Buffalo Newsletter

Number 26 - December 2011

BULLETIN OF THE FAO-ESCORENA INTER-REGIONAL COOPERATIVE RESEARCH NETWORK ON BUFFALO AND OF THE INTERNATIONAL BUFFALO FEDERATION (IBF) – INCLUDES SHORT COMMUNICATIONS, RESEARCH PAPERS, TECHNICAL NOTES, ONGOING RESEARCHES

The year 2011 is going to finish. It was very active and rich of buffalo events: in May 6-7 the SAVE Foundation organized in Sighisoara (Romania) the International Workshop on Conservation of Autochthonous Buffalo, in June 21-22 the Indonesian Center for Animal Research and Development of Indonesia (ICARD) held in Samarinda (East Kalimantan, Borneo, Indonesia) the National Workshop on Buffalo Production with the title "Buffalo Breeding Development through the use of its adaptability in supporting National beef self-sufficiency", in September 11-14 the Universidade Federal do Oeste do Parà (UFOPA) realized in Santarem (Parà, Brasil) the "IX Encontro Brasileiro de Bubalinocultores", finally the Agricultural Ministry of Cuba with the International Buffalo Federation (IBF) and the CIMAGT is going to held in November 21-26 in Havana (Cuba) the VI Buffalo Symposium of Americas together with the V Buffalo Symposium of Europe and Americas and afterwards (November 28-30) the Post Symposium Courses on Buffalo production and management in the tropics, on Biotechnology of reproduction and practical application of molecular markers, on buffalo fattening, carcass quantitative and qualitative features, on Arboreous Systems of grazing on cattle's.

Moreover the website, founded by FAO-ESCORENA, including Buffalo Network too, is very active and utilized to find books on buffaloes, Buffalo Newsletters, news and so on: www.agrowebcee.net.

The Editor

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International Workshop on Conservation of Autochthonous Buffalo

By SAVE FOUNDATION

Romania, May 6-7, 2011

The Workshop Conservation of Autochthonous Buffalo in Southeast Europe took place 6-7 May 2011 in Sighisoara, Romania and was organised by SAVE Foundation and Fundatia ADEPT as an occasion to meet together with buffalo experts and stakeholders from South-eastern Europe with the aim of creating a network for the conservation of water buffalo in the area. The participants were: for SAVE, Ms. Elly Broxham and Mr. Hape Grunenfelder; for IBF, Prof. Antonio Borghese; for GREECE, Dr. Joannis Kazoglou and Mr. Dimitris Patrousis; for UKRAINE, Dipl. Forstwirt Michel Jacobi; for SERBIA, Dr. Sergej Ivanov and Dr. Srdjan Stojanovich; for ROMANIA, Mr. Gabor Kolumban and Mr. Nat Page. Each one contributed with a presentation based on the following discussion topics:

• Buffalo in your country/region: History, Current situation, Population numbers, Level of crossbreeding, Number of available bloodlines for pure-breeding, Herdbooks/records;

• Varieties of autochthonous buffalo in South-Eastern Europe. State of: Phenotypical characterisation, Characterisation of production systems, DNA testing, Necessary action to improve characterisation, Keeping a purebred nucleus whilst cross-breeding for better production. How can an international expert network contribute to the conservation of autochthonous buffalo in South-Eastern Europe?

The goals of the workshop were to assess the situation of stakeholder motivation, involvement and networking leading to stakeholder network. To publish an overview of the status quo. Create a plan of action for the characterisation of types both phenotype and genotype. Agree upon a conservation strategy through identifying further priorities and planning future actions. After a morning of presentations and questions, participants were asked to answer questions within a discussion round. Some time was also taken to look at photos from various buffalo and discuss their physical features for purposes of both characterisation and health.

The questions addressed were as follows: What are the priorities? What action should be undertaken? How can a network of experts improve the situation? What are the next steps for the network?

The Workshop was completed with an excursion to a large buffalo farm in the area, where it was possible to look more carefully at husbandry issues and to discuss practical aspects of buffalo keeping and conservation.

The following paper sums up the presentations and subsequent discussions and, also, presents the conclusions and recommendations of the participants of the workshop.

Summary of presentations

On a global scale, Riverine or Water Buffalo (*Bubalus bubalis*) are a very popular species. They can be used for milk, meat and traction. They are very different from the cattle more commonly kept in Europe. In South Eastern Europe buffalo have been an important addition to farms, especially in subsistence and semi-subsistence agriculture. Buffalo are enjoying a renaissance in Italy, where mozzarella production demands vast quantities of high quality milk. These buffalo farms are large-scale, intensive operations that are established with the aims of obtaining as much milk as possible from the buffalo (Borghese).

Buffalo were once numerous and popular within the region of South East Europe. Despite the fact that the origins of buffalo in the area are unclear, it is sure that they were introduced about 1000 years ago - by perhaps the Crusaders or the Islamic invaders. The buffalo found in the north in the Carpathians were, possibly, introduced 500 years earlier by the Avars. However, genetic testing is required to find out whether the northern and southern populations are separate or not. Even though the origins are not yet clear, it is possible to see that the buffalo have adapted to their local environments: the Carpathian and Transylvanian types have hard hooves for moving over stones and have a thick winter coat. Wherever the buffalo live, this Riverine type loves to swim.

Various traditional products were made with their milk, meat and skins. Their muscle power was used on the farm as traction. Buffalo were valued for their frugality, longevity and triple-use. The negative side of the buffalo is, perhaps, part of the key to its downfall: the cows often only let down their milk for one person – usually the man of the family - they can also be aggressive and are extremely wilful and stubborn. These factors, along with the increased use in tractors and the promotion of high-yield cows led to the buffalo being replaced. Numbers in the last 20 years have decreased from tens of thousands down to, in some countries, too few to make breeding viable without import of new stock.

Successful conservation depends on many factors. The evidence presented at the workshop shows some interesting aspects.

