

## The Institute

The National Research Centre on Mithun was established in June 1988 in the state of Nagaland under the aegis of Indian Council of Agricultural Research to provide impetus on the research work on mithuns (*Bos frontalis*). Mithun, a ruminant species belonging to family *bovidae* and assumed to be the domesticated form of wild gaur (*Bos gaurus*) is indigenous to the eastern Himalayas and has been referred to as 'sacrificial ox' of the North Eastern region of India. It played an important role in the traditions and rituals of the vast tribal population of this region. Mithuns live at elevations between 300 to 3000 m in the hilly terrains of North East India.

NRC on Mithun is playing key role in conservation, breeding and health management of Mithun. The scientists of NRC on Mithun in the past 25 years has generated information in all aspects of Mithun production and developed many farmers' friendly technologies which have greatly helped the Mithun owners to make the Mithun husbandry a successful and economic venture.

## Geographical Distribution and Population Status of mithun

Mithun is distributed within a limited geographical boundary. It is mainly found in the North-Eastern region of India (Arunachal Pradesh, Nagaland, Manipur and Mizoram), Myanmar, China, Bangladesh and Bhutan. It is difficult to ascertain the total population of Mithun, as no systematic population record of mithun is available in the mithun inhabited areas except India. According to the Livestock census (2007), out of the total mithun population in India (264,138), 218,931 animals are available in Arunachal Pradesh followed by 33,244 in Nagaland, 10,024 in Manipur and 1939 in Mizoram.

Mithun is traditionally reared under forest ecosystem. As the population growth of this animal is not very high due to problem of inbreeding, indiscriminate slaughter, cross breeding with cattle and habitat destruction due to local agricultural practices ('Jhum' cultivation), therefore, this animal deserves special attention for the conservation, breeding and propagation.

## Mandate

- Identification, evaluation, and characterization of Mithun germplasm available in the country
- Conservation and improvement of Mithun for meat and milk
- To act as a repository of germplasm and information centre on Mithun

## Major Research Programmes in progress

- Development of a nucleus breeding stock of Mithuns for propagation of pure stock for meat and milk – A participatory approach (The flagship research programme)
- Conservation and genetic improvement of Mithun through the application of conventional and molecular breeding techniques.
- Phenotypic traits generation, exome sequencing, and identification of SNPs for association studies of growth, meat and milk quality traits of Mithun

- Enhancing reproductive efficiency of Mithun using frontier technologies.
- Production enhancement in Mithun through management of stress and area specific feeding strategies
- Epidemiology of diseases in Mithun and development of molecular diagnostic and control strategies
- Upgradation of technologies for value addition to Mithun products and byproducts.
- Technology for round-the-year fodder production and conservation for lean seasons.
- Development of mithun based Integrated-farming system
- Technology percolation and extension research

## Our Stakeholders

- Mithun owning community, farmers, State departments of AH & Vety, SAUs, KVKs and NGOs of North East Hill Region having mithun populations, researchers, students, community workers, Scientists

## NRCM in the service of stakeholders

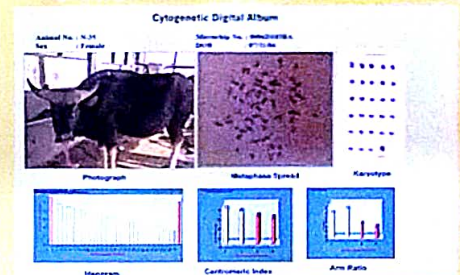
- Genetic improvement, conservation and characterization of mithuns through innovative research
- Production and propagation of valuable mithun germplasm
- Development of newer technologies for processing of value added products of mithuns meat, milk and hides
- Overall economic benefits of mithun rearing tribes through improved mithun husbandry practices.



## Major Research Achievements



- First ever birth of Embryo Transfer Mithun calf in the world – "Bharat" on 27 March 2012 and "Mohan" born of 100-day cryo-preserved embryo on 12 May, 2012.
- Two AI calves of Mithun by using this protocol born in 2010 in village (field) conditions.
- Superovulation protocol has been standardized in order to do embryo transfer in Mithun.
- Dentition patterns of Mithuns for determination of age under field conditions have been established.
- Cytogenetic screening and analysis of all the Mithuns in the Institute farm were completed and these information was depicted through a "Digital Cytogenetic Album".



