

QUANTITATIVE AND QUALITATIVE STUDY OF MILK PRODUCTION OF GRAY STEPPE CATTLE IN ROMANIA

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Abstract

Researches were carried out on a number of 122 Grey Steppe breed females grouped into 8 groups: 3 groups in cattle unit increase: SCDCB Dancu Iasi (38 heads), USAMV Cluj (4 heads), Roua-Grup Ialomița (3 heads), and 5 lots in Neamț population households (Tazlău - 6 heads, Tupilași-7 heads) and Tulcea (39 heads in Chilia Veche, Letea -18 heads and Pardina -7 heads), aiming the mean quantitative and qualitative of characters milk production. Data were extracted of primary records of farms and direct measurements being statistically processed using SPSS 19 program, and statistical significance was done using ANOVA test. Quantitative milk production in cows Grey Steppe is now higher than in the production of this breed highlighted in studies over time, so the value of 1244 kg milk, registered in 1961, today it amounts to more than 2000 kg milk, which shows the high potential of this breed on milk production, modest to specialized breeds in milk production and even mixed. The average percentage of fat present values between 4.48 and 4.63% in specialized units and values less than 4.15 to 4.33% in the household population with significant statistical differences between values.

Key words: Gray Steppe, quantitative milk production, the average fat

INTRODUCTION

Gray cattle breed from Romania is included in the *Bos* genus, *Taurus* subgenus, *Primigenius* species, Bull without humps subspecies, being spread on the territory of our country since the oldest times.

In 1935 the gray cattle had a proportion of about 57,3 % of the total number of bulls and only 0,6 % in 1977 [2].

At present, gray cattle are found here and there in the north-eastern part of Moldavia, in Neamț and Iași counties and in the Danube Delta, in rural farms, more as half-breed and fully gray cattle can be found at the Station of Research-Development for Bovine Breeding of Dancu - Iași, TCE 3 Brazi Piatra Neamț, U.S.AMV Cluj and Roua-Grup from Ialomița county and in some individual farms from Neamț and Tulcea counties.

The aim of researches was to establish the milk production to gray cattle in different breeding areas, taking into account it is an endangered species.

MATERIAL AND METHOD

Researches were carried out on 122 cows grouped in 8 groups: 3 groups in bovine breeding units: SCDCB Dancu Iași (38 heads), USAMV Cluj (4 heads), Roua-Grup Ialomița (3 heads); and 5 groups in the farms of the population from Neamț county (Tazlău - 6 heads, Tupilași - 7 heads) and Tulcea (Chilia Veche - 39 heads, Letea - 18 heads and Pardina - 7 heads), followed quantitative and qualitative of milk production characters, currently reported at different periods of time. The statistical interpretation and processing of obtained data was carried out with the aid of the program SPSS 19 referring to the position and variation estimators (arithmetic mean \bar{X} , standard deviation of the mean $\pm s$, standard deviation s , variation factor $V\%$).

Establishing the significance of differences between the values of features to the analyzed batches was carried out with the aid of the Fischer test, through the ANOVA method.

The analysis of inheritance was calculated based on the following calculus formula:

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The manuscript was received: 25.02.2013

Accepted for publication: 1.06.2013

$$h^2 = \frac{s^2G}{s^2G + MS_w} \times 4$$

RESULTS AND DISCUSSIONS

Different variations of the production of milk realized at gray cattle were determined in specialized units compared to individual farms (tables 1 and 2).

At gray cattle from SCDCB Dancu, the following aspects were determined:

- Duration of the first lactation with an average value of 253.44 ± 8.57 days, with a variability of 17.5 %

- The average production of milk during normal lactation is quite reduced, with average values of 1519.5 ± 93.8 kg

- The average content of fats of milk is superior to other autochthonous breeds, with average values of 4.48 ± 0.08 %

- Corresponding to the quantity of milk and to the content of fats, the average quantity of fats is of 68 ± 4.26 kg

At gray cattle from USAMV Cluj, the average duration of the first lactation has values of 265.33 ± 39.66 days, the variability of this feature being emphasized (25.89 %).

