Buffalo Newsletter

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INFORMATION BULLETIN OF THE FAO INTER-REGIONAL COOPERATIVE RESEARCH NETWORK ON BUFFALO

SYMPOSIUM ON BUFFALO RESOURCES

INTRODUCTION

The International Symposium on 'Buffalo Resources' was organized by the Animal Production Research Institute, Cairo (APRI) within the activities foreseen for the first four years of activity of the Buffalo Network. It was the third of a series of Symposia on the specific topics which were defined to be the priorities for buffalo development in the first meeting of the co-ordination board (5 May, 1993).

This Symposium, as well as the previous two on 'Products' and 'Reproduction', had the purpose to describe the state of art of buffalo production on each topic in the member countries.

PARTICIPANTS

The following people responsible for the activities of the Buffalo Network attended the Symposium:

- the co-ordinator of the Buffalo Network, G. Rossi;
- the co-ordinators of the three WG's: F. El-Keraby, the organizer, for WG on 'Production Systems', S. Gigli as temporary substitute for D. Matassino, for WG on 'Products' and Tz. Peeva as temporary substitute for L. Kanchev, for WG 'Reproduction';
- the following co-ordinators of the National liaison centres:

O. Sekerden for Turkey,
S. Magid for Iraq,
A. El-Kurdi for Syria (temporary substitute for A. Swaid), the responsible for the liaison centres for Italy, Bulgaria and Egypt were already present as members of the co-ordination board;

- B. Muller-Haye, FAO advisor for ESCORENA;
- A. Talib, FAO-RNEA officer responsible for the Buffalo Network;
- J. Intaramongkol, representative of the Asian Buffalo Association (ABA);

Furthermore, the Symposium was attended by ten more Italian and Bulgarian scientists, and by over 60 Egyptian scientists.

OPENING OF THE SYMPOSIUM

O. Salama, chairman of the organizing committee, welcomed all the participants emphasizing the interest of the Egyptians for international co-operation.

F. El Keraby, director of APRI, underlined how important buffalo is for Egypt - among the reared livestock it is in number the first, supplying over 50% of total milk produced in the country; buffalo is kept by very small holders, and this has to be considered when foreseeing future development projects; he finally wished that the symposium give the participants the opportunity to discussing and exchanging their experiences.

G. Rossi, Buffalo Network co-ordinator, gave the regards of the former co-ordinator, A. Pilla, and summarized the objectives and the activities implemented by the Network: the organization of two specific symposia, the publication of five issues of the Buffalo Newsletter, the constitution of a Working Group on the milk performance recording of buffaloes within the International Committee for Animal Recording (ICAR). He also mentioned the future activities to be foreseen: to enhance communication between member countries, to create a data base on the research projects implemented in each country, to create institutional links with ABA.

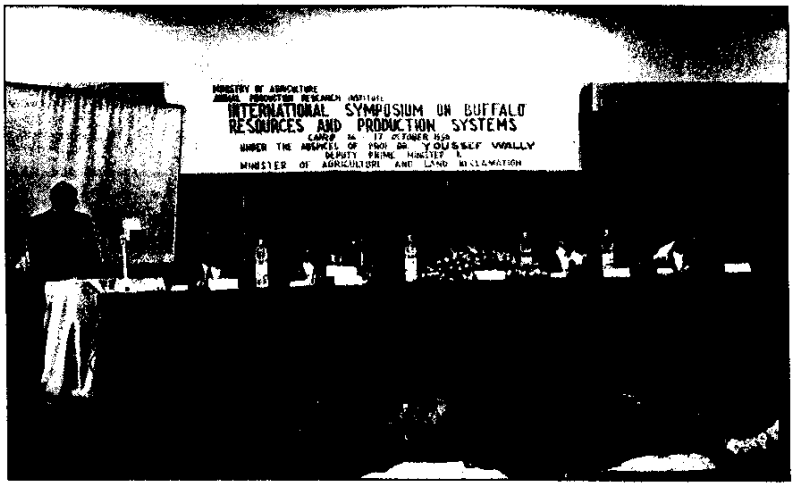
follows page 2

INSIDE THIS ISSUE

F R O M P A G E 1

A. Abdel Aziz, Chairman of the Egyptian Society for Animal Production, underlined the activities developed by the Network, in particular by preparing international regulations for milk performance recording in buffaloes, and wished fruitful co- operation with ABA for the future.

M. Sharafeldin, technical counsellor of the Egyptian Minister of Agriculture, took away the reputation that buffalo is a poor producer compared to cattle: productivity in fact does not mean only milk and meat but tolerance, hardness and adaptability. Buffalo is essential for the welfare of Egyptian rural society.



OPENING OF THE SYMPOSIUM

SCIENTIFIC PROGRAMME

The symposium included the following five sessions (with the relevant chairmen):

1. Characterization of buffaloes in the Mediterranean and Middle East (M. Sharafeldin and B. Muller-Haye);
2. Breeding and Genetics (A. Mostageer and A. Nigm);
3. Buffalo Nutrition and Feeding Resources (A. Z. Mehrez and A. Borghese);
4. Buffalo management (H. El Khatab and S. Gigli);
5. Production Systems (B. Moioli and A. Abdel Aziz).

Twenty-eight scientific papers and technical communications were presented. The characteristics of buffaloes in the Mediterranean and Near Eastern countries were discussed deeply, indicating the importance of buffalo in particular in extensive farming. In the discussion the following points were underlined:

1. the management system has a great impact on the reproduction of buffalo cows (e.g. age at puberty, calving interval, percentage of recorded quiet ovulations, etc.);
2. there is urgent need for setting up and executing a breeding programme for improving milk production and growth rate;
3. the area of production systems must be deeply considered, in particular studying more intensively the conditions of small holders;
4. in some countries, buffalo milk is given extremely high value, not for its mere fat and protein content, but for producing special and unique types of dairy products;
5. buffalo could successfully contribute to red meat production in some countries;
6. new trends for feeding buffalo calves on fat supplementation is enhanced;
7. buffalo has the abitity to digest poor quality roughage compared to cattle;
8. it is important to study the buffalo gene map in order to improve buffalo productivity and reproduction.

RECOMMENDATIONS

The following recommendations were summarized by the chairmen of each session on the basis of the topics presented and of the discussion which followed:

1. Nutrition and feed resources:
a - calculating the buffalo nutritional requirements for growth, milk production and pregnancy;
b - utilizing crop residues as source of feed.

2. Breeding and genetics:
a - enhancing the new biotechnologies (artificial insemination, embryo transfer, ovum pick-up, in vitro fertilization and genetic engineering) as tools for genetic improvement;
3. developing milk recording methods and rules in order to standardize specific small holders conditions; put in practice the international agreement on buffalo recording as proposed at the ICAR 30th meeting (June 1996);
4. supporting extension work at village level;
6. enhancing research in the area of production systems, in particular for small holders conditions.