Numerical data shows that large populations exist where there are many products on the market and the animals are essential for local economical structures. Selection (using milk recording), animal recording, and also creating a market for products is important for both conservation breeding and also for the survival of the buffalo as a species of domesticated animals in Europe. However, market demand cannot always be met due to low population numbers. In some countries it is not even possible to produce enough for a niche market - buffalo are kept in a semi-subsistence situation. Difficulties in buffalo husbandry (e.g. their preference to always be milked by the same person) add to the economic constraints, which make buffalo less attractive for new owners. A coherent strategy for addressing this problem needs to be developed.

Subsidies can be useful to increase stock numbers but, as participants

emphasised, buffalo are farm animals not zoo animals, they should be utilised within agricultural production. Subsidies are not a long-term, sustainable solution for conservation of the species. Policy changes can lead to immediate decrease in numbers as subsidies are cut or the focus of them merely changes.
Connecting with nature conservation in protected areas (e.g. grazing) provides a cost-effective eco-management system whereby buffalo can obtain a monetary value without requiring a commercial activity. This, in turn, can be coupled with agri-tourism activities, use within extensive production systems and linked to local traditions and ethnic minorities.
Breeding associations provide essential services – herdbooks, monitoring, farm visits, information dissemination and networking of breeders. This activities are the basis for successful conservation.

Need for action is clear. What that action should look like and in which order activities should be planned, is more difficult. The danger of extinction of buffalo in South-eastern Europe has already been outlined. There is also a risk of inbreeding. Concrete action is required in order to reverse these trends.
In many of the countries concerned, availability of land and land ownership has been negatively affected by historical processes. Land has changed hands, been collectivised or, in some places, national borders have changed. Often it is impossible to find out who really owns a piece of land, this is compounded by the fact that many traditional farms are so small-scale that, to buy a land parcel large enough for a commercially viable buffalo herd would mean tracking down many previous owners and their relations in order to negotiate a purchase. Factors such as this can dishearten even the most enthusiastic buffalo farmer.

Points to consider were taken from the presentations into the discussion round in order to look at them more closely. These were as follows:

• How can farmers, consumers, experts and scientists be better targeted in future actions?
• Are the Southern and Northern populations (Carpathian/Mediterranean) closely related or is there a difference between them?
• Should there be knowledge exchange with Georgia, Turkey and Bulgaria – should they also be in the network?
• What can we learn from the experience in Italy?
• How are stock numbers related to demand for products?
• Milk yield is low – is crossbreeding (e.g. with Italian) an option?
• Carpathian type respond to their owners – is this a barrier for commercial activity?

Summary of the discussion

Conservation and commercial activities need to be separated if cross-breeding is to be used to improve production. Improved production is needed if buffalo are to be utilised in large scale (100+ animals per herd) production. Demand for products is in place but the supply is often poor. Conservation activities should preserve the full range of buffalo type to ensure a large gen pool. Selection for better

production can take place within the conservation activities.
Conservation herds can be utilised in extensive, low-input systems such as grazing in protected areas. These animals are also interesting for the subsistence and semi-subsistence farmers who utilise buffalo for their own needs. With good bull management, conservation breeding with small-scale farmers would be a good option.
Markets for buffalo products (dairy products and meat, depending on country) exist but could be improved upon. Improvements need to be made in production, distribution channels and raising awareness of the unique nature of buffalo products. Organic and other labelling, e.g. DPO or Heritaste® adds value to the products.

Registration and record keeping adds value to individual animals or to herds of buffalo. Registration and recording is poor to very poor in all countries. Some form of payment or benefit in order to motivate animal owners to register their animals is required.
Greece – animals are earmarked according to EU regulations and there are records up to grand-parents. However, there is no production data collected.
Ukraine – the NGO SATrans marks and registers their own animals and is starting a herdbook. There is no production data.
Serbia – animals that are registered for subsidies are earmarked. Earkmarking for all animals is planned but there are inadequate finances for implementing this. There is some production data kept but only for a few animals and only for milk production.
Romania – There is a herdbook and some milk recording done in conjunction with Sercaia. Small farms are unregistered, these farms make up approximately 50% of the buffalo population. Registration and data can be kept by private persons on their own initiative (e.g. Buffalo Breeders Association of Transylvania).
Albania – there is partial registration related to subsidies.

Genotyping of the buffalo found in each country in SE Europe is an expensive but necessary measure that should be conducted as soon as possible. In some countries, populations are so small that breeding lines need to be imported. Genotyping will aid the decision-making process. It is also necessary to ascertain whether the northern "Carpathian" population of buffalo differentiate vastly from the Mediterranean-type or not due to introduction into the area by Avars 500 years earlier than the rest of Europe. Commercial interest in cross-breeding e.g. Romanian with Italian stock is great. However, if the two populations show a significant genetic difference, this cross-breeding exercise may endanger the Carpathian-type enormously. In this case, a move towards investment in performance selection within the Carpathian-type population would be more sensible. Many participants, especially at the Roundtable discussion for Romanian stakeholders, preferred the latter route to improving commercial potential than the route of cross-breeding with Italian bloodlines.
Participants are willing and able to collect necessary samples. Finding a suitable laboratory to conduct the analysis is urgent. A concerted effort to find a suitable partner for this piece of research will be needed. Some institutes

or scientists appearing to be suitable will be directly approached but a more general appeal for assistance will also be made.
It was suggested that samples are also collected in Bulgaria, Georgia and Turkey in order to complete the picture of the area. Although the Bulgarian buffalo are considered to be exclusively cross-bred with Murrah, it is possible that, as in other regions and other species, there are still some remnant populations in cut-off areas that are not.

