



MITHUN DIGEST

मिथुन डाइजेस्ट



Vol. 16 No. 1

ICAR – NATIONAL RESEARCH CENTRE ON MITHUN

JAN-JUNE 2020

ISO 9001:2015 Certified ICAR Institution

The bi-annual panorama.....



Director's Desk



Mithun (*Bos frontalis*), a unique and magnificent bovine species, plays a multi-dimensional role for the tribal farmers in North-Eastern hilly States. Mithun ownership is a pride possession symbolizing wealth, power and status and also considered as a means of social security to meet any exigencies. Mithun rearing is a viable component in the integrated hill farming system and it helps in conserving the agro-ecological balances and preserving the socio-cultural uniqueness. Mithun is primarily reared as a meat animal and it serves as an alternative source of livelihood of lakhs of tribal mithun rearing farmers. Mithuns though primarily reared as a meat animal can also be reared for diversified use such as milch and draught animal as well as a good source of leather.

During the reported period, under Tribal Sub-Plan (TSP) inputs were distributed for the benefit of farmers. Various programs were organized including mithun *mela-cum-technology* injection program, establishment of semi-intensive mithun rearing units, animal health cum vaccination camp, exposure visits, training, workshops, and piglet distribution for doubling farmers' income benefitting 2049 farmers. The KVK Phek, under ICAR-NRC Mithun is upfront in technology dissemination and organized many trainings, extension activities,

health camps, etc. benefiting 2653 farmers. During the initial period of Covid-19 lockdown, our Institute provided weekly advisories on mithun husbandry to farmers of Arunachal Pradesh, Mizoram, Manipur, and Nagaland. Institute has also distributed 2000 pieces of three-ply masks to the farmers as a preventive measure for carrying out their daily agriculture activities.

The Institute has joined hands with the Central Agriculture University, Imphal and its constituent colleges such as Colleges of Veterinary Sciences & Animal Husbandry, Jalukie, Nagaland, Colleges of Veterinary Sciences & Animal Husbandry, Selesih, Mizoram, and College of Horticulture & Forestry, Pasighat, Arunachal Pradesh for organizing awareness campaign on mithun rearing, led by ICAR-NRC on Mithun. The Institute is highly indebted to the various visiting dignitaries

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and academicians for their encouragement, candid suggestions, and valuable inputs.

I take this opportunity to congratulate all the staff members of the Institute for their commitment, hard work, and dedication to achieve our target to conserve,

improve, and propagate this magnificent species, Mithun.

Jai Hind !

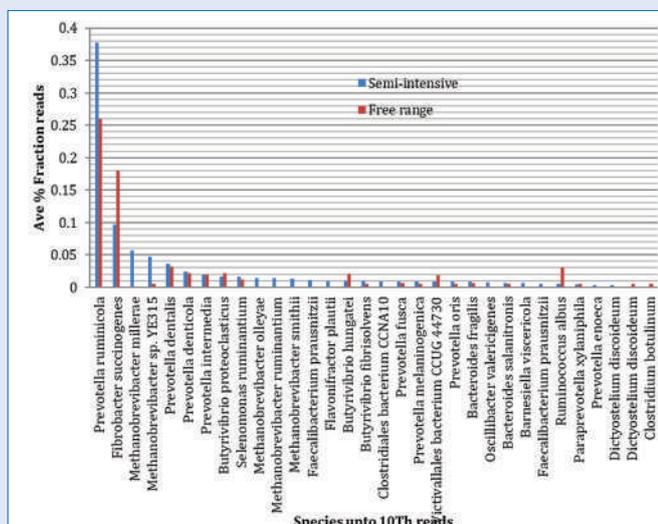


(M. H. Khan)

RESEARCH ACHIEVEMENTS

Profiling gut microbiome of mithun

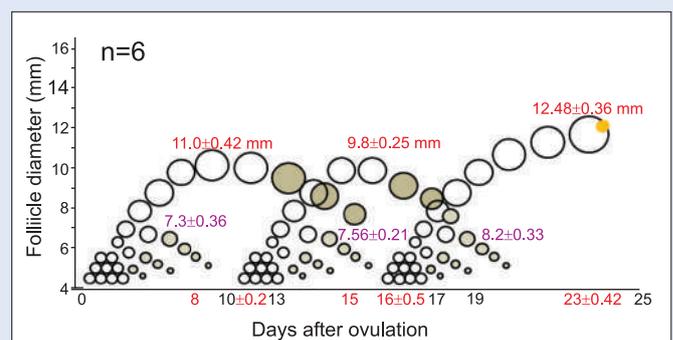
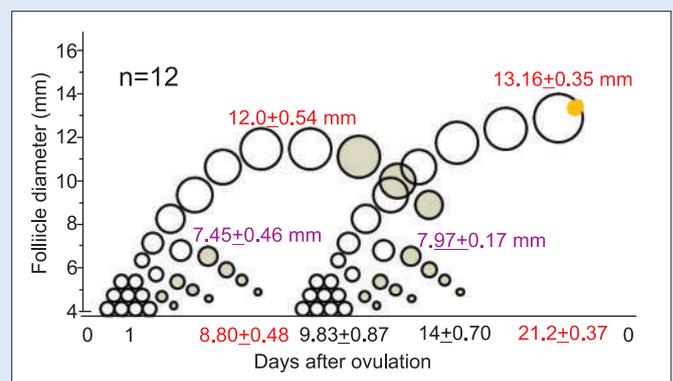
A study was conducted to understand the diversity and density of rumen microbiota in mithun. Rumen liquor samples were collected from 6 slaughtered adult mithun, 3 each reared under the semi-intensive and free-range systems, respectively. DNA was isolated from all six samples and sequenced using next-generation sequencing. The result showed that 55 microbial phyla including bacteria, eukaryote, archaea, and viruses were identified in all the samples of rumen liquor. The number of species was observed to be 15013. Out of which, 12091 species were common in both the systems of rearing. The relative abundance of bacteria *Prevotella ruminicola* was the highest followed by *Fibrobacter succinogenes*, *Methanobrevibacter millerae*, *Methanobrevibacter* YE315, *Prevotella dentalis*, etc. in a semi-intensive system. However, the relative abundance of *Prevotella ruminicola* was also the highest in the free-range system followed by *Fibrobacter succinogenes*, *Prevotella dentalis*, *Ruminococcus albus*, *Butyrivibrio hungatei*, etc. It was concluded that there was a difference in the abundance of different types of bacterial population in semi-intensive and free-range system of rearing.



