STUDY REGARDING THE BREEDING ACTIVITY OF CAL DE BUCOVINA POPULATION

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Abstract

"Cal de Bucovina" population is the result of crossbreeding between "Semigreul Românesc" and Hutsul breeds made in the 80's, at Lucina Stud. Although it has some rather interesting characters, unfortunately, they have been little studied and used so that, at present, the population is extremely low, surviving as a nucleus in conservation through the skilled care of the specialists of the Stud. The biological material used in this study was represented precisely by mares that make up the nucleus breeding, breeding activity analysis revealing that the specific indicators as the introduction to breeding age (1817.429 ± 161.861 days), age at first calving (2170 ± 164.567 days), period of gestation (339.7 ± 2.0 days), service period (97.8 ± 25.6 days), calving interval (465.4 ± 36.8 days), etc., have normal values within the species characteristics, which gives us hope in terms of future survival of this population.

Key words: stud, mares, stallions, reproduction

INTRODUCTION

Initially *"Cal de Bucovina"* presented two types, namely the Lucina type, resulted from cross-breeding of mares from Hutsul breed with *"Semigreu românesc*" stallions and Rădăuţi type, formed by crossing mares from Gidran bred with *"Semigreu românesc*" stallions [6], [7-9].

Presently only the Lucina type exists as a conserved nucleus. This type harmoniously combines the resistance features of Hutsul breed with those regarding the traction force of *"Semigreu românesc*" breed [6], [8], [9].

MATERIAL AND METHOD

The biological material used in this study was represented by the 7 mares which, at present, form the breeding nucleus of *"Cal de Bucovina"* population, from Lucina stud.

Data on the reproduction activity of these mares, obtained after consulting the stud registers, were centralized, processed and statistically analyzed, results being expressed by means of reproduction indices, such as: age at first mating, age at first calving, period of gestation, service period and calving interval [1-5], [9].

RESULTS AND DISCUSSIONS

From the data regarding the age of mares' introduction at reproduction it can be observed that the age of first mating ranged between 1427 and 2553 days, averaging 1817.42 ± 161.86 days (tab. 1, 2 and fig. 1).

From this point of view, the effective is very heterogeneous, of over 23 %, due to the fact that one of mares (Pilot I – 36) wasn't promoted to the breeding nucleus until 2013, until then being included in the category sport and leisure which is not subject to breeding activity.

Mares age at first calving varied between 1772 and 2946 days, averaging 2170 ± 164.567 days.

Similarly to the age of mares' introduction at reproduction, on which it directly depends, the variability of this character was higher of over 20 %, due to the same reason mentioned above.

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Table 1 Age at first mating and calving of the mares taken in study

Mares name	Date of birth	Date of first mating	Date of first calving	Age at first mating (days)	Age at first calving (days)
3 Molid I – 38	09.05.1998	09.05.2003	18.04.2004	1825	2168
4 Molid I - 47	09.06.1999	10.05.2003	13.04.2004	1431	1772
5 Molid I - 49	02.05.2000	02.05.2006	07.04.2007	2190	2520
6 Molid I - 60	14.06.2002	27.06.2006	30.05.2007	1473	1810
9 Molid I - 69	24.04.2007	27.03.2011	16.04.2012	1427	1817
7 Pilot I - 12	04.05.2001	02.05.2006	07.04.2007	1823	2157
11 Pilot I - 36	20.04.2007	18.04.2014	25.03.2015	2553	2946

Table 2 Statistical analysis regarding age at first mating and calving

Specification	Age at first mating (days)	Age at first calving (days)
n	7	7
$\overline{X}$	1817.429	2170.000
s	428.244	435.404
$\pm s_{\overline{X}}$	161.861	164.567
V%	23.563	20.065
MIN	1427.000	1772.000
MAX	2553.000	2946.000

Data concerning the period of gestation where centralised and statistically analysed in tables 3 and 4 being represented in figure 1.

From these data it is noted that the average length of gestation for each mare ranged between 331.1 and 346.0 days, average throughout the studied batch being 339.7 ± 2.0 days.

Variability of this character was small, of 1.6 %, the studied batch being homogenous from this point of view.

