

INTRAUTERINE INSEMINATION IN SOWS

P. ROȘCA*, D. DRUGOCIU, L. RUNCEANU

University of Agricultural Sciences and Veterinary Medicine of Iași

ABSTRACT - For obtaining high and constant fecundity and natality in sows, doses containing between 3 and 5 spermatozoa were used in Romania. Our investigation was oriented to a new insemination method, called intrauterine, which consists in depositing the seminal material in uterus, thus reducing the number of inseminated spermatozoa. The DeepgoldenpigTM device was used. This method was compared with the classical artificial insemination, which involves the use of the Goldenpig® device and depositing the seminal material at cervical level. Doses containing 3, 2, and 1 billion spermatozoa, diluted with X – Cell gel were packaged in 80 ml Cchette bags. The females with a weaning to estrus interval of 2 – 11 days were inseminated twice at an interval of 12 hours. Pregnancy was determined at 28 – 30 days since insemination, using an ultrasound scan. The standard inseminating method produced fecundity rates of 90.6%, 87.9%, and 60.5% per doses with 3, 2, and 1 billion spermatozoa, while the intrauterine method obtained rates of 91.6%, 90.8%, and 59.5%. The farrowing rates were of 90.2%, 87.4%, and 59.5% in case of classical method, and 90.9%, 90.3%, and 81.1% for intrauterine method. Significant differences were obtained by using doses of 1 billion spermatozoa. As a conclusion, intrauterine insemination was simple, safe, and effective, and allowed the sperm dose to be reduced to 1 billion spermatozoa.

Key words: sow, gestation, fertility, prolificacy

REZUMAT–*Însămânțarea artificială intrauterină la scroafă. Pentru obținerea unei fecundități și natalități ridicate și constante la suine, în România se folosesc, la ora actuală, doze ce conțin între 3 și 5 miliarde de spermatozoizi. Cercetările noastre au fost orientate spre o nouă metodă de însămânțare, numită intrauterină, care presupune depunerea materialului seminal în corpul uterin și permite reducerea numărului de spermatozoizi pe doza de însămânțare. Pentru aceasta s-a folosit*

* E-mail: petru1065@yahoo.com

dispozitivul Deepgoldenpig™ . Această metodă a fost comparată cu I.A. clasică, ce presupune utilizarea cateterului Goldenpig®, cu ajutorul căruia materialul seminal se depune la nivel cervical. Dozele, având concentrații de 3,2 și, respectiv, 1 miliard de spermatozoizi, diluate cu X Cell, au fost ambalate în săculețe Cochette, de câte 80 ml. Femelele care au prezentat estru în intervalul de 2-11 zile de la înțarcare au fost însămânțate de 2 ori la interval de 12 ore. Diagnosticul de gestație a fost stabilit folosind sistemul de scanare cu ultrasunete, în intervalul 28-30 de zile de la însămânțare. Folosind metoda clasică, s-au obținut proporții ale fecundității de 90,6%, 87,9% și 60,5% pentru însămânțarea cu 3,2 și, respectiv, 1 miliard de spermatozoizi, în timp ce, prin metoda intrauterină, s-au obținut proporții de 91,6 %, 90,8%, și 83,4%. În mod asemănător a evoluat și rata fătărilor, care a fost de 90,2%, 87,4% și 59,5%, în cazul metodei clasice și de 90,9%, 90,3% și 81,1%, în cazul celei intrauterine. Se constată că doar în cazul folosirii dozei de 1 miliard de spermatozoizi se obțin diferențe semnificative în favoarea metodei intrauterine de însămânțări. În concluzie, putem afirma că I.A. la scroafă este simplă, sigură și eficientă, permițând reducerea numărului de spermatozoizi pe doză la 1 miliard.

Cuvinte cheie: scroafă, gestație, fertilitate, prolificitate

INTRODUCTION

Practiced for many years, the artificial insemination in swine involves the use of 3 – 5 billions spermatozoa per dose, for obtaining a high fecundity. Seminal material can be used raw, freshly diluted, diluted and preserved for 3 – 7 days at 17°C, or frozen (Bogdan et al., 1999; Runceanu, Cotea, 2001; Runceanu, 2002).

For insemination, various kinds of catheters can be used; some of them simulate the corkscrew tie of boar's penis, but all of them allow seminal material to be deposited at cervical level. For overcoming the barrier represented by the cervix in the way of spermatozooids, it is necessary to deposit a large amount of seminal material at cervical level to ensure a sufficient number of spermatozoa in the isthmus of the oviduct. Overcoming this barrier and depositing the seminal material directly in uterus allows the reduction in the number of spermatozoa per dose, ensuring a sufficient number of spermatozoa at the place of fecundity (Krueger, Rath, 2000; Watson, Behan, 2002).

Knowing these aspects, the aim of this study was the comparative testing of the two methods of insemination, intrauterine and classical ones, simultaneously with the reduction in the number of spermatozoa per dose.

