
COMPARISON OF SEMEN TRAITS OF CROSSBRED BOARS AND HYBRIDS RAISED AT INSEMINATION STATION

Zejer P., Milewska W.

Department of Pig Breeding, Faculty of Animal Bioengineering, University of Warmia and Mazury, Oczapowskiego 5, 10-957 Olsztyn, Poland

E-mail: malwa@uwm.edu.pl

ABSTRACT

In pig production in Poland important role is played by crossbred boars and hybrids. In the year 2010, the crossbred boars semen used in the insemination was 14.77%, and 26.30% for the hybrids. The semen collected from crossbred boars (Duroc x Pietrain) and hybrids (PIC) enjoyed the most popular in the insemination. The aim of this study was to compare the semen characteristics of crossbred (Duroc x Pietrain) and hybrids (PIC and NECKAR) boars.

Materials for the study were 747 ejaculates collected from 10 boars by one year (2010). Semen was collected using manual method. The following traits were identified among physical characteristics of ejaculates: volume (ml), spermatozoa concentration (thousand/mm³), the number of live spermatozoa (%), the content of spermatozoa in the ejaculate (billions), the number of insemination doses produced from a one ejaculate (units). Furthermore, ejaculates divided into two groups, depending on the lean content of boars (group I. ≤60% and group II. >60%). Boars lean content was determined by performance test.

It was found that the characteristics of boar semen have changed depending on the genotype, season and lean content of boars. Semen of crossbred boars was characterized by significantly higher volume and number of spermatozoa in the ejaculate than ejaculates obtained from hybrids, which them produced more insemination doses ($P \leq 0.05$). Both crossbred and hybrids boars responded similarly to changes in the seasons. Best ejaculates were obtained in the autumn and winter months. At the turn of October and November there was observed dynamically increase in the spermatozoa concentration of the boars semen. Variability of hybrids boars ejaculates was greater than the crossbred. Moreover there was determined a negative impact of high meatiness of boars on volume of the ejaculates.

Key words: boars crossbred, hybrids, semen traits, lean content

INTRODUCTION

In pig production in Poland important role is played by crossbred boars and hybrids. Crossbreds compared to pure breeds have a stronger constitution, higher weight gains and better libido (Bobčák and Rehaček, 2000). In the year 2010, the sperm of crossbred used in the artificial insemination was 14.77%, and 26.3% for hybrids boars (Mucha and Tyra, 2011). The highest popularity enjoyed sperm obtained from crossbreds Duroc x Pietrain boars and among the hybrids of the PIC line. In the insemination stations are kept the best boars in terms of fattening and slaughtering performance (Milewska et al. 2005). From an economic point of view it is also important that they produce a lot of semen with a high concentration of live spermatozoa from which is possible to obtain multiple insemination doses. The purpose of this study was to compare the characteristics of boar semen of crossbreds (Duroc x Pietrain) and hybrids (PIC and NECKAR line) used in insemination station.

MATERIAL AND METHODS

Materials for the study were 747 ejaculates collected from 10 boars within one year (2010). Semen collected by manual method. The following traits of ejaculates were identified: volume (ml), sperm concentration (thousand/mm³), the number of live spermatozoa (%), the content of spermatozoa in the ejaculate (billions), the number of insemination doses produced from a one ejaculate (units). Boars semen characteristics were analyzed according to the season (group A spring - summer, group B autumn-winter). Furthermore, ejaculates were divided into two groups, depending on the lean content of boars (group I. $\leq 60\%$ and group II. $\geq 60\%$). Boars lean content was determined by performance test based on measurements of backfat thickness and loin eye height at the points P2 and P4 and P4M on the right side of the animal. The results were analyzed statistically using ANOVA test. Calculations were performed in STATISTICA 9.0.

