



DBW 187

DWRB 137

प्रगति प्रतिवेदन
PROGRESS REPORT
2021-22

PROCEEDINGS

(Research Review, Recommendations & Plan of Work 2022-23)

अखिल भारतीय समन्वित गेहूँ एवं जौ अनुसंधान परियोजना

AICRP on Wheat and Barley

भा.कृ.अनु.प.-भारतीय गेहूँ एवं जौ अनुसंधान संस्थान, करनाल

ICAR-Indian Institute of Wheat and Barley Research, Karnal


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Amrit Mahotsav

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PROCEEDINGS

(Research Review, Recommendations & Plan of Work 2022-23)

**61st All India Wheat & Barley Research Workers' Meet
Held at
Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya (RVSKVV),
Gwalior (Madhya Pradesh)
(August 29-31, 2022)**

**Organised By
RVSKVV Gwalior & ICAR-IIWBR, Karnal**

**Issued by
Dr. GP Singh
Director
ICAR-Indian Institute of Wheat and Barley Research
Karnal-132001, Haryana, India**

Correct Citation: Proceedings of the 61st All India Wheat and Barley workers meet held at RVSKVV, Gwalior during August 29-31, 2022. All India Coordinated Research Project on Wheat and Barley. Pages 78.

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Foreword

The 61st All India Wheat and Barley Research Workers' meet held at the Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh during 29-31 August, 2022 was jointly organized by the ICAR-Indian Institute of Wheat and Barley Research, Karnal and RVSKVV Gwalior. The meet was inaugurated by Dr. T.R. Sharma, Deputy Director General (Crop Sciences) Indian Council of Agricultural Research, alongwith Dr. Bram Govaerts, Director General CIMMYT Mexico. Dr. DH Ranade the Vice chancellor (acting) of RVSKVV Gwalior, Dr DK Yadava, ADG (Seeds) and Dr R K Singh, ADG (CC&FFC) graced the occasion.

The meeting reviewed the results of 2021-22 crop season and based on the deliberations and presentations, the programme for ensuing crop season 2022-23 was finalized. Apart from this, emerging issues in wheat production and protection along quality were also discussed by eminent speakers during various special sessions. The speakers from international arena highlighted the recent advances in the field of wheat and barley research.

On behalf of the wheat and barley fraternity, I express my deep sense of gratitude to Dr T. Mohapatra Former Secretary DARE & DG, ICAR; and Dr Himanshu Pathak, Secretary DARE and DG, ICAR for their guidance and support. I also express my gratitude to Dr TR Sharma, DDG (CS) ICAR for his valuable inputs in planning, execution of work plans and also during various sessions of the workshop. I am also thankful to Dr NP Singh, Vice Chancellor, BUAT, Banda for his imperative inputs and gracious presence in the meeting. Suggestions provided by eminent personalities like Dr B Mishra, Former VC, SKUAST-Jammu, Dr. Bram Govaerts, Dr Ravi P Singh, Dr AK Joshi, Dr Pawan Singh from CIMMYT, Dr G Subbarao, JIRCAS-Japan, representative from ICARDA, PMC Members and special invitees for fine tuning the programme are gratefully acknowledged.

I would also take this opportunity to thanks Dr SK Rao VC, RVSKVV Gwalior for accepting our request to host this mega event. I am also thankful to Dr DH Ranade, Dean and Dr SK Sharma, Director Research and all the members of the organizing committee from RVSKVV Gwalior and ICAR-IIWBR Karnal for all the hard work they have done in making this programme a grand success. I would also commend all the Principal Investigators and staff for timely preparation of annual progress reports and this proceeding (work plan and recommendations). Thanks are also due to the chairmen and rapporteurs of various technical sessions for smooth conduct and recording of proceedings. At last but not the least, my appreciations are due to all the cooperators across country for their valuable contributions in somooth running of this AICRP.

I wish all the best for the ensuing season.

(GP Singh)

Session - I : Inaugural Session

August 29, 2022

11:00 -13:00

Chairman : Dr. TR Sharma, DDG (CS), ICAR, New Delhi
Co-Chairman : Dr. Bram Govaerts, DG-CIMMYT, Mexico
Chief Guests : Dr. D.H. Ranade, (Acting VC, RVSKVV)
Dr. RK Singh, ADG (CC&FFC) ICAR, N. Delhi
Dr. DK Yadava, ADG (Seeds) ICAR, N. Delhi
Rapporteurs : Drs. BS Tyagi, Mamrutha HM and Hari Krishna

The inaugural session of 61stAll India Wheat and Barley Research Workers' meet was held at RVSKVV, Gwalior on 29th Aug.2022. The chief guest of the session was Dr DH Ranade who was the acting Vice Chancellor in the absence of Dr. SK Rao. Dr. TR Sharma, DDG (CS) graced the meet as chairman and Dr. Bram Govaerts, DG-CIMMYT, Mexico as co-Chairman. The other dignitaries who graced the occasion were Dr. D. K. Yadava, ADG (Seed), Dr. RK, Singh, ADG (CC), Dr. GP Singh, Director IIWBR, Dr. Ravi P Singh, head of global wheat improvement, CIMMYT, Mexico, Dr. G. Subba Rao, JIRCAS, Japan, Dr. SK Sharma, Director Research (DR), RVSKVV, Gwalior, Dr. B Mishra, former VC, SKUAST-Jammu and other dignitaries. The inaugural session started with lighting the lamp and with ICAR song. Dr. S.K. Sharma, Director Research, RVSKVV formally welcomed the dignitaries and participants for the workshop, at Gwalior.

Dr. GP Singh, Director, ICAR-IIWBR presented the overall progress of the wheat programme made during 2021-22. Dr. Singh conveyed greetings of Hon'ble Agricultural Minister to all wheat and barley scientists. He was pleased to appraise the house that Indian wheat production has been increasing consistently in the recent past with a little yield reduction during the year 2021-22 due to terminal heat. The overall production of wheat has been 106.84 million tons with some yield loss in late sown condition of Haryana and Punjab. He also emphasized that compared to last 5 years average, about 2.5% of higher yield was obtained in this year. Dr. GP Singh informed the house that the variety DBW 187 has occupied 5 million hectares of wheat cultivation area. He mentioned that UP contributes for 31% of wheat production and MP surpassed the Punjab and Haryana states in wheat production and therefore, it will be the strategic state for producing export quality wheat. He appraised the house that, recently released wheat varieties have replaced the old varieties in breeder seed (BS) indents as indicated by the fact that about 66% of total BS indent contains varieties from two major institutes IIWBR and IARI, New Delhi. Dr. Singh also highlighted and acknowledged the major research achievements of crop protection, resource management technology, wheat and barley quality and social sciences groups.

Dr. DH Ranade emphasized on different farmers friendly policies of MP government and appreciated the wheat researchers for giving new varieties which are climate resilient. He also urged for the need of early sowing, short duration, high yielding wheat varieties and also re-start front line demonstrations in wheat. He asked the researchers for giving technologies on straw management, water management and water harvesting technologies for wheat and barley.

Dr. D.K. Yadav ADG (Seed) praised the Wheat and Barley AICRP and said that it is an excellent model among all AICRP's of the ICAR. He appreciated the scientists for giving 30 Biofortified wheat varieties covering 5-million-hectare area and also complemented for faster seed replacement of new varieties in breeder seed indents. He urged the need for hybrid production and genome editing in wheat like other crops.

Dr. R.K Singh, ADG (CC) mentioned that about 7 million tons of wheat was exported accounting for 2.5 billion dollars of foreign exchange. He emphasized on biofortification for alleviating malnutrition in India and also urged on strengthening survey and surveillance of wheat and barley diseases and genome editing to initiate the research programme with CIMMYT, IARI and IIWBR. He congratulated the wheat scientists developing wheat blast resistant varieties. Dr. RK Singh asked the barley workers to develop high quality malt varieties so that farmers can fetch more prices.

Dr. Bram Govaerts, DG, CIMMYT remembered the remarkable contribution of Indian scientists at CIMMYT including Dr. Sanjay Rajaram and Dr. Ravi P. Singh. He also mentioned that 80 Indian scientists have been trained during last 5 years in new generation wheat research areas and complemented the strong collaboration of CIMMYT and ICAR.

The meeting later was followed by SAWBR awards distribution which included Dr. S. Rajaram Outstanding Woman Scientist Award to Prof. Paramjit Khurana of Delhi University, Prof. J.P. Chatrath Endowment Award to Dr. Subhash Chander Bhardwaj, Ex-Principal Scientist, IIWBR, Shimla. Dr. MV Rao Memorial Award to Dr.VS Sohu, PAU, Ludhiana, Sh. S.A. Dadlani Memorial Award to Dr. Arun Gupta, IIWBR, Dr. S. Nagarajan Memorial Award to Dr. Hari Ram, PAU, Prof. Mahatim Singh Memorial Award to Dr. Koushik Chakraborty, NRRI, Cuttack. This was followed by felicitation of crop varieties developers and it had a list of varieties which included DBW 296 (Karan Aishwarya), DBW 332 (Karan Aditya), DBW 327 (Karan Shivani) from IIWBR, Karnal, HI 8823 (Pusa Prabhat), HI 1636 (Pusa Vakula) from IARI, Indore, MP (JW) 1358 from JNKVV Jabalpur, HUW 838 from BHU Varanasi, Birsa Gehun-4 (JKW-261) from BAU, Ranchi, GW 513 from SDAU, Vijapur as wheat varieties. Organizers also felicitated several farmers and industrial partners. This was followed by felicitating the scientists who are due to super annuate before next AICRP meeting for their significant contribution in Wheat/Barley research and these included Dr RPS Verma, from IIWBR, Dr. Ved Prakash from ARS Durgapura, Dr. Vinod Singh from NDU&T, Kumarganj, Ayodhya. Afterwards, few publications from IIWBR and RVSKVV were released.

Dr. TR Sharma, DDG, Crop science in his address, congratulated the whole wheat and barley family including researchers and farmers for sustained wheat and barley production compared to other countries in covid situations. He listed few thrust areas to be addressed in wheat and barley research for future sustainance. Dr. Sharma emphasized on targeted research for improving quality of specific products like bread, pasta and chapatti; to work on export quality wheat along with developing Karnal bunt free wheat; pyramiding of genes for improving multiple disease resistances; Marker assisted breeding for development of rust and powdery mildew resistant varieties; strengthening wheat blast screening efforts; developing input use efficient varieties including WUE and NUE varieties; human resource development; understanding rust race virulence structure is most important; marker assisted back cross breeding for large number of genomic resources; feed, food, fodder and multipurpose barley research.

At the end he once again congratulated all wheat and barley workers. The inaugural session ended with the formal vote of thanks by Dr. Gyanendra Singh, PI Crop Improvement.

Session II -International Collaboration for Wheat & Barley Improvement

August 29, 2022

14:30 -16:30

Chairman : Dr. B Mishra, EX VC, SKUAST Jammu

Co-Chairman : Dr. AK Joshi, Managing Director BISA

Rapporteurs : Dr. Vishnu Kumar

At the outset, Dr. B Mishra, Chairman of the session welcomed Dr. AK Joshi, Co-chairman, Dr. Bram Govaerts, DG CIMMYT, speakers, rapporteurs and all the delegates. He outlined the theme of the session and also introduced the speakers. The brief proceedings of the Technical Session II are as follows:

The Guest of Honour, Dr. Bram Govaerts, DG CIMMYT emphasized to further strengthen CIMMYT collaboration with India. He quoted several examples of collaborative success, like combating wheat blast, Ug99 and release of climate smart wheat varieties in the world as well as in India. He emphasized the need to develop and release the nutri-dense wheat varieties with high grain protein, Fe & Zn for eradicating malnutrition and improving nutritional security. The DG CIMMYT cited an example of wheat variety DBW187 area coverage, mainstreaming for zinc, genetic gains and especially talked to tackle three CCC: ie Covid, Conflicts and Climate change problems. He further urged to work hard on varietal development, value chain addition, trans-boundary threats and simultaneously translating research to the farmers for food and nutritional security.

Dr. G Subba Rao, from JIRCAS, Japan presented “BNI Technology for Improving NUE in Wheat”. He stressed upon that nitrogen consumption has increased 30-fold since 1950, whereas, the food production has only tripled. He said that nearly 70% nitrogenous fertilizers are lost due to the environmental effects leading to 90 billion USD losses/year based on 2000 fertilizer prices. He emphasized on better effects of ammonium over nitrate form and discussed about the Biological Nitrification Inhibition (BNI) technology in wheat for efficient nitrogen utilization. The grass *Leymus racemosus* has BNI mechanism (Lr#3Nsb denoted by (Lr#n) under acidic soils and he shared improved performance of BNI enabled wheat variety Munal for better NUE due to the T3BL.3NsbS (Lr#n-SA) translocations. Dr. Rao added that the Lr#n-SA translocations are stable, seed-based with-out having any adverse effects on agronomic base and quality.

Dr. Pawan Kumar Singh from CIMMYT delivered a talk on “Achievements and Prospects of Wheat Blast Disease”. He presented the scenario of wheat blast disease caused by *Magnaporthe oryzae* pathotype *Triticum* (MoT) and discussed about its spread during 2016 in Bangladesh and in 2020 in Zambia, Africa. Dr. Singh revealed that the significant losses can be caused by this fungal disease and even entire fields can be wiped out in case of severe incidences. He presented on 2NS region from *A. ventricosa* for wheat blast resistance and effective gene(s) Rmg8 and RmgGR119 against wheat blast. Dr. Singh informed that out of 298 lines, 175 genotypes were with 2NS region during last year and CIMMYT is continuously screening Indian lines for wheat blast resistance at Bangladesh and Bolivia sites. He discussed for release of blast resistant materials such as, Bari Gom33 in Bangladesh, Borlaug 2020 in Nepal and DBW187, DBW252, HD2967, HD3249, HUW838, MP1358 etc. in India. Dr. Singh emphasized for skill development against wheat blast in CIMMYT collaboration. Dr. Amit Gautam presented on “ICAR-ICARDA Collaboration on Wheat & Barley” during the session. He said that ICARDA is working for dryland agriculture and sharing bread and durum wheat nurseries and trials and similarly barley yield trials and nurseries for partner countries, including India. Dr. Gautam discussed the global durum and barley panels being grown at Amlah center of ICARDA. He talked to utilize crop wild relatives to introgress novel rust resistance genes and showed willingness to share durum global panel on indent.

After the presentations, Dr. B Mishra and Dr. AK Joshi congratulated all the speakers for good presentations. Dr. AK Joshi further summarized on wheat breeding progress since incorporation of dwarfing gene(s) and urged to make collaborative efforts for wheat breeding in the areas of blast resistance, BNI technology, nutri-dense wheat varieties and maximization of resource use efficiencies for increasing productivity and on-farm profitability. Dr. B Mishra stressed upon for improving soil and plant health and to be ready with solutions against the detrimental effects of rising population pressure, depleting natural resources and shifting in biotic stresses in the era of climate change. The Chairman further added on strengthening collaborative efforts of Indian programme with CIMMYT, ICARDA and other international organizations for increasing wheat and barley productivity and profitability.

The session ended with a formal vote of thanks to the Chairman, Co-chairman, Speakers, Rapporteur and delegates.

Recommendations:

- Breeding efforts should be expedited for BNI wheat and the available BNI enabled sources, like BNI-Munal and others should be shared with the plant breeders.
- Wheat blast is a serious threat and the resistant sources other than 2NS region should be worked upon.
- Human resource development should be focused in collaboration with CIMMYT, ICARDA and other international organizations.

Session III – Panel Discussion on Improving Indian Wheat Quality for Changing Needs

August 30, 2022	Chairman	:	Dr. B. Mishra, Former VC, SKUAST, Jammu
9:30 -10.40	Co-Chairman	:	Dr. T. R. Sharma, DDG (CS), ICAR, New Delhi
	Panelists	:	Dr. Ravi P. Singh, Distinguished Scientist & Head of Global Wheat Improvement (CIMMYT) Dr. Parminder Virk, HarvestPlus, ICRISAT, Hyderabad Dr N. K. Singh, National Professor, NIPB, New Delhi Dr N. P. Singh, VC, BUAT, Banda Dr Ravish Chatrath, Emeritus Scientist, ICAR-IIWBR Dr S. C. Mishra, Ex Emeritus Scientist, ARI, Pune Dr. M. V. Malhan, Roller Flour Mill Association Dr. Sewa Ram, PI Quality, ICAR-IIWBR, Karnal Dr. G.P. Singh, Director, ICAR-IIWBR, Karnal
	Rapporteurs	:	Drs. Dinesh Kumar & Sunil Kumar

The panel discussion started with the welcome address by Dr. G. P. Singh, Director, ICAR-IIWBR, Karnal. While setting the agenda, he emphasized upon the need to improve Indian wheat for both domestic and export purposes and hoped that the session will lead to certain concrete recommendations as far as the quality of wheat is concerned.

Dr. B. Mishra, Chairman of the session and also that of PMC, made opening remarks by saying that there is tremendous scope for improving both soft and hard wheat for different products as per the international standards. He further emphasized the need to increase the content and bioavailability of micronutrients particularly iron and zinc in wheat grains. Improvement in phytase concentration and decrease in anti-nutritional factors like phytic acid are also needed. He expected some workable solution in this regard.

Dr. T. R. Sharma, DDG (CS) ICAR and Co-chairman of the session emphasized the need to develop certain quality standards for release of varieties and breeding programs should start for wheat quality for domestic as well as for export purposes. He further emphasized that there should not be any compromise on quality of wheat produced in India and suggested to identify quality traits to be used in breeding. For this purpose a standard document can be published to assist breeders. He suggested that wheat varieties can be identified even with little compromise on yield but having exceptionally good quality traits. Future wheat quality research should be aimed at micronutrients (like iron, zinc), resistant starch, anthocyanin, anti-nutritional factors etc.

Dr. Sewa Ram, PI Quality & Basic Sciences, presented status of wheat quality in India. He mentioned challenges to be faced in future for improving wheat quality along with higher yield under all kinds of biotic and abiotic stresses. He gave detailed account of the availability of germplasm for different traits, knowledge of molecular markers for genes associated with different traits, availability of microlevel tests for assessing segregating generation and thus helping breeders for improving wheat quality. He also gave account of the progress made in improving nutritional quality through genetic and agronomic management. He informed the house that significant progress has been made in generating high phytase mutants and transferring the trait into high yielding backgrounds for improving bioavailability of micronutrients to human beings. He emphasized the need to develop collaborations between industry and research and to propagate the use of whole wheat products as most of the nutrients are present in outer layer of the grain which are removed while milling.

Dr. Ravi P. Singh emphasized the mainstreaming of quality traits in breeding programme and the classification of varieties as per their product profile and accordingly labeling of wheat varieties as per their destined end-use can be done. As genetics of many of the quality traits is known, it is easier to use the information in breeding for producing varieties with specific quality traits. For export purposes, quality

parameters of importing country should be taken into account. Dr. Parminder Virk stressed the need to improve nutritional quality to deal with rampant malnutrition across different parts of world. In the changing climate with elevated carbon dioxide, temperature etc., there is a need to develop varieties which are climate resilient, terminal heat tolerant. Incentives to farmers and seed producers growing quality oriented wheat varieties can lead to the development and faster adoption of such varieties. Both genetic as well as agronomic biofortification can be combined to enhance micronutrients in wheat. There is need of labeling of biofortified wheat in collaboration with FSSAI/other bodies.

Dr N. K. Singh: Research should be aimed at towards three aspects of wheat quality *i.e.* nutritional, technological and organoleptic quality. Selection of better quality traits can be combined with high yield potential of all three species of wheat. Wheat should be graded and notified for product specificity to be used for export as well as domestic purposes. In addition, he opined that greater emphasis should be put on chapati quality. Dr Ravish Chatrath advised to explore more germplasm for identification of high Zn and Fe lines in wheat and stressed to use available molecular markers associated with high Zn content. Dr. S. C. Mishra stressed to develop bread wheat for higher loaf volume and also urged to take up research on Zn, Fe, folic acid etc. along with product development using whole wheat. Dr. M. V. Malhan: informed the house that there are more than 25000 chakkis involved in milling and around 30% of the total wheat production is processed through milling in India. There is trend of whole wheat, multigrain, brown and other types of breads right now with their FSSAI regulations. He showed his concern about wheat allergy (celiac disease) due to gluten.

Dr. N. P. Singh, VC, Banda University informed that Bundelkhand is earmarked for cultivation of Durum wheat for pasta products. The region is proposed to be developed as export zone for pulses and wheat based products. Farmers also interacted in the meeting and emphasized that quality of high yielding varieties should be maintained by using traditional high quality germplasm and special emphasis should be given to health related traits in wheat and huskless barley.

Dr. G. P. Singh made concluding remarks. He informed that ICAR-IIWBR, Karnal has developed wheat grading standard and is in the process of notification with APEDA. About the celiac disease he clarified that there is no cause of concern of celiac disease as only 0.6 % of the population is allergic to wheat gluten and there is no difference in CD toxic epitopes between old and new varieties of wheat. He further emphasized that mainstreaming of quality in breeding is needed along with higher yield.

Based on above observations by the chairman, co chairman and panelists and interactions with the audience following recommendations were made.

- Grading standards of wheat should be developed and notified with APEDA and accordingly recent varieties should be graded along with their product profile for domestic and export purposes.
- As genetics of most of the quality traits is known and microlevel tests are available associated with industrial quality traits, the information should be utilized in breeding for developing product specific varieties.
- Emphasis should be put on understanding molecular basis of nutritional quality traits and concerted efforts be made for improving nutritional quality for enhancing antioxidants including anthocyanins, resistant starch, dietary fibre and reducing antinutritional factors such as phytic acid.
- It is recommended that along with yield and disease resistance, quality will be used as criteria for identification/promotion of varieties and weightage will be given to entries having exceptionally good quality irrespective of yield.

The meeting ended with vote of thanks by Dr. Sunil Kumar.

Proposed Wheat Grading Standards

India is the IInd largest producer of wheat in the world and has the potential to export large quantity of wheat. Three species of wheat namely bread wheat, durum wheat and dicoccum wheat are grown in India. Bread wheat is cultivated in more than 95% of the area of the cultivated wheat across the country, durum (kathia or macaroni wheat) wheat is grown in around 4% area and mostly confined in central and peninsular parts and dicoccum (khapli wheat) is grown in very less area confined to Karnataka and some parts of Maharashtra. Bread wheat is used mainly for chapati, bread, biscuit, cakes and noodles while durum is used for pasta products and dicoccum for some local products. Hard amber wheat with medium strong gluten is used for chapati; hard wheat with high protein content and strong and extensible gluten for bread and soft wheat with low protein and weak gluten for biscuit and cakes. However each class has some common features for trading and accordingly grades can be made. There is a need to have grades for different classes of wheat for both domestic and international trade as well as procurement by Government agencies.

High quality wheat (Grade I) should fetch a premium price and the subsequent grades should fetch correspondingly lower price or MSP. Premium price for high quality wheat will boost the export demand as well as domestic production. Farmers, if produce high quality wheat based on the demand and selling at premium can earn more profit than selling the 'dara' wheat (pooled produce irrespective of quality) at the support price. This will enhance the market share of Indian wheat in the international market besides staying ahead of international competitors. The grades are proposed in the tables below keeping into account the specifications developed by Agmark, FCI, FSSAI and Codex and requirements of domestic and international market. In addition, premium may be given to hard wheat with high protein content (>12.0 %) for better bread quality required by the baking industry. Similarly, durum wheat with high protein content (>12.5 %) and high yellow pigment (>7 ppm) should be given premium price to attract farmers for cultivation of high quality wheat for different products. In addition, farmers should be encouraged to produce disease and weed free wheat with high hectolitre weight and taking care while harvesting and threshing to have minimum amount of broken shrivelled and foreign matter. This will have impact on production of good quality wheat and farmers profit as well as consumers acceptance. Details of grades are given in the tables below followed by definitions of each parameter.

