

Buffalo Newsletter



Number 27 – December 2012

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

The year 2012 passed away.

The 6th Buffalo Symposium of Americas together with the 5th Buffalo Symposium of Europe and Americas was held in Havana, Cuba, in November 2011 and the activity is reported in this number, as the last International Buffalo Federation (IBF) meeting was held during this Congress.

Actually, the most of activity of IBF and Asian Buffalo Association (ABA) is the organizing of the next 10th World Buffalo Congress together with the 7th Asian Buffalo Congress in Phuket, Thailand, on May 6/8, of which the provisional program is reported in this number.

In the editorial field too, we have two great news.

In IVIS (International Veterinary Information Service - www.ivis.org) is going to be published a new book: **Bubaline Theriogenology** by G.N. Purohit and A. Borghese.

A second book is going to be published:

Buffalo Livestock and Products, edited by Antonio Borghese and C.R.A., Consiglio per la Ricerca e la Sperimentazione in Agricoltura, Roma, Italy: the complete state of art in each field of research and development on buffalo in the world in 500 pages.

Therefore the year 2013 is opening with richness of very important international events and actual books for the farmers and for the researchers working on different themes of

buffalo livestock.

Finally the World Buffalo Congress and the Asian Buffalo Congress, for the first time in the long history of IBF, held together in the same site: THAILAND, beautiful country, rich of art and culture, with a long tradition in buffalo rearing.

The best wishes for a happy 2013 to all the buffalo lovers.

The Editor

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**VI BUFFALO SYMPOSIUM OF AMERICAS – V BUFFALO
SYMPOSIUM OF EUROPE AND AMERICAS
LA HABANA, CUBA NOVEMBER 21 TO 30, 2011**

During the days 22 and 23 November we celebrated at the National Hotel, Cuba, the 6th Buffalo Symposium of Americas – 5th Buffalo Symposium of Europe and Americas, with the presence of 168 participants from Argentina, Brazil, Columbia, Costa Rica, Cuba, Italy, Panama, Venezuela and Trinidad and Tobago. This Symposium, organized by the Agriculture Ministry and the Research Center for the Animal Improvement of the Tropical Livestock was inaugurated with the correspond official speeches by the Vice Minister of Livestock of Cuba, Engineer Jesús García Piloto, by the General Secretary of the International Buffalo Federation Prof. Dr. Antonio Borghese and the President of the American Buffalo Breeders Federation Dr. Otavio Bernardes, besides he presented the topic: “ Buffalos in the Americas-situation and perspectives”, in which he emphasized the contribution that the bubaline specie gives in the nutrition of the population.

The scientific program included four paper works, eight round tables, two conferences, and the presentation of the book: “Bubaline

culture in Americas” written by a collective of authors from Argentina, Brazil and Cuba; a video on Bubaline Production in Italy and fifty- nine postulates in poster sessions.

Once concluded the inauguration, Dr. Alina Mitat, presented a masterful conference about the results and perspectives on buffalo breeding in Cuba. In this conference we knew the evolution of the herd since its introduction in Cuba in 1983; the productive results, reproductive ones, and also the future perspectives of this specie in the Cuban Livestock Scenario. The buffalo population in Cuba is 67,246 head. As no selection was applied for dairy purposes in buffalo, the milk production is very low: about 870 kg for lactation of 244 days. As no market was created in buffalo products, the demand of the consumer is very poor.

Like homage to the Dr. Steve Bennett, medical veterinary of the islands of Trinidad and Tobago, who selected the Buffalypso, whose animals gave the populations to Colombia, Costa Rica, Cuba, United States, Guatemala, Honduras, Panama and Venezuela, the Workshop was held on

“ Impact and perspectives of the Buffalypso in buffaloes' breeding at the American continent”; where the results of the herds of Colombia, Costa Rica, Cuba and Trinidad and Tobago showed up, indicating the potential for the production of milk and meat production and work, regardless of this race tends to disappear, but not the availability of the animals.

In the theme Education pre and postgraduate in bubaline culture, whose coordinator was the Dr. Emilio Campos Pipaón PhD, every delegates arrived to the conclusion to introduce bubaline culture contents in the teaching of pre-grade, without incrementing hours in the curriculum, considering that every year new knowledge and technologies to use for Medical Veterinaries and zoo technicians appear, recommending to give optional courses for the students of the last year of the career.