FIELD TRIP

On October 16th a full day field trip was attended by the participants. Two buffalo herds (1000 animals altogether) were visited in the El-Fayoum area (west of Cairo), the first was in the reclaimed land, and the participants had the opportunity to see the facilities for supplying irrigation; the second in the old cultivated land.

PRELIMINARY RESULTS ON CONCEPTION RATES IN ITALIAN BUFFALOES AFTER USE OF INTRAVAGINAL PROGESTERONE DEVICE AND ARTIFICIAL INSEMINATION

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INTRODUCTION

Two important problems affect buffalo production in Italy. The first is the difficulty to progeny testing bulls: artificial insemination (A.I.) is used on only 4% of the Herdbook buffaloes (A.I.A.) because the farmers are discouraged to apply this technology for the not available proven semen and for the low pregnancy rates following A.I. The second is the seasonality of reproduction, for which if a buffalo does not get pregnant between September and December, she will get into anoestrus until September of the next year.

In order to induce and control oestrus in domestic animals, a progesterone releasing intravaginal device (PRID) is used. It consists of a silicone rubber elastomer filled with progesterone. In order to cope with the mentioned reproduction problems, in a group of buffaloes of the experimental farm of our Institute which did not get pregnant in autumn, a progesterone pessary was used during the following spring and summer seasons in order to find out if the treatment:

- improves pregnancy rate in the low breeding season (spring-summer);
- could help in heat synchronization so that insemination could be effected at fixed times, overtaking the problem of heat detection.

key words: buffaloes, oestrus induction, progesterone pessary, AI, seasonality

MATERIALS AND METHODS

Sixty-two buffaloes of different ages and parity which were not pregnant after the reproduction season (autumn) were used in this trial. Forty of them were lactating, while 22 were non-lactating buffaloes.

Starting from May until the end of June, buffaloes were implanted with one PRID each intravaginally. Each PRID, containing 1.55 g natural progesterone and a gelatine capsule containing 10 mg oestradiol benzoate, was kept for 10 days. On the 7th day after PRID insertion, an injection of 1000 UI PMSG was given and if a corpus luteum was found at the rectal palpation a further injection of 15 mg luprostiol, a prostaglandin F2 analogue was given too. At PRID removal all 22 non-lactating buffaloes and 17 of the lactating ones, were naturally mated, while the remaining 23 lactating buffaloes were artificially inseminated with frozen semen three times at 48, 72 and 96 hours after PRID removal. At the heats following A.I. the buffaloes were naturally mated, however 35 days after insemination to be sure whether the pregnancy was due to the A.I. or to the bull.

Pregnancy was diagnosed by rectal palpation 40-60 days after insemination or the supposed mating.

RESULTS AND CONCLUSIONS

The use of PRID was harmless for the animals except for a few cases of mucus discharge at the removal. The retention rate was very high (97%).

The conception rate after PRID treatment (tab.1) was 21% at the induced heat while the total conception rate (up to the third heat) was 56.5%. Zicarelli and Boiti (1982) using PRID on Italian buffalo in spring obtained a conception rate of 50% for the cycling animals and 33% for the non cycling. Our result is very satisfactory if compared to the conception rate obtained in the same season in the previous years without heat induction (fig.1). Chi-square analysis gave significant differences between the conception rate after PRID treatment (1996) and the years 1991 and 1994 ($p<0.005$), 1993 and 1995 ($p<0.001$).

In our trial the very low conception rate obtained for the non-lactating buffaloes at first heat (4%) was probably due to the fact that they were problem animals which did not get pregnant during the performed lactation. For these buffaloes however PRID was helpful in improving cyclic activity so that 50% of conception rate was finally obtained. The average conception rate after A.I. (induced heat) was 34.8%. This is a positive result considering that at the induced heat the conception rate of lactating buffalo natural mated was 23.5%. Moreover the results obtained after A.I. was similar to that recorded in the same farm during the high breeding season at the first spontaneous heat (40%) (Moioli et al., submitted). Authors from Pakistan (Chohan et al., 1993) reported a conception rate of 22.86% in the low breeding season after synchronization with prostaglandine and A.I.; Bhosrekar et al. (1994), in Indian buffaloes, using PRID+prostaglandine+PMSG and A.I. obtained a conception rate in low breeding season ranging from 32.5 to 34%.

Our preliminary results indicate that PRID might be successfully employed to improve pregnancy rate in the low breeding season and to increase the effectiveness of

FOLLOWS PAGE 4 ☞

the A.I. programmes by overcoming the problem of the difficult heat detection.

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Figure 1. Conception rate concerning the months of the trial (1996) and the same period in the previous years

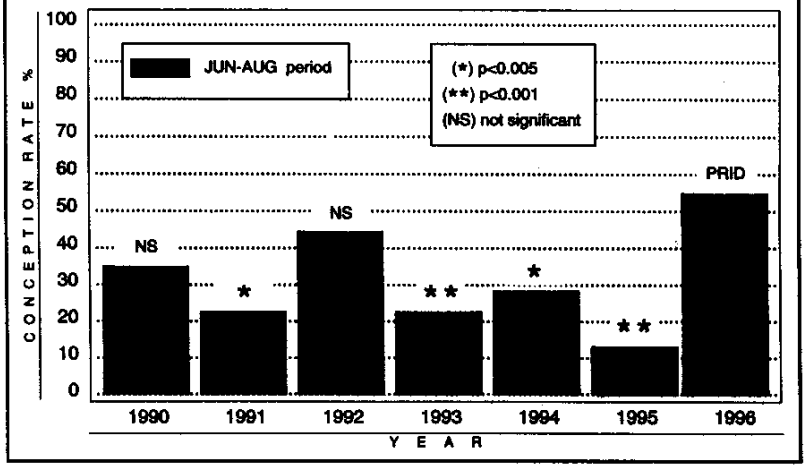

Table 1. Conception rate after PRID treatment

GROUPS	Animals	Pregnant animals				
		1st heat		Following heats (2nd + 3rd)	Total	
	N°	N°	%	N°	N°	%
Lactating buffaloes (AI at first heat + natural mating at 2nd and 3rd)	23	8	34.8	8	16	69.6
Lactating buffaloes natural mating	17	4	23.5	4	8	47.1
Non-lactating buffaloes natural mating	22	1	4.0	10	11	50.0
TOTAL	62	13	21.0	22	35	56.5

NATIONAL COORDINATED BUFFALO RESEARCH PROGRAMME FOR PAKISTAN

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Riverine type buffaloes of Pakistan belong to two breeds i.e Nili-Ravi of Punjab and Kundi of Sindh province. Nili-Ravi buffaloes constitute approximatly 79% of the total buffalo population in the country and are found in several parts of NWFP and AJK in addition to their primary home-tract which is irrigated Punjab.

