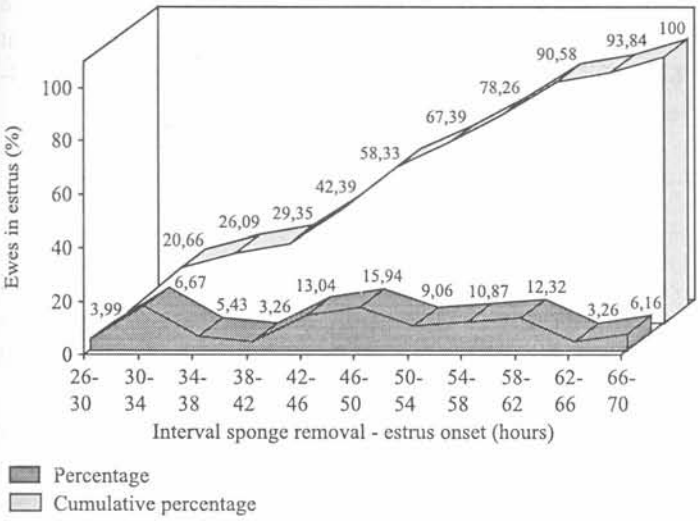


**Figure 1**
Estrus distribution in an ewe herd after treatment with 60 mg MAP-sponges and 375 IU PMSG.

### Synchronization method

All females were treated with 60 mg MAP in impregnated polyurethane sponges. Polyurethane sponges were prepared by the method already reported by Robinson[12].

Pessaries were inserted deep into the vagina and left in place for 14 days.

At sponge withdrawal, both groups of females received an intramuscular injection of 375 IU PMSG.

### Estrus detection

The onset of estrus was carried out by the use of vasectomized rams in a ratio of 5%. Rams were painted with a vegetable dye mixed in a vaseline base so that ewes that were mounted could be identified. The males were introduced in the herd after pessary removal and for a total period of 96 hours. Ewes were inspected for the presence of marks at 4-hours intervals.

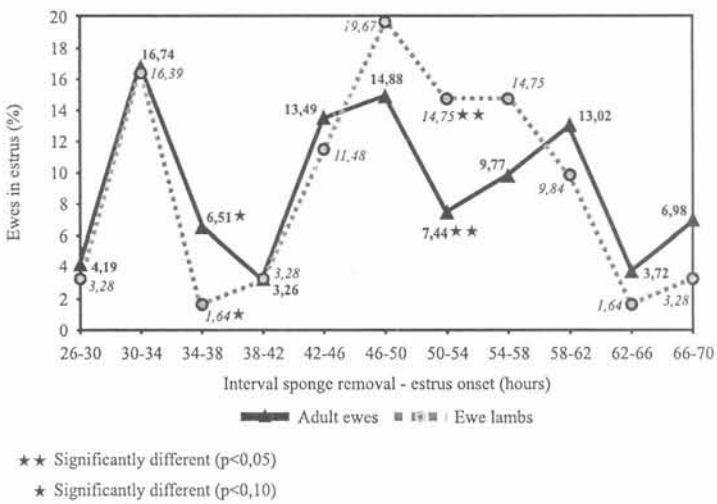


**Figure 2**
Estrus distribution in adult ewes and ewe lambs after treatment with 60 mg MAP-sponges and 375 IU PMSG.

**Table 1**
Sponge losses, estrus response and time interval to onset of estrus in ewes treated with 60 mg MAP-impregnated sponges and 375 IU PMSG. Buenos Aires, Argentina, 1996.

| Item | N. ewes treated | N. sponge losses (%) | N. ewes in estrus (%) | Time to estrus onset (hours:mean ± SD) |
|---|---|---|---|---|
| Total | 300 | 3/300 (1.0) | 276/297 (92.93) | 46.88 ± 11.78 |
| Adult ewes | 231 | 1/231 (0.4) | 215/230 (93.48) (a) | 46.99 ± 12.22 (a) |
| Ewe lambs | 69 | 2/69 (2.9) | 61/67 (91.04) (a) | 47.31 ± 10.94 (a) |

a = Same letters within a column do not differ significantly (p>0.10).

**Evaluation of results**

Estrus percentages for adult ewes and ewe lambs were compared using chi-square test.

Statistical differences for the mean ± SD distribution of estrus onset after treatment between adult ewes and ewe lambs were determined by Students't-test.

Proportions of adult ewes and ewe lambs for each interval of estrus detection were compared by Z test.

## RESULTS

Tab. 1 summarizes sponge losses, estrus response and time interval to onset of estrus for all females, adult ewes and ewe lambs.

Estrus distribution and cumulative estrus distribution for the ewe herd is shown in Fig. 1.

Estrus distribution for each class of female is shown in Fig. 2.

## DISCUSSION

Sponges were retained in 297 of the 300 ewes for the full period of 14 days (Tab. 1). This 1% (3/300) of sponge losses is similar to that reported by other authors[3,5,8,15]. This is in contrast to 16 to 18% sponge losses reported by some authors[1,4] and observed in previous works on the same farm (not published).

