IIRR

ICAR-Indian Institute of Rice Research

NEWSLETTER

Volume: 20 Number: 1 RICE IS LIFE January - March 2022

9th Annual Hill Rice Research Group Meeting

The 9th Rice Research Group Meeting for Hill Region was held on 28th February 2022 in virtual mode under the chairmanship of Dr TR Sharma, DDG (Crop Science), ICAR and co-chaired by Dr RK Singh, ADG (FFC), ICAR. It was hosted by ICAR-Indian Institute of Rice Research (ICAR-IIRR), Hyderabad. Dr RM Sundaram, Director, ICAR-IIRR, Dr Padmini Swain, Director (A), ICAR-NRRI, Dr LV Subba Rao, PI-AICRIP, ICAR- IIRR, PIs and Scientists of different disciplines of ICAR-IIRR, as well as cooperating centres of the Hill region *viz.,* Almora, Khudwani, Pombay, Rajouri, CAU-Umiam, ICAR-Umiam, Upper Shillong, Malan, Palampur, Sundernagar, Lamphelpat, Ponnampet, Sirsi, Gudalur participated in the workshop.

Dr RM Sundaram briefed about the importance of Rice Hill workshop and the necessity to conduct it in advance in February instead of usual time by mid-April every year. Dr LV Subba Rao, PI-AICRIP elaborated about the importance of Rice Hill ecology, its area, production and constraints in the Hill ecology. Dr RK Singh briefed about diverse rice ecologies in India and urged the co-operators to ensure the supply of quality rice seeds to farmers in Hill zones including north eastern India. Dr TR Sharma in his introductory remarks emphasised on the importance of collection and submission of high quality data of the trials from all the funded and voluntary centres to ensure proper assessment of the test entries. The inaugural session was followed by centre wise presentations and deliberations were made on increasing the testing locations in hill ecology, strengthening the research on breeding program involving coloured rices, *indica* X tropical *japonica* crosses combining the important traits like cold tolerance and other biotic stress tolerance and collection and characterization of diverse germplasm of north-western Himalayan region to identify the new genes/novel sources for various biotic and abiotic stress tolerance/resistance. The workshop ended with vote of thanks by Dr R Mahender Kumar, PI (Crop Production), ICAR- IIRR Hyderabad.

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Institute Technology Management Unit (ITMU) Activities

MoAs signed

- A Memorandum of Agreement (MOA) signed on 8th February 2022 between Association for Innovation Development of Entrepreneurship in Agriculture (a-IDEA), Technology Business Incubator of ICAR - National Academy of Agricultural Research Management (ICAR-NAARM) and ICAR-IIRR under the Incubation programme of a-IDEA.

Patents filed

- Patent filed with Indian Patent Office with application no. 202241006257 dated 5th February 2022 for ICAR-IIRR developed technology "ANHYDROUS SKIN CLEANSING AND MOISTURIZING COMPOSITION".
- Patent filed with Indian Patent Office with application no. 202241011157 dated 2nd March 2022 for ICAR-IIRR developed technology "ANHYDROUS NATURAL PAIN RELIEF COMPOSITION FOR TOPICAL APPLICATION".

Meetings attended

- Dr RM Sundaram, Director, ICAR-IIRR, Dr M Sheshu Madhav, PS & ITMU, Chairman and Dr AS Hari Prasad, PS (Hybrid Rice) participated in the Workshop on Business Plan Development for the Farmer Producers Organization (FPOs) held on 22nd February 2022 at ICAR – Indian Institute of Oilseeds Research (ICAR-IIOR), Hyderabad. Dr RM Sundaram presented a lecture on "Technological interventions in rice for the FPO farmers" (in virtual mode).

Second Meeting of the Expert Committee on Revisiting the AICRIP Guidelines

The second meeting of the expert committee on revisiting some of the AICRIP guidelines for evaluation of entries was held on virtual mode on 10th March 2022 under the chairmanship of Dr JP Tandon, Former ADG (F&FC), ICAR, New Delhi. The members of the committee, Dr DK Yadava, ADG (Seeds), ICAR, New Delhi, Dr RM Sundaram, Director, ICAR-IIRR, Hyderabad, Dr AS Dhatt, Director of Research, PAU, Ludhiana, Dr LV Subba Rao, PI-AICRIP, Dr AVSR Swamy, Principal Scientist, ICAR-IIRR, Hyderabad, Dr Jogi Naidu, Assc. Director, RARS, ANGRAU, Maruteru, AP, Dr BC Viraktamath, Former Director, ICAR-IIRR, Hyderabad, Dr AS Hariprasad, Principal Scientist, ICAR-IIRR, Hyderabad and Dr SK Pradhan, Principal Scientist, ICAR-NRRI, Cuttack, participated in the meeting. Dr Gopalakrishnan, Principal Scientist, ICAR-IARI, New Delhi participated in place of Dr AK Singh, Director, ICAR-IARI, New Delhi. Dr Jyothi Badri, Senior Scientist, ICAR-IIRR and Dr R Abdul Fiyaz, Senior Scientist, ICAR-IIRR recorded the proceedings as rapporteurs. Dr SV Sai Prasad Principal Scientist, ICAR-IIRR, Dr B Sailaja Principal Scientist, ICAR-IIRR and Dr Santosha Rathod, Scientist, ICAR-IIRR also participated in the meeting as special invitees.

Drs LV Subba Rao, PI-AICRIP and AVSR Swamy, Principal Scientist, Plant Breeding, ICAR-IIRR made a brief presentation on the existing guidelines and flagged the issues of concern. Dr Santosha Rathod gave inputs on statistical analysis of AICIRP data. The committee discussed on minimum number of locations with acceptable quality of data required for promotions, monitoring of ACIRIP trials, norms for promotion and grain quality concerns in basmati and non-basmati trials. The recommendations made by the committee will be presented during the forthcoming ARGM.

