

प्रगति प्रतिवेदन
PROGRESS REPORT
2019-20

**PROCEEDINGS,
RECOMMENDATIONS
AND WORK PLAN**



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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PROCEEDINGS

(Research Review, Recommendations and Plan of Work 2020-21)

59th All India Wheat & Barley Research Workers' Meet

(August 24-25, 2020: Virtual Mode)

Organized by

ICAR-Indian Institute of Wheat & Barley Research

Issued by

Dr Gyanendra Pratap Singh

Director



**ICAR-Indian Institute of Wheat & Barley Research
Karnal-132 001, Haryana, India**

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FOREWORD & ACKNOWLEDGEMENTS

The 59th All India Wheat and Barley Research Workers' Meet, was virtually organized by the ICAR-Indian Institute of Wheat & Barley Research, Karnal from August 24-25, 2020. The meet was inaugurated by Dr T Mohapatra, Secretary, DARE & Director General, ICAR, New Delhi. The other dignitaries who graced the occasion were Dr TR Sharma, DDG (Crop Science), Dr. YP Singh, ADG (FFC), Dr. AK Singh, Director, IARI, New Delhi and Dr. AK Joshi, CIMMYT Co-ordinator, India. The meeting had five sessions for reviewing the research progress of 2019-2020, five year work performance of central zone centres and planning of 2020-21 season trials. Besides, one session on International collaborations with CIMMYT, ICARDA and HARVEST PLUS was also held wherein research program with these organizations was discussed.

This year was remarkable for wheat production and despite COVID pandemic, the national wheat production reached an all-time highest level of 107.54 mt. The consistent record level of production has ensured the Hon'ble Prime Minister's vision of Atmanirbhar Bharat, to be self-reliant nation. This significant achievement could not have been possible without active efforts of scientific community who have been consistently creating awareness among farmers about latest crop technologies aiming for higher productivity of these two important cereal crops. Seed is the crux of crop production and quality seeds are more pertinent to realize better yield and profit. A total of 19639.46 quintals of breeder seed was produced catering the diverse needs of farmers. The highest quantity of breeder seed was produced for HD2967 (2467.25q), followed by HD3086 (1731.7q) & PBW723 (1148.8q). HD2967 has been serving as one of the most promising varieties which garnered an economic surplus to the tune of Rs 62405 crores (at 2018 prices) during the period of past eight years. The country has not witnessed any pests and/or disease epidemic in wheat. Timely monitoring and vigil by the team of scientist across production regions as well as contingent advisories through multiple platforms including social media has kept the wheat production in safer hands. Preparedness on occurrence of blast disease in wheat has been under full swing since its reporting in the neighboring countries.


All these milestones could not have been achieved without active leadership of Dr T Mohapatra, Secretary DARE and DG, ICAR. I express my deep sense of gratitude to him for his guidance and continuous support. I am also thankful to Dr TR Sharma, DDG (Crop Science), ICAR for his encouragement and taking keen interest in planning of the meeting and also giving us valuable suggestions in the improvement of AICRP program.

I express our deep sense of appreciation to the PMC members; Dr B. Mishra (Ex-Director, ICAR-IIWBR), Dr BS Mahapatra (Ex-Director: ICAR-CRIJAF, Kolkata), Dr AN Mishra (ICAR-Emeritus Scientist, IARI RS, Indore), Dr ML Lodha (Ex-Head, Division of Biochemistry, ICAR-IARI, New Delhi), and Dr SR Verma (Ex- Barley Breeder, CCSHAU, Hisar) for giving constructive suggestions for the improvement of program and for their active participation during the whole program.

I also place on record my sincere thanks to Dr. Hans Braun, Dr. Ravi Singh, Dr AK Joshi and zonal coordinators for fine tuning the programme are gratefully acknowledged.

I would also take this opportunity to thank all the AICRP co-operators AICRP co-operators who inspite of COVID conducted the trials for timely submission of the data .I would also appreciate all the Principal Investigators and staff for timely preparation of Annual Progress reports and this proceeding. Thanks to the Chairmen and rapporteurs of various technical sessions for smooth conduct and recording of proceedings.

I wish all the best for the ensuing season.


(GP Singh)

SESSION I: INAUGURAL SESSION

August 24, 2020	Chairman	: Dr.TR Sharma (DDG,CS), ICAR-New Delhi
	Co-Chairman	Dr.YP Singh (ADG, FFC), ICAR-New Delhi
	Rapporteurs	: Drs. Hanif Khan and OP Gupta

The 59th All India Wheat and Barley Research Workers' meet was held virtually through zoom platform. The meet was inaugurated by Dr T Mohapatra, Secretary, DARE & Director General, ICAR, New Delhi. The other dignitaries who graced the occasion were Dr TR Sharma, DDG (Crop Science), Dr. YP Singh, ADG (FFC), Dr. AK Singh, Director, ICAR-IARI, New Delhi and Dr. AK Joshi, CIMMYT Co-ordinator, India. The chairman of the session Dr. TR Sharma invited Dr GP Singh, Director, ICAR-IIWBR, Karnal to make presentation on the significant achievements made during the year 2019-20.

Dr Singh expressed satisfaction on the India's wheat production surpassing 107 million tons during 2019-20 as a consequence of the hard work of farmers and scientific community and sound policies of government. He appraised the house that during 2019-20 a total of 14 wheat and barley varieties were released by the Central Sub-Committee on Crops Standards, Notification and Release of Varieties. Besides, three wheat and one barley varieties were released by state varieties release committees of various states during the year 2019-20. During the year 2019-20, 14 genetic stocks of wheat were registered with ICAR-NBPGR, New Delhi for traits like resistance/tolerance to biotic and abiotic stresses, male sterility, grain-quality and, early maturity and increased micro-nutrient content. Dr. Singh also informed the participants about the major research achievements of crop protection, resource management technology, wheat and barley quality and social sciences. On this occasion, he honored the scientists involved in developing improved wheat and barley varieties during the previous year and also felicitated superannuating wheat and barley workers. He also released major publications of the institute and also felicitated the authors and co-authors of these publications during his address.

Dr YP Singh ADG (FFC) and co-chairman of the session appreciated the excellent work of wheat and barley programmes. He expresses his concerns about declining area of the barley cultivation despite availability of low cost technologies. He stressed upon better dissemination of technologies from ICAR and DAC.

The chairman of the session Dr TR Sharma complemented the excellent achievement of AICRP on Wheat and Barley during 2019-20. Dr Sharma appreciated the variety development teams and achievement of wheat production of more than 107 million tons during 2019-20 ensuring food security for India under Covid-19 situation. He emphasized on strengthening targeted breeding programme on Fe and Zn biofortification, protein content. He advocated for more focussed studies on bioavailability of micro-nutrients stress upon developing collaboration with other organizations like NIN and NIFTEM. He recognised the historically successful deployment of disease resistance genes, particularly rust resistance and the continued need for the strategic deployment of diverse rust resistance genes for ensuring the food security of India. Dr Sharma emphasized on the intensive study on virulence structure of various wheat diseases like rusts, powdery mildew, and Karnal bunt. He stressed on developing technologies to cope with crop stresses by using tools of speed breeding, MAS, genomic selection etc. The importance of collaboration with CGIAR institutes CIMMYT and ICARDA was acknowledged. He also emphasized on making every possible efforts to sustain the barley area, developing high malt genotypes to attract brewery industry.

The chief guest of the program, Dr. Trilochan Mohapatra, Secretary DARE & Director General ICAR congratulated Dr GP Singh, Director, ICAR-IIWBR and his teams for their contribution in record production of wheat. He acknowledged the support of CIMMYT and ICARDA for providing the breeding lines, important germplasm, capacity building and enabling phenotyping facility of various disease hot-spots. Dr Mahapatra appreciated the high seed replacement of wheat cultivars which has contributed to the record wheat production and increased farmer's income. He emphasized the need of varietal mosaic and systematic gene deployment for rust resistance. Dr Mohapatra emphasized to strengthen studies on epidemiology of wheat diseases particularly rusts. He underlined that the new wheat and barley varieties/technologies should be showcased on various platforms in the form of the success stories. Dr Mohapatra stressed on the identification of product traits in wheat for international market and the value chain. He also emphasized on use of microbiological consortia and nano-fertilization system in wheat production technologies.

The inaugural session ended with formal vote of thanks by Dr Gyanendra Singh, Principal Investigator Crop Improvement.

SESSION II: PRINCIPAL INVESTIGATORS' REPORT- RESEARCH REVIEW MEETING

August 24, 2020	Chairman	: Dr.TR Sharma (DDG,CS), ICAR-New Delhi
	Co-Chairman	Dr.YP Singh (ADG, FFC), ICAR-New Delhi
	Rapporteurs	: Drs. Sendhil R and Mamrutha HM

The session was chaired by Dr.TR Sharma, DDG (CS), ICAR, New Delhi and co-chaired by Dr.YP Singh,ADG (FFC), ICAR. At the outset, session chairman welcomed delegates to the second session and informed the house to have discussion after the end of all PI's presentations. He invited Dr. Gyanendra Singh (PI, Crop Improvement) to deliver his presentation on the previous year's progress. Dr.Gyanendra Singh presented the list of varieties released during 2019-20 and genetic stocks registered for the various traits. He also listed different trials proposed and conducted. He informed that the success rate of trial conduction has been increasing over the years. PI informed the house about the monitoring of trials and also highlighted that, due to COVID-19 lockdown NHZ was monitored virtually. Subsequently, Dr.Gyanendra Singh listed the promising genotypes which are likely to get promoted to the next stage on the basis of their performances. PI presented the seed production activities and highlighted that recent released varieties are coming up in seed indents and old varieties are replaced by higher yielding newer varieties recommended for the specific zone. Towards the end of his presentation, he listed various capacity building programs offered during the year and different issues for discussion point.

The chairman appreciated Dr.Gyanendra Singh for highlighting the significant achievement under crop improvement and invited Dr.SC Tripathi (PI, Resource Management) to present the progress report. Dr.SC Tripathi, informed the house about various trials conducted under resource management. He also informed the house about various chemicals and their combinations being tested as probable weedicides for controlling weed menace in wheat. In alignment with the government "per drop more crop" mission, Dr.SC Tripathi, presented the findings about the water management using micro irrigation methods. Findings of the experiments on growth regulators and application of hydrogel were also presented highlighting the benefits.

Dr. Sudheer Kumar (PI,Crop Protection) presented the significant achievements of different trials and nurseries conducted under crop protection coordination programme. The major highlights were on rust and other wheat disease survey and surveillance, new pathotypes identified in different rusts, post harvest crop health monitoring specially in concern to Karnal bunt disease. Leaf rust and brown rust status in CZ and PZ zones, APR and SRT conducted, strategies for control of blast like disease in India, number of new chemicals identified for control of aphids and cereal cyst nematode were also presented.

Dr. SC Bhardwaj, Head, Flowerdale Shimla, elaborated the activities at Shimla centre, including SRT screening for rusts and their national service for inoculum supply for different centres across the country. He also explained the epidemiology of the rust pathogens and the new races of rusts prevailing in the present situation.

Dr.Sewa Ram (PI, Quality and Basic Sciences) presented the highlights of wheat quality work of coordination programme. He explained about promising genotypes identified for different wheat products, processing and nutritional quality. Quality in released wheat varieties is increasing over decades due to change of PBW 343 in breeding programme. Promising genotypes were identified for yellow pigment content also. Nutrition quality has been increased in all zones and micro level tests were standardized for different quality parameters at ICAR-IIWBR. He also highlighted the significant findings of wheat biofortification w.r.t. Fe and Zn including agronomical biofortification. At the end, he informed the house that due to lockdown quality analysis of mandi samples were not done.

Dr.RPS Verma (PI, Barley Network) presented the progress of barley coordination programme. He presented the status on production, productivity and quality in barley, new varieties and genetic stocks released, interaction with companies for sending materials to them, barley germplasm activities, working on competing with international standards of malt barley, finding entries for host resistance, new chemicals identified for insect and weeds control. At the end he emphasized that barley as a nutritional crop, it should be promoted for cultivation in a large area.

Dr. Satyavir Singh (PI, Social Sciences) presented the progress report on the impact of FLD's at farmers' field. In his presentation, he informed the house that 98 per cent of allotted wheat FLDs were conducted and in the case of barley, it was 92 per cent. He also presented the high yielding varieties in both wheat (HI 8759 d: 77 q/ha in CZ) and barley (RD 2907: 67.50 q/ha at NWPZ) at different zones. In the case of wheat FLDs, the yield gain due to improved varieties over checks was highest in NEPZ followed by CZ, NHZ, NWPZ and PZ. The returns per rupee of investment was highest in CZ in the case of wheat, whereas it was in NEPZ for barley by adoption of improved varieties. Further, he also emphasized that FLDs were much pertinent for technology percolation, yield gain, capacity building of farmers which ultimately gets reflected on income and food security.

Post presentation of all the PI's of different divisions, there was a detailed discussion by all the experts viz., Dr. BS Mahapatra (Ex-Director: ICAR-CRIJAF, Kolkata), Dr. AN Mishra (ICAR-Emeritus Scientist, ICAR-IARI RS, Indore), Dr. ML Lodha (Ex-Head, Division of Biochemistry, ICAR-IARI, New Delhi) and Dr. SR Verma (Ex- Barley Breeder, CCSHAU, Hisar) along with Dr.GP Singh, Director, ICAR-IIWBR. In the experts' discussion, Dr. BS Mahapatra suggested for validating the biofertilizer technology as it gave around 10 per cent yield gain. Climate change is a serious threat and the program activities should orient towards addressing the challenges posed by climate variability. Focus should be given on nutrient management especially in NEPZ wherein soil carbon, sulphur and phosphorus should be emphasized. He also reiterated that only validated technologies should come out as a recommendation from the AICRP on wheat and barley. Dr. SC Tripathi in his reply, said that conservation agriculture has been recommended widely which plays a prominent role in increasing the carbon content. Similarly, intervention through cropping system like Rice-Wheat-Green Gram will also have some positive impact on soil carbon content. Sensor based nitrogen application in field is saving 15-20kg nitrogen per hectare and also, nano fertilizer has been tried this crop season to improve nitrogen use efficiency.

Dr. AN Mishra in his remarks indicated that only PAU is involved in targeting specific genes like Yr10 and Yr15 for rust resistance. Dr. SC Bhardwaj replied that reactions decide the postulation. He mentioned that PAU, ICAR-IIWBR and ICAR-IARI are working in a collaborative mode and trying to use the maximum information available in trait specific genes. Dr. AN Mishra also recommended for testing various isolates across pathotype for different years like University of Minnesota is doing and also to identify race specific APR genes in varieties. Dr. Bhardwaj in his reply informed the house that they are doing APR studies for a few mega varieties. Dr ML Lodha insisted that the AICRP should focus on nutritional quality, especially micro nutrients. He recommended the integration of breeding for wheat quality with crop breeding program. He suggested for publishing a catalogue of bulletin based on nutritional evaluation, decentralising the testing lab facility, initiating work on resistant starch, fixing the benchmark for Zn and Fe with respect to varietal identification (like in pearl millet as informed by the DDG-CS), special facility for bioavailability testing, and, separate breeding program for biscuit and bread. He advocated for a program to lower the glycemic index. Like NIN, Hyderabad he insisted for collaboration with NABI, PGI on clinical trials with respect to bioavailability of micro nutrients.

Dr. SK Verma appreciated the barley network and insisted to put efforts in raising the area under barley as a steep decline has been noticed in comparison to the past. He advocated collaborating with the private companies to increase the efficiency as well as intensity, to recommend the Government for imposing duty on imports so that domestic demand will increase, allotment of more FLDs in Madhya Pradesh, special package for hilly regions, and distribution of huskless barley due to increasing demand. Barley being a sensitive crop to aphids, research has to focus now more on developing resistant barley varieties.

Dr. YP Singh, ADG (FFC) in his remarks congratulated the functioning of AICRP on wheat and barley. He indicated that a research program should be initiated on biocontrol of pests, termite as well as aphids management for barley.

In the concluding remarks by Dr. TR Sharma, DDG (CS) appreciated the AICRP on wheat and barley for being a model for other AICRPs. He advocated for collaboration with AICRP on arthropod and regular monitoring of coordinating centres in virtual mode and underperforming centres to be removed by considering its five years' performance. He congratulated the researchers for digitizing the coordinated trials which needs to be replicated in others AICRPs. He stressed for flagship programs to be incorporated in the EFC document. He recommended the resource management team to present the data by including significance level and to come out with a package of practices from the validated trials for dissemination to SAUs, State Departments and other line departments. For plant protection, he recommended to have the analysis on multiple resistance for lines as well as genetic stock, strengthening the blast resistance breeding program especially for the eastern region, IPM in collaboration with the NCIPM. He recommended extension of digital platforms and to keep fund in EFC for work stations for storage of large data. He congratulated the progress of ICAR-IIWBR RS Shimla for its contribution with respect to rust. Further, in his remarks he stressed for research on stem rust as well, followed by strong collaboration with CGIAR organizations.

The Day 1 session wrapped up with the remarks and thanks to all the participants by Dr.GP Singh, Director, ICAR-IIWBR, wherein he said all recommendations were noted and thanked the Project Management Committee (PMC) for sharing their wisdom.

