International Journal of Animal Breeding and Genetics ISSN 2756-3650, Vol. 12 (4), pp. 001-006, April, 2023. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Features of the buffalo population (Bubalus bubalis) in Kosovo

Bytyqi Hysen*, Muji Skender, Jahja Ardita and Aliu Sali

Faculty of Agriculture and Veterinary Sciences, University of Prishtina, Prishtina, Kosovo.

Accepted 21 November, 2022

Buffalo population in Kosovo belongs mainly to Mediterranean type, which is spread in many countries of the Balkan Peninsula. The basic aim of this study was to characterize the buffalo population in Kosovo and focus on their breeding characteristics. In the past (up to years 80th), this specie played significant role in the Kosovo rural families, mainly used for its products (milk and meat) and work. In the last decade, the number of buffaloes has dropped rapidly for about 20 times less. Now, it is considered that population size is > 400 heads, in total. Buffaloes in Kosovo are characterized by black color, long and rare hair, curved horns, the average ear, shining eyes, and developed udder. The live body weight varies from 500 to 700 kg per mature animal. For 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%. The fertility traits to a large extent were poorer comparing them on indicators to achieving a 15 month calving interval, as ideal scenario in dairy buffalo breeding. However, there is an indication that this animal was less sensitive to an extensive environment and balanced ratio and a better management may have significantly improved overall traits. Design of the conservation program for this animal and study of the components of their products for their economic effects, and their importance in relation to genetic biodiversity require immediate attention of all stake holders in Kosovo.

Key words: Buffalo, population, identification, breeding, genetic biodiversity.

INTRODUCTION

A buffalo is an animal found since more than 6000 years. It is thought that their domestication occurred before 5000 years. In the world can be found in various types and names like "Water Buffalo," "African Buffalo," "European Buffalo, etc. (Mahadevan, 1992; Fraga et al., 2004).

Nowadays, buffaloes are bred throughout the world, almost in all continents, where are bred other domestic animals, as well. Though it is distributed throughout the world, it has not undergone major genetic changes as it has happened to cattle and other animals. Still in many countries buffaloes are using for three purposes (milk, meat production and for working-transport). These animals are being adapted very well under extensive climates, humid and swampy lands (Sastry, 1983; Mahadevan, 1992). Although there are no exact data how buffalos were spread in the Europe, BSTID (1981) depicted that this specie was brought from Mesopotamia to Europe, at first to Greece, Italy and Romania and later to the Balkan Peninsula countries. In Europe, a greater number is reared in Italy and the Balkans in Bulgaria and Turkey (Borghese et al., 1997; Borghese, 2009). During the last decade as a result of the socio-economic changes, the number of buffaloes in Kosovo was reducing rapidly. From the data of the Yugoslav Federal Statistical Office, the former Yugoslavia bred about 59.000 head of buffalo and only in Kosovo was bred about 45.000 of them (about 76%). The udder is well supplied with interviewing alveolus and arterial system, which participate in the synthesis and secretion milk. Generally, papillae are long with good distance with each other and suitable for the milking buffaloes (Sastry et al., 1998; Saxena, 1973).

*Corresponding author. E-mail: hysenbytyqi@hotmail.com. Tel: +37744196235.

Figure 1. Type of buffaloes in Kosovo.

Table 1. The number of buffalo population raised in different periods in Kosovo.

Years	Total number
**> 1990	> 45.000
* 2002	2500
* 2005	622
*2006	273
*2007	207

Source of data: * statistic office data of Kosovo 2009; **ex-Yugoslav statistic office data 1973.

Actually, most farmers who cultivate buffaloes having their farms near to the lakes or rivers area where buffaloes during the summer season require water for freshness or shade (Borghese et al., 1997; Soysal and Kok, 2004).

Description of the buffalo breed characteristics bred in Kosovo

As far as Kosovo buffalo, no exact data exist about its origin. However, there are allegations that this specie was cultivated by the old Illyrian and since that time has been bred in here. However, data from authors (Bytyqi et al., 2010; Tahiri, 2011 (personal communication)) claim that this animal was distributed in the region of Kosovo since an invasion of the Turkish Empire. Buffalo specie in Kosovo has reached the peak of breeding in the late 1980 which was the largest number, but due to the development of agricultural mechanization and movement towards high production species like cows, number of buffalos has decreased by a high speed.

