

## RESEARCHES REGARDING AGE, BREED AND COLLECTING SEASON INFLUENCE IN QUALITY AND QUANTITY BOARS SEMEN

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### Abstract

*Semen production from reproduction boars depends upon different factors as: age, breed, using way to natural mating or collecting, but also the environmental conditions. The present researches have in view to establish how three influence factors as breed, age and collecting season could change the quantitative and qualitative indices of the semen. There were analyzed 65 boars owing to three different genetic types: Large white (16 boars), Landrace (16 boars) and Pietrain (33 boars). At every collecting there were recorded the following sperm indices: macroscopic-sperm volume and microscopic-sperm concentration ( $\times 10^6$  spz/ml), and total number of sperm cells/ejaculate ( $\times 10^9$ ). The influence of the three factors was made along two years, studying the dynamics of the sperm volume, concentration and total number of sperm cells/ejaculate depending on boars breed (large white, Landrace and Pietrain), boars age (1 year, comparative two years) and collecting season (spring, summer, autumn and winter). The results of the research regarding the season of semen collecting revealed the fact that the value of the analyzed sperm indices was superior in the cold season.*

**Key words:** sperm collecting, qualitative and quantitative indices.

### INTRODUCTION

Swine breeding in industrial system supposes the applying of the most modern breeding technologies to exteriorize the swine biologic potential and also the best using of forages, shelters, working force to assure some high, rhythmic and valuable productions (Marin, 2006; Tapaloaga, 2008; Tapaloaga, 2012). The productive genetic potential breeding to increase the quantity and quality of meat production is linked to the reproduction activity setting. The Romanian experience has proved in the last decade that the artificial insemination is an up to date compound of the reproduction function increasing in swine (Tapaloaga, 2008; Tapaloaga, 2012; Tapaloaga, 2011).

### MATERIALS AND METHODS

As it is known, the semen production in boar is appreciated by its volume, sperm cells concentration, and sperm motility and presents large variability depending on some factors, existing differences between different breeds, ages and collecting season. The aim of this paper was to study the three factors that

influence the quantity and quality of the semen in boars used for artificial insemination in a famous breeding unit. Thus, there were analyzed 65 boars in three genetic types: 16 Large White boars, 16 Landrace boars and 33 Pietrain boars.

At every sperm collecting there were analyzed and recorded the following sperm indices:

- Macroscopic indices: sperm volume, measured in the collecting glass, in the moment of sperm filtering
- Microscopic indices: sperm cells concentration ( $\times 10^6$  spz/ml) determined by the colorimeter and the total number of sperm cells per ejaculate ( $\times 10^9$ ) calculated multiplying the sperm cell concentration and its volume.

The study was conducted during two years, having in view the evolution of the three sperm indices depending on:

- breed (Large white, Landrace, Pietrain);
- age (1 year, comparatively 2 years;)
- collecting season (spring, summer, autumn and winter).

The study regarding the breed effect upon the sperm production was made on 400 ejaculates, 100 ejaculate from Large white boars, 100

ejaculates from Landrace boars and 200 ejaculates from Pietrain. The sampling was made conformingly the using program to artificial insemination of boars.

The values obtained upon the analyses of the ejaculates from the three studied breeds (Large white, Landrace, Pietrain) were used to statistical processing including mean and standard deviations, sperm concentration and the total number of sperm cell/ ejaculate, having in view the emphasizing the breed differences. The effect of boar age upon the seminal production was studied by comparing the sperm indices recorded at one year boars, comparative the same boars at two years old.

The researches were made during 24 months. To cancel the breed effect and to be correct evaluate the effect of age upon the semen, there were analyzed equal numbers of ejaculates

from the three breeds, for the both years. Thus, from Large white boars were studied 100 ejaculates, 50 of them in the first year and the others in the second years and the same for the other two breeds, Landrace and Pietrain.

The seasonal effect on the main spermatoc indices was studied during 12 months, grouped by the four seasons of the year (winter, spring, summer and autumn). There were analyzed 25 ejaculates per each breed, per each season.

## RESULTS AND DISCUSSIONS

Analyzing the values of the seminal material depending on the boars breed, there was noticed that there are differences regarding the sperm production among the three genetic types (table 1, charts 1, 2, 3).

Table 1. Sperm indices in the three analyzed boar breed

Genetic type		Large white	Landrace	Pietrain	All breeds
Sperm indices	Boars number/ analysed ejaculates	16/ 100	16/ 100	33/ 200	65 400
Volume (ml)	$\bar{x} \pm s_x$	271±96 (2)	291±91 (1)	260±85 (3)	270±91
Sperm cells concentration ( $10^6/ml$ )	$\bar{x} \pm s_x$	350±89 (2)	320±99 (3)	380±90 (1)	347±93
Total number of sperm cells /ejaculate ( $\times 10^9$ )	$\bar{x} \pm s_x$	89±31 (1)	77±28 (2)	75±27 (3)	80±29

Thus, it was noticed that regarding the volume of the ejaculate, the highest value was recorded in Landrace breed (291±91 ml), the lowest value in Pietrain boars (260±85 ml), while

Large white boars achieved, 271±96 ml, an intermediary value between the other two analyzed breeds, Landrace and Pietrain (table 1, chart 1).

