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NDRI News

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Fulfilling Nation's Dairy Dreams

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ICAR-National Dairy Research Institute, Karnal

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From the Director's Desk

ICAR-National Dairy Research Institute, Karnal has hosted and promoted an initiative in the form of the Society for Innovation and Entrepreneurship in Dairying-Technology Business Incubator (SINED-TBI) with the objective to build a strong ecosystem for nurturing innovation and start-ups that would drive sustainable economic growth and generate large scale employment opportunities in the field of dairying. Established with the help of the Department of Science and Technology (DST), Government of India, it promotes the concept of growth through innovations and applications of technology, supports economic development strategies for small business and establishment of start-ups. The SINED-TBI is designed to support and nurture industries in the areas of Dairy and Food Processing, Dairy Farming, Feed Technology, Biotechnology, Bio-fertilizers, Bio pesticides and Panchgavya products. SINED-TBI is designed to provide a launch pad to budding entrepreneurs who wish to introduce themselves to the world of technology-based business careers. An entrepreneur makes fewer mistakes when he operates in the highly innovative and supportive environment of SINED-TBI. The incubator is designed to provide entrepreneurs all the support needed to make technology-based business ventures successful.

Any innovative Indian- a student, dairy/ food technologist, engineer, professional, unemployed youth, farmer etc. can apply for incubation of his/ her idea in the SINED-TBI. The individual must have an innovative idea/ project, which has the potential of commercial utility and/ or societal absorption. The success of any start-up depends on how effectively the entrepreneur demonstrates an understanding of the working environment of the venture, its target markets, as well as his/ her strategy to achieve stability and growth. Preference is given to first generation innovative entrepreneurs below the age of 30 years. Anyone who has viable project idea with high technology content covered under thrust areas and which requires incubation facilities can request for incubation at SINED-TBI. The application form to become an incubatee at SINED-TBI and format to submit business plan can be obtained from TBI office

In this issue	From Director's Desk	Research	Success Story	Extension	Events	Honours and Awards	Personalia	Distinguished Visitors	राज भाषा एकक	Southern Campus, Bengaluru	Eastern Campus, Kalyani
	1 - 2	3-5	5-6	6	6-17	17-18	19-20	20-21	21	21-25	26-29

or downloaded from the Institute website. Once the application is received, a panel of eminent technocrats consisting of experienced and qualified professionals from dairy industry and academicians process the applications of potential entrepreneurs for incubation in TBI. The panel selects the ventures after carefully evaluating the business idea, capability for business viability, growth prospects, market availability, potential value of the technology, innovative content and promoter team. The expert committee assesses this through a review of past activities, background check, references and personal interview, if necessary.

In the absence of a proper business plan, the request for membership is accepted provisionally in case the business proposal, seems promising prima-facie to the expert panel. The TBI also helps development of a business plan under pre-incubation programme. Once the decision is made to admit the entrepreneur to the incubation programme of TBI, negotiation of terms and execution of agreement between SINED-TBI and the entrepreneur are undertaken. Short-term and long term objectives for the venture's performance are jointly set up. Mentors, consultants, service providers or resource centres to assist the entrepreneur in achieving his goals are also identified, if necessary. The tenure of license to operate in the incubation program is for 18 months. An extension of one more term of 18 months is considered on a case-by-case basis based on the recommendations of the expert committee. In addition, an interested entrepreneur can acquire any technology developed at ICAR-NDRI and start incubation at SINED-TBI for commercialization of the product.

The performance of each incubatee company is reviewed twice a year by the expert committee set up for this purpose, which evaluates the progress of the company against its objectives. The quality and impact of the business assistance provided by the TBI or any further assistance in the form of mentors, consultants, service providers or resource centres required by the entrepreneur is identified during this review. In case the progress is not as per plan, the entrepreneur has to submit a formal application to the expert committee highlighting all factors responsible for the delays in the plan and the strategies to be adopted by the venture in overcoming the problems faced by the company.

The entrepreneur graduates from the incubation programme when the expiry of the period specified in the license agreement is over (unless it is extended by the competent authority), the revenue stream of the company is adequate for self-sustenance or the entrepreneurs have been able to tie up investors to finance the expansion plans of the venture and the incubator support is no longer necessary.

SINED-TBI also conducts Entrepreneurship Awareness Camps for the benefit of students every year. Experienced entrepreneurs, industry experts, officials from various agencies like banks, district industry centre and venture funding companies interact with our students and provide them with valuable inputs. Such programs are held to identify potential candidates for incubation. Educating and training people for developing entrepreneurial capabilities through positive training interventions is the core strategy of SINED-TBI. It acts as a facilitator and resource pool to motivate, guide and help the prospective and existing entrepreneurs in their entrepreneurial endeavours/ efforts through positive training interventions. Entrepreneurship Development Programmes (EDPs) are well formulated and suitably structured trainings conducted with the aim to create new enterprises. The programme provides details on institutional linkages and assistance, business opportunities, achievement motivation, technical orientation, factory visits, market survey, project report preparation, marketing management aspects, financial aspects, Factory Acts and Labour Laws, etc. Since its inception in 2009, at least twenty dairy entrepreneurs have graduated from the SINED-TBI of NDRI and have been successfully running their business. We are looking forward to make it more vibrant to produce more entrepreneurs.

(M S Chauhan)
Director

RESEARCH

Buffalo calves produced from semen of cloned bulls

M.K. Singh, N.L. Selokar, Subhash Chand, S.S. Lathwal, Kanika Gandhi, Smiriti Gupta, T.K. Mohanty and M.S. Chauhan

The Next Generation Sequencing of transcriptomic data from spermatozoa of the cloned bulls (MU-6253, MU-6708 & MU-6923) as well as parent bulls (MU-7263 from population, MU-5926 & MU-4393) revealed 27,481 transcripts, out of which 18,703 transcripts were expressed commonly in both cloned and somatic cell donor bulls spermatozoa. 566 up-regulated and 410 down-regulated transcripts at fold change >2.0 in cloned bulls spermatozoa revealed their involvement in different pathways. Expression level of most of the transcripts in spermatozoa of cloned bulls and their somatic cell donor bulls regulating spermatogenesis, fertility and early embryonic development were apparently similar. The findings of fresh semen parameters of cloned bulls semen and non-cloned bulls semen were also similar. Semen of the cloned bulls was found to be fit for AI, seven normal and healthy calves have been produced till October 3, 2021.

Calves produced using cloned bull semen

Role of improved management practices for production and reproductive performance in Sahiwal heifers:

Ashutosh, Anil Kumar, Inderjeet and Manju Ashutosh

Introduction of new package of practices along with flute music proved to be very effective in attaining higher daily weight gain and early age at insemination to establish pregnancy in indigenous breed of cattle (Sahiwal). The experiment was conducted in Sahiwal heifers (n=18) by providing regular feeding based on ICAR 2013 feeding standards, hygienic conditions and management of microenvironment. In addition to regular feeding practices, the experimental

heifers were also fed green Ramie (Boehmeria nivea) fodder @ of 2% of their body weight from the age of 12 months onwards. The animals were also allowed on kacha floor in an open paddock for 3 hours daily during the morning hours from 7.00 to 10.00 am in all seasons. The animals received sufficient sun light in open paddock. Based on available literature and ancient knowledge, the experimental heifers were exposed to soft flute music at smoothing volume on daily basis inside the animal house for 8 hours. The average daily weight gain of these Sahiwal heifers was recorded 343.5± 8.26 g/day since birth till the age at first AI and maximum daily weight gain (g/day) of 570±16.62 g (350-910 g/day) was recorded in these heifers between the age of 12-18 months. Age at the first service of experimental heifers was found to be significantly lower ($p<0.01$) in comparison to the field conditions. Out of 18 heifers, pregnancy was confirmed in 14 heifers. Average age at first service was found 761.78 days (2.08 years) only.

