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ARTIFICIAL INSEMINATION IN RABBIT: ROUTINE APPLICATION TO INDUSTRIAL BREEDERS IN ITALY

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Abstract

Artificial Insemination supported by hormonal treatment was introduced to over 40 industrial rabbit farms in northern Italy.
Sixty hours prior to insemination does were injected with 0.2 ml (30 I.U.) Pregnant Mare Serum Gonadotrophin (Ciclogonina, Solvay Veterinaria, Italy) to promote follicular growth and enhance receptivity.
Subsequently 0.5 ml (4ug/ml Buserelin) Gonadotrophin Releasing Hormone were injected intramuscularly, at insemination, to induce ovulation.
Insemination was performed with a glass cannula using extended pooled fresh semen.
Fertility averaged 78%, ranging from 50 to 85%; number of born was not affected by artificial insemination.
Hormonal treatment apparently did not have negative effects on fertility over a period of 11 months.
Artificial insemination has been seen to be fast, cost effective, and an essential management tool where intensive breeding is based on synchronization of production.

Introduction

Intensive rabbit breeding accounts for over 70 % of the italian rabbit meat output.
Italy's 200.000 t of rabbit meat produced per year account for over 18% of the world's production (Lebas and Colin, 1992).
Intensive breeding is based on cyclical production where females in the same reproductive and physiological stage are reared in groups (Colin, 1992).
Thus mating and parturition have to be synchronized and hormonal treatment of the doe jointly with artificial insemination are therefore becoming increasingly widespread.
A further advantage, from the economical standpoint, is the reduction of the number of males in a breeding unit which starts on Artificial Insemination.
In Italy most of the does are bred 10 to 12 days after parturition, allowing for a post partum uterine involution, whereas in Belgium and often in Spain post partum breeding is common (Maertens et al, 1987).
The Artificial Insemination procedure, which is hereafter described, is

being successfully applied to many industrial farms (several thousand does) with competitive results.

Material and Methods

Semen collection and dilution: on farm harvesting of semen, if required, is performed with a specific artificial vagina (IMV, France), then semen of more males is pooled and diluted according to season and quality (spermatozoa concentration, individual and mass motility).
Pooled semen is diluted with commercial extenders such as Dilap 2000 (IMV, France) and is kept at constant temperature.
Dilution factor may vary between 1:5 to up to 1:20.
Avoidance of thermal shocks is essential in all operations involving fresh semen; during transport and use, semen is stored in 10 to 50 ml ready to use glass vials kept in polistyrene shells.
Different working temperatures i.e. 33ºC, 20ºC, 18ºC or 4ºC have been successfully used.

Oestrus synchronization of the doe: synchronization of oestrus in the doe is achieved with a first intramuscular injection of 0.2 ml (I.U.) of Pregnant Mare Serum Gonadotrophins (PMSG) approximately 60 hours prior to insemination to enhance follicular growth (Ciclogonina, Solvay Veterinaria ,Italy).
A second intramuscular injection with 0.5 ml (4ug/ml Buserelin) of Gonadotrophin Releasing Hormone (GnRH), at the time of insemination will induce ovulation (Receptal, Hoechst, Germany).

Insemination of the doe: insemination is performed with a curved glass cannula about 20 centimeters long, using previously prepared pooled fresh semen.
The female is set onto the cage and the rear of the animal is gently lifted grabbing the skin with one hand and keeping the thumb and forefinger over the tail.
The glass cannula, kept in the other hand and carefully inserted into the vagina paying attention to bypass the urinary meatus; semen is then released as deep as possible inside the vagina.
The doe is subsequently lifted and placed back into her cage.
It must be pointed out that experienced practitioners will inseminate females directly inside the cage, thus avoiding any unecessary stress.

Results and Discussion

The overall conception rate on the 40 farms was 78% ranging from a minimum of 50% in one case to over 85%.
One of the major constrains in artificial insemination is the duration of fresh semen.
Results on 5 randomly chosen farms, comprehensive of fertilization rate, are summarized in table 1.

TABLE 1: Results on 5 chosen farms, comprehensive of fertilization rates.

FARM	MASCARO	SURIANO	SONGIA	MUSSO	CORTELLINI
VENTILATION	NATURAL	FORCED	NATURAL	FORCED	FORCED
FAECES REMOVAL	YEARLY	YEARLY	YEARLY	15 DAYS	DAILY
LIGHT PROGRAMME	16 HOURS	NONE	16 HOURS	16 HOURS	NONE
NUTRITION*	3	3	3	4	3
GEN. HEALTH STATUS	STATIONARY	STATIONARY	STATIONARY	GOOD	GOOD
N.x OF DOES	250	300	300	750	250
INSEMINATIONS PER WEEK	40	50	50	120	40
POST PARTUM INTERVAL	10	10	10	12	10
FERTILITY	50%	85%	80%	85%	75%
FARMER'S EXPERIENCE	MODERATE	GOOD	GOOD	GOOD	GOOD

* NUMBER OF DIFFERENT PRODUCTS USED

Diluted fresh semen has been viable for at least 48 hours and up to 60 hours without any appreciable decrease in fertilization rate or number of born (Blocher et al., 1990; Prud'hon, 1975; Della Porta et al., 1991).
Thermal shock, rather than different working temperatures, has been seen to affect semen negatively (Castellini et al., 1990).
Although in this specie ovulation is induced by mating and/or other external stimuli, treatment with GnRH will assist in increasing fertilization rate (Garcia Rebollar, 1991).
Treatment of does with PMSG has been reported to cause a surge in anti-PMSG antibodies in the doe with negative implications on fertility even after 4 to 5 treatments (Battaglini, 1991).
In this work, repeated hormonal treatments apparently did not have negative effects on fertility over a period of 11 month.
In industrial farms the restocking rate of does is high, reaching up to 160% per year.
Therefore few does will be present for longer cycles of hormonal treatment, and this lowers the risk of having animals with high anti PMSG titres in the farm.
Variation in the conception percentages have been observed within the same farm due to season or disease or to unknown factors (Zanirato, 1988).
A trained farmer will inseminate with this technique, up to 80 does per hour with consistent time saving over the traditional approach.

CONCLUSION

The progressive diffusion and acceptance of artificial insemination is based on its cost effectiveness and is becomming a precious management tool where intensive breeding is based on synchronization of production. Further advantages are genetic improvement and flexibility: in a market which is oriented to medium or heavy rabbits according to area or season, Artificial insemination gives to farmers the capability to modify effectively the final product within a short timespan.
A lighter or heavier meat rabbit, according to demand, is currently being produced with full satisfaction of both customers and producers.

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