Table 1: Bread wheat grading

S.No.	Grading standard	Grades				
		I	II	III	IV	V
1	Hectolitre Weight (Kg/hl) (Minimum)	76	74	72	70	68
2	Moisture content (%) (Maximum)	12	13	14	15	15
3	Foreign Matter (FM) (%) (Maximum)	0.5	0.8	1.5	3	6
4	Other Food Grain (OFG) (%) (Maximum)	1	2	3	4	5
5	Damaged Grains (DG) (%) (Maximum)	2	4	7	10	15
6	Shrivelled/Shrunken (%) (Maximum)	3	5	8	12	20
7	Weevilled Grains (WG) (%) (Maximum)	0.5	2	5	7	10
8	Other wheat grains (Maximum)	1	3	10	10	10
9	Ergot (%) (Maximum)	0.5	0.5	0.5	0.5	0.5
10	Karnal Bunt (Maximum)	0.0	0.0	1.0	3.0	3.0

Table 2: Durum wheat grading

S. No.	Grading standard	Grades				
		I	II	III	IV	V
1	Hectolitre Weight (Kg/hl) (Minimum)	78	76	74	72	68
2	Moisture content (%) (Maximum)	12	13	14	15	15
3	Foreign Matter (FM) (%) (Maximum)	0.5	0.8	1.5	3	6
4	Other Food Grain (OFG) (%) (Maximum)	1	2	3	4	5
5	Damaged Grains (DG) (%) (Maximum)	2	3	5	7	10
6	Shrivelled/Shrunken (%) (Maximum)	3	4	6	8	10
7	Insect bored Grains (IBG) (%) (Maximum)	0.5	2	4	7	10
8	Other wheat grains (%) (Maximum)	1	2	4	7	10
9	Ergot (%) (Maximum)	0.5	0.5	0.5	0.5	0.5
10	Yellow pigment (ppm) (Minimum)	7	6	5	4	4

Definitions:

- Hectolitre weight:** Hectolitre weight is the weight of a specific volume of grain and is an indication of the bulk density of the grain. It determines the plumpness of the grain and is related to flour yield.
- Moisture (%):** Moisture content is important in storage where < 12% moisture is required for long term storage.
- Foreign matter:** It includes, dust, stones, lumps of earth, chaff, stem of straw and any other impurity including non-edible seeds.
- Other Food Grains:** Edible foodgrains other than wheat.
- Damaged Grains:** Grains that are internally damaged or discoloured, damage and discolouration materially affecting the quality.
- Immature, Shrivelled, broken grains:** Immature and shrivelled grains are those that are not properly & broken grains developed. Broken grains are pieces of whole grains.
- Weevilled Grains/ Insect bored Grains:** Grains that are partially or wholly bored or eaten by weevil or other grain insects.
- Other Wheat grains:** For this purpose wheat would be divided into two classes – (1) Durum or Macroni wheat and (2) Vulgare or common wheat; Durum again would be sub-divided into two groups (i) amber and (ii) red ; and Vulgare would be sub-divided in to three groups – (i) white (ii) amber and (iii) red.
- Ergot (%):** Ergot is a plant disease caused by the fungus *Claviceps purpurea*, which infects the developing grains of cereals and grasses. Ergot infected kernels adversely affects grain quality and also causes a disease in humans.
- Yellow pigment (Durum):** Yellow colour in durums imparts attractive appearance to the pasta products and therefore majority of the pasta consumers prefer the yellow pigment.
- Karnal Bunt (Aestivum):** Karnal bunt a disease of wheat caused by the pathogen *Tilletia indica* is soil and seed borne which pose a serious quarantine problem and decrease in quality of grains by imparting a fishy odour and taste to the wheat and thus interferes with wheat trade.

Session IV - Discipline-wise presentation of Progress Report (2021-22)

August 30, 2022

10:45 -13.00

Chairman : Dr TR Sharma, DDG(CS), ICAR, New Delhi

Co-Chairman : Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi

Rapporteurs : Drs Ravinder Kumar, Vikas Gupta & OP Gupta

The session was chaired by Dr TR Sharma, DDG(CS), ICAR, New Delhi and co-chaired by Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi. The session was graced by Director, ICAR-IIWBR, Dr GP Singh, Project Management Committee (PMC) experts viz., Dr B. Mishra, Former VC, SKUAST-Jammu, Dr. AN Mishra (Ex Principal Scientist, IARI-RS Indore) and Dr. SR Verma (Ex- Barley Breeder, CCSHAU, Hisar). The chairman in his opening remarks welcomed the delegates and invited Dr. Gyanendra Singh (PI, Crop Improvement) to present the progress report for the year 2021-22.

Dr. Gyanendra Singh presented the list of varieties released during 2021-22 (CVRC: 9 and SVRC: 07) along with the notification of two varieties for area extension. He also apprised the house about the PPVFR&A registration of five varieties and registration of 42 genetic stocks for various traits. DR. Singh also updated the house about the finalization of Crop Improvement work plan in a pre-workshop meeting held on 8th August 2022 for the ensuing crop season. During the reported year, trial conduction was 100% across the zones, however, the reporting percent was 76%. The major reason for less reporting was due to low site mean and also the trials rejected by monitoring teams. Dr RK Singh seriously pointed out the low reporting of trials from some centres and asked the Director IIWBR to write to respective centre authorities regarding the same. Apart from that, PI-CI apprised the house about the conduction of 5 MABB trials in different zones in which two genotypes were promoted to the next year of testing. He elaborated on the different activities undertaken like Zonal monitoring, HRD activities, initiation of 'Visitors' Week' and sharing of seed with the indenters and also wheat blast evaluation through CIMMYT collaboration. He informed the house about the initiation of a new adaptive cum exploratory wheat trial at Ladakh for encouraging wheat cultivation. Dr Singh informed the house that surplus breeder seed is produced against the DAC indent so that new variety seeds be made available to the farmers and the recently released varieties DBW187 and DBW303 were the highest indented varieties. The NBPGR activities related to the import of different nurseries and trials were also presented. The chairman and experts appreciated Dr. Gyanendra Singh for highlighting the significant achievements of the crop improvement team. Dr. B Mishra pointed out that there should be some mechanism to remove the continuously non- performing centres. In response to that, Dr. TR Sharma, DDG (CS) informed the house that the poor performing centres have been dropped in the next EFC.

Dr. SC Tripathi (PI, Resource Management) presented the progress report of resource management experiments conducted during 2021-22. He informed the house that the work plan for the ensuing crop season of the Resource Management was finalized in a pre-workshop meeting held on 12th August, 2022. He presented the work done during 2021-22 including trial conduction, reporting under different agronomic management practices. Genotypes PBW 826, PBW 872 and HI 8826(d) were found to be the superior genotypes under different production conditions. Application of sea weed extract as seed treatment (3 ml/kg.) along with two foliar applications @4 ml/liter water at tillering and jointing stage was found significantly superior in terms of grain yield. The application of CCC@1500 ppm at 50 DAS significantly improved the yield of dicoccum wheat. Two sprays of nano urea at tillering and jointing stage with recommended N increased the grain yield by 6% over recommended N in NWPZ. The foliar application of nitrogen (2% urea), zinc (0.5%), potassium (1%) & sulphur (2%) produced more protein content (14.2%) over control. Two foliar applications of zinc (0.5%) significantly increased the Zn content in grain.

Dr. Sudheer Kumar (PI, Crop Protection) presented the progress report of crop protection. He outlined the total experiments and nurseries being conducted under the umbrella of AICRP W& B crop protection programme at a total of 32 centres (Funded 17, Non-funded 15). While emphasizing on the importance of the crop protection programme he highlighted that under this programme > 1500 lines were screened against rusts and blights, >150 advanced wheat breeding lines were screened against rusts,

powdery mildews, blight bunts etc. and 350 lines were tested against wheat blast with the help of CIMMYT.

He informed that first appearance of yellow rust of wheat was reported from village Nikku Nangal in Sh. Anandpur Sahib block of Rupnagar district of Punjab on 14th January, 2022. Two major recommendations i.e. Azoxystrobin 18.2% w/w + Difenoconazole 11.4% @ 0.1% is best performing fungicide against powdery mildew, and application of fipronil 0.6% GR @ 10 Kg/ha was found most effective against lepidopterous insects.

Dr. OP Gangwar presented significant achievements made at IIWBR RS Flowerdale, Shimla. He outlined the geographical distribution of rust pathotypes among 565 samples of three rusts of wheat and stripe rust of barley collected from different regions of India and Nepal. Amongst those, 126 samples with six pathotypes were of stripe rust with Pst pathotype 110S119 being most predominant (34.9%). Wheat leaf rust was found in 377 samples which led to identification of 18 pathotypes of Puccinia triticina with pathotype 77-9 (121R60-1) being most widely distributed (59.9%). Stem rust shared only 62 samples, Pgt pathotype 79G31 (11) was most predominant (69.4%).

Dr. Sewa Ram (PI, Wheat Quality) presented the significant achievements in coordinated wheat quality research. He briefly showed the status of product specific varieties available for industry as well as domestic consumption. He also showed the zone wise and center wise variability in different wheat quality parameters such as protein content, hectoliter weight, grain hardness, sedimentation value, gluten content, bread volume, biscuit spread factor, yellow pigment etc. It was pointed out by Mr. Chairman pointed out that quality analysis of mandi wheat samples does not carry any specific advantages therefore, wheat samples directly from farmer's field can be done. This point was further discussed and clarified by Dr. Ravi P Singh, wherein, he suggested that quality of mandi wheat samples is just representative of farmers' field only of that area and therefore, can be continued which will serve as ready reckoner in case of export. And it was also suggested that need-based grain protein content can also be done for export.

Dr. RPS Verma (PI, Barley Network) presented the achievement and progress of barley coordination. He highlighted the barley cultivar DWRB 137. Which is going to be a mega variety and is the highest indented variety. He further informed that a total 9 genetic stocks from barley were registered and even first time a genetic stock for aphid resistance was also identified. One recommendation has emerged that two sprays of Tebuconazole 50% + Trifloxystrobin 25% or Picoxystrobin 7.05% + Propiconazole 11.7% or Propiconazole 25% @ 0.1% can be effectively applied to manage foliar blights of barley.

Dr. Satyavir Singh (PI, Social Sciences) presented the progress report on technology transfer through FLDs at the farmers' field. In his presentation, he expressed his concern over non-allotment of wheat FLDs by the Ministry of Agriculture and Farmers Welfare for the year 2021-22. In the case of barley, 228 FLDs were conducted at 277 farmers' fields in barley growing zones. He also presented the report on 250 wheat demonstrations conducted under the SCSP programme.

After the presentation of progress report by all the section PI's, there was a detailed deliberation by the Chairman, Co-Chairman, PMC experts and Dr.GP Singh, Director, ICAR-IIWBR on various issues and following recommendations were made:

- Presenters' first and last slide should include approved/ executed work plan and proposed work plan, respectively.
- Shimla centre presentation should include one slide on impact of climate change on structure of rust pathotypes including some historical data from next year onwards.
- List of publications should be included in the presentation.
- Recurrent parent genome recovery of >90% will be the criterion for testing MABB entries
- Barley programme at ANDUAT, Ayodhya should be dropped from next crop season.
- ICARDA to distribute nurseries and trials through IIWBR for proper reporting of data as ICAR is doing in-case of nurseries/trials received from CIMMYT, Mexico.
- Like identification of varieties, crop protection and crop production technologies should be put up for recommendations.

Session V- Progress of research in North Western Plains Zone

August 30, 2022
14:00 -15.45

Chairman : Dr NP Singh, VC, BUAT, Banda

Co-Chairman : Dr RK Singh, ADG (CC&FFC), ICAR, N. Delhi

Rapporteurs : Drs.CN Mishra and Charan Singh

Chairman of the session, Dr NP Singh welcomed all the delegates and opined that performance of centres should be evaluated in terms of crosses attempted, trial conduction and publications made. In all there were 7 presentations from the different centres, only six presentations were made except Modipuram station. The first presentation was made by Dr Rajbir Yadav from New Delhi centre. One farmer asked about Karnal Bunt incidence in Malwa region of MP as IARI projected the plan for 5 years. Dr Yadav replied that the respective zone problems will be solved by respective Institute. The chairman of the session asks the presenter at least IARI should provide different template for presentation. The overall the performance was appraised by the Chairman and Co-chairman was excellent.

The progress of five years of Ludhiana centre by Dr. VS Sohu. He presented the Staff position cut from 28 to 11 and also highlighted the dramatic cuts in budget. He mentioned that every year >1000 crossed in wheat attempted in PAU, Ludhiana. He informed that 2/3 of the total entries contributions by the centre is from in-house project and number of different major rust resistant gene incorporated for rust resistant in wheat by the Ludhiana centre. Dr. OP Bishnoi presented the five year performance of Hisar centre. He mentioned that one biochemist is required for the station as proposed. Director, IIWBR informed the house that during the period, only one variety is contributed from the centre; AUC and remaining unspent budget has not been returned back to the Institute. Moreover, the name of scientist for the training slot allotted to the CIMMYT has been changed by the CCSHAU, Hisar. The chairman asks the presenter why the performance is going down day by day of research in wheat at CCSHAU, Hisar and suggested that the centre has to give more emphasis on basic/ strategic research and should not be depends on CIMMYT material. Hence more collaborative efforts need to be done by the centre in future. Chairman has asked about the emerging issues highlighted and have been provided but not solution of these issues provided by the presenter. Chairman asked to discuss these issues to the VC and Director research of the University. The Co-chairman commented that the performance is very poor of the centre. Dr. JP Jaiswal presented the five year performance of Pantnagar centre. Chairman asked the presenter, why you exceeded the limit and utilized more budget as allotted to the centre and asked why no variety reached and identified by the CVRC during last couple of the years. Further, variety for poor situation performance needs to be quantified. Co-chairman has informed that biotechnological work need to be done in collaborative mode by the centres. Dr. Sudhanshu Jain was presented the five year performance of Gwalior centre.

Dr GP Singh asked about the budget utilization and asked the centre to return the un-utilized budget to the Institute at the earliest possible. The session chairman asked the presenter about the Lok-1 wheat is still grown by the farmers. One farmer was against the chairman remarks and said that the farmers of the zone still need Lok-1. Chairman commented as it blank presentation and asked the Director, IIWBR to provide some breeding material to the centre. He also informed that seed can be produced by the centre in farmer participatory mode. Director, IIWBR informed the house that DBW 187 variety got area extension for the CZ and why they have given still more emphasis on the production of seed of the LOK-1 wheat. Dr. Kashyap was presented the five year performance of Jammu centre. He informed that about 14% of the budget was not utilized by the centre. Chairman asked about the un-utilized budget as it was not returned back to the IIWBR.

Chairman of the session also informed the house that budget will not be allotted in next financial year if centre has not sanded un-utilized budget timely and also asked the presenter to request personally to the comptrroller of the university. Remarks by Dr. B. Mishra, that some centres are doing well but few centres are not doing up to the mark. The total no. of crosses, publication parts is not clear; some crosses would be made by the labors. Hence, pre-breeding material need to be supplied by the CIMMYT. If, then also centres is not performing well, the ICAR need to take strong action against the non-performing centres. He also suggested that stripe rust is a major disease and all the centres needs to sit together and exchange rust resistant donors.

The Director, IIWBR informed the house that we are doing pre-breeding; the breeder should visit and can make site specific selection in the material. He also informed the house that we are producing around 140000 quintal breeder seed indent from only two varieties. If any body was found for producing our varieties seed without licensing to our Institute, we will take action against the centres/companies and also mentioned that if you have provided foster breeding rights, then you cannot produce our variety seed. Dr. RK Singh, Co-Chairman mentioned in his remarks that the performance of IARI and PAU is excellent. If other centres not performing well in future, we will take strong action against these centres and some centres not returning budget in time. Remarks from the private seed company, that breeder seed quality with respect to genetic purity is declining day by day. Hence, institute need to give more emphasis on the production of genetic pure seed.

Finally, Chairman of the session informed that wheat AICRIP is best in the country and informed that if this is the performance of the NWPZ than I can understand the performance of others zones. He informed the house that IARI is best centre in ACRIP but template of slide need to be change. He also informed that PAU is leading centre doing excellent work, but why the material is not translating into the product. The performance of the centre is decreasing over the year. He mentioned that Hisar and Pantnagar centres not performing well. Hence, the material needs to be supplied to the centres by the IIWBR. He also commented that the no. of crosses to be done and donors utilized need be decided by the centres in the wheat workshop itself. He also added that in zonal monitoring of co-ordinated wheat trials, one person representing from the state to be the member for trial conduction and monitoring. Further, he mentioned that quarterly monitoring of budget utilization can also be done. At last Dr Gyanendra Singh, PI Crop Improvement thanked all the presenters and Chairman, Co chairman for conducting the session and Rapporteurs for recording the proceeding of the session.

National Initial Varietal Trial
NIVT-1A-IR-TS-TAS, 2022-23

Conducting centres

Zone	No.	Centres
NWPZ	9	Delhi, Ludhiana, Gurdaspur, Hisar, Karnal, Pantnagar, Modipuram, Sriganganagar, Durgapura
NEPZ	6	Kanpur, Ayodhya, Varanasi, Sabour, Ranchi, Coochbehar
Total	15	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	5	HD3472, HD3444, HD3445, HD3446, HD3447
2.	IWBR, Karnal	5	DBW408, DBW409, DBW410, DBW411, DBW412
3.	Ludhiana	5	PBW908, PBW909, PBW910, PBW911, PBW912
4.	Pantnagar	3	UP3121, UP3122, UP3123
5.	Durgapura	3	RAJ4576, RAJ4577, RAJ4578
6.	Hisar	2	WH1315, WH1316
7.	Ayodhya	1	NW8072
8.	Kanpur	1	K2201
9.	Varanasi	1	HUW854
10.	Sabour	1	BRW3944
10.	CSSRI, Karnal	1	KRL2106
11.	Jammu	1	JAUW711
12.	Nuziveedu Seeds	1	NWS2442
13.	Kalyani	1	BCW28
14.	Coochbehar	1	UBW18
15.	Modipuram	1	SVPWL21-15
	Checks	3	DBW187, DBW222, HD3086
	Total	36(33+3)	

Experimental details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.20m (6 rows)
Fertilizer dose (kg/ha)	: 150:60:40 (N:P:K)
Time of sowing	: November 1-15
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director.

National Initial Varietal Trial

NIVT-1B-IR-TS-TAS, 2022-23

Conducting centres

Zone	No.	Centres
NWPZ	8	Delhi, Ludhiana, Gurdaspur, Hisar, Karnal, Bulandshahr, Sriganaganagar, Durgapura
NEPZ	7	Kanpur, Ayodhya, Varanasi, Sabour, Prayagraj, Ranchi, Kalyani
Total	15	

Details of trial entries

SN	Contributing centres	No. of Entries	Name of entries
1.	IARI, Delhi	4+1	HD3448, HD3449, HP1978, HP1979, HD3467
2.	IIWBR, Karnal	5	DBW413, DBW414, DBW415, DBW416, DBW417
3.	Ludhiana	5	PBW913, PBW914, PBW915, PBW916, PBW917
4.	Pantnagar	2+1	UP3124, UP3125, UP3132
5.	Ayodhya	2	NW8073, NW8075
6.	Hisar	2	WH1317, WH1318
7.	Kanpur	2	K2203, K2204
8.	Sabour	2	BRW3946, BRW3942
9.	Durgapura	1	RAJ4579
10.	Ranchi	1	JKW305
11.	Varanasi	1	HUW855
12.	Nuziveedu Seeds	1	NWS2216
13.	Kalyani	1	BCW29
14.	Coochbehar	1	UBW19
15.	Modipuram	1	SVPWL21-07
	Checks	3	DBW187, DBW222, HD3086
	Total	36 (33+3)	

Experimental details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.20m (6 rows)
Fertilizer dose (kg/ha)	: 150:60:40 (N:P:K)
Time of sowing	: November 1-15
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

National Initial Varietal Trial

NIVT-2-IR-TS-TAS, 2022-23

Conducting centres

Zone	No.	Centres
CZ	10	Indore, Powarkheda, Jabalpur, Sagar, Gwalior, Bilaspur, Junagadh, Vijapur, SK Nagar, Udaipur
PZ	7	Niphad, Pune, Akola, Dhule, Parbhani, Dharwad, Nippani
Total	17	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	4	HD3450, HD3451, HI1683, HI1684
2.	Pune	4	MACS6826, MACS6837, MACS6842, MACS6844
3.	Vijapur	3	GW548, GW549, GW550
4.	IIWBR, Karnal	2	DBW418, DBW419
5.	Dharwad	2	UAS3025, UAS3026
6.	Jabalpur	2	MP3570, MP3573
7.	Niphad	2	NIAW4364, NIAW4440
8.	Powarkheda	2	MP1392, MP1393
9.	Junagadh	2	GW554, GW555
10.	Udaipur	2	PWU16, PWU20
11.	Ludhiana	1	PBW918
12.	Durgapura	1	RAJ4582
13.	Bilaspur	1	CG1045
14.	Akola	1	AKAW5347
15.	Parbhani	1	PBN16-1766
16.	Lok Bharti	1	LOK80
17.	Nuziveedu Seeds	1	NWS2170
19.	Bioseeds	1	BW18R6016
	Checks	3	GW322, DBW187, MACS6222
Total entries		36 (33+3)	

Experimental Details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.20m (6 rows)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K)
Time of sowing	: November 5-15
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**National Initial Varietal Trial
NIVT-3A-IR-LS-TAS, 2022-23**

Conducting centres

Zone	No.	Centres
NWPZ	9	Delhi, Jammu, Ludhiana, Gurdaspur, Hisar, Karnal, Pantnagar, Durgapura, Modipuram
NEPZ	10	Kanpur, Ayodhya, Varanasi, Sabour, RPCAU-Pusa, Ranchi, Kalyani, Coochbehar, Burdwan, Shillongani
Total	19	

Details of trial entries

SN	Contributing centres	No. of Entries	Name of entries
1.	IARI, Delhi	4+1	HD3452, HD3453, HD3454, HD3455, HP1980
2.	IIWBR, Karnal	5	DBW420, DBW421, DBW422, DBW423, DBW424
3.	Ludhiana	5	PBW919, PBW920, PBW921, PBW922, PBW923
4.	Hisar	3	WH1322, WH1323, WH1324
5.	Kanpur	3	K2206, K2207, K2208
6.	Durgapura	2	RAJ4580, RAJ4581
7.	Ayodhya	2	NW8055, NW8071
8.	Pantnagar	2	UP3126, UP3127
9.	Ranchi	1	JKW303
10.	Sabour	1	BRW3941
11.	Kalyani	1	BCW30
12.	Coochbehar	1	UBW20
13.	Modipuram	1	SVPWL21-14
	Checks	4	HD3059, DBW173, HI1563, DBW107
Total entries		36 (32+4)	

Experimental Details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.08m (6 rows)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K)
Time of sowing	: December 5-15
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries, etc. will be invalid if not approved by the Director

**National Initial Varietal Trial
NIVT-3B-IR-LS-TAS, 2022-23**

Conducting centres

Zone	No.	Centres
CZ	9	Indore, Powarkheda, Jabalpur, Gwalior, Bilaspur, Junagadh, Vijapur, SK Nagar, Lok-Bharti
PZ	8	Dharwad, Niphad, Akola, Pune, Bagalkot, Dhule, Nippani, Parbhani
Total	17	

Details of trial entries

SN	Contributing centres	No. of Entries	Name of entries
1.	IARI, Delhi	4	HD3456, HI1685, HI1686, HI1687
2.	IWBR, Karnal	2	DBW425, DBW426
3.	Dharwad	2	UAS3027, UAS3028
4.	Jabalpur	2	MP3568, MP3575
5.	Niphad	2	NIAW4300, NIAW4432
6.	Pune	2	MACS6829, MACS6830
7.	Vijapur	1+1	GW551, GW558
8.	Akola	1	WSM138
9.	Bilaspur	1	CG1046
10.	Hisar	1	WH1325
11.	Junagadh	1	GW556
12.	Lok Bharti	1	LOK81
13.	Ludhiana	1	PBW924
14.	Powarkheda	1	MP1394
	Checks	2	HD2864, HD2932
Total entries		25 (23+2)	

Experimental Details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.08m (6 rows)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: December 5-15
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries, etc. will be invalid if not approved by the Director

