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AN OVERVIEW OF BUFFALO MILK PRODUCTION AND DISTRIBUTION AT TERRITORIAL LEVEL

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Abstract

The aim of this paper is to present the evolution of buffaloes' number and buffalo milk production, from the perspective of statistical indicators and the topicality at territorial level, also describing the ways of buffalo milk use and distribution. The calculations are based on the operational data provided by Ministry of Agriculture and Rural Development and official statistic data, using statistical indicators such as average, minimum, maximum, annual growth rate, standard deviation, coefficient of variation. Research shows that during 2010-2020, number of buffaloes decreased to 19,596 heads, by 30.3%, with an average annual rate of -3.55%. The majority of buffaloes grow in central and north western Romania, and the largest numbers are in Cluj County (3,470 heads). On October 31, 2020, 199,539 hl of buffalo milk were produced, Maramureș County being on the first place, with 50,976 hl milk. Of total milk production, 58.3% is destined for market, 28% for family consumption and 13.7% for technological consumption on farms. Of the market milk, 64.7% is sold directly on the market and only 35.3% is delivered to milk processing units.

Key words**:** *buffaloes, milk, production, market*

INTRODUCTION

The raising of buffaloes in Romania is a traditional activity, with a mixed production direction, of milk-meat, but these animals are also used as a traction force for some agricultural and transport activities. In recent years, in the context of the lack of support policies in the field of buffalo breeding, the decrease in their importance in milk production, with a low demand on high fat milk, the reduction of animal use for work, coupled with a number of technological factors, there has been a sharp decline in herds of this species in Romania [13].

Currently, the largest share of buffalo herds is found in small farms, where animals of non-specialized breeds are raised, being characterized by a low genetic quality. The current situation of buffalo breeders in Romania is precarious, and the number of Romanian buffalo breeds is declining, raising buffalo for milk being considered an economically inefficient activity, one of the causes of inefficiency being the low productivity per buffalo (approximately 1,700 litres of milk/head) [10].

MATERIALS AND METHODS

The calculations in this paper are based on the operative data from Ministry of Agriculture and Rural Development and also from National Institute of Statistics – tempo online [6, 13].

In order to have an overview of buffalo milk production and distribution at local level, a series of indicators were used, like: number of buffalo stocks at national (during 2010-2020) and county level (October, 2020), number of heifers at county level, number of young buffalos at county level, buffalo milk production and different forms of use at county level.

Also, a series of statistical indicators have been calculated, as follows: average, minimum, maximum, annual growth rate, standard deviation, coefficient of variability.

RESULTS AND DISCUSSIONS

During 2010-2020, the buffalo livestock decreased by 30.3%, from 28,127 heads to 19,596 heads. The minimum was reached in

2018 (18,266 heads), and the average of the period was 20,662.5 heads.
The average annual rate was negative (-3.55%) and the coefficient of variability of 12.84% indicates that the string analysed is homogeneous.
Calculating the equation of the evolution trend of the herd, it can be seen that the value of the coefficient x is negative, which indicates that, on average, annually, the number of buffalo herds decreases by 612.6 heads (Figure 1).

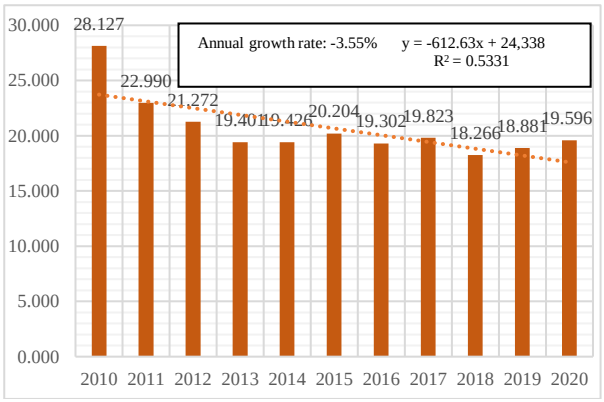


Fig. 1. Evolution of buffaloes' number
Source: Own calculation following MARD data.