According to the last livestock census conducted in Pakistan during 1986 the buffalo population was 15.7 million. As per 1994 estimates, the population of buffaloes has increased to 19.7 million which is indicative of 5.04% annual growth rate since 1986. Pakistani buffaloes are used as a triple purposes (milk, beef draught power) animal. They are the main dairy animals in the country and more than 71% (13.4 million tonnes) of the national milk production (18.94 million tonnes) is contributed by buffaloes. Beef is an important by-product of buffaloes. According to the recent estimates, more than 0.45 million tonnes of buffalo

FOLLOWS PAGE 5

beef is produced per annum which constitutes about 49% of the total beef production in Pakistan.

In addition to their use for milk and beef production buffaloes are an important source of draught power in the country. Buffaloes are used for a variety of agricultural operations e.g. ploughing especially in paddy fields, water-lifting from wells, transportation of farm produce to nearby markets etc.

The major problems faced by the buffalo breeders and farmers include poor reproductive efficiency, sub-optimal production potential, higher incidence of infertility diseases, lower rates of calf survival and higher costs of feeding. Poor reproductive efficiency is mainly due to delayed onset of puberty (32-42 months) and longer calving intervals (18-24 months) of buffaloes. Although the Nili-Ravi and Kundi of Pakistan are among the best dairy breeds of buffaloes in the world, their milk producing ability is still sub-optimal and there is considerable scope for their genetic improvement. Buffalo nutrition is another area where lot of research is required to develop economical feeding strategy for various stages of growth and productive cycle of buffaloes.

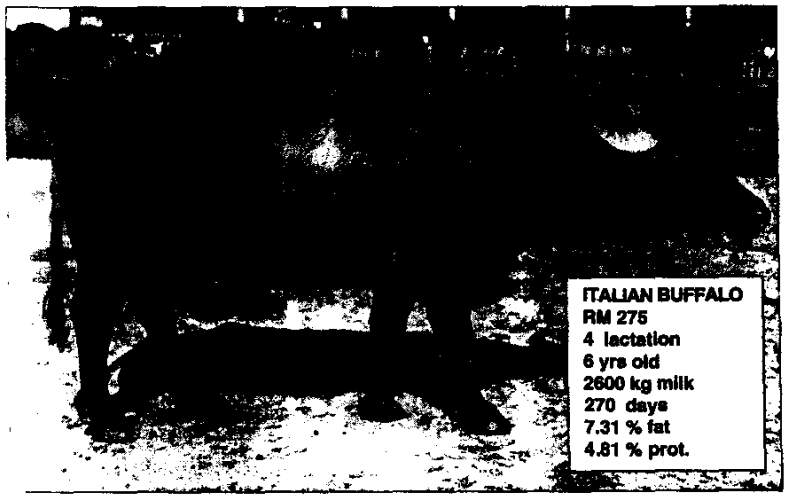
In order to address these problems of buffalo farming in Pakistan and to make best possible use of available research and development resources, a National Coordinated Buffalo Research Programme (NCBRP) was initiated by the Pakistan Agricultural Research Council in 1992 for a period of six years. The NCBRP is a part of the overall Agricultural Research Project (ARP-II) sponsored by the World Bank under a loan to the Government of Pakistan.

The main objective of NCBRP is to improve reproductive efficiency and production performance of dairy buffaloes of Pakistan through research on reproduction, breeding nutrition and disease control of buffaloes. Buffalo research and development activities of seven research institutes located in various parts of the country are coordinated under the programme.

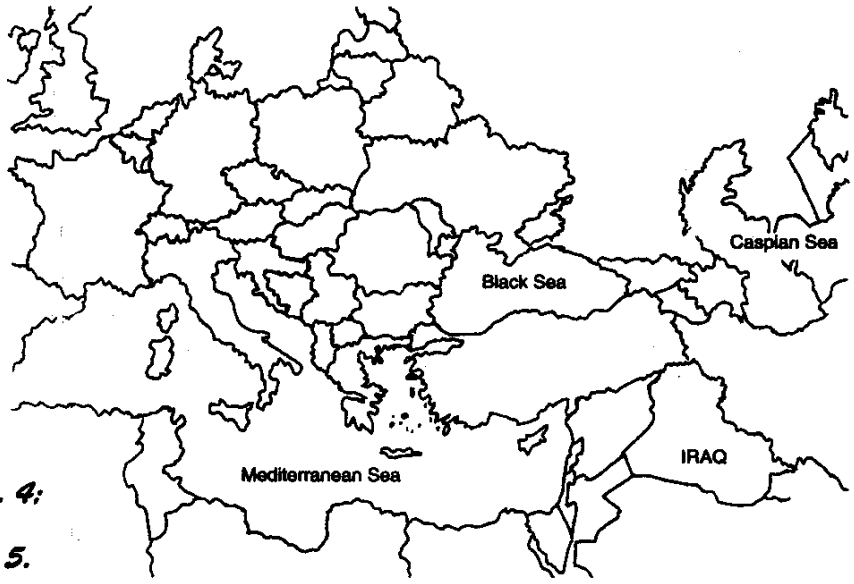
In the field of male buffalo reproduction, research activities are aimed at improving semen evaluation and processing techniques, development of suitable extender for buffalo semen and studies on comparative physiology of buffalo and cattle spermatozoa in terms of sperm capacitation and acrosomal integrity. In the field of female buffalo reproduction, the research work is focused on reducing the calving interval. Suckling by calf, inefficient heat detection and higher ambient temperatures during summer have been identified as the common non-genetic factors responsible for longer calving intervals of buffaloes.

In the field of buffalo breeding, the progeny testing programme of Nili-Ravi buffaloes in operation since 1981 in Punjab province is being strengthened under the NCBRP. So far, more than 5000 buffaloes maintained at five Govt. Livestock Farms; three military Dairy Farms and field area of Districts Okara, Sahiwal and Faisalabad have been registered under the programme. Out of these, 542 bull mothers have been identified with average lactation field ranging from 2600 to 3800 liters. Progeny testing of candidate bulls of first four batches have been completed and out of 44 contesting bulls, 16 bulls have been selected having Relative Breeding Value greater than 100. The results of 5th Batch are still awaited.

The important issue of economical rearing and fattening of male buffalo calves for increasing beef production in the country is studied under the NCBRP. Efforts are underway to develop economical and efficient early weaning diets for buffalo calves. Experiment work completed so far indicates that diets based on cotton seed meal and soybean meal can be successfully and economically used for early weaning of buffalo calves.



In each issue of the Buffalo Newsletter a description of Buffalo farming in every member country is presented. Egypt and Syria appeared in n. 3; Bulgaria and Albania in n. 4; Turkey and Romania in n. 5.



BUFFALO POPULATION AND PRODUCTION IN IRAQ

1 – ORIGIN:
Conflicting opinions were published; some believe that buffaloes already existed in wild state in Mesopotamia and from there spread to other countries; others say that buffaloes were introduced to the marshes of southern Iraq from India 13 centuries ago.
- **Type:** Indian
- **Breed:** Iraqi
- **Groups:** Marsh buffaloes (44% of total population)
Town buffaloes (56% of total population)
- **Crossing:** None

2 – GEOGRAPHICAL AREAS:
- marsh buffaloes are raised in the southern provinces;
- town buffaloes are raised in towns in the middle part of Iraq;
- in the northern provinces there are some mountain buffaloes (smaller in size).

