



# ICAR-IASRI



Volume 21

No. 2

## NEWS

July-September, 2016

- Research Achievements
- Awards and Recognition
- Human Resource Development
- Panorama of Activities
- Publications
- Lectures Delivered
- Participation
- Consultancy/Advisory Services
- Personnel

### *From Director's desk.....*

This Newsletter highlights salient research achievements, training programmes and workshops organized and other significant activities performed at the Institute during the period under report.

Onion Genomic Research (OGR), with three-tier architecture is an open web resource accessible freely at <http://webtom.cabgrid.res.in/ogr/>. It is built in My SQL database and PHP that catalogues the genomic developments specific to onion. The resource contains information on gene annotations and is linked with KEGG pathways. Gene prediction was carried out for the annotated sequences and over 200 different ready-to-use experimentally validated molecular markers were also mined to enrich the lab-based studies targeting variety improvement.



Krishi Vigyan Kendra Knowledge Network (<http://kvk.icar.gov.in>), an online portal has been developed to disseminate knowledge from KVKs to farmers. As of now, 635 KVKs have already been enrolled and more than 15000 KVKs events (past and future) detail have been uploaded on the portal. The portal is linked with <http://www.enam.gov.in/> for providing information related to agricultural marketing. A beta version of mobile app consisting of all the functionalities of the portal has been developed. A Dash board monitoring system for various components of portal has also been developed. Further, a live cluster map has been incorporated into the portal to keep track of the users. The Hindi version of Home Page of the portal has also been developed.

10 training programmes, 4 under HRD-ICAR, 2 under Education Division-ICAR, one each under Cabin Network Project, ATFC Network Project, Market Intelligence Network Project and an International programme for Afghan nationals were organized. Annual Day and Hindi Pakhwada of the Institute were also celebrated.

Scientists of the Institute received awards and recognitions and have visited various countries viz. Italy, Sri Lanka on different assignments. During the period, 4 new projects were initiated and one project was completed while one project was declared closed. Scientists of the Institute have published 27 research papers, 3 manuals/e-manuals, 05 popular articles, developed one package and participated in different conferences/ symposia/ workshops etc. in various capacities.

It is hoped that the contents of this document would be informative and useful to the scientists in NARES. Any suggestions for improvement of the newsletter further would be highly appreciated.

(U.C. Sud)

## RESEARCH ACHIEVEMENTS

- **The Onion Genomic Resource: A Genomics and Bioinformatics Driven Resource for Onion Breeding.**

(Sarika Jaiswal, M. A. Iqubal, U. B. Angadi, Anil Rai and Dinesh Kumar)

Onion (*Allium cepa* L.), often regarded as a crop having an antediluvian coexistence with humans, is by far one of the most challenging plant species to be worked on, especially with respect to delineating its genomic information. It is considered as a plant of immense culinary and medicinal importance. However, there are very limited genomic resources that have so far been established that could shed light on some of the most captivating aspects of the onion genome.

The screenshots illustrate the OGR database search capabilities:

- Homepage:** Provides an overview of the resource, including its purpose and the types of data available.
- Markers' search:** A search interface for Simple Sequence Repeats (SSR) markers, displaying a table of results with columns for SSR Type, Size, Map, and various primer sequences.
- Annotation:** A table listing the annotation of assembled contigs, with columns for Contig ID, Description, and Length.
- Gene identification:** A table listing putative genes identified in the onion genome, with columns for Contig ID, Gene Coordinate, Gene Length, Strand, Protein Length, ORF Sequence, and Protein Sequence.

### The database search for markers, genes and their annotation

Onion Genomic Resource (OGR), with *three-tier architecture*, is the first of its kind, comprehensive web-resource/ database, built in MySQL database and PHP that catalogues the genomic developments specific to onion. It has comprehensive information on assembly of available onion ESTs from public domain as well as the transcriptome data from *Allium cepa* with their annotations and functional significance. It

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houses information on assembly of 20204 publicly available onion expressed sequence tags (ESTs), available 20755 assembled transcripts and 249987 unigenes from *Allium cepa* transcriptome shotgun assembly (TSA) along with their annotations and functional significance. 3754 contigs and 6534 singletons were annotated from onion EST sequences along with 136660 transcripts. A total of 1915 SSRs from Onion ESTs and 123282 SSRs from Onion TSA data have been catalogued in OGR. Also, 135424 SNPs and 11891 Indels identified from Onion TSA data as well as 15 and 13 SNPs and Indels identified, respectively from Onion ESTs have been put in database. Besides, onion miRNAs and their targets are also catalogued in this database. The resource contains information on gene annotations, linked with KEGG pathways, 7 previously reported and one predicted onion miRNAs with their associated targets, which range from cytoplasmic globular proteins to membrane ion channels. Additionally, gene prediction was carried out for the unannotated sequences, of which a few were observed to harbor coding regions for novel protein coding genes and transcripts that so far have not yet been identified. Over 200 different miRNAs ready-to-use experimentally validated molecular markers were also mined from the existing literature to further enrich the lab-based studies targeting variety improvement. It is a valuable tool for confirmation of predicted ORF once the whole genome of onion is sequenced. OGR is the open web resource freely accessible at <http://webtom.cabgrid.res.in/ogr/>.

