Buffalo Newsletter

Number 21 - December 2005

EUROPE - NEAR EAST

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

# BUFFALO INTERNATIONAL ACTIVITIES

**M**any activities were held about buffaloes in the world from October 2004 until April 2006.
We have to start remembering the 7th World Buffalo Congress, held in Manila, Philippines on October 20-23, 2004, organized by Dr Libertado C. Cruz, the President of the International Buffalo Federation (IBF) and the Executive Director of the Philippines Carabao Center, by the Philippines Society of Animal Science and the Department of Agriculture. This Congress involved all the scientific and political Authorities of Philippines and more than 700 people from all the countries of the world. The proceedings, including 172 papers and 31 invited papers, represented the state of art in the research in all the buffalo fields (animal health, breeding and genetics, meat and milk production, nutrition, physiology, reproduction, socio-economic). During the IBF plenary meeting, prof. Luigi Zicarelli (University Federico II of Napoli, Italy) was elected President of IBF, that means he will organize the 8th World Buffalo Congress in Caserta, Italy on 2007, October 20-23 (for information call: zicarelli@wbc2007.org, info@wbc2007.org).
Libertado C. Cruz handed the flag of the IBF to the Italian delegation for the next Congress with the wishes for the success and the development of the buffalo species in the world.
An international workshop was organized on 16-17 July 2005 at Pune in India by the Bombay Veterinary College in Mumbai and by the Maharashtra Animal and Fishery Sciences University in Nagpur, according to proposals of the Indian Minister of Agriculture and the Government of Maharashtra, to discuss and to resolve the problem of low productivity and fertility, low disease resistance and heat tolerance in dairy cows, following the adopted policy in early 1970s of crossbreeding low producing indigenous animals with high production exotic breeds. In the second day issues related with buffalo genetic improvement had been discussed and a detailed report is referred by Dr G.M. Terzano in the following pages.
The Third Italian Buffalo National Congress (Congresso Nazionale sull'Allevamento del Bufalo) and the First Buffalo Symposium of Europe and the Americas was held in Capaccio – Paestum (Salerno), Italy on 2005, October 12-15. This means a radical change from the First Italian Buffalo National Congress (Eboli 2001) that was really a National Congress, to the Second one (Monterotondo, Roma 2003) that was linked to the 54th Annual Meeting of the European Association for Animal Production with the Satellite Symposium "Recent Progress in Buffalo Reproduction", organized by the FAO Inter-Regional Cooperative Research Network on Buffalo, with the proceedings in English only for the Symposium, until the Third one, that was really an international Congress with the proceedings both in English and Italian languages (5 invited lectures and 125 papers) and the presence of many researches from America and of a numerous China delegation. The Third Italian Buffalo National Congress was organized by the National Association of the

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Buffalo Breeders (ANASB), by the University Federico II in Naples, by the Istituto Sperimentale per la Zootecnia in Rome (Animal Production Research Institute), by the two Istituto Zooprofilattico Sperimentale (Animal Prophylaxis Research Institute) in Naples and in Rome; the President was Prof. Luigi Zicarelli. During this Congress the IBF (International Buffalo Federation) meeting was held on October 14, 2005 in Paestum by the IBF President Luigi Zicarelli and by the IBF General Secretary Antonio Borghese. The list of the Founder members and of fellows of IBF was approved. The 2005 balance sheet was approved. The needs that each Country indicates the representative members and pay the fee was underlined and confirmed.
About the organization of the 8th World Buffalo Congress, Raffaele Garofalo, the President of ANASB, disposed the availability to organize the Congress that will be held in Caserta on 20-23 October 2007. Dr: Marco Zava, representative for Argentina, proposed his country as candidate for the 9th World Buffalo Congress on 2010.
The 5th Asian Buffalo Congress was organized on 18-22 April 2006 in Nanning (China) by Prof. Yang Bingzhuang, President of the Asian Buffalo Association (ABA) and Director of the Buffalo Research Institute in Nanning, Guangxi Autonomous Region, by the Bureau of Guanxi Aquaculture and Animal Husbandry and by the Chinese Academy of Agricultural Sciences with the title "Social economic contribution of buffalo to rural areas".
The people, coming from different countries of the world, was host in the beautiful Li Yuan Resort in Nanning, with lakes, waterfalls and gardens with tropical flowers.
The first day, April 18, the Congress was opened by Mr. Chen Ronggui, Director of Bureau of Guangxi Aquaculture and Animal Husbandry, who met and presented the distinguished guests in the plenary session in the conference hall. Opening remarks were presented by Mr. Liu Chengguo, Former Minister of Ministry of Agriculture and Director of Dairy Association of China, by the leaders of Agricultural Ministry, of Chinese Academy of Agricultural Sciences, of Guangxi University. Greetings were presented by the President of IBF, prof. Luigi Zicarelli, that you find in the following pages. Prof. Yang Bingzhuang presented an introduction report on the aims of the Congress, as improving knowledge, intensifying international cooperation, promoting scientific innovation, improving breeding and selection, nutrition, health and production of milk and meat.
Afterwards in plenary session the lead papers were presented with the following titles: "Genetic resources of water-buffalo in China" by Prof. Wu Changxin of Agricultural University, China, "History, current situation and future trend of Chinese animal husbandry" by Prof. Zhang Ziyi of Institute of Animal Science, China, "Dairy buffalo on small farm: the approach towards rural development" by Prof. Ibrahim Soliman of Agriculture University in Zagazig, Egypt and Vice president of IBF, "Genetic improvement strategies in buffalo" by Prof. Antonio Borghese of Animal Production Research Institute, Monterotondo, Roma, Italy, General Secretary of IBF and Coordinator of FAO Buffalo Network, "Buffalo development in Asia: current situation and future trends" by Dr. S.K. Ranjhan of Hind Agro Industries Ltd, New Delhi, India and Vice president of IBF, "Buffalo development in Europe: current situation and future trends" by Prof. Luigi Zicarelli of Federico II University, Naples, Italy and President of IBF, "Buffalo Development in America" by Dr. Jesus Reggeti, buffalo breeder and Vice president of IBF, "Development of Indian buffalo as dairy animal" by Dr. O.P. Dhanda of Indian Council of Agricultural Researh, New Delhi, India and General Secretary of ABA, "Buffalo development in the Philippines: current situation and future trends" by DR. Libertado C. Cruz, Director of the Philippines Carabao Center, Past president and executive Officer of IBF.
On April 19 the papers were presented and discussed in different sessions: Breeding and genetics, Nutrition and management, Animal health, Industrialization and socio-economics, Reproduction.
On April 20 three sessions were open: Reproduction, Physiology, Milk and meat. In the afternoon the Guangxi Buffalo Research Institute was visited and many buffalo cows and bulls of local breeds, imported breeds (Murrah and Nili-Ravi) and crossbreds were shown. The Guanxi Zhuangniu buffalo dairy CO.,LTD Industry was visited too, with mechanized implants of manufacturing dairy products, as milk, yoghurt that were tested by visitors and found of high quality.

