

**Effect of intensive and semi-intensive rhythm  
on reproductive performance of rabbit does**

**Szendrő Zs.<sup>1</sup>, Mikó A.<sup>1</sup>, Odermatt M.<sup>2</sup>, Gerencsér Zs.<sup>1</sup>, Radnai I.<sup>1</sup>, Matics Zs.<sup>1</sup>**

<sup>1</sup>Kaposvár University, Faculty of Animal Science, Kaposvár, Hungary

<sup>2</sup>Olivia Ltd, Lajosmizse, Hungary

*Corresponding Author:* Zsolt Szendrő, Kaposvár University, H-7400 Kaposvár Guba S. str. 40., Hungary - Tel. +36 82-505-800 - Fax: +36 82-320-167 - Email: szendro.zsolt@ke.hu

**ABSTRACT:** A total of 34 Pannon rabbit does were housed in commercial rabbit cages (floor area 0.32 m<sup>2</sup>) and inseminated 2 d after kindling (18 does; 33D group) or 11 d after kindling (16 does; 42D group). A single-batch system (all of the does in the group were inseminated on the same day) was used. Duration of the experiment was 193 days. During this period number of cycles were 5 and 4 in group 33D and 42D, respectively. There were not significant difference in kindling rates (33D: 75.6%, 42D: 85.2%), in litter size (33D: 9.02 and 8.69, 42D: 9.44 and 8.58, total and alive, respectively), suckling mortality (33D: 14.5%, 42D: 15.6%), and survival of does (33D: 71%, 42D: 81%) between the two groups. During the experiment, the percentages of does that kindled 0, 1, 2, 3, 4, and 5 times were 0, 0, 0, 8, 69, and 23% in does of 33D group; and 0, 0, 17, 58, and 25% in does of 42D group (in this group, does had maximum 4 kindlings). Significant differences were found in kindling rate of primiparous does (33D: 50.0%, 42D: 87.5%,  $P < 0.05$ ) and in mortality of suckling kits of the 3<sup>rd</sup> and 4<sup>th</sup> litter (33D: 8.6 and 3.3%, 42D: 17.2 and 19.1%, respectively). During the entire experiment (193 d), the numbers of rabbits born alive per doe were 32.8 and 29.4 in groups 33D and 42D, respectively, so that the annual productivity of 33D does was 17% higher than that of the 42D does.

Key words: Rabbit does, Reproductive rhythm, Performance.

**INTRODUCTION** – After the publication of Prud'hon *et al.* (1969) keen interest was mating the does post partum (pp). After applying artificial insemination (AI) and the cycled production, the AI at 11 days p.p. became the most common method in rabbit farms also in view of controlling body energy deficit of reproducing does (Xiccato and Trocino, 2010). Nowadays, the body condition, longevity, animal welfare are also in focus of doe reproduction (Castellini *et al.*, 2009; Pascual *et al.*, 2012), but at the same time, the selection for prolificacy gave some interesting results (improved body reserves) (Pascual *et al.*, 2012).

**MATERIALS AND METHODS** – This experiment was conducted at the Kaposvár University using the maternal line of the Pannon Rabbit Breeding Program. The temperature in the room was 15-17°C, and the daily lighting period was 16 h. Rabbits received *ad libitum* the same commercial pelleted diet (DE: 11.1 MJ/kg, CP: 18.0 %, CF: 15.0 %). The size of the cage was 84.0 x 38.5 cm, including the nest box (26.0 x 38.5 cm).

At the age of 17 weeks, female rabbits were randomly allocated to two treatments (33D and 42D). Rabbits were inseminated artificially. At kindling, the litters were equalized only within groups (maximum 8 kits for primiparous does and 10 kits for multiparous does). Does that died or were culled during the experiment were not replaced. The characteristics of the two experimental groups were as follows:

**33D** group (n=18): A reproductive rhythm of 33 d was used; does were inseminated 2 d after kindling, applying a single-batch system. The does could freely nurse, and the kits were weaned at 28 d of age.

