

Buffalo Newsletter



Number 2 - September 1994

EUROPE - NEAR EAST

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

The first issue of the Buffalo Newsletter was sent last November in 1,500 copies to researchers, national organizations as well as private farmers interested in buffalo production, in 102 countries of the five continents. Replies of appreciation and interest were received also from countries outside the network, where buffalo is commonly reared. These countries are: Israel, Pakistan, Sri Lanka, Bangladesh, Korea, China, Nepal, Myanmar, Thailand, Philippines, Malaysia, Israel, Brazil, Venezuela. Replies came also from countries having no specific interest in buffalo production: U.S., Australia, Kenya and Tunisia.

We feel that the newsletter might be a first mean of communication for the researchers of different countries. Through the newsletter they might know the main

research projects involving buffaloes which go on in other countries and they could get in touch with the researchers working on similar subjects. In this issue a few scientific papers were published. Some of them were kindly supplied by the readers of the Newsletter although their country is not part of the network.

A symposium on buffalo products was also announced (September 1994). It will be held in Rome, Italy, and we look forward to receiving approval and participation from many countries.

Finally, we emphasize that we would greatly appreciate if any reader collaborate actively to the newsletter, sending to the Editor

information and material for publication.

The Editor

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EFFECTS OF DIFFERENT DIETS ON THE CHEMICAL COMPOSITION AND COAGULATING PROPERTIES OF WATER BUFFALO MILK

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In Italy, water buffalo milk is used only to make cheese. The main Italian product is Mozzarella cheese, a typical cheese, once consumed especially in the South of Italy and today in all parts of the country.

Mozzarella cheese is also made from cow milk and in this case is always used in cooking and in famous Italian "pizza". Water buffalo Mozzarella cheese is a very valuable product and is consumed particularly as a main dish.

In cheese making, particularly for typical cheeses, the quality of the milk is very important because it positively influences the sensory properties and yield. In particular it seems that water buffalo Mozzarella cheese is softer and

more juicy than cow milk Mozzarella, for higher fat-to-protein ratio of milk (the optimal fat-to-protein ratio is about 2:1) (Addeo et al., 1993.)

Numerous factors determine milk composition: genetics, nutrition, and others such as stage of lactation, season, parity. Some researchers have investigated the variation of milk quality as it is related to these factors (Asker et al., 1957; Albonico et al., 1969; Galvano et al., 1982; Shah et al., 1983; Sangwan et al., 1988; Bertoni et al., 1993; Pilla and Moiola, 1993). Other Authors have studied the effects of lactating water buffalo feeding on some of the component of milk (Shukla et al., 1972; Mallikarjunappa and Mudgal, 1988; Singh and

Barsaul, 1988; Bertoni et al., 1991) and the effects of pre-partum feeding on milk fat content (Usmani and Inskeep, 1989). The coagulating properties of water buffalo milk, even though most of this milk is used in cheese making, have been studied by a few Authors (Matassino et al., 1991; Sallem and Albury, 1991). At present the relationship between characteristics of diets and coagulating properties of this kind of milk have not been considered. These studies are important because they allow the evaluation of the ability of milk to make cheese.

The goal of this paper is to present finding about the milk composition and the coagulating properties of lactating water buffaloes fed different

Table 1. Effect of energy and protein level of diet on milk composition (1st trial)

PARAMETERS	D I E T S				R.M.S.E.
	LELP (1)	LEHP (1)	HELP (1)	HEHP (1)	
Fat %	9,07	8,83	8,77	9,26	0,8693
TN x 6,38%	4,83 b	4,91 b	5,14 a	4,95 ab	0,2498
Protein %	4,60 b	4,66 b	4,91 a	4,70 ab	0,2527
Casein %	3,97	4,01	4,12	4,05	0,2296
NPN %	0,037 AB	0,038 A	0,034 B	0,039 A	0,0025
pH	6,73 a	6,71 ab	6,67 b	6,67 b	0,0555
Obs. number	14	14	14	14	

(1) LELP = lower energy, lower protein
LEHP = lower energy, higher protein

HELP = higher energy, lower protein
HEHP = higher energy, higher protein

A, B, C = P<0,01; a, b, c = P<0,05

energy concentrations, protein levels and protein degradability of diets.

The research was carried out in the Animal Production Research Institute of Rome; 16 pluriparous buffaloes in early stage of lactation were used; they were fed 8 diets in all, according to the two latin squares designs which follow. The first four diets were different in energy content (0.83 and 0.77 UFL/kg d.m.) and protein level (14 and 12%); the other four differed in energy content (0.78 and 0.68 UFL/d.m.) and protein degradability (71.0 and 59.6%), the protein level of the last four diets was 13% (Verna et al., 1993). The first rations were characterized by alfalfa hay, maize silage and concentrates; the second rations by wheat straw, maize silage and concentrates (Verna et al., 1993). From milk samples pH, proteic fractions, fat and fatty acids and coagulating properties were determined (Tripaldi 1993).

Results

In the diets with different

energy concentrations and protein degradability, the fat content was higher in the high energy (HE) diets (Table 1). In all the diets at higher energy level the total N and the protein content increased (Tables 1 and 2). When the protein degradability changed, in the HE diets the casein content rose too (Table 2).

The HE diets determined an increase of fat content as well as evidenced by Bertoni et al. (1991) on water buffaloes bred in Italy and by Mallikarjunappa and Mudgal (1988) on Murrah buffaloes, contrary to what pointed out for dairy cow and for Murrah buffaloes by Shukla et al. (1972). Also Bertoni et al. (1991) and Shukla et al. (1972) evidenced that the total N content increased at higher energy level, whereas Mallikarjunappa and Mudgal (1988) didn't observe any difference in the total N content of milk when the animals were fed different roughage: concentrate ratios.

The NPN content of milk increased when the protein

level of diet varied from 12 to 14% (Table 1). The average NPN content rose 3,0 mg/100 ml of milk when the protein level passed from 12 to 14%. Journet et al. (1975) and Remond (1985) observed in the dairy cow that increasing the protein level of the diet by 1 p.p. the milk ureic-N rose respectively to 1,8 and 2,1 mg/100 ml of milk (1). The two levels of protein degradability of diets in the second trial didn't give a different milk composition (Table 2).

