IIRR

ICAR-Indian Institute of Rice Research

NEWSLETTER

Volume: 18 Number: 2 RICE IS LIFE April - June 2019

54th Annual Rice Group Meeting

54th Annual Rice Group Meeting (54th ARGM) took place during 30th May, 2019 to 2nd June, 2019 at ICAR-National Rice Research Institute, Cuttack. Discipline wise group meetings with cooperators were conducted on 30th May, 2019. The results of the AICRIP trials conducted during *Kharif* 2018 were discussed and finalized the technical program for ensuing *Kharif* on 1st June, 2019. In the inaugural session on May 31st, 2019, Dr. Himanshu Pathak, Director, ICAR-NRRI mentioned about genesis of AICRIP and its contribution towards the service of farming community despite the plethora of challenges of climate change, low income and other issues. Dr. S.R. Voleti, Director, ICAR-IIRR briefly presented the research highlights of AICRIP and IIRR. He thanked the support and cooperation of all the members of AICRIP who contributed to the success of AICRIP for more than five decades.

Dr. D.K. Yadava, ADG (seeds), ICAR, complimented NRRI team for the efforts in conducting Annual Rice Group Meeting for the first time at NRRI. He underscored the significance of rice crop as one of the most important crops in India with largest area and production. He also highlighted importance of the largest network of AICRIP having 45 funded and more than 100 voluntary centers conducting 939 experiments every year. He commended and called for the collective efforts and reorientation of AICRIP to meet the future challenges of rice crop.

Dr. Dinesh Kumar, ADG (FFC) applauded NRRI team for convening 54th ARGM despite the recent *Fani* cyclone. He urged the scientists to develop varieties with yield potential of 10-12 tonnes by insulating the varieties with disease and pest resistance for diverse ecologies taking advantage of new scientific tools and techniques. Dr. H.S. Gupta complimented the tremendous contribution

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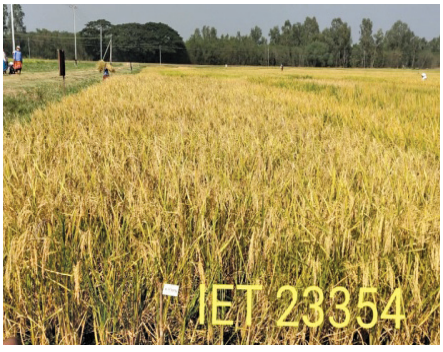
of AICRIP system over 50 years, which was quoted as an efficient research networking system.

Varietal Identification Committee (VIC) meeting was held on 31st May, 2019 chaired by Dr. Dinesh Kumar, ADG (FFC), ICAR. 29 proposals comprising 14 varieties and 15 hybrids were critically examined for their overall and zonal yield performance over the years, reaction to biotic and abiotic stresses, performance in agronomic trials and quality features. 20 proposals comprising 11 varieties and 9 hybrids were accepted.

General Body of the Society for Advancement of Rice Research met on 2nd June, 2019 and a new Executive committee was elected during the meeting. Thirteen Publications from NRRI (6), IIRR (5) and CSKHPKV, Malan (2) and two android mobile apps from IIRR were released during 54th ARGM.