Research Highlights

Marker assisted introgression of yield enhancing genes into the background of elite Indian rice varieties

Sundaram RM[1*], Jena KK[2,3], Kim S[2], Senguttuvel P[1], Abdul Fiyaz R[1], Subba Rao LV[1], Suneetha K[1], Jyothi Badri[1], Padmavathi G[1], Neeraja C N[1], Mangrauthia SK[1], Madhav MS[1], Kalyani K Barbadikar[1], Subramanyam D[1], Raghuveer Rao P[1], Punniakotti E[1], Kousik M B V N[1], Chaitra K[1], Dilip T[1], Rekha G[1], Hajira SK[1], Masthani SK[1], Vivek G[1], Jyothi K[1], Ayyappa DM[1], Anila M[1], Backiyalakshmi C[1], Pragya Sinha[1]

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The yield level of Indian rice varieties has been plateauing for the past two decades and we have not witnessed any significant yield gain in rice in India in the last few years. In order to improve the yield potential of elite Indian rice varieties, we embarked on a programme aimed at marker-assisted introgression of major yield enhancing genes, *Gn1a, SCM2* and *OsSPL14* into the genetic background of four elite Indian mega varieties of rice, viz., Swarna, Samba

Mahsuri, Improved Samba Mahsuri (ISM) and MTU 1010. Crosses were made between Swarna introgression lines (Sw-IL) Sw-IL1 possessing *SCM2* + *OsSPL14* and Sw-IL2 possessing *Gn1a* + *SCM2* with recipient parents Samba Mahsuri, ISM, Swarna and MTU 1010. Backcrossing up to BC_2F_2 followed by inter-crossing was done among selected plants based on foreground selection using gene-specific co-dominant markers RMS-*Gn1a*-1 and RMS-*Gn1a*-4 (for *Gn1a*) and RMS-*SCM2*-8 (for *SCM2*) and *OsPL14* Indel 2 (for *OsSPL14*) to ensure multiple yield enhancing genes in a single background. Inter-crossed plants ICF_2s possessing yield enhancing genes in homozygous condition (*Gn1a* +*SCM2*+*OsSPL14*) were selfed up to ICF_6.

The ILs possessing yield enhancing genes, viz., *Gn1a* + *SCM2* + *OsSPL14,* were evaluated for agro-morphological and yield-related parameters during *kharif* 2018 and 2019 in comparison with their respective recurrent parents. Improvement in grain number by >15%, strong culm in terms of increased culm diameter by 25%, panicle branching by >7% was observed in about five ILs as compared to recurrent parents Samba Mahsuri, ISM, Swarna and MTU 1010 (Fig 1 and 2). Also, multiple correlation studies were conducted among different leaf gas-exchange traits and other important yield related traits. Highly significant positive association was observed between the leaf photosynthetic efficiency (PN) and stomatal conductance (gs), PN/Ci (carboxylation efficiency) and non-significant positive association with SPAD, which is a surrogate trait for leaf chlorophyll content. The intercellular CO_2 and the Ci/Ca (ratio of intercellular and ambient CO_2 concentration) recorded a significant ($p<0.01$) negative association with PN. The association between PN and grain was non-significant. However, positive association was observed between total dry matter (TDM) and PN. Very strong positive association was observed between TDM, 1000 grain weight (test weight) and Harvest Index (Fig 3).

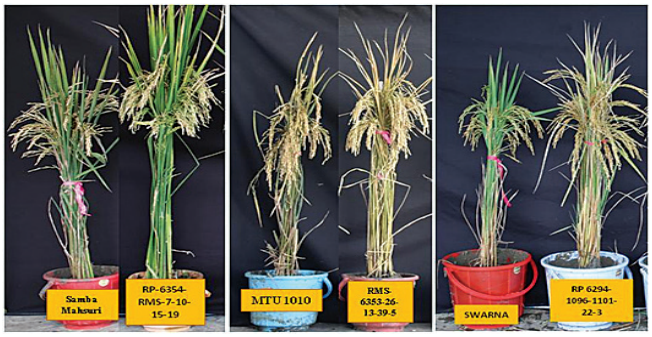

Fig 1. Photos of plants of selected promising improved lines in the background of ISM, MTU1010 and Swarna along with respective recurrent parents, showing high grain number and better panicle architecture

Fig 2. Comparison of panicles with recurrent parents and promising improved lines in the background of ISM, MTU1010 and Swarna showing high grain number

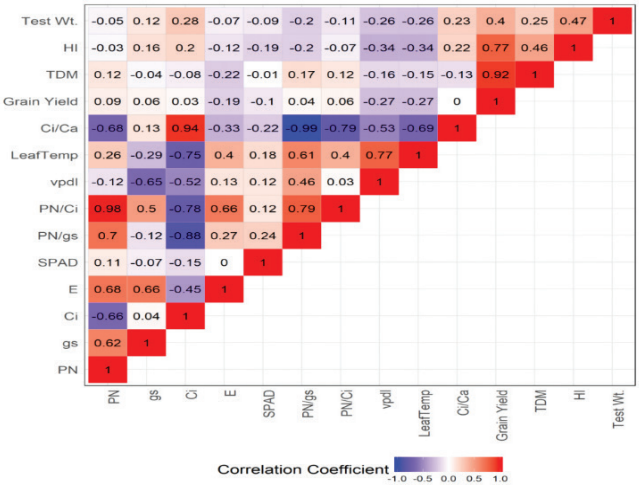

Fig 3. Correlation between different leaf gas-exchange traits and other important yield related traits in 36 selected rice genotypes

Based on agro-morphological evaluation and recurrent parent genome (RPG) recovery of 93-96%, five ILs with high yielding attributes were selected and nominated to All India Coordinated Rice Improvement Project (AICRIP) for national field testing during 2018-2020 and yield performance is summarized in Table 1. In 2019, IL in the background of ISM (IET 28727) recorded yield advantage of 102.37% over the RP with mean yield of 5892 kg/ha across 10 locations with three locations (Jepore, Pusa and Chinsurah) in eastern, four locations (Shirgoan, Navsari, Nawagam and Vyara) in western and three locations (Rajendranagar, Warangal and Aduthurai) in southern zones. Similarly in 2020, it recorded yield advantage of 19.5% over RP with mean yield of 5191 kg/ha across 16 locations. In 2020, another IL, IET 29537 in the background of Samba Mahsuri recorded yield advantage of 16.3% over the RP with a mean yield of 4619 kg/ha across two locations (Sakoli and Navsari)

Table 1. Performance of high yielding lines introgressed with yield enhancing genes namely *Gn1a*, *SCM2* and *OsSPL14* in AICRIP trials during 2018-2020

