ELSEVIER

Animal Reproduction Science 86 (2005) 109–117

ANIMAL REPRODUCTION SCIENCE

www.elsevier.com/locate/anireprosci

Effect of cervical and vaginal insemination with liquid semen stored at room temperature on fertility of goats

H. Paulenz[a,b,*], L. Söderquist[c], T. Ådnøy[d], K. Soltun[d], P.A. Sæther[e], K.R. Fjellsøy[e], K. Andersen Berg[b]

[a] *Team Semin, PO Box 8146 Dep, NO-0033 Oslo, Norway*
[b] *Department of Production Animal Clinical Sciences, Norwegian School of Veterinary Science, PO Box 8146 Dep, NO-0033 Oslo, Norway*
[c] *Department of Obstetrics and Gynaecology, Faculty of Veterinary Medicine, Centre for Reproductive Biology in Uppsala, Swedish University of Agricultural Sciences, SE-75007 Uppsala, Sweden*
[d] *Department of Animal Science, Agricultural University of Norway, NO-1432 Ås, Norway*
[e] *AI Station Lyngsalpene, NO-9060 Lyngseidet, Norway*

Received 18 December 2003; received in revised form 10 May 2004; accepted 18 June 2004

Abstract

The effect of vaginal and cervical deposition of liquid semen stored at room temperature on the fertility of goats was tested in a field trial in which 217 Norwegian Dairy goats aged between 6 months and 7.5 years from 14 farms were inseminated after natural oestrous. Cervical insemination with 200×10^6 spermatozoa resulted in 25-day non-return and kidding rates of 87.0 and 78.0%, and vaginal insemination gave 85.5 and 74.3%, respectively. There was no significant difference between the cervical and vaginal inseminations ($P = 0.59$ for the 25-day non-return and $P = 0.40$ for the kidding rates). Farm had a significant effect on the 25-day non-return rate ($P = 0.03$) but not on the kidding rate ($P = 0.07$). There were no significant differences between the fertility rates for different bucks ($P = 0.36$ for the 25-day non-return and $P = 0.15$ for the kidding rates). Fertility results after vaginal insemination were encouragingly high. Vaginal insemination is a simple, less costly and time consuming technique compared to others, also bringing into focus the animal welfare aspects of the artificial insemination procedure. As the final goal is to establish a technique that could be applied

* Corresponding author. Tel.: +47 22 59 70 13; fax: +47 22 59 70 81.
E-mail address: heiko.paulenz@veths.no (H. Paulenz).

0378-4320/$ – see front matter
doi:10.1016/j.anireprosci.2004.06.007

similarly on a large scale by all farmers, vaginal insemination must be considered as a method that would simplify the use of liquid buck semen in Norway.

Keywords: Goat; Artificial insemination; Vaginal deposition; Cervical deposition; Liquid semen

1. Introduction

Breeding in Norwegian Dairy goats is traditionally based on natural mating. The relatively small average herd size of about 70 animals lead to the establishment of the so-called "buck circles", where the bucks are moved between a certain number of farms during the mating season to be able to select the best bucks according to daughters' production. Artificial insemination (AI) in goats with both cooled liquid semen and frozen semen, using preferably cervical deposition, was introduced in Norway as a supplement to natural mating in the 1960s (Røn and Aamdal, 1963; Lyngset et al., 1965; Andersen, 1969). However, in the following years only a limited number of highly selected does were inseminated, mainly because of poor results after cervical deposition and distribution problems with liquid semen due to transportation over long distances. Furthermore, a toxic effect on spermatozoa of an egg yolk coagulating enzyme (EYCE), which was found in the seminal plasma of bucks added to the limited use of AI. The toxicity of EYCE varies with the season of semen production and among individual bucks (Roy, 1957; Aamdal et al., 1965; for review see Leboeuf et al., 2000).

Therefore, in an attempt to overcome these problems, intrauterine deposition with frozen semen, clarified from EYCE by washing, was introduced in the 1970s. Since AI based on laparoscopy was not allowed at that time in Norway, and still is not, a non-surgical intrauterine insemination technique was developed (Fougner, 1974a), where the semen is deposited directly into the uterus by using a transcervical technique, which enables about 85% of the does to be inseminated into the uterus (Fougner, 1974b). However, considerable differences in the results obtained were registered among the individual inseminators being specially trained to perform inseminations with this technique. Although the fertility results improved after intrauterine deposition, in total approximately only 1–2% of the does were inseminated annually in the last decades in Norway. The high costs associated with the insemination services performed by these specially trained AI technicians, must be considered as the main reason for the limited use of AI in goats in Norway.

In the last few years the present sanitary and epizootic situation in Norway has led to restrictions made by the authorities in order to control spreading of contagious diseases. Today it is in general forbidden to transport goats between counties and, additionally, many farms are no longer allowed at all to transport animals to other farms, hindering the applicability of the buck circles. Owing to these statutory restrictions, there is a need for a further increase of AI in Norway. However, this necessitates the availability of a cheap, effective insemination technique, which is easier to perform, compared to the technique used at present, so that farmers can inseminate their does themselves. The most relevant alternatives to study in this connection seem to be the possibility to use a cervical or vagi-