

THE GENERAL VIEW OF BUFFALO BREEDING IN AYDIN PROVINCE IN TURKEY

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Abstract

According to FAO statistics (United Nations Food and Agriculture Organization) buffalo number has doubled globally in the latest half century. However, the same statistics reveal that the buffalo number has declined tragically to 142.000 heads in 2016 while 1.140.000 buffalos existed in 1961 in Turkey. In this study, a survey, which was conducted in buffalo breeding farmers in the Aydin Province situated in Aegean Region in Turkey, was evaluated with its results in order to determine the general state of buffalo breeding in the region. According to the survey results, it was realized that 75% of the buffalo breeding farmers have been doing this business as family breeding traditionally, 53.85 % of them as the main source of income and the rest as supplementary. The average animal number per farm is 12 heads, and the maximum number is 28 heads. Average daily milk yield of buffalos is 5-6 liters. One kg buffalo cream is produced from 5.5- 6 liters milk. The general target of buffalo breeding is to produce buffalo cream. In producing buffalo cream, traditional methods are used. The average price of a kilo of buffalo cream is about 10.9-12.13 Euros. The numbers of buffalos and buffalo breeding have been decreasing in Aydin Province day by day, as well as in Turkey. At the end of this study, it was determined that the main source of income in the farms doing buffalo breeding for long years had been the buffalo cream. The only markets of this buffalo cream were seen to be the few Turkish pizza restaurants in the environment.

Key words: Buffalo, breeding, cream, milk

INTRODUCTION

Buffalo is a species from the Bovidae Family that is raised for milk in the first place and meat, leather and labor power of it. 95 % of buffalo prevalence is raised in Asia. Defined as “Water Buffalo” in the English Language and domesticated approximately 5000 years ago, the buffalo is bred in nearly 40 countries in various numbers [1]. According to FAO (2016) (UN Food and Agriculture Organization) statistics, then number of buffalo doubled in 50 years. While the global buffalo number was 88 million in the 1961 recordings, this number increased to 194 million in 2010. Countries in Europe raising buffalo are Italy, Bulgaria, Greece, Macedonia, Albania and Turkey [2].

Turkey is a striking example among the other countries due to the tragic fall in the number of buffalos, for the number fell to 87.000 in 2010 while there were 1.140.000

buffalos in 1961 according to FAO statistics [2].

In this study, it was determined to define the general state of buffalo breeding in Aydin Province, where a similar drastic decline is the case, as it is in general in Turkey. For this purpose, under a four-membered- cooperation protocol in Aydin Province, a survey and a field work were conducted by The Faculty of Agriculture of Adnan Menderes University, The Provincial Directorate of Food, Agriculture and Animal Husbandry, The Union of Breeding Cattle Breeders, and The Union of Red Meat Producers.

MATERIAL AND METHODS

In this study, the general state of buffalo breeding in Turkey and the survey results conducted on buffalo breeders in the Province of Aydin, which is located in the Aegean Region, were evaluated.

According to TUIK (2015) records, 198 head buffalos exist in 15 farms in Aydin [3]. It was tried to conduct a situational investigation via a survey prepared under the content of the

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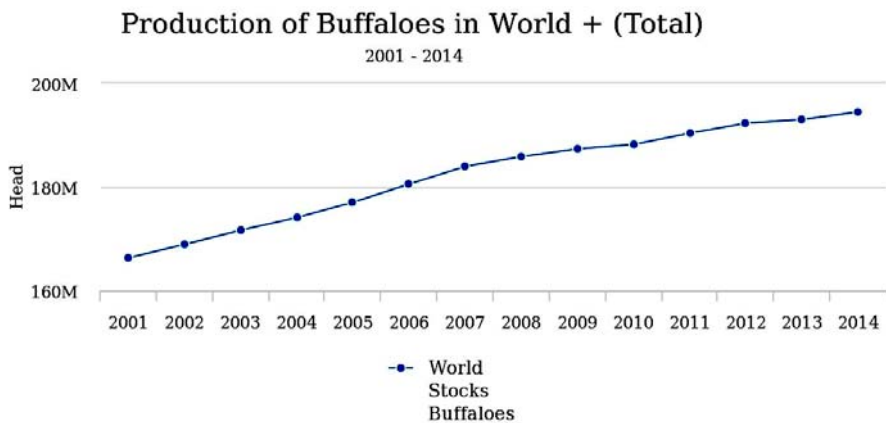
project related with the state of the buffalo breeders, how the breeding was done in the region, the annual maintenance, the annual feeding, the most critical requirements, the marketing conditions of the buffalo milk and the milk products, breeders' expectations and the most significant problems of buffalo breeding.