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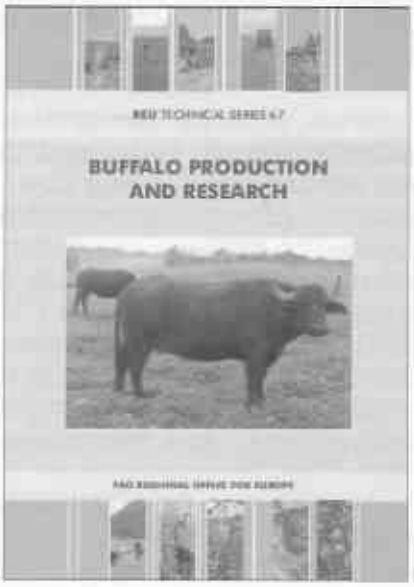
In the night there was the closing ceremony with a rich and typical banquet with many Chinese dishes and the new President of ABA was announced in the person of Prof. Talat Naseer Pasha, from Veterinary University in Lahore, Pakistan, who will organize the 6th Asian buffalo Congress in 2008.
The day after, the Guilin Xiangbala Ecological Agriculture Development Ltd farm was visited, many animals of different buffalo breeds and crossbreds were shown and buffalo products were tested.
During the congress there was the opportunity to held a IBF meeting, at 20,00 on April 18, 2006, with the presence of the President Luigi Zicarelli (Italy), the General Secretary Antonio Borghese (Italy), the Vice presidents S. Ranjhan (India) and I. Soliman (Egypt), the Past president Libertado C. Cruz (Philippines), the representative members of the Standing Committee Jesus Reggeti (Venezuela), William Vale (Brazil), G.M. Terzano (Italy), Hamid Naderfard (Iran), O.P. Dhanda (India), Yang Bingzhuang (China). Borghese introduced Hamid Naderfard, recently nominated officially from Iran Government as representative of his country. Zicarelli and Borghese asked help and suggests to organize the next 8th World Buffalo Congress in Caserta, Italy on October 2007.
Ranjhan underlined the importance of link with industry and suggested a session on "Food". Other innovative sessions were proposed as "pollution" "identification of food and animals" in alternative to the classic sessions. Zicarelli asked to send suggestions by e-mail. Borghese spoke about COST project to unify different countries with international activities.

**Antonio Borghese**

## "Buffalo Production and Research", REU Technical Series 67

In the book *"Buffalo Production and Research"*, edited by Antonio Borghese by FAO Regional Office for Europe, REU Technical Series 67, the state of art of the research, development, products and market of buffalo species in the world, is presented.
The 14 chapters analyse single themes of principal problems concerning the breeding, the selection, the reproduction, the feeding, the milk and meat quality, the buffalo's pathologies.
The great direct experience of the Editor, consequent by his work in the different international Organizations, is noted, particularly in the chapters on strategies, breeds, management systems utilized in different countries, in different continents.
Many coloured photos of different buffalo breeds, with their somatic and productive characteristics, with their social and economic aspects, are really an absolute new at editorial level.
Three chapters on reproduction, very specialized and actual, are cured by V.L. Barile and G.M. Terzano, researchers working by many years with the Editor.
The chapter on requirements, cured by S. Bartocci, S. Terramoccia and A. Borghese, is very useful for the preparing of diets.
There are more some important, new and complete chapters, one on the digestive physiology, another on the metabolic and hormonal parameters, the last on the pathologies in buffaloes, cured by different Authors.
The book is concluded by the chapter on buffalo international organizations and by an useful list of acronyms.

*Alessandro Nardone*



# GENETIC IMPROVEMENT WORKSHOP ON 16-17 JULY 2005 AT PUNE (INDIA)

**Giuseppina Maria Terzano**

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**A** workshop on "Genetic improvement in cattle and buffalo"was held on 16-17 July 2005 at Pune, India.
The idea of this workshop was proposed by Sri Sharad Pawar, Hon. Union Minister for Agriculture, Government of India, by Shri Balasaheb Thorat, Hon. Minister for Agriculture, Government of Maharashtra and by Shri Anees Ahmed, Hon. Minister for Animal Husbandry, Dairy and Fishery, Government of Maharashtra who desired to hold an interactive brain-storming workshop, specially to learn from international experience and to undertake the matter of genetic up-gradation of Indian cattle and buffalo health in a planned manner.
It was organized by Dr. A. Samad of the Bombay Veterinary College, Department of medicine (Mumbai) and by the Maharashtra Animal and Fishery Sciences University (Nagpur).
The purpose of this workshop was to create a place for discussion in the area of planned genetic improvement to achieve significant progress in enhancing the efficiency and productivity in Indian dairy animals, planning a genetic improvement programme involving not only genetic improvement but also other inputs such as nutrition and healthcare.
A number of breeding experts from countries, such as Switzerland, Usa, Australia, Israel, Italy, and Canada, have been invited for sharing their breeding systems, infrastructure and technologies required to achieve significant progress in enhancing the production in their dairy animals.
The first day has been devoted for issues related to cattle whereas on the second day issues related with buffalo genetic improvement have been discussed.

