

Mithun Digest

The bi-annual panorama.....

National Research Centre on Mithun



INSTITUTIONAL ACTIVITIES

Independence Day Celebration

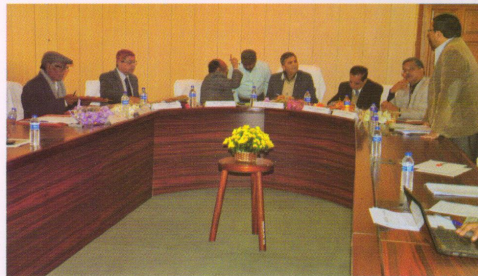
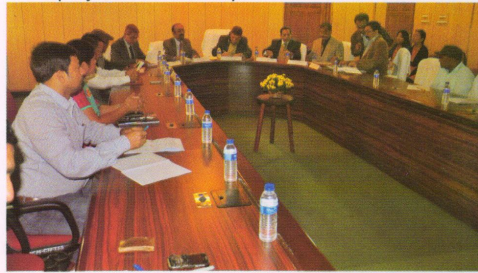
The Institute staff organized the celebration of the Independence Day of the nation on 15 August, 2013 in a befitting manner with a pledge to work for the benefit of the motherland. The Director unfurled the National Flag in the morning and encouraged all the Scientists and other staff to work with a purpose and remain ever vigilant for safeguarding the reputation of the Institute in particular and the nation in general. The children and family members in colourful attire also took part in different programmes organized for this occasion.



RAC Meeting

The 7th RAC Meeting was held on 11th December, 2013 under the Chairmanship of Dr. Arun Varma, Former DDG,

ICAR and was attended by Mr. Aru Khate, Progressive Farmer; 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; Dr. R. Zinyu, Ex. Director, Medical Govt. of Nagaland. Scientists presented the research achievements of different projects before the RAC followed by valuable discussions, which helped to refine these projects substantially.



IMC Meeting

The 19th IMC Meeting of the Institute was held in this Institute on 3 September, 2013 under the Chairmanship of Dr. C. Rajkhowa, Director and was attended by Dr. Rongsentemjen, Representative of Director, Dept of Vety & Animal Husbandry; Mr. Aru Khate, Progressive Farmer; Dr. Abdul Aziz, Faculty of Vety. Sciences,



Khanapara; Dr. Anubrata Das, former Director, NRC on Pig; Dr. K.K. Baruah, former Director, NRC on Yak; Dr. K.K. Baruah, Pr. Scientist, Dr. (Mrs.) Anupama Mukherjee, Sr. Scientist; Sh. S.P.S. Negi, AAO and Sh. Safal Chetri, AF&AO, NRC on Mithun. A number of important agenda regarding development of the Institute were discussed in the meeting.

राष्ट्रभाषा हिंदी सप्ताह का आयोजन एवं विभिन्न कार्यक्रम

राष्ट्रीय मिथुन अनुसंधान केन्द्र झरनापानी, मेडुजीफेमा, नागालैंड में दिनांक 10 सितम्बर से 16 सितम्बर 2013 तक किया गया। इस शुभ अवसर पर हिंदी सप्ताह का उद्घाटन समारोह डॉ. चंदन राजखोवा द्वारा दीप प्रज्वलित करके हिन्दी सप्ताह का शुभारम्भ 10 सितम्बर 2013 को सुबह 11 (ग्यारह) बजे संस्थान के सभा कक्ष में किया गया। इस समारोह में संस्थानों के सभी अधिकारी एवं कर्मचारीगण उपस्थित थे। इस सप्ताह के दौरान संस्थान में हिंदी भाषा के प्रचार एवं प्रसार के लिए विभिन्न प्रतियोगिताओं का आयोजन किया गया। जिसमें परिसर के बालक एवं बालिकाओं के लिए भी प्रतियोगिता का आयोजन किया गया। इन सभी प्रतियोगिताओं में न सिर्फ कर्मचारी अपितु अधिकारियों ने भी उत्साह पूर्वक हिस्सा लिया।