The Onion Genomic Resource

**List of Putative miRNAs**

Sl.No	miRNA Name	miRNA Family	Matrix Sequence	Matrix Sequence Length	GC percent	MFE	Pre-miRNA Sequence Length	Pre-miRNA Sequence	Structure
1	ace-MIR170a	MIR170	UGAUUGAGCCGGCCCAUATC	21	52	-14.00	89	Click	Click
2	ace-MIR170a	MIR170	UGAUUGAGCCGGCCCAUATC	21	52	-14.28	76	Click	Click
3	ace-MIR170a	MIR170	UGAUUGAGCCGGCCCAUATC	21	52	-8.40	55	Click	Click
4	ace-MIR170a	MIR170	UGAUUGAGCCGGCCCAUATC	21	52	-32.91	215	Click	Click
5	ace-MIR171a	MIR171	UGAUUGAGCCGGCCCAUATC	21	52	-14.00	89	Click	Click
6	ace-MIR171a	MIR171	UGAUUGAGCCGGCCCAUATC	21	52	-32.91	215	Click	Click
7	ace-MIR171a	MIR171	UGAUUGAGCCGGCCCAUATC	21	52	-32.91	215	Click	Click
8	ace-MIR444a	MIR444	UGUUUGCCCAACCCUGUCC	21	48	-72.90	221	Click	Click

**Predicted miRNA Targets**

Sl.No	miRNA Accession	Target Accession	Exception	UPE	miRNA Start	miRNA End	Target Start	Target End	Inhibition	Multiplicity	miRNA and Target Aligned Fragments
1	ace-MIR170a	Contig0075ac11	0.00	18.3130	1	21	575	595	Cleavage	1	Click
2	ace-MIR170a	Contig2533ac11	0.00	14.7510	1	21	247	267	Cleavage	1	Click
3	ace-MIR170a	Contig0179rang	4.50	17.6910	1	21	473	493	Translation	1	Click
4	ace-MIR170a	Contig1744knophophane	4.50	19.8680	1	21	477	497	Translation	1	Click
5	ace-MIR170a	Contig1639glectonin	4.50	18.5070	1	21	1134	1154	Cleavage	1	Click
6	ace-MIR170a	Contig2466sacharactrand	4.50	13.5260	1	20	166	185	Cleavage	1	Click
7	ace-MIR170a	Contig2311cellulose	4.00	11.2760	1	20	4	23	Translation	1	Click

**miRNA and Target**

miRNA Accession	miRNA Sequence	Target Accession	Target Sequence	miRNA and Target Aligned Fragment
ace-MIR170a	UGAUUGAGCCGGCCCAUATC	Contig0075ac11	UGAUUGAGCCGGCCCAUATC	UGAUUGAGCCGGCCCAUATC
ace-MIR170a	UGAUUGAGCCGGCCCAUATC	Contig2533ac11	UGAUUGAGCCGGCCCAUATC	UGAUUGAGCCGGCCCAUATC
ace-MIR170a	UGAUUGAGCCGGCCCAUATC	Contig0179rang	UGAUUGAGCCGGCCCAUATC	UGAUUGAGCCGGCCCAUATC
ace-MIR170a	UGAUUGAGCCGGCCCAUATC	Contig1744knophophane	UGAUUGAGCCGGCCCAUATC	UGAUUGAGCCGGCCCAUATC
ace-MIR170a	UGAUUGAGCCGGCCCAUATC	Contig1639glectonin	UGAUUGAGCCGGCCCAUATC	UGAUUGAGCCGGCCCAUATC
ace-MIR170a	UGAUUGAGCCGGCCCAUATC	Contig2466sacharactrand	UGAUUGAGCCGGCCCAUATC	UGAUUGAGCCGGCCCAUATC
ace-MIR170a	UGAUUGAGCCGGCCCAUATC	Contig2311cellulose	UGAUUGAGCCGGCCCAUATC	UGAUUGAGCCGGCCCAUATC

Web interface and additional query features for miRNA and its target prediction

- **Knowledge Management System for Agriculture Extension Services in Indian NARES**  
(Soumen Pal, Sudeep Marwaha, Alka Arora, AK Choubey and SN Islam)

An online portal Krishi Vigyan Kendra Knowledge Network (<http://kvk.icar.gov.in/>) has been developed to disseminate knowledge and information from KVKs to farmers. It is a single window platform which provides information about KVKs, facilities provided by KVKs to the farming community, the details of events organized by KVKs to propagate knowledge among rural people and agricultural contingency plan for most of the districts of India. The portal facilitates KVKs to update and upload all types of information in a timely manner so that the related information and knowledge can be reached to more number of farmers. As of now, 635 KVKs have already been enrolled and 404 KVKs



have uploaded the details of their facility into the portal. More than 15000 KVKs event (past and future) details have been uploaded into the portal. The detail of past events also include images and videos of those events. KVKs can upload their profile in details viz. Employees, Posts, Finance, Soil Health Cards, Appliances, Crops, Resources and Fisheries. The portal has reporting modules on find KVK, KVK facilities, KVK Upcoming Events and KVK Past Events. The portal is linked with <http://www.enam.gov.in/> for providing information related to agricultural marketing. District-wise agro-meteorological advisory provided by Indian Meteorological Department (IMD) for the farming community is disseminated through this portal. Farmers can directly be benefitted by registering into the portal. They can access the knowledge generated at KVKs without being physically present at the demonstration site. In future, the registered farmers will be able to raise any kind of query related to agriculture/animal husbandry through this portal (also by

using mobile app) and the same will be addressed by the Subject Matter Specialists (SMSs) of KVKs. Towards this direction, a beta version of mobile app consisting all the functionalities of the portal has been developed. Agricultural Technology Application Research Institutes (ATARIs) can use this online application for planning and monitoring the activities of their respective KVKs. To this end, Agricultural Extension Division of ICAR which is at the top of the hierarchy can monitor both the ATARIs and KVKs under them through this portal for achieving desired improvement in agricultural development. There is provision for feedback by any user on KVK portal. A Dashboard monitoring system for various components of portal has been developed. A live cluster map has been incorporated into the portal to keep track of the users. The Hindi version of Home page of the portal has been developed. In future, the portal will be available in major regional languages of India.



