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Comparison of two protocols for induction of estrus in black belly ewes

Comparación de dos protocolos de inducción del estro en ovejas de la raza black belly

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Abstract

The aim was to evaluate two protocols for the induction of estrus in hair ewes on the presentation of estrus and fertility. Forty-six ewes of the Black Belly breed were used, the female was divided into two groups: 1) protocol 12 days (P12) and 2) protocol 9 days (P9). P12 sheep were placed with an intravaginal sponge and 400 IU eCG was applied two days before device removal. P9 sheep were sponge inserted, 400 IU eCG was applied two days before device removal, and cloprostenol 250 mcg was applied at the time of removal. All ewes inseminated by laparoscopy. The pregnancy diagnosis was made by ultrasound 48 days after artificial insemination. 100% of the sheep were in estrus. Fertility was 78.3% in P9 ewes and 91.3% in P12 ewes, with no differences between the groups (P>0.05). In conclusion, the use of P9 for the induction of estrus is as effective as P12 in the presentation of estrus and fertility percentage at 48 days.

Ewes, Estrus induction, Fertility

Resumen

El objetivo fue valorar dos protocolos de inducción del estro en ovejas de pelo sobre la presentación del celo y la fertilidad. Se utilizaron 46 ovejas de la raza Black Belly, las hembras fueron divididas en dos grupos: 1) protocolo con duración de 12 días (P12) y 2) protocolo con duración de 9 días (P9). A las ovejas del P12 se les colocó una esponja intravaginal y se aplicaron 400 UI de eCG dos días antes del retiro del dispositivo. A las ovejas del P9 se les insertó una esponja, se aplicaron 400 UI de eCG dos días antes del retiro del dispositivo y se aplicaron 250 mcg de cloprostenol al momento del retiro. Todas las ovejas fueron inseminadas por laparoscopía. El diagnóstico de gestación se realizó mediante ecografía 48 días después de la inseminación artificial. El 100% de las ovejas presentaron celo. La fertilidad fue de 78.3% en las ovejas del P9 y 91.3% en las ovejas del P12, sin observar diferencias entre los grupos (P>0.05). En conclusión, el uso de P9 para la inducción del estro es tan efectivo como el P12 en la presentación del celo y porcentaje de fertilidad a 48 días.

Ovejas, Inducción del estro, Fertilidad

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1. Introduction

Reproductive biotechnologies such as synchronization and / or induction of estrus and artificial insemination are tools that allow accelerated genetic progress, in addition to allowing better reproductive control of the herd, especially to better control the calving season, cover in the anestrous season, group animals into homogeneous lots, schedule weaning and sell animals by batch.

On the other hand, profitability can be substantially improved since synchronization and / or induction protocols increase female prolificacy and the number of parturitions per female per year increases.

The synchronization and / or induction of estrus can be carried out by different methods, these can be natural or hormonal. The most widely used hormonal-type estrus induction or synchronization protocols are based on polypropylene sponges impregnated with progestogens and silicone devices impregnated with natural progesterone. There are also other types of hormonal products that are administered parenterally, such as equine chorionic gonadotropin (eCG), gonadotropin-releasing hormone (GnRH) and prostaglandin F2α (PGFα) and their synthetic analogues, which when used in combination with progesterone and its analogues also synchronize ovulation during the time of year when fertility is decreased or the regression of the previously existing or newly formed corpus luteum (Tabarez and Grajales, 2020).

In recent years, short-term treatments have been proposed, being able to reduce exposure to progesterone to only 5-7 days (Menchaca et al., 2007). Therefore, the objective was to compare the effect of two protocols of estrus induction (12 days vs. 9 days duration) in hairy sheep of the Black Belly breed on the presentation of estrus and fertility at 48 days.

2. Material and methods

The research was carried out during a positive photoperiod (March to April) in a Livestock Production Unit located in the municipality of Tihuatlán, Veracruz, which is located in the north of the state at coordinates 18 ° 27 'north latitude and 96 ° 21 'west longitude at a height of 60 meters above sea level.

