



Mithun Digest

The bi-annual panorama.....

ICAR-National Research Centre on Mithun



Vol. 11 No. 2

July - December 2014

From the Director's Desk

Greetings from our small family of ICAR-National Research Centre on Mithun, Nagaland. It's my proud privilege to present this 11th volume of Mithun Digest, the publication of which is incidentally, the swan-song for me as Director of this premier Institute.

I would like to inform you that my last day in my Office at ICAR is today i.e. on 31st of December 2014. On this day, I shall be retiring after attainment of superannuation and serving for 37 years

and three months in different capacities in ICAR, the premier organization of the country in the field of Agricultural Research, Extension and Education. During this time, I had the opportunity to serve two important divisions of ICAR i. e. NRM and Animal Science. Initially, I served in ICAR Research Complex for NEH Region, Meghalaya in the capacity of S1, S2, Principal Scientist, and Joint Director, ICAR Research Complex, Nagaland Centre, Medziphema, Nagaland and subsequently served ICAR-NRC on Mithun, Medziphema, Nagaland as Director from 2004.

During this long tenure of my service, I had the opportunity to work with you with full satisfaction and pleasure. This was possible only due to the active co-operation, guidance as well as whole hearted support. The love and affection shown by the elders and support from younger were the strength, while delivering my duties for the cause of the Nation. I thankfully acknowledge the support and co-operation given by you during this period while discharging the duties to the best of my abilities.

I thank you on this day of my superannuation and hoped that the same love and affection from you will continue for ICAR-NRC on Mithun, Medziphema, Nagaland in future days to come.

Please feel free to contact me in the future days to come in the following address.

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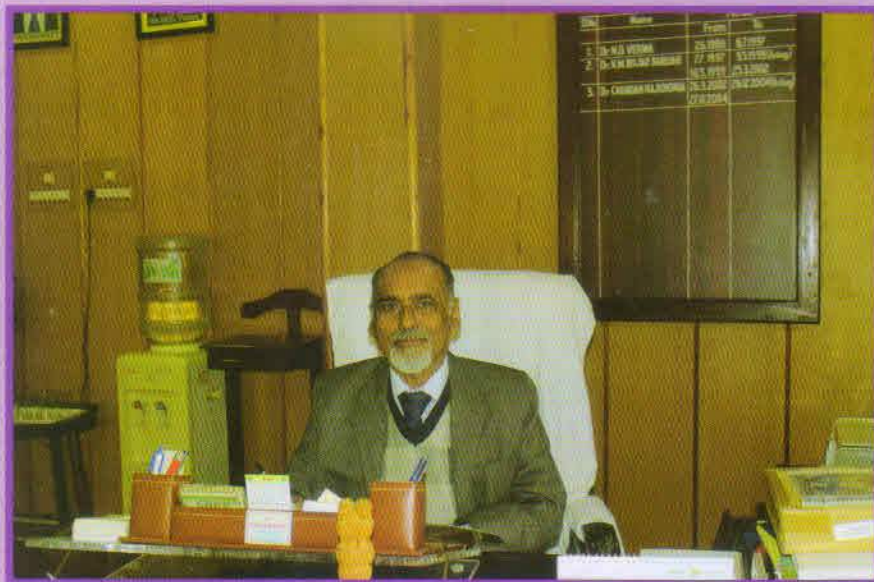
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(Chandan Rajkhowa)
Director



INSTITUTIONAL ACTIVITIES

Independence Day Celebration

The Institute staff organized the celebration of the Independence Day on 15th August, 2015 in a befitting manner. The Director unfurled the National Flag in the morning and encouraged all the Scientists and other staff to work with a purpose and remain ever vigilant safeguarding the reputation of the Institute in particular and the nation in general. The children and family members in colorful attire also took part in different programmes organized for this occasion.