Experimental Sahiwal heifers at NICRA complex

Institutional Technology Management Cell

Patent Granted:

Name of Institute	Application/ Registration Number	Name of inventors	Name of Innovation/Technology/ Product/ Variety	Date of Filing/ Registration	Application Granted/ Registered
ICAR-NDRI, Karnal	3090/DEL/ 2011	Yajuvendra Singh, S.P. Lathwal, T.K. Mohanty, A.P. Ruhil and Shiv Prasad	Method and system for automatic identification and estrous detection in buffaloes on their vocalization patterns	October 31, 2011	Grant No.: 378373; Grant Date: September 30, 2021

Patent Filed:

Name of Institute	Application/ Registration Number	Name of inventors	Name of Innovation/ Technology/ Product/ Variety	Date of Filing/ Registration	Application Granted/ Registered
ICAR-NDRI, Karnal	202111038528 (Provisional)	Prasanna Pal, Anjali Aggarwal, Sachinandan De, Rajib Deb, Vinay Joshi and Avijit Haldar	Peptide sequences and epitope specific antibodies for detection of bovine Anti-Mullerian hormone (bAMH)	August 25, 2021	Application filed

Commercialization of Technologies:

Name of Institute	Name of Technology/ Know-How	IP Protection (Yes/ No)	Name of Contracting Party	Mode of Partnership	Date of Licensing	Revenue Earned (₹)
ICAR-NDRI, Karnal	Spore based kit for detection of antibiotic residues in milk at dairy farm	Yes/ Patent Application No. 2213/DEL/ 2014	Schreiber Dynamix Dairies Pvt. Ltd., Mumbai	License Agreement	August 31, 2021 through Agrinnovate	4.00 Lakhs
	Milk Protein enriched Iron fortified Bajra Biscuit	No	Chandigarh sweets, Chandigarh	License Agreement	Sept. 22, 2021 through Agrinnovate	1.50 Lakhs
	Total revenue generated = 5.50 Lakhs (Excluding Service Tax)					

Technology Transfer:

Transfer of Technology of "Milk Protein enriched Iron fortified Bajra Biscuit" to M/s Chandigarh sweets, Chandigarh on September 22, 2021

SUCCESS STORY

Break-through in Research / Success Stories / Promising Technologies:

Value addition and entrepreneurship critical for doubling farmer's income: ICAR-National Dairy Research Institute formed a woman self-help group (SHG) namely Shiv Sakthi SHG in Padhana village of Karnal district in the year 2018 under the DST project namely "Improving Livelihood of Rural Women through Dairy based Secondary Agriculture". The objective behind

the project is to facilitate the rural women to convert their raw milk into various value added milk products and sell them by themselves in the nearby markets. They were intensively trained on scientific preparation of quality milk products in NDRI and also in their premises.

The women entrepreneurs, besides manufacturing dairy products, have also entered into catering contract with some factory owners based at NH-1 for supplying dairy based tiffin items as per order. This group serves as a role model for others to emulate for similar ventures. Dr M. S. Chauhan, Director, NDRI visited the village on August 27, 2021 and appreciated the efforts of women group. He advised the women farmers to form groups, collect the milk from all members, make products and market under a brand name for realizing higher income and become successful farm entrepreneurs.

Further, he stated that women, being important contributors to dairying activities, can certainly work towards fulfilling the dreams of self-reliance. He emphasized that cleanliness of village premises add value and bring recognition to them. The women SHG earn income ranging from Rs. 15,000 to 40,000 per month through value added milk products.

These women farmers were found to follow all good dairy farm management practices and can be a good source of inspiration for others. Their role in welfare of the family and children can bring about tremendous improvement in the quality of life of the family.

EXTENSION

ICAR- NDRI identified 15 rural youth belonging to Scheduled Caste (SC) communities from Haryana and Himachal Pradesh and trained them for 45 days on Artificial Insemination (AI) in order to make them self-reliant (Atmanirbhar). The training was organized at Regional Demonstration and Training Centre (RDTC) of National Dairy Development Board (NDDB), Jalandhar, Punjab from August 2 to September 15, 2021 under Development Action Plan for Scheduled Caste (DAPSC).

The trainees obtained the skills comprising AI, pregnancy diagnosis (PD), Calving, conducting village survey, vaccination, castration, dehorning, basics of first Aid, deworming and other such functions associated with animals. It is expected that trainees will get exposure at field level to further sharpen their skill and establish entrepreneurship in AI to render quality AI services to the dairy farmers at affordable and reasonable rates. The training was coordinated by Dr K. Ponnusamy, Dr Arun Kumar Misra and Dr Chand Ram from NDRI side.

EVENTS

Hands-on training on Techniques in Molecular Biology

Animal Biotechnology Centre organized the 10 days National training on Hands-on Techniques in Molecular Biology sponsored under the Scheduled Caste Sub Plan (SCSP) Scheme of Govt. of India from August 21 to 30, 2021. A total of seven participants from different parts of the country, such as Tamil Nadu, Maharashtra, West Bengal, Orissa, and Pondicherry physically participated and got trained in the basic and advance molecular biology techniques.

Virtual International Symposium on 'Harnessing the potentials of genome editing tools to augment the productivity and health of farm animals':

Animal Biotechnology Centre, ICAR-NDRI organized the two days international symposium on July 19 & 20, 2021 harnessing the potentials of genome editing tools to augment the productivity and health of farm animals. Five speakers, namely Dr. Wang Xiaolong, College of Animal Science and Technology, Northwest A&F University, Yangling, China; Dr. Mcgrew Mike, Senior Lecturer, Roslin Institute, University of Edinburgh, UK; Dr. Petersen Björn, Institute of Farm Animal Genetics, Mariensee, Germany; Dr. Bhanu Talagu, Animal Sciences Research Center, University of Missouri, USA; and Dr. Naresh Selokar, Animal Biotechnology Centre, NDRI, Karnal, India, shared their experiences on the application of genome editing tools in farm animals.

This symposium was organized under the aegis of National Agricultural Higher Education Project (NAHEP). A total of 280 participants from different countries attended the symposium.

समौरा में पशु प्रजनन और समस्याओं पर प्रशिक्षण कार्यक्रम आयोजित

राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल ने फार्मर फसल परियोजना के तहत सितम्बर **9, 2021** को गांव समौरा में पशु प्रजनन और समस्याओं पर एक प्रशिक्षण कार्यक्रम आयोजित किया गया। इस कार्यक्रम में संस्थान के भूतपूर्व वरिष्ठ पशु चिकित्सक डा. ओमवीर सिंह ने पशुओं का गर्मी में आने पर पहचान तथा उच्च किस्म का वीर्य कृत्रिम गर्भाधान में प्रयोग हेतु किसानों को जागरूक किया तथा खनिज लवण का इस्तेमाल लगातार करने की सलाह दी जिसमें पशु ब्याँने के **100** दिन के अंदर गाभिन हो जावे और किसान भाईयों को नुकसान से बचाया जा सके। पशुओं के बांझपन के कारण इस गांव के पशुपालकों को बहुत नुकसान हो रहा है। इस प्रशिक्षण कार्यक्रम में गांव के पंच, सरपंच और मौजिज आदमियों ने भाग लिया ताकि ये पूरे गांव को जागरूक कर सकें।

इस परियोजना के प्रधान इन्वेस्टीगेटर डा. गोपाल सांखला ने पशुपालकों को बताया कि अगर किसान खेती के साथ पशुपालन वैज्ञानिक ढंग से करें तो वो अपनी आय को दुगुने से अधिक कर सकते हैं। संस्थान के निदेशक डा. मनमोहन सिंह चौहान की प्रेरणा से किसानों को उनके गांव व द्वार पर इस तरह के ऑफ कैम्पस प्रशिक्षण कार्यक्रम करके किसानों को प्रशिक्षित किया जा रहा है। इस कार्यक्रम को सफल बनाने में डा. राजकुमार, डा. सुनील कुमार, चंद्रपाल, शशिकांत और अशोक आदि ने अपना योगदान दिया।

वैज्ञानिक विधि से बकरी पालन

कृषि विज्ञान केंद्र, भा.कृ.अनु.प.- राष्ट्रीय डेरी अनुसंधान संस्थान में पांच दिवसीय वैज्ञानिक विधि से बकरी पालन प्रशिक्षण कार्यक्रम निदेशक डॉ. मनमोहन सिंह चौहान के मार्ग दर्शन में आयोजित किया गया। इस प्रशिक्षण में **15** प्रशिक्षणार्थियों ने भाग लिया। कृषि विज्ञान केंद्र अध्यक्ष डॉ. पंकज कुमार सारस्वत ने बकरी का कृषि में महत्व पर प्रकाश डालते हुए बताया कि बकरी गरीब परिवारों की आर्थिक स्थिति सुधरने में कैसे सहयोग कर सकती है। इस कार्यक्रम में बकरी पालन से सम्बन्धित सभी पहलुओं पर प्रकाश डाला गया। डॉ. निशांत कुमार ने बकरी के प्रजनन सम्बन्धित समस्याओं और उनको कैसे दूर किया जाये इस पर व्यख्यान दिया। डॉ. राज कुमार और डॉ. कौशल कुमार ने बकरियों की प्रमुख बीमारियों और उनकी रोकथाम के बारे में किसानों से विस्तार से चर्चा की। डॉ. नीलम उपाध्याय ने बकरी के दूध को प्रोसेसिंग के विषय में व्याख्यान प्रस्तुत किया। इस कार्यक्रम में श्रीमती दीपा कुमारी ने बकरी के दूध का पनीर कैसे बनाया जाता है प्रैक्टिकल द्वारा समझाया। डॉ. रमेश चंद्रा ने बकरियों के लिए आवास व्यवस्थाए कैसे शुरू करें, बकरी पालन, बकरियों की विभिन्न नस्ले और बकरियों से अधिक लाभ कैसे कमाया जा सकता है आदि विषयों पर अपने व्याख्यान प्रस्तुत किये। प्रशिक्षण से दौरान एक भ्रमण बड़ा गाँव और कुंजपुरा में किया गया। प्रशिक्षणार्थियों को बकरी अनुसंधान इकाई पशुधन संस्थान केंद्र का भी भ्रमण कराया गया था। इस कार्यक्रम में कृषि विज्ञान केंद्र के सभी आधिकारियों ने अपना सहयोग दिया जिसके फलस्वरूप यह कार्यक्रम सफल हो सका। इस प्रशिक्षण से सभी किसान बहुत खुश हुए और भविष्य में इस प्रकार के कार्यक्रम करने का अनुरोध किया। प्रशिक्षण के अंत में सभी प्रशिक्षणार्थियों को प्रमाण पत्र वितरित किये गये।

