- **Research Achievements**
- **Panorama of Activities**
- **Publications**
- **Papers Presented/Lectures Delivered**
- **Participation**
- **Human Resource Development**
- **Consultancy/Advisory Services**
- **Awards and Recognitions**
- **Projects Initiated / Completed**
- **Personnel**

From the Director's desk ...

This Newsletter brings to you the key research achievements, awards and recognitions received, training programmes conducted, workshops and conferences organized/ attended, advisory services provided and significant publications of ICAR-IASRI during the period under report.

Gene Set analysis with QTL sequences **(GSQSeq)** has been developed to analyze gene sets with genetically rich trait data, such as quantitative trait loci (QTL). In addition, (i) **TpGBNVDb**-Thrips palmi transcriptome database of Melon thrips (*Thrips palmi*); (ii) **CsExSLDb**- (*Cucumis sativus* Extended Shelf-Life Database) of cucumber (Cucumis sativus) transcriptome and (iii) **PlantSSRDb** provides the SSRs information accompanied with the primer pair information for 439 plants species have been developed.

Online systems Portals viz.,Plant Trees; BRICS Agricultural Research Platform; ICAR-AU-Grievance Redressal & Monitoring System have been developed. On the occasion of Digital India Day on July 01, 2021, the Institute shared several digital research data management, computing and e-governance initiatives through Social Media and reached out to its stakeholders.

The Institute started its journey in 1930 as a small Statistical Section of then Imperial Council of Agricultural Research. The Institute has entered its 10th decade of its service to the nation and would be celebrating its centenary year during 2029-30. On its foundation day, it has been resolved to have programmes for celebrations of 10th decade in a periodic manner till 2030. An opportunity has also been opened for internship programmes for students through online mode in order to provide an exposure to statistical sciences and informatics.

Institute organized four lectures under Bharat ki Azadi Ka Amrut Mahotsav to celebrate India's 75 years of Independence and organized Hindi pakhwara during September 01-14, 2021. The Institute also organized a Tree Plantation Programme on September 17, 2021 under the initiative "Poshan Vatika Maha Abhiyan" & Tree Plantation.

During the reported period, the Institute initiated 05 new projects, and 38 Research Papers were published.

We congratulate Dr. Prabina Kumar Meher for receiving the ICAR Lal Bahadur Shashtri Award in Social Sciences and Dr. Sayanti Guha Majumdar, Ph.D. (Bioinformatics) for Jawaharlal Nehru Award for Doctor Thesis in Social Sciences on July 16, 2021.

The scientists of the Institute brought recognitions to the Institute by way of serving as Expert Members in various high level committees, delivering invited talks in prestigious forums. Several training programmes were conducted via online mode and many lectures have been delivered by the Scientists in various online training programmes.

I earnestly hope that the contents of this Newsletter would be useful and informative to you all. Any constructive comments for better presentation of this newsletter are most welcome.

(Rajender Parsad)

RESEARCH ACHIEVEMENTS

Trend Free Partially Balanced Incomplete Block designs

In agricultural, animal, fisheries and industrial experimentation under block design setup, systematic trend may affect the response under consideration. Although remote, these effects may still have high influence on response and hence should be incorporated in the model for proper model specification. Considering this, a method of constructing classes of Trend Free Partially Balanced Incomplete Block (TR-PBIB) designs based on different association scheme has been developed. For providing readymade solutions to the end users, SAS macros for the generation of such designs have also been developed and made available in public domain.

ICAR-AU-Grievance Redressal & Monitoring System

Developed ICAR-AU-Grievance Redressal & Monitoring System for Agricultural Universities, which is an online platform (https://education.icar.gov.in/grms/GRMS.aspx) which primarily aims to raise grievances on admissions, fellowships, accreditation of universities and related matters by the students/faculty with ease from anywhere and anytime. A 4-tier automated redressal process flow is built to act for speedy and favourable redressal of these grievances in a transparent and effective way. Automated notification system, real time monitoring and tracking of grievances by the complainant is also facilitated through the system. A sensitization cum demonstration session for ICAR AU-GRMS was held on July 22, 2021 where nodal officers of all the Agricultural Universities joined and the system was made live on July 26, 2021.

KISAN-SARATHI (System of Agri-information Resources Auto-transmission and Technology Hub Interface)

KISAN-SARATHI-System of Agri-information Resources Auto-transmission and Technology Hub Interface, is an Information Communication and Technology (ICT) based interface solution with an ultimate goal to an intelligent online platform for supporting agriculture at local niche with national perspective. This also intends to provide a seamless, multimedia, multi-ways connectivity to the farmers with the latest agricultural technologies, knowledge base and the pool of large number the subject matter experts. This has been launched during 93rd foundation day of ICAR on July 16, 2021 to support the emerging need of multi-ways and multi-lingual communication among various agricultural stakeholders. This initiative will be implemented in phased manner by ICAR-Indian Agricultural Statistics Research Institute, Agricultural Extension Division, ICAR and Digital India Corporation, MietY, Government of India. Currently the services have been started in four major states of India viz. Bihar, Madhya Pradesh, Maharashtra, and Uttar Pradesh.

Ensemble Gene Regulatory Network Approach for Rice Blast Disease

ICAR-IARI and ICAR-IASRI developed a methodology for identifying key genes responsive to rice blast disease based on ensemble gene regulatory network approach. In this approach, gene regulatory networks related to blast disease in rice obtained from correlation, partial least square, principal component regression and ridge networks obtained from individual methods. Key genes obtained from this integrated regression technique were combined. This integrated network was obtained by Fisher's weighted method of meta-analysis. The stability of the obtained ensemble network was higher than the network. This study will help the breeders for developing the new variety resistant to rice blast disease.

Feasibility Assessment of Renewable Energy Resources for Tea Plantation and Industry in India

Indian Institute of Technology, Delhi, Tocklai Tea Research Institute, Jorhat, and ICAR-IASRI reviewed and evaluated the opportunities for renewable energy technologies to encounter the energy demand of tea plantations and industry in India. Based on the analysis, it is found that solar energy may be the potential energy resource in Golaghat (Assam), and Munnar (Kerala) to satisfy the electricity requirement need as compared to other renewable energy resources. This study prudently revealed that the global tea sector has to replace the possible practices for sustainable tea production with renewable energy sources that may enhance the productivity, market value, environmental and social aspects to stay competitive. This could reduce the production cost of tea.

BRICS Agricultural Research Platform

Developed a "BRICS Agricultural Research Platform" (http://barp.org.in) which allows officials of all BRICS countries to register and collaborate on various themes as per the objectives of BRICS 2020-2021 Agenda. The platform allows users to download/upload multiple documents, create projects/events, upload pictures, ability to collaborate using discussion forums and dashboard for decision support system.

Plant Trees Portal

Hon'ble Union Minister of Agriculture and Farmers Welfare inaugurated Poshan Vatika Maha Abhiyan & Tree Plantation at all the KVKs/Institutes/AUs on the occasion of Prime Minister's 71st Birthday. ICAR-IASRI has designed and developed a portal "Plant Trees" (https://planttrees.icar.gov.in/) which provides a unified platform for KVKs/Institutes/AUs to record.

Others

Developed and released the video film of Agricultural University-Clean and Green Campus Awards by Honourable Prime Minister on September 28, 2021 (https://nahep.icar.gov.in/greencleancampus/). Online applications of these awards were received and processed through the Clean and Green portal developed by ICAR-IASRI. A booklet entitled Strengthening the Agriculture Education through Digital Interventions along with Agriculture Experts Information System (AEIS) (https://aeis.icar.gov.in) and Management System for Student READY were also released during the VC Conference. Brochures of these systems were also released during the conference.

- **PGRClim:** An online Tool to Achieve Climate-Ready Genebank was launched on August 02, 2021 by Dr. T.R. Sharma, DDG(Crop Science) during Foundation Day Celebrations of ICAR-NBPGR, New Delhi.

- The CMS based website of AICRP on Linseed was launched by Dr. T.R. Sharma, DDG (Crop Sciences) in the Annual Group Meeting of Safflower and Linseed organized by ICAR-IIOR on August 08, 2021.