S. No.	Entry	Trial	Year	loc	Mean yield (kg/ha)	yield advantage (%) over BC/RP	RPG %
1	IET 28727	IVT-MS & AVT1-MS	2019 & 2020	26	5461	33.40	95.8
	BPT 5204 (RP)				4093		
2	IET29537	IVT-MS	2020	7	4619	16.3	93.5
	BPT 5204 (RP)				4005		
3	IET 27661	IVT-IM & AVT-IM	2018 & 2019	5	5931	12.03	93.2
	Best check				5294		
4	IET 28674	IVT-Aerob	2019	2	6177	4.06	95.3
	Best check				5932		
5	IET 28365	IVT-ETP	2019	7	5847	11.8	96.1
	Best check				5235		

Loc-Number of locations, RP-Recurrent parent, BC-best check (high yielding check among national, zonal and local check was considered as best check), RPG-Recurrent Parent Genome. Weighted means were calculated for the entries IETs 28727 and 27661 where data is available for two years.

in western and five locations (Kampasagar, Warangal, Aduthurai, Coimbatore and Mandya) in southern zone. In 2019, IET 27661 in the background of Swarna recorded yield advantage of 13.19% over the RP with mean yield of 6386 kg/ha across four locations such as Kaul, Karjat, Bikramgunj and Masoda. The percent yield advantage of this IL over the best check based on weighted mean of two year data is 22.03 %. In 2019, IET 28674 an IL in the background of MTU 1010 outperformed the best by 4.06% with mean yield of 6177 kg/ha. Another IL IET 28365 in the background of MTU 1010 recorded yield advantage of 11.8% over the best check with mean yield of 5847 kg/ha across seven locations in western and southern zones.

The ILs pyramided with 2-3 yield enhancing genes *Gn1a, SCM2,* and *OsSPL14* pyramided in the background of elite cultivars viz., ISM, Samba Mahsuri, Swarna and MTU 1010 were found promising in the multi-location testing of AICRIP and are further promoted to next level of testing. The elite introgression lines will serve as potential donors in future breeding programs aimed at development of high yielding lodging resistant rice cultivars.

Molecular and morphological characterisation of aroma in scented aromatic short grain rice lines

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Aromatic rices are speciality rices, the whole grain is fragrant and fetches premium price in national and international markets. Aroma is due to several chemical and volatile compounds and 2-acetyl-1-pyrroline (2AP) is one among the hundreds of volatiles, predominantly present in aromatic rice and its expression is increased due to non-functional *BADH* gene. *BADH1* and *BADH2* on chromosomes 4 and 8 respectively have been reported widely to be responsible for encoding Betaine aldehyde dehydrogenase (BADH). The recessive allele *badh2* has been confirmed to be responsible for fragrance in rice and its alleles have been associated with the accumulation and synthesis of 2AP. *BADH2* has 15 exons and 14 introns on chromosome 8 and the major genetic bases of aroma lie in the 8 bp deletion along with three SNPs in Badh2 exon 7 and in the 7 bp deletion in exon 2.

Breeding populations were generated from seven different crosses involving four elite high yielding cultivars (WGL 14, Sugandha Samba, Shobini) and five aromatic short grain germplasm (Kalanamak, Neelabathi, Kalikati, Mugulakuchi and Ganjekalli) during *Kharif* 2018. During

Rabi 2020, the breeding population with a size of 2564 plants of F_4 generation were raised and selection pressure applied based on days to fifty percent flowering, plant height, panicle length, panicle weight, culm strength and grain type at the field level resulted in obtaining 680 lines. The number was further reduced to 150 lines based on second round of stringent selection. The selected F_5 lines were analyzed for quality parameters like kernel length, kernel breadth, kernel L/B ratio, grain type, kernel length after cooking, elongation ratio, alkali spreading value, amylose content, gel consistency and aroma. Among them, 24 lines were found to be aromatic based on panel test and 17 among them were having intermediate amylose content in the range of 20.85 to 24.78% (Fig 1 and Fig 2).

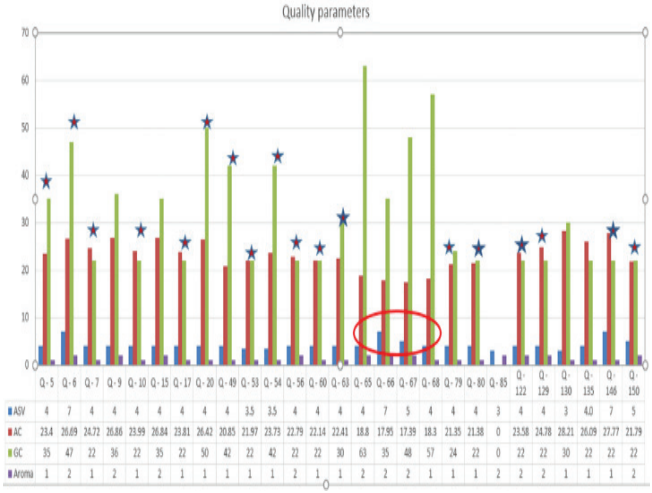

Fig 1. Quality parameters of mapping population at F_5 generation (Asterisk indicates the stabilized lines with good aroma and quality parameters and lines encircled in red oval shape are with good aroma but low amylose content)

Fig 2. Cooked grains of aromatic breeding line SRB-2102-5-41-6-1

The aroma positive stabilized $F_{5:6}$ lines were raised during *Kharif* 2021 and evaluated at molecular level using BADEX7-5 marker which could discriminate fragrant (95 bp) and non-fragrant (103 bp) genotypes very clearly in a 3.5% to 4% agarose gel as the product size varied from 95bp to103 bp and detected the polymorphism in a co-dominant fashion. The amplification pattern of the marker BADEX7-5 in fragrant and non-fragrant rice breeding lines of the cross Shobini and Kalikati showed positive bands for Q3, Q9 and Q33 lines along with Pusa Basmati 1121 and Sugandha Samba as positive checks while the negative band was seen in BPT 5204. A second round of panel test was done using leaf samples with 1.7% KOH solution giving a gap of 30 minutes between the expertise evaluation (Fig 3.). The results from Panel test of cooked rice samples, molecular analysis and KOH solution are correlated, while BADEX7-5 marker could distinguish fragrant and non-fragment rice, the panel test of cooked rice and leaf sample KOH test could discriminate the intensity of aroma and different types of aroma like sweet scent, nutty flavor, pleasant aroma etc.