On the first day Dr. Haja Kadarmideen, from Switzerland, with a lecture on *Dairy cattle breeding strategies for low input systems* has reported on:
1) *Cattle breeding in Developed countries*, summarizing developments and current status, with an overview of Swiss Agricultural Policy.
2) *Cattle breeding in Developing countries*, with the focus on India, extrapolating results from other developing countries to Indian situation. Also he mentioned what desirable traits to improve or which breeds with these desirable traits needs improving and how such genetic improvement could be achieved.
3) *Summary of suggestions for Indian Cattle breeding Schemes* (based on experience in other developing countries) making some suggestions for genetic improvement of cattle, with the possible Indo-Swiss business and research partnership.

Subsequently Dr. A. E. McClintock, from Sydney, with a lecture on *Genetic improvement of dairy cattle in Australia and its relevance to India* has reported on:
1) The dairy genetic improvement system in Australia, pointing on role of breed societies, co-ops, government, local private companies, international semen sellers, international dairy companies.
2) Development of "adapted" breeds, showing the different strategies that could be considered.

After Dr. E. Ezra from Israel with a lecture on *Dairy cattle breeding in Israel* has reported on:
1) the general characteristics of agriculture in Israel, describing the history of dairy cattle breeding in Israel and including the development of the Israeli Holstein breed and the current status of the Israeli dairy cattle population.
2) the Israeli dairy cattle breeding program, based on the progeny testing program.
3) the genetic and phenotype trends in Israel for productive and unproductive dairy cattle traits (Kgs of milk, fat and protein, percentage of fat, protein and female fertility, somatic cell score).

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The lectures of Dr. P. Kalarickal from USA on *Genetic improvement of Dairy cattle in India: a global overview and practical approaches* and the lecture of Dr. R. Lange from Canada on *Cow genetic improvement in Canada* were also very appreciated.

On the second day devoted for issues related to buffalo, Dr. Giuseppina Maria Terzano from Italy, with a lecture on *Genetic improvement and reproductive strategies in Italian buffaloes* referred on the genetic improvement of Mediterranean Italian buffaloes with particular attention on:
1) Artificial insemination, animal recording organisation, selection and progeny testing.
2) Oestrus control and efficiency of artificial insemination and on the use of treatments to increase pregnancy rate after artificial insemination, by which by now pregnancy percentages over 50% are very frequently obtained.
3) the progress on the biotechnologies applied to this specie, such as multiple ovulation and embryo transfer, ovum pick-up and in vitro embryo production.
4) the reproductive application of ultrasound in this specie that was very appreciated because showed the amount of possible clinical approaches in this specie.

Dr C.S.Thomas from Pune, India with a lecture on *Improvement in buffaloes with respect to cisternal size, cisternal fraction, milk and milk ability* evaluated that the potential for improved milk production is influenced by the skill used in selection, breeding and reproduction and the extent to which this potential is converted into reality depends upon the efficiency of nutrition, disease control and management. The author evaluated also that all the resource focused on improved milk production is rendered ineffective if the milk secreted by the dairy animal is not harvested efficiently and the sensitive tissue which is the organic industry where milk is manufactured is not maintained in the most healthy state.
Other ranking livestock planning officials, dairy cooperative senior officials and scientist attended the workshop and senior private sector officials have also been invited.
About 100 researcher from all over the country have been shared their international experience and cutting edge technologies so far developed in the area of genetic improvement in cows and buffalo and reviewed strategies in the light of emerging trends to achieve goals of increasing the milk production.

# ARTIFICIAL INSEMINATION IN BUFFALO

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Artificial insemination (AI) is necessary to promote genetic improvement in farm animals, but problems of oestrus detection limit its application in buffalo herds; moreover the poor number of tested bulls and the low conception rate obtained at AI discouraged buffalo farmers to apply this technique. For these reasons the genetic improvement of the buffalo species is very slow.
In Italy, for example, where animal recording is effected and where there is the highest proportion of milk recorded buffaloes, the average production per buffalo head did not improve as much as the one of the dairy cows in which a systematic genetic improvement has been carried out (average milk production registered by the Italian Breeders Association: in buffalo cows from 1740 Kg in 1981 to 2170 Kg in 2002; in Italian Friesian cows from 5640 Kg in 1981 to 8570 Kg in 2002).
The success of a genetic improvement program is essentially based on the possibility of carrying out AI in the field. This assumption can be missing when , because of the poor results obtained by the use of AI, farmers are inclined to avoid it. Furthermore, because buffalo is a species with seasonal anoestrus, farmers are inclined to natural mating in order to avoid the risk to have non-pregnant buffaloes and lose the production of a whole year. Moreover, because a satisfactory conception rate can be achieved only if the insemination is performed at the correct time relative to ovulation, the difficulty in predicting the correct insemination time prevents the increased use of AI in buffalo. One of the possible solutions is that of increasing AI by using techniques which guarantee a good conception rate, in order to inspire new confidence in buffalo farmers.
To overcome the problem of difficult oestrus detection because of weak oestrus signs, we can resort to techniques for the control of oestrus and ovulation such as : a) teaser bull; b) automated detection systems; c) hormonal treatment.

**a) Use of teaser bull**
The presence of teaser bull is helpful in identifying buffaloes in heat; in this case the standing oestrus is the most reliable sign of next ovulation, although a large variability has been found in the interval between the start of standing oestrus and LH peak *(Barile et al., 1996)*, thus not always allows a good prediction of ovulation time. The end of bull courtship and the end of bull acceptance by the cow are reliable signs that indicate end of heat and ovulation. Utilising a teaser bull, the average conception rate at AI, as reported by different researchers, resulted to be about 40% *(Baruselli, 1996; Zicarelli et al., 1997; Moioli et al., 1998)*.