कृषि विज्ञान केंद्र, राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल के निदेशक डॉक्टर मनमोहन सिंह चौहान के मार्गदर्शन में लगातार कृषि की विभिन्न विधाओं में किसानों के लिए प्रशिक्षण कार्यक्रम आयोजित कर रहा है। इसी श्रंखला में चार दिवसीय प्रशिक्षण कार्यक्रम मत्स्य पालन, वैज्ञानिक विधि से तालाब प्रबंधन और बीमारियों की रोकथाम, विषय पर अगस्त **23** से **26, 2021** तक आयोजित किया गया। इस प्रशिक्षण कार्यक्रम मे करनाल और आसपास के जिलों से **48** किसानों एवं ग्रामिण युवाओं ने भाग लिया। प्रशिक्षण कार्यक्रम कोविड-**19** के नियमों की अनूपालना के साथ आयोजित किया गया जिसमें सभी किसानों की थर्मल स्क्रीनिंग के साथ सैनिटाइजर का भी प्रबंध किया गया। प्रशिक्षण कार्यक्रम के आयोजन में कृषि विज्ञान केंद्र के अध्यक्ष डॉ पंकज कुमार सारस्वत ने मत्स्य पलकों के लिए भारत सरकार द्वारा संचालित प्रधानमंत्री मत्स्य संपदा योजना के बारे में बताया। इस प्रशिक्षण कार्यक्रम का संचालन केंद्र के विषय विशेषज्ञ (मत्स्य पालन) डॉ राकेश कुमार टोंक ने किया। डॉ राकेश कुमार टोंक ने प्रशिक्षण कार्यक्रम के दौरान मत्स्य पालन की वैज्ञानिक विधियों के बारे में किसानों को विस्तार से जानकारी दी जिसमें मछली का

बीज संचय करने से पूर्व तालाब का प्रबंधन, बीज संचय करने की वैज्ञानिक विधियां, बीज संचय करने का अनुपात, बीज संचय करने के उपरांत तालाब का प्रबंधन, मछलियों का प्रबंधन एवं मछलियों का रखरखाव, मछलियों को फीडिंग कराने की तकनीक और मछलियों में प्रेरित प्रजनन प्रक्रिया पर प्रकाश डाला गया। प्रशिक्षण कार्यक्रम के दौरान केंद्र के तकनीकी सहायक श्री अरुण कुमार ने किसानों को मछलियों में होने वाली बीमारियों, उनके लक्षण और उनके उपचार के संबंध में जानकारी दी। प्रशिक्षण में किसानों को तकनीकों को प्रयोगात्मक पहलू के आधार पर समझाया गया जिसमें मछली पालन में प्रयुक्त होने वाली मछलियों की पहचान, जाल लगाना, मछलियों को पकड़ना, मछलियों के बीज की आक्सिजन के साथ पैकिंग की तकनीक को किसानों के समक्ष करके दिखाया गया। इस प्रशिक्षण कार्यक्रम के अंतर्गत प्रशिक्षणार्थियों को ग्राम कमालपुर रोड़ान ब्लॉक इंद्री के प्रगतिशील किसान श्री सुशील कुमार की हैचरी एवं मत्स्य पालन तालाब का भ्रमण भी कराया गया। प्रशिक्षणार्थियों ने श्री सुशील कुमार के साथ मत्स्य पालन के कार्य में आने वाली अड़चनों और मत्स्य पालन के उत्पादों की मार्केटिंग के बारे में चर्चा की। इस प्रकार के कार्यक्रम से किसानों में कृषि की नई विधाओं के बारे में जागरूकता के साथ-साथ स्किल डेवलपमेंट का कार्य भी बढ़ता है। इस कार्यक्रम के अंत में प्रशिक्षणार्थियों को प्रमाण पत्र वितरित किए गए।

Parthenium Weed Eradication Campaign under Swachh Bharat

ICAR-National Dairy Research Institute, Karnal organized a Parthenium weed eradication campaign on September 25, 2021 in order to create awareness among the residents of NDRI campus and maintain cleanliness. Dr. Dheer Singh, Joint Director (Research), NDRI while participating in the campaign informed that Parthenium hysterophorus is an alien invasive weed, producing 5000 to 25000 seeds per plant and easily get dispersed to distant places due to its light weight seed. It affects the health of animals, plants, people and environment as it is present everywhere including crop lands, city dwellings and rail and road sides. The strategies for control of this obnoxious weed include community mobilization involving all sections of the society, organizing regular meetings and demonstrations for awareness creation, uprooting the weed before flowering and making compost by pit method, spraying herbicides like glyphosate (1.0 to 1.5%) or 2, 4-D (1.0 to 1.5 %) and releasing bio-control agents such as Zygogramma biocolorata in infested areas during rainy season. Dr. Dheer Singh highlighted the importance of joining together by all concerned to eliminate the Parthenium weed menace and build clean, strong and healthy nation. The programme was coordinated by Dr. K. Ponnusamy, Nodal officer, Swachh Bharat Abhiyan, ICAR-NDRI, Karnal.

Webinar on Biological Diversity Act

ICAR-NDRI, Karnal organized a webinar on the theme "Biological Diversity Act 2002 with special reference to Access and Benefit Sharing" on July 19, 2021. The main objective of this webinar was to provide education, information and awareness among students, faculty and researchers of the institute and other ICAR institutes about the conservation, sustainable use of the biodiversity and equitable sharing of benefits arising from the use of products of the biodiversity among the local communities. The webinar was attended by more than 100 participants including, students, faculty and researchers.

Dr. P. K. Singh, Principal Scientist, ICAR-National Bureau of Animal Genetic Resources was the main resource person. Dr. K.P. Raghuram and Dr. Neelima, the two officials of National Biodiversity Authority (NBA), Chennai, which is the main implementing agency for the Biological Diversity Act 2002 also participated in the discussion. In his opening remarks, Dr. M.S. Chauhan, Director, NDRI said that responsible use of bio resources is the need of the hour and the act provides for conservation of Biological Diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith. He further said that whenever a patent is filed wherein a bio-resource has been used, the permission of NBA is required. He further said that Human genetic material is exempted from the purview of the Act.

Webinar on Developing Practical Leadership Skills

A Webinar on "Developing Practical Leadership Skills" was held at ICAR-NDRI, Karnal on September 13, 2021. At the outset, Dr. Manmohan Singh Chauhan, Director of NDRI said that Practical Leadership Skill provides a framework and template for our journey to become a great leader and added that leadership was a skill to acquire and master, rather than a genetic inheritance. The main speaker on the occasion was Major Priya Jhingan who is also the Lady Cadet No.1 of the Officers Training Academy, Chennai. She has been instrumental in advocating the cause of women's induction into the Indian Army by writing a letter to the Chief of Army Staff, way back in the late 80's, appealing to him to permit women to join the Indian Army. Major Priya spoke on the knowledge of various aspects of leadership, personality development and grooming. She said that there was an urgent need to make our Indian Youth 'Future Ready" to make Ever Progressive India. Dr. Bimlesh Mann coordinated the Webinar. The Webinar was attended by more than 120 scientists and scholars from throughout the country.