Exchange of knowledge within the network is very important. This exchange ranges from practical aspects such as discussion of nutrition and monitoring to the more theoretical ideas for conservation strategies. Some factual information was also discussed within the discussion which resulted in the following:
The highest recorded age for a buffalo, according to participants is about 25 years. Buffalo cows have been known to reproduce up to 22 years. These facts should be taken into account when comparing productivity to that of cows. The peak milk production is usually in the 3rd lactation. Buffalo show significant behavioural differences between summer and winter and also between types. Observations show that buffalo move around less in winter and consume very little food. On the pastures in summer, buffalo of the Carpathian-type walk further and grave more than those animals that are phenotypically Murrah-crossbreeds. These animals walk significantly less, rest more and are less integrated into the herd. Buffalo are to be found at altitudes as high as 1700-2000m above sea-level in Georgia. In South Eastern Europe it is reported that they are found up to 1100m in Serbia, 700-800m in Romania and that, during the Greek Civil War, they were used for traction at altitudes of about 1200m. The buffalo found at these altitudes tend to have harder hooves and roughter, longer coats than their counterparts lower down. Whether these animals are a distinct variety of buffalo or not can only be satisfactorily explained by genotype testing.
Populations are stable in Hungary (200 head), Serbia (1200 head) and Greece (3137 head). They are declining in Romania (24246 head), Macedonia (175 head) and Bulgaria (9200 head) – where cross-breeding with Murrah has possibly totally eradicated local stock. Populations in the Ukraine (115 head) and Albania (321 head) are increasing albeit on a low level.

Next steps
The next steps of the Network appear to be clear. The urgent need for genotype testing must be addressed by finding a suitable institute willing to undertake this piece of research. A list of recommendations and priorities is attached. The presentations and other information from the Workshop should be made available online (see: http://www.save-foundation.net /Conferences/Sighisoara.htm)
Furthermore, dissemination channels such as the SAVE Foundation's eNews, the Buffalo Newsletter, DAD-Net etc.

Recommendations and Priorities

The participants of the workshop make a number of recommendations for the conservation of Water Buffalo in South

Buffaloes on Transylvanian pastures

Eastern Europe:

Genotyping is urgently required as a basis for future conservation work. The following people should be approached for this: J. A. Lenstra (NL), B. Moioli (IT). The need for this research should also be widely publicised in order to gain support for it.

Monitoring of populations and holdings is urgently required in countries where this does not already take place. It is important that the age of animals and farmers is recorded. The number of available bulls, the phenotypical characteristics of the animals and the production systems they are kept in should also be recorded. Any products or specialities offered should be noted.

Registration of animals into a herd book where it is not already occurring is essential if an overview of the bloodlines is to be achieved.

An assessment of the capacity for production of local breeds should be undertaken before any cross-breeding occurs. On no account should Murrah be used in Europe, crossbreeding could be effected using Mediterranean Italian semen, improving milk production capacity (Borghese). Europe has enough commercially viable stock that it adapted to local conditions.

Introducing bloodlines from other European countries before genotyping and production recording has taken place may also be a mistake – it is suggested that, with improved production systems, local breeds have the capacity to be just as productive as imported breeds. In countries where no herdbooks are kept, there is no way of keeping imported commercial lines separate from autochthonous conservation breeding lines.

Although the desire to rapidly **improve commercial capacity** in understandable, from a conservation perspective extreme caution is called for as this kind of activity, if not carefully handled could lead to disaster for locally adapted breeds.

The current **level of communication** about the buffalo situation in South Eastern Europe is poor. There are many interested people and associations, institutes etc, however there is very little coordinated response to the situation which is, in some places, critical. The International Workshop on Conservation of Autochthonous Buffalo was a good first step towards improving matters. This must now be built upon so that information is shared and action can be coordinated.

National Workshop on Buffalo Production

"Buffalo Breeding Development through the use of its adaptability in supporting National Beef Self-sufficiency"

Samarinda (East Kalimantan, Borneo, Indonesia), June 21-22, 2011

The Workshop was open by Dr. Ir. H. Ibrahim, Head of Livestock Services, Provincial Government of East Kalimantan, by Dr. Abubakar, General Director for Livestock and Animal production of Agricultural Ministry and by Dr. Bess Tiesnamurti, Director of ICARD (Indonesian Center for Animal Research and Development).

Prof. Antonio Borghese thanked the Authorities and Dr. Chalid Talib for the kind invitation and presented the invited lecture on "Buffalo Breeding Development in Italy" speaking about the criteria in buffalo breeding, selection and genetic improvement in Italy, where the priority is the increase of mozzarella cheese production, about management and nutrition schemes, reproduction technologies and buffalo products and market. Dr. Chalid Talib presented two lectures, the first with Bess Tiesnamurti.

"TECHNOLOGY INNOVATION FOR IMPROVEMENT IN PRODUCTIVITY AND BREEDING OF BUFFALO"

Buffalo has a large enough role for rural communities and also nationally. Unfortunately the preservation of the traditional buffalo and advanced technologies developed through research are very low which is applied in rearing buffaloes. In the other side buffalo targeted as one of the main supporters for meat self-sufficiency of beef since buffalo entered into a program that previously was the PSDS (Program of Self Sufficiency for Beef) to PSDSK (Self Sufficiency Program for Beef and Buffalo). National buffalo population is currently estimated to total about- 2 million, which spread across various Indonesia Agro-eco-system, level of density which is also different. At

Libertado Cruz (Philippines), Antonio Borghese (Italy) and Indonesian Delegates

Antonio Borghese (Italy) and Bess Tiesnamurti (Indonesia)

present per capita consumption of beef and buffalo meat has only reached about 7kg per capita per year with a target of achieving the national consumption of 10.1 kg / capita / year. Meanwhile PSDSK program that is expected to meet target of consumption in the year 2014, experienced the first test of cessation of live sheep exports by the Government of Australia for at least 6 months in the current year 2011. That is until December 2011 there will be no imports of live cattle from Australia that directly means that the buffalo's role will be even greater in subsequent years associated with PSDSK.

