

## Evaluation of Enterprises Raising Water Buffalo in Samsun Province of Turkey

Ibrahim Cihangir Okuyucu

Ondokuz Mayıs University, Faculty of Agriculture, Samsun/Turkey  
E-mail: cihangir.okuyucu@omu.edu.tr

Lutfi Bayyurt

Ondokuz Mayıs University, Faculty of Agriculture, Samsun/Turkey  
E-mail: lutfi.bayyurt@omu.edu.tr

Ahmet Akdag (Corresponding author)

Ondokuz Mayıs University, Faculty of Agriculture, Samsun/Turkey  
E-mail: ahmet.akdag@omu.edu.tr

CemTirink

Ondokuz Mayıs University, Faculty of Agriculture, Samsun/Turkey  
E-mail: cem.tirink@omu.edu.tr

Aysenur Bulu

Ondokuz Mayıs University, Faculty of Agriculture, Samsun/Turkey  
E-mail: aysenurbulu@hotmail.com

### Abstract

This study was conducted to determine the barn, nutrition and milking characteristics of enterprises raising water buffalo in Bafra. For this purpose, 45 enterprises were selected by using random sampling method. Data were obtained from survey which was made face to face with owners in their enterprises. Based on the data, indoor and semi-open barns constitute 53.3 and 31.1% of total, respectively. While barn base of all enterprises was concrete, ventilation was highly inadequate. Ad-libitum feeding was highly popular 84.4 % and 86.7 % of total was determined to prefer concentrate feed stuffs as a supplement to rangelands. In total, 95.6 % of the all enterprises were having their own silage and silages were based on corn (42.2 %) and corn-grass mixes (51.1%). Milking was manually made by women with 71.1 and 62.2 %, respectively. Although pre-milking udder care was almost perfect (93.3%), post-milking udder care rate was only 17.8. Milk produced from water buffalo is highly sold after being stored in plastic bottles (60%). In total % 40 of the produced milk is sold daily and 20% of the milk is sold as yogurt or cheese. It has been determined that average price of water buffalos milk is 3.85 TL/l. Based on the data, it can be concluded that owners need some information and education about air conditioning of barns, milking hygiene, animal welfare, milk storing process and animal nutrition.

**Keywords:** Bafra, milking, nutrition, barn, survey, Buffalo.

### 1. Introduction

Turkey has important genetic resources in animal production areas (Sahin et al., 2016; Kul et al., 2018). It is also a country with appropriate ecological potential in terms of growing present gene resources. When nutritional requirements of increasing population are considered, Anatolian Buffalos takes its place as a production source that can be used effectively in animal production field for meeting these needs. The Anatolian Buffalos grown under the condition of our country are rooted in the Mediterranean Buffalos (Sarıözkan, 2011) classified in the river Buffalos (Akoz et al., 2017). Buffalos, taking part in Bovidae family (Özdemir ve Özdemir, 2016) are known to be resistant to diseases and can convert feeds with high and low cellulose content to high protein sources (meat and milk) (Şahin et al., 2013; Akoz et al., 2017; Kaygısız et al., 2018). Moreover, they are able to make production on economic terms because of their easy adaptability and less need for labour (Sarıözkan, 2011). The Anatolian Buffalo, our domestic

gene source, has been continuously decreasing from 1980 to 2010 due to various factors. In this context, the Ministry of Food, Agriculture and Animal Husbandry was included in the scope of supports in 2011 to prevent the rapid decrease of Buffalo existence and ‘Rehabilitation of Anatolian Buffalo in People’s Hand’ Project was initiated. As a result of these support and breeding projects, the number of buffalo, which was approximately 84 736 in 2010, reached 161 439 in 2017. Buffalos are spread to a large part of Turkey but the majority is grown in the Black Sea region (Ermetin, 2017). The increase of demand for organic meat and dairy products (Şahin et al., 2014) in recent years was increased the interest of consumers in Buffalo’s products, mostly due to the unique structures of meat and dairy products grown in extensive conditions (Atasever and Erdem, 2008). In Samsun province 19 896 buffalos are grown, which is the most in our country and 14 % of the total buffalo milk is produced by this city (TUİK, 2017). For this reason, it is important to examine the feeding and growing conditions of the enterprises in this region where buffalo farming is concentrated. In addition, the number of studies conducted to determine barn, feeding and milking characteristics of buffalo farming is very limited due to the fact that it is a species that has not been studied much in the conditions of buffalo country. For this purpose, it was aimed to reveal the general characteristics of the enterprises in the province of Bafra where the buffalo breeding was concentrated in Samsun.