IDP Webinars

- International Webinar on the topic "Impact of Oxidative Stress on Male and Female Reproduction" was organized during July 1, 2021. The lecture was delivered by Dr. Robert John Aitken, Distinguished Laureate Professor, School of Environmental and Life Sciences, University of Newcastle University Drive, Callaghan, Australia.
- International Webinar on the topic "Host-microbial interactions in Neonatal calves" was organized during July 5, 2021. The lecture was delivered by Dr. Nilusha Malmuthuge, Research Scientist, Agriculture Agri-Food, Lethbridge Research and Development Centre, Canada.
- International Webinar on the topic "Colonization and Establishment of Rumen Microbiota-opportunities to Influence the Livestock Productivity" was organized during July 20, 2021. The lecture was delivered by Dr. David Yanez- Ruiz, Senior Research Scientist, Estacion Experimental del Zaidin (CSIC), Granada, Spain.
- International Webinar on the topic "Milk Proteins for the Future" was conducted on July 22, 2021. Two lectures were delivered viz. i) "Heat induced immunological consequences in milk" by Dr. Kasper Hettinga, Associate Professor, Food Quality and Design, Wageningen University and Research & ii) "Casein Micelles: Latest insights and developments" by Dr. Etske Bljl, Assistant Professor, Food Quality and Design, Wageningen University and Research.

हरेला कार्यक्रम

भारतीय कृषि अनुसंधान परिषद् के 93वें स्थापना दिवस के सुअवसर पर राष्ट्रीय डेरी अनुसंधान संस्थानए करनाल में हरेला कार्यक्रम के अंतर्गत प्रसिद्द पर्यावरणविद एवं वन्य जीव विशेषज्ञ श्री हरीश रौतेला जी के मार्गदर्शन में पौध रोपण कार्यक्रम का आयोजन किया गया। इस अवसर पर डॉ. एम.एस. चौहान की अध्यक्षता में संस्थान के वैज्ञानिकों द्वारा विविध प्रकार के फलों के 150 से अधिक पौधों का रोपण किया गया। अपने सम्बोधन में राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल के निदेशक, डॉ. मनमोहन सिंह चौहान ने बताया कि आज उत्तराखंड का यह सांस्कृतिक एवं लोक पर्व हरेला न केवल पूरे देश में बल्कि फ़्रांस, दुबई, अमेरिका सहित दुनिया के 114 देशों में धूमधाम से मनाया जा रहा है।

अपने सम्बोधन में डॉ. मनमोहन सिंह चौहान ने कहा कि हरेला कार्यक्रम के मुख्य घटकों में वन्य जीव संरक्षण, पौध रोपण, जल संचय, गरीबों के लिए समाज उपयोगी कार्य आदि सम्मिलित है। उन्होंने आगे बताया की हरेला कार्यक्रम आज के दिन विद्यालयों के विद्यार्थियों को जल संचयए पर्यावरण सुरक्षा आदि के लिए शिक्षित एवं प्रोत्साहित करता है। अपने उदबोधन में उन्होंने कहा कि कोरोना महामारी की दूसरी लहर के दौरान हम लोगों ने देखा कि ऑक्सीजन मानव जीवन के लिए कितना महत्वपूर्ण है। पौध रोपण कार्यक्रम पर्यावरण में ऑक्सीजन की यथोचित मात्रा सुनिश्चित करने के लिए एक महत्वपूर्ण कदम है।

इस कार्य के लिए श्री हरीश रौतेला जी विगत 20 वर्षों से संघर्षरत हैं। उनके अथक प्रयास का ही परिणाम है कि आज देश में करोड़ों की संख्या में तरह-तरह के पौधे लगाए जा रहे हैं ताकि पृथ्वी पर पर्यावरण संरक्षित रहे तथा हरियाली कायम रहे। श्री हरीश रौतेला जी ने कहा कि इस कार्य को करने के लिए सभी लोगों को सामूहिक प्रयास करने की आवश्यकता है ताकि पर्यावरण संतुलन कायम रहेए ऑक्सीजन की अपेक्षित मात्रा विद्यमान रहे तथा पहाड़ों एवं मैदानी क्षेत्र में वृक्ष, पशुधन तथा वन्यजीवों का संतुलन भी बना रहे।

श्री रौतेला जी ने आगे बताया कि हरेला त्योहार में भौतिकवादी चीजों की तुलना में मानवीय चीजों को महत्ता दी जाती है। वर्तमान समय में प्राकृतिक एवं मनुष्य को परस्पर विरोधी के रूप में देखा जाता है जबकि यह अवधारणा मिथ्या है। हरेला का त्योहार मानव एवं प्राकृतिक के बीच सामंजस्य बैठाने की सीख देता है। इस लोक पर्व का मुख्य उद्देश्य प्राकृतिक का संरक्षण एवं संर्वधन है जो किसी एक व्यक्ति के द्वारा संभव नहीं है। इसके लिए सामूहिक एकजुटता की आवश्यकता है। श्री रौतेला जी ने अन्त में बताया कि यह महान लोकपर्व मनुष्य को आपस में जौड़ता है। जब हरेला के दौरान मानव प्राकृतिक की हरियाली को देखता है तो वह प्रफुलित होता है और इस त्योहार में सामाजिक मूल्य को समझता है। इस कार्यक्रम के अवसर पर संस्थान के संयुक्त निदेशक (अनुसंधान), डॉ. धीर सिंह, संयुक्त निदेशक (शैक्षणिक), डॉ. आर. आर. बी. सिंह, अनेक प्रभागों के अध्यक्ष, अनुभागों के प्रभारी, वैज्ञानिक अधिकारी एवं कर्मचारी उपस्थित थे।

कृत्रिम गर्भाधान पर अनुसूचित जाति के युवाओं का प्रशिक्षण

डॉ. मनमोहन सिंह चौहान, निदेशक, भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल के मार्गदर्शन में हरियाणा और हिमाचल प्रदेश के अनुसूचित जाति (एस सी) के 15 ग्रामीण युवाओं को कृत्रिम गर्भाधान (ए आई) बेसिक पर 45 दिनों के लिए प्रशिक्षित किया गया। प्रशिक्षण अनुसूचित जाति के लिए विकास कार्य योजना (डी.ए.पी.एस.सी.) के तहत अगस्त 2, 2021 से सितम्बर 15, 2021 तक राष्ट्रीय डेयरी विकास बोर्ड (एन.डी.डी.बी.) जालंधर, पंजाब के क्षेत्रिय प्रदर्शन और प्रशिक्षण केंद्र (आर.डी.टी.सी.) में आयोजित किया गया। प्रशिक्षुओं ने ए आई गर्भावस्था निदान (पी.डी.), ब्यांत प्रबंधन, टीकाकरण, डीवर्मिंग, बधियाकरण, डीहार्निंग, प्राथमिक चिकित्सा आदि की मूल बातें और पशु प्रबंधन से जुड़े अन्य कार्यों का कौशल प्राप्त किया ताकि वे डेरी विकास में गुणवत्तापूर्ण ए आई सेवाएं किसानों को सस्ती और उचित दरों पर प्रदान कर सकें। प्रशिक्षण का समन्वय एन.डी.आर.आई. की ओर से डॉ. के. पोन्नुसामी, डॉ. अरुण मिश्रा और डॉ. चाँद राम द्वारा किया गया।

Scientists Visit Village Baragaon under Mera Gaon Mera Gaurav Programme

A six-member team of subject matter specialists of ICAR-NDRI, visited the village Baragaon (Tehsil Karnal, District Karnal, Haryana) September 29, 2021under Mera Gaon Mera Gaurav (MGMG) programme. The team discussed various issues related to good veterinary and animal husbandry practices that the farmers should follow in order to keep milch animals healthy; and to obtain better milk yield. Farmers had inquired about remedial measures and treatment for placenta problems in cows.

The scientists addressed the issues related to placenta problems and described health care practices that the farmers should adopt to prevent such issues. They further educated the farmers about mineral mixture's importance on animal health as well as preparation of mineral mixture with the locally available fodder and feed ingredients. They educated the village women about clean milk practices. Farmers were also informed about various online resources available for progressive farming and the need to avoid use of recycled plastics in daily life to save environment. Information on village demographics was also collected for helping the farmers in a befitting manner by keeping in continuous touch.

