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एवं
कार्ययोजना

Proceedings,
Recommendations
and
Work Plan 2009-10

48वीं अखिल भारतीय गेहूँ एवं जौ
शोधकर्ता बैठक

48TH ALL INDIA WHEAT AND BARLEY
RESEARCH WORKERS' MEET



गेहूँ अनुसंधान निदेशालय, कर्नाल
DIRECTORATE OF WHEAT RESEARCH, KARNAL

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**Proceedings, Recommendations
&
Plan of Work (2009-10)**

48th All India Wheat & Barley Research Workers' Meet

August 28-31, 2009-10

at

Indian Agricultural Research Institute, New Delhi

Issued by

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Contents

Title	Page No
Foreword	1
Introduction	2
SESSION-I : Inaugural Session	3
SESSION –II : Research Review Meeting	5
Crop Improvement	6
Crop Protection	9
Resource Management	12
Quality Improvement	15
Barley Network	16
SESSION –III : Crop Year Review, 2008-09	18
SESSION –IV : Work Planning Meeting	21
Crop Improvement	21
Crop Protection	67
Resource Management	77
Quality Improvement	80
Barley Network	83
SESSION-V : Varietal Identification Committee Meeting	89
SESSION –VI : Special Session	
Enhancing wheat and barley production in the country under prevailing climatic condition	93
SESSION-VII : Special Session	
International Collaboration: Strengthening of Wheat and Barley Research for Enhancing Productivity	95
SESSION –VIII : Progress of Barley Research at AICW&BIP centers: A Review	97
Plenary Session	99
ANNEXURE –I : List of final year entries along with check varieties: 2009-10	106

Foreword

The 48th All India Wheat and Barley Research Workers' meet held at IARI, New Delhi during 28th to 31st August, 2009 was jointly organized by IARI, New Delhi and Directorate of Wheat Research (DWR). The meet was inaugurated by Dr. Mangala Rai, Secretary DARE and Director General, ICAR while Dr. Swapan K Datta Deputy Director General (Crop Science), ICAR presided over the function. Dr. SN Shukla, ADG (FFC) was also present and gave his remarks. A galaxy of dignitaries and delegates from India and abroad graced the occasion.

The meeting, besides reviewing the work the progress of preceding crop season and finalizing the plan of work for the ensuing crop season, also utilized this opportunity to conduct two special sessions viz., "Enhancing wheat and barley production in the country under prevailing climatic conditions" and "International collaboration – Strengthening of wheat and barley research for enhancing productivity".

I, on behalf of the Directorate of Wheat Research, entire fraternity of wheat and barley, guest invitees and on my own behalf extend our gratitude to Hon'ble Secretary DARE and DG, ICAR, Dr. Mangala Rai for gracing the occasion of the workshop despite his busy schedule. He ignited in all of us, a spirit of quest, to address a series of crucial issues that limits wheat production in the country.

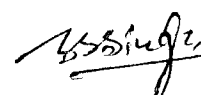
I also express my gratitude to our Honb'le DDG Crop Science Dr. Swapan K Datta who has been with us for three days, sharing his rich experience and wisdom. I must express my deep sense of appreciation to our ADG (FFC), Dr. SN Shukla for guidance and support for the programme.

I am thankful to local orgainiser, the Director of IARI, New Delhi, Dr. HS Gupta, and their team for untiring efforts to make the meet successful. An event of this scale is impossible without their unflinching support.

All the Principal Investigators and their staff associated with the preparation of workshop reports and this proceeding need special commendation. Equally, I am thankful to the Chairman's and Rapporteurs of various sessions for smooth conduct and timely preparation of the proceedings. I wish to record appreciation for Dr. Ravish Chatrath and his team for coming out with the proceedings during the plenary session. The efforts of Sh. JK Dureja, Sh Yogesh Sharma, Sh P Chandrababu, Sh Pawan, Sh. Bhim Sen, Sh. Swaran Singh and Sh. Sukh Ram were commendable.

Now, placed before you, is the final document which will be of use to all our cooperators for efficiently carrying out the activities of the next crop season.

I wish you all a great success in your endeavours to enhance the wheat and barley production in the country. I trust that with your hard work and dedication, the set goals will be achieved.



(SS Singh)

Introduction

The 48th All India Wheat and Barley Research Workers' Meet held at IARI, New Delhi during 28th to 31st August, 2009 was jointly organized by IARI, New Delhi and Directorate of Wheat Research (DWR), Karnal. The meet was attended by more than 300 scientists, policy makers, administrators and all those concerned with wheat and barley research and development. This meet is an annual event of All India Coordinated Wheat and Barley Improvement Project, which was organized to review the progress of preceding crop season 2008-09 as well as to discuss and finalise the plan of work for the ensuing crop season 2009-10. In addition, the group also utilizes this opportunity to conduct two special sessions *viz.*, "Enhancing wheat and barley production in the country under prevailing climatic conditions" and "International Collaboration – Strengthening of wheat and barley research for enhancing productivity". The meet culminated in the identification of 14 new wheat and 2 barley varieties by the Varietal Identification Committee for different production conditions of the country.

The meet was inaugurated by Dr. Mangala Rai, Secretary DARE and Director General, ICAR while, Dr. Swapan K Datta, Deputy Director General (Crop Science), ICAR presided over the function. Dr. SN Shukla, ADG (FFC) was also present and gave his remarks. A galaxy of dignitaries and delegates such as Dr. HK Jain, Former Director IARI; Dr. HS Gupta, Director, IARI; Dr. B Mishra, VC, SKUAST-J; Dr. KD Kokate, DDG (Extension); Dr. JP Tandon, former Project Director (Wheat) and many others also graced the occasion. Representatives from ICARDA and CIMMYT also attended the meeting.

The proceedings and recommendations in respect of different programmes along with plan of work for the ensuing crop season 2009-10 were compiled and presented herein for implementation by all concerned.

SESSION I

Inaugural Session

August 28, 2009	Chief Guest :	Dr. Mangala Rai, Secretary DARE & DG, ICAR
	Chairman:	Dr. Swapan K Datta, DDG (CS)

The 48th All India wheat and barley research workers meet commenced with the invocation. Meet was inaugurated by Dr. Mangala Rai, Secretary DARE and Director General ICAR by lightening the lamp on 28th August, 2009. Dr. Swapan K Datta, Deputy Director General (Crop Science) ICAR presided over the function. Dr. HS Gupta, Director, IARI welcomed the Chief Guest and other dignitaries including delegates of the wheat and barley researchers meet from different parts of the country and abroad. He also thanked the Council for holding the meet at IARI, New Delhi. During this session five publications from DWR, Karnal and four from IARI, New Delhi were released by the dignitaries.

Dr. SS Singh, Project Director, DWR, Karnal expressed his sincere gratitude to Dr. Mangala Rai, Secretary DARE and DG ICAR for his guidance and support to wheat programme of the country. Dr. Singh, while presenting the highlights of progress made in 2008-09 informed that the country has witnessed a record breaking increase in total wheat production to the tune of 80.58 million tons from an area of 27.8 mha giving a productivity of 2.90 t/ha. The wheat programme has released 357 wheat varieties, comprising bread wheat (302), durum (47), dicocccum (5) and triticale (3) for cultivation under different production conditions in all the wheat growing zones since its inception. He expressed the satisfaction on successful conducting of trials by funded as well as non-funded centres. During 2008-09 eight wheat varieties, HS 490, PBW 590, Raj 4120, CBW 38, MP 1203, PBW 596, UAS 415 (d) and MACS 2971 (dic) were released for commercial cultivation. He also elaborated on the progress of work related to crop improvement and protection, resource management, quality improvement and barley improvement. He also informed that as against an indent of 23349 quintals of breeder seed, the production of 28974 quintals was recorded.

Dr. SN Shukla, ADG(FFC) spelt out the various opportunities available for quality research in wheat through an enhanced availability of funding by the Council in form of network projects and international collaborative projects. He also informed the house about creation of one new centre, viz., Modipuram under AICW&BIP in XIth Plan.

The Chairman of the session, Dr. Swapan K Datta, DDG (CS) while appreciating the research conducted under the wheat and barley programme of the country, emphasized the role of biotechnological interventions for developing nutritionally rich wheat, transcript profiling of agronomic traits, genetic mapping of traits and utilizing synteny with rice to improve rust resistance in wheat.

Dr. Mangala Rai, Secretary DARE and DG, ICAR in his keynote address deliberated on various important issues related to national food-security in general and wheat production and productivity in particular. He mentioned that in our country the cultivated area had been 140-145mha since long but our population has multiplied by manifolds. Despite this the present level of 233mt of food grains has been achieved, of wheat contributed 80.58mt 2008-09. He further, called upon the researchers, for next three months, to join hands in launching a campaign to ensure timely sowing of wheat using quality seeds, balanced dose of fertilizers and required quantity of micro-nutrients for the purpose of enhancing the wheat production to a great extent.

He also raised the issue of soil health and hoped that proper resource management will help to remove micronutrient deficiencies and improve the C/N ratio and help in reducing the cost of cultivation. He also cautioned the scientists about the threat of Ug99 and new races of yellow rust. The onslaught of yellow rust can easily be neutralized by deployment of PBW 550 and DBW 17 varieties of wheat. In Bihar and eastern parts of UP, the shallow tube wells need to be established and balanced quantity of fertilizers and improved seeds have to be made available to realize a quantum jump in wheat production in next crop season. He also put forth that strategy should be developed for the improvement of durum and dicoccum in the Central and Peninsular Zone.

Advances in molecular biology are now set to provide solutions for developing high yielding, disease resistant and nutritionally superior wheat. Marker assisted selection has started giving dividends. He put forward a challenge to researcher for utilizing the synteny of rice-wheat genomes for creating resistance to rust diseases in wheat through the use of rice-genomics. In this age of biotechnology, the wheat plant needs to be transformed from C₃ to C₄ system for making it more productive like other C₄ plant species.