INTRAUTERINE INSEMINATION IN SOWS

MATERIALS AND METHODS

The study was performed on 2685 PIC Camborough sows with a weaning to estrus period of 2 – 11 days. The seminal material used was diluted with X – Cell packaged in 80 ml Cochette bags. The sows were reinseminated in 12 hours.

The intrauterine method was tested in comparison with the classical method of insemination. In the classical method, the Goldenpig® standard device is being used, allowing the seminal material to be deposited at cervical level. The intrauterine method requires the use of the DeepgoldenpigTM inseminating device, which is in fact a DeepgoldenpigTM standard catheter, through which a narrow inner tube with a diameter of 4 mm is inserted, and which extends 200 mm beyond the tip of the outer catheter, reaching the body of the uterus, where the seminal material is deposited. In parallel with the testing of the two methods, the number of spermatozoa per dose was reduced, sows being inseminated with doses of 3, 2, and 1 billion spermatozoa, in both methods. Gestation was established with ultrasounds at 28 – 30 days since the insemination.

RESULTS AND DISCUSSION

The comparative results for the two methods and the three concentrations were presented in *Table 1*.

The rates of pregnancy, in case of using doses with 3 billions spermatozoa were, with the classical method, 90.6%, and 91.6 with the intrauterine method. They did not differ significantly from the 2 billion spermatozoa doses. This demonstrates that, for a good fertility, at least 2 billions spermatozoa per dose are necessary. For doses of 1 billion spermatozoa, inseminated with the classical method, the fertility rates are of only 60.5%, which means that this concentration is insufficient to ensure the necessary amount of functional spermatozoa in utero-tube joint and implicitly, in the isthmus of the oviduct. With intrauterine insemination of doses with 1 billion spermatozoa, a higher fecundity rate, 83.4%, was obtained. The obtained results have shown that the intrauterine insemination with a reduced number of spermatozoa was not a disadvantage.

Analysing the parturition, with the classical method of insemination, the rates were of 90.2%, 87.4% and 59.5%, for doses of 3, 2 and 1 billion spermatozoa, while, for the same doses, with the intrauterine method, the rates of parturition were 90.9%, 90.3% and 81.1%. In case of inseminating 1 billion spermatozoa, with the classical method, significant differences were obtained in comparison with insemination by using doses of 2 and 3 billions spermatozoa.

A similar evolution was found in the litter number. With the classical method, the litter number was of 12.3, 12.1, and 9.8, while with the intrauterine method, the litter number was 12.5, 12.2, and 11.8.

Considering the results, one can assess that intrauterine insemination in sows was simple, safe, and effective, allowing the diminution in the number of spermatozoa per dose at 1 billion.

Table 1

Comparison between fecundities and fertilities obtained after insemination with the standard device Goldenpig® and the new device Deepgoldenpig

Device	Dose (billions)	Inseminated		Gestation		Parturition		Litter no.	
		No.	%	No.	%	No.	%	No.	%
Goldenpig®	3	450		408	90.6	406	90.2	5034	12.3
	2	415		365	87.9	363	87.4	4428	12.1
	1	200		123	60.5	119	59.5	1167	9.8
Deepgoldenpig	3	650		596	91.6	591	90.9	7388	12.5
	2	620		563	90.8	560	90.3	6886	12.2
	1	350		292	83.4	284	81.1	3378	11.8
Total		2685		2347		2323		28281	

CONCLUSIONS

With the classical insemination method, the fecundity rates were of 90.6%, 87.8%, and 60.5%, for doses with concentrations of 3, 2 and 1 billion spermatozoa.

With the intrauterine insemination method, the fecundity rates were of 91.6%, 90.8%, and 83.4%, for doses with the same concentrations.

Similar results were obtained for rates of parturitions and litter number at birth.

Only by using 1 billion spermatozoa, significant differences were obtained to the advantage of the intrauterine method.

The use of the intrauterine insemination method, associated with the reducing in the concentration of doses, results in significant gains by more rational usage of the genetically superior boars.

REFERENCES

- Bogdan A.T., Mantea Șt., Bogdan Dorina, 1999** – *Treatise of reproduction and artificial insemination in swine*. Tehnică Agricolă, Bucharest
- Krueger C., Rath D., 2000** – *Intrauterine insemination in sows with reduced sperm number*. *Reprod. Fertil. Dev.* 12 : 113-7
- Runceanu L., Cotea C., 2001** – *Veterinary reproduction, obstetrics, and gynecology*. Ion Ionescu de la Brad Publishing House of University of Agricultural Sciences and Veterinary Medicine of Iași
- Runceanu L., Drugociu D., Roșca P., Anton C., 2002-** *Reproduction, obstetrics and clinical andrology*. Venus Publishing House, Iași
- Watson P.F., Behan J.R., 2002** – *Intrauterine insemination of sows with reduced sperm number: results of a commercially based field trial*. *Theriogenology*. 57 : 1683-1693.