So, to get target of self sufficiency program in meat have to be based on current conditions, Indonesia has only one option that is based on local resources owned. Therefore, efforts to accelerate the increase in population and productivity of individuals and local buffalo population as a meat-producing livestock should be done more intensively. Improved productivity is focused mainly to produce high meat production per unit of livestock and increase in population. The two targets for improvement can be achieved through a variety of applications applied technology innovations include feed technology, management, reproduction and breeding. Feed technology focused on feed formulation that meets the standards of buffalo production in accordance with physiological and functional status based on local feed resources. Improved management intended to implement changes to buffalo traditional system without the intervention of technology to the open acceptance of technological innovation and increasing the amount of business scale. Improvements aimed at improving reproductive efficiency through the regulation of marriage and the detection system to accurately synchronize estrous which ended with breeding that produced the maximum number of gestation. While the technology is aimed at the selection and breeding stud formation and their use to minimize the marriage in the family system and suppress the level of inbreeding within the group and together with the application of cattle feed and management technologies to build superior INDONESIA elite buffalo herd.

The second lecture of Dr. Chalid Talib was:

“APPLIED OF BUFFALO BREEDING PROGRAM IN INDONESIA”

Indonesia has a buffalo population of about 2 million head in 2010. The spread of buffalo distributed in the wide area on many islands, accompanied by variations in the ability of adaptation to different ecosystems, agro-socio-culture, and farming system of the local areas. Closed mating system practiced by farmers in each of the islands caused by various things such as transportation and communication difficulties, lack of good bulls, and the minimize in knowledge of farmers as the owner, shortcomings and lack of attention of local government in the past. Regardless of caused of closed breeding system practices but the system carried out at least three main points. **First** is the creation of animal groups that have a high specification adaptation ability in local environments ranging from lowland to highland, dry area until environmental

swamps and rivers and cool temperatures until hot, and rainy season in areas throughout the year until the rainy season is only in 2 - 4 months per year with small number of rainfall. **Second** is the creation of groups of buffalo with the content of a fairly high level of inbreeding which is characterized by the emergence of albino buffalo, horns come-down, low reproductive capacity and low meat production. **Third**, is the target products consumed from buffaloes are for meat and for milk. Therefore, the implementation of the applied breeding program of buffalo in Indonesia needs all the capacity owned by local buffaloes, owned by Indonesia and supported by breeding and reproduction technologies and related technologies to create a system supporting the application of appropriate breeding program of buffalo for Indonesia. So buffalo breeding program should be focused on the Buffalo breeding Institute and related technologies utilizing resources of the agency producing technology i.e. Indonesian Center for Animal Research and Development and Universities as well as utilize the traditional knowledge of farmers. Thus Buffalo breeding Institute will be able to produce superior buffalo bulls to increase buffalo meat, dairy buffalo bulls to increase milk products (only in certain areas) and take advantage of buffalo proven bulls through sperm and embryos of the animals from Foreign Affairs to accelerate the improvement of Indonesian buffalo productivity. Application of out-crossing in the certain areas identified high levels of inbreeding using local males with thinking about environmental conditions and agro-ecosystems that are similar.

The day after a vivacious discussion was held about the possible goals of Indonesia to increase the milk and meat production capacity: as Prof. Borghese proposed the application of A.I. with m Mediterranean Italian breed semen to increase rapidly in F1 the genetic value as milk producers in buffaloes, Dr. Libertado Cruz from Philippines too, as Director of the Carabao Center, showed the experience started in 1993 in his country in crossbreeding to increase the milk production in Swamp buffaloes.

Antonio Borghese

IX ENCONTRO BRASILEIRO DE BUBALINOCULTORES

SANTAREM, PARA', BRAZIL, September 11-14, 2011

The meeting was open with the salutations of Authorities of Santarem, of Government of Parà, of Federal University of South East of Parà (UFOPA), with the Rector José Seixas Lourenco and the Prof. William Vale, the Organizer, the FAO delegates and so on.

Dr. Otavio Bernardes, the President of the American Federation of Buffalo Breeders, presented a lecture on "Situation and perspectives on production chain in buffalo field", prospecting a green revolution as the basis for the diffusion of milk and cheese market, when the milk price in the farms is 1.1 reais (R) and the cheese starts from 10 R until the mozzarella price, link to fat percentage, of 40-50 R (1 US dollar=1.82 R, 1 euro=2.46 R). The meat price is very low as about 3-5 R/kg according the cut value until 12 R/kg for the filet.

The day after, 12 September, Prof. William Vale presented the lecture on "The buffalo in the world context" with several pictures of management, breeding and products in many countries, as afterward Dr. Manfred Thiele, the President of Buffalo breeders in Germany, showed the situation of buffalo products and marketing in his country, where with only 2100 buffaloes, a rich market of high quality products (mozzarella and other cheeses, yogurt, sausages and also beauty products) was created.

Prof. Antonio Borghese presented the invited lecture on "Buffalo and its importance in human food sustainability in the world", sublining the strategic role of this species as a source of protein food (milk and meat) for human survival in the world: as India and Pakistan selected milk purpose breeds (Murrah, Nili Ravi,Kundi) to produce fat for butter, ghee and cream food and defattened milk for direct consumption, as Italy created the best milk breed (Mediterranean Italian) to spread out the market of mozzarella, ricotta and other luxurious cheese in the world, according Italian cooking style. Other countries as China, Bangladesh, Indonesia, Philippines, Iran, Turkey, adopted a different strategy to increase the milk production and availability for human need as the importing of high quality semen to apply crossbreeding on Swamp and River breeds where the milk potential is very low.

Dr. Pedro Paulo Assef presented the lecture on "the buffalo as alternative for milk production in Ribeira Valley", that is very rich of pasture at 160 km from S. Paulo, showing milk productions about 2400 liters in the first lactation, with several cheese products as provolone, parmesao, mozzarella.

Rodrigo Barauna Pinheiro, of Simoes Group, Manaus, Amazonas, showed the management system in Amazonas

Buffaloes in Amazonian pastures

lands, where the flood is the reality and the buffaloes swamp in lagoons, anyway the milk production is high for the use of Italian semen in A.I. by high genetic value bulls as Malandrino, Jafar, Napoli, obtaining several products as “La vera mozzarella”.