While speaking on international collaborations he stressed on 50:50 partnership basis along with emphasis on quality research only. He also emphasized the strengthening of human resource development in the country for making India a leader in technology generation.

The session ended with the vote of thanks by Dr. KR Kaundal, Joint Director (Research), IARI.

SESSION II

Research Review Meeting

August 28, 2009

Chairman : Dr. Swapan K Datta, DDG (CS)

Rapporteur : Dr. Jag Shoran

Presentation of Progress Report (2008-09)

At the outset, Dr. SS Singh, Project Director appraised the house about 30 different funded centres of All India Coordinated Wheat and Barley Improvement Project, where 107 scientists are the part of this project. Besides, there are 119 testing centres which, are designated as non-funded, but provided need based contingency for conducting the field trials.

A large number of Front Line Demonstrations conducted during past few years have indicated the existence of yield gaps of 1-1.5 t/ha in the six wheat growing zones of the country. The main emphasis needs to be placed in the NEPZ and Central Zone where exists the opportunity of achieving tangible results by bridging the larger yield gaps.

The critical analysis of weekly precipitation and temperature data from 34 centres led to demonstrate that by and large the mean minimum and mean maximum temperatures happened to be marginally higher in 2008-09 than the preceding season of 2007-08. Also, the crop season of 2008-09 remained largely a dry season without much of winter rains. The cultivated area under wheat was slightly decreased from 28.15 m/ha (2007-08) to 27.80 mha (2008-09). There were reports of onslaught of yellow rust disease in the foothills of Jammu and adjoining areas of Punjab in 2008-09. Despite of all these odds, the country recorded all time high production of 80.58 mt in the current crop season. That shows the resilience of wheat production technologies at hand. Later, he dealt on in detail to bring out the most significant findings made in various disciplines during 2008-09.

While talking on varietal development, he informed the house that since inception of the AICW&BIP Project in 1965, till date the project has successfully developed and released 357 improved varieties of wheat and over 75 varieties of barley. The zero-tillage and other resource conservation technologies developed in recent time need to be popularized like zero-tillage among the farmers to sustain the production and productivity as well as maintaining/restoring the soil health.

To contain rust diseases, the use of resistant wheat and barley varieties should be increased by producing and making available their quality seed to the farmers. Particularly in the NWPZ zone which is considered the granary of the country, the rust susceptible variety PBW 343 must be replaced as early as possible by PBW 550 and DBW 17, the new resistant varieties. For the containment of powdery mildew, loose smut, Karnal bunt and aphids, the IPM approach has been advocated for deploying on need based basis.

At the end, the Chairman desired that it is essential to plug the yield gaps by providing new varieties, fertilizers, along with improved production and protection measures to each zone in form of a package to the farmers. The Project Director made a recommendation in view of water shortage for irrigation that the final year entries/genotypes should be evaluated by the Resource Management scientists in NWPZ under restricted supply of irrigations.

The Session ended with the vote of thank to the Chairman for conducting the session and sparing time for this purpose from his very busy schedule.

Crop Improvement Research Review Meeting

August 28, 2009

Chairman : Dr. JP Tandon
Co-Chairman: Dr. Jag Shoran
Rapporteurs: Dr. Lakshmi Kant
Dr. SK Singh

In this session, Research work on Crop Improvement for the year 2008-09 was reviewed. At the onset, Dr. JP Tandon, Chairman, emphasized on the importance of quality of the trials conducted on breeding of varieties having higher productivity for more gains in production.

The various Zonal Coordinators presented the results of yield evaluation trials and problems in their conduct. The first presentation was made by Dr. Sanjay Kumar about the trials conducted in the Northern Hills Zone. He informed that it was drought like situation over the zone during last season and only few centers got more than 20 mm rainfall. He requested that since continuous data is not being received for Very High Altitude Trial therefore, decision has to be taken about the conduction of this trial. In order to avoid the high rate of failure of trials in the zone, he requested for relaxation in the limit of coefficient of variation, date of sowing and level of minimum yield. He also requested for identification of more number of trial conducting centers. He also requested for the involvement of NHZ centers in network project of national importance so that they can contribute in national interest. Since he is also looking after barley coordination of NHZ he requested for more contingency. The Chairman recommended for the strengthening of centers to improve the conduct and quality of trials. He also recommended that PD (Wheat) should take up the matter with CSK HPKV, GBPUA&T and SKUAST-S for improving the performance of centers under their control.

Dr. Jag Shoran informed that contingency can be provided even to voluntary centers as per demand. He further informed that norms for acceptance of trials have been set after thorough discussion and are already fairly low. Therefore, they need not be changed frequently.

Dr. VS Sohu presented the results of the North Western Plains Zone. Stating the problems in the conduct of trials, he raised the issues of financial support for the voluntary centers and the repeatedly poor performance like of Bulandshahr, Modipuram, Sriganaganagar, Nagina and Dhanauri should not be proposed as trial centers this year. Dr. Jag Shoran expressed his concern over the unrealistic yield reported from Gurdaspur and Ambala under rainfed conditions. He also informed that regarding contingency he will put a proposal to PD (Wheat) for increasing it. The Chairman suggested that the matter regarding non-acceptance of trials at Nagina, Bulandshahar and Modipuram should be looked into carefully and the trials should be conducted properly. He brought to notice the gaps in realized and realizable yields and stressed the need for better management of trials in order to generate meaningful information. He told that the quality of trial management should be improved to touch the yield levels of 60 q/ha.

The results of the trials conducted in North Eastern Plains Zone were presented by Dr. LP Tiwari. He requested for providing a vehicle to Kanpur centre for effective monitoring of zonal trials and FLDs. The Chairman said that India is

hoping rise in production from NEPZ. He further expressed his concern over the highest number of trials rejected in this zone. He emphasized the gap between trials yield and FLDs yield and requested to improve it. He requested to see the reasons why large number of entries are being rejected due to mixtures. He suggested that DWR should look into the matter that why the AVT entries are showing high rust reaction under natural conditions when they are resistant under PPSN and controlled conditions. Dr. Jag Shoran has requested to the group to look into why the checks are at the bottom due to which large number of varieties are being promoted.

Dr. SV Sai Prasad presented the results of trials conducted in the Central Zone. He stated that the trial conduction was almost 100% in this zone. He requested that precision plot drill must be used for sowing rainfed trials under conserved soil moisture to get good plant stand and to minimize the error in Tancha and Dhandhuka. He further stated that In MP and Chattisgarh, almost 50% area is under limited irrigation/rainfed, hence, JNKVV, Jabalpur, RVSKVV, Gwalior and IGKVV, Raipur should help in providing more test centers. He also informed that there is no centre in Bundelkhand. Hence, JNKVV, Jabalpur should ensure at least two test centers one at KVK-Chhaterpur and other at college of Agriculture Tikamgarh for conduct of trials. Dr. Jag Shoran suggested that if individual location data is unrealistic (very high or low yield) then that locations data should be rejected. The chairman appreciated the efforts of Dr. HN Pandey, the former zonal coordinator for 100% conduction of trials in the zone. He stated that his vigour and enthusiasm is exemplary for a zonal coordinator.

The Peninsular Zone report was presented by Dr. DA Shambharkar. Dr. Gyanendra Singh of DWR raised the issue of failure of all the trials at Andhra Pradesh which started a few years back. Chairman stated that AP is not a favourable environment for wheat and if they are not interested then we should go away with it. Dr. Jag Shoran raised the issue of changing the constitution of trial as well as changing the site of trial conduct which is being freely done in this zone. Chairman said that no one has authority to change the constitution as well as site of the trials once finalized in the workshop. The report of Southern Hills Zone was presented by Dr. Jagdish Kumar. He requested that a person from DWR preferably breeder should join SHZ team for monitoring of the trials.

The special trial on triticale was presented by Dr. GS Mavi. He asserted the importance of triticales for stem rust and powdery mildew resistance as well as better nutritional quality. The Chairman remarked that triticales have potential, but they could not compete with wheat. Further, their acceptance has to be established by convincing the farmers. Dr. Jag Shoran opined that they should identify certain niche for their cultivation. Dr. Neeraj Kulshreshtha presented the salinity/alkalinity trials. The Chairman stated that this is a unique programme which has given many good varieties by transferring resistance from Kharchia. Dr. SC Misra reported the results on special trial on semi dwarf dicoccum. Dr. Jag Shoran mentioned that area coverage of dicoccum should be looked in Maharashtra and Karnataka. He further emphasized on the democratic way of finalizing the things and suggested that the proposal for new entries should come in proper way. He further stated that funds wherever required can be provided from DWR. The chairman said that dicoccum is being cultivated in large area by the farmers of Karnataka.

Dr. Santosh Tewari from Mahyco presented information about their hybrid wheat Pratham 7070 and 7272. The overall heterosis reported is around 10%. Chairman asked the motive of the presentation and stated that if they want to test

the materials through coordinated system they are welcome. Dr. Jag Shoran stated that its good that some work has been done. Dr. Santosh Tewari informed that he may have to discuss this issue with his management.

The report on evaluation of national/international nurseries was presented by Dr. (Mrs) S Kundu. The results on physiological investigations particularly on heat stress were presented Dr. (Mrs) S Sareen. The Chairman remarked that the physiological investigations are important particularly in view of the increasing temperatures due to global warming.

At last chairman summarized the proceedings and emphasized to improve the agronomy of the trials to achieve high productivity levels as we are searching for the high potential which cannot be identified in the absence of good agronomic management of trials.

The meeting ended with a vote of thanks to the Chairman by Dr. KV Prabhu.

