MODIFICATION OF THE NURSING SYSTEM AS A BIOSTIMULATION METHOD

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ABSTRACT

The aim of the experiment was to investigate, whether the modification of the nursing method (from free to controlled) before the insemination improves the reproduction performance. Primi- and multiparous Pannon White rabbit does were divided into three groups. In the C group (n: does=58, AI=144) does were allowed to nurse freely, in the CN2 group (n: does=53, AI=126) two days before the insemination, while in the CN3 group (n: does=64, AI=148) three days before the insemination free nursing was changed to controlled. In the statistical analysis only data obtained from the insemination 11 days after the kindling were taken into account. The colour of the vulva in the experimental groups was unaltered, but it was significantly ($p<0.001$) more turgid. The kindling rate of the C (77.8%), CN2 (78.5%) and CN3 (80.3%) groups was identical, while the total litter size (8.56, 8.73 and 9.26) and the alive litter size (7.81, 8.04 and 9.01) increased significantly ($p<0.05$) in the CN3 group. No differences were found in the mortality between days 0 and 21 (12.5, 12.9 and 13.3%), in the litter weight at 21 days of age (2633, 2576 and 2609g) as well as in the individual body weight (354, 348 and 356g). Based on the above results it can be concluded that changing the nursing method from free to controlled 3 days before AI is a proper biostimulation method for the improvement of reproduction performance. Compared to the C group, the total litter size/AI increased from 6.66 to 7.84, while the alive litter size/AI from 6.08 to 7.24, meaning an improvement of 18 and 19%, respectively.

Key words: rabbits, nursing method, biostimulation, reproductive traits.

INTRODUCTION

In the past few years the International Rabbit Reproduction Group and the Reproduction workgroup of the COST 848 action performed numerous experiments for the natural substitution of the PMSG treatment (so-called biostimulation) used for oestrus synchronisation. The dam-litter separation (DLS) is proved to be an effective method to improve reproductive performance of rabbit does (for a duration equal or longer than 36 hours), though the absence of a nursing event led to a slightly lower body weight of the kits, when compared to the control (THEAU-CLEMENT, 2000). Changing the nursing method from free to controlled (in the morning) on the 9th day after the kindling leads to a

nervous condition of the does, increasing from the evening to the morning (MATICS *et al*., 2004); this may be similar to that experienced by a 24 hours DLS after the separation of the does. At free nursing does are allowed to nurse only in the morning in a period of some days before AI, the kindling rate and the litter size could increase (EIBEN *et al*., 2004ab; BONNANO *et al*., 2004). Based on the above facts it can be assumed that the change of the nursing, instead of DLS, can be an effective biostimulation method. Accordingly, the effects of the nursing method changed 2 or 3 days before the insemination from free to controlled was investigated on the receptivity, kindling rate and litter size.

MATERIAL AND METHODS

The experiment was carried out at the University of Kaposvár, on Pannon White rabbits. The rabbit house was not climatized, therefore, the temperature reached 28-30°C on hot summer days; in the winter a minimum of 16°C was provided. The lighting was 16L:8D. Rabbits were fed a commercial pelleted diet (11MJ DE/kg, crude protein = 17%, crude fibre = 15.5%) *ad libitum*; water was offered *ad libitum* from nipple drinkers.

Primi- and multiparous does were divided into three groups randomly. Does in the control group (C, does = 58, AI=144) were allowed to nurse freely. In the two experimental groups the nursing was changed from free to controlled either two or three days before the insemination. The nest-box was closed with a solid metal sheet in the morning of the 8th (CN3, does = 64, AI=148) or 9th day (CN2, does = 53, AI=126) at 9:00 and it was opened in the mornings for a half an hour (8:00-8:30) until the insemination at the 11th day. Does were allowed to nurse freely again (the nest-box was opened) after the insemination within 15 minutes after the nursing event. At the same time with the insemination, 1.5 µg GnRH hormone was injected. Litter equalization was only performed within group; kits of died does were also placed to does within group.

The vulva colour (white and pink = 0; red or purple = 1), its turgidity (not turgid and semi-turgid = 0; turgid = 1), receptivity (white or not turgid = 0, pink, red, violet and turgid = 1), the kindling rate and the litter size (total, alive) were recorded as well as the growing traits of kits (litter and individual weight until day 21). In the statistical analysis only data obtained from the insemination 11 days after the kindling were taken into account.
Experimental data were analysed by means of the SPSS 10.0 program package, using analysis of variance and chi^2 test. The treatment (nursing methods) and the parity order was handled as fixed factors.