The pH values of all diets seem influenced by energy concentration of diets (Tables 1 and 2).

It can be observed that the average composition of milk of the first trial is better than that of the second trial. Some considerations should be made: the roughage of the two diets is different, alfalfa hay in the first and wheat straw in the second trial and the average intake of food is higher in the first than in the second trial (Verna et al., 1993). Moreover the moment of calving was different, the end of

Table 2. Effect of energy level and rumen protein degradability of diet on milk composition (2nd trial)

PARAMETERS	D I E T S				R.M.S.E.
	LLEPD (1)	LHEPD (1)	HLEPD (1)	HEHPD (1)	
Fat %	8,17 ab	8,12 b	8,69 a	8,54 ab	0,7592
TN x 6,38%	4,25 b	4,26 b	4,36 ab	4,43 a	0,1804
Protein %	4,01 b	4,02 b	4,12 ab	4,19 a	0,1764
Casein %	3,54 c	3,57 bc	3,71 ab	3,73 a	0,2034
NPN %	0,038	0,037	0,037	0,036	0,0023
pH	6,74 AB	6,77 A	6,70 B	6,73 AB	0,0626
Obs. number	16	16	16	16	

(1) LLEPD = lower energy, lower rumen protein degradability
 LHEPD = lower energy, higher rumen protein degradability
 HLEPD = higher energy, lower rumen protein degradability
 HEHPD = higher energy, higher rumen protein degradability

A, B, C = P<0,01; a, b, c = P<0,05

August-the beginning of September in the first and the end of June-the beginning of July in the second trial. Consequently for the last group of animals, the temperatures were elevated at early lactation and this, as it is known, could

have had repercussions on milk quality. In fact a decrease in protein and fat percentage of water buffalo milk during the summer was observed by Pilla and Moiola (1993).

In both trials the composition of fatty acids varied according

to feeding. The long-chain fatty acids were higher when the diets had a lower energy concentration (Figures 1 and 2). Then for the water buffalo, as for the dairy cow, the energetic balance is the major factor of variation which influences

Table 3. Effect of energy and protein level of diet on milk coagulation parameters (1st trial)

PARAMETERS	D I E T S				R.M.S.E.
	L1LP	L2HP	H1LP	H2HP	
r (min.)	12,15	12,46	11,69	11,02	2,3790
k ₂₀ (min.)	2,45 A	2,23 AB	2,22 AB	2,06 B	0,2860
A ₃₀ (mm)	60,94 b	61,23 ab	62,06 ab	63,75 a	3,1640
Obs. number	14	14	14	14	

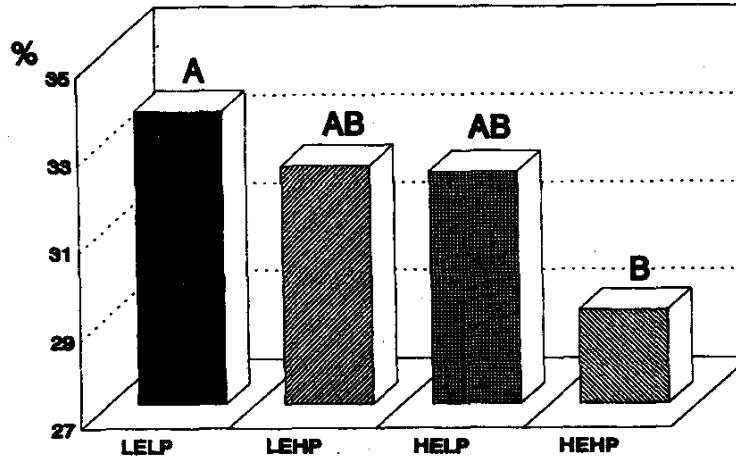
A, B, C = P<0,01; a, b, c = P<0,05

Table 4. Effect of energy and rumen protein degradability of diet on milk coagulation parameters (2nd trial)

PARAMETERS	D I E T S				R.M.S.E.
	L1LPD	L2RPD	H1LPD	H2RPD	
r (min.)	9,62 ab	10,42 a	8,79 b	9,12 ab	1,9980
k ₂₀ (min.)	3,16 A	2,97 AB	2,41 B	2,44 B	0,7250
A ₃₀ (mm)	51,69 ab	52,62 ab	55,56 a	55,56 ab	
Obs. number	16	16	16	16	

A, B, C = P<0,01; a, b, c = P<0,05

FIG. 1 - Effect of energy and protein level of diet on milk fatty acid composition: LCFA



fatty acid profile.

In fact when the available energy is lower, fat mobilization increases and long-chain fatty acid content in the blood and in the milk increases; the higher average long-chain fatty acid content of the second trial demonstrated a major fat mobilization.

The coagulating properties of buffalo milk being studied were influenced by the energy level of diets. The rations with higher energy content produced milk with a lower rennet clotting time, a lower curd firming time and a major curd firmness (Tables 3 and 4). Milk having these qualities is very suitable for cheese making. These results were in agreement with those of Vertes et al. (1989) and Machebosuf et al. (1993).

Conclusions

The protein and fat content of buffalo milk is positively influenced by the higher energy concentration of the diet. Long-chain fatty acid percentage increased when there was a lower energy availabi-

lity. The better coagulating properties were connected with higher energy diets. The protein level of 14% determined an increase in the NPN content only. Otherwise the different protein degradability of rations didn't influence milk quality.

