एन.डी.आर.आई.

N.D.R.I. News

राष्ट्र के डेरी स्वप्नों को समर्पित
Fulfilling Nation's Dairy Dreams

भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल
ICAR-National Dairy Research Institute, Karnal

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From the Director's Desk

Though there is tremendous improvement in agriculture and dairy sector, the yield gap exists between experimental stations and farmers' fields due to several biophysical and socio-economic factors. This affects the income of farmers to a greater extent. With the facilitation of critical inputs, right technologies, advisory services and mobilization of farmers into groups, it is possible to reduce the yield and income gaps. In this context, ICAR is Implementing 56 farmers FIRST Projects across the country with an objective of enhancing the productivity and profitability through technology modules. ICAR-NDRI has been implementing the farmers First Project namely "*Capacity Building of Resource Poor Farmers in Paddy-Wheat cum Dairy Production Systems through FARMERS FIRST Programme under Irrigated Agro-Eco. Region of Haryana"* for holistic development of farm families since 2016 initially in five villages' upto 2020 and later the project got extended to another two villages in Karnal district. ICAR-NDRI is working with more than 2100 farm families in order to have the perceptible impact on all fronts of farming. Technology module includes use of improved seeds of relevant varieties, integrated nutrition, weed and pest management, health and nutrition management in dairy animals, training, exposure visits, ICT tools and formation of farmers' groups.

In this issue

After identification and prioritization of needs, the technology modules are being implemented through multi-disciplinary team of scientists with an active participation of farm families. The Project laid special emphasis on resource poor farmer families, women and youth. The Project has so far covered 25 technological interventions among all the households covering 1344.09 hectares area in the crop component and 15748 cases of animals for dairy based interventions.

SMS Portal launched under the project provided timely information every week on critical operations of crop and dairy, weather and other services. A FPO namely Misthi Fruit & Vegetable Producer Company limited was started to provide technical inputs, resource pooling and market services, which has become a boon for member farmers.

Mobile applications viz. Smart Information System for Productive and Reproductive Management of Dairy Animals developed under the project help the farmers to take appropriate decisions and thereby improving their production and farm efficiency. The google play store link of App is *https://play.google.com/store/apps/details?id=ndri.apps.ndrisis*

Various crop based interventions could see the yield increase of 20-25 per cent. Farmers were able to obtain round the year green fodder to the tune of 1225 q/ha in Maize- Berseem rotation and 1100q/ ha in maize –oat rotation. Farmers witnessed a milk yield increase of 1 to 1.5 litres per animal due to Bypass Fat and 1.3 to 1.65 litres per animal due to feeding of rumen protective amino acids. Similarly, estrus synchronization and ovulation synchronization could see a success rate of more than 30 per cent in dairy animals.

Farmers enhanced their profit to 35 per cent through Anionic mineral supplement and 28 per cent through ration based mineral supplement in dairy animals. The strip test developed by NDRI was used to detect clinical and sub-clinical mastitis in more than 20 per cent of cows and buffaloes, which could drastically reduce economic losses of farmers due to early detection and treatment. In collaboration with local animal husbandry department, the dairy animals in project villages were also vaccinated against Lumpy Skin Disease.

The fruitful results of various interventions were disseminated among the farming community through the organization of Kisan Diwas and other interaction meetings in the project area and publication of extension literature like leaflets, Krishi calendars. News coverage was also done to disseminate the successful project outputs from the farmers FIRST villages.

The approach piloted by NDRI has become a role model for other institutes and organizations for demonstrating the potential of yield and income as well as addressing technological gaps. The socio- technological interventions are also aligned with efforts of government in doubling farmers' income and sustainable livelihood of farm families.

Director, ICAR-NDRI

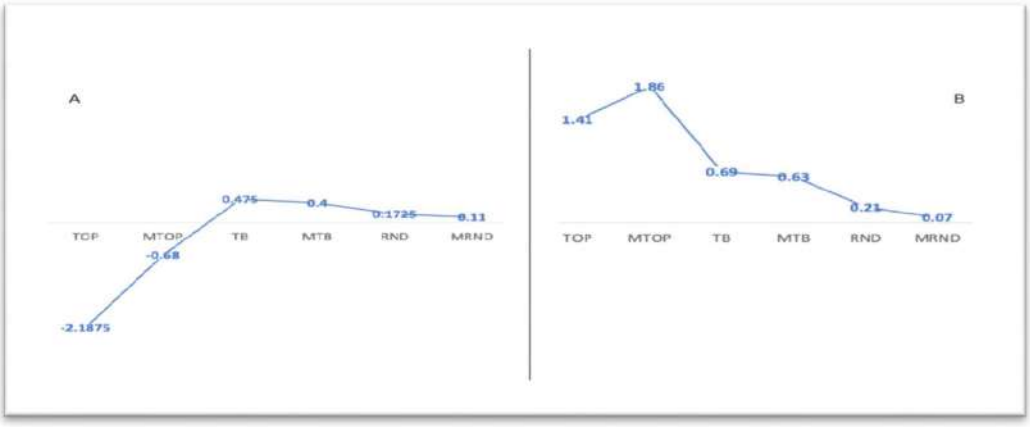
RESEARCH

Development of the genomic analytical models for implementation of genomic selection

(Gopal R. Gowane, Rani Alex, Vikas Vohra and Anupama Mukherjee)

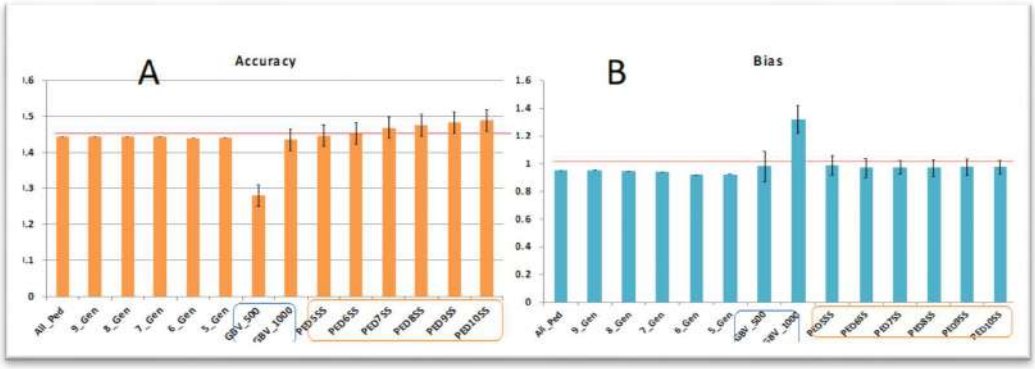
Two models typical to Indian dairy breeding structure were standardized for genomic evaluation so that unbiased and accurate estimates of genomic breeding values can be obtained.

- **Multi-breed joint prediction model:** This model is typically useful for Indian dairy scenario where pedigree information is mostly not available in numerically small breeds. Here using only genomic data of low to medium density, random selective genotyping in multiple breeds followed by GBLUP in joint-breed prediction model yields unbiased and accurate estimates of GEBV.



