GLOBALIZATION IN BUFFALO MILK PRODUCTION

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Abstract: *Buffalo species have been kept and used on the warmer parts of Asia, Africa and Europe for thousands of years. The species (Bubalus bubalis) is not new in Eastern Europe, but the Carpathian type buffalo and those from the Balkan countries have three main purposes: use in yoke (draught power), meat production, and some milk production. In the last decades the increasing demand for Italian type buffalo milk products generated the spread of buffalo farm all over the Western part of the world. In the mean time there is present the global trade and transportation of milk, milk products and breeding animals. The complete supply chain of buffalo milk production was built up also in Hungary.*

Key words*: buffaloes, milk production, production level, buffalo farming*

INTRODUCTION

The domesticated buffalo is useful for man in several ways: it can provide meat, leather, milk, ghee, horn, organic manure and draught power even today [17]. Many breeds and variety of the buffalo species (*Bos bubalus domesticus* or *Bubalus bubalis* Linnaeus, 1758) are wellknown worldwide [12]. It has greater importance in people's life than other domestic animals have. On the one hand the buffalo milk production serves the protein supply of human population first of all in Asia. On the other hand the demand for Italian type milk products (mozzarella, ricotta, ice cream, etc.) is step-by-step increasing in the prosperous part of the world [7].

The aim of this work was to prepare a short overview on the worldwide situation of buffalo milk production with a special outlook on the developing Hungarian buffalo sector.

MATERIALS AND METHODS

The work was based on the scientific literature of buffalo milk production, a discussion with Professor Antonio Borghese (International Buffalo Federation), interview with Zoltan Takacs (the general manager of Italiagro Ltd.) and visits on the first Hungarian dairy buffalo farm.

RESEARCH RESULTS

Buffalo production worldwide

In the '90s, a sudden downtrend in swamp buffalo population was observed in the wold, especially as a consequence of the dynamic farm mechanization and development of irrigation systems in rice production replacing the swamp buffaloes' draft power. In the countries of Southeast Asia, like Thailand, Vietnam, Cambodia, etc. the same negative process took place, linked to an altered development in farm mechanization. On the other hand the river-type buffalo preserved its significantly higher milk production as a base of the economical-size dairy farms around the city areas. This buffalo farming is very similar

to the systems for dairy cows, where animals are fed with forages and other feedstuff produced on farms [11].

The buffalo farming and buffalo milk production is continuously increasing worldwide [15] and not only in the developing countries (Table 1), but also in the Western-European countries.

Asian buffaloes have a high proportin in the world buffalo population, representing 96.36% of 172.2 million among the buffaloes of the wold (in 2004). During the period from 2001 to 2004, the registered buffalo population in Asia had a moderate annual growth rate of 1.34% [10]. The highest amount of milk production is originated mainly from India and Pakistan (95.96% of the total).

Table 1

The number of buffaloes and their milk production in some European and Near East countries [4]

Countries	Total Number	Adult Female	Lactation Milk Yield (kg)	Days Lactation	Milk Recorded Buffaloes	Recorded %
Italy	370,000	180,000	2,221	270	46,799	26.0
Egypt	3,950,000	1,650,000	1,850	180	unknown	
Iran	470,000	211,500	1,675	240	12,000	5.7
Turkey	86,297	29,000	962	224	190	0.66
Azerbaijan	290,000	150,000	1,000	266	100	0.06
Romania	43,000	34,000	1,800	274	669	19.6
Iraq	120,000	75,000	1,600	258	0	0
Bulgaria	9,200	5,880	1,870	278	5,880	100
Syria	4,500	1,800	1,191	254	unknown	
Greece	2,503	1,818	1,020	240	0	0
Germany	2,111	1,000			0	0
United Kingdom	2,500	1,200	1,500	300	0	0
Macedonia	70				0	0
Albania	100	70	400	180	0	0

Buffalo has an important role also in the agricultur of Nepal. It is the main animal protein source with a great contribution and share in Nepal's GDP (52.9%). The purpose of buffalo keeping there is not only milk and meat, but they are also used for draught power and for their manure. Buffaloes have cultural, social and religious importance in the certain ethnic community, too [18].