Nelson Prado showed the management system in his farm “Fazenda Laguna”, 90 km from Fortaleza, with rotation pastures, irrigation, sugar can production, selection for milk and meat purposes, health control, no consanguinity, milking machine and other technologies.

On September 13 started with the lecture by Prof. Pietro Baruselli, from S. Paulo University (USP-SP) “Perspectives in buffalo reproduction”, showing the effect of A.I. in the genetic improvement and the different technologies in estrous detection, in estrous synchronization, in superovulation and embryo recovery.

Prof. Haroldo Lobato Ribeiro, from Universidade Federal Rural da Amazonia, spoke about the Artificial Insemination in flood areas, where the used breeds are Jaffarabadi, Murrah and Mediterranean, the identification is on the horn and the health problems are brucellosis (30%) and TBC (16%).

Prof. Marilia Viviane from UPIS; Brasilia, spoke about the management and feeding of calves, as Prof. André Jorge, from UNESP, Botucatu, presented the requirements in dry matter, water, energy and protein for milk production.

The meeting finished with a round table on the problems of marketing in meat lines and in milk and cheese lines.

IRAQI BUFFALO STATUS AND PERSPECTIVES

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HISTORY AND POPULATION

There are many ideas regarding the back history of water buffalo in Iraq , the dominant one was that buffaloes had been domesticated since third millennium B.C in Mesopotamia during Sumerian Era (Zuener,1963; Sousa,1983). Buffaloes is considered one of the animals that has wide spread in the marshes area in the south of Iraq. There is no house in the marshes area don't have it. Buffaloes lived with circumstances of the environment. It is considered as the main source for living the people of marshes. It was considered as a source of insurance for care taker and his family to face the requites in that area. The buffalo isn't get the sufficient importance in the past either by centers of investigation or by the agriculture offices or by veterinary organizations (Al-Fartosi, 2010). The latest Iraqi buffalo population is estimated about 285,537 head and distributed on 15 provinces with highest percent on the Basra province in south marshes (57704 head), Thi-Qar province (49283 head), Baghdad (47809 head mainly in fadiliaya village in the east boundary of the capital) and Missan province (24345 head) (MOA, 2008).

The number of buffaloes in Iraq was 250 thousand head in the middle of the last century, and was a source of livelihood for a large segment of the rural population and especially the inhabitants of the marshes.

However, and due to political and economic circumstances experienced by Iraq during the last five decades, from wars, draining the marshes, economic blockade and removal of subsidies on feed, and thus migration of buffalo farmers from the South part to other regions in middle and north parts of Iraq, for more water and fodder is cheap, that number has dropped dramatically (Alsaedy, 2007).

In addition to the low number of buffalo, productivity of milk and meat have been reduced, which led to the inability of local production of red meat and dairy products to meet the increasing demand for these products, increasing demand due to the increase in population, rising per capita incomes and high rates of urbanization.

Too little research and studies have been held compared to some other farm animals and most of that research has been conducted in private stations established for this purpose.

PRESENT STATUS

The population of buffaloes in Iraq at 1960-1970 was 250000, they declined for many reasons as before reported.
The management pattern of buffalo herd is private sector with small holders ranging between 5 and 50, with some herd more than 150 head.
The objectives of buffaloes keeping are:
Fresh milk and thick cream (Gymair) production. Males are used for slaughtering after weaning others males are used for reproduction (natural), there's no artificial insemination neither semen collection and breeding depend on breeders skills only. The reproduction season begins at the end of autumn and the most of calving takes place to the end of summer. The mortality of calves is 10% and adult mortality is 5%, due to feed shortage and absence of state support for concentrates. Therefore many buffalo keepers slaughter their females and many others change their jobs.
Buffaloes suffer from low reproductive efficiency (hypo fertility)with high percent of uterine abnormality, hemorrhagic septicemia, foot and mouth disease and brucellosis which contributed in decline rate of population (MOA, 2006) .
The other problem in our buffalo industry is the difficulty in the products marketing especially in marsh land far from the city center (no milk collection dealers, no milk plants).
The performance of our adult buffalo female is 6 liters milk per day, with lactation length of 250 days and 7.95% fat. We have a good daily weight gain in feedlots up to 780 g (Jumma, 1997).
The biggest challenge in buffalo industry in Iraq is the loose and absence of infrastructure of buffalo raising, especially three big problems:
1. Absence of farmers' own land for agriculture purpose to support feed shortage, most farmers in Iraq have illegal lands for buffalo raising.
2. Absence of milk plants to receive farmers' milk that leads to loss of the products especially in hot seasons.
3. Common outbreak of diseases hemorrhagic septicemia (H.S), Brucellosis, and foot and mouth disease (FMD), especially in south marshes in Iraq, without strict preventive measures.

PERSPECTIVES

After American occupation, exactly in 2006, the Ministry of Agriculture was going to establish the department of water buffalo in 2008, as the first step in history of Iraq to develop this ancient indigenous animal, so there are many achievements made by this department as below:
1. Four national centers will be established in recent five years at four provinces in capital (Baghdad), north (Nineveh), south (Thi-Qar) and Euphrates area (Najaf). The main purpose for these buffalo centers will be the updating of Iraqi buffalo informations by conducting many researches in all fields that are uncovered by Iraqi researchers.
2. Support the buffalo farmers by concentrates and free veterinary services.
3. Hold Annual Conference to discuss the new buffalo researches from all over the country.
4. Establish a new Iraqi buffalo farmers association (GILGAMMOS) to connect with others in the world.
5. International Buffalo Federation (IBF)

membership with national focal point.
6. Support buffalo farmers all over the country, with facilitated loans to develop farms.
7. Apply biotechnology researches to develop buffalo introducing new genetic resources, which begins with researches in Baghdad.