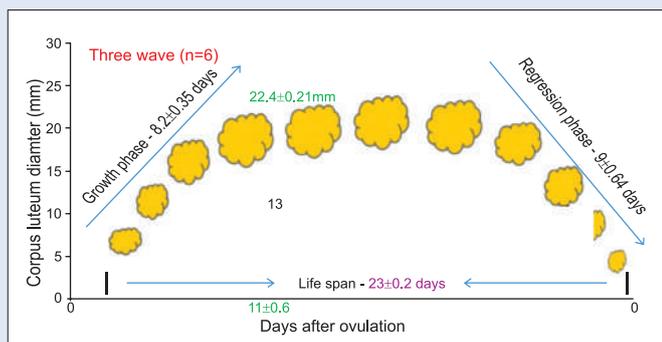
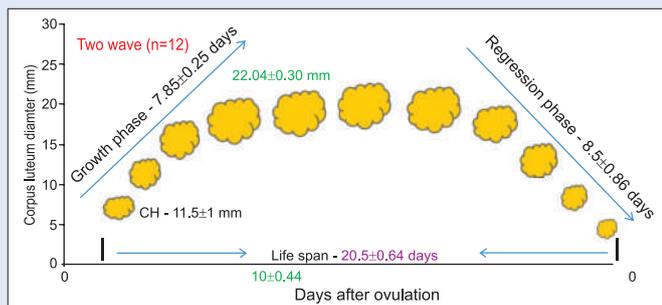
Relative abundance of rumen bacteria in mithun

Follicular dynamics in pubertal mithun

The understanding of follicular dynamics, hormonal profile during the estrous cycle, number of recruited follicles per wave, and time of ovulation are important for improving ART (Assisted reproductive technology). Results of the study may be utilized for the hormonal treatment for Ovum pick up (OPU) or Transvaginal oocyte retrieval (TVOR) and Multiple ovulation and embryo transfer (MOET) regimes. Follicular dynamics were studied in cyclic pluriparous mithun of 5-6 years of age, maintained under semi-intensive conditions (n=6; 18 Estrous cycles). Results showed that the two-wave folliculogenesis cycles were prominent with an ovulatory dominant follicle (13.16±0.35 mm) and the corpus luteum (maximum diameter of 22.4±0.21 mm). The ovulation in mithun occurred at 10.33±0.92 h after the end of estrus with a range of 7-16 h. Therefore, the ideal time for artificial insemination (AI) should be 16-24 h after the onset of estrus in mithun.



Dynamics of ovarian follicular development during two and three-wave estrous cycles in mithun



Corpus luteum development during two and three-wave estrous cycles in mithun



Training of teaser mithun bull for estrus detection

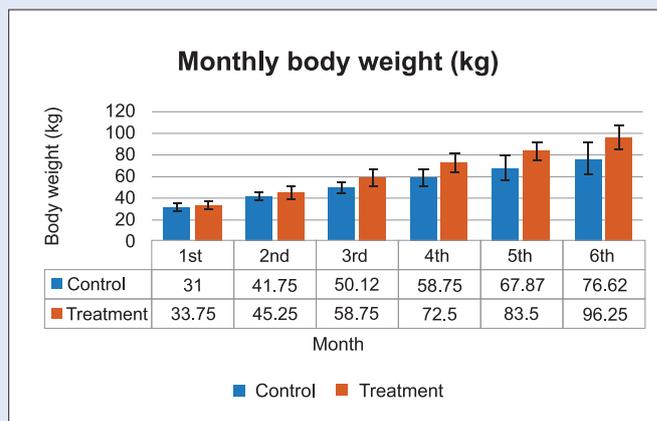
Training of teaser mithun bull for estrus detection

Unlike cattle, mithun cows are not exhibiting a prominent behavioral and physiological sign of estrus which makes it difficult to identify the mithun cow in estrus. Estrus detection is one of the major problems in the implementation of artificial insemination program. The failure in the estrus detection can result in serious economic losses to the farm. Therefore, castrated mithun bulls were trained for estrus detection. The purpose of such bulls is to aid in the detection of cows in estrus to facilitate when to artificially inseminate. Although several heat detection methods are available, some farms still prefer the use of teaser bulls. Teaser bulls often identify the cows showing transient signs of heat and their presence within as herd provides psychosexual stimulation.



Effect of weaning on growth performance of mithun calf

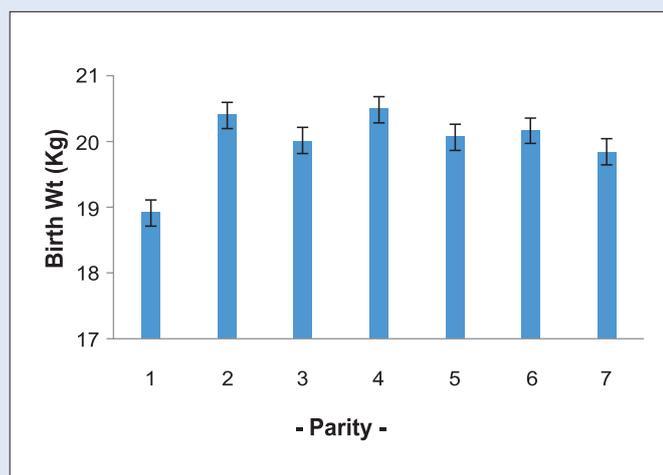
A trial was conducted to compare the growth performance of mithun calves weaned at 4 months and 6 months of age. For the early weaning group (4 months; Treatment) calves were bottle-fed with the provision of calf starter. For the conventional group (6 months; Control) calves were allowed to suckle their dam and weaned at 6 months of age with no provision of calf starter. The results showed no significant difference in the growth performance between the two weaning methods. The present study indicates that weaning of calf at 4 months of age is possible with the provision of calf starter without any adverse effect on growth. The average body weight at the end of 6 months for the control and treatment groups was 76.62±14.98 kg and 96.25±11.24 kg, respectively. Post-calving onset of estrus in dams showed a significant difference between the two groups. Early onset of estrus was recorded in the early weaning group compared to the control (101.4±8.65 vs. 127.14±6.99 days).



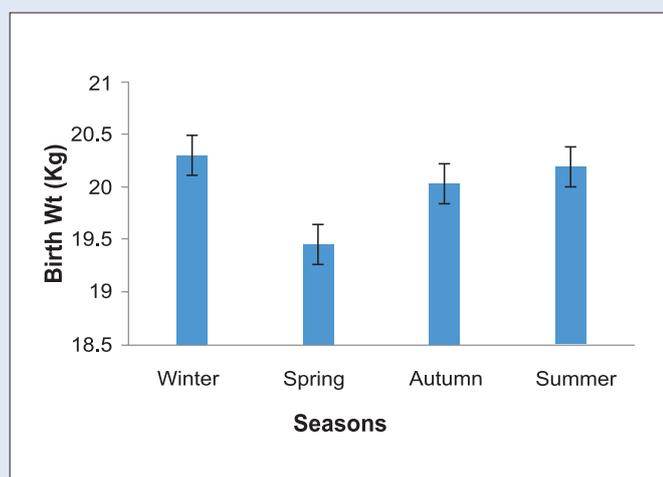
Monthly body weight (kg)

