

## SUMMARY

of the doctoral thesis titled:

Research on the optimization of semen material inoculation method for sow  
developed by drd.ing. **Georgeta Dârlă (Tălpuș)** under scientific guidance of

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The purpose of the research is to study the reproduction processes in swine using a new and modern method of sowing artificially sows.

For the profitability of livestock breeding and in order to ensure a good quality of the food products on the market, it is indispensable that at the farms, optimal conditions of the breeding function should be ensured for the swine, this being the guarantee that the technology is practiced correctly and the animals can manifest their genetic potential.

In order to follow the reproduction activity in animal's growth domain, there are kept a number of zootechnical reports, on the basis of which the results obtained are evaluated.

The evaluation of the reproduction function is based on some breeding indexes, their calculation being very important for assessing the quality of the activity carried out in an animal farm.

The best way to improve reproductive activities is to reduce the number of non-productive days.

Following the application of intrauterine artificial sowing to sows in the current practice, it is intended to improve fertility in order to obtain the highest economic efficiency.

In the present paper, the following general objectives were pursued:

- Knowledge of breeding performance in the PIGCOM farm (fecundity, prolificity, index of usage, etc.).
- Creation of a comparative experimental study on intracervical, intracervical with support, intrauterine and intrauterine with support artificial insemination.

- Optimizing the way sperm inoculation is performed in swine by comparing intracerebral and intrauterine inoculation. For each of the two methods, inoculation was performed with and without support for seminal doses.

**Part I**, represented by bibliographic research, contains a number of four chapters in which the selected information from the literature is concentrated.

*Chapter I - THE EVIDENCE OF THE SWINE'S GROWTH WORLDWIDE AND IN OUR COUNTRY*, presents the position occupied by the pig sector in the share of total zootechnical market in our country and a forecast for the export of pork meat worldwide by 2023.

*Chapter II - entitled MORPHOPYSIOLOGICAL PARTICULARITIES OF THE FEMEL'S GENITAL APPARATUS*, describes the genital apparatus at the sow, the internal and external genital organs.

*In Chapter III - called the PARTICULARITIES OF THE SEXUAL CYCLIC FOR THE SOWS*, we described the sex cycle morphology, the stages and phases of the sex cycle, genital changes during the sexual cycle, the role of the neuro-endocrine system on the sexual cycle for the sows, behavioral changes.

*Chapter IV - entitled THE ARTIFICIAL SOWING FOR SWINES*, presents the use of artificial sowing, importance and advantages, the technological flow of artificial sowing, principles and methods of sperm collection, sperm dilution, sperm inoculation

**Part II** includes own research and is compressed in three chapters, following the purpose and objectives proposed, and at the end of the thesis are emphasised final conclusions, recommendations and bibliography.

*In Chapter V - THE PURPOSE AND THE OBJECTIVES OF THE RESEARCH .*

The research has been made at the PIGCOM farm in Tulcea County and started with data recording, completing breeding registers, genealogical records and calculating breeding indexes according to the method of semen inoculation. At the end of the chapter it is presented the evaluation of reproduction indices in sows according to the use of artificial sowings

*In Chapter VI – entitled THE RESULTS CONCERNING THE MAIN INDICES OF REPRODUCTION IN CASE OF MULTIPAROUS SOWS*, we had as biological material 100 gilts from the PIGCOM farm, which were divided into 4 lots:

- Lot 1 - of 25 primiparous sows, intracervical sowing;
- Lot 2 - of 25 primiparous sows, intracervical sowing with support;
- Lot 3 - of 25 primiparous sows, intrauterine sowing;

- Lot 4 - of 25 primiparous sows, intrauterine sowing with support.

Research has been conducted over three years of study; for the experiments were analyzed groups of gilts and breeding sows belonging to different breeds.

The following reproductive parameters were observed in these groups:

1. The values for gestation duration in lot 1 were  $113.48 \pm 0.83$  days, being the lowest value, followed by lot 4 with a value of  $115.27 \pm 0.43$  days. Differences were insignificant from statistically point of view.
2. Comparing the recorded service-period values (between the first and the second parturition), the four studied lots show that the lowest average was  $35.62 \pm 0.52$  days in lot 4, and also in case of lot 3, with a value of  $39.49 \pm 1.62$  days. Compared to the other specialized works from literature, the average service-period value obtained with this research, is lower.
3. The best result in the interval between parturitions (between the first and second parturition) was recorded in lot 1 -  $150.63 \pm 2.04$  days, and in lot 4 -  $150.88 \pm 0.69$  days. Significant differences were found between the studied lots (L1 and L2, L2 and L4, L3 and L4).
4. Results on fecundity in the four groups studied were: lot1 with an average value of  $73.46 \pm 4.74\%$ , lot 2 with a percentage of  $75 \pm 5.56\%$  and lot 4 of  $89.77 \pm 3.90$ .

The significance of differences between average values of fecundity in case of primiparous, was also calculated.

5. The usage index for reproductive gilts had the best value in lot 4 – 2.50, followed by lot 1 with 2.43 and lot 3 with 2.29. The index is the average number of parturitions produced by one gilt in a year.