The image shows a screenshot of the KVK Portal interface on the left and a video player on the right. The portal interface includes a header for 'Krishi Vigyan Kendra Knowledge Network' and a section for 'KVK Facilities' with dropdown menus for State (Chhattisgarh), District (Kaberdham), and KVK (Krishi Vigyan Kendra Newari Farm, Dist. Kawardha, (KABERDHAM)). Below this is a section for 'Physical Facilities - Dairy Farm' with a video player showing a dairy farm. The video player on the right shows a woman speaking in front of a banner for 'समयार' (Samayara) and a video player interface with a play button and progress bar.

Facilities and event details uploaded by KVKs are available for general viewing through KVK Portal

## AWARDS AND RECOGNITIONS

- Dr. AR Rao received Fellow, National Academy of Agricultural Sciences (NAAS) under the Social Science section, covering Agricultural Economics, Agricultural Statistics, Extension Education, Bioinformatics, Food Science and Nutrition, Food Technology and Home Science.

- The following were awarded in the Hindi Pakhwada organized at the institute during 01-14 September, 2016:
  - ❖ Dr. Wasi Alam received appreciation letter and Rs. 500 cash for organizing six days Hindi workshop and delivering three lectures in the workshop during March 26-31, 2016.
  - ❖ Division of Designs of Experiments received Hindi Chal Shield for research, training/teaching work in Hindi.
  - ❖ Dr. RK Paul received third prize in Hindi Shrutlekh competition.
- Dr. Susheel Kumar Sarkar received certificate of Appreciation from the Department of Public Health Dentistry, Faculty of Dentistry and Centre for Culture, Media & Governance, Jamia Milia Islamia on 07.09.2016.
- Dr. KK Chaturvedi chaired the session “Software Engineering and Testing” in 6th International Conference on Reliability, Infocomm and Technology Optimization (ICRITO 2016) at Amity University, Noida on September 09, 2016.

## Visits Abroad

- Dr. UC Sud and Dr. Tauqeer Ahmad visited Rome, Italy during September 07-08, 2016 for participation in the Validation meeting on “Improving methods for estimation crop area, yield and production under mixed, repeated and continuous cropping” and brief session on “Measuring vegetable production” at FAO Head quarters.
- Dr. Hukum Chandra visited Sri Lanka during September 12-23, 2016 for providing consultancy to FAO of United Nations under the project Country Statistical Capacity Assessment and Strategic Planning in Agricultural Statistics.

## HUMAN RESOURCE DEVELOPMENT

### Training Programmes Organized

S. No.	Title	Venue	Date	Sponsored by	Number of participants
1.	Analysis of Biological Data using Computational Tools Co-ordinators : Dr. Sarika Dr. MA Iqbal	ICAR-CIFA, Bhubaneshwar	July 05-14, 2016	CABin Network Project	35
2.	Computer Applications for technical personnel of ICAR Co-ordinators : Dr. Anshu Bhardwaj Dr. NS Rao	ICAR-IASRI, New Delhi	July 18-23, 2016	HRD Fund of ICAR, New Delhi	22

7.	Technology Forecasting Methods Co-ordinators : Dr. KN Singh Dr. Santosh Rathod Dr. Mrinmoy Ray	ICAR-IASRI, New Delhi	July 20-21, 2016	ATFC Project	8
6.	Networking:Basics and Management Co-ordinators : Dr. Soumen Pal Dr. AK Choube Sh. SN Islam	ICAR-IASRI, New Delhi	July 25-30, 2016	HRD Funds of ICAR, New Delhi	22
4.	Basic Statistical Methods Co-ordinators : Dr. Sukanta Dash Dr. Rajender Parsad Dr. Eldho Varghese	ICAR-IASRI, New Delhi	July 30- August 25, 2016	International M.Sc. Programme for Afghan nationals on teaching of PG course in Agronomy	19
3.	Machine Learning Tools and Techniques for Agricultural Datasets for Knowledge Discovery Coordinators : Dr. Anshu Bharadwaj Sh. Soumen Pal	ICAR-IASRI, New Delhi	August 03-23, 2016	Education Division of ICAR, New Delhi	10
5.	Experimental Data Analysis for technical personel of ICAR Co-ordinators : Dr. Cini Varghese Dr. B.N. Mandal	ICAR-IASRI, New Delhi	Aug 24 - Sept 06, 2016	HRD Funds of ICAR, New Delhi	19
8.	Price Forecasting Techniques Co-ordinator : Dr. RK Paul	ICAR-IASRI, New Delhi	August 26-28, 2016	Network Project on market intelligence	04
9.	Winter School on Designing and Analysis of Cropping System Experiments Co-ordinators : Dr. Anil Kumar Dr. Sukanta Dash	ICAR-IASRI, New Delhi	Sept 07-27, 2016	Education Division of ICAR, New Delhi	21
10.	Cyber Security for technical personnel Co-ordinators : Dr. Mukesh Kumar Dr. Sudeep Marwah	ICAR-IASRI, New Delhi	Sept 28- Oct 05, 2016	HRD Fund of ICAR, New Delhi	23

## PANORAMA OF ACTIVITIES

### Conferences/Workshops/Seminars/Symposia/Meetings

- ❖ Dr. Seema Jaggi organized and coordinated the Visit of NAAC Peer Team to ICAR-IASRI on August 10, 2016 during their visit to IARI (August 08 - 11, 2016) for accreditation of IARI.
- ❖ "Hindi Pakhwada" was organized during September 01-14, 2016.
- ❖ Annual day of the Institute was celebrated on July 2, 2016

- ❖ Seminars in different areas of Agricultural Statistics, Computer Applications and Bioinformatics were delivered by the scientists and students of the Institute. The seminars included presentations on salient findings of the completed research projects and new project proposal by the scientists, thesis/ORW/course seminars of students of M.Sc. and Ph.D. (Agricultural Statistics), M.Sc. (Computer Application) and M.Sc. (Bioinformatics).