- **PlantSSRDb** (http://webtom.cabgrid.res.in/plantssr/): Cataloging transcript SSRs for biodiversity and ecological explorations: PlantSSRDb provides a platform for the wide exploration of the repeat mining along with the primer information for the whole plant kingdom. Transcript assemblies present an important source of information for developing genic microsatellite markers. PlantSSRDb was constructed with the aim of providing a standalone platform for the exploration of the SSRs from the expressed portions of the genome as well as online platform for mining the SSRs either from the transcripts or the NGS reads of the transcriptome. PlantSSRDb provides the SSRs information accompanied with the primer pair information for 439 plants species including model as well as well as non-model species in an easy to browse and user- friendly format. For the accomplishment of the above task, MYSQL and PHP functionalities have been integrated so that the user can easily extract the information and the resource can be sustainably used for ecological explorations. The PlantSSR database contains the SSRs and also SSR-FDMs from all the plant species for which transcripts are available.

- **TpGBNVDb**-Thrips palmi transcriptome database has been developed by ICAR-IASRI in collaboration with ICAR-IARI in response to groundnut bud necrosis virus and is an online relational database of Melon thrips (Thrips palmi) transcriptome that catalogues the information pertaining to assembled transcripts, differentially expressed genes and the pathways.

- **CsExSLDb**-Cucumis sativus Extended Shelf-Life Database has been developed by ICAR-IASRI in collaboration with ICAR-IARI and ICAR-NIPB, is an online relational database of cucumber (Cucumis sativus) transcriptome that catalogues the information pertaining to assembled transcripts, differentially expressed genes and the pathways.

- **GSQSeq** (Gene Set analysis with QTL sequences): Traditionally, the gene sets are analyzed based on the available gene ontology or pathway annotation data. However, such research may not establish the links between gene sets with the underlying quantitative traits. ICAR-IASRI proposed an innovative statistical approach, namely GSQSeq, to analyze gene sets associated with quantitative trait loci (QTL) which is an improvement over the existing GSVQ(Gene Set Validation with QTLs) and GSAQ (Gene Set Analysis with QTLs) methods, as it considers the differentially expressed scores of the genes in the gene list while performing GSA with the QTLs. In GSQSeq approach, the statistically meaningful and biologically interpretable p-values are assigned to each gene set, which associates the gene sets with the QTLs. We also developed a package GSQSeq that is available in https://github.com/sam-uofl/GSQSeq. This software can analyze the gene sets for gene expression datasets derived from microarrays and RNA-seq studies.

- CCS University, Meerut; NABI, Mohali and ICAR-IASRI performed genome-wide association study (GWAS) for yield and yield component traits in spring wheat genotypes. Identified Marker-trait associations (MTAs) involving main effect and epistatic QTLs. These identified may be used for MAS (marker-assisted selection) in wheat breeding programmes targeted towards yield improvement.

- ICAR-IARI, Banaras Hindu University, and ICAR-IASRI evaluated the functional response of the developmental stages of Scymnus coccivora Ayyar against the different densities of cotton mealybug and different prey densities. The numerical response increases with increase in prey densities with the highest number of eggs produced at highest prey density. Understanding the issues that lead to variation in functional response of predator in natural population will advance our understanding of the effects of predation on individual and the effectiveness of coccinellid predators as biocontrol agent against cotton mealybug.

PANORAMA OF ACTIVITIES

Annual Day

Organized 63rd Annual Day of the Institute on July 03, 2021. Dr. P.K. Joshi, Former Director, International Food Policy Research Institute-South Asia Region and Secretary, National Academy of Agricultural Sciences delivered Nehru Memorial Lecture on the Topic Agri-food System Transformation in India. The function was presided over by Dr. R.C. Agrawal, Deputy Director General (Agricultural Education), ICAR. Following students were presented Nehru Memorial Gold Medals for their academic achievements (i) Sh. Bijoy Chanda, M.Sc. (Agricultural Statistics); (ii) Sh. Tamal Kundu, M.Sc. (Computer Applications) and (iii) Ms. Prinita Das, M.Sc. (Bioinformatics).
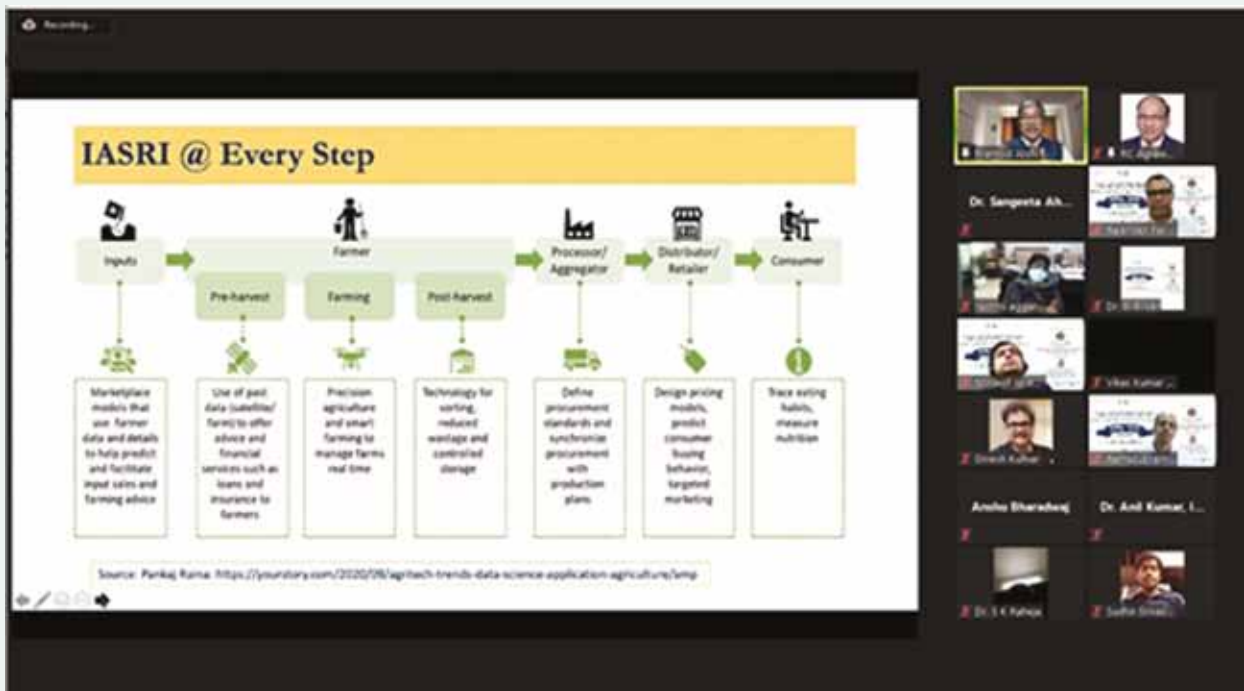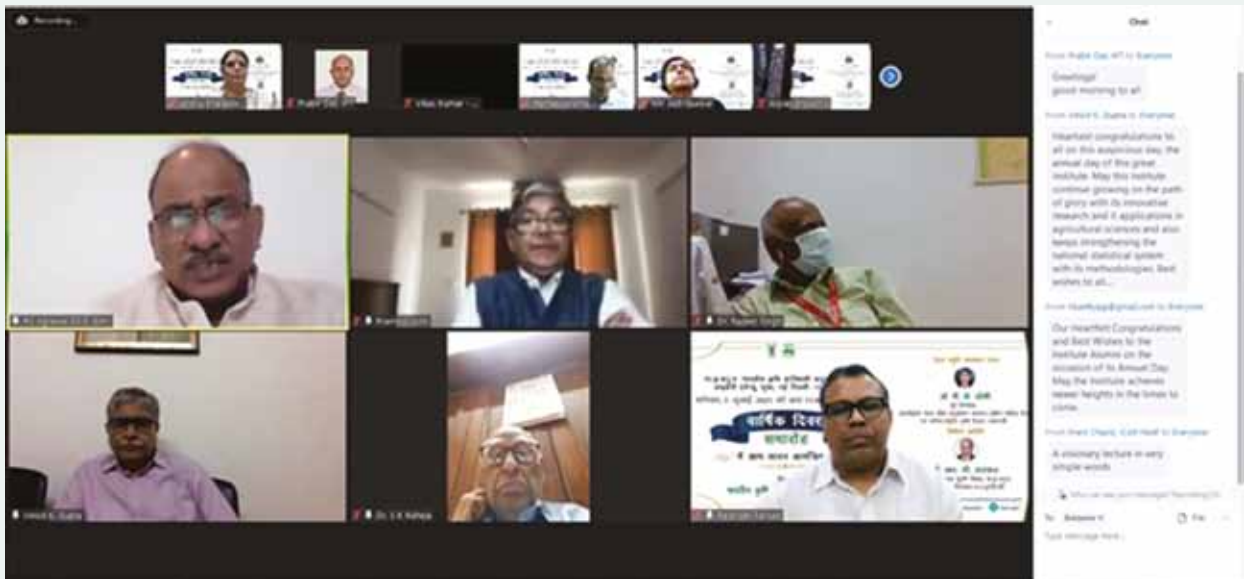
हिन्दी पखवाड़ा

