

PARTIAL RESULTS REGARDING THE GENETIC ANALYSIS OF HUCUL HORSE FROM LUCINA STUDFARM: REPRODUCTIVE ISOLATION AND AGE STRUCTURE

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Abstract

This study is a part of an ample research concerning the genetic analysis (history) of Lipizzan horses from Beclean studfarm. The genetic analysis studies are a part of Animal Genetic Resources Management because just start of them we elaborate the strategies for inbreeding management. This study has as purpose to present two important aspects of genetic analysis: reproductive isolation level and age structure. This parameters has a capital importance in animal breeding because there has a directly influence in animal population evolution.

The reproductive isolation situation was quantified using the relation elaborated by S. Wright in 1921.

The age structure situation is based on the age distribution histogram.

The analysis showed that the Hucul horse from Lucina stud is a reproductively isolated population and have its own evolutionary path. Age structure is not balanced with negative repercurssions on generation interval.

Key words: Hucul, Lucina, reproductive isolation, structure

INTRODUCTION

This study is a part of an ample research concerning the genetic analysis (history) of Hucul horses from Lucina studfarm. The genetic analysis studies are a part of Animal Genetic Resources Management because just start of them we elaborate the strategies for inbreeding management [3]. This study has as purpose to present two important aspects of genetic analysis: reproductive isolation level and age structure. This parameters has a capital importance in animal breeding because has a directly influence in animal population evolution.

The population acceptance criteria are four: reproductive isolation, morphological and physiological differences, environmental requirements and genetic size [4]. The reproductive isolation level is the most important criteria for population acceptance, the other three being in according to them [1]. This parameter is very important because only reproductive isolated populations have an own

evolution, in contrary they are influenced by evolving of immigrants populations.

The age structure have a double importance: for exploitation because influenced directly average age, and on the other hand, for animal breeding because is influenced the generation interval and population variability [2].

MATERIAL AND METHOD

The biologic material are represented by seven sire stallions and sevntythree mares, Hucul breed, representing the entire reproductive nucleus from Lucina stud farm at this time (05.12.2010).

The reproductive isolation level was quantified using the follow relation [1]:

$$C.I.R. = \frac{AA - (AI + H)}{AA + AI + H}$$

where: AA – number of individuals accepted for reproduction in analysed interval with both autohtones parents; AI – number of individuals accepted for reproduction in

analysed interval with one autohtone and one immigrant parent; II – number of individuals accepted for reproduction in analysed interval with both immigrants parents.

The age structure can be described by weight of different age categories from entire population [4]. The age structure is expressed in years.

RESULTS AND DISCUSSIONS

The results regarding reproductive isolation coefficient (RIC or CIR) are showed in table 1.

The age structure for Hucul horse from Lucina stud farm is presented in table 2 and in the figures 1 and 2.

Table 1 - The reproductive isolation coefficient values

Specifications	No.	Immigrants (I)	Parents			R.I.C.	
			AA	AI	II		
Reproductive nucleus (RN)	♂	7	-	7	-	-	+1,000
	♀	73	-	73	-	-	+1,000
	Total	80	-	80	-	-	+1,000
Parents of RN	♂	16	-	16	-	-	+1,000
	♀	59	-	59	-	-	+1,000
	Total	75	-	75	-	-	+1,000
Grandparents of RN	♂	22	-	22	-	-	+1,000
	♀	68	-	68	-	-	+1,000
	Total	90	-	90	-	-	+1,000

The dates presented in table 1 releave the fact that the hucul Horse from Lucina stud farm is a true population with his own evolution and perfect distinct from other similar communities.

We can note the reproductive isolation coefficient value, constant in generations

successions and equal with +1.000, which coressponds to a complete reproductive isolation. Also, analyzing the data regarding current reproductive nucleus, and those of the last ranking papers (2010), we remark a laudable tendency for increasing the brood mares number (N = 73).