Crop Protection Research Review Meeting

August 28, 2009

**Chairman : Dr. DV Singh
Co-Chairman : Dr. AK Sharma
Rapporteurs : Dr. Rashmi Aggarwal
Dr. AK Singh**

At the outset, Dr. DV Singh welcomed all the scientists of crop protection programme for attending the crop protection review session. Presentations were made by scientists as per the agenda, viz, Drs. AK Sharma, KS Babu, AK Singh, MS Saharan, VL Majumdar, DP Singh, M Prashar and Dr. BP Kurundkar. Drs. Indra Rajvanshi, SK Jain, SC Bhardwaj and AN Mishra could not be present for the presentations. Dr. M Prashar made the presentations on behalf of Drs. SC Bhardwaj and SK Jain. Dr. AK Sharma presented an overview of the Crop Protection Programme and appreciated the cooperation extended by all the cooperators. He highlighted that there was not a single center which was non performing. He appreciated the work on host resistance and mentioned about the IPPSN, PPSN, MDSN and other nurseries of important diseases in identifying entries resistant to various diseases, insect-pests and nematodes. He mentioned that several genotypes with multiple resistance to rusts, leaf blight, Karnal bunt have been identified. Root aphid is emerging as an important pest in NWPZ and resistance against this pest had been identified along with other diseases. On crop health monitoring, he mentioned that yellow rust appeared on PBW 343, PWB 502 and other susceptible varieties but there was no epidemic. Some new varieties like PWB 550 and DBW 17, were resistant to yellow rust. WH542 also showed resistance against yellow rust. Karnal bunt situation was comfortable this year. Only 8.99% sample were found to be infected with this. No KB was recorded in MP, Gujarat, Karnataka and Maharashtra.

The Chairman desired that samples for KB analysis be collected from western UP also. Dr. Sharma mentioned that survey teams, were sent to different areas during the year. Mealy bug, was not seen on wheat crop during the season under cotton-wheat system. The level of rust resistance in released varieties and advanced entries was found to be higher. Disease development in disease screening nurseries at various centers was compared and it was seen that at most of the centres, the disease development was satisfactory. Keeping Ug 99 in view, it was desired that the centers which are working on stem rust, should be very vigilant and continue to monitor the disease situation and pathotype development. Powdery mildew is coming in a big way in the foot hills of Punjab, northern Haryana and is becoming a major crop health issue in the NWPZ. The multilocal trials conducted during the year exhibited 20-25% loss due to this disease.

Entomological program was reviewed by Dr. KS Babu. He mentioned that termite control could be achieved by having imidacloprid 70WS at 0.6gm / a.i. /kg while endosulfan was effective against aphid population. Seed treatment with imidacloprid is effective against termite and root aphid. Botanicals with half doze of recommended pesticides were effective in checking termite damage. Aphid population dynamics studies were also conducted.

Dr. AK Singh presented Wheat Nematology report and he mentioned that resistance against CCN and ECN was not available in AVT. There was not a

single entry which could be found resistant at more than one location. It was also mentioned that there is no variety which is resistant against ECN but the degree of resistance in them varies with variety to variety. Survey has indicated that in Punjab, which was free from ECN till 2002, infestation of ECN was found as a single gall at Gurdaspur location. It was suggested that the survey should be undertaken vigorously in order to see the recurrence of the same. On soil biological front, Dr. AK Singh mentioned that the nematode population is continuously being monitored in different wheat based cropping systems. It was observed that RKN is coming as a pest of wheat in the rice-wheat cropping system. The situation of CCN in rice-wheat system is continuously being monitored, and it has been found that CCN can adapt in rice-wheat system which has wet-wet situation in rice. Cotton-wheat system was also monitored from nematode point of view and there was not any glaring finding for concern. It was brought to the notice of the house that RD2035 and RD2052 of Barley are resistant to CCN besides being good yielder. On integrated CCN management aspect, it was narrated that Neem Oil did not have any effect on CCN at Hisar location whereas it gave very good control of CCN at Durgapura location. The reason for varying response/differential occurrence at both the locations needs to be ascertained.

The Chairman remarked that program on multiple diseases resistance should continue. Monitoring has to be made strong enough and continuous surveys need to be conducted in view of threat of Ug 99 race and its mutants. He also suggested that Powdery mildew is raising its head, either due to susceptible varieties or due to congenial weather but our preparedness should not get slackened in future. Botanicals and biological control agents can be included in IPM Module. The Chairman desired that the scientists of Rajasthan can look for resistance in wheat or allied species for CCN. Dr. AK Sharma responded that CCN is a problem in Haryana, Rajasthan and Punjab. He also added that in zero tillage, powdery mildew and KB incidence was very low. Dr. DP Singh informed the house that all the available varieties for the commercial purposes are susceptible to powdery mildew. Dr. SS Singh, PD, joined the group and said that our efforts should be concentrated in breeding for powdery mildew resistant varieties. The Project Director also mentioned that for survey work, vehicle availability will be ensured during the cropping season. About frequent transfers of scientists, he desired that this practice should be discouraged by the University authorities in the interest of research work. Young scientists should also be trained to make them aware of the recent developments in coordination activity. Dr. Singh appreciated the contribution of Crop Protection group and wished them success. Dr. KS Babu presented the work on new RCTs and pest problem. He added that tillage might favour the habitation of insects like cut worm, snails and other predators. It was shown that surface residue in zero tillage favours population of grass hopper. Grass hopper population was also high, while root aphid population was very dominant in FIRBS. Predators like coccinellids were more in zero tillage. Regarding residue management in rice-wheat rotation, it was found that it invites termite problem. Higher number of irrigations showed reduced termite damage, but the increased quantity of residues incorporated, increased the termite population.

Dr. DP Singh presented the work on MPSN/MDSN and pest resistance as well as utilization of sources for resistance. A total of 1188 entries were screened at different locations. Of these, 398 entries were supplied through NGSN. It was found that percentage utilization was satisfactory. Some durum and khapli wheat

have also been identified as resistant materials. Leaf blight is causing much damage. Combining resistance to rust and leaf blight together is difficult task but it was found that there are few entries resistant against both. Some newly released varieties like PBW 550 had pedigree derived from resistant stocks like RAJ 3765 and DBW 16. Dr. MS Saharan discussed the new and diverse sources of resistance under NBPGR-DWR project. Entries from NBPGR were evaluated for various diseases like three rusts, KB and leaf blight at multilocations. A total of 6319 entries were screened in five years under artificial inoculation. NBPGR has not supplied pedigree and passport data of above entries evaluated yet. The chairman desired that NBPGR should provide the details like pedigree of entries with Passport data so that resistant entries identified can be used. Dr. Vijay Lakshmi Majumdar put an account on flag smut of wheat in NWPZ. She narrated that parts of whole Rajasthan is suffering from flag smut and there is need to put concerted effort to contain this. Dr. M Prashar presented work on race specific APR genes, seedling resistance etc. He added that this country is vigilant against Ug 99 race of stem rust and that path is regularly being monitored as a preparedness to contain the same. Many of the Indian wheat varieties are resistant to Ug 99 and the new materials are being continuously screened at Kenya location as a part of preparedness on our part.

Dr. BP Kurundkar presented the report on the work being done by Mahabaleshwar center and he provided detailed account on stem and leaf rust and their pathotypes. The Chairman desired that this centre should supply the population of pathotypes to Flowerdale center for authentication besides confirmation since this centre is monitoring stem and leaf rusts in Maharashtra and Karnataka and Flowerdale does not have few of the pathotypes. The Chairman reemphasized that the crop protection program of DWR is doing excellent job in containing the rusts and other diseases of wheat for the last 36 years and preparedness as well as strategies pursued on their part shows the way forward in containing any disease. The meeting ended with thanks to the chair.

Resource Management Research Review Meeting

August 28, 2009

Chairman : **Dr. RK Rai**
Co-Chairman : **Dr. RK Sharma**
Rapporteurs : **Dr. RP Meena**
: **Dr. BN Patil**

The session was chaired by Dr. RK Rai, Professor and Head, Division of Agronomy, IARI, New Delhi and Co-chaired by Dr. RK Sharma, PI (RM), DWR, Karnal. Dr. BN Patil and Dr. RP Meena were the rapporteurs of the session. At the outset, Dr. RK Sharma welcomed the delegates, introduced the Chairman and requested him to conduct the proceedings on the review of work done during the year 2008-09. The Chairman after welcoming the delegates stressed the need for proper conduct of trials. He requested all the participants to take active part in the deliberations. Thereafter, the Chairman asked for the zone wise presentation of the results of experiments conducted during the crop year 2008-09.

Presentation of Research Results

The results of coordinated trials conducted in NHZ were presented by Dr. SC Gill, Senior Scientist, DWR, Karnal. In all, three trials were conducted in this zone for evaluation of genotypes for irrigated timely sown, restricted irrigation and rainfed conditions. The data showed superiority of test entry VL 907 under both timely sown and rainfed conditions. In restricted irrigation trial, the test entry HS 502 was not significantly superior to the best check.

The results of five varietal evaluation trials conducted in NWPZ were presented by Dr. Anand Prakash, Professor of Agronomy, Pantnagar. In irrigated timely sown conditions, the test entry HD 2967 gave significantly higher yield. The difference in timely and late sown conditions was 10.6 q/ha. Under late sown condition, none of the five test entries was better than the recently released check variety PBW 590, which gave the highest yield. Among durum wheat genotypes, PDW 311 and PDW 314 were at par with each other and were significantly superior to rest of the genotypes with a yield gain 6.4 and 7.3 percent, respectively over the best check PDW 291. The test entry, PBW 613 was statistically at par with the best check under rainfed situation and the response to nitrogen was up to 80 kg/ha.