The production of milk per normal lactation has registered average values of 1684.3 ± 418.96 kg. The content of milk fats has average values of 4.63 ± 0.2 %, and the average quantity of fats was ranged between 76.33 ± 17.45 kg.

In the case of gray cattle from Roua-Grup, the following average values of the features of milk production were determined: the duration of the first lactation of 290.66 ± 7.21 days, the quantity of milk per normal lactation of 1948.3 ± 47.83 kg; the contents of milk fats of 4.58 ± 0.07 %, and the average quantity of fats of 89.3 ± 0.66 kg.

Table 1 Average values and variability of the milk production to gray cattle in the first lactation in specialized breeding units

Specification	Normal lactation						Total lactation						
	Day milk	Milk	%	Kg	%	Kg	Day milk	Milk	%	Kg	%	Kg	
SCDCB DANCU	n	27	27	27	27	27	5	5	5	5	5	5	
	\bar{x}	253.44	1519.5	4.48	68	3.52	53.7	391.4	2590.4	4.32	111.6	3.47	90.8
	$\pm s_{\bar{x}}$	8.57	93.8	0.08	4.26	0.03	3.30	42.5	263.53	0.09	111.6	0.12	11.58
	s	44.5	487.56	0.43	22.1	0.20	17.1	95.1	589.28	0.22	23.8	0.28	25.9
	V%	17.5	32.0	9.78	32.5	5.85	31.9	24.3	22.7	5.11	21.3	8.30	28.53
	Min	144	677	3.72	25.3	3.15	22.4	306	1993	4.1	84	3.22	64.17
	Max	305	2296	5.32	107	3.91	81.1	530	3565	4.67	150	3.89	130.4
USAMV CLUJ	n	3	3	3	3	3	2	2	2	2	2	2	
	\bar{x}	265.33	1684.3	4.63	76.33	3.45	56.66	321	2175	4.45	97	3.26	70.97
	$\pm s_{\bar{x}}$	39.66	418.96	0.23	17.45	0.16	12.54	15	182	0.21	13	0.04	6.8
	s	68.7	725.66	0.4	30.23	0.29	21.73	21.21	257.38	0.304	18.38	0.05	9.62
	V%	25.89	43.08	8.63	39.61	8.39	38.35	6.6	11.83	6.82	18.95	1.73	13.55
	Min	186	856	4.24	43	3.26	32	306	1993	4.24	84	3.22	64.17
	Max	305	2208	5.04	102	3.79	73	336	2357	4.67	110	3.3	77.78
ROUA-GRUP	n	3	3	3	3	3	1	1	1	1	1	1	
	\bar{x}	290.66	1948.33	4.58	89.33	3.70	72.27	314	2081	4.42	92	3.81	79.28
	$\pm s_{\bar{x}}$	7.21	47.83	0.07	0.66	0.15	3.8	-	-	265.33	265.33	265.33	265.33
	s	12.5	82.85	0.13	1.15	0.27	6.58	-	-	-	-	-	-
	V%	4.3	4.25	2.83	1.29	7.29	9.11	-	-	-	-	-	-
	Min	282	1889	4.43	88	3.4	65	-	-	-	-	-	-
	Max	305	2043	4.66	90	3.91	77.83	-	-	-	-	-	-
Test Fischer	F	1.072	1.237	0.129	1.494	1.085	1.715	1.503	1.276	0.500	0.817	1.473	1.543
	p	0.355	0.304	0.879	0.240	0.350	0.197	0.266	0.302	0.506	0.401	0.270	0.261
		ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	

ns. = no significant differences; * = significant differences; *** = highly significant differences

At gray cattle breed from individual farms, different variations of the average values of milk production were determined.