The details of seminars delivered.

<u>Category</u>	<u>Type of seminar</u>	<u>Number of seminars delivered</u>
Student	Course	25
	ORW	02
	Thesis	04
Scientist	Project completion	04
<b>Total</b>		<b>35</b>

## FOREIGN COLLABORATION

Working on ICAR-ACIAR Indo-Australian program entitled "Marker Assisted wheat breeding using GWAS technique" (Dinesh Kumar, MA Iquebal, Sarika and UB Angadi) (Letter No. Dir/IASRI/CABin/2016 dated April 30, 2016) (Lead Centre: ICAR-IIWBR, Karnal) is under process.

## PUBLICATIONS

### *Research Papers*

- ❖ Gupta, S, Singh, Y, Kumar, H, Raj, U, Rao, AR and Varadwaj, PK (2016). Identification of novel abiotic stress proteins in *Triticum aestivum* through functional annotation of hypothetical proteins. *Interdiscip. Sci. : Comput. Life Scis*, doi:10.1007/s12539-016-0178-3.
- ❖ Jaiswal, V, Gahlaut, V Meher, PK, Mir, RR, Jaiswal, JP, Rao, AR, Balyan, HS and Gupta, PK (2016). Genome wide single locus single trait, multi-locus and multi-trait association mapping for some important agronomic traits in common wheat (*T. aestivum* L.). *PLoS ONE*, **11(7)**, 0159343



- ❖ Kumar, M, Paul, RK and Singh, BK (2016). Estimating area, production and productivity trends of cotton crop in Haryana state. *J. Cotton Res. Dev.*, **30(2)**, 317-323.
- ❖ Kumar, RR, Goswami, S, Singh, K, Dubey, K, Singh, S, Sharma, R, Verma, N, Kala, YK, Rai, G, Grover, M, Mishra, DC, Singh, B, Pathak, H, Chinnusamy, V, Rai, A and Praveen, S (2016). Identification of putative RuBisCo activase (TaRca1) - the catalytic chaperone regulating carbon assimilatory pathway in wheat (*Triticum aestivum*) under heat stress. *Front. Plant Sci.* doi: 10.3389/fpls.2016.00986.
- ❖ Meher, PK, Sahu, TK and Rao, AR (2016). Identification of species based on DNA barcode using k-mer feature vector and Random forest classifier. *Gene*. doi:10.1016/j.gene.2016.07.010.
- ❖ Saha, S, Kalia, P, Sureja, AK and Sarkar, S (2016). Breeding tropical carrots (*Daucuscarota*) for enhanced nutrition and high temperature stress. *Ind. Jour. Agril. Sci.*, **86(7)**, 940-945.
- ❖ Singh, NK, Mahato, AK, Jayaswal, PK, Singh, A, Singh, S, Singh, N, Rai, V, Mithra, A, Gaikwad, SV, Sharma, K, Lal, N, Srivastava, S, Praksh, M, Kalidindi, J, Singh, U, Singh, SK, Anand, K, Khan, K, Mishra, RK, Rajan, S, Bajpai, A, Sandhya, BS, Nischita, Puttaraju, Ravishankar, KV, Kumar, Dinesh, MR, Jaiswal, N, Jaiswal, S, Iquebal, MA, Kumar, D, Rai, A and Sharma, TR (2016). Origin, diversity and genome sequence of mango (*Mangifera indica* L.). *Ind. J. History of Sci.*, **51.2.2** 355-368.
- ❖ Varghese, E, Jaggi, S and Sharma, VK (2016). Rotatable response surface designs in the presence of differential neighbour effects from adjoining experimental units. *Cal. Stat. Assoc. Bull.*, **67 (267-268)**, 163-186.
- ❖ Goswami, S, Kumar, RR, Dubey, K, Singh, JP, Tiwari, S, Kumar, A, Smita, S, Mishra, DC, Kumar, S, Grover, M, Padaria, JC, Kala, YK, Singh, GP, Pathak, H, Chinnusamy, V, Rai, A, Praveen, S and Rai, RD (2016). SSH analysis of endosperm transcripts and characterization of heat stress regulated expressed sequence tags in bread wheat. *Front. Plant Sci.*, **7**, 1230.
- ❖ Lama, A, Jha, GK, Gurung, B, Paul, RK and Sinha, K (2016). VAR-MGARCH models for volatility modelling of pulses prices: An application. *J. Ind. Soc. Agril. Statist.*, **70(2)**, 145-151.
- ❖ Mourya, KK, Sisodia, BVS and Chandra, H (2016). Calibration approach for estimating finite population parameters in two-stage sampling. *J. Statist. Theo. Pract.*, **10 (3)**, 550-562.
- ❖ Panwar, S, Kumar, A, Sarkar, SK, Paul, RK, Gurung, B and Rathore, A (2016). Forecasting of common carp fish production from ponds using non-linear growth models: A modelling approach. *J. Ind. Soc. Agril. Statist.*, **70(2)**, 139-144.

