MITHUN DIGEST
मिथुन डाइजेस्ट

Vol. 14 No. 1 | ICAR – NATIONAL RESEARCH CENTRE ON MITHUN | JANUARY-JUNE 2017

ISO 9001:2015 Certified ICAR Institution

The bi-annual panorama.....

29th Foundation Day of ICAR-NRC on Mithun on 2nd June, 2017

Director's Desk

On 2nd June 2017, while celebrating the 29th Foundation Day of the Institute, we reiterated our commitment of making Mithun Farming as a sustainable component of the agro-economic practices of the tribal communities of NEH region. However, for exploiting the full potential of this unique animal species, there is an urgent need to deliberate on emerging issues such as rearing system of mithun, bankability of mithun framing including the insurance and designating the mithun as a food animal.

Developing meaningful linkages and effective liaisoning with the stakeholders, implementing agencies, line departments, financial institutions are also the need of the hour. We organized stakeholders workshops in Nagaland and Arunachal Pradesh involving the veterinarians, extension personnel, ATMAs, NABARD, and progressive farmers. On 18th March 2017, we also organized a one day brainstorming workshop on "*Rearing mithun under free-range system: challenges and way forward*". The deliberations made in these workshops will be instrumental in developing future strategies.

Under the Tribal sub-plan (TSP), we organized Mithun *Melas*-cum-Awareness Programmes in Arunachal Pradesh, Manipur, Mizoram, and Nagaland. We launched a bull exchange/ distribution program in order to prevent the inbreeding in the local population. Through the different programs under TSP, more than 650 framers got direct benefits. Besides the mandated activities, KVK-Phek, Porba, the only KVK of this Insitute, also conducted 44 training programs benefiting 1074 participants.

Developing skills and motivating the staffs and faculties of the Institute is also very important. A one

In this issue

Director's Column	1
Research Highlights	2
Extension Activities	4
Krishi Vigyan Kendra-PHEK	9
Major Events Organized	11
Programme Participated	12
Institutional Activities	12
Skill Development Programmes	14
Publications	15
Personalia	15
Visiting Dignitaries	16

day workshop on "*Motivation, Organisational Behaviour and Team Building*" was organized under HRD activity.

The Institute is committed to the overall development of mithun and making mithun farming a profitable venture towards doubling the farmer's income by 2022. Our commitments get further vindicated with the visit of several dignitaries during the period.

I hope the information given in this News Letter will be useful to the stakeholders.

Jai Hind!

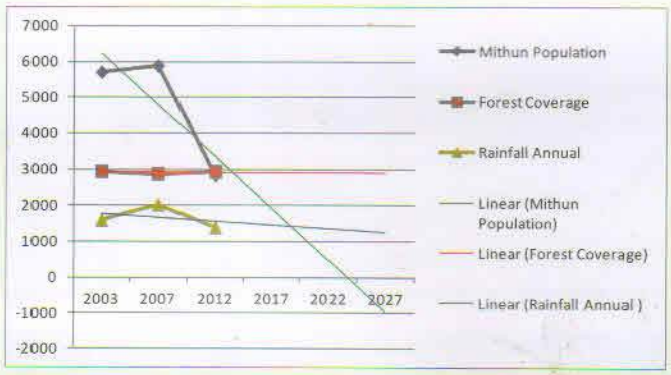
(Abhijit Mitra)

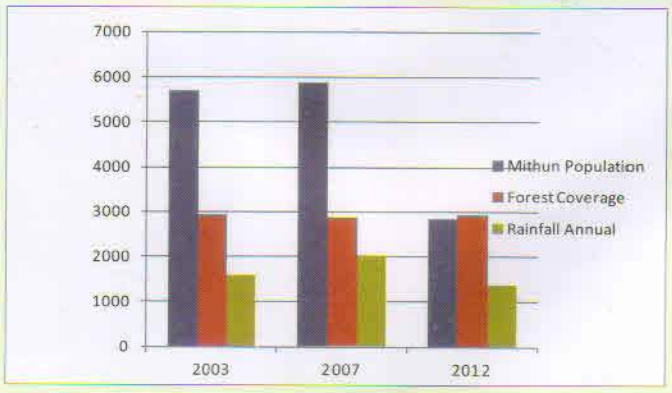
RESEARCH HIGHLIGHTS

Animal Genetics and Breeding

Population trend of mithun with corresponding forest coverage and climatic factors in mithun rearing districts of Nagaland

Under the National Mission for Sustaining the Himalayan Ecosystem (NMSHE), a component of the National Action Plan on Climate Change (NAPCC), the impact of climatic factors *vis-a-vis* forest coverage on population trend of mithun in major mithun breeding tracts of Nagaland (Kohima, Phek, and Tuensung) was studied. A drastic reduction in the mithun population was observed (5689 in 2003 vs. 2826 in 2012) along with an equally high reduction in annual rainfall (1577.3 mm in 2003 to 1370 mm in 2012). Though there was no change in the forest coverage, a decrease in average humidity over the past decade was recorded.





In Tuensang district, mithun population decreased (9693 in 2003 vs. 7355 in 2012) coupled with a gradual decline in forest cover and annual rainfall (1458 mm vs. 1432 mm) with a marginal increase in the ambient temperature. Interestingly, however, Phek district witnessed a gradual increase in the mithun population (4416 mithuns in 2003 vs. 5732 in 2012) coupled with increased forest area (1611 sq. km in 2003 vs. 1767 sq km in 2012); there was a minor reduction in average annual rainfall (1529 mm in 2003 vs. 1421 mm in 2012).