New rice varieties - Gazette notification

- The Gazette of India [S.O1498 (E) dt. 1st Apr, 2019] notified 33 rice varieties and 7 rice hybrids for release. Of them, 21 are SVRC releases and 19 are CVRC releases. Among the SVRC varieties, 4 each were recommended for the states of Telangana, Maharashtra and Uttar Pradesh, 2 each for Chhattisgarh and Madhya Pradesh and 1 each for West Bengal, Odisha, Jammu, Gujarat and Assam. One variety, DRR Dhan 52 developed from IIRR is notified in this Gazette.
- Arize 6129 Gold BS-129G (IET 22878-HRI179), a rice hybrid from M/s. Bayer Bioscience Pvt. Ltd., Hyderabad was earlier notified vide S.O268(E) dt. 28/01/2015 for Haryana and Chhattisgarh vide S.O1007(E) dt 30/3/2017 is approved for area expansion and further notified for Madhya Pradesh vide S.O1498 (E) dt. 1st Apr, 2019.
- DRR Dhan 52 is developed from IIRR in collaboration with International Rice Research Institute and is notified through CVRC for the states of Haryana, Gujarat and Odisha [S.O1498 (E) dt. 1st Apr, 2019]. It is a first heat tolerant variety. **Developers:** Drs. T. Ram, Jyothi Badri, S.K. Mangrauthia (IIRR), Arvind Kumar (IRRI) **Collaborators:** Drs. L.V. Subba Rao, R. Abdul Fiyaz, M.S. Prasad, V. Jhansi Lakshmi, B. Sreedevi, P. Raghuveer Rao and Amtul Waris (IIRR).



New rice varieties- CVRC/SVRC

82nd Meeting of Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops was held on 1st June, 2019 under the chairmanship of Dr. Anand Kumar Singh, Deputy Director General (Crop Science) at IARI, New Delhi.

- 11 deferred proposals on rice (one CVRC and 10 SVRC) in previous meetings were approved and recommended for release after revision. Bhupesh (IET 23324) from Govt. Rice Research Station, Chinsurah (W.B) was recommended for release through CVRC in 6 states-Tripura, Odisha, Bihar, Chhattisgarh, Rajasthan and Tamil Nadu. Among the State releases, three were from Chinsurah (W.B) meant for West Bengal (IET 23770, 21943 and 22866); 2 each from Navsari Agricultural University and Share-e-Kashmir

University of Agricultural Science and Technology of Kashmir for Gujarat (NVSR 2031, NVSR 6128) and Jammu & Kashmir (Shalimar Rice 4 and Shalimar Rice 5), respectively; one each from UAS-Raichur, PRDF-Gorakhpur and JNKVV for Karnataka (IET 24716), Uttar Pradesh (Kalanamak Kiran: IET 24753) and Madhya Pradesh (IET 26079), respectively.

- 12 proposals on rice for State releases that were considered in 81st meeting were approved and recommended for release during 82nd meeting. Of them two are hybrids, NVSR-H-1011 from Navsari Agricultural University (for Gujarat) and IET24949 from Bisco Bio Sciences Pvt Ltd (for UP). Two rice varieties (HKR128 and HKR06-443) from Kaul for Haryana, one each from BCKV (Bidhan Suruchi) and UBKV (Uttar Sona) for WB, IET 22188 and IET 22611 from ANGRAU for AP, IET 20329 and IET 23206 from CSSRI for UP and IET 24606 and IET 23955 from TNAU for TN were approved and recommended as State releases.
- Area expansion sought for three rice hybrids was approved-ARIZE 6129 GOLD BS (HRI 179) (IET 22878) from Bayer Bio Science Ltd was approved for area expansion in Uttar Pradesh; PAC 801 and PAC 837 of UPL Ltd, Hyderabad for area expansion in Madhya Pradesh.
- Amendment was made for the rice hybrid c.v NK16520 (S.O No 3540 (E)dt 22/11/2016 at S. No 19 and correction to be made in the name Rice hybrid c.v NK16520-IET 24116 (S7002).

Research highlights of IRR

Breeding Wide Compatible Restorer Lines through Inter-Subspecific Hybridization

K. Sruthi[1], A.S. Hari Prasad[1], K.B. Eswari[2], P.Senguttuvel[1], P. Revathi[1], K.B. Kemparaju[1], M. Sadath Ali[1], P. Koteswara Rao[1], Ch. Damodhar Raju[2], M. Sheshu Madhav[1], R.M.Sundaram[1] and A. Dhandapani[3]

[1]ICAR-IIRR; [2]Professor Jayashankar Telangana State Agricultural University; [3]National Academy of Agricultural Research Management.