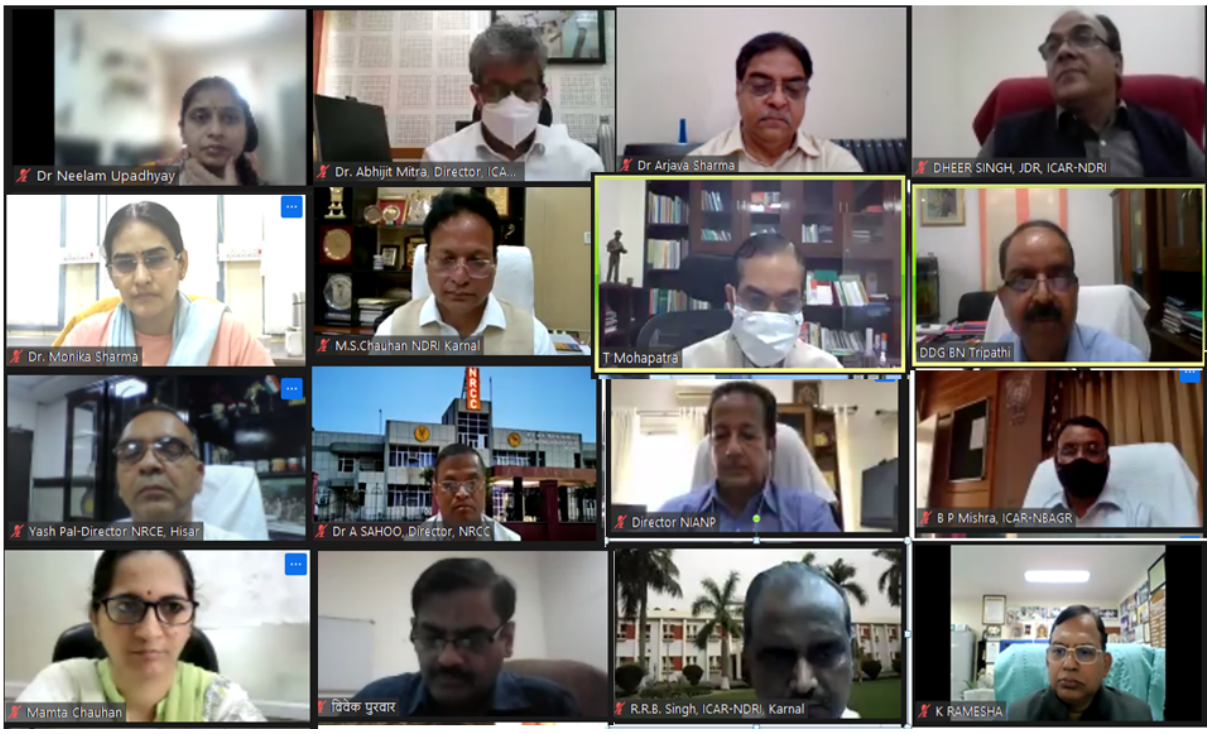
International Webinar on Genomic Dairy Cattle Breeding in Developed Countries

In commemoration of India's 75 years of Independence and Azadi Ka Amrit Mahotsav, ICAR-National Dairy Research Institute organized an international webinar on the topic "Genomic Dairy Cattle Breeding in Developed Countries - with a view to its application in India" on September 30, 2021 under IDP-NAHEP programme of ICAR.

Dr. M. S. Chauhan, Director of the Institute and the Chief Patron inaugurated the webinar with his introductory remarks and welcomed the Speaker. Prof. Bernt Guldbrandtsen from the University of Copenhagen was the Speaker on the occasion. He gave an outstanding presentation on the pros and cons of the genomic selection of dairy cattle in the developed countries and explained its possible utilization for dairy development programme in our country, which was followed by an interactive and detailed discussion session. A strong audience of 111 participants from post-graduate students, scientific faculty from ICAR-NDRI as well as other ICAR Institutes was the testimony to the success of this international webinar. The webinar was a huge success.

The 99th Foundation Day of ICAR-NDRI:

The 99th Foundation Day of ICAR-NDRI was celebrated on July 1, 2021 in virtual mode by the Alumni Association of Southern Regional Station (SRS) Bangalore. At the onset of program, Dr. K.P. Ramesha, Head, SRS of NDRI, Bangalore briefed about the various activities carried out by the Institute over the last 99 years. Dr. Manmohan Singh Chauhan, Director of the Institute welcomed all the participants and informed that around 36 technologies and 16 patents have been developed by the Institute over the years. The cloning technique developed at NDRI has revolutionised the area of reproduction. Over 7000 students have graduated under various graduates, post graduate and doctoral programs over the last 99 years.



Dr. B.N. Tripathi, DDG (Animal Sciences), Guest of Honor, in his deliberation said that although we have become the world leaders in milk production but we have to work hard to meet the day to day challenges faced by the dairy industry and farmers. Chief Guest of the function, Dr. Trilochan Mohapatra, Secretary, DARE & Director General, ICAR critically reviewed the performance of ICAR-NDRI for the last 99 years. Dr. Mohapatra told that NDRI as one of the premier Institutes in dairy sector has contributed a lot in the growth of dairy industry and played a crucial role in India's development in milk production with its continuous research. He added that still there is an urgent need to identify unique products of Indian dairy breeds and enhance our Human Resource Development (HRD) resources. He empathized that more Industry – Institute partnership should be made and efforts should be made to improve the quality of milk products so that our farmers can get more income from their products. Dr. Mohapatra emphasised that ICAR-NDRI should also work more towards upliftment of various *goshalas* and help young entrepreneurs to promote dairying under rural conditions. The meeting was attended by more than 300 participants including Directors of various Institutes, Alumni, students and staff members.

Webinar on Dietary Interventions for Addressing Menopausal Symptoms:

A one day Webinar on 'Dietary Interventions for addressing menopausal symptoms' was organized at ICAR-National Dairy Research Institute on August 27, 2021. Dr. Manmohan Singh Chauhan, Director, NDRI informed that the webinar was conducted under the NDRI Lecture series to commemorate 75 years of Indian Independence. He told that the objective of the webinar was to bring about much needed awareness amongst the faculty and students about the dietary interventions that can be helpful in addressing as well as minimizing the adverse effects associated with menopausal symptoms.

Ms. Manisha Mehta, Clinical Dietician and Sports Nutritionist acted as a resource person for this webinar. During the webinar, Ms. Mehta focused on medical symptoms of menopause. She emphasized on the three steps, namely exercise, right diet and timely sleep to rectify menopausal symptoms. She detailed about the specific exercises to manage menopausal symptoms. She focused that quantified damage is done by exercise, which is repaired by right choice of foods. Further, Ms. Manish talked about nutritional guidelines and food products that must be consumed by women showing menopause symptoms.

Webinar on Career Opportunities in Dairy Sector:

Karnal regional chapter of National Academy of Agricultural Sciences (NAAS) in collaboration with National Dairy Research Institute, Karnal organized a webinar on the theme Career Opportunities in Dairy Sector on August 19, 2021. The webinar was attended by students, faculty members and vice chancellors of various agricultural universities.

In this webinar Dr. R.R.B. Singh, Joint Director (Academic), NDRI, Karnal made a presentation on Career Opportunities in Dairy Sector. He said that career is a life long journey that helps one fullfil important inspirational goals and needs to be planned well in advance looking into one's aptitude, personality and interest. He informed that there are tremendous career opportunities in the dairy sector as milk production is growing at the rate of 6% and the demand for milk product is also rising. In the year 2020, milk production in the country was 198 million metric ton, which was around 20% of the global milk production.

Estimates do indicate that in the coming 5 years processed dairy segment will grow by 15% and this will bring enormous employment opportunities. He said that at present 25 institutions across India offer under-graduate programme in Dairy Technology and every year around 600 dairy graduates pass out while the demand is much higher. He informed that NDRI dairy graduates are getting handsome salary packages in the range of Rs. 5 – 13.5 Lakh per annum.

Speaking on this occasion, Dr. M.S. Chauhan, Director, NDRI, Karnal, said that Dairy Science represents a domain which offers a wide variety of career paths viz., industry professionals, managers, researchers, teachers and entrepreneurs. He indicated that in the present context career in dairy technology would be good option for the students as the dairy industry is growing at over 10% CAGR and there would be huge demand for dairy professional for many more years.

Dr. M.L. Madan, Convener, NAAS, Karnal Chapter and former Deputy Director General (Animal Sciences), ICAR said that the main purpose of these lectures is to bring awareness among the students about Agricultural Sciences and make them aware about the opportunities available in these allied subjects. He further said that many such lectures have been planned in future wherein eminent agricultural scientists will interact with students about scope in agriculture. The entire session was coordinated by Dr. Sunita Grover, former Head, Dairy Microbiology Division, NDRI, Karnal.

HONOURS AND AWARDS

- ICAR-NDRI was conferred Global Water Award on August 22, 2021 for work carried out on water saving and reuse technologies on the occasion of 5th World Water Summit 2021. This is one of the prestigious awards in the field of water conservation and the project Agri CRP on water was adjudged as Global Agri Water Project of the year 2021. The award was conferred by Sh. Gajendra Singh Sekhawat, Hon'ble Union Cabinet Minister of Jal Shakti, Govt. of India to Dr. M.S. Chauhan, Director, ICAR-NDRI, Karnal, on August 22, 2021. On this occasion Dr. M.S. Chauhan, emphasized on the importance of water for the future and informed that this award would give us enthusiasm for developing more technologies for water saving and waste water reused in livestock based farming system for the conservation of water at farmer's level and would help in saving significant quantities of water. By installing water saving devices, Institute is saving around 10 lakhs liters of water on daily basis. Presently, Institute campus is zero liquid discharge (ZLD) unit.