Animal Nutrition

Storage of wet cake in polyvinyl chloride (PVC) drums

An experiment was carried out to evaluate the feasibility of using polyvinyl chloride (PVC) drums for storing wet cake. The results of the study demonstrated that wet cake can be stored in PVC drum under the airtight condition as long as 50 days without any apparent change in color. The bacterial load in the wet cake stored in airtight PVC drum (3.0×10^7 CFU g^{-1}) was significantly ($P<0.05$) lower than those stored otherwise (1.0×10^8 CFU g^{-1}).

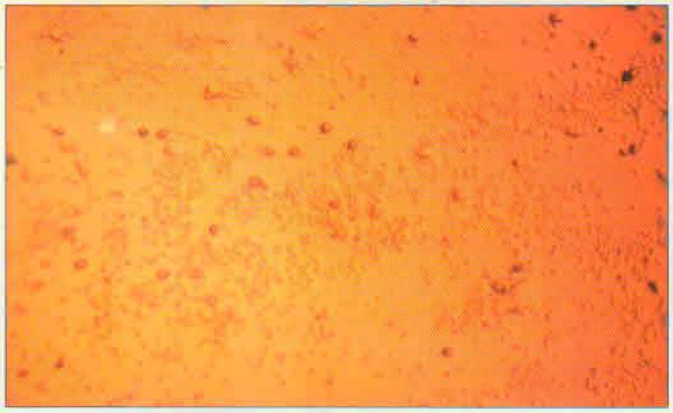
Wet cake after 50 days of preservation in polyvinyl chloride (PVC) drums: Golden colour indicating the absence of spoilage when stored in fully filled and tightly closed lid (right) and black colour indicating spoilage when stored otherwise (left).

Animal Reproduction

Arborisation pattern of cervical mucus in mithun

Cervical mucus, a viscoelastic secretion of constantly secreting mucus-producing cells of the endo-cervix, acts as a mechanical barrier to prevent intruding organisms. The properties of the cervical mucus vary with the estrogen: progesterone ratio during the reproductive cycle. Cervical secretion becomes more copious and watery during the estrogen dominating phase of the ovarian cycle while the viscosity of mucus increases under high progesterone concentration. Further, the degree of crystallization/ arborization pattern in cervical mucus is also influenced by the relative concentration of the ovarian hormones, estrogen, and progesterone. Under the influence of estrogen, crystallization progresses whereas progesterone diminishes the formation of arborization. Thus arborization pattern of the cervical mucus serves as a useful tool in determining the stages of estrus, predicting the onset of estrus, and ovulation time in bovines. The present investigation was carried out to study the physicochemical properties of cervical mucus in mithun heifers.

Cervical mucus of mithun heifers (n= 6) was collected through per-rectal massage of the cervix. Two to three drops of mucus were placed over a clean, grease-free glass slide and spread evenly with the help of another slide. The slide was air dried. On examination of the slide with naked eyes against a black background, a clear crystal-like pattern of dried mucus was observed. When these slides were examined under a phase-contrast microscope (40X) different patterns were observed depending upon the stage of the estrous cycle.



Smears of cervical mucus were examined under naked eyes and a phase-contrast microscope (40X). A typical fern pattern indicating the estrous phase was observed under naked eyes (A) and microscope (B). Lack of arborization pattern indicating the absence of estrous (C).

Livestock Production Management

Mithun is primarily reared as a meat animal. Genetic improvement of mithun for better growth performance is one of the thrust areas. In order to evaluate the economic traits influencing growth, a project has been initiated. Under this project body weight of the animals are being recorded at regular interval, to validate the first-hand information on the growth performance of mithun *(Bos frontalis)*.

Livestock Product Technology

An experiment was conducted to study the basic parameters of mithun carcass. Mithuns were slaughtered in the modern abattoir at Dimapur. Dressing percentage and hide weight was 54.34±0.79% and 19.4±1.18 kg, respectively. Blood yield was recorded as 2.95% of the body weight. The color of the meat was red to dark red and consistency of the meat was fairly firm. Fat was yellowish in color and firm in consistency.

There was moderate to abundant presence of intramuscular fat.

Quartering of mithun carcass

Evisceration of mithun carcass

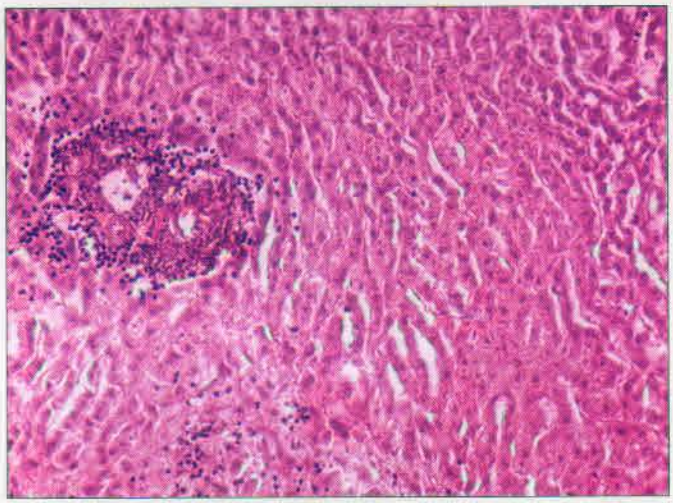
Further, considering the fact that only a small percentage of the meat produced is converted into value-added products and in order to develop mithun meat as a profitable venture, some value-added mithun meat products namely patties, meat ball, nuggets were developed. These value-added products would improve economics, extend shelf-life, and encourage entrepreneurship.

