

CONTRIBUTIONS TO THE STUDY OF REARING DAIRY COWS FROM ROMANIAN BLACK PIED BREED IN DOBROGEA

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Abstract

The study was conducted on a population of 1575 BNR cows exploited in 6 representative farms with private capital from Dobrogea. The mean phenotype values of the milk production indexes on successive lactations (1st-7th) enlightened, in assembly, a certain low productive level, ranged between 4342.03 kg of milk in 1st lactation and 4463.45 kg of milk in 3rd lactation, but with great differences from one farm to another. The best performances were obtained at Dairy Farm, which realised in the first three lactations over 5000 kg of milk on normal lactation and individual performances of 9728 kg of milk in 1st lactation, respectively 10113 kg of milk in 2nd lactation. Milk content in fat and proteins, on the whole population from the six farms in Dobrogea, was placed between 3.73% and 3.80% for fat, respectively 3.18% and 3.27%, for proteins. In the studied population were identified 92 genetic families of paternal half-sisters, from which 53 families had an average milk production superior to mean of population, which was of 4342.03 kg of milk at first lactation, from which 20 genetic families with a mean of over 5000 kg of milk. These genetic structures constitute a valuable genetic-fund, based on which could be conceive a programme for genetic breeding of productive performances for these population. Analysing the age of first calving for the 1611 cows from the studied farms resulted a mean value of 967.15 days (32 months and 7 days), with limits between 442 days (14 months and 22 days) and 2002 days (66 months and 22 days). These extreme limits prove that the management of reproduction function was poor and with exploitation mistakes. Must be mention the fact that for the feature of reproductive precocity the best one was the genetic family of the indigenous bull code 16866, of which the four daughters had the age of first calving at 808.83 days (26 months and 28 days) and for the exploitation period, genetic family code 11014 with a mean of 4430.71 days (14.5 normal lactations).

Key words: milk production, Romanian black pied cows (BNR), genetic families

INTRODUCTION

Breeding animals, especially cows and sheep, has long tradition in Dobrogea area, allowing its merge with rural tourism in an area with natural and geographical conditions of the outstanding Romanian seaside and Danube Delta [4], [9], [11].

Having in view that Romanian black pied breed has a percentage of 100% within the cattle structure from Dobrogea, that it is a relatively new breed, and still in genetic

consolidation, and its breed is done in small and medium-sized family farms and less in large private farms, we considered useful to carry out a study upon breed evolution of the last five decades, production and reproduction performance, in the exploitation conditions characteristic to Dobrogea area.

Breeding dairy cows in farms of different sizes know some features that differs from one area to another and even within the same area, depending on environmental conditions and applied technologies [3], [7], [9], [11], [13], [15], [16], [19], [20].

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MATERIAL AND METHODS

Research was carry out in the six largest farms, with major private stock hold from Dobrogea, on a batch of 1575 cows, biologic material representative for the cattle breed population BNR from Dobrogea area. In the studied population activated, by using (the use of) frozen semen, a number of 101 indigenous bulls and from import, with different improvement value.

According to experimental protocol scheme the objectives followed were:

- ✓ Study of natural environmental conditions from Dobrogea area, and exploitation technologies within the studied farms;
- ✓ Study of the phenotypic and genetic parameters for the production and reproduction characteristics;
- ✓ The analysis of intra - population structure and the performance for 92 paternal half sister genetic groups with minimum 5 individuals;
- ✓ The improvement value of bulls used in reproduction, and influence on the main production and reproduction characteristics.

In elaboration of this paper it was use the primary data bank belonging to O.A.R.Z. Constanța and to the farms taken in study, completed with personal observations and research.

All data were statistically processed, using the literature methodology for zoo-technical research and specific methodology of criteria and objectives can be found in detail in the paper.

RESULTS AND DISCUSSIONS

From the data analysis on productive performances, depending on farm and successive lactation, showed that the best performances were obtained in Dairy Farm, where in the first three lactation realized over 5000 kg milk on normal lactation and individual performance of 9728 kg milk in the 1st lactation, respectively 10113 kg milk in the 2nd lactation.

Other farms obtained milk production of 4000 kg per lactation, mentioning that the batch from Cobadin Farm exceeded in all lactation the average of 4500 kg milk, and in the 4th lactation was obtained the mean production of 5015.28 kg milk.

