The Importance for Conservation of the Romanian Buffalo Breed

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Abstract

Approved as a breed in 1987, the Romanian buffalo is far for being an unitary or single population. The Romanian buffalo populations are scattered in territory and tends to gain new economic importance. The differences between the type bred in the Danube area and the type bred in Transylvania are difficult to be established and clear criteria for separation of the different types are not defined. The Romanian buffalo breed, reproductively isolated as a pure breed, is characterised by a clear uniformity in terms of morpho-productive traits resulted from the genetic consolidation actions applied to clearly define the breed. In order to preserve the important genetic resource, the productive potential and the valuable aptitudes of the breed, it is recommended to continue breeding Romanian buffalo in the actual geographic areas of distribution in order to preserve and develop the existing buffalo population as a valuable genetic heritage and biological resource.

Keywords: buffalo, conservation, genetic diversity, genetic heritage.

1. Introduction

The Romanian buffalo originates from the wild Indian buffalo (*Bubalus arni*) and the common domestic buffalo (*Bubalus microceros*). Genetically and ecologically, it belongs to the river type (Mediterranean river buffalo). There are two hypotheses regarding the period of the buffalo's arrival in our country: the first claims that they arrived in the 5th century and the second that they arrived in the 11th-12th century. Regarding the routes of entry, it is accepted that there were two directions: the first through the south of the country (Turkey, Greece, Bulgaria), brought by the Turks and the second through the west (Hungary), brought by the Huns.

Homologated as a Romanian breed in 1987, the breed developed in wetter and poorer regions with less abundant vegetation, where harder work was required, and was initially spread in three large centres: Transylvania, the Danube Plain and Dobrogea. Today 97% of the herd is found in the counties: Sălaj, Cluj, Brașov, Bihor, Maramureș, Sibiu and Bistrița-Năsăud counties, the rest being spread in Teleorman, Olt, Ilfov, Vâlcea, Gorj, Tulcea and less in Vrancea, Bacău and Suceava counties.

Within the breed there are two original types, ecological and morphological:

1. Transylvanian buffalo: taller, with a waist of 132 cm, relatively short trunk length of 139 cm, short body size 107%, shallower thorax with a depth index of 54%, medium-sized udder, longer

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and thicker limbs of 21 cm, with an appearance closer to that of the draught animal.
2. Danube plains buffalo: less tall, 129 cm waist, 110% rectangular body shape, deeper thorax with 55% depth index, more developed udder, thinner limbs, drier appearance.
The main direction of exploitation is for mixed production (milk-meat), working capacity representing an additional production, satisfying more the household needs of farmers. Reproductive isolated, is characterized by a pronounced uniformity of morpho-productive traits, because of a high degree of genetic consolidation [1].
Only 41 Country Reports indicates that buffaloes are kept. Of these countries, 29 percent mention buffalo breeding as a priority and 22 percent have breeding programs. In Asia, the main buffalo rearing region, the figures are 44 percent and 38 percent, respectively. The main countries with breeding programs for buffaloes are India, Pakistan, China, Egypt and Bulgaria, with milk yield being the main breeding objective [2].
In Europe, the main country that exploits buffalo is Italy, the main production being mozzarella type soft cheese. In 2004, Romania ranked second in Europe in terms of buffalo breeding, with 100,000 heads [3].
Currently in our country buffalo herd is continuously decreasing. In this context, conservation of genetic resources represents an extremely important action. Loss of genetic diversity is the main cause of the disappearance of populations or their entrance in the area of vulnerable or endangered risk status.
Romanian buffalo was an important resource for meat and milk, plus several traditions associated with this species, characteristic for growth areas [4].
Romanian buffaloes manifest good milk, meat and traction qualities. Thus, under normal farming conditions, 1000-1200 kg of milk/lactation are achieved. Milk is rich in fat (7-8%) and protein (4.1-4.4%). It also performs well in meat production (daily growth rate 400-600 g, carcass weight 300 kg, slaughter yield 50-51%) and has very good traction aptitudes, especially Transylvanian buffaloes. Under good breeding, exploitation and management conditions, Romanian buffaloes achieve high performance. Thus, in milk production 1300-2000 kg/lactation, fat 100-140 kg and protein 60-75 kg) as well as meat production (600-800 g/day) [5].
Regarding the bubaline species, although it has remarkable biological characteristics (hardiness, adaptability, disease resistance, etc.), it often does not have favourable farming conditions, which means that its welfare suffers.[5]
Buffaloes, although of minor importance in relation to the structure of livestock (all domestic animals) and livestock production, they have a particular ecological importance.
The ecological importance of buffaloes is based on the following:
The peculiarities of the digestive system (wide mouth, strong dentition with thick and resistant enamel, compartmentalized and voluminous stomach - 250-300 l - with rich microflora, etc.).
High capacity for ingestion and digestion of voluminous feed, especially cellulosic-coarse feed.
High amount of solid and liquid waste 30-50 kg of solid waste and 15-25 L of urine per adult which contributes to improving soil fertility and physical and chemical structure, as well as enhancing the activity of soil microorganisms, improving soil aeration and water holding capacity; application of organic fertilizers is an intervention of the anthropogenic factor in an ecosystem.
Provides organic milk and meat rich in nutrients, especially milk, but poor in germs, somatic cells, etc.
It provides unconventional energy through solid waste used to produce biogas, as well as through the buffalo draught power used in agriculture and transport [6].