- संस्थान में 01 से 14 सितम्बर 2021 के दौरान हिन्दी पखवाड़े का आयोजन किया गया। कोविड–19 महामारी के कारण इस वर्ष अधिकांश कार्यक्रम प्रतियोगितायें ऑन–लाइन आयोजित की गयीं। दिनांक 01 सितम्बर, 2021 को हिन्दी पखवाड़े का उदघाटन संस्थान के निदेशक, डॉ. राजेन्द्र प्रसाद द्वारा किया गया। हिन्दी पखवाड़े के उदघाटन के पश्चात काव्य–पाठ का आयोजन किया गया। हिन्दी पखवाड़े के दौरान 'डॉ. दरोगा सिंह स्मृति व्याख्यान' के साथ–साथ प्रभागों में हिन्दी में सर्वाधिक वैज्ञानिक कार्य करने के लिए प्रभागीय चल–शील्ड के साथ–साथ डिजिटल शोध पोस्टर प्रस्तुति, हिन्दीतर कर्मियों के लिए हिन्दी श्रुतलेख एवं शब्दार्थ लेखन प्रतियोगिता आयोजित की गयी। सभी प्रतियोगिताओं में छात्रों सहित संस्थान के विभिन्न वर्गों के कर्मियों ने बढ़–चढ़कर हिस्सा लिया। संस्थान में प्रत्येक वर्ष हिन्दी दिवस के अवसर पर डॉ. दरोगा सिंह स्मृति व्याख्यान का आयोजन किया जाता है जिसमें किसी सुप्रसिद्ध वैज्ञानिक द्वारा किसी भी वैज्ञानिक विषय पर हिन्दी में व्याख्यान दिया जाता है। इस वर्ष इस कड़ी का तीसरा व्याख्यान सांख्यिकी विज्ञान प्रभाग, टोरंटो विश्वविद्यालय, कनाडा के डॉ. मुरारी सिंह जी द्वारा डॉ. दरोगा सिंह की स्मृति को समर्पित विविधता के गुणांक पर विविध दृष्टिकोणः एक चयनात्मक समीक्षा" विषय पर दिया गया और इस कार्यक्रम की अध्यक्षता आई.सी.एम.आर. के पूर्व अपर महानिदेशक एवं राष्ट्रीय सांख्यिकीय आयोग के पूर्व सदस्य, डॉ. पदम सिंह जी द्वारा की गयी। दिनांक 14 सितम्बर, 2021 को हिन्दी पखवाड़ा के समापन समारोह के अवसर पर इस दौरान आयोजित प्रतियोगिताओं के सफल प्रतियोगियों को पुरस्कृत करने के साथ–साथ वर्ष 2020–21 के दौरान ''सरकारी कामकाज मूल रूप से हिन्दी में करने के लिए प्रोत्साहन योजना'' के अन्तर्गत भी नकद पुरस्कारों की घोषणा की गयी। इसके अतिरिक्त, जुलाई 2020 से सितम्बर, 2021 तक की अवधि के दौरान संस्थान में आयोजित हिन्दी कार्यशालाओं के वक्ताओं एवं संस्थान द्वारा प्रकाशित हिन्दी पत्रिकाः सांख्यिकी विमर्श 2020 के संपादक मण्डल के सदस्यों को प्रशस्ति पत्र प्रदान करने की भी घोषणा की गयी।
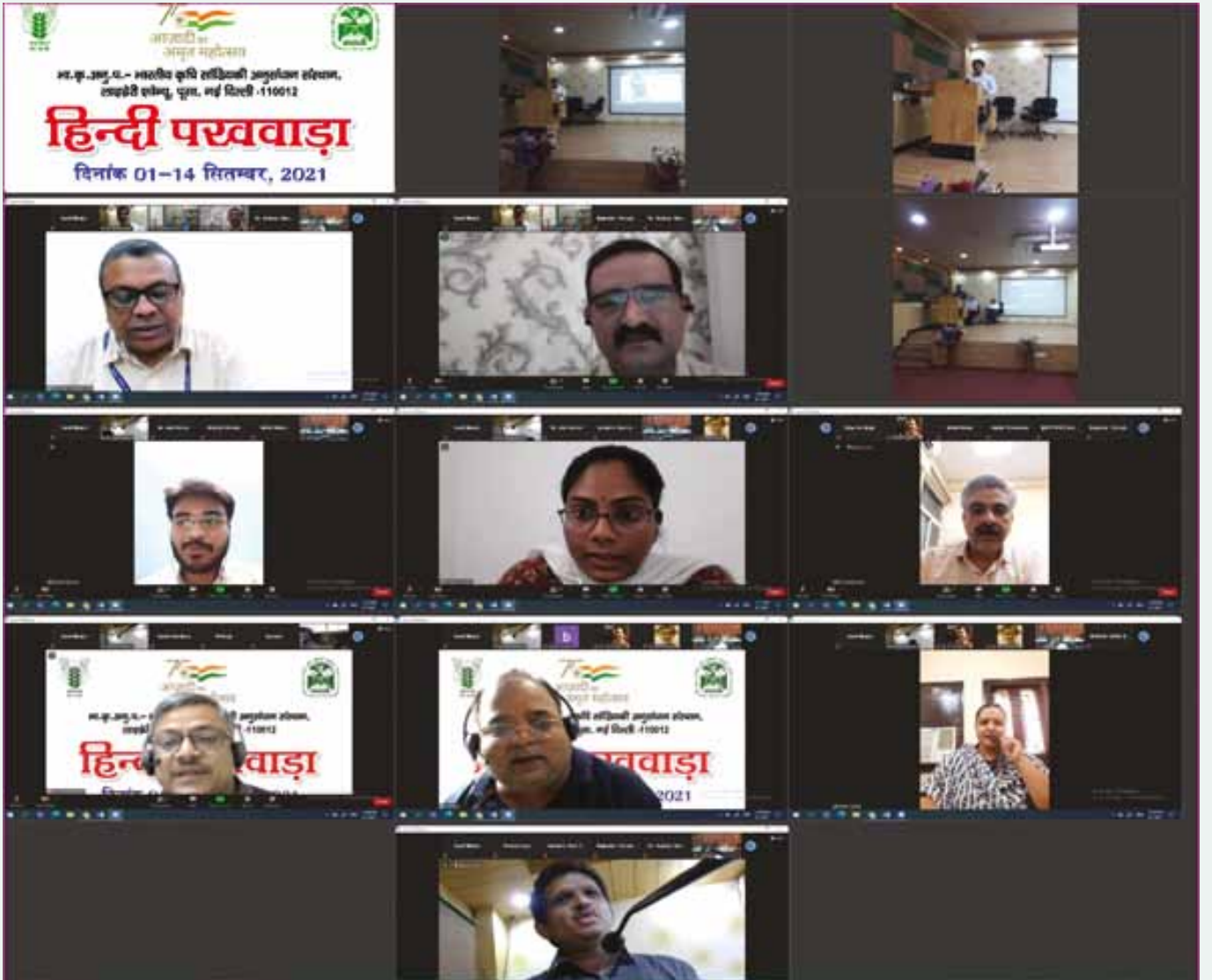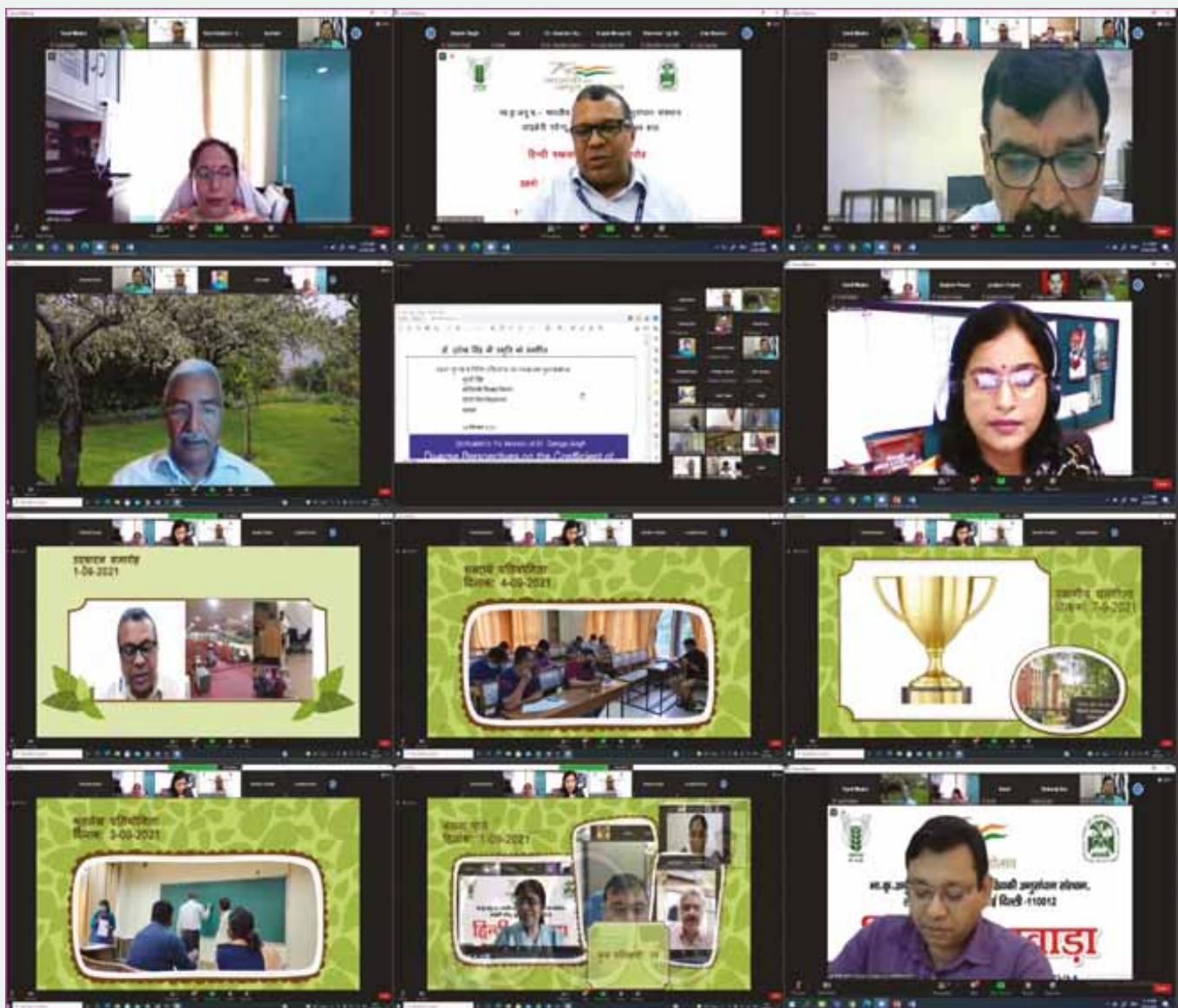
Teachers' Day

