

## **THE INFLUENCE OF THE BREED AND AGE ON THE LIBIDO OF INSEMINATION BOARS**

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**Abstract.** The libido of a boar is a very important factor which determines the male's suitability for insemination. Before a breeder is included in the semen production cycle, its libido has to be estimated, which may significantly contribute to the improvement of the organization of work in breeding stations. Many factors influence a boar's libido. Among others, it is the male's age and breed. In this work the influence of the breed and age on the sexual behaviour of boars is estimated, as well as the phenotype correlations between a boar's libido and the parameters of the semen are defined. It has been proved that among the analysed breeds and hybrids the highest libido characterized PIC hybrids, and hybrids such as: Pietrain x Duroc and Duroc x Pietrain, and among the pure breed boars – Duroc breed. It has also been proved that the sexual activity of boars decreases with age. Significant correlations between a boar's libido and some features of the semen have been shown.

**Keywords:** boar, insemination, libido

### **INTRODUCTION**

One of the basic criteria for selecting boars for pig fertilisation stations is their reaction for phantom. Mature boars should react to the presence of a phantom with a specific sexual excitation, which manifests itself by a characteristic behaviour. The signs of the sexual behaviour of boars should be clear but not too violent. An insemination boar should have an appropriate libido [Strzeżek 2002]. The libido of a boar is characterized by significant variability and depends on many factors, among others, on the breed [Marchev et al. 1996] and on the age [Dubiel et al. 1985 b].

Many authors have proved that the libido and the state of sexual excitation in males before semen collection have a significant influence on the quality of the semen [Cambell and Lingam 1965, Mensil du Buisson et al. 1974, Łyczyński et al. 1977, Łyczyński 1984]. It has been proved that boars which show a higher degree of sexual excitement, and subsequently reacting more rapidly to the phantom, produce a bigger amount of sperm [Cambell and Lingam 1965, Mensil du Buisson et al. 1974].

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Libido of a boar can be estimated on the basis of the reaction and time from the moment of letting the boar into the place with the phantom and taking a leap, and the total time of copulation.

The aim of the research was to define the influence of the breed and age of a boar on his libido, and estimating phenotypic correlations between the features characterising the libido of a boar and the parameters of the semen.

## MATERIAL AND METHODS

The sexual activity of boars was established on the basis of time measurements, taking semen of boars of the following breeds: Polish Large White breed (PLW) – 246 ejaculates, Polish Landrace boars (PL) – 753, Pietrain (pi.) – 51, Duroc x Pietrain hybrids – 122, Pietrain x Duroc hybrids – 277, Hampshire x Pietrain hybrids – 47, PIC hybrids – 61, and 43 ejaculations from the Duroc boars. The boars were divided into three age groups: group 1 – <24 months old, group 2 – from 24 to 36 months old, and group 3 – <36 months old.

To define a boar's libido the following factors were taken into account in the statistical model: the time from the moment of letting the boar into the pen with the phantom to the moment of leap, the time from the moment of letting to the pen until beginning of ejaculation, the total time from the moment of letting to the pen until getting off the phantom.

The level of analyzed features was estimated by means of a two-factor analysis of variance, acknowledging in the model the permanent influence of the boar's age and breed. Phenotypic correlations between the parameters of libido and semen traits (volume ejaculate, spermatozoa concentration, spermatozoa motility, number of spermatozoa, number of insemination doses) were estimated.

The results were statistically elaborated using Statistica®. To estimate the importance of differences between the means, Tukey's test was used.

## RESULTS AND DISCUSSION

The influence of the breed and the hybrid variant of the boar on his sexual behaviour is given in Table 1. Pietrain males needed the longest period of time to mount the phantom – about 13.5 minutes. From pure breed males, Duroc boars needed the shortest period of time – about 1.5 min. However, PIC hybrids needed the shortest period – about 0.2 min, and Duroc x Pietrain and Pietrain x Duroc hybrids – about 0.8–0.9 min. From hybrids, Hampshire x Pietrain hybrids required the longest period of time, about 2.8 min.

The total time calculated from the moment of letting the animal into the place with the phantom to the moment of getting off the phantom after completed ejaculation was the longest for the Pietrain breed, and it was 22.98 min. The Hampshire x Pietrain hybrids needed about 14 minutes, and the Polish Large White breed and Polish Landrace breed needed 10.4 and 12.6 min respectively. The shortest period of time, and consequently the best libido, characterised the PIC hybrids (about 6.5 min). A high libido was also found in

the Pietrain x Duroc hybrids and in the Duroc boars. These boars needed about 7 minutes from being let in to the moment of ejaculation and getting off the phantom. The significance of differences between the breeds was very high, and for most groups it was estimated at  $P \leq 0.001$ .