According to official statistic data, the number of buffalo cows during 2010-2020 decreased by 34.9%, from 21,422 heads to 13,941 heads. The average of the period was 15,625.3 heads. The average annual rate was negative (-4.20%) and the coefficient of variability of 13.23% indicates that the series under analysis is homogeneous.

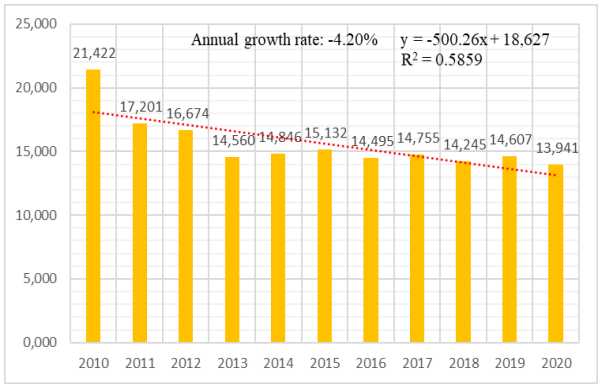


Fig. 2. Evolution of buffalo cows' number
Source: Own calculation following MARD data.

The equation of the evolution trend shows that the value of the coefficient x is also negative, indicating that, annually, the number of buffalo cows' herds decreases by 500.2 heads (Figure 2).
At local level, on October 31-st, 2020, most of the herds are in the centre and north-west of Romania and a few farms in the south of the country. The largest number of buffaloes are in Cluj county (3,470 heads), followed by the counties of Maramureș (3,358 heads), Sălaj (2,488 heads) and Brașov (2,283 heads) (Figure 3).

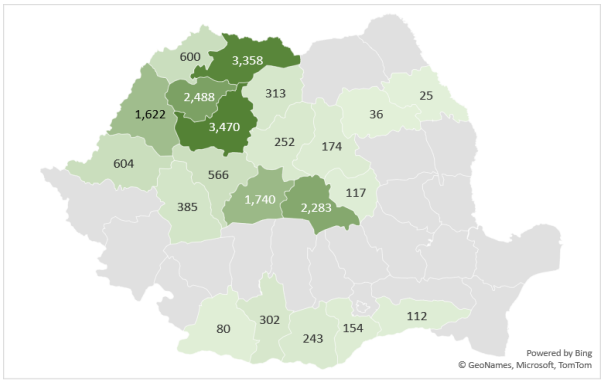
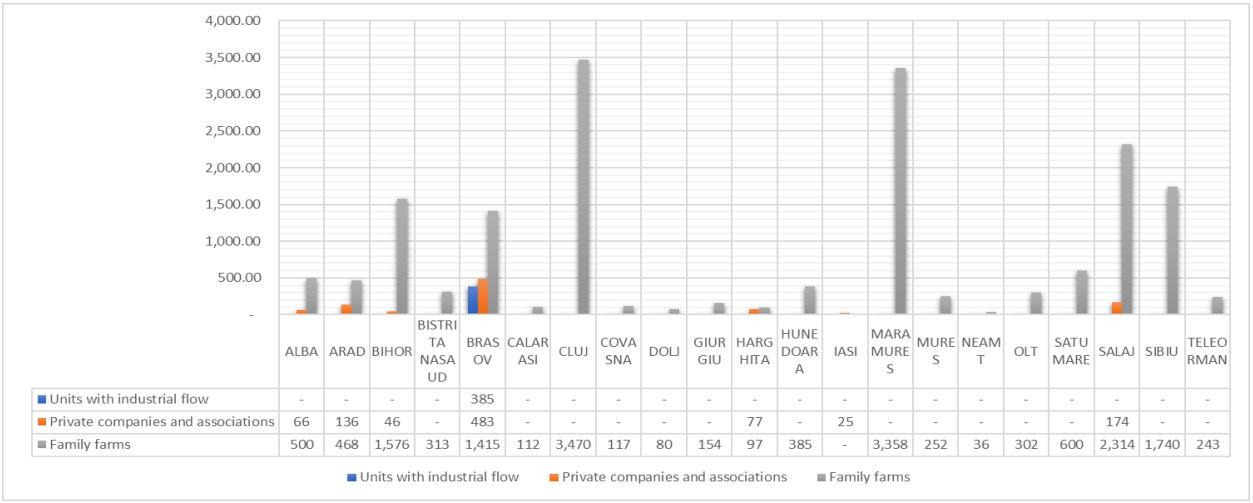


Fig. 3. Distribution of buffaloes at county level
Source: MARD.