Animal Health

Molecular characterization and pathological studies of *Fasciola gigantica* infection in mithun (*Bos frontalis*)

Molecular identification of *Fasciola gigantica* was carried out using ITS-1 and mitochondrial enzyme Cox 1. Nucleotide sequence analysis and morphological studies confirmed the fasciola species imfecting mithun and cattle as *F. gigantica*. Histopathological alteration in *Fasciola* infestation was also studied. Out of 110 animals examined, liver specimens of eight animals were fasciola infested. Histopathological examination of the infested specimens showed extensive fibrous connective tissue proliferation with necrosis of hepatocytes with infiltration of the polymorphonuclear cell. There was evidence of migratory tract of parasites with loss of normal lobular hepatic architecture. Bile duct proliferation was followed by congestion of portal vein with perivascular cuffing with surrounding degeneration of hepatocytes was evident. The hepatocytes showed pyknosis with hyperplasia of bile duct also noticed.

Parasitic tract of the parasite with fibrous proliferation is observed in the liver parenchyma. Bile duct proliferation with infiltration of inflammatory cells. The lobular hepatic architecture of the organ is lost due to heavy infestation.10x. H&E.



Congestion of portal vein with perivascular cuffing with surrounding degeneration in the cytoplasm of hepatocytes. Mild focal inflammatory cell aggregation in between the hepatocytes in the hepatic parenchyma 20X H&E

EXTENSION ACTIVITIES

Mithun Mela

Arunachal Pradesh

Mithun, since time immemorial, is not only a part of all social events and ceremonies but also serves as a source of livelihood and insurance in case of financial emergencies. In order to provide a common platform of knowledge-sharing among mithun farmers, Scientists and Extension functionaries towards creating mass awareness and ensuring the effective service delivery support to farmers at their doorsteps, the Institute organized mithun *mela* in the mithun rearing states.

Mani village, Itanagar: In collaboration with Arunachal Mithun and Yak Conservation Mission, a two-day technology outreach programme *cum*-mithun *mela* was organized at Mani village, Papum Pare district, Arunachal Pradesh. The programme was inaugurated by Dr. Mohesh Chai, Minister for Animal Husbandry, Veterinary & Dairy Development in the presence of a huge crowd including farmers, Scientists, and State Veterinarians. A total of 210 farmers got benefitted through the awareness and Kisan Gosthi programme conducted during Mithun Mela. A total of 57 mithuns from Chiputa, Midpu and Mani villages were brought for a health check-up and were vaccinated against Foot & Mouth disease (FMD) and Black Quarter (BQ) diseases. In order to address the ownership conflicts, the microchip-based identification method was demonstrated and mithun identity was issued to the mithun owners. The various agencies showcased their technologies and package of practices. During the glittering valedictory function, prizes were distributed to the mithun owners in various categories of mithun competition.

Miren village, Pasighat: A mithun *mela*-cum Animal Health camp was held at Miren village of West Siang District, Arunachal Pradesh on 24th March 2017 in collaboration with Dept. of Animal Husbandry, Veterinary & Dairy Development, Govt. of Arunachal Pradesh. The programme was inaugurated by Er. Tatung Jamoh, Parliamentary Secretary for Agriculture and Fishery, Govt. of Arunachal Pradesh. Prof. Premjit Singh, Vice Chancellor, Central Agriculture University, Imphal graced the programme as Guest of Honour. The primary objective was to create an awareness about the scientific mithun rearing especially semi-intensive rearing system. The farmers were apprised about the role of mithun farming in doubling the income. A total of 360 farmers attended the

Dr. Mohesh Chai, Minister for Animal Husbandry, Veterinary & Dairy Development addressing the inaugural programme of Mithun Mela at Itanagar

Farmer-Scientists interaction during Mithun Mela at Itanager

Vaccination and microchip insertion in mithun during Mithun Mela at Itanagar

Some mithun in front of Mela stage

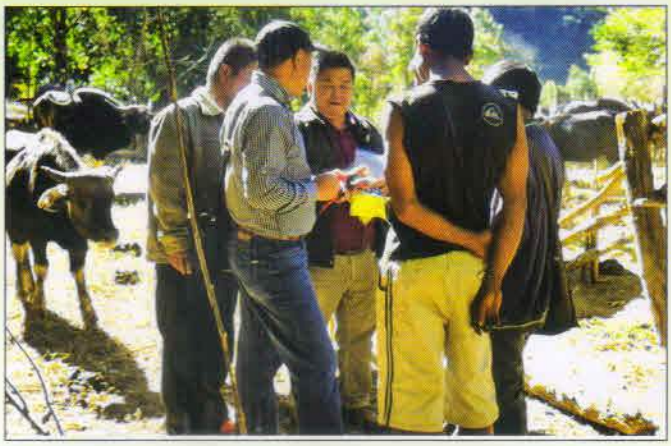
programme. Mithun owners from nearby villages brought their animals for a health check-up and got their animals vaccinated and ear tagged. Ear tagging based identification of mithun was demonstrated to address the ownership disputes among the mithun farmers.