On the sphere of the post grade and capacitation to the producers, was considered very important a correct handling, applicable at those regions that the buffalos manage to get in, in order to neutralize the various negative criteria that are emitted for breeders.

At the table round: Needs for the integration of the technical aspects of the

Genealogical Record and the programs of genetic improvement, the Ing. Mario Cerón Muñoz, PhD, leader of the fact-finding Group in Genetics, Animal Improvement and Model (GaMMA) of the University of Antioquia, Colombia, presented the advances achieved in the selection and the application of modern technologies for the genetic improvement of buffalos at his country. Lic. Odalys Uffo Reinoso, PhD, the woman investigator of National Centre of Sanitary Farming (CENSA) of Cuba exposed the present-day status of the application of molecular tools in the genetic improvement and the Ing. Roberto Peinado Ferrer, MSc, of the Direction of Pure Breeds of the National Centre of the Livestock Control (CENCOP) also from Cuba he highlighted the importance of the genealogical record for individual control.

The need of the individual identification for breeders, like previous and essential step to achieve an animal's genetic precise evaluation, as well as collaboration among different countries to make uniform criteria, was concluded.

The future of the Bubaline culture relating to Functional Foods was analyzed, existing general check up that certain food exerts action for provisional remedy in front of determined human diseases (Functional

Foods or Nutracéuticos). They utilize these terms to identify that they possess components with additional properties for consumer's health and they surpass the classical benefit of a contribution of nutrients. This investigation showed a trend towards a natural obtaining of the aforementioned foodstuff.

The need to unite the sanitary protocols for the interchange of genetic material among countries was analyzed, as the present-day situation of herds affected with brucellosis and tuberculosis at the American continent was treated.

There was consent in relation to the need to accomplish united investigations in the area, very in particular with the nutrition of animals, where in many cases the nutritional requirements are not satisfied.

Meeting of American Buffalo Breeders Federation

The third directors' meeting of American Buffalo Breeders Federation, with following member's participation took place during the Symposium: Marco Zava and Gustavo Crudeli (Argentina); Otavio Bernardes and Joao Almeida's Ghaspar (Brazil); Richard Wineskin Maker, Claudia Patricia Roldán and Jesus Berdugo (Colombia); Rodrigo Rosales, Álvaro Salas (Costa Rica); Alina Mitat, Enrique Álvarez and Aldaín García

(Cuba); Anna Graciela Mendoza and Héctor Scannone (Venezuela).

They analyzed the following themes: definition of the calendar of the Symposiums of Americas, accomplishing the election campaign of the Federation and updating the work of the Committees of Genetic Improvement, Genealogical Record and the recently created on Health. They recognized the fact that the celebration of Symposiums in bubaline local development, in the countries where they have developed, has to be effected toward producers and students, of manner to develop the productive space and to motivate new generations to water buffalo's study.

It was agreed that the proximate Symposium will come true at Costa Rica in the year 2014.

Equally, to consent the Federation's organization, whose is rotating the presidency, was created for oneself the secretarial General debit, for which Otavio Bernardes of Brazil was elected . This structure is equal to the one that shows off the International Buffalo Federation.

Meeting of the Standing Committee of International Buffalo Federation

Look specific chapter.

Buffalo Tour

The buffalo tour was held from 24 to 26 November, visiting the following sites: Instituto de Ciencia Animal (ICA) with 34 dairy buffaloes from Trinitaria Breed and crossbreds, producing 4-5 liters of milk per day; Fortalecida farm of the Cooperativa de Produccion Agropecuaria (CPA), in Artemisa, where tobacco, mango, papaya, banana are produced and where a rodeo was held; Empresa Pecuaria Macun in Villa Clara, with Uriarte State farm, with 30 Trinitaria buffaloes, producing 732 liters in 202 days of lactation; as the buffaloes have only pasture and sugar cane with urea in dry period, the protein requirements are not satisfied; Empresa Pecuaria Genetica "El Cangre" in Mayabeque, is a State farm with 5000 buffaloes, 200 dairy Buffalypso, producing 700 liters of milk in 200 days of lactation on pasture or with natural crops. Crossbreds, from Millennium bull of Mediterranean Italian breed on Buffalypso breed, produce until 1700 liters of milk per lactation.