(1) the milk NPN varies as ureic-N (r between 0,78 and 0,98) (Remond, 1985)

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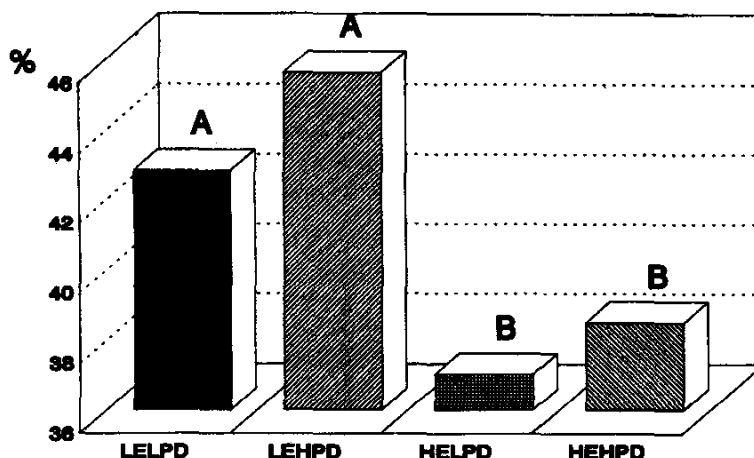
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FIG. 2 - Effect of energy level and rumen protein degradability of diet on milk fatty acid composition: LCFA



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EFFECTS OF BUFFALO (*BUBALUS BUBALIS*) GRAZING ON PLANT STRUCTURE AND COMPOSITION IN THE HULEH NATURE RESERVE

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The buffalo (*Bubalus bubalis*) was domesticated in India and brought to the Near East in the seventh century C.E. In 1948 there were about 5,000 buffaloes in Laje Huleh in the B'teha Valley. With the draining of the swamps they disappeared from the Huleh, and in 1968, 87 were brought back. Today the herd numbers about 110 adults, and also calves aged up to one year, which are sold each autumn. The herd grazes in an area of 300 hectares, of which 120 are covered by water. The aim of reintroducing the buffaloes to the Huleh was vegetation management, the basic assumption being that management which was in force prior to drainage should be adhered to, and that buffalo grazing would ensure the opening up of thickets and create meadows.

In the wake of a temporary drainage, soon after the reserve was set up in 1956, thickets of *Tamarix jordanis*, *Rubus sanguineus*, *Phragmites australis* and *Cyperus papyrus* started growing. Until 1973, wide stretches were covered by these thickets, as also by invader species, such as *Melia azedarach* and *Phytolacca americana*. *Cyperus papyrus* occupied mainly flooded areas but *Melia azedarach*, *Tamarix jordanis*, *Rubus sanguineus* and *Phragmites australis* settled in an area that had been earmarked for open meadows.

Systematic vegetation survey has been carried out in the Huleh since 1979 by means of 10 transects which are sam-

pled 1-3 times per year in 6-12 squares along the transect, each in an area of 25 sq m. As regards structure and dominant species, the transects represent thickets *Phragmites australis*, *Tamarix jordanis*, moist meadows of *Paspalum paspalodes* and *Phyla nodiflora*, edged by *Cyperus fuscus* and *Cyperus pygmaeus*, and dry meadows of *Cynodon dactylon* and *Trifolium fragiferum*.

In areas with a high growth potential of *Tamarix jordanis*, grazing alone did not create meadows. Therefore, mechanical clearing of *Tamarix jordanis* and *Melia azedarach* was carried out in 1983-1986 in an area of 60 hectares projected to serve as a meadow. This enabled comparison of areas not cleared of *Tamarix jordanis* and *Phragmites australis* thickets with cleared areas, both under a grazing regime. In addition, two pre-cleared meadows were divided by fencing - one in 1986 and the other in 1991 - with a heavy grazing regime on one side of the fence, and a moderate on the other.

In areas where mechanical clearing of *Tamarix jordanis* followed by manual uprooting was carried out, heavy grazing by buffaloes in the course of three years led to a decrease in *Tamarix jordanis*, *Phragmites australis*, and *Rubus sanguineus*, and to domination of *Paspalum paspalodes*, *Phyla nodiflora* and, at the water's edge, *Cyperus fuscus* and *Cyperus pygmaeus*, without any need of further interven-

tion. In areas with only moderate grazing, the grass is higher, but is interspersed with small thickets of *Rubus sanguineus* and germinating *Tamarix jordanis*, notwithstanding the mechanical clearing.

Cover of invader species such as *Silybium marianum* and *Ammi visnaga* has decreased due to combined grazing and cutting, while a rise has been observed in the abundance of *Atriplex rosea* and *Conyza canadensis* in cleared areas under heavy grazing.

As a management tool, it would appear that buffalo grazing is effective in creating meadow, if preceded by clearing of *Tamarix jordanis* followed by uprooting during 3 years, but is not effective where there has not been prior cutting of *Tamarix jordanis*. Nevertheless, even in the absence of clearing, paths and small meadows are created. Grazing contributes to increased abundance of *Paspalum paspalodes*, *Cynodon dactylon*, *Cyperus fuscus*, *Cyperus pygmaeus*, and *Trifolium fragiferum*, and to a decrease in cover of *Phragmites australis*, *Rubus sanguineus*, and *Tamarix jordanis*.

THE MEAT PRODUCTION PERFORMANCES OF ITALIAN MALE YOUNG BUFFALOES

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Introduction

The buffalo stock in Italy is now the 33% of the European presence, that is very limited in comparison with the world (0.24%).

Ten years ago this proportion was lower (27%), in fact the heads in Europe have decreased (-23,6%), in particular in Bulgaria (-50%) and in Rumania (-21%), while in Italy have increased (+ 21.7%).

The 150,000 Italian buffaloes are concentrated in a restricted area in southern Italy, even if, in the last years, this species is reared in northern Italy, in replacement of Italian Friesian cows culled for the national milk quotas imposed by EEC.

In Italy the main buffalo production is the milk for making "Mozzarella cheese".

Therefore the female buffalo calves are kept for future replacement of the buffalo dairy stock, while males are killed after birth or are managed with no care leading to their death in large proportion.

In Italy 60% of the population are female buffaloes in reproduction (Ismea); being 0.80 the coefficient of live calves, it is possible to obtain each year about 36,000 male calves for meat production. That means about 700 ton/year of carcass (380 kg live weight and 55% of dressing percentage).

The official data (FAO) report now (without male slaughtering) 1,000 ton/year but the evaluation is probably underestimated for the absence of the private slaughtering and for the low carcass weight (177

kg) considered. Therefore the use for slaughter of males means almost an increase by more of 50% of tons per year.

In the last years the research has shown that male buffalo young bulls, correctly reared, can produce carcass and meat similar to Friesian male young bulls with good quality (Borghese et al., 1977a, 1977b - Romita et al. 1977, 1982 - Abdallah et al., 1981, 1982 - Gigli et al., 1982, 1988).

