

# MATING FREQUENCY EFFECT ON SPERMATOGENESIS AND PERFORMANCE OF BREEDING RABBITS

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**Abstract** - The present study presents the breeding performance of rabbits in an experiment with five variants of breeding intensity. In variants V1-V4, double matings took place (DM): V1=4DM; V2=3DM; V3=5DM; V4=6DM. Between mating days, there was a rest day in order to have a normal spermatogenesis. In V5, a single mating (M) took place daily. The optimal mating frequency is 3 times/week and a rest day after each double mating (V2). Male fertility in V2 was 73,1 % compared to 53.7 % in V5. The spermatozoon concentration was 223.85 million/ml in V2 compared to 159.5 million in V5.

## INTRODUCTION

Breeding performance is strongly influenced by semen quality and mating technique. Male performance is determined by reproduction potential manifested by female gestation potential. Mating frequency influences greatly spermatogenesis and implicitly the breeding performance.

GREGOIRE (1958), has carried out daily semen samples for 43 weeks without influencing the male libido, the semen production or fertility. AMANN (1966) had good results when two ejaculations took place within 48 hours. DESJARDINS (1968) performed 4 semen samplings in 2 days, without exhausting the males. TAG (1984) presented the effect of double matings and of the interval between matings on the conception rate in rabbit. SURDEAU (1984) investigated the effect of different mating frequencies on the biological response to does and SZENDRO (1988) studied the frequent parturitions with a view to the breeding performance. DUCCI (1992) and PEREZ (1993) surveyed rabbit semen quality. BUNACIU (1988) undertook experiments testing male breeding potential using morphobiochemical methods and indicating the existence of a correlation between semen quality and fecundity and individual variability.

The present paper presents the results of an experiment carried out to establish an optimal mating frequency in rabbit reproduction.

## MATERIAL AND METHOD

The study included 20 males and 180 females. Initially, males were 27-weeks old. Five variants were constituted with 4 males and 36 females each. Mating frequency was according to Table 1. Monthly, semen quality was assessed from the age of 27 weeks to 68 weeks when males were removed. Analysis was carried out on the sample mixture of the two ejaculates collected at 10 minute intervals.

Table 1 : Experimental diagram

Variant	Week days						
	1	2	3	4	5	6	7
1 - control	-	-	DM	DM	-	DM	DM
2	-	DM	-	DM	-	DM	-
3	-	DM	DM	DM	-	DM	DM
4	-	2DM	-	2DM	-	2DM	-
5	-	M	M	M	M	M	M

Legend: - : rest day M : single mating DM : double mating

Does of the experimental stocks were used for 10 months. The initial stocks were primiparous, subsequently being mated after 24 hours since delivery. When does were pregnant, males were mated with other females not belonging to the controls groups. Semen quality was tested for each male from 27 to 68 weeks of age by the assessment of sperm amount (in a scaled phial in ml); spermatozoon motility (on microscope slide),

concentration of total spermatozoa (counting with Turk camera, million/ml), concentration of dead and abnormal spermatozoa (in percentages on smears stained with eosin-nigrosin).

Semen sampling for tests was carried out using BUNACIU'S method (1985). Reproductive performance were assessed by fertility (number of positive matings / number of matings) and by prolificity (average number of offspring / doe).

## RESULTS AND DISCUSSION

Semen quality differed according to the breeding management (Table 2).