Post Symposium Courses:

During days 28 to November 30 two courses were developed:

Reproduction in bubaline, organized by the Research Centre for the Animal Improvement of Tropical Livestock of Cuba and CRA, Animal Production Research

Centre, Italy with 12 assistances on following themes:

Hormonal activity in reproduction.

Follicular dynamics.

The ultrasound's beginnings and its applications in reproduction.

Diagnosis of pregnancy and fetal sex.

Technologies related with AI in buffalo

Clinical and andrological evaluation of the male bubaline.

Biotechnology of reproduction.

Practical application of molecular animal scoreboards.

Post Symposium Course "Bubaline production and handling in the Tropical conditions", organized by the Animal Science Institute of Cuba, with 22 student's participation, the processed themes were :

Advances and perspectives of the breeding of the buffalo in Latin America.

The water buffalo's digestive physiology.

Comparative aspects with the bovine cattle and other ruminants.

Milky buffaloes' nutrition system with a bench of biomass.

Handling and nutrition of the pregnant female with emphasis in critical period.

Genetic improvement of the water buffalo in Latin America.

Minerals in buffaloes' nutrition.

Morphologic characteristics of the udder and his relation with production and composition of milky buffaloes.

Handling and nutrition of a buffaloes' dairy. Discussion in situ of the system of production.

Alina Mitat



Buffalypso herd with albino animal. Livestock Company “El Cangre”, Cuba (Borghese photo, 2011)



Crossbred Millennium (Mediterranean Italian breed) x Buffalypso. Livestock Company “El Cangre” (Borghese photo, 2011).

INTERNATIONAL BUFFALO FEDERATION (IBF) MEETING HAVANA, CUBA, November 23, 2011, 9:40

During the 6th Buffalo Symposium of Americas, 5th Buffalo Symposium of Europe and Americas, held in Havana (Cuba) on November 21-26, 2011 with the contribution of IBF too, as it was an occasion for many IBF members to meet them together, it was decided to organize an IBF meeting to speak about the past and the future activities. Bystanders:

The IBF General Secretary Antonio Borghese, the Cuba IBF members Alina Mitat Valdes and Emilio Campo Pipaon, the Italy IBF members Giuseppina Maria Terzano, Vittoria Lucia Barile and Antonio Fagiolo, the Venezuela IBF member Hector Antonio Scannone, the Colombia IBF members Claudia Patricia Roldan and Ricardo Botero J., the Trinidad-Tobago IBF member Leela Rastogi, the Brasil IBF member Joao Ghaspar de Almeida, the Argentina IBF member Marco Zava, the Costa Rica IBF member Rodrigo Rosales and Alvaro Salas.

Ghaspar de Almeida opened the meeting thanking Antonio Borghese for his work as IBF General Secretary. He replied that the IBF is very important for: 1, organizing the

congresses at the level of Asia Buffalo Association , America Buffalo Association and particularly the

World Buffalo Congress every 3 years, that in 2013 will be held in Thailand together with the Asian Buffalo Congress as Rangsun Parnpai was elected as President of the IBF and of the Asia Buffalo Association; 2, spread out of information through the Buffalo Newsletter (the number 26, December 2011 is distributed now) and through the website www.agrowebcee.net , moreover sending email to all the members and to all the people interesting.

Borghese invited to cooperate to organize the next World Buffalo Congress and to involve people, scientists, breeders, private and public organizations, companies and institutes. Marco Zava proposed to suggest Rangsun Parnpai to maintain the same schedule for the Congress with lectures and papers subdivided in different sessions: genetic, nutrition, reproduction, management, welfare, health, milk production, meat production, byproducts, marketing . Barile suggested to involve the breeders and to organize a day for the

breeders during the congress. Claudia Roldan suggested to find support to participate to the congress: the discussion followed as find support to the Congress by breeders associations, by commercial organizations, by Agricultural Ministry and other Govern institutions , by companies.