**b) Use of automated detection systems**
New approaches are being developed to provide automated systems of detection of oestrus using the electronic technology, such as pedometry and radiotelemetry. Recently, studies on the efficiency of pedometers in buffalo oestrus detection have been carried out by *Di Palo et al. (1999, 2001)*. Pedometer is very useful for AI when visual observation of oestrus can be carried out only for short time, providing a greater number of alerts for spontaneous oestrus to be inseminated (obtained conception rate was 40%). A study on oestrous detection using radiotelemetry has been carried out in Brazil by *Baruselli (2001)*. He found that the distribution of mountings during the day did not present significant differences showing that buffalo present a homogeneous distribution of oestrus during the 24 hours of the day.

**c) Use of hormonal treatment**
In order to increase the use of AI without resorting to oestrus identification, different hormonal treatment schedules and fixed time AI have been proposed. Various Authors have reported the use of either $PGF_2$ or one of its analogues in oestrus control in buffalo, often using an 11 day interval between two consecutive doses, but not always this treatment was successful, because it should be done in animals having a functional corpus luteum and preferably during the peak

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breeding season. Some trials have demonstrated that oestrus synchronization and in particular ovulation synchronization can be obtained using GnRH + prostaglandin after 7 days + GnRH after 36-48 hours (Ovsynch protocol). This second administration of GnRH improves the efficiency of fixed time insemination because it synchronizes the ovulation in a short period of time. The conception rate at AI using Ovsynch protocol ranged from 56.5% *(de Araujo Berber et al., 2002)*, if used during the breeding season, to 42.55% *(Barile et al., 2004)* and 36.0% *(Neglia et al., 2003)*, if used in the period of transition to seasonal anoestrus. Natural or synthetic progesterone containing devices (injections, intravaginal pessary, ear implants along with estradiol, PMSG and prostaglandin) have been used successfully to improve synchrony of oestrus and conception in buffaloes. The synchronization protocols, however, are efficient if buffaloes are cyclic and therefore if they are used during the breeding season (autumn). In the spring season there is a higher variability between the oestrus beginning and the ovulation time and it is more difficult to establish the correct time for AI.

The results of the work carried out in our Institute showed that the use of a progesterone pessary (PRID) associated with a follicle stimulating hormone as PMSG and with an analogue of prostaglandin, can be able to control ovulation and induce a good synchronization rate, even during the spring season. This treatment allowed the use of AI in the low breeding season too, obtaining similar conception rates either in autumn or in spring, 46.2% and 44.3% respectively *(Barile et al., 1999)*. It was also possible to observe, by the determination of the preovulatory peak of LH, that the fixed time for AI was near to ovulation *(Barile et al., 1998; Borghese et al., 1999)*. On the basis of our results we can suggest that 72 and 96 h after PRID removal are the most appropriate time for AI in synchronized buffalo cows in the low breeding season while 48 and 72 hours could be better in the autumn. In fact, utilising 2 AI schedules at 72 and 96 hours during the spring season we have obtained a conception rate ranged from 45.1% to 64.5% in different years *(Barile et al., 2001a, 2001b, 2003)*. These are good results considering that animals are treated in a period in which their reproductive efficiency is lower and that the treatment improves the fertility so that buffaloes that do not conceive at AI will become pregnant afterwards, during the natural breeding period.
In order to decrease the variation in ovulation time and increase the effectiveness of fixed time AI, GnRH was used in association with PRID treatment, but the conception rate did not improve respect to the one found using PRID protocol alone (45.2% and 64.5% with PRID+GnRH or PRID respectively) *(Barile et al., 2003)*. Recently, we have compared the efficiency of PRID and Ovsynch protocols for the application of fixed time AI in buffalo cows, in spring. The two utilised different hormonal schedules showed the same efficiency in obtaining oestrus synchronization and good conception rate at AI, in spring. Although the fertility rate did not differ significatively between the PRID and Ovsynch protocols (47.82% and 42.55% respectively), a higher conception rate was found in buffaloes synchronized with PRID compared with Ovsynch, as PRID treatment was able to removing the anoestrus status in non-cycling animals *(Barile et al., 2004)*. It can be concluded that the use of GnRH, in association to prostaglandin (Ovsynch protocol), improves the efficiency of fixed time insemination because it synchronizes the ovulation in a short period of time but this treatment is efficient when buffaloes are cyclic. The use of PRID associated with PMSG and prostaglandin can be successfully employed in the low breeding season indicating to be the preferred treatment when oestrus synchronization and AI are programmed in the period of reduced reproductive activity in buffalo.

In conclusion, for the above explained reasons, AI in buffaloes is seldom performed. The use of the techniques for the control of oestrus and ovulation can be helpful to identify buffaloes in heat and increase the effectiveness of AI programmes. However, the efficiency of AI techniques alone, is not sufficient to promote genetic improvement. Along with the possibility of carrying out AI in the field, it is necessary to have the opportunity to perform animal recording and to have the availability of progeny tested sire semen.

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# PHENOTYPIC CHARACTERISTICS OF TARAI BUFFALO BREED

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## ABSTRACT

Tarai buffalo is a compact and strong built animal. Body is medium with grayish brown to black coat color on black skin. Orientation of horn is mostly back word and black in color. Average first lactation milk yield was 1030.04 ± 26.78 kg while that in second lactation was 1080.09 ± 28.58 kg with fat of 6.53 % and solid not fat of 8.56 %.

KEY WORDS: Tarai Buffalo, phenotypic characters, lactation milk yield

## INTRODUCTION

Tarai breed of buffalo is less known breed being maintained by farmers in Tarai part of Uttaranchal and Uttar Pradesh state of India. Characterization of Tarai breed of buffalo has been done under NATP project " Animal Genetic Resource Biodiversity". The breed is not described but some results of the project have been published *(Prasads et.al. 2003, Arora et.al. 2003).*

## MATERIALS AND METHODS

Survey of more than 2000 animals was done in 60 villages of total 12 blocks of three districts namely Udham Singh Nagar of Uttaranchal state, Pilibhit and Bareilly of Uttar Pradesh state. Measurements of 200 males and females each were taken and percentile analysis was done. Milk production, lactation period, calving interval and other production traits were recorded by trained personals right at farmer's door during July 2001 to September 2002 on 151 buffaloes in first and 167 buffaloes in second lactations.

