

RESEARCH ON THE GENETIC STRUCTURE AND MORPHOLOGICAL AND PRODUCTIVE POTENTIAL OF THE GREY STEPPE

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Abstract

The current state of the problem concerning the cattle preservation of the breeds in danger of extinction determines us to continue these studies and to finding the most modern and efficient preservation methods of these valuable resources in the genetic fond, represented by Grey Steppe breed. So this paper wants to have a small contribution to knowledge of morphological and productive potential and genetic structure of this breed in order to maintain the specific features and continue of conservation work of Grey Steppe breed. Nucleus of Grey Steppe breed that is in genetic conservation at SCDCB Dancu is divided into 10 genetic groups. Overall analysis of the value of improvement for the amount of milk Grey Steppe breed bulls used for breeding shows that 4 of 9 bulls are enhancers studied for this purpose (with positive values between 6.87 and 178.71 kg), a bull is indifferent (0.12 kg) and 4 are worsened for quantitative milk production (negative values between -59.14 and -101.93 kg). Breeding value for morphology, respectively for the height at the withers of the Grey Steppe breed bulls used for breeding indicates that 4 of the 9 bulls are enhancers studied for this purpose (with positive values between 0.74 and 2.88 cm), an indifferent bulls (0.18 cm) and 4 worsened for height at the withers (negative values between -1.10 and -2.62 cm). Regarding weight of the Grey Steppe breed bulls used for breeding analysis shows that 6 of 9 bulls are enhancers studied for this purpose (with positive values between 3.99 and 19.15 kg) and 3 worsened for (negative values between -2.75 and -48.72 kg). Potential breeding value of the nucleus of the Grey Steppe breed from SCDCB Dancu is 2048.59 kg for the amount of milk and 4.59% for fat content, which shows the potential of this breed decreased for all analyzed morpho-productive. Also for the main morphological indicators analyzed potential improvement value shows: height at withers: 123.73 cm, chest area: 183.65 cm, horizontal length of the trunk: 152.34, while the weight is 513 kg for breeding value.

Key words: genetic structure, morphological and productive potential, Grey Steppe

INTRODUCTION

The Grey Steppe breed represents one of the oldest indigenous breeds, which was born from the *Bos Taurus Primigenius*, having as common pattern other Europeans breeds (Andaluza, Romagnola, Zamorana, Salers, Podolica, Ukrainian Grey Steppe etc.).

Grey Steppe breed strain is part and Romanian Grey Steppe breed, originated in the plains of Ukraine, place where such animals spread to the Balkans and the

Mediterranean region, where they formed Podolian type breeds. All of these people newly formed by spreading in most countries neighboring with Ukraine new races formed surahs, in many varieties, depending on the area of distribution, the method of increasing the absorption type selection and the local population.

From the productive point of view, this breed no longer responds to the actual requests, but due to its historical, economic and genetic role it could have in the future, as a resource of valuable genes, this breed is still very important, fact which imposes the preservation of this biological source as a

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main priority due to the situation in which it can be found, an almost extinct breed.

So this paper wants to have a small contribution to knowledge of morphological and productive characteristics and genetic structure of this breed in order to maintain the specific features and continue of conservation work of Grey Steppe breed.

MATERIAL AND METHOD

Biological material is composed of a core of 48 Grey Steppe breed cows existing at SCDCB Dincu – Iasi.

Primary data processing was performed using the method REML (Restricted Maximum Likelihood). The amount of improvement was calculated using the difference BLUP selection methodology plays average phenotypic value of individuals selected expressed as deviation from the average population, the average phenotypic value of all individuals in the parental generation before selection $S = I -$ where: I = average of sample selection.

Average production value expressing the studied population phenotypic parents by differential selection (S), it follows that the effect of selection on generation (Δg) can be expressed by the equation $\Delta g = h^2 \times S$ elements to be determined to establish the difference in selection which will work to achieve a certain effect refers to: the proportion of the lot selected, namely the intensity of selection the average batch value selected and the value or the minimum requirement.

Calculation of the intensity of the selection (A) is made according to the formula: $R = x \times 100$ where: E is the percent change in the number of annual production; F is the number of the female sex products produced annually from a female. The percentage of change (S) is determined by the equation: $E =$ where: $V1$ is the age at first calving; $V2$ is the age at which females of the herd production recasts $E \text{ min} -$ the minimum requirement is $\text{min} = \bar{X} \pm kXs$ where: \bar{X} = the average yield of the population studied; K = the weight ratio of the normal distribution, the values of which are standardized (80%); s

= standard deviation $I = \bar{X} + i * s$ where: \bar{X} = the average yield of the population studied; i = value of the difference in the unit of selection standard deviation; s = standard deviation.