3 – NUMBER:
Number of buffaloes in Iraq has decreased in the last few years, as indicated below:

years	total buffaloes
1986	141,450
1990	129,000
1993	98,700

(see table 1).

4 – HERD SIZE:
Most buffaloes are in private small stock herds; there is one research herd.
Herd size in private herds ranges from 5 to 20 buffaloes.

5 – DESCRIPTION:
(see table 2)

6 – PRODUCTIVITY:
N. DAYS LACTATION/YEAR:
in towns 254-259.
in marshes 180.
LACTATION MILK YIELD (KG):
in towns 1520-2500.
in marshes 680-700.
AGE AT FIRST CALVING (MONTHS):
56.
AVERAGE LACTATION NUMBER:
5.
AGE AT SLAUGHTER (MALES):
2 - 6 months.
WEIGHT AT SLAUGHTER (MALES):
150-150 kg.
- IS THE CALF SUCKLING? **Yes, during 5 to 6 months.**
- IN ALL HERDS ? **Yes.**
- ARE COWS MILKED ONCE A DAY? **Yes when yield is low or medium .**
- ARE COWS MILKED TWICE A DAY? **Yes the high milk producing and at beginning lactation.**

Table 1. Number of buffaloes according to sex and age (1986).

AGE (YEARS)	MALES	FEMALES	TOTAL
LESS THAN 1	14,610	19,880	34,490
1 - 3	6,650	19,260	25,910
3 AND OVER	4,280	76,800	81,080
TOTAL	25,540	115,940	141,480

FOLLOWS PAGE 7 ☞

- WHERE?
In the yard.
- ARE THEY HAND MILKED? **Yes.**
- ARE THEY MACHINE MILKED? **No.**

7 – FERTILITY:
N. CALVES/YEAR: **two calves every three years.**
SEASON OF CALVING: **August to November: 60%.**

8 – HOUSING:
- In villages people keep buffaloes in human dwellings mainly for safety;
-In towns: small farmers keep buffaloes in thatched or mud-roofed sheds or in mud-walled paddocks. During day time buffaloes are let out for feeding, roaming around or wallowing in ponds;
- In the marshlands: buffaloes are kept in cottages.
When the flood is high, buffaloes stand on platforms made of papyrus, reeds and mud that rise above the water surface. Those platforms are big and cottages are built on them to house groups of buffaloes. Platforms can be pushed from one place to another in the marshes.

9 – ARE BUFFALOES USED FOR DRAUGHT? No.

10 – SOURCE OF FEEDING:
Buffaloes in the marshes swim far and wide for feeding on papyrus, reeds, common ash and other plants; when the flood is high their owners need to cut and collect these plants to feed the buffaloes on the platform. Rice hulls are also given when available. Buffaloes in towns rarely graze natural pasture; they are mostly fed concentrates, green forage, straw and agriculture by- products.

11 – TOTAL ANNUAL PRODUCTION BY SPECIES.
(see table 3).

OTHER PRODUCTS FROM BUFFALO: **Leather.**

12 – MILK RECORDING:
No, except in the research station where only 0.1% of the population is raised.

13 – REPRODUCTION:
HAS EACH FARM ITS OWN BULL? **Yes.**
ARTIFICIAL INSEMINATION? **No.**
ARE BULLS FOR NATURAL MATING AVAILABLE IN VILLAGES: **No.**

14 – DISEASES:
Due to an immunity gained during adverse contitions, buffaloes in Iraq have good general contitions. They have a minimum chance for infection with theileriosis or other tick and parasite diseases.

15 – SOCIAL POSITION OF BUFFALO FARMERS.
The full majority of buffalo population is raised in private small herds. Owners are not wealthy and are poorly educated for which they follow the traditional production system: hand milking, natural breeding, traditional feeding, etc. and as a result they receive low profit.

16 – PERSPECTIVES OF BUFFALO PRODUCTION:
Buffalo population in Iraq has gone through a severe reduction in the last few years due to the following reasons:
1 - many buffalo farmers have quit raising this tough and sturdy animal and started work on jobs of better income; 2 - many buffaloes were slaughtered during the years of economic blockade due to the high raising costs and the shortage of feedstuff; 3 - reduced fertility and sterility; 4 - buffalo owners were not compelled to follow strict hygienic measures and effect vaccinations.
These constraints might be solved by: 1 - utilizing agro-industrial by-products and non-conventional feed resources; 2 - improvement of hygienic conditions along with vaccination with special emphasis on detection of sterility and reduced fertility; 3 - implementation of artificial insemination; 4 - establishment of research stations for buffalo production and improvement with the employment of milking machines; 5 - develop research projects on reproduction with emphasis

FOLLOWS PAGE 8

Table 2.

	3-7 YEARS OLD FEMALE	7-8 YEARS OLD FEMALE
- HEIGHT AT WITHERS	145.8 cm	147.2 cm
- WEIGHT	-	900 kg
- CHEST GIRTH	207.2 cm	223.8 cm
- BODY LENGHT	115.2 cm	128.0 cm
- COLOR	black or grey with white spots in the forehead, legs and tail.	
- HORNS	long, curved to the back.	

No available body measurements for males for the difficulties in getting them.

on the causes for infertility and sterility; on semen production, freezing and conservation; on meat production; on the employment of by-products to cope with the shortage of feedstuff and reduce calf mortality.

Dr. Sawsan A. Magid, Science Researcher, National Co-ordinator for Iraq, State Board for Agricultural Research, Baghdad

Table 3. Total animal production by species (metric tons) year 1986.

	N. ADULT FEMALES	TOTAL MILK	MEAT
BUFFALO	115,940	35,000	32,660
DAIRY COW	1,345,900	899,000	466,095
SHEEP	8,505,600	170,000	1,700,790
GOAT	1,303,500	70,000	819,780

A BUFFALO FARM IN ISRAEL

The first modern buffalo farm in Israel is located in the agricultural settlement 'Bizaron'. This complex is a combination of a dairy farm with Holstein-Israelian cows and water buffaloes. The dairy cows (80 cows + 40 heifers for replacement) produce 9000 litres milk per lactation, with 3.2% fat and 3.15 % protein. In this complex three people work full time, milking twice a day and feeding the animals.

In the farm there is also a dairy processing plant, producing 40 different dairy products through different techniques. Recently, the dairy plant was modified in order to produce buffalo mozzarella cheese according to the rules of the Italian designation of origin for mozzarella cheese.