- First ever R- and C-banded karyotypes of Mithun were prepared in this Institute.
- Genetic polymorphisms were identified in Mithun kappa casein and Leptin genes and animals were genotyped based on these polymorphisms.
- Morphometric (phenotypic) and genetic characterization of all four strains of Mithuns has been completed and found that all these strains are genetically distinct from wild gaur (*Bos gaurus*).
- Estrus synchronization protocols in Mithun standardized for fixed time insemination and implemented successfully at field level.
- Preservation of liquid semen of Mithun at refrigeration temperature has been standardized.
- The PCR based technique to detect Fertility Associated Antigen (HBP and Osteopontin) transcript in Mithun seminal plasma has been standardized.
- Study on physiological, hematological and biochemical parameters of Mithun under stress due to load carrying capacity has been assessed.
- More than 260 tree leaves/ shrubs available in NEH region of India for feeding of Mithun has been identified, chemically analyzed and nutritionally evaluated.

- Macro and micro minerals analysis were done in tree leaves / shrubs, soil samples and blood of animals.
- Area specific mineral mixture suitable for Mithun was developed based on the information generated by various studies in the Institute.
- The protein requirement of growing Mithun has been determined and was found to be lesser than cattle as per NRC requirement.
- Different types of feed blocks based on total mixed rations for Mithun were developed.



- Feeding of breweries waste (spent grains) in Mithun was found to improve growth rates and economized feeding cost.
- Important bacterial, viral and protozoan diseases identified in Mithun and control measures were evolved for some of the diseases.
- The hide of Mithun was compared with that of cattle and it was found that Mithun hides and its products were better as compared to that of cattle.
- Different leather products of mithun like jacket, shoe, portfolio bag, etc were prepared successfully as demonstration purpose and found to be of superior quality.
- Technology Injection programme (Transfer of technology) like dissemination of scientific Mithun husbandry practices, conducting health camps for vaccination of important disease of Mithun helped to transmit the information to the farming community.

#### Value added products of Mithun meat, milk and leather

Mithun is mainly used as a meat animal by the tribal population. Mithun meat "meef" was analyzed and found to contain dry matter (23.37 – 24.05), CP (84.62 – 87.07), Ether extract (2.66 – 3.23), NFE (4.89 – 7.84) and Total ash (4.75 – 4.81).

Organoleptic evaluation of Mithun meat (meef) and milk showed overall palatability of 6.92±0.20 in comparison to beef 6.33±0.17, and 7.10±0.15, respectively in a scale of 10.

Finished leather products like bag leather, shoe upper leather, as well as garment leather were found to be soft and have better body and roundness and can be a better leather source for the leather industry.



Mithun milk products (Lassi, rosgulla and barfi) Mithun meat products (Meatnugget) Mithun meat products (Meatblock)



Mithun finished leather products (Shoe and bag) Mithun finished leather products (Key case, money bag)



Mithun finished leather products (Shoe) Mithun finished leather products (Jacket and ladies bag)

#### List of patent application filed

Sl. No.	Application Nos.	Filing date	Title
1	1432/Kol/2012	13.12.2012	A method for bio-preservation of mithun hides
2	1334/Kol/2012	20.11.2012	A method for processing racoon pelts and fur
3	12777/Kol/2012	07.11.2012	An energy efficient post tanning process for mithun hides
4	12769/Kol/2012	07.11.2012	A novel method of chrome tanning of mithun hides with glycolic acid
5	11977/Kol/2012	17.10.2012	An improved method for chrome tanning mithun hides
6	3609/Kol/2012	30.03.2012	A process of making leather without any large machinery
7	183/Kol/2013	18.02.2013	A method of removal of chromium from chrome liquor obtained after processing of mithun hides
8	1927/Kol/2013	19.02.2013	A method of processing rabbit fur or leather

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## NRCM – At a Glance

ISO 9001:2008 Certified Institute



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