Its climate is warm-regular, with an annual average temperature of 22 ° C; its average annual rainfall is 1,076.2 mm (INEGI, 2015).

46 second parturition females of the Black Belly breed were used, with body condition 3 on a scale of 0 to 5 (Russel et al., 1969), the females were randomly divided into two groups: group P12, estrus induction protocol with duration of 12 days (n = 23) and group P9, protocol of induction of estrus with duration of 9 days (n = 23).

In the sheep of group P12, on day 0 a polyurethane sponge containing 20 mg of cronolone (Chronogest CR®) was placed intravaginally, remaining in the insertion site for 12 days, on day 10 they were applied intramuscular 400 IU of equine chorionic gonadotropin (eCG; Novormon 5000 ®) and the sponge was removed on day 12.

In group P9 sheep, on day 0 the sponge was inserted intravaginally, remaining in the insertion site for 9 days, on day 7 was applied intramuscularly 400 IU of eCG and on day 9 it was performed removal of the sponge and 250 mcg of synthetic prostaglandin cloprostenol (Celosil ®) were applied intramuscularly.

The estrus detection of all the ewes was carried out 24 hours after the removal of the sponge using a ram with penis deviation, the detection was carried out twice a day (in the morning and in the afternoon), a female was considered in estrus when he allowed the riding of the ram. All ewes were inseminated at a fixed time (50 hours after removal of the sponge), artificial insemination (AI) was performed by laparoscopy with thawed semen.

The pregnancy diagnosis was made 48 days after AI by transrectal ultrasound. All the sheep were fed daily with 2.7 kg of wet orange silage, 2 kg of insurgent grass (*Brachiaria brizantha*) hay and 0.5 kg of balanced feed with 18% crude protein. The water and mineral salts were provided freely available.

The statistical analysis of the variable hours of presentation of estrus was performed with the Student's t test for independent samples and the fertility variable, evaluated as a percentage of gestation at 48 days, was analyzed using the Chi-square test, using the SPSS statistical package 24 for MAC (IBM SPSS, 2016).

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3. Results

Ewes in both the 9-day and 12-day protocols responded to estrus induction, 100% of the ewes in both groups manifested estrus. Regarding the time in which they presented estrus after removal of the intravaginal sponge, the ewes of the 12-day protocol presented it 30.31 ± 0.05 hours after the removal of the sponge and the ewes of the 9-day protocol presented estrus at 30.29 ± 0.02 hours, without observing differences between the groups (Pα 0.05; Table 1).

Estrus induction protocol	Hours of presentation of estrus
12 days	30.31±0.05
9 days	30.29±0.02

Table 1 Hours of presentation of estrus (mean ±standard error) after removal of the intravaginal sponge in sheep with estrus induction using a protocol of 12 days vs. 9 days.

The fertility at 48 days in the sheep of the 12-day estrus induction protocol was 91.3% and in the sheep of the 9-day protocol it was 78.3%, without observing statistically significant differences between the groups (P> 0.05; Table 2).

Estrus induction protocol	Fertility percentage
12 days	91.3 (21/23)
9 days	78.3 (18/23)

Table 2 Percentage of fertility in ewes with induction of estrus using a protocol of 12 days vs. 9 days.

4. Discussion

In the present study, 100% of the ewes exhibited estrus, both in the 9-day estrus induction protocol group and in the 12-day protocol group, unlike Farfán et al. (2009), who when comparing a 12-day and a 6-day synchronization protocol using a combination of parenteral PGF2α and intravaginal sponges impregnated with 50 mg of medroxyprogesterone, obtained only 100% of sheep in heat in the 12-day treatment , while in the 6-day protocol only 85.7% presented it. Similarly, Balcázar, (2013) obtained a percentage of estrus synchronization in Dorper sheep that was lower than the present study, after comparing two synchronization schemes, a 5-day protocol and a 12-day protocol, using PGF2α and new CIDR in both groups. impregnated with 0.3 g of natural progesterone and 200 IU of eCG to the sheep of the short protocol.