Table 3 Period of gestation at mares taken in study

Mares name	Gestation period (days)										
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
3 Molid I – 38	342	330	347	333	324	343	326	320	316	343	-
4 Molid I - 47	339	334	332	331	354	351	340	350	335	343	338
5 Molid I - 49	338	334	333	326	352	332	335	335	-	-	-
6 Molid I - 60	335	338	342	336	344	343	334	-	-	-	-
9 Molid I - 69	352	349	337	-	-	-	-	-	-	-	-
7 Pilot I - 12	338	354	333	352	350	347	-	-	-	-	-
11 Pilot I - 36	340	-	-	-	-	-	-	-	-	-	-

Table 4 Statistical analysis of data regarding gestation period

Specification	Gestation period (days))											
	Average	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
n	7	7	6	6	5	5	5	4	3	2	2	1
$\overline{X}$	339.7	340.6	339.8	337.3	335.6	344.8	343.2	333.8	335.0	325.5	343.0	338.0
s	5.3	5.5	9.5	6.0	9.9	12.2	7.1	5.8	15.0	-	-	-
$\pm s_{\overline{X}}$	2.0	2.2	3.9	2.5	4.4	5.5	3.2	2.9	8.7	-	-	-
V%	1.6	1.6	2.8	1.8	2.9	3.5	2.1	1.7	4.5	-	-	-
MIN	331.1	335.0	330.0	332.0	326.0	324.0	332.0	326.0	320.0	316.0	343.0	338.0
MAX	346.0	352.0	354.0	347.0	352.0	354.0	351.0	340.0	350.0	335.0	343.0	338.0
%	100.0	100.3	100.0	99.3	98.8	101.5	101.0	98.3	98.6	95.8	101.0	99.5

Also, it can be observed that, on average, the smallest period was recorded at the ninth gestation 325.5 days, respectively with 4.2 % beneath the batch media.

The longest period, on average, was recorded at the fifth gestation, 344.8 ± 5.5 days, respectively 1.5% above the batch media.

Regardless of the rank of gestation, variability was low, with maximum values of 4.5%.

In absolute values the minimum period of gestation was 316 days (3 Molid I – 38, 9th gestation), and the maximum was 354 days (7 Pilot I – 12, 2nd gestation and 4 Molid I – 47, 5th gestation).

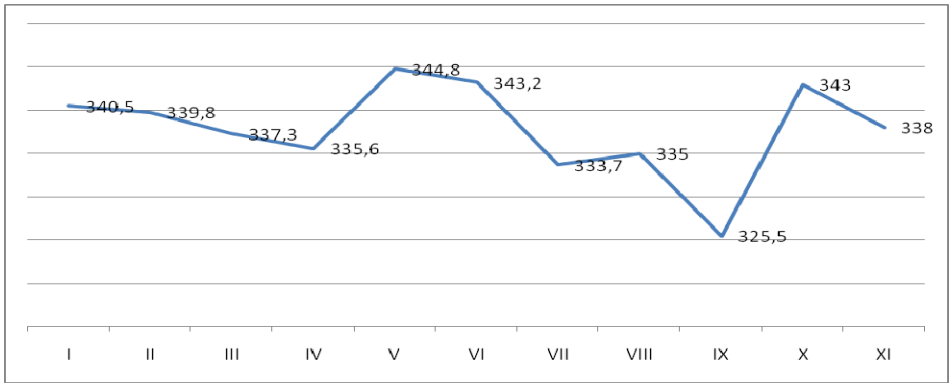

Figure 1 Average period of gestation according to its rank (days)

Data concerning the length of the service period shows that its average duration for each mare ranged from a minimum of 11 days to a maximum of 201.6 days, media throughout the studied batch being 97.8 ± 25.6 days (tab. 5, 6; fig. 2).

Variability of this character was very high, of 69.2%, the studied batch being heterogeneous from this point of view.

Table 5 Length of service period of the mares taken in study

Mares name	Length of service period (days)										
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Molid I – 38	414	15	76	49	14	15	13	33	13	367	-
4 Molid I - 47	34	32	33	14	37	13	359	74	13	75	13
5 Molid I - 49	28	44	13	16	12	47	9	98	-	-	-
6 Molid I - 60	14	348	13	86	33	33	11	-	-	-	-
9 Molid I - 69	363	18	86	-	-	-	-	-	-	-	-
7 Pilot I - 12	109	739	7	334	17	4	-	-	-	-	-
11 Pilot I - 36	11	-	-	-	-	-	-	-	-	-	-

Table 6 Statistical analysis of data regarding service period of the mares taken in study