SPECIAL SESSIONS: RESEARCH PLANNING AND FINALIZATION OF WORK PLAN

Due to the pandemic situation caused by COVID 19, AICRP workshop was held on virtual mode for two days from August 24-25, 2020. As the time was short to discuss the various activities for season 2020-21, the work plan meetings for finalization were held before actual virtual meeting. The meeting of Crop Improvement was held on July 27, 2020, Barley Improvement on July 28, 2020, Crop Protection on July 29, 2020 and Resource Management on August 05, 2020. The work plan finalized for 2020-21 crop season of each program is given as under:-

Work Plan (2020-21)-Crop Improvement

National Initial Varietal Trial NIVT-1A-IR-TS-TAS, 2020-21

Conducting centres

Zone	No.	Centres
NWPZ	11	Delhi, Jammu, Ludhiana, Gurdaspur, Hisar, Karnal, Bulandshahr, Pantnagar, Durgapura, Modipuram, Sriganaganagar
NEPZ	9	Kanpur, Ayodhya, Varanasi, Sabour, RPCAU-Pusa, Ranchi, Kalyani, Coochbehar, Shillongani
Total	20	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	5	HD3385, HD3386, HD3387, HD3388, HD3389
2.	IIWBR, Karnal	5+1	DBW342, DBW343, DBW344, DBW345, DBW346, DBW362
3.	Durgapura	3	RAJ4555, RAJ4556, RAJ4557
4.	Ayodhya	1	NW8012
5.	Hisar	3	WH1292, WH1293, WH1294
6.	Kanpur	1	K2001
7.	Ludhiana	5	PBW849, PBW850, PBW851, PBW852, PBW853
8.	Pantnagar	4	UP3080, UP3081, UP3082, UP3083
9.	Varanasi	1	HUW844
10.	CSSRI, Karnal	1	KRL1914
11.	BARC	1	TAW123
13	Jammu	1	JAUW691
	Checks	4	DBW187, DBW222, HD3086, HD2967
Total entries		36(32+4)	

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	: NWPZ: November 1-15; NEPZ: November 15-25
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, 2020-21**

Conducting centres

Zone	No.	Centres
NWPZ	11	Delhi, Jammu, Ludhiana, Gurdaspur, Hisar, Karnal, Bulandshahr, Pantnagar, Durgapura, Modipuram, Sriganaganagar
NEPZ	9	Kanpur, Ayodhya, Varanasi, Sabour, RPCAU-Pusa, Ranchi, Kalyani, Coochbehar, Shillongani
Total	20	

Details of trial entries

SN	Contributing centres	No. of Entries	Name of entries
1.	IARI, Delhi	4	HD3390, HD3391, HD3417, HD3416
2.	IWBR, Karnal	4	DBW347, DBW348, DBW349, DBW350
3.	CSSRI, Karnal	1	KRL1912
4.	Durgapura	2	RAJ4558, RAJ4559
5.	Ayodhya	3	NW8013, NW8017, NW8019
6.	Hisar	2	WH1295, WH1296
7.	Kanpur	3	K2003, K2004, K2005
8.	Ludhiana	3	PBW854, PBW855, PBW856
9.	Pantnagar	2	UP3084, UP3085
10.	Ranchi	2	JKW282, JKW287
11.	Sabour	2	BRW3895, BRW3902
12.	Varanasi	2	HUW845, HUW846
13.	BARC	1	TAW119
13	SHUATS, Prayagraj	1	AAI-W70
	Checks	4	DBW187, DBW222, HD3086, HD2967
Total entries		36 (32+4)	

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	: NWPZ: November 1-15, NEPZ: November 15-25
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, 2020-21**

Conducting centres

Zone	No.	Centres
CZ	10	Indore, Powarkheda, Gwalior, Sagar, Jabalpur, Bilaspur, Junagadh, Vijapur, Kota, Udaipur
PZ	8	Niphad, Pune, Akola, Parbhani, Dharwad, Ugar-Khurd, Nippani, Kolhapur
Total	18	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	5	HI1656, HI1657, HI1658, HI1659, HI1660
2.	IIWBR, Karnal	2	DBW351, DBW352
3.	Bilaspur	1	CG1038
4.	Dharwad	2	UAS3015, UAS3016
5.	Durgapura	1	RAJ4560
6.	Gwalior	2	RVW4343, RVW4348
7.	Hisar	1	WH1297
8.	Jabalpur	2	MP3552, MP3545
9.	Ludhiana	1	PBW857
10.	Niphad	2	NIAW3924, NIAW3950
11.	Pantnagar	1	UP3086
12.	Powarkheda	2	MP1378, MP1379
13.	Pune	4	MACS6785, MACS6786, MACS6789, MACS6792
14.	Akola	1	WSM109-4
15.	Vijapur	2	GW529, GW530
16.	Junagadh	1	GW533
17.	Udaipur	1	PWU6
18.	Nuziveedu Seeds	1	NWS2194
	Checks	4	GW322, HI1544, MACS6222, MACS6478
Total entries		36 (32+4)	

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 10-20
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, 2020-21**

Conducting centres

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

Details of trial entries

SN	Contributing centres	No. of Entries	Name of entries
1.	IARI, Delhi	5	HD3392, HD3393, HD3394, HD3395, HD3396
2.	IIWBR, Karnal	5	DBW353, DBW354, DBW355, DBW356, DBW357
3.	Durgapura	3	RAJ4561, RAJ4562, RAJ4563
4.	Ayodhya	2	NW8004, NW8022
5.	Hisar	3	WH1298, WH1299, WH1300
6.	Kanpur	1	K2007
7.	Ludhiana	5+1	PBW858, PBW859, PBW860, PBW861, PBW862, PBW875
8.	Pantnagar	3+1	UP3087, UP3088, UP3089, UP3094
9.	Ranchi	1	JKW285
10.	Varanasi	1	HUW847
11.	Sabour	1	BRW3897
	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	: NWPZ :December, 10-25; NEPZ :December 15 - 25
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, 2020-21**

Conducting centres

Zone	No.	Centres
CZ	10	Indore, Gwalior, Powarkheda, Jabalpur, Bilaspur, Raipur, Junagadh, Vijapur, Udaipur, Sagar
PZ	7	Dharwad, Niphad, Pune, Parbhani, Akola, Nippani, Ugar-khurd
Total	17	

Details of trial entries

SN	Contributing centres	No. of Entries	Name of entries
1.	IARI, Delhi	4	HI1661, HI1662, HI1663, HI1664
2.	IIWBR, Karnal	1	DBW354
3.	Akola	1	AKAW5349
4.	Bilaspur	1	CG1039
5.	Dharwad	2	UAS3017, UAS3018
6.	Hisar	1	WH1401
7.	Jabalpur	2	MP3541, MP3542
8.	Junagadh	1	GW534
9.	Lok Bharti	1	LOK78
10.	Ludhiana	1	PBW863
11.	Niphad	2	NIAW4028, NIAW3923
12.	Powarkheda	1	MP1380
13.	Pune	2+1	MACS6784, MACS6779, MACS6793
14.	Vijapur	1+1	GW531, GW535
	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	: CZ: December 5-15; PZ: December 1-10
Seed requirement	: 6.0 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, 2020-21**

Conducting centres

Zone	No.	Centres
CZ	10	Powarkheda, Indore, Junagadh, Vijapur, SK Nagar, Kota, Udaipur, Jabalpur, Bilaspur, Sagar
PZ	7	Dharwad, Ugar-Khurd, Nippani, Niphad, Pune, Akola, Kolhapur
Total	17	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	5	HI8834, HI8835, HI8836, HI8837, HI8838
2.	IIWBR, Karnal	2	DDW56, DDW57
3.	Dharwad	2	UAS476, UAS477
4.	Hisar	1	WHD966
5.	Ludhiana	1	PDW361
6.	Niphad	2	NIDW1399, NIDW1405
7.	Powarkheda	3	MPO1381, MPO1382, MPO1383
8.	Pune	2	MACS4110, MACS4111
9.	Vijapur	2	GW1357, GW1358
10.	Udaipur	1	PWU10
11.	Parbhani	1	PBND1625-01
	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	: CZ: November 10-20; PZ: November 5-15
Seed requirement	: 6.0 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, 2020-21**

Conducting centres

Zone	No.	Centres
NWPZ	11	Jammu, Balachaur, Gurdaspur, Ludhiana, Hisar, Delhi, Karnal, Pantnagar, Modipuram, Bulandshahr, Durgapura
NEPZ	9	Ayodhya, Kanpur, RPCAU-Pusa, Varanasi, Sabour, Ranchi, Kalyani, Coochbehar, Shillongani
Total	20	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	IARI, Delhi	4+1	HD3397, HD3398, HD3399, HD3400, HD3418
2.	IIWBR, Karnal	4	DBW358, DBW359, DBW360, DBW361
3.	Ayodhya	1	NW8010
4.	Hisar	2	WH1402, WH1403
5.	Jammu	1	JAUW694
6.	Kanpur	1	K2010
7.	Ludhiana	3	PBW864, PBW865, PBW866
8.	Pantnagar	2	UP3090, UP3091
9.	Sabour	1	BRW3901
10.	Varanasi	1	HUW848
	Checks	4	WH1142, PBW644, HI1612, K1317
Total entries		25 (21+4)	

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	: NWPZ: Oct. 25 - Nov. 5; NEPZ: Oct. 25 - Nov. 10
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-TDM, 2020-21**

Conducting centres

Zone	No.	Centres
CZ	9	Powarkheda, Indore, Sagar, Jabalpur, Bilaspur, Udaipur, Vijapur, Junagadh, Dhandhuka
PZ	11	Dharwad, Bagalkot, Nippani, Niphad, Pune, Akola, Ugar-Khurd, Kolhapur, Parbhani, Savalivihar, Bailhongal
Total	20	

Details of trial entries

SN	Contributing Centres	No. of Entries	Name of entries
1.	Delhi	5	HI1665, HI1666, HD3401, HI8839(d), HI8840(d)
2.	IIWBR, Karnal	2+1	DBW358, DBW359, DDW58(d)
3.	Akola	1	AKAW5351
4.	Bilaspur	1	CG1040
5.	Dharwad	2	UAS3019, UAS478(d)
6.	Jabalpur	1	MP3544
7.	Niphad	2	NIAW4028, NIAW3922
8.	Powarkheda	2	MP1377, MPO1376(d)
9.	Pune	2	MACS6795, MACS4107(d)
10.	Vijapur	2	GW532, GW1359(d)
	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. 10
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

Northern Hills Zone
Advance Varietal Trial, 2020-21
AVT-RF-TS-TAS

Trial conducting centres

State	Centres	Name of the centres
Himachal Pradesh	4	Malan, Shimla, Bajaura, Dhaulakuan
Uttarakhand	3	Almora, Majhera, Ranichauri
J&K	2	Khudwani, Wadura
Manipur	1	Imphal
Meghalaya	1	Umiam
Total	11	

Details of test entries

Contributing Centres	No. of entries	Name of entries
VPKAS, Almora	1	VL2041
Checks	4	VL907, HS507, HPW349, HS562
Total	5 (1+4)	

Experimental details

Design	: R.B.D.
Replications	: Six
Plot size	: 3.5 x 1.20m (6 rows)
Fertilizer dose (kg/ha) (N:P:K)	: (60:30:20)
Time of sowing	: (October 15-31)
Seed rate (kg/ha)	: 100
Seed requirement	: 7 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, 2020-21
AVT-IR-TS-TAS**

Trial conducting centres

State	Centres	Name of the centres
Himachal Pradesh	3	Malan, Shimla, Bajaura
Uttarakhand	1	Almora
J&K	1	Khudwani
Manipur	1	Imphal
Meghalaya	1	Umiam
Total	7	

Details of test entries

Contributing Centres	No. of entries	Name of entries
VPKAS, Almora	1	VL2041
Checks	4	VL907, HS507, HPW349, HS562
Total	5 (1+4)	

Experimental details

Design	: R.B.D.
Replications	: Six
Plot size	: 3.5 x 1.20m (6 rows)
Fertilizer dose (kg/ha) (N:P:K)	: (120:60:40)
Time of sowing	: (November 1-15)
Seed rate (kg/ha)	: 100
Seed requirement	: 5 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
Initial Varietal Trial, 2020-21
IVT-RI-LS-TAS**

Trial conducting centres

State	Centres	Name of the centres
Himachal Pradesh	4	Shimla, Malan, Bajaura, Dhaulakuan
Uttarakhand	3	Almora, Majhera, Ranichauri
Meghalaya	1	Umiam
Manipur	1	CAU-Imphal
J&K	1	Khudwani
Total	10	

Details of test entries

Contributing Centres	No. of entries	Name of entries
CSKPHKV, Malan	2	HPW480, HPW481
IARI, RS, Shimla	3	HS685, HS686, HS687
VPKAS, Almora	3	VL3025, VL3026, VL3027
GBPUA&T, Pantnagar	1	UP3093
Checks	2	VL892, HS490
Total	11 (9+2)	

Experimental details

Design	: R.B.D.
Replications	: Four
Plot size	: 3.5 x 1.08m (6 rows)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: December 1-15
Seed rate (kg/ha)	: 125
Seed requirement	: 7 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
Initial Varietal Trial, 2020-21
IVT-RF-TS-TAS**

Trial conducting centres

State	Centres	Name of the centres
Himachal Pradesh	4	Malan, Shimla, Bajaura, Dhaulakuan
Uttarakhand	3	Almora, Majhera, Ranichauri
J&K	2	Khudwani, Wadura
Manipur	1	Imphal
Meghalaya	1	Umiam
Total	11	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Shimla	4	HS682, HS683, HS684, HD3402
CSKHPKV, Malan	4	HPW476, HPW477, HPW478, HPW479
VPKAS, Almora	4	VL2043, VL2044, VL2045, VL2046
GBPUA&T, Pantnagar	1	UP3092
SKUAST-K, Khudwani	1	SKW358
Checks	2	HS507, HS562
Total	16 (14+2)	

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	:	7 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, 2020-21
AVT-IR-TS-TAS**

Trial conducting centres

State	No.	Centres
Punjab	4	Ludhiana, Gurdaspur, Rauni, Faridkot
Haryana	5	Hisar, Karnal, Rohtak, Shikohpur, KVK-Kaithal
Rajasthan	3	Durgapura, Sriganganagar, Tabiji
Uttar Pradesh	4	Nagina, Bulandshahr, Modipuram, Ujhani
Uttarakhand	2	Pantnagar, Kashipur
J & K	1	Jammu
Delhi	1	Delhi
Total	20	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Delhi	3	HD3349 [#] , HD3354, HD3406 ^M
PAU, Ludhiana	2	PBW826, PBW876 ^B
RARI, Durgapura	1	RAJ4548 [#]
IIWBR, Karnal	1	DBW313 [#]
CCSHAU, Hisar	1	WH1283
Checks	5	HD2967, HD3086, WH1105, DBW187, DBW222
Total	13 (8+5)	

[#] denotes resistance to wheat blast; ^M MABB entry; ^B Biofortification 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	: 22 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, 2020-21
AVT-IR-LS-TAS**

Trial conducting centres

State	No.	Centres
Punjab	4	Ludhiana, Gurdaspur, Rauni, Faridkot
Haryana	5	Hisar, Karnal, Rohtak, Shikohpur, KVK-Kaithal
Rajasthan	3	Durgapura, Sriganganagar, Tabiji
Uttar Pradesh	4	Nagina, Bulandshahr, Modipuram, Ujhani
Uttarakhand	2	Pantnagar, Kashipur
J & K	1	Jammu
Delhi	1	Delhi
Total	20	

Details of test entries

Contributing Centres	No. of entries	Name of entries
Ranchi	1	JKW261#*
Ludhiana	1	PBW834
Checks	4	HD3059, DBW173, WH1124, PBW771
Total	6 (2+4)	

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

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 10-25
Seed rate (kg/ha)	: 125
Seed requirement	: 23 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, 2020-21
AVT-RI-TS-TAS**

Trial conducting centres

State	No.	Centres
Punjab	3	Ludhiana, Gurdaspur, Balachaur
Haryana	4	Hisar, Karnal, Shikohpur, KVK-Kaithal
Uttar Pradesh	4	Modipuram, Nagina, Bulandshahr, Ujhani
Rajasthan	2	Sriganganagar, Durgapura
Uttarakhand	1	Pantnagar
J&K	1	Jammu
Delhi	1	Delhi
Total	16	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IWBR, Karnal	2	DBW296*, DBW321
BHU, Varanasi	1	HUW838#*
IARI, Delhi	2	HD3368, HD3369
IARI, Indore	2	HI1653, HI1654
PAU, Ludhiana	2	PBW838, PBW848
CSAUAT, Kanpur	1	K1910
NDUAT, Ayodhya	1	NW7096
GBPUAT, Pantnagar	1	UP3062
Checks	5	PBW644, HD3043, WH1142, NIAW3170, HI1628
Total	17 (12+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)
Irrigations	: Two (pre-sowing & one irrigation at 45-50 DAS)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: October 25 – November 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, 2020-21
AVT-IR-TS-TAS**

Trial conducting centres

State	No.	Centres
Uttar Pradesh	7	Kanpur, Prayagraj, Araul, Ghaghraghat, Ayodhya, Varanasi, Gorakhpur
Bihar	4	IARI-Pusa, Sabour, Purnea, RPCAU-Pusa
West Bengal	4	Coochbehar, Kalyani, Burdwan, Manikchak
Jharkhand	4	Ranchi, Chianki, Dumka, IARI-Gauria Karma
Assam	1	Shillongani
Total	20	

Details of test entries

Contributing Centres	No. of entries	Name of entries
PAU, Ludhiana	1	PBW826 [#]
IARI, Delhi	2	HD3406 ^M , HD3411 ^M
Checks	6	HD2967, DBW39, HD2733, HD3086, DBW187, HD3249
Total	9 (3+6)	

[#] denotes resistance to wheat blast; ^M MABB 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 15-25
Seed rate (kg/ha)	: 100
Seed requirement	: 22 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, 2020-21
AVT-IR-LS-TAS**

Trial conducting centres

State	No.	Centres
Uttar Pradesh	7	Kanpur, Prayagraj, Araul, Ghaghraghat, Ayodhya, Varanasi, Gorakhpur
Bihar	4	IARI-Pusa, Sabour, Purnea, RPCAU-Pusa
West Bengal	4	Coochbehar, Kalyani, Burdwan, Manikchak
Jharkhand	4	Ranchi, Chianki, Dumka, IARI-Gauria Karma
Assam	1	Shillongani
Total	20	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IWBR, Karnal	3	DBW316, DBW317, DBW318#
PAU, Ludhiana	3	PBW833, PBW834, PBW835
IARI, Delhi	1	HD3360
GBPUAT, Pantnagar	1	UP3060
Checks	4	HI1563, DBW107, HD3118, HI1621
Total	12 (8+4)	

denotes resistance to wheat blast

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 15-25
Seed rate (kg/ha)	: 125
Seed requirement	: 22 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, 2020-21
AVT-RI-TS-TAS**

Trial conducting centres

State	No.	Centres
Uttar Pradesh	7	Kanpur, Prayagraj, Araul, Ghaghraghat, Ayodhya, Varanasi, Gorakhpur
Bihar	4	IARI-Pusa, Sabour, Purnea, RPCAU-Pusa
West Bengal	4	Coochbehar, Kalyani, Burdwan, Manikchak
Jharkhand	4	Ranchi, Chianki, Dumka, IARI-Gauria Karma
Assam	1	Shillongani
Total	20	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IWBR, Karnal	2	DBW321, DBW322
IARI, Delhi	2	HD3368#, HD3369#
IARI, Indore	2	HI1653, HI1654#
HAU, Hisar	1	WH1281
PAU, Ludhiana	1	PBW848#
GBPUAT, Pantnagar	1	UP3062
Checks	5	HI1612, HD3171, K1317, DBW252, HD3293(I)
Total	14 (9+5)	

denotes resistance to wheat blast

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	: October 25 - November 10
Seed rate (kg/ha)	: 100
Seed requirement	: 22 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, 2020-21
AVT-IR-TS-TAD**

Trial conducting centres

State	No.	Centres
Gujarat	5	Vijapur, SK Nagar, Anand, Amreli, Junagadh
Madhya Pradesh	6	Gwalior, Jabalpur, Powarkheda, Indore, Sagar, KVK-Ujjain
Chhattisgarh	2	Bilaspur, Raipur
Rajasthan	3	Kota, Udaipur, Mandor
Total	16	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Indore	5	HI1636*, HI1650, HI1667 ^B , HI8832(d) ^M , HI8833(d) ^M
SDAU, Vijapur	1	GW513*
JAU, Junagadh	1	GW523
JNKVV, Jabalpur	1	MP3535
ARI, Pune	1	MACS6768
Checks	4	GW322, HI1544, HI8498(d), HI8713(d)
Total	13 (9+4)	