Er. Tatung Jamoh, Parliamentary Secretary for Agriculture & Fishery, Govt. of Arunachal Pradesh and Prof. Premjit Singh, VC, CAU, Imphal during inauguration of Mithun Mela at Miren village, Pasighat, AP.

Mizoram

Mithun though occupies an important place in the Mizo society, conserving and increasing mithun population in Mizoram is a challenge as it has the lowest population of mithun among the North Eastern states. Mithun Mela cum Farmers' Awareness programme was organized in collaboration with the Department of Veterinary and Animal Husbandry, Government of Mizoram on January 24th at Khuangleng village, Champhai district. The programme was formally inaugurated by the Chief Guest Mr. Pachhunga, SDO (C), Champai district, in the presence of Dr. L. Pudiate, DVO, Champhai District, Officials and technical staff from KVK, Khawzawl, Champhai and ATMA officials from Champhai. Ear tagging of mithun was demonstrated. A farmer-scientist

Inaugural programme of Mithun Mela at Khuangleng village



Vaccination of mithun and distribution of veterinary medicines

interaction was also organized where the problems of the farmers were addressed. More than 200 farmers from Khuangleng and nearby villages participated in the Mela.

Nagaland

In order to encourage the mithun farmers, one day Mithun Mela cum Regional Livestock show was organized at Saptiqa village, Zunheboto district, Nagaland in collaboration with the Dept. of Vety and Animal Husbandry, Govt. of Nagaland on 16th March 2017. Parliamentary Secretary for Animal Husbandry & Veterinary Services, Shri S Chuba Longkumer lauded the initiative of ICAR-NRC on Mithun. He stressed that adoption of scientific rearing of mithun would help to meet the shortfall in meat production in Nagaland by 2025. Dr. Abhijit Mitra, Director, ICAR- NRC on Mithun informed the farmers that mithun is being blamed falsely as a destroyer of forests and it is a myth. He stressed that rather mithun helps the forest to grow better. He encouraged the people of Saptiqa area to rear more mithuns and gain maximum benefit from it. More than 70 farmers participated in the programme. Technologies developed by NRC on Mithun were also showcased during the programme.

Inauguration of Mithun Mela *cum* Regional Livestock Show by Shri S. Chuba, Parliamentary Secretary, Department of Veterinary & Animal Husbandary, Govt. of Nagaland

Nagaland Government officials at Mithun Mela

Farmers gathering at Mithun Mela

Mithun judging competition during Mithun Mela at Septiqa, Zunheboto district, Nagaland

Awareness Programme on scientific Mithun Rearing in Manipur

An awareness programme to encourage the scientific rearing of mithun was conducted at Yangkhullen village on 8th June 2017. It is one of the remotest villages in Manipur state, located 87 km away from its district headquarters Senapati, Manipur. The village has more than 300 mithuns reared under free-range forest ecosystem. Apart from paddy cultivation, mithun husbandry is one of the major sources livelihood. In order to address the ownership disputes among the mithun farmers, the farmers were demonstrated with the technology of animal identification and the animals were vaccinated against FMD, BQ and HS.

More than 200 mithun farmers were participated in the programme and were appraised on the importance of adopting scientific mithun rearing and diversified use of mithun as a source of milk, draught and leather products besides meat. Under Tribal Sub-Plan inputs including barbed wire, CGI sheet, Gumboot, rain coats, and veterinary medicines were distributed to the farmers.

Development of Semi-Intensive Mithun Rearing Model

In order to popularize the semi-intensive Mithun rearing, the inputs were distributed to the village Secretary and Chairman of Tobu village, Mon district on 15.06.2017 at ICAR-NRC on Mithun. Raw materials like CGI sheets, Cement and bricks were given for making Mithun shelter, manger and water trough. Barbed wire was also provided for

fencing the grazing area. Gumboots and rain coats were also distributed under TSP.

Distribution of Breeding Bull under TSP

In order to reduce the inbreeding under field condition, a total of 04 breeding bulls (age between 2- 3 years) raised at Institute Mithun Farm, Medziphema were distributed in Tenning, Mezoma and Khonoma village in Nagaland and Ayeng village in East Siang district of Arunachal Pradesh. 219 mithun farmers were benefited by this programme.

Poultry Chick Distribution Programme

Under TSP programme 6500 poultry chicks were distributed in Hazadisha, Disaguphu, Monglumukh, Medziphema and Tsuuma villages of Dimapur, Khonoma and Zzulekema villages in Kohima district and Porba village in Phek district of Nagaland benefiting 188 farmers. Farmers were also trained about scientific rearing of poultry birds in order to improve their livelihood and income generation.