CPP potential production capacity = $P + b1 (s + p)$ where: P = the average yield of the population studied; s = maximum output of selected animals; $b1$ = regression coefficient of the production capacity of the average performance of the individual likely $b1 = n \times R / 1 + (n-1) \times$ where n = the number of productive cycles; R = coefficient of repeatability of these properties

VAP potential improvement value = $P + b1 (s + p)$ where: P = the average yield of the population studied; s = ability selectionator probable; $b1$ = regression coefficient of the genotype to the genotype of the medium in X $b1 = h^2 / 1 + (n-1) \times$ where n = the number of productive cycles; R = coefficient of repeatability of these properties; h^2 = heritability coefficient of the respective properties

RESULTS AND DISCUSSIONS

Nucleus of Grey Steppe breed that is in genetic conservation at SCDCB Dancu is divided into 10 genetic groups.

Each genetic group includes animals that have their descent group founder bull or continuous group.

Overall analysis of the value of improvement for the amount of milk Grey Steppe breed bulls used for breeding shows that 4 of 9 bulls are enhancers studied for this purpose (with positive values between 6.87 and 178.71 kg), a bull is indifferent (0 12 kg) and 4 are worsened for quantitative milk production (negative values between -59.14 and -101.93 kg).

Breeding value for morphology, respectively for the height at the withers of Grey Steppe breed bulls used for breeding indicates that 4 of 9 bulls are enhancers studied for this purpose (with positive values between 0.74 and 2.88 cm), an indifferent bulls (0.18 cm) and 4 worsened for height at withers (negative values between -1.10 and -2.62 cm).



Fig. 1 Mean half sister groups for the amount of milk and milk quality



Fig. 2 Two average values morphological half sister groups(--height at the withers,-- oblique body length,-- chest area)

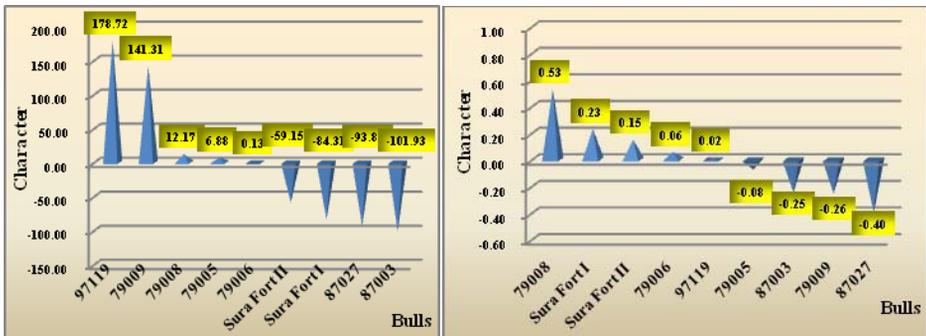


Fig. 3 Improvement of breeding value for milk quantity and fat %

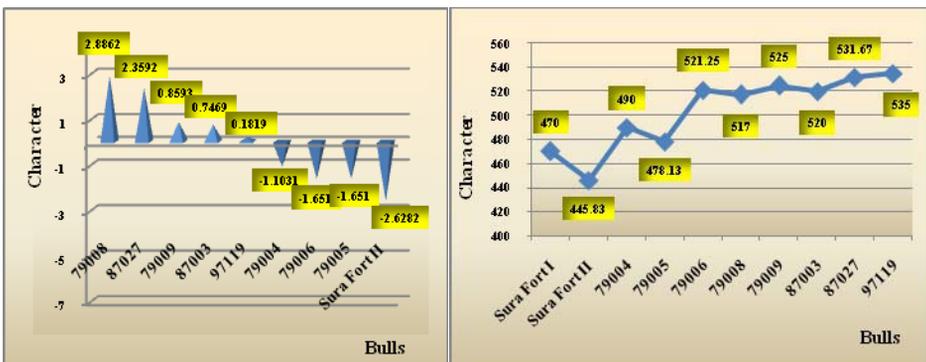


Fig. 4 Improvement of breeding value for height and weight

Table 1 Technical parameters of genetic improvement program Grey Steppe breed

Character	Average	Standard Deviation	Coefficient heritability (h ²)	Repeatability coefficient (R)
Milk kg- EM	1975.35	487.56	0.21	0.22
% Fat	4.48	0.43	0.61	0.63
Kg Fat	88.4	22.1	0.24	0.25
% Protein	3.52	0.20	0.57	0.60
Kg Protein	69.81	17.1	0.23	0.24
HG	122.7	4.81	0.37	0.39
PT	181.7	9.81	0.33	0.35
LOT	149.8	13.55	0.29	0.30
GC	500.3	57.61	0.43	0.46