- ❖ Rao, NS, Kumar, M, Choubey, A and Jha, SK (2016). Design and development of web based information system for results framework document in ICAR. *J. Ind. Soc. Agril. Statist.*, **70(2)**, 173-177.
- ❖ Varghese, E, Varghese, C and Jaggi, S (2016). A class of efficient row-column designs for type III diallel cross experiments with specific combining abilities. *J. Ind. Soc. Agril. Statist.*, **70(2)**, 123–130.
- ❖ Vats, G, Grover, M, Singh, A, Chandra, N, Pandey, N and Rai, A (2016). Role of palmitoylation and nitration in modification of large number of proteins associated with drought stress in plants. *Agrica*, **5**, 59-62.
- ❖ Singh, A and Sharma, A (2016). Evaluation of a secured interface for intelligent recommendations for web personalization, *Intern. J. Comp.*, **6(2)**, 64-69.
- ❖ Sharma, A, and Singh, A (2016). ABSEP3S- An agent based security engine for privacy preserving in personalized search, *Inter. J. Comput. Acad. Res. (IJCAR)*, **5(3)**, 170-176.
- ❖ Kaur, S, Iquebal, MA, Jaiswal, S, Tandon, G, Sundaram, RM, Gautam, RK, Suresh, KP, Rai, A and Kumar, D (2016). A meta-analysis of potential candidate genes associated with salinity stress tolerance in rice. *Agrigene* **1**, 126-134.
- ❖ Aditya, K (2016). Estimation of domain mean using two stage sampling in the presence of non-response. *IJRSS*, **6 (5)**, 496-511.
- ❖ Kumar, B, Guleria, S, Khanorkar, S, Dubey, R, Patel, J, Kumar, V, Parihar, C, Jat, S, Singh, Vishal, Yatish KR, Das, A, Sekhar, J, Bhati, P, Kaur, H, Kumar, Madhvi, Singh, A, Varghese, E and Yadav, Om (2016). Selection indices to identify maize (*Zea mays L.*) hybrids adapted under drought stress and normal ecologies in tropical climate. *Crop & Pasture Science*. <http://dx.doi.org/10.1071/CP16141>.
- ❖ Kumar, B, Hooda, KS, Yadav, Om, Gogoi, R, Kumar, V, Kumar, S, Abhishek, Alok, Bhati, P, Sekhar, J, Yatish, KR, Singh, V, Das, A, Mukri, G, Varghese, E, Kaur, H and Malik V (2016). Inheritance study and stable sources of maydis leaf blight (*Cochliobolus heterostrophus*), *Cereal and Res. Commu.*, **44(3)**, 424–434
- ❖ Mandal, BN, Dash, S, Parui, S and Parsad, R (2016). Orthogonal Latin hypercube designs with special reference to four factors. *Statist. Probab. Lett.*, **119**, 181-185.
- ❖ Meher, PK, Sahu, TK and Rao, AR (2016). Identification of species based on DNA barcode using k-mer feature vector and Random forest classifier. *Gene*, **592(2)**, 316-324.
- ❖ Meher, PK, Sahu, TK, Rao, AR and Wahi, SD (2016). Discriminating coding from non-coding regions based on codon structure and methylation-mediated substitution: An application in rice and cattle. *Comput. Elect. Agric.*, **129**, 66-73, DOI:10.1016/j.compag.2016.09.013.
- ❖ Sharma, P, Tiwari, R, Saharan, MS, Sharma, I, Kumar, J, Mishra, S, Muthusamy, SK., Gupta, RK, Jaiswal, S, Iquebal, M A, Angadi, UB, Kumar, N, Fatma, S, Rai, A and Kumar, D (2016) Draft genome equence of the Karnal Bunt fungus, *Tilletia*

indica Mitra: Two monosporidial lines (PSWKBGH-1 and 2). *Genome Announcement*, **4(5)**, e00928-16. doi:10.1128/genome.A.00928-16.

- ❖ Shukla, S, Iquebal, MA, Jaiswal, S, Angadi, UB, Fatma, S, Kumar, N, Jasrotia, Rahul, Fatima, S, Rai A and Kumar, D (2016). The Onion Genomic Resource: A Genomics and Bioinformatics driven resource for onion breeding. *Plant Gene*, **8**:, 9-15.
- ❖ Srivastava, R, Bajaj, D, Sayal, SK, Meher, PK, Upadhyaya, HD, Kumar, J, Tripathi, S, Bharadwaj, C, Rao, AR and Parida, SK (2016). Genome-wide development and deployment of informative intron-spanning and intron-length polymorphism markers for genomics-assisted breeding applications in chickpea. *Plant Sci.*, **252**:, 374–387.

## LECTURES DELIVERED

- ❖ Training Programme on "Thematic Research on Border Issues" organized at Institute for Border Management and Strategic Studies, New Delhi during July 04-August 26, 2016.
  - Parsad, R. (i) SPSS: An Overview; (ii) Practical exercise on central tendency using SPSS; (iii) Practical exercise on correlation and regression using SPSS and (iv) Practical exercise on analysis of qualitative data using SPSS.
- ❖ Training Programme on "FDP on Application of Statistical Tools and Data Analysis in Research" organized at Jagannath International Management School, Vasant Kunj, New Delhi during July 18-22, 2016
  - Jaggi, S. (i) Hypothesis Testing: One sample test, Two sample test and ANOVA (3 lectures); (ii) Hands on SPSS.
  - Paul, RK. Time-series analysis.
  - Parsad, R. (i) Correlation and regression analysis; (ii) Non-parametric tests; (iii) Web resources on statistical techniques (2 lectures).
  - Varghese, E. (i) Levels of measurements; (ii) Descriptive statistics; (iii) Exploratory data analysis; (iv) SPSS: An overview.
- ❖ Refresher course on "Law and Social Transformation" organized by the Department of Laws and Academic Staff College, Bhagat Phool Singh Mahila Vishwavidyalaya, Khanpur Kalan (Sonipat) Haryana on July 30, 2016.
  - Chandra, H. Research methodology and sample survey. (2 lectures)
- ❖ Training programme on "Hands-on Training on Analysis of Biological Data using Computational Tools" jointly organized by ICAR-CIFA, Bhubaneswar and ICAR-IASRI, New Delhi at ICAR-CIFA, Bhubaneswar from July 05-14, 2016.
  - Sarika. i) Data cleaning and pre-processing and ii) Allele mining and its application in agriculture.
  - Iquebal, MA. i) Genome assembly, ii) Transcriptome analysis and iii) Metagenome analysis.
  - Kumar, Dinesh. Genome annotation.

