

THE EFFECT OF DOUBLE MATING ON CONCEPTION RATE AND LITTER SIZE IN RABBITS

Zs. Szendrő<sup>x</sup> - T.H. Tag-El-Den<sup>xx</sup> and B. Németh<sup>x</sup>

<sup>x</sup>Research Centre for Animal Breeding and Nutrition,  
Gödöllő /Hungary/

<sup>xx</sup>University of Agricultural Sciences, Gödöllő

Introduction

Some breeders have made the double mating a practice to breed the female a second time several hours after the first under the assumption that better conception rates will result from two matings. Studies have indicated, however, that there is no advantage in a second mating as the sperm cells from the first mating remain viable for a number of hours /Arrington and Kelley, 1976/.

Dziuk /1965/ utilized a double mating series to determine capacitation time for rabbit. He varied ovulation time with respect to the time of first mating and found that capacitation took a minimum of 6 hours. His results show that the second buck was able to contribute to the offspring produced. Similarly, Taylor /1982/ observed that the second buck contributed to the offspring produced by the double matings, even when there was a 4-hours interval between matings.

The need for accuracy in timing of mating and estimating the times of ovulation the onset and stage of pregnancy are extremely important for both scientific and practical reasons. Ova are fertilizable for 6-8 hours postovulation and sperm capable of effecting fertilization for about 20-30 hours after ejaculation /Dukelow et al. 1967; White 1955; Morueh and Mastroianni 1966/. Thus, errors in timing alone related to mating technique might introduce a reduced pregnancy rate.

### Materials and Methods

Two experiments were conducted out to investigate the effect of double mating on some reproductive traits.

In the first experiment Californian White and New Zealand White females were mated from two bucks; one of the same breed and the other from Blue vienna or Giant Hungarian. Females were bred secondly after 0, 2, 4, 6, 8 and 24 hours from the first one. The bucks were used alternately as the first male. Youngs from the two bucks were distinguishable from each other.

The second experiment was carried out to examine the efficiency of the second mating under the condition of medium-scale production. Mating system was as follows: 1- Does were bred one time, 2- Does were bred secondly after the first one immediately, 3- The second mating was after the first one by about 4 hours, and 4- The doe remained with the buck for about two hours after the first mating.

Conception rate and litter size at birth was recorded. The data were statistically analysed after Snedecor and Cochran /1967/, and Sváb /1973/.

### Results and Discussion

The second mating failed with 0,0, 5,2, 6,9, 15,9, 18,8 and 38,5 % of does bred secondly after 0, 2, 4, 6, 8 and 24 hours from the first one, respectively /Table 1/. This failure of second mating due to that the does not or poorly kept their sexual activity with prolonging the interval between matings.

Contribution of the second buck to the offspring produced was decreased with increasing the interval between matings. It was 53,6, 32,8, 25,7, 25,2, 6,9 and 0,0 % for the groups bred secondly after 0, 2, 4, 6, 8 and 24 hours, respectively /Table 1/.

Number of litters produced only by the second buck was reduced also with prolonging the interval between matings

/Table 1/.

Under productive farm condition it was noted that conception rate was 71,3 % for does mated one time, 80,2 % for does mated second time immediately after the first one, 75,4 for those mated secondly after 4 hours and 81,3 % for those stayed for two hours with the buck after the first successful mating /Table 2/. Corresponding figures of litter size was 7,99, 8,36, 8,55, and 8,47 /Table 2/.

From these experiments, it was observed that the best results were obtained by breeding the doe second time immediately after the first one. This may be related to the number of sperms reach the fertilizing area in the oviduct at the proper time, so that the contribution of the second buck reduces with prolonging the interval between matings.

#### Literature Cited

- 1 - Arrington, L.R. and K.C. Kelley, 1976. Rose printing Co. Tallahassee, Florida, USA.
- 2 - Dukelow, W.R.; H.N. Chernoff; and W.L. Williams. 1967. Amer. J. Physiol. 213, 1397 - 1400.
- 3 - Dziuk, P.J. 1965. J. Reprod. Fert. 10, 389-395.
- 4 - Mroueh, A. and L.Jr. Mastroianni. 1966. Fert. Steril. 17, 76-82.
- 5- Snedecor, G.W. and W.G. Cochran 1967. Iowa State Univ. Press, Ames, USA.
- 6 - Sváb J. 1973. Mezőgazdasági Kiadó, Budapest
- 7 - Taylor, N.J. 1982. J. Reprod. Fert. 66, 157 160.
- 8 - White, I.G. 1955. Aust. J. Exp. Biol. 33, 367-370.

### Summary and Conclusion

Two experiments were carried out to investigate the importance of the second mating on rabbit fertility. The interval between the two matings was 0, 2, 4, 6, 8 and 24 hours.