The buffalo farm started to operate on January 1995, when 50 female and 4 male buffalo calves (averagely 6 months old) were imported from Italy. Calves were born in three different farms: Agricola Circe, owned by Mr. Benedetti Panici, located at Latina; Torre Paladina, owned by Mr. C. Conforti, located at Salerno, and Istituto Sperimentale per la Zootecnia (research institute of the Ministry of Agriculture) located near Rome.

The young buffaloes were fed 80% of standard mix for growing (12% crude protein, 50% roughage) and 20% wheat straw. The heifers showed oestrus at 14 months of age, and at a weight of 350 kg, having registered an average daily gain of 728 grams/day. Height at withers was 121 cm. At the age of 14 months they were mated to the bull, and they were kept with the bull from September 1995 until July 1996.

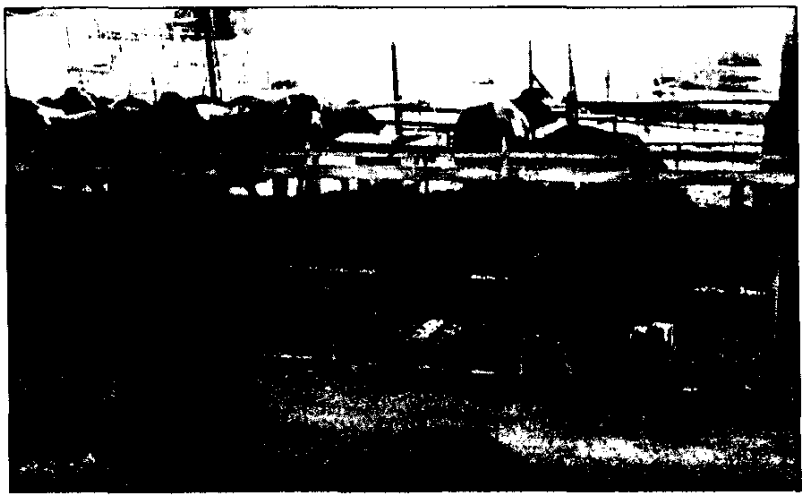
Calving started on September 1996, at an average age of 25.5 months, and weight of 635 kg, the heifers having registered an average daily gain of 770 grams/day. Height at withers was 130 cm at this time.

One heifer died before calving; 2 buffaloes died at calving as well as two calves at birth.

The newborn calves were bottle fed for two days with the dam's colostrum, and for 5 more days with dairy cow colostrum; then they were bucket fed with cow milk until the age of 60 days, having consumed 240 litres milk. A concentrate mix (18% protein) was added ad libitum very early. At the age of 60 days they were weaned.

At 45 days from calving - i.e. the time in which this note is being written - milked

FOLLOWS PAGE 9 ☞



buffaloes produce averagely 7.7 kg milk per day, with 7.5% fat, 5.8% protein and 17% total solids.

The housing include a wide corral for young buffaloes, 1 acre wide, 25% roofed. The dams are kept in an old cowshed, 0.35 acre wide, 30% roofed. The yokes were cut up so that buffaloes did not require horn reduction, which has commercial significance.

A few problems occurred at the first calvings, very likely due to the fat buffalo syndrome which caused pernicious parturitions, feet tumefaction and incidence of uterine and vaginal prolapses.

A dramatic correction in the diet was done after the visit of Mr. Alfonso Cutillo a buffalo owner of Caserta (Italy) who assisted in modifying the composition of the ration and guided the manufacturing of mozzarella cheese.

The feeding of the buffaloes is now the following: 15 kg corn silage, 5 kg vicia hay, 2 kg wheat straw, 2 kg wheat hay, 0.5 kg soybean meal, 1 kg concentrate of barley grain and vitamins + minerals. Globally, the ration includes 15.7 kg dry matter, 11.5% crude protein and 22% crude fibre.

Dried buffaloes as well as pregnant heifers are given 12 kg dry matter, 8.1% crude protein and 30% crude fibre.

The milking parlour is new. The milking equipment includes automatic identification which measures and retains daily individual milk yields, electric conduction of milk (for suspected udder infections) and podometer (recording abnormal tread activity for heat detection). Buffaloes are milked first, then the Holstein cows. Buffalo milk is kept separate and sent to the dairy plant.

The dairy plant is at present processing 200 litres buffalo milk every day. During three days/week, the 200 litres are all processed into 50 kg mozzarella cheese. Another dairy products of the kind of Italian 'ricotta' or the German 'Quark' is then produced from a curd obtained with the whey remaining after making mozzarella (after heating and a further addition of acid whey). During the remaining four days of the week, only 100 litres buffalo milk are processed into mozzarella. From the remaining 100 litres, cream is taken away and sold in plastic containers of 300 or 500 grams weight; from the skimmed milk various types of cheese are produced (feta type, gouda, etc.); average yield is 20-24 kg cheese out of 100 kg milk.

Assistance to the farm is offered by a veterinarian, a nutritionist from the feeding centre and an extensionist in dairy management.

ALL THREE PHOTOS SHOW THE BIKAROM BUFFALO FARM

Adin G., Management and Dairy Nutrition Specialist, Extension Service, Ministry of Agriculture, Israel
Rubinchick H., Buffalo Farm, Bikaron, Israel

A BUFFALO FARM IN ENGLAND

We started keeping buffalo in 1991 with 12 six month old heifers purchased from Mrs E di Stefano in Latina. Since then we have imported heifers from Romania and Salerno. Our herd has now grown to over 140 animals of which 65 are currently being milked. These 65 include number of heifers born in the UK.

Milking is carried out twice daily in a herringbone milking parlour with 8 standings and 8 milking points which are linked to milk meters. The herd is independently milk recorded by National Milk Records (associated to ICAR). Our herd average is 2800 kg in 305 days. This is with 75% of the herd comprising of heifers. The best cows are yielding over 4500 kg in 305 days.

The average composition of our milk is 8.59% Butter Fat, 4.65% Protein and 5.10% Lactose.

At present we are producing 3000 ltrs of milk per week which is used for: Hard cheese manufacture (12 weeks matured) ~ 40%, Mozzarella ~ 40%, Live Thick Set Yogurt ~ 20%.

Buffalo meat will be eaten in UK but as yet we have had no meat available. It is proposed to sell meat from young bulls (450 kg) at a premium over cows meat on account of the lower cholesterol levels and "guaranteed" freedom from BSE.

Our health status is high. No animals have ever been vaccinated against Foot & Mouth Disease, and we are free from Brucellosis, Tuberculosis and Leucosis.

All the calves (bull and heifer) are reared on the farm. They are kept in small communal groups of 5 to the pen on straw bedding. For the first 2 weeks they are fed three time per day, then between weeks 3 and 8 twice per day and in weeks 9 and 12 just once per day. They are then weaned and put into larger groups. All calves are fed on fresh cows milk, hay and a concentrated blend similar to that fed to the lactating cows.

The largest cause of calf mortality was due to difficulties in getting calves to feed artificially. This problem has now been resolved and mortality rates are currently less than 1%. The calves from Italian buffalo are generally more difficult to start feeding artificially than those out of Romanian buffalo.