But the diet (energy and protein) has been the same used for the Friesians, while recent studies have shown that buffaloes have a different rumen degradation and a different utilisation of nutritive components (Settineri et al; 1993).

We would reach some goals with this trial:

- a) to define the age at slaughter giving the best qualitative characteristics of the carcass and meat;
- b) to evaluate the energy input and output considering some factors (age and quality);
- c) to calculate the trend on the age of the different carcass tissues and of the meat qualitative characteristics.

Experimental scheme

The trial has involved 58 male buffaloes slaughtered at different ages (10 at 6 months and 16 at 10, 14 and 18 months).

The buffaloes slaughtered at 6 months were "zero" group.

The other animals were fed, half (A) on a high energy level ration (maize silage *ad libitum*, 900 g/d of soya bean and 100 g/d of vitaminic - mineral supplement) and half (B) on a low energy level ration (50% of the maize silage of group A, equal-soya bean and vitaminic-mineral supplement).

The body weight of each animal was recorded monthly and the individual feed intake daily.

After slaughter the carcass was aged for 7 days at 4°C in refrigerating cell; then the left side was entirely minced to determine the energy output with "calorimeter bomb", while the right side was anatomically dissected in regions and tissues (meat, bone and fats), according to our method (Gigli et al 1991).

On B muscles (longissimus dorsi, semitendinosus, semimembranosus, gluteo biceps, caput longum triceps brachii) the quality parameters were studied: 1) Colour on raw meat; using CIELAB system we measured lightness (L), saturation (C) and hue (H); 2) Hardness on raw and cooked meat: using Warner Bratzler Shear (WBS) force system; 3) Water losses during conservation and after cooking.

For the estimation of the trend of the tissues we have used the logistic equation.

Here we report only the main results of a part of the trial referred to A energy level; the other informations are found in other publications (Failla et al. 1993, Gigli et al., 1993a, 1993b, 1994).

FAO - INTERREGIONAL COOPERATIVE RESEARCH NETWORK ON BUFFALO

INTERNATIONAL SYMPOSIUM ON BUFFALO PRODUCTS

Paestum (SA) - Italy, 1/4 December 1994

The Coordination Board of FAO Interregional Cooperative Research Network on Buffalo in the first meeting on May 1993 has defined the activity of three working groups formed in the Network: Reproduction (coordinated by Bulgaria), Livestock System (coordinated by Egypt) and Products (coordinated by Italy).

The last one has been intensively working for the organization of a workshop on typical regional buffalo products.

Two detailed questionnaires were prepared, one for milk, cheeses and other dairy products, the second one for fresh

meat and meat products, with the scientifically support also of FAO and EAAP experts.

The two questionnaires were forwarded to the National Liaison Centres of the countries of the Network and all of them sent back the appropriate answers.

On the basis of the received answer an "International Symposium on Buffalo Products" was organized and will be held in Southern Italy in December 1994.

Two of the main papers of the Symposium will report the results of the questionnaires while the other ones will point out the present status of the

typical regional buffalo products in Italy, in the Mediterranean area and in the World.

The short papers and the poster sessions will deal with specific items of buffalo products or more generally with buffalo production in each country; a Round Table will conclude the meeting.

The Symposium could be an interesting meeting opportunity for the buffalo product scientists and will be the starting point for setting up future plans for the valorization of buffalo typical products.

Looking forward to meeting you at Symposium in Italy



FAO - INTERREGIONAL COOPERATIVE RESEARCH NETWORK ON BUFFALO

**INTERNATIONAL SYMPOSIUM
ON BUFFALO PRODUCTS**

Paestum (SA) - Italy, 1/4 December 1994

P R O V I S I O N A L P R O G R A M M E

1 / 12 / 94:

16.00-19.00 - Registration

2 / 12 / 94:

08.30 - Registration

09.30 - Opening and Welcome Ceremony

10.30 - Coffee-break

11.00 - **I Session - Milk products**

Chairman: E. Bellitti (ITALY)
Rapporteur: V. Bottazzi (ITALY)

- "Starter" and "protective" cultures of lactic acid bacteria for technological valorization of buffalo milk (S. Coppola - ITALY)
- The "Mozzarella di bufala campana cheese" production, tradition and innovation (G.C. Emaldi and F. Addeo - ITALY)
- The primary structure characteristics of the buffalo caseins. The analytical applications for the "Mozzarella di bufala campana cheese" genuineness defense (P. Ferranti, L. Chianese and F. Addeo ITALY)
- The milk products in the Mediterranean Area (J. Renaud - EAAP)
- The yoghurt production (G.A. Mahran - EGYPT)

13.30 - Lunch

14.30 - **II Session - Meat and typical products**

Chairman: B. Ferrara (ITALY)

Rapporteur: G. Heinz (FAO)

- The situation of the meat products in the Mediterranean Area (S. Gigli - ITALY)
- The typical products in Asia (T.B. Thapa - NEPAL)
- The typical products in South America (J. Reggeti - VENEZUELA)
- The Buffalo production in the Amazon Valley (W.G. Vale - BRAZIL)
- The typical products in East Europe (Z. Peeva - BULGARIA)

17.00 - Coffee-break and poster presentation

18.00 - **III Session - Oral communications and poster discussion**

Chairman: M. Valls Ortiz (CHIEAM)

Rapporteur: S.M. Yener (TURKEY)

3 / 12 / 94:

09.00 - **IV Session - Genetic and environmental aspects**

- Chairman: A. Nardone (EAAP)
Rapporteur: D. Chupin (FAO)
- The genetic improvement and the germoplasm conservation for the quality (D. Matassino and B. Moloi - ITALY)
 - Buffalo, the environment and the quality (A. Georgoudis GREECE)

10.00 - Coffe-break

10.30 - **V Session - Certification of production**

Chairman: M. Zjalic (FAO)

Rapporteur: F. Valfrè (ITALY)

- The EEC and Italian norms (V. Camilla - ITALY)
- The improvement of the productif process and the quality certification (A. Falesi ITALY)
- The legal aspects (C. Corraera - ITALY)
- The role of the consortium for the protection of the cheese "Mozzarella di Bufala Campana" (A. Brandi - ITALY)
- The marketing situation (F. De Stefano - ITALY)

12.30 - **VI Session - Free communications and Country reports (posters)**

Chairman: A. Bosticco (ITALY)
Rapporteur: S.A. Al-Mashiki (IRAQ)

14.30 - Lunch

16.00 - 19.00 - **Round Table**
Coordinators: E.S.E. Galal and J. Boyazoglu (FAO)
V. Pilo (MIRAAF)

- Results of Symposium (Rapporteurs)
- The future role of the Interregional Cooperative Research Network on Buffalo (A.M. Pilla - ITALY)
- Discussion and suggestions
- Conclusions

4 / 12 / 94:

09.00 - 19.00 - Technical (farms, dairies) and touristic (Greek temples) tour.

