

# Mithun Digest

NATIONAL RESEARCH CENTRE ON MITHUN

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## INSTITUTIONAL ACTIVITIES

### Republic Day Celebration

The Republic day was celebrated at the Institute with full enthusiasm where all the staff members and the children of the staff members had actively participated and took part in many cultural events organized on the day.



Celebration of Republic Day at the institute

### Institute Management Committee Meeting

The Xth IMC meeting of the Institute was held on 12th January, 2007 under the chairmanship of the Director N.R.C. Mithun. Dr. O. P. Dhanda, ADG (AN & P), ICAR, New Delhi, Dr. R. N. Goswami, Dean, F. V. Sc. Khanapara, AAU, Dr. K. K. Baruah,

Principal Scientist, Dr. S. Rajkhowa, Scientist (Sr. Scale), and Dr. B. Prakash, Scientist of the Institute had also attended the meeting. The committee thoroughly discussed the various agenda of the meeting and reviewed the various activities and progress of the Institute. They also gave some recommendations and valuable suggestions for the activities to be undertaken in future. The committee strongly suggested filling up the vacant posts to run the Institute smoothly.



IMC members are discussing the various agenda of the meeting

### Institute Research Council (IRC) Meeting

The Institute Research Council meeting was held at the meeting hall of the NRC on mithun on the 28th March'2007 under the chairmanship of Dr. Chandan Rajkhowa, the Director of the institute. A total of 10 members participated in the meeting.



The committee evaluated the various on going projects of the institute and also put forward their suggestions for the further improvement of the some of the projects keeping in view that the ultimate benefit should reach the target group i.e. farming community engaged in mithun husbandry. The committee also approved some of the new project proposals in this meeting.



Scientists presenting their research achievements before the committee members

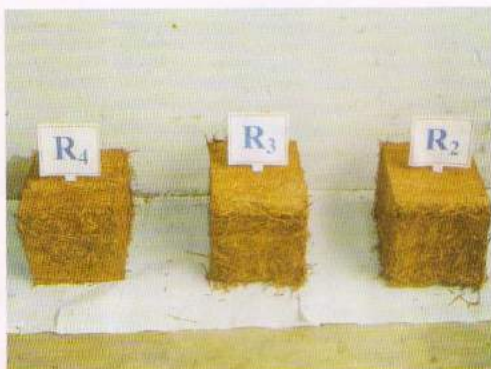


Brain storming session on sustainable mithun production organized by the institute is in progress

## RESEARCH ACTIVITIES

### Animal Nutrition

An experiment was conducted to determine the effect of feeding complete rations containing varying proportion of urea treated rice straw on dry matter (DM) intake (DMI), nutrient utilization, N balance, blood bio-chemicals and nutritive value in mithuns under complete confinement system in hilly state of Nagaland. For the purpose, adult male mithun (average body weight 294.5 kg) were selected and offered four experimental rations viz. R<sub>1</sub> (Napier fodder + concentrate at 60:40), R<sub>2</sub> (urea treated rice straw + concentrate at 50:50), R<sub>3</sub> (urea treated paddy straw + concentrate at 60:40) and R<sub>4</sub> (urea treated paddy straw + concentrate at 70:30) in 4 x 4 Latin square design. The average DMI kg/100 kg body weight was  $2.59 \pm 0.14$ ,  $2.96 \pm 0.13$ ,  $2.85 \pm 0.16$  and  $2.77 \pm 0.06$  and DMI g/kg W<sup>0.75</sup> was  $107.25 \pm 4.22$ ,  $123.13 \pm 3.44$ ,  $118.52 \pm 5.15$  and  $115.04 \pm 1.70$  in mithuns fed R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> respectively. The mean DM was higher in R<sub>2</sub> and R<sub>3</sub> than R<sub>1</sub> and R<sub>4</sub> fed animals whereas, water intake

