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Intravaginal Device for the Collection of Ram Semen

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Summary

Using simple materials, an intravaginal device ((IVD) for sheep was designed to collect semen under field conditions. The IVD was made using 25 cc disposable syringes, Terumo with 9 mm internal diameter and 9 cm long, 9.5 mm internal diameter and 9.5 cm long plastic tubes (M&M) were also used. Semen was collected with a washed condom. The device was inserted into the vaginal canal of the ewe moments before allowing the ram to mount her. When the ram ejaculated, the IVD was removed and the quality of the semen obtained was determined. On two sheep farms, it was observed that the quality of the semen obtained was viable for freezing or fresh insemination**.** The proposed method for the collection of ovine semen with an intravaginal device of handmade construction is suitable and can be of great help to sheep breeders all over the world, due to its easy fabrication in the field.

I. Introduction

Artificial insemination (AI) is a powerful tool for livestock producers. This technique has allowed cattle and pigs to achieve rapid genetic improvement. In these two species AI is widely practised, allowing a linear increase in milk and meat production.

From an anatomical and physiological point of view, the reproductive tracts of cattle and pigs allow semen to be deposited in the optimal depths of the uterus, achieving fertility and prolificacy rates that allow high volumes of milk and meat production.

In Mexico, AI is rarely used in sheep due to the use of artificial vagina and lack of trained personnel.

Semen collection represents the preliminary basis for artificial fertilisation and represents a complex and delicate methodology.

Among the methods that have been devised are artificial vagina, massage and electro ejaculation.

However, the advances in the AI technique in cattle and pigs are supported by the methodology used for the collection of semen.

The most commonly used method is the use of the artificial vagina, with which semen is collected from the species mentioned above.

In 1914 the Italian professor Amantea devised the first artificial vagina to obtain semen from a dog with the so-called fictitious coitus. It was later adapted by Ivanov of the Moscow Institute in 1931 for sheep. The artificial vagina is the most widespread collection method for most mammals. The artificial vagina attempts to replicate, as closely as possible, the conditions of the natural vagina of a female[1].

With the artificial vagina, semen free of impurities and with normal proportions of an ejaculate is obtained. This artificial vagina must be handled under sterile conditions and must be dry during use.

Its advantage is that it is a para-physiological method, which requires the voluntary action of the trained animal and adequate training of the technician who implements it. The disadvantages are: The animal must be trained and it is not easy to develop in field animals.

In rams, there are different models of artificial vagina, such as the Duran Model and the Mies Model, which are used in many sheep breeding centres.

In sheep, the most commonly used methods for semen collection in sheep are the artificial vagina (AV) and electroejaculation (EE). However, VA is not very efficient when the males are not trained, which represents an extreme difficulty when it is necessary to collect semen from many rams2.

In order to avoid all the procedures of using commercial artificial vagina, the use of intravaginal devices has been investigated in cattle[3]; and sheep[2,4].

To date, other intravaginal devices have been designed, including the one by Mozo et. al 2015, made of silicone. These were implemented by the author, with unsatisfactory results.

The problem faced by the sheep producer, when wishing to obtain semen from sires of high zootechnical value, is the availability of devices to obtain semen under field conditions.

The aim of this work is to design an intravaginal device (IVD) to obtain sheep semen, of simple construction that allows its use in field conditions.

II. Material and Methods

Based on the experiences of Wulster-Radcliffe et al (2001). And after countless trials, the IVD was manufactured using 25 cc disposable syringes, Terumo 1.9 mm inner diameter and 9 cm long, and 2.8 mm inner diameter plastic tubing with a length of 9.5 cm (M&M). The entrance of the tube was grooved with two 5 mm grooves and a 2 mm hole, in which a plastic cord is tied to remove the device (IVD) from the vaginal canal after ejaculation (Fig. 1). It can be stated that following these measures the IVD can be easily manufactured**.**

At the mouth of the tube, two slight cuts are made to hold with a rubber band a clean condom and a pair of small strips of foam rubber, which simulate the ovine vaginal narrowing.