ORGANIZING INSTITUTIONS

- Dipartimento di Scienze Zootecniche (DSZ) - Università degli Studi di Napoli "Federico II" - Portici (NA) - ITALY
- Istituto Sperimentale per la Zootecnia (ISZ) - Roma - ITALY
- Campania Region, Agriculture Council, clerk's office
- Consorzio di Sperimentazione, Divulgazione e Applicazione di Biotecniche Innovative (ConSDABI) - Circello (BN) - ITALY

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INSTRUCTIONS FOR SUBMISSION

PAPER

- Manuscripts must be submitted in camera ready copy; only English will be accepted and published in the Congress Proceedings.
- Papers must be typed on electric typewriter or computer printer (please do not use dot matrix printers). Typed characters must not be extended beyond the lines on the form. The form must be 16 cm x 24 cm in width and length.
- The first page should contain a centered title in capital letters. The name(s) of the author(s) should be given, family name first followed by initials. A full institutional address must be given. The paper should consist of Introduction, Material and Methods, Results and Discussion and References. The maximum length allowed is 6 pages including tables, figures and references. Four words as Index Terms are necessary, at the bottom of the first page. References should be referred to by a number in the text and in the list of references. Type single space and do not indent

paragraphs, rather separate them by 1.5 lines.

- The postmark deadline for receipt of abstracts is November 10th 1994 while the full papers will be consigned at the Symposium.

POSTER

- You will be assigned a poster number at registration. This will have a date, time and location for poster pointing and removal. Please adhere to time given. You are expected to be at your assigned space during the arranged poster sessions to discuss your work.
- The boards provided for mounting posters will measure approximately 1.20 m x 1.30 m. You should prepare a title card for the top in lettering larger than 3 cm. The poster should be readable from at least 1-2 meters. Colour is acceptable, the figures should add interest. Try to keep the diagrams and tables simple. A brief listing of aims, methods, results and conclusions from the study or the report will clarify the presentation.
- Also for posters the abstracts must be received before November 10th 1994

NOTE:

ALL PAPERS AND POSTERS MUST BE WRITTEN IN ENGLISH.

Address of Scientific Secretariat:

Dr. Sergio GIGLI
Istituto Sperimentale per la Zootecnia - Via Salaria, 31 - 00016
- Monterotondo Scalo (RM) - ITALY

**International Symposium on Buffalo Products
FAO - Interregional Cooperative Research Network on Buffalo**

Paestum (SA) - Italy, 1/4 December 1994

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Type or write clearly in block letters

(for internal use)

Registration Form

Personal data (Prof., Dr., Mr., Mrs., Miss)

Last Name _____ First Name _____

Institution, Organization _____

Complete mailing Address _____

City _____ State _____ Country _____

Zip Code _____ Phone Code (home) _____ (office) _____ (fax) _____

Registration Fees (Italian Lit)

	DELEGATE	STUDENT AND OPERATOR	ACCOMPANYING PERSON
Before November 10, 1994	200.000	100.000	150.000
After November 10, 1994	250.000	150.000	200.000

THE REGISTRATION FEE INCLUDES

- Participation in the scientific programme	•	•	/
- Opening ceremony	•	•	•
- Proceedings	•	•	/
- Conference Dinner	•	/	•
- Technical Tour	•	/	•
- Accompanying programme	/	/	•

Hotel Registration Form

Full Name (Dr., Mr., Mrs.) _____

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Will your companion participate in the Accompanying Person's Programme that will be defined in Final Programme? **YES** **NO**

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	single <input type="checkbox"/>	150.000
	double <input type="checkbox"/>	120.000 (per person)
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- The reservation of double and triple rooms is recommended.		

Will you participate in Congress Tour (4/12)? **YES** **NO** Persons n. _____

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Will you transfer from Naples or Salerno to Paestum and from Paestum to Naples or Salerno? **YES** **NO**

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Return this form with cheque to: Organizing Committee - Agenzia Salerno Meeting - Corso Vittorio Emanuele, 170 - 84100 Salerno (ITALY) - Tel. 0039.89.226289 - Fax 0039.89.252599 (9,30 - 12,30 a.m.; 8,00 - 7,30 p.m. from monday to friday)

Results

The energy input and the output increased significantly with the age (graph 1), showing a low energy efficiency in comparison with cattle and it decreased from 10 to 18 months of age (0.18 vs 0.13).

The decreasing trend of energetic efficiency was due to higher subcutaneous fat deposition.

The average daily gain (ADG) (table 1), was similar from 6 to 10 and to 14 months (0.970 kg); same result was reported by Romita et al 1982 (0.947 kg/d for animals 8 and 15 months old) while according to Ferrara et al. 1993, at 18 months was lower (0.798 kg, -18%) but was higher than the value observed by Patak et al. (1987) and Baruah et al. (1988). The conversion index increased from 10 to 14 months (+18%) and some more from 14 to 18 months (+31%), showing the lowest productive capacity at this age.

The increasing trend of fasted live weight was maximum

between 6 and 10 months (+63%) and minimum between 14 and 18 months (+23%); while the dressing percentage was not different between 10 and 14 months and was higher at 18 months (+2.97 p.p.).