IJD34 (RP6367) and IJD38 (RP6368) are two newly developed wide compatible restorer lines bred through inter sub specific hybridization. IJD34 is derived from a cross between RPHR1096 and IRGC 66755 and IJD38 from IBL-57 and IRGC 66651. These two derived lines were developed through pedigree method of breeding by selecting important characters like *indica* plant type, grain type with medium height and japonica type strong culm at ICAR-Indian Institute of Rice Research, Hyderabad. At molecular level these three genes were confirmed by using reported candidate gene specific markers viz., RMS-PRR9-1 for *Rf4*, RMS-SF21-5 for *Rf3* and *S5n* INDEL for *S5n* (Fig.1) and to confirm their fertility restoration ability at field level, F_1s derived from test crosses between these two wide compatible restorer lines and four WA-CMS lines were evaluated during *rabi* 2018-19 and *kharif* 2019 for pollen and spikelet fertility and resulting hybrids showed >80 per cent pollen and spikelet fertility (Table 1). IJD 38 showed >80 per cent pollen and spikelet fertility with all the tested CMS lines but IJD 34 showed >75 per cent pollen and spikelet fertility with two tested CMS lines. This might be due to varying ability of fertility restoration behavior among different CMS lines. Heterosis studies revealed that hybrids derived from these two wide compatible restorer lines showed positive standard heterosis for different yield traits over hybrid check DRRH3.

IJD 34 recorded 102 days and IJD 38 recorded 110 days of days to 50 per cent flowering indicating medium duration of these lines. For plant height, IJD 34 and IJD 38 recorded 100 cm and 86 cm, number of productive tillers-6 and 8, number of filled grains-188 and 153, spikelet fertility-87% and 89%, thousand grain weight-23 g and 18 g respectively. Phenotypic performance of wide compatible restorer lines for yield related traits was comparable with popular restorer lines RPHR1005 and KMR3R (Fig. 2). Regarding grain quality, both the lines recorded intermediate amylose content (IJD34-20.99%; IJD38-25.89%) and different grain type (IJD34-short bold; IJD38-medium slender). IJD34 and IJD38 were qualified as potential restorers with good restoration ability and spikelet fertility can be utilised in hybrid breeding programme to develop heterotic hybrids.

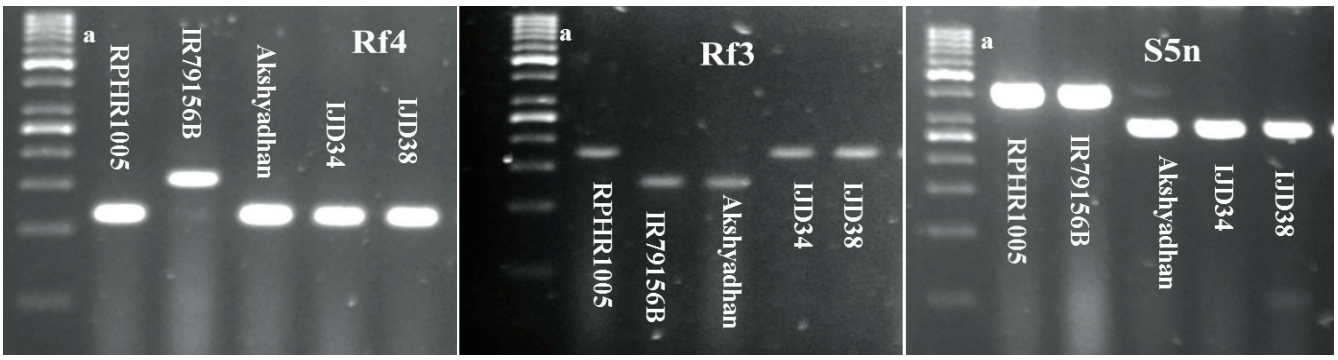


Fig. 1 Molecular screening of indica *tropical* japonica *derivative lines for fertility restoration genes (*Rf4 *and* Rf3*) and wide compatible gene (*S5n*); (a) 50bp DNA ladder*

Table 1: Pollen and spikelet fertility percentage of hybrids derived from IJD34 and IJD38 with four CMS lines