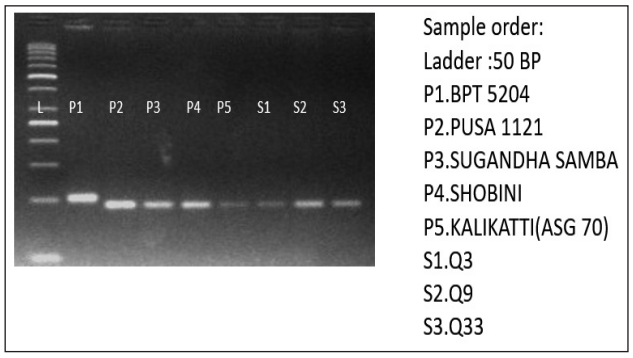

Fig. 3. Amplification pattern of the marker BADEX7-5 in fragrant and non-fragrant rice breeding lines of the cross Shobini and Kalikati (Positive band for Samples P2, P3, P4, P5, S1, S2, S3 and negative band P1)

In the present study based on two years of panel test and marker-based validation,17 lines viz., Q5 to Q7, Q10, Q17, Q20, Q49, Q53, Q54, Q56, Q60, Q63, Q79, Q80, Q122, Q129, Q130 were selected with excellent aroma and desirable grain quality parameters. In addition, stringent phenotypic selection right from the early segregating generations resulted in the selection of high yielding lines with superior plant type.

Development of artificial mass screening technique for brown spot disease under field condition

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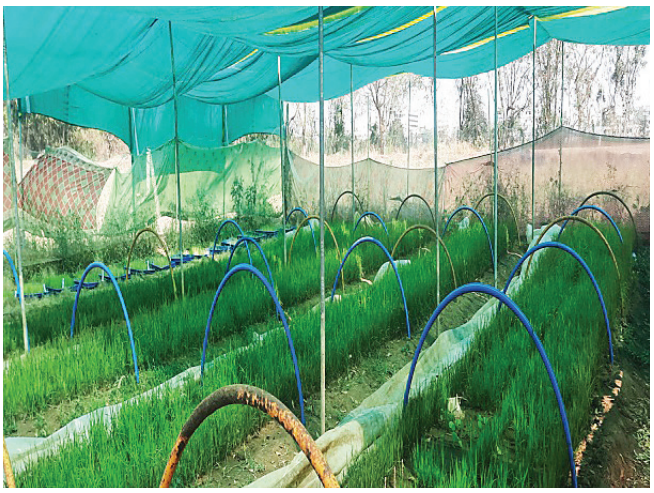
During *Kharif* 2021, artificial mass screening technique for brown spot disease under field conditions to identify the resistant sources was standardized. Nineteen popular or released varieties *viz*., BPT 5204, purple puttu, IR 50, Swarnadhan, CH 45, Tadukan, Phalguna, Tetep, Vikramarya, CO-39, Tellahamsa, Benibogh, TN-1, IR-64, RP Bio 226, HR-12, Rasi, Gangavathi Sona, and Phoghak were artificially inoculated with brown spot pathogen under field condition. The genotypes were sown on raised beds following the sandwich method wherein, every five test entries were surrounded by the border susceptible varieties BPT 5204 or purple puttu. Pure culture of the brown spot pathogen was mass multiplied by growing pathogen on rabbit food agar medium at 27 ± 2^0 C for 5 days and later on 12 h alternate exposure of the culture to near UV light and dark conditions to induce conidial production. Conidia were harvested in sterile distilled water by passing through cheese cloth and concentration of conidia was adjusted to 10^5 conidia/ml using heamocytometer. Inoculation was done by spraying spore suspension in the evening hours (10^5 conidia/ml) after adding 0.01% of tween 20. The inoculated plants were covered with plastic sheet for 48 h to provide a congenial humidity condition for the germination and infection by pathogen conidia. The symptoms of brown spot disease appeared after 5 days of inoculation on most of the genotypes as small reddish-brown spots. The beds were covered with plastic sheet in night time to enhance the spread of disease for 15 days. The number of spots and size of spots increased gradually to cover larger leaf area.

All the tested varieties showed varied level of susceptibility to brown spot disease. The disease progression was slow and it took around 25-30 days to attain its peak on susceptible varieties. The varieties such as BPT 5204, Swarnadhan, Gangavathi sona and Purple rice were identified as highly susceptible varieties; while CH 45, Tetep, Tadukan and IR 64 were moderately resistant varieties. While quantifying the disease it was observed that, the size and number of the spots also varied among the varieties. The varieties *viz*., Tetep, Tadukan and CH 45 produced fewer spots of minute size while Phoghak and Benibogh produced large number spots with smaller size. Large number of bigger size spots were observed in all the remaining varieties.



Brown spot disease screening nursery

High disease pressure on susceptible variety- BPT 5204

A web based photothermic indexing calculator (PTI) for rice genotypes http://14.139.94.107:8080/

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Plants require a certain amount of heat to develop from one point in their life cycles to another. This measure of accumulated heat is known as physiological time. Physiological time is often expressed and approximated in units called degree days (D). The development rate over time is expressed in daily heat units/degree days (Td). All plants tend to respond to the seasonal and daily variation in the duration of night and day time periods. Plant responses to this variation were attributed to the variation in the day time duration (Photoperiod) rather than to its complementary part of dark time duration (Nyctoperiod). Rice has been classified as a quantitative short-day plant. In other words, it is a long night requiring plant. Hence nyctoperiods are also considered.