The meat and bone proportion in the carcass (graph 2) decreased after 10 months, while the fat increased with the age, even if the differences between 14 and 18 months of age were not significant. The meat / fat ratio decreased from 6 to 18 months (from 6.3 to 2.7) as observed also by Salem et al. (1983), Tahim et al. (1985) and Padua et al. (1986).

The amount of lean meat (in cold carcass) produced at different ages was 42.1, 76.8, 112.3 and 140.1 kg respectively; +26% between 14 and 18 months and +46% between 10 and 14 months.

The chroma of longissimus dorsi muscle (tab. 2) increased with the age only between 6 and 10 months (+26.7%).

Instead, the lightness and the hue fall off two ways between 6 and 10 months (-12.2% and -

12.5%) and also between 10 and 14 months (-6.1% and -6.4%) (Matassino et al 1984).

There were no statistic differences for three colour parameters between two commercial ages (14 and 18 months).

The hardness on raw meat was not different between 14, 18 and 10 months (2.34 kg/cm), while was lower at 6 months (-21.4%).

On cooked meat the higher value was at 18 months (+21% vs 14 months), but lower in comparison with data observed by Gigli et al. (1993).

The water losses for the raw meat were different according to the ages, the maximum value was at 14 months (1.65%) and the minimum value at 10 and 18 months (1.22%), while for the cooked meat the losses were higher at 6 months and not very different at the other ages (32.24% vs 25.6% at 18 months).

Moreover, the mean values of quality characteristics have been very good in comparison with the other male buffaloes differently fed and with the friesian young bulls.

Table 1. In vita and at slaughter performances

AGE (months)	ADG kg	CONVERSION INDEX MFU/kg	FASTED LIVE WEIGHT /kg	DRESSING %
6	/	/	147.1 d	49.17 c
10	0.962 a	4.34 c	240.3 c	52.81 b
14	0.979 a	5.13 b	363.3 b	54.39 b
18	0.798 b	6.74 a	446.0 a	56.67 a
Mean	0.940	5.00	290.2	52.99
Standard deviation	0.1104	0.617	31.22	1.882

Note: Different letters show significant differences ($P \leq 0.05$)

Table 2. Physical quality of longissimus dorsi muscle

AGE (months)	COLOUR			HARDNESS		WATER LOSSES	
	LIGHTNESS	CHROMA	HUE	RAW kg/cm ²	COOKED kg/cm ²	RAW %	COOKED %
6	50.57a	20.27b	43.13a	1.84b	1.66ab	1.39ab	32.24a
10	44.42b	25.69a	37.75b	2.25a	1.81ab	1.23b	28.50bc
14	41.69c	24.96a	35.35c	2.28a	1.57b	1.65a	28.99b
18	39.81c	26.21a	34.56c	2.49a	1.90a	1.21b	25.60c
Mean	44.50	24.05	38.02	2.19	1.73	1.37	29.03
Standard deviation	2.452	2.088	1.901	0.411	0.308	0.297	3.256

See note tab.1

(Matassino et al. 1984)

Conclusions

With a high energy level ration the Italian male buffaloes can produce meat. Their energetic efficiency is lower than cattle due to higher subcutaneous fat deposition particularly over 14 months.

At 14 months the average daily gain is enough high, the conversion index is satisfactory, the dressing percentage and the meat percentage are about 53% and over 60%; the fat content is relatively high. The physical quality of longissimus dorsi muscle is very good at 14 and at 18 months.

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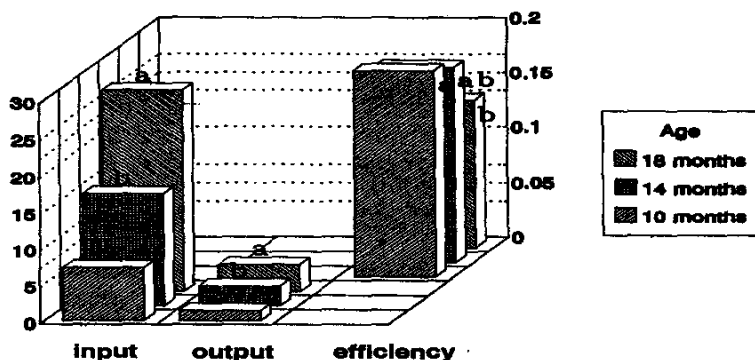
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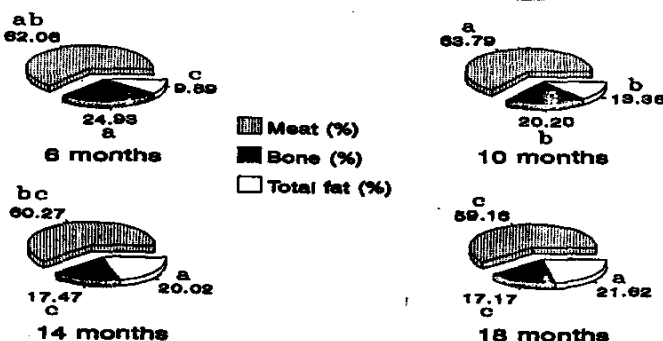
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Graph. 1. Energy efficiency of growth



Graph. 2. Carcass composition



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**A NOTE
ON BUFFALO
REPRODUCTION
IN PAKISTAN**

M. Maqsood, Lahore, Pakistan

We have received from M. Maqsood, a scientist from Lahore (Pakistan), a review on buffalo reproduction in his country. It was here synthesized for editing reasons, though emphasizing the most relevant items; the author will therefore be allowed to fully publish it in a most appropriate journal.

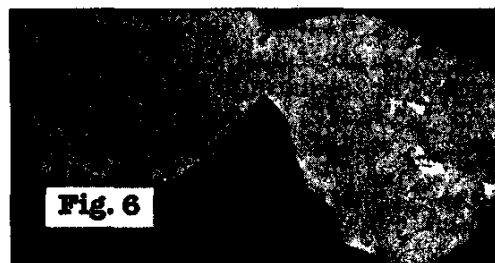
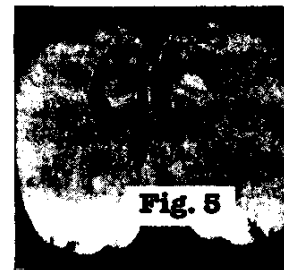
In Pakistan 14 million heads of buffaloes are reared (FAO 1988), amounting to 10.2% of the world, essentially of dairy type; their contribution to total milk production is 71%, to total beef production is 50%

Male characteristics

In male buffaloes bred in Pakistan, the average weight of the testes is about 80 grams with a scrotal circumference of about 40 cm.