- ❖ Training programme on "Bioinformatics" at Department of Biotechnology, Madhav Institute of Technology and Science, Gwalior, Madhya Pradesh during August 08-12, 2016
  - Mishra, DC. Genome analysis
- ❖ Training programme on "Bioinformatics in Next Generation Sequencing Data Analysis" organized by ICAR-NBFGR, Lucknow during August 02-11, 2016.
  - Iqbal, MA. SSR mining and its application in agriculture. (Invited lecture)
  - Kumar, Dinesh. Agricultural bioinformatics and computational biology.
- ❖ Training Programme on "Statistical Tools used in IPM" organized at NCIPM, New Delhi during August 09- 11, 2016.
  - Parsad, R. (i) Basic Principles of Design of Experiments and (ii) Indian NARS Statistical Computing Portal. Sarkar, Susheel Kumar. MANOVA, PCA and Cluster analysis.
- ❖ Training programme on "Application of Molecular Biology Tools and Bioinformatics in Agriculture" at College of Biotechnology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut held during August 19, 2016- September 08, 2016.
  - Iqbal, MA. i) Genome Assembly and ii) Molecular marker discovery.
  - Kumar, Dinesh. i) Global and Indian status on agricultural bioinformatics and ii) Genome annotation.
  - Sarika. i) Phylogenetic analysis and ii) Transcriptome analysis.
- ❖ Training programme on "Post Genomic to Phenomic Approaches and Methodologies for Upgrading Livestock Production" at Central Institute for Research on Cattle, Meerut held during September 06-26, 2016
  - Iqbal, MA. i) Mining of polymorphic STR markers from bovine genome, ii) Genome annotation and iii) Metagenomics of rumen microbes
  - Kumar, D. i) Global and Indian status on agricultural bioinformatics and ii) IP informatics.
  - Sarika. i) Genome assembly and ii) RNA seq/ differential gene expression/Transcriptome analysis
- ❖ Workshop on Scientific Programme and Workshop on Biostatistics organized at Department of Public Health Dentistry, Jamia Milia Islamia on September 07, 2016.
  - Sarkar, SK. Testing of hypothesis. (Lecture and hands on session)
- ❖ Marwah S: Lecture on "Access to Agriculture Database" at ZTM BPD, IARI on September 20, 2016 to the representatives of incubated companies of ARISE program.

## Manual/ E-manual

- i) Rasal, KD, Sahoo, L, Nandi, S, Iquebal, MA, Sarika, Kumar, D, Sundaray, JK (2016). Hands-on training on analysis of biological data using computational tools. *Training Reference Manual, ICAR-CIFA, Bhubaneshwar and ICAR-IASRI, New Delhi.*(E-manual)
- ii) Kumar, A and Dash, S (2016). Designing and Analysis of Cropping System Experiments. Winter School organized during September 07-27, 2016 under the aegis of Education Division, ICAR, New Delhi. (Reference Manual Volume-I and Volume-II and E-manual)
- iii) Kumar, A and Dash, S (2016). Designing and Analysis of Cropping System Experiments. *Winter School Organized during September 07-27, 2016 under the aegis of Education Division, ICAR, New Delhi.*
- iv) Varghese, C and Mandal, BN (2016) Experimental Data Analysis. *Training Programme on Experimental Data Analysis for the Technical Personnel of ICAR during August 24 - September 06, 2016* (E-manual) and Reference Manual

## Popular Articles

- i) International Conference on Bioinformatics and Systems Biology (2016). IEEE Xplore digital library.
  - Mishra, DC, Mittal, S, Singh, I, Sanjeev and Rai, A. Identification of co-regulated genes of chick pea under abiotic stress. 1 – 4.
  - Nigam, D, Kadimi, Kumar, P, Sanjeev, Mishra, DC, Pandey, P, Singh, M, Rai, A and Sinha, SK. Meta-analysis of potential miRNA in *Triticum aestivum* and its genome biased association with different metabolisms EST based potential miRNA identification in wheat. 1–5.
  - Rai, N, Mishra, DC, Sanjeev, Rai, A, Chaturvedi, KK, Lal, SB, Kumar, A, Farooqi, MS, Majumdar, PG and Archak, S. Genome analysis of Rhizobium species using codon usage bias tools, 1 – 4.
- i) International Conference on Bioinformatics and Systems Biology (2016). IEEE Xplore digital library.
  - Sahu, S, Rao, AR, Bansal, KC, Muthusamy, SK, and Chinnusamy, V (2016). Genome-wide analysis and identification of abiotic stress responsive transcription factor family genes and miRNAs in bread wheat (*Triticumaestivum* L.), 1-4. <http://dx.doi.org/10.1109/BSB.2016.7552159>.
  - Pandey, B, Gupta, S, Rao, AR, Pandey, DM and Chatrath, R (2016). Molecular modeling and dynamics study of nonsynonymous SNP in bread wheat HSP16.9B gene. 1-4. <http://dx.doi.org/10.1109/BSB.2016.7552123>.