Mithun Health Camp/ Awareness Programme/Input Distribution Programme

Sl. No	Name of the programme	Village/ District/State	Date	No. of beneficiaries
1.	Distribution of mithun bull	Tening village, Peren District, Nagaland	5.04. 2017	40
2.	Distribution of mithun bull	Mezoma village, Kohima District, Nagaland	10.04.2017	50
3.	Distribution of mithun bull	Khonoma village, Kohima District, Nagaland	10.04.2017	69
4.	Distribution of mithun bull	Ayeng village, East Siang District, Arunachal Pradesh	25.04.2017	80
5.	Poultry chicks distribution programme 1200 chicks were distributed in 20 beneficiaries	Disaguphu village, Dimapur, Nagaland	03.06.2017	20
6.	Awareness programme for scientific rearing of mithun	Yangkhullen village, Senapati, Manipur	08.06.2017	200
7.	Input distribution programme under TSP	Tobu village, Mon District, Nagaland	15.06.2017	38
8.	Distribution of poultry birds under TSP:	Medziphema village, Dimapur District, Nagaland	02.06.2017	20
9.	Distribution of poultry birds under TSP	Khonoma village, Kohima District, Nagaland	05.06.2017	48
10.	Distribution of poultry birds under TSP	Dzulekema village, Kohima District, Nagaland	06.06.2017	20
11.	Distribution of poultry birds under TSP	Tsuuma village, Diampur District, Nagaland	12.06.2017	20
12	Distribution of poultry birds under TSP	Porba village, Phek District, Nagaland	23.06.2017	60
Total beneficiaries				665

KRISHI VIGYAN KENDRA-PHEK

The mandatory activities of the Krishi Vigyan Kendra include imparting training, conducting on-farm trials, demonstrating proven technologies of agriculture and allied sector and organizing various extension activities for the farmers, rural youth and extension personnel of the district. During the period from January to June 2017, a total of 44 numbers of training programmes were conducted benefiting 1074 participants, of which 448 were male and 626 were female in the district. Under horticulture, trainings were mostly imparted on propagation techniques in fruit crops, scientific cultivation of onion and nursery raising technique. In soil science division the emphasis was given on management of problematic soil, soil fertility management and techniques of low cost vermicomposting. In the field of agronomy, trainings were mostly conducted on SRI technology and integrated farming system. Trainings under plant protection were conducted in disease management in large cardamom, insect pest management in paddy, etc. Under animal science division, trainings were imparted mostly on scientific duck farming, rabbitry, backyard poultry production and prevention of common poultry diseases.

Capacity building of rural youth through vocational training programmes was also undertaken during the period. Two numbers of vocational training programmes were imparted on "the Scientific management of goat for production optimization" and "entrepreneurial opportunities in pig and poultry farming". Each training programme was of four days duration benefiting 38 rural youths.

A farmer oriented programme initiated by GOI 'Mera Gaon Mera Gaurav' under which Phugi village under Sekruzu block has been adopted to take up various developmental activities in agriculture and allied sector. Altogether, seven numbers of training programmes were organized in the area of soil fertility management, management of problematic soil, protected cultivation technology, insect pest management in vegetables, etc. benefiting 178 farmers.

Among extension activities, two field-days were conducted benefiting 24 number of participants, 28 diagnostic visits and 32 scientist visit to farmers field were carried out in different villages. Eight method demonstrations were conducted with participants of 160 numbers. 22 numbers of mobile advisory service through SMS was sent to 245 farmers. Three vaccination camps were organized in different villages of the district benefiting 155 farmers. A total of 1933 poultry birds were vaccinated during the camps. Important days were celebrated in the Institute during the reporting period i.e. National Science Day, National Youth Day, World Environment Day. Two exhibitions were also organized in Northeast Network, Chizami and Yisisotha Village, Meluri subdivision. During the reporting period, 1 research article, 3 popular article were published.

On-Farm Trial (OFT) and Front Line Demonstration (FLD) Programmes

On farm trial on Assessment of vermicompost and biofertilizer in cabbage and ginger rhizome treatment with biofertilizer is being carried out at Porba and Kami village.

Vermicomposting units at ICAR-NRC on Mithun, Medziphema Farm with two species *Jai Gopal (Perionyx ceylanesis) and Eisenia fetida*

Soil Health Camp organized for students at Porba

On farm trial on Performance of Lentil

National Youth Day celebrated at Lekromi village

On farm trial on Performance of Soybean

Front line demonstration on cut worm management in cabbage using *Derris indica* extract

Harvesting on Onion by women SHG of Porba village

On farm trial on Performance of bitter gourd var. Pusa Aushadhi at Gidemi village

Front line demonstration on Popularization of Soviet Chinchilla Rabbit under backyard farming system

Front line demonstration on Popularization of Srinidhi birds under backyard farming system

MAJOR EVENTS ORGANIZED

Stakeholders Meeting in Arunachal Pradesh

An interface meeting with the Field Veterinarians, Govt. of Arunachal Pradesh was organized at Mani village, Doimukh, Arunachal Pradesh. More than 200 field veterinarians, KVK officials, Officers from State Veterinary, Animal Husbandry and Dairy Development, and progressive mithun farmers participated in the meeting. The Scientists of NRC on Mithun extensively covered the issues of nutritional deficiency and suggested for their remedial measures for enhancing the productivity. The participants were apprised about the need for rotation of breeding bulls to avoid inbreeding. The common diseases of mithun along with vaccination calendar were also discussed. An emphasis was given for mithun conservation through Community Mithun Conservation approach making a cluster of 3-5 villages covering at least 500-800 mithuns in different mithun rearing pockets with the provision of maintenance funds for the follow up programme.

