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INFLUENCE OF DAILY COLLECTION ON EJACULATE QUALITY FROM PIETRAIN BOARS

INFLUENTA RECOLTĂRII ZILNICE ASUPRA CALITĂȚII EJACULATELOR OBȚINUTE DE LA VIERII DIN RASA PIETRAIN

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The purpose of our research was to establish the influence of daily collection the quality and quantity of semen form Pietrain boars. They were kept and fed in optimum conditions between 10th and 14th December 2007. The values of ejaculate parameters are mainly influenced by the genetic heritage of each animal and its particular physiological traits and not by age. Among ejaculate parameters concentration is the most constant for a period of time after which it decreases suddenly. Therefore it can be viewed as a reliable ground for the decision to collect semen from the same boar the following day. Volume and concentration decrease dramatically from the third day, while motility is more constant. The number of doses per ejaculate is much lower from the third day onwards. Together with semen quality this indicates that daily collections in Pietrain boars can be conducted but no more than for 2 consecutive days without negative economic effects.
Key words: boars, ejaculates, semen quality

Introduction

Thanks to the research of Alm, K. et al., (2006) we know that in order to successfully inseminate females with semen preserved at room temperature a maximum of two ejaculates per week must be collected, the dose volume should be 100 ml and it must contain 3 x 10^9 spermatozoa. The practice of artificial insemination has revealed certain situations when this optimum is not the best solution. Given such instances it is important to be aware of the risks and the proper techniques for the prevention of any negative influences. Semen quality is influenced by race (Kamminsrud et al., 2002), individual (Johnson et al., 2000), age (Miclea V., 2003), ejaculate volume (Kondracki, S., 2003), collection frequency (Miclea et al., 2007), fodder (Sara A., 2007) and keeping. Except for genetic influences, the other factors can be influenced by proper management. Ejaculate collection at suboptimal intervals is very frequent especially in the case

of very valuable boars. This fact and the desire to further our research concerning the influence of collection frequency on boar semen quality have lead us to conduct the present study.

Materials and Methods

The research has been conducted on 5 Peitrain boars which were the following ages: 1 was 7 years old, 1 was 5 and 3 were 4. The animals were kept in optimum conditions and fed so ass to ensure the valorisation of their genetic potential. Semen was harvested between 10th and 14th December 2007 when the period of daylight was the shortest. We decided on this in order to complete our previous research which had been conducted at the end of July and the beginning of August. The manual was technique employed for collection, which took place daily until the animals refused to jump on the dummy. Only the spermatic fraction of the ejaculate was collected in the graded cup and volume together with mobility were assessed. Motility was assessed as the number of spermatozoa displaying energetic movement from the spermatozoa visible in the microscopic field. The concentration was established by photocolorimetric measurements. Semen was diluted according to the volume and concentration requirements of 100 ml and $3x10^9$ spermatozoa /dose. The minimum required motility for ejaculate processing so as to ensure the optimum number of spermatozoa per dose for artificial insemination is of 70%. Being aware of the influence the number of doses has on boar economic management we were also interested in assessing it. Sexual behaviour was assessed on a scale from 1 to 5, 5 being the equivalent of well manifested sexual drive. Results were organized in a table in order to expose the influence of age and individual on semen quality. Data were statistically processed using ANOVA and were organized in tables. We also thought it necessary to present the differences and their significance between harvest days.

Results and Discussions

Based on the analysis of the results, it is evident that the animal and its age greatly influence semen production when daily harvests are conducted. On the other hand, ejaculate quality on the 5 collection days does not appear to be influenced by age. From this point of view, is especially worth mentioning boar R, who although 7 years old was still able to provide good quality semen after 5 days of collection. Boar F_2 who was 3 years younger was in the same situation. As for the other boars although their ages are similar (4 and 5 years), the ejaculate quality decreases much faster. The genes of each animal, which are the reason for their physiological individual characteristics have a greater influence on semen quality as well as collection dynamics.

Volume, motility and sperm concentration are at first, regardless of animal within physiological limits. Ejaculate volumes for boars R and F_2 are maximal on the first day (280 ml-R; 300 ml-F_2) while motility and concentration are 70% and

0,265 x 10^9 for R and 340 x 10^9 for F_2, respectively. Afterwards the values decreased but less markedly than for the other animals. Spermatozoa concentration has values near the optimum for a while and then decreases abruptly. Therefore we believe that spermatozoa concentration can be taken into account as an indicator of whether or not to collect semen from certain boars on the nest day. This trait is also the most important for establishing the number of doses obtained from one ejaculate.

Sexual behaviour at the moment of collection is mainly influenced age. Surprisingly, the young boars, except for F_2 are less and less interested in the collection process.