## RESULTS AND DISCUSSION

**1. Physical characters:** Typical buffaloes have been described as medium size animals of strong built. Size of animal decreases as they move high in hills. The body size is moderate with coarse and somewhat convex head, prominent and long nasal bone *(Arora et. al, 2003).* The details of physical characters were recorded through random sampling in various villages of the three districts as per questionnaire developed by National Bureau of Animal Genetic Resources, Karnal. Based on percent of observations of different body parts, the Tarai breed have been described as:

**Body:** Body was medium and compact with small, straight and shining hairs on the body. Heart girth of adult animal was 201 cm while paunch girth was 227 cm. Height of the animals at back of shoulder was 156 cm. Navel was tight and sheath was non pendulous. Temperament of animal was docile.

**Body Color:** Body was grayish to black coat color on black skin. Eyelids, hooves, nose ridge, face and pastern joint were mostly black in 89 to 95% cases. Tail switch was white (85%) in color.

**Poll:** Poll had white star in 30 % cases while others had black color. Width of poll was 25 to 28 cm wide.

**Head:** Head was short in length, convex (60%) or flat (35%) in shape.

**Horns:** Orientation of horn was mostly back word (76%) and black in color. Shape of horn was slightly curved to sickle shape (76%) measuring 44 cm with tip projecting mostly upward (72%). Horns were smaller in females (32 cm) than male (44 cm).

**Ears:** Orientation of ears was backward and comparatively small in size.

**Neck:** Strong neck of 63 – 66 cm long in females and 70 – 71cm long in males.

**Legs:** Fore legs were smaller (72 to 76 cm long) in size. They were squarely set and straight. Hooves were black in color.

**Tail:** Tail was slightly lower than hock joint measuring 89 to 99 cm. Tail switch was mostly white.

**Hook Bone:** Hook bones were projected and distance between left and right hook bone was 45 to 48 cm.

**Pin Bone:** Distance between left and right pin bone was 23 cm in buffaloes.

**Rump:** Rump was sloppy measuring 39 to 40 cm in females and 34 to 37 cm in males.

**Skin fold thickness:** Skin fold thickness between 12th & 13th rib was more in females (2.0 to 2.5 mm) than buffalo bullocks (0.9 to 1.1 mm). Average skin fold thickness in female was 2.0 mm at second lactation *(Prasad et. al. 2003).*

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**Udder:** Shape of udder was mostly round (56 %) and rarely pendulous. Fore udder was either flat (31 %) or projected (45 %) when filled with milk. Rear udder was small.
**Teats:** Forty six percent of teats were small with pointed tips.
**Milk vein:** Milk vein was small and vary in prominence.

**2. Performance Traits**
**Milk production:** Milk production performance of 151 buffaloes in first lactation and 167 buffaloes in second lactation was recorded in different blocks during July 2001 to September 2002. Recording of first month milk yield was started between 7th to 10th day after calving and then regular recording after every 30 days interval was done till date of drying off or sale of animals. Fat percent of milk was noted from records of the primary milk collection societies. Lactometer reading was also taken. Hence with the help of lactometer reading (LR) and fat percent, solid not fat (SNF) was calculated by formula:

SNF = LR/4 + fat %x 0.2 + 0.5.

**a. Monthly milk yield:**
Milk yield on day of recording multiplied by 30 was taken as monthly milk yield. Average milk yield during first month of first lactation was 127.07 ± 4.18 kg while during second lactation it was 125.86 ± 4.81 kg. Milk yield increased by 16.85 % to become 148.48 ± 3.39 kg during second month. Milk yield progressively declined from third month to 12th month of lactation. Coefficient of variation varied from 24.72 to 78.82 percent. Coefficient of variation was least during 2nd to 5th month of lactation (24 to 25 percent). Since the number of animals producing milk from 7th month onwards either in first or second lactations decline. Therefore, coefficient of variation increased drastically because of very wide variation in animal numbers each month.

**b. Lactation milk yield:**
Average first lactation milk yield was 1030.04 ± 26.78 kg while that in second lactation it was 1080.09 ± 28.58 kg. Thus there was increase in milk yield by 4.86 % during second lactation over first lactation. Overall average milk yield in both the lactations was 1054.08 ±19.57 kg.

**c. Fat percent:**
Fat percent recorded during first lactation was 6.53 ± 0.11 percent while in second lactation it was 6.67 ± 0.14percent with overall fat percent of 6.58 ±0.09 %. The coefficient of variation observed was between 13.71 to 16.63 percent.

**d. Solid not fat:**
Average SNF calculated during first lactation was 8.56 ±0.08 percent while it was 8.59 ± 0.02 during second lactation. The overall SNF content was 8.57 ± 0.05 percent based on 47 samples.

**e. Lactation length:**
Seventy nine percent of buffaloes could complete lactation upto 9 months while only 12.6 % of buffaloes could lactate for 12 months. Average lactation length was observed to be 290.00 ± 4.97 days during first and 292.48± 5.32 days in second lactation with overall lactation length of 291.19 ± 3.63 days.

**f. Service Period:**
Based on samples of 201 buffaloes, service period in Tarai buffalo was 197.07 ± 6.59 days with 47.45 % of coefficient of variation.

**g. Dry period:**
Recording of dry period could be completed for 12 % of buffaloes from July 2001 to September 2002. Based on 27 observations, dry period was 186.92 ± 16.77 days with 46.62 percent of coefficient of variation.

**h. Calving interval:**
Average calving interval noted under the recording period was 470.62 ± 18.07 days with 19.95 percent of coefficient of variation.

**ACKNOWLEDGEMENT**
The financial support for the project" Animal Genetic Resource Biodiversity"by NATP(ICAR) is acknowledged.