Too, many researches were performed on water buffalo in marshes of Iraq after 2003, related with comprehensive studies for water buffalo in provinces of south of Iraq, M.Sc. thesis related with physiology and ecology of water buffaloes, some researches on hormones and lipid profile of buffaloes.
Beside all these important steps to develop our buffalo, also we need the urgent cooperation and support from developers ,researchers and national organization deal with this animal , and we think that our buffalo has a good potential profits, quite similar to the others in advanced countries, still we need more time and ongoing hard plans to discover.

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Buffaloes in South Iraq

MILK COMPOSITION, RENNET COAGULATION TIME AND UREA CONTENT IN ANATOLIAN BUFFALO MILK OF ILIKPINAR VILLAGE (HATAY PROVINCE)

I. Environmental Factors

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Abstract: The objectives of this study were to investigate the effect of environmental factors on composition, renneting time, urea concentration, acidity, density and pH of Anatolian Buffaloes milk. As a total of 115 milk samples from 53 cows that were calved in 2004 and 2005 in 8 units of Ilıkpınar Village were collected in morning milkings in June, September, December and March. The cows were on their lactation days 30±15, 60±15, 90±15, 120±15, 150±15, 180±15, 210±15, 240±15 and 270±15. The milk samples were analysed for total dry matter, fat, protein, ash, density, pH, acidity, renneting time and urea content. Rennet coagulation time, urea, protein and fat contents were determined using Berridge, photometric, formol titration and Gerber methods, respectively. Data were classified as follows; lactation stages: 1 (30±15, 60±15, 90±15 days): 2 (120±15, 150±15, 180±15): 3 (210±15, 240±15, 270±15); calving year: 1 (2004), 2 (2005); calving season: 1 (January-May), 2 (September and October); month of samples collection: 1 (June), 2 (September), 3 (December), 4 (March); lactation order: 1 and 2 : 1, 3 and 4: 2, 5 and 6: 3. Effects of environmental factors on each variable were investigated separately and analysed using analysis of variance.
Production mount on all the characteristics; calving year and lactation stage on most of the characteristics; lactation order on fat and protein contents; unit and calving season on some of the characteristics were found to be affected significantly.

Key Words: Buffalo, milk properties, variation sources

INTRODUCTION

It is a well established fact that there are several factors affecting milk composition. -It varies from one genotype to another (1, 2). Feeding (3), lactation stage (4, 5, 6) production season (7, 8) and calving season (7, 9, 10, 11) have significant effects on fat, casein, protein and total dry matter (TDM). Lactation order also has important influence on milk yield and its constituent contents (4, 10) although Şekerden et al (5), reported that lactation order did not have an important effect on any milk component percentage in Anatolian buffaloes.

Milk coagulation properties [rennet coagulation time, firming time and firmness of clot] are very important to cheese production and can be affected by genotype (2, 12), season, lactation order, lactation stage and feeding (13). These properties change throughout lactation as milk yield, protein and fat concentrations change. Lactation number does not have a significant effect on milk coagulation ability (12), whereas season has such an effect owing to the reduction in urea content of milk (14). Foltys et al. (15) determined that urea content of milk rises from 29.2 mg/100 g in winter to 36.07 mg/100 g in May; protein, fat and lactose contents decreased in the same period from 3.06% to 2.77%, 4.27% to 3.92%, 4.80% to 4.60%, respectively. Feeding level is effective on urea content of milk (16).

Milk coagulation properties differ significantly from one unit to another. The differences are due most likely to feeding and management factors (12). Povinelli et al. (2) found that breed, herd and lactation stage had a significant effect on milk coagulation ability on five different dairy cattle breeds unlike the urea content. pH has a negative effect on milk coagulation ability (17).

Milk urea concentration can be used as a tool to monitor crude protein and energy intake (18) and is related to the rate of protein-energy in ration and crude protein intake (19, 20). In order to use milk urea concentration as a tool to identify any imbalances related to feeding, in addition to feeding related factors such as food intake and ration composition and other factors, their levels of effect have to be determined and should be taken into consideration to interpret urea concentration (21). These factors can be ordered as sample collection season, analysis method, live weight of animal, parity and milk yield of cow (22). Roy et al. (23) reported that a significant reduction occurred in milk urea concentration as the lactation number increased. However, lactation stage did not have significant effects on urea and protein concentrations of milk.

Hojman et al. (24) showed that milk urea level was higher in summer and increased with lactation number for adult cows. Relationships with milk urea content and crude protein, ruminal digestive protein and fibre content of ration were positive, but the relationship between urea content and ration energy was negative.

The objective of this study is to investigate the effect of environmental factors on milk composition, rennet coagulation time, urea concentration, titratable acidity, density and pH of Anatolian Buffaloes' milk.

Material and Methods

The material of the study consisted of 115 milk samples from 53 Anatolian buffalo cows of Ilıkpınar Village of Kırıkhan District of Hatay Province in 8 units that they were calved in 2004 and 2005. Milk samples were collected from the morning milking in June, September, December and March from the cows on lactation days 30±15, 60±15, 90±15, 120±15, 150±15, 180±15, 210±15, 240±15 and 270±15.

From the beginning of June 2004, milk samples were collected from all the buffalo cows in morning milking monthly on milk control days of June, September, December and March. The samples were analysed for total dry matter, fat, protein, ash contents, pH, density, rennetting time and milk urea content. Protein and fat contents were determined by formol titration (25) and Gerber methods (26), respectively. Rennet coagulation time was determined by recording time from the addition of enzyme to milk to the appearance of first clot using Berridge method (27). Milk urea content determined with diacetyl monoxime using photometric method, as described in Merck handbook (28). Data were classified as follows; 30±15., 60±15, 90±15 days: 1st.; 120±15, 150±15, 180±15: 2nd.; 210±15, 240±15, 270±15: 3rd Lactation Stages (LS). 2004: 1st, 2005: 2nd Calving Years (CY); January-May period: 1st, September and October Months: 2nd Calving Seasons (CS); June: 1st, September: 2nd, December: 3rd, March: 4th Production Months (PM); 1st and 2nd : 1st, 3rd and 4th: 2nd, 5th and 6th: 3rd Lactation Order (LO) groups.

