Researches Regarding the Influence of the Bulls Age on the Raw and Processed Semen

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Abstract

The researches were made within S.C. Semtest BVN Targu Mures on a sample of 1946 ejaculates collected from eight bulls, with the age between two and nine years, of Fleckvieh breed, collected between the year 2000 and 2006. In this direction, to identify main variation sources and the way this factors act upon sperm production and implicitly on the quality of the semen material, sperm parameters were evaluated by the bulls age. Thus, they were determined the following parameters: the volume of the ejaculate, sperm concentration, sperm mobility in raw semen material, sperm mobility in defrosted semen material, obtained and admitted doses. Following the researches it was confirmed that the ejaculates volume rises from 6.07 ml at two years category up to 9.61 ml at six years category, after that decreases; the concentration of raw sperm is higher at young bulls, and regarding the number of obtained and admitted doses, the age of the bulls has a significant influence, with variations showing an ascendent trend depending on the ageing of the bulls. The results are showing, that depending on the age, the volume of the ejaculate grows, raw sperm mobility and concentration is higher at young age and regarding the obtained and admitted doses number, they grow along with the age. Semen production, quantitative and also qualitative, is also influenced by the age of the bulls.

Keywords: *bulls, semen quality, spermiograms*

INTRODUCTION

Genetic improvement of cattle effectives as a activity with primarily character in the progress strategy of Romanian animal husbandry, is achieved by selection actions, made on the base of official control of performances, guided reproduction mostly by artificial insemination (www.anarz.eu). The reproduction process of animals is a national concern activity, which it has as a main objective the rational usage of genetically ameliorated reproduction material, by applying in animal husbandry the modern biotechnology of directed reproduction. The artificial insemination biotechnology represents the main instrument to increase and diffuse the genetic, by using at reproduction the most valuable, materialized work by obtaining higher productions (Miclea, 2003). Given the fact the special importance of the

bulls in the process of breeding and improvement of cattle, it's necessary that they must be always in "breeding condition, respectively to have a good health and maintenance, to be vigorous, with high libido, to produce highly quality semen material (Acatincai, 2004).

MATERIALS AND METHODS

The researches of the present study were carried in S.C. Semtest BVN Târgu Mureş on a number of eight bulls, with age between two and nine years, analized in the period 2000-2006, from wich it was obtained a number of 168 ejaculates from two years old bulls, 240 ejaculates from three years age old bulls, 246 ejaculates from four years old age bulls, 364 ejaculates from five years old age, 458 ejaculates from six years age old bulls, 331 ejaculates from seven years old bulls,

90 ejaculates from eight years old bulls and 49 ejaculates from nine years old bulls.

For achieving the evaluation of the spermograms, our researches were performed inside of the Semtest BVN Targu Mures bulls center, one of the elite Romanian centers for animal husbandry, for many years now, carrying activities from reproductive biotechnology field in order to increase the genetic potential of cattle. In this direction, to identify main variation sources and the way this factors act upon sperm production and implicitly on the quality of the semen material, sperm parameters were evaluated by the bulls age. Thereby, they were determined the following parameters: the volume of the ejaculate, sperm concentration, sperm mobility in raw semen material, sperm mobility in defrosted semen material, obtained and admitted doses.

RESULTS AND DISCUSSION

The results of the researches made on the sperm production, on a sample of 1946 ejaculates (Tab. 1), collected from eight bulls of Fleckvieh breed are presented as:

The ejaculate volume, depending on age, rises from 6.07 ml at 2 years category up to 9.61 ml at 6 years category, after that it decreases gradually

reaching at nine years old at a medium volume of 7.85 ml.

Sperm mobility presents easy deferences depending on the age meaning that, mobility is between 76.21-76.36% at 2-3 years, between 4-6 years mobility is about 73.20-75.23%, then after seven years mobility slightly decreases reaching at the value of 71.02% at nine years old.

Raw sperm concentration is higher at two year bulls, this one being a average of 1.64×10^9 /ml after that decreases easily till 1.26×10^9 /ml at the age of six, after is stabilizing around the value of 1.34×10^9 /ml, then starts decreasing.

Following the researches regarding the influence of the bulls age on proccesed sperm production (Tab. 2), within BVN Târgu Mureş they were observed the follwings:

The bulls age has a decisive influence upon the obtained dossage number, with variations wich shows an ascending trend dependind on the bulls aging. Thus, the obtained doses media rised gradually from 297 at two years old bulls and up to 529 at seven years old bulls, after that drops at 504 doses at eight years and 378 doses at nine years.

The sperm mobility after freezing is not influenced by the bulls age, obtaining variations wich don't show an ascendent trend or descendent

Tab. 1. The influence of the bulls age over brut spermatic production.

Age of bulls (years)	Ejaculated no	Statistics	Volume (ml)	Mobility (%)	Concentration ($\times 10^9$ /ml)	Concentration of ejaculate ($\times 10^9$)
2	168	X	6.07	76.21	1.64	10.20
		$\pm s_x$	0.17	0.51	0.05	0.40
3	240	X	8.15	76.36	1.48	12.23
		$\pm s_x$	0.14	0.41	0.03	0.36
4	246	X	8.83	73.20	1.38	12.33
		$\pm s_x$	0.16	0.36	0.03	0.33
5	364	X	9.43	73.65	1.29	12.06
		$\pm s_x$	0.12	0.23	0.02	0.25
6	458	X	9.61	75.23	1.26	11.87
		$\pm s_x$	0.12	0.28	0.02	0.20
7	331	X	8.58	72.48	1.34	11.19
		$\pm s_x$	0.20	0.31	0.03	0.30
8	90	X	8.05	72.33	1.69	13.74
		$\pm s_x$	0.19	0.85	0.06	0.55
9	49	X	7.85	71.02	1.32	10.66
		$\pm s_x$	0.27	1.52	0.06	0.55

depending on the aging, showing ranging averages between 32.71% and 39.04%.