These buffaloes are raised in units with industrial flow, private companies, associations and family farms (Figure 4).
We notice that only 2% of the total number of buffaloes are raised in units with industrial flow, namely in Brașov county, and in some counties in the centre, west and northwest of the country, there are several associations, with 5.3% of buffaloes.
Otherwise, most of the herds are raised on family farms (92.6%).
Regarding the distribution of the number of buffaloes at territorial level, at the end of October 2020, the largest numbers were in the counties of Cluj (2,480 heads), Maramureș (2,320 heads) and Sălaj (2,130 heads) (Figure 5). Among them, 1.2% are raised in units with industrial flow, 4.4% in associations and 94.4% in family farms.
The highest share of buffalo heifers at territorial level is also found in the centre and northwest of the country, most being in the counties of Sălaj (257 heads), Sibiu (190 heads) and Maramureș (140 heads) (Figure 6).



	ALBA	ARAD	BIHOR	BISTRITA NASAUD	BRASOV	CALARASI	CLUJ	COVASNA	DOLJ	GIURGIU	HARGHITA	HUNEDOARA	IASI	MARAMURES	MURES	NEAMT	OLT	SATU MARE	SALAJ	SIBIU	TELEORMAN
Units with industrial flow	-	-	-	-	385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Private companies and associations	66	136	46	-	483	-	-	-	-	-	77	-	25	-	-	-	-	-	174	-	-
Family farms	500	468	1,576	313	1,415	112	3,470	117	80	154	97	385	-	3,358	252	36	302	600	2,314	1,740	243

Fig. 4. Distribution of buffalo herds at county level
Source: MARD.

Of total number, 1.2% are raised in units with industrial flow, 8.9% in associations and 89.8% in family farms.

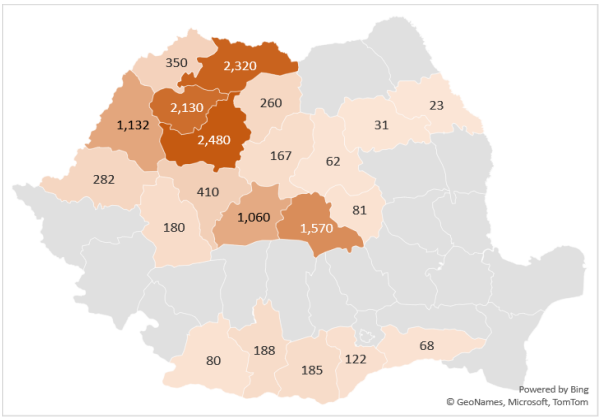


Fig. 5. Distribution of buffalo cows at county level
Source: MARD.

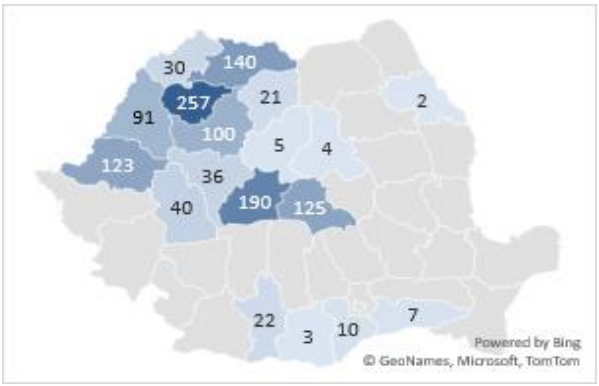


Fig. 6. Distribution of buffalo heifers at county level
Source: MARD.

The buffalo youth is present in only 16 counties of the country, being in number of 6,460 heads, the majority in family farms (91.6%) (Figure 7).