Reduction in bias of prediction for the Multi-breed joint evaluation (MRND) model for moderate (A) and low (B) heritability scenario

- **Single-Step model for shallow pedigree data:** In the case of shallow pedigree or holes with pedigree data in numerically small breeds, pedigree of at least 1 generation can be used in ssGBLUP along with selective (two-tailed) genotyping, which can result in most accurate and unbiased estimates of GEBV.



Increased accuracy (A) and bias (B) of prediction for single step model for shallow pedigree data

A novel process of ghee preparation with lesser energy requirement and an energy efficient method for ghee flavor simulation in butteroil

(Writdhama Prasad, Kaushik Khamrui, Shaik Abdul Hussain and *Ankit Deep)*

Ghee is a widely consumed fat rich dairy product. Its preparation involves boiling white butter at more than 100°C for varying duration of time. Such a heat treatment not only removes the moisture, but also develops the characteristic '*ghee'* flavor. Variation in the flavor intensity affects the acceptability of the final product. However, such heat treatment also requires huge amount of energy and makes the whole process energy intensive. In view of this, a novel process was developed at Indigenous Dairy Products Lab of Dairy Technology Division, which requires 34 % less energy for ghee preparation. Technology for *ghee* flavor simulation in butter oil was also optimized at the Indigenous dairy products lab. During the lab experiments, both of these optimized technologies showed promising results of energy conservation. The processes were also simulated at large scale. Variations in the heating regime of the ghee boiling conditions were adopted during these trials as per the optimized technologies to prevent the undesirable changes in the quality of the final product. It was observed that the optimized technologies worked appropriately during large scale trials and similar results of energy saving were obtained.

Ghee preparation using modified pre-stratification method with lesser energy requirement at Dairy Engineering division

Institutional Technology Management Cell (ITMC)

Patents Filed:

Sl. No.	Title of Patent	Inventors	Date of Filing	Application Number
1)	A novel method for Ghee preparation with lesser energy requirement.	Writdhama G Prasad, Shubham Kumbhare, Kaushik Khamrui and Shaik Abdul Hussain	December 23, 2022	202111060140

Patents Granted:

Sl. No.	Title of Patent	Inventors	Date of Filing	Grant No. & Regn. Date
1)	Mangifera indica flower panicles' extract stabilized gold nanoparticles and method for making the same (807/DEL/2015).	Varij Nayan, Suneel Kumar Onteru and Dheer Singh	March 24, 2015	408952 October 12, 2022
2)	Two Stage Enzyme Assay for Detection of *Listeria Monocytogenes* in Milk Products (1357/DEL/2013).	Mandeep Balhara, Naresh Kumar, Geetika Thakur, H. Raghu, Vinay Kumar, Ramakant Lawaniya, Alia Khan and Shabnam	May 7, 2013	410633 October 31, 2022

Details of Request for Examination for Patent:

Registration No.	Inventors of the Patent	Title of the Patent	Registration Date	Remarks
202111004587	P.N. Raju, Lal Chand Sharma and Ashish Kumar Singh	Label for indicating freshness of milk-millet composite complement food and preparation method thereof.	December 2, 2022	Request Filed
202111004590	P.N. Raju, Rakesh Kumar Raman, Karpurapu Uma, Ashish Kumar Singh and Sangita Ganguly	Label for indicating freshness of Indian Dairy Products and preparation method thereof.	-do-	-do-

Submission of NBA Application:

Registration No.	Inventors of the Patent	NBA Ref. No.	Name of the Technology	Registration Date	Remarks
202011033806	Bimlesh Mann, Ankita Hooda, Rajan Sharma, Rajesh Kumar and Richa Singh	INBA3202203987	Milk based spray dried Nano-encapsulated Curcumin formulation and method thereof.	November 18, 2022	Under Examination

Filing of Reply of First Examination Report (FERs) of Patents Filed:

Registration Number	Inventors of the Patent	Name of the Technology	Regn. Date	Remarks
202111007461	Pradip Vishnu Behare, Rallapalli Vembar Rajanikar, Sudhir Kumar Tomar, Diwas Pradhan, Rajan Sharma and Sanket Borad	A process for production of antimicrobial coagulant formulation for making extended shelf-life paneer	December 15, 2022	FER Issued

EXTENSION

Agricultural Technology Information Centre (ATIC)

The Agricultural Technology Information Centre of ICAR-National Dairy Research Institute, Karnal worked as per the mandates given to it. The quantitative progress of ATIC during October to December, 2022 is given as under:

Sl. No.	Activity Done	Description of Activity	Amount of Activity	Revenue Generated	No. of Beneficiaries
1)	Seed and grains sold	**Wheat Varieties:** DBW-187, 222 & 303 **Mustard Variety:** PM-32 **Barseem Variety:** BL-42	19,597kg	10,24,651/-	126
2)	Visitors attended	Farmers, entrepreneurs, students etc.	1920	Nil	1920
3)	Calls received on toll free No. (1800-180-1199) of NDRI	Queries of farmers/ students/ entrepreneurs/ stakeholders etc. attended	208 Calls	Nil	208
4)	WhatsApp messages sent to farmers	On WhatsApp group i.e. "बातें खेती एवं पशुपालन की"	22 Messages	Nil	A group of 200 farmers

Accordingly, it provided services and products to farming community (2454 farmers in total) like selling of high quality seed of wheat and mustard, grains, disseminating latest information for use amongst farmers visiting NDRI, Karnal, addressing queries of farmers by attending their calls on NDRI, Karnal toll free line at 1800-180-1199 and many more other ways.

Villagers Sensitized about Eco-friendly Farming Practices

During the Amrit Mahotsav program, the cleanliness awareness campaign was organized in Staundi village of Karnal district on December 20, 2022. Dr. K. Ponnusamy, Principal Scientist explained about maintaining cleanliness not only in household surroundings, but also the cattle yard and the village environment. He advocated the farmers to be self-sufficient in all respects including the food, milk and vegetable requirements in the village itself. He further emphasized clean milk production practices. Dr. Rajkumar Chahal, senior scientist advised the farmers to practise natural farming. Dr. P. K. Saraswat, Head, KVK briefed about stable burning management including manure and fodder preparation. The participants were also exposed to video presentation about NDRI technologies, compost making from straw and preparation of compost from Kitchen waste. The programme was coordinated by Dr. K. Ponnusamy, Nodal Officer, Swachh Bharat Abhiyan.

Celebration of Kisan Samman Diwas

Farmers' fair, exhibition with farmers-scientist interface on the subject of Annual Crop Residue Management was organized on December 23, 2022, on the occasion of Kisan Samman Diwas at KVK-National Dairy Research Institute, Karnal. On this occasion, a comprehensive exhibition was organized by the Institute for the farmers depicting Crop Residue Management, Improved Livestock Production and Dairy Management, Natural Farming, Integrated Farming System Model, Good and Proven Agricultural Technologies, Pisciculture, Honey Bee Farming, Small and Marginal Women Dimensions of livelihood security of farmers, plans for livestock

production and agriculture development, bamboo cultivation for soil conservation, dragon fruit cultivation under vegetable and horticulture and lectures on entrepreneurship development and green energy production along with lectures on wide ranging topics in scientific farming. Officers of district level departments including farmers, women farmers, self-help groups and students of district Karnal participated in the Kisan Mela. In the program, Dr. Dheer Singh, Director, NDRI exhorted the farmers to adopt farming in entrepreneurial mode to realise higher income. Mr. Kanwal Singh Chauhan, a Padma Shri farmer from Aterna village in Sonipat district of Haryana was the chief guest in this function and explained as to how he adopted baby corn cultivation to harness the market opportunities in Delhi and surrounding areas.