Heat Units/Degree Days (ºC d): The growth and development of both plants and insects is strongly dependent on temperature. Below the base temperature (Td) and above the maximum temperature (Tm) the rate of development is zero. Three cardinal temperatures base temperature, optimum temperature (To) and maximum temperatures are identified to compute the heat units. The development rate over time is expressed in daily heat units/ degree days (ºC d). Daily heat units were calculated using the following formula

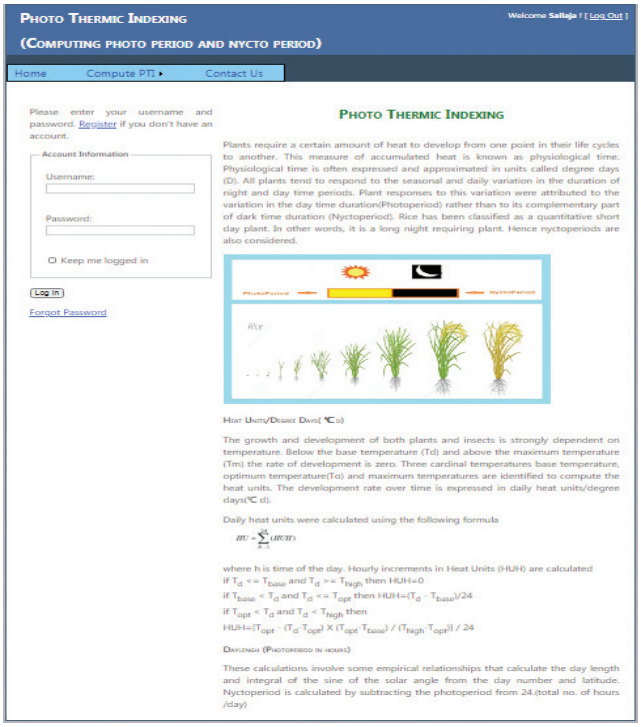
$$HU = \sum_{h=1}^{24} (HUH)$$

Where *h* is time of the day. *Hourly increments in Heat Units (HUH)* are calculated if *d<=Tb* and *Td>=Th* then *HUH=0*; if *Tb<Td* and *Td<=To* then *HUH=(Td-Tb)/24*

If *To <Td* and *Td<Th* then

$$T_{opt} < T_d < T_{high} \quad : HUH = [T_{opt} - (T_d - T_{opt}) \times (T_{opt} - T_{base})/(T_{high} - T_{opt})]/24$$

Day length (Photoperiod in hours): These calculations involve some empirical relationships that calculate the day length and integral of the sine of the solar angle from the day number and latitude. Nyctoperiod is calculated by subtracting the photoperiod from 24 (total no. of hours / day). Manual process of computing day wise values is tedious and time consuming. Hence, Photothermic Indexing (PTI) software has been developed to compute day wise heat units, photoperiod and nyctoperiod and genotype wise cumulative photoperiod and nyctoperiod at different stages of Rice crop. PTI software has 3 tabs for Home, Compute PTI and Contact details. Home page has login form with brief introduction about computation of PTI. User registration is mandatory for using the computation facility of PTI. Compute PTI tab has 3 menu items such as Heat Units/Degree Days, Day Length/Photoperiod and Nyctoperiod, Experimental data- Photoperiod and Nyctoperiod.



Heat Units/Degree days (ºC d) Menu Item: This menu prompts for location, start date and end date and minimum and maximum temperatures for computing degree days. In addition to this, there is "Copy from Excel check box" to copy temperatures from excel to the interface and by clicking the "Click here to copy data to the grid" the data will be copied to the grid. By using 'Calculate Result' Heat degrees will be computed and displayed in the grid. This data can be copied easily to Excel or Word.

Day length (Photoperiod in hours) Menu Item: This menu prompts for location, start date and end date and computes photoperiod and nyctoperiod for the input dates. By using the submit button Julian date, photoperiod and nyctoperod will be calculated and displayed in the grid. This data can be copied easily to Excel or Word.

Experimental data- Photoperiod and Nyctoperiod Menu Item: Experimental data interface has two forms; One form prompts for sowing date, sowings, number of replications and varieties. There are two check boxes for opting the crop growing stages like panicle initiation and flowering. Second form generates grid for the above sowings, replications and varieties. The data can be copied from excel using 'Copy from Excel' check box and by clicking the "Click here to copy data to the grid" the data will be copied to the grid. Then by using "Add PTI details", the data will be added to the PTI database and computes grid wise photoperiod and nyctoperiod at different stages of rice crop. The values will be displayed in the grid. The data generated by this software can be easily copied to Excel and use for further analysis with other data sets.

This software was evaluated with five years data of photothermic indexing experiment conducted under All India Coordinated Rice Improvement Programme (AICRIP). This software is easily understandable and user friendly. As this program uses solar declination and latitude to compute photoperiod and nyctoperiod, the software can be used for other crops also. This can be easily customized for any other experimental designs.

Inauguration of Automatic Weather Station (AWS)

Automatic weather station (AWS) at ICAR-IIRR, Hyderabad was established under DST-ICRISAT collaborative project on Centre of Excellence on Climate Change Research for Plant Protection: Pest and Disease Management. It was inaugurated on 25th February 2022 by Dr RM Sundaram, Director, ICAR-IIRR, Hyderabad and Dr Mamta Sharma, Project Co-Ordinator, Deputy Regional Director-Asia, ICRISAT, Hyderabad.

Nutririce crunchy snacks from ICAR-IIRR rice varieties

The long-standing desire to taste and enjoy the fruits of hard labour of developing rice varieties of ICAR-IIRR took shape in the form of preparation of traditional recipes from two ICAR-IIRR rice varieties (Improved Samba Mahsuri and DRR Dhan 48). The all-time favourite snack ***murukku*** was prepared from rice flour of ISM (Low glycemic index) and DRR Dhan 48 (high zinc). The crunchy snack was relished by all the consumers.

The edible products have been conceptualized by Dr RM Sundaram, Director, IIRR and Dr Amtul Waris. The logo was artistically designed by Dr S Arun Kumar with the apt tagline penned by Dr Santosha Rathod. A range of traditional and nutritionally enriched snacks are in the offing. The long-term plan is to promote the products under the brand name NutriRice *nutritious and delicious*.

Webinars/workshops/trainings hosted

As part of the *Azadi ka Amrit Mahotsav* - 75th year of Celebration of Independence, ICAR- IIRR in association with Society for Advancement of Rice Research, Rajendranagar, Hyderabad and ICAR-National Rice Research Institute (ICAR-NRRI), Cuttack organised a Webinar "Developing rice cultivars for water saving cultivation: A physiological perspective" on 19th February 2022 by Dr M Sheshshayee Sreeman, Professor, Plant Physiology, UAS, Bengaluru.

