

# Comparative evaluation of pregnancy rates in Dutch laboratory rabbit after insemination and natural breeding

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**Abstract:** Artificial insemination (AI) is a selective method which has been used in commercial rabbitries and for research purposes. The results of pregnancy rates were observed here which were comparable with natural mating. This experiment is conducted to provide the potentials of AI in the breeding center and also to compare this technique with on going natural mating method. One hundred sexually matured Dutch does were randomly divided into two equal groups. Does from experimental group were inseminated with diluted fresh semen and single dose of 0.2 ml of GnRH analog (Receptal) to each/doe was immediately injected intramuscularly. Does of control group were naturally mated with mature Dutch bucks. The environmental conditions were same in the both groups. The results of study showed that the 62% of does in control group had developed pregnancy where as in AI group 60% were pregnant. This result indicates the conception rate is similar in both groups and differences are not statistically significant.

**Key words:** pregnancy, artificial insemination, rabbit.

## Introduction

Superovulation of rabbit has been performed for embryo crypreservation (10). However, ovulation in this species normally induced by mating, taking place after about 10 hours, but failure to ovulate is more common. Incidence of such failure appears to vary with the season of the year (1). Therefore, artificial means of inducing ovulation are necessary which include treatment with luteinising hormone, human chorionic gonadotrophin injection (hCG), copper salts or other hormonal means. Since ideally, one would like to be able to apply the treatment repeatedly at short intervals, specially in commercial rabbit breeding. The AI is a technique which has been used many years ago specially for experimental purposes (1). The technique of AI is used by some worker (5, 7, 9). However, there are still some unknown points which need to be understood. This study enables us to

prepare the required equipments, materials and develop certain experience in AI techniques, providing capability for its practical application in commercial rabbitries and also conducting training courses in this field.

## Materials and Methods

### Artificial insemination

1) Selection of suitable buck, semen preparation and making dilution

1-1. Three mature unmated healthy bucks of Dutch breed were selected.

1-2. Semen collection and control, animals were prepared to ejaculate into the artificial vagina for semen collection (4). A doe in heat was put into the buck's cage. The operator held the artificial vagina with its collection tube between the rabbit's paws. The artificial vagina was kept at a temperature of about 40°C to 42°C prior to use, so that it will be at 39°C, the normal vaginal temperature of doe, at the moment of

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Fig. 1: Rabbit artificial insemination equipment.



Fig. 2: Position of inserting bended syringe for rabbit AI.

use. Ejaculation mostly took place immediately following the presentation of the doe.

1-3. Sperm quality (motility and morphology) was evaluated and counting was done by hemocytometer (4). Sperm concentration may vary from  $2 \times 10^8$ /ml to  $1 \times 10^9$  and its volume depending on animal body weight and the volume of insemination varies from 0.2 ml to 1 ml or sometimes more. At present study the sperm volume was 0.6 ml and concentration was  $9 \times 10^8$ /ml.

1-4. The semen was diluted in ratio of 1:10 with commercial diluent GALAP (IMV Co., France) and was pulled in the plastic paillette of 0.5 ml.

2) Selection of does and insemination.

2-1. Hundred mature does of Dutch breed were selected and randomly divided into two equal groups. Treated group was inseminated by a bended syringe, as explained later (see section 1).

2-2. Immediately after insemination 0.2 ml Receptal /each doe was injected intramuscularly for induction of ovulation according to Cecchini *et al.*, (1992) and Chen *et al.*, (1989).

#### Natural mating

Fifty does of control group were mated with bucks (1 doe/1 buck/cage) and left for 3 consecutive days, and then the does were returned to their home cages.

#### Pregnancy determination

Twenty-eight days after artificial insemination and natural mating, all does of both groups were checked for pregnancy by palpation of abdominal cavity. The pregnant does were kept in cages with

nest boxes, till parturition and of nursing period.

#### Technique for insemination

A special devise, bended syringe, made of stainless steel was used (Fig. 1). The dimensions vary according to the size of the rabbit to be inseminated. Some workers have used Pyrex glass inseminating pipette. Insemination may be carried out with the inseminator either in a standing or sitting position. The rabbit is placed on its back, care being taken to secure the hind legs. The syringe is guided carefully into the vagina to a depth of 3-4 inches after passing the pelvic brim it was rotated through  $180^\circ$  during entry. Some experience is needed to avoid causing the discharge of urine. The semen is deposited near the cervix in the anterior of fornix of the vagina (Fig. 2).

#### Results

The result indicates that of 50 does which were artificially inseminated 30 does (60%) and of 50 naturally mated does 31 does (62%) have developed pregnancy. The differences between two groups were not statistically significant.