The buffalo breeding in China has a more than 7000 years old tradition. Chinese buffalo belongs to the swamp type variety and the population is mainly distributed in Southern Chinese provinces. The size of the total in 2005 was 22,745,300, and it took the third place in the world. Chinese buffalo has a very low milk yield of 500-700 kg/lactationbecause it is mainly used as draft animal. Therefore, The Chinese population needs an improvement, transform them into dairy buffalo through crossbreeding with the most famous dairy type buffalo breeds as Murrah and Nili-Ravi (Table 2) [31].

Several researcher observed that the milk of the buffalo species contained 6.5% fat and 9.81% SNF, with 37% more energy (kcal) content and with 33% higher solid corrected milk (SCM) than the milk of dairy cattle. The quantity of butter or ghee yield was about three times higher in buffalo milk than cow milk. Buffalo milk seemed more suitable for soft cheese production and the utilization of milk per kg of soft cheese was determined as 5:1 verses 8:1 from bovine milk [22].

Table 2

Buffalo types and milk parameters in some coutries

Country	Type of animal	Production/ lactation (liter)	Lact. lenght (days)	Protein (%)	Fat (%)	Source
Brazil	-	1188.5	-	3.58	6.89	[27]
Bulgaria	Bulgarian Murrah	1800	-	-	-	[5]
China	swamp	800-1000	-	5	7.5	[31]
China	swamp x Murrah x Nili-Ravi	2295	-	4.5	7.9	[26; 31]
Cuba	river	-	-	4.76	8.20	[21]
Greece	Mediterran.	700-1000	210-280	-	-	[4]
Italy	Mediterran. Italian	2180	270	4.59	8.47	[3]
Italy	Mediterran. Italian	2221 (4000!)	270	4.66	8.24	[8]
Kosovo	Mediterran.	950	240	4.9	8.9	[16]
Pakistan	river	2257	-	3.5	6	[13]
Romania	river	1679.9 1675.8 1442.5	278 287 251	- - -	6.83 6.52 6.23	[9]
Romania	Mediterran.	1700	-	4.1	7.4	[19]
Serbia	Mediterran.	700-1300	-	-	7-8	[23]
UK	Mediterran.	1500	300	-	-	[4]
Venezuela	Murrah	1473	247	-	6.7-9.6	[25]

Source: authors

The main areas of distribution are in northwest Turkey in the Marmara and Black Sea Regions. Buffalo are kept in small herds by livestock and mixed crop–livestock farmers. Milk is the main product, meat is largely a by-product of the dairy function and provision of the once-important draught power is now a minor output. Buffalo milk is used to prepare a variety of speciality products but output of both milk and meat is very low in comparison to cattle. Conditions of welfare and health status are not optimal. Internal parasites are a constraint on productivity. Some buffalo are being used for conservation grazing in the Black Sea area [32].

Water buffalo was introduced into Venezuela 85 years ago, but real growth and development started in the 70's. Milk production and milk processing have become the principal operation of buffalo breeders [25]. There are over 669 buffalo farmers in the country. Their objective is to focus on the buffalo as a domesticated species of animal which can complement the traditional forms of animal production in order to address the chronic deficiency that exists in the country in terms of milk and meat, particularly in light of the difficulty in recent years to make up the short fall in the international marketplace. The priorities are: Production registers in order to identify superior genetic material for dissemination throughout the national herd. Stimulate the proper functioning of education and extension services in buffalo management. The main cause of confinement, in spite of the big increasement in buffalo production is the limited size of the national herd and therefore its inability to supply the demand of new and prospective producers with breeding animals. Buffalo milk production is still not mature in this country, although there are several projects underway in Uruguay, Bolivia and Argentina.

In Greece buffalo herds are pure and they are permanently herded. They are raised for milk and meat purposes. Milk is used for the production of cream, butter, cheese and yoghurt. Meat and its products (minced meat, burgers, sausages and kavourmas) reach end users at butcher shops, local or not [30].