The effect of environmental factors on each characteristic were analysed separately using variance analysing technique. The means and correlation coefficients of each character were calculated. SPSS programme (standard version, SPSS Inc.) were used in the statistical analysis.

Results

Variance analysis are given in Table 1, 2 and 3.

Table 1. Variance analysis for morning and daily milk yields, rennet coagulation time and pH

Variation source	f.d.	F			
		Morning milk yield	Daily milk yield	Rennet coagulation time	pH
Unit	7	11.400***	12.149***	1.193	2.841*
Production month	3	7.275***	8.531***	12.931***	3.246*
Calving season	1	6.516*	0.474	4.563*	0.066
Lactation stage	2	0.067	5.424**	10.049***	7.076**
Calving year	1	1.371	5.295*	13.169***	2.918*
Lactation order	2	1.915	1.360	0.972	1.699
Total N		115	115	115	115

*P < 0.05, **P < 0.01, ***P < 0.001

Table 2. Variance analysis for TDM, fat, ash contents and density

Variation source	f.d.	F			
		TDM	Fat	Ash	Density
Unit	7	0.997	0.644	0.781	1.508
Production month	3	6.017**	3.025*	19.797***	22.553***
Calving season	1	0.002	0.842	0.003	0.085
Lactation stage	2	3.611*	10.758***	4.610*	3.534*
Calving year	1	38.739***	46.880***	14.403***	35.519***
Lactation order	2	0.356	3.377*	0.805	0.740
Total N		109	109	107	107

*P < 0.05, **P < 0.01, ***P < 0.001

Table 3. Variance analysis for titratable acidity, protein and urea contents

Variation source	f.d	F		
		Titratable acidity	Protein	Urea
Unit	7	5.497***	1.225	1.831*
Production month	3	4.898**	9.191***	6.081**
Calving season	1	1.758	5.425*	1.293
Lactation stage	2	9.687***	3.869*	0.689
Calving year	1	12.733**	110.153***	1.110
Lactation order	2	1.185	3.538*	1.223
Total N		115	109	100

*P < 0.05, **P < 0.01, ***P < 0.001

Discussion

As can be seen in Table 1, morning milk yield was affected by unit (P < 0.001), production month (PM) (P < 0.001) and calving season (CS) (P<0.05); daily milk yield was affected by unit (P < 0.001), PM (P < 0.001), lactation stage (LS)(P < 0.01) and calving year (CY) (P < 0.05) significantly. Differences in daily milk yield between CY can be explained by differences in feeding level during the year, year to year and unit to unit. As opposed to the literature (4, 10), the effects of lactation order (LO) on morning and daily milk yields were found not significant in this study (Table 1).

As is clear from Table 2, PM (P < 0.01), LS (P < 0.05) and CY (P < 0.001 were influential on TDM content. The effects

of PM and CY can be explained by feeding conditions since a pasture-based feeding in the Village was commonly employed. The literature also supported that PM (4, 7, 8) and LS (5, 6) effects on TDS were significant. However, the effect of lactation order on TDM content was found insignificant on Anatolian buffaloes in an earlier study (7).

PM ($P < 0.05$), LS ($P < 0.001$), CY ($P < 0.001$) and LO ($P < 0.05$) were influential on fat content significantly. The effects of PM and CY on fat can be explained by feeding level. The literature supported the significant effects of PM (7, 15) and LS (4, 5, 6) on fat content, except for one study (5) where the effect of LO on fat content was reported insignificant (4, 10) (Table 2).

Ash content was also affected by PM ($P < 0.001$), LS ($P < 0.05$) and CY ($P < 0.001$) (Table 2). PM ($P < 0.001$), CS ($P < 0.05$), LS ($P < 0.05$), CY ($P < 0.001$) and LO ($P < 0.05$) were found to be effective on protein content significantly. Alteration in milk fat and protein contents are related to feeding level and climatic conditions. Literature also confirms that PM (7, 8, 15), and CS (7, 9) are influential on protein content of milk. The significant effect of LO on milk protein content was also reported (4, 10), as opposed to the findings of Şekerden et al (5). The milk yield varies due to LS and there are negative relationship between milk yield with fat and protein contents of milk. Protein and fat contents were highest at the beginning and end of lactation, and lowest during peak lactation associated with milk yield (1, 4, 11) (Table 3). Roy et al (23) reported that LS did not have a significant effect on milk protein concentration in Murrah buffaloes.

The pH of milk samples were affected by unit ($P < 0.05$), PM ($P < 0.05$), LS ($P < 0.01$) and CY ($P < 0.05$); the density was similarly affected by PM ($P < 0.001$), LS ($P<0.05$) and CY ($P< 0.001$) significantly. PM ($P < 0.001$), CS ($P < 0.05$), LO ($P < 0.001$) and CY ($P < 0.001$) were effective significantly on RCT (Table 1). Literature reports that milk coagulation properties can be affected by production season, feeding level (12, 13, 14) and LS (2, 12, 13); coagulation properties are well related to alteration in fat and protein contents at the beginning and end of lactation. However, the significant effect of LO on coagulation properties are reported by some researchers (13) whereas findings supporting our results were reported by the others (12).

In spite of literature indicating that milk coagulation properties vary from one unit to another significantly, this was found insignificant in our study since feeding was based mainly on village pasture, and supplement fodders were almost the same in every unit (Table 1). Titratable acidity was affected by unit ($P < 0.001$), PM ($P < 0.01$), LS ($P < 0.001$), CY ($P < 0.01$) at significant levels (Table 3). Similarly, urea content of milk was affected by unit ($P < 0.05$) and PM ($P < 0.01$) significantly (Table 3). It can be suggested that urea concentration was affected by only feeding level since both sample collection months and unit factors are related to feeding levels. It is reported that production season (14) and feeding level (15, 16, 24) are effective on milk urea concentration. It was also reported that milk urea concentration is affected by LO significantly (23, 24), but LS does not have an important effect on milk urea concentration (23) as was found in our study (Table 3).