## Package Developed

1. Mandal, BN and Das, S. R package "dhga: Differential Hub Gene Analysis available at <https://cran.r-project.org/web/packages/dhga/index.html>.)

## PROJECTS REPORTS

1. Paul, AK and Wahi, SD (2016). Estimation of heritability under correlated error. Project Report ICAR- IASRI Publication, *I.A.S.R.I./P.R.-03/2016*.
2. Varghese, C, Dash, S and Bhowmik, A (2016). Status Report of the project "Designing and analysis of on farm research experiments planned under All India Co-Ordinated Research Project on Integrated Farming System" for the year (2014-2015). *ICAR-IASRI Publication, I.A.S.R.I./P.R.-05/2016*.

## PARTICIPATION

### **Conference/Workshop/Seminar/Symposia/Training/Foundation Course/Annual Day**

1. 3 months attachment training at Department of Statistics from June 16, 2016 to Sept. 17, 2016, at Viswa Bharati University under the guidance of Prof. Kashinath Chatterjee. (Dr. Anindita Datta and Mr. Mohd. Harun)
2. ICAR Foundation Day Function on July 16, 2016 at Vigyan Bhawan, New Delhi. (Dr. UC Sud, Dr. Tauqueer Ahmad and Dr. Hukum Chandra)
3. 2016 Altair Technology Conference organized by Altair on High Performance Computing Simplified held on July 29, 2016 at Shangri La's Eros Hotel, Ashoka Road, Connaught Place, New Delhi. (Dr. SB Lal, Dr. KK Chaturvedi and Dr. UB Angadi)
4. 21 days training programme entitled 'Information Communication Technology Mediated Agricultural Extension' under the aegis of CAFT at Division of Agricultural Extension, ICAR-IARI, New Delhi during 02-22 August, 2016. (Dr. Arpan Bhowmik)
5. 21 days training programme on "Machine Learning Tools and Techniques for Agricultural Datasets for Knowledge Discovery" at ICAR-IASRI, New Delhi organized under CAFT during August 03-23, 2016. (Dr. N. Srinivasa Rao and Sh. Prakash Kumar)
6. Workshop on Scientific Programme and Workshop on Biostatistics organized at Department of Public Health Dentistry, Jamia Milia Islamia on September 07, 2016. (Dr. Susheel Kumar Sarkar)
7. 9th Agriculture Leadership Summit 2016 held at New Delhi during September 08-09- 2016 (Dr. Hukum Chandra).

8. 6<sup>th</sup> International Conference on Reliability, Infocomm and Technology Optimization (ICRITO-2016) at Amity University, Noida on September 09, 2016. (Dr. KK Chaturvedi)
9. Three months professional attachment training programme on "Microarray data expression study for better identification of differentially expressed genes" during June 10– September 09, 2016 at CSIR-IHBT, Palampur. (Sh. Neeraj Budhlakoti)
10. Workshop on Advancement in Computing at Banasthali Vidyapeeth, Rajasthan held on September 10, 2016 (Dr. Hukum Chandra).
11. Regional workshop on Onion at Lasalgaon, Maharastra on September 20, 2016 conducted under the project network project on Market Intelligence (Dr. RK Paul)
12. The Review Meeting of ICAR Institutes under Agricultural Engineering Division on September 22, 2016 at ICAR Headquarter. (Dr. AK Choubey, as Officiating Director).
13. Third Interaction Meeting with Administrative and Finance Officials from North Zone ICAR Institutes held on September 30, 2016 at ICAR-IISR, Lucknow. (Dr. AK Choubey)

## **TECHNOLOGY ASSESSED/TRANSFERRED/UPDATED**

- Updated the module on "Balanced Incomplete Latin Square Designs" at Design Resources Server at IASRI website.
- Implementation of MIS/FMS in all ICAR Institutes.
- CBP Vortal.
- Agridaksh on Maize, Mushroom.
- Expert system on Wheat and Seed Spices.
- Updated version of the data entry software was provided to the state headquarters for the state of Assam and Uttar Pradesh under the project "Pilot study for developing State level estimates of crop area and production on the basis of sample sizes recommended by Professor Vaidyanathan Committee report".
- Updated the MAPI software with new features.

## **CONSULTANCY/ADVISORY SERVICES PROVIDED**

- Dr. RK Paul provided advisory to Ms. Priyanka Solanki, Ph.D. student of Agri. Business Management from Department of Agricultural Economics, College of Agriculture, S.V. Rajasthan Agricultural University and provided advisory to Dr. Fazil Hasan, Division of Entomology, IARI for fitting of Nonlinear Model for estimation of data set.