**National Initial Varietal Trial
NIVT-4-IR-TS-TDM, 2022-23**

Conducting centres

Zone	No.	Centres
CZ	9	Powarkheda, Indore, Junagadh, Gwalior, Vijapur, SK Nagar, Kota, Udaipur, Dhandhuka
PZ	7	Dharwad, Bagalkot, Nippani, Niphad, Pune, Akola, Parbhani
Total	16	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	3	HI8848, HI8849, HI8850
2.	Niphad	2+1	NIDW1499, NIDW1534, NIDW1520
3.	IIWBR, Karnal	2	DDW62, DDW63
4.	Dharwad	2	UAS482, UAS483
5.	Ludhiana	2	PDW364, PDW365
6.	Powarkheda	2	MPO1395, MPO1396
7.	Pune	2	MACS4125, MACS4135
8.	Vijapur	2	GW1365, GW1366
9.	Hisar	1	WHD968
10.	Udaipur	1	PWU24
11.	Junagadh	1	GW1367
12.	Akola	1	AKDW5516
	Checks	3	HI8713, HI8737, MACS3949
Total entries		25 (22+3)	

Experimental Details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.20m (6 rows)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K)
Time of sowing	: November 5-15
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**National Initial Varietal Trial
NIVT-5A-RI-TS-TAS, 2022-23**

Conducting centres

Zone	No.	Centres
NWPZ	10	Delhi, Jammu, Gurdaspur, Ludhiana, Hisar, Karnal, Sriganaganagar, Modipuram, Bulandshahr, Durgapura
NEPZ	9	Kanpur, RPCAU-Pusa, Varanasi, Sabour, Ranchi, Kalyani, Coochbehar, Burdwan, Shillongani
Total	19	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	4+1	HD3457, HD3458, HD3459, HD3460, HD3468
2.	IWBR, Karnal	4	DBW427, DBW428, DBW429, DBW430
3.	Ludhiana	4	PBW925, PBW926, PBW927, PBW928
4.	Pantnagar	1+1	UP3129, UP3133
5.	Hisar	2	WH1326, WH1327
6.	Kanpur	1	K2210
7.	Ayodhya	1	NW8053
8.	Ranchi	1	JKW304
9.	Sabour	1	BRW3935
10.	Jammu	1	JAUW705
	Checks	3	HI1612, K1317, PBW644
Total entries		25 (22+3)	

Experimental Details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.20m (6 rows)
Irrigations	: Two (pre-sowing & one irrigation at 45-50 DAS)
Fertilizer dose (kg/ha)	: 90:60:40(N:P:K)
Time of sowing	: Oct. 25 - Nov. 5
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**National Initial Varietal Trial
NIVT-5B-RI-TS-TAD, 2022-23**

Conducting centres

Zone	No.	Centres
CZ	11	Indore, Sagar, Jabalpur, Bilaspur, Udaipur, Kota, Vijapur, SK Nagar, Junagadh, Dhandhuka, Powarkheda
PZ	7	Dharwad, Nippani, Niphad, Pune, Dhule, Akola, Parbhani
Total	18	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	Delhi	5	HI1688, HI1689, HI1693, HI8851(d), HI8852(d)
2.	IWBR, Karnal	4	DBW428, DBW431, DBW432, DDW64(d)
3.	Dharwad	2	UAS3029, UAS484(d)
4.	Niphad	2	NIAW4267, NIAW4387
5.	Vijapur	2	GW552, GW1368(d)
6.	Akola	1	AKAW5514
7.	Bilaspur	1	CG1047
8.	Jabalpur	1	MP3577
9.	Powarkheda	1	MPO1398(d)
10.	Pune	1	MACS4131(d)
11.	Parbhani	1	PBN16-1826
	Checks	4(2A+2D)	DBW110, HI1605, HI8627(d), UAS446(d)
Total entries		25 (21+4)	

Experimental Details

Design	: Simple Lattice
Replication	: Two
Plot size	: 6 x 1.20m (6 rows)
Irrigations	: Two (1 pre-sowing & one irrigation at 40-45 DAS) (Limit of 3 irrigations in Gujarat)
Fertilizer dose (kg/ha)	: 90:60:40(N:P:K)
Time of sowing	: Oct. 25 – Nov. 05
Seed requirement	: 7.0 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**National Initial Varietal Trial
NIVT-6-ES-IR-NWPZ/CZ, 2022-23**

Trial conducting centres

Zone	No.	Centres
NWPZ	7	Delhi, Ludhiana, Ladowal, Hisar, Karnal, Bulandshahr, Sriganaganagar
CZ	7	Indore, Powarkheda, Jabalpur, BISA-Jabalpur, Bilaspur, Junagadh, Vijapur
Total	14	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Delhi	4+2	HD3461, HD3462, HD3463, HD3464, HI1690, HI1691
PAU, Ludhiana	5+1	PBW903, PBW904, PBW905, PBW906, PBW907, PBW929
IIWBR/BISA	5+4	DBW433, DBW434, DBW435, DBW436, DBW437, DBW438, DBW439, DBW440, DBW445
CCSHAU, Hisar	2	WH1320, WH1321
GBPUAT, Pantnagar	1	UP3130
RARI, Durgapura	1	RAJ4583
BAU, Sabour	1	BRW3922
IGKV, Bilaspur	1	CG1049
JNKVV, Sagar	1	JWS1333
SDAU, Vijapur	1	GW553
GAU, Junagadh	1	GW557
JNKVV, Jabalpur	1	MP3572
JNKVV, Powarkheda	1	MP1399
Checks	4	DBW187, DBW303, DBW327, DBW332
Total	36 (32+4)	

Experimental details

Design	: Simple Lattice (5x5)
Replications	: Two
Plot size	: 6 x 1.20m (6 rows)
Fertilizer dose (kg/ha)	: 150% RFD+ FYM15 t/ha+ Growth Regulators*
Time of sowing	: NWPZ: Oct. 25 – Nov.5; CZ: Nov 1-10
Seed requirement	: 6 Kg per entry

* **Note:** Two sprays as tank mix-[Chloromequat chloride @ 0.2%+ tebuconazole @ 0.1% of commercial product dose at First Node and Flag leaf \(Tank mix application\)](#). Use 400 l/ha of water for spraying.

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**Northern Hills Zone
Initial Varietal Trial, 2022-23
IVT-RF-TS-TAS**

Trial conducting centres

State	Centres	Name of the centres
Himachal Pradesh	3	Malan, Shimla, Bajaura
Uttarakhand	3	Almora, Majhera, Gaja
J&K	2	Khudwani, Wadura
Manipur	1	Imphal
Total	9	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Shimla	6	HS695, HS696, HS697, HS698, HS699, HD3466
CSKHPKV, Malan	6	HPW489, HPW490, HPW491, HPW492, HPW493, HPW494
VPKAS, Almora	6	VL2051, VL2052, VL2053, VL2054, VL3031, VL3032
SKUAST-K	3	SKW368, SKUAW101, SKUAW102
GBPUA&T, Pantnagar	2	UP3131, UP3134
Checks	3	HS507, HS562, VL892
Total	26 (23+3)	

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 3.5 x 1.20m (6 rows)
Fertilizer dose (kg/ha)	: 60:30:20 (N:P:K)
Time of sowing	: Oct. 15-31
Seed rate (kg/ha)	: 100
Seed requirement	: 6 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**Northern Hills Zone
Advance Varietal Trial, 2022-23
AVT-RF-TS-TAS**

Trial conducting centres

State	Centres	Name of the centres
Himachal Pradesh	3	Malan, Shimla, Bajaura
Uttarakhand	3	Almora, Majhera, Gaja
J&K	2	Khudwani, Wadura
Manipur	1	Imphal
Total	9	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, New Delhi	2	HS691, HS692
VPKAS, Almora	1	VL3028
CSKHPKV, Palampur	1	HPW484
Checks	5	VL907, VL892, HPW349, HS562, VL2041(I)
Total	9 (4+5)	

Experimental details

Design	: R.B.D.
Replications	: Six
Plot size	: 3.5 x 1.20m (6 rows)
Fertilizer dose (kg/ha)	: 60:30:20 (N:P:K)
Time of sowing	: October 15-31
Seed rate (kg/ha)	: 100
Seed requirement	: 10 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**North Western Plains Zone
Advance Varietal Trial, 2022-23
AVT-IR-TS-TAS**

Trial conducting centres

State	No.	Centres
Punjab	2	Ludhiana, Gurdaspur
Haryana	3	Hisar, Karnal, Bawal
Rajasthan	2	Sriganganagar, Durgapura
Uttar Pradesh	3	Bulandshahr, Modipuram, Nagina
Uttarakhand	2	Pantnagar, Dehradun
J & K	1	Jammu
Delhi	1	Delhi
Total	14	

Details of test entries

Contributing Centres	No. of entries	Name of entries
PAU, Ludhiana	2	PBW887, PBW889
IARI, Delhi	3	HD3386*, HD3470 ^M , HD3471 ^M
IARI, Indore	1	HI1668
IWBR, Karnal	1	DBW386 [#]
GBPUAT, Pantnagar	1	UP3102 [#]
Checks	5	HD2967, HD3086, DBW187, DBW222, PBW826(I)
Total	13 (8+5)	

* denotes final year entry

denotes resistance to wheat blast

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Fertilizer dose (kg/ha)	: 150:60:40 (N:P:K)
Time of sowing	: November 1-15
Seed rate (kg/ha)	: 100
Seed requirement	: 18 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**North Western Plains Zone
Advance Varietal Trial, 2022-23
AVT-IR-LS-TAS**

Trial conducting centres

State	No.	Centres
Punjab	2	Ludhiana, Gurdaspur
Haryana	2	Hisar, Karnal
Rajasthan	1	Durgapura
Uttar Pradesh	3	Nagina, Bulandshahr, Modipuram
Uttarakhand	2	Pantnagar, Dehradun
J & K	1	Jammu
Delhi	1	Delhi
Total	12	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Delhi	1	HD3428
PAU, Ludhiana	1	PBW893
CSA, Kanpur	1	K2108
Checks	4	HD3059, DBW173, PBW771, JKW261
Total	7 (3+4)	

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.16m (12 rows)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K)
Time of sowing	: December 5-15
Seed rate (kg/ha)	: 125
Seed requirement	: 15 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**North Western Plains Zone
Advance Varietal Trial, 2022-23
AVT-RI-TS-TAS**

Trial conducting centres

State	No.	Centres
Punjab	2	Ludhiana, Gurdaspur
Haryana	3	Hisar, Karnal, Bawal
Uttar Pradesh	3	Modipuram, Nagina, Bulandshahr
Rajasthan	2	Sriganganagar, Durgapura
Uttarakhand	2	Pantnagar, Dehradun
J&K	1	Jammu
Delhi	1	Delhi
Total	14	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IIWBR, Karnal	2	DBW397, DBW398
HAU, Hisar	2	WH1402*, WH1311
GBPUAT, Pantnagar	1	UP3111
PAU, Ludhiana	1	PBW899
Checks	6	PBW644, NIAW3170, DBW296, HD3369(I), HI1653(I), HI1654(I)
Total	12 (6+6)	

* denotes final year entry

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Irrigations	: Two (pre-sowing & one irrigation at 45-50 DAS)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: Oct. 25 – Nov. 5
Seed rate (kg/ha)	: 100
Seed requirement	: 18 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**North Eastern Plains Zone
Advance Varietal Trial, 2022-23
AVT-IR-TS-TAS**

Trial conducting centres

State	No.	Centres
Uttar Pradesh	5	Kanpur, Prayagraj, Mau, Ayodhya, Varanasi
Bihar	2	Sabour, RPCAU-Pusa
West Bengal	3	Coochbehar, Kalyani, Burdwan
Jharkhand	2	Ranchi, Dumka
Assam	1	Shillongani
Total	13	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IIWBR, Karnal	1	DBW386 [#]
IARI, Delhi	3	HD3388*, HD3470 ^M , HD3471 ^M
Checks	6	HD3249, DBW187, HD3086, HD2967, DBW222, PBW826(I)
Total	10 (4+6)	

[#] denotes resistance to wheat blast

* denotes final year entry

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Fertilizer dose (kg/ha)	: 150:60:40 (N:P:K)
Time of sowing	: November 1-15
Seed rate (kg/ha)	: 100
Seed requirement	: 18 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**North Eastern Plains Zone
Advance Varietal Trial, 2022-23
AVT-RI-TS-TAS**

Trial conducting centres

State	No.	Centres
Uttar Pradesh	4	Kanpur, Prayagraj, Mau, Varanasi
Bihar	2	Sabour, RPCAU-Pusa
West Bengal	3	Coochbehar, Kalyani, Burdwan
Jharkhand	2	Ranchi, Dumka
Assam	1	Shillongani
Total	12	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IWBR, Karnal	1	DBW398
Checks	5	HI1612, K1317, HD3171, HD3293, DBW252
Total	6 (1+5)	

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Irrigation	: Two (pre-sowing & one irrigation at 45-50 DAS)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: Oct. 25 – Nov. 5
Seed rate (kg/ha)	: 100
Seed requirement	: 15 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

Central Zone
Advance Varietal Trial, 2022-23
AVT-IR-TS-TAS

Trial conducting centres

State	No.	Centres
Gujarat	5	Vijapur, SK Nagar, Junagadh, Anand, Dhandhuka
Madhya Pradesh	6	Jabalpur, Sagar, Gwalior, Powarkheda, Indore, Jhansi
Chhattisgarh	2	Bilaspur, Raipur
Rajasthan	1	Udaipur
UP	1	Banda
Total	15	

Details of test entries

Contributing Centres	No. of entries	Name of entries
Nuziveedu Seeds	1	NWS2194 ^{#*}
IARI, Indore	2	HI1669, HI1670 ^Q
UAS, Dharwad	1	UAS3020
SDAU, Vijapur	1	GW547 [*]
Checks	5	GW322, GW513, HI1636, HI1650(I), MACS6768(I)
Total	10 (5+5)	

* denotes final year entry; # denotes resistance to wheat blast

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K)
Time of sowing	: November 5-15
Seed rate (kg/ha)	: 100
Seed requirement	: 18 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**Central Zone
Advance Varietal Trial, 2022-23
AVT-IR-LS-TAS**

Trial conducting centres

State	No.	Centres
Gujarat	5	Vijapur, SK Nagar, Junagadh, Anand, Lok-Bharti
Madhya Pradesh	4	Jabalpur, Gwalior, Powarkheda, Indore
Chhattisgarh	2	Bilaspur, Raipur
UP	1	Banda
Total	12	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Indore	3	HI1673, HI1674, HI1675
PDKV, Akola	1	AKAW5104
JNKV, Jabalpur	1	MP3557 [#]
Checks	4	HD2932, MP4010, HI1634, CG1029
Total	9 (5+4)	

[#] denotes resistance to wheat blast

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6m x 2.16m (12 rows)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: Dec. 5-15
Seed rate (kg/ha)	: 125
Seed requirement	: 15 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**Central Zone
Advance Varietal Trial, 2022-23
AVT-RI-TS-TAS**

Trial conducting centres

State	No.	Centres
Gujarat	5	Vijapur, SK Nagar, Dhandhuka, Junagadh, Anand
Madhya Pradesh	5	Powarkheda, Jabalpur, Sagar, Indore, Jhansi
Chhattisgarh	2	Bilaspur, Raipur
Rajasthan	2	Kota, Udaipur
UP	1	Banda
Total	15	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IIWBR, Karnal	3	DBW359*, DBW441 ^M , DBW442 ^M
IGKV, Bilaspur	1	CG1040*
Checks	4	MP3288, DBW110, CG1036(I), HI1655(I)
Total	8 (4+4)	

* final year entry

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Irrigations	: Two (pre-sowing & one irrigation at 40-45 DAS (Limit of 3 Irrig. in Gujarat)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: Oct. 25 – Nov. 05
Seed rate (kg/ha)	: 100
Seed requirement	: 18 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**Peninsular Zone
Advance Varietal Trial, 2022-23
AVT-IR-TS-TAD**

Trial conducting centres

State	No.	Centres
Maharashtra	7	Niphad, Pune, Dhule, Akola, Parbhani, Nashik, Karad
Karnataka	4	Dharwad, Ugar-Khurd, Kalloli, Nippani
Total	11	

Details of test entries

Contributing Centres	No. of entries	Name of entries
UAS, Dharwad	2	UAS3020, UAS3021
ARI, Pune	2	MACS6811, MACS6809
ARS, Niphad	2	NIAW4183, NIAW4153
PDKV, Akola	2	AKAW5314, AKAW5100
JNKV, Powarkheda	2	MP1378*, MP1386
IWBR, Karnal	2	DBW443 ^B , DBW444 ^B
IARI, Delhi	1	HD3469 ^B
Nuziveedu Seeds	1	NWS2222
MPUAT, Udaipur	1	PWU15
CCSHAU, Hisar	1	WH1306
PAU, Ludhiana	1	PBW891 [#]
IARI, Indore	1	HI8841(d)
Checks	6	MACS3949(d), HI8826(d)(I), MACS4100(d)(I), MACS6222, GW322, DBW187
Total	24 (19+6)	

* final year entry, # denotes resistance to wheat blast, ^B promotion from QCWBN

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K)
Time of sowing	: November 5-15
Seed rate (kg/ha)	: 100 kg/acre
Seed requirement	: 15 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**Peninsular Zone
Advance Varietal Trial, 2022-23
AVT-IR-LS-TAS**

Trial conducting centres

State	No.	Centres
Maharashtra	7	Niphad, Pune, Nashik, Akola, Dhule, Karad, Parbhani
Karnataka	5	Dharwad, Ugar-Khurd, Bagalkot, Kalloli, Nippani
Total	12	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Indore	4	HI1674, HI1672, HI1673, HI1675
IWBR, Karnal	2	DBW394, DBW395
ARI, Pune	2	MACS6814, MACS6805
ARS, Niphad	2	NIAW4114, NIAW4120
UAS, Dharwad	2	UAS3022, UAS3023
JNKV, Jabalpur	2	MP3557, MP3556 [#]
PAU, Ludhiana	1	PBW897 ^Q
JNKV, Powarkheda	1	MP1388
PDKV, Akola	1	AKAW5104
GAU, Junagadh	1	GW542
SDAU, Vijapur	1	GW538
CCSHAU, Hisar	1	WH1310
Lokbharti	1	LOK79
Checks	4	RAJ4083, HD2932, HD3090, HI1633
Total	25 (21+4)	

[#] denotes resistance to wheat blast

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6m x 2.16m (12 rows)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: Dec. 5-15
Seed rate (kg/ha)	: 125
Seed requirement	: 15 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**Peninsular Zone
Advance Varietal Trial, 2022-23
AVT-RI-TS-TAD**

Trial conducting centres

State	No.	Centres
Maharashtra	6	Akola, Pune, Niphad, Nashik, Parbhani, Karad
Karnataka	5	Dharwad, Nippani, Bagalkot, Ugar-Khurd, Kalloli
Total	11	

Details of test entries

Contributing Centres	No. of entries	Name of entries
UAS, Dharwad	2	UAS478(d)*, UAS481(d)
IARI, Indore	2	HI1665*, HI8840(d)*
IIWBR, Karnal	3	DBW359*, DBW397 ^Q , DDW61(d)
ARS, Niphad	1	NIAW4028**
Checks	4	HI1605, NIAW3170, UAS446(d), NIDW1149(d)
Total	12 (8+4)	

* final year entry

denotes resistance to wheat blast

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Irrigations	: Two (pre-sowing & one irrigation at 40-45 DAS)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: Oct. 25 – Nov. 5
Seed rate (kg/ha)	: 100
Seed requirement	: 15 kg per entry

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

SPL - HYPT, 2022-23 (IR-ES-TAS-NWPZ)

Trial conducting centres

Zone	No.	Centres
NWPZ	7	Delhi, Ludhiana, Ladowal, Hisar, Karnal, Modipuram, Sriganaganagar
Total	7	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IWBR, Karnal	1	DBW380 [#]
Checks	6	DBW187, DBW303, DBW370(I), DBW371(I), DBW372(I), PBW872(I)
Total	7 (1+6)	

[#] denotes resistance to wheat blast

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Fertilizer dose (kg/ha)	: 150% RFD+ FYM15 t/ha+ Growth Regulators*
Time of sowing	: Oct. 25 – Nov. 5
Seed rate (kg/ha)	: 100
Seed requirement	: 8 Kg per entry

* **Note:** Two sprays as tank mix-[Chloromequat chloride @ 0.2%+ tebuconazole @ 0.1% of commercial product dose at First Node and Flag leaf \(Tank mix application\)](#). Use 400L/ha of water for spraying

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

**SPL – HYPT, 2022-23
(IR-ES-TAS-CZ)**

Trial conducting centres

Zone	No.	Centres
CZ	7	Indore, Powarkheda, BISA-Jabalpur, JNKVV-Jabalpur, Bilaspur, Junagadh, Vijapur
Total	7	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IWBR, Karnal	1	DBW377#*
IGKV, Bilaspur	1	CG1044
SDAU, Vijapur	1	GW543
Checks	3	DBW187, DBW303, GW322
Total	6 (3+3)	

denotes resistance to wheat blast; * final year entry

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 6 x 2.40m (12 rows)
Fertilizer dose (kg/ha)	: 150% RFD+ FYM15 t/ha+ Growth Regulators*
Time of sowing	: 1-10 November
Seed rate (kg/ha)	: 100
Seed requirement	: 8 Kg per entry + Agronomy 16kg

* **Note:** Two sprays as tank mix-[Chloromequat chloride @ 0.2%+ tebuconazole @ 0.1% of commercial product dose at First Node and Flag leaf \(Tank mix application\)](#). Use 400L/ha of water for spraying

Note: Change in test sites, date of sowing, trial entries etc. will be invalid if not approved by the Director

Physiological Trial/ Nursery

Drought & Heat Tolerance Trial (DHTT) 2022-23

Conducting centres

Zone	No.	Centres
NWPZ	3	Hisar, Karnal, Ludhiana
NEPZ	3	Ranchi, Sabour, RPCAU-Pusa
CZ	3	Junagadh, Indore, Vijapur
PZ	3	Pune, Dharwad, Niphad
Total	12	

Details of trial entries

SN	Contributing centres	No. of Entries	Name of entries
1.	IARI, New Delhi	2	HD3386, HD3388
2.	Nuziveedu seeds	1	NWS2194
3.	IIWBR, Karnal	2	DBW359, DBW377
4.	Bilaspur	1	CG1040
5.	Hisar	1	WH1402
6.	Niphad	1	NIAW4028
7.	Dharwad	1	UAS478(d)
8.	Vijapur	1	GW547
9.	Powarkheda	1	MP1378
10.	Indore	2	HI8840(d), HI1665
	Checks	12	DBW187, HD3086, WH730, RAJ3765, GW322, HI1605, DBW110, HD2932, NIAW3170, NIDW1149(d) + Two identified checks
Total entries		25 (13+12)	

Experimental details

Design	:	Simple lattice
Replications	:	Two
Plot size	:	4 rows of 2.5 m length
Treatments	:	3 (timely and late sown with minimum 21 days and maximum 1 month difference between the two sowings and one rainfed condition)
Time of sowing	:	NWPZ & NEPZ: TS: Nov.1-15, LS: Minimum 21 days and maximum one-month difference between two sowings, RF-Oct.25-Nov.5th CZ & PZ: TS: Nov.5-15 LS: Minimum 21 days and maximum 1 month difference between two sowings, RF-Oct.25-Nov.5th
Fertilizer dose (Kg/ha)	:	As per the recommendation of the zones
Seed rate (kg/ha)	:	TS:100, LS:125, RF:125
Seed requirement	:	4 kg per entry

Observations to be recorded: Germination%, Days to heading, Days to anthesis, Days to maturity, Plant height (cm), Total biomass of each net plot at harvest (g), Productive tillers of one full row length, Grain yield of each gross plot (g), 1000-grains weight (g), Grain number per spike, Grain weight per spike, Two recordings of NDVI at 15 days after sowing and again at 21 days after anthesis, Canopy temperature at 15 days and 21 days after anthesis, Chlorophyll content at 15 days and 21 days after anthesis.