Growth performance of mithun

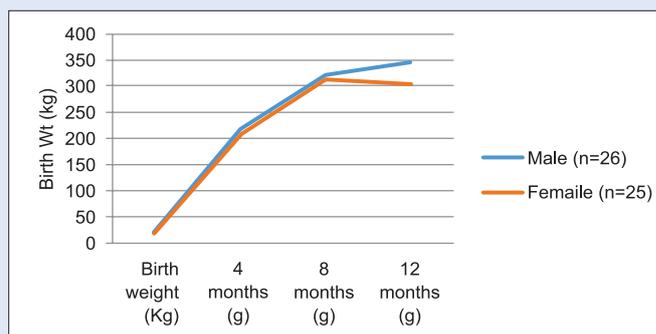
Mithun (*Bos frontalis*) is mainly reared for meat purposed by the tribal farmers of the North-east Hill region. It has great potential in meat production. Knowing the growth performance and the factors that inhibit the growth will help the mithun herdsman for better care and management. A project has been undertaken to study the genetic as well as non-genetic factors that influence the growth performance of mithun. Available retrospective data (seasons of calving, birth weight at different parity) and monthly/weekly live weight were recorded and analyzed. It was observed that parity and season have no significant effect on birth weight. However, calves born in winter and summer were heavier than in autumn and rainy season. The birth weight has no significant effect on subsequent growth (ADG) up to 8 months of age, however, after 8 months, a significant effect was observed.



Effect of parity on birth weight of mithun (kg)



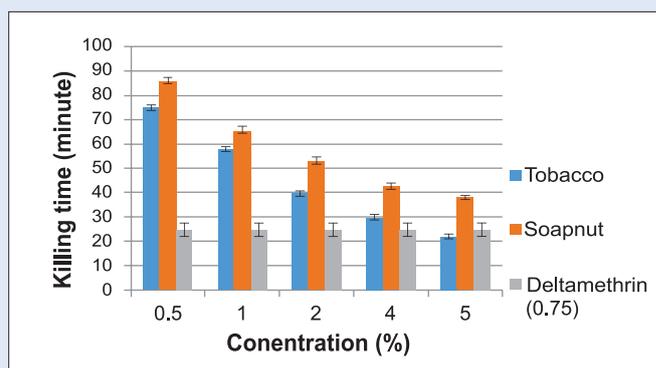
Effect of seasons on birth weight (kg)



Effect of birth weight in male and female mithun on growth (ADG)

Efficacy of aqueous extract against aquatic leech

Leech infestation is one of the most common problems in mithun. It results in severe respiratory distress, often the death of the animals. Aquatic leech is distributed worldwide and they often get attached to the mucosal membranes of the mithun while drinking water from the springs and ponds in endemic areas. The main

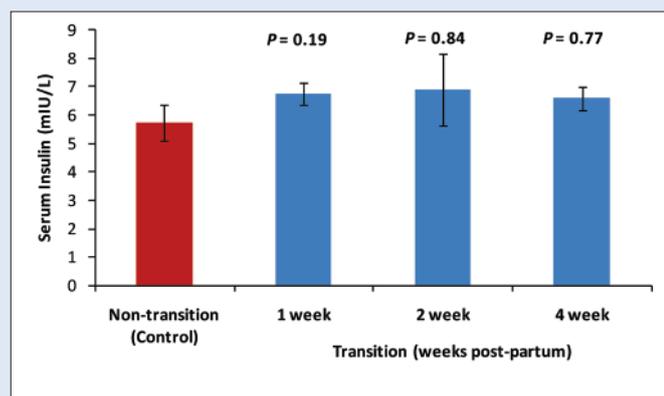


Efficacy of herbs (aqueous extract) against aquatic leech (killing time in minutes) compared with control (Deltamethrin 0.75 %)

complication of leech infestation includes anemia, weight loss, respiratory distress, restlessness, haematemesis, haemoptysis, bleeding from vagina, mouth and rectum. An in-vitro trial was undertaken to find out the efficacy of aqueous extracts of herbs like Tulsi (*Ocimum sanctum*), Garlic (*Allium sativum*), Ginger (*Zingiber officinale*), Neem (*Azadirachta indica*), Tobacco (*Nicotiana tabacum*), and Soapnut (*Sapindus* sp.) against aquatic leech infestation. Different concentrations (0.5 %, 1.0 %, 2.0 %, 4.0 % and 5 %) of extracts were used against leech and a standard drug (Deltamethrin 0.75%) served as the control with an average killing time of 24.75±2.17 min. Among all extracts, soapnut and tobacco were effective whereas other extracts like garlic, tulsi, ginger, and neem were not effective. At 5% concentration, aqueous extract of tobacco exhibited the highest efficacy against aquatic leech followed by soapnut. The average killing time for tobacco and soapnut was 22±0.91 min. and 38.0±0.91 min., respectively.