RESULTS AND DISCUSSION

Experimental results are summarized in Table 1.

The examination of the receptivity did not show a difference in the vulva colour of the experimental groups, though in the CN2 and CN3 groups the vulva was more turgid that that of the controls. A significant difference was found in the receptivity between groups

of C and CN3 (P<0.01). In the experiment of BONNANO *et al.* (2004) no improvement in the receptivity was found, in a group similar to CN2 of the present experiment.

In the present experiment, the fertility was not significantly improved by a controlled nursing. EIBEN *et al.* (2004ab) and BONNANO *et al.* (2004), comparing the fertility when a controlled suckling was applied 2 days before insemination with a control group without DLS obtained a difference (+15-26% and +15.3%, respectively). Since in the present experiment the does in the C group also showed a high kindling rate (77.8%), a strong improvement in the fertility could not be expected, in contrast with the cited references where the kindling rate of the C group was low (33.3-43.0 and 44.1%).

The total and alive litter size showed a 2 and 3% (NS), and a 14 and 15% (p<0.05) improvement in the CN2 and CN3 groups, respectively, as compared to the control group. EIBEN *et al.* (2004 a) found a 14% (NS) and a 23% (P<0.05) improvement of litter size alive in the CN2 group with closing the nest-box by wire net or removing the nest-box, respectively. In opposition, BONNANO *et al.* (2004) did not find any advantage of the controlled nursing on prolificacy.

The young mortality was identical in the first week; during the 2nd week significantly more kits died from the CN2 group, while during the 3rd lower mortality was observed. Therefore, the mortality of the three groups for the first three weeks was identical. This is in agreement with EIBEN *et al.* (2004 ab) and BONNANO *et al.* (2004) who didn't evidence higher mortality till 21 or 14 days of age when a similar controlled nursing was applied 2 days before insemination.

Differences were not found between the groups (either in the litter, or in the individual body weight), though the litter weight gain of the experimental groups was significantly lower as compared to the control during the 2nd week. BONNANO *et al.* (2004) and EIBEN *et al.* (2004 a) also did not find any negative effect of controlled suckling on kit's growth.

CONCLUSIONS

It can be concluded from the results that the change of free nursing 2 days before insemination has no practical benefit under our experimental conditions. In contrast, changing to controlled nursing 3 days before AI leads to a marked improvement of the litter size and the litter size/AI ratio; 14-15, and 18-19% increases can be induced while the body weight of kits at the weaning is unaltered. It can be thus concluded that the change of the nursing method could be an alternative for the PMSG treatment.

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Table 1. The effect of biostimulation on the reproduction parameters of does, and on the nursed kits' growth.

	C	CN2	CN3	S.E.	Prob.
n (doe)	58	53	64		
n (AI)	144	126	148		
			Receptivity		
Vulva colour	0.56	0.62	0.52		NS
Turgidity	0.35^{A}	0.48^{AB}	0.57^{B}		0.01
Receptivity	0.35^{A}	0.48^{AB}	0.56^{B}		0.01
			Kindling rate (%)		
	77.8	78.5	80.3		NS
			Litter size		
Total	8.56^{A}	8.73^{A}	9.76^{B}	0.18	0,05
Alive	7.81^{A}	8.04^{AB}	9.01^{B}	0.18	0.05
			Mortality (%)		
1st week	10.33	9.73	10.65		NS
2nd week	1.27^{A}	3.18^{B}	2.21^{AB}		0.01
3rd week	1.10^{A}	0.32^{B}	0.81^{AB}		0.05
0-3rd weeks	12.45	12.88	13.33		NS
			Litter weight (g)		
1 day old	503	500	501	4.5	NS
7 days old	1040	1024	1038	12.1	NS
14 days old	1865	1787	1817	20.3	NS
21 days old	2633	2576	2609	25.6	NS
			Mean body weight of kits (g)		
1 day old	59.8	59.2	59.3	0.46	NS
7 days old	135	132	135	1.1	NS
14 days old	247	239	244	1.9	NS
21 days old	354	348	356	2.7	NS
			Weight gain of litter (g/day)		
1st week	89.4	87.3	89.4	1.51	NS
2nd week	118^{A}	109^{B}	111^{AB}	1.38	0.05
3rd week	110	113	113	1.33	NS

C= free nursing in the whole period, CN2 and CN3= change of free nursing to controlled 2 or 3 days before AI.; SE: standard error of mean; NS = not significant; ^{A,B}: different letters mark significant difference at $P<0.05$.

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