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Anatolian Buffaloes in Ilikpinar

HUGH POPENOE OBITUARY

Hugh Popenoe, age 82 of Archer passed away Wednesday, September 21, 2011 in Gainesville.

Born in 1929 in Tela, Honduras, Hugh devoted his life to the tropical world, its people, and its agriculture. His education in Guatemala prepared him for a B.Sc. in Irrigation and his first employment in Thailand. He entered the University of Florida where he studied for his PhD on the effects of shifting cultivation on basic soil properties near Lake Isabal in Guatemala. He spent the rest of his professional life teaching for the University as a professor in Soils and Water Management, Botany, Agronomy and Geography and being involved in various international activities. After directing the Caribbean Research Program, he was appointed Director of the Center for Tropical Agriculture in 1965; Director of International Programs in Agriculture in 1966. He initiated and was Director of the Florida Sea Grant College from 1971 to 1978 and performed the duties of Chairman of the Council of Sea Grant Directors during this time. At the National level he chaired the joint Committee of Agricultural Research and Development of the Board of International Food and Development and also served on the Board of Science and Development of the National Research Council (NRC) and chaired the Advisory Committee of Technology Innovation. Hugh was the chairman or committee member of 16 NRC publications and also a member of the National Science Foundation International Advisory Committee, and founder and president of the American Water Buffalo Association.

Internationally, Hugh was a past President and Emeritus Board member of La Escuela Agricola Panamericana (Zamorano) in Honduras. He was a trustee of the International Foundation for Science and a founding board member of the Organization for Tropical Studies. He was a fellow of the Soil Science Society of America, the American Society of Agronomy, the American Association for the Advancement of Science, and the American Geographical Society. He was awarded the Science Pioneer Prize of the Egyptian Veterinary Association of Buffalo Development, and was a Visiting Lecturer on Tropical Public Health at the Harvard School of Public Health.

He and his sister, Dr. Marion Popenoe de Hatch, donated their colonial home in Antigua, Guatemala, built in 1636, to the Universidad Francisco Marroquin to preserve the colonial heritage of Latin America Continuing his interest in preservation, Hugh was a supporter of the Legacy Institute for Nature and Culture and the Conservation Trust of Florida. This past year was spent in preserving an 1873 board and batten school house on his property in Levy county.

In 1964 he was honored as "Professor of the Year in Agriculture" and continued teaching throughout his years as an administrator. Of all his activities and accomplishments, Hugh was most proud of his more than 300 graduate students and of his honor in 2009 as the first recipient of the Charles B. Heiser, Jr. Mentor Award which he received from the Society for Economic Botany in recognition of substantially impacting the Training and Professional Development of Students.

He was a Founder of International Buffalo Federation and he is remembered by all the IBF Delegates.

He is survived by Betty Haeseker, Marion Popenoe de Hatch, Sally Popenoe and several nieces and nephews.

BUFFALOES IN THE PUNJAB VILLAGES

At the end of August 2011, Pakistan was hit by monsoon rains , that caused flood and devastation. More than 1700 people died and 21 million people with 10 million children lost everything, looking at the violence of water sweeping away their houses, their properties and their family animals, buffaloes, goats, sheep, donkeys, horses, that are essential to give milk, meat and work to the families. The destroyed houses are 300,000, the flood paralyzed all the Pakistan, particularly Punjab Region, that is in emergency state: agricultural productions are lost, the properties are destroyed, the animals died. After that new pathologies are evidenced, caused by infected water and by low hygienic conditions in the villages, without drinkable water and electricity: more than 500,000 people are hit by malaria, cholera and other infections. Many clubs of the Rotary International moved soon in the first emergency period sending containers with relief supplies, working with District 3271 and 3272 (Pakistan), where local clubs distributed the goods and purified water. The Rotary Foundation is accepting contributions to fund Rotary projects supporting long term disaster recovery. “The people of Pakistan were not prepared for a disaster like this to reach this magnitude” said Shehzad Ahmed, Governor of District 3272 (Pakistan).

The project of Rotary Club Monterotondo- Mentana (Roma, Italy), Rotary District 2080

After one year from the disaster, the people need food, safe drinking water and medicine. We have to help the families giving them the animals that produce food as in the past: in each village there were milking buffaloes, producing the milk for the family, who utilizes the milk fat to produce butter for cooking purposes and creams and drinkable milk, very rich of protein for children requirements. The buffalo is the best animal in Punjab, for the high production of milk (about 10 liters for day), for the high capacity to work in the flood fields, as rice fields, it is the only swimmer animal, very adapted to the hot and humid climates. After that, it is possible to utilize the male calves to produce high quality meat, bone and skin for local production purposes.
Therefore **the first project** goal is to give some milking buffaloes to the villages where the families lost the animals for surviving. The cost of each buffalo is about 500 euros, so we can create a modular plane according the funds, starting from a basic plane to buy 40 buffaloes for 40 poor families in damaged villages. The International Buffalo Federation, Roma, Italy, the University of Veterinary and Animal Sciences in Lahore, Pakistan, Mr. Raza Khursand, Deputy Governor of the District 3272 (Pakistan, Afghanistan), of Rotary Club of Lahore Mozang, were just involved to identify villages that lost the buffaloes and to find the buffaloes for this purpose.
The second project goal is to give to the villages without drinkable water and electricity a machine that produce electricity and the capacity to pump the water by animal work. This machine, very simple , was invented by a Rotarian, Dr. Antonio Perrone and tested by the Institute of Agriculture Mechanization in Monterotondo, Roma, Italy, with the cooperation of the International Buffalo Federation. It can be produced locally with low cost and used to pump the water by the buffalo work and provide drinkable water to the villages. The cost of each machine could be about 500 euros.

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