

## **ABSTRACT**

An important progress has been made in rabbit breeding, feeding and management over the past decades. However, productivity remains one of the most important factors in the farm.

Present work was divided into three experiments in order to determine the effect of the nutritional flushing with propylene glycol during the days prior to insemination, on productivity (prolificacy and fertility) and subsystems that affect it.

The first experiment had the objective of evaluating in vivo the presumptive effect of the contribution of the nutritional flushing to prolificacy and fertility. One thousand and twenty animals were randomly distributed into two groups: Control and Treatment. Animals from the Treatment, group received 2 mL propylene glycol in drinking-water at 48 hours before artificial insemination, while the Control group did not get any supplementation.

In Experiments 2 and 3, 90 parous females were used in 8 different replicates . Females were distributed into 2 groups (Treatment and Control). In this case, 6 mL of propylene glycol were supplied to treated animals in two administrations of 3 mL, 48 and 60 hours before artificial insemination. At 48-72 hours post-coitum, the reproductive organs were evaluated at the laboratory of the Grup de Recerca en Biologia de la Reproducció i Embriologia d'Animals Domèstics i Salvatges of the Facultat de Veterinària de la Universitat Autònoma de Barcelona, and ovulation rate, number and quality of embryos and number of oocytes obtained after follicular puncture were assessed.

The objective of Experiment 2 was focused on studying the differences between groups in ovarian features and embryo development (ovulation rate, number, developmental stage and quality of embryos, recovery rate, and number and quality of oocytes obtained by follicular puncture from antral follicles).

In Experiment 3 we studied embryo growth and development after in vitro culture for 120 hours. In addition, this experiment included the study of the effects of a stressor factor (heat stress) over embryos forming part of the control and treatment groups.

The results of experiment 1 were analyzed by CADMOD and GLM for fertility and prolificacy, respectively. No significant differences were detected in fertility, but the results showed a significant increases in prolificacy.

In experiment 2, no significant differences were obtained in any of the susceptible factors that could affect directly the prolificacy. No differences were detected between treatment and control groups in ovulation rate, embryo recovery rate, number and quality of embryos.

The results from Experiment 3 were analyzed using a model of multivariate logistic regression that determined a greater growth of embryos from females subjected to a nutritional flushing. Differences were detected only in embryo size,

with a significant higher size of embryos coming from females treated with PG, including after culture under heat stress conditions.

In conclusion, a nutritional flushing consisting on the administration of propylene glycol into the drinking water 48 to 60 hours before artificial insemination allowed to increase significantly the prolificacy of rabbit does. Experiments 2 and 3 have shown that increase in prolificacy can be related to an indirect effect on embryo metabolism, allowing to reach higher sizes after culture, probably related to a higher metabolism rate, which can play an important role in the reduction of peri-implantation losses.