The totally 15 farms, in Central Aydin, Bozdogan, Nazilli, Incirliova, Kuyucak and Soke, were visited and the survey was given to breeders. Survey results were analyzed and in the perspective of the provided findings, the results were interpreted. As a final step, a case report was prepared about the buffalo breeding in the region and was shared with The Provincial Directorate of Food, Agriculture and Animal Husbandry. This study, therefore, is a kind of pre-investigation targeted for new and comprehensive future projects to develop and to disseminate

buffalo breeding in Aydin on condition that they could provide the support of the related public and private bodies.

RESULTS AND DISCUSSIONS

There exist totally 194.463.729 buffalos in the world (FAO, 2014). 97% of these buffalos are raised in Asia. The buffalo is an important livestock resource in several countries of South Asia and the Mediterranean regions. However, reproductive efficiency is compromised due to known problems of biological and management origins, such as lack of animal selection and poor nutrition [4]. Buffalos are resistant to environmental conditions and they require more natural raising necessities. According to FAO 2014 data, the number of buffalos has increased globally since 2001 [2].



Source: FAOSTAT (Sep 21, 2017)

Fig. 1 Production Of Bufaloes In World (FAO, 2017)

The General View of Buffalo Breeding in Turkey

While the prevalence of buffaloes in Turkey was 1.178.000 in 1970's, it started to fall sharply and dramatically from 1980 on, and it reached 84.705 in 2007, declining 92%, which means to the extinction point [5]. When the case during the last 20 years was taken into account, the number of the buffalos in Turkey, which was 366.150 in 1991, decreased gradually each year and fell

to 84.705 in 2007, as seen in the Table 1. During the following years, though, this number increased at some rates and reached to 142.073 according to 2016 statistics [3].

The buffalos raised in Turkey have descended from the Mediterranean Buffalos, a sub-group of River Buffalos, and they are identified as Anatolian Buffalos [6]. Buffalo raising in Turkey is more generally implemented in Istanbul in the Region of Marmara, in Samsun, Tokat and Sinop in the

Black sea Region, in Corum and Amasya in the Inner Black Sea Region, in Afyon and Balıkesir in the Inner- West Anatolia, in Sivas and Mus in Central and Eastern Anatolia, and in Diyarbakir in South-Eastern Anatolia [6].

Table1 Prevalence of Buffaloes in Turkey according to Years

YEAR	Number of Buffalos	YEAR	Number of Buffalos
1991	366 150	2004	103 900
1992	352 410	2005	104 965
1993	316 000	2006	100 516
1994	305 000	2007	84 705
1995	255 000	2008	86 297
1996	235 000	2009	87 207
1997	194 000	2010	84 726
1998	176 000	2011	97 632
1999	165 000	2012	107 435
2000	146 000	2013	117 591
2001	138 000	2014	121 826
2002	121 077	2015	133 766
2003	113 356	2016	142 073

When the “buffalo” word is heard in Turkey, buffalo cream is remembered in the first stage. Buffalo milk contains less water and cholesterol, more dry matter, minerals, fat and protein than cow milk [7]. In addition, buffalo meat contains 40% less cholesterol, 55% less calorie, 11% more protein and 10% more minerals when compared with cow milk [8].

Buffalo is a breed that can make use of roughage better, that can benefit from inefficient pastures more than the other breeds, and that is more resistant to environmental conditions and to diseases [1]. Buffalo raising is an important production section for organic animal production [9]. Despite all these advantages, buffalo breeding and the buffalo number have recessed in the recent years, while the dairy cattle breeding has developed and the number of animals has increased during these years. [9]. During the recent years, the support provided by the government and the foundation of breeding associations/unions have been effective on the buffalo number to remain fixed and even on the slight increase of it.

Buffalo Breeding in the Province of Aydin

As in all the provinces dealing with buffalo breeding, buffalo breeding and the buffalo number have decreased in Aydin over the years, and even the breeding has been

stuck in few regions locally. Depending particularly on the cream market, buffalo breeding has been done commonly only in few villages. The same state is the case in the other provinces in Turkey as well. According to TUIK recordings, there exist 198 buffalos on totally 15 farms [3].