Regarding products from buffalo milk, cream is produced in high quantity and cheese and yogurt in less quantity. A common characteristic is that almost in all farms, there is evidence of poor milking mechanization, and milking is done manually. Nutritious diets are not Well balanced, low levels of farm hygiene and other shortcomings that affect reaching maximum production and profit in these farms.

The aim of this study was twofold: First goal was to identify the population of buffaloes in Kosovo, while the second goal was focused on the specific trait's ability in term's buffalo breeding goals in of Kosovo.

MATERIALS AND METHODS

A base for our study was used the questionnaire prepared in advance, including general data in regard to basic breeding characteristics of buffaloes farm in Kosovo. The recording identification cards generally consisted of: identification number, sample number, stage of lactation, farm, date of birth, date of calving, the amount of milk produced, and some socio-economic characteristics related to the farmers breeding buffaloes. Type of buffalo living in Kosovo was shown in Figure 1. For milk analysis, samples were taken in the evening and morning time in quantity 40 to 50 ml of milk and placed in sterile bottles with azidol densification material, and then were put in a mobile refrigerator at temperatures 4oc, from where the samples were transfer to a laboratory for analysis. The analysis of milk was carried by the "MilkoScan-FOOS" device with infrared specto-photometric rays. The study was conducted during the period April 2009 to August 2010. Basis for identifying the total number of buffalos were taking the existing data before the year 1990 in Kosovo (Table 1).

Fertility traits

For each buffalo, the farmer recorded dates up to third mating. Since the artificial insemination has not been introduced at all, natural mating is the only way of buffalo breeding in Kosovo. From these, the interval from calving to first insemination defined the service period (SP; Table 4), while an open period was defined as an interval from calving to successful insemination (OP; Table 4). The conception rate at first insemination was coded 1 if a buffalo did not return to service after the first insemination and 0 otherwise (CR; Table 2).

Statistical analysis

The data were analyzed using JMP- starter packet a business unit of SAS program, (Sall et al., 2004) by proc- glm procedure (general linear model).

RESULTS

In Table 2, were presented the total number of farms and number of buffaloes according to different categories in Kosovo. The result shows a very low number of farms (33) and small population size for this specie, about 163 heads in total. The number of animals per farm ranges from 1 to 11 buffaloes for all categories. The number of young animals, the category age from 0 to 6 and 7 to 10 months of age was also very small, about 14 and 19 heads, respectively. Furthermore, there were only 72 milking buffaloes in total while number of buffalo heifer

Table 2. The number of farms and buffaloes according to different categories in Kosovo.

Buffalo population in Kosovo							
No. of farms	Calves				Heifers < 10 month	Milking buffaloes	Males for reproduction
	0 to 6 month		7 to 10 month				
	M	F	M	F			
Farms 1		1			2	2	1
Farms 2					1		
Farms 3		1	1		1	2	1
Farms 4	1	1	1	1	3	6	2
Farms 5	1		1		1	3	1
Farms 6		1		1		2	
Farms 7					1	2	
Farms 8					1	1	
Farms 9		1	1			3	1
Farms 10						1	
Farms 11						1	
Farms 12	1		1			2	
Farms 13	1			1	1	3	1
Farms 14						2	1
Farms 15		1		1	3	3	1
Farms 16					2	2	1
Farms 17				1	3	6	1
Farms 18					1	1	
Farms 19			1		2	2	1
Farms 20						2	1
Farms 21			1	1	1	1	
Farms 22		1	1		1	2	1
Farms 23	1		1		2	6	1
Farms 24			1	1	2	4	1
Farms 25					1		
Farms 26					1	1	1
Farms 27					1	1	
Farms 28			1		2	3	1
Farms 29					1	2	1
Farms 30						1	
Farms 31			1		1	1	1
Farms 32					1	2	1
Farms 33	1	1			1	2	
Total	6	8	12	7	37	72	21

stock was about 37. Total number of males for reproduction was 21 head.