* denotes final year entry; # denotes resistance to wheat blast; ^M MABB entry; ^B Biofortification entry

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	: Nov. 10– 20
Seed rate (kg/ha)	: 100
Seed requirement	: 20 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, 2020-21
AVT-IR-LS-TAD**

Trial conducting centres

State	No.	Centres
Gujarat	5	Anand, Junagadh, Vijapur, SK Nagar, Sanosara
Madhya Pradesh	6	Indore, Gwalior, Jabalpur, Powarkheda, Sagar, KVK-Ujjain
Chhattisgarh	3	Bilaspur, Ambikapur, Raipur
Rajasthan	2	Udaipur, Mandor
Total	16	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Delhi	1	HD3407 ^M
Checks	6	HD2932, HD2864, MP3336, MP4010, CG1029(I), HI1634(I)
Total	7 (1+6)	

^M MABB entry

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	: 20 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, 2020-21
AVT-RI-TS-TAD**

Trial conducting centres

State	No.	Centres
Gujarat	5	Vijapur, Amreli, Dhandhuka, Sanosara, Junagadh
Madhya Pradesh	5	Gwalior, Sagar, Jabalpur, Powarkheda, Indore
Chhattisgarh	2	Bilaspur, Ambikapur
Rajasthan	2	Udaipur, Mandor
Total	14	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Indore	3	HI8823(d)*, HI8830(d), HI1655
IWBR, Karnal	2	DDW55(d), DBW326
UAS, Dharwad	1	UAS475(d)
SDAU, Vijapur	1	GW528
ARS, Niphad	1	NIAW3851
IGKV, Bilaspur	1	CG1036
Checks	4	HI8627(d), MP3288, DBW110, DDW47(d)
Total	13 (9+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. 10
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, 2020-21
AVT-IR-TS-TAD**

Trial conducting centres

State	No.	Centres
Maharashtra	9	Niphad, Pravaranagar, Pune, Akola, Parbhani, Nasik, Kolhapur, K-Digranj, Karad
Karnataka	7	Dharwad, Ugar-Khurd, Arbhavi, Kalloli, Mudhol, Nippani, Mandya
Total	16	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Indore	3	HI8826(d), HI8827(d), HI8828(d)
ARS, Niphad	2	NIDW1345(d), NIDW1348(d)
ARI, Pune	2	MACS4100(d), MACS4106(d)
IIWBR-Karnal	1	DDW53(d)
CCS HAU, Hisar	1	WHD965(d)
Checks	5	MACS3949(d), UAS428(d), MACS6222, GW322, DDW48(d) (I)
Total	14 (9+5)	

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	: 20 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, 2020-21
AVT-IR-LS-TAS**

Trial conducting centres

State	No.	Centres
Maharashtra	7	Niphad, Pravaranagar, Pune, Akola, Parbhani, Nasik, Karad
Karnataka	7	Dharwad, Ugar-Khurd, Arbhavi, Kalloli, Mudhol, Nippani, Mandya
Total	14	

Details of test entries

Contributing Centres	No. of entries	Name of entries
ARI, Pune	1	MACS6774
IARI, Indore	1	HI1651
IIWBR, Karnal	1	DBW320
Nuziveedu Seeds	1	NWS2180#
Checks	4	RAJ4083, HD2932, HD3090, HI1633(I)
Total	8(4+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, 1-10
Seed rate (kg/ha)	: 125
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, 2020-21
AVT-RI-TS-TAD**

Trial conducting centres

State	No.	Centres
Maharashtra	9	Akola, Pune, Niphad, Nashik, Parbhani, Savalivihir, Karad, Kolhapur, K-Digraj
Karnataka	4	Dharwad, Nippani, Bagalkot, Bailahongal
Total	13	

Details of test entries

Contributing Centres	No. of entries	Name of entries
ARI, Pune	2	MACS6753, MACS6755
JNKVV, Powarkheda	1	MP1358*
UAS, Dharwad	1	UAS3014
IIWBR, Karnal	1	DBW325
Checks	5	HI1605, NIAW3170, AKDW2997-16(d), UAS446(d), NIDW1149(d) (I)
Total	10 (5+5)	

* 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 40-45 DAS)
Fertilizer dose (kg/ha)	: 90:60:40 (N:P:K)
Time of sowing	: Oct. 25 – Nov. 10
Seed rate (kg/ha)	: 100
Seed requirement	: 16kg per entry

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

Special Trial (Dicoccum), 2020-21
SPL-DIC-IR-TS-PZ

Trial conducting centres

State	No.	Centres
Maharashtra	5	Niphad, Pune, Karad, Kolhapur, K-Digranj,
Karnataka	6	Dharwad, Arbhavi, Ugar-Khurd, Kalloli, Mudhol, Mandya
Total	11	

Details of test entries

Contributing Centres	No. of entries	Name of entries
ARI, Pune	2	MACS5057, MACS5058
UAS, Dharwad	2	DDK1060, DDK1061
Checks	3	HW1098, DDK1029, MACS6222(a)
Total	7 (4+3)	

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	: Nov. 1-15,
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, 2020-21
(IR-ES-TAS-NWPZ / CZ)**

Trial conducting centres

NWPZ			CZ		
State	No.	Centres	State	No.	Centres
Punjab	3	Ludhiana, Gurdaspur, Ladowal	MP	3	Gwalior, Indore, Jabalpur (BISA)
Haryana	2	Hisar, Karnal	Gujarat	1	Vijapur
UP	1	Modipuram	Rajasthan	1	Udaipur
Uttarakhand	1	Pantnagar			
Rajasthan	1	Sriganganagar			
Delhi	1	Delhi			
Total	9		Total	5	
Total = 14 (9+5)					

Details of test entries

Contributing Centres	No. of entries	Name of entries
IIWBR, Karnal	7	DBW327*, DBW328*, DBW332*, DBW333*, DBW370, DBW371, DBW372
PAU, Ludhiana	3	PBW872, PBW873, PBW874
IARI, Delhi	1	HD3410
CCSHAU, Hisar	1	WH1252*
Checks	4	HD3086, DBW187(I), DBW303(I), WH1270(I)
Total	16 (12+4)	

* denotes second year of testing

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	: October 20- November 5
Seed rate (kg/ha)	: 100
Seed requirement	: 16 Kg per entry

* **Note:** Two sprays as tank mix-Chlormequat chloride (Lihocin) @ 0.2%+ tebuconazole (Folicur 430 SC) @ 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

CI-HYT (IR-ES), 2020-21

Trial conducting centres

NWPZ			CZ		
State	No.	Centres	State	No.	Centres
Punjab	3	Ludhiana, Gurdaspur, Ladowal	MP	3	Gwalior, Indore, Jabalpur (BISA)
Haryana	2	Hisar, Karnal	Gujarat	1	Vijapur
UP	1	Modipuram	Rajasthan	1	Udaipur
Uttarakhand	1	Pantnagar			
Rajasthan	1	Sriganganagar			
Delhi	1	Delhi			
Total = 14 (9+5)					

Details of test entries

Contributing Centres	No. of entries	Name of entries
IARI, Delhi	5	HD3403, HD3404, HD3405, HD3412, HD3413
PAU, Ludhiana	5	PBW867, PBW868, PBW869, PBW870, PBW871
IIWBR, Karnal	7	DBW318, DBW373, DBW374, DBW375, DBW376, DBW377, DBW378
CCSHAU, Hisar	4	WH1404, WH1405, WH1406, WH1407
GBPUAT, Pantnagar	2	UP3095, UP3096
Checks	2	HD3086, DBW187(I)
Total	25 (23+2)	

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	: October 20- November 5
Seed rate (kg/ha)	: 100
Seed requirement	: 7 Kg per entry

* **Note:** Two sprays as tank mix-Chlormequat chloride (Lihocin) @ 0.2%+ tebuconazole (Folicur 430 SC) @ 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

**SPL – AST, 2020-21
(IR-TS-TAS-All Zones)**

Trial conducting centres

State	No.	Centres
Haryana	3	Hisar (IIWBR), CSSRI-Karnal, Nain
UP	3	Lucknow, Dalipnagar, Ayodhya
Gujarat	2	Bharuch, KVK-Sanosara
Punjab	1	Muktsar
Rajasthan	1	Pali
Total	10	

Details of test entries

Contributing Centres	No. of entries	Name of entries
IIWBR, Karnal	7	DBW363, DBW364, DBW365, DBW366, DBW367, DBW368, DBW369
CSA, Kanpur	1	K1805
Checks	3	Kharchia65, KRL19, KRL210
Total	11 (8+3)	

Experimental details

Design	: R.B.D.
Replications	: Six
Plot size	: 6 x 2.40m (12 rows)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K) + 10 Kg Zinc Sulphate
Time of sowing	: NWPZ: 1-15 Nov., NEPZ: 10-25 Nov., CZ: 10-25 Nov.
Seed rate (kg/ha)	: 100
Seed requirement	: 12 Kg per entry

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

Multilocation Physiology Trial-1 (NWPZ&NEPZ), 2020-21

Conducting centres

Zone	No.	Centres
NWPZ	4	Durgapura, Hisar, Karnal, Ludhiana,
NEPZ	4	Kanpur, Ranchi, Sabour, RPCAU-Pusa
Total	8	

Details of trial entries

Contributing centres	No. of Entries	Name of entries
IIWBR, Karnal	5	DBW296, DBW327, DBW328, DBW332, DBW333
Hisar	1	WH1252
Ranchi	1	JKW261
Varanasi	1	HUW838
Checks	6	DBW187, HD3086, PBW771, NIAW3170, DBW303, WH1270
Registered Genetic Stocks	02	WH730, DBW150
Total entries	16 (8+6+2)	

Multilocation Physiology Trial-2 (CZ&PZ), 2020-21

Conducting centres

Zone	No.	Centres
CZ	4	Junagadh, Udaipur, Indore, Vijapur,
PZ	4	Pune, Parbhani, Dharwad, Niphad
Total	8	

Details of trial entries

Contributing centres	No. of Entries	Name of entries
Vijapur	1	GW513
Powarkheda	1	MP1358
Indore	2	HI8823(d), HI1636
Checks	10	HI1544, HI1605, MP3288, HD3090, MACS3949(d), DDW47(d), AKDW2997-16(d), UAS446(d), HI8805(d), MACS4058(d)
Registered Genetic Stocks	02	WH730, DBW150
Total entries	16 (4+10+2)	

Experimental details

Design	:	Simple lattice
Replications	:	Two
Plot size	:	6 rows of 3m length spaced 20cm apart (3.6m ²)
Treatments (3)	:	1. Timely sown irrigated 2. Late sown irrigated 3. Timely sown rainfed
Date of sowing	:	NWPZ: Nov.1-15, NEPZ: Nov.15-25, CZ: Nov.10-20, PZ: Nov.5-15 Minimum 21 days and maximum 30 days difference between timely and late sown conditions
Fertilizer dose (Kg/ha)	:	NW & NE: TS (150:60:40); LS (120:60:40); RF (90:60:40) CZ & PZ: TS (120:60:40); LS (90:60:40); RF (60:40:20)
Seed rate	:	TS:100 Kg/ha, LS:125 Kg/ha
Seed required	:	3.5 kg per entry

Agromorphological 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.

Drought & Heat Tolerance Screening Nursery (DHTSN)2020-21

Conducting centres

Zone	No.	Centres
NWPZ	5	Hisar, Karnal, Ludhiana, Durgapura, CSSRI-Karnal
NEPZ	4	Kanpur, Ranchi, Sabour, RPCAU-Pusa
CZ	3	Junagadh, Udaipur, Indore
PZ	4	Pune, Parbhani, Dharwad, Niphad
Total	16	

Details of entries

Contributing Centres	No. of Entries	Name of entries
Indore	5	IND576, IND577, IND578, IND579, HI 1645
Niphad	1	NI3924
Vijapur	3	GW-A 2020-1009, GW-A 2020-1010, GW2020-1016(d),
Dharwad	2	UASDT7, UASDT9
BARC	4	TAW211, TAW212, TAW213, TAW214
Pune	6	MACS6752, MACS6749, MACS6753, MACS6755, MACS6774, MACS4087
Karnal	15	
Checks	5	C306, MP3288, K1317, DBW110, NI5439
Registered Genetic Stocks	2	WH730, DBW150
Total	43(36+5+2)	

Experimental details

Design	:	Simple lattice
Replications	:	Two
Plot size	:	3 rows of 2.5 m length spaced 20cm apart
Treatments (3)	:	1. Timely sown irrigated (normal) 2. Timely sown rainfed (drought) 3. Late sown irrigated (late)
Date of sowing	:	NWPZ/NEPZ: Nov.1-15, CZ/PZ: Nov. 5-20, (Both the treatments of timely sown are to be sown on same date, while late sown treatment should be after a gap of 21-30 days)
Fertilizer dose -NPK (Kg/ha)	:	NW & NE: TS (150:60:40); LS (120:60:40); RF (90:60:40) CZ & PZ: TS (120:60:40); LS (90:60:40); RF (60:40:20)
Seed rate	:	TS:100 Kg/ha, LS:125 Kg/ha
Seed required	:	1.5 kg per entry

Agromorphological 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.

Short Duration Screening Nursery

Conducting centres

Zone	No.	Centres
NHZ	3	Khudwani, Malan Bajaura
NWPZ	5	Karnal, Pantnagar, Hisar, Durgapura, Sriganaganagar
NEPZ	6	Ranchi, Coochbehar, Shillongani, Kalyani, Ayodhya, Sabour
CZ	6	Jabalpur, Bilaspur, Vijapur, Powarkheda, Indore, Udaipur
PZ	4	Pune, Niphad, Dharwad, Akola
Total	24	

Details of entries

Contributing Centres	No. of Entries	Name of entries
Akola	1	AKAW 5104
IIWBR, Karnal	10	DWAP1822, DWAP-1925, DWAP-1926, LBP 2017-2, M2-285, RWP 2019-32, RWP 2019-38, RWP 2019-40, RWP 2019-41, RWP 2019-42
Washim	1	WSM-138
Vijapur	2	GW 2017-841, GW-2017-845
Checks	6	DBW 14, DBW 71, HD 2932, NIAW 34, Sonalika, WR 544
Total	20(14+6)	

Experimental details

Plot size	:	2.5m x 2 rows x 0.18m= 0.9 m ²
Time of sowing	:	1-15 December
Fertilizer dose (Kg/ha)	:	As per recommendations at the centres
Seed requirement	:	500 g per entry

Agromorphological observations: Days to heading, days to maturity, grain number/ spike, 1000-grain weight (g), and grain yield/plot(g), purpose of utilization and Remarks (if any).

QCWBN (2020-21)

ConductingCentres

Zone	No.	Centres
NWPZ	4	Karnal, Delhi, Ludhiana, Hisar
NEPZ	4	Kanpur, Sabour, Varanasi, Ranchi
CZ	4	Indore, Vijapur, Powarkheda, Jabalpur
PZ	4	Dharwad, Pune, Niphad, Akola
Total	16	

Details of entries

Contributing Centres	No. of Entries	Name of entries
Pune	10	MACS6752, MACS6797, MACS6805, MACS6819, MACS6821, MACS6822, MACS6823, MACS6824, MACS6825, MACS6826
Vijapur	15	GW-A 2020-993, GW-A 2020-994, GW-A 2020-995, GW-A 2020-996, GW-A 2020-998, GW-A 2020-999, GW-A 2020-1000, GW-A 2020-1001, GW-A 2020-1002, GW-A 2020-1011, GW-A 2020-1012, GW-A 2020-1013, GW-A 2020-1014, GW-A 2020-1015, GW-2017-825
Ludhiana	12	BWL9980, BWL9981, BWL9982, BWL9983, BWL9984, BWL9985, BWL9986, BWL9987, BWL9988, BWL9989, BWL9990, BWL9991
Pantnagar	1	UP4003
Indore	8	IND572, IND573, IND574, IND575, ID2017, ID2018, ID2019, ID2020
Karnal	10	RWP (3), LBP(3), PBS(2), Quality (2)
Dharwad	1	UASQ330
Checks	6	HD3226(Protein), DBW187 (yield NW+NE and iron), GW322 (yield CZ+PZ), DDW47(yellow pigment), HS490(Soft), WB02 (Zinc)
Total	60 (54+6)	

Maximum 10 entries per contributing centre

Experimental details

Design	: Augmented Block Design
Plot size	: 6 rows of 4 m each, 20cm apart (4.8m ²)
Fertilizer dose (kg/ha)	: NWPZ & NEPZ: 150:60:40 (N:P:K), CZ & PZ: 120:60:40 (N: P: K)
Time of sowing	: NWPZ: November 1-15; NEPZ: November 15-25; CZ & PZ: November 10-20
Seed requirement	: Biofortification: 1.5 kg per entry; Other quality traits: 100 g per entry

Traits to be recorded: Fe, Zn and Protein

NATIONAL GENETIC STOCK NURSERY [Suggested Crossing Block]

ConductingCentres

Zone	No.	Centres
NHZ	3	Almora, Malan, Khudwani
NWPZ	7	IIWBR-Karnal, CSSRI-Karnal, Jammu, Hisar, Pantnagar, Ludhiana, Durgapura
NEPZ	8	Ayodhya, Kanpur, Varanasi, Sabour, RPCAU-Pusa, Ranchi Coochbehar, Kalyani
CZ	8	Indore, Gwalior, Jabalpur, Udaipur, Vijapur, Bilaspur, Junagadh, Lokbharti
PZ	5	Pune, Dharwad, Akola, Niphad, Parbhani
Total	31	

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
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 (kg/ha)	: As recommended
Time of sowing	: NWPZ/NEPZ : November 1-15; CZ / PZ : November 5-20
Seed requirement	: 750g seedeach 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)

Salinity/Alkalinity Tolerance Screening Nursery (SATSN)

Conducting Centres

Zone	No.	Centres
NWPZ	5	CSSRI Karnal*, Nain Farm, IIWBR Hisar, IIWBR Karnal*, Muktsar
NEPZ	5	Daleep Nagar, Lucknow, Ayodhya, Pratapgarh, Amethi
CZ	2	Bharuch, Pali
PZ	1	Ugar-Khurd
Total	13	

* CSSRI and IIWBR Karnal will plant two sets of the nursery one under normal soil and one under micro-plot to derive salinity tolerance index of the genotypes.