Moments before exposing the ram to a ewe immobilised in a lasher, the IVD is introduced into the ewe's vaginal canal, preferring ewes in oestrus, and the ram is immediately released to mount her. As soon as the ram mounts her and ejaculates, the IVD is quickly removed by pulling on the string and the ejaculate is collected for evaluation. The ejaculate is collected at the tip of the condom, the tip is trimmed and the ejaculate is pipetted and deposited in a 5 mL test tube for evaluation and handling.

As a field test, two Pelifolk sheep farms were used, one in the municipality of Arandas, and the other in the municipality of Zapotlanejo, in the highlands region of the state of Jalisco, MEXICO.

In each of the sheep farms, three males of indistinct age and weight, with previous experience of having participated in mating, were randomly selected.

III. Results and Discussion

It was observed that males with no previous training, and no contact with the sheep flock, when exposed to the ewe lashed in a portable trap designed for this work, went to the ewe and proceeded without problem to mount her, it was observed that when rams are kept mixed with the sheep flock their libido is not high. Whereas rams isolated from the flock had excellent libido.

Sometimes rams required up to three attempts to achieve ejaculation. After collection, the semen was kept protected from sudden temperature changes, contact with water and metals, direct sunlight and impurities. All material in contact with the ejaculate should be glass or plastic, clean and dry, and preferably at the same temperature as the semen. The procedure did not cause any damage to the ewes and rams used.
The semen obtained (Figure 2) was evaluated under the microscope for its characteristics and viability as follows:
The evaluation of fresh semen is expressed in averages and percentages. To compare the progressive semen movement of the rams, a one-way ANOVA was performed. To apply these analyses and to determine the statistical significance of the differences obtained, Statistics 6.0 (Statsoft, 2004) was used.

Table 1 Statistical evaluation of ejaculated semen in the intravaginal device

VARIABLE	Arandas (n = 4 Rams)	Zapotlanejo (n 0 = 4)
VOLUMEN (mL)	0,84 ± 0,4 (ml) (0,4 - 1,5)	0,71 ± 0,2 (0,5 - 1)
Concentration (millones/mL)	1.099 ± 298 (700 – 1.5)	1.2 ± 547 (560 - 2.010)
Mass movement (1 – 5)	3,5 ± 0,7 (3 - 5)	3,8 ± 0,8 (3 - 5)
Progressive Movement (%)	76,5 ± 9,1 (70 - 85)	78,5 ± 5,8 (70 - 85)
Live Esperms (%)	75,8 ± 7,4 (75 - 84)	78,3 ± 4,7 (71 - 83)

Statistical evaluation showed no differences, but it is necessary to comment that the published IVDs [2,3,5] were difficult to manufacture because they required special technicians and materials for their manufacture.

It is concluded that the proposed method for the collection of ovine semen with an intravaginal device of handmade construction is suitable and can be of great help to sheep breeders all over the world, due to its easy fabrication in the field.

REFERENCES

[1.] Velasco-cruz FL. Determinación de sub poblaciones espermáticas por motilidad en ovinos de pelo. Tesis presentada como requisito parcial para obtener el título de: Ingeniero Agrónomo zootecnista Buena Vista, Saltillo, Coahuila, México. Septiembre de 2011

[2.] Wulster-Radcliffe, MC, Williams, MA, Stellflug, JN, Lewis. GS. Technical note: Artificial vagina vs a vaginal collection vial for collecting semen from rams. Journal of Animal Science. 2001 79: (12) 2964–2967. https://doi.org/10.2527/2001.79122964x

[3.] Barth, AD, Arteaga,A. Brito, LFC. Palmer CW. Use of internal artificial vaginas for breeding soundness evaluation in range bulls: an alternative for electroejaculation allowing observation of sex drive and mating ability. Anim Reprod Sci. 84(3-4):315-25.doi: 10.1016/j.anireprosci.2004.02.010

[4.] Synnott, A.L., Fulkerson, W.J., Lindsay, D.R. • Sperm output by rams and distribution amongst ewes under conditions of continual mating. J Reprod Fertil 1981. 61, 355-361

[5.] Mozo, R.; Alabart, J.L.; Rivas, E; Echegoyen, E.; Navarro, M.A.; Folch, J. Desarrollo de un dispositivo intravaginal para la recogida de semen en ganado ovino. AIDA (2015), XVI Jornadas sobre Producción Animal, Tomo II, 402-404

Figure 1. Materials used to make the IVD

Figura 2. Semen collected with the IVD