RAC Meeting

The 8th RAC Meeting was held on 23rd December, 2014 under the Chairmanship of Dr. Arun Varma, Former DDG, ICAR and was attended by Dr. K.T. Sampath, Ex Director, NIANP; Dr. A. Chakravarty, Director (Research) AAU; Dr. S.K. Rastogi, Prof. & Head, Dept. of Physiology, College of Vety. & Animal Sciences. Scientists presented the research achievements of different projects before the RAC

followed by valuable discussions, which helped to refine these projects substantially.

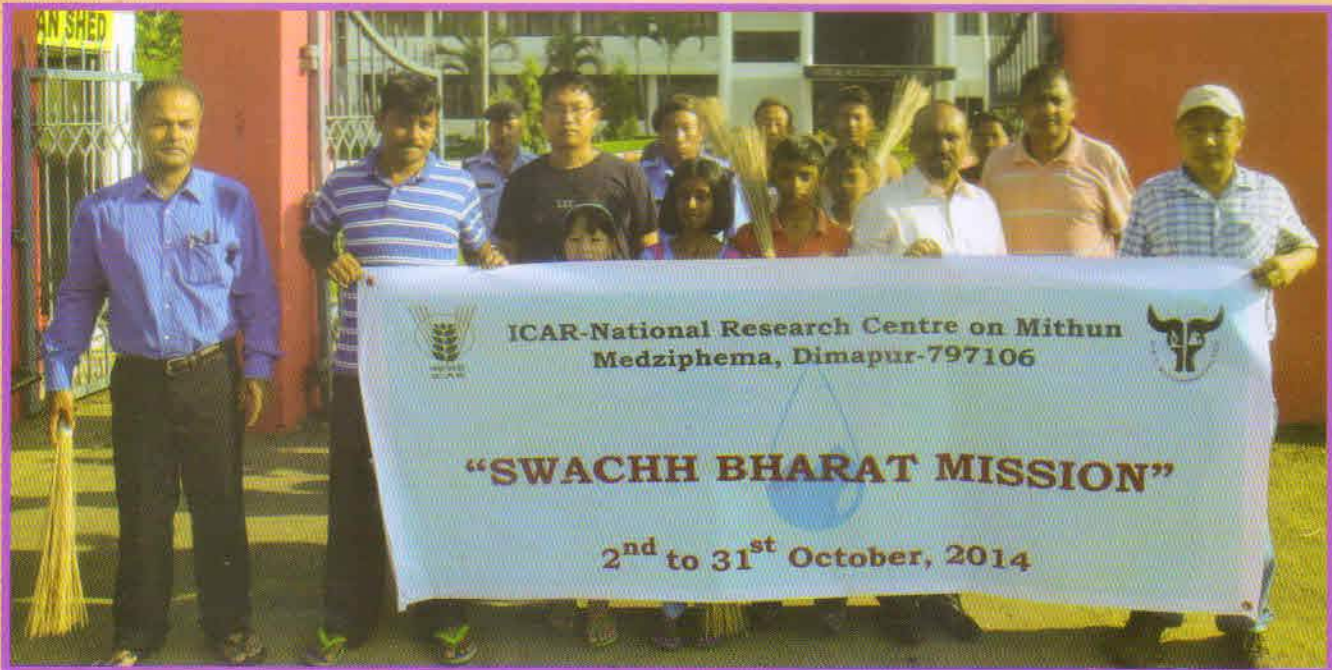


Technology Transfer Conclave

A Technology Transfer Conclave was held in our Institute on 9 September 2014 led by Dr. K. K. Baruah, Principal Scientist and I/C, ITMU to showcase the various technologies developed by the Institute for the benefits of mithun and their owners. Mr. Vikho-o Yhoshü, Parliamentary Secretary, Dept. Vety & A.H., Govt. of Nagaland was the Chief Guest and Dr. Timothy, Director, Vety. & A.H., Govt. of Nagaland was the Guest of Honour during the conclave.