Table 1

The individual dynamic for ejaculate characteristics

Collection day	Age/ boar (years)	Ejaculate parameters				Doses/ ejaculate	Sexual behaviour
		Volume -ml-	Motility -%-	Concentration n x 10^9	Spermatozoa/ ejaculate n x 10^9		
1	R - 7	280	70	0,265	74,20	25	5
	V_1 - 5	210	75	0,405	85,05	28	5
	F_1 - 4	280	75	0,164	45,92	15	5
	F_2 - 4	300	70	0,340	102,00	32	5
	V_2 - 4	200	70	0,241	48,20	15	5
2	R - 7	300	70	0,205	61,50	20	5
	V_1 - 5	220	75	0,280	61,60	20	5
	F_1 - 4	260	75	0,100	26,00	8	5
	F_2 - 4	280	70	0,493	138,04	46	5
	V_2 - 4	200	75	0,150	30,00	10	4
3	R - 7	280	70	0,210	58,80	18	4
	V_1 - 5	200	75	0,285	57,00	19	4
	F_1 - 4	150	75	0,120	18,00	6	5
	F_2 - 4	200	70	0,358	71,60	24	4
	V_2 - 4	160	70	0,115	18,40	6	4
4	R - 7	250	70	0,186	46,50	15	4
	V_1 - 5	150	70	0,199	29,85	10	3
	F_1 - 4	140	75	0,114	15,96	5	5
	F_2 - 4	180	70	0,273	29,14	16	3
	V_2 - 4	120	70	0,100	12,00	4	2
5	R - 7	210	70	0,145	30,45	10	4
	V_1 - 5	Refused to jump					
	F_1 - 4	Refused to jump					
	F_2 - 4	150	70	0,253	37,95	12	3
	V_2 - 4	Refused to jump					

The influence of collection day on the average values for semen parameters can be observed in table 2.

Ejaculate volume for the first two days remains almost unchanged (-1%) and then it decreases in days 3 and 4 (-23.62% and -14.94%).

Spermatozoa motility is the most constant trait varying only between 73.0-71.0%.

The dynamics for sperm concentration are similar to the one for ejaculate volume, the only difference being that the values begin decreasing after the first day (-13.43%) to 18.73% on day 3 and 13.0% on day 4. However the dynamic is highly dependent on the animal as is apparent by looking at the variability index.

The average number of doses obtained form one ejaculate on the first day is of 23.0. On the second day it decreases by 9.57%, on the third by 29.81, and on the fourth by 31.51%. So after 4 days the number of doses per ejaculate has decreased by 56.53%. Together with spermatozoa concentration this is the second parameter that has a great influence, mainly economic on the decision to collect semen daily or not.

The differences between collection days are positive but most of them are not statistically significant. Important decreases can be seen for volume, total number of spermatozoa, and number of doses per ejaculate when comparing the first day of collection with the fourth. These differences are statistically significant for the 5% significance level. The same is true for the differences between ejaculate volume from the second and the fourth day.

Table 2

Average values and variability for ejaculate parameters

Parameter	Statistical parameters	Collection day				
		10.12.2007	**11.12.2007**	**12.12.2007**	**13.12.2007**	**14.12.2007**
Volume -ml-	n	5	5	5	5	2
	x ± sx	254.0± 20.45	252.0±18.59	197.5±26.49	168.0±22.73	180.0
	v%	17.95	16.45	29.91	30.17	-
Motility -%-	n	5	5	5	5	2
	x ± sx	72.0±1.22	73.0±1.22	72.0±1.22	71.0±1.00	70.0
	v%	3.80	3.75	3.80	3.14	-
Concentration n x 10^9	n	5	5	5	5	2
	x ± sx	0.283±0.041	0.245±0.068	0.200±0.036	0.174±0.031	0.199
	v%	32.76	62.54	40.40	40.18	-
Spermatozoa/ ejaculate n x 10^9	n	5	5	5	5	2
	x ± sx	71.07±10.79	63.42±20.16	44.76±11.16	30.69±7.62	34.20
	v%	33.86	70.91	55.61	55.42	-
Doses/ejaculate	n	5	5	5	5	2
	x ± sx	23.0±3.45	20.8±6.78	14.6±3.66	10.0±2.47	11
	v%	33.53	72.78	55.98	55.22	-
Sexual behaviour		5	5	4,20	3,20	3 boars refused to jump

Conclusions

Daily collection has a negative influence on semen quality and reduces the number of doses that can result from an ejaculate.

The dynamics of ejaculate volume and quality are mainly influenced by genetic characteristics and less by age.

The average values of ejaculate quality parameters indicate that after two daily collections semen quality is not much affected but suddenly decreases afterwards according to animal and parameter.

Volume and concentration are similar in dynamics and the most important parameters, their decrease by more than 25% being a sign that collection on the following day must not take place.

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