Arithmetic averages of production and breeding characteristics for buffaloes in Kosovo were represented in Table 3. Per lactation length about 240 days of buffaloes in Kosovo tend to yield about 950 kg/day milk per heads per lactation. The fat and protein content shown to be about 8.9 and 4.9%/kg milk, respectively. The live body weight ranges about 550 kg for adult females and about 650 kg for adult males. The height at shoulders ranges from 136 cm for mature female and 139 cm for mature male. Results show that heifers reach first lactation at the age of above 30 months, but they harvest more than eight lactations per head.

Table 4 was showing the results of fertility traits. After calving, buffaloes seem to have first service at distance of 121 days, open period at about 184, conception rate at service 1st about 60%, and number of services per conception about 1.8. The pregnancy length was about 308days. Figure 2, was showing the buffalo farms in different municipalities/region of Kosovo. Larger numbers of such farms were in the south-east, while less recorded in north-west of Kosovo. Out of 33 existing farms managing buffaloes, biggest number was identified in the

Table 3. Arithmetic averages of production and breeding characteristics for buffaloes in Kosovo.

Traits	Arithmetic averages
Lactation length (days)	240
Milk (kg/lactation)	950
Fat (%/kg milk)	8.9
Protein (%/ kg milk)	4.9
First lactation (month)	< 30
Average lactations number (head)	< 8
Live body weight (M/F (kg)	650/550
Height M/F(cm)	139/136

Table 4. Fertility traits for buffaloes in Kosovo.

Traits	Arithmetic averages
Service period 1st (days)	120
Open period (days)	180
Concepcion rate at service 1st (%)	60
Number of services per conception	1.8
Pregnancy length (days)	308

municipalities of Vushtrria (5 farms), Ferizaj and Vitia (4 farms), respectively. Many other municipalities there were left only 1 to two farms (Prishtine, Shtrpce, Malisheve, Gjilan, Prizren, Rahovec, Mitrovice, Podujeve, Skenderaj, Gllogoc, Kacanik, Shtime, Lypjan, and Novo Brda). In addition, out of 30 municipalities, about 43.3% of the total territory (13 of them) there were no more left any buffalo farm.

DISCUSSION

The buffalo production used to be important segment of the economy in rural household in Kosovo. To date, the existing buffalo farms mainly producing for home consumption, but also for market sale during some periods of the year. The buffalo production of Kosovo farms has many characteristics typical for buffalo production in developing countries, as it depends almost exclusively on the resources locally available on the farm and basically aims at fulfilling the households' own needs.

Nowadays, buffalo is known as a low-yielding animal compared to their body size and other species (that is, cows). In this rather extensive environment compared to the countries, especially in Europe, milk production was definitely lower in Kosovo, approximately 66.8% (Bytyqi et al., 2010; Anasb, 2009).

When analyzing the fertility traits (SP, OP, CR, etc.), we are to a large extent comparing them on indicators to achieving a 15 month calving interval, as ideal scenario in dairy buffalo breeding.

With respect to estimation of a daily ration effect, the information was rather limited. However, there is an indication that this animal was less sensitive to an extensive environment, but unbalanced feed and overall poor management may have significantly reduced production and fertility traits. Kosovo families managing buffalo farms are characterized as large families often well over 12 members. These families have as a tradition of eating dairy products of buffalo origin and cannot consume the same products originating from other domestic species or from plants. These farmers' have a long tradition in breeding buffaloes, for two and three generations before.

Management practices of this do not seem to have changed much and still generally seen as the traditional form in regard to nutrition, production and processing (milk, meat and their products) reproduction, etc.

Selection of males for breeding is not based on any available phenotypic criteria. Due to the very small number of farms that breed buffaloes in Kosovo (often in very remote distance one from the other) most farmers use males originating from the same farm. Such problem would quickly shove run buffalo farms in Inbreeding problems and appearance of negative effects and unwanted traits (production decrease, appearance of genetic anomalies, etc.).