The percentage of synchronization was 94.7% in the group that received a 5-day treatment and 81.6% for the group with a 12-day treatment. The differences observed in the aforementioned studies were not statistically significant, this means that the short-term regimens with natural or synthetic progesterone are as effective for the synchronization or induction of estrus in sheep, as the long regimens.

Regarding the time of presentation of estrus after removal of the intravaginal sponge, no statistically significant differences were observed between the two protocols, P12 and P9, the ewes of both groups showed the estrus during the first 31 hours. Coinciding with Farfán et al. (2009), who also found no significant differences for said variable between sheep synchronized with PGF2α and a progestogen for 12 days (58.0 ± 16.09 h) and sheep synchronized with PGF2α and progestogen for 6 days (56.4 ± 6.76 h), although the time in which they presented estrus was higher than that observed in the present study.

The pregnancy percentage obtained was lower in the ewes of the 9-day protocol (78.3%) compared to the ewes of the 12-day protocol (91.3%), however, the difference (13%) was not statistically significant, coinciding with Farfán et al. (2009), who also did not observe statistically significant differences between the short synchronization protocol (6 days) and the long protocol (12 days), obtaining a conception rate of 75% in the short treatment and 71.42% in the long treatment. In contrast, Balcázar, (2013) obtained a significantly higher pregnancy percentage in the group of sheep of the 5-day protocol (71.1%) compared to the group of sheep of the 12-day protocol (31.6%). Similarly, Raso (2004), obtained a higher percentage of pregnancy in the short protocol of 6 days (91%) than in the long protocol of 12 days (62.5%), when synchronizing Merino sheep using intravaginal sponges impregnated with Medroxyprogesterone Acetate plus 300 IU of PMSG. Menchaca et al. (2007) point out that the fundamental objective of short protocols is to avoid sublethal progesterone concentrations for prolonged periods and to ensure adequate levels that allow follicular turnover and ovulation of fertile oocytes.

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5. Conclusion

The use of a 9-day protocol for the induction of estrus with intravaginal sponges impregnated with 20 mg of cronolone was as effective as the 12-day protocol in the presentation of estrus, time of presentation of estrus after removal of the device and percentage of fertility.

6. References

Balcázar, SJA. (2013). Sincronización del estro y fertilidad en ovejas Dorper aplicando un esquema corto de progesterona. Disponible en: https://www.ganaderia.com/destacado/Sincronizaci%C3%B3n-del-estro-y-fertilidad-en-ovejas-Dorper-aplicando-un-esquema-corto-de-progesterona

Farfán, JA., Forero, JA., Pardo, NA., Tovar, FJ., Atuesta JE. & Grajales, HA. (2009). Efecto del tiempo de tratamiento con progestágenos sobre las características del celo sincronizado y su fertilidad en ovinos y caprinos bajo condiciones del trópico de altura colombiano. Livest. Res. Rural Dev. 21(1).

Instituto Nacional de Estadística y Geografía (INEGI). (2015). *Cuadernillos municipales*. Tihuatlán, Veracruz.

Menchaca, A., Crispo, M., Vilariño, M. & Rubianes E. (2007). Avances en la aplicación de biotecnologías reproductivas en ovinos y caprinos. VII Simposio Internacional de Reproducción Animal.

Raso, M., Buratovich, C. & Villa M. (2006). Comparación de 4 tratamientos de sincronización de celos en ovinos. Instituto Nacional de Tecnología Agropecuaria (INTA EEA) Bariloche. Ganadería. 9,1-6

Russel, JF., Doney, JM. & Gunn, RG. (1969). Subjective assessment of body fat in live sheep. J. Agric. Sci. Cambridge. 72, 451-454.

Tabarez, A. & Grajales H. (2020). Ovinos. Capítulo 15. In: Reproducción de los animales domésticos. Galina C. México. Disponible en: https://reproduccionanimalesdomesticos.fmvz.unam.mx/libro/capitulo15/index.html

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