2. Materials and methods

The sources of information for the present paper are represented by the data collected from the Transylvanian Buffalo Breeders Association, the accredited association holding the Herd Book of the Romanian Buffalo, the Research and development station for the breeding of buffaloes

in Șercaia, the Genetic Heritage Catalogue held by ANZ (National Agency for Animal Husbandry), the Country Report carried out together with specialists from the National Commission for the Management of Genetic Resources and the Directorate for the Protection of Animal Genetic Resources and the national breeding program for buffaloes. According to data provided by the ANZ the Romanian buffalo breed has been in the conservation program since 2007.

Production performance testing is carried out by ANZ accredited control organizations and collaborators of the breeding society in accordance with the legislation in place. By providing the necessary technical and organizational framework for the implementation of the bubaline breeding program, it is estimated that an average annual genetic progress of more than 4.1% will be achieved in milk production and more than 5.3% in meat production, which is the best way to achieve the proposed objectives.

The following tables illustrate the dynamics of the buffalo herd in Romania, by breeding area and the number of holdings registered in the herd book and the number of keepers and their herds.

3. Results and discussion

Directions and objectives for improvement and conservation.

Starting from the current situation of bubaline breeding, from their main morpho-productive characteristics and from the market economy situation required by internal and external demand, the main directions and objectives for the improvement of the Romanian Bubaline Breed are the following:

Breed improvement - modification of the genetic potential of the populations for milk production traits through the selection of breeders with breeding value based on their own characteristics and appropriate matching of mattings, in correlation with the controlled breeding of the young and ensuring optimal living conditions.

Breed conservation - maintaining genetic diversity to ensure the conservation of animal genetic resources, preserving, maintaining, breeding and preventing their extinction, increasing the number of animals, avoiding crossbreeding and inbreeding, generating pure-bred products and, extending them to as many breeders as possible:

-modification of the morpho-productive type, increased production, precocity, resistance to natural factors, diseases, etc.

-definition of conservation directions and objectives.

-criteria for the purity of animal genetic resources

-actions and technical measures to increase herds and their production.

Table 1. Dynamics of buffalo herds in Romania by breeding areas

Year	Specification	Country area							
		NW	SE	SM	SWO	W	NW	Centre	TOTAL
2015	Total	15	14	821	60	1071	11392	5011	18384
	female buffaloes	1	14	756	42	913	9420	3467	14613
2016	Total	2	0	996	0	1343	12097	5842	20280
	female buffaloes	0	0	894	0	976	9656	4402	15928
2017	Total	0	0	976	0	1161	11520	5162	18819
	female buffaloes	0	0	855	0	907	9173	4092	15027
2018	Total	30	0	879	0	1146	11326	5694	19075
	female buffaloes	21	0	741	0	862	8674	4474	14772
2019	Total	0	12	35	0	1147	11775	6052	19021
	female buffaloes	0	8	0	0	938	8527	4536	14009
2020	Total	0	85	392	0	1053	12136	6256	19922
	female buffaloes	0	0	392	0	978	9200	4708	15278

NW = North-West; SE = South-East; SM = South Muntenia; SWO = South-West Oltenia; W = West; NW = North-West.

Table 2. Situation of bubalines registered in the Herd Book - Romanian Buffalo breed on 26.01.2023

No.	County	Number of holdings	Number of animals
1	BRAȘOV	347	2923
2	SIBIU	245	2465
3	ALBA	9	101
4	HUNEDOARA	39	147
5	ARAD	52	575
6	BIHOR	136	698
7	BISTRIȚA-NĂSĂUD	79	286
8	SATU MARE	45	339
9	SĂLAJ	389	1601
10	MARAMUREȘ	300	843
11	CLUJ	336	2199
12	COVASNA	6	49
13	HARGHITA	18	209
14	MUREȘ	7	53
15	OLT	26	107
16	DOLJ	5	40
17	GIURGIU	12	128
18	IAȘI	1	9
19	ARGEȘ	1	31
20	BACĂU	2	23
21	CĂLĂRAȘI	1	27
22	CONSTANȚA	1	2
23	PRAHOVA	1	6
24	TELEORMAN	39	219
25	TIMIȘ	2	8
26	TULCEA	1	59
27	VASLUI	1	70
28	VRANCEA	1	47
TOTAL		**2102**	**13264**