Details of entries

Contributing Centres	No. of Entries	Name of entries
CSSRI Karnal	10	KRL2001, 2006, 2009, 2011, 2012, 2017, 2018, 2023, 2026, 2027
IIWBR Karnal	10	RWP1116, RWP1119, LBP-2019-14, LBP-2019-21, LBP-2019-31, DWAP2022, DWAP2023, DWAP, 2024, SANSR-8, SANSR-9
IARI, Delhi	2	HD3414, HD3415
Kanpur	2	K1901, K1905
Ayodhya	2	NW8003, NW8005
Hisar	2	WH1278, WH1283
Ludhiana	2	BWL5179, BWL6851
Durgapura	2	RAJ 4564, RAJ4565
Dharwad	2	UASS300, UASS310
Checks	2	KRL210, KRL19
Total	36 (34+2)	

Experimental details

Design	: Augmented Block Design (2 rep)
Plot size	: 04 row plot of 2.5m length spaced at 20cm apart (2.0 m ²)
Fertilizer dose (kg/ha)	: 120:60:40 (N:P:K)
Time of sowing	: November 5-20
Seed requirement	: 1.5 kg seed each entry

Agromorphological observations: Germination percentage, Early vigour, Days to heading, Days to anthesis, Days to maturity, Plant height (cm), Total biomass at harvest (g), 1000-grain weight (g), and Grain yield / plot (g).

24th Segregating Stock Nursery

ConductingCentres

Zone	No.	Centres
NHZ	3	Khudwani, Malan, Wadura
NWPZ	6	Jammu, Hisar, Pantnagar, Durgapura, Sriganaganagar, Modipuram
NEPZ	7	Coochbehar, Ayodhya, Kalyani, Ranchi, Sabour, RPCAU Pusa, Shillongani
CZ	6	Bilaspur, Gwalior, Jabalpur, Udaipur, Lok Bharati, Junagadh
PZ	4	Akola, Parbhani, Pune, Dharwad
Total	26	

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 (kg/ha)	: As recommended for the centre
Time of sowing	: NHZ / NWPZ / NEPZ (November 1-15); CZ / PZ (November 5-20);
Seed requirement	: 250g seedforeach cross combination

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

INTERNATIONAL TRIALS & NURSERIES (2020-21)

CIMMYT

Trial /Nursery	Sets	Cooperating centres
41st ESWYT	13	Ludhiana, Hisar, Indore, Pantnagar, Jabalpur, Powarkheda, Niphad, Dharwad, Karnal, Delhi, Gwalior, Kanpur, RAU(Pusa)
28 th HRWYT	2	Karnal, Shillongani
19 th HTWYT	20	Ludhiana, Hisar, Indore, Pune, Jabalpur, Vijapur, Karnal, Powarkheda, Bilaspur, Niphad, Dharwad, Ayodhya, Delhi, Durgapura, Varanasi, Kanpur, Udaipur, Coochbehar, Junagadh, Wellington
28 th SAWYT	17	Ludhiana, Hisar, Indore, Pantnagar, Jabalpur, Vijapur, Powarkheda, Bilaspur, Niphad, Dharwad, Ayodhya, Ranchi, Karnal, Delhi, Durgapura, Varanasi, Kanpur
8 th WYCYT	7	Ludhiana, Pantnagar, Dharwad, Karnal, Delhi, Srinagar, Udaipur
10 th SATYN	4	Ludhiana, Dharwad, Karnal, Delhi,
2 nd CWEN	2	Ludhiana, Delhi,
53 rd IBWSN	15	Ludhiana, Hisar, Indore, Pantnagar, Ayodhya, Wellington, Karnal, Delhi, Durgapura, IARI-Pusa, Coochbehar, Varanasi, Jammu, Malan, Gwalior
31 st HRWSN	3	Wellington, Karnal, Shillongani
38 th SAWSN	17	Ludhiana, Pune, Hisar, Jabalpur, Powarkheda, Junagadh, Bilaspur, Niphad, Dharwad, Sabour, Ayodhya, Ranchi, Karnal, Delhi, Durgapura, Kanpur, RAU(Pusa)
15 th STEMRSN	4	Karnal, Mahabaleshwar, Wellington, Delhi
12 th HLBSN	7	Karnal (2 set), Ayodhya, Varanasi, Sabour, Coochbehar, Delhi
22 nd KBSN	5	Karnal (2sets), Hisar, Ludhiana (2sets)
1 st IYPTE*	4	Karnal, Ludhiana, Indore, Delhi
52 nd IDYN	7	Ludhiana, Pune, Niphad, Indore, Vijapur, Dharwad, Karnal
52 nd IDSN	5	Ludhiana, Pune, Niphad, Indore, Karnal

*New trial “*International Yield Potential Trait Experiment (IYPTE)*” involve growing about 30 advanced lines, at 3 or 4 high yield environments/locations in India. This is a more research oriented, calls for high quality trials and falls outside of typical IWIN activities.

ICARDA Trials/Nurseries

SN	Trial /Nursery	Sets	Cooperating centres
1	21 st ESBWYT	5	Karnal, Udaipur, Jabalpur, Vijapur, Kalyani
2	21 st SBWON-HT	5	Karnal, Indore, Vijapur, Jabalpur, Kanpur
3	28 th FAWWON-SA	2	Almora, Srinagar
4	23 rd IWWYT-SA	3	Almora, Malan, Srinagar
5	44 th IDYT	3	Karnal, Indore, Pune,
6	44 th IDON	3	Karnal, Vijapur, Dharwad

DAC & FW breeder seed indent allocation for 2020-21

DAC&FW breeder seed indent for 2021-200 is received for 16420.60 breeder seed for wheat varieties and 643.84 quintal of barley seeds. The following breeder seed allocation is finalized production in the 59th Wheat & Barley Workers' Meet.

Crop: Wheat

Production Centre	Variety	Year of release	DAC Indent	Breeder seed Allocation	Indenting Agency	Nucleus seed allocation
ARI , Pune	MACS 6222	2010	60.00	60.00	MH 60	1.50
	MACS 6478	2014	15.00	15.00	KK 7, MH 3 NSAI 5	0.50
	MACS-3949	2017	2.00	2.00	NSAI 2	0.25
	MACS-4028	2018	2.00	2.00	KK 2	0.25
	Total			79.00		2.50
BAU Sabour	BRW 3708(SABOUR SAMRIDHI)	2017	100.00	100.00	BI 100	2.50
	BRW 3723(SABOUR NIRJAL)	2017	50.00	50.00	BI 50	1.50
	BRW 934 (SABOUR SRESHTHA)	2017	50.00	50.00	BI 50	1.50
	Total			200.00		5.50
BHU Varanasi-221 005.	HUW 669 (Malviya 669)	2018	17.20	17.20	NSAI 7.2, UP 10	1.00
	Total			17.20		1.00
BISA Jabalpur	DBW 110	2015	170.90	170.90	BI 30, CG 20, MP 72, NSAI 48.9	4.00
	DDW 47	2020	155.00	155.00	MP 50, NAFFD 5, RJ 100	3.00
	Total			325.90		7.00
BISA Ludhiana.	WB-2	2017	80.20	60.20	HP 4, NSC 5, NSAI 1.2, UP 50,	1.50
	HD 2967	2014	1659.00	300.00	NSAI 300	5.00
	DBW 187 KARAN VANDANA	2019	1617.35	100.00	UK 100,	3.00
	DBW 173	2017		45.00	NSAI 45	1.00
	Total			505.20		10.50
BISA Pusa, Samastipur	DBW 39	2010	18.15	18.15	JH 18.15	0.50
	DBW 252 Karan Shriya	2020	12.50	12.50	NAFFD 4, NSC 5, NSAI 2, WB 1.5	1.00
	DBW 107	2015	35.15	35.15	JH 18.15, NSC 5, UP 10, WB 2	1.00
	DBW 187 KARAN VANDANA	2019	1617.35	130.00	BI 30, JH 100,	3.00
	Total			195.80		5.50
HAU Hisar	WH 1105	2013	232.60	232.60	HP 35, IFFDC 10, NFL 11, NSC 5, PB 10,NSAI 109, UP 50, UK 2	6.00
	WH 1124	2014	153.40	153.40	CG 20, HR 28, HP 20, KCO 2, IFFDC 2, NFL 6, NSC 25, NSAI 30.4,	3.00

					UP 20	
	WH 1184	2020	4.00	4.00	NSC 2, NSAI 2	2.00
	WH 711	2002	93.20	93.20	NSAI 93.2	2.00
	WH-1080	2011	20.00	20.00	HP 20	1.00
	C-306	1969	18.80	18.80	HR 2, NSAI 16.8	1.00
	Total			522.00		15.00
CSA Kanpur	K 1006	2014	33.15	33.15	JH 18.15, NSC 5, UP 10	1.00
	K-1317	2018	93.15	93.15	BI 50, JH 18.15, UP 25	2.00
	K-307	2007	36.30	36.30	JH 36.3	1.00
	K-7903	2001	14.20	14.20	NSC 5, NSAI 9.2	0.50
	K-9423 (Unnat Halna)	2005	4.00	4.00	NSAI 4	0.50
	Total			180.80		5.00
CSSRI Karnal	KRL -283	2018	10.00	10.00	UP 10	1.00
	KRL-210	2012	4.60	4.60	NSAI 4.6	0.50
	Total			14.60		1.50
GBPUAT Pantnagar	UP 2844	2019	2.40	2.40	NSAI 2.4	0.50
	UP 2855	2019	2.40	2.40	NSAI 2.4	0.50
	UP 2865	2019	2.40	2.40	NSAI 2.4	0.50
	UP-2784	2016	42.00	42.00	UP40 , UK 2	1.50
	PBW-154	1988	58.40	58.40	NSAI 58.4	1.50
	PBW-226	1989	34.90	34.90	NSAI 34.9	1.00
	PBW-343	1996	202.20	152.20	NSAI 92.2 UP 60	2.00
	PBW-373	1997	45.60	28.60	NSAI 28.6	0.50
	Total			323.30		8.00
HPKVV Palampur	HPW 349	2013	70.00	40.00	HP 30, JK 10	1.00
	HPW-360	2016	12.00	12.00	HP 12	0.50
	HPW-368	2016	8.00	8.00	HP 8	0.50
	Total			60.00		2.00
IARI New Delhi	HD 3249	2020	35.80	35.80	IFFDC 5, NSC 10, NSAI 0.8, UP 20	10.00
	PUSA YASHASVI (HD-3226)	2019	1151.30	705.90	NSAI 255.9, UP 450,	16.00
	HD 3237 Pusa Wheat 3237	2019	93.00	93.00	JK 25, NAFFD 3, NSC 5, NSAI 35, UP25,	2.00
	Pusa Gautami (HD 3086)*	2014	1700.60	903.80	NSC 300, RJ 67, PB 10, NSAI 526.8	21.00
	HD 2967	2014	1659.00	160.00	NFL 50, NSC 110	3.50
	HD 3059 (Pusa Pachheti)	2013	70.00	70.00	NSC 10, NSAI 10 UP 50	1.50
	Total			1968.50		54.00
IARI RS Indore	HI-8777	2018	2.00	2.00	KK 2	2.00
	HI 8759 (PUSA TEJAS-8759)	2017	846.20	846.20	IFFDC 2, MP 775, MH 2, NAFFD 2, NFL 15, NSC 10, NSAI 40.2	20.00
	HI 1605	2017	20.00	20.00	KK 2, MH 2, NSC5, NSAI 11	1.00
	Pusa Anmol (HI 8737)	2015	223.80	223.80	CG 30, MP 173, NSAI 18.8	5.00
	Pusa Mangal (HI 8713)	2013	270.00	270.00	CG 30, MP 233, NFL 5, NSAI 2,	6.00
	Pusa Wheat-111(HD-2932)	2008	24.00	24.00	CG 24	1.00

	Purna (HI-1544)	2008	105.20	105.20	CG 45, IFFDC 2, MH 7, NFL 5, NSC 7, NSAI 39.2,	2.50
	POSHAN(HI8663)	2008	15.00	15.00	NFL 15	0.50
	Total			1506.20		38.00
IARI RS Karnal	HI 1628*	2020	70.00	70.00	NSC 20, UP 50	2.00
	HD 3271*	2020	17.00	17.00	IFFDC 5, NSC 10, NSAI 0.8, UP 20	2.00
	PUSA YASHASVI (HD-3226)	2019	1151.30	445.40	HIL 5, HR 14, KH 8, KCO 19, IFFDC 14.4, NAFFD 3, NFL 22, NSC 200, RJ 100, UK 60	12.00
	HI 1620 Pusa Wheat 1620	2019	31.20	31.20	JK 15, NSC 15, NSAI 1.2	1.00
	HS 562	2018	45.00	45.00	HP30, JH 5 UK 10	1.50
	HS-542 (Pusa Kiran)	2015	10.00	10.00	HP 10	0.50
	Pusa Gautami (HD 3086)*	2014	1700.60	365.80	HIL 10, HR 56, HP 30, JK 7, KCO 50.8, IFFDC 54, NAFFD 2, NFL 26, UK 30, NSAI 100	8.50
	HD 2967	2014	1659.00	333.20	HIL 10 KCO 27.2, IFFDC34,NAFFD 2, RJ 50, PB 10, UK100, NSAI 100	8.50
	WR-544 (PUSA Bold)	2005	10.20	10.20	NSAI 10.20	0.50
	HD-2851(Pusa Vishesh)	2005	352.10	352.10	NSC 25, RJ50, NSAI 277.1,	8.00
	Total				1679.90	44.50
IARI Pusa Samastipur	HD-3171	2017	56.45	56.45	JH 54.45, NSAI 2	2.00
	Pusa Gautami (HD 3086)	2014	1700.60	431.00	BI 50, UP 380, WB 1	10.00
	HD 2967	2014	1659.00	865.80	BI 200, CG 20, JH 36.3, NSAI 199.5, UP 400, WB 10	20.00
	Pusa Basant (HD 2985)	2011	50.00	50.00	BI 50	1.50
	Pusa Prachi (HI-1563)	2011	193.15	193.15	BI 160, JH 18.15, NSC 15,	5.00
	HD 2733 (VSM)	2001	8.80	8.80	NSAI 8.8	0.50
	Total				1605.20	39.00
IARI, RS- Wellington	Nilgiri Khapli (HW 1098)	2015	20.00	20.00	CG 20	0.50
	Total				20.00	0.50
IGKVV Raipur	Ratan (CG 5016)	2009	63.40	63.40	CG 63.4	1.50
	CG AMBER	2019	15.00	15.00	CG 15	2.00
	Chhattisgarh Gehun-3 (CG-1013)	2018	35.00	35.00	CG 35	2.00
	Chhattisgarh Gehun-4 (CG-1015)	2018	57.40	57.40	CG 49, NSAI8.4	2.00
	Total				170.80	7.50
ICAR- IIWBR, Karnal	DBW 187 KARAN VANDANA	2019	1617.35	1387.35	HR 40, JK 20, JH 100, KCO 18.2, IFFDC 27,NAFFD 15, NFL 18, NSC 200, RJ 100, NSAI	30.00

					295.15, UP 650, UK 100, WB 4	
	DBW 222	2020	506.30	506.30	JK 20, KCO 5, IFFDC 3.2, NAFFD 4, NSC 60, NSAI 214.1, UP 100	15.00
	DBW-173	2018	170.00	110.00	JK 15, NSC, 10, UP 100	3.00
	DBW 303	2020	0.00	0.00		5.00
	Total			2003.65		53.00
JAU Junagarh.	GW-366	2007	55.00	55.00	CG 45, NSC 2, NSAI 8	2.50
	GJW 463	2017	19.00	19.00	NSC 10, NSAI 9	2.00
	Total			74.00		5.50
JNKVV Jabalpur	MP 3336 (JW 3336)	2013	261.00	261.00	CG 10, MP 150, RJ 100, NSAI 1	8.00
	MP-1203	2009	27.50	27.50	CG 27.5	1.00
	MPO 1255(MPO(JW)1255)	2016	80.00	80.00	MP 80	2.50
	JW-3288	2012	253.80	253.80	MP 253.8	6.00
	JW-3382	2016	308.40	308.40	MP 252, NSAI 55.4	8.00
	Total			930.70		25.00
Lokbharti Sanosara	LOK-1	1982	267.80	267.80	CG 40, MH 80, NFL 5, NSC 20, NSAI 122.8	6.00
	Total			267.80		6.00
MPKV Niphad	Netravati (NIAW-1415)	2011	6.00	6.00	MH 6	0.50
	NIAW-1994 (PHULE SAMADHAN)	2016	3.00	3.00	NSAI 3	1.00
	NIAW-301 (TRIMBAK)	2002	1.50	1.50	MH 1.5	0.25
	Total			10.50		1.75
PAU Ludhiana-141 004	PBW 1 ZN	2017	191.00	191.00	BI 50, NSC 5, NSAI 14, PB 20, UP 100, UK 2	4.00
	PBW 752	2019	71.80	71.80	JK10, KCO 2, NAFFD 2 NSC 10 NSAI 17.8, UP 25 PB 5	2.00
	PBW 771	2020	71.80	71.80	PB 5, NSAI 16.8, UP 50	2.00
	PBW-550	2008	69.65	69.65	NSAI 59.65, UK 10	1.50
	PBW-590	2009	18.20	18.20	NSAI 18.2	0.50
	PBW-658	2015	50.00	50.00	CG 20, HR 6, PB 10, NSAI 14	1.50
	PBW-660	2016	18.00	18.00	PB 2, NSAI 14, UK 2	0.50
	PBW-677	2016	101.40	101.40	HR 6, PB 40, NSAI 35.4, UP 20	2.50
	PBW-725	2016	258.80	258.80	HIL 2, HR 28, HP 30, JK 5, IFFDC 3, NSC 40, PB 40, NSAI 100.8, UK 10	7.00
	PBW-373	1997	45.60	17.00	NFL 7, NSAI 10.0,	0.50
	PBW 343	1996	202.20	50.00	NSC 15, NSAI 35.0	1.00
	PBW-757	2019	33.00	33.00	JK 5, NAFFD 2, NSC 5, PB 5, NSAI 16	1.50
	UNNAT PBW 550 (PBW 761)	2019	227.40	227.40	KCO 7.4, NFL 5, NSC 10, PB 40, NSAI 115,	8.00