Analysis of sequence variance for milk quantity on normal lactation, in first lactation

had an amplitude of 8615 kg, with limits between 1113 kg and 9728 kg milk. In the studied population 36% from cows within the first lactation realised a production ranging from 4000 kg and 5000 kg milk, 30.41% a production between 3000 kg and 4000 kg, and 2.34% had extremely low milk production, beneath 2000 kg milk. At the same time there were 16.19% plus - variants with performances between 5000 kg and 7000 kg milk, and 0.76% (12 cows) with performances over 7000 kg and a cow with 9728 kg milk in the 1st lactation.

Comparing the milk production between the farms the differences were significant ($p < 5\%$). For the fat content, between the farms there were no significant differences. The highest fat content was obtained from Dairy Farm batch 3.9%, and the smallest in Valu lui Traian Farm (3.64%). In all other farms the fat content was between 3.71% (Cezotor Farm) and 3.78% (Andra International Farm).

Regarding the protein content, the average values calculated for the six farms taken in study shows that from this point of view, the BNR cattle batch fits in breed standard, with mean values of over 3.20% protein content.

From the analysis of the mean values and variability of reproduction indexes (VPF, CI, RM), by farms, by successive lactation, and by entire population is found that:

Age at first calving (VPF) for the entire population was 1081.65 days (36 month and 1 day), with limits between 600 days (20 month) and 1692 days (56 month and 12 days). From the analysis of these data it can be observed that the age at first calving was delayed due to some deficiencies in breeding technology of juvenile reproduction female.

Resting breast (RM), depending on lactation, had average values between 62.3 days and 70.6 days, but individual variability was particularly pronounced, the variation coefficient being between 56.1% and $V=58.38\%$. The analysis of this reproduction index shows that in the studied farms, cows weren't weaned on time, and optimum resting breast wasn't respected. Sometimes cows weaned too early by a drastic reduction in milk production due to inadequate feeding and maintenance, other times productive cows are milked longer than normal lactation until near birth, breast rest being too short.

Calving interval, (CI) exceeded the acceptable period of 400 days, mean values for the entire population was between 457.13 days and 396.89 days. This synthetic index of the reproduction function had an individual variability between 311 and 956 days.

Study the main indicators of the reproduction function shows that in the studied population the reproduction management was poor, and influenced the productive performances and high production costs.

Analysing the period of exploitation result that from 764 cows, which ended their productive life, have been exploited, in average, 2443.39 days (6.69 years), limits between 720 and 5727 days (1.97-15.69 years). The variability of exploitation period was particularly pronounced as shown by the values of dispersion ($s = 854.19$ days and $V\% = 34.83$) and the maximum limit of 15.69 years.

The obtained results shows that cows from indigenous bulls had longer period of

exploitation than those from imported bulls, first with a better adaptation to poor life conditions and a better organic resistance.

Analysing the causes of herd output we find that cows output was influenced by technological factors of exploitation and farm management. In all studied farms the most frequent output were the reproduction ones udder diseases and members' disorders. A sufficiently large proportion holds the accidental causes, which shows deficiencies in the management of the technological exploitations factors.

To better highlight the production and reproduction performances of the BNR cattle population breed in large farms of over 100 source cows, we shall present some comparative data, from the research carried out by *Gh. Neaga, 2008*, in small and medium family farms from the same breed and within the same area (tab. 1 and 2).

Table 1 Milk production from small and medium family farms, comparatively with large farms in Constanța County

Lactation	Family farms (Neaga, 2008)		Large farms (own research, 2008)		Differences small farms – large farms (\pm)			
	Total lactation (kg)	Normal lactation (kg)	Total lactation (kg)	Normal lactation (kg)	Total lactation (kg)		Normal lactation (kg)	
					\pm absolute (kg)	\pm relative (%)	\pm absolute (kg)	\pm relative (%)
I	5356.65	4541.88	5135.01	4342.03	+221.64	+4.31	+199.85	+4.60
II	5451.02	4798.50	5050.09	4416.46	+400.93	+7.93	+382.04	+8.65
III	5481.80	4959.50	5009.95	4463.45	+471.85	+9.41	+446.05	+11.11
IV	4969.69	4830.41	4854.43	4372.67	+115.26	+2.37	+457.74	+10.46
V	5269.60	4760.15	4899.97	4429.03	+369.63	+7.54	+331.12	+7.47
VI	5194.97	4708.00	4727.54	4321.03	+467.43	+9.88	+386.97	+8.95

Table 2 Reproduction indexes from small and medium family farms comparatively with large farms in Constanta County