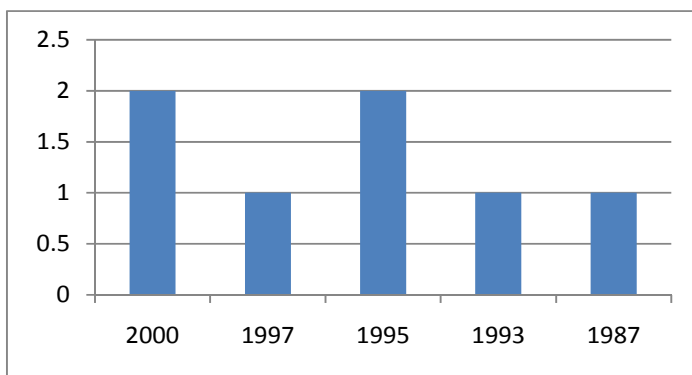


Figure no. 1. Sire stallion age structure

Table 2 – Hucul horse age structure in Lucina stud farm

Sex	Total		Average age
	N	%	
F	73	7	9,03 ± 0,67
M	7	1	14,71 ± 1,58
Birth year	1987	N	1
		%	14,29
	1990	N	1
		%	1,37
	1991	N	5
		%	6,85
	1992	N	3
		%	4,11
	1993	N	5
		%	6,85
	1994	N	2
		%	2,74
	1995	N	3
		%	4,11
	1996	N	2
		%	2,74
	1997	N	1
		%	14,29
	1998	N	2
		%	2,74
	1999	N	3
		%	4,11
	2000	N	4
		%	5,48
	2001	N	2
		%	2,74
	2002	N	3
		%	4,11
	2003	N	4
		%	5,48
	2004	N	1
		%	1,37
	2005	N	7
		%	9,59
	2006	N	14
		%	19,17
2007	N	12	
	%	16,44	

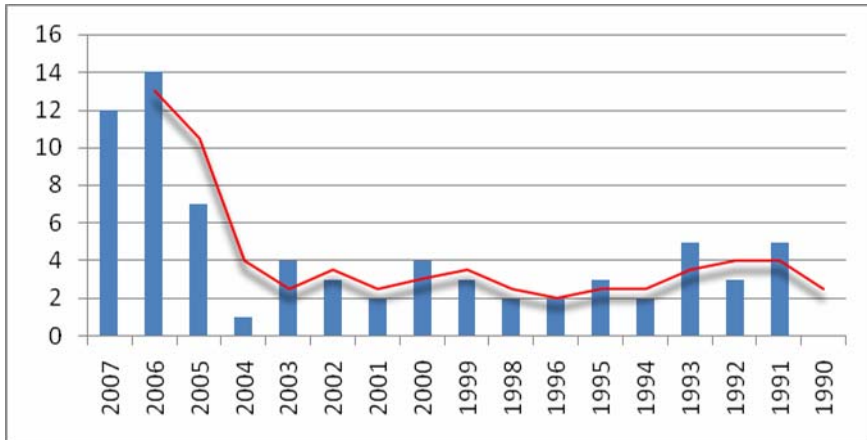


Figure no. 2. Brood mares age structure

From dates presented in table 2 and from figures no. 1 and 2, we observe an unbalanced age structure for Hucul horse from Lucina stud farm. Regarding the mares, thanks to admittance in reproductive nucleus to a significant number of young mares (born in 2006-2007), the age structure, for this sex can be balanced in time if the strategy will be maintained. In the same time is very hard, for Lucina studfarm, to reform old mares (born in 1993 - 1995) because of the remarkable genetic values of them.

CONCLUSIONS

1. The Hucul horse from Lucina stud farm is a population with his own evolution.
2. The constant value of reproductive isolation coefficient, constant in generations successions and equal with +1.000 corresponds to a complete reproductive isolation.
3. The age structure is improper for increasing genetic progress because is increasing the generation interval as following the existence of a significant share of old parents (in specially in the sire stallions rank).
4. The average age, for Hucul horse from Lucina stud farm, have very different

values between sexes: 14,71 years for sire stallions and 9,03 years for mares, and this fact make as the generation interval, estimated through this parameter, (considering an average value of 0,92 years for gestation in horses), at the populational level, to be at 12,79 years (bigger on the males way because of holding males offsprings from old fathers).

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