**42D** group (n=16): A reproductive rhythm of 42 d was used. Does were inseminated 11 d after kindling, applying a single-batch system. Does could freely nurse their kits. However, during the 3 days prior to AI, does were allowed to nurse their kits only once-a-day (in the morning). Kits were weaned at 35 d of age.

Duration of the experiment was 193 days. During this period number of cycles were 5 and 4 in group 33D and 42D, respectively. Production traits were evaluated by T-test. Kindling rate and suckling mortality were analysed by Chi<sup>2</sup>-test and doe survival was evaluated by survival analysis using the SPSS 10.0 software.

**RESULTS AND CONCLUSIONS** – Kindling rate was always high for 42D does (81.3-87.5%) and, overall, for the 33D group except for the primiparous 33D does (50.0%) (Table 1). During the experiment, the percentages of does that kindled 0, 1, 2, 3, 4, and 5 times were 0, 0, 0, 8, 69, and 23% in does of 33D group; and 0, 0, 17, 58, and 25% in does of 42D group (in this group, does had maximum 4 kindlings).

**Table 1** – Effect of reproductive rhythm on kindling rate (%)

Kindling order	33D group	42D group	Prob.
1	83.3	87.5	0.74
2	50.0	87.5	0.02
3	81.3	81.3	1.00
4	92.3	84.6	0.55
5	76.9	-	
<b>1-4/5</b>	<b>75.6</b>	<b>85.2</b>	<b>0.16</b>

Litter size was not significantly different between groups (Table 2). However, the number of kits born dead was higher for the 42D group than 33D does ( $P=0.05$ ).

**Table 2** – Effect of reproductive rhythm on litter size (1-4/5 kindlings)

Litter size	33D group	42D group	SE	Prob.
Total, n	9.02	9.44	0.39	0.44
Alive, n	8.69	8.58	0.26	0.83
Stillborn, n	0.33	0.86	0.13	0.05

Mortality of suckling kits was similar during the whole experiment (Table 3), but significant differences were found in the 3<sup>rd</sup> and 4<sup>th</sup> litters, with better results in the 33D group.

Calculating the number of total born kits per inseminated does were 7.06 and 8.04 in 33D and 42D groups, respectively. During the entire experiment (193 days), the number of rabbits born alive per doe (based the number of reproductive cycles: 5 or 4 in

groups 33D and 42D, resp.) in the 33D and 42D groups were 32.8 and 29.4, respectively.

**Table 3** – Effect of reproductive rhythm on mortality of suckling kits (0-21 d, %)

Kindling order	33D group	42D group	Prob.
1	24.2	17.6	0.28
2	10.9	9.3	0.77
3	8.6	17.2	0.04
4	3.3	19.1	<0.01
5	17.1	-	
<b>1-4/5</b>	<b>14.5</b>	<b>15.6</b>	<b>0.47</b>

Kindling rates of 42D does were better than it was expected, and the results of 33D group were also excellent compared to our former experiment (Szendrő *et al.*, 1999). Sexual receptivity is very high immediately pp. and it speedily decreases at 4 d pp. (Castellini *et al.*, 2007). Post partum mating or insemination typically results in low kindling rates (Poujardieu and Theau-Clément, 1995). Using a 35-d reproductive rhythm, most of the authors found low fertility rates (Castellini *et al.*, 2007). In the present experiment only primiparous does of the 33D group had a low kindling rate (50.0%), which was attributed to a negative energy balance during the first pregnancy and lactation (Xiccato and Trocino, 2010). Depletion of body reserves leads to a decrease in reproductive performance. Pascual *et al.* (2012) summarizing the results in the literature, established that selection for litter size increases body fatness. This finding may give answers why the pp. inseminated rabbit does in the present experiment achieved better results than those used about 14 years ago (Szendrő *et al.*, 1999).

Selection of maternal lines could result in a better body condition of does which better fit to intensive reproductive rhythms than the former generations. However, the 33-d rhythm does not fit to the cycled production, and there are some welfare aspects according to which the 33D system could be questionable.

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