On the occasion of birthday of **Dr. Sarvapalli Radhakrishnan**, our institute celebrated Teacher's day on 05th September 2021. Dr. P.R. Sreenath, Former Head, Division of Design of Experiments, ICAR-IASRI, New Delhi was the guest of honour on this occasion.
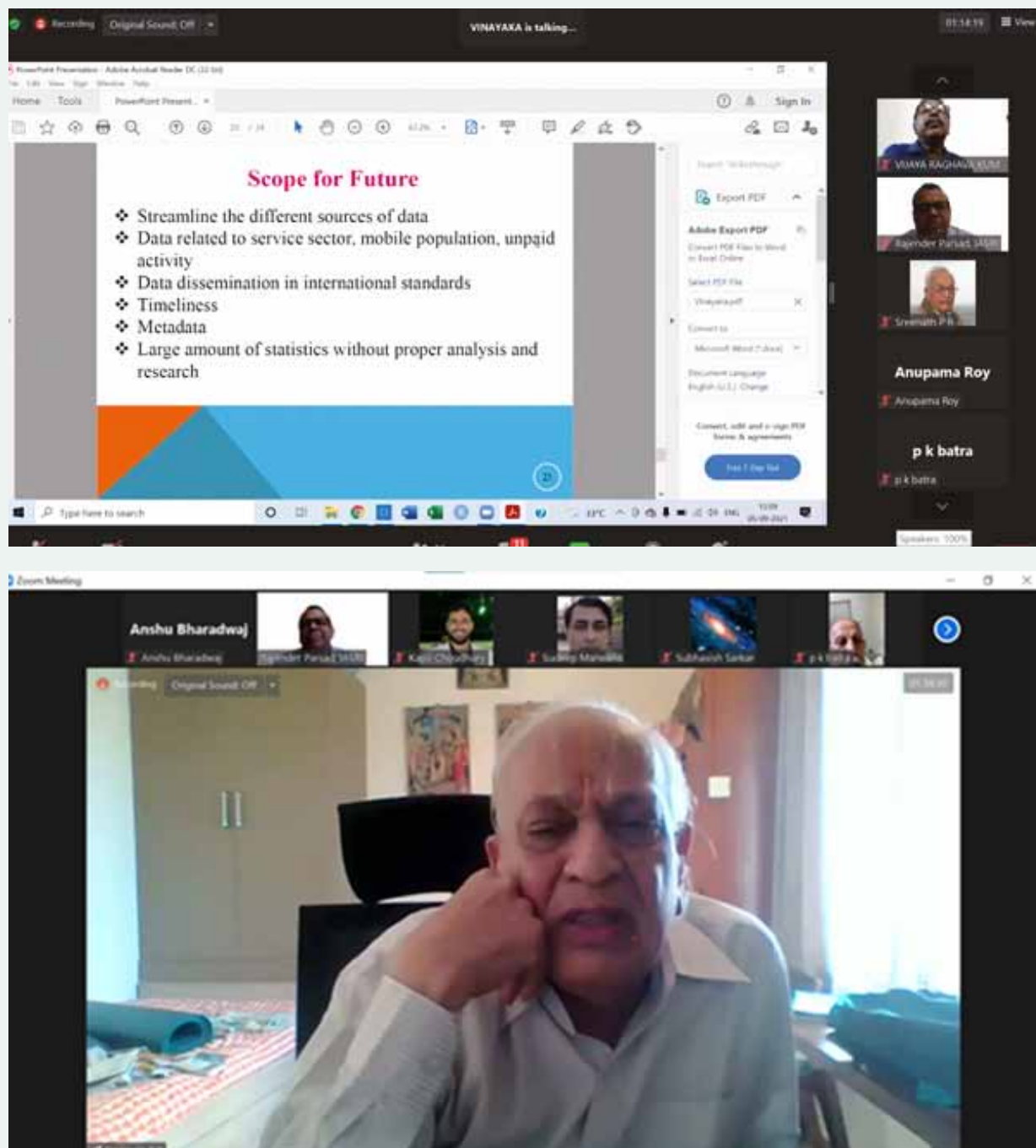
Tree Plantation Programme

Tree Plantation Programme was organized at ICAR-IASRI, on 17 September 2021, under the initiative "Poshan Vatika Maha Abhiyan & Tree Plantation" as per the direction of Hon'ble MoS, Ministry of Agriculture and Farmers' Welfare, Sh. Kailash Chaudhary. Dr. R.C. Agrawal, DDG(Education), ICAR was the Chief Guest. The following trees were planted by Dr. R.C. Agrawal, DDG(Agricultural Education), ICAR and Dr. Rajender Parsad, Director, ICAR-IASRI. Scientific, Technical, Administrative and other staff members of the Institute participated in the event. Following trees were planted: Lemon Tree (Citrus limon) – Four; Mango Tree (Mangifera indica) – One; Pomegranate Tree (Punica granatum)– One and Guava Tree (Psidium guajava) – One