Subclinical metabolic diseases of transition mithun cows

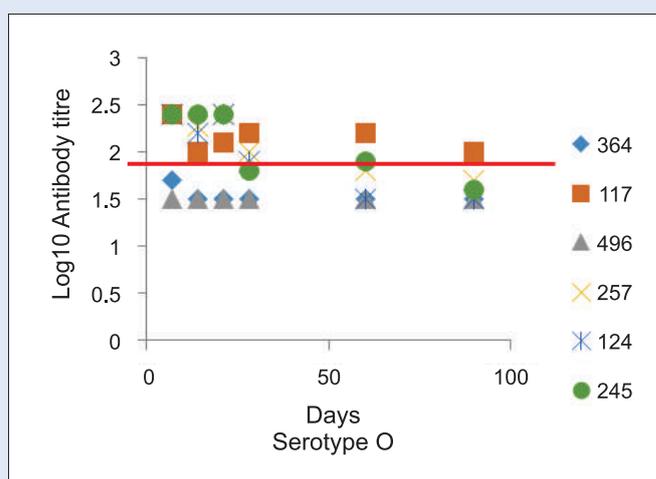
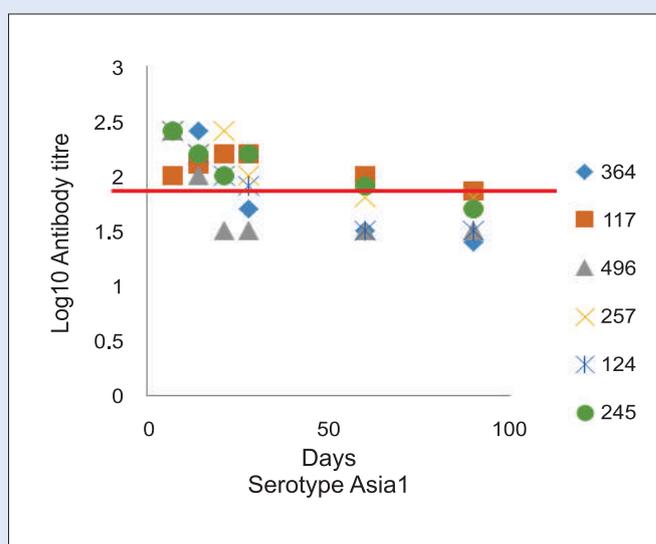
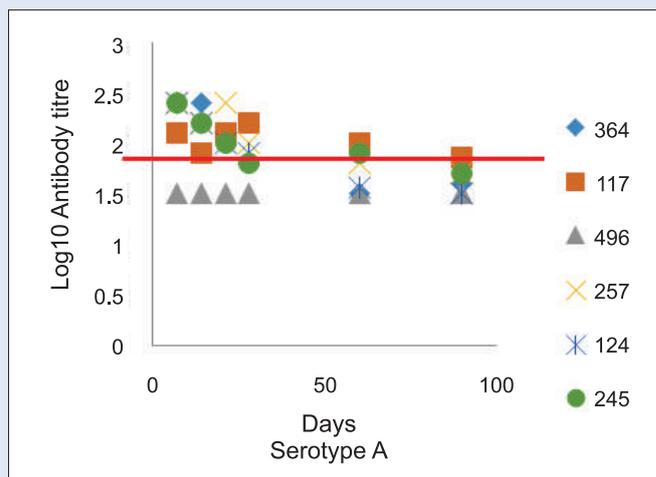
Subclinical metabolic diseases are a gateway for other infectious diseases and their impact in mithun herds on energy balance, mineral profile, postpartum immune function, fertility, risk of culling, etc. has been studied. A cut-off point of 0.26 mmol/L for non-esterified fatty acids (NEFA) and 1.09 mmol/L for beta-hydroxybutyric acid (BHBA) can be used for the diagnosis of negative energy balance and subclinical ketosis (SCK) in mithun. The prevalence of SCK was 55%, 82%, 64% and 45% at 1, 2, 4 and 6 weeks post-partum, respectively. The overall prevalence of SCK in mithun cows was 18%. No significant differences were observed in the mean values of serum insulin (5.75 ± 0.62 mIU/L) of mithun cows with SCK. An optimal cut-off value of serum calcium for diagnosis of subclinical hypocalcemia (SHC) in mithun cows is 2.07 mmol/L. No prevalence of subacute ruminal acidosis (SARA) in transition mithun cows as mean pH values of rumen fluid (6.53 ± 0.11), blood (7.49 ± 0.04), and urine (8.01 ± 0.06) were lying within normal ranges at 1, 2, 4, 6 weeks post-partum. The best non-invasive method to collect sterile urine from mithun was by 'forced diuresis' as mithun is refractory to 'perineal massage method' and 'per-rectal stimulation of urinary bladder'. The average time to first voiding after furosemide-induced forced diuresis (0.5 mg/kg, slow IV) in mithun was 7.67 ± 1.20 minutes.



Variation of insulin level in transition mithun cows

FMDV induced immune response in mithun calves

As FMD is one of the most important viral diseases affecting mithun, it is important to maintain herd immunity to prevent its occurrence in susceptible animals. To understand the longevity and level of immunity obtained from the dam, the study was conducted to determine the duration of maternally derived protective



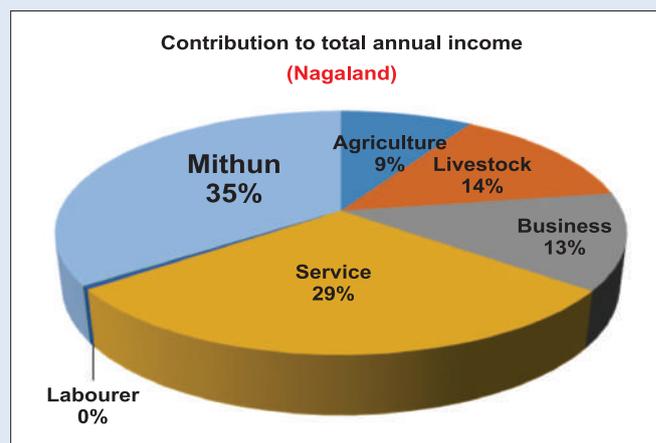
Duration of maternal antibody in mithun calves

antibody titre of FMDV in the newborn mithun calves. Serum samples were collected (n=6) on days 1, 7, 14, 21, 28 after birth, 2 months, and 3 months. The maternal antibody was estimated using a solid phase competitive ELISA kit (supplied by DFMD). It was observed that 33% of the calves were born unprotected against FMDV. Duration of maternal antibody lasted about 2 months in

50% of the animals tested, by 3 months only one animal remained protected against all the serotypes.

Socio-economic evaluation of mithun rearing

The study was conducted for systematic documentation of the role of mithun in the livelihood security of the mithun farmers, and the socio-economic value of mithun from the point of view of the mithun farmers based on the contingent valuation scenario. The study was conducted in three districts of Nagaland and observed that more than 80.15% of the mithun farmers (n=126) rear mithun to ensure their livelihood security. Mithun farming contributes 35% to the total annual income of the farmers. Income from mithun farming is significantly correlated to the total annual income of the mithun farmers ($r=0.463$, $P\leq 0.01$). High input price for fencing the forest and predator attack on young calves are the major constraints in mithun rearing. The socio-economic and cultural value of mithun has significantly declined from the point of view of the farmers and is reared primarily for sale, only 1.64% difference between the perceived value of existing mithun owned and perceived value under the contingent scenario.



Contribution of mithun to total annual income

Outreach Programs

Under Tribal Sub-Plan (TSP), a total of 6 programs were organized by ICAR-NRC on Mithun in all the four mithun inhabited states viz., Arunachal Pradesh, Manipur, Mizoram, and Nagaland. The various programs organized included mithun *mela*-cum-technology injection, establishment of semi-intensive mithun rearing units, animal health cum vaccination camp, exposure visits, training, workshops, and piglet distribution for doubling farmers' income. A total of 2091 farmers benefitted from these programs.

Sl. No.	Programmes	Date	Village/District/State	Total Beneficiaries	
1.	Mithun <i>mela</i> -cum-technology Injection programme	05.03.2020	Leng, Serchhip, Mizoram	657	
		04.03.2020	Konsakhul, Kangpokpi, Manipur	98	
		19.02.2020	Tening, Peren, Nagaland	552	
		14.02.2020	Mawai, Kamjong, Manipur	364	
2.	Establishment of semi-intensive mithun rearing units	05.03.2020	Haipi, Kangpokpi, Manipur	150	
3.	Animal health cum vaccination camp	05.03.2020	Leng, Serchhip, Mizoram	36	
		19.02.2020	Tening, Peren, Nagaland	48	
		14.02.2020	Mawai, Kamjong, Manipur	35	
4.	Exposure visits	24.01.2020	Jalukie, Peren, Nagaland	15	
5.	Workshops	Review meeting workshop of the semi-intensive mithun rearing units established under TSP	06.02.2020 to 07.02.2020	Mithun Farmers from Arunachal Pradesh, Manipur, and Nagaland	60
		Awareness workshop on prospects of mithun farming in the hilly district of West Bengal	03.03.2020		
		Virtual interface workshop on promotion and branding of mithun	22.06.2020	KVKs of ATARI Zone VI and VII	42
6.	Piglet distribution for doubling farmer's income	5.02.2020	Dimapur, Phek and Kohima, Nagaland	34	

Mithun *mela*-cum-Technology Injection Programme

The Institute over the years through the mithun *melas* has made inroads in creating awareness among the farmers about the need to conserve and preserve mithun keeping in mind its inherent multi-dimensional importance to the tribes. During the *melas*, the technologies developed by the Institute were showcased and several competitions were organized to adjudge the best mithun bulls, cows, and heifers out of those animals gathered by local farmers to encourage them not to slaughter their best mithuns. A total of four *melas* were organized benefiting 1671 farmers.