Table 2 Parameters genetic improvement program Grey Steppe breed

Character	Emin	\bar{X}_i	S	CPP	VAP
Milk kg- EM	2365.3	2526.24	550.94	2086.36	2048.59
% Fat	4.82	4.96	0.48	4.61	4.59
Kg Fat	106.08	113.34	24.97	93.64	92.01
% Protein	3.68	3.74	0.22	3.57	3.56
Kg Protein	83.49	89.13	19.32	73.81	72.53
HG	126.54	128.13	5.43	124.01	123.73
PT	189.54	192.78	11.02	184.27	183.65
LOT	160.64	165.11	15.31	153.24	152.34
GC	546.38	565.39	65.09	516.83	513.68

Emin - the minimum requirement; \bar{X}_i - batch media selection; S - the difference in selection; CPP - potential production capacity; VAP - potential improvement value

Regarding the weight of Grey Steppe breed bulls used for breeding analysis shows that 6 of 9 bulls are enhancers studied for this purpose (with positive values between 3.99 and 19.15 kg) and 3 worsened (negative values between -2.75 and -48.72 kg).

In the first stage was calculated selection intensity by total population. So the total population, that number is maintained at the proposed size is possible that the next generation is produced with 27.02% of the flock.

The next stage in the development of better Grey Steppe breed was calculating the minimum requirement (E min) for the main character selection, you must meet the cows to be admitted into the core selection was further calculated the potential production capacity (CPP).

b1 = regression coefficient of the production capacity of the average performance of the individual are: b1 = 0.69kg milk, b1 = 0.93 fat, b1= 0.72 fat %, b1 kg protein = 0.92 kg protein b1= 0.71% protein, b1 height at withers = 0.83, b10

chest area = 0.81, b1 oblique body length = 0.77, b1 weight = 0.87.

Capacity potential (CPP) Grey Steppe breed is: CPP = 086.36 kg milk, CPP =4.61% fat, CPP = 93.64 kg fat, CPP = 3.57% protein, CPP = 73.81 kg protein, CPP= 124.01 cm height at withers, CPP = 184.27 cm chest area, CPP = 153.24 cm oblique body length, CPP = 516.83 kg body weight.

Coefficient of the regression of genotype to genotype environment for Grey Steppe cattle are: b1 = 0.66 kg milk fat, b1 = 0.90 kg fat b1% fat = 0.69, b1 kg protein = 0.87, b1% protein = 0.68, b1height at withers = 0.79, b1 thoracic perimeter = 0.76, b1oblique length of the body = 0.74, b1 weight = 0.81.

Improvement of their probable value (VAP) is: VAP = 2048.59 kg milk, VAP = 4.59% fat, VAP = 92.01 kg fat, VAP = 3.56% protein, VAP 72.53 kg protein, VAP = 123.73 cm height at withers, VAP = 183.65cm chest area, VAP = 152.34 cm oblique body length, VAP = 513.68 kg body weight

CONCLUSIONS

1. Nucleus of the Grey Steppe breed that is in genetic conservation at SCDCB Dancu is divided into 10 genetic groups.

2. Overall analysis of the value of improvement for the amount of milk Grey Steppe breed bulls used for breeding shows that 4 of the 9 bulls are enhancers studied for this purpose (with positive values between 6.87 and 178.71 kg), a bull is indifferent (0.12 kg) and 4 are worsened for quantitative milk production (negative values between -59.14 and -101.93 kg).

3. Breeding value for morphology, respectively for the height at the withers of the Grey Steppe breed bulls used for breeding indicates that 4 of the 9 bulls are enhancers studied for this purpose (with positive values between 0.74 and 2.88 cm), an indifferent bulls (0.18 cm) and 4 worsened for the height at the withers (negative values between -1.10 and -2.62 cm).

4. Regarding the weight of the Grey Steppe breed bulls used for breeding analysis shows that 6 of the 9 bulls are enhancers studied for this purpose (with positive values between 3.99 and 19.15 kg) and 3 worsened for (negative values between -2.75 and -48.72 kg).

5. Potential breeding value of the nucleus of the Grey Steppe breed from SCDCB Dancu is 2048.59 kg for the amount of milk and 4.59% for fat content, which shows the potential of this breed decreased for all analyzed morpho-productive.

6. Potential milk production of Grey steppe cattle from SCDCB Dancu registred mean value 1727,1 kg milk, white variation of 1315,46 and 2049,86 kg milk and 16 % variability.

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