Claudia announced the next breeders meeting in Colombia on September 2012, the program will be published on the Buffalo Newsletter. Ghaspar de Ameida proposed Australia or America as continent for the next World Buffalo Congress after Thailand, for example Colombia, which never hosted the Congress and where

there is a strong Buffalo Breeders Association.

Borghese replied that is a very important for the decision to go to the next IBF meeting in Thailand with a concrete proposal with site, involved organizations and support documents signed by Authorities, as Govern, Agricultural Ministry, Universities, Breeders Associations, private companies and so on that declare to support the Congress: this will be a guarantee as happened for the recent decisions regarding Argentina in 2010 and Thailand in 2013.

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The 10th World Buffalo Congress The 7th Asian Buffalo Congress



Green Production Against Global Warming

May 6-8, 2013

Hilton Phuket Arcadia Resort and Spa,
Phuket, THAILAND

www.wbc2013.com

**Please mark up your calendar !
We are waiting to see all of you.**



Important dates

Abstract Submission	Opens: 1 st June, 2012
Abstract Submission	Deadline: 30 th November, 2012
Full Paper Submission	Opens: 1 st November, 2012
Full Paper Submission	Deadline: 31 st January, 2013
Early Bird Registration	Opens: 1 st September, 2012
Early Bird Registration	Deadline: 31 st October, 2012
Regular Registration	Deadline: 31 st January, 2013

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WBC/ABC 2013 Phuket

Letter of Invitation

To: Buffalo scientists/practitioners/farmers

From: **Rangsun Parnpai**, Ph.D., Assoc. Prof.
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President, International Buffalo Federation
President, Asian Buffalo Association
Chair of The 10th World Buffalo Congress and The 7th Asian Buffalo Congress

On behalf of the International Buffalo Federation and Asian Buffalo Association,
I cordially invite you to the **10th World Buffalo Congress** and the **7th Asian Buffalo Congress** which
will be held in Hilton Phuket Arcadia Resort and Spa, Phuket, Thailand during 6th - 8th May, 2013.
This is for the first time that both congresses join together.

The theme of the WBC/ABC 2013 is: *“Green production against global warming”*

The symposia include:

1. Physiology
2. Reproduction
3. Health
4. Meat and meat products
5. Milk and milk products
6. Nutrition/Feeding
7. Genetic/Breeding
8. Draft power/Sustainable production
9. Socio-economic
10. Management

In addition to the main congress, there will be the Pre-Congress Workshop on **“Reproductive Biotechnology in Buffalo”** during 28th April to 4th May, 2013.

The Local Organizing Committee is planning a variety of events. Tours will be available for pre- and post-congress. During the post-congress tour you will have a chance attend **“World Buffalo Show and Competition”**. You will exciting to participate **“Miss World Buffalo Contest”** on 6th May, 2013 during welcome dinner. The contest is open for all ladies, no limit of age and nationality.

The winner will get trophy and 500 US\$. In the gala dinner, you will really enjoy the dozen of Thai cultural shows at **Phuket Fantasea** (<http://www.phuket-fantasea.com/index.php>).

The details of the congresses are currently available on the website at: <http://www.wbc2013.com>
Registration, final program, hotel reservation and other information already posted on the website.

We sincerely hope that you will bring your family, colleagues and friends to Phuket, Thailand.

General Program of Main Congress
The 10th World Buffalo Congress and The 7th Asian Buffalo Congress
 May 5-8, 2013 Hilton Phuket Arcadia Resort and Spa