Heifer calves born in the UK are calving down at 24-30 months of age.

All buffaloes being milked are fed between 1kg and 5kg per day of blended feed in the milking parlour. The quantity depends on yield and stage of lactation. This feed comprises of pelleted dried sugar beet, wheat distillers dark grains, maize gluten feed, wheatfeed, sunflower, barley and molasses (The crude protein (CP) is 18%, fibre 10.5% and metabolisable energy (ME) 12.5). In addition to this buffaloes are fed during the winter an ad-lib uni-feed ration consisting of wheat or barley straw (55 %), hay or haylage (25%) vitagold (20%). Vitagold is a moist distillers wheat grain waste (DM 35%, CP 34%, Fibre 11%, ME 14.5%).

During the winter (mid-October > mid April) the buffalo are all kept in large straw bedded covered yards. During the summer the buffalo are kept outside and graze grass and clover swards. They are also allowed access to a mixture of straw and vitagold.

We AI most cows but do have 3 young bulls on the farm, these are used mainly with heifers. Our 1st time conception rates with AI are around 80% in the winter but much lower in the summer. AI is only practised on synchronised buffalo cows or heifers due to the difficulties in observing heat. Frozen semen is always used.

In addition to AI we have been flushing embryos from our best cows. The number of embryos flushed from each cow is averaging 2.5 per flush and the quality of the embryos which are generally very good appear to freeze well. We are currently experimenting with several ideas to improve the flushing rate and the percentage of buffalo holding to ET. We currently have 3 buffaloes in calf by ET and intend to carry out further transplants during this winter.

By UK standards our farm is considered small (60 ha - 70% grass, 30% winter cereals) and is run by my wife, myself and one full time worker. It was the first buffalo farm in the UK. Before the end of next summer we will be milking 120 buffalo at this farm, and we are already making provisional plans to expand production to 500 animals at another farm.

There are now 10 other people keeping buffalo although only 2 of those are milking buffaloes. There will be several more dairy buffalo farms starting up in the UK next year.

My estimate is that the UK market for buffalo milk is 300,000 ton pa. This is for processing into hard cheeses, a small amount of mozzarella but mainly products for the Asian community. I would therefore expect there to be scope for national herd of about 100,000 lactating buffaloes.

R J Palmer
Upper Nineveh Farm, Idlicote, Shipston on Stour, CV36 5EH, England

SURVEY ON THE ON-GOING AND FUTURE RESEARCH PROJECTS ON BUFFALO

The Buffalo Network is a research network, for which major effort is being put in circulating all news relevant to the research in buffalo. We are collecting the main research projects both actual and of future implementation in the Universities and research institutions working with buffaloes. A list of research projects at present going on at the Agriculture University of Bangladesh was published in issue n. 5 of the Buffalo Newsletter. In this issue we are presenting the projects developed in Gujarat (India).

GUJARAT AGRICULTURAL UNIVERSITY (GAU)

Shahibag, Ahmedabad - 380004 India

List of ongoing research projects on buffaloes:

1. Network project of NBAGR on genetic resource survey on Jafarabadi buffaloes at cattle breeding farm, GAU, Junagadh (Gujarat) for VIII Five year Plan, likely to continue during IX Five year Plan (1997-2003).
2. Establishment of elite herd of Jafarabadi buffaloes at cattle breeding farm, GAU, Junagadh (Gujarat).
3. Establishment of elite herd of Surti buffaloes at livestock research station, GAU, Navsari (Gujarat).
4. Establishment of elite herd of Mehsani buffaloes at livestock research station, GAU, Sardar, Krushinagar, Dist. Banaskantha (Gujarat).
5. Network project on embryo transfer and reproductive biology at GAU, Anand (Gujarat) for VIII Five Year Plan likely to continue during IX Five Year Plan.
6. Network project on process up-gradation of indigenous dairy products at Dairy Science College, GAU, Anand (Gujarat).

Dr. Patel, Director of Research and Dean

Coordinated Research Project of the Italian Research Council on

THE POLYMORPHISM OF CASEINS IN BUFFALO MILK

Up to a few years ago buffalo caseins have been regarded as monomorphic; previous researches carried out by Addeo et al. (1977) on the milk of 170 Italian buffaloes through electrophoresis on agarose gel showed in fact that patterns of individual buffaloes were similar to each other for the β-, k-, and α-s1 caseins, while rare individual variations were detected in the α-s2 fraction. While k-casein was found monomorphic also in Nepalese buffaloes (Kawamoto et al. 1992), a two allele polymorphism was suggested by the same author for β -and α -s1 fractions.

Recently, however, Chianese et al. (1994) have analysed individual whole buffalo casein samples from Venezuela, by polyacrylamide gel electrophoresis at alkaline pH and found a high heterogeneity determined both by the different degree of phosphorylation and by genetic polymorphism. Eight phenotypes were dissimilar from the others showing three altered patterns at the level of α-s1 , α-s2 and β-casein fraction. These results could be due either to the different origin of the buffaloes - although Italian buffaloes were also imported when the population of Venezuela was established, or to the better resolution power of the electrophoretic methods.

It seemed therefore interesting to verify the obtained results on the Italian buffaloes. The Department of Food Science of the University of Naples and the Animal Production Research Institute of Rome have started a research project supported by the Italian Research Council with the purpose to study the polymorphisms of milk caseins in Italian buffaloes and their effect on milk composition and cheese making ability.

Carmela Tripaldi,
Istituto Sperimentale per la Zootecnia,
via Salaria 31, 00016 Monterotondo (Italy).

REFERENCES

ADDEO F., MERCIER J.C. AND RIBARDEAU-DUMAS R., 1977. The caseins of buffalo milk. Journal of Dairy Res., 44:455-468.

CHIANESE L., GARRO G., FERRANTI P., CAIRA S. AND ADDEO F. 1996. Occurrence of casein polymorphism in water buffalo milk. EAAP Publication n. 82, pp.187-191.

KAWAMOTO Y., AMANO T., NAMIKAWA T., NISHIDA T. AND RAJUBHANDARY H.B., 1992. Milk protein polymorphisms of water buffaloes in Nepal. Anim. Sci. Technol., 63:270-276.

MEETING OF THE ESCORENA CO-ORDINATORS

ESCORENA is the European System of Cooperative Research Networks in Agriculture, established, supported and supervised by FAO.

Believing that research is the key element in sustainable agriculture and rural development and that the success of research depends on the exchange of information and material, FAO plays a fundamental role in encouraging the relations between scientists of different countries.

At present (1996) ESCORENA groups the following 17 Networks, each of them covering a specifica area:

Olives; Sunflower; Soyabeans; Animal Waste Management; Trace Elements, Natural Antioxidants and Contaminants in Foods and Diets; Pastures and Fodder Crops; Sheep and Goat; Cotton; Nuts; Rice; Buffalo; Flax; Sustainable Rural Environment and Energy; Maize Selection for Disease Resistance; Oats Disease; Game Farming; Mushrooms.