The semen from healthy buffalo males is milky white in colour and the average volume of the ejaculate is about 3.5 ml. There is a wide variation in sperm concentration (from 630 to 1025 million/ml). Semen volume and biochemistry, sperm concentration and morphology show wide seasonal variation; in particular the temperature/humidity index negatively influences the volume of semen production and significantly depresses sperm cells concentration and initial motility; it is highly responsible for the production of dead and abnormal spermatozoa.

The most frequent type of abnormalities are the following: bent and coiled tails



Figs. 1, 2, 3: Microphotographs of testes of infertile/sterile buffalo bulls, showing different degrees of degenerative changes/abnormalities.

Figs. 4, 5, 6: Ovaries of infertile/sterile buffalo cows, showing different abnormalities

and proximal droplets, followed by acrosome defects and abnormally shaped heads.

In 12 infertile/sterile buffalo bulls of different age groups in the slaughter-house of Lahore, the following abnormalities were found by histological examination: arrested spermatogenesis, incomplete Sertoli cells, hipoplasia with narrowing of the seminiferous tubules, inactivity of the partially developed interstitial cells, desquamated spermatogenesis cells, amorphous debris masses. The tubules of the same testicle showed vacuolization to various degrees, increase in fibrous tissues, formation of giant cells, appearance of fluid in and around the tubules, imperfectly developed spermatides.

Female characteristics

In female buffaloes the ova-

ries are smaller and of lighter weight than in cattle. Weight ranges from 2.5 to 11 grams; they are heavier when bearing the corpus luteum (CL). Size ranges from 3 to 4 cm in length and from 1 to 3 cm in width.

The developing CL is pinkish grey, with red veining and it does not get yellowish during oestrus cycle. The red veining disappears in the regressing CL which finally becomes dull grey and sinks into the ovary stroma. The weight of the CL ranges from 0.5 to 1.5 grams and the size from 1 to 1.5 cm during the oestrus cycle.

The oestrus cycle lasts 20-30 days and the duration of the heat ranges from 24 to 30 hours. Oestrus activity is seasonal: higher from July to January (70%).

Sub-functional ovaries are registered in 30% of the cows; 50% of the cows have an active

corpus luteum without having shown oestrus symptoms (silent heats).

Calving interval is averagely 548 days, much longer than in cattle.

The genitalia of 20 buffalo cows slaughtered at Lahore slaughter house were examined. A great variation in the weight and size of the ovaries was registered, as well as atrophy, persistent CL, single/multiple cystis, fibrous ovaries.

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A poem

Paulo Ponce de Leon Filho has kindly sent to us from Brazil a poem made of 18 quatrains entitled 'O Bufalo e a sua Picardia' (Recife-Pernambuco, Brazil, 1988), of which we publish here a short piece with the English translation.

The poem has no technical purpose and often poetry requirements modify the reality. The English translation unfortunately damages the musicality, which is the most relevant feature, and which is inborn in the Brazilian blood. An Italian proverb, says: "Translations are like wives: if they are beautiful, they cannot be faithful; if they are faithful, they cannot be beautiful".

The civilization of a country is often condensed in sayings and proverbs, which are the produce of mankind in relation to society. In many parts of the world buffalo is considered part of the family, for which it is very likely that sayings and proverbs referring to buffaloes are still popular somewhere. Why don't we try to collect all of them before they are forgot?

We invite all readers who know any sayings or idiome used in their country, concerning buffaloes, to send them to the Editor of the Buffalo Newsletter. We will publish them in the next issue.

O BUFALO EM VERSOS

Paulo Ponce de Leon Filho

Como um bom nordestino,
 Vou fazer a louvação
 do bicho, cujo destino
 é crescer, na Região.

De búfalo, afinal,
 no mundo, tiram bom suco,
 e, no setor nacional
 já desponta Pernambuco.

Búfalo é bicho bom,
 desta verdade me valho,
 pois tem verdadeiro dom,
 pra carne, leite e trabalho.

Além de queijo e manteiga, leite
 em pó e condensado,
 doce e coalhada meiga,
 da seu leite abençoado.

Em Tracunhaém, já foi
 o búfalo esculpido,
 tal como se fez ao boi,
 com barro cru, ou cozido.

Mais precoce, sempre foi
 da carne, na produção,
 tão boa quanto a do boi
 vocês verificarão.

THE BUFFALO IN STANZAS

As a good north-easterner
 I will make the prayer
 Of the animal whose destiny
 Is to grow in the Region.

From buffalo, indeed,
 In the world, good juice (milk) is
 extracted
 And in the national sector
 Pernambuco is already the leader.

Buffalo is a good beast
 And that is really true
 As they have the gift
 For milk, work and meat.

Besides the cheese and the butter
 The powder milk, the condensed
 milk
 The sweets or the soft yoghurt
 It gives its blessed milk.

At Tracunhaém, already
 A buffalo was sculpted
 As it had been done with the
 bull (steer)
 With raw or cooked clay.

The most precocious, it has
 always been
 For meat in the production,
 As good as the bull's one
 You will soon verify

(Translated by Roberto Weite)

IV WORLD BUFFALO CONGRESS

The IV World Buffalo Congress took place in Sao Paulo, Brazil, from 27th to 30th June, 1994. It was a great success due to the many skillful and experienced participants, as well as to the quality and variety of the main papers and posters presented.

The Congress will be an incentive to buffalo farming all over the world: in fact people from several countries of the five continents took part to it. All the countries of South America where buffaloes are reared were represented: Brazil, Argentina, Venezuela, Columbia and Chili.

All the participants have shared their knowledge and skills among each other's, not only during the communications and the poster presentation but also through active discussion. The main papers have touched the most relevant topics: reproduction, nutrition, breeding and selection, not only scientifically, but referring the existing problems and making proposals to rationalize buffalo production, often involving political and international matters.