EVENTS

36th National Training Programme of 21 days under CAFT

ICAR-National Dairy Research Institute Karnal successfully organized 36th ICAR sponsored 21 days National Training Program at 'Centre for Advanced Faculty Training (Animal Genetics and Breeding) from 1st to December 21, 2022 on the topic "Exploring integration of multi-omics and conventional breeding approaches for sustainable livestock production". The highlight of the programme was that it was organized by 'all women team': Dr. Archana Verma, (Head AGB & Director CAFT) Dr. Anupama Mukherjee (Course Coordinator), Dr. Rani Alex (Joint Coordinator) and Dr. Indu Devi (Joint Coordinator).

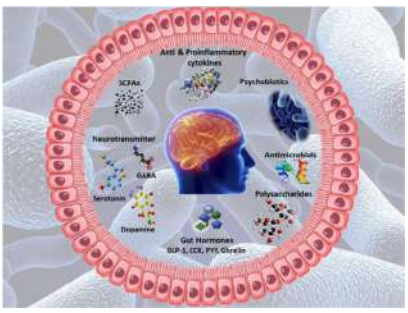
A total of 14 participants, including 2 women, from 10 different states across the country attended the training programme. In the training programme, a total of 52 lectures/ practicals were delivered by 27 resource persons including 4 external experts. Participants were highly satisfied and opined that the training was thought provoking and would open up opportunities for collaboration and networking.

Dr. Dheer Singh, Director, ICAR- NDRI congratulated the 'all women team' and emphasized on the role of animal breeders in overall development of the animal science and specifically for enhancing productivity through identification and improvement of single marker traits for including in the animal selection and breeding programme. Dr. A. K. Singh, Joint Director (Academic) interacted with the participants and encouraged them to use this opportunity to develop skill in the respective field of research by utilizing the available resources to the maximum. Dr. T. K. Datta, Director, ICAR-CIRB, Hisar in his address during inauguration, emphasized on the need for genetic improvement. He said that only selection could bring about the permanent change in the population dynamics with regards to change in the gene frequency for the desirable trait.

Dr. B.P. Mishra, Director, ICAR-NBAGR and the Chief Guest of the Valedictory Function complemented the team for conducting training on an apt topic. He said that during last 8 years there was 50million ton increase in milk production and significant part of that was due to genetic improvement of dairy animals in the country. He said that there were several challenges as well as enhanced opportunities in animal breeding and genetics with ever increasing number of registered breeds of cattle (53) and buffaloes (20) for enhancing their productivity. He also stressed on the need of accurate data recording and understanding the basics of animal breeding.

Faculty and Participants of 36th National Training Programme under CAFT (AG&B)

International symposium on Psychobiotics and Gut: Potential in the neurological disorders



ICAR-National Dairy Research Institute in association of DUVASU, Mathura and Probiotic Association of India organized the 6th Biennial PAi Conference and International Symposium on "Psychobiotics and Gut: Potential in the neurological disorders". The symposium was held in virtual mode where around 500 participants registered for the symposium held during December 5-6, 2023. There were 12 expert talks delivered by six international speakers and six national speakers in four different scientific sessions, viz., Probiotics and Neurodevelopmental disorders, Neurological/ Neuropsychiatric disorders, Next

generation probiotics: Psychobiotics, and Probiotics and Neurodegenerative diseases. Dr. J. K. Kaushik was the organizing secretary while Dr. Diwas Pradhan served as the Joint Organizing secretary from NDRI. The symposium was organized to celebrate the NDRI centennial year being celebrated during 2022-23.

National Referral Center for Milk Quality & Safety Notified as "Referral Food Laboratory"

National Referral Center for Milk Quality & Safety (NRCMQS) at ICAR-NDRI which is a NABL accredited lab as per ISO/ IEC 17025:2017 was granted the status of "Referral Food Laboratory" by Food Safety and Standards Authority of India, New Delhi. This was notified by Gazette Notification No. CG-DL-E-20102022-239774 and F. No. QA-12013/7/2021-QA-FSSAI dated October 18, 2022 for testing of Dairy Products and Analogues for Chemical, Biological and Safety Parameters (Residues in Food Product including Pesticides, Antibiotics, Melamine, Aflatoxins).

Workshop for Technical Personnel

A Workshop on "Role of a Technician in Emerging Scenario of ICAR" for the Technical Personnel working in ICAR Institutes was organized from November 30, 2022 to December 2, 2022 with the participation of 89 Male and 11 Female participants from West Bengal, Uttar Pradesh, Himachal Pradesh, Karnataka, Haryana, Delhi, Punjab, Rajasthan and Odisha. The workshop covered different topics like E-governance, Motivation through Goal Setting, Role of a Technician towards agriculture/ dairy science, Cyber Security, Life Balance and Time Management, Purchase Procedure, Vigilance Awareness and Health and Well Being. Dr. A.K. Rawat, Former Advisor, DBT, Govt. of India inaugurated the workshop and Dr. M.S. Chauhan, VC, GBPUAT, Pantnagar distributed the certificates to the participants during Valedictory Function.

World Food Day

ICAR-National Dairy Research Institute, Karnal organized a special swatchhta campaign 2.0 and World Food Day in Pundrak village of Karnal district on October 16, 2022. Before starting the campaign, villagers were sensitized about maintaining clean and hygienic environment and lead a stress free healthy life. In the campaign women, girls, boys and male family members as well

as scientists and students of NDRI actively participated in the cleaning of streets, roads and common premises including temple in the village. Deliberations included the information on health, nutrition, sanitation and various local herbal preparations for remedy of various ailments. The participants were also exposed to video presentation about NDRI technologies, compost making from straw and preparation of compost from Kitchen waste. Later scientists visited the farmers' doors and examined the shelter, feeding and health management practices of dairy animals followed by them. Remedial measures were suggested to queries related to reproductive problems of dairy animals, marketing of milk, various health issues of dairy animals were given. Farmers were also encouraged to form producer companies and link with urban consumers directly to realise the better price for their produces. Programme was coordinated by Dr. K. Ponnusamy, Nodal Officer, Swachh Bharat Abhiyan.

Refresher Training Programme on "Capacity building of Artificial Insemination Trainees"

ICAR-National Dairy Research Institute, Karnal organized a Refresher Training Programme on "Capacity building of Artificial Insemination Trainees" under Development Action Plan for Schedules Caste (DAPSC) during October 17-21, 2022. About 14 trainees from Himachal Pradesh and Haryana participated. During the training programme, the participants were exposed to theory and practicals of Identification of different female reproductive organs on morbid genitalia, SOP for artificial insemination, approaches to reproductive tract examination by rectal palpation, LN_2 container-handling and post thaw semen evaluation, Evaluation of cervico-vaginal discharge for proper time of AI, Personal protective paraphernalia during AI and restraining of animals for rectal examination and AI, Pregnancy diagnosis in dairy cattle and buffaloes, Management of heifer for early sexual maturity and Feeding management of cows for higher conception rate. Dr. K. Ponnusamy the Course Director and Dr. A. K. Misra and Dr. Chand Ram Grover coordinated the training programme.