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Tarai buffalo

# Buffalo production in Iran

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## Introduction

There are 400000 head of buffaloes in Iran which are raised in the north, north west and south west (particularly Khuzestan province) of the country. Iran is one of the important buffalo raising countries of Asia. Climatic conditions and occurance of four different seasons along the cause wide differences of temperature in the different seasons, particularly in summer and winter, so that , in the north west, particularly in the provinces of Ardebil and Azerbaijan , temperatures in winter can reach – 5 °C. On the contrary, in the southern provinces (Khuzestan) in the warmest days of summer temperature reache + 45 °C, with high humidity. Inspite of the very different climatic conditions, buffaloes have adapted well and give good performances with different managing systems in several provinces of Iran. They produce meat and milk with average fat of 6.8%.
The main breeding purpose of buffalo in Iran is milk production; this has caused a natural selection of milking buffaloes during the centuries, so that buffalo milk yield plays the most important role in the income and family welfare of Iranian buffalo farmers.

## 1 - Ardebil province

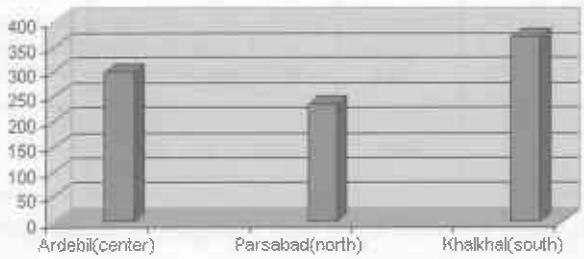
### 1.1 Geographical situation

Ardebil province covers an area of 17953 square kilometers, equal to 1.09 % of total surface of the country and is located in north west of Iran.

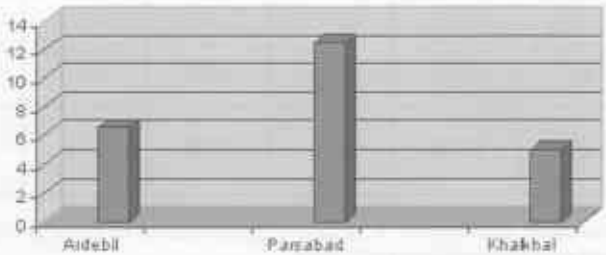

Map of Ardebil

It shares borders with the Gilan province to the south east, Republic of Azerbaijan (valley of Aras river) to the north and north east, East Azerbaijan to the west and Zanjan province to the south.
Ardebil is a mountain and cold province. Height of different regions from sea level varies from 40 to 4811 meters.
Rainfall is abundant (9 months in the year) and in winter snow is common.
Alongwith abundant rich water plains and rivers, alluviums transferred to the plains have provided the best place for human life, agriculture and animal husbandry *(Figures)*.

**Average annual rainfall in Ardebil province (mm.)**




**Average annual temperature (°C)**

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1.2 Climate

Generally, the weather of the Ardebil province is mountainous- moderate. The southern region is high and mountainous, with very cold and snowy winters , but summers with moderate climate. Moving from south to north, the height of the mountains decreased and temperature increases, followed by decrease of rainfall.

1.3 Source of farmers' income

Most farmers are busy in agriculture activities followed by animal husbandry and orchard keeping. In the slopes of Sabalan mountain and Talesh mountains, the keeping of honey bee is very popular and it is a lateral farmers' income.

1.4 Natural disasters

Similar to some other regions of Iran, occasionally, some natural disasters such as earthquake, flood and drought occur. These disasters usually cause significant losses.

1.5 Human population and important cities

Based on national census, the human population was 1 168 011 people of which 51% live in villages and 48% in cities, while 1% are nomads. Capital of the province is Ardebil city. Important cities from north to south are: 1-Pars abad; 2-Bilehsavar; 3-Germi; 4-Meshkin shahr; 5-Namin; 6-Ardebil; 7-Nir; 8-Cousar(givi) 9-Khalkhal (Highschool Education Geography book, 2006, Ministry of Education).

## 2 - Status of buffalo rearing in Ardebil province

2.1 Population

Today, there are about 93000 head of river buffaloes in Ardebil; 44% of this population include female milking animals. Ardebil province is the second in Iran for numbers of buffaloes, after West Azerbaijan (100000 buffaloes), followed by Khuzestan (88000), East Azerbaijan (78000), Gilan (22000), Mazandaran (6000) and Golestan (1500). In the remaining provinces arere are 11500 buffaloes. Total of buffaloes in Iran is 400000.

2.2 Breeding system: feeding and housing

Buffalo breeding in Ardebil (in comparison to Khuzestan province) is mostly done in closed housing, so that in the cold seasons the buffaloes are kept in closed sheds, and are hand fed by feedstuffs such as dry alfalfa, straw of cereals, cotton seed, bran of cereals, sugar beet pulp and apple pulp. Caring of animals, particularly in cold seasons, mainly is done by women. In the end of spring and summer when the weather is warm, animals will be grazing freely in the common and private natural pastures or pastures of agriculture lands during the day. During the nights they are hand fed forages or concentrate (depending on the financial power of farmers). Grazing of animals is often as common herds and mixed with cattle; mating is often free and uncontrolled, so that harmful inbreeding among herds might occur. We hope that in the future this problem will be solved by extension of artificial insemination.