WORKSHOPS/WEBINARS/MEETINGS/CELEBRATIONS ETC. ORGANIZED

- 04 Online Workshop-cum-Training Webinars were organized on ICAR Research Data Repository for Knowledge Management for (i) Scientists and Technical staff of ICAR-CIRCOT, Mumbai on July 15, 2021: Participants 36 (Coordinators: Himanshu Shekhar Chourasia, Senthil Kumar T. and Arpan Bhowmik; Speaker: Rajender Parsad); (ii) Scientists and Technical staff of ICAR-NBFGR, Lucknow on July 30, 2021: Participants 34. (Conveners: Ajey Pathak and Susheel Kumar Sarkar; Speaker: Anshu Dixit); (iii) Scientists of ICAR Research Complex for NEH Region, Umiam, Meghalaya on September 25, 2021: Participants 56 [Conveners: Debasis Chakraborty (ICAR Research Complex for NEH Region, Umiam, Meghalaya), Rajender Parsad, Anshu Bharadwaj and Arpan Bhowmik (ICAR-IASRI)] and (iv) ICAR-CIFRI on September 29, 2021: Participants 45 [Conveners: Malaya Naskar (ICAR-CIFRI) and Susheel Sarkar (ICAR-IASRI)].

- 05 Online Workshop-cum-Training Programmes were organized on Integrated Sample Survey Solutions for Major Livestock Products (eLISS) for (i) Zone 1: ISS West & Central on September 22, 2021: 560 participants; (ii) Zone 2: ISS South on September 23, 2021: 360 Participants; (iii) Zone 3: ISS North East on September 24, 2021 : 180 Participants; (iv) Zone 4: ISS East on September 27, 2021: 1005 Participants and (v) Zone 4: ISS East on September 28, 2021: 634 Participants (Convener: Dr Prachi Misra Sahoo).

- 03 Online Workshop-Cum-Training Programme on Academic Management System for (i) North Zone on July 14, 2021: 35 Participants; (ii) South Zone on August 12, 2021: 76 Participants and (iii) West Zone on August 26, 202: 45 Participants (Convener: Sudeep).

- 01 Online Workshop-Cum-Training Proramme on AU-Project Information Management System on July 15, 2021: 161 Participants (Conveners: Sudeep and Alka Arora).

- 03 Online Workshop-Cum-Training Programme on Basics of Virtual Class and Agri-DIKSHA on July 14, 2021, August 11, 2021 and August 12, 2021 with Participants 168, 112 and 129 respectively (Conveners: Sudeep and Anshu Bharadwaj).

Meetings

- Interactive session with Officer Incharge Data Management for KRISHI Portal on July 17, 2021 at 12:00 noon. The session was attended by 85 Nodal Officers and team members. (Conveners: Rajender Parsad and Anshu Bharadwaj).

- Steering Committee meeting under KRISHI Project on July 26, 2021 (Rajender Parsad).

Seminars delivered

A total of 33 seminars on different areas of Agricultural Statistics, Computer Application and Bioinformatics which include presentations on new project proposals, salient findings of the completed research projects and training undertaken at International level by the Scientists, Course/ Thesis/ ORW Seminars of students of M.Sc. and Ph.D. disciplines of Agricultural Statistics, Computer Application and Bioinformatics. The category-wise break-up is given below.

Category	Type of Seminar	Number
Scientist	Project Completion	2
	New Project Proposal	3
Student	Course	12
	ORW	3
	Thesis	13
Total		**33**

PUBLICATION

Research Papers

1. Banerjee R, Jaggi S, Varghese E, Bhowmik A, Datta A and Varghese C (2021). Construction of saturated designs for mixture experiments. *Bhartiya Krishi Anusandhan Patrika*. **36(2),** 81-84. *http://krishi.icar.gov.in/jspui/handle/123456789/71893*

2. Chanda B, Bhowmik A, JaggiS, Varghese E, Datta A, Varghese C, Saha ND, Bhatia A and Chakrabarti B (2021). Minimal cost multifactor experiments for agricultural research involving hard-to-change factors: construction methods and analytical procedure. *Indian Journal of Agricultural Sciences,* **91(7)**, 97-100. *http://krishi.icar.gov.in/jspui/handle/123456789/62026*

3. Choudhary P, Bhowmik A, Chakdar H, Khan MA, Selvaraj C, Singh SK, Murugan K, Kumar S and Saxena AK (2020). Understanding the biological role of PqqB in Pseudomonas stutzeri using molecular dynamics simulation approach. *Journal of Biomolecular Structure & Dynamics,* **8**, 1-13. https://doi.org/10.1080/07391102.2020.1854860; *http://krishi.icar.gov.in/jspui/handle /123456789/47461*

4. Das S and Rai SN (2021). Statistical approaches for gene set analysis with quantitative trait loci for crop gene expression studies. *Entropy* (Spl. Issue Statistical Inference from High Dimensional Data II), **23(8)**, 945. https://doi.org/10.3390/e23080945

5. Deo MM, De D, Mani I and Iquebal MA (2021). Design and evaluation of vertical cup metering mechanism for urea briquette application. *Indian Journal of Agricultural Sciences*, **91(3)**, 359-363. http://krishi.icar.gov.in/jspui/handle/123456789/70233

6. Dey S, Sinha K, Chand AK, Pandit P,Singh H and Sahu PK (2021). Measuring Price Transmission, Causality and Impulse Response: An Empirical Evidence from Major Potato Markets in India. *Journal of the Indian Society of Agricultural Statistics*, **75(1)**, 55-62 (Available online).

7. Dutta A, Mandal A, Kundu A, Malik M, Chaudhary A, Khan MR, Shanmugam V Rao U, Saha S, Patanjali N, Kumar R, Kumar A, Dash S, Singh PK and Singh A (2021). Deciphering the Behavioral Response of Meloidogyne incognita and Fusarium oxysporum towards Mustard Essential Oil. *Frontiers in Plant Science,***12**, 714730. https://doi.org/10.3389/fpls.2021.714730

8. Gopinath PP, Parsad R, Joseph B and Adarsh VS (2021). grapesAgri1: Collection of Shiny Apps for Data Analysis in Agriculture. *Journal of Open Source Software*, **6(63)**, 3437. https://joss.theoj.org/papers/10.21105/joss.03437

9. Gora JS, Kumar R, Sharma BD, Ram C, Berwal MK, SinghD, Bana RS and Kumar P (2022). Performance evaluation of Fremont mandarin on different rootstocks under the hot arid environment of India. *South African Journal of Botany*, **144,** 124-133. https://doi.org/10.1016/j.sajb.2021.08.037

10. Gurung B, Sarkar KP, Singh KN and Lama A (2021). Modelling annual maximum temperature of India: A distributional approach. *Theoretical and Applied Climatology*, **145,** 979-88. http://krishi.icar.gov.in/jspui/handle/123456789/64743

11. Jaiswal S, SamiranN, Iquebal MA, Jasrotia RS, Patra S, Mishra G, Udit UK, Sahu DK, Angadi UB, Meher PK, Routray P, Sundaray JK, Verma DK, Das P, Jayasankar P, Rai A and Kumar, D (2021). Revelation of candidate genes and molecular mechanism of reproductive seasonality in carp fish (Labeo rohita Ham) by RNA sequencing. *BMC Genomics*, **22**, 685. https://bmcgenomics.biomedcentral.com/articles/10.1186/s12864-021-08001-6#Sec2.

12. Khode N, Singh BP, Chander M, Bardhan D, Verma MR and Paul AK (2020). Impact of dairy trainings on productivity of herd, generation of income and employment. *Indian Journal of Animal Sciences*, **90(8)**, 1191-1194.

13. Kumar A, Mishra DC, Angadi UB, Yadav R, Rai A and Kumar D (2021). Inhibition Potencies of Phytochemicals Derived from Sesame Against SARSCoV-2 Main Protease: A Molecular Docking and Simulation Study. *Frontiers in Chemistry*, **9**, 744376. https://doi.org/10.3389/fchem.2021.744376

14. Kumar P, Malik R, Tikle AN, Budhlakoti N and Verma RPS (2021). Microsatellite markers based association mapping for yield contributing traits in exotic barley (Hordeum vulgare) accessions from ICARDA. *Indian Journal of Genetics and Plant Breeding,* **81(3)**,1-5.