Special Swachhta campaign

Every division/ section/ unit in main campus Karnal in Haryana and regional stations at Bengaluru in Karnataka and Kalyani in West Bengal carried out the cleaning, rearranging and other innovative practices involving all the faculty, staff and students on every day from October 2-31, 2022. An innovative approach of maintaining an oxygen park at the NDRI premises could inspire many inmates of campus as well as outsiders after thoroughly cleaning the space.

NDRI carried out 15 special Swachhta Campaigns with a total participation of 1250 stakeholders. A cleanliness campaign as part of Special Swachhta Campaign was organized on October 2, 2022 to commemorate the 153rd birth anniversary of the Father of our nation Shri Mohandas Karamchand Gandhi. The entire faculty and students/ inmates of eight hostels cleaned their respective premises.

ICAR-National Dairy Research Institute, Karnal organized a special Swatchhta Campaign 2.0 in Kailash village on October 8, 2022. The face masks printed with NDRI logo were distributed to all the participants. The faculty educated the villagers and farmers about cleanliness, non-use of single use plastics, non-spitting on the road and public places, putting the water bottles and other wastes in dust bins, wearing face masks while going out in public places and adhering to all Covid-19 guidelines.

Swachhta Pakhwada Activities

ICAR-National Dairy Research Institute, Karnal organized Swachhta Pakhwada from December 16-31, 2022. Various activities including taking pledge, organizing farmers interaction meets, celebration of Kisan Diwas, competition for school children and college students, campaign on crop residue management. Cleaning of tourist places, disposal of pending files, stock taking of solid waste management, selection of clean division, sections and residential quarters have been organized on daily basis. Awareness was created about the clean India campaign among the visiting students (86 numbers) of SRS Institute of Agriculture and Technology, Vedasanthur, Dindigul district, Tamil Nadu (TNAU affiliated college) on December 17, 2022. Apart from Swachhta pledge, the students and faculty were exposed to the technologies and products of ICAR-NDRI, Karnal. They were taught on maintaining cleanliness in their own localities and surrounding areas.

An awareness about Swachh Bharat Abhiyan was conducted for 200 students of Government Senior Secondary School, Bakhli, Pehowa, Kurukshetra district on December 21, 2022. They were explained about importance of celebrating the Swachhta Pakhwada, maintaining cleanliness among students, school and surroundings, good academic habits; NDRI technologies and other advisories which are useful for their career and life.

A debate programme was organized by ICAR-NDRI on December 22, 2022 on the topic "***Swachh Bharat is the engine for transforming India's picture at global stage as developed nation"***. Students from **Government Senior Secondary School, Sangoha, Karnal** participated in the debate and presented their views for and against the debate motion. The debate provided scope to the students to present their views on the mentioned topic and helped to create awareness among them. Participants highlighted the success of the swachhta program and its larger penetration in the society by changing group attitude which is beneficial for the society. The programme was coordinated by Dr. K. Ponnusamy, Nodal Officer, Swachh Bharat Abhiyan.

PERSONALIA

Permission Granted to the following Staff for attending Workshop/ Seminar/ Symposia/ Conference/ Training during the period from October to December, 2022:

Name & Designation	Title of the Programme	Period
Dr. Heena Sharma, Sr. Scientist Dr. G. S. Meena, Sr. Scientist Dr. Yogesh Khetra, Sr. Scientist Dr. P. N. Raju, Sr. Scientist Dr. A. K. Singh, Joint Director (A)	7th Convocation of NADSI and National Dialogue on Innovation in Reshaping the Indian Dairying at DUVASU, Mathura.	October 29, 2022
Dr. Hima John, Sr. Scientist	CAFT training programme on Innovations in Processing and Packaging of Dairy and Food Products & Opportunities for Entrepreneurship Development and Start-ups at NDRI.	November 7-27, 2022
Dr. Heena Sharma, Sr. Scientist Dr. G. R. Gowane, Sr. Scientist	National Seminar cum Annual Conference on at ICAR-CS&WRI, Avikanagar.	November 10-12, 2022
Er. Ankit Deep, Scientist	10th International Conference at Bhai Gurdas Institute of Engineering Technology at Sangrur (online).	November 11-12, 2022
Dr. P. S. Minz, Sr. Scientist	International Conference on Advancements in Engineering and Technology (online).	November 11-12, 2022
Dr. Nishant Kumar, Sr. Scientist	National Conference on Contemporary Multidisciplinary Issues in Applied Science, Humanities, Agriculture, Animal Health and Production (ASHAA-2022), Rajiv Gandhi South Campus, Barkachha, Mirzapur, BHU	November, 14-15, 2022

Dr. Sunita Meena, Sr. Scientist	Online International Conference on Contemporary Multidisciplinary issue in Applied Science, Humanities, Agriculture, Animal Health and Production (ASHAA-2022).	November 14-15, 2022
Dr. Rubina K. Baithalu, Scientist	National Symposium on Optimizing animal reproduction through recent techniques of biotechnology, nutraceuticals & alternative medicine and XXXXVII Annual Convention of ISSAR (ISSARCON-2022), Dept. of Veterinary Gynecology & Obstetrics, College of Veterinary Science & AH NDVSU, Jabalpur (MP).	November 16-18, 2022
Dr. S. De, Principal Scientist	AMR International Seminar and delivered a talk on AMR patterns of *E.Coli* from fish, ICAR-CIFT, Cochin, Kerala.	November 21-22, 2022
Dr. Rakesh Kumar, PS	International Seminar Interventions for control of AMR: Harnessing One Health Knowledge, Cochin Kerala.	November 21-22, 2022
Dr. J. K. Kaushik, PS	12th Training programme on Science Technology and Emerging Trends in Governance.	November 21-25, 2022
Dr. Vikas Vohra, PS	1st National Convention and National Seminar at DPR, Hyderabad.	December 2-3, 2022
Dr. Ashutosh, Principal Scientist	International Conference on Reimaging Rainfed Agro-ecosystems at Hyderabad.	December 2-3, 2022
Dr. S. De, Principal Scientist	XVI Annual Conference of Indian Society of Animal Genetics and Breeding (ISAGBCON-2022), ICAR-Directorate of Poultry Research, Hyderabad	December 2-3, 2022
Er. Ankit Deep, Scientist (SS)	Delivered an invited talk on the topic "Orientation to Dairy Processing Equipments" on the occasion of University foundation day via online mode at College of Dairy Technology, Udgir, Dist-Latur, Maharastra.	December 3, 2022
Dr. P. S. Minz, Sr. Scientist	6th Biennial e-Conference of Probioltic Association of India (PAi) and International e-symposium on Psychobiotics and Gut: Potential in Neurological Disorders (online).	December 5-6, 2022