#### Discussion

During last 8 decades, artificial insemination has been used and gradually improved quantitatively as well as qualitatively. It is most widely and commonly used in Italy and France commercial rabbitries (3). Since rabbit is an induced ovulator animal, the different techniques are developed to stimulate the ovulation and to make artificial insemination



procedure more applicable. In rabbit breeding, occurrence of spontaneous ovulation is reported 1%. Therefore many stimulators with antibody free effect or vasectomized bucks are used for this purpose. Evidences showed that treatment of rabbit with gonadotropin releasing hormone (GnRH) analog such as Receptal (1, 4, 6) at the right time can result to a successful artificial insemination. Some reports show that in does following artificial insemination, the conception rates varied from 58.5% to 85% (3, 6). Results of this study are comparable with other reports (3, 6) where the average of conception rate 60% and in naturally mated does was 62% which were not significantly different. But not in agreement with Hawk *et al.*, (1982) in which only 16% pregnancy rates were observed after AI (8). Another report (1) following treatment with hCG, 87% of does failed to produce litter when they were inseminated artificially. This difference may be due to time of insemination, dosage of hormone, route of treatment or technique of semen preparation. At the present study the maximum rate of pregnancy was 71% and minimum rate was 52.2% with an average of 60%. This rate may be improved by using pooled sperms from different bucks (4), controlling the environmental conditions, getting more experience in semen preparation, insemination time and injection of hormone (4). The obtained data indicated a good result of AI in rabbits and have implication to reduce the number of bucks, decrease the failure of ovulation in does and increase the fertility rate.

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### References

1. Adams, C. E. (1972) Induction of ovulation and A. I. techniques in the rabbit. *Vet. Record.* 91: 194 - 196.
2. Alvandi, A. (1996) Artificial insemination in rabbits. A. Alvandi, Thesis, Karadj Islamic Azad University, No. 70.
3. Cecchini, C.A., Coli, M., Vacchelli, M. (1992) Artificial insemination in rabbit: routine application to industrial breeders in Italy. *J. Applied Rabbit Research*, 15:633-636.
4. Chen, Y., Li, J., Simkin, M. E., Yang, X., Foote, H. R. (1989) Fertility of fresh and frozen rabbit semen inseminated at different times is indicative of male differences in capacitation time. *Biology of Reproduction.* 41: 848 - 85.
5. Farrell, P. B., Foote, R. H., Simkin, M. E., Clegg, E. D. and Wall, R. J. (1993) Relationship of semen quality, number of sperm inseminated and fertility in rabbits. *J. Androl.* 14: 464-471.
6. Fischer, B., Adams C. E. (1981) Fertilization following mixed insemination with cervix - selected and unselected spermatozoa in the rabbit. *J. Reprod. Fert.* 62: 337 - 343.
7. Gaafary, M. N., Marai, F. M. (1994) Artificial insemination in rabbits. *International Conference of Rabbit Production in hot Climate, Egypt.* 8: 95 - 107.
8. Hawk, H. W., Cooper, B. S., Conley, H. H. (1982) Increased numbers of sperm in the oviducts and improved fertilization rates in rabbits after administration of phenylephrine or ergonovine near the time of insemination. *J. Anim. Sci.* 55: 878 - 890.
9. Morrell, J. M. (1995) Artificial insemination in rabbits. *Brit. Vet. J.* 151:477 - 488.
10. Schahidi, R. (1997) Cryopreservation of rabbit embryos (Abst. in English). *J. Fac. Vet. Med. Univ. Tehran.* 52: 59-62.



## ارزیابی مقایسه‌ای میزان آبستنی در خرگوش‌های آزمایشگاهی Dutch در شرایط تلقیح مصنوعی و جفت‌گیری طبیعی

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تلقیح مصنوعی روشی انتخابی است که در مراکز تکثیر و پرورش خرگوش و همچنین اهداف تحقیقاتی مورد استفاده قرار می‌گیرد. طبق نتایج حاصل از مطالعه فعلی میزان آبستنی حاصل از انجام این تکنیک، با جفت‌گیری طبیعی قابل مقایسه است. هدف از انجام این مطالعه ارزیابی روش تلقیح مصنوعی در مراکز تکثیر خرگوش و همچنین مقایسه آن با روش معمول جفت‌گیری طبیعی است. در این مطالعه ۱۰۰ خرگوش ماده بالغ نژاد DUTCR به طور تصادفی به دو گروه مساوی تقسیم شدند. خرگوش‌های گروه درمانی با مایع منی تازه و رقیق شده تلقیح شدند و همزمان یک دز از آنالوگ هورمون GnRH را به میزان ۰/۲ میلی لیتر تزریق داخل عضلانی دریافت کردند. خرگوش‌های گروه شاهد به طور طبیعی با خرگوش‌های نر جفت‌گیری کردند. در طول مطالعه شرایط محیطی برای هر دو گروه یکسان بوده نتایج حکایت از آن دارد که ۶۲ درصد از خرگوش‌های گروه شاهد و ۶۰ درصد از خرگوش‌های گروه درمانی آبستن شدند. از این رو نتایج گویای آن است میزان آبستنی دو گروه مشابه است و اختلاف معنی داری بین آنها وجود ندارد.

واژه‌های کلیدی: آبستنی، تلقیح مصنوعی، خرگوش.

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