**Table 2 : Morphologic quality of rabbit semen by experimental variants**

Parameter	Samples	V1		V2		V3		V4		V5	
		X	St. dev.	X	St. dev.	X	St. dev.	X	St. dev.	X	St. dev.
Total semen amount (ml)	40	0.94	0.69	0.85	0.67	0.77	0.55	0.73	0.59	0.82	0.50
Fluid semen amount (ml)	40	0.55	0.29	0.55	0.24	0.54	0.23	0.47	0.28	0.59	0.27
Motility (%)	40	79	21.32	85	11.17	81	19.07	73	22.88	76	19.07
Concentration (million/ml)	40	172.6	169.7	223.8	160.4	172.7	146.3	149.4	164.2	159.5	215.1
Dead spermatozoa (%)	40	1.42	1.45	1.64	1.51	1.17	1.25	1.52	2.53	1.47	1.59
Abnormal spermatozoa (%)	40	9.34	5.18	9.12	4.42	8.46	6.48	6.91	4.46	9.08	5.23

*Semen amount* (fluid fraction + gel) with an average value for the whole experimental period ranged from 0.73 ml in V4 where males had 12 ejaculations/week and 0.94 ml in V1 with 8 ejaculations/week.

In case of fluid semen amount, values varied from 0.47 ml in V4 and 0.59 ml in V5 (V5=6 ejaculations/week).

Gel represents the fraction which does not take part in fecundation.

Over the whole surveyed period of the experiment, fluid semen amount displayed fluctuations in all variants, without any correlation between semen quality, age and season. There were mating without ejaculations which became more frequent at the age of 63 and 68 weeks, hence an exhaustion of the males was noted towards the end of the reproduction season.

*Motility* of spermatozoa had a mean ranging from 73% in V4 to 85% in V2. Over the observed experimental period, it varied in all variants : in V2 from 73 to 93% remaining high at 68 weeks, too (81%). In all the other variants, the decrease was almost sudden, especially in V4.

*Concentration of total spermatozoa* ranged between 149.46 million/ml in V4 and 223.85 million/ml in V2. At the age of 50 weeks, it was maximal in all variants except for V1 and V5. In V2, it was 397.5 million/ml, contributing to a great average concentration.

*Concentration of dead spermatozoa* ranged from 1.17% in V3 and 1.64% in V2, thus, normal values indicating a good semen. Over the whole period, it was lower, from 31 to 44 weeks and increased at 54-58 weeks and then again decreased more in V1, V4 and V5 and increased in V2 and V3.

*Concentration of abnormal spermatozoa* varied from 6.9% in V4 to 9.3% in V1. It showed the same oscillating values like in dead spermatozoa. A maximal value was recorded at 50 weeks followed by a decrease and then by an increase at 68 weeks.

*Fertility percentage* (Table 3) was best in V2 where the double mating alternated with the rest day, and the worst in V5 where between mating days there were no rest day. It increased constantly up to the 58 weeks of age and afterwards it decreased. In V5, the decrease was abrupt at 54 weeks but increased again at 63 weeks up to 67% and again decreased down to 49.3%. The statistical analysis demonstrated that between V2 and V5, there are statistically significant differences (Figure 1).

*Prolificity* is concordant with the fecundity values : 6.51 offspring in V2 and 5.89 in V5 (Figure 2).