Each Network is structured with one co-ordinator, responsible for the activities of the Network and a few working groups covering the most relevant subjects. Each Network is open to all scientists and technicians interested in each topic. Presently there are more than 300 institutions from most European countries and 1,800 network members, plus 400 further researchers and technicians participating in the activities.

A meeting of the ESCORENA coordinators was held at Potenza (Italy) on 30 May and 1 June 1996.

The meeting was opened by H. Olez on behalf of the FAO Regional Representative for Europe, who underlined the importance that FAO attaches to the long-standing voluntary research cooperation and suggested that the Networks pay closer attention to supporting the research in Eastern Europe and to transferring technology to developing countries.

J. Boyazoglu, FAO Regional Officer for Europe,presented the activities developed by the networks during 1994-1995, underlining that they have played a significant role in the field of genetic biodiversity, its conservation and management. Activities relating to the environmentally sustainable use of marginal land were further developed. Increased emphasis was given to integration between networks, so that a global system approach be used to face technical issues and problems. Integration was also implemented at geographic level: six networks formally involve European and Near Eastern countries. A database of members and their fields of expertise is also being created in order to improve the potential of participating researchers to share thair expertise worldwide through FAO.

G. Best, FAO Senior Energy Coordinator, presented the FAO renewable energy programme. Biomass energy is increasingly entering European agricultural production schemes and new conversion technologies are making biofuels an economically interesting option. Europe is interested in energy plantations as ways to reduce the dependence on fossil fuels and to keep active the 'set-aside lands'.

The coordinators have then reviewed the specific activities developed by each Network.

Copies of the Report of the ESCORENA meeting including the reports of each network coordinator on the activities developed in the recent years are available from dr. J. Boyazoglu Senior Officer, FAO-REUR, via delle Terme di Caracalla, 00153 Rome.

TO ALL MEMBER COUNTRIES OF THE BUFFALO NETWORK

PROJECT PROFILE

The co-ordination board of the Buffalo Network (Europe-Near East), during the meeting held in Cairo on 17 October 1996, agreed on the idea of developing research programmes with immediate benefit for the member countries. Anybody wishing to propose a research or assistance programme is kindly invited to prepare a PROJECT PROFILE of one page, describing:

- area of interest;
- problems to be solved;
- goals of the project;
- expected results and
- time to achieve them.

Do please submit the PROJECT PROFILE to:

The co-ordination board of the Buffalo Network, Istituto Sperimentale per la Zootecnia, via Salaria 31, 00016 Monterotondo, Italy, fax: +39 6 906 1541, e-mail: isz@flashnet.it

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ITALIAN BUFFALO SEMEN AVAILABLE

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Contact dr. Emanuele Villa, A.I.A., via Tomassetti 9, 00145 Rome, tel +39 6 85451308, fax +39 6 85451322

THE PROCEEDINGS OF THE SYMPOSIUM ON BUFFALO PRODUCTS

Organized by the Buffalo Network in December 1994 (see report in Buffalo Newsletter n. 3) were published.

The contents include the following sessions: Milk Products, Meat and Typical Products, Genetic and Environmental Aspects, Certification of Production, plus free communications and a poster session.

We highly recommend this book which contains two major papers: 'Buffalo milk products' by J. Renaud and 'The situation of meat products'by S. Gigli, in the Mediterranean area. The two papers are the result of a deep and detailed survey carried out by the WG on Products of the Buffalo Network in all countries of the Network. The readers will be happy to learn about cheeses like Domiati, Karish, Rahss (Egypt), Madhfoor, Dhafayer (Iraq), Mozzarella (Italy), Braila, Vladeasa, Bucedi, Homoaod (Romania), White brine (Bulgaria), Alghab, Akkawi (Syria), Beyaz Peyner, Abaza (Turkey); as well as about creams like Queshta Mosakhana (Egypt), Gaymar (Iraq), Quishada (Syria) and Kaymak (Turkey).

BIBLIOGRAPHICAL INFORMATION

INTERNATIONAL SYMPOSIUM ON BUFFALO PRODUCTS, EAAP PUBLICATION N. 82, 1996,
276 pages, price 149 Dutch Gulden.
Wageningen Pers., P.O. Box 42, NL-6700 AA Wageningen, The Netherlands,
tel. +31 317476514,
fax +31 317426044.

THE PROCEEDINGS OF THE SYMPOSIUM ON BUFFALO REPRODUCTION

Organized by the Buffalo Network in October 1995 (see report in Buffalo Newsletter n. 4) were published.

The contents include 21 research communications and three main lectures on the state of art in the following areas: Male Reproduction and A.I. (F. El-Keraby et al.), Physiology and Endocrinology of Reproduction (A. Borghese et al.) and Biotechnology of Reproduction (M. Drost).

BIBLIOGRAPHICAL INFORMATION

BULGARIAN JOURNAL OF AGRICULTURAL SCIENCE, VOL. 2, N. 1, FEBRUARY 1996,
Published by Agricultural Academy of Bulgaria.
Guest-editor of the issue: L. Kanchev
Editorial Secretariat: Tsarigradsko shosse 125, bl. 1, room 215, 1113 Sofia, Bulgaria

BUFFALO MILK, CHEMISTRY AND PROCESSING TECHNOLOGY

Presenting for the first time a comprehensive book which deals exclusively on chemistry and developments in processing technologies of Buffalo milk

By DEEPAK SAHAI
(Ph.D., Food Science and Technology, University of Nebraska - Lincoln, USA)
November 12, 1996

274 pages, illustrated
US $ 69.00
ISBN: 81-900609-0-2 S.I.

Publications, 231, MIG, Old Housing Board Colony, Sector -13, Kamal (Haryana) 132001 India

INTRODUCTION

Buffaloes are important farm animals in countries of South East Asia, India, Australia, Egypt, parts of Africa, Italy, and in several Latin American countries like Brazil. However, there is little consolidated

FOLLOWS PAGE 14

BUFFALO MILK, CHEMISTRY AND PROCESSING TECHNOLOGY

FROM PAGE 13 ☞
information available on the milk production potential of buffalo, compositional and functional properties of buffalo milk and technologies in manufacture of buffalo milk products. This book delineates buffalo milk composition, its chemistry and processing technologies in detail.

CONTENTS

CHAPTER 1.

Buffalo a candidate for milk production.

The first chapter elucidates the descent, domestication, taxonomic classification and global distribution of water buffaloes. Potential of buffaloes as a milk producer is described, where emphasis is on elaborating the milk production efficiency of buffaloes.

CHAPTER 2.

Compositional profile of buffalo milk.

The second chapter elaborates the chemical constituents such as proteins, enzymes, lipids, vitamins, minerals, trace elements and pigments of buffalo milk. The chapter includes 12 comprehensive tables.