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- Sh. Prakash Kumar provided advisory to analyze allicin and allyl thiosulphinates data of different germplasm of garlic of Dr. Preeti Singh, Scientist, section of Medicinal & Aromatic Crops, ICAR-IIHR, Bengaluru.
- Sh. UK Pradhan provided advisory service to Mr. Rishi Raj Yadav, Scientist, Division of Agronomy, ICAR-IARI, New Delhi and analyzed the data for combined split-plot design for two locations. Dr. Bishal Gurung advised Ms. Lungkudailiu Malangmeih, RA at ICAR-NIAP, New Delhi on the use of logit and probit model using SAS.
- Dr. BN Mandal advised i) Ms. Dipti Nayak, Ph.D. Student, IGKV, Raipur on principal component analysis of soil chemical, physical and biological data and ii) Mr. Akshay Sahkare, Ph.D. student, IARI, on factorial CRD analysis with two factors: varieties and presence/absence of stress condition.
- Dr. Arpan Bhowmik performed genetic component analysis based on the data from the experiment of Dr. Partha Saha, a Scientist, Division of Vegetable Science, IARI, New Delhi. Phenotypic correlation and variance, genotypic correlation and variance, environmental correlation and variance along with heritability were obtained.
- Mr. Sunil Kumar Yadav advised Mr. KSV Poorna Chandrika, Scientist, IIOR, Hyderabad about regression analysis to study the effect of various constituents on water absorption of foam sheet.
- Dr. BN Mandal advised i) Sh Rishiraj, Scientist, Agronomy Division IARI on combined analysis of split plot data and ii) Sh Akshay Sahkare, in-service PhD student, IARI on augmented design analysis.
- Dr. VP Chaudhary, Sr. Scientist (FMP) & Dr. Nisha Verma, Scientist, IIFSR, Modipuram, Meerut, Uttar Pradesh were advised about sampling design related to their project.
- Sh. Prakash Kumar advised Nikita Sharma, Horticulture ( IARI), Ph.D. Student in the analysis of the data of different level of treatment of different quantitative value of variables of horticultural crop.
- Dr. Ravindra Singh Shekhawat advised Dr. G.L. Meena, Assistant Professor, RCA, MPUAT, Udaipur and Dr. Madhusudan Bhattarai, Consultant, IFPRI, New Delhi in correspondence analysis.
- Sh. Santosha Rathod advised regarding RBD Data analysis for Ph.D. Research work of Laxmipati, Ph.D Scholar, ICAR-IARI on 30th August, 2016.
- Shri Prakash Kumar advised Shri Jitendra Kumar, Ph.D. Student IARI, New Delhi for analyzing the data on study of broccoli irrigation water productivity with crop water productivity of horticultural crop.
- Dr. Wasi Alam advised Dr. MC Singh, Principal Scientist, Centre for Protected Cultivation Technology, ICAR-Indian Agricultural Research Institute, New Delhi for ANOVA analysis for post harvest treatments in tuberoses.



## PROJECTS:INITIATED/COMPLETED

1. Incomplete split-plot designs: construction and analysis. (BN Mandal, Sukanta Dash, Rajender Parsad, VK Gupta) (16.08.2016-15.08.2019)
2. Standardization and validation of scales for measuring socio-psychological constructs related to risk adjustment and entrepreneurship behaviours of farmers. (RN Padaria, RR Burman, Rashmi Singh, Sujit Sarkar, V Lenin, Reshma Gills, Arpan Bhowmik, Eldho Varghese) (05.09.2016-31.03.2018)
3. Development of varietal and hybrid technologies of pearl millet [Pennisetum glaucum (L). R. Br.] for higher yield and nutritional improvement. (C. Tara Satyavathi, S.P. Singh, Mukesh Sankar, M.B. Arun Kumar, R.S. Banna, Sudhir Kumar, N. Srinivasa, Dabas, Gynander Singh, Anil Dahuja, Jayant Bhat, Raj Kumar, Jasdeep Chatrath Padaria, S.K. Jha, M.C. Meena, Eldho Varghese) (26.09.2016-31.03.2019)
4. In silico analysis of data for identification of functional alleles for stress tolerance and quality traits using bioinformatics in Potato. (Anil Rai, AR Rao, Sanjeev Kumar, DC Mishra, Shashi Rawat, Sanjeev Sharma, Vinay Bhardwaj, Som Dutt, Jagesh Tiwari, Sundresha, Sridhar, VU Patil) (12.09.2016-31.03.2017)
5. Calibration estimators under twp stage sampling design when study variable is inversely related to auxiliary variable. (Ankur Biswas, Kaustav Aditya and UC Sud) (01.05.2014 - 26.09.2016)
6. Cluster ensemble algorithms for germplasm evaluation on ChickPea. ( Sangeeta Ahuja, AK Choubey, OP Sharma, HL Raiger)  
(*This project was closed in special IRC held on 02 September, 2016.*)

## PERSONNEL

### Congratulation on your Promotion

Name	Designation	Effective Data
Dr. Ranjit Paul	Scientist	23.06.2013
Sh. Pal Singh	Scientist	29.10.2013
Dr. K.K. Chaturvedi	Sr. Scientist	16.11.2013
Smt. Anu Sharma	Scientist	18.11.2013
Sh. SN Islam	Scientist	29.11.2013
Dr. Dwijesh Chandra Mishra	Scientist	15.12.2013
Smt. Jyoti Gangwani	Chief Technical Officer	01.07.2014
Sh. Devendra Kumar	Chief Technical Officer	01.01.2015
Sh. Devi Prasad Sharma	Chief Technical Officer	01.01.2015
Sh. CP Singh	Chief Technical Officer	01.01.2015
Sh. Sheoraj Singh	Chief Technical Officer	01.01.2015
Sh. Kasi Vishwanathan	Sr. Technical Officer	01.01.2015
Sh. RK Saini	Chief Technical Officer	01.01.2015
Sh. Ashwani Kumar	Chief Technical Officer	01.07.2015

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## Wish you Happy Retired Life

<b>Name</b>	<b>Designation</b>	<b>Effective Date</b>
Dr. AK Gupta	Principal Scientist	31.07.2016
Dr. Ved Prakash	Chief Technical Officer	31.07.2016
Sh. SD Wahi	Principal Scientist	31.08.2016
Sh. Satbir Singh	UDC	31.08.2016
Sh. Bhaskar Dutt	SSS	31.08.2016

## Transfer

<b>Name</b>	<b>From/To</b>	<b>Effective Date</b>
Dr. NS Rao, Senior Scientist	ICAR-IASRI To ICAR-NARM, Hyderabad	04.09.2016

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एक कदम स्वच्छता की ओर



हर कदम, हर डगर  
किसानों का हमसफर  
भारतीय कृषि अनुसंधान परिषद

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