The values obtained can be considered very good because the literature shows values between 2.2 and 2.45.

6. The results obtained regarding the number of piglets produced, had an average of  $10.72 \pm 0.25$  and  $10.97 \pm 0.31$  for lots 1 and 2 and for lots 3 and 4 an average of  $10.57 \pm 0.25$  0.30 and  $11.01 \pm 0.42$ . The differences were not significant from statistically point of view
7. The medium value of the alive piglets, ranged on an average of  $94.34 \pm 1.73\%$  of the total of 10,97 piglets for lot 1 and for lot 4 on an average of  $9.24 \pm 0.73\%$ , out of 11.01 piglets. Differences were not significant from statistically point of view.
8. With regard to the weight of the products of the studied gilts, they varied between  $0.81 \pm 0.03$  and  $0.69 \pm 0.03$  kg in lots 1 and 2. The variations obtained for Lots 3 and 4 were between  $0.80 \pm 0.03$

and  $0.60 \pm 0.12$  kg; the sowing method used was intrauterine and intrauterine with support. The difference between lots was significant from statistically point of view.

9. The data recorded for the average weight at weaning, in the 4 studied lots indicate superiority of  $5.75 \pm 0.28$  and  $6.69 \pm 0.15$  kg, with a difference of 940 g (lot 3 and lot 4). Lots 1 and 2 recorded values between  $5.33 \pm 0.30$  and  $5.09 \pm 0.33$  kg, with a difference of 240 g.

The weighted average weighted product / batch weight was calculated and good results achieved group 4 with an average of 73.69 products / batch

General conclusions from the analysis of the data obtained were emphasised.

In *Chapter VII, entitled THE RESULTS CONCERNING THE MAINE INDICES OF REPRODUCTION IN CASE OF MULTIPAROUS SOWS*, we had as biological material 100 adult sows that were divided into four groups:

- Lot 1 - 25 multiparous sows, intracervical sowing;
- Lot 2 - 25 multiparous sows, intracervical sowing with support;
- Lot 3 - 25 multiparous sows, intrauterine sowing;
- Lot 4 - 25 multiparous sows, intrauterine sowing with support.

To determine reproduction performance, the following parameters were calculated:

1. Results on gestation duration recorded in lot 4 were  $114.36 \pm 0.24$  days being the lowest value, followed by lot 2 with a value of  $114.16 \pm 0.43$  days.

This indicator may be influenced by the inoculation method.

2. Analyzing the recorded service-period values, we found different values in the four lots studied. By testing the statistical significance of differences, it is found that they are insignificant.
3. Regarding the interval between parturitions, the values obtained in lot 1 were  $160.12 \pm 2.68$  days, and for lot 4 we obtained  $160.92 \pm 3.88$  days. There were no significant differences between the studied lots.
4. Results on fecundity expressed as a percentage were: lot 1 with an average of 53.15%, lot 2 with an average of 61.36% and lot 4 with an average of 54.58%.

Analyzing the values of this parameter, there are small variations on the studied lots.

5. The average usage - index for adult sow had the best value in Lot 4 - 2.45, followed by Lot 3 with 2.42, superior to Lot 1 and Lot 2.

The values obtained can be considered very good because the literature shows values between 2.2 and 2.45.

6. The best results on the number of products were on average  $9.19 \pm 1.17$  and  $9.73 \pm 0.42$  for lots 1 and 2, and for lots 3 and 4 we obtained an average of  $10.78 \pm 0.29$  and  $10.83 \pm 0.24$ .  
The small differences in adult sows in correlation with the sowing method were not significant from statistical point of view.
7. The percentage values for the new alive borned piglets averaged  $91.47 \pm 2.07\%$ , from the total of 9.19 piglets for lot 1 and for lot 4 an average of  $99.18 \pm 0.56\%$ , out of a total of 10.83 piglets. We found significant differences due to the sowing method.
8. The values of medium weight of the new borned piglets, for all the 4 lots studied, are different between the intracerebrally sowed lots and the intrauterine sowed lots. Lot 1 has an average weight of  $0.75 \pm 0.04$ , and for lot 4 we obtained an average weight of  $0.79 \pm 0.09$ .
9. With regard to the average weight at weaning for the piglets, the higher value is found for lot 4 -  $6.29 \pm 0.13$ . The weight variation of piglets at weaning from one lot to another is very big; the difference between the maximum and the minimum value was 1.47 kg.

The average weight at weaning / lot ranged from 39.60 (L2) piglets / lot to 68.12 piglets / lot (L4).

This thesis end with some general conclusions, reflecting the contribution of the research to the breeding of the swine and the possibility to improve breeding indices in sows by using artificial sowings.

### **Recommendations**

The reproductive performance of the female stock is the economic success for the pig meat production.

The technique of intrauterine sowing optimizes the production of semen through the use of low sperm quantity.

The cost of maintaining breeding bulls includes purchase, food, medication. So, the higher the number of doses produced by each male, the greater the efficiency and cost reductions.

Taking into account a better use of semen material, the intrauterine insemination it is distinguished by the possibility of increasing the breeding sowing intensity of sows using genetically superior males.