When the general state of the Aydin Province is taken into account with regard to climatic, habitat and wetland conditions, it will be seen that a great number of areas are available to feed the buffalos particularly along the Great Meander River basin. If a sustainable buffalo breeding could be achieved in these appropriate areas for buffalos, the animal products of the region, mainly the meat production, would increase and business profitability would be influenced positively due to the less labour power and bait entry. When the production cost fell down, meat prices would diminish as well and thus, the purchasing power of the consumer would rise and the socioeconomic structure would improve. In this way, this production would contribute to resolving the protein deficit of the country and to healthier and balanced nourishment of the new generation. Furthermore, buffalos enter wetlands and swamps, which are their natural habitats, in order to nibble and cool themselves, and in this way, they contribute

to the preservation and the development of natural life as well. The buffalos moving about in these areas play a significant role in providing an ecological balance by creating galleries, where mainly the fish and the other creatures living in the water can swim freely, can reach food more easily and can leave their eggs in more convenient and reliable places and they can contribute to the scattering of the seeds of the plants around.

The Evaluation of the Survey Results Conducted in the Aydın Province

Descriptive information about breeders and the farms

When educational levels of the breeders who breed buffalos were compared, 9 of them were seen to have graduated from the primary education, 4 from lyceum and 1 from a university and 1 breeder was illiterate. Their ages varied between 25 and 80 and the age average was 49.53.

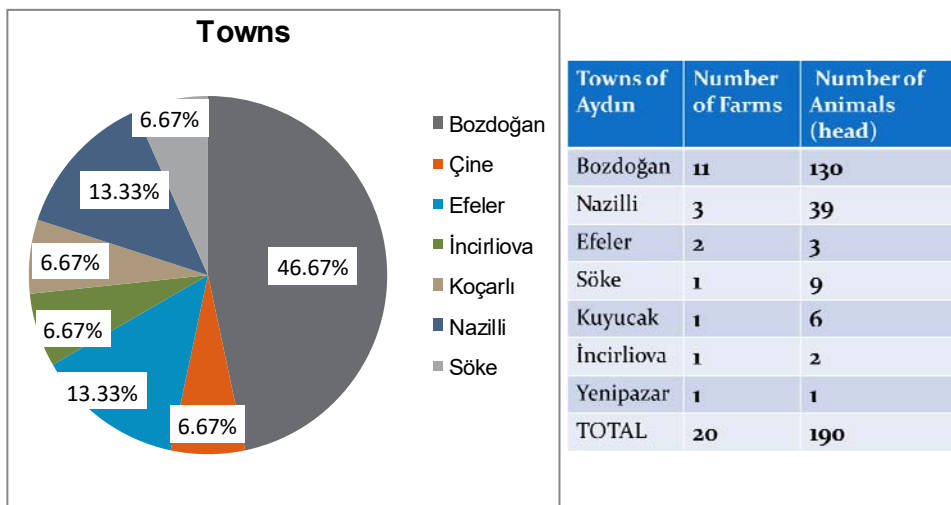


Fig. 2 Distribution of farms and number of animals according towns of AYDIN

86.67 % of the enterprise holders are farmers (13), 6.67% of them is a retired (1) and 6.67% of them is a merchant (1).

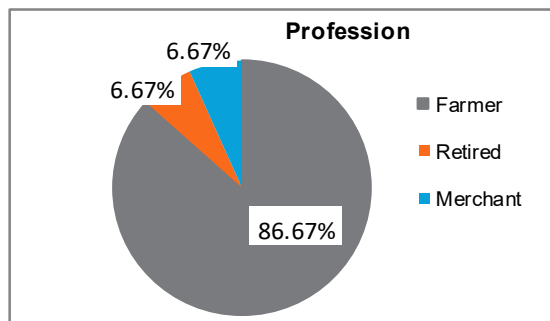


Fig. 3 Professions of the Breeders

Buffalo breeding is the main source of income for 53.85 of the breeders and the supplementary source of income for 46.15% of them.

When the breeders were asked about the source of their competence related with buffalo breeding: 78.57 of them answered as from their ancestry, 14.29% of them said as hobby, and 7.14% said they were new beginners. These results made us conclude that historical family culture was the dominant element in buffalo breeding in the region.

Animal numbers in the farms; The average animal number per enterprise in Aydin Province was 12 (maximum 28 and minimum 2). When the holders were asked in

what way they owned these animals, 9 holders said they had purchased them from others, 4 said they had inherited the animals from their fathers and 2 said they had both purchased from others and also inherited from their ancestors.

The breeders were asked the wetlands they had since wetlands and swamps are quite significant for buffalos, and 58.33% of the holders said they had artificial pools, 33.33% of them said they had natural wetlands, and 8.33% said they had both.



