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

Motedayen, M. H.<sup>1</sup>\*, Todehdehghan, F.<sup>1</sup>, Tajik, P.<sup>2</sup>

<sup>1</sup>Razi Vaccine and Serum Research Institute, Karaj, Hessarak-Iran. <sup>2</sup>Department of Clinical Sciences, Faculty of Veterinary Medicine, University of Tehran, Tehran-Iran. (Received 28 March 2004, Accepted 8 September 2005)

*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, 1)9). However, there are still some unknown points which need to be understood. This study enables us to

\*Corresponding author's email: Lab\_animal@rvsri.com Tel: 0261- 4570038, Fax: 0261-4552194 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  $40^{\circ}$ C to  $42^{\circ}$ C prior to use, so that it will be at  $39^{\circ}$ C, the normal vaginal temperature of doe, at the moment of





Fig. 1: Rabbit artificial insemination equipment.

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 paillete 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 intramascularly 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



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

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 °C during entry. Some experience is needed to avoid causing the discharge of urine. The semen is deposited near the cervices 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 commertial 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 different bucks (4), controlling from 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.

### Acknowledgments

We are indebted to Dr. M. H. Ansarifard for his helpful advice and also thankful to Mr. B. Tohidi and Mr. M. A. Mansouri.

### References

- 1. Adams, C. E. (1972) Induction of ovulation and A. I. techniques in the rabbit. Vet. Record. 91: 194 196.
- Alvandi, A. (1996) Artificial insemination in rabbits.
  A. Alvandi, Thesis, Karadj Islamic Azad University, No. 70.
- 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.
- 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.
- 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.
- 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.
- Gaafrary, M. N., Marai, F. M. (1994) Artificial insemination in rabbits. International Conference of Rabbit Production in hot Climate, Egypt. 8: 95 - 107.
- 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.
- Schahidi, R. (1997) Cryopreservation of rabbit embryos (Abst. in English). J. Fac. Vet. Med. Univ. Tehran. 52: 59-62.



مجله تحقيقات دامپزشکی، ۱۳۸۶، دوره ۶۲، شماره ۶۵،۴-۶۳

# ار زیابی مقایسهای میزان آبستنی در خر گوشهای آزمایشگاهی Dutch در شرایط تلقیح مصنوعی و جفت گیری طبیعی

محمد حسن متدین <sup>۱</sup> فاطمه توده دهقان پرویز تاجیک <sup>۲</sup> موسسه واکسن و سر مسازی رازی، کرج، تهران – ایران. <sup>۲</sup>گر وه علوم در مانگاهی دانشکده دامپز شکی دانشگاه تهران، تهران - ایران. (دریافت مقاله:۸ فروردین ماه ۱۳۸۴، پذیرش نهایی: ۱۷ شهر یورماه ۱۳۸۴)

تلقیح مصنوعی روشی انتخابی است که در مر اکز تکثیر و پر ورش خرگوش و همچنین اهداف تحقیقاتی مورد استفاده قرار می گیرد. طبق نتایج حاصل از مطالعه فعلی میزان آبستنی حاصل از انجام این تکنیک، با جفت گیری طبیعی قابل مقایسه است. هدف از انجام این مطالعه ارزیابی روش تلقیح مصنوعی در مراکز تکثیر خرگوش و همچنین مقایسه آن با روش معمول جفت گیری طبیعی است. در این مطالعه ۱۰۰ خرگوش ماده بالغ نژاد Tonce کر مراکز تکثیر خرگوش و همچنین مقایسه آن با روش معمول جفت گیری طبیعی است. در این مطالعه ۱۰۰ خرگوش ماده بالغ نژاد OUTCR به طور تصادفی به دو گروه مساوی تقسیم شدند. خرگوش های گروه در مانی بامایع منی تازه ورقیق شده تلقیح شدند و همزمان یک دز از آنالو گهور مون را به میزان ۲/ میلی لیتر تزریق داخل عضلانی دریافت کردند. خرگوش های گروه شاهد به طور طبیعی با خرگوش های نر جفت گیری کردند. در طول مطالعه شر ایط محیطی برای هر دو گروه یکسان بوده نتایچ حکایت از آن دارد که ۶۲ در صد از خرگوش های گروه شاهد و ۶۰ در صد از خرگوش های گروه در مانی شر ایط محیطی برای هر دو گروه یکسان بوده نتایچ حکایت از آن دارد که ۶۲ در صد از خرگوش های گروه شاهد و ۶۰ در صد از خرگوش های گروه در مانی

**واژههای کلیدی:** آبستنی، تلقیح مصنوعی، خر گوش.

ww.SID.ir