- Dr. P. Barnwal, PS and Acting Head, DE Division received "Engineering Excellence Award-2021" from The Institution of Engineers (India) Rajasthan State Centre, Jaipur" on the occasion of 75th Independence Day on August 15, 2021 at Jaipur.

- Dr. K. Ponnusamy Principal Scientist (Dairy Extension) and Dr. Nishant Kumar, Senior Scientist (Veterinary Gynaecology and Obstetrics) received Best Teacher Award of the Institute at 18th Convocation held on August 24, 2021.

- श्री प्रभजीत सिंह बहल, सहायक (विश्वविद्यालय कार्यालय), सदस्य, आई.जे.एस.सी. एवं सी.जे.एस.सी. (प्रशासन) को वर्ष 2019-20 के दौरान सरकारी कामकाज में मूल रूप से हिन्दी टिप्पणी/ आलेखन प्रतियोगिता में प्रथम पुरस्कार मिलने पर डा. एम.एस. चौहान, निदेशक, भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल ने सम्मानित किया।

PERSONALIA

Joining/ Appointments/ Promotions:

- Followings Scientists have been promoted to the next higher Research Grade Pay under CAS w.e.f. date mentioned against each:-

Sl. No.	Name/Designation of the Scientists	Promoted to Next Grade Pay	Date of Promotion
1)	Dr. Priyanka Singh Rao, Scientist, DC	RGP of Rs. 7,000/-	1.01.2018
2)	Dr. Richa Singh, Scientist, DC	-do-	-do-
3)	Dr. Diwas Pradhan, Scientist, DM	-do-	-do-
4)	Dr. Vedamurthy G V, Scientist, ABC	-do-	1.01.2019
5)	Dr. Writdhama G Prasad, Scientist, DT	-do-	-do-
6)	Dr. Neelam Upadhyay, Scientist, Food Technology	-do-	-do-
7)	Dr. Sachin Kumar, Scientist, Animal Nutrition	-do-	-do-
8)	Dr. Manoj Kumar Singh, Scientist, ABTC	RGP of Rs. 8,000/-	10.02.2018
9)	Dr. Sudarshan Kumar, Scientist, ABTC	-do-	21.04.2018
10)	Dr. Sanjit Maiti, Scientist, Vet. Extension Education	-do-	21.10.2018
11)	Dr. Asif Mohammad, Scientist, Vet. Extn. Education	-do-	04.11.2018
12)	Dr. S. Subash, Scientist, Vet. Extension Education	-do-	-do-
13)	Dr. P. Narender Raju, Scientist, FS&T	-do-	15.12.2018
14)	Dr. A. Manimaran, Scientist, Veterinary Pharmacology	-do-	07.02.2019
15)	Dr. Prashant Saurabh Minz, Scientist, AS&PE	-do-	10.02.2019

- Consequent upon his promotion to the post of Chief Administrative Officer (Sr. Grade) in the Pay Level-13, Sh. G.G. Harakangi, Chief Administrative Officer joined his duties to the post of CAO (Sr. Grade) in the forenoon of September 2, 2021 at ICAR-NDRI, Karnal.
- In pursuance of offer of appointment issued dated September 15, 2021, Sh. Ram Dhari, Assistant was promoted to the post of Assistant Administrative Officer under Promotion Quota in the Pay Level-7 at ICAR-NDRI, Karnal w.e.f. September 15, 2021(AN).

Transfers/ Retirements/ Relieving

- Dr. Veena Mani, PS, Animal Nutrition Division retired on attaining the age of superannuation in the afternoon of July 31, 2021 from ICAR Services.

Additional Responsibility

- Dr. Vikas Vohra, Principal Scientist, Animal Genetics & Breeding entrusted with the responsibilities of Coordinator, Dairy Production & Management wing of the Placement Cell w.e.f. July13, 2021.
- Dr. A. K. Puniya, Principal Scientist was entrusted with the responsibilities of Incharge, Library Services w.e.f. July 22, 2021.
- Dr. A.K. Mishra, PS & Acting Head, LPM was entrusted with the responsibilities of Chairman, Animal Allotment Committee w.e.f. July 22, 2021.

- Dr. Udita Chaudhary, Scientist, Dairy Economics was assigned the responsibilities of Incharge, Computer Centre and EPABX w.e.f. July 29, 2021.
- Dr. Vikas Vohra, Principal Scientist has been entrusted with the responsibilities of Nodal Officer, PMS w.e.f. August 23, 2021
- Consequent upon his joining, Sh. G.G. Harakangi, CAO (SG) was entrusted with the responsibility of Head of Office w.e.f. September 3, 2021.
- Dr. Dheer Singh, Joint Director (Research) was entrusted with responsibilities of Nodal Officer of 'Gender Advancement for Transforming Institutions (GATI) w.e.f. September 3, 2021 and also Chairman of "Lab to Wheel" Committee w.e.f. September 3, 2021.
- Dr. M.S. Chauhan, Director was entrusted with responsibilities of Chairman of Library Advisory Committee (LAC) w.e.f. September 7, 2021 and also Chairman of Institute Technology Management Committee (ITMC) w.e.f. September 27, 2021.
- Dr. Ravinder Malhotra, Principal Scientist, DES&M and CEO, ICAR-NDRI, Karnal was entrusted with the responsibilities of Nodal Officer for RTI-MIS portal facilities w.e.f. September 23, 2021.

DISTINGUISHED VISITORS

Environmentalist and social worker Dr. Harish Routella, visits NICRA Complex

A program was organized at NICRA complex of the ICAR-National Dairy Research Institute, Karnal on July 22, 2021 for distribution of education related material and table top water filters to Scheduled Caste community beneficiaries. At this occasion rewound environmentalist and social worker **Dr. Harish Routella** was the Chief Guest.

At this occasion, Dr. Routella, emphasized on the effects of climate change on the farming community and called it as need of the time to solve climate related issues affecting the agriculture as well as livestock sector of the country. He appealed the scientific community to take up the research projects on climate related issues to make the livestock production system climate resilient.

During his address to the gathering of SC Community of farmers and children, he explained the role of every citizen in nation building activities like water saving, tree plantation and conservation of natural resources. All such efforts made by every citizen may lead to better future of coming generations. While interacting with children during the program, he told them the importance of education and studies in life.

राज भाषा एकक

राजभाषा कार्यान्वयन समिति की तिमाही बैठक

डा. धीर सिंह, कार्यकारी निदेशक एवं संयुक्त निदेशक (अनुसंधान) की अध्यक्षता में संस्थान राजभाषा कार्यान्वयन समिति की 92वीं तिमाही बैठक सितम्बर 7, 2021 को कोविड संबंधी निर्देशों की पालना के साथ संस्थान के डा. एन. एन. दस्तूर सभागार में आयोजित की गयी। इस बैठक में पिछली बैठक के कार्यवृत्त के अनुमोदन उपरांत सर्वसम्मति से कई महत्वपूर्ण निर्णय लिए गए। संस्थान के अधिकारियों एवं कर्मचारियों का हिंदी ज्ञान से संबंधी रोस्टर तैयार कर उन्हें व्यक्तिशः आदेश जारी करने, सेवा-पुस्तिकाओं के सभी इन्दराज हिन्दी में करने, राजभाषा अधिनियम 1963 की धारा 3(3) के सभी दस्तावेजों को अनिवार्यतः द्विभाषी में जारी कर इन्हें संस्थान ई-ऑफिस नोटिस बोर्ड तथा वेबसाइट पर अपलोड करने, राजभाषा नियम 1976 के नियम 5 के अनुसार हिंदी में प्राप्त पत्रों के उत्तर हिंदी में दिए जाने तथा सभी अधिकारियों व कर्मचारियों के द्वारा ई-ऑफिस पर लघु टिप्पणियां हिन्दी में लिखने का निर्णय लिया गया। बैठक के दौरान हिन्दी उल्लास महोत्सव-2021 तथा हिन्दी दिवस का भव्य आयोजन किए जाने का निर्णय भी लिया गया।

हिन्दी प्रशिक्षण का आयोजन

राजभाषा एकक के द्वारा सितम्बर 29, 2021 को संस्थान के पांच कर्मचारियों को उनके कंप्यूटर पर हिन्दी फोंट व ई-हिन्दी टूल्स का प्रयोग करने के बारे में डेस्क प्रशिक्षण प्रदान कर अभ्यास कराया गया।

Southern Campus, Bengaluru

Research Highlights:

Technology for ghee residue incorporated energy bar

Amanchi A Sangama, Monika Sharma, K Jayaraj Rao, Menon Rekha Ravindra and Laxmana Naik N

Ghee residue (GR), a nutrient dense mass obtained as a by-product during the preparation of ghee has not been effectively utilized for food product development. Efforts were made to optimize the formulation of a ghee residue incorporated energy bar using response surface methodology. All the energy bar samples were subjected to sensory evaluation and determination of hardness. Cubic models were significant ($p<0.05$) for colour, flavour and overall acceptability and quadratic model for body and texture scores. Upon optimization, desirability of 0.88 was obtained for 32.09% GR and 22.91% LG. Predicted and experimental values were same ($p>0.05$) for all responses except colour ($p<0.05$). Acidity and free fatty acid increased significantly ($p<0.05$) during storage of bar. Product had storage life of 45 days at 25±2˚C.