Fig. 4 Artificial pool for buffalos

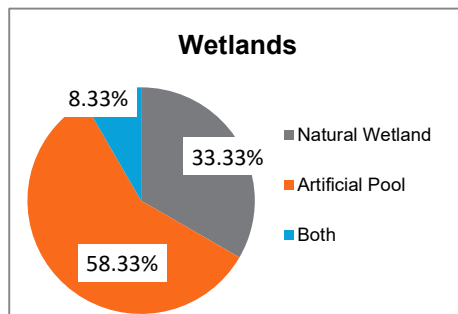


Fig. 5 variety of whedlands for buffalos

Breeding Buffalo Selection and the desired external properties:

In the selection of the breeding males:

The breeders mostly declared that they prefer animals with long body, long legs and long tails whose live weights were around 600 kg and whose mothers' milk yields were high.

In addition, most of the holders were of the opinion that breeding males should be taken from various provinces so as not to increase the relativeness in the flock.

In the selection of the breeding females:

Most of the breeders stated that they chose animals with long body and legs as breeding animals. Some of them said all the females were only used for breeding due to their late fertility and long pregnancy period.

Many of the breeders answered the question of “**How should a good female buffalo be?**” similarly. They said a good female buffalo should have a powerful huge body structure, a live weight of 500-600 kg, thick legs, long tails, thin horns, soft nipples and veined breasts, and their milk yield should be high.

Table 2 Some descriptive information related with reproductive and milk yielding properties of the buffalos in the farmers

First breeding age	24 months
Pregnancy period-average	10.5 months
First age to give a young calf	3 years old
Average Lactation period	8 months
Breast feeding period(free)	1.5-2 months
Age of the bull to be used in breeding (mating) for the first time	20 months
Duration of the bull to be used for breeding/mating	They are sold after they reach 4 years old.
The duration of the female buffalo to be used for breeding	20 years (10-15 calves could be taken)

In the farms, female and male buffalos are kept together and free mating is applied. It was reported from only one farms that artificial insemination application with Italian sperm was used there and 50 % pregnancy rate was achieved.

Milk yielding properties and the processing of the milk

Births in the farms are arranged in 2 periods in a year for a continuous cream production purpose. Milking is done twice a day with hand except for one farm. The animals are always milked by the same person. The average daily milk yield of the buffalos is 5-6 litres. 1 kg cream is produced from 5.5-6 lit milk. Traditional methods are used in producing the cream. The price of 1 kg cream is around 45-50 TL on average; however, there are customers who want to buy it for 80-90 TL as well.

The baby calf, sucking the mother freely during the first 1, 5- 2 months, is permitted to suck the mother for a short time before the milking in order to create a stimulation in the mother. It was reported by the breeders that buffalos have the most milk yield between the 12th day and the 3rd month of the lactation period. It was reported by the breeders that the milk yield was 1.5- 2 lit on average in the first lactation; however it rose to 5.5-6 lit after approximately the 3rd birth.

The process for the milk whose cream has been taken away;

The milk whose cream has been taken away is generally mixed with cow milk and is sold at cow milk price by wholesale or by retail. The milk that cannot be sold is made into yogurt, cheese, etc. and is consumed in the family or sold at markets.



Fig. 6 Home-made creamers produced by traditional methods

Sanitary Conditions of the Animals

In the farms, it was reported that the buffalos were resistant mainly to breast diseases and to the others and had no serious health problem. In addition, the same vaccination programs for the cattle at present has been applied for the buffalos by the Ministry of Food, Agriculture and Livestock Provincial Management in Aydin. No other sanitary application towards preservation or treatment is done in the enterprises apart from these. Most of the enterprises stated that they used lime for disinfection in the barns and applied external parasite treatment. It was determined through the survey answers that most enterprises don't use barn disinfection

method for feet except for a few. 10 out of 15 enterprises expressed that they did the dung cleaning by hand and the rest 5 did by using tractors. 9 out of 15 enterprises said they did dung cleaning daily, 2 enterprises weekly, 3 once in 2 weeks and 1 once in a month. All of the enterprises expressed for dung evaluation methods that they used it in their farms in the fields and gardens.

Feeding of buffalos

Animals were given cotton seed particularly in order to increase the fat rate in the milk. As roughage, straw, vetch, alfalfa, corn silage, and meadow dry grass were given. As granulated feed, barley, wheat corn and cotton seed were given. Mixed industrial

feed, cattle stock feed and cattle milk feed were also given. It was observed that some cattle enterprises did buffalo breeding particularly to make use of the remains of the cattle feed and it was reported that buffalos ate nearly everything.

When the breeders were asked whether they took the yielding property into account in feeding, they answered that the same amount and content were taken into account without considering the yield.