संस्थान में हिन्दी सप्ताह के दौरान आयोजित प्रतियोगितायें

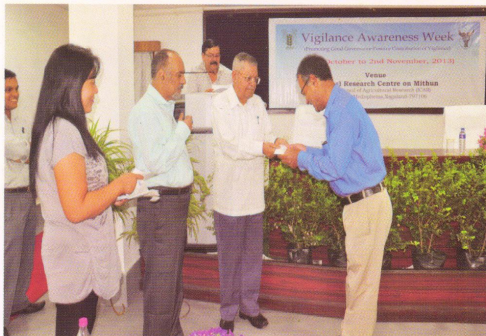
क्रम संख्या	प्रतियोगिता का नाम	आयोजन की तिथि
1.	तात्कालिक भाषण,	10. 9. 2013, 11. बजे सुबह
2.	पत्रलेखन, अंताक्षरी	13. 9. 2013, 3 बजे शाम सुबह
3.	निबंध लेखन	16.9.2013, 11 बजे सुबह
4.	पुरस्कार वितरण एवं समापन समारोह	16. 9. 2012- 3 बजे शाम

इस सप्ताह का समापन समारोह दिनांक 16 सितम्बर 2013 संस्थान के सम्मेलन कक्ष में निदेशक डॉ.चंदन राजखोवा ने उपस्थित सभी अधिकारियों एवं कर्मचारियों को राजभाषा प्रयोग की ओर विशेष रूप से प्रोत्साहित करते हुए कहा कि, हिन्दी सप्ताह के सभी कार्यक्रम हिन्दी को बढ़ावा देने के लिए आयोजित किये जाते हैं। इनसे हमें हिन्दी में अधिकाधिक कार्य करने की प्रेरणा मिलती है। हिन्दी हमारी राष्ट्रभाषा है, अतः हम सभी को राष्ट्रभाषा का सम्मान करना चाहिए और कार्यालय एवं दैनिक कार्यों में प्रयोग करना चाहिए। इस सप्ताह के समापन समारोह में विभिन्न प्रतियोगिताओं के विजेताओं को निदेशक द्वारा पुरस्कार प्रदान किया गया। अंत में हिन्दी सप्ताह के सफल आयोजन पर सभी को बधाई दी।

Vigilance Awareness Week

The Vigilance Awareness Week was observed at National Research on Mithun (ICAR), Jharnapani, Medziphema, and Nagaland from 28th October to 2nd November, 2013. 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. Chanadan Rajkhowa, Director, NRC on Mithun. This year the main focus of observing Vigilance Awareness week was “Promoting Good Governance- Positive Contribution of Vigilance”. The programme started with taking a pledge by all the staff followed by group discussion, essay writing competitions as well as 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 websites and providing information of status of applications to citizens/ public etc were also highlighted. Competitions on cartoon and story telling with moral values were 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 on 2nd November 2013 and prizes were distributed among the winners of different competitions.





Farm Innovators Day

The Institute celebrated Farm Innovators Day on 31 October , 2013. Mr. Yitachu, Parliamentary Secretary, Dept. of Vety & AH, Nagaland was the chief guest and Dr. Timothy, Director, Vety & AH Government of Nagaland, was the guest of honor. The programme started with lighting of lamp, followed by address by the dignitaries. An interaction programme held between the Scientists and farmers was fruitful regarding creating awareness of

scientific Mithun husbandry practices and various technologies developed by the Institute for the benefit of Mithun and Mithun farmers.



Institute Industry Day

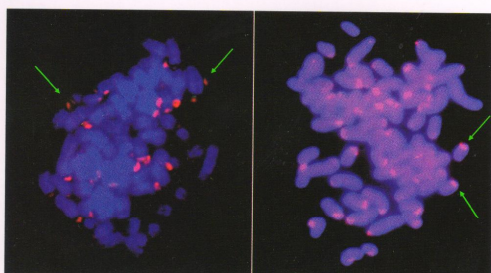
The Institute celebrated the Industry Day on 29 July, 2013 and was attended by Mr. N. Doulo, Co-ordinator, Entrepreneur Associates, Kohima, Nagaland and his team. A number of issues was discussed in this programme including interactions between the Scientists, KVK personnel and Entrepreneur Associates. The Entrepreneur Associates have started an important venture of mithun rearing in Thetsumi Village, Nagaland for profitable Endeavour.