Technology Injection Program at Konsakhul vill., Kangpokpi Dist., Manipur 2020



Mithun mela at Leng vill., Serchhip dist., Mizoram



Mithun mela at Tening vill., Peren dist., Nagaland





Mithun mela at Mawai vill., Kamjong dist., Manipur

Establishment of semi-intensive mithun rearing units

On the 5th March 2020, a semi-intensive unit was established at Haipi village, Kangpokpi district of Manipur. Inputs like barbed wire for fencing approximately five kilometers of forest area, CGI sheet for the construction of low-cost mithun shed, gumboots, and raincoats for the mithun herdsman were distributed to the Haipi Mithun Society.



Animal health cum vaccination camp

Mithun being reared under a free-range forest ecosystem are not routinely vaccinated making them susceptible to transboundary routinely diseases. Three vaccination camps were conducted during the mithun melas conducted in Mizoram, Manipur, and Nagaland. The mithuns were vaccinated against Foot and Mouth Disease (FMD), Haemorrhagic Septicemia (HS) and Black Quarter (BQ). A total of 119 mithuns were vaccinated during the camps.



Animal Health cum Vaccination camp at Leng vill., Serchhip dist., Mizoram



Animal Health cum Vaccination camp at Tening vill., Peren dist., Nagaland



Animal Health cum Vaccination camp at Mawai vill., Kamjong dist., Manipur

Exposure visits

On the 24th January 2020, 15 farmers from Jalukie, Peren District, Nagaland visited the Institute to witness the semi-intensive mithun rearing units at the Institute farm. The exposure visit was organized in collaboration with KVK-Peren, Nagaland. During the visit, a farmers-scientist interaction was also organized and hands-on training on restraining mithun was demonstrated.



Workshops Organized

Review workshop on semi-intensive mithun rearing units established under TSP

On the 6-7th February 2020, a meeting was conducted to review all the semi-intensive mithun rearing units established under TSP. The representative mithun farmers of all the beneficiary villages across the mithun rearing state of the North Eastern Hilly region were invited. Altogether a total of 60 farmers from 20 villages of three North-Eastern states viz. Arunachal Pradesh, Manipur, and Nagaland have attended the program. During the meeting, each village representative has given feedback on the difficulties of the free-range system and the benefits of adopting a semi-intensive rearing system.



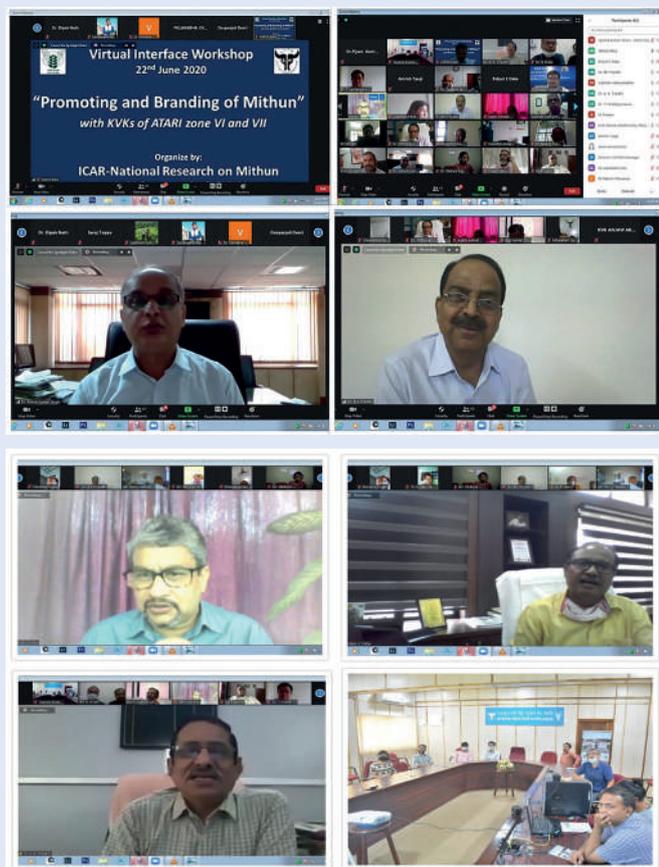
Prospect of mithun farming in the hilly district of West Bengal

Awareness Workshop on “Prospect of Mithun Farming in the Hilly District of West Bengal” jointly organized by ICAR-NRC on Mithun, Nagaland and West Bengal Comprehensive Area Development Corporation, Kolkata was held on 3rd March, 2020 at Circuit House, Darjeeling. During the workshop, the prospects of introducing mithun in the hill district of West Bengal were explored



Virtual interface workshop on promotion and branding of mithun

On 22nd June 2020, a one-day virtual interface workshop on “Promoting and Branding Mithun” was organized in collaboration with the Krishi Vigyan



Kendras (KVKs) of the Agricultural Technology Application Research Institute (ATARI) of Zone VI and VII. The workshop was organized to promote scientific mithun husbandry as an entrepreneurial activity through integration of scientific mithun husbandry and its diversified use in terms of value addition of mithun meat, milk, draught-power and hide through the intervention from KVKs.

Piglet distribution for doubling farmers' income

A total of 30 piglets were distributed to farmers from three districts of Nagaland on the 5th February, 2020 for doubling the farmers' income. Piglets were distributed to 34 beneficiaries from Seithekema, Nutun, and Chumukedima villages from Dimapur district, Phisachodii village from Phek District, and one Self-Help Group (Lievisenomia Union) of Khonoma village from Kohima District.



EXTENSION INITIATIVES DURING THE COVID-19 LOCKDOWN

Weekly advisories to the mithun farmers

- ICAR-NRC on Mithun, Medziphema through its WhatsApp group viz. “Mithun Farmers-Arunachal Pradesh, Mizoram, Manipur, and Nagaland” provided weekly advisories on mithun husbandry. (nrcmithun.icar.gov.in/sites/default/files/files/4_12-2020Advisory.pdf).
- *Whatsapp Group participants* were receiving weekly advisories in **four languages** (*English, Hindi, Manipuri, and Mizo*) and necessary solutions to their problems.

Created awareness about different schemes and activities of the government of India

- Compulsory guidelines and activities allowed during the LOCKDOWN 2.0 issued by the Government of India have been widely circulated.

- Downloading and use the *Arogya Setu* app by providing already generated links to this app via WhatsApp.
- Use of the Kisan Rath mobile app for the facilitation of inter-state and inter-district movement of perishable crops
- Use of Kisan Call Centre numbers 18001804200 and 14488.