Meat Production and Marketing

The breeders sell older dams and the male buffalos that won't be used for breeding to the butchers at a lower carcass price than cattle. Some breeders sell them for scarification during Kurban Bairam. It was reported that there was a great demand for male buffalos particularly in order to produce sausage by the buyers coming from Istanbul during the 1980's. For the buffalo breeding in Aydin today, it was observed that this breeding was done more to produce milk, and particularly cream, rather than to produce buffalo meat, and that even the breeders themselves did not have the sufficient knowledge and experience about buffalo meat and its quality or its consumption.

Organization

All of the breeders answered the question "Would you like to have your own Associations?" as yes. They were of the opinion that easier profits related with particularly supporting and encouragement could be provided through associations.

In the answer to the question of "**What are your expectations from the government?**", most of the breeders expressed that they expected that the government should give to buffalo breeding a private prominence, should support with breeding buffalo dams, should provide with easily re-payable supporting credits and should give particularly live animal grant. They complained about the supports to have been reduced half in 2016. They expressed they thought the supports to be increased in addition to the feed support by the ministry. All of the farmers were experiencing market stagnation and they could not market the milk whose cream was taken away. More expensive feed entry was another problem for them. Except for 1, all enterprises said they were glad to do this job.

CONCLUSIONS

At the end of this study; It was determined that **the main income source was the buffalo cream** for the enterprises having been breeding buffalos for long years and their markets were the Turkish Pizza restaurants in the neighbourhood. It could be claimed in summary that **the sustainability of buffalo breeding depends on pizza restaurants**. If the buffalo breeders do not have a good organization provincially; marketing conditions could not be improved; buffalo productions could not be introduced satisfactory enough, The buffalo breeding will gradually be extinct in the region.



Fig. 7 Turkish Pizza and Turkish Dessert with buffalo cream

It was reported that a serious buffalo breeding aiming at stock and meat in Aydin Province was not the case. Long years ago

there had been a serious demand for sausage production; however, it couldn't be sustained till now. Although the buffalo meat possesses

more significant advantages than other meat types regarding to meat quality, no studies have been conducted so far on neither buffalo breeding nor buffalo meat consumption in our province. The habit of breeding buffalos aims at particularly producing milk and cream, so the breeders have a negative point of view about the quality of the meat because the animals are sent to cutting at old ages.

In this Study, it was observed that buffalo the number of breeders diminished with regard to the past; however, during the last 5 years, particularly big cattle breeders have been interested in buffalo breeding and have started raise buffalos.

Apart from the breeders whose main income source was buffalo cream, it was also witnessed that buffalo breeding was done to benefit from particularly the other production advantages of buffalos. These advantages could be stated as follows:

1- There were stock or milk cattle breeders that were also raising buffalos in order to make use of the remaining feed from the cattle and to provide some benefit economically.

2- Buffalo bull was used to determine the oestrus state and the accurate insemination time.

3- Breeding buffalos could turn such areas as swamps and reeds into productive places which are not suitable to raise other animal breeds.

One of the most significant problems of buffalo breeding in the region was that the breeders didn't have a breeder organization. For that reason, the breeders could not make use of governmental support. Together with this study, Food, Agriculture and Animal Husbandry Provincial Management started a program to establish a breeding buffalo breeders association in the province.

Mozzarella cheese is a well-known significant product all over the World. Like this, in Turkey, buffalos milk should be converted into different products and, the products should be advertised. New markets should be created with a good presentation of these products. Since buffalo cream is produced at homes with conventional methods, the microbial bacteria rate will naturally be high, and this will influence both

human health and the duration of the cream. For this reason, it is a must to carry on some research to develop more accurate methods for the production of buffalo cream. The produced cream should be advertised in convenient ways and it should not be introduced and disseminated not only into pizza restaurants but also into various fields for its consumption potential. Furthermore, it should be branded and patented as well.

Some precautions should be taken for the young males, except for the breeding ones, not to be sold to butchers at a lower price than cattle. Some studies related with meat quality and its evaluation should be conducted, and for this aim, the buffalo breeders could be encouraged for meat production beside milk.

A thorough investigation of the genetic properties of buffaloes should be conducted in order to be able to contribute to other breeds owing to the fact that they are resistant to diseases and particularly they don't suffer from breast problems intensively despite the conditions they live in particularly in Aydin Province, there are many wetlands, swamps, river banks and areas that are not convenient for agriculture and animal husbandry. These areas could possibly be turned into buffalo breeding fields to add a positive value to agriculture of the region.

As a last and most significant point, Aydin Provincial Buffalo Breeders Association should be established at once in order to develop buffalo breeding in the region, to put the proposals into practice more easily, and to make use of the governmental supports better.

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