Table 1. The influence of the breed and crossing variant on the libido of the boar  
Tabela 1. Wpływ rasy i wariantu krzyżowania knura na jego libido

Group Grupa	The breed and crossing variant Rasa i wariant krzyżowania	The time from the moment of bringing the boar to the insemination spot until: Czas od wprowadzenia knura do:					
		– the moment of the leap on the phantom, min wykonania skoku na fantom, min		– the beginning of ejaculation, min rozpoczęcia ejakulacji, min		– the getting off the phantom, min zejścia z fantomu, min	
		LSM	SE	LSM	SE	LSM	SE
I	PLW	3.095	0.295	5.306	0.314	10.363	0.353
II	PL	4.194	0.170	6.302	0.181	12.622	0.203
III	Pietrain	13.531	0.628	14.649	0.669	22.980	0.751
IV	Du. x Pi.	0.811	0.450	1.990	0.479	8.828	0.538
V	Pi. x Du.	0.979	0.269	2.246	0.286	7.263	0.321
VI	Hamp. x Pi.	2.786	0.680	4.625	0.724	13.834	0.812
VII	PIC	0.256	0.605	2.072	0.644	6.469	0.722
VIII	Duroc	1.507	0.703	2.892	0.748	7.046	0.839
Significance of differences Istotność różnic		I–II, III, IV, V, VII*** I–VIII*		I–III, IV, V, VII*** I–II, VIII**		I–II, III, V, VII, VIII*** I–VI**, I–IV*	
		II–III, IV, V, VIII*** II–VI*		II–III, IV, V, VII, VIII***		II–III, IV, V, VII, VIII***	
		III–IV, V, VI, VII, III–VIII***		II–VI*		III–IV, V, VI, VII, VIII***	
		IV–VI** V–VI** VI–VII**		III–IV, V, VI, VII VIII***		IV–VI***, IV–V, VII**	
			V–VI**, VI–VII**		V–VI**, VI–VII**		V–VI**, VI–VII, VIII***

\*\*\*  $P \leq 0.001$ ; \*\*  $P \leq 0.01$ ; \*  $P \leq 0.05$ .

Table 2 comprised data characterising the boar's libido depending on the boar's age. On the basis of obtained results, it can be observed that with age, the period from letting the boar in to the moment of mounting, starting ejaculation and its completion was getting longer. The period of time younger boars needed to mount the phantom and ejaculate was over 1.5 min shorter that of the oldest boars (over 3 years old). Younger boars (below 24 months old) needed slightly over ten minutes to ejaculate. Significant differences ( $P \leq 0.001$ ) were noted between the youngest and the oldest boars. Whereas the significance of the differences between the boars from the first and the second age group was estimated at  $P \leq 0.01$ .

Table 2. The influence of the age of the boar on his libido  
Tabela 2. Wpływ wieku knura na cechy charakteryzujące libido

Group Grupa	Age of boar, months Wiek knura, miesiące	The time from the moment of bringing the boar to the insemination spot until: Czas od wprowadzenia knura do:					
		– the moment of the leap on the phantom, min wykonania skoku na fantom, min		– the beginning of ejaculation, min rozpoczęcia ejakulacji, min		– the getting off the phantom, min. zejścia z fantomu, min	
		LSM	SE	LSM	SE	LSM	SE
I	< 24	2.984	0.265	4.917	0.282	10.352	0.316
II	24–36	3.265	0.282	4.702	0.300	11.207	0.336
III	>36	3.936	0.232	5.412	0.247	11.967	0.277
Significance of differences: Istotność różnic:		I–III***			I–III***, I–II**		

\*\*\*  $P \leq 0.001$ ; \*\*  $P \leq 0.01$ .

The phenotypic correlations between the features characterising the boar's libido and the semen features are presented in Table 3. The coefficients of the correlation indicate very significant negative dependences between the particular time limits on the basis of which the boar's libido was defined and the amount of ejaculation and the percentage content of sperm with progressive motility in an ejaculation. It means that the higher the males libido is (less time is needed to provide semen) the bigger the amount of the semen and the higher the percentage content of sperm with progressive motility in an ejaculation. From the above mentioned phenotypic correlations, the highest value characterised the dependence between the time from letting the boar in to the moment of getting off the phantom and the percentage content of sperm with progressive motility in an ejaculation ( $-0.403$ ). A medium value characterised the dependence between the total time characterising the libido and the concentration of sperm in an ejaculation ( $0.357$ ).

Similar results (as shows the Table 1) were obtained by Ciereszko et al. [2000] and Kawęcka [2002], who found that hybrids showed not only better semen quality, but also better libido. Wysokińska et al. [2008] also found that hybrid boars usually showed better sexual activity and were more effective in mating than pure breed boars. Sows inseminated by hybrid boars repeat estrus less frequently and yield more piglets.

Similar conclusions about libido younger boars were made by Dubiel et al. [1985 b], who claimed that the reflex of ejaculation in young boars of the Polish Large White breed was getting longer as the boars grew older and the more they were used.

Many authors have proved that the libido and the state of sexual excitation of males before collecting semen have a significant influence on the quality of the semen [Cambell and Lingam 1965, Mensil du Buisson et al. 1974, Łyczyński et al. 1977, Łyczyński 1984, Dubiel et al. 1985 a].