Dr. Shaik Abdul Hussain, Scientist	Training program titled Advances in web and mobile application development at National Academy of Agricultural Research Management (NAARM), Hyderabad.	December 5-9, 2022
Er. Ankit Deep, Scientist (SS)	Participated in online webex meeting for FAD 19/Panel V through Webex to Review of Indian Standards on Dairy Equipment (i) IS 3661 'Bulk milk cooling tanks' and (ii) IS 16440:2016 'Stainless steel milk cans-Specification'.	December 8, 2022
Dr. Meena Malik, Professor (Eng.)	Oral presentation on 'Relevance of English Language through the Lens of NEP-2020' at 16th International and 52nd Annual Conference of ELTAI, CKT College, Navi Mumbai.	December 8-10, 2022
Dr. Rashmi H.M., Sr. Scientist	ICAR-HRD Training Programme at ICAR-IIWBR, Karnal (online).	December 13-15, 2022
Dr. Chitranayak, PS	Lead speaker on "Application of Hybrid Solar Energy in Fermentation Processing" at 12th Convention of IDEA & National Seminar on Engineering Interventions in Dairy Processing for Self Reliant India at Warud, Dist., Yavatmal (MS).	December 15-16, 2022
Er. Ankit Deep, Scientist	12th Convention of IDEA & National Seminar on Engineering Interventions in Dairy Processing for Self Reliant India at Warud, Dist., Yavatmal (MS).	December 15-16, 2022
Dr. P. Barnwal, Principal Scientist	Delivered a talk as Lead Speaker on "Application of Hybrid Thermic Fluid Based Heating System for Frying of Gulabjamun Balls" at 12th Convention of IDEA and National Seminar organized by Indian Dairy Engineers' Association and College of Dairy Technology (Constituent college of MAFSU) at Pusad (Warud).	December 15-16, 2022
Dr. Pradip Behare, Scientist	12th Convention & National Seminar, College of Dairy Technology, Warud Pusad, Maharashtra.	December 15-16, 2022
Dr. Arun Kumar Mishra, PS	National Dialogue on Sustainable Growth and Development of Indian Dairy Sector at DUVASU, Mathura.	December 16-17, 2022

Dr. D. Malakar, Principal Scientist	Oral presentation in the National Development programme at National Bureau of Animal Genetic Resources (NBAGR), Karnal.	December 17-18, 2022

Joining/ Promotion/ Relieving

- Dr. Ashish Kumar Singh, Principal Scientist & Acting Head, Dairy Technology Division was appointed as of Joint Director (Academics), ICAR-NDRI, Karnal vide office order No. 13-502/98/E-I(S)/369-379 dated 23/11/2022 and Council Office Order No. 39(16)/2021/Per. III dated 17/11/2022.
- Sh. Mukesh Kumar Dua, Administrative Officer was transferred from NDRI, Karnal to IIWBR, Karnal vide office order No. Admn./F.No.3-1/2021-E-I(Part-1) dated 29/09/2022 and relieved from NDRI vide office order No.13-661/2012/E-I(S)-917-21 dated 10/10/2022.
- Smt. Nirmala Kumari, PS was promoted to the Post of PPS vide Council office order No. F.Admn./6-1/2022-Estt.I(Part-1) dated 18/10/2022 and joined the post of PPS vide office order No. F.6-57/20 /E-I(S)/Vol-IV/184-192 dated 18/10/2022 (AN).
- Smt. Simita Roy DEB, PS was promoted to the Post of PPS vide Council office order No. F.Admn./6-1/2022-Estt.I (Part-1) dated 18/10/2022 and join the post of PPS vide office order No. F.6-57/20 /E-I(S)/Vol-IV/184-192 dated 18/10/2022 (AN).
- Sh. Annu Mann, Assistant was promoted tor the post of AAO vide office order No.1-139/90/E-I(S)-Vol.I/175-181 dated 26/10/2022 and he joined at ERS Kalyani on 28/10/2022 (FN).
- Smt. Rajni Bala, PA was promoted to the post of PS vide office order No.1-139/90/E-I(S)-Vol.I/278-282 dated 15/11/2022.
- Smt. Santosh, PA was promoted for the post of PS vide office order No.1-139/90/E-I(S)-Vol.I/273-277 dated 15/11/2022.

HONOURS & AWARDS

- **NDRI Team Bags First Prize in National Bio Entrepreneurship Competition (NBEC) 2022**

A team of our Ph.D. students (Mr. Sumit Kumar Singh, Mr. Rohit Kumar and Ms. Anju Nagpal) under the guidance of Dr. Sudarshan Kumar, Senior Scientist, Animal Biotechnology bagged first prize with a cash award of Rs. 3 lakhs in the National Bio Entrepreneurship Competition (NBEC) with a concept on Development of Electrochemical Impedance based Aptasensor for Semen sorting in Cattle. The National Bio Entrepreneurship Competition (NBEC) is an annual competition organised by C-CAMP to attract, identify and cultivate biotechnology entrepreneurs working on unique and scalable company ideas with significant societal benefit. More than 3000 applicants from 35 states and the UT across India applied for the NBEC-2022, which had four rounds: an external assessment; regional rounds; an online entrepreneurship development boot camp; and a Pre-Final Jury Panel. Winners of NBEC-2022 were decided in round 4, the Grand Finale, where five teams were chosen and a cash prize of Rs. 9 lakhs were split among them. This was a significant achievement by students of NDRI with country wide presence and impact showcasing their excellence.

- Er. Bhavesh Chavhan, Ph.D. Scholar received First Prize for oral presentation entitled "Chemical kinetic modelling of in-package microwave treated pindi khoa for shelf life prediction" in "Techno-engineering interventions in milk production and processing" theme during 12th National Convention and Seminar of Indian Dairy Engineers' Association (IDEA) on Dairy Process Engineering from "Farm to Table" held at College of Dairy Technology, Warud (Pusad), Dist. Yavatmal (Maharastra) during December 15-16, 2022.
- Er. Abhinash P., Ph.D. Scholar received First Prize for Poster presentation entitled "Development of Isothermal Bioreactor for the Generation of Biogas from Cow Dung" in "Application of Nanotechnology, Artificial Intelligence, Machine Learning and I-O-T and Design of New Processes or Equipment for Mechanization in the Dairy Industry" theme during 12th National Convention and Seminar of Indian Dairy Engineers' Association (IDEA) on Dairy Process Engineering from 'Farm to Table' held at College of Dairy Technology, Warud (Pusad), Dist. Yavatmal (Maharastra) during December 15-16, 2022.
- Er. Ankit Deshmukh, Ph.D. Scholar received Second Prize for Poster presentation entitled "Effect of ultra-sonication on mechanical properties of biodegradable cup" in "Emerging Technologies in the Field of Dairy Processing and Quality Control" theme during 12th National Convention and Seminar of Indian Dairy Engineers' Association (IDEA) on Dairy Process Engineering from 'Farm to Table' held at College of Dairy Technology, Warud (Pusad), Dist. Yavatmal (Maharastra) during December 15-16, 2022.
- Er. Ankit Deep, Scientist (Sr. Scale) received First Prize for oral presentation entitled "Evaluation of low toxicity solvent as an energy efficient alternative for milk fat extraction from Ghee residue" in "Emerging technologies in the field of dairy processing and quality control" theme during 12th Convention of IDEA and National Seminar organized by Indian Dairy Engineers' Association (IDEA) on Dairy Process Engineering from 'Farm to Table' held at College of Dairy Technology, Warud (Pusad), Dist. Yavatmal (Maharastra) during December 15-16, 2022.
- Gurpreet Kaur, Navkiran Kaur, Neha Sarova, K. Siddharth Singh, Sudershan Kumar, and Jai K. Kaushik won the first Best Poster Award on "A Designed mini-Mucus-binding Protein of *Limosilactobacillus reuteri* is a Structurally Competent Adhesion Protein that Binds to Human Tissue and Cell lines to Exclude Pathogens" during the 6th Biennial PAi Conference and International Symposium on Psychobiotics and Gut: Potential in the neurological disorders organized by NDRI during December, 2023.