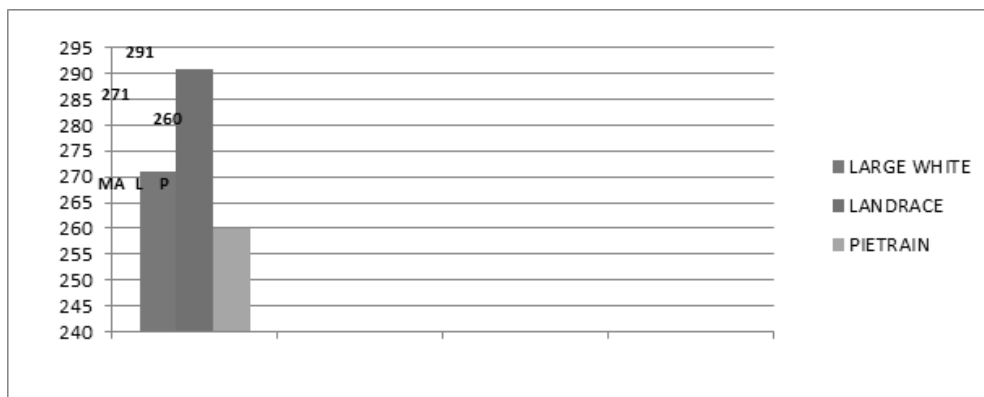


Figure 1. Ejaculate volume dynamics

Sperm concentration in sperm cells ( $10^6/ml$ ) in the studied material had also different values in

the analyzed values, existing practically a negative correlation to the ejaculate volume:

the highest value of the sperm concentration in sperm cells was recorded in Pietrain breed ( $380\pm90\times10^6/\text{ml}$ ), the lowest value in Landrace

boars ( $320\pm99\times10^6/\text{ml}$ ), and the large white boars recording an intermediary value, as is seen in table 1 and chart 2,  $350\pm89\times10^6/\text{ml}$ .

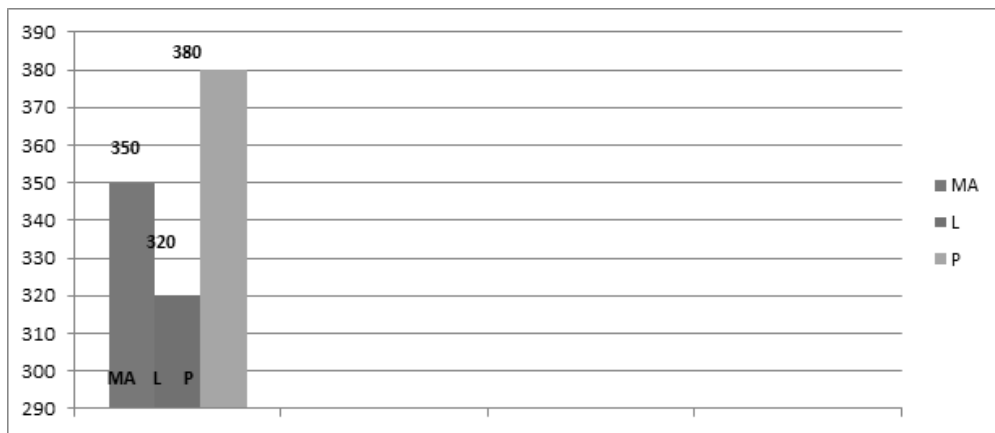


Figure 2. Sperm cells concentration ( $\times 10^6/\text{ml}$ )

The total number of sperm cells/ejaculate ( $\times 10^9$ ) had values within  $75\pm27\times10^9$  and  $89\pm31\times10^9$ . Thus, in table 1 and chart 3 it may notice that the highest value of the total number of sperm cells/ejaculate was recorded in Large

white boars ( $89\pm31\times10^9$ ), the lowest value was recorded in Pietrain boars ( $75\pm27\times10^9$ ), while Landrace boars recorded almost the same values as in Landrace boars,  $77\pm28\times10^9$ .