Swachh Bharat Mission

Swachh Bharat Mission was begun in the Institute led by Dr. Chandan Rajkhowa, Director and participated by all the staff members enthusiastically to clean the surroundings and the Institute

**ICAR Foundation Day**

The Institute celebrated the 86th ICAR Foundation Day on 16 July 2014 with much dignity and grandeur under the leadership of Dr. Chandan Rajkhowa, Director. A number of dignitaries were also present including Col. Boral, CO, 37 Assam Rifles, Dr. Aleminla Ao, DEAN SASRD, Medziphema and Dr. Timothy Lotha, Director, Vety. & A.H., Govt. of Nagaland.

**Vigilance Awareness Week**

The Vigilance Awareness Week was observed in the Institute from 27th October to 1st November, 2014. All the staff members had participated in the programme. At the very outset the importance of observance of vigilance week were briefed out by Dr. K. K. Baruah, Vigilance Officer of the institute. This year the main focus of observing Vigilance Awareness week was “Combating Corruption-Technology as an enabler”. The programme started with taking a pledge by all the staff followed by group discussion. Various competitions like essay writing, cartoon competition on vigilance awareness were also organized among the staff members of the institute. Awareness about effective preventive measures undertaken through system improvements and use of information technology like e-payments to vendors, suppliers etc., publishing complete details of tenders on the Institute websites and providing information of status of applications to citizens/ public etc were also highlighted. Cartoon competition was also organized among the school children in order to make them aware about the importance of maintaining integrity for developing themselves as a good citizen. The

programme ended with a valedictory function under the Chairmanship of Dr. Chandan Rajkhowa, Director, ICAR-NRC on Mithun on 1st November 2014 and prizes were distributed among the winners of different competitions.



RESEARCH HIGHLIGHTS

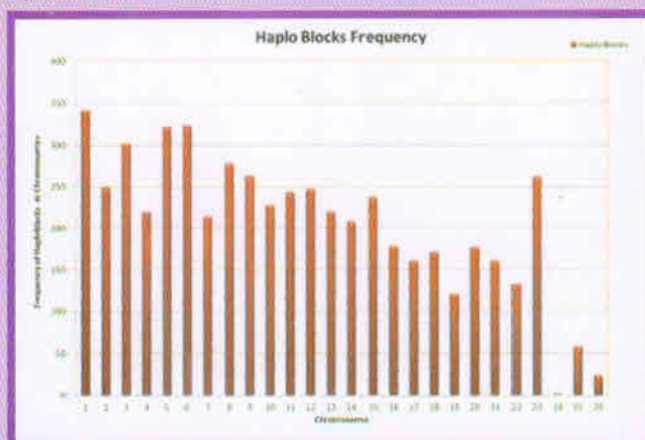
Genome wide association study in mithun

A pilot study on whole genome association was done in mithuns (*Bos frontalis*) belonging to four different geographical locations/breeds. The samples were collected from 96 unrelated animals over the three generations (Parent, F1, F3 and F4) and SNP genotyping was carried out using Illumina Bovine HD 770K chip. The quality of genotypic data was checked before performing any analysis. The clean genotypic data, consisting of approximately 10^5 polymorphic SNPs were used for the estimation of various population statistics.

In mithun population, the observed heterozygosity, an important parameter for assessing the genetic diversity, and the inbreeding coefficient was estimated as 0.28 ± 0.03 and 0.13 ± 0.10 , respectively. The results indicated that the mithun population consisted of unrelated and outbred individuals.

The Linkage Disequilibrium (LD) was estimated for the SNPs that were at least 100kbp apart. On the basis of estimated linkage disequilibrium, substructures of the mithun population were also studied. The estimated

frequencies of the haplotypes block are presented in the figure.



The F-statistics (fixation indices) represents the deviation of allelic frequencies from those described in the Hardy-Weinberg equilibrium in the population. It is observed to have low degree of heterozygosity than the expected Hardy Weinberg distribution. This might be due to several environmental, evolutionary, and behavioral influences in the mithun population.

Preparation of animal feed block from distillers grains

The wet cake, a by-product from distillery having high levels of protein (about 31% on dry matter basis), is difficult to use as an animal feed due to its high moisture content (70 - 80%) and fungal growth. In a distillery plant, wet cake is generally dried using a rotary evaporator and referred as Dried Distillers Grains and Solubles (DDGS). But this method of drying is cost intensive. Therefore, a cost effective and easy method for drying of the wet cake, containing ingredients like paddy straw has been developed.