As in many other countries (Borghese, 2004), also in Kosovo, in the same buffaloes farms stables often are

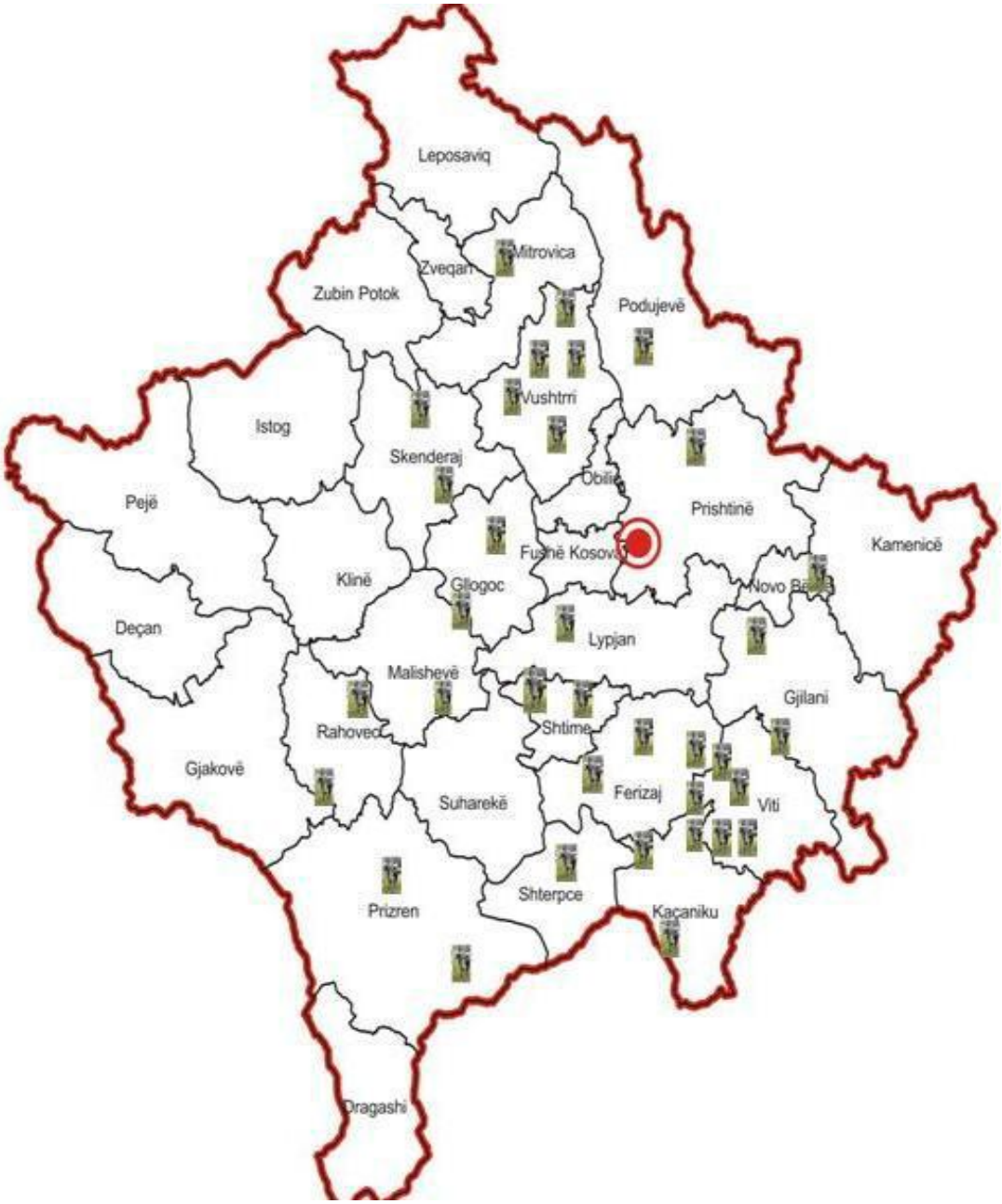

Figure 2. Map of buffalo habitat in Kosovo.

found along the other animals (that is, cattle, horses, poultry, etc.), as well. It is characteristic of all farmers who calves take milk for a period of over six months and in some cases even up to the drying period. Fertility traits were of low rate, which makes difficult breeding of buffalos (low number of males, spread farms, etc). Heifers come to the first estrous usually at very late, above 24 months of age. Due to well developed reproductive tract, buffalos are characterized by easy calving and in most cases carried out without veterinary assistance. Production and marketing relation chain, milk production processing (on farm or dairy) consumption, almost do not exist. The whole farm production is characterized by closed cycle (produced and processed in farm). Currently, no policies in relation to breeding buffaloes in Kosovo (lack of preservation program, proper identification, lack of subsidies, etc.) were developed.