RESEARCH HIGHLIGHTS

Application of Fluorescent *In-situ* Hybridization (FISH) to find out the unique features of Mithun Chromosomes

The unique feature on metaphase chromosomes of mithun, tho-tho cattle, mithun cattle crossbred and Gaur were studied using Fluorescent in situ hybridization technique. The location of centromere was confirmed in mithun, cattle and crossbred animals using pancentromeric probe for bovine. The rhodamine was used as a flurochrome for highlighting the signals. All the acrocentric chromosomes were showing centromeric signals in mithun as well as in crossbred, however there were no signals in submetacentric as well as sex chromosomes. In cattle all the autosomes were acrocentric and are having the signals at centromeric position.

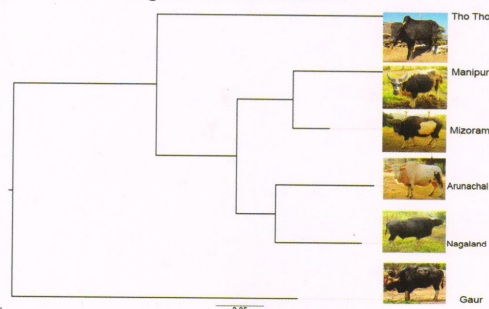


Mithun metaphase chromosome showing centromeric signals with rhodamine as a flurochrome in bovine probe

Microsatellite characterization

Cattle microsatellite markers were tested on Indian mithun and wild gaur and subsequently, genetic diversity of these species was investigated using 30 cattle-specific microsatellites. The analysis revealed some unique alleles with high allelic frequencies. Nineteen (63%) microsatellite markers successfully amplified the genomic DNA of mithun and wild gaur; where 15 (79%) of these loci were highly polymorphic in mithun and gaur, respectively with Polymorphic Information Content (PIC) greater than 0.50. Observed heterozygosity (Ho) and Nei's expected heterozygosity values (He) ranged from 0.15 to 0.94 and 0.31 to 0.89 in mithun and 0.01 to 0.99 and 0.36 to 0.83 in gaur. The average estimates of Ho, He and PIC across 19 microsatellite loci were 0.48, 0.66 and 0.63 in mithun, and 0.62, 0.71 and 0.61 in gaur, respectively. Intra-population inbreeding level (FIS) was

0.30 in mithun and 0.065 in gaur. The study provided valuable information on the present genetic status of mithun and gaur populations and also demonstrated that cattle microsatellite markers can be applied effectively on mithuns and wild gaur for studying their genetic diversity. Based on the microsatellite study, phylogenetic tree was prepared to show the genetic status of four mithun strains with wild gaur and Tho tho cattle:

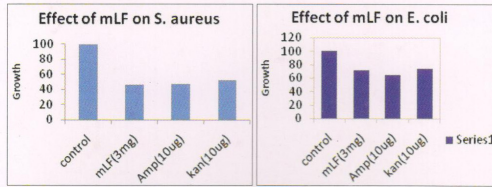


Antimicrobial effect of Mithun Lactoferrin (mLF) on different pathogenic bacteria

Pure cultures of *E. coli* BI21DE3 were swabbed over Luria Agar plates containing 0.6% Luria Agar and paper disks with different concentrations of Kanamycin, Ampicillin and mLF were placed followed by overnight incubation at 37°C for carrying out disc diffusion test. A smaller zone of inhibition was observed with mLF while a larger clear zone of inhibition was observed for Ampicillin and Kanamycin indicating. MIC was measure for mLF by broth dilution method against *E. coli* and *S. aureus*. MIC of mLF for *E. coli* and *S. aureus* was observed to be 3 and 3±0.5 mg/ml respectively. It was observed that mLF could reduce growth of *E. coli* by 30% and for *S. aureus* by 50% with respect to control. Mithun lactoferrin could inhibit the growth of *S. aureus* and *E. coli* by 53% and 28% respectively and was observed to be comparable to Ampicillin and Kannamycin.