Table 3. The phenotypic correlations between the features characterising the libido of a boar and the parameters of the semen

Tabela 3. Korelacje fenotypowe między cechami charakteryzującymi libido knura a parametrami nasienia

The time from the moment of bringing the boar to: Czas od wprowadzenia knura do:	Volume of ejaculate, ml Objętość ejakulatu, ml	Spermatozoa concentration, thous. · mm <sup>-3</sup> Koncentracja plemników tys. · mm <sup>-3</sup>	Spermatozoa Motility; % Plemniki o ruchu postępowym, %	Number of spermatozoa, mld Liczba plemników w ejakulacie, mld	Number of insemination doses Liczba dawek inseminacyjnych
– the moment of the leap on the phantom, min – wykonania skoku na fantom, min	–0.180 P≤0.001	0.245 P≤0.001	–0.244 P≤0.001	0.066 P≤0.01	0.074 P≤0.01
– the beginning of ejaculation, min – rozpoczęcia ejakulacji, min	–0.171 P≤0.001	0.245 P≤0.001	–0.169 P≤0.001	0.066 P≤0.01	0.057 P≤0.05
– the getting off the phantom, min. – zejścia z fantomu, min	–0.183 P≤0.001	0.357 P≤0.001	–0.403 P≤0.001	0.143 P≤0.001	0.158 P≤0.001

In our scientific research I have found that the shorter is time needed to ejaculate (better libido of the boar), the bigger is the amount of ejaculation and the percentage content of sperm with progressive motility in the semen. For other parameters of the semen, positive, but low, phenotypic correlations connected with the boar's libido were found. Similar dependences between the boar's libido and the features of the semen were obtained by Marchev et al. [1996].

Łyczyński [1988] stated that an increase in the number of times the boar mounted the phantom causes a gradual decrease in the amount of ejaculation and its sperm fraction with a simultaneous increase in sperm concentration in an ejaculation, the total volume of sperm and the amount of sperm with progressive motility. The content of the jelly fraction was distributed differently. In the ejaculations of the Polish Large White breed boars the content of the jelly fraction showed a tendency to increase with the increase in the number of times the boar mounted the phantom, and in the ejaculations of the Polish Landrace boars – a substantial decrease in amount.

The most numerous significant differences were found by the author between the quality of the semen and the first and third mounting, as well as between the first and the fourth mounting. Only males of the Polish Large White breed showed a statistically significant increase in sperm concentration, general amount of sperm with progressive motility in an ejaculation between the first and third mounting, first and fourth and second and fourth. In other research Łyczyński [1984] found significant differences between the number of the times the boar mounted the phantom and sperm concentration.

## CONCLUSIONS

Based on the results presented here, it may be concluded that the significant differences between the libido of boars of different breeds and variants of hybrids show that there is a need to estimate the libido of insemination boars. The estimation of the libido should constitute part of the selection system for boars qualified for pig fertilisation stations. The age of the boar substantially influences his libido. Young boars are characterised by a better libido; with age, the boars' sexual activity is getting worse. The sexual activity of males has a significant influence on the amount and quality of semen.

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## WPLYW RASY I WIEKU NA LIBIDO KNURÓW INSEMINACYJNYCH

**Streszczenie.** Aktywność płciowa knurów jest bardzo ważną cechą decydującą o przydatności samca do inseminacji. Na behavior seksualny knura wpływa wiele czynników, między innymi wiek i rasa. W niniejszej pracy dokonano oceny wpływu rasy i wieku na zachowanie płciowe knurów oraz określono korelacje fenotypowe między libido knura a parametrami nasienia. Aktywność płciową knurów określano na podstawie pomiarów czasowych, przy pobieraniu nasienia knurów następujących ras: wielka biała polska (wbp) – 246 ejakulatów, polska biała zwisłoucha (pbz) – 753; pietrain (pie.) – 51; mieszańce duroc x pietrain – 122; mieszańce pietrain x duroc – 277; mieszańce hampshire x pietrain – 47; hybrydy PIC – 61; oraz 43 ejakulatory od knurów rasy duroc. Do określania libido knura w modelu statystycznym uwzględniono następujące cechy: czas od momentu wprowadzenia knura do pomieszczenia z fantomem do wykonania skoku, czas od momentu wprowadzenia knura do rozpoczęcia ejakulacji, całkowity czas od momentu wprowadzenia knura do chwili zejścia z fantomu. Stwierdzono, że najwyższym libido spośród badanych ras i mieszańców charakteryzowały się knury – hybrydy PIC oraz mieszańce: pietrain x duroc i duroc x pietrain, a z osobników czystorasowych knury rasy duroc. Stwierdzono również, że wraz z wiekiem spada aktywność płciowa samców. Wykazano istotne korelacje pomiędzy libido knura i niektórymi cechami nasienia.

**Słowa kluczowe:** inseminacja, knur, libido

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