Estrus was observed in 92.93% (276/297) of the ewes that retained sponges (Tab. 1). This high degree of synchrony has been achieved by other workers[1,5,8]. Conversely, Alberio *et al.*[3] obtained a lower estrus response working in similar conditions. Estrus synchronization rates were 93.48% (215/230) for adult ewes and 91.04% (61/67) for ewe lambs (Tab. 1). There were no statistical differences between both classes of females for estrus presentation ($p>0.10$). Similar results were reported by Moses *et al.*[7]. However, Ainsworth; Wolynetz[2] obtained a higher percentage of adult ewes marked in comparison with ewe lambs following a treatment FGA plus PMSG. The high estrus synchronization response obtained for ewe lambs in this study has also been reported by other investigators[1,8].

Estrus appearance was detected from 28 to 68 hours following treatment in both classes of females. This data agrees with a previous report[3] where estrus onset was carried out until 72 hours after end of treatment.

The time interval between sponge removal and the onset of estrus (mean ± SD) was 46.88 ± 11,78 hours for the ewe herd (Tab. 1). This result is consistent with the findings of Samartzi *et al.*[13]. The time interval between sponge removal and the onset of estrus (mean ± SD) was 46.99 ± 12.22 hours for adult ewes and 47.31 ± 10.94 hours for ewe lambs (Tab. 1). The mean distribution of estrus onset after synchronization treatment was not significantly different between both categories ($p>0.10$). This is in contrast with Quirke *et al.*[10,11] who found that the time interval between sponge removal and the onset of estrus was shorter for adults than for ewe lambs. Ainsworth; Wolynetz[2] also reported a tendency for ewe lambs to be marked later than adult ewes. Conversely, other authors[7] informed that ewe hoggets underwent estrus significantly earlier than mature ewes.

Cumulative percentage of ewes in estrus showed that 58% of them were marked by 46-50 hours after sponge removal (Fig. 1). Alberio *et al.*[3] obtained 48% of synchronization rate within 48 hours working with Corriedale ewes.

Comparison of proportions between adults and ewe lambs for each interval of estrus detection demonstrates that statistical differences were found only for the intervals 34-38 hours ($p<0.10$) and 50-54 ($p<0.05$) (Fig. 2).

## CONCLUSION

1) It can be concluded that the progestagen-PMSG treatment used in this study was effective for estrus synchronization in sheeps. Adult ewes and ewe lambs showed similar synchronization rates;

2) Although there were no statistical differences for the interval of estrus detection and its mean time between adult ewes and ewe lambs, a different pattern of estrus exhibition was detected in two intervals (34-38 and 50-54 hours);

3) According to the results of the present study, adult ewes and ewe lambs could be treated jointly in an artificial insemination program. Fixed time artificial insemination could be applied due to the close synchronization of estrus.

## ACKNOWLEDGMENT

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**RESUMO**

Os objetivos deste trabalho foram: 1) determinar a apresentação e a distribuição do estro através do método convencional de sincronização do estro (tratamento progestágeno-PMSG) num rebanho de ovelhas; e 2) analisar a apresentação e a distribuição do estro em ovelhas adultas e borregas. Um total de 300 ovelhas Merino em período reprodutivo (primavera), incluindo-se 231 ovelhas adultas e 69 borregas, foram tratadas com esponjas intravaginais impregnadas com 60 mg de acetato de medroxiprogesterona (MAP). As esponjas foram retiradas após 14 dias e foram administradas 375 UI IM de gonadotrofina de égua prenhe (PMSG). Utilizaram-se carneiros vasectomizados para a detecção do cio. As ovelhas foram observadas para a presença das marcas a intervalos de 4 horas. Analisaram-se perdas das esponjas, sincronização e distribuição dos cios nas ovelhas adultas e borregas. Detectou-se 1% (3/300) de perda das esponjas. A taxa de sincronização do estro no rebanho de ovelhas foi de 92,93% (276/297), sendo 93,48% (215/230) nas adultas e 91,04% (61/67) nas borregas ($p>0,10$). Detectou-se a apresentação do cio desde 28 até 68 horas após o tratamento nas duas classes de fêmeas. O intervalo entre a extração das esponjas e a apresentação do cio foi de 46,88 ± 11,78 horas no rebanho de ovelhas, sendo 46,99 ± 12,22 nas adultas e 47,31 ± 10,94 nas borregas ($p>0,10$). Encontraram-se somente diferenças significativas entre adultas e borregas nos intervalos 34-38 ($p<0,10$) e 50-54 horas ($p<0,05$). Conclui-se que o tratamento utilizado foi efetivo na sincronização do estro nas ovelhas.

**UNITERMOS:** Ovelhas; Sincronização do estro; Acetato de medroxiprogesterona; PMSG; Esponjas.

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