Drought and Heat Tolerance Screening Nursery (DHTSN), 2022-23

Conducting centres

Zone	No.	Centres
NWPZ	2	Hisar, Karnal
NEPZ	2	RPCAU-Pusa, Sabour
CZ	2	Junagadh, Indore
PZ	2	Pune, Dharwad
Total	8	

Contributing Centres: Indore, Niphad, Vijapur, Dharwad, Pune, IARI, Hisar, Ludhiana, Karnal
No. of Entries: 5 to 7 promising entries/ centre

Checks: C306, MP3288, K1317, DBW110, NI5439 **Registered Genetic Stocks:** WH730, DBW150

Experimental details:

Design: Augmented/Alpha lattice

Plot size: 1.5m length x 3rows (spaced 20cm apart)

Agronomy: As per the package of practices

Seed requirement: 2kg.per entry

Observations to be recorded:

Agro-morphological observations: Germination percentage, Days to heading, Days to anthesis, Days to maturity, Plant height (cm), Total biomass at harvest (g), Productive tillers of one full row length, Grain yield / plot (g), 1000-grain weight (g), Grain number/spike, Grain weight/spike.

Physiological parameters: Two recordings of NDVI (one month after sowing & 21 days after anthesis), Canopy temperature, Chlorophyll fluorescence and Chlorophyll content (15 days & 21 days after anthesis), respectively.

NATIONAL GENETIC STOCK NURSERY (NGSN) [Suggested Crossing Block]

Conducting Centres

Zone	No	Centres
NHZ	3	Almora, Malan, Khudwani
NWPZ	7	IIWBR-Karnal, CSSRI-Karnal, Jammu, Hisar, Pantnagar, Ludhiana, Durgapura
NEPZ	8	Ayodhya, Kanpur, Sabour, RPCAU-Pusa, Ranchi, Coochbehar, Kalyani, IARI-Hazaribagh
CZ	11	Indore, Gwalior, Jabalpur, Udaipur, Vijapur, Bilaspur, Junagadh, Lok-Bharti, Powarkheda, Mandor, Sagar
PZ	5	Pune, Dharwad, Akola, Niphad, Parbhani
Total	34	

Details of entries & Checks

NGSN consists latest released/identified varieties, genetic stocks, confirmed elite lines from national nurseries, proven elite lines (with 3 years testing and/or published information)	
Contributing Centres	Dharwad, IARI-New-Delhi, IIWBR-Karnal, PAU-Ludhiana, CCHAU-Hisar, Vijapur, BARC, Pantnagar, NBPGR-New-Delhi
Checks	Total=04: Sonalika, HD 2967, DBW 187, HI 8713 (d)
Total	100 (96+4)

Experimental details

Design	: Augmented Block Design
Plot size	: 02 row plot of 2.5m length spaced at 20cm apart (1.0 m ²)
Fertilizer dose	: As recommended
Time of sowing	: NWPZ/NEPZ: November 1-15; CZ / PZ: November 5-20
Seed requirement	: 750g seed each entry; 2.0 kg check varieties

Observations: Grain yield/plot (g), days to heading, days to maturity, plant height, tillers/m row, 1000 grains weight, rusts, leaf blight, powdery mildew, loose smut, other diseases (artificial epiphytotic conditions)

Utilization report: 1. As donor in hybridization 2. Direct selection 3. Germplasm enrichment (trait)

26th SEGREGATING STOCK NURSERY (SSN)

Conducting Centres

Zone	No.	Centres
NHZ	3	Khudwani, Wadura, Almora
NWPZ	4	Jammu, Hisar, Pantnagar, Durgapura
NEPZ	4	Ayodhya, Kalyani, Ranchi, Sabour,
CZ	9	Bilaspur, Durgapura, Jabalpur, Udaipur, Lok-Bharati, Junagadh, Powarkheda, Mandor, Sagar
PZ	5	Akola, Parbhani, Pune, Dharwad, Niphad
Total	25	

Details of cross combinations

Contributing Centres	No. of crosses	Priority trait(s)
IIWBR Karnal	50	Yellow rust, spot blotch, quality, abiotic stress, pre-breeding
IARI, Delhi	50	Yield, adaptation, pre-breeding, quality, leaf rust, stem rust
Ludhiana	30	Yellow rust, quality, adaptation, KB, pre-breeding
Hisar	20	Leaf rust, drought, heat, adaptation
Pantnagar	20	Yellow rust, leaf rust, heat, KB, quality
Almora	10	Winter x spring
Pune	10	Stem rust, quality, heat, drought, pre-breeding
Vijapur	10	Heat, short duration, bold grain, quality
Total	200	

Experimental details

Design	: Augmented Block Design
Plot size	: 4 row plot of 2.5 m length spaced at 20cm apart
Fertilizer dose	: As recommended for the centre
Time of sowing	: NHZ / NWPZ / NEPZ (November 1-15); CZ / PZ (November 5-20);
Seed requirement	: 250g seed for each cross combination

Utilization Report: No. of cross combinations / plants selected (Selected / preferred traits).

INTERNATIONAL TRIALS & NURSERIES (2022-23)

CIMMYT

Trial /Nursery	Sets	Cooperating centres
43 nd ESWYT	15	Ludhiana, Hisar, Indore, Pantnagar, Jabalpur, Powarkheda, Niphad, Dharwad, Karnal, Delhi, Gwalior, Kanpur, RAU(Pusa), Vijapur, Parbhani
30 th HRWYT	2	Karnal, Shillongani
21 st HTWYT	21	Ludhiana, Hisar, Indore, Pune, Jabalpur, Vijapur, Karnal, Powarkheda, Bilaspur, Niphad, Dharwad, Ayodhya, Delhi, Durgapura, Varanasi, Kanpur, Udaipur, Junagadh, Wellington, Kalyani, Pusa (Bihar)
30 th SAWYT	19	Ludhiana, Hisar, Indore, Pantnagar, Jabalpur, Vijapur, Powarkheda, Bilaspur, Niphad, Dharwad, Ayodhya, Ranchi, Karnal, Delhi, Durgapura, Varanasi, Kanpur, Parbhani, CSSRI (Karnal)
10 th WYCYT	6	Ludhiana, Pantnagar, Dharwad, Karnal, Delhi, Malan
12 th SATYN	5	Ludhiana, Dharwad, Karnal, Delhi, Indore
4 th CWEN	3	Ludhiana, Delhi, Karnal
55 th IBWSN	19	Ludhiana, Hisar, Indore, Pantnagar, Ayodhya, Wellington, Karnal, Delhi, Durgapura, IARI-Pusa, Coochbehar, Varanasi, Jammu, Malan, Gwalior, Vijapur, Bilaspur, Kalyani, CSSRI (Karnal)
33 nd HRWSN	3	Wellington, Karnal, Shillongani
40 th SAWSN	18	Ludhiana, Pune, Hisar, Jabalpur, Powarkheda, Junagadh, Bilaspur, Niphad, Dharwad, Sabour, Ayodhya, Ranchi, Karnal, Delhi, Durgapura, Kanpur, RAU (Pusa), Vijapur
17 th STEMRSN	4	Karnal, Mahabaleshwar, Wellington, Delhi
14 th HLBSN	8	Karnal (2 set), Ayodhya, Varanasi, Sabour, Coochbehar, Delhi, RAU (Pusa)
24 th KBSN	5	Karnal (2 sets), Hisar, Ludhiana (2 sets), Pantnagar
3 rd IYPTE	5	Karnal, Ludhiana, Indore, Delhi, Vijapur
2 nd EDPIE	2	Pune, Karnal
54 th IDYN	8	Ludhiana, Pune, Niphad, Indore, Vijapur, Dharwad, Karnal, Hisar
54 th IDSN	5	Ludhiana, Pune, Niphad, Indore, Karnal

ICARDA Trials/Nurseries

SN	Trial /Nursery	Number of sets	Cooperating centres
1	23 rd ESBWYT	5	Karnal, Pantnagar, Kalyani, Jabalpur, Kanpur
2	23 rd SBWON-HT	5	Karnal, Hisar, Jammu Dharwad, Pune
3	46 th IDYT	4	Karnal, Indore, Vijapur, Dharwad
4	46 th IDON	1	Karnal

**Breeder Seed Allocation
DAC Breeder Seed Indent Allocation for 2022-23**

Year of indent: 2022-23 (for use during 2023-24)

Crop: Wheat

Production Centre	Variety	Year of release	DAFW Indent	Breeder seed	Indenting Agency	Nucleus seed
1) ARI , Pune (MH)	MACS 6222	2010	50.40	50.40	MH 50.NSAI 0.40	2.00
	MACS 6478	2014	12.00	12.00	MH 12	1.50
	MACS-4028 (d)	2018	1.50	1.50	KK 1.50	1.00
	Total			63.90		5.50
2) BAU, Sabour, Bihar	Sabour Nirjal	2017	100.00	100.00	BI 100	2.50
	Sabour Samriddhi	2017	50.00	50.00	BI 50	1.50
	Sabour Shreshtha (BRW 934)	2017	50.00	50.00	BI 50	1.50
	Total			200.00		5.50
3) BISA Jabalpur (MP)	DBW 110	2015	69.00	69.00	CG 20, MP45, NSAI 4.0	2.00
	DDW 47	2020	100.00	90.00	MP90	2.50
	Total			159.00		4.50
4) BISA Ludhiana (Pb)	DBW 187 (Karan Vandana)	2021	1352.20	162.00	HIL2, HP30, KCO44, IFFCO20, IFFDC 23, NAFED10, KVSSL10, NFL23,	4.00
	DBW 303 (Karan Vaishnavi)	2021	1414.40	310.00	HIL2, HR20, JK20, KCO40, IFFCO100, IFFDC40, NAFED8, KVSSL50, NFL30,	6.00
	Karan Narendra (DBW 222)	2020	730.20	167.60	HIL1, HR40, HP20,, KCO24.60, IFFDC18, NAFED4, KVSSL 10, NFL 25, UK 25	3.00
	DBW 296 (Karan Aishwarya)	2021	121.00	71.00	HR10, JK20, NAFED2, NSC5, RJ30, NASI4,	2.00
	Total			710.60		15.00
5) Director Research, BUAT, Banda	DDW 47	2020	100.00	10.0	UP 10	1.00
	DBW 187 (Karan Vandana)	2021	1368.20	100.00	UP 100	1.00
	Total			110.00		2.00
6) BISA Pusa (Bihar)	DBW 187 (Karan Vandana)	2021	1352.20	211.00	BI200, JH5, WB6	2.50
	Karan Narendra (DBW 222)	2020	719.20	60.00	UP 60	1.50
	HD 2967	2014	643.10	100.00	IFFDC60, KVSSL 10, NSC20, WB 10	4.00
	Total			371.00		8.00
7) CCS HAU Hisar-125 004.	WH 1105	2013	44.60	44.60	IFFDC 1, NSAI 43.60	1.50
	WH 1124	2014	19.00	19.00	HR 3, NSAI 16	1.50
	WH 1270	2021	447.00	447.00	HR 10, KCO 2, IFFDC 5, KVSSL 5, NFL 3, NSC 100, RJ 30, NSAI 42, UP 250	10.00

	WH 711	2002	44.80	44.80	NSAI 44.80	1.50
	WH-147	1980	19.00	19.00	NSAI 19,	1.00
	WH-283	1985	12.80	12.80	NSAI 12.8	1.00
	C-306	1978	17.40	17.40	NSAI 14.40	1.00
	DBWH 221 (DBW 221)	2021	8.00	8.00	NAFED 2.0, KVSSL 5.0, NSAI 1.0	1.50
	Total			612.60		19.00
8) CSAUA&T Kanpur	K-1317	2018	6.00	6.00	HIL2, JH2, NSC2	1.00
	K-7903	2001	6.00	6.00	NSAI 6	0.50
	K-9423 (Unnat Halna)	2005	2.00	2.00	NSAI 2	0.50
	Total			14.00		2.00
9) GBPUAT Pantnagar (UK)	UP 2784	2016	20.00	20.00	HP 20	1.50
	UP 2938	2021	2.00	2.00	UK 2	1.50
	Total		22.00		3.00	
10) SPU, IARI, New Delhi	HD 2967	2014	643.10	443.10	CG 25, HIL 5, KCO 23.20, NSAI 327.90, UP 25, , NFL 37,	10.00
	HD 3237	2019	30.40	30.40	NSAI 5.40, UP 25	1.0
	HD 3293	2021	112.00	112.00	BI 100, NSAI 2, UP 10	2.50
	HD 3298	2021	138.00	138.00	HR2, IFFCO50, NSC 25, NSAI 11, UP 50	4.00
	Pusa Gautami (HD 3086)	2020	488.10	488.10	HIL 10, HP 50, JK 5, KCO 10, IFFCO 50, IFFDC 15, NFL 13, NSC 45, PB 7, NSAI 217.10, UP 50, WB 1	10.00
	Pusa Wheat 3271 (HD 3271)	2020	42.00	42.00	NSAI2, UP40	2.00
	Total			1253.6		29.50
11) IARI-RS, Indore (MP)	HI 1633 (Pusa Vani)	2021	5.40	5.40	MH 2, NSAI 3.4	1.50
	HI 1634 (Pusa Ahilya)	2021	328.40	328.40	GC20, KCO 8, MP 210, NAFED5, NFL 6, NSC 5, RJ20, NSAI 4.4, UP 50	12.00
	Pusa Vakula (HI 1636)	2021	17.00	17.00	NFL 7, RJ 10,	1.00
	HI 8759 (PUSA TEJAS)	2017	598.80	598.80	CG45, MP 469, NSC 6, KCO 10, NSAI 34.80, IFFDC 4, NFL 10, UP 20	15.00
	Purna(HI-1544)	2008	97.20	97.20	CG50, IFFDC4, MH8, NFL10, NSC5, NSAI20.20	4.00
	Pusa Anmol (HI 8737)	2015	201.00	201.00	CG30, MP165, NSC2, NASI4	5.00
	Pusa Malwi (HD 4728)	2016	159.00	159.00	MP155, NAFED2, NSAI2	4.00
	Pusa Prabhat (HI 8823)	2021	7.00	7.00	KCO7	1.00
	Pusa Wheat 8777 (HI 8777)	2018	23.50	23.50	CG20, KK1.50, NSC2	2.00
	Total			1437.3		32.00
12) IARI RS Karnal	HD-2851 (Pusa Vishesh)	2005	117.20	117.20	KCO 4, IFFDC 5.0, NAFED 2, NSC 15, NSAI 91.20	3.00

	PUSA YASHASVI (HD 3226)	2019	769.80	769.80	HP40, JK 20, KCO 8.60, NAFED 4.80, KVSSL10, NSC75, UK20, IFFCO150, IFFDC2, UP350, RJ 40, NSAI 49.4	4.00
	HI 1628	2020	4.00	4.00	NSC4	1.00
	HI 1621	2020	22.00	22.00	NSAI 2, UP 20	2.00
	HI-1620	2019	2.00	2.00	NSAI 2	1.00
	HS-542	2015	80.00	80.00	HP 80	2.00
	Total			995.00		13.00
13) IARI RS Pusa, (Bihar)	Pusa Wheat 3249 (HD 3249)	2020	148.00	148.00	BI100, NSC5, NASI3, UP40	4.00
	HI-1612	2018	100.00	100.00	BI 100	4.00
	HD 3171	2017	102.00	102.00	BI100, NSAI2	3.00
	HD 3237	2019	25.00	25.00	NSC 25	1.00
	Total			375.00		12.00
14) IGKVV Raipur (Chhatish.)	CG 1023	2021	60.00	60.00	CG60,	1.50
	CG 1018	2019	50.00	50.00	CG50	1.50
	CG-1013	2018	25.00	25.00	CG25	1.00
	CG 1015	2018	50.00	50.00	CG50	1.00
	Kanishka (CG 1029)	2021	254.00	254.00	CG50, MP 204	5.00
	Ratan (CG 5016)	2009	50.00	50.00	CG50	3.00
	Total			489.00		13.00
15) ICAR- IISS, Mau	DBW 252	2020	113.20	12.20	KCO1.2, NSAI1, UP10	1.00
	DBW 187	2021	1368.20	100.00	UP 100	3.00
	DBW 222	2020	730.20	100.00	UP 100	3.00
	HD 2967	2014	643.10	100.00	IFFCO 100	3.00
	Total			312.20		10.00
16) ICAR- IIWBR, Karnal	DBW 187 (Karan Vandana)	2021	1352.20	654.20	HR20 NSC 130, PB6.20, NSAI178, UP 300, UK20	20.00
	DBW 296	2021	121.00	50.00	UP50	5.00
	DBW 303 (Karan Vaishnavi)	2021	1414.40	984.40	NSC150, PB6, RJ100, NSAI 198.40, UP 505, UK 25	20.00
	DBW 327 (Karan Shivani)	2021	346.40	346.40	HR40, JK20, IFFDC4, NAFED2, NFL10, PB2.4, RJ40, NSAI22, UP200, UK6	15.00
	Karan Aditya (DBW 332)	2021	154.60	154.60	HR40, JK20, NAFED2, NSC5, PB2.4, RJ30, NASI15.20, UP40,	15.00
	Karan Narendra (DBW 222)	2020	730.20	442.60	NSC 120, PB 4, RJ 40, NSAI 148.60, UP 130,	10.00
	Total			2632.20		85.00
17) JAU Junagarh	GW-366	2007	50.00	50.00	CG 50	2.00
	GW-463	2017	10.80	10.80	CG 10, NSAI 0.8	1.00
	Total			60.80		3.00
18) JNKVV Jabalpur (MP)	MP 3336 (JW 3336)	2013	5.00	5.00	NSAi 5.0	1.00
	MP 3382(JW 3382)	2016	461.00	461.00	CG 40, MP 411, NSAI 10	12.00
	MP 3465 (JW 3465)	2021	292.00	292.00	MP284, NSAI 8	8.00
	MPO 1255 (MPO(JW)1255)	2016	36.00	36.00	MP36	2.00
	JW-3288	2012	20.00	20.00	MP 20	1.00
	Total			814.00		24.00

19) Lokbharti Sanosara	LOK-1	1982	174.40	174.40	IFFDC5, MH100, NFL10, NSC15, NSAI44.40	7.00
	Total			174.40		7.00
20) MPKV Niphad-	NIAW-1415)	2011	2.00	2.00	MH 2	1.00
	NIDW 1149 (Durum)	2021	10.00	10.00	KVSSL 10	2.00
	NIAW-3624)		2.00	2.00	MH2	1.00
	NIAW-1994)	2016	50.00	50.00	MH45, NSC5	2.00
	Total			64.00		6.00
21) PAU Ludhiana	PBW 1Zn (HPBW 01)	2017	62.80	62.80	PB10, NASI0.80, UP50, UK2	2.00
	PBW 803	2021	23.20	23.20	PB10, NSAI 13.20	2.00
	PBW 644	2012	10.00	10.00	JK 10	3.00
	PBW 677	2016	112.40	112.40	HP35, NSC2, PB40, NSAI35.40	2.00
	PBW 752	2019	31.80	31.80	NSC4, PB5, NASI2.80, UP20	2.00
	PBW 757	2019	27.00	27.00	PB5, NSAI2, UP20	1.50
	PBW 766	2021	27.40	27.40	PB20, NASI7.40	1.50
	PBW 771	2020	16.00	16.00	NSC4, PB2, UP 10	1.00
	PBW 824	2021	30.60	30.60	PB20, NASI10.60	8.00
	PBW 869	2021	42.80	42.80	PB20, NSAI22.80	3.00
	PBW Chapati 1	2022	10.00	10.00	PB10	2.00
	PBW-154	1988	30.60	30.60	IFFDC5, NFL9, NSC2, NSAI14.60	1.50
	PBW-502	2004	19.80	19.80	NFL2, NSAI 17.80	2.00
	PBW-550	2008	21.35	21.35	NSC2, NSAI19.35	1.50
	PBW-725	2017	124.40	124.40	JK25, IFFDC2, KVSSL5, NSC5, PB40, NSAI47.40	5.00
Total			590.15		38.00	
22) PDKV, Akola	AKAW-4210-6	2016	12.00	12.00	MH12	0.50
	WSM 1472	2012	0.40	0.40	MH 0.40	1.00
	Total			12.40		1.50
23) RARI, SKNAU, Durgapura, Jaipur (Raj.)	RAJ 4037	2014	194.40	194.40	KCO6, IFFDC27, NFL15, NSC55, RJ50 NSAI41.40	5.00
	RAJ-1482	1983	32.00	32.00	IFFDC5, NSC5, NSAI22	1.50
	RAJ-3077	1989	26.80	26.80	NSC2, NSAI 24.80	1.00
	RAJ-3765	1996	26.20	26.20	NSC5, NSAI 21.20	1.00
	RAJ-4079	2011	12.00	12.00	IFFDC 12	1.50
	RAJ-4238	2016	429.40	429.40	CG 40, IFFDC 5, MP 35, NFL 5, NSC 15, RJ 325, NSAI 4.4	8.00
	Total			720.80		18.00
24) SDAU Vijapur Mehasana (Gujarat).	GW-322	2002	35.20	35.20	IFFDC 4, NFL 5, NSC 10, NSAI 16.2	1.50
	GW-496	1990	111.00	111.00	MH 88, NSC 8., NSAI 15	3.00
	GW 273	1998	15.00	15.00	IFFDC 2, NSC 2, NSAI 11	1.00
	GW 451	2016	75.60	75.60	CG 40, IFFDC 2, NSC 25, NSAI 8.60	3.00
	GW 499	2021	20.60	20.60	CG 20, NSAI 0.6	2.00
	GW 513	2021	12.00	12.00	NSC 10, NSAI 2	2.00
	Total			269.40		12.50
25) SKUAST, Jammu	DBW 173	2018	76.20	15.0	JK15	1.00
	WB 02	2021	169.00	19.00	HP 4, JK 15	1.00

	(Rajendra Genhu-3)					
	DBW 187	2021	1368.20	25.0	JK 25	1.00
	DBW 222	2020	730.20	20.00	JK20	1.00
	DBW 303	2021	1414.40	20.00	JK20	1.00
	(Karan Vaishnavi)					
	Total			99.00		5.00
26) RVSKVV, Gwalior (MP)	DBW 303	2021	1414.40	100.00	UP 100	3.00
	DBW 187	2021	1352.20	100.00	UP 100	3.00
	Total			200.00		6.00
27) SKUAST, Srinagar	SKW-355	2015	20.00	20.00	JK 20	1.50
	Total			20.00		1.50
28) SVPUA&T Meerut	DBW 173	2018	76.20	61.20	NSC (5.0), NSAI (6.20), UP (50)	2.00
	DBW-17	2007	18.80	18.80	NSAI 18.8	1.00
	WB 02	2021	169.00	50.00	UP 50	2.00
	(Rajendra Genhu-3)					
	Total			130.00		5.00
29) Special Officer (Seeds), UAS , Dharwad	DBW 168	2018	10.00	10.00	KK (2.0), MH (8.0)	1.00
	DBW-93	2015	2.00	2.00	MH 2.0	0.50
	DDW 48 (Durum)	2021	2.00	2.00	NSC 2.0	1.00
	DWR-162	1993	20.90	20.90	KK 18.90, NSC 2	1.00
	UAS 347	2015	1.50	1.50	KK 1.5	0.50
	UAS-304	2013	6.00	6.00	KK 6	0.50
	UAS-334	2018	1.50	1.50	KK 1.5	1.00
	UAS-375	2018	3.50	3.50	KK 1.5, NFL 2.0	1.00
	Total			47.40		6.50
30) VPKAS Almora.	(VL 967) VL Gehun 967	2019	36.00	36.00	NSC (6.0) UK (30.0)	1.50
	VL 2015	2021	5.00	5.00	UK 5	1.00
	VL 953	2016	15.00	15.00	UK 15	1.00
	Total			56.00		3.50
31) RPCAU, Dholi, Muzaffarpur Bihar	DBW 107	2015	11.00	11.00	JH5, NSC2, NSAI2, WB2	1.00
	KARAN SHRIYA (DBW 252)	2020	113.20	113.20	BI100, KCO1.20, NSAI1, UP10, WB1	3.00
	WB 02	2021	169.00	100.00	BI 100	4.00
	(Rajendra Genhu-3)					
	Total			224.20		8.00
	Grand Total		13862.75	13239.95		423.00

Year of indent: 2022-23 (for use during 2023-24)