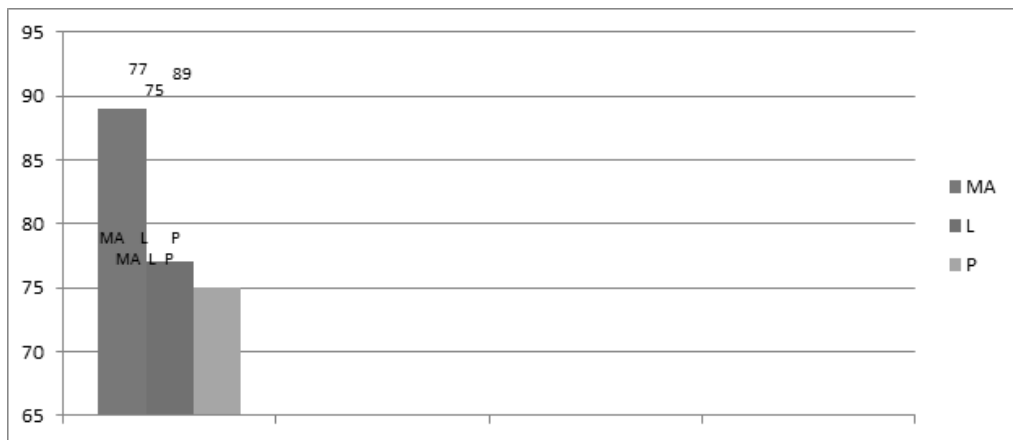


Figure 3. Total number of sperm cells /ejaculate dynamics ( $\times 10^9$ )

Analyzing the values of the sperm indices depending the age of boars, it was noticed that

there were little differences regarding the sperm production between the two age studied categories. (table 2).

Table 2. Sperm indices depending on age at collecting

Age category		1 year	2 years
<b>Sperm indices</b>	<b>No of analysed ejaculates</b>	<b>150</b>	<b>150</b>
<b>Volume (ml)</b>	<b>x ± sx</b>	265±54	270±60
<b>Sperm cells concentration (10<sup>6</sup>/ml)</b>	<b>x ± sx</b>	340±45	342±40
<b>Total number of sperm cells /ejaculate (x10<sup>9</sup>)</b>	<b>x ± sx</b>	75±17	78±21

Thus, the ejaculate volume increases as the boars age from 265±54 ml at 1 year old, la 270±60 ml at two years old, while the sperm concentration in sperm cells (x10<sup>6</sup>/ml), less age dependant, seems to be balanced at 1 year old. (340±45x10<sup>6</sup>/ml-342±40x10<sup>6</sup>/ml).

The total number of sperm cells /ejaculate (x10<sup>9</sup>) had a low increasing by the boars' age

from 75±17x10<sup>9</sup> to 78±21 x10<sup>9</sup>. This increasing is linked to the one of volume of ejaculate after 12 years old.

The results of the researches carried out during a year having in view the influence of the season upon the sperm material are presented in table 3.

Table 3. Sperm indices depending on collecting season

Season	Volume (ml)	Sperm cells concentration (10 <sup>6</sup> /ml)	Total number of sperm cells /ejaculate (x10 <sup>9</sup> )
<b>Spring</b>	270±48	320±43	74±27
<b>Summer</b>	260±52	310±40	76±21
<b>Autumn</b>	280±50	325±41	85±30
<b>Winter</b>	272±60	338±46	88±31

Analyzing the data in table 3, we can notice the following aspects:

- the volume of the ejaculate depending on the collecting season was framed within 260±52 ml and 280±50 ml, the highest values recording as it was expected in cold seasons (autumn and winter), and the lowest value, in summer (260±52ml);

- sperm concentration in sperm cells (x10<sup>6</sup>/ml), classified depending on collecting season was framed within 310±40x10<sup>6</sup>/ml and 338±46x10<sup>6</sup>/ml, the highest values being recorded in the cold seasons (autumn and winter);

- the total number of sperm cells/ejaculate (x10<sup>9</sup>) is correlated with sperm concentration, so the highest values in this sperm index too are recorded in the cold seasons (autumn and winter) more exactly: in autumn, 85±30x10<sup>9</sup> and in winter, 88±31x10<sup>9</sup>.

The researches regarding the effect of boars breed upon the spermatric material, carried out on three genetic types (Large white, Landrace and Pietrain), emphasized some differences. Thus, even in the volume of ejaculate the landrace boars recorded the highest values (291±91 ml), the ones in Pietrain breed had the

highest value of sperm concentration in sperm cells. (380±90x10<sup>6</sup>/ml).

The total number of sperm cells per ejaculate (x10<sup>9</sup>) had a little increasing parallel the age of collecting from 75±17x10<sup>9</sup> to 78±21 x10<sup>9</sup>. This increasing is linked to the one of the volume of ejaculate after 12 months of age.

The researches regarding the effect of collecting season on the main sperm indices revealed, as it was expected that the highest values were recorded in cold seasons.

## CONCLUSIONS

There were also low differences regarding the effect of boars age, the sperm indices increased parallel the age increasing.

The effect of collecting season on sperm indices revealed high performances in the cold season.

The obtained results in the present research prove the fact that besides the best organizing of the activity in an artificial insemination center which depends on the staff professional status and correctitude, the reactive and equipment quality, there are influence factor which could modify more or less the

quantitative and qualitative index in boars spermatic material.

### **ACKNOWLEDGEMENTS**

This work was co financed from the European Social Fund through Sectorial Operational Program Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/63258 "Postdoctoral school for zoo technical biodiversity and food biotechnology based on the eco-economy and the bio-economy required by eco-san-genesis"

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