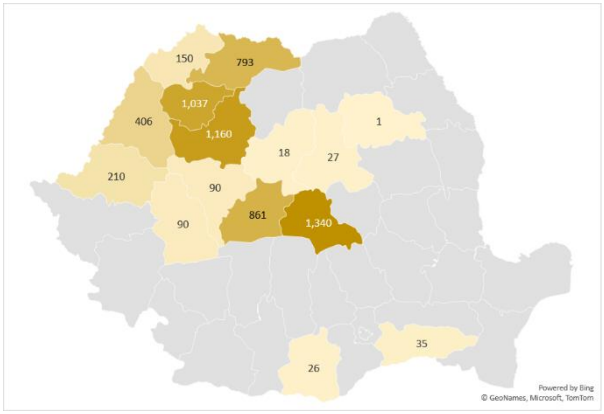


Fig. 7. Distribution of buffalo youth at county level
Source: MARD.

The total production of buffalo milk at the end of October 2020 was 1,995.39 hl, coming from 20 counties, among which on the first place is Maramureș county, with 509.76 hl, followed by Sălaj with 344.41 hl, Brașov with 293.53 hl and Cluj with 242.5 hl (Figure 8).

Of the total production of buffalo milk, 58% is intended for delivery on the market, 28% for family consumption, and the remaining 14% is technological consumption on the farm (Figure 9).

Of the buffalo milk production delivered to the market, 65% is sold directly on the market and only 35% is delivered to dairies (Figure 10).

In the Figure 11, the quantities of buffalo milk are presented, by counties, delivered to the dairy factories.

It is observed that the largest amount of milk delivered (49.2%) is in Sălaj County.

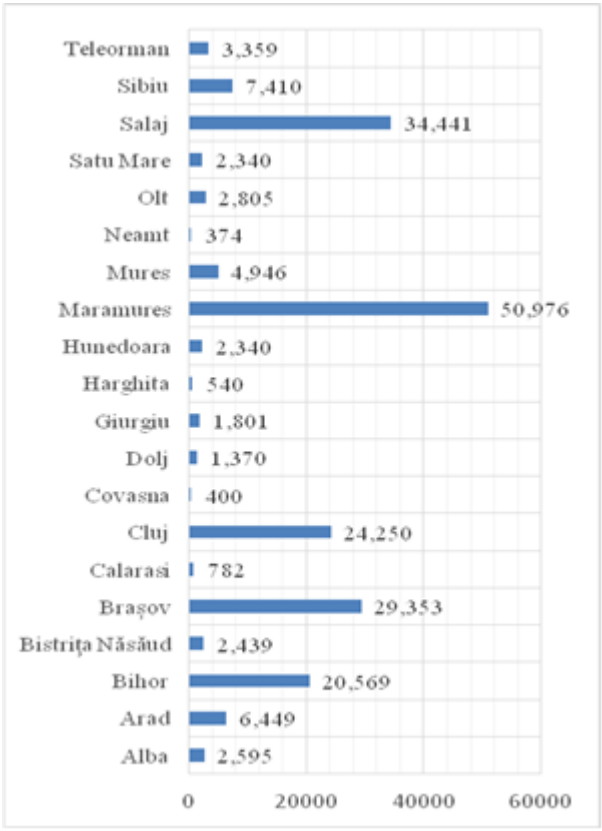


Fig. 8. Distribution of buffalo cow's milk at territorial level (hectolitres)
Source: MARD.

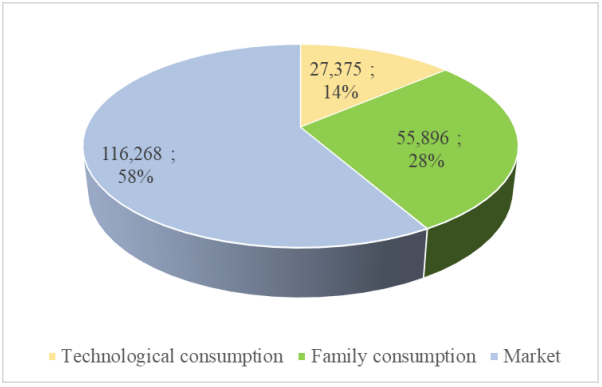


Fig. 9. Destination of buffalo cow's milk (hectolitres)
Source: MARD.