Stakeholders' meeting at Mani village, Itanager

Scientist from ICAR-NRC on Mithun interacting with the Field Veterinarians, Govt. of Arunachal Pradesh during the meeting.

Meeting with Officials, Dept. of Vety. and Animal Husbandry, Nagaland

The senior Veterinary officers from all the districts of Nagaland participated in the programme. The interface meeting was graced by Mr. Mero, Commissioner & Secretary, Department of Animal Husbandry & Veterinary, Govt. of Nagaland. After a thorough deliberation, a road map was prepared for increasing mithun population in the state. It was decided that adoption of scientific mithun husbandry and adopting the semi-intensive model and introduction of commercial mithun farming involving educated youth for organic meat production would be a profitable and remunerative enterprise.

Meeting with the State Veterinary Officers of Govt. of Nagaland

Interface Meeting with ATMA Officials, Nagaland on Potentials of Mithun Husbandry for Livelihood Improvement

An Interface meeting with the officials of the Agriculture Technology Management Agency (ATMA) was held on 9th March 2017 at ICAR, NRC on Mithun. The theme of the Interface Meeting was "Potentials of Mithun Husbandry for Livelihood Improvement". Shri Imkonglemba Ao, Agriculture Production Commissioner, Govt. of Nagaland graced the occasion as the Chief Guest. The ATMA officials were apprised with the technologies developed by ICAR-NRC on Mithun. During the event, an interaction between the Scientists of NRCM and ATMA officials was held to discuss the issues related to mithun genetic resources, rearing system, nutritional requirements, and reproductive management. *Jhooming* is the

Shri Imkonglemba Ao, Agriculture Production Commissioner, Govt. of Nagaland as Chief Guest during inaugural programme

Meeting with ATMA Officials of Nagaland

traditional way of agriculture in Nagaland. Therefore, it was emphasized to integrate mithun farming with *Jhoom* cycle.

Brainstorming Workshop on Mithun Rearing

A one day brainstorming workshop on "Rearing mithun under free-range system: challenges and way forward" was organized on 18th March 2017 at ICAR-NRC on Mithun. It was attended by Dr. B.P Bhatt, Director, ICAR-RCER Patna, Dr. P. K. Ghosh, Director, ICAR-IGFRI, Jhansi, Dr. A Arunachalam, Principal Scientist & Scientific Officer to the Secretary DARE & DG, ICAR, Director and Joint Director, Dept. of Vety and Animal Husbandry, Govt. of Nagaland, Officials from Govt. of Arunachal Pradesh, Official from KVK, Dept. of Forest/ NGOs and progressive mithun farmers from Arunachal Pradesh and Nagaland. Nutritional security of mithun and loss of superior germplasm were the main agenda for the discussion. The workshop recommended that efforts need to be taken by ICAR-NRC on Mithun as well as to State Govt. to

Brainstorming Workshop at ICAR-NRC on Mithun

make sure the availability of feed and fodder throughout the year and steps to be taken for conservation and propagation of mithun. Some measures were also suggested by the expert members like the introduction of *Pennicum maximum* (Guinea Grass) and *Pennisetum* spp (Dinanath Grass) on trial basis and to conduct awareness camps in collaboration with the forest department. Using GIS mapping, identification of rich pockets of mithun in all mithun rearing states may be carried out in collaboration with NASTEC.

PROGRAMME PARTICIPATED

Participation in Agri-Fair NEH at Barapani

Scientists from ICAR-NRC on Mithun participated in Agri-Fair NEH held at ICAR Research Complex, Barapani, Meghalaya from 25-27th Feb. 2017 and showcased the technologies developed by the Institute. Products prepared from mithun meat were also displayed and sold during the Fair.

Dr. Trilochan Mohapatra, Secretary, DARE and DG, ICAR visiting NRC Mithun stall during Agri Fair, NEH at Barapani, Meghalaya

Participation in Krishi Unnati Mela at New Delhi

A team comprised of Scientist, Research Associates and Technical Officers participated in Krishi Unnati Mela held at New Delhi from 15-17th March 2017. Technologies developed by the Institute were showcased and displayed.

Institute stall exhibiting the technologies and products during Krishi Unnati Mela at New Delhi

INSTITUTIONAL ACTIVITIES

INTERNATIONAL YOGA DAY

The International Yoga Day was celebrated on 21st June, 2017 at NRC on Mithun by organizing a Yoga camp at NRCM campus at 9.00 AM for the office staff and families.

Republic Day Celebration

The 70th Republic Day was celebrated in the Institute on 26th January 2017 in a befitting manner with a pledge to work for the benefit of the motherland. Dr. Abhijit Mitra, Director, ICAR-NRC on Mithun unfurled the tricolor in the morning with the singing of the National Anthem. The Director encouraged all the staffs to work with a purpose and remain ever vigilant for safeguarding the reputation of the Institute in particular and nation in general. The children and family members also took an active part in the celebration.

The 10th RAC Meeting of ICAR-NRC on Mithun was held on 2nd May, 2017.