Effect of mithun Lactoferrin and antibiotics on growth of *S. aureus* and *E. coli*

	<i>S. aureus</i>		<i>E. coli</i>	
	Growth (%)	Inhibition (%)	Growth (%)	Inhibition (%)
Control	100	Nil	100	Nil
mLF (3mg)	46.9	53.1	72	28
Amp (10ug)	47.9	52.1	65	35
Kan (10ug)	53	47	74	26



Effect of addition of cysteine hydrochloride and reduced glutathione on the liquid storage (5°C) of mithun semen

The effect of cysteine hydrochloride and reduced glutathione (GSH) on seminal parameters, antioxidant and biochemical profiles of mithun semen was assessed and found that inclusion of cysteine hydrochloride and reduced glutathione (GSH) into diluent resulted in significant ($p < 0.05$) decrease in percentages of dead spermatozoa, abnormal spermatozoa and acrosomal abnormalities at different hours of storage periods as compared with control group. Additionally, cysteine hydrochloride and GSH at 5 and 15 mM respectively, were inferior to cysteine hydrochloride and GSH 10 mM treatments as regards to these characteristics. Further, cysteine hydrochloride and GSH at 10 mM concentration has significant improvement in quality of mithun semen for *in-vitro* storage up to 30 h.

PERSONALIA Promotion/Joining/Training



• Dr. M.H. Khan, Sr. Scientist, (Anim. Reprod. & Gynaecology) – Joined on 29.07.2013.



• Dr. Nazrul Haque, P. S. (A. N.) visited University of Arkansas, USA availing DBT's Overseas Associateship for Northeastern Region from 1st May to 27 October, 2013. He worked with Prof. Walter Bottje of the Center of Excellence for Poultry Science on assessment of bioenergetics in hsp70 and ampktransfected as well as heat stressed quail myocytes.

VISITING DIGNITARIES

- Setong Sena, Ministry of Agri. Horti & AHU/DD - 20.7.13
- Anuradha Mitra, Joint Secy. & Financial Advisor, Dept. of Science & Tech, GOI - 28.07.13
- Dr. G.J. Samathanam, Advisor & Head CTD, DST, New Delhi - 28.07.13
- Avdesh Kavshik, Punjab State Council for Science & Technology, Chandigarh - 28.07.13
- S.K. Jain, PSCST, Chandigarh - 28.07.13
- Dr. M. Prithvi Raj, Exct. Secretary, KSCST, Bangalore - 28.07.13
- Dr. K.D. Kokate, DDG (Agri Ext), ICAR, New Delhi - 09.09.13

- Shri. Yitachu MLA, & Parliamentary Secy. Vety & A&H Govt. of Nagaland - 31.10.13
- Naba Kumar Das IAS (Retd) Chairperson Assam Electricity Regulatory Commission - 6.12.13



Minister, Dept. of Vety. & A.H., Arunachal Pradesh - 20.7.2013

MISCELLANY

Technology Injection programe under TSP - Arunachal Pradesh

A Technology Injection programe ws organized in Mani village, Papumpare district, Arunachal Pradesh on 23 september 2013 led by Dr.C. Rajkhowa, Director NRCM and a team of three Scientists - Dr Sabyasach Mukherjee, Dr M. Khan and Dr. Jayanta Chamuah. A health camp was also organized along with technology injection programe showcasing the various technology developed by the Institute.

Veterinary Medicines, salts, mineral mixture were distributed among the farmers. More than 70 farmers participated in the program including some self-help groups. The program was organized in collaboration with KVK, Papumpare district as well as mithun Farmers Club of the area.

Shri, Nabam Rebia, MLA of the area and Parliamentary secretary, Planning & Govt Spokesperson, Govt. Arunachal Pradesh graced the occasion as Chief Guest. He emphasized the importance of participation of different agencies for the development of poor tribal population through mithun based farming system, which in turn may help in preserving the ecosystem of forest area.





Dr. Taba Heli, I/C, KVK in his welcome address offered his sincere gratitude to NRCM for coming all the way from Nagaland to support the poor mithun rearers of Arunachal Pradesh.

Shri Yab Bola, Chairman and Tana Akin, Secretary, Mithun Farmers Club also spoke on the occasion and requested the NRCM to help them in preservation of this important species of animals.

Director, NRCM assured the farmers that some more programs under TSP will be taken up this year in Mani Village so that some direct benefits can be given to the mithun farmers. He also expressed his happiness for the wisdom of the farmers who have formed the community based organization for protecting and preserving mithun in Arunachal Pradesh.