					UP 50	
	Unnat PBW-343(PBW-723)	2017	593.00	593.00	BI 40, HIL 5, KCO 11, IFFDC5, NAFFD 2, NFL 11, NSC 50 PB 60, NSAI 149, UP260,	15.00
	PDW-291	2005	14.00	14.00	NSAI 14.2	1.00
	Total			1785.05		58.50
PDKV, Akola	AKAW-4627	2012	2.50	2.50	MH 2.5	0.25
	PDKV SARDAR	2016	4.00	4.00	MH 4	0.25
	PHULE SAMADHAN	2016	31.00	31.00	MH 15, NSC 5, NSAI 11	1.00
	Total			37.50		1.50
SKNAU, Durgapura,	RAJ - 4079	2011	51.40	51.40	IFFDC 7, NFL 4, RJ 25, NSAI 15.4,	1.50
	RAJ 4037	2004	201.20	201.20	KCO10, IFFDC 12, NFL 4, NSC 65, RJ 65, NSAI 45.2,	4.00
	RAJ-3077	1989	45.20	45.20	KCO 2, RJ 20, NSAI 23.2	0.50
	RAJ-3765	1996	42.00	42.00	RJ 5, NSAI 37	0.50
	RAJ-4120	2009	106.20	106.20	BI 100, NSC 5, NSAI 1.2	2.50
	RAJ-4238	2016	676.40	676.40	CG 20, KCO 10, IFFDC 20, MP 199, NFL 4, NSC 25, RJ 355, NSAI 23.4 UP 20	15.00
	Total			1122.40		24.00
RVSKV Gwalior	Raj Vijay Wheat 4106 (MP 4106)	2012	48.50	48.50	MP 28.5 CG 20	2.00
	Total			48.50		2.00
SDAU Vijapur	GDW-1255	2013	20.00	20.00	MP20	1.00
	GUJRAT WHEAT-496	1990	146.40	146.40	MH 100, NSC 10, NSAI 36.4,	4.00
	GW 11	2013	3.70	3.70	NSAI 3.7	0.50
	GW-273	1998	71.20	71.20	CG 30, NSAI 39.2	1.00
	GW-322	2002	78.80	78.80	CG 35, NSAI 43.8	1.00
	GW-451	2016	110.40	110.40	NSC 20, NSAI 90.4	4.00
	Total			430.50		11.50
SKUA&T Jammu	WB-2	2017	80.20	20.00	JK 20	0.00
	DBW-71	2013	10.00	10.00	JK 10	0.00
	HPW 349	2013	70.00	30.00	JK 30	0.00
	DBW-173	2018	170.00	15.00	JK 15	0.00
	Total			75.00		0.00
SVPUA&T Meerut	DBW-17	2007	62.40	62.40	NSAI 62.4	0.00
	DBW 88	2014	18.40	18.40	NSC 16, NSAI 2.4	0.00
	DBW 90	2014	6.00	6.00	NSAI 6	0.00
	Total			86.80		0.00
UAS Dharwad	UAS - 304	2013	5.00	5.00	KK 5	0.50
	UAS-334	2018	6.00	6.00	KK 6	0.50
	UAS-347	2015	2.00	2.00	KK 2	0.25
	UAS-375	2018	2.00	2.00	KK 2	0.50
	UAS-415	2009	2.00	2.00	KK 2	0.25
	UAS-466	2020	50.00	50.00	MP 50	2.00
	DBW 168	2018	35.00	35.00	KK 6, MH 4, NSC 20,	1.00

					NSAI 5	
	Total			102.00		5.00
SHIATS, Prayagraj (UP)	SHUATS W-13	2019	10.00	10.00	UP10	1.00
	AAI-W6	2014	2.00	2.00	KCO 2	0.25
	Total			12.00		1.25
VPKAS Almora	VL Gehun 2014 (VL 2014)	2019	6.00	6.00	NSC 5, UK 1	0.50
	VL Gehun 3004 (VL 3004)	2019	3.00	3.00	NSC 2, UK 1	0.50
	VL Gehun 907(VL 907)	2010	2.00	2.00	NSC 2	0.25
	VL Gehun 967 (VL 967)	2019	20.00	20.00	UK 20	1.00
	VL-953	2016	29.00	29.00	HP 4, NSC 5, UK 20	1.00
	Total			60.00		3.25
	Grand Total			16420.80		449.75

Crop: Barley

Production Centre	Variety	Year of release	DAC Indent	Breeder seed Allocation	Indenting Agencies	Nucleus seed allocation
BHU Varanasi	Mahamana 113 (HUB 113)	2014	40.00	40.00	UP 40	1.00
CCS HAU Hisar	BH 946	2014	20.90	20.90	HR 0.9, NSC 10, RJ 10	1.00
	BH-393	2002	53.35	53.35	NSAI 53.35	1.50
	BH-902	2010	1.00	1.00	NSAI 1.0	0.10
	BH-959	2015	45.00	45.00	NSC 25, RJ 20	1.50
	Total				120.25	4.10
CSAUA&T Kanpur	NARMADA (K 603)	2001	2.89	2.89	JH 2.89	0.10
	Prakhar (K-1055)	2018	22.00	22.00	MP 2,UP 20	1.00
	Total			27.78		1.10
GBPUAT Pantnagar	UPB-1008	2011	1.00	1.00	UK 1	0.10
HPKVV Palampur	HBL 713	2016	0.50	0.50	HP 0.5	0.10
IARI Karnal	BHS-380	2019	2.50	2.50	HP 05, MP 2	0.20
ICAR-IIWBR Karnal	DWRB 101	2015	32.00	32.00	NSAI32	1.50
	DWRB-137	2018	121.66	121.66	JH 8.66, MP11, RJ 40,NSAI 2, UP 60	3.00
	DWRB-160	2020	5.00	5.00	NSC 5	0.50
	Total			158.66		5.00
PAU Ludhiana	PL - 172	1987	4.40	4.40	NSAI 4.4	0.20
	PL 891	2020	17.65	17.65	HR 0.6, NSC, 10, PB 6, NSAI 1.05	1.00
	PL-426	1996	29.90	29.90	PB 1, NSAI 28.90	1.25
	PL-807	2009	3.00	3.00	NSAI 3.0	0.50
	Total			54.95		0.70
SKNAU, Durgapura	RD- 2052	1991	5.00	5.00	NAFED 5	0.25
	RD 2899	2018	80.00	80.00	IFFDC 3, MP2, NSC	2.50

				25, Rj 50,		
	RD 2907	2018	45.00	45.00	IFFDC 3, MP2, NSC 15, Rj 25,	1.50
	RD-2035	1994	34.20	34.20	NSC 5, RJ 25, NSAI 4.20	1.25
	RD-2715	2009	3.00	3.00	NDDDB 3	0.10
	RD-2786	2013	50.00	50.00	Rj 50	1.50
	RD-2794	2016	20.00	20.00	NSC 10, Raj 10	1.00
	Total			237.20		9.95
VPKAS Almora	VL Jau 118 (VLB 118)	2015	1.00	1.00	UK 1	0.10
	Total			1.00		0.10
	Grand Total			643.84		

Work Plan (2020-21)-Resource Management

At the outset, after welcoming the participants Dr SC 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 observed that some of the centres were not serious, rather were tentative, while recording and submitting the data. It was followed by the critical review of the results of the coordinated and special 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 Dr GP Singh, Director ICAR-IIWBR, Karnal actively participated to formulate new experiments for addressing the zone-wise issues. Based on the discussions, the group decided to conclude two special coordinated trials and formulated four new special trials, the details of which are given below;

- The following four varietal evaluation trials were formulated based on the entries received from the breeding group.
 - Varietal evaluation trial at two dates of sowing (Late and Very Late) under irrigated conditions in NWPZ.
 - Varietal evaluation trials under restricted irrigation (Zero, One and Two) conditions in NWPZ, CZ and PZ.
 - Varietal evaluation trials at two dates of sowing (Timely and Late) under irrigated conditions in CZ
 - Evaluation of wheat genotypes targeted to achieve 8 t/ha productivity under two nutrient management scenario in NWPZ.

- The group decided to conclude the following two special trials and come out with recommendations.

SPL-2: Exploring the role of phosphorus solubilising bacteria in improving phosphorus usage in wheat under wheat based cropping systems.

SPL-5: Precision nitrogen management in irrigated wheat using NDVI sensor.

- The group decided that the following four special trials will be continued during the 2020-21 crop season.

SPL-1: Maximising the wheat productivity by fine tuning sowing time and fertilizer rates.

SPL-3: Exploring timely sowing of wheat in NEPZ through surface seeding, seed priming and seed rate under rice-wheat system.

SPL-4: Optimisation of nitrogen doses for high yield potential under different zones

SPL-6: Performance of Wheat (*Triticum aestivum* L.) under different levels of Silicon and Restricted Irrigation. (Dropped)

- The following four new special trials were formulated and proposed to be conducted from the 2020-21 crop season.

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

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

SPL-7: Resource conservation techniques for enhancing the productivity and resource-use efficiency of soybean-wheat cropping system.

SPL-8: Precision nutrient management for higher yield in wheat through fertigation

Work Plan of Social Science

- During the Rabi season 2020-21, 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.

Work Plan (2020-21)-Crop Protection

The programme for the crop year 2020-21 discussed in detail in work plan finalization meeting held on 29.7.2020 through virtual platform and finalized in the 59th All India Wheat and Barley Research Workers Meet during August 24-25, 2020. The various activities to be executed at respective centers 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 centers against rusts and foliar blights for promoting to coordinated multi-location trials. (Under artificial inoculated conditions)

(a) Rusts:

North:

Yellow Rust: Gurdaspur, Dhaulakuan, Malan, Karnal, Durgapura, Ludhiana, Hisar and Jammu (8)

Leaf Rust: Delhi, Karnal, Durgapura, Ludhiana, Faizabad, Kanpur (6)

South:

Stem Rust + Leaf Rust: Dharwad, Mahabaleshwar, Wellington, Powarkheda, Niphad & Indore (6)

(b) Leaf Blight: Faizabad, Pusa (Bihar), Varanasi, Kalyani, Sabour and Coochbehar (6)

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:

North:

Stripe Rust: Dhaulakuan, Gurdaspur, Malan, Bajaura, Karnal, Delhi, Ludhiana, Pantnagar, Durgapura, Jammu, Kudwani and Hisar (12)

Leaf Rust: Delhi, Hisar, Jammu, Kanpur, Karnal, Ludhiana, Pantnagar, Durgapura, Faizabad (9)

South:

Leaf and Stem Rusts: Wellington, Mahabaleshwar, Niphad, Vijapur, Pune, Junagarh, Powarkheda, Dharwad and Indore (9)

(b) Leaf blight (NIVT 1A, 1B, 3A): Kalyani, Coochbehar, Pusa (Bihar), Faizabad, Varanasi, Sabour, Shillongani (7)

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 immediately to the Incharge, IIWBR Regional Station Flowerdale, Shimla for pathotype analysis, with information to P.I. (Crop Protection). The rusts have to be recorded every month.

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

Rust	Rust pathogen	Pathotypes
Stem/Black	<i>Pucciniagraministritici</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 for effective monitoring and data recording in PPSN at various locations in different zones. The Plant Pathologists and Breeders of other zones will monitor PPSN during Zonal monitoring tours.

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

Leaf and Stripe rusts – Karnal, Ludhiana
 Stem and leaf rusts -Mahabaleshwar
 Leaf rust: Faizabad
 Stem rust -Indore

PROGRAMME 2: Seedling rust resistance and rust gene postulation

1. Race specific and slow rusting

- (a) **Leaf rust:** AVT entries of NWPZ, NHZ and NEPZ, along with the check entries of the respective zones (under glass house conditions).
 Centres: New Delhi and Ludhiana under field conditions and Flowerdale, Shimla
- (b) **Stem rust:** AVT of CZ and PZ, along with the check varieties of the respective zone.
 Centres: Indore, Pune, Powarkheda and Mahabaleshwar
- (c) **Stripe rust:** AVT entries of NWPZ and NHZ alongwith the checks of the respective zones.
 Centres: Ludhiana and Delhi under field conditions and Flowerdale (under controlled condition),

Race inoculum to be supplied by RS, IIWBR, Flowerdale and races should be the same for all the respective centers as follows.

Rust	Rust pathogen	Pathotypes	
		Flowerdale	Other Centres
Stem/Black	<i>P. graministritici</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 and postulation of Rust Resistance Genes

- (a) Leaf, Stem and Yellow rusts (All races): IIWBR, Regional Station, Flowerdale, Shimla for AVT's (*T.aestivum*) entries. Flowerdalecentre to generate data on rust resistance genes of all the AVT entries. Besides, this, identification of Rust Resistance genes to be done in selected entries of MDSN, MPSN and EPPSN.
- (b) Stem and Leaf rusts: 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 earlier identified resistant materials as well as the AVT's and NIVTs. It will have all the released varieties and material found resistant in preceding years. It will have entries sent to CIMMYT for screening against wheat blast also.

Centers: 18

NWPZ: Pantnagar, Ludhiana, Karnal and Hisar.

NEPZ: Varanasi, Faizabad, IARI Pusa, Coochbehar, Shillongani, Ranchi, Naini, Gorla Karma Jharkhand and Kalyani

PZ: Dharwad, Wellington, Pune

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.

Centers: Ludhiana, New Delhi, Pantnagar, Hisar, Karnal and Jammu (6).

PROGRAMME 5: Loose Smut

Loose Smut Screening Nursery (LSSN): It will contain resistant materials identified in the past released varieties and AVT entries of NHZ, NWPZ and NEPZ

Centres: Ludhiana, Almora, Durgapura and Hisar (4)

PROGRAMME 6: Powdery Mildew

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

Centres: Almora, Pantnagar, Shimla, Malan, Bajaura, Dhaulakuan, Wellington and Jammu (8)

PROGRAMME 7: Region specific diseases

1. **Flag Smut Screening Nursery:** Ludhiana, Hisar, Karnal and Durgapura(AVT entries).
2. **Foot rot:** Dharwad(AVT entries)
3. **Head scab:** Delhi, Dhulakuan, Gurdaspur
4. **Hill bunt:** Malan, Bajaura and Almora(AVT entries NHZ).

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 supply information fortnightly on crop health from the areas of their jurisdiction to P.I. Crop Protection starting from November 2020 till the harvest of crop.
- 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 of new virulences of yellow rusts in NWPZ by specially constituted teams:

Specially constituted teams will visit the areas as per the need for effective monitoring of crop health in general and appearance and spread of yellow rust in particular, along the areas near the western border and foothills / sub-mountainous areas in NWPZ. ***If, by the time the situation of COVID19 outspread will persist the visits will be very limited and will use mobile phone or whatsapp for monitoring.*** Teams will be constituted as per the need for survey.

Monitoring of wheat blast: The following teams are constituted to monitor wheat crop in West Bengal and Assam along the Indo-Bangladesh borders for the presence of wheat blast. ***If, by the time the situation of COVID19 outspread will persist the visits will be very limited and will use mobile phone or whatsapp for monitoring.*** Teams will be constituted as per the need for survey. If any suspected samples of wheat blast like disease found will be analyzed at Kalyani and Coochbeharcentre.

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). ***If, by the time the situation of COVID19 outspread will persist the visits will be very limited and will use mobile phone or whatsapp for monitoring.*** All the cooperating centers 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 DalangMaidan, Kukumseri, Sangla, Sarahan (HP) and Leh (J&K). High altitude varieties and one hulless 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, Faizabad, 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 cooperating centres by analysing samples from grain *mandies* in each district of their respective states. Centres from C.Z. (Indore, Sagar, Powarkheda, Junagarh, Vijapur) and PZ (Pune, Niphad and Dharwad) may also supply grain samples to PI (CP), IIWBR, Karnal for analysis.

PROGRAMME 9: Integrated disease management

1. **Elite Plant Pathological Screening Nursery (EPPSN):** The sources of resistance to three or two rusts identified in PPSN will be retested to confirm their resistance to rusts:

North: Delhi, Malan, Karnal, Ludhiana, Pantnagar, Durgapura, Hisar, Jammu and Almora (9)

South: Wellington, Mahabaleshwar, DharwadNiphad, Pune and Indore (6).

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

DISEASES

North:

Stripe rust: Karnal, Ludhiana, Hisar, Dhaulakuon, Malan, Pantnagar, Durgapura

Leaf rust: Karnal, Ludhiana, Delhi, Hisar, Durgapura

Karnal Bunt: New Delhi, Karnal, Ludhiana, Dhaulakuan, Pantnagar

Powdery mildew: Dhaulakuan, Almora, Pantnagar, Malan, Chattha

Foliar blights: Faizabad, Varanasi, Coochbehar, Sabour, Hisar, Kalyani,

Loose smut: Hisar, Durgapura, Ludhiana, Almora

Flag smut: Hisar, Durgapura, Ludhiana

Head scab: New Delhi, Dhulakuan, Gurdaspur

South:

Leaf and Stem rust: Mahabaleshwar, Indore Dharwad, Niphad, Pune and Wellington

Nematodes (CCN) : Durgapura, Hisar, and Ludhiana

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

3. Management of diseases

(a) **Chemical management of stripe rust:** New chemicals will be tested at Karnal, Hisar, Ludhiana, Durgapura, Pantnagar and Jammu. The chemicals will be tested are:

Picoxystrobin 7.05% + Propiconazole 11.7% SC, Pyraclostrobin 133g/l + Epoxiconazole 50g/l SE, Tebuconazole 50% + Trifloxystrobin 25% WG, with standard chemicals (Propiconazole and Tebuconazole) and without chemicals.

The chemical will be evaluated under artificial inoculated condition and doses will be @ 0.1% and repeated once after 15 days. Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

(b) **Chemical management of powdery mildew:**

New chemicals will be tested at Pantnagar, Shimla, Malan, Bajaura, Dhaulakuan, Wellington and Jammu. The chemicals will be tested are:

Azoxystrobin 18.2% w/w + Cyproconazole 7.3% w/w SC, Azoxystrobin 18.2% w/w + Difenconazole 11.4% w/w SC, Tebuconazole 50% + Trifloxystrobin 25% WG with standard chemical (Propiconazole and Tebuconazole) and without chemicals.

The chemical will be evaluated under artificial inoculated condition and doses will be @ 0.1% and repeated once after 15 days. Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

(c) Chemical management of head scab:*

New chemicals will be tested at Gurdaspur, Ludhiana and Karnal

(d) Chemical management of leaf rust:*

New chemicals will be tested at Jammu, Kanpur, Karnal, Ludhiana, Pantnagar, Durgapura, Faizabad, Coochbehar.

(e) Chemical management of stem rust:*

New chemicals will be tested Dharwad, Mahabaleshwar, Wellington, Powarkheda, Niphad and Indore

*the fungicides to be tested against head scab, leaf and stem rust shall be decided later on and send to centers.

PROGRAMME 10. ENTOMOLOGY

1. Host plant resistance: Entomological screening nurseries (ESN), Multiple pest screening nurseries (MPSN), National initial varietal trial nurseries (NIVT) and special screening nurseries of promising entries identified during previous season

(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, Shillongani and Kharibari)

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

The NIVT entries will also be screened against foliar aphids at Niphad, Ludhiana and Karnal

(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, Shillongani 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 sowing time on the population build-up of major insect-pests of wheat will be studied at four geographical locations to better understand the insect-pest behaviour under different climatic conditions.

(c) Effect of effect of Zinc sulphate application on aphid incidence in wheat (Centres:Karnal, Ludhiana, Niphad)

Effect of zinc sulphate application in soil as well as foliar application will be tested to determine its effect on aphid abundance in wheat. Soil application rate of zinc sulphate will be kept as 25 kg/hand foliar application rate will be 0.5%. Observations will be recorded on population of aphids per plant, natural enemies (adult and grubs) per plot, yield per treatment and nutrient status of soil as well as of plants before the treatment and at the time of harvest.