15. Kumar R, Kundu A, Dutta A, Saha S, Das A and Bhowmik A (2021). Chemoprofiling of bioactive metabolites from Chaetomium globosum for biocontrol of Sclerotinia rot and plant growth promotion. *Fungal Biology*, **125(3)**, 167-176.http://krishi.icar.gov.in /jspui/handle /123456789/47463

16. Kumari S, Suroshe SS, Kumar D, Budhlakoti N and Yana V (2021). Foraging behaviour of Scymnus coccivora Ayyar against cotton mealybug Phenacoccus solenopsis Tinsley. *Saudi Journal of Biological Sciences*, **28(7)**, 3799-3805.

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Popular Articles

- Mishra DC, Budhlakoti N, Majumdar SG and Rai A (2021). Innovations in Genomic Selection: Statistical Perspective. Special Proceedings: ISBN #: 978-81-950383-0-5, 23rd Annual Conference of SSCA, 24-28 February 2021, 101-111.

- Verma N, Pandey PS, Pal S and Arora M (2021). Direct Benefit Transfer (DBT) in Agricultural Research and Education. Souvenir of International Web Conference, In 4th Global Meet on Science and Technology (GMST-2020), 12-13 September, 2021, (Eds. Vipin Kumar, Poonam Kashyap, Prerna Singh, A.K. Prusty, Subhash Kumar, Shweta Singh, Yesh Pal Singh and Satya Prakash) 53-61.

PAPERS PRESENTED/LECTURES DELIVERED

Paper presented /Invited talk delivered in Conferences

- 6th International Conference on Internet of Things and Connected Technologies (ICIoTCT) 2021 at IIT Patna on July 29-30, 2021
    - Sapna Nigam. Wheat Disease Severity Estimation: A Deep Learning Approach
    - Prakash Kumar. Weather Based Decision Support System for Crop Risk Management
- 5th International Conference on Advances in Agriculture, Environmental and Biosciences for Sustainable Development (AAEBSSD-2021) organized in virtual mode during August 05-07, 2021
    - Md. Samir Farooqi. Trait Specific Genes Identification from Gene Expression Data
- AICTE approved ATAL Faculty development program on Data Science and Machine Learning with Python organized by RNTU Bhopal during August 23-27,2021
    - K.K. Chaturvedi. Data Science vs Business Intelligence
    - S.B. Lal. Deep Learning and Big Data Analytics
    - Anu Sharma. Algorithms and Machine Learning for Recommender Systems
- First NABS-International Conference on Life Sciences: Contemporary approaches in Biological Science for Food, Health, Nutrition Security and Conservation of Biodiversity organized at Faculty of Agriculture, Annamalai University, Chennai during August 26-28, 2021
    - Sarika Jaiswal*, Ajay Kumar Verma, U.B. Angadi, Anil Rai and Dinesh Kumar. Deep learning network approach for antimicrobial peptide recognition and its comparison with the existing web-based tools
    - M.A. Iquebal*, Ankita Negi, Kalpana Singh, Anil Rai and Dinesh Kumar. Genome-wide SSR marker discovery in black pepper for variety improvement and assessment of genetic diversity
- International Conference (Virtual Mode) on Emerging Trends in Statistics and Data Science in Conjunction with 40th Annual Convention of Indian Society for Probability and Statistics organized during September 07-10, 2021.
    - Rajender Parsad. Influence on Design of Experiments with Special Reference to Agricultural Sciences (Special Invited Talk in Special Session to Honour Professor C. R. Rao)
    - Sumeet Saurav*, Cini Varghese, Seema Jaggi, Arpan Bhowmik and Mohd Harun. Detection of Outlying Observation and its Impact in a Designed Bioequivalence Trial.
    - Sayantani Karmakar*, Cini Varghese, Seema Jaggi and Mohd Harun. Partially Balanced t-designs.
    - Vinay Kumar, L.N.*, Cini Varghese, Seema Jaggi, Mohd. Harun and Eldho Varghese. Efficient p-rep Designs for Early Generation breeding Trials
- Online 17th International Conference on "Applied Statistics 2021" Slovenia, September 20–22, 2021
    - Deepak Singh. An improved ratio-product-ratio class of estimators for finite population mean. (Poster Presentation)

(* denotes the paper presenter)

Lecture Delivered (Outside institute)

- One lecture on Sampling Methodology for Assessment of Harvest and Post-Harvest Losses in India in Virtual Training Programme on Food Loss Measurement, Sustainable Development Goal (SDG) indicator 12.3.1.a and Identification of Critical Loss Points organized by Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific (FAORAP), Bangkok during July 21- 22, 2021. (Tauqueer Ahmad)
- Faculty Training Programme organized by College of Biotechnology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (http://www.svbpmeerut.ac.in/) which is scheduled for July 07-20 2021.
    - One lecture on Gene expression analysis using NGS data. (Sarika)
    - One lecture on Marker discovery using NGS data and its application in Agriculture. (M.A. Iquebal)

- One lecture on Plant Variety Protection Law in Indian Agriculture: Challenges and Prospects and Geographical Indication Law in Indian Agriculture: Challenges and Prospects. (Dinesh Kumar)

- One lecture on Introduction to Cluster Analysis and its applications in Agriculture and Cluster Analysis using R in the National Webinar on Scope of Cluster Analysis in Agriculture and Allied Sectors organized by S.V. Agricultural College, Tirupati of Acharya N.G. Ranga Agricultural University on July 09, 2021. (Alka Arora)

- One lecture on High-Performance Computing (HPC) in the Agriculture Domain in workshop under the National Supercomputing Mission (NSM) from Supercomputer Education and Research Centre (SERC) jointly organized by IIT Indore, ICAR-IISR Indore, and Mahindra University, Hyderabad in collaboration with C-DAC, Pune; IISC, Bangalore and IIT, Kharagpur on July 15,2021. (Dinesh Kumar).

- One lecture on Application of AI in Agricultural Data Analysis in the training entitled Artificial Intelligence for Smart Agriculture organized by ICAR-RCER, Patna, Bihar on July 22, 2021 in online mode. (D.C. Mishra)

- Seven lectures on Principal Component Analysis, Cluster Analysis and Discriminant Analysis along with practical sessions for the students of B.Tech., Computer Science and Business System w.r.t the course Computational Statistics under Joint Teaching Programme of Thiagarajar College of Engineering, Madurai as Guest Faculty. The lectures were delivered through online mode on 02.09.2021, 03.09.2021, 13.09.2021, 16.09.2021, 24.09.2021, 27.09.2021 and 29.01.2021 respectively. (Arpan Bhowmik)

- One lecture on Cointegration in the Department of Agricultural Economics, College of Agriculture, CAU, Imphal on July 21, 2021.(Ranjit Paul)

- One lecture on Basics of Design of Experiments and the Good Agricultural Practices (GAPs) for higher productivity, profitability and resource-use sponsored by Indian Council of Agricultural Research conducted by Division of Agronomy, ICAR-Indian Agricultural Research Institute, New Delhi during August 02-16, 2021. (Susheel Kumar Sarkar)

- Two lectures (i) Non Parametric Tests and (ii)Regression analysis in an online International Workshop on Advance Data Analysis using SPSS organized by Science Tech Institute, Lucknow during September 21-27, 2021. (Ranjit Kumar Paul)

- One lecture on Machine learning techniques for weather based prediction of diseases and pests One week National Training Program on Weather Based Decision Support System for Crop Risk Management sponsored by IDP-NAHEP, SKUAST-K organized by Division of Agronomy, Faculty of Agriculture, Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir (SKUAST-K) during September 27 – October 02, 2021. (Ranjit Kumar Paul)

- One lecture on Wavelets based Artificial Neural Network Technique for Forecasting Agricultural Prices in an International Webinar on Emerging Trends in Statistics and Data Science organized by the Indian Society for Probability and Statistics (ISPS) during September 07-10, 2021. (Ranjit Kumar Paul)

- One lecture on Information Management System for Student Ready in Agricultural Education Portal in the Experiential Learning Coordinators Meeting organized by Agricultural education Division, ICAR on August 06, 2021. (Alka Arora)

PARTICIPATION

International Conference/ Workshop/Symposium etc.