## 2. Material and method

The research was carried out in Bafra location of Samsun province. In the study, 45 farms that farming buffalo were selected by random sampling method. The data were obtained through face to face surveys with the owners of enterprises. The questions in the survey were composed of 3 main sections; barn, feeding and milking characteristics. Descriptive values of the obtained data were determined by SPSS 20.0 package programme licensed by Ondokuz Mayıs University.

## 3. Results and discussion

According to the results obtained from this study, the majority of the Bafra buffalos are raised in closed (53.3 %) and semi-open (31.1 %) and tie stalls (55.6 %) (Table 1).

Table 1. Obtained results of barn characteristics

	Independent variable	Frequency	%	Std. deviation
Barn type	Open	6	13.3	0.703
	Closed	24	53.3	
	Semi-Open	14	31.1	
	Other	1	2.2	
Barn base	Concrete	45	100	0.000
	Stone	0	0	
	Soil	0	0	
	Wood	0	0	
	Other	0	0	
Litter type	None	29	64.4	1.276
	Straw	9	20	
	Sawdust	4	8.9	
	Manure	0	0	
	Forage	2	4.4	
	Stalk	0	0	
	Other	1	2.2	
Stall type	Tie stall	25	55.6	0.750
	Free stall	13	28.9	
	Free	7	15.6	
	Other	0	0	
Ventilation	Chimney	13	28.9	1.375
	Ventilator	0	0	
	Door/Window	27	60	
	Open	1	2.2	
	Chimney+Door+Window	4	8.9	
Birth chamber	None	24	53.3	0.504
	Yes	21	46.7	

In addition, it has been determined that all of the existing enterprises where the work is carried out are stibble floor concrete but 64.4% of the enterprises do not use litter.

Similar results were obtained in a study conducted by Yılmaz, (2013). The ventilation of the stables was determined through doors /windows (60%). However, it was observed that the ventilation areas in the barns of the surveys were insufficient. Nevertheless, it was found that 24 enterprises have a birth compartmentfor buffalos whose birth is close.

In the second part of the survey, it was determined that rangeland-based (86.4%) and *adlibitum* feeding (84.4%) were applied in the enterprises (Table 2). It was also found that the farmers do not care about the group feeding(6.6%), same feed are offered to all animals. As a matter of fact, the results obtained by Yılmaz, (2013) are similar to this study. The proportion of enterprises using paddy straw in the feeding of buffalos was 44.4%. The most important reason for the use of paddy straw in nutrition of buffalos is intensive paddy cultivation in the region(Table 2).

Table 2. Obtained results on nutrition characteristics

	Independent variable	Frequency	%	Std. deviation
Feeding system	Rangeland	3	6.7	0.369
	Feeding+rangeland	39	86.7	
	Insentive	3	6.7	
	Other	0	0	
Usage status of paddy straw	Yes	20	44.4	0.712
	No	25	55.6	
Type of feeding	<i>Ad libitum</i>	38	84.4	0.520
	Individual	4	8.9	
	Group feeding	3	6.6	
Silage making status	No	2	4.4	0.208
	Yes	43	95.6	
Type of silage	Corn or grass silage	23	51.1	0.998
	Corn and barley	3	6.7	
	Corn	19	42.2	
Feed storage status	Sheltered	35	77.8	0.579
	Sheltered but outside	9	20	
	Outside+roofless	0	0	
	Other	1	2.2	
Meeting the water needs of animals	City water	12	26.7	1.335
	Pond	1	2.2	
	Creek	2	4.4	
	Well water	30	66.7	
	Other	0	0	

Almost all of the enterprises that are engaged in buffalo farming use silages (95.6%), mostly maize and grass (51.1%) (Table 2). Yılmaz (2013) have reported that usage rate of silage in buffalo farming enterprises in Afyon was 87%. However, in another study conducted by Özkan et al. (2017), the proportion of farmers using silage in Bafra was determined to be 56.0%, which is lower than the results obtained in this study.