(d) Basic studies for development of IPM strategies (Centres:Karnal, Niphad, Ludhiana, Kharibari)

The study will be conducted to generate region-wise data on population dynamics of major insect-pests of wheat and barley for developing pest-forecasting models. Weather parameters of a location will be correlated with insect population to determine the effect of climatic variations on the pest population dynamics under changing climate scenario.

(e) Zone specific IPM modules (Centres: Karnal, Ludhiana, Niphad, Kanpur)

The integrated pest module consisting of effective cultural, physical, biological and chemical components of integrated pest management will be formulated and tested against major pests of wheat viz., foliar aphids, shootfly and termites.

(f) Effect of organic treatments on the incidence of major insect-pests and natural enemies (Centres:Karnal and Ludhiana)

Keeping in view of the interest of farmers about zero budget farming, effect of organic treatments viz., Neemastra, Bramhastra, Agniastra, Deshparni, Fermented butter milk and Cow urine will be evaluated against major insect-pests of wheat and natural enemies.

(g) Management of aphids through foliar application of new chemical molecules (Centres:Karnal, Ludhiana, Niphad and Kharibari)

New chemicals molecules 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.

(h) Management of lepidopterous pests (pink stem borer, army worm & cutworms) of wheat: With increasing incidence of lepidopterous insect-pests in rice-wheat cropping system, an experiment will be conducted on the management of these pests through, chemicals, biopesticides etc.

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

Few selected insecticides and their combination with fungicides will be tested as seed treatment against termites. The observations on insect population counts before and after the treatment will be recorded along with yield in each treatment..

3. Stored Grain Pest Management

(a) Evaluation of different packaging bags for storage insect-pest infestation and its effect wheat seed quality (Centre: Karnal, Ludhiana, Kharibari, Niphad)

Different types of storage bags viz., jute bags, High density polyethylene bags (HDPE) and Biaxially Oriented Polypropylene (BOPP) bags will be evaluated for storage insect-pest infestation and its effect on wheat seed quality will be determined.

PROGRAMME 11. NEMATOLOGY

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

2. Evaluation of resistance against nematodes parasitizing wheat

(a) *Heteroderaavenae*:Hisar, Durgapura, Ludhiana and New Delhi (AVT and MDSN lines)

(b) *Meloidogynegraminicola*: Ludhiana (AVT)

(c) *Heteroderafilipjevi*: Ludhiana (AVT)

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

Centers: Durgapura, Ludhiana, Hisar

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

4. Differentiation of CCN Pathotype by using International differential

Centre: Durgapura

Work Plan (2020-21)-Wheat Quality

NIVT

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

Changes in work plan: NIVT 3B and NIVT 4 samples will now be analysed at ARI, Pune instead of MPKV, Rahuri.

- **NIVT 1A** (Irrigated Timely Sown) samples from Ludhiana, Hisar, Durgapura, Delhi, Pantnagar (NWPZ), Kanpur, Pusa, Varanasi and Sabour (NEPZ) will be analysed at PAU, Ludhiana.
- **NIVT 1B** (Irrigated Timely Sown) samples from Ludhiana, Hisar, Durgapura, Delhi, Pantnagar (NWPZ), Kanpur, Pusa, Varanasi and Sabour (NEPZ) will be analysed at RAU, Durgapura.
- **NIVT 2** (Irrigated Timely Sown) samples from Indore, Vijapur, Junagarh, Powarkheda (CZ), Dharwad, Pune and Niphad (PZ) will be analysed at SDAU, Vijapur.
- **NIVT 3A** (Irrigated Late Sown) and **NIVT 5A** (Restricted Irrigation Timely Sown) Entries from Pantnagar, Hisar, Ludhiana, Durgapura, Delhi (NWPZ) & Pusa, Sabour, Kanpur, Varanasi (NEPZ) will be analysed at GBPUA&T, Pantnagar Centre.
- **NIVT 3B** (Irrigated Late Sown T. Aestivum) and **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.
- **Dicoccum** dehusked samples from Dharwad, Pune, Arabhavi, Kalloli and Ugar (PZ) will be analysed at UAS, Dharwad.
- **IVT (NHZ)** samples from Shimla, Almora and Malan will be analysed at ICAR-IIWBR, Karnal.

AVT

- **AVT 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 IInd year entries. **Special Trial (HYPT)** samples will be analysed at ICAR-IIWBR, Karnal.

Quality Components and Wheat Biofortification Nursery (QCWBN)

- **Quality Components and Wheat Biofortification Nursery (QCWBN)** samples will be analysed at ICAR-IIWBR, Karnal for grain appearance score, test weight, protein content, grain hardness index and sedimentation value, Fe and Zn content. **Hand threshed samples using cloth should be provided for Fe and Zn analysis separately.** Followings are the 10 centres for providing samples for the nursery for quality analysis;

Ludhiana, Karnal, New Delhi and Pantnagar (NWPZ); Kanpur and Varanasi (NEPZ); Indore and Vijapur (CZ) and Dharwad and Niphad (PZ)

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

NHZ 15th June 2020

NWPZ & NEPZ 20th May 2020

CZ 15th May 2020

PZ 30th April 2020

- 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. The *T.dicoccum* samples should be sent after de-husking.
- All the co-operators, who will analyze the wheat samples of various NIVTs and Special Trials should send the data to ICAR-IIWBR, Karnal positively by 15th July, 2020, by e-mail in the format used in annual report.

Work Plan (2020-21)-Barley Network

Crop Improvement:

The following eight yield evaluation trials were finalized for conduct during 2020-21 crop season at different locations in respective zones

Name of Trial	AVT-RF-NH Zone	
No. of Trial Centres	11 (Bajaura, Berthein, Kangra, Katrain, Malan, Shimla, Almora, Ranichauri, Majhera, Rajauri, Khudwani)	
No. of varieties including checks	23	
Contributing Centres	No.	Name of varieties
IARI, RS, Shimla	5	BHS483, BHS484, BHS485, BHS486, BHS487
Pantnagar	3	UPB1091, UPB1092, UPB1093
Almora	5	VLB170, VLB171, VLB172, VLB173, VLB174
Bajaura	5	HBL869, HBL870, HBL871, HBL872, HBL873
Checks	5	HBL113, BHS352, BHS400, BHS380, VLB118
Experimental Design	RBD	
Replications	4 (2 for cut and 2 non cut)	

Name of Trial	Advanced Varietal Trial-IR-FB- NWPZ and NEPZ (Pooled)	
No. of Trial Centers	17 (Hisar, Karnal, Ludhiana, Bathinda, Durgapura, Tabiji, Navgaon, SG Nagar, Pantnagar, Modipuram, Kanpur, Varanasi, Ayodhya, Pusa (CAU), Sabour, Ranchi and Kalyani)	
No. of varieties including checks	10	
Contributing Centers	No.	Name of varieties
Kanpur	1	KB1822
Durgapura	1	RD3012
Varanasi	1	HUB272 (NWP+NEP)
Hisar	1	BH1029
Ludhiana	2	PL911, PL917
Checks	4	BH946, BH902, HUB113, DWRB137
Experimental Design	RBD	
Replications	4	
Plot Size	Gross: 5m x 2.76m (12 rows) Net: 4.5 x 2.30 (10 rows)	

Name of Trial	Advance Varietal Trial-IR-FB- CZ	
No. of Trial Centers	7 (Udaipur, Kota, Gwalior, Morena, Tikamgarh, CAU Jhansi, Vijapur)	
State	NO.	Name of centers
No. of varieties including checks	6	
Contributing Centers	No.	Name of varieties
Kanpur	1	KB1822
Durgapura	1	RD3013

Pantnagar	1	UPB1088
Checks	3	RD2899, DWRB137, BH959
Experimental Design		RBD
Replications		4
Name of Trial	AVT-SST (SAL / ALK)- NWPZ / NEPZ	
No. of Trial Centers	08 (Dalipnagar, Ayodhya, CCSHAU Hisar, IIWBR (Hisar), CSSRI Karnal, Kumher, Fatehpur, Bhilwara)	
State	No.	Name of centres
No. of varieties including checks	15	
Contributing Centers	No.	Name of varieties
Hisar	1	BH1039
Kanpur	3	KB1822 , KB1909, KB1911
Varanasi	1	HUB280
Faizabad	1	NBD1757
Karnal	1	DWRB224
Durgapura	5	RD3016 , RD3039, RD3040, RD3041, RD3042
Checks	3	NDB1173, RD2794, RD2907
Experimental Design		RBD
Replications		4 (Four)

RD3016 and KB1822 are retained for AVT-I year

Name of Trial	Initial /Advance Varietal Trial Food barley (Hulless)	
Production Condition	Irrigated	
Zone	NWPZ/ NEPZ / CZ	
No. of Trial Centers	15 (Hisar, Karnal, Ludhiana, Durgapura, Udaipur, Pantnagar, Kanpur, Varanasi, Faizabad, Modipuram, CAU Jhansi, Gwalior, Morena, Tikamgarh and Vijapur)	
No. of varieties including checks	8	
Contributing Centers	No.	Name of varieties
Kanpur	2	KB1909, KB 1926
Karnal	1	DWRB223
Pantnagar	2	UPB1086 , UPB1094
Checks	3	Karan16, NDB943, PL891
Experimental Design		RBD
Replications		4 (Four)

UPB1086 in AVT 1st Year of all three zones

Name of Trial	IVT-MB-IR-TS-NWPZ	
No. of Trial Centers	10 (Bawal, Hisar, Karnal, Ludhiana, Bathinda, Durgapura, SG Nagar, Navaon, Modipuram and Pantnagar)	
No. of varieties including checks	22	
Contributing Centers	No.	Name of varieties
Hisar	3	BH1034, BH1035, BH1036
Pantnagar	2	UPB1097, UPB1098
IIWBR, Karnal	4	DWRB218, DWRB219, DWRB220, DWRB221,
Durgapura	4	RD3027, RD3028, RD3029, RD3030
Ludhiana	3	PL926, PL930, PL931
Kanpur	1	KB1939
Checks	5	BH946, DWRUB52, RD2849, DWRB160, DWRB182(I)
Experimental Design		RBD

Replications	4
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Name of Trial	Initial Varietal Trial-IR-FB- NWPZ/ NEPZ / CZ	
No. of Trial Centers	18 (Hisar, Karnal, Ludhiana, Durgapura, Tabiji, Udaipur, Pantnagar, Kanpur, Varanasi, Ayodhya, Modipuram, Gwalior, Morena, Pusa (CAU), Sabour, Ranchi, Vijapur and Kalyani)	
No. of varieties including checks	25	
Contributing Centers	No.	Name of varieties
Kanpur	3	KB1912, KB1916, KB1946,
Varanasi	3	HUB277, HUB278, HUB279
Faizabad	1	NDB 1756
Hisar	2	BH1037, BH1038
Durgapura	4	RD3031, RD3032, RD3033, RD3034
Pantnagar	2	UPB1095, UPB1096
Ludhiana	4	PL927, PL928, PL929, PL932,
Karnal	1	DWRB222
Checks	5	BH902, BH 946, DWRB137, RD2899, HUB113
Experimental Design		Lattice
Replications		2 (Two)

Name of Trial	IVT-Rainfed-NEPZ	
No. of Trial Centers	8(Kanpur, Varanasi, Ayodhya, Saini, Pusa (CAU), Sabour, Ranchi and Chiyanki)	
No. of varieties including checks	12	
Contributing Centers	No.	Name of varieties
Kanpur	3	KB1940, KB1944, KB1947
Varanasi	2	HUB275, HUB276
Faizabad	1	NDB1754
Durgapura	4	RD3035, RD3036, RD3037, RD3038
Checks	2	K 603, Lakhan
Experimental Design		RBD
Replications		4

Barley Quality (2020-21):

1. Malt Barley

Identification of Promising genotypes for malting quality traits

Trial: Initial Varietal Trial (Malt Barley)

Number of Locations: 8

Traits to be analysed:

Grain Traits: Test weight, Thousand Grain weight, Kernal 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: 20

Food Barley Genotypes: 15

Number of Locations: 5 (Karnal, Hisar, Ludhiana, Pantnagar & Durgapura)

3. Feed & Hulless Barley

Quality Evaluation of Feed and Hulless Barley Genotypes

Trials: Feed Barley/Hulless Barley

Zones: NWPZ, NEPZ, CZ & NHZ

Grain Physical Traits: Test Weight, Thousand Grain Weight, Grain Plumpness, Protein, Beta Glucan (in selected entries of Hulless genotypes)

Barley Crop Protection (2020-21)

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.

A. Plant pathology:

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

i. Initial Barley Disease Screening Nursery (IBDSN):

This nursery will comprise 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)

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 yellow rust (Centres: Ludhiana, Durgapura, Bajaura, Karnal, Almora and Jammu)

Picoxystrobin 7.05% + Propiconazole 11.7% SC, Pyraclostrobin 133g/l + Epoxiconazole 50g/l SE, Tebuconazole 50% + Trifloxystrobin 25% WG, with standard chemical (Propiconazole and Tebuconazole) and without chemicals.

The chemical will be evaluated under artificial inoculated condition and doses will be @ 0.1% and repeated once after 15 days. Design – RBD, Plot size – 6 rows of 3 meters, replications - 3.

B. Entomology:

1. Screening of NBDSN against foliar aphids (Centres: Ludhiana, Kanpur, Durgapura 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. Treatment details are as under:-

S. No	Treatment	Dosage g ai/ha	Formulation Dose ml/ha
1.	Thiamethoxam 12.6% + Lambda cyhalothrin 9.5% ZC(Alika)	33.15 (18.9+14.25)	150
2.	Thiamethoxam 25% WG	12.5	50
3.	Lambda cyhalothrin 5% EC	25	500
4.	Beta-Cyfluthrin 9%+ Imidacloprid 21% (Solomon)	(8.49 + 19.81 % w/w)	400
5.	Imidacloprid 17.8 SL	20	400
6.	Beta-cyfluthrin 25 SC	18.75	1450
7.	Sulfoxaflor 12% SC	30	250
8.	Untreated control	-	

C. Nematology

1. Screening of NBDSN and EBDSN against CCN:

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

RESOURCE MANAGEMENT (2020-21):

1. BARLEY AGRONOMY EXPERIMENT NO. SPL-1

Title: Productivity enhancement through adjusting sowing dates in barley

Objective: To optimise sowing dates for increasing the feed and malt barley productivity

Treatments:

Main plot: Sowing dates

NWPZ, CZ	NEPZ	NHZ
1-5 November	11-15 November	25-30 October
11-15 November	21-25 November	5-10 November
21-25 November	1-5 December	15-20 November
1-5 December	11-15 December	25-30 November

Subplot: Varieties

NWPZ: (BH 946, DWRB160)

NEPZ: (DWRB137, HUB113);

CZ: (DWRB137, RD2899) NHZ: (BH 400, VLB 118)

Design: Split plot Design **Replication:** 3

CENTRES: NWPZ: (Agra, Durgapura, Hisar, Karnal, Ludhiana); NEPZ: (Varanasi, Faizabad, Kanpur); NHZ: Bajaura, Malan; CZ: Udaipur

2. BARLEY AGRONOMY EXPERIMENT NO. SPL-2

Title: Productivity and quality enhancement of barley through N 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) +0.5% urea spray at anthesis stage (80-90DAS)
5. 1/2 at basal+1/2 at tillering (35-40 DAS) +0.5% urea + 0.5% ZnSO₄.7H₂O spray at anthesis stage (80-90DAS)
6. 1/2 at basal+1/4 at tillering (35-40 DAS) +0.5% urea spray at anthesis stage (65-70DAS)
7. 1/2 at basal+1/4 at tillering (35-40 DAS) +0.5% 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) +0.5% spray at flag leaf stage (80-90DAS)
9. 1/3 at basal+1/3 at tillering (35-40 DAS) +0.5% Urea + 0.5% ZnSO₄.7H₂O spray at anthesis (80-90DAS)

Variety: NWPZ: DWRB160

Design: RBD

Replications: 3

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

3. BARLEY AGRONOMY EXPERIMENT NO. SPL-3

Title: Yield maximisation of barley through integrated nutrient supply and PGRs application

OBJECTIVE: To increase barley productivity and nutrient use efficiency.

TREATMENTS:

1. Control (No fertiliser)
2. RDF 50%+10t FYM
3. RDF 75%+10t FYM
4. RDF 75%+10t FYM+PGR
5. RDF
6. RDF+PGR
7. RDF + 10t FYM
8. RDF + 10t FYM+PGR
9. RDF 125%+PGR
10. RDF 125%+10t FYM+PGR
11. RDF 150%+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 as per recommendations

Variety: NWPZ: BH946 NEPZ: DWRB 137 CZ: DWRB137 NHZ: BHS400

Design: RBD

Replications: 3

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

4. BARLEY AGRONOMY EXPERIMENT NO. SPL-4

OBJECTIVE: To enhance the nutrient use efficiency and to optimise dose of nano fertiliser for 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

Variety: NWPZ: BH 946 NEPZ: DWRB 137 CZ: DWRB137 NHZ: BHS400

Design: RBD **Replications:**3

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana; CZ: Udaipur

5. BARLEY AGRONOMY EXPERIMENT NO. SPL-5

Title: Effect of Zn application on quality and productivity of barley

Objective: To enhance the quality and productivity of barley

Treatments:

A. Main Plot: Zinc Application

1. No zinc application
2. Soil application of zinc (12.5 kg Zinc sulphate / ha)
3. Soil application of zinc (25.0 kg Zinc sulphate / ha)
4. Two Foliar application of zinc (0.5 % Zinc sulphate at heading and early milk stage)
5. T2+T4
6. T3+T4

B. Sub Plot: Varieties:

NEPZ: DWRB137, HUB 113, **NWPZ:** BH 946, DWRB123, **NHZ:** BHS 400, VLB118 and **CZ:** DWRB137, RD2899

Design: RBD **Replication:** 3

CENTRES: NWPZ: Agra, Durgapura, Hisar, Karnal, Ludhiana; NEPZ: Varanasi, Faizabad, Kanpur; NHZ: Bajura, Malan; CZ: Udaipur

6. BARLEY AGRONOMY EXPERIMENT NO. SPL-6

Title: Enhancing productivity and quality of barley using Silicon in low moisture areas.