In buffalo breeding in Kosovo, so far, the largest emphasis in selection has been for increased production (milk yield and calf growth rate), since other traits were less considered. One way to support future breeding of this specie would be to rely on a profit approach,

requiring measurement of all traits affecting profit and thus improve efficiency of production.

Conclusions

The introduction of this species in an adequate conservation program for endangered animals, genetic diversification, introduction of a range variety of product, deeper study of the components of their products (that is, essential fatty acids, minerals, vitamins, etc.), the overall impact of their breeding in rural development and the significance in relation to biodiversity, require immediate attention of all stakeholders (governmental institutions, those scientific research, farmer organizations, etc.) in Kosovo.

ACKNOWLEDGEMENTS

Authors address special acknowledgment to farmers for their excellent cooperation to fulfill this study. Also, we are grateful to the Food and Veterinary Agency of Kosovo laboratory for the milk samples analysis

REFERENCES

Anasb-Italian Buffalo Breeders Association (2009). Statistical Data of 4th Asian Buffalo Congress, New Delhi, India, p.121.

Borghese A, Barile VL, Ficco G, Galasso A, Marchiori E and Terzano GM (1997). Feeding system effect on reproduction performances in buffalo heifers. Proc. of the Fifth World Buffalo Congress. Caserta, Italy, 13 to 16 Oct., pp. 697-701.

Borghese A (2004). Recent developments of buffaloes in Europe and Near East. Proc. of the Seventh World Buffalo Congress, Manila, Philippines 20 to 23 Oct., pp. 10 -16.

Borghese A (2009). Present Situation and Future Prospective of Buffalo Production in Europe and Near East. Pakistan. Ser., No.9, pp 491-502.

BSTID (1981). Report of an ad hoc panel of the advisory committee on technology innovation. Cited in Thomas, C. S., Milking management of dairy buffaloes. Ph thesis, Swedish University, Uppsala, Sweeden.

Bytyqi H, Tahiri T, Muji S, Mehmeti H, Hoxha A (2010). Buffalo Population (Bubalus Bubalis) and Breeding Characteristics in Kosova. Annual Meeting 2010 of SAVE Foundation and the European SAVE Network 4th European Seminar on Agro-Biodiversity: „AgroBiodiversity – a crucial part of Biodiversity".

Fraga LM, Fundora O, Gutiérrez M, Mora M, Gonzàles ME (2004). Milk production characterization in a Water buffalo (Buffalypso) unit during a 4-year productive period under tropical conditions. Proc. of the Seventh World Buffalo Congress, Manila, Philippines 20 to 23 Oct., pp. 240-243.

Mahadevan P (1992). Distribution, ecology and adaptation of river buffaloes. In*:* Buffaloproduction, production-system approach. (Eds. M. H. Tulooh, J.H.G. Holmes World Animal Science, c6., Elsevier Scientific Publications, Amsterdam, Netherlands. pp. 1–58.

Sall J, Lehman A, Creighton L (2004). JMP Start Statistics. A Guide to statistics and Data Analysis Using JMP and JMP IN Software (3d ed.) SAS Institute USA, p. 491.

Sastry NR (1983). Monograph: Buffalo Husbandry; Constraints to successful buffalo farming and overcoming the same through management. Institute of Animal Management and Breeding, University of Hohenheim, Germany, Discipline – Milk Production, Pp. 4-6.

Sastry NR, Tripathi VN (1998). Modern management innovations for optimizing buffalo production. Buffalo production and health, A compendium of latest research information based on Indian studies. 2nd World Buffalo congress, New Delhi 1988*,* Indian Council of Agricultural Research, New Delhi, pp.38-62.

Saxena HK (1973). Variation in shape and size of teats in Murrah buffaloes. Indian Vet. J., 51(1): 669-675.

Soysal I, Kok S (2004). Buffalo breeding in Turkey. Proc. of the Seventh World Buffalo Congress, Manila, Philippines, 20 to 23 Oct., pp. 547-548.

Tahiri T (2011). Buffaloes and their breeding in Kosovo (Personal Communication).