CHAPTER 3.

Functionality and physico-chemical properties of buffalo milk.

Chapter 3 covers the various physico-chemical and functional properties of buffalo milk. Thermal stability of buffalo milk and salt balance has been described in detail.

CHAPTER 4.

Challenges in Buffalo milk processing.

Chapter 4 elaborates the various challenges and advantages in buffalo milk processing. Recent developments such as UHT processing of buffalo milk, lactoperoxidase system for buffalo milk preservation and application of membrane technology in buffalo milk processing has been elucidated. Manufacture of milk powders, concentrates, infant formula, caseins and caseinates using buffalo milk are described.

CHAPTER 5.

Technology of buffalo milk processing.

Chapter 5 elaborates the technological developments and process modifications in the manifacture of cheeses using buffalo milk. Emphasis has been on recent developments in the manufacture of typical buffalo milk cheeses such as Mozzarella and Karish

CHAPTER 6.

Buffalo milk fat and fat rich products.

Chapter 6, besides delineating the functional characteristics of buffalo milk fat, describes the technology for manufacture of traditional buffalo milk fat products such as ghee and Samana.

CHAPTER 7.

Traditional products from buffalo milk.

Chapter 7 describes the technology and recipes for the manufacture of traditional buffalo milk products popular in India, Pakistan Iran, Iraq, Egypt, Italy, Philippines, and Sumatra. Efforts have been made to describe the recent developments, process upgradations and product characteristics for these popular buffalo milk products. The chapter includes 4 figures and 9 tables.

ORDER FORM

Mail to: *Deepak Sahai*
231 MIG, Old Housing Board Colony, Sector - 13,
Karnal (Haryana) 132001 INDIA
Please send me n..... copy(s) of Buffalo Milk: Chemistry and Processing Technology by Deepak Sahai at US $ 69.00 plus US $ 2.50 for postage and handling per volume.
I enclose payment in the amount of US $..... by: check (in favor of Deepak Sahai); money order.
Name, Address, City/State/Zip, Country.
Kindly allow about 45 days mailing time on a confirmed order.

FIFTH WORLD BUFFALO CONGRESS

Royal Palace, Caserta (Italy) 13-16 October, 1997

Organized by the International Buffalo Federation

Preliminary Scientific Programme

Monday, October 13

8.30 - 9.30 Registration
9.30 - 10.30 Opening ceremony
10.30 - 11.00 Coffee break
11.00 - 13.00 1st Plenary
Session: Buffalo production in different environments
Key lectures:
Buffalo milk and processing
Milk production and quality
Meat production on grazing conditions
13.00 - 14.00 Lunch break
14.30 - 15.30 Poster Session
15.30 - 18.00 Short communications (3 separated sessions):
1. Milk production and processing
2. Nutrition requirements and forage resources
3. Meat and draught
18.00 - 19.00 Discussion

Tuesday, October 14

9.00 - 11.00 2nd Plenary
Session: Buffalo genetic improvement
Key lectures:
Impact of new breeding schemes on genetic progress
Gene mapping of the Mediterranean buffalo
DNA polymorphisms in paternity exclusion
11.00 - 11.30 Coffee break
11.30 - 12.30 3rd Plenary
Session: News on reproduction
12.30 - 14.30 Lunch break
14.30 - 17.00 Short communications (3 separated sessions):
1. Breeding schemes
2. Reproduction Technologies
3. Buffalo Genome
17.00 - 18.00 Discussion

Wednesday, October 15

9.00 - 11.00 4th Plenary
Session: Social and economic aspects
Key lectures:
Prospects of buffalo production in Asia
Prospects of buffalo production in South America
Prospects of buffalo production in Europe
11.00 - 11.30 Coffee break

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FIFTH WORLD BUFFALO CONGRESS

11.30 - 12.30 Poster session
12.30 - 14.30 Lunch break
14.30 - 16.00 Short communications (3 separated sessions):
1. Management of calf weaning and newborn pathology
2. Physiology and diseases
3. Processing hides and carcass by-product

16.00 - 17.00 Discussion
17.00 - 18.00 Presentation of the FAO Buffalo Research Network (Europe-Near East)

Thursday, October 16
9.00 - 11.00 5th Plenary Session: Management and market
Key lectures:
Marketing of milk and dairy products in India
Marketing of Mozzarella cheese
Management and marketing of products in small holdings
11.00 - 11.30 Coffee break
11.30 - 12.30 Closing session
15.00 - 19.00 Field trip (buffalo farm and Museum of ancient local history)
20.00 Social dinner

Post-conference tours (buffalo farms and tourism) will be organized on 17 and 18 October.

PROCEEDINGS

The lecture manuscripts (on request and maximum 8 pages), poster abstracts, and the short papers will be published in the Proceedings (available at the meeting).

ABSTRACTS AND SHORT PAPERS

Any topic concerning buffaloes is welcome. Abstracts (about 230 words) and short papers (4 pages written on one side of one sheet of white A4, 21 x 29,7 cm) must be in English and should include the title, authors' names, address for correspondence, and at least 3 key words. Send the abstracts and short papers to Congress secretary.

DEADLINE

The deadline for receiving abstracts and short papers is February 28th, 1997.

Notification of acceptance together with instructions for preparation of definitive short paper will be sent to the first author. The deadline for receiving the definitive short papers is April 30th, 1997. At least one author must register for the Congress and attend the Poster Session. Posters may not be presented and appear in the programme unless the author

FOLLOWS PAGE 16 ☞

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Istituto Sperimentale per la Zootecnia
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Number 6 – December 1996

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January 31, 1997

has completed the official registration form and provided a registration fee before May 31th, 1997. Official language: English. Simultaneous translation service from English into Italian and Portuguese will be provided.

REGISTRATION FEES

Participant:
before March 31th, 1997: $ 300
after March 31 th, 1997: $ 350
Accompanying Person: $ 150
Student: $ 100
Visit and touristic trips are not included.
Send registration fee to the following address:

APA - Associazione Provinciale Allevatori Via C. Battisti, 56
81100 Caserta, Italy
Tel. (+39) 823-356670
Fax (+39) 823-356564

ACCOMODATION

Hotel informations will be provided in final announcement.

REGISTRATION FORM

Please type or print in block letters and send the completed form to the APA - Associazione Provinciale Allevatori and retain a copy for your records.

PERSONAL INFORMATION

1. Participant:

Family name (Mr./Mrs./Ms.) .....
First name ..... Middle name .....
Participation (Active/Listener) .....
Discipline (Genetic/Nutrition/Production systems) .....
Article Title .....
.....
Presentation (Lecture/Poster) .....
Nationality ..... Passport N° .....
Organization .....
Position .....
Address .....
Telephone ..... Fax ..... Telex .....

2. Accompanying person(s):

Family name (Mr./Mrs./Ms.) First name .....
Family name (Mr./Mrs./Ms.) First name .....

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