Objectives: To evaluate the performance of barley cultivars under Silicon application

Treatments

Main Plots: Irrigation levels (3)

- I1 : No irrigation
I2 : One irrigation (between 30-35 DAS)
I3 : Two irrigations (30-35 DAS and 80-85 DAS)
I4 : Three irrigations (30-35 DAS, 60-65 DAS and 90-95 DAS)

Sub plot: Silicon (4)

Treatments: Control, Silicon @ 100 kg/ha Silicon @ 150 kg/ha Silicon @ 200 kg/ha

Varieties: BH 946

Centres: NWPZ: Agra, Durgapura, Hisar; CZ: Udaipur

Recommendations (2019-20)

Crop Improvement

1. Newly released varieties will be taken up in seed chain for cultivation. Also, 14 new genetic stocks will be shared. The newly identified varieties proposals will be now put up to CVRC for release and notification.
2. Work plan (2020-21) with a total of 439 new trials sets to be executed. Also, work plan for national nurseries including SSN will be taken up during 2020-21.
3. It is proposed to get contribution from major centers to contribute material for national nurseries.
4. Plan proposed for trait specific hybridization targets and directed program on pre-breeding by major wheat breeding centres and accordingly contribution in national nurseries including SSN.
5. Strategy for harvesting 9 tons/ha in early sown high potential environments in mega zones.
6. Limit of ACI revised to 20.0 under both natural and artificial
7. Revisiting site means for different zones particularly RI trials
8. The plot size (AVT/IVT) in NHZ will be uniform across locations.
9. Contribution of MABB/Biofortified entries to AVTs should be supported by valid passport data.
10. The AICRP will take up screening of 350 wheat genotypes against wheat blast disease in Bangladesh and Bolivia.
11. In view of COVID-19, constitution & dispatch of all coordinated trials will be done by ICAR-IIWBR, Karnal.
12. Under HRD, one training programme on data recording and conduction of trials during Feb-March, 2021.
13. As suggested by DDG, one training on molecular aspects for wheat breeders will be organized during the crop season (December 2020).
14. The grain yield of all trials is to be reported for gross plot only.

Resource Management

1. In NHZ and NWPZ, last week of October is the optimum time of sowing for getting higher yield.
2. In all zones application of 150% NPK + FYM (15 t/ha) + GR (0.2% CCC and 0.1% tebuconazole) produced maximum grain yield and yield attributes than recommended fertiliser dose.
3. The need based N application with Green Seeker can save up to 20 kg N/ha.

Crop Protection

General recommendations

1. Growing of newly released yellow rust resistant varieties in Punjab, Haryana, Himachal Pradesh and Jammu in view of current pathotype prevalence and discourages old varieties.

Technical recommendations

1. Deploy blast resistant cultivars in NEPZ more specifically in West Bengal that are as follows:
 - DBW 187, HD 3249 and HD 2967 (irrigated and timely sown)
 - DBW 252 and HD 3171 (restricted irrigation and timely sown)
2. Strict monitoring for wheat blast in NEPZ specially areas bordering to Bangladesh. Use of preventive measures i.e. seed treatment with Carboxin + Thiram (1:1) @ 2.5

g/kg and spray of Tebuconazole (50%) + Trifloxystrobin (25%) WG @ 0.06% if any symptoms observed.

3. It is recommended to record the leaf blight score at least three times with 10-15 days interval for effective screening and harnessing the variability for leaf blight resistance.
4. For the management of CCN use of Chalcone @40 ppm conc. + half dose of Carbofuran 1kg ai. per ha found effective.
5. For the management of aphid use Beta-Cyfluthrin 9%+ Imidacloprid 21% @ 400 ml /ha found effective.
6. The monitoring of PPSN trial will be through digital mode.
7. A training to crop protection cooperators for diseases scoring, recording and reporting is needed to further improving screening.

Wheat Quality

1. It is recommended to use bench marks of traits in combination to identify superior entries for different end-use products and nutritional quality traits having distinct superiority in the trial. The details of bench marks are given below.
2. It is recommended to have breeding for soft and hard wheat classes separately in bread wheat. Emphasis should be on high yellow pigment and protein content with strong gluten in durum wheat. This is required to meet the rising demand of baking products in the country. For this purpose quality and breeders should go hand in hand.
3. Issue of nutritional quality was discussed in length and it was suggested to develop catalogue/technical bulletin of nutritional quality traits including bioavailability of Fe and Zn, dietary fibre, resistant starch, glycemic index etc of popular released varieties. For this purpose institutions (including NABI, Mohali, NIN, Hyderabad, NIFTAM, Kundli) where such facilities are available will be involved.
4. Self assessment and reviewing the AICRP-WAB programme as a whole should be done under the chairmanship of ADG (FFC) to identify quality traits for evaluating AICRP trials.
5. Since protein content showed large variations across centres and zones, it is suggested that after keeping in view the total N requirement, the possibility of balancing added N-fertilizer with the available N, may be explored.
6. For checking uniformity of data, PI quality should provide check samples of selected wheat varieties to coordinating centres where NIVT s are being analysed. In turn centres should also send few random samples to ICAR-IIWBR, Karnal for checking data uniformity and thus minimising the lab to lab variations.
7. Considering the nutritional and therapeutic value of Diccocum wheat, the dicocum trials should be analyzed for nutritional parameters like protein content, total dietary fiber, soluble fiber, resistant starch content, Zn and Fe content.
8. It is recommended that samples from a centre having average value of hectolitre weight below 73.0 will not be used for further analysis and thus no data of the centre will be reported.
9. Because of Covid-19 crisis, samples from Mandi/Farmers' filed could not be collected during this year, it is therefore, recommended that AICRP centres involved in sending trial samples for quality analysis in different zones should collect and send samples from Mandi/Farmers' filed samples for quality analysis ICAR-IIWBR, Karnal.

Proposed Wheat Quality Bench Marks

Proposed bench marks for wheat quality traits for promotion based on distinct quality advantage. There are 5 major groups based on end-product and nutritional quality. Promotion based on one trait only may not be desirable and hence groups have been identified having some traits in combination for end-product as well as nutritional quality. Since quality traits are also affected by the environment, therefore combination of traits is required to ascertain better wheat quality.

S.no	Traits	Group I Hard wheat for Chapati	Group II Hard wheat for bread	Group III Soft wheat for biscuits etc	Group IV Durum wheat for pasta	Group V Nutritional quality
1	Hectolitre weight (kg/hl)	>76	>76	>76	>78	>76 (A) >78(D)
2	Grain Protein % (at 12% MB)	>12.5	>13.0	<11.0	>13.0	>13.0
3	Sedimentation volume (ml)	50-60	>60	<35	>45	-
4	Grain hardness index by SKCS	>80	>75	<35	>80	-
5	Phenol reaction (1- 10 scale)	<3.0	-	-	-	-
6	Yellow pigment (ppm)	-	-	-	>8.0 ppm	-
7	Fe (ppm)	-	-	-	-	>40
8	Zn (ppm)	-	-	-	-	>40

A= Aestivum; D=Durum

Barley Improvement

1. The regular trials of NH Zone will also include a treatment for dual purpose evaluation by having a cut for green fodder in two replications and the remaining two will be as non-cut for generating all required information on grain and forage yield, however this should be discussed with the statistician before taking any decision
2. The Salinity trials will also be conducted at Kumher, Bhilwara and CSSRI Karnal locations, while will be discontinued at Rampura and Banasthali. The request to CSSRI may be made through proper channel for taking up barley trial also in addition to the regular wheat trial at the institute.
3. Screening for barley blights (spot blotch) will also be carried out at Arabhavi location under UAS Dharwad for which an extra set of NBDSN will be supplied from PI CP, ICAR-IIWBR, Karnal. Dharwad location will continue for black rust screening as usual. In addition to the aphid screening, data on shoot fly is also to be recorded at two locations.
4. Observations on leaf blight will be recorded at least at three appropriate growth-stages in order to calculate the AUDPC of barley genotypes for their reaction to leaf blight. The AUDPC may be considered for comparison of entries and checks instead of highest score only, which sometimes is not sufficient to differentiate the genotypes.
5. Breeders may practice the selection of new malt barley genotypes in the range of 42 to 48 g of TCW to avoid extra bold grains, which becomes disadvantageous during malting process.
6. The resource management trials should include components like ZnSO₄ and osmo-protectants/suppressants
7. From crop season 2020-21 all entries of the coordinated yield trials will be analysed for molecular diversity, which is currently being done for only AVT final year entries.

SPECIAL SESSION: VARIETAL IDENTIFICATION COMMITTEE MEETING

August 24, 2020	Chairman	: Dr. T R Sharma, DDG (CS)
	Member Secretary	: Dr. GP Singh, Director, IIWBR
	Rapporteurs	: Drs. Satish Kumar & Gopalareddy K

The meeting of Varietal Identification Committee of Wheat & Barley was held on 24 August 2020 during 59th AGM of All India Coordinated Research Project (AICRP) on Wheat & Barley under the Chairmanship of Dr. T R Sharma, DDG (CS).

The Varietal Identification Committee (VIC) of following members participated in the meeting:

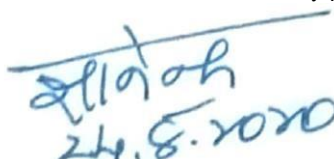
1. Dr. T R Sharma, DDG (CS), ICAR, Krishi Bhavan, New Delhi (*Chairman*)
2. Dr. A K Singh, Director, ICAR – IARI, New Delhi
3. Dr. B S Mahapatra, Prof., GBPUA&T, Pantnagar
4. Dr. Y P Singh, ADG (FFC), ICAR, Krishi Bhawan New Delhi
5. Shri Shravan Kumar, DDA (Seed) Department of Agriculture, Govt. of Uttar Pradesh
6. Dr. Arvind Nath Singh, Director, ICAR-IISS, Mau Nath Bhanjan
7. Dr. S C Mishra, Ex Head, Plant Genetics Division, ARI, Pune
8. Dr. Mohinder Prashar, MAHYCO, R&D, Jalna (Pvt. Representative)
9. Dr. G P Singh, Director, ICAR-IIWBR, Karnal (Member Secretary)


The committee considered all 12, wheat (11) and barley (1) varietal proposals submitted for identification and after detailed deliberations, gave the following recommendations unanimously, as indicated against each proposal:

SN	Name of Variety	Production conditions	Recommendations
WHEAT			
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.			
1	HD 3298	IR-VLS	The variety was identified based on its high yield under very late sown conditions and also for good chapatti & bread quality.
North Eastern Plains Zone (NEPZ): East of UP, Bihar, Jharkhand, West Bengal (excluding hills), Orissa, Assam and plains of NE States.			
2	HD 3293	RI-TS	The genotype has shown resistance to wheat blast disease and to APR reactions of brown rust and hence identified .
Central Zone (CZ): Madhya Pradesh, Gujarat, Rajasthan and Chhattisgarh states.			
3	CG 1029	IR-LS	Both the genotypes were considered together and were identified based on high level of resistance to rust and yield superiority.
4	HI 1634	IR-LS	
Peninsular Zone (PZ): Maharashtra, Karnataka and plains of Tamil Nadu			
5	DDW 48(d)	IR-TS	Both the durum wheat genotypes were considered together and after discussion it was decided to identify DDW 48 based on yield superiority and resistance to rust. DDW 49 was not identified as it has shown susceptible reaction to rust and there is no yield gain.
6	DDW 49(d)	IR-TS	
7	HI 1633	IR-LS	HI 1633 was identified on the basis of yield gain and superiority in rust resistance.

8	NIDW1149(d)	RI-TS	NIDW 1149 was identified on the basis yield superiority and rust resistance.
IR-ES Special – High Yield Potential Trial (NWPZ)			
9	DBW 187	ES-IR	All the three genotypes were considered together and based on their yield superiority, rust resistance, all three varieties namely, DBW 303, WH 1270 & DBW 187 were identified .
10	DBW 303	ES-IR	
11	WH 1270	ES-IR	
BARLEY			
12	DWRB 182	IR-TS	The genotype was identified based on its superior grain quality. It is having low levels of beta glucan and a high diastatic power, suitable for malt barley.

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


24.8.2020
Gyanendra P Singh
Member Secretary


24.8.2020
Tilak Raj Sharma
Chairman

SESSION III: INTERNATIONAL COLLABORATIONS FOR WHEAT & BARLEY IMPROVEMENT

August 25, 2020	Chairman	:	Dr. TR Sharma (DDG,CS), ICAR-New Delhi
	Co-Chairman		Dr. Hans Braun, CIMMYT, Mexico
	Rapporteurs	:	Drs. Charan Singh & Prem Lal Kashyap

The session was chaired by Dr. TR Sharma, DDG (CS), ICAR, New Delhi and co-chaired by Dr. Hans Braun, CIMMYT, Mexico. The session had three presentations. First presentation was made by Dr. Ravi P Singh (CIMMYT) on new research avenues for the collaboration of CIMMYT with Indian Wheat improvement Program. In his talk, he provided detail insight on the progress made in the major wheat breeding projects involving CIMMYT and India followed by selection traits in product profiles and genomic prediction for grain yield under different target population environments (TPEs) in India. He also highlighted the key achievements and the impact of international collaboration on Indian wheat program and congratulated the Indian wheat family for attaining the record production of more than 107MT during 2019-20. Further, he gave emphasis on the need of research impetus especially on new breeding and testing schemes for rapid cycling through speed breeding, quantitative genetics and molecular breeding to enhance genetic gain for target traits, their optimization and mainstreaming based on the experimental results. Besides this, he stressed on earlier and increasing phenotyping in target population of environments beyond selection environments, rapid access of elite lines to collaborating partners for use as parents for faster delivery of genetic gains in addition to human resource development and integration of women farmers for trait selection preferences. He also emphasized on the need for exploratory research on the identification and characterization of genomic regions associated with stripe rust and wheat blast resistance.

Second presentation from ICRISAT was made by Dr. Parminder Virk on prospectus of zinc biofortification in wheat. He presented global scenario of micronutrient malnutrition and hidden hunger and gave emphasizes on the importance and significance of biofortified wheat especially its indirect role in boosting immunity towards COVID-19 infection, though presently there are no research findings to support the claim. Further, he highlighted the impact of HarvestPlus programme especially exploitation of plant breeding tools for developing biofortified wheat varieties with desirable characters (traits)-higher yield, resistance to diseases, better nutrition (higher micronutrient content). He informed that, so far 11 biofortified durum and bread wheat varieties have been released in India and well accepted by the farmers and consumers. In this context, chairman, Dr. TR Sharma informed that from this year, there will be 10% FLDs quota for biofortified wheat in FLDs at farmer's fields.

Dr. M. Baum, Director, Biodiversity and Crop improvement programme (ICARDA) and Dr. Miguel Sanchez-Garcia from ICARDA presented detailed account on the research initiative of ICARDA for Indian barley improvement. They highlighted the significant achievements of ICARDA barley program which focuses on the diversification of germplasm for genetic enhancement of barley, global panel of barley land races, and molecular marker identification for quality and diseases resistance along with abiotic stress tolerance. Dr. Miguel Sanchez-Garcia stressed on the impact of pre-breeding work in barley being carried out at ICARDA. Further, he informed that capacity building has also been a success on this collaboration with a large number of Indian scientists getting trained in International institutions.

After the detailed presentations, co-chairman, Dr. Hans Braun, CIMMYT, Mexico has expressed his gratitude for his fruitful and symbiotic collaboration for more than 15 years with Indian wheat programme and for attaining the record production of more than 107MT during current year. He further highlighted that there is a need to enhance that wheat productivity and diversification of food diet through genetic and agronomic manipulations. Further, he stressed on the identification of new resistance sources for wheat blast, public-private partnership and strong linkages with international centers for human resource development.

The session ended with final remarks by the chairman, Dr. TR Sharma, DDG (crop science), who duly acknowledged the contribution and strong collaborative linkages of global partners with Indian wheat and barley improvement programme. He also emphasized on the need of biofortified wheat enriched with micronutrients (Zn and Fe) and their bioavailability, target specific breeding, pre-breeding, human resource development in the area of cutting edge science and phenotypic evaluation of wheat and barley germplasm for biotic and abiotic stresses. He also stressed on the development of specialized products based on wheat and barley and exploration of nearby research laboratories/ institutes for their quality testing and evaluation.

The meeting ended with the vote of thanks to chair and co-chair of the session.

SESSION IV: - CENTRAL ZONE PROGRESS REPORTS OF AICRP (W&B)

August 25, 2020	Chairman	:	Dr YP Singh, ADG (FFC), ICAR-New Delhi
	Co-Chairman		Dr GP Singh, Director, ICAR-IIWBR, Karnal
	Rapporteurs	:	Drs. CN Mishra and Vikas Gupta

The chairman Dr YP Singh welcomed all the presenters and delegates to the session and briefed about the importance of Central Zone in Indian wheat programme. In all, there were 09 presentations to review the progress for the quinquennium 2015-16 to 2019-20 from the different centres located in the zone. All the centres presented the progress in terms of staff position, budget, varieties notified, coordinated trials allotted and conducted, summary of national and international nurseries conducted, hybridization programme and segregating populations handled, contribution to NIVT and promotion to AVTs, germplasm maintenance and utilization, seed production, technology development, extension activities and list of publications in national and international during the period of review.

The first presentation was made by Dr SV Sai Prasad for ICAR-IARI, RS-Indore station. He informed the house that during the period a total of 09 wheat varieties (5 bread and 4 durum varieties) and 4 production technologies were also developed. A total of 177 FLDs were also conducted to disseminate the technologies to the farmers. Seventeen research papers were published in the journals having high impact. The achievements of Indore centre was praised by all the panellists. Dr KK Mishra presented the progress of Powarkheda centre. He informed that 4 wheat varieties were released and 35 donors for different attributes were also identified. The centre also shared 35 crosses with the Sagar centre. Eight research papers were published in the journals having high impact. Dr SI Patel presented achievements of Vijapur and informed that 04 wheat varieties were released by the centre and 2 donors identified for high protein content and high grain weight. 3427 crosses were attempted and 10 segregating populations were shared with other co-operators. The centre recommended and fine tuned the drip irrigation system in wheat and a total of 105 FLDs were conducted that showed the average gain of 11%.

Dr KH Dhahi presented the progress of Junagadh centre, and only one variety was released during the reported period. 1240 cross combinations were attempted and 4377 lines were evaluated during the period. Dr AP Aggrawal while presenting Bilaspur achievements reported the release of 3 wheat varieties, development of 646 cross combinations and evaluations of 2378 lines. The progress of Udaipur centre was made by Dr Jagdish Chaudhary. The centre has recommended 04 production technologies for the farmers which deals with mitigating terminal heat stress, weed control and high grain yield. The progress of Jabalpur centre was made by Dr Suneeta Pandey. Two wheat varieties have been developed by this centre and 32 donors were identified in last five years. A total of 723 crosses were attempted during the period. A total of 18652.77 q of breeder seed has been produced during the period. Dr NS Bhadouriya, presented the progress of the Gwalior centre. There was no release of variety by the centre. 946 lines were evaluated and 357 crosses were attempted. From Sagar centre the progress was presented by Dr MP Dubey. He informed that the position of the breeder is vacant and not much work has been done in terms of varietal development.