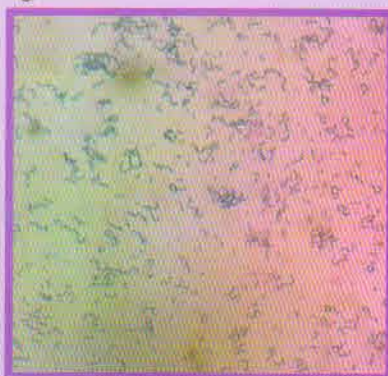
Feed block containing dried wet cake, paddy straw and other ingredients

Isolation of tannin degrading bacteria

Eleven tannin degrading / tolerant bacteria have been isolated from the faecal samples of mithun reared in free-range system in Nagaland.



Colonies of tannin degrading / tolerant bacteria



Tannin degrading / tolerant bacteria (*Streptococcus sp*)

Plasma Membrane Integrity

A trial was conducted to determine the optimum osmolarity of hypoosmotic solution to assess the functional membrane integrity of mithun sperm.

Osmolarity of 150 mOsm/l was most suitable for hypoosmotic swelling test in mithun.

Buffalo Follicular Fluid on Mithun Semen Preservation

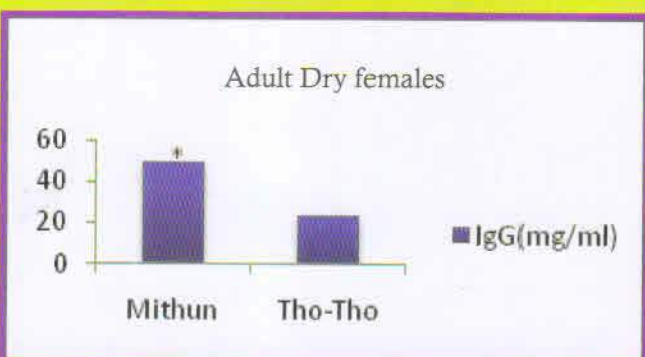
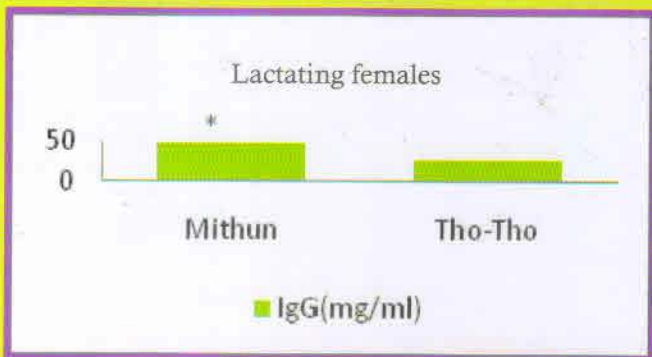
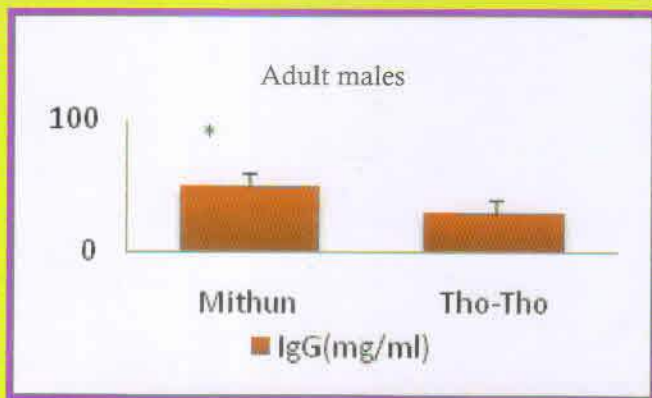
In vitro incubation of mithun sperm with standard diluent supplemented with 25% buffalo follicular fluid (BFF) resulted in a significant improvement of motility, viability and integrity of plasma membrane and nuclear membrane of mithun sperm.