Energy bar contained 5.49% fat, 20.82% protein, 9.80% moisture, 2.53% minerals, 1.10% phospholipids, 31.1% antioxidants activity, 15.28% crude fiber and 377.70Kcal/100g total calories, respectively. Thus, it can be concluded that GR was successfully utilized for development of protein rich energy bar. Chocolate-coated variant was also developed for the wider acceptance among younger population.

Technology for production of reduced sugar burfi with natural sweeteners

Amal Biswas K. V. and Sathish Kumar, M.H.

Studies were carried out to develop natural non-nutritive sweetener based burfi. The optimized combination sweetener included fructo-oligosaccharides, maltitol and stevia. The optimized reduced sugar burfi was prepared with optimized combination and compared with sucrose added burfi (control). The prepared product was packed in an airtight polypropylene cup and storage stability was examined over a period of 10 days. The changes in physico chemical characteristics, textural attributes, sensory attributes and microbial quality were evaluated. Moisture, acidity, FFA, HMF, hardness, gumminess, chewiness and all sensorial attributes showed significant changes ($p<0.05$) during storage with respect to time, however, difference between optimized product and control was not significant ($p>0.05$). As an outcome, a sensorially acceptable reduced sugar burfi with natural sweeteners was successfully developed.

Glycerol block like supplement to dairy cows in early lactation

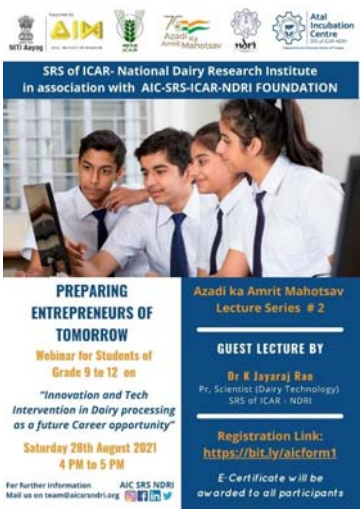
Bandla Srinivas, Savitha, G., Punith Kumar

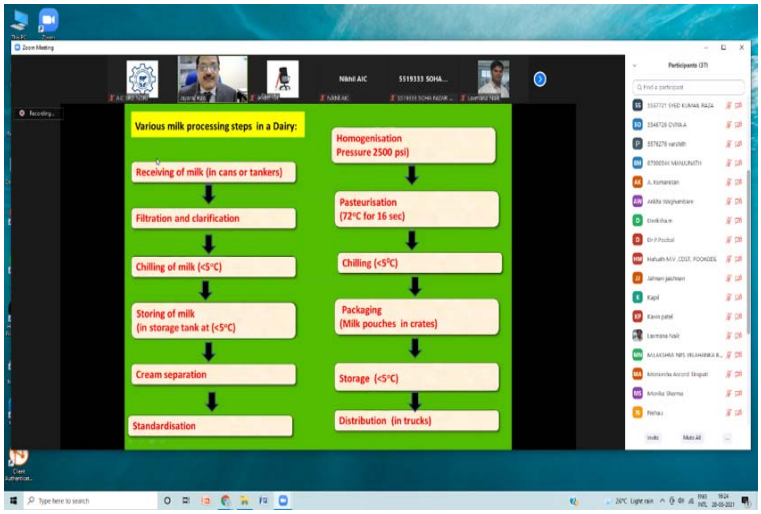
Glycerol block lick composition was standardized and fed to lactating cows in the early lactation for 6 weeks and observed increased 4% fat corrected milk yield by 3.85 kg/d compared to control with average milk yield of 10.40 kg/d and milk fat% was 3.97% in comparison to control with 3.37%. The energy status of the animal was unaltered but blood glucose content was increased significantly ($P< 0.01$) even upto 75 mg/dL that was 10 mg/dL was higher than the control. Glycerol being intermediary metabolite appears to be channelized based on metabolic requirements mostly for gluconeogenesis and less extent for triglyceride synthesis in lactating cows. Net benefit from glycerol block lick cost and increased milk yield was Rs. 80/- per day.

Events Organized

Webinar on "Preparing Entrepreneurs of Tomorrow: Innovation and Tech Intervention in Dairy Processing as a Future Career Opportunity"

As part of Azadi Ka Amrit Mahotsav – Lecture series, SRS of ICAR-NDRI in association with AIC-SRS-ICAR-NDRI Foundation hosted its second webinar on the topic "Preparing Entrepreneurs of Tomorrow: Innovation and Tech Intervention in Dairy processing as a future Career opportunity" for students from 9th to 12th standard from 4 to 5 PM on Saturday, August 28, 2021. The session was headed by Dr. K. Jayaraj Rao, Principal Scientist, Dairy Technology Section, Southern Regional Station, ICAR-NDRI, Bengaluru and Director, AIC-SRS-ICAR-NDRI Foundation with a welcome address from Dr. K.P. Ramesha, Head, Southern Regional





Station, ICAR-NDRI, Bengaluru and Director, AIC-SRS-ICAR-NDRI Foundation. The topic was of interest as entrepreneurship allows students to learn more than just their chosen field of study, and bridges the gap between real life skills and skills taught at school. Students were guided for acquiring the skills of 21st century such as problem solving, critical thinking, effective communication, innovation etc. The acquired skills would fill their world with success and brighten their future. The presentation focused mainly on the entrepreneurial opportunities in the field of dairy processing. Dr. K. Jayaraj Rao explained several aspects related to dairy processing that included need for milk processing, various steps in processing of milk, range of milk and milk products available in the market, economics of dairy processing, importance of value addition among others. The session was concluded after interaction with the participants who got to clear their doubts with regard to dairy processing. The webinar was held to nurture the young entrepreneurs and sharpen their skill set and the event received a wonderful applause especially from the students and teachers community.

Observance of 'Parthenium Awareness Week'

Parthenium hysterophorus (Family: Asteraceae), locally called gajar ghas or congress grass, is an alien weed, which entered into India along with wheat imported from USA in the early 1950s. Since then it has spread alarmingly and invaded about 35 million hectares of land throughout the

country. This weed is notorious to cause many diseases like skin allergy, hay fever, breathing problems in human beings and animals besides reducing agricultural productivity loss of biodiversity (ICAR). Southern Regional Station of ICAR-NDRI, Bangalore observed Parthenium Awareness Week' during August 16 to 22, 2021 created awareness about the menace, harmful effects of Parthenium.

During the period, staff of LRC and housekeeping was involved actively in removal of Parthenium weed in the campus by uprooting, spraying herbicides and clearing off the weeds and bushes etc.

Extension Activities

Advisory services- Advisory services were rendered to 110 of the clienteles, to most through online mode and during their personal visits to the institute, phone and mail enquiries. The advisory profile comprised technical advice for commercial dairy farming /dairy start-ups, scientific feeding of dairy cows, indigenous dairy products, hydroponic fodder cultivation and silage making.

Outreach Activities

A farmers' interactive meeting was organized under SCSP project in the project villages of Kolar Taluk, Kolar District on July 13, 2021 in Karisandra and on August 6, 2021 at Hunasikote villages, for sensitizing farmers about green fodder production. Improved fodder seeds of sorghum, maize, lucerne & hedge lucerne were distributed for benefit of 55 SC beneficiaries.

A Demonstration programme on Mastitis Management was organized in the adopted villages, Karisandra on July17, 2021 & Hunasikote on August 6, 2021 and CMT kits were provided to the 55 SC farmer-beneficiaries. An Animal Health Camp was organized at Karisandra village and 80 dairy cows were attended to for various health & infertility related problems.

Animal Health Camp & Calf Rally was organized on September30, 2021 at Hunasikote Village, as a Collaborative programme with the State Milk Federation: KMF, under Azadi ka Amrit Mahotsav Programme followed by a technical session on 'Clean Milk Production and Scientific Feeding of Dairy Animals'. The programme was well attended by more than 100 farmers.

Under Farmer First Project, an Animal Infertility & Health camp for the health care of the dairy cattle was organized on August 11, 2021 at Vasappana Doddi and Balepura villages of Kanakapura Taluk, Ramnagara District in which, 40 HF dairy cows were attended in the camp for the infertility and other related problems, and curative medicines & mineral mixture supplement was provided for the benefit of the famer beneficiaries of the two adopted villages. Guest Lectures on updating of technical know-how on quality milk production and scientific feeding of dairy animals were presented by subject matter specialists to 60 Field Veterinary Officers of State Livestock Breeding & Training Centre (SLBTC) of State Department of Animal Husbandry on August 12, 2021 and September 23, 2021.