At the Meeting Director, ICAR-NRCM Dr. Abhijit Mitra presented a brief account of the Institute during the last one year. Dr. Dharmeswar Das, Chairman RAC, appreciated the efforts made by the Institute and emphasized the need of prioritization of the research areas. He further urged to take up the research projects to delineate the uniqueness of Mithun. The committee members visited the Mithun Farm at Medziphema and took an account of the farm activities. The meeting was attended by RAC chairman Dr. Dharmeswar Das, Dr. R. S. Gandhi, ADG (AP & B), ICAR, New Delhi, Dr. Kusumakar Sharma, former ADG, Dr. K. K. Baruah, Ex-director, NRC on Yak, Dr. A. Chakravarty, Director Research, C. V. Sc, Khanapara, IMC member Jaangsillung Gonmei, IMC member Lachit Kachari and all the scientists of the Institute.

29th Foundation Day of ICAR-NRC on Mithun celebrated on 2nd June 2017

In the inaugural session, Shri Yatachu Fithu, Minister of School Education & SCERT, Govt. of Nagaland, who was the Chief Guest of the Foundation Day Meeting, He lauded the Centrer for its efforts and said that the NRCM gained wide recognition. He wanted the NRCM not to focus on giving incentives but to be a centre of providing information and helping farmers to grow on their own. Then the purpose of this Institute will last. Dr. Chandan Rajkhowa, former director of ICAR-NRC on Mithun, Guest of Honor of the Foundation Day Meeting said that mithun has tremendous potential to transform the lives of the tribal population in the NE region. He expressed satisfaction at the progress made by the Institute in past years and gave credit to the staff who works with sincerity and zeal. Dr. Abhijit Mitra, Director ICAR-NRC on Mithun informed that the Institute was working towards a bankable scheme for mithun rearing in Nagaland, by keeping in touch with NABARD. He further said that mithun rearing has ecotourism potentials as well. He also informed that the Institute was in touch with the airport authority to install a mithun statue at the arrival entrance of Dimapur airport. A MoU for this has already been signed.

IRC meeting

The IRC meeting was held on 16th May 2017 and started with a welcome address by the Director, ICAR-NRC on Mithun. Dr. Vineet Bhasin, Principal Scientist, ICAR Headquarters, in his opening remarks suggested that the Scientists should follow the recommendations of the RAC in letter and spirit and should take up the projects keeping in view of the mandate of the Institute

for the betterment of the rare species, which is the pride of the nation in general and North East India, in particular. The Director of the Institute stressed that all the present and future projects are to be completed as per the approved technical program within a given time frame.

Activities under College of Veterinary Science, Jalukie, Nagaland

The Institute could develop well linkage with the stakeholders both vertically and horizontally for the purpose of improving agricultural research services delivery. A MoU was signed with Central Agricultural University (CAU) Imphal for jointly undertaking various research programme of mutual interest. Over the year, the Scientists and the Technical Officers of the institute took classes for B.V.Sc&A.H students in the College of Veterinary and Animal Husbandry, Jalukie of CAU. Students of the first batch comprising of 27 undergraduate from the college frequently visit our Institute for on-campus practical as well as theory classes.

SKILL DEVELOPMENT PROGRAMMES

Training on Statistical Methods

Three days training programme on "Statistical Methods in Biomedical Science" was organized by ICAR-NRC on Mithun from 27–30th January 2017. The training programme was attended by the Scientists from ICAR-NRC on Mithun, ICAR RCNEHR, Nagaland and SASRD, Nagaland. Training was imparted by Dr. Jitendra Kumar Choudhry, Assistant professor, College of Vety. Science, Salesih, Aizawl, Mizoram.

Workshop on motivation, organisational behaviour and team building

A one day workshop on **Motivation, Organisational Behaviour and Team Building** was organized at ICAR-NRC on Mithun on 29th March 2017. All the scientific and technical staff of institute and ICAR-Nagaland Centre participated in the workshop. Dr. P. Manikandan, Retired Head & P. C. ICAR-NARRM, Hyderabad, was invited as a resource person for the programme

Activities under HRD

Imparting of Training Programme by Institute Staff

S.N.	Name of the Staff	Date	Particular of Event
1	Mr. Safal Chetri (AF& AO)	11-13th January 2017	Practical Training on MIS-FMS to the staff of ATARE, Umiam, Barapani

Participation of the Institute Staff in Training Programme/Seminar/Conference/Symposium

S.N.	Name of the event	
1	Technical session on National Conference on "Challenges in Quantitative Genetic Improvement of Indigenous Animal Genetic Resources" at ICAR- IVRI, Izatnagar, UP on 19-20th January 2017	Abhijit Mitra, Director
2	Gender budgeting for Mainstreaming Women in Agriculture at MANAGE, Hyderabad on 13-16th February 2017	Mrs T. Esther Longkumer (ACTO, Soil Science), KVK-Phek, Porba, Phek, Nagaland Mrs Hannah Krujia Asangla (SMS, Agronomy), KVK-Phek, Porba, Phek, Nagaland
3	Farmers First for Conserving Soil and Water Resources in North-Eastern Region on 9-11th February 2017 (FFCSWR-2017) at Guwahati	Dr. R.K Singh, Programme Coordinator, KVK-Phek, Porba, Phek, Nagaland
4	17th Indian Veterinary Congress of IAAVR and XXIV National Symposium on "New Generation Vaccines, Diagnostics for Improvement of Animal and Poultry Health and Productivity vis-à-vis Genomic Interventions for the Societal Benefit" at Indian Veterinary Research Institute, Izatnagar-243122, UP on 6-7th April 2017	Dr. Abhijit Mitra, Director Dr. Sabyasachi Mukherjee, Principal Scientist (AG&B) Dr. Lalchamliani, Scientist(LPT)
5	Annual Zonal Workshop at Agartala, Tripura on 21-23rd April 2017	Dr. Esther Longkumer, ACTO (Soil Science)
6	Coordination meeting for Doubling Farmers' Income at ICAR RC for NEHR, Nagaland Centre on 26th April 2017	Dr. Esther Longkumer, ACTO (Soil Science)