Communicated to the respective Commissioner and Secretary as well as the Directors of the Department of Veterinary and Animal Husbandry, Govt. of Arunachal Pradesh, Mizoram, Manipur, and Nagaland requesting their intervention for issuing suitable instructions to the mithun rearing districts/village authorities to allow the mithun farmers for fencing work and other activities.

Distributed 2000 pieces of three-ply masks to the farmers as a preventive measure for carrying out their daily agriculture activities

No. 01

‘कृषि एवं पशुपालन परामर्शी’
लॉकडाउन 2.0 के लिए द्वारा जारी
भा.कृ.अनु.प.- राष्ट्रीय मिथुन अनुसंधान केन्द्र, मेडजीफेमा, नागालैंड

अनमन गतिविधियाँ

कृषि संबंधित गतिविधियाँ

- किसानों द्वारा खेतों में कृषि-कार्य।
- संस्थान जो कृषि उत्पादों की खरीदारी से संबंधित हों जैसे- न्यूनतम समर्थन मूल्य (एम.एस.पी.) कार्य।
- कृषि उत्पादन मंडी समिति व राज्य द्वारा संचालित मंडी-।
- राज्य और एफ.पी.ओ की सहकारी समितियों द्वारा संचालित किसानों / किसानों के समूह से सीधा व्यापार। सरकार राज्य व्यापार के विकेंद्रिकरण और ग्रामों में व्यापार को बढ़ावा देना।
- कृषि मशीनों, उनके अतिरिक्त पुर्जों और मरम्मत की दुकानें खुली रहेंगी।
- कृषि यंत्रावली से संबंधित कस्टम हायरिंग केन्द्र (सी. एच. सी.)।
- खाद, कीटनाशक दवाओं और बीजों का उत्पादन, वितरण और फुटकर बिक्री।
- फसल कटाई और बीजरोपण संबंधित मशीनों जैसे संयुक्त हार्वेस्टर व अन्य कृषि उपकरणों की अंत- और अंतरराज्यीय आवाजाही।

पशुपालन संबंधित गतिविधियाँ

- दूध और दूध उत्पादों का संग्रहण, प्रक्रिया, वितरण और विक्रय।
- पशुधन एवं कुक्कुट फार्म और हेचरी संबंधित क्रिया-कलाप।
- पशुओं के लिए खाद्य उत्पादन हेतु कारखानों में मकई और सोया की आपूर्ति।
- पशु आवास जैसे गोशाला के प्रबंधन कार्य।

अनिवार्य दिशानिर्देश

- चेहरे पर मास्क लगाएँ और सोशल डिस्टेंसिंग का पालन करें।
- सभी क्रिया-कलापों के दौरान 3-4 फीट की सुरक्षित दूरी बनाएँ रखें।
- ऑफिस में दो बिम्बों के बीच 1 घंटे का अंतर रखें।
- आरोग्य सेतु एप के प्रयोग को प्रोत्साहन दें।
- एक जगह पाँच से अधिक लोग एकत्रित न हों।
- सार्वजनिक स्थानों पर धूँकना दंडनीय है, जर्मना लगेगा।
- झूम-खेती के लिए परिवार के लोगों की सहायता लें।

सह एप जस्टी खरब सोने वाली फसलों के अंतरराज्यीय और अंतरजन्मवर्षीय आवाजाही की सहूलियत के लिए है।

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No. 02

ICAR-NRC on Mithun Advisory for African Swine Fever (ASF) in Pigs

ASF hi vawk natna chikhat virus kan th ten an thlen ani a, vawk bakah sanghal te hian an vei thei bawk a, natna hi an inkai chhawng awlsam em em ani. August ni 3 kum 2018 ah khan he natna hi China ramah hmuh ani a, hemi hma hi chuan Africa lamah chauh a awm thin a hriat ani. He mi hnu hian Myanmar ram bung thenkhat ah pawh a darh ta niin hriat a ni a, North east state te hi heng ram thenawm te nen a inhnaik tah anih avangin he natna laha inven leh hmalakna neih a, he natna nihphung lo hriat chian hi a tul em em ani.

A Natna lan chhuah dan-

- A rang chi ah chuan vawk te hi natna an nei th pawh hriat lem loh in an lo thi mai thin.
- A tiangpuin khawsik, chaw ei duhlo leh tho chhuak peihloin an awm a, ding ngil theilo leh khur deuh der der te, mit tui deuh pir per, kawthalo te awm in, vawk rual chu an inngheng khawm dul thin.
- An beng kawm, dul vun nem lai leh kap bawr te a duk.
- Vawk rai laiah chuan no chhiat a awm duh hle.

Ven leh enkawi dan

- Natna thlenna hmuhma hriat chhuah chuan tlawhpawh leh enkawina kawngah finkhur taka mithiam te rawn tur.
- A enkawl nan hian damdawi a awmo a, vawk hrisel ten an kaichhawng loh nan a damlo te chu talh a, a ruang phum emaw halral a tha.
- Vawk damlo chu dah hran a, vawk hrisel te pawh huang ah tha taka khung

Fimkhur na tur leh zawmtur te-

- Vawk chin hriatloh leh ram pawn ajang lei loh tur.
- Vawk in leh a velah motor leh mihring phalna loh a kal tir loh tur.
- Vawk in luh dawnah ke chiahna tuisen dah a, mihring lut leh chhuak ten pheikhawng chhuat chiah huh zel tur.
- Vawk in thianghlim taka enkawl a, bleaching leh thildang hmang emaw a thifai thin tur.
- Vawk lei thar hlim te chu kar 4 vel tai dah hran a, vawk dang nen dah pawh loh tur.
- Vawk chaw tha taka chum hmin chauh pek tur, vawksa thing vel pek loh tur.
- Rulth hlo leh vitamin vel tha taka pek thin tur.
- Vawk ek leh bawhhlawh te mumal taka paih tur.
- Vawk enkawtu in thawmhnaaw fai leh thianghlim inbel hram hram tur.
- Vawk damlo leh thi te hral/ser loh tur.
- Vawk damlo te chu dah hran tur.
- Vawk damlo enkawl nan hmanraw hran hman tur, thawmhnaaw hak pawh thiak zel a, kut leh ke te fai taka sil tur.
- Vawk chhuah loh tur, huang ah tha taka dah tur.
- Vawk in ASF a vei ni a hriat anih chuan Vety department lam hriatir vat tur.

Hriat tur pawimawh

- Vawk eng rual pawhin he natna hi an vei thei
- A natna lan chhuah atanga ni 2-13 ah an thi tiangpu
- A natna hi vawk leh vawk an inkai chhawng bakah saphihrik seh atangin an kai thei bawk
- He natna hi mihring leh ran dang tan a hlahawng loh
- Vawk in natna hi a lang chhuak thin.

“He natna ven nan hian VACCINE a awmo a, heng a chungma mi te hi fimkhur tak a zawm hram hram tur”

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No. 03

Mithun karone kenchu dawai aro vaccination laga homai

Kenchu dawai kitia dibo lagey?