Strengthening and improving the morpho-productive type of milk, which proves to be the most appropriate to the objectives pursued. By targeting selection, we are aiming at the type of buffalo with medium to high body development, with a large and harmonious udder, with favourable mechanical milking aptitudes suitable for intensive breeding and exploitation, with high genetic potential for production with increased precocity and fertility, while maintaining the current organic resistance.

In parallel with these aptitudes, for meat production the 'desired type' must be characterized by good development and high commercial quality of the carcasses.

The achievement of a type with high body development at adult age, marked in buffaloes by a waist of at least 135 cm and a body mass of

over 600 kg, with good development of the length, depth, profundity, and width of the trunk, particularly the posterior train. It is also intended to increase the depth of the chest to more than 55 % of the waist and the length of the trunk to more than 108 % of the waist.

Raising the genetic potential for milk production to more than 1400 kg with 112 kg pure fat and 62 kg protein in first lactation, minimum 1800 l milk with 144 kg pure fat and 79 kg protein in full lactation, and population averages of at least 1600 kg milk with 128 kg pure fat and 70 kg protein in normal lactation. In this context, it is also necessary to increase the average lactation length to at least 280 days. At the same time, the aim is to improve early calving performance by reducing the age of first calving to 34-36 months, achieving maximum production in the 5th lactation, and achieving more than 71% in the first lactation.

Improved udder shape and size, with pronounced abdominal and backward extension, with even and medium developed teats, with favourable mechanical milking aptitudes. Milk yield rate should be at least 1.1 L/minute for the total population and a minimum of 1.3 L/minute for herd mother buffaloes.

Considering the yet low birth rate, it must increase in a first stage to over 90% and the minimum number of valuable products to at least 87%.

Table 3. The objectives of the 2014-2020 conservation programme

Specification		Reference year						
		2014	2015	2016	2017	2018	2019	2020
Pure-bred breeding female buffalo registered in the herdbook, main section	heads	80	90	100	150	200	250	300
Animals included in the herd-book, secondary section	heads	400	450	500	550	600	650	700
Number of buffalo breeders with animals in the main section	No.	2	4	6	8	10	12	14

Table 4. Technical parameters of the breeding and conservation programme for the Romanian Buffalo breed for the period 2021-2035

Specification			Value
a. Weight of economic characters			
- Milk		%	50
- Meat		%	20
- Reproduction -Fitness		%	30
b. Average production per normal lactation			
- Milk		Kg	1500
- Fat		%	7,70
		kg	115
- Protein		%	4,5
		kg	65
c. Early milk production - age at first lactation		months	42
d. Buffaloes in official control of milk production (COP)		heads	20000
e. Average birth rate		%	90
f. average survival during the birth period - first birth		%	85
g. average exploitation period at reproduction	females	years	12
	males	years	8

Improving meat production traits, increasing fattening capacity and reducing the proportion of bones in the carcass. To this end, the genetic potential for increasing the average daily body mass gain to over 900 g, a minimum slaughter yield of 54% and a meat:bone ratio of 4.2:1 is intended, in order to obtain medium to large carcasses (250-300 kg) with a higher commercial value. Body weight for sale 450-550 kg at ages under 20 months.

Reduction of specific consumption towards milk production to less than 1.3 FU/kg and less than 5.6 FU/kg live weight gain in meat production.

The objective of the 2014-2020 conservation program is summarized in the table below and aimed, over a period of 7 years (2014-2020), to move the breed out of the "critical" risk category and into the "vulnerable or uncertain" category by entering the animals in the herd book, particularly in the main section [7].

4. Conclusions

Buffalos are important first of all because they represent a step on the biological ladder of bovine evolution. They represent about 10% of the world's cattle population. In large breeding countries, buffaloes make an important economic contribution, while other cattle species are unsuitable or achieve lower levels of productivity. They have an important genetic strength in adapting to the harshest of growing and farming conditions, especially for the swamp and lake areas of the world. They are also animals with a longer productive life than cattle, living around 30 years. Productions from buffaloes with minimal maintenance costs can be a solution for certain areas of the world. Buffalo milk is an important source of protein, successfully used in the preparation of cheeses of higher quality than those made from the milk of other species. Last but not least, the meat of young fattened animals is a real delicacy, with a high content of unsaturated fatty acids and iron.

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