Interface Meeting at Arunachal Pradesh

An interface meeting was held in Nirjuli, Arunachal Pradesh with the Dept of Vety. & A.H. on 23 September 2013. Dr. Tabam, Director, Vety & AH, along with other senior officials of the department participated in the meeting. Dr. Lama, Jt. Director, Dept. of Vety. & AH was nominated as Nodal Officer from the Department side for carrying out the development work for mithun in Arunachal Pradesh in collaboration with NRCM, Nagaland.

Dr. Sabyasachi Mukherjee, Sr Scientist informed the house that the level of inbreeding is found to be very high in the mithun population due to the fact that mithuns are reared traditionally under close system of mating, and to counter this effect, it was suggested that there should be bull exchange programme among the various communities rearing mithuns. For this purpose, awareness programmes will be taken up among the



farmers of these mithun rearing areas by State Govt, where NRCM will also support. NRCM has taken the responsibility for short term training of progressive mithun rearing in some essential mithun management techniques.



Technology Injection to Mithun Farmers from Manipur

Technology injection to mithun farmers from Manipur was organized at NRCM on 23rd Sept. '2013. A group of 36 mithun farmers from Ukhrul district under the banner of 'North- East Border Area Development Organization', an NGO from Manipur visited NRCM, Nagaland. In the beginning, Dr. Anupama Mukherjee has interacted with the farmers and discussed salient scientific achievements of NRCM. The farmers were shown a documentary video film on research achievements and overall view of NRCM. Scientists from NRCM had given deliberation on various topics and problems faced by mithun farmers. The

farmers were also given the exposure to the latest technology developed by NRCM Scientists. The queries of the farmers related to the problems and diseases of mithun were solved by health group of Scientists. Dr. Kobi Khate has shown various activities and operations performed at farm.



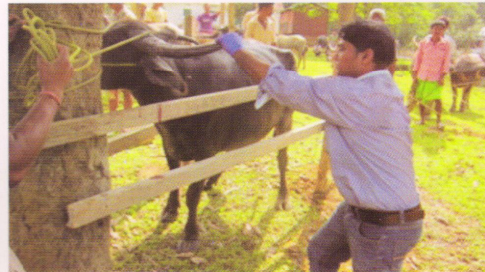
Farmer's Training and Mithun Health Camp, Mezoma, Nagaland

A Farmer's Training and Mithun Health Camp was conducted in Mezoma village, Nagaland on 30 September 2013 involving Dr Akhilesh Kumar, Dr Vidya Singh and Dr Kobi Khate. The programme was attended by 64 farmers, VFA of The Village and interaction between farmer and scientific team and farmers were held regarding modern Mithun husbandry techniques. Salt

and veterinary medicines were distributed to the mithun owners.

Farmer's Training and Mithun Health Camp, Maova, Nagaland

Another such programme was conducted in Maova village, Nagaland on 23 October 2013 involving Dr. Vidya Singh and Dr. Akhilesh Kumar and held a meeting with the farmers and village council chairman. All the animals brought were vaccinated against FMD, HS and BQ Diseases. The farmers were told about the benefit of regular deworming and vaccination of animals. They were also given leaflets, folders and other literatures regarding improved mithun husbandry practices.



Farmer's Training and Animal Health Camp, Pholami, Nagaland

Similar programme was conducted in Pholami village of Nagaland on 26 October 2013 involving Dr. Vidya Singh, Dr. Akhilesh Kumar, Dr. Debojyoti Borkotoky and Dr. Lekro who interacted with the farmers for training for 55 farmers and awareness on Mithun husbandry practices. Vaccination of animals and distribution of salt and veterinary medicines were carried out in this programme.



From the Director's Desk

It is my pleasure to present happily this volume of Mithun Digest for the period July to December 2013. Mithun Digests highlight different activities of the Institute and contain valuable information on scientific Mithun husbandry. This is the reason this document has become quite popular among those who are engaged with Mithuns in different capacity either with rearing or research activities. I must congratulate the editor for his efforts in this endeavour.

During this period, the Scientists of this Institute generated some useful information in regard to various aspects of Mithun husbandry. Studies involving FISH of Mithun chromosomes to identify specific chromosomes and microsatellite characterization of mithuns are significant achievements. Work on mithuns lactoferrin protein having anti-microbial activity is noteworthy.