Cross combination	Pollen fertility %			Spikelet fertility %		
	Rabi 2018-19	*Kharif* 2019	Mean	*Rabi* 2018-19	*Kharif* 2019	Mean
IJD34 X IR68897A	70	56	63	65	60	63
IJD38 X IR68897A	89	90	90	80	85	83
IJD34 X IR79156A	75	74	75	85	78	82
IJD38 X IR79156A	87	81	84	95	92	93
IJD34 X PUSA5A	79	75	77	83	78	81
IJD38 X PUSA5A	87	86	86	88	85	87
IJD34 X APMS6A	55	60	58	62	65	64
IJD38 X APMS6A	83	76	80	88	79	84
DRRH3	85	78	82	83	78	80

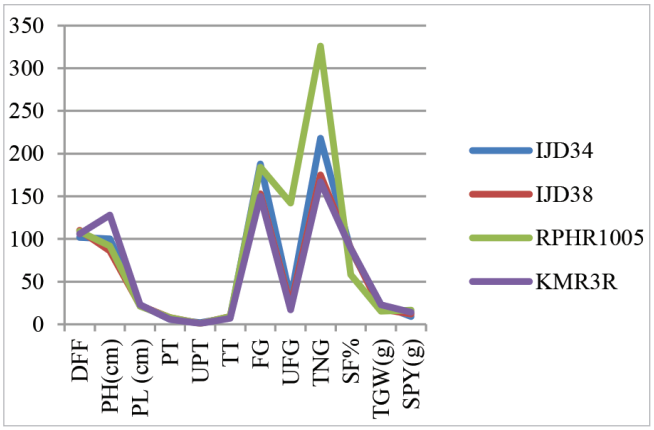


Fig. 2 Comparable agro morphological performance of IJD34 and IJD38 with popular restorer lines RPHR1005 and KMR3R. DFF-Days to 50% flowering; PH-Plant height; PL-Panicle length; PT-Productive tillers; UPT-Unproductive tillers; TT-Total number of tillers; FG-Filled grains; UFG-Unfilled grains; TNG-Total number of grains; SF%-Spikelet fertility; TGW-Thousand grain weight; SPY-Single plant yield

Grain protein content in rice germplasm

At IIRR, Institute project on **"Development of Rice Cultivars with High Grain Protein Content and Quality Traits"** (Project code: GEY/CI/ BR/9; PI: Dr. J. Aravind Kumar; Co-PIs: Dr. L.V. Subba Rao, Dr. D. Subramanyam, Dr. Jyothi Badri, Dr. R.A. Fiyaz, Dr. Ch Suvarna Rani) was initiated in 2018 and field experiments were taken up during 2018-19. 679 germplasm lines (360 tropical japonica lines, 250 landraces, 50 breeding lines and 19 cultivars) have been evaluated with an objective to identify novel sources of high grain protein and to develop high grain protein rice varieties with desirable quality traits. The grain protein content was estimated with "Infratec™ 1241 Grain Analyser". The spectrometer is a "Scanning Monochromator" with a wavelength range of 570-1100 nm with a Silicon detector. 500 gm of milled rice sample was required for the sampling. The path length is variable and automatically controlled from 6-33 mm. The regression programs used are "Artificial Neural Network [ANN] and Partial Least Square [PLS]". The Infratec database with its robust ANN-based calibrations building on a wide sample range gives a level of accuracy and stability. The grain protein content among the germplasm lines evaluated ranged between 7.4 to 10.6%. Two germplasm lines JAK 703 and JAK 719 had 10.6% grain protein and 20 g/plant grain yield each, intermediate amylose content of 21.4% and 22.9% high head rice recovery of 61.0% and 56.5% respectively (Table 1). The two germplasm lines identified with high GPC coupled with high yield and desirable grain quality traits will serve as donors for GPC improvement in rice.