Crop: Barley

Production Centre	Variety	Year of release	DAFW Indent	Breeder seed	Indenting Agencies	Nucleus seed
1) IAS, BHU Varanasi (UP)	Mahamana 113 (HUB 113)	2014	40.0	40.0	UP 40	2.00
	Total			40.0		2.00
2) CCS HAU Hisar	BH 946	2014	2.0	2.0	NSAI 2	0.50
	BH 959	2015	7.0	7.0	NSC 5, NSAI 2	0.50
	BH-393	2002	32.15	32.15	NSAI 32.2	1.00
	BH-902	2010	2.0	2.0	NSC 2	0.50
	Total			43.15		2.50
3) CSAUA&T Kanpur	K-1055 (Prakhar)	2018	26.0	26.0	NSC 5, NSAI 1, UP 20	1.00
	KB- 1425 (Azad Barley- 33)	2021	22.0	22.0	NSC 2, UP 20	1.00
	Total			48.00		2.00
4) ICAR-IIWBR Karnal	Central Barley DWRB123 (DWRB 123)	2017	8.0	8.00	NAFED 2, KVSSL 5, NSC 1	1.00
	Central Barley DWRB-137	2018	113.30	73.30	HR 0.30, MP8, KVSSL5, RJ 60,	2.00
	DWRB 182	2021	7.0	7.0	NAFED 2, KVSSL 5	1.00
	Karan Maltsona (DWRB 160)	2020	12.0	12.00	NAFED6, KVSSL 5, NSC 1	1.50
	Total			100.30		5.50
5) BUAT, Banda	DWRB 137	2018	113.30	40.00	UP 40	2.00
	Total			40.00		2.00
6) HPKV, Palampur	Him Palam Jau-1 (HBL 713)	2020	1.5	1.50	NSC 1 HP 0.50	1.00
	Total			1.50		1.00
7) PAU Ludhiana	PL 891	2020	5.0	5.00	NSC 2, PB 2, NSAI 1	1.00
	PL-426	1996	13.9	13.90	PB 2, NSAI 11.90	1.00
	Total			18.90		2.00
8) SKNAU, Durgapura, Jaipur	RD 2786	2013	3.0	3.0	IFFDC 3	0.50
	RD 2899	2018	112.0	112.0	KVSSL5, NSC5, RJ100, NSAI2	3.00
	RD 2907	2018	37.0	37.0	NAFED 2, NSC 5, RJ 30	2.50
	RD 2035	1994	17.4	17.40	IFFDC3, NSC10, NSAI4.4	1.00
	RD 2052	1991	3.6	3.60	NSAI3.6	0.50
	RD 2715	2009	20.00	20.00	NDDB 20	2.00
	RD-2794	2016	16.0	16.00	IFFDC3, NAFED2, NSC1	1.00
	RD2849	2016	4.0	4.00	NSC2, NSAI2	1.00
	Total			213.00		11.50
9) Director VPKAS	VL Jau 118 (VLB 118)	2014	5.0	5.00	KVSSL5	0.50
	VLB 130	2019	1.0	1.00	UK 1	0.50
	Total			6.00		1.00
Grand Total			511.15	510.85		29.50

Research Plan

Resource Management

At the outset, after welcoming the participants Dr S C Tripathi, PI Resource Management Programme stressed that in addition to conduct of the allotted trials, the data reporting must be done carefully, sincerely and strictly as per the technical programme. It was followed by the critical review of the results of the trials conducted by the resource management group and the recommendations were finalised. Subsequently, the trials on genotype evaluation were formulated based on inputs received from PI (Crop Improvement) and it was decided to modify further as per the revised inputs, if any, received from the breeding group. Thereafter, detailed discussions were held in which members of the group actively participated. Based on the discussions, the group decided to conclude seven special coordinated trials and continue five ongoing trials with minor modifications in SPL-5, the details of which are given below;

- The following eight co-ordinated varietal evaluation trials were formulated based on the entries received from the breeding group.
 - Varietal evaluation trial at two dates of sowing (Timely and Late) under irrigated conditions (IR-TS-DOS-TAS) in North Western Plains Zone
 - Varietal evaluation trials under restricted irrigation (Zero, One and Two) conditions (RIR-TS-TAS) in North Western Plains Zone.
 - Varietal evaluation trial at two dates of sowing (Timely and Late) under irrigated conditions (IR-TS-DOS-TAS) in North Eastern Plains Zone
 - Varietal evaluation trial at two dates of sowing (Timely and Late) under irrigated conditions (IR-TS-DOS-TAS) in Central Zone
 - Varietal evaluation trials under restricted irrigation (Zero, One and Two) conditions (RIR-TS-TAS) in Central Zone.
 - Varietal evaluation trial at two dates of sowing (Timely and Late) under irrigated conditions (IR-TS-DOS-TAS) in Peninsular Zone
 - Varietal evaluation trials under restricted irrigation (Zero, One and Two) conditions (RIR-TS-TAS) in Peninsular Zone
 - Evaluation of wheat genotypes under high fertility conditions (SPL-HYPT-IR-ES-TAS-CZ) in Central Zone.

Coordinated trial details are as under

Entry/Zones/Trials	Checks	Locations
IR-TS-DOS-TAS - North Western Plains Zone		
HD3386	DBW187, DBW222, HD3086, HD2967, PBW 826 (I)	Agra, Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar, Sriganaganagar
RIR-TS-TAS- North Western Plains Zone		
WH1402	PBW644, NIAW3170, DBW296 HD3369(I), HI1653(I), HI1654(I)	Agra, Delhi, Durgapura, Gurdaspur, Hisar, Jammu, Karnal, Ludhiana, Pantnagar, Sriganaganagar
IR-TS-DOS-TAS - North Eastern Plains Zone		
HD3388	HD3249, DBW187, HD3086, HD2967, DBW222, PBW826(I)	Ayodhya, Coochbehar, Kalyani, Kanpur, Ranchi, RPCAU Pusa, Sabour, Shillongani, Varanasi
IR-TS-DOS-TAD – Central Zone		
NWS2194, GW547	GW322, GW513, HI1636, HI1650(I), MACS6768(I)	Bilaspur, Gwalior, Indore, Jabalpur, Junagarh, Powarkheda, Udaipur, Vijapur

RIR-TS-TAD – Central Zone		
CG1040, DBW359	MP3288, DBW110, CG1036(I), HI1655(I)	Bilaspur, Gwalior, Indore, Jabalpur, Powarkheda, Udaipur,
IR-TS-DOS-TAD – Peninsular Zone		
MP1378	MACS3949(d), HI8826(d)(I), MACS4100(d)(I), MACS6222, GW322	Akola, Dharwad, Niphad, Pune
RIR-TS-TAD – Peninsular Zone		
UAS478(d), HI8840(d), HI1665, DBW359, NIAW4028	HI1605, NIAW3170, UAS446(d), NIDW1149(d)	Akola, Dharwad, Niphad, Pune
SPL-HYPT-IR-ES-TAS-CZ		
DBW377	DBW187, DBW303, GW322	Powarkheda, BISA-Jabalpur, Jabalpur, Vijapur, Udaipur

Note: Varieties recommended by VIC have been included as identified checks in respective trial(s).

- The group decided to conclude the following seven special trials and come out with recommendations of repeated experiments.

SPL-2: Effect of seaweed extract on growth and yield of wheat.

SPL-5: Lodging management for enhancing yield in *dicoccum* wheat using potential plant growth regulator.

SPL-6: Resource conservation techniques for enhancing the productivity and resource-use efficiency of soybean-wheat cropping system.

SPL-7: Precision nutrient management for higher yield in wheat through fertigation.

SPL-8: Effect of foliar K application for improving wheat yield and water productivity under restricted irrigation condition.

SPL-11 Effect of Silica foliar (KSi) application for improving wheat yield and productivity under restricted irrigation condition (PZ)

SPL-12 Effect of N, P and K solubilizing microbial (Rhizosphere) consortium on productivity of wheat under irrigated condition (PZ)

- The group decided that the following five special trials will be continued during the 2022-23 crop season.

Special Trials (2022-23)

Trials	Titles	Locations
SPL-1	Efficacy of herbicides against diverse weed flora of wheat (continue...)	Ayodhya, Bajaura, Bilaspur, Dharwad, Durgapura, Gurdaspur, Hisar, Indore, Jabalpur, Jammu, Khudwani, Ludhiana, Malan, Powarkheda, Pune, Ranchi, RPCAU Pusa, Shillongani, Udaipur
SPL-2	Effect of nano urea on increasing N use efficiency and productivity of wheat under irrigated condition (continue...)	Akola, Almora, Bilaspur, Burdwan, Coochbehar, Delhi, Dharwad, Durgapura, Gurdaspur, Gwalior, Hisar, Indore, Jabalpur, Jammu, Junagarh, Karnal, Ludhiana, Niphad, Pantnagar, Powarkheda, Pune, Ranchi, Sabour, Varanasi, Vijapur

SPL-3	Effect of nano urea on increasing N use efficiency and productivity of wheat under restricted irrigation condition (continue...)	Bajaura, Malan, Dhandhuka, Gwalior, Hisar, Karnal, Malan, Pantnagar, Ayodhya, Burdwan, Kanpur, RPCAU Pusa, Shillongani, Indore, Udaipur, Vijapur
SPL-4	Agronomic interventions for quality enhancement in wheat varieties across different wheat growing zones (continue...)	Gurdaspur, Hisar, Kanpur, Ludhiana, Pantnagar, Vijapur
SPL-5	Effect of bio NPK and bio Grow solubilizing microbial (Rhizosphere) consortium on productivity of wheat under irrigated condition	Gurdaspur, Hisar, IARI Pusa, Indore, Jammu, Junagarh, Ludhiana, Pune, RPCAU Pusa, Shimla, Varanasi, Vijapur

The SPL-5 trial was modified with inclusion of bio Grow treatments and it will be supplied by ICAR-NBAIM, Mau, Uttar Pradesh.

Work Plan of Social science

- During the Rabi season 2022-23, the wheat and barley frontline demonstrations (FLDs) will be conducted and coordinated as per the approval of the Ministry of Agriculture and Farmers' Welfare, GOI, New Delhi in different zones. The Wheat demonstrations will be conducted under SCSP programme.

The Resource Management and Social Sciences groups after thorough deliberations arrived at the following recommendations;

Recommendations

1. Sea weed extract as seed treatment @ 3 ml/kg followed by two foliar sprays @ 1.6 litres in 400 litres of water per hectare at tillering and jointing stage is recommended for improving the wheat productivity across the zones.
2. Foliar application of Cycocel (CCC) @ 600 ml in 400 litres of water per hectare at 50 DAS is recommended to reduce lodging and improve productivity of *dicoccum* wheat in PZ.

At the end of the session, Dr S C Tripathi, on behalf of the ICAR-IIWBR and RVSKVV, Gwalior(MP) thanked all the participants for valuable suggestions.

Research Plan-Crop Protection

Date: 12.08.2022

Time: 11.00 – 13.00 hrs

Venue: Virtual platform

Chairman: Dr. G. P. Singh, Director, ICAR-IIWBR, Karnal

Co-Chairman: Dr. Sudheer Kumar, PI, Crop Protection, ICAR-IIWBR, Karnal

Rapporteurs: Dr. P.L. Kashyap and Dr. Ravindra Kumar, Crop Protection, ICAR-IIWBR, Karnal

The research plan meeting of All India Coordinated Research Projects on Wheat and Barley (AICRPW&B) crop protection (2022-23) was held on 12th August, 2022 at VS Mathur Hall, ICAR-IIWBR, Karnal through online zoom platform. The meeting was chaired by Dr. G.P. Singh, Director, ICAR-IIWBR, Karnal and co-chaired by Dr. Sudheer Kumar, Principal Investigator (PI), Crop Protection. PI, Crop Protection welcomed the chairman and other participants attending the meeting. The meeting was started with the welcome address by chairman. He appreciated the efforts of crop protection team for untiring efforts made by them in securing the wheat crop from diseases and pest. Further, he also expressed his satisfaction and appreciated that due to effective survey and surveillance, racial status of rusts and its use in resistance screening, advisories lead to no major disease and pest outbreak in the country since decades. Besides this, he also showed his concerns to the frequent transfer of AICRP scientists at collaborative centers which adversely affected the programme.

The major achievements and work done by crop protection group during the crop season 2021-22 and work plan for year 2022-23 was made by Dr. Sudheer Kumar. The trial conduction was very good with almost 100%. However, the data of some centers were not included due to very low/ erratic disease development specially leaf rust due to sudden temperature raise in month of Feb. 2022 during the cropping season. Some of the nurseries have not been screened at Kalyani center due to heavy rain and thereon water stagnation in the field. During the discussion, it was decided that screening of LBSN would not be in central zone centers and also in Ranchi because there is only one nursery. It was discussed that the EPPSN and MDSN should be merged and should be form single nursery as EMDSN because of less practicability of keeping two separate nurseries.

It was also discussed that survey and surveillance is an important activity and will be done by all the centers in their jurisdiction area. Further emphasis has been given to collect and send the wheat leaf samples immediately after the appearance of rust disease under natural conditions to IIWBR, Regional Station, Flowerdale, Shimla and samples of other diseases to PI, Crop Protection, IIWBR, Karnal. Similarly, all the centers will collect the seed samples from grain markets, analyzed and submit the report to the PI, Crop Protection. One trial on chemical control of powdery was concluded last season, and remaining trials on chemical management will be continued.

The entomological trials were also discussed and suggested that the new trials initiated during last year will be continued. Data of insect resistance from few centres were not included in the report owing to the low infestation of the insects. Therefore, the centres were advised to build of proper infestation load by artificially releasing the insect population into the border rows of highly susceptible check entries.

In the nematology experiments, survey, screening and management of CCN will be continued at both the centers. While discussion it was noticed that many new scientists have joined the crop protection, therefore, need was felt to organize training course on crop protection trial conductance, uniform diseases/pest recording and reporting to improve the accuracy and efficiency.

The work plan was again discussed during the workshop on 30.8.2022 and further refined and changes proposed have been included in the crop protection work plan 2022-23. The meeting was ended with a vote of thanks to chair.

PROGRAMME OF WORK CROP PROTECTION 2022-23

The work plan for the crop year 2022-23 which is finalized in the 61st All India Wheat and Barley Research Workers Meet held during August 29-31, 2022 at RVSKV, Gwalior, Madhya Pradesh. The various activities to be executed at respective centres are given below:

PROGRAMME 1: Host resistance - IPPSN and PPSN

Adult Plant Resistance for rusts & other diseases

1. Initial Plant Pathological Screening Nursery (IPPSN)

Objectives

To evaluate breeding materials generated at various Centres against rusts and foliar blights for promoting to coordinated multi-location trials. (Under artificial inoculated conditions)

(a) Rusts:

Stripe rust: Malan, Dhaulakuan, Jammu, Gurdaspur, Ludhiana, Karnal, Hisar and Durgapura.

Leaf rust (North): Ludhiana, Karnal, Delhi, Durgapura, Ayodhya, Kanpur, Sabour and Coochbehar.

Leaf rust (South) + Stem rust: Vijapur, Indore, Powarkheda, Niphad, Pune, Mahabaleshwar, Dharwad and Wellington.

(b) Leaf Blight: Ayodhya, Varanasi, RPCAU Pusa, Sabour, Kalyani, Coochbehar, Pune and Dharwad.

2. Plant Pathological Screening Nursery (PPSN)

Objectives

Evaluation of breeding material for promotion of entries from one stage to the other in the coordinated trials and identification of varieties for release after AVT level on the basis of their level of disease resistance.

(a) Rusts:

Stripe rust: Khudwani, Malan, Bajaura, Dhaulakuan, Almora, Jammu, Gurdaspur, Ludhiana, Karnal, Hisar, Delhi, Durgapura and Pantnagar.

Leaf rust (North): Jammu, Ludhiana, Karnal, Hisar, Delhi, Durgapura, Pantnagar, Kanpur, Ayodhya and Kalyani.

Leaf rust (South) and Stem rusts: Junagarh, Vijapur, Indore, Powarkheda, Niphad, Pune, Mahabaleshwar, Dharwad and Wellington.

Note: The samples of leaves of AVT entries and varieties (checks) in PPSN showed resistance in the past but now showing rust severity of 40S or more at any centre, should be sent to the Incharge, IIWBR Regional Station Flowerdale, Shimla for pathotype analysis, with information to P.I. (Crop Protection).

For screening against rusts the mixture of following races will be used and be provided by IIWBR, RS, Flowerdale, Shimla

Rust	Rust pathogen	Pathotypes
Stem/Black	<i>Puccinia graminis tritici</i>	11, 40A, 117-6, 21A-2, 122
Stripe/Yellow	<i>P. striiformis</i>	238S119, 46S119, 110S119, 110S84, T
Leaf/Brown	<i>P. triticina</i>	77-9, 77-5, 104-2, 12-5, 77-1

3. Monitoring of PPSN

The teams of plant pathologists and breeders will be constituted by PI, CP for effective monitoring and data recording in PPSN at various locations in different zones.

4. AUDPC based identification of slow rusters in AVT material:

Stripe rust: Ludhiana, Karnal, Durgapura

Leaf rust: Ayodhya, Mahabaleshwar

Stem rust: Mahabaleshwar, Indore

PROGRAMME 2: Seedling rust resistance and rust gene postulation

1. Race specific adult plant resistance

AVT entries will be screened for adult plant resistance to specific predominant races

a) Stripe, leaf and stem rusts (under controlled conditions): Flowerdale, Shimla

b) Stripe rust – Ludhiana and New Delhi

c) Leaf rust – New Delhi and Ludhiana

d) Black rust (under controlled conditions): Pune, Indore and Mahabaleshwar
Race inoculum to be supplied by RS, IIWBR, Flowerdale and races should be the same for all the respective Centres as follows.

Rust	Rust pathogen	Pathotypes	
		Flowerdale	Other Centres
Stem/Black	<i>P. graminis tritici</i>	11, 40A, 117-6	11, 40A
Stripe/Yellow	<i>P. striiformis</i>	238S119, 46S119, 110S119	238S119, 46S119
Leaf/Brown	<i>P. triticina</i>	77-9, 77-5, 104-2	77-9, 77-5

2. Seedling Resistance Tests (SRT) and postulation of rust resistance genes

(a) Stripe, leaf and stem rusts (All races): IIWBR, Regional Station, Flowerdale, Shimla for AVT's (*T. aestivum*) entries. Flowerdale centre to generate data on rust resistance genes of all the AVT entries.

(b) Leaf and stem rust: Mahabaleshwar for SRT on AVT entries of CZ, PZ and NIVT (durum entries).

PROGRAMME 3: Leaf Blight

Leaf Blight Screening Nursery (LBSN):

This nursery will consist of AVT's entries as well as other resistant entries identified. It will have all the released varieties and material found resistant in preceding years.

Centres: **NWPZ:** Ludhiana, Karnal, Hisar and Pantnagar.

NEPZ: Ayodhya, Varanasi, RPCAU Pusa, Sabour, Kalyani, Coochbehar and Shillongani.

PZ: Pune and Dharwad

PROGRAMME 4: Karnal Bunt

Karnal Bunt Screening Nursery (KBSN):

This nursery will consist of the earlier identified resistant materials, released varieties along with AVT entries under artificially inoculated conditions.

Centres: Malan, Jammu, Ludhiana, Karnal, Hisar, New Delhi, and Pantnagar.

PROGRAMME 5: Loose Smut

Loose Smut Screening Nursery (LSSN): It will contain resistant materials identified in the past released varieties and AVT entries.

Centres: Malan, Almora, Ludhiana, Hisar and Durgapura.

PROGRAMME 6: Powdery Mildew

Powdery Mildew Screening Nursery (PMSN): All entries of AVT, previously identified resistant material and released varieties (NHZ, NWPZ)

Centres: Malan, Dhaulakuan, Almora, Shimla, Jammu, Pantnagar and Wellington

PROGRAMME 7: Region specific diseases

- Flag Smut Screening Nursery:** Ludhiana, Hisar, Delhi and Durgapura.
- Head scab:** Dhaulakuan, Gurdaspur, Delhi and Wellington
- Foot rot:** Dharwad
- Hill bunt:** Malan, Bajaura and Almora (AVT entries NHZ only).

PROGRAMME 8: Crop Health

1. Pre-harvest crop health monitoring

Crop Health Monitoring: Pre harvest surveys

- All the centres associated with crop protection programme will conduct the surveys on regular interval during crop season and will send the information after every survey. During survey, if found any disease, in case of rusts samples should be sent to Incharge, ICAR-IIWBR, RS, Flowerdale, Shimla and other disease P.I. Crop Protection.
- Wheat Crop Health Newsletter will be issued on monthly basis by PI (CP) IIWBR, Karnal, during the crop season. Information on off season surveys will be included in first issue.

Monitoring the pathotype distribution of rust pathogens: It will be undertaken by IIWBR, Regional Station, Flowerdale, Shimla (all three rusts from all zones) and Rust Research Station, Mahabaleshwar (brown and black rust from CZ and PZ). All the cooperating Centres are required to send the rust infected samples (natural infection) for pathotype analysis to the concerned centres according to recommended protocol.

Wheat Disease Monitoring Nursery (To be co-ordinated by Flowerdale, Shimla): The nursery will be planted at 38 locations including Kudwani (Srinagar), Varanasi KVK, Rampur and Yamunanagar (Haryana). Samples from this nursery should be sent regularly to IIWBR, RS, Flowerdale, Shimla for virulence analysis and information. Information on rust appearance to be provided at monthly intervals, starting from end of December to the P.I. (Crop Protection).

Off-season Disease Monitoring Nursery (To be coordinated by IIWBR Reg. Station, Flowerdale): This nursery will be planted in Dalang Maidan, Kukumseri, Sangla, Sarahan (HP) and Leh (J&K). High altitude varieties and one hullless barley variety will also be included in this nursery. (Inclusion of PBW 757 in place of WL 711)

SAARC- Nursery (To be coordinated by Flowerdale, Shimla): Nursery will be planted at 15 Indian locations, viz, Ludhiana, Delhi, Dhaulakuan, Gurdaspur, Dera-Baba-Nanak, Abohar, Sri Ganganagar, Chattha, Kathua, Rajouri, Almora, Durgapura, Ayodhya, Pantnagar and Wellington.

2. Post-harvest crop health monitoring

Monitoring of Karnal bunt and black point in harvested grains

Post harvest monitoring will be undertaken by all the cooperating centres by analysing samples from grain *mandies* of their respective states.

PROGRAMME 9: Integrated disease management

1. **Elite Multiple Disease Screening Nursery (EMDSN):** It will have sources of resistance to rusts and other diseases found earlier and will revalidate their status to different diseases:

DISEASES

Stripe rust: Kudwani, Malan, Dhaulakuan, Almora, Jammu, Ludhiana, Karnal, Hisar, Delhi, Durgapura and Pantnagar.

Leaf rust (N): Jammu, Ludhiana, Karnal, Hisar, Delhi, Durgapura, Pantnagar, Kanpur, Ayodhya & Kalyani

Leaf rust (S) and Stem rusts: Vijapur, Indore, Powarkheda, Niphad, Pune, Mahabaleshwar, Dharwad and Wellington.

Leaf blights: Ludhiana, Karnal, Pantnagar, Ayodhya, Varanasi, Sabour, Kalyani, Coochbehar, Pune and Dharwad.

Karnal Bunt: Malan, Jammu, Ludhiana, Karnal, Hisar, New Delhi, and Pantnagar.

Loose smut: Malan, Almora, Ludhiana, Hisar and Durgapura.

Powdery mildew: Malan, Dhaulakuan, Almora, Jammu, Pantnagar and Wellington

Flag smut: Ludhiana, Hisar, Delhi and Durgapura

Head scab: Dhulakuan, Gurdaspur and Delhi

Nematodes (CCN): Hisar and Durgapura.

The confirmed sources of resistance will be multiplied and seed will be shared with breeders along with passport data in NGSN.

2. Management of diseases

(a) Chemical management of head scab:

Centres: Gurdaspur, Ludhiana, Karnal and Wellington.