Jonom hoikene 7-10 din bitore: 1st kenchu dawai dibo lagey

Piperazine @ 2 ml, ekbar khelabi
Naholie
Levamisole @ 7.5 mg/kg ghau laga ojon hisap te ekbar khelabi

1-6 mahina bitore: 6 mahina nahoa tak, hudai mahina te ekbar khelabo lagey

Fenbendazole @ 5-7.5 mg/kg ghau laga ojon hisap te khelabi
Naholie
Oxyclozanide @ 10-15 mg/kg ghau laga ojon hisap te khelabi
Naholie
Albendazole @ 5-10 mg/kg ghau laga ojon hisap te khelabi

6 mahina para bist hoile: 4-6 mahina te ekbar khelabi naholie saal te dui tin bhar khelabi

- Anthelmintic dawai toh komti nadibo lagey aru mithun sop majote sabsey ghau bhari wala hisap te dawai toh dibi
- Mithun bacha dui saal umor nahoa tak toh kenchu dawai thik khelabo lagey
- Bura hua janwar ke bi saal te ek dui bhar toh kenchu dawai khelabo lagey

“Vaccination naholebi bacha dibole ama ase koile, para tak kenchu dawai toh ek hapta agey te khelai dibo lagey”

Vaccination laga homai

Bimar	Vaccine (Dawai naam)	Kiman dibo aro kineka dibo	Primary Vaccination (1 st vaccination homoi te umor)	Booster (Dui bar wala vaccination)	Revaccination
Foot and mouth disease (FMD) - theng aro muk bimari	Raksha Trivalent FMD	3 ml, chamara nichete injection	4 mahina	Primary vaccination di kene 2-4 hapta pasote	6 mahina te ekbar
Haemorrhagic Septicaemia (HS) & Black Quarter (BQ)	Raksha HS + BQ	3 ml, chamara nichete injection	6 mahina aru upor	-	Saal te ekbar

Ki te hoshiyar thakibo lagey?

- Dawai toh ana homai te hudai thanda (2-9° C) te thakibo dibi
- Komjur aro bimari janwar belak vaccinate nakurlebi hojabo
- Vaccination diya pasote dui hapta tak antibiotics aro immunosuppressants khelabo lagey

“Vaccination karone VETERINARIAN logot khobor lobi”

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Advisory for mithun farmers during COVID 19 lockdown issued by ICAR-NRC ON MITHUN, MEDZIPHEMA, NAGALAND

- Soap, bucket of water and hand sanitizer to be kept at the entrance of the gate of the Mithun shed
- Farmers should use masks and ensure hand washing with soap at regular intervals before handling any animal
- Maintenance of proper hygiene in Mithun shed is essential and sanitize at regular intervals.
- Mithun farmers are suggested for regular supplementation of mineral mixture @ 40-50 g/day/adult to maintain productivity
- By maintaining social distancing, herd men should collect sufficient fodder to ensure for Mithun feeding in order to prevent Mithun going out of ranges
- Farmers can visit Mithun salt lick centre with salt and minerals with only 2 person a day
- Herd men should continue to attend the pregnant animals and young calves as well as guard the Mithun herd to watch out for predator attacks on Mithun during the COVID-19 pandemic crisis.
- Mithun should be kept separated from other types of animals in free range.
- Fencing should be carried out by maintaining social distancing
- Maintain a distance of 3-4 feet during rest, taking of meals, loading/unloading of feeds in sheds of organized Mithun farms.
- Water sources in ranges for Mithun may be checked during the lean season.
- All transport vehicles, gunny bags or other packaging material should also be sanitized

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INSTITUTIONAL ACTIVITIES

Republic Day Celebration

The 71st Republic Day was celebrated in the institute on 26th January, 2020. Dr. Abhijit Mitra Director, ICAR-NRC on Mithun unfurled the tricolor in the morning with the singing of National Anthem. The children and family members in colorful attire also took an active part in the celebration.

13th RAC Meeting

The institute conducted its 13th RAC Meeting on 27th February 2020. Dr Surender Lal Goswami, Chairman of the RAC presided over the meeting. All the RAC members and scientists of the institute attended the meeting.



International Women's Day

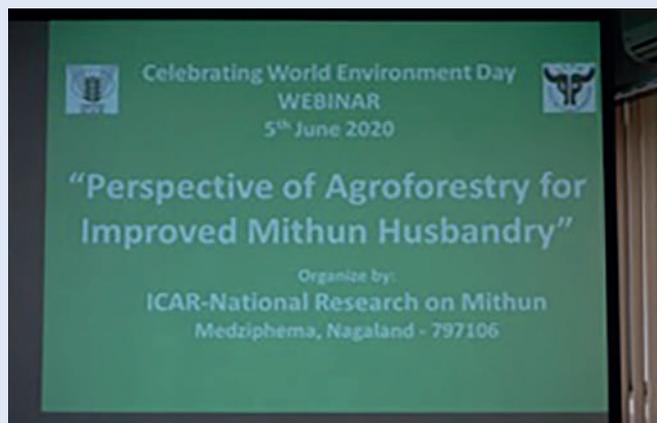
The staff members of the Institute assembled and observed International Women's Day on 8th March, 2020. The theme for the year, "I am Generation Equality: Realizing Women's Rights" was displayed for wide publicity.



Foundation Day

The Institute celebrated its 32nd Foundation Day on 2nd June, 2020 with much dignity and grandeur. Dr. Trilochan Mohapatra Secretary, DARE and Director





General, ICAR graced the function as the Chief Guest from New Delhi via video conferencing. He inaugurated the new website of ICAR-NRCM and state-wide painting and drawing competition for school children of Nagaland.

World Environment Day

The Institute celebrated World Environment Day on 5th June 2020 and organized a webinar on “Perspective of Agroforestry for Improved Mithun Husbandry”. The expert speakers and specialists were invited from across the country to create awareness on the implications of agroforestry for improved mithun husbandry in North-East India. The online program commenced with a virtual tree plantation at Mithun Farm of ICAR-NRC on Mithun. Dr. S. K. Chaudhari, Deputy Director General (Natural Resource Management), ICAR, chaired the webinar.



ACTIVITIES OF KRISHI VIGYAN KENDRA-PHEK

Krishi Vigyan Kendra Phek is a grass root level organization engaged in imparting training, conducting On-Farm Trials and Frontline demonstration, and also organizes various extension activities. KVK has been functioning as a Knowledge and Resource Centre of agricultural technology supporting initiatives of the public, private, and voluntary sectors for improving the agricultural economy of the district. The various activities of KVK include training under capacity building program, vocational training for skill development, on-farm trials, frontline demonstration and extension activities benefiting 2653 farmers. Apart from this other activities includes the celebration of important days in

the Institute like Republic Day, International Women's Day, World Earth Day, Environment Day, etc.