- Diptesh Das, Nikunj Tyagi, Sudarshan Kumar and Jai K. Kaushik won the third Best Poster Award on "Insight into the dynamical factors responsible for the difference in thermos-stability of a homologous protein pair" during the 6th Biennial PAi Conference and International Symposium on Psychobiotics and Gut: Potential in the neurological disorders organized by NDRI during 5-6 Dec 2023.
- Er. Sumit Mehta, Ph.D. Scholar received Third Prize for Poster presentation entitled "Energy Benchmarking: A useful tool for energy conservation in dairy processing plant" in "Techno-engineering interventions in milk production and processing" theme during 12th National Convention and Seminar of Indian Dairy Engineers' Association (IDEA) on Dairy Process Engineering from 'Farm to Table' held at College of Dairy Technology, Warud (Pusad), Dist. Yavatmal (Maharastra) during December 15-16, 2022.
- Ankit Deep and Chitranayak (2022). "Basics of Electrical Engineering", a compendium cum teaching manual, especially for B.Tech. (Dairy Technology) students, Institute Publication Number: 183/ 2022.

राजभाषा एकक

संस्थान राजभाषा कार्यान्वयन समिति की बैठक

डॉ. धीर सिंह, निदेशक, भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल की अध्यक्षता में संस्थान राजभाषा कार्यान्वयन समिति की 1 अक्तूबर, 2022 से 31 दिसंबर, 2022 तक की तिमाही 91वी समीक्षा बैठक दिनांक 29.12.2022 को पूर्वाह्न 10.30 बजे संस्थान के पिनाकी सभा कक्ष में आयोजित की गयी। बैठक में संस्थान के 11 पदाधिकारीगण शामिल हुए।

बैठक के आरंभ में सदस्य-सचिव, श्री धीरज शर्मा ने सभा को अवगत कराया कि समिति की पिछली बैठक दिनांक 23.07.2022 को आयोजित की गई थी जिसकी कार्यवृत्त के अनुसार कार्रवाई रिपोर्ट पर चर्चा के उपरान्त पुष्टि की गई। साथ ही बैठक की कार्यसूची पर भी विस्तार से चर्चा की।

संस्थान राजभाषा कार्यान्वयन समिति की तिमाही बैठक (29.12.2022) की झलक

हिन्दी कार्यशाला का आयोजन

संस्थान में दिनांक 27.12.2022 को **"यूनिकोड/ कम्प्यूटर हिन्दी टेबल कार्यशाला"** विषय पर तिमाही हिन्दी कार्यशाला का आयोजन किया गया। जिसमें 14 अधिकारीगण एवं कर्मचारीगण शामिल हुए।

नगरस्तरीय राजभाषा गतिविधियां

नगर राजभाषा कार्यान्वयन समिति, करनाल के अध्यक्षीय कार्यालय के रूप में संस्थान के द्वारा दिनांक 7.12.2022 को नगरस्तरीय छमाही समीक्षा बैठक का आयोजन डॉ. धीर सिंह, निदेशक, रा.डे.अनु.सं., करनाल की अध्यक्षता में संस्थान के डा. एन. एन. दस्तूर सभागार में किया गया। इस बैठक में समिति के 46 कार्यालयों के कार्यालय प्रमुखों एवं प्राधिकृत अधिकारियों ने भाग लिया।

संस्थान राजभाषा कार्यान्वयन समिति की छमाही बैठक (29.12.2022) की झलक

पुरस्कार

भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल, नराकास को उत्तर-1 'क' क्षेत्र के नगर राजभाषा कार्यान्वयन समितियों में भारत सरकार के राजभाषा विभाग द्वारा वर्ष 2020-21 का प्रथम पुरस्कार तथा वर्ष 2021-22 का द्वितीय पुरस्कार प्रदान किया गया। ये पुरस्कार डॉ. धीर सिंह, निदेशक, भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल एवं अध्यक्ष, करनाल, नराकास तथा श्री धीरज शर्मा, उप निदेशक (राजभाषा) ने भारत सरकार के गृह मंत्रालय के संयुक्त सचिव, राजभाषा विभाग से अमृतसर के गुरूनानक देव विश्वविद्यालय के दशमेश सभागार में प्राप्त किए। इसके अलावा, भारत सरकार के 50 से अधिक स्टाफ संख्या वाले कार्यालयों में भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल को वर्ष 2020-21 का द्वितीय पुरस्कार भी प्राप्त हुआ है। भारत सरकार के गृह मंत्रालय के राजभाषा विभाग द्वारा भारतीय कृषि अनुसंधान परिषद के किसी भी संस्थान को दिए जाने वाले ये सर्वोच्च पुरस्कार हैं।

ध्यान देने वाली बात है कि इसी वर्ष भा.कृ.अनु.प.-राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल को उसके द्वारा राजभाषा कार्यान्वयन के क्षेत्र में किए गए सर्वोच्च कार्यों के लिए भारतीय कृषि अनुसंधान परिषद का राजर्षि टंडन पुरस्कार प्राप्त हुआ। डॉ. धीर सिंह, निदेशक के साथ श्री धीरज शर्मा, उप निदेशक (राजभाषा) ने यह पुरस्कार एवं प्रशस्ति पत्र ग्रहण किया।

SOUTHERN CAMPUS, BENGALURU

Research Highlights

Quantitative proteomics profiling of spermatozoa and seminal plasma reveals proteins associated with semen quality in Hallikar (*Bos indicus*) bulls

A. Ashwitha, K.P. Ramesha, and T.S. Keshava Prasad

Through the Tandem mass spectrometry approach, quantitative proteomics profiling of the spermatozoa and seminal plasma proteome of Hallikar bulls with low and high Ejaculate Rejection Rate (ERR), a total of 2409 proteins were identified, in which 828 proteins were common in both the semen components, whereas 375 and 378 proteins were unique to spermatozoa and seminal plasma respectively. Tandem mass tags (TMT) based protein quantification resulted in 75 spermatozoal and 42 seminal plasma proteins being differentially regulated between high and low ERR bulls. Proteins such as SPADH2, TIMP-2 and PLA2G7 which are negative regulators of motility were upregulated in the seminal plasma of high ERR bulls.