The chemicals will be tested are:

S. No.	Treatments	Doses
1	Picoxystrobin 7.05% + Propiconazole 11.7% SC,	@ 0.1%
2	Pyraclostrobin 133g/l + Epoxiconazole 50g/l SE,	@ 0.1%
3	Tebuconazole 50% + Trifloxystrobin 25% WG,	@ 0.06%
4	Azoxystrobin 18.2% w/w + Cyproconazole 7.3% w/w SC	@ 0.1%
5	Azoxystrobin 18.2% + Difenconazole 11.4% w/w SC	@ 0.1%
6	Azoxystrobin 11% + Tebuconazole 18.3% w/w SC	@ 0.1%
7	Propiconazole	@ 0.1%
8	Tebuconazole	@ 0.1%
9	Control	-

The chemical will be evaluated under artificial inoculated condition and spray will be done at heading stage. Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

(b) Chemical management of leaf rust:

Centres: Ludhiana, Karnal, Durgapura, Pantnagar, Kanpur, Ayodhya, Indore, Powarkheda, Niphad, Mahabaleshwar.

The chemicals will be tested are:

S. No.	Treatments	Doses
1	Picoxystrobin 7.05% + Propiconazole 11.7% SC,	@ 0.1%
2	Pyraclostrobin 133g/l + Epoxiconazole 50g/l SE,	@ 0.1%
3	Tebuconazole 50% + Trifloxystrobin 25% WG,	@ 0.06%
4	Azoxystrobin 18.2% w/w + Cyproconazole 7.3% w/w SC	@ 0.1%
5	Azoxystrobin 18.2% + Difenconazole 11.4% w/w SC	@ 0.1%
6	Azoxystrobin 11% + Tebuconazole 18.3% w/w SC	@ 0.1%
7	Propiconazole	@ 0.1%
8	Tebuconazole	@ 0.1%
9	Control	-

The chemical will be evaluated under artificial inoculated condition and spray will be done on initiation of diseases and repeated once after 15 days. Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

(c) Chemical management of stem rust:

Centres: Vijapur, Indore, Niphad, Pune, Mahabaleshwar, Dharwad and Wellington.

The chemicals will be tested are:

S. No.	Treatments	Doses
1	Picoxystrobin 7.05% + Propiconazole 11.7% SC,	@ 0.1%
2	Pyraclostrobin 133g/l + Epoxiconazole 50g/l SE,	@ 0.1%
3	Tebuconazole 50% + Trifloxystrobin 25% WG,	@ 0.06%
4	Azoxystrobin 18.2% w/w + Cyproconazole 7.3% w/w SC	@ 0.1%
5	Azoxystrobin 18.2% + Difenconazole 11.4% w/w SC	@ 0.1%
6	Azoxystrobin 11% + Tebuconazole 18.3% w/w SC	@ 0.1%
7	Propiconazole	@ 0.1%
8	Tebuconazole	@ 0.1%
9	Control	-

The chemical will be evaluated under artificial inoculated condition and spray will be done on initiation of diseases and repeated once after 15 days. Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

(d) Chemical management of leaf blight

Centres: Karnal, Ayodhya, Sabour, Kalyani, Coochbehar, Pune and Dharwad.

The chemicals will be tested are:

S. No.	Treatments	Dosages
1	Tebuconazole 50% + Trifloxystrobin 25%,	0.06%
2	Propiconazole 13.9% + Difenconazole 13.9%	0.1%
3	Azoxystrobin 12.5% + Tebuconazole 12.5%	0.1%
4	Picoxystrobin 7.05% + Propiconazole 11.7%	0.1%
5	Kresoxim Methyl 44.3% SC	0.1%
6	Propiconazole 25%	0.1%
7	Tebuconazole 25.9%	0.1%
8	Mancozeb 75%	0.2%
9	Control	-

The chemical will be evaluated under artificial inoculated condition and spray will be done on initiation of diseases and repeated once after 15 days. Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

PROGRAMME 10. ENTOMOLOGY

1. **Host plant resistance:** Entomological screening nurseries (ESN), multiple pest screening nurseries (MPSN) and special screening nurseries of promising entries identified during previous season will be evaluated as per following plan.

(a) **Entomological screening nurseries (ESN)-** In these nurseries, AVT entries along with those found resistant during previous years will be screened for

(i) Shoot fly (Centres: Dharwad, Ludhiana, Kanpur, Niphad)

(ii) Brown wheat mite (Centres: Durgapura and Ludhiana)

(iii) Wheat Aphids (Centres: Niphad, Ludhiana, Karnal, Durgapura, Khudwani, RAU Pusa, Vijapur, and Kharibari)

(iv) Root aphid (Centres: Karnal and Ludhiana)

(b) **Multiple pest screening nurseries (MPSN)-** In these nurseries, the germplasm having resistance to multiple diseases and insect-pests will be screened for

(i) Shoot fly (Centres: Dharwad, Ludhiana, Kanpur and Niphad)

(ii) Brown wheat mite (Centres: Durgapura and Ludhiana)

(iii) Foliar aphids (Centres: Niphad, Ludhiana, Karnal, Durgapura, Khudwani, RAU Pusa, Vijapur and Kharibari)

(iv) Root aphid (Centres: Karnal and Ludhiana)

2. Integrated Pest Management

(a) **Survey and surveillance of insect-pests and their natural enemies in wheat and barley cropping systems** (*All centres*)

Roving surveys will be carried out at fortnightly intervals during the cropping season in wheat and barley crops for insect-pests and their natural enemies. Population and damage levels of different insect-pests will be recorded and indicated as grades or percent damage inflicted to crop. The peak period of pest activity and its severity of damage will also be recorded.

(b) **Influence of sowing time on the incidence and population build-up of major insect pest of wheat** (Centres: Karnal, Ludhiana, Kharibari)

The effect of four different dates of sowing i.e. early (first fortnight of November), timely (second fortnight of November), late (first fortnight of December) and very late (second fortnight of December) will be evaluated on the population build-up of major insect-pests of wheat to better understand the insect-pest behaviour under different climatic conditions. At Kharibari, as the wheat sowing is done late, the four different dates of sowing that will be tested are early (first fortnight of December), timely (second fortnight of December), late (first fortnight of January) and very late (second fortnight of January) will be evaluated.

(c) **Population dynamics of insect-pests and natural enemies under different residue management scenarios in rice-wheat cropping system** (Centres: Karnal, Ludhiana)

Effect of different sowing methods (Happy seeder, Superseeder, Rotavator) under varied residue amounts will be tested to study the population dynamics of insect-pests and natural enemies in rice-wheat cropping system.

(d) **Effect of silicon on the incidence of major insect-pests and natural enemies of wheat** (Centres: Karnal and Ludhiana)

Following treatments of Monosilicic acid (MSA) will be evaluated against major insect-pests and natural enemies of wheat.

Treatment ID	Treatment Details
T1	One spray of sodium meta-silicate @ 10g/litre at booting stage
T2	Two sprays of sodium meta-silicate @ 10g/litre first at booting stage and second 10 days after first spray
T3	One spray of sodium meta-silicate @ 30g/litre at booting stage
T4	Two sprays of sodium meta-silicate @ 30g/litre first at booting stage and second 10 days after first spray
T5	One spray of sodium meta-silicate @ 50g/litre at booting stage
T6	Two sprays of sodium meta-silicate @ 50g/litre first at booting stage and second 10 days after first spray
T7	One spray of Actara (thiamethoxam 25 WG) @ 50g/ha at booting stage

T8	Two sprays of Actara (thiamethoxam 25 WG) @ 50g/ha first at booting stage and second 10 days after first spray
T9	Untreated Check

(e) Evaluation of biodegradable insecticide loaded hydrogels for management of termites in wheat (Centres: Karnal and Ludhiana)

Following treatments will be evaluated against termites in wheat.

Treatment ID	Treatment and dosages	Method of application
T1	Goond Katira (100 g/kg) + Jaggery (250 g/litre)+ Thiamethoxam 70WS @ 1 g/kg of seed)	Seed treatment
T2	Goond Katira(100g/kg)+Jaggery (250 g/litre)+chlorpyriphos @4ml/kg of seed)	Seed treatment
T3	Goond Katira (100g/kg) + Jaggery (250 g/litre)+ Neonix @ 2 ml/kg of seed)	Seed treatment
T4	Thiamethoxam 70WS @ 1 g/kg of seed	Seed treatment
T5	Chlorpyriphos @ 4 ml/kg of seed	Seed treatment
T6	Neonix @ 2 ml/kg of seed	Seed treatment
T7	Goond Katira (5kg/ha)+ Fipronil 0.6% GR (8.75 kg/ha) before 1st irrigation	Soil application
T8	Goond Katira (5kg/ha)+Chlorpyriphos 20 EC(2.5 litres/ha) before 1st irrigation	Soil application
T9	Fipronil 0.6% GR (8.75 kg/ha) before 1st irrigation	Soil application
T10	Chlorpyriphos 20 EC(2.5 litres/ha) before 1st irrigation	Soil application
T11	Untreated seed+ no application of chemical (Control)	-

(f) Management of aphids through foliar application of new chemical molecules (Centres: Karnal, Ludhiana, Niphad, Vijapur, Kanpur, Durgapura)

Following chemicals will be evaluated against foliar aphids in wheat. Insect population counts before and after the treatment will be recorded along with yield in each treatment.

Treatment ID	Treatments	Dosage g ai/ha
T1	Pymetrozine 50% WG	80 g
T2	Pymetrozine 50% WG	100 g
T3	Pymetrozine 50% WG	120 g
T4	Thiamethoxam 25% WG	12.5 g
T5	Imidacloprid 17.8 SL	100 ml
T6	Acetamiprid 20SP	100 g
T7	Untreated Check	-

(h) Management of lepidopterous pests (pink stem borer, army worm & cutworms) of wheat: (Centres: Karnal and Ludhiana)

Following chemicals will be evaluated against lepidopterous insect-pests in wheat

Treatment ID.	Treatments	Dosages/ha
T1	Foliar spray of Coragen 18.5 SC (chlorantraniliprole)	100 ml
T2	Foliar spray of Coragen 18.5 SC (chlorantraniliprole)	125 ml
T3	Foliar spray of Coragen 18.5 SC (chlorantraniliprole)	150 ml
T4	Soil application of fipronil 0.6 GR	6.0 Kg
T5	Soil application of fipronil 0.6 GR	7.0 Kg
T6	Soil application of fipronil 0.6 GR	8.0 Kg
T7	Soil application of chlorpyriphos 20EC	2.0 litre
T8	Soil application of chlorpyriphos 20EC	2.5 litre
T9	Soil application of chlorpyriphos 20EC	3.0 litre
T10	Untreated Check	-

(i) Management of termites through seed treatment of chemical molecules combinations (Centres: Durgapura, Kanpur, Ludhiana and Vijapur)

Following insecticides will be tested as seed treatment /soil application against termites.

Tr.No.	Treatment	Dosage
T1	Seed treatment with Neonix (Imidacloprid 18.5%+ Hexaconazole 1.5% FS)	1.5 ml/kg of seed
T2	Seed treatment with Neonix (Imidacloprid 18.5%+ Hexaconazole 1.5% FS)	2 ml/kg of seed
T3	Cruiser 70 WS (thiamethoxam)	1 ml/kg of seed

T4	Cruiser 70 WS (thiamethoxam)	1.5 ml/kg of seed
T5	Soil application of fipronil 0.3 GR	15 Kg
T6	Soil application of fipronil 0.3 GR	17.5 Kg
T7	Soil application of fipronil 0.6 GR	20 Kg
T8	Soil application of chlorpyrifos 20EC	2.0 l
T9	Soil application of chlorpyrifos 20EC	2.5 l
T10	Soil application of chlorpyrifos 20EC	3.0 l
T11	Untreated control	-

3. Stored Grain Pest Management

(a) To evaluate seed protectants for management of storage insect pests of wheat (Centres: Karnal, Ludhiana, Kharibari, Nipad)

Following seed protectants will be tested against infestation of major storage insect pests; *Sitophilus oryzae* or *Rhizopertha dominica* in wheat.

Tr.No.	Treatments	Doses/ kg seed
T1	Neem oil (<i>Azadiracta indica</i>)	15 ml
T2	Blue gum oil (<i>Eucalyptus globulus</i>)	15 ml
T3	Karanj oil (<i>Pongamia pinnata</i>)	15 ml
T4	Castor oil (<i>Ricinus cumunis</i>)	15 ml
T5	Sweet flag (Vekhand) powder (<i>Acorus calamus</i>)	5 g
T6	Turmeric Powder (<i>Curcuma longa</i>)	5 g
T7	Diatomaceous earth	500 ppm
T8	Untreated control	-

PROGRAMME 11. NEMATOLOGY

1. **Monitoring of Nematodes:** *Heterodera avenae*, *Anguina tritici*, *Meloidogyne graminicola* and other plant parasitic nematode: All centres of Nematology

2. **Evaluation of resistance against nematodes parasitizing wheat**

(a) *Heterodera avenae*: Hisar and Durgapura. (AVT and EMDSN lines)

3. **Evaluation of new chemical against cereal cyst nematode, *Heterodera avenae***

Centres: Hisar and Durgapura.

Treatments:

T1 = Fluensulfone 2% GR @0.5 Kg a.i./ha at sowing (25 Kg formulation/ha)

T2 = Fluensulfone 2% GR @1.0 Kg a.i./ha at sowing (50 Kg formulation/ha)

T3 = Fluensulfone 2% GR @1.5 Kg a.i./ha at sowing (75 Kg formulation/ha)

T4 = Fluensulfone 2% GR @2.0 Kg a.i./ha at sowing (100 Kg formulation/ha)

T5 = Carbofuran @2 kg a.i/ ha at sowing

T6 = Untreated Check

Research Plan Meeting - Wheat Quality

Work Plan Wheat Quality (2022-23)

Work plan was finalized based on the meeting held on 12th August 2022 in virtual mode and discussions held during the wheat and barley research worker's meet (29-31 August 2022). The detailed work plan for 2022-23 is given below.

NIVT and IVT

NIVT and IVT entries will be analysed for grain appearance score, test weight, protein content, and sedimentation value in both *aestivum* and durum wheat genotypes. In addition, phenol reaction in bread wheat and yellow berry and yellow pigment in durum wheat will also be analysed.

- **NIVT 1A** (Irrigated Timely Sown) samples from Ludhiana, Hisar, Durgapura, Delhi, Pantnagar (NWPZ), and Kanpur, RPCAU-Pusa, Varanasi and Sabour (NEPZ) **and 5A (NWPZ)** (Restricted Irrigation Timely Sown) from Pantnagar, Hisar, Ludhiana, Durgapura, Delhi will be analysed at PAU, Ludhiana.
- **NIVT 1B** (Irrigated Timely Sown) from Ludhiana, Hisar, Durgapura, Delhi, Pantnagar (NWPZ), Kanpur, RPCAU-Pusa, Varanasi and Sabour (NEPZ) **and NIVT 6 (NWPZ)** from Ludhiana, Hisar, Delhi, Pantnagar samples will be analysed at RAU, Durgapura.
- **NIVT 2** (Irrigated Timely Sown) samples from Indore, Vijapur, Junagarh, Powarkheda (CZ), Dharwad, Pune and Niphad (PZ) **and NIVT 6 (CZ)** from Indore, Vijapur, Junagarh, Powarkheda will be analysed at SDAU, Vijapur.
- **NIVT 3A** (Irrigated Late Sown) Entries from Pantnagar, Hisar, Ludhiana, Durgapura, Delhi (NWPZ) and RPCAU-Pusa, Sabour, Kanpur, Varanasi (NEPZ) **AND NIVT 5A (NEPZ)** (Restricted Irrigation Timely Sown) from RPCAU-Pusa, Sabour, Kanpur, Varanasi will be analysed at GBPUA&T, Pantnagar Centre.
- **NIVT 3B** (Irrigated Late Sown *T. Aestivum*) samples from Vijapur, Indore, Powarkheda, Junagarh (CZ) and Dharwad, Niphad, Pune (PZ) will be analysed by the quality laboratory at ARS, Niphad.
- **NIVT 4** (Irrigated Timely Sown *T. durum*) samples from Vijapur, Indore, Powarkheda, Junagarh (CZ) and Dharwad, Niphad, Pune (PZ) will be analysed by the quality laboratory at ARI, Pune.
- **NIVT 5B** (Restricted Irrigation Timely Sown, both durum and *aestivum*) samples from Vijapur, Indore, Powarkheda, Junagarh (CZ) and Dharwad, Niphad, Pune (PZ) will be analysed at UAS, Dharwad.
- **IVT (NHZ)** samples from Shimla, Almora and Malan will be analysed at ICAR-IIWBR, Karnal.

AVT and HYPT

- AVT and HYPT samples from all the centres mentioned in NIVTs and IVTs will be analyzed by ICAR-IIWBR, Karnal for various quality parameters including baking evaluation of 1st year entries and checks. Grain hardness index of selected centres of AVT/HYPT will be evaluated at ICAR-IARI, New Delhi.

IPPSN samples grown at ICAR-IIWBR, Karnal as per standard agronomic practices will be analysed for grain protein, Fe and Zn content.

Mandi/farmer's field samples: All centres to collect samples from Mandi/farmer's field and send to ICAR-IIWBR, Karnal in time.

Soil Fe, Zn and nitrogen analysis: Data to be provided to ICAR-IIWBR by all centres conducting trials for quality analysis after taking due care of soil sample collection and analysis.

All trials should be conducted as per the standard agronomic practices.

- The last dates for supplying the samples by respective centres were finalised as follows:

NHZ	15 th June 2023 ; NWPZ & NEPZ	20 th May 2023
CZ	15 th May 2023; PZ	30 th April 2023

- All the wheat grain samples, duly cleaned and properly packed in polythene bags separately, enclosed in cloth bags should be sent by registered post parcel.
- All the co-operators, who will analyze the wheat samples of various NIVTs should send the data to ICAR-IIWBR, Karnal positively by 15th July, 2023, by e-mail in the format used in annual report.

Research Plan Barley Improvement

The workplan finalization meeting was chaired by Dr GP Singh, Director, ICAR-IWBR, Karnal and co-chaired by Dr RPS Verma, Principal Investigator, Barley Improvement. Barley workers from different cooperating centres participated in the meeting on 30 August, 2022. The tentative work plan finalized in on line meeting on 7 August 2022, was discussed and approved with some additions from the house. The following are the details of the technical programme of barley improvement for the season 2022-23.

TECHNICAL PROGRAMME (RABI 2022-23)

Name of Trial	Advanced Varietal Trial	
Production Condition	Irrigated Feed barley	
Zone	NWPZ + NEPZ (Combined)	
No. of Trial Centers	14	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Punjab	1	Ludhiana
Rajasthan	2	Durgapura, Tabiji,
Uttarakhand	1	Pantnagar
U. P	1	Modipuram, Kanpur, Varanasi, Kumarganj
Bihar	3	Pusa (CAU), Sabour, BISA Samastipur
Jharkhand	1	Ranchi
No. of varieties including checks	6	
Contributing Centers	No.	Name of varieties
Entries	DWRB226, KB2004, UPB1106	
Checks	3	BH 946, DWRB137, HUB113
Experimental Design	RBD	
Replications	4	

KB2004 and UPB1106 are for NWPZ and DWRB226 for NEPZ in the AVT-IR-FB (1st year)

Name of Trial	Advanced Varietal Trial	
Production Condition	Irrigated Feed barley	
Zone	Central Zone	
No. of Trial Centers	7	
State	NO.	Name of centers
Rajasthan	2	Udaipur, Kota
M. P	3	Gwalior, Morena, Tikamgarh
Gujarat	1	Vijapur
UP	1	Banda
No. of varieties including checks	9	
Contributing Centers	No.	Name of varieties
Durgapura	1	RD3053
Hisar	1	BH1045
Kanpur	2	KB2004, KB2015

Ludhiana	1	PL937
Varanasi	1	HUB281
Checks	2	DWRB137, RD2899
Experimental Design		RBD
Replications		4 (Four)

Name of Trial	AVT-MB	
Production Condition	Malt Barley	
Zone	NWPZ (Timely Sown)	
No. of Trial Centers	11	
State	NO.	Name of centres
Haryana	3	Bawal, Hisar, Karnal
Punjab	2	Ludhiana, Bathinda
Rajasthan	4	Durgapura, SG Nagar, Navgaon, Tabiji,
U.P.	1	Modipuram
Uttarakhand	1	Pantnagar
No. of varieties & checks	5	
Contributing Centers	No.	Name of varieties
Karnal	1	DWRB219*
Checks	4	DWRB137, DWRUB52, RD2849, DWRB182
Experimental Design		RBD
Replications		5 (Five)
Plot Size		Gross: 5 m x 2.40 m (12 Rows@ 20 cm)
Fertilizer dose		90 Kg. N: 40Kg P: 20Kg per ha
Irrigation		2-3 or more if required at certain locations
Date of sowing (Between)		1-20 November (TS)

*AVT final year entry

Name of Trial	IVT-MB Malt Barley	
Production Condition	IRTS	
Zone	NWPZ (Timely Sown)	
No. of Trial Centers	11	
State	NO.	Name of centres
Haryana	3	Bawal, Hisar, Karnal
Punjab	2	Ludhiana, Bathinda
Rajasthan	4	Durgapura, SG Nagar, Navgaon, Tabiji,
U.P.	1	Modipuram
Uttarakhand	1	Pantnagar
No. of varieties including checks	25	
Contributing Centers	No.	Name of varieties
Hisar	3	BH1050, BH1051, BH1052
Kanpur	2	KB2131, KB2145
Pantnagar	2	UPB1116, UPB1117
IIWBR, Karnal	6	DWRB235, DWRB236, DWRB237, DWRB238, DWRB239,

		DWRB240
Durgapura	4	RD3064, RD3065, RD3066, RD3067
Ludhiana	4	PL941, PL942, PL943, PL945
Checks	4	DWRB137*, DWRUB52, RD2849, DWRB182
Experimental Design		Lattice (5x5)
Replications		2

* Six row check

Name of Trial	Initial Varietal Trial	
Production Condition	Irrigated Feed barley	
Zone	NWPZ/ NEPZ / CZ	
No. of Trial Centers	20	
State	NO.	Name of centers
Nine	20	Hisar, Karnal, Ludhiana, Durgapura, Tabiji, Udaipur, Pantnagar, Kanpur, Varanasi, Kumarganj, Modipuram, Gwalior, Morena, Tikamgarh, Banda, CAU Pusa, BISA Samastipur, Sabour, Ranchi, Vijapur
No. of varieties including checks	25	
Contributing Centers	No.	Name of varieties
Kanpur	3	KB2145 [@] , KB2127, KB2133
Varanasi	2	HUB283, HUB284
Hisar	3	BH1047, BH1048, BH1049
Durgapura	4	RD3068, RD3069, RD3070, RD3071,
Pantnagar	2	UPB1114, UPB1115
Ludhiana	4	PL946, PL947, PL948, PL949
Karnal	3	DWRB 241, DWRB242, DWRB 243
Checks	4	DWRB137, BH 946, RD2899, HUB113
Experimental Design		Lattice
Replications		2 (Two)

@ = Two row type entries

Name of Trial	Initial Varietal Trial	
Production Condition	Irrigated Food barley (Hulless)	
Zone	NWPZ/ NEPZ / CZ	
No. of Trial Centers	15	
State	NO.	Name of centers
Haryana	2	Hisar, Karnal
Jharkhand	1	Ranchi
Punjab	1	Ludhiana
Rajasthan	2	Durgapura, Udaipur
Uttarakhand	1	Pantnagar

U. P	4	Kanpur, Varanasi, Kumarganj, Modipuram,
M. P	3	Gwalior, Morena, Tikamgarh
Gujarat	1	Vijapur
No. of varieties including checks	9	
Contributing Centers	No.	Name of varieties
Karnal	3	DWRB223 , DWRB244, DWRB245@
Pantnagar	3	UPB1104 , UPB1112, UPB1113
Checks	3*	PL891, K1149, Karan16
Experimental Design		RBD (3 Reps)

DWRB223 in AVT 1st Year of NWPZ only and **UPB1104** is for Central Zone *Seed for NDB943 is not available from Kumarganj, hence K1149 is included @ = Two row type entries