Dr. RK Singh, Professor (Agronomy), BHU, Varanasi, presented the results of the four trials conducted in NEPZ. None of the new genotypes was found superior compared to the best check CBW 38 under timely sown condition, although the test entry HD 2967 was numerically better than the check. Under late sown condition, test entries HD 2985 and MP3224 recorded significantly higher yield compared to the best check DBW 14. Under rainfed conditions, none of the test entry was better than the check and the response to N application was significant up to 80 kg/ha. The results of the saline-alkali trials pooled across NWPZ and NEPZ gave a response to nitrogen up to 150 kg/ha. All the test entries viz., WH1021, KRL210 and KRL213 were significantly superior to the best check KRL 19.

The results of the Central zone were presented by Dr. SPS Tomar, Senior Scientist (Agronomy), RVSKVV, Gwalior. The experiments conducted in this zone

were on DxV (TS), DxV (LS), RIRxV and NxV (RF). The durum test entry HD 4719 was significantly superior to the best check HI 8498 with an yield gain of 3.2 percent, whereas the test entry MPO 1215 was numerically better. These two durum entries were numerically better than even the best *aestivum* check HI1544. In rest of the three coordinated trials, none of the entry was found superior to respective checks.

Dr. BN Patil presented the results of five experiments conducted in PZ and SHZ. He reported that durum test entry HI8680 gave significantly higher yield compared to the best durum check UAS 415 whereas HI 8682 was numerically better. Among bread wheat test entries, MACS 6222 and MACS 6273 were at par with each other and numerically better than the best check RAJ 4037. In late sown trial, none of the test entry was superior to the best check Raj 4083. In restricted irrigation trial, the test entry HD 2987 was numerically better than the best check NI 5439 whereas under rainfed conditions, none of the test entry was better than the best check NI 5439. In Southern Hills Zone, the test entry HW 5207 was significantly superior to the best check variety HW 2044 with a yield gain of 12.1 percent.

The results of the special coordinated experiments on weed management, resource conservation technologies, residue management, bio-regulators, crop intensification, integrated nutrient management and boron application in wheat production were presented by Dr. RK Sharma. He also raised the issue of non-conduct of trials despite providing funds by two centres namely Akola and Sriganaganagar. The results of the special trials are summarised hereunder:

- The ready mix combination of sulfosulfuron + carfentrazone with surfactant was found effective against broad spectrum weed flora of wheat, whereas carfentrazone alone was effective against broad-leaved weeds only.
- Crop residue retention on soil surface helped in saving up to two irrigations.
- In intensification trial under three tillage options (ZT, CT and FIRBS), the performance of vegetable pea was better under ZT compared to CT system whereas green gram gave higher yield when grown on beds.
- In rice residue management trial, the incorporation of residue with 25% additional N gave higher yield in both NWPZ and NEPZ.
- The effect of bio-regulators was not significant at all the locations in NWPZ, CZ and NEPZ except Durgapura centre.
- The RCTs and weed management effects were evaluated at two centres in CZ. In Soybean-wheat system, the yields were better in bed planting whereas in Maize-wheat system conventional tillage was better than other tillage options.
- The results of the integrated nutrient management in PZ showed that the maximum yield was obtained when recommended NPK fertilizers were applied along with organic sources.
- The effect of boron application in NEPZ was observed and maximum yield was obtained with the application of borax @ 10-15 kg/ha.

After thorough deliberations, the Resource Management and Social Sciences group made the following recommendations:

Technical Recommendations:

1. In boron deficient soils of NEPZ, apply 10 kg/ha Borax as a basal dose for better productivity.
2. For enhancing the system productivity, intensify rice-wheat system by including zero till sown short duration summer green gram after wheat and zero till sown short duration vegetable pea after rice.

Administrative Recommendations

1. For conduct of the system based trials to address the zone wise issues, the group felt that an additional contingency of Rs 20,000/- per trial per year may be made available to the conducting centres.
2. For conducting relay cropping trial power tiller based self propelled zero tillage machines will be required at two centres. A sum of Rs 2 lakhs will be required to procure these machines which may be made available.
3. The funds for FLDs must be released by 30th September for effective implementation of the programme.
4. The conduct report of FLDs must be submitted by 30 December and yield report by 15th June by conducting centres.

To end the session, Dr. RK Sharma, on behalf of the Directorate, IARI and RM group proposed a sincere vote of thanks to the Chair for smooth conduct of the proceedings and valuable suggestions.

Quality Improvement Research Review Meeting

August 28, 2009

Chairman: Dr. BK Misra
Co-Chairman: Dr. RK Gupta
Rapporteurs : Dr. Anju M Singh
Dr. Sneh Narwal

The meeting was chaired by Dr. BK Misra, Ex. Principal Scientist, IARI, New Delhi. The meeting started with brief overview of the coordinated programme by Dr. RK Gupta, P.I., Quality, DWR, Karnal. This was followed by presentations by different scientists from DWR, Karnal and coordinating centres. Dr. RK Gupta presented significant findings of 2008-09 work on wheat quality. The wheat genotypes were listed having desirable traits such as grain protein content, sedimentation value, gluten content and overall end-product suitability etc. He gave brief account of the work done at different centres. He also presented work on QTL analysis and molecular marker assisted selection.

Dr. SS Singh, Project Director, DWR, Karnal joined the meeting and highlighted the importance of quality work in wheat research. He also appreciated the quality group for good work. This was followed by presentations from different centres on NIVTs. In these reports, work on grain appearance, test weight, protein content, sedimentation value, yellow pigment content and yellow berry incidence was presented by Dr. RP Singh (NIVT-1A), Dr. RS Saini (NIVT 1B), Dr. N Augustine (NIVT-2), Dr. Anil Kumar (NIVT-3), Dr. RS Giakwad (NIVT-4), Dr. (Ms.) Suma S Biradar (NIVT-5B & Special *T.Dicoccum* Trial) and Dr. (Ms.) Shashi Madan (NIVT-5A & Salinity / Alkalinity trial). Entries with better quality trials were identified.

Dr. Sewa Ram reported that two genotypes from NHZ had higher spread factor and soft grain characteristics. Otherwise all other entries in all the trials exhibited hard grain characteristics and lower spread factor. This demonstrates that soft materials are not being developed to improve biscuit making quality. He also gave account of molecular marker utilization in the improvement of wheat grain quality. Dr(Mrs.) Anju M Singh gave detailed information about the Quality Component Screening Nursery (QCSN) and suggested that good material should be contributed by breeders and quality scientists in that nursery. The group felt that in addition to protein content, test weight and sedimentation value; product making potential of selected QCSN entries may be evaluated. It was agreed that breeders should provide the parentage of the entries supplied for QCSN, seed should be sown at least in 4 lines of 2.5 m length so as to produce more quantity of seed required for quality analysis.

The meeting ended with the remark by the Chairman that good work is done by the quality group. He suggested that the use of molecular markers should be enhanced in breeding programme. The chairman also emphasized that the information on released varieties with specific end-use should be highlighted to seed producers and industry as well. Since yellow berry incidence is known to be physiological disorder, the Chairman suggested that the role of micronutrients like Mo and Mg be investigated to contain yellow berry.

Barley Network Research Review Meeting

August 28, 2009

Chairman : Dr. SC Gulati
Co-Chairman: Dr. RPS Verma
Rapporteurs: Dr. AS Kharub &
Dr. Sarvjeet Singh

The progress of coordinated barley programme was reviewed in this session and there were four presentations made. The session started with the presentation of Dr. RPS Verma on coordinated yield trials. In this presentation the highlights of last year's results were presented. Overall the acceptance of research trials was only 76%. He requested the concerned scientist to improve the conduct of trials so that rejection can be minimized. He also highlighted that during monitoring of trials in the different zones, segregation or mixture was observed in some entries. It was emphasized that breeders should observe critically their entries for any segregation or off-types before sending them to the coordinated programme. He also suggested that breeders should contribute entries for dual-purpose trial based on preliminary evaluation in the station trials. Suggestions were also given regarding the data recording and the filling up of data sheets. Data should be recorded more precisely rather than in multiple of 100g and data sheets are to be filled with ball pen. He also suggested that for developing malt type varieties hybridize malt type with malt type so that malt quality is maintained.

The chairman suggested that centers should not report inflated yield data. He also suggested that DWR should distribute F₂ seed to different centers.

Dr. S Grando, Barley Breeder from ICARDA suggested to analyse the best performing environments. The chairman told that the environments are already classified and divided into different zones based on climatic conditions.

Dr. R Selvakumar presented the highlights of plant protection trials. It was revealed that resistance level of entries from different centres is quite good for leaf rust, but the proportion of entries having resistance to yellow rust is comparatively low. Leaf blight (spot blotch) is becoming important disease in the NWPZ also and the level of resistance in the present material is low which is a cause of concern. He told that results of IPM were better than non-IPM.

Dr. Shrimali raised the issue of screening of breeding material against leaf blight. The Project Director, Dr. Singh suggested that we should not look for immunity against any disease but for high level of resistance. He also suggested that different centres should join hands for screening of their breeding material at their respective locations on reciprocal basis for different diseases and both centres should get credit for the outcome. Dr. Singh also advised that pre-breeding is going to be more important in near future to enhance the productivity.

Dr. RPS Verma mentioned that he will supply leaf blight resistant sources to different centres for hybridization. Dr. S Grando suggested also to use *H. spontaneum* for generating variability.

Dr. Sneha Narwal presented highlights of malt quality evaluation results. Promising entries for various malt quality traits were identified. It was observed that protein content was very high in the samples supplied by Durgapura centre. Dr. Shrimali replied that it may be due to high dose of nitrogen fertilizer.

Dr. Sanjay Kumar and Dr. Shayam Verma asked about the possibilities of growing barley for malt in the hills (Himachal Pradesh). It was decided to conduct the same set of trial under rainfed as well as under restricted irrigated conditions in the NHZ.

