

## RESEARCH ON THE INFLUENCE OF DOSE SPERM COUNT ON THE RESULTS OF ARTIFICIAL INSEMINATION IN SOWS

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### Abstract

For artificial insemination of sows are recommended between 3 and 5 billion sperm/ dose. The aim of this paper is to follow the results of sows' cervical inoculation with doses containing 2, 3, 4 and 5 billion mobile sperm/ dose and sows intrauterine inoculated with 2 billion sperm. There were inseminated 256 gilts and 408 sows divided in 8 groups depending on the motile spermatozoa number/ dose and age category. The sows which were cervically inoculated with 3, 4 and 5 billion sperm had a fecundity between 93.33% and 96.38%, while sows inseminated with 2 billion sperm, the fecundity decreased to 85.9%. To the intrauterine insemination with 2 billion sperm was noticed a fecundity of 96.03%.

**Key words:** sows, number of spermatozoa/insemination, fecundity

### INTRODUCTION

Sows artificial insemination ensures the intensive use of high genetic value boars. Cervical insemination with over 3 billion sperm per dose is widespread and ensures a high fertility [1,3,9,10]. The use of a smaller number of gametes per dose will increase the number of doses per ejaculate and also, reduce their cost. The closer the insemination technique allows the deposition closer to the oviduct, the lower the number of sperm [2,5]. Until now, good results have been obtained using doses of 1.75 billion sperm intrauterine deposited. There have been attempts to reduce the number to 750 and 500, respectively million mobile sperm/ dose [4].

### MATERIAL AND METHOD

The biological material was represented by 664 females from Hypor and PIC varieties which were artificially inseminated with semen from Duroc boars. In table 1 are presented the studied batches. L1, L2 and L3

batches consisted of 256 cervically inseminated gilts with 3, 4 and 5 billion motile spermatozoa/dose, respectively. L4, L5 and L6 batches were consisting of 160 sows, cervically inseminated with 3, 4 and 5 billion motile spermatozoa/dose. Groups L7 and L8 were formed by 268 PIC hybrid sows inseminated with 2 billion spermatozoa. The sows from L7 batch were inseminated cervically and the ones from L8 batch, intrauterine.

The insemination was carried out during October-December. The studied sows had between 2 and 3 sowing and they had a nursing duration between 23 and 28 days.

There were performed 2 insemination/oestrus with freshly diluted semen (for the first insemination) and with refrigerated for 12 hours semen (for the second one).

Before insemination, the doses were heated on a water bath at 36°C and also, the spermatozoa mobility was checked.

The dose volume was 80 ml. After insemination, the sows were housed in individual boxes for 30 days for a good nidation. [7]. There was verified the oestrus return to 21 ± 3 days and at 42 ± 3 days.

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The manuscript was received: 29.09.2020  
Accepted for publication: 30.10.2020

Fecundity (F%) was calculated to 21 and 42 days, respectively, through the ratio between the number of sows that did not show oestrus to the inseminated sows

number. The prolificity was appreciated during sowing.

There were calculated the statistical parameters, the variance analysis was done with the Fisher and Tukey tests.

Table 1 Batches structures

Batches	L1	L2	L3	L4	L5	L6	L7	L8
No of gilts/ sows	83	83	90	55	45	60	126	122
Billions of motile spermatozoa/dose	3	4	5	3	4	5	2	2
Insemination type	C	C	C	C	C	C	IU	C

C - cervically  
IU-intrauterine

## RESULTS AND DISCUSSIONS

**Gilts fecundity** to the first control was very good and the differences between batches were of 1,2% (tab. 2). The same situation was observed to the second control, the fecundity at 42 days oscillating between

92.77% to L2 batch and 95.18% to L1 batch. The high values are in accordance with data cited by other authors, which are obtained during the cold season [6,8]. According to these results, it is not necessary to use more than 3 billion motile sperm/dose for gilts.