Experts Comments

Dr BS Mahapatra, appreciated the achievements of Indore, Udaipur and Jabalpur centres. However he emphasized that the other centres should also follow these centres for carrying out their research activities. Dr AN Mishra stressed that there is need to study the constraints faced by these centres and devise a mechanism to utilize the potential of the centres located in this zone. The recommendations of QRT should be followed by the centres in terms of germplasm sharing especially by the Powarkheda centre. Dr ML Lodha, observed variation in quality attributes within the zone and emphasized that soil testing based fertilizer application should be done at the centres where experiment on quality analysis of grains is being carried out. Dr SR Verma, suggested that the barley germplasm should be provided to the Udaipur centre to strengthen its breeding programme. Dr GP Singh was not satisfied with the performance of the centres in the zone except Indore. The centres also need to improve their research and publication output besides conducting AICRP trials. He also stressed that on the basis of performance of centres stringent corrective measures will be taken in near future to improve the performance. Dr YP Singh, Chairman of the session commented that the centres should pay attention to the publications and improve their research capability. New germplasm collections should be undertaken in the zone to preserve the available diversity. During the last five years no new pest/disease has been reported in the zone. The presentations of the centres should be thoroughly reviewed by the AICRP coordinator before presenting in the workshop. At the end the chairman thanked Dr GP Singh, experts, all the presenters and the delegates that actively participated in healthy and fruitful discussion.

Session V -Plenary Session

August 25, 2020	Chairman	:	Dr TR Sharma, DDG (CS), ICAR, New Delhi
	Co-Chairman	:	Dr YP Singh, ADG (FFC), ICAR, New Delhi
	Rapporteurs	:	Drs Sindhu Sareen and Karnam Venkatesh

The plenary session of the two days wheat and barley research workers virtual meet, i was chaired by Dr. TR Sharma, DDG (CS), ICAR, New Delhi and co-chaired by Dr YP Singh, ADG (FFC), ICAR, New Delhi. The Chairman welcomed the delegates and appreciated the efforts of the coordinated programme in achieving the historic wheat production of 107.18 MT during 2019-20. He then requested the section wise PIs to present the significant recommendation and highlights of work plan for 2020-21.

The recommendations and plan of work for Crop Improvement was presented by Dr Gyanendra Singh, PI, Crop Improvement. He informed that the finalized work plan 2020-21 included 439 trials. Some of other important decisions taken by the group for the conduct of the trials included trait specific hybridization, extending of HYPT further to CZ and other potential zones, revising ACI limits to 20 in case of rusts, sharing of new registered genetic stocks with co-operators, harvesting gross plots, mandatory contribution to SSN and national nurseries by major centres. All the trials will be constituted and despatched by ICAR-IIWBR due to COVID pandemic. Entries for MABB and Biofortification trials must be supported by authentic data. Trainings will be conducted during Feb and March 2021. Chairman emphasized that ICAR-IIWBR has to suggest donors and recipient parents to cooperating centres in view of initiation of trait specific hybridization programme.

Dr SC Tripathi, PI, Resource management presented the recommendations and plan of work for 2020-21 crop season. The Resource Management and Social Sciences groups after thorough deliberations arrived at the general and specific recommendations including the proposal for special trials. After the presentation, chairman questioned the basis of initiating special trial on silicon foliar spray and asked for thorough review in the group before initiation. Dr BS Mohapatra while delivering his expert comments requested to revise the DOS in NWPZ to 25th Oct to 5th Nov.

Crop Protection's recommendations and the work plan for 2020-21 were presented by Dr Sudheer Kumar, PI-Crop Protection, ICAR-IIWBR, Karnal. He informed that the programme has led to development for new chemicals for control of yellow rust and organic treatment for the aphids' management. Deployment of blast resistant wheat varieties and stepping up of wheat blast monitoring in Bangladesh bordering districts of India, strengthening of aphid tolerance trials, nematological trials and digital monitoring of PPSN trials were the major recommendations for ensuing season.

Wheat quality group formulated the plan of work and recommendations based on the discussion with their group members and Dr Sewa Ram, PI-Quality Improvement presented the section recommendations. Benchmarking of quality parameters, parameter testing of *dicoccum* entries, setting of 73 kg hectoliter⁻¹, supply of quality standard sample seeds from ICAR-IIWBR to maintain uniformity of data from quality labs, testing of samples from mandis and initiation of an agronomic biofortification trial to enhance Zn content were the major recommendations. After the presentation by the PI, there was a suggestion to initiate special breeding programmes for soft and hard wheats to deliver product specific varieties for industrial and international market. Dr AM Singh from IARI and Dr AK Joshi from CIMMYT while responding to discussion on agronomic biofortification, enumerated the constraints such as labour and costs involved which caused shifting of focus towards genetic biofortification in international projects. Dr HR Saharan from PAU defended the agronomic approach and said that it would complement the genic approach. Inclusion of resistant starch and anthocyanin pigment into benchmarking of quality traits was suggested by the session chair. Chairman asked PI Quality to have a separate discussion on feasibility of agronomic biofortification before approving this specific recommendation.

Barley network recommendations and the work plan for 2020-21 were presented by Dr RPS Verma, PI-Barley Network, ICAR-IIWBR, Karnal. Initiation of dual purpose barley trial in NHZ, salinity screening of barley entries at ICAR-CSSRI, Karnal, special emphasis on leaf blight screening, and maintenance of 42- 48 g TGW for malt barley, trial on ZnSO₄ and osmoprotectants and molecular profile of all the entries were the major recommendation. Chairman in his response stressed for inter institutional collaborations with institutes like AICRP on forage crops.

Following the presentations made by the PIs of all units, the PMC members presented their expert opinion on improving the programme. Dr BS Mohapatra suggested following measures viz., inter institutional collaborations with centres like NCIPM, NBAIM etc; relook of RDF for different zones and micronutrient supplementation for sustaining yields. Dr AN Mishra suggested to strengthen rust recording of pathological nurseries in presence of joint team of breeders and pathologists and use of diverse sources of resistance. In response chairman suggested for initiation of HRD training programmes for young researchers with involvement of experienced senior pathologists as tutors. Further Dr Lodha suggested strengthening breeding for quality and speciality traits. In response chairman suggested to train young biochemists to fulfil the future challenges in quality programme. Dr SR Verma welcomed the initiation of dual-purpose barley trial and suggested for strengthening of engaging with industries.

Subsequently, Dr GP Singh presented the Varietal Identification Committee (VIC) report. Of 11 wheat proposals, 10 were recommended and the single barley proposal was also recommended by the VIC.

Dr.YP Singh, ADG (FFC) in his remarks emphasised that survey and surveillance should be strictly followed to unravel the impact of climate change on the pest incidence. He also emphasised the need for termite and aphid management. Dr. T R Sharma, DDG (CS) congratulated the wheat AICRP program but also showed his concern that the varieties are released by few centres only. He emphasized to strengthen phenotyping for diseases and insects. All the new entrants in the program should be trained in their fields particularly breeders should be trained in molecular biology techniques and facilities should be created at the centres. He said that the challenge for higher production will always exist and at the same time efforts should be put for the diversification of products by value addition through industry and inter-institutional collaborations.

The session ended with the vote of thanks by Dr. Poonam Jasrotia, Organizing Secretary of the 59th All India Wheat & Barley Research Workers' Meet.

List of final year entries and checks (2020-21)

Entry	Checks
AVT-IR-LS-TAS - North Western Plains Zone	
JKW261	HD3059, DBW173, WH1124, PBW771
AVT-RI-TS-TAS - North Western Plains Zone	
DBW296, HUW838	PBW644, HD3043, WH1142, NIAW3170, HI1628
AVT-IR-TS-TAD – Central Zone	
GW513, HI1636	GW322, HI1544, HI8713(d)
AVT-RI-TS-TAD – Central Zone	
HI8823(d)	HI8627(d), MP3288, DBW110, DDW47(d)
AVT-RI-TS-TAD – Peninsular Zone	
MP1358	HI1605, NIAW3170, AKDW2997-16(d), UAS446(d), NIDW1149(d) (I)
SPL – HYPT (NWPZ)	
DBW327, DBW328, DBW332, DBW333, WH1252	HD3086, DBW187(I), DBW303(I), WH1270(I)

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



AGENDA

59TH ALL INDIA WHEAT & BARLEY RESEARCH WORKERS' VIRTUAL MEET (August 24-25, 2020)

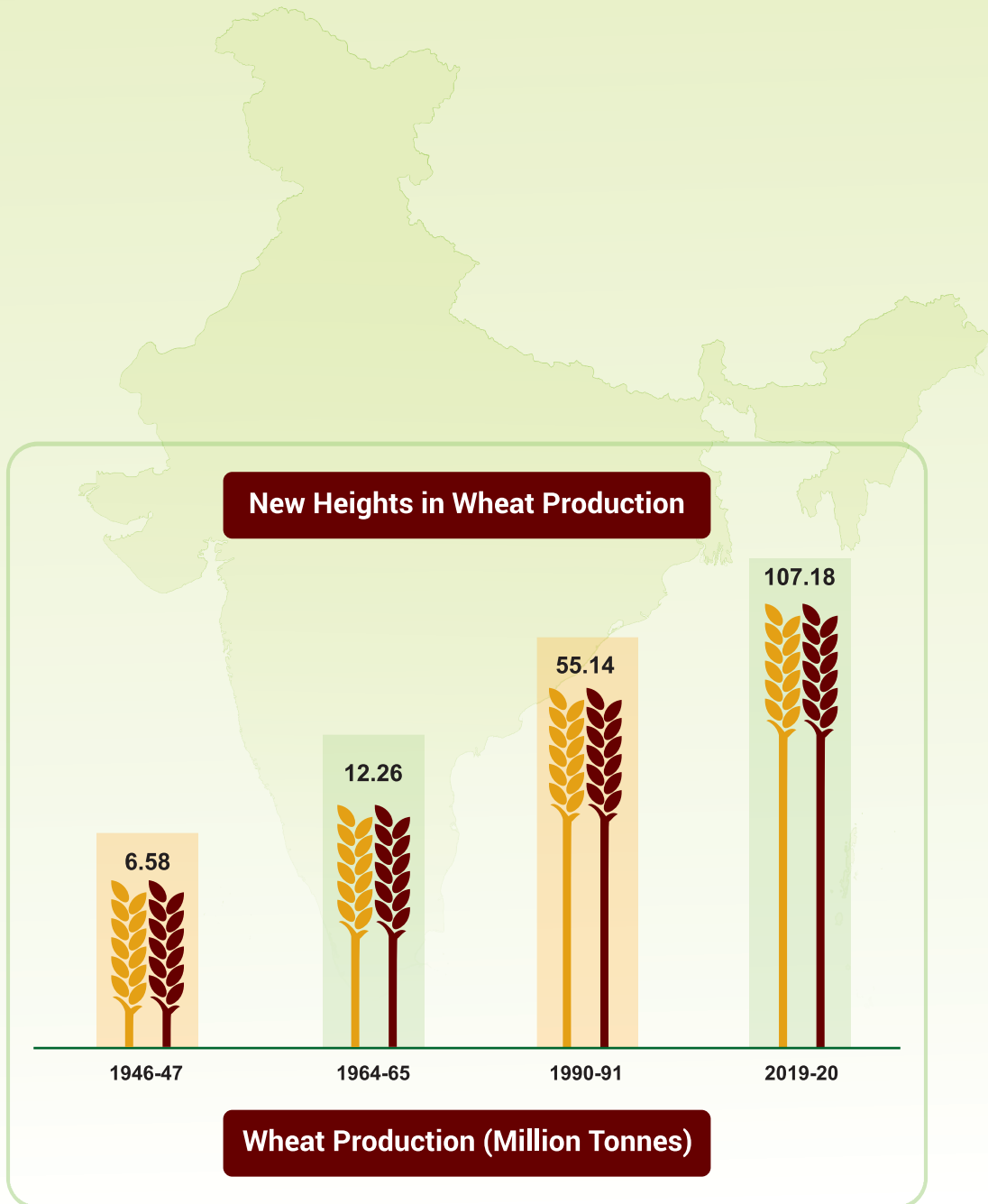


DAY-1: August 24, 2020 (Monday)

10:00–11:35	SESSION-I: INAUGURAL SESSION	
	Chairman	Dr TR Sharma, Deputy Director General (CS), ICAR, New Delhi
	Co-Chairman	Dr YP Singh, ADG (FFC), ICAR, New Delhi
	Chief Guest	Dr T Mohapatra, Secretary, DARE & Director General, ICAR, New Delhi
	Rapporteurs	Drs Hanif Khan & OP Gupta
10.00-10.30	Welcome address & Brief Progress Report (2019-20)	Dr GP Singh, Director, ICAR-IWBR
10.30-10.35	Address by Co-Chairman	Dr YP Singh, ADG (FFC), ICAR, New Delhi
10.35-10.45	Felicitation of crop variety developers, superannuating scientists & release of publications	By the Dignitaries of the Inaugural Session
10.45-11.00	Address by Chairman	Dr TR Sharma, DDG (CS), ICAR
11.00-11.30	Inaugural Address by Chief Guest	Dr T Mohapatra, Secretary DARE & DG, ICAR
11.30-11.35	Vote of Thanks	Dr Gyanendra Singh, PI Crop Improvement
11.45-13.00	SESSION-II: Discipline wise Presentation of progress report (2019-20)	
	Chairman	Dr TR Sharma, Deputy Director General (CS), ICAR, New Delhi
	Co-Chairman	Dr YP Singh, ADG (FFC), ICAR, New Delhi
	Rapporteurs	Drs Sendhil R & Mamrutha HM
	Experts	Dr B. Mishra (Ex-Director, ICAR-IWBR) Dr BS Mahapatra (Ex-Director: ICAR-CRIJAF, Kolkata) Dr AN Mishra (ICAR-Emeritus Scientist, IARI RS, Indore) Dr ML Lodha (Ex-Head, Division of Biochemistry, ICAR-IARI, New Delhi) Dr SR Verma (Ex- Barley Breeder, CCSHAU, Hisar)
11.45-12.05	Crop Improvement	Dr Gyanendra Singh
12.05-12.25	Resource Management	Dr SC Tripathi
12.25-12.45	Crop Protection	Dr Sudheer Kumar
12.45-13.00	Flowerdale Shimla	Dr SC Bhardwaj
LUNCH (13.00-14.00)		
14.00-16.00	Session – II: Continued...	
14.00-14.20	Quality & Basic Sciences	Dr Sewa Ram
14.20-14.40	Barley Improvement	Dr RPS Verma
14.40-15.00	Social Sciences	Dr Satyavir Singh
15.00-15.15	Discussion & Remarks	All Experts & Dr GP Singh, Director, ICAR-IWBR
15.15-15.25	Remarks by Co-chairman	Dr YP Singh, ADG (FFC)
15.25-15.40	Concluding Remarks by Chairman	Dr TR Sharma, DDG (CS)

15.40-15.45	Concluding of Day-1 programme	Dr GP Singh, Director, ICAR-IIWBR
BREAK(15.45-16.00)		
16.00-17.00	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
	Rapporteurs	Drs Satish Kumar & Gopalareddy K
	Presentation of varietal proposals	Dr GP Singh, Director
DAY-2: August 25, 2020 (Tuesday)		
09.00-11.00	SESSION III-International Collaborations for Wheat & Barley Improvement	
	Chairman	Dr TR Sharma, DDG (CS), ICAR, New Delhi
	Co-chairman	Dr Hans Braun, Director of CIMMYT's Global Wheat Program & CGIAR Research Program on Wheat, CIMMYT, Mexico
	Rapporteurs	Drs Charan Singh & PL Kashyap
09.05-09.35	An insight into the new research collaboration of CIMMYT with Indian Wheat improvement Program	Dr Ravi P Singh, Head of Global Wheat Improvement, CIMMYT, Mexico
09.35-10.05	Prospects of Zinc Biofortification in wheat	Dr Parminder Virk, Head, Crop Improvement HarvestPlus,ICRISAT, Patancheru, Telangana,India
10.05-10.35	Overview of Research initiatives of ICARDA for Indian wheat & barley improvement	Dr Michael Baum, Director, Biodiversity and Crop Improvement Program ICARDA, Morocco
10.35-10.40	Remarks by Co-chairman	Dr Hans Braun, CIMMYT, Mexico
10.40-10.55	Concluding Remarks by Chairman	Dr TR Sharma, DDG (CS)
SESSION IV- Central Zone Progress Reports of AICRP (W&B) centres		
	Chairman	Dr TR Sharma, DDG (CS), ICAR, New Delhi
	Co-chairman	Dr YP Singh, ADG (FFC), ICAR, New Delhi
	Experts	Dr B Mishra (Ex-Director, ICAR-IIWBR) Dr BS Mahapatra (Ex-Director: ICAR-CRIJAF, Kolkata) Dr AN Mishra (ICAR-Emeritus Scientist, IARI RS, Indore) Dr ML Lodha (Ex-Head, Division of Biochemistry, ICAR-IARI, New Delhi) Dr SR Verma (Ex- Barley Breeder, CCSHAU, Hisar)
	Rapporteurs	Drs CN Mishra & Vikas Gupta
11.00-11.05	Welcome & Introductory remarks	Dr GP Singh, Director, IIWBR, Karnal
11.05-11.10	Remarks by Chairman	Dr TR Sharma, DDG (CS)
11.10-13.25	Presentation of progress of work by centers of Central Zone (CZ) (10 minutes presentation & 5 minutes discussion)	IARI Indore JNKVV Powarkheda SDAU Vijapur JAU Junagadh IGKV Bilaspur MPUAT Udaipur JNKVV Jabalpur

		RVSKVV Gwalior
		JNKVV Sagar
13.25-13.35	Remarks	All Experts & Dr GP Singh, Director, ICAR-IIWBR
13.35-13.45	Remarks by Co-chairman & Chairman	Dr YP Singh, ADG (FFC) & Dr TR Sharma, DDG (CS)
LUNCH (13.45-14.30)		
14.30-17.30	SESSION V- Plenary Session	
	Chairman	Dr TR Sharma, DDG (CS), ICAR, New Delhi
	Co-chairman	Dr YP Singh, ADG (FFC), ICAR, New Delhi
	Experts	Dr B Mishra (Ex-Director, ICAR-IIWBR) Dr BS Mahapatra (Ex-Director: ICAR-CRIJAF, Kolkata) Dr AN Mishra (ICAR-Emeritus Scientist, IARI RS, Indore) Dr ML Lodha (Ex-Head, Division of Biochemistry, ICAR-IARI, New Delhi) Dr SR Verma (Ex- Barley Breeder, CCSHAU, Hisar)
	Rapporteurs	Drs Sindhu Sareen & Karnam Venkatesh
14.30-15.30	Significant recommendations and highlights of work plan(2020-21)	Respective PIs
15.30-15.45	Report of VIC	Dr GP Singh, Director, IIWBR, Karnal
15.45-16.15	Discussion & Remarks	All Experts & Dr GP Singh, Director, ICAR-IIWBR
16.15-16.30	Remarks by Co-chairman	Dr YP Singh, ADG (FFC)
16.30-17.15	Concluding Remarks by Chairman	Dr TR Sharma, DDG (CS)
17.15-17.30	Vote of Thanks	Dr Poonam Jasrotia (Organizing Secretary)



59th All India Wheat & Barley Research Workers' Meet
(August 24-25, 2020)

59^{वीं} अखिल भारतीय गेहूँ एवं जौ अनुसंधान कार्यशाला
में आयोजित गोष्ठी के दौरान जारी किया गया