Action photographs-OFT/FLD/Training/Extension Activities

On-Farm Trial

A total of 4 On-Farm Trial was conducted namely OFT on assessment of organic management in Turmeric Var. Megha Turmeric-1, the performance of CARI Uttam quail, Modified system of rice intensification (SRI) for higher productivity and performance of Pakchoi benefiting 22 farmers.



OFT on Assessment of organic management in Turmeric Var. Megha Turmeric-1 at Yoruba village



OFT on Performance of CARI Uttam Quail



OFT on Modified system of rice intensification (SRI) for higher productivity



OFT on Performance of Pakchoi

Front Line Demonstration:

Under front line demonstrations, 2 numbers of activities were performed namely, FLD on the popularization of QPM var. HQPM1 and demonstration on nutritional gardening benefitting 20 farmers.



FLD on Popularization of QPM var. HQPM1



Demonstration on Nutritional gardening

Training Organized:

A total of 26 training were organized by the KVK Phek covering different villages and benefitting 426 farmers.



Training on Package and practice maize and beans intercropping system



Skill training on Organic production of fruits and vegetable at Porba village



Training cum demonstration for Assam Rifle Personnel at Phek



Training on Nutritional gardening

Trainings were conducted on acid soil management, soil sample collection, soil fertility management, vermicomposting, awareness on cultivation near river-bank, Organic cultivation on turmeric, Nursery management in vegetables, Production technology of

pakchoi, Nutritional gardening, Scientific breeding management in pig, Commercial layer duck farming, Health care management in pigs, Agronomic measures for soil moisture conservation, Production technology in potato, Production technology in maize (QPM), Package and practice in maize and beans, Crop intensification in paddy, Nursery management in SRI, Scientific rearing and management of poultry, Post-harvest management and value-added product in soybean.

Extension activities:

A total of 17 extension activities were conducted which include field day and method demonstration benefitting 245 farmers. The list of various activities includes Method demonstration organic cultivation on turmeric, Potato cultivation var. Kufri Girdhari, Cultivation on maize and beans intercropping, Field day on Field Pea var. Aman, French bean, Low-cost



Field day on French bean at Thipuzu under NICRA Project



Distribution of planting materials during World Environment Day



Village Level programme for SHG under NABARD



Demonstration and vermicomposting under NICRA Project



Vaccination cum animal health camp



International Women's Day 2020 at Pftusero



Demonstration on Potato cultivation under NICRA



Method demonstration on Potato

vermicomposting, Organic cultivation broccoli, Low-cost polyhouse vegetable, Potato var. Kufri Girdhari, Vaccination cum animal health camp, etc. Other activities

include diagnostic visits, scientist visits to farmers' field, mobile advisory services, farmer-scientist interaction, exhibition, etc. benefiting 1940 farmers.

SKILL DEVELOPMENT

Training/Worshops/Seminars Organized Workshop on Intellectual Property Rights (IPR)

A one-day workshop on "Intellectual Property Rights" was organized by ICAR-NRC on Mithun, Nagaland on the 16th January 2020. The workshop was part of the Institute Technology Management Unit capacity-building programme to educate and increasing

awareness among scientific communities about intellectual property rights of research activities. A total of 44 participants including Assistant Professor, College of Veterinary Sciences and Animal Husbandry, Jalukie and SASRD, Nagaland University, scientific faculty, and staffs of ICAR-NRC on Mithun, Nagaland actively participated in the programme.



Hands-on Training on Real-Time PCR and its Uses

The two-day hands-on training on the real-time PCR and its uses in the detection of nucleic acids for the medical team of CIHSR led by Dr. Neto Yephthomi was organized on 17th and 18th April 2020 by ICAR-NRC on

Mithun. The basic theoretical aspects of real-time PCR including the mechanism and chemistry of detection was explained followed by a demonstration for setting up of reaction and running of the machine. The participants were allowed to handle the samples (mock samples non-



infectious) by themselves. Emphasis was given on the importance of good laboratory practices (GLP) for the minimization of risk in handling an infectious sample in the laboratory. And also analysis of the result and troubleshooting of different types of problems in the data were highlighted. The different chemistry of detection in real-time PCR was also demonstrated along with validation of the results. Besides, the trainees were also taught about sample handling, isolation of RNA, cDNA synthesis as well as quality checking of nucleic acids, the importance of sample quality in the downstream analysis.

Presentation in Conference/Symposia/Workshop

- Saroj Toppo, Nazrul Haque, Kobu Khate, Laishram Sunitibala Devi and Abhijit Mitra (2020). Fatty acids composition of mithun milk with special reference to conjugated linoleic acid (CLA). In: Compendium of National Conference and 27th Annual Convention of Indian Society of Animal Production and Management on “Paradigm shift in livestock management to obtain high quality animal products for enhancing farm economy and entrepreneurship”, 4-6th February, 2020. pp 189.
- Vivek Joshi, J. K. Chamuah, Vikram R., M. H. Khan (2020). Multiple live leeches in nasal cavity of mithun (*Bos frontalis*): A diagnostic challenge. In: Proceedings of 38th Annual Convention of ISVM and National Symposium, 5-7th February, 2020. pp 435.

- Vivek Joshi, J. K. Chamuah, Abhijit Mitra (2020). Effect of lactation on serum electrolytes of semi-captive mithun cows (*Bos frontalis*). In: Proceedings of 38th Annual Convention of ISVM and National Symposium, 5-7th February, 2020. Pp 437.

Publications

- Joshi V., Biam K. P., Chamuah j. K., R. Vikram and Khan M. H. (2020). Status and Prospects of Mithun Farming in Northeast India *In: CAU Farm Magazine* January-March (5): 16-19
- Khape, V., Neog, P. and Asangla, H. K. (2020). Efficacy of insecticides against major insect pest of pigeon pea in Nagaland. *Journal of Entomology and Zoology Studies*. 8(4): 91-96.
- Chamuah, J. K., Amenti and Lalchamliani (2020). Occurrence of acaricidal resistance on ticks and their detection measures. *International Journal of Bio-resource and Stress Management*. 11(3):240-245

Distinguished Visitors

- Shri Bimbadhar Pradhan, Additional Secretary & Financial Advisor (DARE & ICAR) Krishi Bhavan, New Delhi visited ICAR-NRC on 13th January, 2020.
- Dr. S. L. Goswami former Vice-chancellor BUAT-Banda visited ICAR-NRC on Mithun on 27th February, 2020.
- Sri Temjen Imna Along; Hon'ble Minister of Higher & Technical Education, and Tribal Affairs, Govt of Nagaland visited ICAR-NRC on Mithun on 23rd May, 2020.

- Children from Shalom Public School, Chumukedima visited ICAR-NRC on Mithun, Medziphema on 30th January, 2020.



- Students from Hope Academy School visited ICAR-NRC on Mithun on 12th February, 2020.





The Editorial Escapade

This issue of the Mithun Digest covers the research achievements and outreach activities of ICAR-NRC Mithun as well as the KVK Phek which has been carried out during January to June 2020 for livelihood improvement of the mithun farmers. Besides, there is chronicle depicting activities of the Institute.

Chief Editors



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