Date	Time	Program	Room and Remarks
May 5, 2013	9.00-21.00	Pre-Congress Tour	Need to buy ticket
	14.00-20.00	Pre-registration bag/badge collection Onsite registration	Ballroom B
May 6, 2013	7.00-18.00	Pre-registration bag/badge collection Onsite registration	Ballroom A-B
	8.00-9.00	Opening Ceremony	
	9.00-9.30	Keynote Lecture	Ballroom A-B
	9.30-10.00	Health Break	
	10.00-10.25	Prof. Maneewan Kamonpatana Lecture	Ballroom A-B
	10.25-12.30	Plenary Session 1	Ballroom A-B
	12.30-14.00	Lunch Break	
	14.00-16.05	Plenary Session 2	Ballroom A-B
	16.05-16.30	Health Break	
	16.30-18.30	Practitioner Forum	Room will be announced
	19.00-23.00	Welcome Dinner and Miss World Buffalo Contest	Room will be announced
May 7, 2013	8.30-10.30	Symposia 1-10	Room will be announced
	10.30-11.00	Health Break	
	11.00-12.30	Symposia 1-10	Room will be announced
	12.30-13.30	Lunch Break	
	13.30-15.00	Symposia 1-10	Room will be announced
	15.00-15.30	Health Break	
	15.30-17.30	IBF Busines Meeting	Arcadia 1
18.00-22.00	Gala Diner at Phuket Fantasea	Need to buy ticket	
May 8, 2013	7.30-9.30	ABA Business meeting	Arcadia 1
	8.00-10.00	Poster Session	Ballroom A
	10.00-10.30	Health Break	
	10.30-12.30	Symposia 1-10	Room will be announced
	12.30-13.30	Lunch Break	
	13.30-15.00	Symposia 1-10	Room will be announced
	15.00-15.30	Health Break	
	15.30-17.30	Concluding session and Awarding Ceremony	Ballroom B
19.00-23.00	Presidential Diner	Executive Member of IBF/ABA, only	

**Plenary Session Program of Main Congress
Room: Ballroom A-B**

Date	Time	Activities
May 6, 2013	8.00 9.00	Opening of congresses by H.E. Minister of Agriculture and Cooperatives, Government of Thailand Dr. Yukol Limlamthong
	9.00 9.30	Keynote Lecture World buffalo production: challenging to decrease global warming Prof. Charan Chantalakkana <i>Professor Emeritus, Department of Animal Science, Faculty of Agriculture, Kasetsart University</i>
	9.30-10.00	Health Break
	10.00 10.25	Prof. Maneewan Kamonpatana Lecture Changing dynamic of buffalo production in South Asian region Prof. O.P. Dhanda <i>General Secretary of Asian Buffalo Association</i>
	10.25 10.50	International collaboration in water buffalo development Prof. Libertado C. Cruz <i>Executive Director, Philippines Carabao Center Science City of Munoz, Nueva Ecija, Philippines</i>
	10.50 11.15	Buffalo livestock and strategies in Europe Prof. Antonio Borghese <i>Secretary General International Buffalo Federation</i>
	11.15 11.40	Developments of buffalo industry in America Dr. Marco Zava <i>Manager of the Argentine Buffalo Breeders Association, Argentina</i>
	11.40 12.05	Thailand buffalo strategic plan 2012-2016 Expert Kitti Koobkaew <i>Department of Livestock Development, Ministry of Agriculture, Thailand</i>
	12.05 12.30	Buffalo share in small farmer welfare under intensive agricultural system Prof. Ibrahim Soliman <i>Faculty of Agriculture, Zagazig University, Egypt</i>
	12.30 14.00	Lunch Break
	14.00 14.25	World buffalo production efficiency through rumen manipulation and nutrition Prof. Metha Wanapat , <i>Tropical Feed Resources Research and Development Center (TROFREC), Department of Animal Science Faculty of Agriculture, Khonkaen University, Thailand</i>
	14.25 14.50	Prospect of global nutrition and feeding for sustainable buffalo production Prof. Talat Naseer Pasha , <i>Vice Chancellor University of Veterinary and Animal Sciences, Lahore, Pakistan</i>
	14.50 15.15	Manipulation of methagenic microbes for efficient buffalo production Prof. D.N. Kamra , <i>Indian Veterinary Research Institute, Izatnagar, India</i>
	15.15 15.40	Biotechnological approaches for efficient buffalo production Prof. M.E. Babar , <i>Institute of Biochemistry and Biotechnology, University of Veterinary and Animal Sciences, Lahore, Pakistan</i>
	15.40 16.05	The buffalo genome and the application of genomics in animal management and improvement Dr. John Williams , <i>Parco Tecnologico Padano Via Einstein, Polo Universitario, Lodi, Italy</i>
	16.05 16.30	Health Break