Virtual Users training cum workshop on AICRIP Intranet functionalities (www.aicrip-intranet.in)

As part of the '*Azadi Ka Amrit Mahotsav'*, ICAR-Indian Institute of Rice Research (ICAR-IIRR) has successfully conducted a vrtual "User training cum workshop on AICRIP Intranet functionalities" (www.aicrip-intranet.in) during 15-17 February 2022. This programme was organised by ICAR-IIRR in association with Society for Advancement of Rice Research, Hyderabad. The training program was targeted to sensitise AICRIP Co-operators on data uploading, analysing and generating the reports through AICRIP Intranet. A total of 160 participants took part in the training cum workshop among which, 40% are from crop improvement, 33% are from crop production and 27% are from crop protection.

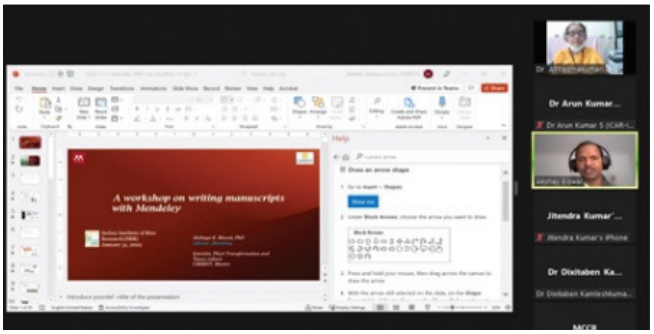
During the Inaugural session of the programme, Dr AK Singh, Director, ICAR-Indian Agricultural Research Institute (ICAR-IARI) highlighted the importance of digital database and Dr RM Sundaram, Director, ICAR-IIRR briefed about the significance of AICRIP Intranet in uniform data receipt and use of this database for use in machine learning and artificial intelligence.

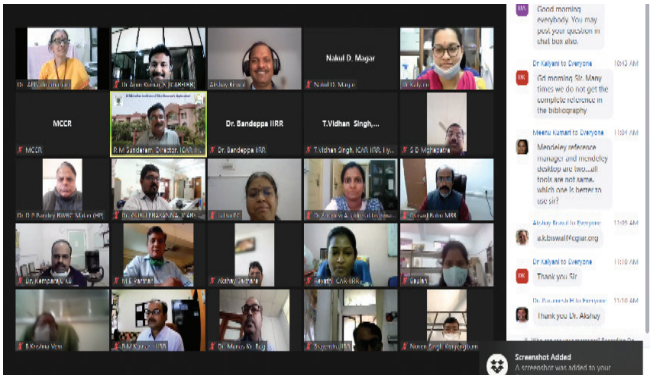
The three days' sessions covered an overview of trials and statistical designs in various AICRIP disciplines, viz., Plant Breeding and Hybrid rice, Agronomy, Soil Science, Physiology, Entomology and Pathology followed by demonstration and hands on training on the designs in AICRIP Intranet Portal. The training programme sensitised participants on various menus and interfaces of AICRIP Intranet for data upload, analysis and reports on major statistical designs used in AICRIP.

Virtual Users Training cum Workshop on AICRIP Intranet functionalities - 15 - 17 February, 2022

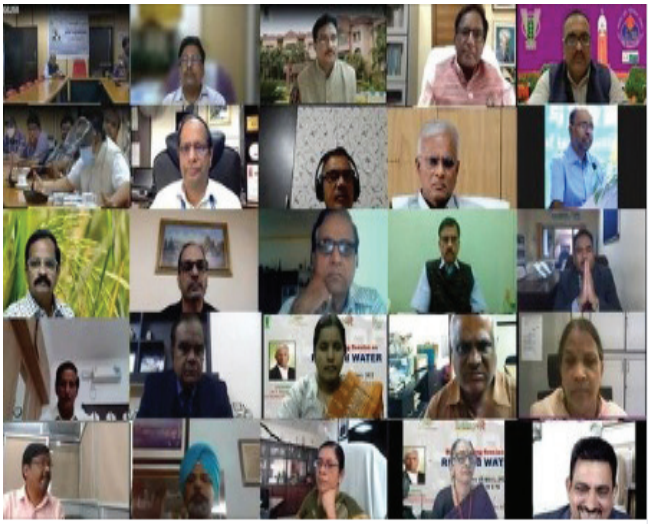
- Online training on Advance Statistical Techniques for Data Analysis using R" during 3-15 January 2022 at ICAR-IIRR, Hyderabad, was inaugurated on 3rd January 2022. Totally 480 participants registered across the country. The course covered various topics through a series of six structured modules R software package, regression and multivariate analysis, design of experiments, statistical genetics and genomic data analysis, time series data analysis and other useful techniques.

- Online workshop on writing manuscripts with Mendeley was hosted on 31st January 2022. Dr Akshay Kumar Biswal, Scientist, CYMMIT, Mexico and Adviser, Mendeley served as the resource person. Dr Akshay introduced Mendeley, its genesis and its usefulness for the scientific writing especially in managing the references. He gave a demo on installation of the Mendeley and engaged all the participants through his step by step guidance on using Mendeley and its various features.





- Brainstorming session on "Rice and Water" was held on 11th February 2022. 175 rice researchers, R & D personnel and progressive farmers participated in the session. It focussed on sustainable rice production through novel water-saving technologies and practices.



- Dr Jitender Giri delivered lecture on "Low P tolerance in rice: mechanisms and way forward: on 22nd January 2022 organized by ICAR-IIRR and SARR
- Dr PS Brahmanand, PS, ICAR-Indian Institute of Water Management (IIWM), Odisha delivered lecture on "Ideology of Swami Vivekananda: Motivational force for ensuring fruitful result of Science and Technology and establishing welfare society" organized by SARR and ICAR-IIRR on 26th March 2022.
- Dr Nese Sreenivasulu, Research Unit Leader - Consumer-driven Grain Quality and Nutrition, IRRI, Manila, Philippines delivered lecture on "Rice Value addition for future road map of India" on 28th March 2022 organized by ICAR-IIRR and SARR.