RESULTS AND DISCUSSION

Semen of crossbreds boars was characterized by significantly higher volume and number of spermatozoa in the ejaculate than hybrids semen ($P \leq 0.05$), which resulted in production of more insemination doses (Table 1.). In addition, greater variability of boars ejaculates among the hybrids indicates that there were outstanding individuals and average boars among them. The crossbreds and hybrids boars responded similarly on season changes. Best ejaculates were obtained in the autumn and winter season (table 2., and 3). At the turn of October and November was observed dynamical increase in the concentration of spermatozoa in the semen of boars. Effect of season changes on characteristics of boar ejaculates in their research confirmed Frydrychová et al., (2007), Milewska and Falkowski (2004) and Park and Yi (2002). As is clear from the data presented in Table 4, boars of greater meatiness (group B) produced ejaculates of smaller volume,

higher concentration and greater spermatozoa count than those in group A. The reports of Chen et al. (2003) showed that semen characteristics, such as volume and sperm concentration are negatively correlated, which was confirmed in the present study.

CONCLUSION

Based on the results, it was found that the characteristics of boar semen used in artificial insemination have changed depending on the genotype, season and lean content of boars. Ejaculates better overall, with higher volume and spermatozoa concentration were produced by crossbred boars, in the autumn and winter, and by the males with less lean content in the body. Greater variability of ejaculates of hybrids proves that among them were both of outstanding individual and also average.

REFERENCES

- Bobček B., Rehaček P. 2000. Situation of breeding pigs of meat production of the basis of dam and sire breeds in the Slovak Republic. *Biuletyn Naukowy ART w Olsztynie* 7: 27-31.
- Chen P., Baas T.J., Dekkers J.C.M., Koehler K.J., Mabry J.W. 2003. Evaluation of strategies for selection for lean growth rate in pigs. *J. Anim. Sci.*, 81: 1150-1157.
- Frydrychová S., Lustyková A., Čerovský J., Lipenský J., Rozkot M. 2007. Seasonal changes of boar semen production. *Research in Pig Breeding*, 1: 31-33.
- Milewska W., Falkowski J. 2004. Effects of season on some semen characteristics in purebred and crossbred boars. *Animal Science Papers and Reports*. 22(3): 289-295
- Milewska W., Falkowski J., Čechová M. 2005. Analysis of intravital assessment results in purebred and crossbred boars. *Acta univ. agric. et silvic. Mendel. Brun.*, LIII, 4: 81-86
- Mucha A., Tyra M. 2011. Inseminacja trzody chlewnej. W: Stan hodowli i wyniki oceny świń w 2010r. I. *Zoot. PIB, Kraków*: 70-75 [Results of pig insemination. in: Report of pig breeding in Poland].
- Park C.S., Yi Y.J. 2002. Comparison of semen characteristics, sperm freezability and testosterone concentration between Duroc and Yorkshire boars during seasons. *Anim. Reprod. Sci.*, 73: 53-61.

Table 1. Semen traits of boars (mean \pm SD)

Boars	Volume (ml)	Sperm concentration (ths./mm ³)	Percentage of live spermatozoa	Number of spermatozoa in ejaculate (mld)	Number of insemination doses
crossbred	228 ^a \pm 23	365 \pm 42	71,45 \pm 0,86	59,0 \pm 7,88	22,10 ^a \pm 2,09
hybrids	203 ^b \pm 33	417 \pm 143	72,24 \pm 1,08	56,2 \pm 12,49	18,02 ^b \pm 0,66

a,b - P \leq 0,05

Table 2. Volume of ejaculate of boars semen in seasons of the year

Boars	Statistics	Group A	Group B
		spring-summer	autumn-winter
crossbred	Mean	221	239
	SD	22	38
hybrids	Mean	186 ^a	218 ^b
	SD	37	34

a,b - P \leq 0,05

Table 3. Sperm concentration in the boars semen in seasons of the year

Boars	Statistics	Group A	Group B
		spring- summer	autumn-winter
crossbred	Mean	343 ^a	399 ^b
	SD	35	95
hybrids	Mean	402	416
	SD	26	52

a,b - P \leq 0,05

Table 4. Semen traits depending on boars meatiness

Group	Volume (ml)	Sperm concentration (ths./mm ³)	Percentage of live spermatozoa	Number of spermatozoa in ejaculate (mld)
I. (<60%)	226 ^A ±29	367±100	71,31±0,82	58,15±12,5
II. (≥60%)	196 ^B ±32	453±128	71,17±1,10	59,06±9,9

A,B - P≤0,01