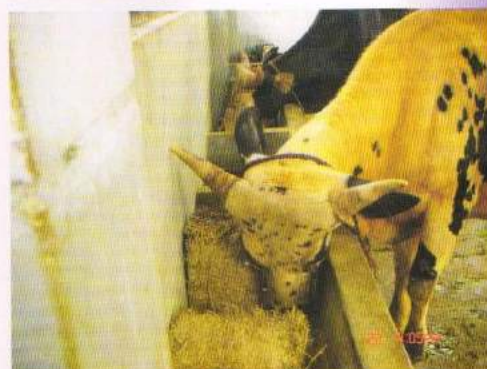


Different experimental rations (urea treated rice straw, concentrate-based feed blocks) are being prepared using the Institute feed block machine

was higher in mithun fed rice straw supplemented diets ( $R_2$ ,  $R_3$  and  $R_4$ ) than green fodder supplemented ration ( $R_1$ ). Digestibility of DM, organic matter (OM), crude protein (CP), crude fibre (CF), neutral detergent fibre (NDF) and cellulose were significantly higher in animals fed  $R_2$ ,  $R_3$  and  $R_4$  than  $R_1$ . All the rations showed positive nitrogen balance, with higher values in animals offered  $R_2$ ,  $R_3$  and  $R_4$  than  $R_1$ . Mithun fed  $R_2$  and  $R_3$  the digestible crude protein (DCP) and total digestible nutrient (TDN) intake was higher than  $R_1$  and  $R_4$ . The experimental diets did not showed impact on

different blood biochemical parameters.

It is concluded that urea treated rice straw can be incorporated up to 70 % to formulate the complete feed block to feed the mithuns for maintenance as well as production under complete confinement or semi-intensive system.



Urea treated rice straw based feed blocks are being fed to the experimental animals

#### Livestock Production & Management

The studies on lactation curve for milk production and major milk constituents in mithun revealed that the average lactation length in mithun was 340 ± 2 days and for individual animal it varied between 322 to 364 days. The longer lactation length recorded in mithun may be due to the effect of continuous

suckling which prolonged anoestrus thereby lengthening the lactation. However, the data on milk yield and milk constituents are presented up to day 315 of lactation as milk yield was found to be less than 0.5 Kg/ day after this time point. Although, the average milk yield measured in the present study was low (1.54 ± 0.14 to 0.630 ± 0.11 kg/day), it was 2 to 3 times higher compared to previous records in wild mithun.



Mithun calf born through AI at institute farm (DAM: MZ31)

Following parturition, milk yield increased and reached peak at day 30 postpartum and then decreased to almost 25% between day 30 and 105 and then further decreased to almost 50% from day 270 onwards. Two respective distinct inflection

point of rapid decrease in milk yield showed by the lactation curve were at around day 75 (early lactation) and day 270 (late lactation).



Mithun calf born through AI at institute farm (DAM: 0232)

Studies also revealed significantly ( $P < 0.05$ ) higher fat, TS as well as SNF percentages during the last 15 days as compared to the first 30 days of lactation. The respective ranges for different milk constituents throughout the 315 day lactation period were 12.05 to 14.99%, 5.73 to 7.16%, 4.02 to 4.85%, 3.45 to 4.79%, 0.32 to 0.50 % and 32.55 to 49.91 mg/dL for SNF, total protein, casein, lactose, NPN and MU respectively.

### Animal Physiology

Unlike other bovine, mithun bulls did not mount cows that were not in estrus (heat) thereby problem to get semen regularly using AV method. The scientists in Animal Physiology, NRCM tried to use urine from estrus cows stored at refrigerated temperature to attract bull to mount. Urine collected from estrus cows and stored at refrigerated temperature was effective till day 7 post-collection. The semen collected by AV method has also been evaluated and the characteristic of semen collected by this method is as follows:

Colour Milky white to creamy white, Consistency Medium to thick, Mass activity- +++ to +++++, Initial motility: 75-90% (post-thaw: 50-70%), Volume 3.5 6.0 ml, Concentration 550 1100 x 10<sup>6</sup>/ml, Live sperm 75 85% (post-thaw:50-70%), HOST responded 65-80% (post-thaw:50-70%), Intact DNA 65-78% (post-thaw:50-65%) and Intact Acrosome 60-75% (post-thaw:50-60%).



Use of urine of estrus mithun cows for collection of semen using non-estrus mithun cows as dummies



Response to stimulation by AV on semen parameters collected by massage method

### Animal Health

Studies on biochemical characteristics and sugar fermentation pattern of *E. coli* isolates isolated from mithun calves revealed that all the isolates were positive to Methyl red and Indole production test, but negative for Voges Proskauer, H<sub>2</sub>S production and urease test. These isolates failed to utilize citrate in simmon's medium.