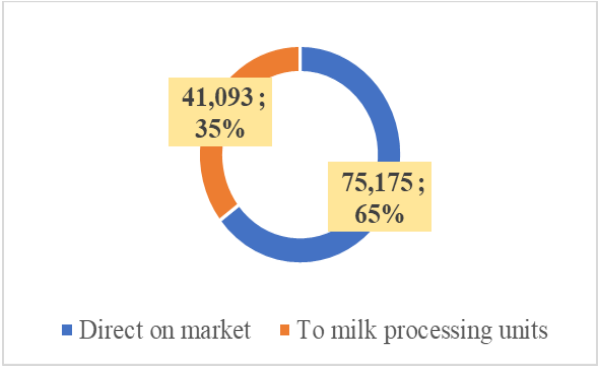


Fig. 10. Distribution on market of buffalo cow's milk (hectolitres)
Source: MARD.

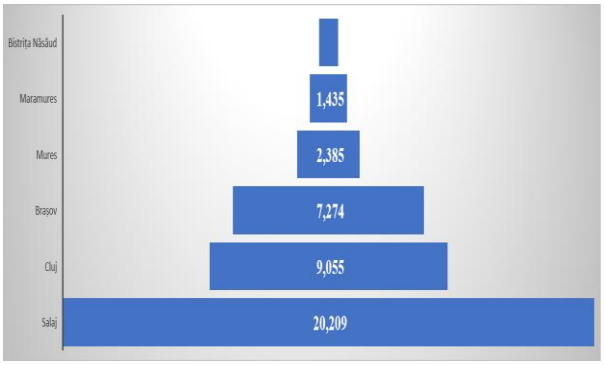


Fig. 11. Buffalo cow's milk delivered to dairies, by counties (hectolitres)
Source: MARD.

The buffalo business is one of the most attractive in animal husbandry.
The breeding of buffaloes is handled by a small number of farmers, most of them positioned in the Transylvania area. Breeders say that is easier to raise dairy cows, than to struggle with buffaloes [12].
Buffalo milk is higher in terms of nutrient content compared to cow's milk [11].
A characteristic of medium-sized farms is that 85% of the milk destined for the market is processed on the farm, which means that it is transformed into buffalo cheese [7].
Although the global trend in buffalo breeding is upward, focused on the development and sustainability of the activity, in Romania, it is declining.
In the past, Romania has been a recognized country in buffalo breeding, with specific natural exploitation conditions. The largest buffalo herd in Romania was met in 1980 (228 thousand heads) [1].
The main causes of the reduction of buffalo herds in Romania, after 1990, are the massive slaughter of animals, the retention of a small number of female youths for technical selection and reproduction works, the abusive trade in animals, the advanced age of buffalo breeders in rural areas, difficult access to credits in order to obtain financing for the establishment of livestock farms [8].
Buffalos are resilient to environmental conditions and they require natural raising environment [5].
In improving buffalo milk production, due to the species' lateness and longer gestation period than in cows, the generation interval is longer and the annual genetic progress is

slower, so it is necessary to integrate the species into longer-term breeding programs.
In Romania, due to the small number of buffaloes compared to cattle, the statistics on cattle also include buffaloes, but they bring an important economic contribution in conditions where other species of cattle are unadaptable or achieve much lower production levels [13].
In terms of competitiveness, cattle meet many qualities superior to buffaloes, but the advantages must be interpreted in terms of technical and economic efficiency, compared to the biological characteristics of adaptability to various conditions of growth and exploitation, in some areas buffaloes being more efficient [3].
Environmental factors, such as geographical area and climatic factors, can influence milk production. They are of particular importance in terms of buffalo farm management.
The use of good practices, combined with a superior animal genetic background, can lead to higher milk production [4].

CONCLUSIONS

In Romania, in Transylvania area, there is a tradition regarding the breeding of buffaloes, and the perspectives of this species are high, but too little exploited.
The current situation of buffalo farms is still quite precarious, with buffalo breeders generally being elderly people who have neither the physical nor the financial resources to continue to raise this species of animal. In addition, there are extremely few buffalo milk processing plants [2].
In this context, the number of buffaloes in Romania is constantly decreasing, being urgently necessary to take measures to support and conserve the species, as well as to improve buffalo milk production.

ACKNOWLEDGEMENTS

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