PUBLICATION

Papers in peer reviewed Journal

- Chamuah JK, Dutta B and Borkotoky D. (2017). Pathological studies on helminth parasitic infection in mithun (*Bos frontalis*). Journal of Parasitic Diseases. DOI 10.1007/s12639-017-0913-7
- Chamuah JK, Raina OK, Sakhrie A and Gama N. (2017). Molecular characterization of *Mecistocirrus digitatus* and *Toxocara vitulorum* in the mithun (*Bos frontalis*). Journal of Parasitic Diseases, DOI 10.1007/s12639-017-0879-5
- Khan MH, Hazarika SB, Baruah KK, Perumal P and Sinha P. (2017). Kiss 1 and GPR54 mRNA expression, endocrine profile, follicular development and onset of estrus following Kisspeptin administration in pre-pubertal mithun heifers. Indian Journal of Animal Science **87**: 427-431.

Popular/Technical Article

- Mukherjee S, Mukherjee A, Longkumer I, Jamir Y and Mech M. (2017). Outline of genomic selection in animals. In: the Compendium of 33rd National Training Programme on "Skill Development for Sustainable Livestock Productivity in the Genomic Era", ICAR-NDRI, Karnal, from 6-26th March, 2017.

PERSONALIA

Honours and Recognition

- Dr. Perumal P. received the Certificate of Excellence in Reviewing by International Journal of Livestock Research (ISSN 2230-7613) for the year 2016-17.

Training

- Dr. S. Mukherjee attended two days training workshop on "Competency Development Programme for HRD Nodal Officers of ICAR" at ICAR-NAARM, Hyderabad, from 23-25th February 2017.

Transfer/Promotion/Joining

Scientist on transfer

- **Dr. Akhilesh Kumar, Scientist** was relieved on 12th June 2017 to join ICAR-IVRI, Izatnagar on transfer
- **Dr. Perumal P, Scientist** was relieved on 28th June 2017 to join ICAR-CARI, Port Blair on transfer.

Dr. Sapunii S. Hanah, Scientist
joined on 30.03.2017

VISITING DIGNITARIES

- Mr. Yitachu Fithu, Honourable Minister of School Education & SCERT, Govt. of Nagaland on 02.06.2017
- Dr. Dharmeswar Das, Chairman, Research Advisory Committee – 02.05.2017
- Dr. R S Gandhi, ADG (AP&B), ICAR, New Delhi –02.05.2017
- Dr. Kusumkar Sharma, Former ADG and Member Research Advisory Committee – 02.05.2017
- Dr. Kishore Kumar Baruah, Former Director, NRC on Yak and Member Research Advisory Committee – 02.05.2017
- Dr. Apurba Chakraborty, Director Research, CVSc, AAU, Khanapara, Guwahati and Member Research Advisory Committee – 02.05.2017
- Dr. I.P. Khala, Director, Animal Husbandry & Vety. Department, Govt. of Nagaland on 09.03.2017
- Dr. Imkonglema AO, Commissioner and Secretary, Department of Agriculture on 09.03.2017
- Dr. A. Arunachalam, Principal Scientist & Scientific officer to the Secretary DARE& DG, ICAR on 18.03.2017
- Dr. B. P. Bhatt, Director, ICAR-RCER, Patna on 18.03.2017
- Dr. P. Ghosh, Director, ICAR-IGFRI, Jhansi on 18.03.2017

The Editorial Escapade

ICAR-NRC on Mithun, situated in the beautiful hillside located on the extreme North Eastern strip of this wonderful country could develop a sound reputation in the local tribal community of traditional mithun rearers and owners by virtue of its service and dedication of research work for this unique species of livestock. So little else to say, every effort being made to include the research highlights, recent news and most importantly opportunity of service among the farmers and mithun keepers in this edition of Mithun Digest, as well as a host of extension and technology injection programme for the overall social and economic benefits of mithun and mithun rearing communities.

Every effort is made to include the information about the Institute and the services done for the mithun and their owners. If this proves to be helpful and serves the purpose of the Institute, community, individual researchers or for that matter anybody else, then our editorial efforts would be worthy to be cited.

Editors

Chief Editor: Dr. Abhijit Mitra, Director, ICAR-NRC on Mithun, Medziphema, Nagaland
Editors: Dr. Sabyasachi Mukherjee, Dr. Meraj Haider Khan, Dr. Jayanta Chamuah and Dr. Akilesh Kumar
Tele Fax: (03862) 247341, **Email:** director.nrcmithun@icar.gov.in, **Web:** www.nrcmithun.res.in
https://www.facebook.com/nrc.mithun, https://mobile.twitter.com/NRCMITHUN

Design & Printed at M/s Royal Offset Printers, A-89/1, Naraina Industrial Area, Phase-I, New Delhi 110028.