Our Institute showcased the technologies developed for the benefits of field veterinarians, Mithun farmers and others concerned during various training programmes and Technology Injection Programmes organized by this Institute. These activities have helped us to reach to the stakeholders for transmitting the technologies developed.

Apart from research and extension programme, this Institute has




different staff-welfare activities where family members also participate enthusiastically. Celebration of Nationally important days and taking part in cultural programmes are the ways of life for breaking the daily monotony.

We have received very good responses from different quarters and a number of high-profile dignitaries visited this Institute to show their keen interests and the developmental work undertaken for

the benefits of tribal Mithun owners. Our Institute also organized important meetings like RAC, IMC and number of training programmes for biotechnology students, mithun farmers, field veterinarians and celebrated few important events like Hindi Week, Vigilance Week and Farm Innovator's Day to enthuse the spirit of nationalism and transparency in every sphere of life.

It is our solemn mission to spread awareness among the Mithun owners about scientific animal husbandry practices and at the same time, keeping their traditional Mithun rearing system to continue.

Last but not the least, I pray to the Almighty to shower His blessings and give us wisdom and strength to devote ourselves in a positive way for the betterment of magnificent Mithuns.


(C. Rajkhowa)
Director

The editorial escapade



The world is about to be one more year older now with the clock ticking past the last day of December 2013 and we here in this Mithun country are busy in compiling the best of the information on mithuns as well as snippets in science all over!

While the FISH study discovers its first prominent fluorescent signals from mithun chromosomes in our lab, American scientists develop a method of "switching off" the extra chromosome that causes Down's syndrome (Trisomy 21) potentially offering an entirely new treatment for the condition. Microsatellite characterization of mithuns is completed now with the establishment of four distinct strains of mithuns and their genetic relationship with gaurs and Thotho cattle.

India launches its first Mars probe, Mangalyaan on 3 November 2013 and Geneticist Bryan Sykes and his team at Oxford University seems to solve a age-old mystery of Yeti (or "Abominable Snowman") with report that DNA analysis of presumed samples of Yeti may have come from a hybrid species of bear (cross between a brown bear and a polar bear)!

While the world's first hamburger made entirely of lab-grown in-vitro meat was being eaten in London in 5 August 2013, a breakthrough in tissue engineering has allowed scientists to 'grow' the first true cartilage in one lab and grown functional livers from stem cells and successfully transplanted them into mice – a very important break-through in regenerative medicine in another.

The world has become poorer with the loss of some of its greatest scientists.

We pay our respectful homage to them viz. Frederick Sanger (1918-2013), British biochemist and Nobel laureate in Chemistry; Douglas Engelbart, (1925-2013), American scientist-inventor of the computer mouse and Shakuntala Devi, (1929-2013), our very own mathematics genius.

With our Institute has drafted the final XII EFC plan document for presentation and approval from HQ, new programmes like WGS of mithuns, mithun based integrated farming system and the lone flagship programme for mithun conservation and ONBS scheme are in focus now. We are in constant touch with the stakeholders of Mithuns – the Mithun owners, farmers, and Directors and other officials from Veterinary and A. H. Dept of four North East States to carry out these new initiatives of XII Plan.

The scientists are busy in both their research work as well as various technology injection programmes in the mithun rearing states to bring awareness of scientific mithun husbandry into practice. Looking at the vast and inaccessible terrains, these tasks are quite challenging considering the meager resources and other social conditions. However, we are carrying out all these responsibilities with great enthusiasm to do something tangible for these meek mithuns as well as their owners to bring some socio-economic benefits in their otherwise mundane life. This has become almost our motto now to work for their potential benefits.

Finally, keeps on drinking coffee as a study by Harvard School of Public Health researchers reported that drinking several cups of coffee daily appears to reduce the risk of suicide in men and women by about 50%!



Publisher : Dr. C. Rajkhowa, Director, NRC on Mithun, Medziphema, Nagaland
Editor : Dr. Sabyasachi Mukherjee, Sr. Scientist & I/C PME Cell
Tel Fax : (03862) 247341 e-mail: nrcmithun@mailcity.com, Web : www.nrcmithun.res.in