Dr. AS Kharub made presentation on the results of the various agronomical experiments including the varietal evaluation, special trials on dual-purpose barley, tillage options in malt and feed barley, row spacing in malt barley and integrated nutrient management. In the presentation, varieties performance in different tillage options was discussed and it was mentioned that the reduced & conventional tillage were at par for grain yield, but were higher than zero tillage. Integrated use of fertilizer (75% inorganic N + 5t FYM per ha + bio fertilizer) gave similar yields to that of 100% inorganic nutrient supply in addition to possible improvement in soil fertility status. Dr. Kharub mentioned that row spacing in malt barley can be reduced for higher productivity. In addition, the results of N schedule in dual-purpose barley also presented.

Dr. S Grando suggested that breeding material should be evaluated under high input conditions to develop dual-purpose varieties.

Mr. Satish (SAB Miller) suggested evaluating two-rowed malt barley varieties under rainfed conditions in Rajasthan state. Dr. Verma reported that two-rowed malt barley is suitable for high input management and not for rainfed conditions. The Session was ended with vote of thanks to the chair.

SESSION III

Crop Year Review, 2008-09

August 29 , 2009	Chairman : Dr. Swapan K Datta
	Co-Chairmen: Dr. SN Shukla & Dr. SS Singh
	Rapporteurs: Dr. Ravish Chatrath
	Dr. Sanjay Kumar

Meeting commenced with the welcome remarks of the chairman who also took the opportunity to welcome Dr. Sanjay Rajaram, representative ICARDA, Syria.

Dr. Jag Shoran, Principal Investigator, Crop Improvement, while highlighting the achievement of the programme, emphasized upon the record production of 80.58 million tons of wheat production, in spite of a marginal decrease in area in 2008-09. He briefed about the work done on development and release of eight new varieties, identification and registration of nine new genetic stocks, organization of national and international nurseries and trials, production of breeder and nuclear seeds, enhancing the useful genetic variability and progress made in different physiological investigations. He also emphasized about the urgent need of replacement of old varieties, increasing seed production of DBW 17 and PBW 550 to effectively replace PBW 343, as well the need to replace old checks in breeding trials.

Dr. SN Shukla, ADG stressed upon focused attention for popularization of newly released varieties through pamphlets and folders and supplying these information to APC/ Chief Secretary/ Principal Secretary of all the concerned states. He also advised to develop better mechanism for efficient utilization of genetic stocks by breeders and having a follow-up action of nucleus/breeder seed for foundation/certified seeds.

Dr. AK Sharma, Principal Investigator of Crop Protection, presented the highlights of work done under crop protection programme during 2008-09. He presented a brief account of different disease and pest screening nurseries and crop health monitoring efforts and informed about total absence of 'Ug99' under TPN. He reported about emergence of head scab in Punjab and powdery mildew as new emerging issue. He also informed about different efforts made to enhance resistance, identification of resistant stocks, utilization of different resistant sources. He also presented reports on IPM and informed about experiments conducted for disease and pest management, tillage technology and IPM module.

Commenting on Dr. Sharma's report, Dr. SN Shukla emphasized the need to closely keep a watch on the pathway of 'Ug99'. He also desired that genetic diversity may be widened for resistance against stripe rust in NWPZ. He also indicated the need for proper validation of IPM module. The need for a high powered committee is required for careful monitoring to avoid any mismatch of resistance pattern.

Dr. RK Sharma, Principal Investigator, Resource Management gave an account of zone-wise detail of 155 different trials conducted in six wheat growing zones with major concern related with increasing food production and conservation of resources. He also presented the performance of test entries and reflection on eight special coordinated trials conducted on resource conservation tillage technologies, residue management and irrigated nutrient and weed

management addressing different issues of different zones. Dr. SS Singh, Project Director, emphasized to minimize the number of irrigations and more experimentation on restricted irrigation. Dr. SK Datta, DDG (CS) corroborated for a serious research in this regards.

Dr. RK Gupta, Principal Investigator, Quality Improvement presented the highlights of work done during 2008-09. He informed the house that 9724 grain samples of AICW&BIP coordinated trials were analysed and the promising genotypes for chapati, bread, biscuit and pasta products were identified. He also gave detail account of promising genotypes for various quality parameters for both bread and durum wheat along with presence of variability in these parameters for different zones. Dr. Gupta also informed about development of RIL's for bread quality and producing of synthetic lines for different quality. Progress in noodle quality analysis and antioxidant activity analysis were also presented and use of molecular approaches for quality improvement in wheat was also highlighted. The Chairman, Dr. SK Datta, stressed upon the need for biotechnological interventions for quality improvement. He also raised a concern about malnutrition in the subcontinent and emphasized that landraces and germplasm could be a good source of iron, zinc and β carotene. To achieve this good facility of advance instruments are required and that collaborative research with National Institute of Nutrition, Hyderabad is required. A strong networked megaproject on biofortification is the need of the hour. Dr. SN Shukla, impress upon to have MOU with industry for better utilization of biscuit variety HS 490 and UAS 415 for pasta quality, for their better utilization.

Dr. RPS Verma, Principal investigator, Barley Network, highlighted the work done under the barley network. He presented a brief account of coordinated yield evaluation trials and identification of promising entries. He also presented a brief account of breeder and nucleus seed production of barley varieties and gremplasm evaluation. Trials were conducted on resource management for feed, dual purpose and different tillage options. Reports on crop health covering different nurseries, identification of resistant germplasm and IPM were also presented. Information on malting quality evaluation was also presented. Dr. SA Farooqi, Project Coordinator, AICRP on Forages, emphasized the need for close collaboration for forage quality analysis. Dr. SN Shukla, expressed his concern about non-performing centres and advised to fix target of crosses for each centres along with regular monitoring.

Dr. M Prasher, Principal Scientist, Regional Station, Flowerdale (Shimla) presented information on pathotype distribution, seedling resistance test, rust virulences and SAARC wheat disease nursery. He gave a brief account of prevalence of wheat rusts in India and pathotypes distribution of all the three rusts in samples collected from all over India. He also presented the seedling resistance test of 250 entries of AVT trials 2008-09 to postulate the rust resistance genes on differential host pathogen interactions. He gave on account of the report on SAARC wheat disease trap nursery and informed about the disease situation in India and SAARC countries. Dr. Prashar informed the house that high inoculum load is creating problem to hold resistance in resistant varieties and emphasized to minimize this pressure. It was advised that artificial inoculation be stopped at hot spots as this practice is leading to high inoculum load. Dr. SN Shukla advised that unique accessions number be given to different variants so as to avoid any confusion. A monograph needs to be published documenting such variants as well as available resistance genes. He further contemplated that a network be

developed for monitoring of rusts by involving centres like Wellington, Mahabaleshwar and any other centres that are suitable for this purpose.

Dr. Randhir Singh, Principal Investigator, presented the report on the impact of FLDS in popularizing new technologies during 2008-09 as well as the constraints in organizing FLDs. He raised the issues regarding use of imbalance fertilizer, non availability of quality seeds and burning of crop residues. Factors like late receiving of funds, late reporting of yield data, non organization of farmers day and delay in audit utilization certificate are major concern for implementation of FLD's. He also listed major problems of the entire zone. Dr. SN Shukla showed his concern about non awareness of FLD's report to DAC and emphasized to develop mechanism to communicate FLD report to DAC.

Dr. Raj Kumar, Senior Scientist DWR, Karnal presented the report on breeder & nucleus seed production during 2008-09 and allocation during 2009-10. He presented detail account of indent and production status of breeder seed, nucleus seed and grow out test. Replacement of old varieties and late reporting of nucleus and breeder seed report were major concern. Dr.SN Shukla laid emphasis to popularize new varieties and have follow up action of breeder seed to foundation/certified seed. He also recommended that a small brochure giving information on new releases of wheat and barley should be supplied to various states for fast dissemination.

A special presentation was made by Dr. M Islam of IASRI, New Delhi on expert system on wheat crop management. He presented newly developed software to disseminate various information related to wheat cultivation. The Chairman appreciated the efforts and opined that it would be of good use for scientists as well as extension workers.

Dr. JP Tandon, former ADG and Project Director (Wheat) expressed his major concerns on the failure of more trials in NEPZ as well as low experimental yields in comparison to FLD yield level in NWPZ. He stressed upon the need of conducting quality trials. Dr. S Rajaram in his special remarks indicated the enormous exercise conducted under the quinquennial review of the research activities at DWR and its cooperating centres resulting in various recommendations. He advised that an effective strategy will help the country to enhance its wheat and barley production.

At the end, Dr.SK Datta concluded the session with the advice that implementation followed by effective monitoring is the key to success and there is need to challenge ourselves to perform higher and higher so as to achieve our set goals.

The session ended with thanks to the chair by Dr. KV Prabhu.

SESSION IV

Concurrent Sessions

Crop Improvement: Plan of Work – 2009-10

Organizers : Drs. Jag Shoran and R Chatrath

The scientists belonging to respective zones deliberated in form of six major zones and reviewed the results trial by trial. Following the set norms on yield, disease (rust diseases), and quality parameters, the desirable test entries were promoted from initial level trials to advance varietal trials (AVTs). The same norms were taken into account to retain the promising entries for final tests in the AVTs. The scientists dealing with special trials, triticales testing and physiological investigations also followed the suit.

Finally, the constitution of various trial series in NWPZ (5), NEPZ (3), CZ (4), PZ (4), NHZ (7), SHZ (1) and Special Trials (3) was completed with the help of collective wisdom (the figures within brackets are the number of trial series in a particular zone).

The coordinators/organizers of this group completed the constitution of nine series of National Initial Varietal Trials, three series of IVTs and three series of Special Trials utilizing the proposals received from different breeding centres. Besides, the requirement of various international nurseries and trials was assessed for sending the indent to CIMMYT, Mexico.