At gray cattle breed from individual farms from Tazlău the following average values were registered:

- Quantity of milk of 2404 ± 194.31 kg with a factor of variability of 19.79 %.
- Content of milk fats of 4.15 ± 0.07
- The average quantity of fats of 99.52 ± 7.76 kg

At gray cattle breed from individual farms from Tupilați the following average values were registered:

- Quantity of milk of 2065.51 ± 161.92 kg with a factor of variability of 20.74 %.
- Content of milk fats of 3.98 ± 0.09
- The average quantity of fats of 82.47 ± 7.28 kg

At gray cattle breed from individual farms from Chilia-Veche the following average values were registered:

- Quantity of milk of 1739.63 ± 84.57 kg, with a factor of variability of 30.36 %
- Content of milk fats of 4.33 ± 0.078 %
- The average quantity of fats of 75.27 ± 3.8 kg.

At gray cattle breed from individual farms from Letea the following average values were registered:

- Quantity of milk of 1528 ± 112.03 kg with a factor of variability of % 31.1
- Content of milk fats of 4.36 ± 0.1 %
- The average quantity of fats of 67.09 ± 5.45 kg.

Table 2 Average values and variability of the milk production to gray cattle in the first lactation in the individual farms

Normal lactation						
Specification	Day milk	Milk	%	Kg	%	
TAZLĂU	n	6	6	6	6	6
	\bar{X}	2404	4.15	99.52	3.36	80.72
	$\pm s_{\bar{x}}$	194.31	0.07	7.76	0.04	6.11
	s	475.98	0.18	19.02	0.10	14.97
	V%	19.79	4.5	19.11	3.06	18.55
	Min	1824.26	3.9	78.44	3.2	63.84
Max	2890.71	4.4	125.21	3.5	96.75	
TUPILAȚI	n	7	7	7	7	7
	\bar{X}	2065.51	3.98	82.47	3.75	77.41
	$\pm s_{\bar{x}}$	161.92	0.09	7.28	0.09	6.27
	s	428.4	0.24	19.27	0.25	16.6
	V%	20.74	6.12	23.37	6.88	21.44
	Min	1437.08	3.49	57.05	3.49	56.04
Max	2695.95	4.18	111.88	4.07	98.13	
CHILIA-VECHE	n	39	39	39	39	39
	\bar{X}	1739.63	4.33	75.27	3.62	62.9
	$\pm s_{\bar{x}}$	84.57	0.078	3.8	0.04	3.00
	s	528.16	0.49	23.74	0.25	18.78
	V%	30.36	11.34	31.54	6.97	29.86
	Min	1098.35	3.53	40.47	3.14	39.43
Max	3245.12	5.32	150.89	4.07	113.25	
LETEA	n	18	18	18	18	18
	\bar{X}	1528.23	4.36	67.09	3.57	55.28
	$\pm s_{\bar{x}}$	112.03	0.1	5.45	0.06	4.66
	s	475.3	0.42	23.14	0.26	19.79
	V%	31.1	9.82	34.49	7.36	35.8
	Min	826.71	3.53	31.41	3.14	25.95
Max	2421.1	5.11	107.73	4.07	98.53	
Test Fischer	F	5.422	1.638	3.223	2.978	4.193
	p	0.002	0.189	0.028	0.038	0.009
		***	ns.	*	*	*

ns. = no significant differences; * = significant differences; *** = highly significant differences

The analysis of inheritance factors carried out at gray cattle from specialized units and individual farms have distinguished different variations to indicators taken into account for the study (table 3).

At gray cattle from SCDCB Dancu, the inheritance factor has registered values ranged between low and average, situated between 0.17-0.24 for the quantitative features (lactation duration, milk quantity, quantity of fats and protein), to a superior level, with fluctuations of values between 0.57-0.61 for the qualitative features (the percentage of fats and protein).

At gray cattle from USAMV Cluj and Roua-Grup, the inheritance factor denotes variations concerning the degree of genetic determination of parameters studied for

animals at first lactation, from an average level (0.24-0.27) for quantitative features (lactation duration, milk quantity, quantity of fats and protein), to a superior level (0.58-0.61) for the qualitative features (the percentage of fats and protein).