Table 1: Protein and grain quality characteristics in rice germplasm

Entry No	Amylose Content (%)			Head Rice Recovery (%)			Grain Protein (%)			Grain Yield/plant (g)		
	Kh18	R19	Mean	Kh18	R19	Mean	Kh18	R19	Mean	Kh18	R19	Mean
JAK703	22.73	20.14	21.44	62.40	60.10	61.25	10.7	10.5	10.6	17.40	21.40	19.40
JAK719	24.70	21.10	22.90	53.80	59.20	56.50	10.5	10.7	10.6	20.60	18.40	19.50
BPT5204	23.60	25.00	24.30	60.40	56.20	58.30	7.9	8.3	8.1	23.00	20.20	21.60

New research projects initiated at IIRR-Externally funded projects

Two new externally funded projects are initiated at IIRR during this quarter.

S. No.	Title of the Project	Investigators	Duration	Budget (Rs.)	Funding Agency	Collaborating Institutes
1	Imparting sheath blight resistance in rice (A DBT flagship project)	**PI: Dr. R.M. Sundaram,** Principal Scientist (Biotechnology) **Co-PIs:** Drs. C. Kannan, Principal Scientist V. Prakasam, Scientist and G.S. Laha, Principal Scientist (Pathology)	2019-2022	108 lakh	DBT	NIPGR, New Delhi (Coordinating Institute) ICAR-IIRR ICAR-IARI NABI, Mohali NII, New Delhi
2	RNA-seq based mapping of robust root system architecture for identification of candidate genes	**PI: Dr. Kalyani M Barbadikar,** Scientist (Biotechnology)	2018-2021	44.18 lakh	DST-SERB	--

Meetings of ICAR-IIRR

Quinquennial review team meeting

QRT chaired by Dr. H.S. Gupta with Drs. R. Sridhar, P.S. Birthal, J.L. Dwivedi, S. Kundu and T.V.K. Singh as members first held meeting at IIRR. In continuation to the QRT first meeting at IIRR during 27th-28th November, 2018, a series of QRT meetings were held across Eastern and North Western zones during this quarter,

- At Varanasi, QRT meeting was held between 5-6th April, 2019 for 9 AICRIP centres of Eastern zone- BHU, Varanasi, ICAR-Patna, BAU, Ranchi, RAU, Pusa, BAU, Sabour, NDUAT, Faizabad, ICAR-Lucknow, Dhanigain, Bikramgunj and CRURRS, Hazaribagh. Dr. Gururaj Katti from IIRR participated in the meeting.
- From 8-9th May, 2019 for 7 centres of North-western zone- ICAR-IARI, Pusa, New Delhi, GBPUAT, Pantnagar, PAU, Ludhiana, RRS, Kaul, ARS, Kota, RRS, Nagina, ICAR-CSSRI, Karnal. Drs. Gururaj Katti and G. Padmavathi represented IIRR in the meeting.
- During 20-21st May, 2019, the other 10 centres of Eastern zone-RRSS, Chakdaha, RRS, Chinsurah, NRRI, Cuttack, RRTTS, Chiplima, OUAT, Bhubaneshwar, UBKV, Pundibari, RRTTSS (OUAT), Jeypore, ZDRPRS, Hathwara, CSSIRRS, Canning and RRS, Bankura were covered. Drs. Gururaj Katti and G. Padmavathi from IIRR participated in the meeting.

Hindi Workshop

ICAR-IIRR organised Hindi Workshop on 27th June, 2019. On this occasion, Shri Naveen Kumar Naithani, Hindi Teaching scheme, Ministry of Home Affairs graced the workshop as chief guest. He trained the staff on the use of 'Hindi' as an official language. A total of 25 participants from different categories including scientists, technical and administrative staff attended the workshop.