Finalization of work plan and Recommendations

The details of various breeding yield trials finalized for conduction during 2008-09 crop season were presented before the crop improvement group. The details of yield trials are as given here under:

**National Initial Varietal Trials
NIVT-IA-IR-TS-TAS**

Conducting centres

Zone	No.	Names of Centres
NWPZ	10	Modipuram, Durgapura, Tabiji, Delhi, Ludhiana, Gurdaspur, Hisar, DWR-Karnal, Pantnagar, Nagina
NEPZ	8	Kanpur, Faizabad, Varanasi, Pusa (IARI), Ranchi, Sabour, Kalyani, Burdwan
Total test Sites	18	

DETAILS OF TRIAL ENTRIES

Sr. No.	Contributing Centers	No. of Entries	Entries
1.	Varanasi	2	HUW 640, HUW 641
2.	Durgapura	5	RAJ 4227, RAJ 4228, RAJ 4229, RAJ 4230, RAJ 4231
3.	Karnal (DWR)	2	DBW 65, DBW 66
4.	Faizabad	2	NW 5000, NW 5001
5.	Hisar	5	WH 1103, WH 1104, WH 1105, WH 1106, WH 1107
6.	Delhi	8	HD 3055, HD 3056, HD 3057, HD 3058, HD 3059, HD 3060, HD 3061, HD 3062
7.	Kanpur	2	K 0901, K 0902
8.	Pantnagar	5	UP 2783, UP 2784, UP 2785, UP 2786, UP 2787
9.	Ludhiana	5	PBW 646, PBW 647, PBW 648, PBW 649, PBW 650
10.	Chatha	2	JAUW 584, JAUW 585
11.	Sabour	1	RW 3689
12.	Ranchi	1	JKW 134
13.	Modipuram	1	WCW 2007-12
14.	Triticales	4	DT 192, DT 193, TL 2973, TL 2974
	Checks	4	PBW 343, DBW 17, K 9107, HD 2733
Total Entries		49	

EXPERIMENTAL DESIGN	:	SIMPLE LATTICE
REPLICATION	:	TWO
PLOT SIZE (GROSS)	:	6M X 1.38 M (6 rows)
PLOT SIZE (NET)	:	6.0M X 0.92 M (4 middle rows)
FERTILIZER DOSE (KG/HA)	:	120:60:30 (N:P:K)
DATE OF SOWING	:	NWPZ: 5 – 20 NOV NEPZ: 10 – 25 NOV
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 Project Director

**NATIONAL INITIAL VARIETAL TRIAL
NIVT-IB-IR-TS-TAS**

Conducting centres

Zone	No.	Names of Centres
NWPZ	11	Delhi, Ludhiana, Gurdaspur, Hisar, Kaul, Pantnagar, Nagina, Modipuram, Durgapura, Tabiji, DWR-Karnal
NEPZ	8	Kanpur, Faizabad, Varanasi, Ranchi, Sabour, Pusa (IARI), Kalyani, Malda
Total test sites	19	

Sr. No.	Contributing Centers	No. of Entries	Entries
1.	Durgapura	3	RAJ 4232,RAJ 4233,RAJ 4234
2.	DWR Karnal	3	DBW 67,DBW 68,DBW 69
3.	Faizabad	5	NW 5002,NW 5009,NW 5010,NW 5012,NW 5014
4.	Hisar	4	WH 1108,WH 1109,WH 1110, WH 1111
5.	Delhi	9	HD 3063, HD 3064, HP 1929, HP 1930, HP 1931, HP 1932, HP 1933, HP 1934, HS 531
6.	Kanpur	5	K 0904, K 0905,K 0906, K 0907, K 0908
7.	Ludhiana	3	PBW 651, PBW 652, PBW 653
8.	Pantnagar	3	UP 2788,UP 2789,UP 2790
9.	Varanasi	5	HUW 642, HUW 643, HUW 644, HUW 645, HUW 646
10.	Ranchi	2	JKW 151, JKW 152
11.	Sabour	2	RW 3693, RW 3695
12.	Modipuram	1	WCW 2007-13
	Checks	4	PBW 343, DBW 17, K 9107, HD 2733
	Total	49	

EXPERIMENTAL DESIGN	:	SIMPLE LATTICE
REPLICATION	:	TWO
PLOT SIZE (GROSS)	:	6M X 1.38 M (6 rows)
PLOT SIZE (NET)	:	6.0M X 0.92 M (4 middle rows)
FERTILIZER DOSE (KG/HA)	:	120:60:30 (N: P: K)
DATE OF SOWING	:	NWPZ: 5 – 20 NOV NEPZ: 10 – 25 NOV
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 Project Director

**NATIONAL INITIAL VARIETAL TRIAL
NIVT-2-IR-TS-TAS**

Zone	No.	Names of Centres
CZ	9	Indore, Gwalior, Powarkheda, Sagar, Junagarh, Vijapur, Kota, Udaipur, Bilaspur
PZ	5	Dharwad, Niphad, Pune, Parbhani, Akola
Total Test Sites	14	

Sr. No.	Contributing Centers	No. of Entries	Entries
1.	Dharwad	4	UAS 328,UAS 329,UAS 330,UAS 331
2.	Durgapura	2	RAJ 4235,RAJ 4236
3.	DWR Karnal	1	DBW 70
4.	Delhi	5	HI 1575, HI 1576, HI 1577, HI 1578, HW 5209-1
5.	Jabalpur	1	MP 3331
6.	Junagadh	1	GW 419
7.	Kanpur	1	K 0920
8.	Ludhiana	1	PBW 654
9.	Niphad	3	NIAW 1594, NIAW 1609, NIAW 1621
10.	Pantnagar	1	UP 2791
11.	Powarkheda	3	MP 1245,MP 1246, MP 1247
12.	Pune	2	MACS 6283, MACS 6387
13.	Vijapur	4	GW 415, GW 417, GW 418, GW 425
14.	Sagar	1	JWS 135
15.	Akola	1	AKAW 4073
16.	Parbhani	1	PBN 6054
17.	Lok Bharti	1	LOK 64
18.	Hisar	1	WH 1102
	Checks	2	NIAW 917, GW 322
Total Entries		36	

EXPERIMENTAL DESIGN	:	SIMPLE LATTICE
REPLICATION	:	TWO
PLOT SIZE (GROSS)	:	6M X 1.38 M (6rows)
PLOT SIZE (NET)	:	6.0M X 0.92 M (4 middle rows)
FERTILIZER DOSE (KG/HA)	:	120:60:30 (N: P: K)
DATE OF SOWING	:	10 NOV – 25 NOV (FOR BOTH CZ AND PZ)
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 Project Director

**NATIONAL INITIAL VARIETAL TRIAL
NIVT-3-IR-LS-TAS**

Zone	No.	Names of Centres
NWPZ	9	Delhi, Ludhiana, Gurdaspur, Hisar, DWR-Karnal, Pantnagar, Modipuram, Bulandshahar, Durgapura
NEPZ	6	Kanpur, Faizabad, Varanasi, IARI-Pusa, Ranchi, Sabour
CZ	6	Indore, Bilaspur, Powarkheda, Jabalpur, Junagarh, Vijapur
PZ	4	Ugar Khurd, Niphad, Pune, Parbhani
Total Test Sites	25	

Details of Trial entries

Sr. No.	Contributing Centers	No. of Entries	Entries
1.	Durgapura	3	RAJ 4237, RAJ 4238, RAJ 4239
2.	Karnal (DWR)	2	DBW 71, DBW 72
3.	Faizabad	1	NW 5019
4.	Hisar	3	WH 1099, WH 1100, WH 1101
5.	Delhi	8	HD 3059, HD 3065, HD 3066, HD 3067, HD 3068, HD 3069, HI 8710, HI 8711
6.	Junagadh	1	GW 421
7.	Kanpur	3	K 0910, K 0911, K 0912
8.	Lok Bharati	1	LOK 65
9.	Ludhiana	4	PBW 655, PBW 656, PBW 657, PBW 658
10.	Jabalpur	1	MP 3336
11.	Niphad	2	NIAW 1594, NIAW 1621
12.	Pantnagar	4	UP 2792, UP 2793, UP 2794, UP 2795
13.	Powarkheda	2	MP 1248, MP 1249
14.	Varanasi	2	HUW 647, HUW 648
15.	Vijapur	2	GW 422, GW 423
16.	Bilaspur	2	CG8001, CG 8005
17.	Dharwad	1	UAS 332
18.	Green Gold Seeds Ltd	1	Gold 23
19.	Sabour	1	RW 3430
20.	Gwalior	1	MP 4096
	Checks	4	PBW 373, MP 4010, DBW 14, HD 2932
	Total Entries	49	

EXPERIMENTAL DESIGN	:	SIMPLE LATTICE
REPLICATION	:	TWO
PLOT SIZE (GROSS)	:	6M X 1.08 M (6 rows)
PLOT SIZE (NET)	:	6.0M X 0.72 M (4 middle rows)
FERTILIZER DOSE (KG/HA)	:	120:60:30 (N:P:K)
DATE OF SOWING	:	NWPZ: 15 – 25 DEC NEPZ: 10 – 25 DEC CZ: 7 – 25 DEC PZ: 5 – 15 DEC
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 Project Director

**NATIONAL INITIAL VARIETAL TRIAL
NIVT-4-IR-TS-TDM**

Zone	No.	Names of Centres
NWPZ	7	Delhi, Ludhiana, Gurdaspur, Hisar, DWR-Karnal, Bulandshahr, Durgapura
CZ	9	Mauranipur, Kota, Indore, Powarkheda, Jabalpur, Junagarh, Vijapur, S.K. Nagar, Gwalior
PZ	4	Ugar Khurd, Niphad, Pune, Akola
Total Test Sites	20	