Figure 1 : Fertility

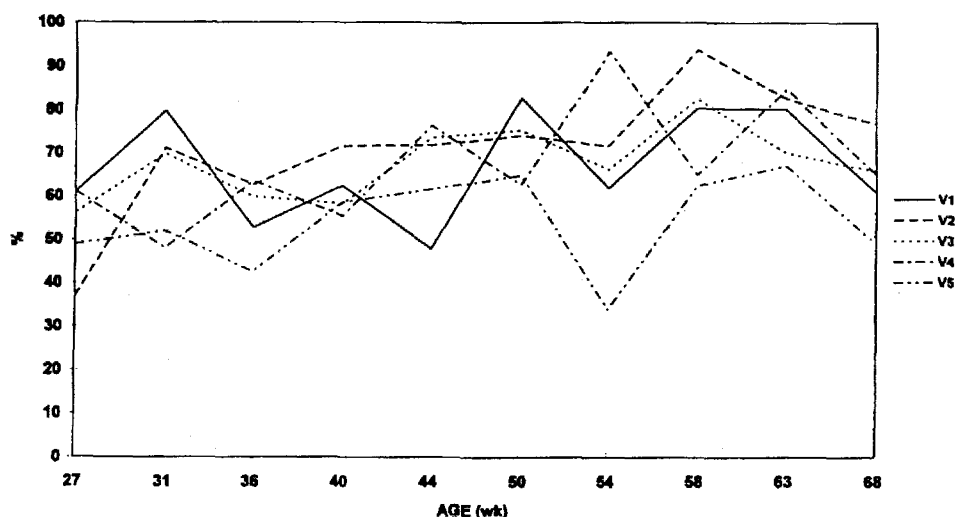
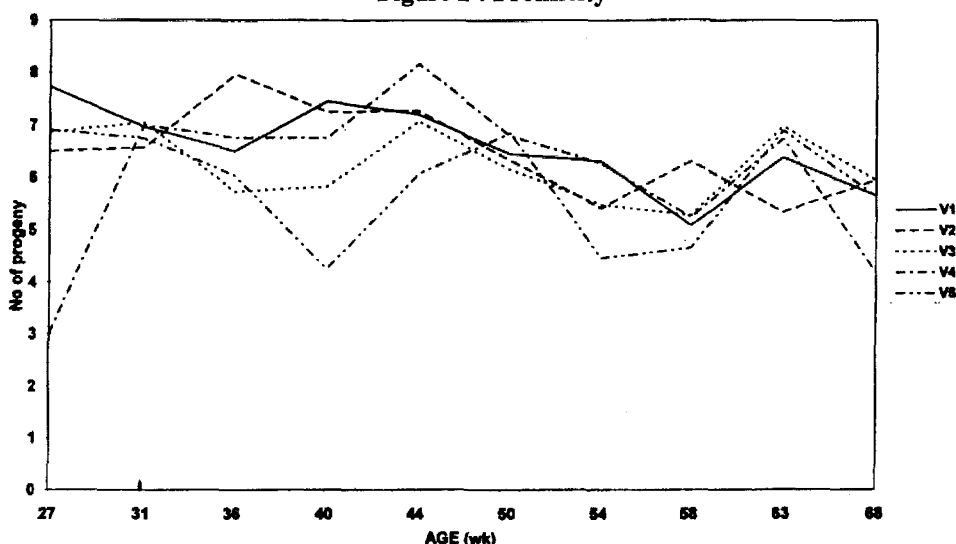


Figure 2 : Prolificity



When analysing all quality parameters of the semen in relation with breeding performance, we can state that a too intense mating rhythm causes spermatogenesis perturbations, that is spermatozoa do not mature (show a cytoplasm drop or they are small) and do not have a fecundating potential. In V4, (2 DM, thrice a week) even with an intercalating rest day the semen was yellowish and sometime with salt sediments (magnesium carbonate) and had a precipitated aspect.

Male behaviour observations were also made during the experiment. There was no correlation between mating moment, fertility, the male weight and semen quality.

It seems that the mating frequency is very important. The average time for a mating in V5 was the shortest (1 min and 35 sec.), while in V3 with 5 DM and single rest day, it was longer (3 min and 8 sec.)

The lowest fertility was in V5 showing that for the normal spermatogenesis it is necessary to allow a rest day between mating days.

Table 3 : Reproduction indices by experimental variants

Parameter	Female number	V1		V2		V3		V4		V5	
		X	St.dev.	X	St.dev.	X	St.dev.	X	St.dev.	X	St.dev.
Fertility (%)	360	67.01	23.69	73.09	20.68	68.47	19.42	63.91	22.78	53.70	20.70
Prolificity (%)	360	6.43	1.74	6.51	1.49	6.14	1.52	6.08	1.89	5.89	1.92

## CONCLUSION

The optimal mating frequency of breeding rabbits is three times a week with a rest day between mating days. Rest day influences positively spermatogenesis.

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