Specification	Length of service period (days) after parturition											
	Average	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
n	7	7	6	6	5	5	5	4	3	2	2	1
$\overline{X}$	97.8	139.0	199.3	38.0	99.8	22.6	22.4	98.0	68.3	13.0	221.0	13.0
s	67.7	174.2	294.1	34.6	134.2	11.5	17.3	174.0	32.9	-	-	-
$\pm s_{\overline{x}}$	25.6	71.1	120.0	14.1	60.0	5.2	7.7	87.0	19.0	-	-	-
V%	69.2	125.3	147.5	91.0	134.4	51.1	77.3	177.6	48.1	-	-	-
MIN	11.0	11.0	15.0	7.0	14.0	12.0	4.0	9.0	33.0	13.0	75.0	13.0
MAX	201.6	414.0	739.0	86.0	334.0	37.0	47.0	359.0	98.0	13.0	367.0	13.0
%	100.0	142.1	203.7	38.8	102.0	23.1	22.9	100.2	69.8	13.3	225.9	13.3

This is caused by the fact that studied mares didn't have foals in every year.

In practice, mares which do not remain pregnant after mating in the spring season may be introduced again to mating in autumn or, most often, the following spring.

If tracing the evolution of service period length throughout the period of mares use for breeding, it can be observed that on average, longest length was recorded at the 10th parturition, 221 days (with 125.9 % above average), and the shorter was recorded the 11th parturition 13 days (with 86.7% below average), this character registering from this point of view a high variability, ranging between 48.1% and 177.6%.

In absolute values the service period length ranged between 4 days (7 Pilot I – 12, after the 6th parturition) and 739 days (7 Pilot I – 12, after the 2nd parturition).

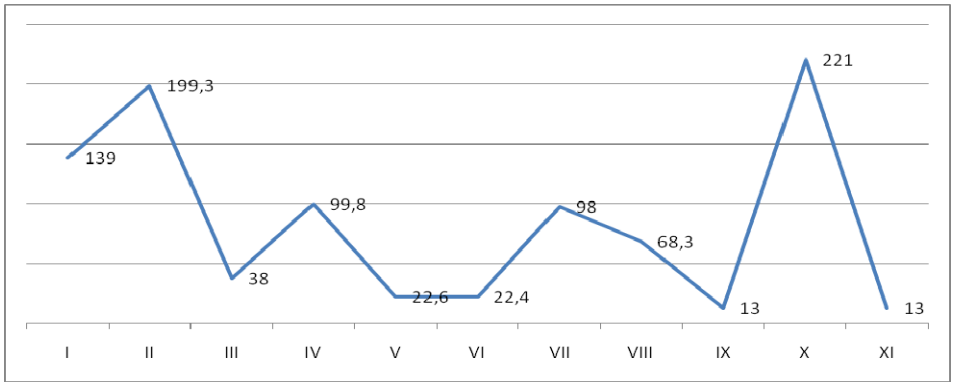

Figure 2 Evolution of service period length of the mares taken in study (days)

Data on calving interval length of breeding mares, centralized, statistically processed and plotted, showed that it was on average throughout the studied batch of 465.4 ± 36.8 days.

The average values recorded for each mare ranged from a minimum of 359.8 days to a maximum of 598.4 days (tab. 7, 8 and fig. 3).

Table 7 Length of calving interval of the mares taken in study

Mares name	Period of calving interval (days)									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Molid I – 38	748	350	402	351	342	352	404	351	360	-
4 Molid I - 47	370	366	366	369	382	354	711	413	358	415
5 Molid I - 49	364	379	342	370	346	385	333	-	-	-
6 Molid I - 60	354	692	351	434	681	369	-	-	-	-
9 Molid I - 69	717	357	-	-	-	-	-	-	-	-
7 Pilot I - 12	525	1056	360	685	366	-	-	-	-	-
11 Pilot I - 36	-	-	-	-	-	-	-	-	-	-

Table 8 Statistical analysis of data regarding calving interval of the mares taken in study

Specification	Lenght of calving interval (days) after parturition:										
	Average	I	II	III	IV	V	VI	VII	VIII	IX	X
n	6	6	6	5	5	5	4	3	2	2	1
$\overline{X}$	465.4	513.0	533.3	364.2	441.8	423.4	365.0	482.7	382.0	359.0	415.0
s	90.2	181.6	288.1	23.0	139.6	144.9	15.3	200.9	-	-	-
$\pm s_{\overline{X}}$	36.8	74.1	117.6	10.3	62.4	64.8	7.7	116.0	-	-	-
V%	19.4	35.4	54.0	6.3	31.6	34.2	4.2	41.6	-	-	-
MIN	359.8	354.0	350.0	342.0	351.0	342.0	352.0	333.0	351.0	358.0	415.0
MAX	598.4	748.0	1056.0	402.0	685.0	681.0	385.0	711.0	413.0	360.0	415.0
%	100.0	110.2	114.6	78.3	94.9	91.0	78.4	103.7	82.1	77.1	89.2

Variability of this character was on average of 19.4%, calving interval being directly related to the length of service period, which, as we have seen, recorded wide fluctuations.