Calving Trend in Mithun

The results of a retrospective study conducted to assess the calving trend in mithun in semi intensive farm of the institute revealed the highest calving occurred during September followed by December to January and lowest in May to June.

Comparative evaluation of Humoral Immune status of Mithun (*Bos frontalis*) and Tho-Tho Cattle

The plasma concentration of IgG was estimated in different physiological stages of mithun and Tho-Tho cattle. A significantly higher concentration of IgG in mithun than that in Tho-Tho cattle during all the physiological stages suggests a better humoral immune status of mithun.



Concentration of immunoglobulin concentration in mithun and Tho tho cattle of different physiological stages using t-test ($p \leq 0.05$ differs significantly)

Capacity Building - Training programmes organized

- Training programme on “*Bioinformatics: A Tool for Better Understanding of Biological Sciences*” from 1st to 10th November, 2014 for undergraduate student of Patkai Christian College, Dimapur.
- Regional stakeholders workshop on “*Augmentation of Livestock Productivity in NE Region through Nutritional Interventions*” organized jointly by ANSI and NRC on Mithun at NRC on Mithun, Medziphema, Nagaland on Nov. 24, 2014.



Training Programme on “*Insight to Molecular Advances for Future Research in Biology*” from 1st to 10th November, 2014 was organized for undergraduate students from Patkai Christian College, Dimapur

AWARDS/HONOURS

- Dr. Perumal P received the Certificate of Excellence in Reviewing by International Journal of Livestock Research (ISSN 2230-7613) for the year 2014
- Dr. Naresh Prasad was Awarded Ph D degree on 31.10.2014 in the discipline of Veterinary and Animal Husbandry Extension Education from the Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science, Lala Lajpat Rai University of Veterinary and Animal Science, Hisar-125004, Haryana. The title of Ph.D. research was “Organizational Communication in State Department of Animal Husbandry and Dairying of Haryana: A Structural and Functional Analysis”.

**Transfer**

- Dr. (Mrs.) Anupama Mukherjee, Sr. Scientist (Animal Genetics &

Breeding) transferred to National Dairy Research Institute, Karnal w.e.f. 17.12.2014

VISITING DIGNITARIES

- Mr. Vikho-o Yhoshü, Parliamentary Secy. Vety & AH, Nagaland, Kohima – 09.09.14
- Prof. S. Singh, Benaras Hindu University – 30.10.14
- Prof. S.H. Mitra, Former Dean, F/Stat, BCUV.WB – 30.10.14
- Dr. A.K. Vyas, ADG (HRM), ICAR – 30.10.14
- Mr. R. Adul H. Gupta, Judge Advocate General (Navy) NHQ, New Delhi – 30.12.14
- Cmdt. G Ojha, PDNE, IHQMOD (Navy), New Delhi – 30.12.14

MISCELLANY

Technology Injection Programme under TSP

- Technology Injection Cum Input Distribution and Health Camps were held in Chenwetnyu village of Mon, Dist. of Nagaland on 06th

August 2014.

- One farmer's training programme on Technology Injection cum Animal Health Camp under TSP programme was organized in collaboration with Entrepreneurs Associates, Nagaland on 22nd Nov, 2014 at Thetsumi village, Pfutsero, Phek, Nagaland. A team comprising of Dr. N. Prasad from NRC on Mithun and Dr. Debojyoti Borkotoky, KVK, Phek participating as resource persons and briefed the farmers about different health and management practices of Mithun husbandry and modern technologies for identification of animals. A total of 92 farmers/farm women participated in the programme from thetsumi village and Enhulumi village and 45 animals were checked health status and accordingly treated. The mithun farmers were given various inputs such as vaccines for Foot & Mouth Disease, Mineral mixture, anthelmintic, various veterinary medicines for first aid to the mithun and other livestock. The participants expressed that this programme is first of its kind in the village and need such several follow up programme in near future on scientific methods of mithun farming.
- Organized Farmers' Training Programme on technology intervention, animal health and input distribution at Abango village, Roing of Lower Dibang Valley district, Arunachal Pradesh on 20.11.2014 and briefed the farmers about different health and management practices of Mithun husbandry and modern technologies like Ear tagging and Microship implementation for identification process. A total of 55 farmers/farm women participated in the programme and 28 animals were checked health status and accordingly treated. The mithun farmers were given various inputs such as vaccines for Foot & Mouth Disease, Mineral mixture, anthelmintic, various veterinary medicines for first aid to the mithun and other livestock.