- International Conference on Emerging Trends in Statistics and Data Science in Conjunction with 40th Annual Convention of Indian Society for Probability and Statistics organized virtually during September 07-10, 2021 (Rajender Parsad, Cini Varghese and Ranjit Kumar Paul)

- International Conference on Alternate Cropping Systems for Climate Change and Resource Conservation organized by ICAR-IIFSR, Modipuram during September 29-October 01, 2021. (Arpan Bhowmik)

- Workshop on Food Balance Sheets (FBS) and its Potential Use for Measuring Undernourishment in India organised jointly by Food and Agriculture Organization of the United Nations (FAO), Rome and Ministry of Statistics & Programme Implementation (MoSPI), Govt. of India in online mode during September 28- October 01, 2021. (Rajender Parsad, Tauqueer Ahmad, Kaustav Aditya and Ankur Biswas)

National Conference/Workshop/ Seminar/ Symposia/Training/Foundation Course/ Annual Day/ Lectures, etc.

- Directors' Conference held 02 July, 2021. (Rajender Parsad)
- Participated and Member of Expert Panel in a workshop on Impact of HPC in sustainable Agriculture growth in India: High Performance Computing (NSM sponsored) organized by C-DAC during July 14-16, 2021. (Anil Rai)
- Workshop on High Performance Computing (HPC) in the Agriculture Domain under the National Supercomputing Mission (NSM) from Supercomputer Education and Research Centre (SERC) hosted by IIT Indore, ICAR-IISR Indore, and Mahindra University Hyderabad in collaboration with C-DAC Pune, IISC Bangalore, IIT Kharagpur organized during July 14-16, 2021(virtual mode). (Chandan Kumar Deb and Madhu)
- International Symposium on Harnessing the potentials of genome editing tools to augment the productivity and health of farm animals during July 19-20, 2021 organized by ICAR-NDRI. (M.A. Iquebal, Sunil Kumar, Ratna Prabha and Sarika)
- Virtual Training Programme on "Food Loss Measurement, Sustainable Development Goal (SDG) indicator 12.3.1.a and Identification of Critical Loss Points" organized by Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific (FAORAP), Bangkok during July 21-22, 2021. (Tauqueer Ahmad)
- 6th National Review Conference of Pradhan Mantri Fasal Bima Yojana (PMFBY) organized by Credit Division, Ministry of Agriculture and Farmers Welfare, Govt. of India during July 24-25, 2021 in virtual mode (Tauqueer Ahmad)
- ESRI Indian User Conference 2021 on July 28-29, 2021. (Rajender Parsad and Anshu Bharadwaj)
- 16th Batch of Generic Online Training Course in Cyber Security (organized by Ministry of Electronics and Information Technology (MeitY), Government of India) on 29 July 2021. (Anshu Bharadwaj)

HUMAN RESOURCE DEVELOPMENT

Training Programmes Organized

S. No	Title	Venue	Period	No. of Participants
1.	Training Programme on Application of OMICS Tools and Techniques for Veterinary Sciences using NGS data (Course Advisors: Dinesh Kumar and Anil Rai; Course Coordinators: Sarika, Mir Asif Iquebal)	ICAR-IASRI, New Delhi (Online) in collaboration with DUVASU, Mathura	July 06-10, 2021	35
2.	Training Programme on E-Goverance Applications in ICAR (K.K. Chaturvedi and SB Lal)	ICAR-IASRI, New Delhi (Online)	September 06-10, 2021	59
3.	Online National Workshop on Data Management, Analysis and Interpretation (Course Directors: V.B. Singh and Sudeep, Course Coordinators: Shashi S Yadav, Ekta Joshi, Soumen Pal and Arpan Bhowmik)	ICAR-IASRI, New Delhi (Online) in collaboration with RSVVV, Gwalior	September 06-10, 2021	250
4.	Applications of Bioinformatics Tools in Agricultural Research (Course Coordinators: IASRI - Mir Asif Iquebal and Sarika, UBKV: S. Mandal, N. Sahana, PM Bhattacharya, B. Roy and AK Chowdhury)	ICAR-IASRI, New Delhi (Online) in collaboration with UBKV, West Bengal	September 20-30, 2021	248
5.	Training Programme on Transcriptomic Data Analysis (Course Coordinators: Samir Farooqi and Sudhir Srivastava)	ICAR-IASRI, New Delhi (Online)	September 28-30, 2021	118
6.	Hindi Workshop on "परीक्षण अभिकल्पना के अनुप्रयोग" (Coordinators: Anil Kumar and Susheel Kumar Sarkar)	ICAR-IASRI, New Delhi (Online)	September 28-30, 2021	18

CONSULTANCY/ADVISORY SERVICES PROVIDED

- Arpan Bhowmik advised Dr. Pramod Kumar Sahu, Scientist, ICAR-NBAIM on the use of Kruskal-Walis test and Jonckheere-Terpstra test for testing the significance of six inoculation of endophytes based on expression data of six tomato genes.

- Arpan Bhowmik advised Mr. Gaurav Singh, Ph.D. scholar, Amity university on the use of Principal component analysis (PCA) based on physiochemical and heavy metal properties of water sample collected from 8 different sites of Hindron river. Biplot analysis were also carried out to establish visual relationship of sampling sites with physio chemical and heavy metal properties of the collected water. Later, hierarchical cluster analysis were also carried out to study the similarities between different sampling sites w.r.t. physio chemical and heavy metal properties of the water of hindron river.

- Arpan Bhowmik advised Ms. Kokila Murugesan, M.Sc. student from CESCRA, IARI, New Delhi on the use of factorial ANOVA for a study involving six different treatment under ambient and polyhouse condition to test their ability to tolerate environmental stress with respecxt to different parameters of tomato. k-means cluster analysis were also carried out in this study.

- Arpan Bhowmik advised Dr. Shruti Sethi, Principal Scientist, Division of fruit science and post harvest technology on Optimization of ultrasound-assisted extraction of phenolics from potato peel though response surface methodology and genetic algorithm approach. First based on data collected through the use of central composite designs (CCD) was analyzed and optimization were carried out. Later non linear form of second order response surface model was also used for the purpose of optimization based on Genetic algorithm approach. Validation and comparison of both the approaches were made through lab experiments.

- Arpan Bhowmik advised Dr. Sagar D., Scientist, Division of Agricultural Entomology, on data analysis for studying Temporal Dynamics of Endosymbionts. First diversity analysis was performed w.r.t. different host pants (Cotton, Brinjal, Soyabean and Bell Flower) based on data collected on different endosymbiont. Further, for the endosymbiont namely Arsenophorus, Poisson regression analysis was carried out based on different weather parameters. On the other hand for the endosymbiont Wolbachia, Zero-inflated Poisson regression analysis was carried out w.r.t. different weather parameters. Kruskal-walis test were also applied to compare between different crop seasons w.r.t. each endosymbiont.

- Anindita Datta and Arpan Bhowmik advised Dr. T. Purakayastha, Principal Scientist, Division of Soil Science and Agricultural Chemistry, ICAR-IARI to use two way Factorial (4x2) analysis for different physical, chemical and biological soil parameters.

- Bishal Gurung advised Dr. Anju Chettri, Assistant Professor, Sherubtse College, Royal University of Bhutan, for analyzing nominal datausing Cramer's V for measuring the association between two nominal variablesusing R software package.

- Achal Lama advised Pradeep Mishra, Assistant Professor, JNKVV, MP for anlysing sugarcane production data of South Asian region using ARIMA and Exponential smoothing models in R.

- Prabina Kumar Meher advised Dr. Salej Sood, Senior Scientist, ICAR-CPRI, Shimla on genome-wide association studies (GWAS). The GWAS was performed for the finger millet with 14 agronomical traits, two nutritional traits, and one disease trait. The GWAS was performed with five different algorithms i.e., MLM, GLM, MLMM, SUPER, and FarmCPU. All the methods were implemented using R-software.

- M.A. Iquebal advised Dr. SS Dey, Senior Scientist, ICAR-IARI regarding QTL mapping analysis in cucumber (Cucumis sativus).