Details of trial entries

Sr. No.	Contributing Centers	No. of Entries	Entries
1.	Karnal (DWR)	2	DDW 19, DDW 20
2.	Hisar	2	WHD 947, WHD 948
3.	Vijapur	4	GW 1264, GW 1266, GW 1267, GW 1275
4.	Pune	3	MACS 3788, MACS 3798, MACS 3828
5.	Powarkheda	1	MPO 1250
6.	Pantnagar	1	UPD 87
7.	Delhi	7	HI 8712, HI 8713, HI 8714, HI 8715, HI 8716, HI 8717, HD 4724
8.	Ludhiana	4	PDW 323, PDW 324, PDW 325, PDW 326
9.	Dharwad	2	UAS 335, UAS 336
10.	Kota	2	RKD 213, RKD 214
11.	Niphad	2	NIDW 610, NIDW 612
12.	Parbhani	1	PBND 5115
	Checks	5	PDW 291, HI 8498, NIDW 295, PBW 343, WH 896
TOTAL ENTRIES		36	

EXPERIMENTAL DESIGN	:	SIMPLE LATTICE
REPLICATION	:	TWO
PLOT SIZE (GROSS)	:	6M X 1.38 M (6 rows)
PLOT SIZE (NET)	:	6.0M X 0.92 M (4 middle rows)
FERTILIZER DOSE (KG/HA)	:	120:60:30 (N: P: K)
DATE OF SOWING	:	NWPZ: 1 – 15 NOV CZ: 10 – 25 NOV PZ: 5 – 15 NOV
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 Project Director

**NATIONAL INITIAL VARIETAL TRIAL
NIVT-5A-RF-TS-TAS**

Zone	No.	Names of Centres
NWPZ	4	Ludhiana*, Gurdaspur, Ambala, Delhi*
NEPZ	5	Kanpur, Faizabad, Varanasi, Ranchi, Sabour
CZ	4	Indore*, Sagar*, Jabalpur*, Kota
PZ	5	Niphad*, Pune, Badnapur, Dharwad, Washim
Total Test Sites	18	

* Centres will also conduct restricted irrigated trials. * Jabapur will conduct under RI condition only

DETAILS OF TRIAL ENTRIES

Sr. No.	Contributing Centers	No. of Entries	ENTRIES
1.	Faizabad	1	NW 5013
2.	Hisar	2	WH 1097, WH 1098
3.	Delhi	5	HD 3070, HD 3071, HI 1579, HI 1580, HI 1581
4.	Jabalpur	1	MP 3346,
5.	Kanpur	3	K 0915, K 0916, K 0917
6.	Ludhiana	2	PBW 659, PBW 660
7.	Niphad	1	NIAW 1594
8.	Pantnagar	2	UP 2796, UP 2797
9.	Powarkheda	4	MP 1239, MP 1240, MP 1241, MP 1242
10.	Pune	2	MACS 6354, MACS 6416
11.	Varanasi	1	HUW 649
12.	Dharwad	2	UAS 326, UAS 327
13.	Akola	1	AKAW 4635
14.	Sabour	1	RW 3430
15.	DWR-Karnal	1	DBW 73
16.	Sagar	1	JWS 134
17.	Triticale	2	DT 194, TL 2975
	Checks	4	PBW 175, HI 1500, HD 2888, NI 5439
Total Entries		36	

EXPERIMENTAL DESIGN	:	SIMPLE LATTICE
REPLICATION	:	TWO
PLOT SIZE (GROSS)	:	6M X 1.38 M
PLOT SIZE (NET)	:	6.0M X 0.92 M
FERTILIZER DOSE (KG/HA)	:	40:20:00 (N:P:K) (RAINFED) and 60:30:15 (N:P:K) (RES./IRRIGATED)
DATE OF SOWING	:	NWPZ: 20 OCT – 31 OCT (RF) 25 OCT – 10 NOV (RI) NEPZ: 25 OCT – 15 NOV CZ: 15 OCT – 31 OCT (RF) 25 OCT – 10 NOV (RI) PZ: 15 OCT – 31 OCT (RF) 25 OCT – 10 NOV (RI)
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 Project Director

**NATIONAL INITIAL VARIETAL TRIAL
NIVT-5B-RF-TS-TDM**

Zone	No.	Names of Centres
CZ	7	Dhandhuka, Arnej, Tancha, Sagar, Indore*, Kota*, Powarkheda*
PZ	4	Niphad, Pune, Washim, Dharwad
Total Test Sites	11	

* Only for RI condition

* Both RF and RI trials

DETAILS OF TRIAL ENTRIES

Sr. No.	Contributing Centers	No. of Entries	ENTRIES
1.	Dharwad	2	UAS 433, UAS 434
2.	Delhi	5	HI 8718, HI 8719, HI 8720, HI 8721, HI 8722
3.	Junagadh	1	GW 1272
4.	Niphad	1	NIDW 612
5.	Akola	1	AKDW 3931-2
6.	Pune	4	MACS 3704, MACS 3801, MACS 3813, MACS 3815
7.	Powarkheda	2	MPO 1243, MPO 1244
8.	Vijapur	2	GW 1270, GW 1271
9.	Kanpur	1	KD 0921
10.	Karnal	1	DDW 19
11.	Kota	1	RKD 216
	Checks	4	A 9-30-1, MACS 1967, B-Yellow, HD 4672
Total Entries		25	

EXPERIMENTAL DESIGN	:	SIMPLE LATTICE
REPLICATION	:	TWO
PLOT SIZE (GROSS)	:	6M X 1.38 M (6rows)
PLOT SIZE (NET)	:	6.0M X 0.92 M (4 middle rows)
FERTILIZER DOSE (KG/HA)	:	40:20:00 (N:P:K) (RAINFED and 60:30:15 (N:P:K) (RES./IRRIGATED)
DATE OF SOWING	:	CZ: 15 Oct – 31 Oct – RF 25 Oct – 10 Nov – RI PZ: 15 Oct – 31 Oct
SEED REQUIREMENT	:	5.0 KG PER ENTRY

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : IR-TS-TAS
Zone : Northern Hills Zone

No. of Trial Centres : 5

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
H.P.	3	Shimla, Dhaulakuan, Malan
UTK	1	Hawalbagh
J & K	1	Rajouri

No. of Varieties including Checks : 11 (7+4)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
CSKHPKV, Palampur	1	HPW 307
PAU, Ludhiana (Triticale)	2	TL 2968, TL 2969
VPKAS, Almora	2	VL 930, VL 931
Shimla	2	HS 507*, HS 514
Checks	4	HS 240, VL 804, TL 2942, VL 907(I)

Experimental Design : R.B.D.
Replication : Six
Plot Size : Gross : 4m × 1.38m (6 rows)
Net : 4m × 0.92m (4 middle rows)
Fertilizer Dose : 120:60:30 kg/ha (N:P:K)
Date of sowing : 1-15 November
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 12 kg per entry (including AVT-Rainfed)

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	RF-TS-TAS
Zone	:	Northern Hills Zone
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No. of Trial Centres	:	13
State	No.	Name of Centres
H.P.	5	Shimla, Malan, Berthin, Bajaura, Chamba (KVK)
Uttarakhand	3	Hawalbagh, Majhera, Ranichauri (KVK)
J & K	1	Rajouri
Manipur	1	Mantripukhari
Sikkim	1	Gangtok
Arunachal Pradesh	1	Basar
West Bengal	1	Kalimpong
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No. of Varieties including Checks	:	11 (07+4)
Contributing Centres	No.	Name of Varieties
CSKHPKV, Palampur	1	HPW 307
PAU, Ludhiana (Triticale)	2	TL 2968, TL 2969
VPKAS, Almora	2	VL 930, VL 931
Shimla	2	HS 507*, HS 514
Checks	4	HS 240, VL 804, TL 2942, VL 907(I)
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Experimental Design	:	R.B.D.
Replication	:	Six
Plot Size	:	Gross : 4m × 1.38m (6 rows) Net : 4m × 0.92m (4 middle rows)
Fertilizer Dose	:	40:20:0 kg/ha (N:P:K)
Date of sowing	:	15-31 October
Seed Rate (kg/ha)	:	100 kg
Seed Requirement	:	12 kg per entry (including AVT-irrigated)

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : RF-ES-TAS

Zone : Northern Hills Zone

No. of Trial Centres : 8

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
H.P.	3	Shimla, Malan, Bajaura
UTK	2	Hawalbagh, Ranichauri
J & K	1	Shalimar
Sikkim	1	Gangtok
West Bengal	1	Kalimpong

No. of Varieties including Checks : 14 (10+4)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, Reg. Station, Shimla	3	HS 521, HS 532, HS 533
CSKHPKV, Malan	2	HPW 338, HPW 339
VPKAS, Almora	3	VL 934, VL 943, VL 944
GPBUA&T, Pantnagar	1	UP 2798
SKUAST, Shalimar	1	SKW 441
Checks	4	VL 616, HS 277, VL 829, HPW 251

Experimental Design : R.B.D.