	16.30 18.30	<p>Practitioner Forum</p> <p>Coordinator: Prof. Federico Infascelli, <i>Department of Animal Production, Naples University Federico II, Italy</i>)</p> <p>Dr. Marco Zava <i>Manager of the Argentine Buffalo Breeders Association, Argentina</i></p> <p>Mrs. Ancharlie Na Chiangmai, <i>Consultant of Department of Livestock Development, Thailand</i></p>
	19.00 23.00	<p>Welcome Dinner and Miss World Buffalo Contest</p>



Buffaloes in Thailand

Post-Congress Tour Program

Date	Time	Activities
May 9th, 2013	05.30 AM 9.00 AM	- Check-in at Phuket International Airport - Pick up from Suwanabhumi airport at 10.00AM - Visit Thai Buffalo Conservation and Development Center at Chonburi province -Lunch at farm
	1.30 PM	- Leave for Pattaya beach (one of the most famous beach). - Check in at Amari Orchid Hotel Pattaya
	6.30 PM 9.00 PM	- Dinner at Pattaya - The Tiffany's Show Pattaya
May 10th, 2013	8.00 AM	- Leave for Visit Murrah Farm at Chachoengsao province
	12.00 PM	- Lunch at Murrah Farm
	1.00 PM	- Leave for Phimai Historical Park at Nakhon Ratchasima province
	6.30 PM 7.30 PM	- Check in at Surasammanakarn Hotel - Dinner at hotel
	May 11th, 2013	8.00 AM 12.00 AM 1.00 PM 7.30 PM
May 12th, 2013	8.00 AM	- Hotel check-out - Visit Milking Buffalo Farm at Burirum Province which belong to Department of Livestock Development
	12.00 PM	Lunch at Burirum City
	1.00 PM	- Leave for Khonkaen province - Visit Buffalo Village at Khonkaen province
	7.00 PM 7.30 PM	- Check in at Pullman Raja Orchid Khonkaen Hotel - Dinner at hotel
	May 13th, 2013	7.30 AM
1.00 PM		- Visit ancient city - Visit Elephant Camp - Visit Wat Phra Sri Sanphet
4.00 PM		- Leave for Prof. Maneewan's house
5.30 PM		- Dinner at Prof. Maneewan's house
7.30 PM		- Check in at Pathumwan Princess Hotel

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by G.N. Purohit and A. Borghese



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Dr. G.N. Purohit has spent over 25 years in teaching and practicing veterinary obstetrics and worked as a reproduction consultant for most domestic animal species in India and abroad. He has to his credit 6 books, 105 research publications, many awards, has guided many research scholars and is assistant editor/referee/member editorial board to many journals. He is actually Associate Professor at the Department of Veterinary Gynecology and Obstetrics to the Rajasthan University of Veterinary & Animal Sciences in Bikaner, Rajasthan, India.



Professor A. Borghese is the General Secretary of the International Buffalo Federation, Coordinator of the FAO-SCORENA Buffalo Network and the Past General Director of the Animal Production Research Institute of Agricultural Ministry in Monterotondo, Rome, Italy. He published more than 300 scientific publications and 6 books. International Veterinary Information Service (IVIS) is a not-for-profit organization established to provide information to veterinarians, veterinary students and animal health professionals worldwide.

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BUFFALO LIVESTOCK AND PRODUCTS

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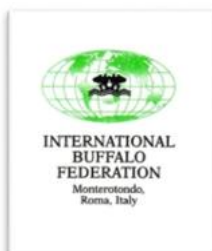
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Milk Composition, Rennet Coagulation Time, Urea Content of Anatolian Buffaloes' Milk (Ilıkpınar Village of Hatay Province).

II. The Relationships Between Milk Constituents and Various Milk Properties

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Abstract: The objectives of this study were to investigate the relationships among milk composition, renneting time, urea concentration, acidity, density and pH of Anatolian Buffaloes' milk. As a total of 115 individual milk samples from 53 Anatolian buffalo cows that calved in 2004 and 2005 on days of their lactations 30±15, 60±15, 90±15, 120±15, 150±15, 180±15., 210±15, 240±15 and 270±15 in 8 units of Ilıkpınar village were collected in morning milkings for June, September, December and March. Samples were analysed for total dry matter, fat, protein, ash, density, pH, acidity, renneting time and urea content. Data were classified according to the following environmental factors: lactation stages: 1 (30±15, 60±15, 90±15 days): 2 (120±15, 150±15, 180±15 days): 3 (210±15, 240±15, 270±15 days); calving year: 1 (2004), 2 (2005); calving season: 1 (January-May), 2 (September and October); month of samples collection: 1 (June), 2 (September), 3 (December), 4 (March); lactation order. Means and correlation coefficients for the characteristics investigated were calculated.