Totally, 77.8% of the feeds used in the nutrition of buffalos are kept in closed stores. However, the water needs of animals are mostly met from underground waters (66.7%) and the other sources are city water, creeks and ponds (Table 2).

In the third part of the survey, it was concluded that buffalos are mostly hand- milked (71.4%) and machine milking rate is only 24.4%. However, it was determined that women (62.2%) have the highest rate of milking in enterprises. In a similar study by Yılmaz (2013), the hand milking rate in the enterprises was 84% and women in the milking operation were reported as 83%. In surveyed enterprises, it was determined that udder cleaning before milking is cared but it has been determined that udder cleaning is not done after milking. (Table 3).

Table 3. Results of the milking characteristics

	Independent variable	Frequency	%	Std. Deviation	Mean
Type of milking	Manual	32	71.1	0.747	
	Portable milking machine	11	24.4		
	Milking chamber	1	2.2		
	Other	0	0		
	Manual and Portable milking machine	1	2.2		
Who is milking?	Owner	9	20	1.043	
	Wife	28	62.2		
	Employee	4	8.9		
	Other	0	0		
	Owner and wife	4	8.9		
Pre-milking udder care	Yes	42	93.3	0.252	
	None	3	6.7		
Post-milking udder care	Yes	8	17.8	0.386	
	No	37	82.2		
Sales status of milk	Yes	38	84.4	0.366	
	No	7	15.6		
Sales frequency of milk	Everyday	18	40	1.691	
	Every seconds day	7	15.6		
	Once a week	4	8.9		
	Yogurt, cheese or butter	1	2.2		
	Twice a week as cheese or yogurt	8	17.8		
Storage or cooling type of milk	Plastic bottle	27	60	0.757	
	Chum	11	24.4		
	Cooling tank	6	13.3		
	Other	1	2.2		
Is there an undesirable odor in produced milk	Yes	4	8.9	0.457	
	No	41	91.1		
What is the price of a liter of milk? TL	Continuous variable				3.86
Average daily milk yield,	Continuous variable				19.36

In total 84.4% of enterprises owners sell milk after milking. The produced milk is sold every day (40.0%), twice a day (15.69%) and twice a week (17.8%) as yogurt, cheese or butter. Produced milk was found to be stored mostly in plastic drums (60%) in enterprises while the other part was stored in jugs (24.4%) and cooler tanks (13.3%). A similar study by Özkan et al. (2017) also reported that enterprises engaged in buffalo breeding in Bafra store milk in plastic drum.

In addition, owners of enterprises have stated that there was no odor that could affect the consumer's preference in a negative way. Moreover, according to the results of the survey the daily milk production capacity of the enterprises was found to be 19.36 liters and the average price of produced 1 liter milk was 3.86 liras (TL).

#### 4. Conclusion

In this study, when the results obtained about the barn characteristics of the enterprises were evaluated, it was determined that the majority of the enterprises were breeding in tie stalls and closed barns. It was also found that all of the barn floors were concrete and the use of the pads was not common. Moreover, it was determined that barns were mostly ventilated through doors and windows and ventilation areas

were not satisfactory in the enterprises. When it is evaluated in terms of the nutrition characteristics, it has been determined that owners of the enterprises feeds animals as *ad libitum* and based on the rangeland. In addition, almost all of the farmers were using silage for the nutrition of buffalos. However, due to the extensive cultivation of the paddy in the region, most of the forage requirements of the buffalos are met by paddy straw.