Briefly, the Congress confirmed that buffalo is a precious animal, easy to adapt to any environment: from the icy North, to the torrid South; supplying high quality products, among which the skin, when well cured, gives the softest, elastic and strong leather. The important contribution given from buffalo to the survival of several populations in many regions of the world is also not to be forgot.

During the Congress, a show of the main buffalo breeds - Murrah, Mediterranean, Jafarabadi and Carabao - was very much appreciated.

Immediately before the

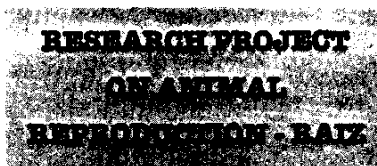
Congress, a course on the biotechnology of reproduction was organized, which turned out extremely useful to spreading advanced technologies.

The new President of the International Buffalo Federation was elected: he is prof. G. De Franciscis (Italy) who devoted his life to studying the buffaloes; he substitutes prof. M.R. Shalash (Egypt) who has been a very competent and zealous President since the foundation of the Federation.

During the Congress, the purposes and the activities of the FAO Inter Regional Cooperative Research Network on Buffalo were presented, to which the countries of South America showed a great interest.

Finally, the warmth and the hospitality of the Brazilians were appreciated by all the participants. The Congress turned out very successful thanks to the President Manoel Osório de Almeida, the General Secretary Joao Ghaspar de Almeida, the Scientific Secretary William G. Vale and all the organizing people who had to overtake technical and financial difficulties.

A.M. Pilla



The Italian Ministry of Agriculture, Food and Forests has financed a specific program for research and technological development in the field of animal reproduction: RAIZ.

1. Background of the project: selection carried out in the latest years allowed a great progress in the quality of the breeding animals; it is necessary therefore to improve the reproduction efficiency of farm animals in order to quickly distribute the best selected

genotypes.

2. Aims of the project: to study and apply new biotechnologies focusing a more efficient reproduction.

3. Duration and means of the project: the project will last three years and will be developed through field research sub-projects carried out by 17 research units - research centres and university institutes - covering the following subjects:

- ovarian activity, physiology and physiopathology;
- seasonal and metabolic factors affecting reproductive efficiency;
- hormonal manipulation for regulating the ovarian activity;
- study of testicular functionality; - improvement of tests for semen evaluation;
- embryological aspects of Multiple Ovulation Embryo Transfer, long term embryo preservation and in vitro embryo production;
- control of pathologies transmissible through embryo transfer;
- undesirable genes reducing fertility and genetic improvement of prolificacy;
- genetic deseasonality;
- genome analysis of reproductive efficiency and transgenic animal production.

Although all species of livestock are the object of the project, three projects involve specifically buffaloes, aiming to:

1. apply successfully artificial insemination by singling out the moment of the ovulation and describing the conditions- oestrus behaviour, ovarian modifications as well as hormonal test values - in which buffaloes are fertile;

2. look for an eventual genetic determinism for the fertility conditions evidenced;

3. deseasonalize buffalo cows;

4. apply the techniques of the superovulation and embryo transfer;

5. produce in vitro embryos.
Cooperation among scientists

both of the research units involved and of foreign institutes interested in some subjects is highly desirable.

RECENT PUBLICATIONS

The Proceedings of the First FAO/Asian Buffalo Association (ABA) Congress "Long term genetic Improvement of the Buffalo" were published. The Congress took place in Khoen Kaen, Thailand, from 17th to 21st January, 1994. According to what asserted during the Congress by D.E. Steane, FAO representative: " The buffalo appears to have been somewhat neglected in the investment in achieving genetic progress. So this Symposium aims to develop ideas and polic-



'Cogito ergo sum' - I think, I am. (Descartes, 1596-1650)

ies which will ensure the most effective and efficient use of the genetic resources available in the buffalo species and to maintain the diversity for the use by future generations".

For all people interested in buffaloes, the Proceedings contain useful and updated information: buffalo production is in fact considered within a social and political framework which



Questionnaire

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determines its present status and future development.

In the above context, the differences between 'swamp' and 'river' buffalo are evidenced: they are not only relevant to the peculiar attitudes of the two groups, but to the structure of farming and the social aspects. Traditional genetic improvement is not suitable for the swamp buffalo, due both to poor productivity and to fragmentation of the farms. Crossbreeding with more productive river breeds - such as Murrah and Nili-Ravi - might turn out useful, although it should be carefully controlled in order to avoid the disappearing of indigenous breeds, like the Carabao in the Philippines.

Swamp buffalo as a draught animal is submitted to a great competition by farming machines: many governments encourage mechanization and some of them incentivate the substitution of buffaloes with cattle.

On the other hand there is a high genetic potential for improving the milk productivity of the river buffalo. In Pakistan, for example, 8% of the milk recorded buffaloes produce over 4,000 litres milk in one lactation. But also for these more productive breeds, structural obstacle must be overtaken. Heat detection is still a not fully solved question, which slows down the application of A.I. and the genetic improvement.

Finally, the Proceedings report a few interesting papers concerning cytogenetics of river and swamp buffaloes and their crossbred, as well as concerning buffalo tolerance to heat compared to cattle.

"Long Term Genetic Improvement of the Buffalo". Proceedings, 1994. Published by Buffalo and Beef Research and Development Centre. P.O. Box 1014, Kasertsart P.O. Chathujara, Bangkok 10903, Thailand.

ANIMAL SCIENCE LOSES A GREAT MASTER

Professor Helmut Fischer (Germany) died on January 8th, 1994. He was an unselfish veterinarian who developed teaching work in graduation and post-graduation courses at the Division of Tropical Veterinary Medicine of the Tropical Science Centre of Justus-Liebig University, Giessen. The death of this experienced professor, great enthusiast of buffalo husbandry, represented an enormous loss for both Veterinary Medicine and Animal Science, as he gave valuable contribution to both sciences in several parts of the world.

(Communication given by Paulo Ponce de Leon Filho and published on 'Veterinaria e Zootecnia', Year XIII, 1, March 1994, ed. Regional Council of Veterinary Medicine, Pernambuco, Brazil).

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