Outreach Activities

- An interaction was organized at ICAR-IIRR, Hyderabad to create awareness about the PM- Kisan Samman Nidhi program and the Release of 10th instalment under PM-Kisan and release of equity grant to FPOs on 1st January 2022. It was live streamed for the staff and students, farm workers and farmers in the IIRR Seminar Hall by the coordinator of the program Dr Amtul Waris.
- Input distribution program under ICAR-IIRR-SCSP was organised on 10th March 2022 for the selected farmers of Allah village of Arnica block and Gandli village of R.S. Pura block of Jammu. The Chief Guest of the program was Dr JP Sharma, Hon'ble Vice Chancellor, SKUAST (Jammu). Inputs *viz.*, storage bins, herbicide, gumboots, umbrellas, drying sheets and sprayers were provided to 131 beneficiary farmers. Dr B Nirmala, PI-ICAR-IIRR, SCSP, attended the program as Guest of Honour. A farmer-scientist interaction was organised with the beneficiary farmers.

- IIRR team with farmers from "Natural Farms and Agro Products Producer Company Limited", Kolhapur, Maharashtra.

Farmers' training programs

- Training program on 'Rice based cropping systems' was organized on 19th January 2022. Training program on 'Rice based cropping systems' was organized at Fareedpur village, Medak district. Seventy-five demonstrations (DRR Dhan 48) are being organised under ICAR-IIRR-SCSP at Medak district during *Kharif* 2021. These demonstrations are being organised in collaboration with Dr D Ramanaidu Ekalavya Foundation-KVK, Thunki, Medak district, Telangana. Dr B Nirmala, PI-ICAR-IIRR, SCSP, Dr P Ravi, In-charge, KVK, Thunki and Dr Srikant, SMS, Smt Nagamadhuri, MAO and Smt Vijrumbhana, AEO have delivered lectures on various aspects of Rice based cropping systems. The Chief Guest of the function, Shri Seri Subhas Reddy, MLC, Shri Rajaiah, MPTC, Shri S Narayana Reddy, MPP, Sarpanch, Smt Soundarya, PACS Chairman, Sri Brahmam have participated in the program. Drying sheets were provided to 120 SC beneficiary farmers of Fareedpur village of Medak district. Shri. Seri Subhas Reddy, MLC, lauded the efforts of ICAR-IIRR for distribution of critical inputs and imparting training to the farmers. A farmer-scientist interaction was organised with the beneficiary farmers.

- On-campus training on climate smart rice cultivation practices under Smart Village project and ICAR-IIRR-SCSP was organized on 8th February 2022 for farmers from Manchal village of Ranga Reddy district. Climate smart rice cultivation practices, lowering input costs for higher income (Dr B Nirmala), IPM for environmental sustainability (Dr Jeykumar), Farmer Collectives (FPOs) for higher incomes and access to markets (Dr S Arun Kumar) were the topics deliberated upon. Preparation of vermicompost for waste management and soil enrichment was explained by coordinator of the program Dr Amtul Waris and compact HDPE-Vermibeds were distributed to the farmers.

- Farmers' training program on problem soil management was organized on 21st March 2022. The institute project on Smart village(s) strategy for accelerated rice technology transfer is being implemented in Manchal village of Ranga Reddy District, Telangana. Farmers' were facing problem of poor crop growth. Putting technology to good use pictures of affected fields were posted in whatsapp by the farmers. A team of IIRR scientists (Drs Brajendra, S Arun Kumar, B Nirmala and Amtul Waris) visited the farmers' fields and identified the problem of salinity by on-farm testing of the soils and later with laboratory analysis. The results indicated severe inland salinity and salinity induced damage of the crop. Remedial measures were suggested based on the resources available with the farmers. Since the water source was also contaminated and having pH more than 8.0, leaching of the soil was not suggested for cultivation. Cow dung slurry was suggested to be applied immediately on the top soils and it started showing good results after a gap of 2-3 days. A mid-term and long-term amelioration plan has been suggested to the farmers with close monitoring by the scientists of ICAR-IIRR.

Panorama of Institute Activities

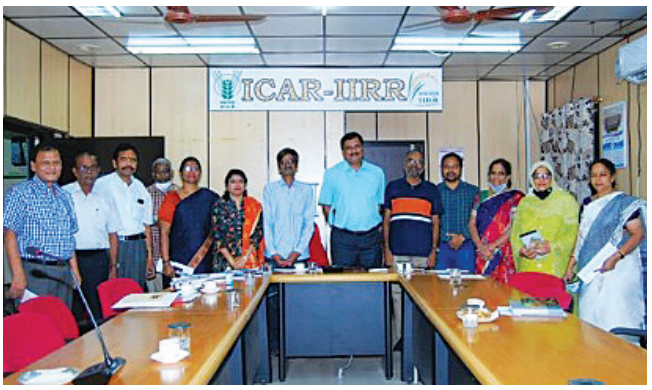
- National Girl Child Day was celebrated in virtual mode on 24th January 2022. The celebration centred around the themes of an equal opportunity institute for girl scholars / employees / support workers eloquently deliberated upon by Dr RM Sundaram, Director-ICAR-IIRR, Career opportunities in the field of agriculture- Dr B Nirmala, Girl power: Trained and skilled girl power to strengthen institutional activities Dr A Padmakumari and Dr S Arun Kumar, Girl Child- Nation's pride, Government schemes for Girl Child-Dr P Muthuraman and Dr P Jeyakumar and Soft skills and administrative discipline for a successful career-Ms Aparna Das. Right Poshan spurs your contribution to Nation was elaborated upon by the coordinator of the program Dr. Amtul Waris.

- ICAR-IIRR celebrated the 73rd republic day at the institute with patriotic fervour on 26th January 2022.

- World Pulses Day was celebrated on 10th February 2022 at ICAR-IIRR. As mandated by ICAR a *Kisan Ghoshti* and discussion forum on "Pulses to empower youth in achieving sustainable agri food systems" was organized on the occasion of World Pulses Day at ICAR-IIRR.

- Students from Government schools from Thorrur Block of Mahabubabad District, Telangana State visited Indian Institute of Rice Research, Rajendranagar, Hyderabad on 24th February 2022 as a part of the DST sponsored visit to scientific institutions project being implemented by Madhumita Foundation.