Key Words: Anatolian buffalo, milk, coagulation, renneting, urea

1. Introduction

It is established fact that reducing protein concentration (80 gr/kgFCM and lower) diminishes milk yield and its fat percentage (1, 2) and that increasing milk yield leads to a decrease in milk fat and protein concentrations (3, 4). Milk coagulation properties (rennet coagulation time, firming time and firmness of clot) are well known important criteria for cheese production. These properties (rennetability) can be affected by genotype (5, 6), season, lactation order, lactation stage and feeding (7). Moreover, they change throughout the lactation depending on milk yield, protein and fat concentrations. These properties are found best at the beginning and the end of lactation. Piironeen et al. (8) reported that protein content affected milk coagulation considerably, which increased as the lactation stages progressed, and that any negative alterations in milk composition had a clear effect on milk coagulation time. Milk coagulation properties also differ significantly from one unit to another. It is most likely that differences are due to feeding and management factors (6). Povinelli et al. (5) found that titratable acidity and protein content had a significant effect on milk coagulation ability.

pH has a negative influence on milk coagulation ability and the effect increases to a significant degree as lactation progresses (8). Milk urea concentration can be used as a tool to monitor crude protein and energy intake (9). It is related to the rate of protein-energy in ration and crude protein intake (10, 11). In order to use milk urea concentration as a tool to identify any imbalances related to feeding, food intake and ration composition together with other factors and levels of their effect have to be determined and taken into consideration while interpreting urea concentration (12). These factors can be ordered as follows: sample collection season, analyze method used, live weight of animal, parity and milk yield of cow (13). Roy et al. (14) reported that milk urea concentration increased significantly in Murrah Buffaloes as the control day milk yield increased. As the lactation number increased, a significant reduction occurred in milk urea concentration. However, lactation stage did not have significant effects on urea and protein concentrations of milk.

The objectives of this study were to investigate relationships among milk composition, renneting time, urea concentration, acidity, density and pH of Anatolian Buffaloes milk.

2. Material and Methods

The material of the study were formed by 115 milk samples from 53 Anatolian buffalo cows of Ilkpinar Village of Kırıkhan District of Hatay Province in 8 units that calved in 2004 and 2005. Milk samples were collected from the morning milking for June, September, December and March. The cows were on 30±15, 60±15, 90±15, 120±15, 150±15, 180±15, 210±15, 240±15 and 270±15 days of their lactations. Samples were analysed for total dry matter, fat, protein, ash contents, pH, density, renneting time and milk urea content. Protein and fat contents were determined by Formol Titration (15) and Gerber Methods (16) respectively. Rennet coagulation time was determined by recording time from the addition of enzyme to milk to appearance of first clot

using Berridge Method (17). Milk urea content determined with diacetyl monoxime by Photometric Method, as described in Merck handbook (18).

The means and correlation coefficients of the characteristics were calculated. SPSS programme (standard version, SPSS Inc.) were used in the statistical analysis.

3. Results

Correlation coefficients between milk yield and milk constituents contents are given in Table 1. Relationships among the rennet coagulation time with composition, pH, density, titratable acidity and urea content of milk are shown in Table 2a and Table 2b.

4. Discussion

As can be seen in Table 1, there was a significant relationship between morning and daily milk yields. There are negative significant correlations between daily milk yield with TDM, fat and protein percentages. These result were confirmed by the following literature (19, 20, 21). There were negative relationships between TDM with fat and ash contents and positive relationships between fat with protein concentrations and TDM with fat and protein contents. In other words, as ash content increased, TDM content decreased. Fat content was adversely affected by the increase in ash content and the increase in TDM and protein contents positively. Protein content increased as fat and TDM contents increased. However, Roy et al. (14) reported that protein concentration did not change significantly. Milk component concentrations have negative relationships with production characteristics, and changing component contents only by genetic selection is not possible. However, there are significant correlations between milk yield and fat, protein and TDM yields. It suggests that genetic selection has to be directed towards increasing fat, protein and total not fat dry matter yields. Under selection programs in which milk yield is taken into consideration, fat and protein

yields also increase, but fat and protein concentrations decrease.