The lowest average length of calving interval was of 382 days (between the 9th and 10th parturition), and the highest was of 533.3 days (between the 2nd and 3rd parturition).

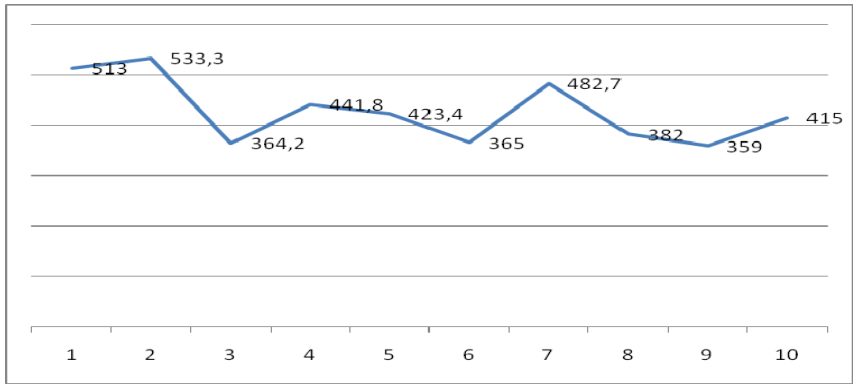

Figure 3 Evolution of mean duration of CI for the mares taken in study (days)

In absolute values, calving interval period ranged between 333 days (5 Molid I – 49, amongst 7th and 8th parturition) and 1056 days (7 Pilot I - 12, amongst 2nd and 3rd parturition).

Regarding the number of foals annually obtained from the studied mares, this one is on average of 0.76 ± 0.05, with limits between 0.50 and 0.92 (tab. 9).

Basically, in the studied nucleus are both mares that have calved each year (4 Molid I - 47), but also mares which have calved once every two years or twice in three years, which is absolutely normal for this breed.

Table 9 Foals number obtained from the studied mares

Mares name	Breeding period (years)	Foals	
		Total	Annually
Molid I – 38	12	10	0.83
4 Molid I - 47	12	11	0.92
5 Molid I - 49	9	8	0.89
6 Molid I - 60	9	7	0.78
9 Molid I - 69	4	3	0.75
7 Pilot I - 12	9	6	0.67
11 Pilot I - 36	2	1	0.50
$\overline{X}$			0.76
s			0.14
$\pm s_{\overline{x}}$			0.05
V%			18.81
MIN			0.50
MAX			0.92

The results obtained from this study show values which generally fits between the limits presented in the literature [1-9].

CONCLUSIONS

"Cal de Bucovina" population at present, is extremely low, being currently surviving as a nucleus in conservation through the skilled care of the specialists of the Lucina Stud.

Following the study conducted over the breeding nucleus of *"Cal de Bucovina"* population, from Lucina stud the following conclusions were drawn:

The age of mares' introduction to breeding (first mating) was on average of 1817.429 ± 161.861 days. If 11 Pilot I- 36 mare is eliminated, which promoted to the breeding nucleus in 2013, it will be obtain an average value of 1478.16 days, which is closer to the population specificity.

Age at first calving of mares averaged 2170 ± 164.567 days.

The average length of gestation was 339.7 ± 2.0 days, value which is lower than the one mentioned in the literature of 343 days, decreasing with the advancement in age of mares which is a normal physiological situation.

The average length of the service period throughout the studied nucleus was 97.8 ± 25.6 days, which shows that a small number of mares remain pregnant after the first mating which is carried out in the first two weeks after birth as stated in the literature.

The average period of calving interval for the studied livestock was 465.4 ± 36.8 days, superior to those mentioned in the literature.

The number of foals annually obtained by the studied mares was in average of 0.76± 0.05, value which is than lower that of literature which is 1.

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