- डॉ.आर.एम.सुंदरम, निदेशक, भा.चा.अनु.सं. की अध्यक्षता मे राजभाषा कार्यान्वयन समिति की बैठक आज 05-03-2022 को संपन्न हुई। बैठक के दौरान संस्थान में राजभाषा कायान्वयन को बढाने संबंधी विविध विषयों पर चर्चा की गई। बैठक में सदस्यों के अलावा विशेष आमन्त्रिती भी उपस्थित थे। डॉ.महेश कुमार, व.तकनीकी अधिकारी (रा.भा.), रा.का.स. के सदस्य सचिव के रूप में तथा श्रीमती वनिता, प्र.श्रे. लिपिक, समन्वयक के रूप में उपस्थित थे।



- "International Women's Day'' was celebrated on 8th March, 2022 by the ICAR-Indian Institute of Rice Research. The UN designated theme "**Gender equality today for a sustainable tomorrow**" was very aptly deliberated upon by the Director, ICAR-IIRR, Dr RM Sundaram. The significance of acknowledging the contributions of women by dedicating a special day was elaborated upon by Dr B Jhansi Rani, the senior most woman scientist and head Entomology. The power of mentoring and coaching to help younger colleagues navigate their careers was deliberated upon by the coordinator of the program Dr Amtul Waris. The emcee, Dr B Nirmala ensured the smooth conduct of the program. A song depicting the important roles from housekeeping to heads of sections being played by women personnel of the institute was composed and melodiously rendered by Drs B Sailaja, K Surekha and team.

Staff News

Awards/Recognitions

Annual awards 2021-ICAR-Indian Institute of Rice Research

Scientists, Technical and Administrative staff of ICAR-IIRR were bestowed **Annual awards 2021-ICAR-IIRR** for their outstanding contributions/dedicated work on 26th January 2022 on the eve of Republic Day by Dr RM Sundaram, Director, ICAR-IIRR

Scientific Category

Department	Young Scientist (Pay Level: 10, 11)	Best Scientist (Pay Level: 12, 13, 14)
Crop Improvement	Dr Abdul Fiyaz	Dr Jyothi Badri
Crop Production	Dr Vijay Kumar	Dr Mangaldeep Tutti
Crop Protection	Dr V Prakasam	
Social Sciences	Dr Santosha Rathod	Dr B Nirmala

Administrative staff

Mr K Srinivasa Rao, Finance and Accounts Officer; Ms Sudhavalli Tayaru, Assistant; Mr R Uday Kumar, Personal Secretary; Ms Sudha Nair, Assistant Administrative Officer-Estt; Mr B Vidyanath, Assistant Administrative Officer; Ms U Rama, Assistant; Ms Aparna Das, Personal Secretary; Mr. Bharath Raju, UDC; Ms S Hemalatha, Personal Assistant; Mr Ashfaq Ali, Stenographer Gr. III; Mr Navneet Kumar, Stenographer Gr. III

Technical staff

Dr MN Arun, Chief Technical Officer; Mr S Amudhan, Asst. Chief Technical Officer; Mr C Sadanandam, Asst Chief Technical Officer; Dr M Ezra, Asst Chief Technical Officer; Mr U Pullaiah, Asst Chief Technical Officer; Mr U Chaitanya, Asst Chief Technical Officer; Mr M Vijay Kumar, Senior Technical Officer; Dr Roseswararao, Technical Officer; Mr E Nagarjuna, Technical Officer; Mr Sadat Ali, Technical Officer; Mr K Ramulu, Technical Officer; Mr Koteshwara Rao, Technical Assistant; Mr M Chandra Kumar, Senior Technical Assistant; Mr K Janardhan, Technical Officer; Mr Narender Prasad, Technical Officer; Mr Yadaiah, Technician; Mr Tahseen, Technical Officer; Mr S Vijay Kumar, Senior Technician.

Skilled support staff

Rajendranagar: V Chandramma, D Kalavathi, M Anjamma, K Laxmi, S Pochamma, P Bharathamma, B Saroja, K Manamma, M Ramesh, Ch Swaroopa

R C Puram: V Pentamma, G Sailoo, I Bikshpathi, B Swamy, R Kistamma

Dr Vakada Manasa, Scientist (Soil Science) has been awarded the "SADHNA All India Best Research Award at Doctorate level 2021" by SADHNA (Society for Advancement of Human and Nature) – Dr YS Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh. This award carries a cash prize, certificate and plaque.

Promotions

- Ms P Lakshmi, Assistant promoted to next higher-grade, Assistant Administrative Officer *w.e.f.* 3rd February 2022.
- Mr U Pullaiah, Senior Technical Officer promoted to next higher-grade, ACTO *w.e.f.* 11th July 2018.
- CAS meeting was held for 25 Scientists in various disciplines on 2nd and 3rd March 2022.
- Mr Ashfaq Ali, Stenographer Gr. III promoted to the post of Personal Assistant *w.e.f.* 24th March 2022.

New charge

Mr Shitanshu Kumar joined as Chief Administrative Officer at ICAR-IIRR on 30th Mar 2022, prior to which he served as Administrative Officer at ICAR-IIOR, Hyderabad. Mr Shitanshu Kumar is from Jharkhand, born in 1983, joined as Admin. Officer at ICAR-Directorate of Rapeseed & Mustard Research, Bharatpur in 2012. He worked at ICAR-Directorate of Onion and Garlic Research, ICAR-NRC for Grapes at Pune for a brief period and subsequently joined at IIOR in 2017 as Sr. Admin. Officer.

Retirement

Smt K Kousalya, AAO retired from the Council's service on 31st January 2022.

Project staff/Research Scholar's News

ICAR-IIRR proudly announces the selection of the following project staff to the post of Assistant Professor under direct recruitment in the discipline of Biotechnology in the Faculty of Horticulture at the Dr YSR Horticulture University, vide Proc.No.1555/Ser(T)-II/2021 Dt.18th March 2022.

Dr S Nagalakshmi was working at ICAR-IIRR as DST-Women Scientist in DST-funded project entitled "Deciphering the role of non-coding micro RNA genes in heat stress tolerance in rice genotypes (*Oryza sativa* L).

Dr K Aruna Kumari worked at ICAR-IIRR as SRF in DBT funded project entitled, "Identification and functional analysis of genes related to yield and biotic stress phase II, sub project 5 A Identification and functional validation of brown plant hopper resistance genes.

Dr G Lakshmidevi worked at ICAR-IIRR as Research Associate in DBT funded project entitled "Marker Assisted Introgression of Different traits to develop new generation rice varieties".

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

Published by

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