Table 2 The gilts and sows fecundity depending on the spermatozoa number per dose

Batch	No of female	No of motile sperm/dose (bilions)	Non return to the first control		Non return to the second control	
			(no)	F(%)	(no)	F(%)
L1	83	3	80	96.38	79	95.18
L2	83	4	79	95.18	77	92.77
L3	90	5	86	95.55	85	94.44
<b>Total</b>	<b>256</b>		<b>245</b>	<b>95.70</b>	<b>241</b>	<b>94.14</b>
L4	55	3	52	94.55	51	92.73
L5	45	4	43	95.56	43	95.56
L6	60	5	56	93.33	55	91.67
<b>Total</b>	<b>160</b>		<b>151</b>	<b>94.37</b>	<b>149</b>	<b>93.12</b>
L7	126		121	96.03	117	92.86
L8	142		122	85.90	120	84.50
<b>Total</b>	<b>268</b>		<b>243</b>	<b>90.97</b>	<b>237</b>	<b>88.43</b>

**Sow fecundity** was maximum (95.56%) to the group inseminated with 4 billion spermatozoa and close to the values from the groups inseminated with 3 billion (94.55%) and 5 billion (93.33%). Nor even to sows were observed higher fecundity when inseminated with a higher number of sperm. groups with higher sperm counts. The fecundity level was kept high and similar to all the 3 groups also after 42 days of insemination.

To the L8 group which was cervically inseminated with 2 billion sperm, the fecundity to the first control was 85.90%

(tab. 2), with 8.58% lower than in the cervically inseminated sows with at least 3 billion sperm. According to these results, the threshold of 3 billion cervical deposited gametes is necessary to obtain a fecundity above 90%. To the group which was uterine inseminated with 2 billion sperm (group L7) was observed a fecundity of 96.03%, (tab. 2) close to that of the sows inseminated uterine with at least 3 billion sperm.

The gilts prolificity was not influenced by the number of sperm from the dose, being 12.17 ± 0.18 piglets in group L1, 13.12 ± 0.17

piglets in group L2 and  $13.39 \pm 0.16$  piglets in group L3 (tab. 3). There were insignificant differences between groups ( $F(3; 237) = 5.77 < F_{0.05}$ ).

Table 3 Gilts prolificity depending on the spermatozoa number on dose

Batch	L1	L2	L3
N	79	77	84
Average (heads)	12.17	13.12	13.39
Mean standard deviation	0.18	0.17	0.16
Variability coefficient (%)	21.70	19.06	15.90
Minimum (heads)	4	7	8
Maximum (heads)	17	19	18
$F_{(3;237)}$	5.77		
F5%	19.50		

Artificially inseminated sows with a number between 3 and 5 billion sperm had an average prolificity between  $13.45 \pm 0.03$  piglets and  $13.82 \pm 0.04$  piglets, the differences between groups being insignificant (tab. 4)

Table 4 Sows prolificity depending on the spermatozoa number on dose

Batch	L4	L5	L6
N	51	43	55
Average (heads)	13.82	13.82	13.45
Mean standard deviation	0.03	0.04	0.03
Variability coefficient (%)	18.22	17.94	16.73
Minimum (heads)	7	5	9
Maximum (heads)	18	18	19
$F_{(3;146)}$	0.44		
F5%	19.5		

Analyzing from the total number of sowed piglets' point of view of, there was observed that, both in sows and gilts which were cervically inseminated, a higher number than 3 billion mobile sperm/dose does not cause significant changes in prolificity.

To the inseminated sows with 2 billion sperm, prolificity was similar, regardless of

the insemination place. Thus, the sows from group L7 cervically inseminated had an average of  $11.4 \pm 0.09$  piglets, and those with uterine insemination,  $11.42 \pm 0.06$  piglets, the differences being insignificant ( $F(2; 233) = 1.78 < F_{0.05}$  (tab. 5).

Table 5 Prolificity of cervical and uterine inseminated sows with 2 billion sperm

Batch	L7	L8
N	116	119
Average (heads)	11.40	11.42
Mean standard deviation	0.09	0.06
Variability coefficient (%)	18.91	17.32
Minimum (heads)	6	8
Maximum (heads)	18	19
$F_{(2;233)}$	1.78	
F5%	19.5	

## CONCLUSIONS

To obtain a fecundity over 90% there are necessary doses with at least 3 billion spermatozoa cervically inseminated or 2 billion spermatozoa uterine inseminated.

The sow's prolificity was not influenced by the number of spermatozoa in the dose nor by the semen insemination technique.

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