2.3 Products

As mentioned before, the main objective of

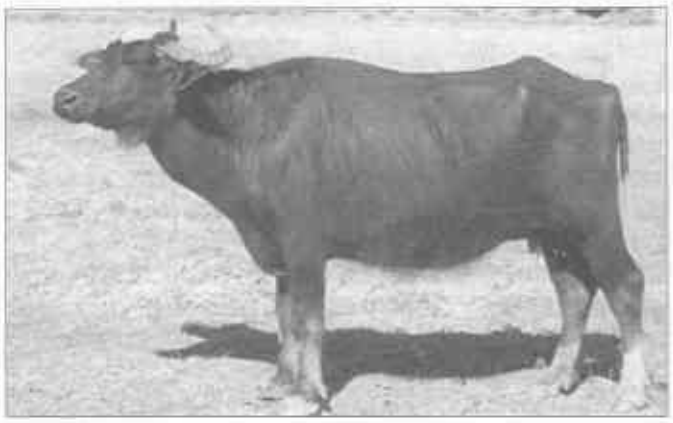
**Table 1- Productive and reproductive performance of Ardebil buffaloes, based on the results of analysing the 36705 individual milk records collected from 1994 to 2004.**

| annual raw milk (kg) | L.S.M of milk (kg) | fat% | L.S.M of fat% | No of milking day | A.F.C (months) | Calving Interval (months) | Weight of adultmale (kg) | Weight of adult female(kg) | Average birth weight male(kg) | Average birth weight female(kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| **1474** | **1189** | **5,6** | **7,03** | **215** | **36** | **15** | **500** | **425** | **33** | **28** |

**Reference: Naderfard, H.R, 2004. Assessment of milk production in iranian buffaloes along with a comparison between Azari and Khuzestani buffaloes.**

**follows page 13** ☞

buffalo breeding is milk production, and processing into different dairy products; moreover, fattening of surplus male calves gives meat production. Average milk production is give in *table 1*. The important fact is that farmers boil the milk and after boiling at nights, put it into flat dishes up to next morning; then they collect the separated cream and sell it to dairy-men. Eating of this product, which is called Qeymaq in turkish and Sarshir in Persian, is very populat among people particularly in the restaurants and public tea rooms of Ardebil, as breakfast in the morning. Part of the fat extracted from milk is sold to dairy shops and the rest is converted to yoghurt (Mast in Persian language). In case of individual consumer, full fat milk is converted to yoghurt and sold. The most of processing activities are done by women. The buffaloes in Ardebil are taken into account as a wealth, so that the wealth of farmers is measured based on their buffaloes. Before the arrival of agriculture machinery, buffaloes were being used as work animals, but now they are only milking animals.



**Female buffalo (Azari breed, Ardebil).** *Photo by Javad Tavakolian*

**Male buffalo (Azari breed, Ardebil ).** *Photo by Javad Tavakolian*

2.4 Water resources

Similar to other buffaloes of rural systems of world, Ardebil buffaloes like wallowing and resting in the water, particularly during the warm hours of summer. In this connection, important water source of water in province are the following rivers: Darreh rud, Sari qamish, Quri chai, Qareh su, Baliqlu chai and Arai chai.

2.5 Kind of housing

As regards to traditional system, sheds for the animals are built in vicinity of the owners. Udes materials include mud, bricks in walls and the roof is built with horizontal poplar lumbers, filled with dry branches, leaves of trees, straw and mud. Unfortunately, light and ventilation are not optimal. Particularly in winter, the animals often stay in a dark environment, filled with ammonia gas. However, since 1993, thanks to the starting of the national buffalo project and governmental assistance to buffalo farmers, through cash subsidies, low interest loans and training of farmers, most of these traditional housing were repaired and reconstructed in standard level: built with washable, disinfectantable and anti-fire materials, with sufficient light and ventilation.

2.6 Sanitary actions

There is not any governmental program for treatment of sick animals in rural places, but treatment of sick animals and vaccination against common diseases is performed after the request of the farmers, particularly, brucellosis, rinderpest, FMD, parasitic diseases and tuberculosis test. This is performed by local or provincial veterinarians. Simply treatments (spraying poison, feeding anti-parasite tablets) are done by farmers themselves.

## 3 - Pursued activities during recent years

3.1 Governmental.

Recording of buffaloes has been transferred to private sector by financial support of government from 2001. Good results have been obtained.

• Because of the shortage of breeding bulls, artificial insemination of buffalo started in

follows page 14 ☞

1999. Frozen semen of Azari buffalo is prepared by JABAL station in Urmieh (W.Azerbaijan) free of charge.Results have been good from the farmers point of view, particularly due to the extension service which accompanies the introduction to A.I.

• The Government promotes the organization of regional and provincial buffalo show with selection of the best animals, every second year, giving valuable awards to owners, in order to encourage them to keeping buffalo.

• The Government promotes the organization of short term training courses for farmers in the field of nutrition, breeding, management systems, every year.

• In order to increase the reproduction efficiency, in 2004, a program of oestrus synchronization of female buffaloes was performed in 2 villages, on 33 head of buffaloes, resulting in 54.84% positive pregnancy rate.

• The Government promoted radio and TV extension programs, in connection with usage of A.I in buffaloes, in 2003, 2004 and 2005.

• The Government promotes the selection of the best bulls based on the parents and sister records and phenotype of the bull, the purchase of them and transfer to JABAL station, from 1995.

**Buffalo herd (Azari breed, Ardebil ).** *Photo by Javad Tavakolian*

• The Government gives priority to the buffalo farms for bank loans for repairing and reconstruction of animal housing.

• The Government promotes publication and distribution of posters and extension leaflets in connection with the advantages of A.I from 1997.

• Every year since 1997, a few good bulls from JABAL station are purchased, transferred to Ardebil and distributed among rural herds for natural mating.

• After 2003, order to promote A.I in the province, some N.G.O. of some cities were charged to organize and supervise the A.I programmes.

**III SIMPOSIO DE BUFALOS DE LAS AMERICAS AND II SIMPOSIO DE EUROPA Y AMERICA**

The Buffalo Breeders Association in Colombia is organizing on 6-8 September 2006 The 3rd Buffalo Symposium of Americas and The 2nd Buffalo Symposium of Europe and Americas in Medelin, Colombia. The programme includes plenary sessions on the main theme: the management of buffalo directed to the competitiveness and to the marketing of milk and meat products. The scientific programme foresees papers and posters in all the fields of research and production of buffalo livestock, particularly in Europe and Americas. Information at *www.asobufalos.org* and *simposio@asobufalos.org*

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## About Caserta

Caserta lies at the North eastern edge of the Campanie plain and is partly hemmed in by the Tifatini mountain range.