Outreach programmes of IIRR

Demonstrations on 'Good Agricultural Practices' in Jangaon district of Telangana (Seed distribution undertaken under SCSP on 11/06/2019)

ICAR-Indian Institute of Rice Research, Hyderabad has organized quality paddy seed distribution in collaboration with NGO-BLESS, Telangana for the benefit of SC famers of Jangaon district of Telangana under the ICAR-SCSP scheme on 11/06/2019. Under the ICAR-SCSP scheme, on-farm cluster demonstrations were planned for the *kharif* 2019 on 670 farmer fields of Jangaon. As part of these demonstrations, 670 bags of seed of improved varieties of paddy viz., Improved Samba Mahsuri, BPT 5204 and Telangana Sona was distributed to 670 farmers of Kodavatoor, Bachannapet, Itikalapally and Obulkeshapuram villages of Bachannapet mandal of Jangaon district. Dr. B. Nirmala, Senior Scientist and PI-SCSP advised the farmers to adopt 'Good Agricultural Practices' in Rice. The farmers were educated to take up need based application of nutrients and plant protection chemicals. Dr. Amtul Waris, PS and Member, SCSP motivated the farmers for adoption of low external inputs for sustainable paddy production. Farmer-scientist interactions were held in Kodavatoor, Bachannpet, Itikalapally and Obulkeshapuram villages.

Society for Advancement of Rice Research

The General body meeting of the Society for Advancement of Rice Research (SARR), Hyderabad was held on 2nd June, 2019 at ICAR-National Institute of Rice Research, Cuttack. 50 members were present in the meeting. GBM-SARR-2019 was chaired by Dr. G. Katti, Principal Scientist and Head, Crop Protection, ICAR-IIRR, Hyderabad. The meeting started with a formal welcome by the General Secretary, Dr. Brajendra, ICAR-IIRR. He briefly presented the activities carried out by SARR during the past two years including journal publication. A presentation of the Financial Report for the period 2017 - 2019 was given by Dr. Jyothi Badri, Treasurer, SARR. Journal related activities were discussed by Dr. R.M. Sundaram, Chief Editor, SARR. The latest journal issue was released by the dignitaries on the dais. The new Executive body of the SARR was elected through nominations/ proposals from the members and following names for the positions were approved by the GBM.

New Executive Committee of SARR (Period April 2019 to March, 2021)

Sl. No.	Name	Designation	Affiliation
1	Dr. S.R. Voleti	President	Director, ICAR-IIRR, Hyderabad
2	Dr. O.N. Singh	Vice President -1	PPVFRA, Chennai
3	Dr. Y. Chandra Mohan	Vice President -2	ARI, PJTSAU, Hyderabad
4	Dr. R.M. Mahendra Kumar	General Secretary	ICAR-IIRR, Hyderabad
5	Dr. Gopala Krishnan	Joint Secretary	ICAR-IARI, New Delhi
6	Dr. B. Nirmala	Treasurer	ICAR-IIRR, Hyderabad
7	Dr. CH. Padmavathi	Chief Editor	ICAR-IIRR, Hyderabad
		Zonal Councilors	
8	North India	Dr. R.P. Singh	Benaras Hindu University, Varanasi, UP
9	West India	Dr. P.B. Patil	Navsari Agricultural University, Gujarat
10	East India	Dr. Vijay Pal Bhadana	ICAR-IIAB, Namkum, Ranchi
11	South India	Dr. Ravi Kumar	RRS, Maruteru, AP

Staff news

Awards

- Dr. Raman Meenakshi Sundaram, Principal Scientist (Biotechnology) was conferred with the Fellow of National Academy of Agricultural Science (NAAS) on 6th June, 2019 for the year 2019. He was recognized for his outstanding contribution made in the field of Application of Biotechnology for rice improvement. The ICAR-IIRR congratulates him for his achievements.

- Dr. Shaik N. Meera, Principal Scientist (Agricultural Extension) was conferred with the Fellow of Association of Rice Research Workers (ARRW) on 2nd June, 2019 during the general body meeting held at National Rice Research Institute, Cuttack. He is the first fellow of ARRW from Social Sciences discipline and was recognized for his outstanding contribution made in the field of rice research and extension. The ICAR-IIRR congratulates him for his achievements.