Specification	Family farms (Neaga, 2008)	Large farms (own research, 2008)	Differences small farms – large farms (\pm)		
			\pm absolute (kg)	\pm relative (%)	
VPF, days	1002.28	967.15	+35.15	+3.63	
CI, days	I-II	428.05	429.81	-1.76	-0.41
	II-III	413.55	419.38	-5.83	-1.51
	III-IV	420.18	409.02	+11.16	+2.72
	IV-V	408.42	410.57	-2.15	-0.52
	V-VI	394.52	405.89	-11.37	-2.80
RM, days	II	59.51	61.88	-2.37	-3.98
	III	60.05	64.46	-4.41	-7.34
	IV	66.28	60.69	+5.59	+9.21
	V	68.58	64.74	+3.84	+5.93
	VI	49.23	61.75	-12.52	-25.43
Period of exploitation, days	2256.03	2443.39	-187.36	-8.30	

Production performance analysis, by successive lactations (tab. 1) leads to the conclusion that in family farms, milk production performances are superior to those recorded for large farms, where technological factors of exploitation, especially feeding, are more difficult to control. Comparative results indicate that differences in production were higher with quantities between 199.85 kg milk (+4.60%) and 446.05 kg milk (+11.11%) by normal lactation for family farms.

Comparing the reproduction indexes it can withdraw the following aspects (tab. 2):

✓ **Age at first calving** was lower with 35.15 days (3.63%) in case of large farms, which means that the first calving was done a month earlier, difference which means a better

reproductive precocity in young females from these farms.

✓ **Calving interval** was a little bit higher than in family farms, with differences between -1.76 days and +11.16 days, statistically insignificant.

✓ **Resting breast** had values closed to the optimum ones in both types of farms, with slightly differences in favour of the large farms, but statistically insignificant.

✓ **The period of exploitation** was surprisingly higher with 187.36 days (8.30%) in large farms, knowing that in small and family farms cows are kept in exploitation a longer period, even if the milk production is greatly diminished.

In table 3 is presented the breeders influence on the main production and reproduction characteristics.

Table 3 Breeders influence on the main production and reproduction features from the studied BNR population

Specification	UM	Breeders influence					
		Improvement		Indifferent		Worsening	
		n	%	n	%	n	%
Milk quantity in normal lactation	kg	39	38.61	3	2.97	59	58.41
Fat content	%	28	27.72	5	4.95	68	67.32
Fat quantity	kg	42	41.58	0	0	59	58.41
Proteins content	%	41	46.06	3	3.37	45	50.56
Proteins quantity	kg	42	47.19	0	0	47	52.80
Age at first calving	days	39	38.61	0	0	62	61.38
Period of exploitation	days	29	36.25	0	0	51	63.75

From the analysis of the improvement value of the 101 bulls, used for reproduction in the studied farms, a first conclusion is the high number of bulls used for reproduction, from which five bulls had an improvement value of over 1000 kg milk, four of those being indigenous. It is a proof, of the superior genetic value of BNR bulls, which must be put in value by optimizing the technological factors for descendents (offspring) exploitation.

Summarizing the breeders influence on the main production and reproduction characteristics, we find that the majority had a negative influence, manifesting as worsening.

Based on the six analysed criteria, was established an overall classification, by giving points depending on the place

occupied for each criterion, the most valuable proving the indigenous bull Cod 18916 with 89 points (1st place), followed by (bull) Cod 50827 (2nd place) and bull Cod 13921 (3rd place).

CONCLUSIONS

Summarizing the results of the investigations in BNR cattle populations from Dobrogea area, it may be concluded that dairy cattle from this breed are well adapted to environmental conditions specific to the area, but productive performances are often modest and highly differentiated from one farm to another. Where the provided welfare condition were similar to optimum ones, the BNR breed responded by similar productive performance closed to the real genetic potential.

The analysis of the intra-population structure highlighted, within each farm, a number of genetic families of paternal half – sisters with average production performances of over 6000 kg milk and of some plus variants with 7000-8000 kg and over, traits correlated with a good body development and a proper reproductive precocity.

It is necessary to identify and reproductive isolation, of these genetic structures in order to multiply the valuable genotypes and the formation of productive breeding lines.