Research

Establishment of folliculo-hormonal dynamics during the entire estrous cycle in black bengal goats:

Rajeev Kumar, Piyali Kuri, Indranil Mukherjee, S K Das, M Karunakaran and M Mondal

The aim of the present study was to establish the folliculo-hormonal dynamics during the entire estrous cycle in Black Bengal goats. For the purpose, a total of 12 cyclic goats were selected from the Goat Farm of ICAR-NDRI, ERS, Kalyani based on signs of behavioral estrus and observation of standstill by buck introduction, which was further confirmed by ultrasonophic examination of the reproductive organs. Blood samples collected during the entire estrous cycle from each animal were assayed for plasma kisspeptin (KP), phoenixin (PNX), LH, FSH, progesterone (P4) and estradiol-17β (E2).

In addition, follicular dynamics were studied during entire estrous cycle using B- and CF -Mode ultrasonography. Follicular and luteal parameters were then correlated with hormonal profiles during entire estrous cycle. Our results revealed the occurrence of four (66.67%; EC length: 22.87 days) and five (33.33%; EC length: 25.67 days) follicular wave patterns in Black Bengal goats.

In four-waved cycle, average day of 1st, 2nd, 3rd and 4th follicular wave emergence was found at day 3±0.46, 9±0.63, 14.75±0.78 and 20.13±0.94 of the estrous cycle (Figure 1). Terminal wave was found to be ovulatory with a preovulatory follicle size of 7.35±0.11 mm. In five-waved cycle, average day of 1st, 2nd, 3rd, 4th and 5th follicular wave emergence was found on day 3.25±0.22, 7.75±0.74, 14.0±0.50, 19.75±0.89 and 24.5±1.44, respectively with preovulatory follicle size of 7.35±0.1mm in terminal wave (Figure 2). The co-dominant follicles that were observed during follicular dominance of a wave dictate the prolificacy of Black Bengal does. Peaks of FSH were found to be coincided with the day of follicular wave emergence (Figs. 1 & 2). Blood supply to growing follicles was increased with the growth of follicles and decrease in the blood supply to the particular follicle was suggestive of onset of atresia. Diameter of CL was highly correlated with plasma progesterone levels (r=0.97).

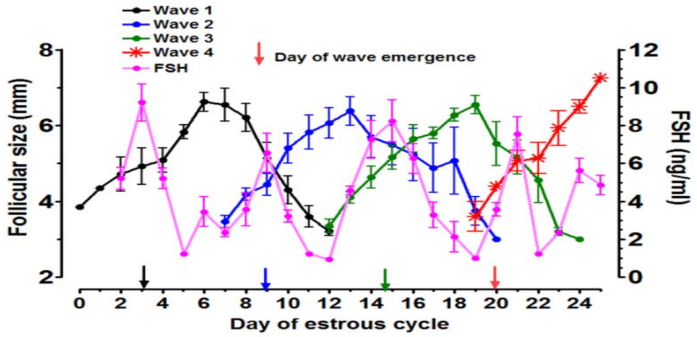


Fig. 1 Changing patterns of plasma FSH concentrations and emergence of follicular waves of four waved cycle in Black Bengal goats.

Our results revealed that a definite secretary pattern of KP and PNX exists during different stages and phases of estrous cycle. On an average four KP and PNX peaks with varying amplitudes were recorded during entire estrous cycle and these peaks of KP and PNX were found to stimulate pre-ovulatory LH peak, and also FSH during the emergence of each follicular wave. Blood KP, PNX, LH and E2 concentrations were higher (P<0.01) during follicular than luteal phase of estrous cycle in Bengal does.

Therefore, results of the present study lead to better understanding of basic physiology of KP & PNX, follicular dynamics & its correlation with hormonal parameters during entire estrous cycle in Bengal does. This information would be of great help to enhance reproductive efficiency of this species.

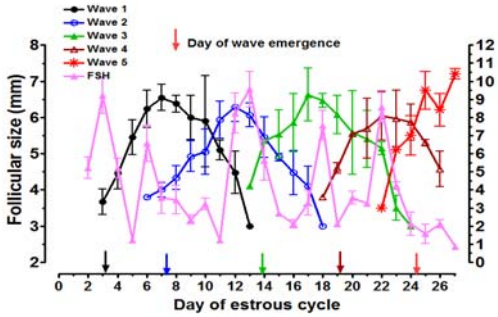


Fig.2 Changing pattern of plasma FSH and emergence of follicular waves of five-waved cycle in Black Bengal goats.

Extension Activities

Online Training Programme on "Scientific Goat Rearing Practices"

On the occasion of ICAR foundation day one day online training programme on "Scientific Goat Rearing Practices" was organized by ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal on July16, 2021. During the occasion a lecture on "Care and Management of Goats" to promote scientific goat rearing practices like feeding, breeding, housing and health care managements was delivered. Dr Daisy Saha, Farm Sector, Technical Officer, State Bank of India, Kolkata discussed on different aspects of applying loans for starting goat farming. A panel discussion with experts cum question answer session was conducted where Dr Daisy Saha and all the scientists, technical officers actively participated in addressing the questions of farmers to clear their doubts. Farmers were made aware about scientific goat rearing, importance of goat milk, value addition to mutton, leather, importance of de-worming & vaccination, feeding practices etc. A total number of 106 farmers from villages like Rangabelia, Jatirampur, Dulduli, Pakhirala, Gosaba, Rajapur, Uttardanga of West Bengal, Sonarpur, Budge Budge –II, Joynagar participated in the programme.

National Campaign on 'Food and Nutrition for Farmers':

On the occasion of National Campaign on 'Food and nutrition for farmers', one training programme by involving 50 farmers was organized by KVK- Additional- Nadia on August 26, 2021. Farmers were sensitized about the programme and importance of proper nutrition. One lecture was delivered on the topic 'Animal husbandry for sustainable nutritional security for tribal farmers'. On the topic 'Importance of dairy farming for economic development of tribal farmers', the importance of dairy farming in accomplishing economic security and subsequently achieving overall livelihood security on sustainable basis was discussed thoroughly. A presentation on the topic 'Food and Nutrition for Farmers' was also made. During the programme, direct telecast from ICAR headquarters, New Delhi was shown to the farmers. Farmers were also engaged in active interaction with the presenters during the programme.

Curtain raiser of 'International Year of Millets 2023'

One program was organized on September 17, 2021 on the occasion of curtain raiser of 'International year of millets 2023'. In the program, a total of 88 farmers attended. Seed packets of several vegetable crops which can be grown in the kitchen garden were also distributed among the farming community. A total of 1225 numbers of planting material was also distributed among the farming community. A special tree plantation drive was also organized. In the programme, several lectures on importance of dairy farming for rural livelihood, importance of animal husbandry for attaining sustainable nutritional security and nutri-cereal and their role on human health was discussed.

Activities under TSP

Off-campus Scientists-Farmer's Interaction Session cum Input Distribution Camp:

ICAR-NDRI, ERS, Kalyani, West Bengal organized one day programme on Livelihood Improvement through Livestock Interventions on September 3, 2021 at Paruldanga village of Birbhum District, West Bengal in collaboration with NGO, Bolpur Manab Jamin. A scientist-farmer interaction meeting was conducted on that day. A total of 100 farmers participated in that interaction meeting. Some need based inputs for goat rearing were distributed to 30 tribal woman farmers.

A total of 60 female goats, two goats to each farmer, along with one 50 kg bag of concentrate mixture feed (EPIC goat mash) were distributed. Additionally, each of tribal farmers was provided with two kg of mineral mixture, vitamin supplements, veterinary fast-aid kit and some other essential medicines. The body weight of each goat distributed was recorded and ear tagged for identification of animal for further recording under this project. Scientists also visited a goat farm of a progressive farmer.

On- campus Scientists-Farmers Interaction Session cum Input Distribution Camp

One scientist's farmer's interaction session and input distribution camp was organized at the ERS of ICAR-NDRI campus on September 28, 2021. A total of 60 tribal farmers attended the programme. During the program, several lectures on role of animal husbandry for securing sustainable economic development were arranged with the tribal farmers. Interaction session with the tribal farmers was also organized and the queries raised by the farmers were answered. In the programme, a direct telecast of lecture and interaction session of Honorable Prime Minister of India was also shown to the farming community. In the program several inputs were distributed among the tribal farmers. Each tribal farmer beneficiary got two bags of pig feed and all of them also got dairy utensils and packets of mineral mixture.