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Short communication

Fixed-time artificial insemination in red deer (*Cervus elaphus*) in Argentina

J.F. Aller[a,*], O. Fernandez[b], E. Sanchez[a]

[a] *Instituto Nacional de Tecnología Agropecuaria, Estación Experimental Balcarce, Buenos Aires, C.C. 276 (7620) Balcarce, Argentina*
[b] *Estancia San Pedro, Sierra de la Ventana, Buenos Aires, Argentina*

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ABSTRACT

Synchronization of estrous and fixed-time artificial insemination (FTAI) was conducted during the reproductive season of 2008 (March–April) in a local red deer breeding farm in Argentina. Multiparous suckling hinds ($n = 38$) were artificially inseminated following hormonal treatment (intravaginal sponge containing 100 mg of medroxiprogesterone acetate). At the time of sponge removal (day 12) 250 IU of eCG and 500 μg of PGF2α were given to each hind. The FTAI was performed at 48–55 h after device removal with cryopreserved semen imported from New Zealand. Rectal-transcervical AI method (similar to that in cattle) was performed and semen was deposited within the uterine body ($n = 28$) or the cervix ($n = 10$). Pregnancy was diagnosed by means of ultrasonography 44 days after FTAI. The overall pregnancy rate was 36.8% (14/38). Percentage of does that became pregnant with intrauterine seminal deposition was 42.9% (12/28) whereas pregnancy rate in the hinds with intracervical AI was 20% (2/10; $P = 0.27$).

1. Introduction

Red deer (*Cervus elaphus*) is the predominant species used principally for recreative hunting, antler velvet and venison production by the Argentinean deer farming industry. Artificial insemination (AI) has become an important reproductive management tool which allows the use of semen of genetically superior bucks and the introduction of new genetic material into a herd. For estrous synchronization

* Corresponding author. Tel.: +54 2266 439100; fax: +54 2266 439101.
E-mail address: jaller@balcarce.inta.gov.ar (J.F. Aller).

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and AI more details concerning female reproduction, such as mating season and length of estrous cycle are necessary. Hinds are seasonally polyestrous with mating coinciding with decreasing photoperiod in autumn (Thimonier and Sempere, 1989). If hinds do not become pregnant, hinds can continue to have regular estrous cycles until April or the beginning of May in the southern hemisphere. The mean length of the estrous cycle is 18.3 ± 1.7 days (s.d.) in red deer (Guinness et al., 1971) or 19.5 ± 0.3 days (range 10–20 days) in Iberian red deer (*Cervus elaphus hispanicus*) (García et al., 2003). Estrous cycle length of fallow deer (*Dama dama*) was, however, 22.4 ± 1.3 days with a range of 20–27 days (Asher, 1985). Estrous seldom lasted more than 24 h (Guinness et al., 1971).

Laparoscopic intrauterine AI is the most effective method in cervids (Mulley et al., 1988). Other AI techniques such as intravaginal, intracervical and intrauterine insemination have been investigated with varying success (Asher et al., 1993, 2000). Transvaginal approaches would permit more widespread use of AI by producers because these methods are less invasive than laparoscopic AI.

The objectives of the present study were to: (i) examine the efficacy of the rectal-transcervical AI method (similar to that of cattle) and passage rate for AI catheter through the cervical canal and (ii) evaluate pregnancy rate following the intrauterine AI with frozen/thawed semen after hormonal synchronization treatment to induce ovulation.

2. Materials and methods

2.1. Experimental location and animal management

The present research was conducted during the reproductive season of 2008 (March–April) at a local red deer breeding farm located in Buenos Aires province (Humid Pampa), Argentina (37°28′S, 61°56′W). The mean annual rainfall is 800 mm equally distributed in all year. The animals were kept on native pasture and water was provided *ad libitum*.

2.2. Estrous synchronization and artificial insemination

Multiparous suckling red deer ($n = 38$) hinds (4–7 years old) were used. Estrous/ovulation synchronization treatment consisted of insertion of an intravaginal sponge contained within a plastic net (long = 45 cm, INTA Balcarce, Argentina; Fig. 1) and impregnated with 100 mg of medroxiprogesterone acetate (MAP) and 216 mg of oxytetracycline dihydrate (Soler et al., 2007). The sponge device was inserted for 6 days (days 0–6) followed immediately with new replacement device for 6 days (days 6–12). At the time of sponge removal (day 12) 250 IU of eCG (Novormon 5,000, Syntex, Argentina) and 500 μg of Cloprostenol (Ciclase DL, Syntex, Argentina) were given i.m. to each hind. The hinds were fixed-time artificially inseminated (FTAI) one time at 48–55 h after device withdrawal, with cryopreserved semen (0.25 mL straw) imported from New Zealand and obtained from four red deer bucks. Semen straws were removed from liquid nitrogen, thawed in water at 37 °C for 45 s and dried prior to insertion into the insemination device. Only semen from straws with a post-thaw motility of >30% was used for AI.

Rectal-transcervical AI method (similar to cattle) was performed using a cattle embryo transfer device (Transfer Instrument MT®, Minitüb, Germany). The rigid device was inserted into the *os cervix* and manipulated through the cervical canal until either the device passed into the uterine body or no further forward movement was possible. The does were artificially inseminated in standing position without sedation and restrained in the handling cradle. At the time AI, the site of semen placement in the reproductive tract of the hind (intracervical compare with intrauterine) was recorded. The same technician who was experienced in AI and embryo transfer in llama (*Lama glama*) and alpaca (*Lama pacos*) conducted all inseminations.

2.3. Pregnancy diagnosis

Pregnancy diagnosis was conducted using ultrasonography 44 days after FTAI. A real-time mode ultrasonic machine (50S Tringa®, Pie Medical, The Netherlands) fitted with a 5-MHz rectal linear-array transducer was used. Ultrasonic examinations were performed with the hind restrained in stand-