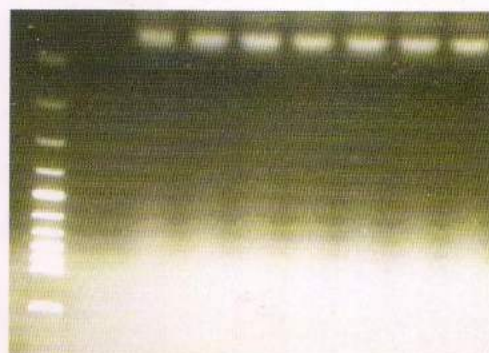
Sugar (sucrose) fermentation test for *E. coli* isolates, red: negative, yellow: positive

The virulence gene profile of different *E. coli* serogroup (isolated from faecal samples of mithun calves with diarrhea) was studied by using multiplex PCR using specific primers. The oligonucleotide primers used in multiplex PCR are shown below:

primers	Sequence 5' to 3'	Target gene	Amplicon size
Stx1F	ATAAATCGCCATTC GTTGACTAC	Stx1	180bp
Stx1R	AGAACGCCCACTGAGATCATC		
Stx2F	GGCACTGTCTGAAACTGCTCC	Stx2	255bp
Stx2R	TCGCCAGTTATCTGACATTTCTG		
hlyAF	GCATCATCAAGCGTACGTTCC	EHEC	534bp
hlyAR	AATGAGCCAAGCTGGTTAAGCT	hlyA	

Out of 60 *E. coli* strains tested by multiplex PCR for detection any one of the *stx1*, *stx2* or *hlyA* genotypes, *stx1* genotype was found to be prevalent in 2 serogroups i.e. serogroup O4 (4 strains) and O32 (3 strains). *stx2* genotype was found in three serogroups i.e. O55 (2 strains), O2 (2 strains) and O49 (2 strains). *hlyA* genotype was found to be prevalent in three serogroups i.e. serogroup O55, O2 and O49 (2 strains in each serogroup). The *E. coli* isolates were also subjected to PCR for the detection of genes responsible for production of thermostable toxin.

M N 1 2 3 4 5 6 7



Detection of *stx1* gene of *E. coli* through PCR; M: Molecular marker; N: Negative control; 1-7: positive samples

### DISTINGUISHED VISITORS



Visit of NRCM Laboratory by Mr. Bhaskar Baruah, IAS, Ex-Secretary, Ministry of Agriculture, Govt. of India



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Visit of NRCM by Dr. N.K. Tyagi, Member, ASRB, New Delhi



Visit of the institute farm by the students from Nagaland University, Medziphema

### PERSONALIA



Visit of NRCM by Dr. S. P. Tiwari, DDG (Education), and Dr. G.C. Tewari, AGD (Education), ICAR, New Delhi



Dr. Mohan Mondal, Scientist (Animal Physiology) has been awarded with the prestigious National Academy of Agricultural Sciences (NAAS) Young Scientist Award in Animal Science for the biennium 2005-2006.

## From The Director's Desk



**T**he role of animal husbandry in uplifting the economy of farmers in our country is well known. This sector is contributing a lot to give economic stability to the poor farmers especially during the time of crisis.

In the hilly topography, animal husbandry sector is a viable component for farming community along with other sectors like horticulture. In the North-eastern hill region, Mithun (*Bos frontalis*) is an important component of livestock production system which plays a vital role in sustaining the economic stability of poor tribal farmers. This animal is also playing an important role for meeting the protein requirement in this remote area.

The NRC on mithun has been addressing the various research and extension issues related to this animal for last several years.

The hard and dedicated effort put by a group of few scientists of different disciplines could bring in perceptible changes in rearing practices of mithun for better production.

The institute could successfully standardize cryopreservation protocol for mithun semen and produce three numbers of AI calves. The standardization recipe for cheap feed block with locally available ingredients is another achievement in the field of nutrition.

The detection of virulence genes from *E. coli* (which has also public health importance) responsible for diarrhoea in mithun calves will definitely help in better understanding of epidemiology of diarrhoea and will also give a new direction in the prevention and control of diarrhoea in newborn of this species.

One of our scientists, Dr. M. Mondal has been awarded the young scientist award by two premier organizations of the country viz. NAAS and INSA.

I must congratulate the dedicated group of scientists for their team spirit and for bringing laurels to the institute and the farming community through their magnificent achievements.

(C. Rajkhowa)

Compiled & Edited	:	Dr. S Rajkhowa, Scientist (Sr. Scale)
Published by	:	Dr. C. Rajkhowa Director, National Research Centre on Mithun Jharnapani, Medziphema, Nagaland 797 106 Tel Fax: 03862247341 E mail: nrcmithun@mailcity.com
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