Formerly Casilia, it was founded by the Etruscans. First reports of a settlement where the city now stands appeared in the 9th century BC. When the city was captured by the Samnites in 423 BC, its inhabitants swore loyalty to Hannibal against Rome, for which it was punished (211 BC) with the confiscation of approximately two hundred yokes, the equivalent of sixty hectares (150 acres). This system allowed the Roman aristocrats to allocate land to their friends. Until the fall of the Roman Empire in AD 476, Galatia remained a colony. With the subsequent Barbarian invasions, the city began its slow descent towards its final destruction in 853 at the hands of Pandolfo II Capuce" who forced the locals to take refuge in the hills.

The District of Caserta has a surface area of 5,030 square km, with a total population of over 850,000 inhabitants. The territory is renowned for its fertility, and is bordered by the Tyrrhenian sea to the west, and the Garigliano river to the north. It is crossed by the Volturno river, and bordered to the east by the Matese mountains. The area is rich of historical heritage, such as the prehistoric Stone Age remains in Pratt Samnia, traces of the Copper age in Maddaloni, the Roman amphitheatre in Santa Maria Capua Vetere - second in the world after the Coliseum, most ancient architecture as the basilica in Sant'Angelo in Formis and the Romanesque cathedral in Caserta Vecchia, the magnificent Royal Palace of Caserta, the so-called Italian Versailles.

Of all the splendid works and constructions by which the Bourbon dynasty embellished and ornamented the Kingdom of the Two Sicilies, the palace is the universally famous and appreciated Palace of Caserta. As everybody knows, it was designed and mostly built by the Dutch architect Ludwig Van Wittel, who renamed the Italian (romantic-poetic name of Vanvitelli).

He was called to Naples by King Charles, who, as the grandchild of the Re Sole", wanted to build a new Royal Palace, a "residence" fit for a Bourbon King and his Court. He wanted that because he wanted to have a royal palace not in Naples but very close to Naples (and in this we find a clear allusion to Versailles), but mainly because the new palace - in the King's intention - had to be the most beautiful and largest royal palace in the world after Versailles, a pride for the new Kingdom he had conquered and a further evidence of his willingness to make the Kingdom an independent and sovereign one.

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# VIII World Buffalo Congress

October 20-23, 2007 - Caserta, Italy

Hotel Crowne Plaza Congress Centre

FIRST ANNOUNCEMENT

## Welcome to the VIII World Buffalo Congress 2007 in Caserta, Italy

The International Buffalo Federation and the Italian Organizing Committee are pleased to announce that the VIII World Buffalo Congress will be held at the Hotel Crowne Plaza Congress Centre, Caserta, Italy.

The Congress will last four working days and will include invited presentations, contributed oral presentations and posters and will consist of plenary sessions and parallel, satellite sessions devoted to specific issues.

A specific session will regard problems of buffalo breeding in industrialized and rural areas of new developing countries.

Post Congress activities including visits to breeding farms will be organized. In addition we are planning for participants the chance to attend the INTERNATIONAL DAIRY CATTLE FAIR in Cremona, Italy, where it will be possible to see the best of Italian and European cattle.

The Organizing Committee will make every effort to create a really exciting time in Buffalo community of researchers, producers and professors. ITALY with its 60% of the entire world artistic treasures will help making the meeting a success.

We cordially invite you to participate in the Congress and recommend the use of the official web site for all news about the event www.wbc2007.org

See you in Caserta
Local Organizing Committee

Congress Language:
**The official Congress language will be English.**

Main scientific topics:
**Genetic and breeding**
**Biotechnology**
**Management**
**Reproduction**
**Nutrition and Feeding**
**Animal health**
**Food safety and technology**
**Milk production**
**Meat production**
**Draught**
**Economy**
**Rearing and Environmental Control**

Congress chairman:
**Luigi Zicarelli**
University of Naples "Federico II"

President of the Scientific Committee:
**Vincenzo Piccolo**
University of Naples "Federico II"

President of the Local Organizing Committee:
**Raffaele Garofalo**
A.N.A.S.B.
Italian National Buffalo Breeders Association

**Important Deadlines**
**January 31, 2007**
**Deadline for Abstract submission**
**June 30, 2007**
**Deadline for early registration and hotel reservation**

**Second announcement will be distributed by e-mail as a PDF file in January 2007**

**The registration form will be available in March 2007**

## Welcome of the President of the International Buffalo Federation at the 5th Asian Buffalo Congress.

I am truly honoured, as the President of the IBF (International Buffalo Federation), to give the welcome and greetings to the 5th Asian Buffalo Congress, that I am sure will provide an important contribution to the intensification of knowledge on buffalo species. This conference is held in a Country that is one of the cradles of human civilization. As an Italian, I am fascinated by the thought that when in Italy the "history" began in 1000 b.C., in China for already 4000 years silkworm had been cultivated, bronze had been known, an organized society and an hereditary dynasty had existed and the first philosophical studies had been born. Furthermore, according to Chang Hva Lin (1985), buffalo had been bred since 5000 b.C.

I am strongly convinced that from IBF and from ABA (Asian Buffalo Association) it should arise a unique world organization subdivided in a Scientific Society and in a Technical Society, that in turn should be arranged in the 5 Continents in order to give more continuity to meetings, discussions and exchanges of opinions. This could contribute to a greater diffusion of buffalo, as a species of economic and social interest, not only in the Countries that had been breeding it for a long time.
I am certain that buffalo should not only represent an irreplaceable species in tropical areas but I believe that it has the potentials to become, if properly valorised, an important resource also for countries that know little or nothing about it or for the countries that have relegated it in marginal areas, due to lack of farsightedness.
I would like to remember to all of you that in October 2007 the 8th World Buffalo Congress will be held in Italy and I am very honoured to invite all of you to this important scientific meeting. The copies of the first announcement are available at the secretary desk.

Luigi Zicarelli, President of IBF

**Buffalo Newsletter - Number 21**
**December 2005**

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Printed by: RiverPressGroup/Digital Shop
Rome, June, 2006



**"Buffalo Newsletter"**
Istituto Sperimentale per la Zootecnia
via Salaria, 31
00016 Monterotondo, Italy