Name of Trial	IVT-RF-NEPZ	
Production Condition	Rainfed	
No. of Trial Centers	8	
State	NO.	Name of centres
UP	4	Kanpur, Varanasi, Kumarganj, Saini
Bihar	2	Pusa (CAU), Sabour
Jharkhand	2	Ranchi, Chiyanki
No. of varieties including checks	15	
Contributing Centers	No.	Name of varieties
Varanasi	1	HUB282
Kanpur	4	KB2155, KB2158, KB2159, KB2160
Ludhiana	4	PL950, PL951@, PL952@, PL953
Durgapura	4	RD3076, RD3077, RD3078, RD3079
Checks	2	K603, Lakhan
Experimental Design		RBD 4 Reps

@ = Two row type entries

Name of Trial	AVT-SST	
Production Condition	SAL / ALK	
Zone	NWPZ / NEPZ	
No. of Trial Centers	07	
State	No.	Name of centres
U.P.	2	Dalipnagar, Kumarganj
Haryana	3	IIWBR, Hisar (two sets at different salinity levels), CSSRI Karnal
Rajasthan	2	Fatehpur, Bhilwara,
No. of varieties including checks	18	
Contributing Centers	No.	Name of varieties
Karnal	2	DWRB228 , DWRB246
Kanpur	5	KB2031 , KB2120@, KB2127, KB2158, KB2160

Varanasi	2	HUB285, HUB286
Hisar	2	BH1053, BH1054
Durgapura	4	RD3080, RD3081, RD3082, RD3083
Checks	3	RD2794, RD2907, KB1425*
Experimental Design		RBD
Replications		4 (Four)

***KB1425 is replacement of NDB1173 for which seed is not available @ = Two row type entries
KB2031 and DWRB228 are for AVT-1st year testing**

Name of Trial	IVT-RFTS-NHZ	
No. of Trial Centres	9	
State	NO.	Name of centres
Himachal	4	Bajaura, Berthein, Malan, Shimla
Uttarakhand	3	Almora, Gaza, Majhera
J&K	2	Khudwani, Wadura
No. of varieties including checks	24	
Contributing Centres	No.	Name of varieties
IARI, RS, Shimla	5	BHS493, BHS494, BHS495 [@] , BHS496, BHS497 [#]
Pantnagar	3	UPB1109, UPB1110, UPB1111
Almora	6	VLB175 , VLB180 [@] , VLB181 [@] , VLB182 [@] , VLB183 [@] , VLB184
Bajaura	5	HBL879, HBL880, HBL881, HBL882, HBL883
Checks	5	HBL113 [@] , BHS352 [#] , BHS380, BHS400, VLB118
Experimental Design		RBD
Replications		4 (2 for green forage cut at 70-75 DAS and 2 as non-cut)
Plot Size		Gross: 3.5 m x 1.38 m (6 Rows) Net: 3.5 x 0.92 m (4 Rows)
Fertilizer dose		40 Kg N: 30 Kg P: 20 kg K/ha (All as basal) In two cut replications 20 Kg/ha N to be broadcasted after cut
Irrigation		NONE
Date of sowing (Between)		NHZ (15 October-10 November)

VLB175 is for first year AVT in normal as well as Dual purpose trials. # = Huskless barley, @ = 2 Row type

BARLEY Quality (AICW&BIP) 2022-23

1. Malt Barley Yield Trials

Identification of Promising genotypes for malting quality traits

Trial: Advanced Varietal Trial (Malt Barley) and Initial Varietal Trial (Malt Barley)

Number of Locations: 11 each

Entries: AVT = 5, IVT = 25 Total = 30 genotypes

Traits to be analysed:

Grain Traits: Test weight, Thousand Grain weight, Kernel Plumpness, Husk Content, Germination percentage, Protein Content, Starch Content, Beta Glucan content

Malt traits: Malt yield, Friability, Homogeneity, Wort Filtration rate, Wort pH, Wort Colour, Saccharification Rate, Hot Water Extract, Wort Beta Glucan, Wort Free Amino Nitrogen

2. Barley Quality Component Screening Nursery

Identification of promising sources of quality traits with respect to malt and food barley for use in Quality Improvement Programme

Malt Barley Genotypes: 25 **Food Barley Genotypes:** 20

Number of Locations: 6 (Karnal, Hisar, Ludhiana, Pant Nagar, Kanpur & Durgapura)

3. Feed & Hulless Barley Trials

Quality Evaluation of Feed and Hulless Barley Genotypes

Trials: AVT and IVT of Feed Barley/Hulless Barley

Zones: NWPZ, NEPZ, CZ & NHZ

Entries: AVT = 13, IVT = 89 Total = 102 genotypes

Grain Traits: Test Weight, Thousand Grain Weight, Protein, Starch, and Beta Glucan (in selected entries of hulless genotypes)

Barley Crop Protection (2022-23)

1. Crop Health Survey: All barley cooperating centres in their area of command will carry out the survey and record the incidence and infestation of disease and insect pest in the farmer's fields. The infected samples of rust will be sent to IIWBR, RS Flowerdale and leaf blight to IIWBR, Karnal for further analysis. Any entry showing > 40S rust reaction in the trials has to be informed to IIWBR, Karnal and sample should be sent to RS Flowerdale, Shimla for race analysis.

Plant pathology:

2. Evaluation for status of host resistance in test entries:

i. Initial Barley Disease Screening Nursery (IBDSN):

This nursery will comprise of test entries of station trial of barley breeding centres. The entries will be screened against rusts and leaf blight at hot spot locations.

Yellow rust: Ludhiana, Durgapura, Bajaura, Karnal, Almora and Jammu (6)

Leaf blight: Pantnagar, Kanpur, Faizabad, and Varanasi (4)

ii. National Barley Disease Screening Nursery (NBDSN):

This nursery will comprise of entries from yield trials (IVT and AVT) which will be screened against rusts and leaf blight.

Yellow rust: Ludhiana, Durgapura, Bajaura, Hisar, Almora, Karnal and Jammu (7)

Leaf rust: Ludhiana and Jammu (2)

Leaf blight: Pantnagar, Kanpur, Faizabad, Varanasi, and Dharwad (5)

Note: Two or six row spike type information should be recorded along with disease score on each entry for data verification purpose in case required

iii. Elite Barley Disease Screening Nursery (EBDSN):

This nursery will have resistant entries identified in NBDSN and EBDSN tested at hot spot locations. The confirmed sources of resistance would later be shared with different barley breeders for their utilization.

Yellow rust: Ludhiana, Durgapura, Bajaura, Hisar, Almora, Karnal and Jammu (7)

Leaf rust: Ludhiana and Jammu (2)

Leaf blight: Pantnagar, Kanpur, Faizabad, and Varanasi (4)

iv. Seedling Resistant Test (SRT) of NBDSN and EBDSN:

The test would be conducted against different pathotypes of three rusts at RS, Flowerdale, Shimla.

3. Chemical control of leaf blight (Centres: Pantnagar, Kanpur, Faizabad, and Varanasi)

S. No.	Treatment	Dosages
1	Tebuconazole 50% + Trifloxystrobin 25%,	0.06%
2	Propiconazole 13.9% + Difenconazole 13.9%	0.1%
3	Azoxystrobin 12.5% + Tebuconazole 12.5%	0.1%
4	Picoxystrobin 7.05% + Propiconazole 11.7%	0.1%
5	Kresoxim Methyl 44.3% SC	0.1%

6	Propiconazole 25%	0.1%
7	Tebuconazole 25.9%	0.1%
8	Mancozeb 75%	0.2%
9	Control	-

The chemical will be evaluated under artificial inoculated condition and spray will be done on initiation of diseases and repeated once after 15 days. Design – RBD, Plot size – 6 rows of 3 meters, 3 replications.

Entomology:

1. **Screening of NBDSN and Elite lines against foliar aphids (Centres: Ludhiana, Kanpur, Khudwani, Pantnagar, Durgapura, Hisar and Karnal).**

The national barley aphid screening nursery (NBDSN) will be continued. It will comprise entries from coordinated trials. Besides, 10-20 extra entries found promising for aphid resistance at Karnal will be screened against aphids at four centres; Ludhiana, Kanpur, Durgapura and Karnal.

2. **Survey and surveillance of insect-pests and their natural enemies in barley (All centres)**

Roving surveys will be carried out at fortnightly intervals during the cropping season for insect-pests and their natural enemies. Population and damage levels of different insect-pests will be recorded and indicated as grades or percent damage inflicted to crop. The peak period of pest activity and its severity of damage will also be recorded.

3. **Management of aphids through foliar application of new bio-chemical molecules (Centres: Vijapur, Ludhiana, Kanpur, Durgapura and Karnal)**

New chemical molecules will be evaluated against foliar aphids in barley. Insect population counts before and after the treatment will be recorded along with yield to determine efficacy of each treatment.

4. **Effect of silicon on the incidence of foliar aphids and natural enemies (Centres: Karnal and Ludhiana) New trial**

Foliar application of Monosilicic acid (MSA) will be tested against aphids and natural enemies in barley crop.

Nematology

1. **Screening of NBDSN and EBDSN against CCN:**

The entries of NBDSN and EBDSN will be tested against Cereal Cyst nematode (CCN) at Durgapura and Hisar centers in sick plots/field.

BARLEY RESOURCE MANAGEMENT (2022-23)

NORTH WESTERN PLAIN ZONE (AVT Malt Barley Entries) 2022-23

TITLE: Response of new malt barley genotypes to different N levels and sowing dates conditions (NWPZ).

OBJECTIVES

1. To work out optimum nitrogen level & sowing time for different malt barley genotypes

TREATMENTS

A. Nitrogen Levels (Main Plots): 3

N1-60 kg

N2-90 kg

N3-120 kg

B. Varieties (Sub-Plots): 6

Test Variety: DWRB219 Checks: DWRUB52, DWRB182, RD2849, DWRB137

FERTILISER: Nitrogen as per treatment and P & K @ 40 & 30 kg/ha, respectively. Apply 1/2 of N and full P & K as basal and rest 1/2 N after first irrigation.

SEED RATE: 100 kg/ha (Adjust seed rate taking 1000 seeds weight of 45 g).

CENTRES: Karnal, Hisar, Durgapura, Ludhiana

BARLEY AGRONOMY EXPERIMENT NO. SPL-1

Title: Productivity and quality enhancement of barley through Nitrogen and Zinc scheduling

Objective: To enhance quality and productivity through different N and Zinc scheduling

Treatments: N and Zn scheduling

1. 1/2 at basal+1/2 at tillering (35-40 DAS)
2. 1/2 at basal+1/4 at tillering (35-40 DAS) +1/4 at anthesis stage (80-90DAS)
3. 1/3 at basal+1/3 at tillering (35-40 DAS) +1/3 at flag leaf stage (65-70DAS)
4. 1/2 at basal+1/2 at tillering (35-40 DAS) +5.0% urea spray at anthesis stage (80-90DAS)
5. 1/2 at basal+1/2 at tillering (35-40 DAS)+5.0% urea+0.5% ZnSO₄.7H₂O spray at anthesis stage (80-90DAS)
6. 1/2 at basal+1/4 at tillering (35-40 DAS) +5.0% urea spray at anthesis stage (65-70DAS)
7. 1/2 at basal+1/4 at tillering (35-40 DAS) +5.0% urea + 0.5% ZnSO₄.7H₂O spray at flag leaf (65-70DAS) and 0.5% urea spray at anthesis stage (80-90DAS)
8. 1/3 at basal+1/3 at tillering (35-40 DAS) +5.0% urea spray at flag leaf stage (80-90DAS)
9. 1/3 at basal+1/3 at tillering (35-40 DAS) +5.0% urea + 0.5% ZnSO₄.7H₂O spray at anthesis (80-90DAS)

Variety: NWPZ: DWRB160

Design: RBD Replications:3 **FERTILIZER:** As per Zone Recommendations and given treatment **SEED RATE:** as per recommendation

OBSERVATIONS: 1. Yield and yield attributing characters. **2. Benefit: cost ratio**

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana

BARLEY AGRONOMY EXPERIMENT NO. SPL-2

TITLE: Enhancing nutrient use efficiency through nano fertiliser in barley

OBJECTIVE: To enhance the nutrient use efficiency and to optimise dose of nano fertiliser in barley.

TREATMENTS:

1. Control (P+K only)
2. Control (P+K only) +1000 ml NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS
3. 50% RDN + 500ml NN/ha at 30-35 DAS+500ml/ha at 60-65 DAS
4. 50% RDN + 1000 NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS
5. 75% RDN +500ml NN at 30-35 DAS+500ml NN at 60-65 DAS
6. 75% RDN + 1000ml NN at 30-35 DAS+1000ml NN at 60-65 DAS
7. RDN + 500ml NN/ha at 30-35 DAS+500ml/ha at 60-65 DAS
8. RDN + 1000ml NN/ha at 30-35 DAS+1000ml/ha at 60-65 DAS
9. Recommended doses of fertiliser

Variety: NWPZ: BH 946 NEPZ: DWRB137 CZ: DWRB137 NHZ: BHS400

Design: RBD Replications:3

OBSERVATIONS: Yield and yield attributing characters.

1. Nutrient use efficiency
2. Economics

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana CZ: Udaipur
NEPZ: Kanpur, Kumarganj, Varanasi, NHZ: Bajaura, Malan

BARLEY AGRONOMY EXPERIMENT NO. SPL-3

Title: Enhancing yield and quality through sowing methods and seeding rate in different barley varieties

Objectives: To evaluate the performance of barley cultivars under sowing methods and seeding rate

Treatments:

Sowing Method and Seed rate (6) Sowing Method (2)

SM1:Sowing at 20cm var. DWRB137 SM2:Sowing in paired row (20cm:skip one row after two rows) DWRB137

Sub plot: Seeding rate (3) Seed rate 75, 87.5, 100 kg/ha

Variety: DWRB137 Design: Split plot Replications: Three

Centres : NWPZ: Agra, Ludhiana, Hisar, Karnal, Durgapura

Session VI- Status Report from states and interaction with farmers and industry partners

August 31, 2022	Chairman	: Dr. VS Tomar Ex VC,RVSKVV Gwalior & JNKVV Jabalpur
9.30 -11.15	Co-Chairman	: Dr. R.K. Singh, ADG (CC & FFC) & Dr. SC Bhardwaj,
	Rapporteurs	: Drs. Anuj Kumar, AK Sharma and SK Bishnoi

The special session on “Status reports from the states and farmers views for R&D in wheat” was chaired by Dr. VS Tomar, Ex-Vice Chancellor, RVSKVV, and Gwalior. At the onset, Chairman welcomed the Co-Chairman, speakers, and delegates and complimented the farmers of the country for their contribution in production >106 million tons and export >7.0 million tons of wheat in the country during the preceding session. He appreciated the efforts of ICAR-IIWBR in enhancing the wheat production and emphasized upon the importance of quality for insudtrital demand. He reteriated the importance of whet germplasm and its inclusion in the breeding programme for the wheat improvement. The chairman called upon the wheat and barley workers to zero in their efforts to transform the country into wheat exporting one. However, It was very disappointing to note that none of the state government representative turned up for this important session panned to discuss progress and issues pertaining to wheat and barley cultivation in the state.The first speaker of the session was Shri Chandra Shekhar Singh, Padamashree Awardee, an innovative farmer of Varanasi (UP), informed that he acquired the technical knowhow of farming from the SAUs and ICAR institutes and now implementing these on his farm and getting better crop yields. He informed the house about successfully coming up with seed hubs and registration of 8 rice varieties and one Vasundhra variety of pigeonpea with the PPVFRA. He emphasized the bad impact of climate change on the crop production and called upon the scientists to come up with climate change solution to enhance the resiliency.

The second presentation was of Shri Yogendra Kaushik from Ujjain (MP) who said that he is following crop diversification and JaivikKheti. He is also involved in seed production of latest HYVs of wheat and earning good profit from seed production. Shri Anant Bahadur Singh from Amethi (UP) adopted Turbo Happy Seeder for seeding wheat to reduce cost of production and tackle the problem of residue burning. He emphasized the need of quick dissemination of agriculture technologies to the farmers. The farmer Amit Patidar spoke about the soil health and how it can be improved through Jaivik Kheti. He expressed his concern on the quality of wheat and the lack of separate market for high quality wheat. Thereafter, owner of private seed companies Shri SudhirAgwarwal (There should be rate fixation variety wise to encourage the quality wheat production in the country. There should be branding of the biofortified varieties),

Vijay Singh Pawar young farmer emphasized upon making of multimedia techniques to popularize the wheat varieties among farmers. Dr Lalji Sharma from DeHaat presented the company profile and how they are changing the livelihoods of the farmers. Dr. Avinash Dayal from Dyal Fertilizers and Dr. SK Singh, Rashi Seed gave his presentation and said that besides doing seed production in major crop they are providing training to the farmers in respect of soil health, modern techniques of raising field crops and seed production. Dr. RK Dadich, Regional Manager NSC, Bhopal spoke about the dissemination of latest wheat varieties through NSC . His major emphasis is on enhancing seed & varietal replacement rates of different crops.

Session VII- Plenary Session

August 31, 2022	Chairman	: Dr VS.Tomar Founder VC, RVSKVV, Gwalior & Ex-VC, JNKVV Jabalpur
	Co-Chairman	: Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi
	Rapporteurs	: Drs Poonam Jasrotia, PL Kashyap, and Pramod Prasad

The plenary session of the three days' wheat and barley research workers meet, was chaired by Dr V.S.Tomar Founder VC, RVSKVV, Gwalior & Ex-VC, JNKVV Jabalpur in lieu of Dr S.K. Rao, VC, RVSKVV, Gwalior and co-chaired by Dr R.K. Singh, ADG (CC & FFC), ICAR, New Delhi. Director Dr. GP Singh welcomed chairman, co-chairman PMC members and the delegates in the online session. Dr V.S.Tomar appreciated the efforts of the coordinated programme. He then requested to PIs to present section wise considerable research recommendation and highlights of work plan for 2022-223.

Dr. Gyanendra Singh, PI, Crop Improvement presented the recommendations and finalized plan of work of Crop Improvement for 2022-23. Some of decisions taken were high fertility early sown trial now will be conducted as NIVT 6 in NWPZ and CZ. In NHZ a common trial IVT and AVT will be conducted under both rainfed and irrigated conditions. Special trial and nursery for addressing heat and drought tolerance in wheat will be initiated from 2022-23 season. Wheat blast data will be used as a promotion criterion for promotion/retention of entries in NEPZ trials. Entries contributed as MABB will be evaluated in the respective AVTs of the zone. The background recovery for such lines should be > 90.

Dr. S C Tripathi, PI, Resource management presented the recommendations and final work plan of Resource Management for 2022-23. He informed all the recommendation of that sea weed extract as seed treatment @ 3 ml/kg followed by two foliar sprays @ 1.6 litres in 400 litres of water per hectare at tillering and jointing stage for improving the wheat productivity across the zones. Dr Tripathi also presented barley FLD plan for 2022-23 and wheat demonstrations to be conducted under SCSP program using new varieties.

Dr. Sudheer Kumar, PI Crop Protection, ICAR-IIWBR, Karnal presented recommendations and the work plan of Crop Protection for 2022-23. Some of decisions taken were included were merging of plant pathological nursery EPPSN and MDSN and should be made in one nursery as EMDSN to keep elite germplasm and should be screened against multiple diseases. Use of preventive measures i.e. quarantine, adoption of alternate crop plan, grow wheat blast resistant varieties identified for the NEPZ with seed treatment etc. in disease prone areas were recommended alongwith strict monitoring for wheat blast in NEPZ specially areas bordering to Bangladesh.

Dr. Sewa Ram, PI Quality & Basic Science, presented the final work plan and recommendations for 2022-23. He emphasized that recommendation related to quality should be followed by all the centres strictly. All centres were instructed to supply the data of Fe, Zn and nitrogen status to for understanding the reasons for variations in these traits location-wise. Centres were also told to provide grain samples for checking the nutrient status of grains

.Barley network recommendations and the work plan for 2022-23 were presented by Dr. RPS Verma, PI-Barley Network, ICAR-IIWBR, Karnal. Dr Verma asked the cooperators to strictly adhere on technical programme sent to them.

After presentations by PIs, the PMC member, Dr. AN Mishra suggested the house that we must maximize the objectives of different programmes and ensure to achieve them. He desired mechanization and need of experienced man power for performing different research activities such as creating disease epiphytotics, screening wheat and barley material for different traits etc. He highlighted the need of human resource development for newly recruited researchers in different programmes so that succeeding line of researchers is competent enough to perform assigned duties.

Dr. Gyanendra P. Singh, Director ICAR-IWBR, presented report of varietal identification committee for the year 2021-22. A total of twenty-seven proposals were submitted for identification and area extension. VL2041 was identified for timely sown rainfed conditions in NHZ for its superior grain quality and suitability for biscuit making. Nine wheat genotypes (PBW826, HD3369, HI1653, HI1654, DBW370, DBW371, DBW372, and PBW872, and HD 3406) were identified for different growing conditions of NWPZ. Four proposals (PBW 826, DBW 316, PBW 833, and HD 3411) were considered for NEPZ. For CZ seven proposals {HI 1650, MACS 6768, HI 8830(d), DDW 55(d), CG 1036, HI 1655, and HD 3407} were identified. Two genotypes {HI 8826(d) and MACS 4100(d)} were identified for different growing conditions in PZ. DBW 303 was recommended for area extension in CZ. Three genotypes PBW 835 (NEPZ), DBW 372 (CZ), DBW320 (PZ)} were not identified due to their low yield as compared to the check varieties.

Dr. RK Singh, Co-Chairman of the session was satisfied with the progress of wheat and barley research program. He emphasized on planning of basic research by IWBR and its validation and dissemination through co-operating centers. He suggested for preparing a proforma for evaluation of innovation or technologies developed at institute level and get the approval for its adoption from ICAR. He urged wheat and barley researchers to work sincerely and go for maximum possible output. Dr. Singh advocated that wheat and barley program should plan a brainstorming session with seed, food and engineering industries and design a consolidated and collaborative future work plan. After the remarks, felicitation superannuating wheat & barley researchers was done and proposal for venue of 2023 workshop was discussed. Three venues i.e. Udaipur, Pune and Srinagar were proposed by the participants. The final decision on the venue will be taken by governing body in due-course of time in consultation with the council officials at New Delhi.

In the end chairman of the session, Dr V.S.Tomar congratulated all workers of wheat and barley improvement program for their contribution. He further urged the scientists to work the present challenging issues like heat, drought, climate change, disease resistance and quality related topics to fill the gaps of increasing productivity of wheat and barley crops. The session ended with a vote of thanks by Dr. Gyanendra Singh, PI, Crop Improvement and Organizing Secretary, 61st All India Wheat and Barley Research Workers' meet.

Recommendations

Crop Improvement:

- Newly released varieties will be taken up in seed chain for cultivation. Also, new genetic stocks will be shared with co-operators.
- The newly identified varietal proposals will now be put up to CVRC for release and notification as soon as possible.
- Work plan 2022-23 in respect of breeding trials and nurseries will be executed as per set norms.
- High fertility early sown trial now will be constituted as NIVT6 only and conducted in NWPZ and CZ. This trial will be of 36 genotypes including checks for this year only. Similarly, special HYPT trial will also be conducted in NWPZ and CZ only.
- In NHZ a common trial IVT and AVT will be conducted under both rainfed and irrigated conditions.
- From 2022-23 onwards Gwalior centre will conduct trials sets of CZ and Durgapura centre will conduct trials of NWPZ.
- Special trial and nursery for addressing heat and drought tolerance in wheat will be initiated from 2022-23 season.
- The QCBWSN will be discontinued and pipelines material from centres will be assessed for quality parameters to provide additional data on grain quality.
- For strengthening wheat breeding program on grain quality, set of IPPSN entries (grown under protected condition) will also be evaluated for basic quality parameters.

- Wheat blast data will be used as a promotion criterion for promotion/retention of entries in NEPZ trials. From 2022-23 season onwards, duly treated seed from centres in West Bengal and Assam will be included in IPPSN for testing.
- Entries contributed as MABB will be evaluated in the respective AVTs of the zone. The background recovery for such lines should be > 90%.
- For evaluating genotypes of private companies and other institutions outside NARS, a testing fee of Rs 1.0 lakh +GST per entry will be charged separately for each program, i.e. Breeding, Agronomy, Pathology, Quality, Physiology etc..
- Under HRD, One Orientation Course on AICRP activities for new incumbents will be conducted during the Crop Season.
- As an initiative to strengthen research for wheat improvement, trait/problem specific programs have been proposed at major centres.