Based on the results of this study, it was determined that milking was mostly done manually by women in the enterprises. Moreover, it was concluded that farmers carefully clean udder before milking but enough attention was not paid to post milking udder care. Produced milk was mostly stored in plastic bottle or chums and it has been found that the number of cooling tanks were insufficient. It is important to store milk in the refrigerated tanks for hygiene. Moreover, it has been determined that liter price of produced milk was very low and it is thought that the probable reason of this situation may be caused by some problems in the marketing process.

As a result, when the findings are evaluated as a whole, it has been determined that there are some deficiencies in barn conditions, nutrition, milking, milking hygiene, milk storage process and marketing. For this reason, it is thought that educating of farmers in Samsun Bafra, which has important potential for our country, to eliminate deficiencies will be beneficial.

## References

- Akoz M., Arik D., Kul M., Celik B., (2017). Buffalo breeding: Buffalo breeding in Turkey from past to today. International Journal of Scientific and Technological Research 3(2): 9-14.
- Atasever S. ve Erdem H., (2008). Manda yetiştiriciliği ve Türkiye'deki Geleceği. Anadolu Tarım Bilimleri Dergisi, 23(1): 59-64.
- Ermetin O., (2017). Husbandry and sustainability of water buffaloes in Turkey. Turkish Journal of Agriculture-Food Science and Technology, 5(12):1673-1682.
- Kaygısız F., Evren A., Koçak Ö., Aksel M., Tan T., (2018). İstanbul'un Çatalca ilçesindeki mandacılık işletmelerinin etkinlik analizi. Ankara Üniv Vet FakDerg., 65, 291-296.
- Kul E., Fılık G., Sahin A., Cayiroglu H., Ugurlutepe E., Erdem H., (2018). Effects of Some Environmental Factors on Birth Weight of Anatolian Buffalo Calves. Turkish Journal of Agriculture - Food Science and Technology, 6(4): 444-446.
- Özdemir G. ve Özdemir A., (2016). Bingöl İli Manda Yetiştiriciliğinin Sorun ve Çözüm Önerilerinin Yetiştirici Gözüyle Değerlendirilmesi. Iğdır Üni. Fen Bilimleri Enst. Der., 6(2): 157-164.
- Özkan Z., Arslan S., Uçum, İ., Canik, F., Uzun B., (2017). Samsun ilinde manda yetiştiriciliği faaliyetine yerveren işletmelerin mevcut durum analizi. TEPGE, Yayın no: 292, ISBN: 978-605-9175-98-2, Ankara.
- Sarıözkan S., (2011). Türkiye'de Manda Yetiştiriciliği'nin Önemi. Kafkas Üniversitesi Veteriner Fakültesi Dergisi, 17(1): 163-166.
- Sahin, A., Ulutas, Z., Yıldırım, A., Kul, E., Aksoy, Y., Ugurlutepe, E., Sozen Ö., Kaplan, Y. (2016). The Effect of Some Environmental Factors on Milk Composition of Anatolian Buffaloes. Scientific Papers. Series D. Animal Science. Vol. LIX: 57-64.
- Şahin A., Ulutaş Z., Yıldırım A., (2013). Türkiye ve Dünya'da Manda Yetiştiriciliği 1. Gaziosmanpaşa Bilimsel Araştırma Dergisi, 8: 65-70.
- Şahin A., Yıldırım A., Ulutaş Z., (2014). Anadolu Mandalarında bazı çiğ süt parametreleri ile somatik hücre Sayısı arasındaki ilişkiler. Tekirdağ Ziraat Fakültesi Dergisi, 11(1): 114-121.
- TÜİK, (2017). Tarım İstatistikleri (Hayvan İstatistikleri Veri Tabanı), [http://www.tuik.gov.tr/PreTablo.do?alt\\_id=1002](http://www.tuik.gov.tr/PreTablo.do?alt_id=1002).
- Yılmaz S., (2013). Afyonkarahisar Yöresi Manda Yetiştiriciliği; Küçükçobanlı Köyü Örneği. Yüksek Lisans Tezi, Adnan Menderes Üniversitesi, Fen Bilimleri Enstitüsü, Zootekni Anabilim Dalı, Aydın.