Proteins such as OAZ3, GPx4, and GSTM3 whose upregulation leads to reduced motility were upregulated in the spermatozoa of high ERR bulls. Caltrin and ADM proteins that enhance sperm motility were downregulated in the seminal plasma of high ERR bulls. The regulation of ACE, a negative regulator of sperm motility was upregulated in both the spermatozoa and seminal plasma of high ERR bulls. The study showed significant differences in spermatozoal and seminal plasma protein profiles between bulls with varying ejaculate rejection rates. Therefore, varying concentrations of spermatozoal and seminal plasma proteins in high and low ERR bulls were likely related to differences in semen quality. This study can further be used to develop molecular tools associated with semen quality and to select bulls for the improvement and conservation of indigenous cattle breeds.

Extension Activities

Advisory Services: Advisory services were rendered to sixty-four of the clienteles, through online mode by phone and mail response and during their personal visits to the institute. The advisory profile comprised technical advice for commercial dairy farming, cattle feed formulation, improved green fodder sources and availability of indigenous cattle.

Visits Conducted: During the period under report, 243 visitors visited the institute in 7 batches comprising of 21 dairy farmers from Tamil Nadu and 222 students from various educational institutes of Southern India States. The visitors were taken round the Institute to livestock research centre, experimental dairy plant and sections, as per their needs and were briefed about the ongoing research and extension activities.

Exhibition Participation: Participated in the Krishi Mela-2022 organized by University of Agricultural Sciences, at GKVK Campus, Bangalore from November 3-6, 2022. NDRI Stall depicted key focus areas of improved green fodder production, indigenous breeds of Southern region, quality milk production and milk products of SRS, to benefit the visiting farming community. The event was well-attended by farmers, farm women and farm youth, progressive farmers, entrepreneurs, students of schools & colleges, research scholars and general public.

Swachh Bharat Abhiyan- Special Campaign 2.0: The Special campaign on Swachh Bharat Abhiyan was held on October 17, 2022 in the adopted villages of SCSP Project Viz. Jinagathimmanahalli, Thoralakki, Tekal Hobli, Malur Taluk, Kolar District. During the programme, more than 50 dairy farmers actively participated in the interaction meeting and the farmers were sensitized about Swachha Bharat Abhiyan- Special Campaign 2.0 and importance of maintaining cleanliness in the dwelling areas including animal sheds. Further farmers were also briefed about good management practices for clean milk production and a demonstration on use of clean milk production kits was conducted for the benefit of dairy farmers.

Animal Health cum Infertility Camp: An animal health cum infertility camp was organised for dairy animal health care for the benefit of the target beneficiaries. A total of 78 dairy animals were attended in the animal health camp which included 53 HF cross-bred animals, 16 heifers and 9 calves, for the problems of infertility issues, mineral deficiency, mastitis, wounds and worms. Corrective measures comprised distribution of inputs, mineral mixture supplements, preventive and curative medicines for infertility, mastitis and wounds, deworming for the healthcare of the dairy cattle to benefit beneficiary farm families of the adopted village.

Training and Capacity Building Program: As a part of celebration of 'Azadi-Ka-Amrit Mahotsav' (75 years of India's Independence Celebrations), 'Swachhta Pakhwada' was observed during December 16-31, 2022 and on the occasion of 'Kisan Diwas' Southern Regional Station (SRS) of ICAR-NDRI, Bengaluru organized Farmers Training Programme on 'Quality Milk Production Practices' on December 23, 2022 at Malur Camp Office of KOMUL, Kolar District of Karnataka State. The training Programme on 'Quality Milk Production Practices' organized was inaugurated by Shri K. Y. Nanje Gowda, President, KOMUL (Kolar Milk Union Limited-KMF) & MLA and Dr. K. P. Ramesha, Head, SRS of ICAR-NDRI, Bengaluru, officials from KMF and Scientists of SRS of ICAR-NDRI. During the occasion, the dignitaries distributed SS Milk Cans to the highest milk producer dairy farmers of two dairy cooperative societies. The training programme was well attended by more than 105 farmer-beneficiaries belonging to SC community. The farmers were trained on various aspects of scientific dairy farming including breeding, feeding, clean milk production and value addition to milk and milk products, besides 'Swachh Bharat Abhiyan- Special Drive 2.0' initiatives of Government of India by the faculty of SRS of ICAR-NDRI, Bengaluru. Selected farmers shared their feedback and also the benefits received by them under SCSP project.

International training: Dr. A. Kumaresan, Principal Scientist (Animal Reproduction) underwent two months international training under IDP, NAHEP, in the laboratory of Dr. Sathish Kumar, Professor, Department of Comparative Biosciences, School of Veterinary Medicine, University of Wisconsin, Madison, USA, from September 15, 2022 to November 14, 2022.

EASTERN CAMPUS, KALYANI

Research

Rumen fermentation pattern and ciliate protozoal population in growing Black Bengal kids maintained under intensive feeding

(P. Jamadar, A. Santra, D.K. Mandal, M. Karunakaran, S.K. Das, T.K. Dutta and S.M. Deb)

The Black Bengal goat (*Capra hircusbengalensis*) is widely found in West Bengal, Bihar, Jharkhand, Orissa, Assam, Tripura, and neighbouring nation Bangladesh. Black Bengal goat is one of the important dwarf meat breeds due to its high prolificacy, early maturity, low kidding interval, delicious meat and high quality skin. However, information regarding rumen fermentation pattern and rumen protozoal population in Black Bengal goats under different feeding regimes is lacking. Twenty weaner Black Bengal Kids were divided in to four groups (G1, G2, G3 and G4) and fed individually under the stall feeding for a duration of 120 days on four types of complete mixed ration which contained various levels of energy and protein e.g., Diet-1: High energy and high protein, Diet-2: High energy low protein, Diet-3: Low energy high protein and Diet-4: Low energy low protein.

Highest ($P<0.01$) rumen pH was recorded in low energy low protein fed kids (G4 group) followed by low energy high protein (G3), high energy low protein (G2) and high energy and high protein groups (G1). The pH values were 6.4, 6.3, 6.1 and 6.0 for G4, G3, G2 and G1 groups, respectively. The rumen pH decreased from 0 to 3h post feeding fallowed by increase at 3 to 9h of post feeding in all the experimental groups. Highest fall in rumen pH was observed in the kids fed high energy high protein diet (G1 group). TVFA concentration in rumen exhibited reverse trend to that of pH at same interval of time. TVFA concentration in rumen liquor was highest ($P<0.01$) in G1 (9.4 mmol/dl), followed by G2 (9.2 mmol/dl), G3 (8.6 mmol/dl) and G4 (7.7 mmol/dl) group. Total-N concentration in SRL was higher ($P<0.01$) in high energy high protein fed kids (G1: 100.8 mg/dl) fallowed by high energy low protein (G2: 95.1 mg/dl), low protein high energy (G3; 94.3 mg/dl) and low energy low protein fed kids (G4: 90.4 mg/dl). Ammonia nitrogen concentration in SRL was significantly higher in kids fed low energy diet (G3 and G4 groups). Ammonia nitrogen concentration was 11.6, 12.2, 12.3 and12.9 mg/dl in G1, G2, G3 and G4 groups, respectively. The rumen Total-N and NH_3-N concentration were steadily increased from 0 to 3 h post feeding and there after it decreased in all experimental groups. Ciliate protozoa present in the rumen of kids of all the experimental group was B type population due to the presence of *Epidinium sp* and the absence of *Polyplastron multivesiculatm*.