REFERENCES

- [1] Bănică T., – Unele probleme legate de existența fermelor de vaci de capacitate mică și mijlocie. Revista de Medicină Veterinară și Creșterea animalelor, nr.8, București, 1993.
- [2] Bucătaru N., Ujică V., Maciuc V., – Cercetări privind ereditabilitatea unor însușiri de producție la populațiile de taurine Bălțată cu negru moldovenească. Lucrări științifice USAMV Iași, vol. 41-42, p.48-52, 1998.
- [3] Dascălu C., - Studiul tehnico- managerial privind tehnologia de creștere a vacilor pentru lapte în exploatațile mijlocii și mici din zona Vrancei. Teză de doctorat, UȘAMV, Iași, 1990.
- [4] Florescu Elena, – Studiu privind posibilități de ameliorare genetică și consolidare a populației de taurine Bălțată cu negru din România. Teză de doctorat, UȘAMV Iași, 1999.
- [5] Georgescu Gh., și colab., – Cercetări de optimizare a limitei economico-biologice de folosire a vacilor de lapte. Lucrări științifice IANB, seria D, vol. XVII, p. 7, București, 1984.
- [6] Grosu H., și colab., - Modelele lineare utilizate în ameliorarea genetică a animalelor. Ed. Coral SANIVET, București, 1997.
- [7] Lupan V., Chilimar S., Ujică V., – Tehnologia creșterii bovinelor. F.E.P. Tipografia Centrală, Chișinău, 1997.
- [8] Mărginean Gh., - Studiul determinismului genetic al unor caractere la taurine în vederea unor mai corecte aprecieri a valorii de ameliorare. Teză de doctorat, UȘAMV, București, 1994.
- [9] Murat Jeana, Murat Isan - Monografia rasei Bălțată cu negru românească. Ed. Ceres, București, 1997.
- [10] Mureșan Gh., – Contribuții la studiul însușirilor morfoproductive a rasei Friză, Bălțată cu Negru. Teză de doctorat, I.A. Cluj – Napoca, 1984.
- [11] Neagu Gh., - Contribuții la studiul creșterii vacilor de lapte în unele exploatații mici și mijlocii din Dobrogea. Teză de doctorat, USAMV Iași, 2008.
- [12] Pipernea N., Ujică V., și colab., - Studiul parametrilor fenotipici și genetici la unele populații de taurine din Moldova. Lucrări științifice, UȘAMV, Iași, vol. 33-34, seria Zootehnie și Medicină Veterinară, p. 3-9, 1991.
- [13] Stroe Pacea Aurora - Evoluția structurii genetice la rasa Bălțată cu negru românească (BNR) în zona de sud a României. Efecte și perspective. Teză de doctorat, UȘAMV București, 2004.
- [14] Ujică V., Nistor I., Marc Mioara, Vârlan Zamfira - Descrierea lineară a caracterelor morfologice la rasa Bălțată cu negru românească și evaluarea genetică a reproducătorilor masculi. Lucrări științifice UȘAMV, vol.39-40, p.17-30, Iași, 1994.
- [15] Ujică V., Pipernea N., și colab. - Ponderea variabilității genetice a principalelor însușiri morfoproductive la o populație de taurine Bălțată cu negru românească, din zona de nord-estică a Moldovei. Lucrări științifice UȘAMV, vol.35-36, p.37-41, Iași, 1992.
- [16] Ujică V., Coordonator, Gemene Gh., - Creșterea și exploatarea vacilor de lapte în microfermele familiale din zona de Nord-Est a Moldovei. Studiu tehnico-managerial, eficiența economică și agroturism. Ed. Pan Europe, Iași, 2005.
- [17] Ujică V., Maciuc V., Nistor I., - Ghid practic de ameliorare genetică a bovinelor pentru producția de lapte. Ed. Alfa, Iași, 2003.
- [18] Ujică V., și colab., - Cercetări privind structura intrapopulațională a taurinelor Bălțată cu negru românească din jud. Iași și influența rasei Friză în procesul de ameliorare. Cercetări Agronomice în Moldova, Anul XXIV, volum omagial, Iași, p.74-84, 1991.
- [19] Ujică V., Nistor I., Maciuc V., Dascălu C., – Managementul creșterii vacilor de lapte. Ed. Alfa, Iași, 2007.
- [20] Ujică V., și colab., - Parametrii fenotipici și genetici pentru caracterele de selecție a vacilor mame de tauri din România. Lucr. șt., vol. 43-44, seria Zootehnie, UȘAMV Iași, 2002.
- [21] Ujică V., - The genetic evolution of exterior characters in Romanian cattle population Black and White (BNR). Interbull meeting, Uppsala, Sweden, 2000.
- [22] Vintilă I., - Bazele ameliorării genetice a populațiilor de animale domestice. Ed. Facla, Timișoara, 1998.