Buffalo population in Kosovo belongs mainly to Mediterranean type, which is spread in many countries of the Balkan Peninsula. In the past this specie played significant role in the Kosovo rural families, mainly used for its products (milk and meat) and work.

In the last ten years, the number of buffaloes has dropped rapidly for about 20 times less. Now, it is considered that the stock size is about 400 heads, in total. Buffaloes in Kosovo are characterized by the period of about 240 days of lactation, produce approximately 950 kg milk. Females enter in the first lactation after 30 months of age. Under rather extensive environment compared to some countries in Europe, milk production was lower in Kosovo for approximately 66.8% [16].

In Romania there exist three distinct buffalo varieties: Carpathian, Danubian type and the one improved by crossing with the Murrah breed. The bigest Romanian buffalo population belongs to the Carpathian type, which intendid as a valuable genetic resource with good adaptation to the cold climate. The largest herds of buffalos are found in the counties of Salaj, Cluj, Maramures, Bihor, Brasov, Satu Mare. In the counties of Sibiu, Brasov, Cluj for the main exploitation is production of milk and Salaj and Bihor counties for meat and milk [19]. Milk yield, milk quality components and mozzarella yield in Romanian buffalo population have enough genetic variation for selection. In the future, the selection of females for milk yield could cause the detriment of quality [24]. Genetic improvement of the quantity of mozzarella will be made only on account of milk constituents that impart its quality. According to heritability values, in the process of female genetic evaluation appears advisable to use additional information sources in order to increase the accuracy of selection. Although a large number of valuable buffaloes from Salaj County have been sold in countries like Great Britain, Italy and Germany, the livestock still have good milking productions [9].

Buffalo production in Hungary

In Hungary, the buffalo (domestic buffalo, water buffalo) has been around for centuries, currently classified among the indigenous species. The ‘buffalo’ as a common name refers to domestic water buffalo, which has two different types: the river-type with a delicate constitution that is mainly used for milk production and the swamp-type with a rougher structure that is particularly used for meat production and draught power [1]. Today the majority of the buffalo stock can be attached to national parks and nature reserves [2]. According to current data there are 6220 animals in the buffalo stock, 73% of which is female.

The domestic buffalo breeding and keeping can have a number of advantages: grassland utilization, the maintenance of eutrophic wetlands, landscape features, tourist attraction, gene preservation role, if the conditions are suitable then their meat can be sold as organic product [20]. Buffalo milk production is not typical in Hungary, the animals are seldom milked, although buffalo milk and the dairy products made of it could also be marketed as organic products.

An Italian-Hungarian joint venture established a new animal production sector in Hungary, based on Italian Mediterranean milking buffaloes which were imported from Italy. The Italiagro Ltd. established a dairy farm in Mezőtúr. The manager is open to new academic research projects in nutrition, reproduction, milk production, and the adaptation of the type to domestic climate and housing environment. The latter topic might be relevant because the literature shows that the buffalo is less tolerant of extreme hot and cold environments than the cattle [28]. The processing of the milk is take place on the Pilot Farm of the Bethlen Gábor Agricultural and Food Industry Vocational School in Gyomaendrőd, in a milk processing and cheese making factory designed and built for the proper technology. The products expected to reach the Italian quality are supposed to meet especially Hungarian demand [6; 29]. There are several project sources that the buffalo breeders can apply for the financial background of the development of the sector [14].

CONCLUSIONS

On the model of the Italiagro Ltd. and due to their integrator role 25-30 new buffalo milk producing plant would be desirable to be established in Hungary. They plan the integration of the production of about 5,000 buffalo cows, as well as the acquisition and processing of the milk they produced. As a result, 250 new jobs could be created directly and an additional 1,000 indirectly. The introduction of buffalo milk on the Hungarian market might be followed by an opening-up to the eastern markets. The farm of the Italiagro Ltd, as a demonstrational pilot farm, will be an extension centre for young Hungarian farmer entrepreneurs.

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