Numerically entodiniomorphid protozoa comprised more than 90 % of total rumen protozoal population. Total number of rumen protozoa as well as number of holotrich and spirotrich protozoa was significantly higher in high energy high protein fed kids (G1 group) followed by G2, G3 and G4 groups. The number of holotrichs protozoa (x 10^4/ml SRL) was 2.9, 2.5, 2.3 and 1.9 for G1, G2, G3 and G4 groups, respectively. The number of spirotrichs protozoa (x 10^4/ml SRL) was 25.8, 22.9, 20.5 and 18.7 for G1, G2, G3 and G4 groups, respectively and total protozoa count (x 10^4/ml SRL) was 28.7, 25.4, 22.8 and 20.6 for G1, G2, G3 and G4 groups, respectively. Lowest rumen protozoal number was observed at 0h post feeding followed by gradual increase in number up to 3h post feeding and thereafter protozoal number gradually

decreased in all the experimental groups. It was concluded from the study that ruminal TVFA and total nitrogen production increased and NH3-N concentration decreased with increase in dietary energy level in Black Bengal goats. Moreover, spirotrich protozoa comprised more than 80% of total rumen protozoal population in Black Bengal goats.

Thermo-insulated kid-hutch can improve performance of winter born goat kids
(Ajoy Das, D K Mandal, M Karunakaran, A Debbarma)

Sizable proportions of kids die (4-30%) in India before weaning age under different management systems. Goats are very vulnerable to cold and moist conditions of the floor. In kids, hypothermia may occur due to chilled air and cold floor of the animal house. This cold stress leads to hypoxia, hypoglycemia, metabolic acidosis, and changes in the metabolism of water and electrolytes. It causes decrease in body growth and a rise in mortality, particularly when the respiratory distress syndrome develops. Low air temperatures, combined with wind and rain seriously affect animals' physical and behavioral thermoregulation mechanisms. Therefore, proper protection is necessary in cold conditions to avoid reduction in body growth, performance and loss due to mortality. For this purpose, one thermo-insulated kid-hutch (TIKH) was fabricated using locally available materials for improving performance of winter born goat kids. The microclimatic variables viz. minimum temperature, dry and wet bulb temperature, relative humidity, THI and floor surface temperature of the TIKH was always higher than the goat shed environment. Body weight of kids during pre-weaning and post-weaning periods (4month) was one kg higher in kids managed with TIKH. Faecal parasitic loads were significantly lower in TIKH. Modifications in the housing system of kids through providing a warm environment with KB for protection from the cold stress in the winter season helped to enhance their growth performance, improve health status, reduce faecal parasitic load and positively influence behavioral responses. The developed TIKH can prevent cold exposure, enhance growth rate, reduce disease incidences and enhance survivability of kids. The kid-hutch is very easy to fabricate; can be made with locally available materials. Depending upon flock size, one can prepare more numbers of kid-hutch or little higher sized kid-hutches to accommodate the kids. The expenditure incurred for fabrication of kid-hutch can be compensated by the benefits obtained from one season of kid rearing.

Livestock Development Programme at Ruppur village, Bolpur, Birbhum, West Bengal to increase livelihood security of Tribal farmers under TSP

ICAR-NDRI, ERS, Kalyani, West Bengal organized one day programme on Livelihood Improvement of tribal Farmers through Livestock Interventions at Ruppur village, Bolpur, Birbhum, West Bengal in collaboration with Manab Jamin Organisation on December 20, 2022 under NDRI-TSP Project Component. Scientists of ERS-NDRI, namely Dr. S.K. Das, Dr. A. Chatterjee, Dr. M. Karunakaran and Technical Officer Dr. S. Datta actively participated in the programme. A Scientists-Farmers' Interaction-cum-Training (off-campus) programme was conducted. Fifty beneficiary tribal farmers participated in the Scientists-Farmers' Interaction-cum-Training session. Dr. S.K. DAS highlighted the objective of this programme for empowerment of tribal farmers for increasing socio-economic status through poultry based integrated farming and he urged all farmers for providing feedback in future. Different aspects of scientific livestock/ poultry farming like transportation stress, breeding, feeding practices, fodder production, housing and general management, reproductive management, deworming, vaccination, mortality issues etc. were discussed by Dr. A. Chatterjee, Dr. M. Karunakaran and Dr. S. Datta in the off-farm training programme. Some inputs were distributed to 50 farmers (2000 chicks, 2500 kg poultry feed, 50 poultry feeders, 50 kg mineral mixture and supplements) as a component of direct benefits transfer under the TSP project. All these inputs were distributed to beneficiary farmers to help them to rear poultry birds scientifically and Higher economic gain is expected by the practicing and resource poor farmers.

Dr. Dheer Singh Joins as Director, ICAR-NDRI, Karnal

Dr. Dheer Singh joined as the Director & Vice-Chancellor, ICAR- National Dairy Research Institute, Karnal on December 8, 2022. He has been the Joint Director Research & Head of Department, Animal Biochemistry Division, ICAR-National Dairy Research Institute, Karnal from March 17, 2016 to December 7, 2022. Previously, he served as a Scientist, 1994-2003, Senior Scientist, 2003-2009, and Principal Scientist (2009 to to-date) in the Animal Biochemistry Division, ICAR-National Dairy Research Institute, Karnal.

Dr. Singh obtained his bachelors and masters in Biochemistry at Lucknow University, 1988 and Ph. D. at National Dairy Research Institute, 1995. He is one of the eminent scientists in exploring the basic understanding of the structure, function and regulation of key molecules or determinants of female fertility in buffaloes. In his exploratory journey, he utilized granulosa cells as model systems to understand the ovarian biology by implementing molecular endocrinology, functional genomics, point of care diagnostics and novel delivery systems. In addition, his studies identified the prominent signalling pathways in the ovarian and uterine cells under the influence of microbial molecular patterns such as LPS. Recognizing the potential of bovine and non-bovine milk bioactive molecules as nutraceuticals and theurapetics, his team characterized the buffalo and cow milk exosomes and proved them as smart delivery vehicles for hydrophilic and hydrophobic molecules.

He published more than 100 research papers in highly reputed journals, such as Reproduction, Biology of Reproduction, Endocrinology, International Journal of Biological Macromolecules, Journal of Functional Foods, etc. He filed 5 patents and 2 of them were granted. His collaborations both at national and international level are commendable.

His research was well recognized by prestigious National Scientific Societies and decorated him with awards such as Fellow of National Academy of Science, India (NASI)-2016, Fellow of National Academy of Agricultural Sciences (NAAS), BOYSACAST Fellowship Award; Chellappa Oration Award, 2014 by ISVPT; SAB Biotechnology Award 2012; Fellow of Society of Applied Biotechnology, 2012; and the prestigious ISSRF Labhsetwar Award in 2013.

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