Resource Management

- Sea weed extract as seed treatment @ 3 ml/kg followed by two foliar sprays @ 1.6 litres in 400 litres of water per hectare at tillering and jointing stage is recommended for improving the wheat productivity across the zones.
- Foliar application of Cycocel (CCC) @ 600 ml in 400 litres of water per hectare at 50 DAS is recommended to reduce lodging and improve productivity of *dicoccum* wheat in PZ.

Crop Protection Programme

- The plant pathological nursery EPPSN and MDSN has to be merged and should be one nursery as EMDSN to keep elite germplasm and will be screened against multiple diseases.
- It is recommended to grow the highly yellow rust resistant newly released varieties like DBW 296, DBW 327, DBW 332, DBW303, DBW187, JKW 261, WH1270, DBW 222, PBW 771, HD 3226, PBW 752, HD 3237, HI 1620, DBW 173, WB 02, HD 3096, DBW 90, WH 1124, WH 1080, WH 1142 etc. in view of current pathotype prevalence in Haryana, Punjab, Himachal Pradesh and Jammu.
- Strict monitoring for wheat blast in NEPZ specially areas bordering to Bangladesh. Use of preventive measures i.e. quarantine, adoption of alternate crop plan, grow wheat blast resistant varieties identified for the NEPZ with seed treatment etc. in disease prone areas.
- It is recommended to apply Azoxystrobin 18.2% w/w + Difenoconazole 11.4% w/w SC @ 0.1% to management of powdery mildew and may be repeated after 15 days as per need.
- Soil application of Fipronil 0.6% GR @ 7.5 kg/ha is recommended for the management of lepidoterous pest pink stem borer in wheat.
- Training to scientists recently associated with crop protection programme for diseases and insect pest scoring, recording and reporting to further improving effectiveness of the programme.

Wheat Quality

Followings are the recommendations finalized based on work plan meeting held on 12th August, 2022 in virtual mode and discussions held during the panel session on wheat quality improvement and PI presentation on 30th August, 2022.

It is recommended that grading standard of wheat should be developed and notified with APEDA and accordingly recent varieties should be graded along with their product profile for domestic and export purposes.

As genetics of most of the quality traits is known and microlevel tests are available associated with industrial quality traits, the information should be utilized in breeding for developing product specific varieties.

Emphasis should be put on understanding molecular basis of nutritional quality traits and concerted efforts be made for improving nutritional quality for enhancing antioxidants including anthocyanins, resistant starch, dietary fibre and reducing antinutritional factors such as phytic acid.

It is recommended that along with yield and disease resistance, quality will be used as criteria for identification/promotion of varieties and weightage will be given to entries having exceptionally good quality irrespective of yield.

Barley Programme

General

Decreasing trend of breeder seed indents in barley is a serious issue and it should be improved by all concerned states. (Action: All concerned)

New centre at Banda (CZ) and BISA Samastipur (NEPZ) are proposed, while Samdari (Central Zone), Kalyani (NEPZ), Katrain, Kangra, Rajauri (all in NHZ) have been discontinued. (Action: PI, Barley Improvement).

Under the current situation Kumarganj center (the center lost all the breeding material, crossing block as well as seed of station as well as coordinated trials) will continue under AICRP *only as testing center for 2022-23 season*. The center *should make sincere efforts to again get status as breeding center* as soon as possible. (Action: Dr. Vinod Singh/ Director Research, NDU&T Kumarganj Ayodhya & PI Barley, IIWBR Karnal).

Technical Recommendations

Information on *row type and hulled/ hullless* should be supplied by the centre at the time of nomination of their entries to ICAR-IIWBR, Karnal for constitution of trials, in addition to the germination report as per last year recommendation. (Action: all the cooperating centres).

1. All the centres *must adhere to the technical programme* sent to them and should follow the plot size and layout mentioned for each trial (Action: all the cooperating centres).
2. The *recommended sowing dates* after three years of experimentation in different zones for better productivity of barley are (NHZ: 20 October-05 November, NWPZ: 01-15 November; CZ: 01-15 November and NEPZ: 11-15 November).
3. To get higher productivity and economics, *recommended dose of Fertiliser (RDF)+10 t/ha FYM+PGR {Plant Growth regulator = Chlormequat-chlorid (CCC) @1.25 L ha⁻¹ at GS₃₀₋₃₁ followed by Ethephon (Cerone) @0.5 L ha⁻¹ at GS₃₉₋₄₀}* is recommended in all the zones for barley cultivation.
4. *Soil application with ZnSO₄@ 25 kg/ha or soil application @12.5 kg ZnSO₄/ha followed by foliar spray (0.5% zinc sulphate) were recommended* for all the zones.
5. To enhance the productivity in low moisture areas *application of Silicon @ 150kg/ha with three irrigations is recommended*.

Recommendations of Varietal Identification Committee Meeting

August 29, 2022

Chairman : Dr. T R Sharma, DDG (CS)

Member Secretary : Dr. GP Singh, Director, IIWBR

Venue: Vice Chancellor Board Room, RVSKVV, Gwalior

The meeting of Varietal Identification Committee of Wheat & Barley was held on 29 August 2022 during 61st AGM of All India Coordinated Research Project (AICRP) on Wheat & Barley under the Chairmanship of Dr. T R Sharma, DDG (CS). The following members participated in the meeting:

1. Dr. T R Sharma, DDG (CS), ICAR, Krishi Bhavan, New Delhi (*Chairman*)
2. Dr. D K Yadav, ADG (Seed), ICAR, Krishi Bhawan New Delhi
3. Dr. R K Singh, ADG (CC & FFC), ICAR, Krishi Bhawan New Delhi
4. Dr. S K Singh, Additional Director, Agriculture, UP
5. Dr. R K Dadhich, RM, NSC – Bhopal
6. Dr. Sanjay Kumar, Director, ICAR-IISS, Mau Nath Bhanjan
7. Dr. Ravish Chatrath, Emeritus Scientist, Karnal
8. Dr. Mohinder Prashar, MAHYCO, R&D, Jalna (Pvt. Representative)
9. Dr. S C Mishra, Ex Head, Plant Genetics Division, ARI, Pune
10. Dr. S K Sharma, Director Research, RVSKVV, Gwalior
11. Dr. G P Singh, Director, ICAR-IIWBR, Karnal (Member Secretary)

The committee considered all 27, wheat varietal proposals submitted for identification and area extension and after detailed deliberations, gave the following recommendations unanimously, as indicated against each proposal:

SN	Name of Variety	Production conditions	Recommendations
Northern Hills Zone (NHZ): Himachal Pradesh, Jammu & Kashmir, Uttarakhand, Manipur and Meghalaya			
1	VL 2041	RF-TS	The variety was identified based on its superior grain quality and suitability for biscuit making.
North Western Plains Zone (NWPZ): Punjab, Haryana, Delhi, Rajasthan (excluding Kota and Udaipur division), Western Uttar Pradesh (except Jhansi division), Jammu and Kathua district of Jammu & Kashmir, Paonta Valley and Una district of Himachal Pradesh and Tarai region of Uttarakhand.			
2.	PBW 826	IR-TS	The variety was identified based on its superior yield and disease resistance.
3.	HD 3369	RI-TS	All the three genotypes were considered together and were identified based on their superiority in yield. The genotypes have shown resistance to rusts and also had superior grain quality.
4.	HI 1653	RI-TS	
5.	HI 1654	RI-TS	
North Eastern Plains Zone (NEPZ): Eastern UP, Bihar, Jharkhand, Orissa, West Bengal, Assam and plains of NE States.			
6.	PBW 826	IR-TS	The variety was identified based on its superior yield and disease resistance.
7.	DBW 316	IR-LS	All the three proposals were considered together. DBW 316 was identified based on its superior quality. PBW 833 was identified based on its superior yield and disease resistance. PBW 835 was not identified due to its low yield as compared to the check varieties.
8.	PBW 833	IR-LS	
9.	PBW 835	IR-LS	

Central Zone (CZ): Madhya Pradesh, Gujarat, Rajasthan and Chhattisgarh states.			
10.	HI 1650	IR-TS	Both the genotypes were considered together and were identified based on their yield gains and superior grain quality.
11.	MACS 6768	IR-TS	
12.	HI 8830(d)	RI-TS	Both the durum wheat proposals were identified based on their yield advantage and resistance to black & brown rusts.
13.	DDW 55(d)	RI-TS	
14.	CG 1036	RI-TS	Both the bread wheat proposals were identified based on their yield advantage and superior grain quality.
15.	HI 1655	RI-TS	
Peninsular Zone (PZ): Maharashtra, Karnataka and plains of Tamil Nadu			
16.	HI 8826(d)	IR-TS	Both the proposals were identified based on their yield superiority, disease resistance and grain quality.
17.	MACS 4100(d)	IR-TS	
18.	DBW320	IR-LS	The proposal was not identified due to its low yield as compared to check varieties.
North Western Plains Zone (NWPZ): Punjab, Haryana, Delhi, Rajasthan (excluding Kota and Udaipur division), Western Uttar Pradesh (except Jhansi division), Jammu and Kathua district of Jammu & Kashmir, Paonta Valley and Una district of Himachal Pradesh and Tarai region of Uttarakhand.			
19.	DBW 370	HF-ES	All the four genotypes were considered together and based on yield superiority and high yield potential all were identified .
20.	DBW 371	HF-ES	
21.	DBW 372	HF-ES	
22.	PBW 872	HF-ES	
Central Zone (CZ): Madhya Pradesh, Gujarat, Rajasthan and Chhattisgarh states.			
23.	DBW 372	HF-ES	The genotype was not identified due to its low yield levels as compared to the check varieties.
North Western Plains Zone (NWPZ): Punjab, Haryana, Delhi, Rajasthan (excluding Kota and Udaipur division), Western Uttar Pradesh (except Jhansi division), Jammu and Kathua district of Jammu & Kashmir, Paonta Valley and Una district of Himachal Pradesh and Tarai region of Uttarakhand.			
24.	HD 3406	IR-TS	The MABB derived line was superior in yield to its recurrent parent. Also resistant to rusts and hence identified .
North Eastern Plains Zone (NEPZ): Eastern UP, Bihar, Jharkhand, Orissa, West Bengal, Assam and plains of NE States.			
25.	HD 3411	IR-TS	The MABB derived line was superior in yield to its recurrent parent and hence was identified .
Central Zone (CZ): Madhya Pradesh, Gujarat, Rajasthan and Chhattisgarh states.			
26.	HD 3407	IR-LS	The MABB derived line was superior in yield to its recurrent parent. Also resistant to rusts and hence identified
Proposals for Area Extension			
27.	DBW 303	CZ HF-ES	The variety was recommended for area extension in MP, Gujarat, Rajasthan, Chhattisgarh states.

At the end, the Member Secretary proposed a formal vote of thanks to the Chairman and members of the committee.

List of Final Year Entries & Checks, 2022-23

Entry	Checks
AVT-IR-TS-TAS - North Western Plains Zone	
HD3386	HD2967, HD3086, DBW187, DBW222, PBW826(l)
AVT-RI-TS-TAS - North Western Plains Zone	
WH1402	PBW644, NIAW3170, DBW296, HD3369(l), HI1653(l), HI1654(l)
AVT-IR-TS-TAS - North Eastern Plains Zone	
HD3388	HD3249, DBW187, HD3086, HD2967, DBW222, PBW826(l)
AVT-IR-TS-TAD – Central Zone	
NWS2194, GW547	GW322, GW513, HI1636, HI1650(l), MACS6768(l)
AVT-RI-TS-TAD – Central Zone	
DBW359, CG1040	MP3288, DBW110, CG1036(l), HI1655(l)
AVT-IR-TS-TAD – Peninsular Zone	
MP1378	MACS3949(d), HI8826(d)(l), MACS4100(d)(l), MACS6222, GW322
AVT-RI-TS-TAS – Peninsular Zone	
UAS478(d), HI8840(d), HI1665, DBW359, NIAW4028	HI1605, NIAW3170, UAS446(d), NIDW1149(d)
SPL-HYPT-IR-ES-TAS-CZ/PZ	
DBW377	DBW187, DBW303, GW322

Note: Varieties recommended by VIC have been included as identified checks in respective trial(s).

AGENDA
61st ALL INDIA WHEAT & BARLEY RESEARCH WORKERS' MEET
Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya (RVSKVV), Gwalior (Madhya Pradesh), India
 (August 29-31, 2022)
Venue: Auditorium - RVSKVV, Gwalior

DAY-1: August 29, 2022 (Monday)

8.30-9.00	Workshop Registration	
9.00-10.00	SAWBAR'S VS Mathur Memorial Lecture by Dr. Ravi P Singh, CIMMYT, Mexico	
	Chairman	Dr TR Sharma, DDG(CS), ICAR, New Delhi
	Co-chairman	Dr DK Yadava, ADG Seed, ICAR, New Delhi
	Rapporteurs	Drs. Satish Kumar & Sunita Mahapatra
9.00-9.05	Welcome & Speaker Introduction	Dr GP Singh, Director, IIWBR, Karnal
9.05-9.45	ICAR-CIMMYT partnership: pivotal for accelerating wheat productivity gains under climate change	Dr Ravi P Singh, Distinguished Scientist and Head of Global Wheat Improvement
9.45-9.50	Remarks by the Co-Chairman	Dr DK Yadava, ADG Seed, ICAR, New Delhi
9.50-10.00	Chairman's Remarks	Dr TR Sharma, DDG(CS), ICAR, New Delhi
	Vote of Thanks	Dr GP Singh, Director, IIWBR, Karnal
Tea Break (10.00-11.00)		
11.00-13.00	Session-I: Inaugural Session	
	Chief Guest	Dr. TR Sharma, Deputy Director General (CS), ICAR, New Delhi
	Chairman	Dr Bram Govaerts, DG - CIMMYT, Mexico
	Guest of Honour	Dr. DH Ranade, Vice -Chancellor, RVSKVV, Gwalior
	Rapporteurs	Drs B S Tyagi, Mamrutha HM and Hari Krishna
	Stage convener	Dr. Anuj Kumar
11.00-11.05	Welcome address	Dr. S.K. Sharma, Director Research, RVSKVV, Gwalior
11.05-11.10	Lighting the lamp and ICAR Song	Chief Guest and Dignitaries on Dais
11.10-11.25	Presentation of Progress Report (2021-22)	Dr. GP Singh, Director, ICAR-IIWBR, Karnal
11.25-11.30	Address by Guest of Honour	Dr. DH Ranade, Vice -Chancellor, RVSKVV, Gwalior
11.30-11.400	Special Address by the Chairman	Dr Bram Govaerts, DG - CIMMYT, Mexico
11.50-11.55	Release of publications	Chief Guest and Dignitaries on Dias
11.55-12.00	Presentation of Awards and Varietal plaques	Chief Guest and Dignitaries on Dias
12.00 onwards	Inaugural Address by the Chief Guest	Dr. TR Sharma, Deputy Director General (CS), ICAR, New Delhi
	Vote of Thanks	Dr. Gyanendra Singh (PI CI), ICAR-IIWBR, Karnal
National Anthem		
Lunch Break (13.00-14.30)		
14.30-16.30	Session II - International Collaborations for Wheat & Barley Improvement	
	Chairman	Dr B Mishra, Former VC, SKUAST - Jammu
	Co-chairman	AK Joshi, Managing Director, BISA
	Rapporteurs	Drs Vishnu Kumar & Vaibhav Kumar Singh
14.30-14.45	Opening Remarks	Dr. Himanshu Pathak, Secretary, DARE & DG, ICAR, New Delhi
14.45-15.10	BNI-wheat technology for NUE	Dr. G. Subba Rao, JIRCAS, Japan
15.10-15.30	Achievements and prospects of Wheat Blast Disease	Dr Pawan Singh, Wheat Pathologist, CIMMYT, Mexico
15.30-15.50	ICAR-ICARDA Collaboration on wheat and barley	Dr. Shiv K Agrawal, Regional Coordinator, ICARDA, New Delhi

15.50-16.00	Remarks by the Co-chairman	Dr TR Sharma, DDG(CS), ICAR, New Delhi
16.00-16.15	Remarks by the Guest of Honour	Dr Bram Govaerts, DG - CIMMYT, Mexico
16.15-16.30	Remarks by the Chairman	Dr. Himanshu Pathak, Secretary, DARE & DG, ICAR, New Delhi
	Vote of Thanks	Dr GP Singh, Director, ICAR-IIWBR, Karnal
Tea Break (16.30-16.45)		
16.45 onwards	Varietal Identification Committee (VIC) Meeting	
	Chairman	Dr TR Sharma, DDG(CS), ICAR, New Delhi
	Member Secretary (VIC)	Dr GP Singh, Director, IIWBR, Karnal
	Experts	VIC Committee members and all PIs (Non-voting members)
	Facilitator	Drs Arun Gupta, Satish Kumar & Shri Om Prakash
	Presentation of varietal proposals	Dr GP Singh, Director & Member Secretary
DAY-2: August 30, 2022 (Tuesday)		
9.30-10.40	Session III- Panel Discussion on Improving Indian Wheat Quality for Changing Needs	
	Chairman	Dr B Mishra, Former VC, SKUAST - Jammu
	Co-chairman	Dr TR Sharma, DDG(CS), ICAR, New Delhi
	Panelists	Drs. Ravi P Singh, Parminder Virk, MV Malhan, NK Singh, NP Singh, Ravish Chatrath & SC Misra
	Rapporteurs	Drs Dinesh Kumar & Sunil Kumar
9.30-9.35	Welcome and setting the agenda	Dr GP Singh, Director, IIWBR, Karnal
9.35-9.40	Remarks by the Chairman	Dr B Mishra, Former VC, SKUAST - Jammu
9.40-9.45	Remarks by the Co-chairman	Dr TR Sharma, DDG(CS)
9.45-10.00	Status of wheat quality in India	Dr Sewa Ram, PI (Quality), ICAR-IIWBR, Karnal
10.00-10.30	Remarks from Panelists	03-05 minutes each
10.30-10.40	Conclusion and recommendations	Dr GP Singh, Director, ICAR-IIWBR, Karnal
	Vote of Thanks	Dr Sunil Kumar
Session Break (10.40-10.45)		
10.45-13.00	Session-IV: Discipline-wise Presentation of Progress Report (2021-22)	
	Chairman	Dr TR Sharma, DDG(CS), ICAR, New Delhi
	Co-Chairman	Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi
	Rapporteurs	Drs Ravinder Kumar, Vikas Gupta & OP Gupta
	PMC Members	Dr B. Mishra, Former VC, SKUAST-Jammu Dr BS Mahapatra (VC, BCKVV, Mohanpur) Dr AN Mishra (Ex Principal Scientist, IARI-RS, Indore) Dr SR Verma (Ex-Barley Breeder, CCSHAU, Hisar)
10.45-11.30	Crop Improvement	Dr Gyanendra Singh
	Resource Management	Dr SC Tripathi
	Crop Protection	Dr Sudheer Kumar
	Shimla	Dr OP Gangwar
Tea Break (11.30-11.45)		
11.45-12.30	Quality & Basic Sciences	Dr Sewa Ram
	Barley Improvement	Dr RPS Verma
	Social Sciences	Dr Satyavir Singh
12.30-12.40	Discussion & Remarks	All Experts & Dr GP Singh, Director, ICAR-IIWBR
12.40-12.50	Remarks by the Co-chairman	Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi
12.50-13.00	Concluding Remarks by the Chairman	Dr TR Sharma, DDG(CS), ICAR, New Delhi
Lunch Break (13.00-14.00)		
14.00-15.45	Session V- Progress of Research in North Western Plains Zone (NWPZ):A Review	
	Chairman	Dr NP Singh, VC, BUAT Banda
	Co-chairman	Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi
	Rapporteurs	Drs CN Mishra & Charan Singh
14.00-14.05	Welcome & Introductory remarks	Dr GP Singh, Director, IIWBR, Karnal
14.05-14.15	Remarks by Chairman	Dr TR Sharma, DDG(CS)

14.15-15.30	Presentation of research work by NWPZ centers (7 minutes presentation & 3 minutes discussion)	ICAR-IARI, New Delhi: Dr Rajbir Yadav
		PAU, Ludhiana: Dr VS Sohu
		CCSHAU, Hisar: Dr OP Bishnoi
		GBPUA&T, Pantnagar: Dr JP Jaiswal
		RVSKVV, Gwalior: Dr Sudhanshu Jain
		SKUAST, Jammu: Dr SC Kashyap
	SVPUA&T, Modipuram: Dr Lokesh Gangwar	
15.30-15.35	Remarks from PMC	PMC Members & Dr GP Singh, Director, ICAR-IIWBR
15.35-15.40	Remarks by the Co-chairman	Dr RK Singh, ADG(FFC)
15.40-15.45	Remarks by the Chairman	Dr TR Sharma, DDG(CS)
	Vote of Thanks	Dr Gyanendra Singh, PI-Crop Improvement
Tea Break (15.45-16.00)		
16.00-17.15	Concurrent Session: Finalization of Work Plan (2022-23)	
	Chairman	Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi
	Co-Chairman	Dr GP Singh, Director, IIWBR, Karnal
	Rapporteurs	Drs. OP Gangwar & RS Chhokar
16.00-17.15	Crop Improvement	Dr Gyanendra Singh
	Resource Management	Dr SC Tripathi
	Crop Protection	Dr Sudheer Kumar
	Quality & Basic Sciences	Dr Sewa Ram
	Barley Network	Dr RPS Verma
General Body Meeting, SAWBAR (17.30 pm onwards)		
DAY-3: August 31, 2022 (Wednesday)		
09.30-11.15	Session VI - Status Report from states and interaction with farmers & industry partners	
	Chairman	Dr V.S.Tomar, Ex-VC, JNKVV Jabalpur
	Co-chairman	Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi Dr S.C. Bhardwaj, Ex-Incharge, RS, IIWBR Shimla
	Rapporteurs	Drs Anuj Kumar, Amit Sharma & SK Bishnoi
09.30-09.45	Speedy percolation of new technologies	Director, DWD
09.45-10.30	Status reports from states	Concerned Director (Agriculture) from states
10.30-10.50	Farmers' experiences and views	Progressive farmers from different states
10.50-11.00	Remarks by the Co-Chairman	Dr RK Singh, ADG (CC & FFC) Dr S.C. Bhardwaj, Ex-Incharge, RS, IIWBR Shimla
11.00-11.15	Remarks by the Chairman	Dr V.S.Tomar Founder VC, RVSKVV, Gwalior & Ex-VC, JNKVV Jabalpur
Tea Break (11.15-11.30)		
11.30-13.30	Session VII-Plenary Session	
	Chairman	Dr DH Ranade, VC, RVSKVV, Gwalior
	Co-chairman	Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi
	Rapporteurs	Drs Poonam Jasrotia, PL Kashyap Pramod Prasad
11.30-12.30	Significant recommendations and highlights of workplan (2022-23)	Respective PIs(Dr Gyanendra Singh, Dr SC Tripathi, Dr Sudheer Kumar, Dr Sewa Ram & Dr RPS Verma)
12.30-12.40	Discussion & Remarks	PMC members & Dr GP Singh, Director, ICAR-IIWBR
12.40-12.50	Presentation VIC report	Dr GP Singh, Director, IIWBR, Karnal
12.50-13.00	Felicitation of Superannuating Scientists	All Dignitaries
13.00-13.05	Finalization of venue for next AICRP workshop	Dr GP Singh, Director, IIWBR, Karnal
13.05-13.15	Remarks by the Co-Chairman	Dr RK Singh, ADG (CC & FFC), ICAR, New Delhi
13.15-13.25	Remarks by the Chairman	Dr SK Rao, VC, RVSKVV, Gwalior
	Vote of Thanks	Dr Gyanendra Singh (Organizing Secretary)
National Anthem		



61st All India Wheat and Barley Research Workers' Meet

(August 29-31, 2022)

Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Gwalior (MP)

61^{वीं} अखिल भारतीय गेहूँ एवं जौ अनुसंधान कार्यकर्ता गोष्ठी

(29-31 अगस्त, 2022)

राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय, ग्वालियर (मध्य प्रदेश)