The bulls age influences the admitted doses number, which at two years old is 257 and reaches 461 at seven years, after that it drops to 401 doses at eight years old and 252 doses at nine years.

The cryobiology rebut index is influenced by the bulls age, from the younger bulls the inappropriate batches number is higher, that fact making the stored doses number from these bulls to be smaller than adult bulls. Thereby, the bulls with ages between 2-4 years are presenting values ranging between 10.47-14.87, comparing with bulls with ages between which 5-7 years which are presenting values between 7.36-12.95.

At the statistic exam of deferences between averages at analyzed sperm parameters according to age (Tab. 3) it is found that there are differences between them, so:

- at two years old the ejaculate volume, the obtained and processed doses number presents values below bulls average, while at mobility, concentration, mobility₂, mobility₃ the values are slightly above average;

- at three years old, they were obtained values slightly over the groups average at mobility and concentration, while at the ejaculate volume, the obtained doses number, at mobility₂, at mobility₃,

as well as the admitted doses number they were obtained values below bulls media;

- at the age of four years, the values for the majority of the followed parameters are below the bulls average, excepting the volume and concentration in sperms which registered easy values above the average;

- at five and six years old, the values for the majority of the followed parameters are above bulls average, excepting the mobility and concentration of sperms which registered values slightly under the average;

- at seven years old the ejaculate volume, mobility, concentration, mobility₂, mobility₃, presents values below the bulls average, while the number of obtained doses and the number of admitted doses the values are above bulls average;

- at eight years old they were obtained values below the groups average at ejaculates volume, mobility, mobility₂, mobility₃ și and for the admitted doses number, while at concentration and obtained doses number they were obtained values above bulls average;

- at nine years old all the followed parameters on the raw and processed semen material are presenting values below bulls average.

Researches in this direction were made also in India by Mukesh Bhakat *et al.* (2011) after 5,483

Tab. 2. The influence of bulls age over the processed sperm production.

Age of bulls (years)	Ejaculated no	Statistics	Obtained doses	Mobility 2 (%)	Mobility 3 (%)	Admitted doses
2	168	X	297.14	37.72	37.72	257.67
		$\pm s_x$	13.89	0.55	0.55	14.76
3	240	X	419.55	35.86	35.87	357.15
		$\pm s_x$	12.23	0.46	0.46	14.26
4	246	X	449.22	36.20	36.28	402.17
		$\pm s_x$	11.92	0.40	0.41	14.32
5	364	X	469.30	37.91	37.99	427.86
		$\pm s_x$	9.91	0.26	0.26	11.29
6	458	X	477.62	39.02	39.04	442.45
		$\pm s_x$	11.45	0.22	0.22	12.05
7	331	X	529.64	36.30	36.31	461.04
		$\pm s_x$	18.60	0.35	0.35	19.70
8	90	X	504.32	34.06	34.04	401.78
		$\pm s_x$	20.67	0.92	0.93	27.58
9	49	X	378.92	32.71	32.71	252.40
		$\pm s_x$	18.97	1.16	1.16	30.15

Tab. 3. The statistical importance of the differences between averages regarding semen material qualities.

Specification	M	Age of bulls							
		2	3	4	5	6	7	8	9
Volume	d	-2.629	-0.546	0.127	0.729	0.911	-0.116	-0.651	-0.854
	t	xxx	ns	ns	xxx	xxx	ns	ns	ns
Mobility	d	2.017	2.165	-0.997	-0.543	1.038	-1.717	-1.860	-3.173
	t	xx	xxx	ns	ns	x	xxx	xx	xx
Concentration	d	0.265	0.107	0.006	-0.090	-0.114	-0.036	0.314	-0.053
	t	xxx	x	ns	x	xxx	ns	xxx	ns
Obtained doses	d	-160.27	-37.86	-8.19	11.87	20.20	72.22	46.90	-78.49
	t	xxx	ns	ns	ns	ns	xx	ns	ns
Mobility 2	d	0.617	-1.239	-0.901	0.800	1.915	-0.806	-3.048	-4.395
	t	ns	ns	ns	ns	xxx	ns	xxx	xxx
Mobility 3	d	0.582	-1.270	-0.857	0.849	1.902	-0.825	-3.094	-4.431
	t	ns	ns	ns	ns	xxx	ns	xxx	xxx
Admitted doses	d	-147.02	-47.55	-2.52	23.16	37.75	56.33	-2.92	-152.30
	t	xxx	ns	ns	ns	ns	xx	ns	xx

ejaculates were analyzed it has been found that all semen traits were significantly affected by age, except sperm concentration.

CONCLUSION

The researches confirm that the age of the bulls can influence in a significantly way the qualities of the raw and processed semen material. The results are showing, that depending on the age, the volume of the ejaculate grows, raw sperm mobility and concentration is higher at young age and regarding the obtained and admitted doses number, they grow along with the age.

The harvest number at these bulls depended very much of custom requirements on bulls and the intensity of sales. Therefore also the bulls individuality (genetic base) has a strong influence upon the obtained and admitted doses following the processing.

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