As can be seen in Table 2a and Table 2b, as daily milk yield and pH increase, titratable acidity is affected negatively. In parallel to increase in fat rate, titratable acidity rises. In the literature it is reported that titratable acidity rises together with a decrease in urea content of milk (22). Whereas feeding level is influent on the urea content of milk (23, 24).

There were significant negative relationships between pH and all of the milk constituents. As pH increased, the amount of milk constituents decreased. Relationship between milk yield and pH was found insignificant. Piironen et al. (8) reported that protein percentage had a positive effect on pH, and the effect enhanced as lactation stage progressed.

Density reduces as TDM, fat and protein contents increase. Similarly, as ash content rises density also increases. Relationships between density with milk yield and pH were not significant. Despite the fact that there is positive correlation between TDM content and density of milk, the negative correlation found in the study was due to increase in fat percentage of TDM content.

Time laps from the addition of rennet to the appearance of first clot get longer as TDM, fat and protein percentages increase, whereas as ash content increases it becomes shorter. Likewise, the studies (5, 6, 7) supported that there were positive relationships between rennet coagulation time with protein and fat contents. Negative alterations related to milk composition were reported to have clear effects on milk coagulation properties and alterations in protein content related to production season result in rennet coagulation properties of milk (8). In this study, relationship between milk coagulation time and pH was not significant. The study (8) supported this findings and state that as lactation stage progressed the effect increased significantly. Relationships between milk urea concentration with none of milk constituents, milk yield, density, pH and titratable acidity were not significant

statistically. Correlation between urea content and milk yield was found to be negative and not significant as opposed to the literature (13, 14).

Table 1. Correlation coefficients between milk yield and milk constituent contents.

Variables measured		Correlation coefficient (r)
Morning milk yield	Daily milk yield	0.737**
TDM %	Morning milk yield	-0.030
“	Daily milk yield	-0.232*
“	Fat %	0.675**
“	Protein %	0.660**
“	Ash %	-0.408**
Fat %	Morning milk yield	-0.028
“	Daily milk yield	-0.202*
“	Protein %	0.596**
“	Ash %	-0.338**
Protein %	Morning milk yield	0.052
“	Daily milk yield	-0.204*
“	Ash %	-0.495**
Ash %	Morning milk yield	-0.104
	Daily milk yield	0.084

*P < 0.05, **P < 0.01

Table 2a. Relationships between various variables

Coagulation time		Urea content		Density	
Variables	Correlation coefficient	Variables	Correlation Coefficient	Variables	Correlation Coefficient
Morning milk yield	0.238*	Morning milk yield	-0.069	Morning milk yield	-0.138
Daily milk yield	0.038	Daily milk yield	-0.118	Daily milk yield	-0.165
TDM %	0.320**	TDM %	0.084	TDM %	-0.247*
Fat %	0.293**	Fat %	-0.046	Fat %	-0.247*
Protein %	0.447**	Protein %	-0.058	Protein %	-0.256*
Ash%	-0.273**	Ash %	-0.143	Ash %	0.210*
Density	-0.049	Density	-0.015	pH	0.027
pH	-0.022	pH	0.050	Titrateable acidity	0.367**
Urea	0.035	Titrateable acidity	0.002		
Titrateable acidity	0.094				

*P < 0.05, **P < 0.01

Table 2b. Relationships between various variables

Titratable acidity		pH	
Variables	Correlation coefficient	Variables	Correlation Coefficient
Morning milk yield	-0.159	Morning milk yield	-0.055
Daily milk yield	-0.323**	Daily milk yield	0.127
TDM %	0.171	TDM %	-0.339**
Fat %	0.205*	Fat %	-0.358**
Protein %	-0.029	Protein %	-0.291**
Ash %	0.098	Ash %	-0.280**
pH	-0.394**		

*P < 0.05, **P < 0.01

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