Trainings and meetings attended

- Dr. Shaik N. Meera, Officer In Charge, PMEC attended Management Development Program on Priority Setting, Monitoring and Evaluation of Agricultural Research Projects during 18-23 July, 2019 organized at National Academy of Agricultural Research Management, Hyderabad.
- Dr. Jyothi Badri participated in the "15th Review Meeting of DUS Test Centres - *Kharif* Crops-2019" held on 25-26th Apr, 2019 at NASC, New Delhi organized by PPV&FRA.

Joining

Mr. Navneet Kumar, Stenographer, Grade III joined at ICAR-IIRR on 01.04.2019

Promotions

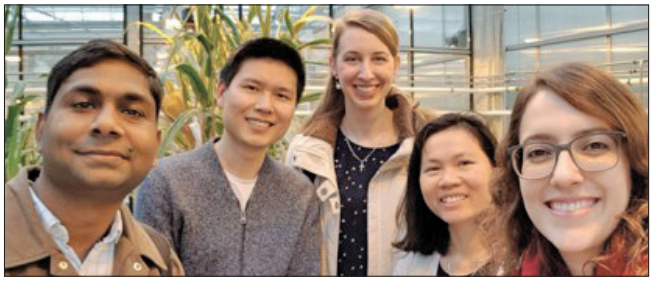
1. Shri. S. Amudhan promoted to next higher grade of Asst. Chief Technical Officer (T-7-8) w.e.f. 31.03.2018
2. Shri. P. M. Chirutkar, promoted to next higher grade of Asst. Chief Technical Officer (T-7-8) w.e.f. 28.04.2017
3. Shri. M. Vijay Kumar promoted to Senior Technical Officer w.e.f. 31.03.2017
4. Shri. B. Venkaiah promoted to Senior Technical Assistant w.e.f. 16.05.2017
5. Shri. K. Shravan Kumar promoted to Technical Officer w.e.f. 27.03.2018
6. Dr. Y. Roseswar Rao promoted to Technical Officer w.e.f. 12.06.2018
7. Shri. K. H. Devadas promoted to Senior Technical Assistant w.e.f. 17.11.2018
8. Shri. P. Koteswara Rao promoted to Senior Technical Assistant w.e.f. 03.01.2019
9. Shri. Bidyasagar Mandal promoted to Senior Technical Assistant w.e.f. 09.01.2019

Deputations

- Drs. S.R. Voleti, Director and Shaik N. Meera, Principal Scientist visited Chinese Academy of Agricultural Sciences, Beijing, China during 1-3 April, 2019 to participate in the conclusion meeting of Green Super Rice Project.

- Dr. Shaik N. Meera, Principal Scientist visited Egypt during June 15 - July 5, 2019. He was invited by International Fund for Agricultural Development (IFAD) as Digital Transformation Specialist to contribute to the design mission for their new investment in Egypt called Sustainable Transformation and Agriculture Resilience (STAR) during 15 June - 5 July, 2019 in Cairo, Egypt.

- Under ICAR Lal Bahadur Shastri Outstanding Young Scientist Award-2016, Dr. Satendra Kumar Mangrauthia visited Institute for Molecular Physiology, Heinrich Heine University (HHU), Düsseldorf, Germany from 30th March to 28th June, 2019. He was invited by Prof. Wolf B. Frommer of HHU, for three months training on "CRISPR/Cas mediated genome editing in rice". Prof Wolf's lab is pioneer in utilization of CRISPR/Cas genome editing tools in rice.



Transfers

Shri. A.K. Maheshwari, FAO transferred from IIRR, Hyderabad to CTRI, Rajahmundry on promotion as SFAO. He was relieved on 25.06.2019.

Retirements

Shri. K. Kumaraswamy, AAO retired from the Council's Service w.e.f. 30.06.2019 on superannuation.

Editorial Committee: Drs. Nageswara Rao, D.V.K., Jyothi Badri, Senguttuvel, P., Kalyani M, Barbadikar., Basavaraj K., Bandeppa, S., Arti Singh and Amtul Waris

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