- M.A. Iquebal advised Dr. M. Dhillon, Principal Scientist, ICAR-IARI regarding whole genome assembly of Chilo partellus.

- D.C. Mishra advised Dr. Gyan Prakash Mishra, Principal Scientist, IARI regarding miRNA identification in the lentil RNAseq data.

- D.C. Mishra advised Dr. Navin Chandra Gupta, Scientist, NIPB regarding secretome data analysis in Brassica juncea .

- D.C. Mishra advised Dr. Harshvardhan Chaudhary, Principal Scientist, IARI regarding GWAS analysis in Musk Mellon.

- D.C. Mishra advised Dr. R.S. Sengar, Professor, Sardar Vallabhbhai Patel University of Agriculture & Technology, regarding insilico characterisation in sugarcane.
- Deepak Singh advised Dr. J.K. Ranjan, Principal Scientist (Horticulture-Vegetable Science), ICAR-Indian Agricultural Research Institute, New Delhi on Diversity analysis and population structure analysis in bottle gourd.
- Upendra Pradhan advised R.K.Chahota (Professor, Division of Biotechnology, CSHPKV, palampur how to perform the QTL analysis for identification of QTLs or genomic regions associated with different markers and construct a linkage map showing positions of QTLs or genomic regions of six different traits of RILS population. Genotypic file having 602 SSR markers data and phenotypic data file having mean of six traits.
- Sarika advised Dr. P. Yadava, Scientist, ICAR-IARI regarding SNP mining from whole genome re-sprimer generation of SSR markers for validation for seed testing purpose.
- Sarika advised Dr. Reeta Bhatia, Senior Scientist, ICAR-IARI regarding phylogenetic analysis using SSR marker data.
- Shivaswamy, GP advised Dr. Ramesh Dasyam, Assistant professor, Department of statistics and computer applications, ANGRAU, Agricultural College, Bapatla, Andhra Pradesh for carrying out propensity score matching analysis.
- Rajeev Ranjan Kumar advised Mr. Mahesh R., Research Scholar, Division Agricultural Engineering, ICAR-IARI on the forecasting of ground water level in coastal region of Andhra Pradesh.
- Harish Kumar H.V. advised Dr.Hemant Kumar, Senior Scientist, ICAR-IIPR, Kanpur on Markov chain analysis for the time series data of area under different crops.

AWARDS AND RECOGNITIONS

Awards

- Anil Kumar received Life Time Achievement Award by New Age Mobilization Society, New Delhi and IIMT University, Meerut, UP conferred during International Conference on Research Initiatives for Agriculture, Biotechnology and Allied Sciences ICRIBAS-2020.
- Prabina Kumar Meher received ICAR Lal Bahadur Outstanding Young Scientist Award 2020 in Social Sciences.
- Dr. Sayanti Guha Majumdar, Ph.D. (Bioinformatics) for Jawaharlal Nehru Award for Doctor Thesis in Social Sciences on July 16, 2021

Recognitions

Rajender Parsad

- Guest of Honor for the valedictory function of one week national training progamme organized for PG and Ph.D students on Statistical Tools in Research and Data Analysis conducted by College of Veterinary and Animal Sciences, Parbhani, Maharashtra Animal and Fisheries Sciences University, Nagpur as part of its Golden Jubilee Celebrations on August 14, 2021.
- Chairman, Technical Session on Information and Communication Technology in Integrated Pest Management on August 28, 2021 from 09:30-11:30 hrs during the National webinar on "Integrated Pest Management: A Paradigm Shift" organized by ICAR-NCIPM, New Delhi during August 27-28, 2021.

Tauqueer Ahmad

- Nominated as a member, national level Technical Committee by Dr. Ashish Kumar Bhutani, Additional Secretary & CEO (PMFBY), Ministry of Agriculture and Farmers Welfare, Govt. of India to assess the results and outcome of PMFBY Pilot studies (GP level Yield estimation using Technology).
- Invited by Ministry of Statistics and Programme Implementation (MoSPI), Govt. of India to attend a presentation by NABCONS on SDG Indicator 12.3.1a (Food Loss Index), under "A Study to Determine the Post-Harvest Losses for Agriculture and Allied Products in India" organized by Ministry of Food Processing Industries (MoFPI), Govt. of India in virtual mode on 27th August, 2021.

Anil Rai

- Expert member of a National level Committee on Mission Mode in the domain of Precision Agriculture constituted by CSIR under the Chairmanship of Ex- Secretary (DARE) and DG ICAR.
- Chairman, ICT Implementation and Organizational Management Committee of ICAR New Delhi.

NEW PROJECTS / SCHEMES / PROGRAMME / CENSUS/SAMPLE SURVEYS/ EVALUATIONS TUDIES / SOFTWARE DEVELOPED / INITIATED / COMPLETED

Initiated: 05

1. 'Sustainable Biochar Production and Use through Rice-Cotton based Agro-forestry System in Odisha: A Climate Resilient Soil Management Approach' w.e.f. August 25, 2021 (PI:BN Mandal, Co-PI: Ajit, Rajender Parsad with Co-PIs also from ICAR-IISS, Bhopal)

2. 'Kisan Sarathi (Powered by IIDS): System of Agriinformation Resources Auto-transmission and Technology Hub Interface' w.e.f. August 09, 2021 (PI: Sanjeev Kumar, Co-PI: K.K. Chaturvedi, S.B. Lal, Mukesh Kumar)

3. 'Network program on Precision Agriculture (NePPA)' w.e.f. September 04, 2021 (PI: K.K. Chaturvedi, Co-PI: Sanjeev Kumar, S.B. Lal, Mukesh Kumar, Ankur Biswas, Rajeev Ranjan Kumar, Samarth Godara)

4. 'Potential irrigated area mapping through remotely sensed high resolution data' w.e.f. September 05, 2021. (PI: from ICAR-IIWM, Bhubaneswar; Co-PI: U.K. Pradhan; with Co-PIs also from ICAR-NBSS&LUP, Nagpur and IMD, Pune)

5. 'Efficient Designs for Order-of-Addition Experiments' w.e.f. September 09, 2021(PI:BN Mandal, Co-PI: Sukanta Dash, Rajender Parsad)

Completed: 05

1. Improving the usability of buffalo spermatozoa by sperm surface remodelling and immune acceptance in female reproductive tract, funded by NASF on July 11, 2021.

2. Estimation of breeding value using generalized estimating equation and Bayesian approach on September 04, 2021.

3. A study on detection and interpretation of expression quantitative trait loci (eQTL) mapping on September 04, 2021.

4. Study on robust estimation of heritability on September 13, 2021.

5. Development of methodology for trait specific genes identification on September 24, 2021.

PERSONNEL

Congratulations on your Promotion / New Assignments

Name	Designation	Effective Date
Smt. Neelam Sethi	Assistant Administrative Officer	12.08.2021
Sh. Nanak Chand	Private Secretary	10.09.2021
Smt. Chandra Kala	Assistant Administrative Officer	10.09.2021
Smt. Harsh Kapoor	Assistant Administrative Officer	10.09.2021

Wish you a very Happy Retired Life

Name	Designation	Effective Date
Sh. Ashok Kumar	Assistant	31.08.2021
Smt. Savita Wadhwa	Chief Technical Officer	30.09.2021

Transfer/Resignation

Name	Designation	Effective Date
Smt. Hema Meena	Technical Assistant	Transferred to ICAR-CSWRI, Avikanagar w.e.f. July 01, 2021
Sh. Yogesh Kadian	Senior Administrative Officer	Transferred on Promotion to ICAR-IARI, New Delhi w.e.f. July 09, 2021
Sh. Arun Pratap Singh	Chief Technical Officer	Voluntary retirement on August 01, 2021

Welcome on Joining back Institute

Name	Designation	Effective Date
Sh. Prakash Kumar	Scientist	On August 05, 2021 (After completion of study leave)
Dr. Bishal Gurung	Scientist	On August 12, 2021 (After 03 years of deputation as Assistant Professor in Royal Bhutan University, Thimpu, Bhutan)

Obituary

ICAR-IASRI family deeply mourns sad demise and prays the Almighty to give peace to the departed soul

Name	Designation	Left for heavenly abode
Dr Lalmohan Bhar	Principal Scientist and Head of Division	July 31, 2021

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