Do you know?



Diploid Chromosome numbers,
2N of a species?

Mithun (*Bos frontalis*) : =58

Man (*Homo sapiens*) : =46

Fruit fly (*Drosophila melanogaster*) : =8

Rat (*Rattus norvegicus*) : =42

Cattle (*Bos taurus*) : =60

River Buffalo (*Bubalis bubalis*) : =50

Sheep (*Ovis aries*) : =54

Goat (*Capra hircus*) : =60

Dog (*Canis familiaris*) : =78

Cat (*Felis catus*) : =38

Pig (*Sus scrofa*) : =38

Chicken (*Gallus domesticus*) : =78

Horse (*Equus caballus*) : =64

The Editorial Escapade



It's a matter of great privilege and honor for me to write the editorial of the Mithun Digest, dealing mainly with activities carried out by our staff both in the lab and off the lab in small news form. However, we will miss the

benevolent presence of our Director, Dr. Chandan Rajkhowa who is superannuating on the last day of the year 2014. We wish him and his family a very happy and healthy life for years to come.



Measurement of physical traits of mithun, Khonoma

The United Nations declared 2014 the International Year of Family Farming and Crystallography, and with a ray of hope for the future, a new report showed how improvements in agricultural efficiency could feed an extra three billion people!

Our geneticist carried out genome wide association studies in mithun and estimated various population parameters of mithun. While nutritionists isolated few tannin degrading bacteria from the mithuns thriving on forest tree leaves; scientists from Newcastle University proved that organic food contains almost 70 percent more antioxidants and significantly lower level of toxic heavy metals than conventionally grown crops.

Other notable research news in our Institute included determination of optimum hypo-osmotic swelling test conditions for mithun spermatozoa and comparative evaluation of humoral Immune status of mithun and Tho Tho Cattle. Various technology injection programmes carried out during the period could give some inputs to the mithuns for better veterinary care, vaccination and feed supplements in the form of salt and mineral mixture.

In International scenario, geneticist discovered and identified a genetic mutation, termed CHD8, that causes autism, and the coffee genome was published, identifying more than 25,000 genes and revealing that coffee plants makes caffeine using a different set of genes from those found in tea, cacao and other such plants.

While three Scientists, Isamu Akasaki, Hiroshi Amano and Shuji Nakamura were awarded Nobel Prize, 2014 for Physics for blue LED lights; the Nobel Prize in Medicine, 2014 was awarded to Edvard Moser, May-Britt Moser and John O'Keefe "for their discoveries of cells that constitute a positioning system in the brain" or, less formally, for finding an "inner GPS, in the brain". Hats off to these great Scientists for their path-breaking inventions!

Researchers Choi Se Hoon and her associates for the first time, found a way of reproducing Alzheimer's cells in a Petri dish and thereby, bring a hope for cure of this disease.

The age old saying of *Bhagavat Gita* that soul is immortal and that neither air nor fire can destroy it, was once again proved in a different way when a new study finds that DNA can survive a flight through space and re-entry into the Earth's atmosphere and still pass on genetic information! These results indicate that life and organic molecules could potentially spread between planetary bodies through meteor impacts.

The largest DNA Bank was created in the Moscow State University to store genetic samples from every living thing on Earth, funded by the country's largest ever scientific grant.

Finally in a lighter vein, one scientific study has found that wine protects against cardiovascular disease, only in people doing regular exercise, hence, say "Cheers" while jogging! *Jai Jawan Jai Kisan Jai Bigyan!*



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