For the experimental groups respectively 0,0, 5,2, 6,9, 15,9, 18,8 and 38,8 % of the does failed to breed secondly.

The second buck contributed to 53,6, 32,8, 25,7, 25,2, 6,9 and 0,0 % of the youngs produced, respectively.

As regards litter size at birth double mating had no significant effect on it.

In the second experiment the does were divided into four groups. The first group was mated one time, the second group was mated secondly after the first one immediately, the third group was bred secondly after 4 hours and the fourth group was remained with the buck for two hours after the first mating.

Conception rate was 71,3, 80,2, 75,4 and 81,3 % and litter size averaged 7,99, 8,36, 8,55 and 8,47, respectively.

From these experiments, it was observed that the best results were obtained by breeding the doe second time immediately after the first one. The contribution of the second buck in young production decreases with prolonging the interval between the two matings.

### Resume

Une méthode recommandable á l'élevage du lapin d'ordre pratique est l'accouplement des femelles pendant la meme journée, dans deux périodes différentes. Dans une expérience nous avons examiné l'aboutissement du premier et deuxième accouplement en rapport avec la durée de période entre les deux accouplements /0, 2, 4, 6, 8 et 24 heures/.

Dans l'ordre des groupes d'expérience le deuxième

accouplement est demeuré sans résultat à 0,0, 5,2, 6,9, 15,9, 18,8 et 38,8 p.c. Les petits lapins mis au monde sont issus du 2<sup>e</sup> bouquin dans l'ordre de pourcentage 53,6, 32,8, 25,7, 25,2, 6,9 et o.o.

On n'a pas obtenu une différence significative concernant la population litée de naissance et de lactation.

Nous avons examiné aussi, au cours d'un essai semi-industriel la formation de la gestation et la population litée par rapport avec la méthode d'accouplement. Dans la 1<sup>ère</sup> groupe le bouquin ne couvrit qu'une seule fois dans la 2<sup>e</sup> deux fois successivement, dans la 3<sup>e</sup> une fois pendant la matinée, une fois l'après-midi /pres de 4 heures passées entre les deux accouplements/, dans la 4<sup>e</sup> groupe après l'accouplement réussi la femelle a resté à peu près 2 heures dans la cabane du bouquin. Chez les groupes d'expérience les femelles à 71,3, 80,2, 75,4 et 81,3 p.c. successivement ont été devenues prégnantes la population datée de naissance; 7,99, 8,36, 8,55 et 8,4%.

En vertu des expériences, on peut constater que le meilleur résultat s'est fait par les accouplements successifs l'un apres l'autre. Plus grand fut la durée de la période entre les deux accouplements, le moins c'est le roledu deuxieme bouquin.

Table 1.

Effect of interval between the two matings on mating-ability of the does and the descent of their youngs

Intervals between matings /hours/	Matings		Total No. of youngs	Youngs sired by		No. of litters produced	Litters sired by		
	No. of first mating	unsucces- ful second mating %		First buck %	Second buck %		First buck only	Second buck only	The two bucks
0	69	0,0	263	46,4	53,6	38	31,6	26,3	42,1
2	58	5,2	183	67,2	32,8	28	42,9	14,2	42,9
4	58	6,9	218	74,3	25,7	33	57,6	12,1	30,3
6	44	15,9	163	74,8	25,2	20	55,0	10,0	35,0
8	48	18,8	159	93,1	6,9	24	83,3	4,2	12,5
24	26	38,5	28	100,0	0,0	4	100,0	0,0	0,0

Table 2.

Conception rate %/ and Litter size as effected by mating system

Breed line	Does mated one time			Does mated second time						Does remain- ed 2 hours with buck		
	n	$\bar{X}$	s	immediately			after 4 hours			n	$\bar{X}$	s
	C o n c e p t i o n   r a t e   %											
H-line	32	71,9		26	84,6		32	75,0		38	73,7	
G-line	32	65,6		28	68,6		27	74,1		27	88,9	
M-line	45	73,3		33	84,8		35	68,6		32	93,7	
K-line	34	73,5		34	3,5		24	87,5		26	69,2	
Total	143	71,3 <sup>+</sup>		121	),2		118	75,4		123	81,3 <sup>+</sup>	
	L i t t e r   s i z e											
H-line	23	8,22	2,35	22	8,05	2,36	24	8,42	1,98	28	8,61	1,89
G-line	21	6,95	2,29	22	8,41	2,44	20	8,55	1,96	24	7,92	2,64
M-line	33	8,30	1,99	28	8,07	2,37	24	9,33	1,79	30	8,70	2,25
K-line	25	8,24	1,64	25	8,92	1,82	21	7,81	2,11	18	8,61	2,30
Total	102	7,99 <sup>+</sup>	2,10	97	8,36	2,25	89	8,55 <sup>+</sup>	2,00	100	8,47	2,25

<sup>+</sup> Significant at 0,10 level