At gray cattle from private owners, the inheritance factor denoted different variations concerning the degree of genetic determination of parameters studied for animals at first lactation, from an average level, with values ranged between 0.23-0.26 for quantitative features (lactation duration, milk quantity, quantity of fats and protein), to a superior level, with fluctuations of values between 0.59-0.64 for qualitative features (percentage of fats and protein).

Table 3 Inheritance factor (h^2) for the factors studied to gray cattle

Caracter	h^2 SCDCB Dancu	h^2 Usamv Cluj și Roua Grup	h^2 individual farms
Milk production	0.21	0.24	0.23
% of fat	0.61	0.61	0.64
Kilo of fat	0.24	0.27	0.26
% of protein	0.57	0.58	0.59
Kilo of protein	0.23	0.25	0.24

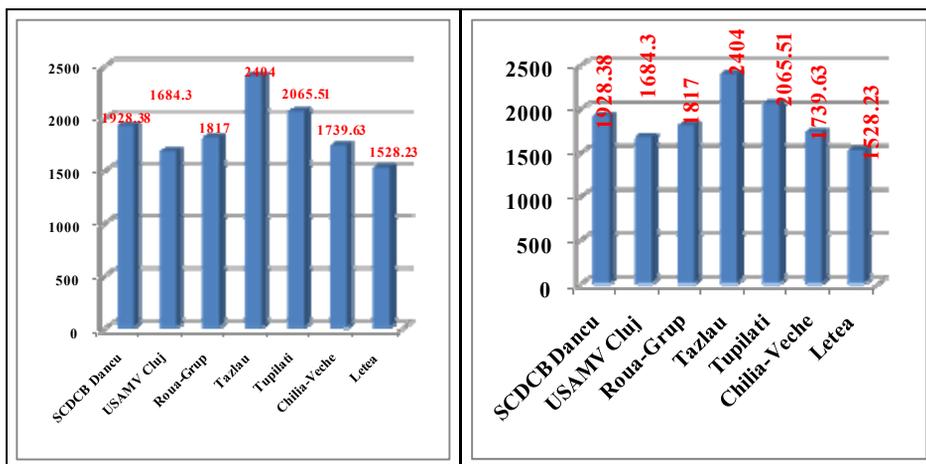


Fig. 1 Values concerning milk production, by various authors (1947- Cardaş A. [1]; 1960, 1961,1963- Miriță I. [3];1982- Miriță I. [4];2009- Creangă Ș., Maciuc V. [2] (left) and valuea concerning body weight following results (right)

Comparing the levels of milk production realized at gray cattle with those reported by different authors in different periods along

time, it was determined that higher values are registered at present, the increases being from 1244 kg milk in 1961 to 2535 kg milk

in 2009. This fact shows the productive potential of the breed, which can be improved through better conditions of breeding and feed (figure 1).

The average percentage of fats shows values comprised between 4,48 and 4,63 % in specialized units with statistically insignificant differences between values and lower values of 4,15 - 4,33 % in the farms of the population, also with statistically insignificant differences between values. The average percentage of protein shows values of 3,45 - 3,86 % in specialized units (statistically insignificant differences) and 3,36 - 3,62 % (statistically significant differences), for animals from the population (tables 1 and 2).

ACKNOWLEDGEMENTS

Thanks for financial and technical support in preparing and drafting this scientific research to project POSDRU 77222.

CONCLUSIONS

1. The quantitative production of milk to gray cattle is currently higher compared to those registered in time, distinguishing the increase of the productive potential in the conditions of improving the conditions of breeding and feed.

2. The analysis of inheritance factors has denoted different variations concerning the degree of genetic determination of parameters studied from an average level for quantitative features (lactation duration, milk quantity, quantity of fats and protein) to a superior level for qualitative features (percentage of fats and protein).

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