Replication : Four

Plot Size : Gross : 3m × 1.38m (6 rows)
Net : 3.0m × 0.92m (4 middle rows)

Fertilizer Dose : 40:20:00 kg/ha (N:P:K)

Date of sowing : 1-10 October

Seed Rate (kg/ha) : 100 kg

Seed Requirement : 5 kg per entry

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	RI-LS-TAS
Zone	:	Northern Hills Zone
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No. of Trial Centres	:	8
<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
H.P.	5	Shimla, Malan, Bajaura, Dhaulakuan, Sundernagar
UTK	2	Hawalbagh, Majhera
Arunachal Pradesh	1	Basar
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<u>No. of Varieties including Checks</u>	:	13 (9+4)
<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, Reg. Station, Shimla	3	HS 513*, HS 525, HS 534
CSKHPKV, Malan	2	HPW 347, HPW 348
VPKAS, Almora	3	VL 925*, VL 945, VL 946
GPBUA&T, Pantnagar	1	UP 2799
Checks	4	Sonalika, HS 295, VL 892, HS 490
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Experimental Design	:	R.B.D.
Replication	:	Six
Plot Size	:	Gross : 4m × 1.08m (6 rows) Net : 4m × 0.72m (4 middle rows)
Fertilizer Dose	:	40:20:0 kg/ha (N:P:K)
Date of sowing	:	1Dec.- 15 Dec.
Seed Rate (kg/ha)	:	125 kg
Seed Requirement	:	7 kg per entry

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	RF-VHA-(Summer)-TAS
Zone	:	Northern Hills Zone
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No. of Trial Centres	:	4
<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
H.P.	2	Dalang Maidan, Kukumseri
J & K	2	Kargil, Leh (SKUAST)
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<u>No. of Varieties including Checks</u>	:	14 (6 Wheat +5 Barley + 3 checks)
<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, Reg. Station, Shimla	1	HS 490
CSKHPKV, Malan	2	HPW 316,HPW 317
VPKAS, Almora	2	VL 914, VL 926
SKUA&T, Srinagar	2	SWL 19, SBL 8 (Barley)
DWR, KARNAL	4	DWR 62*, DWR 63*, DWR 79, DWR 80
Checks	2+1	HS 375, Sonalika, BHS 352 (Barley)
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Experimental Design	:	R.B.D.
Replication	:	Four
Plot Size	:	Gross : 3m × 1.38m (6 rows) Net : 3m × 0.92m (4 middle rows)
Fertilizer Dose	:	40:20:00 kg/ha (N:P:K)
Date of sowing	:	As per prevailing practice (Month of May)
Seed Rate (kg/ha)	:	100 kg
Seed Requirement	:	4 kg per entry

* Final year entry

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

INITIAL VARIETAL TRIAL (2009-10)

Production Condition	:	IR-TS-TAS
Zone	:	Northern Hills Zone

No. of Trial Centres	:	3
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<u>State</u>		<u>No.</u> <u>Name of Centres</u>
H.P.	2	Dhaulakuan, Bajaura
UTK	1	Hawalbagh

<u>No. of Varieties including Checks</u>	:	25 (23+2)
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<u>Contributing Centres</u>		<u>No.</u> <u>Name of Varieties</u>
IARI, Reg. Station, Shimla	7	HS 524, HS 525, HS 526, HS 527, HS 528, HS 529, HS 530
CSKHPKV, Malan	7	HPW 340, HPW 341, HPW 342, HPW 343, HPW 344, HPW 349, HPW 350
VPKAS, Almora	6	VL 937, VL 938, VL 939, VL 940, VL 941, VL 942
GPBUA&T, Pantnagar	2	UP 2800, UP 2801
SKUA&T, Srinagar	1	SKW 407
Checks	2	HS 240, VL 804

Experimental Design	:	R.B.D.
Replication	:	Four
Plot Size	:	Gross : 4m × 1.38m (6 rows) Net : 4m × 0.92m (4 middle rows)
Fertilizer Dose	:	120:60:30 kg/ha (N:P:K)
Date of sowing	:	1-15 November
Seed Rate (kg/ha)	:	100 kg
Seed Requirement	:	6 kg per entry (including IVT-Rainfed)

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

INITIAL VARIETAL TRIAL (2009-10)

Production Condition : RF-TS-TAS
Zone : Northern Hills Zone

No. of Trial Centres : 7

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
H.P.	3	Shimla, Malan, Dhaulakuan
UTK	2	Hawalbagh, Ranichauri
J & K	1	Shalimar
West Bengal	1	Kalimpong

No. of Varieties including Checks : 25 (23+2)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, Reg. Station, Shimla	7	HS 524, HS 525, HS 526, HS 527, HS 528, HS 529, HS 530
CSKHPKV, Malan	7	HPW 340, HPW 341, HPW 342, HPW 343, HPW 344, HPW 349, HPW 350
VPKAS, Almora	6	VL 937, VL 938, VL 939, VL 940, VL 941, VL 942
GPBUA&T, Pantnagar	2	UP 2800, UP 2801
SKUA&T, Srinagar	1	SKW 407
Checks	2	HS 240, VL 804

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 4m × 1.38m (6 rows)
Net : 4m × 0.92m (4 middle rows)
Fertilizer Dose : 40:20:00 kg/ha (N:P:K)
Date of sowing : 15-31 October
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 6 kg per entry (including IVT-Rainfed)

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : IR-TS-TAS
Zone : North Western Plains Zone

No. of Trial Centres : 28

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Punjab	5	Ludhiana, Gurdaspur, Bathinda, Kapurthala, Rauni
Haryana	7	Hisar, DWR-Karnal, Uchani, Kaul, Bawal, Faridabad, Shikopur
Uttarakhand	4	Pantnagar, Kashipur, Dhanauri, Dhakarani
U.P.	6	Bulandshahr, Nagina, Modipuram, Barielly, Hardoi, Ujhani
Rajasthan	3	Durgapura, Tabiji, Alwar
Delhi	1	Delhi
J & K	1	Chatha
H.P.	1	Dhaulakuan

No. of Varieties including Checks : 16 (12+4)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
PAU, Ludhiana	5	PBW 621*, PBW 631, PBW 634, PBW 635, PBW 636
DWR Karnal	3	DBW 50*, DBW 55, DBW 58
IARI, New Delhi	2	HD 3024, HD 3027@
Varanasi	2	HUW 635, HUW 636
Checks	4	PBW 343, DBW 17, PBW 550, HD 2967(I)

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 2.76 m × 6.0m (12 rows)
Net : 2.30 m × 6.0m (10 middle rows)
Fertilizer Dose : 120:60:30 kg/ha (N:P:K)
Date of sowing : 5 –20 November
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 30 kg per entry
Sowing Period : From : Nov. 5 To : Nov. 20
Last Date of Seed Receipt : October 5

* Final year entry @ Based on quality traits

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : IR-TS-TDM
Zone : North Western Plains Zone

No. of Trial Centres : 14

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Punjab	4	Ludhiana, Gurdaspur, Kapurthala, Rauni
Haryana	4	Hisar, Uchani, DWR-Karnal, Kaul
Uttarakhand	1	Pantnagar
U.P.	2	Bulandshahr, Modipuram
Rajasthan	1	Durgapura
Delhi	1	Delhi
J&K	1	Chatha

No. of Varieties including Checks : 16 (11+5)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
PAU, Ludhiana	3	PDW 315*, PDW 317*, PDW 322
Hisar	2	WHD 943*, WHD 976
IARI, N. Delhi	1	HD 4722
SDAU, Vijapur	1	GW 1255
UAS, Dharwad	1	UAS 429
IARI, Indore	1	HI 8703
MPKV, Niphad	1	NIDW 577
DWR, Karnal	1	DDW 16
Checks	5	PDW 233, PDW 291, PBW 343, WH 896, PDW 314(I)

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 2.76 × 6.0 m (12rows)
Net : 2.30 × 6.0 m (10 middle rows)
Fertilizer Dose : 120:60:30 kg/ha (N:P:K)
Date of sowing : 1-15 November
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 18 kg per entry
Last Date of Seed Receipt : October 5

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : IR-LS-TAS
Zone : North Western Plains Zone

No. of Trial Centres : 21

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Punjab	4	Ludhiana, Gurdaspur, Bathinda, Kapurthala
Haryana	5	Hisar, Uchani, Kaul, Rohtak, DWR, Karnal
Uttarakhand	2	Pantnagar, Kashipur
U.P.	6	Bulandshahr, Nagina, Modipuram, Barielly, Hardoi, Ujhani
Rajasthan	2	Durgapura, Tabiji
Delhi	1	Delhi
J & K	1	Chatha

No. of Varieties including Checks : 14 (11+3)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
PAU, Ludhiana	2	PBW 639, PBW 642
DWR, Karnal	2	DBW 59, DBW 60
HAU, Hisar	1	WH 1094
GBPUAT, Pantnagar	2	UP 2763, UP 2765
BHU, Varanasi	1	HUW 638
Kanpur	1	K 0811
Indore	1	HI 1571
JNKVV, Powarkheda	1	MP 1236
Checks	3	PBW 373, WH 1021, PBW 590

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 2.16 x 6.0 m (12rows)
Net : 1.80 x 6.0m (10 middle rows)
Fertilizer Dose : 100:60:30 kg/ha (N:P:K)
Date of sowing : 15 -25 December
Seed Rate (kg/ha) : 125 kg
Seed Requirement : 22 kg per entry
Last Date of Seed Receipt : October 5

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : RF-TS-TAS
Zone : North Western Plains Zone

No. of Trial Centres : 12

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Punjab	4	Ludhiana, Gurdaspur, Kapurthala, Balachaur
Haryana	3	Hisar, Uchani, Ambala
Uttarakhand	1	Pantnagar
U.P.	1	Modipuram
Delhi	1	Delhi
J & K	1	Chatha
H.P.	1	Dhaulakuan

No. of Varieties including Checks : 12(9+3)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
PAU, Ludhiana	2	PBW 644, TL 2968
CSAU&T, Kanpur	1	K 0818
Hisar	1	WH 1080*
Delhi	2	HD 3043, HD 3045
Dharwad	3	UAS 315*, UAS 324, UAS 325
Checks	3	C 306, PBW 175, PBW 396

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 2.76 x 6.0 m (12 rows)
Net : 2.30 x 6.0 m (10 middle rows)
Fertilizer Dose : 40:20:0 N:P:K
Date of sowing : 20-31 October
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 15 kg per entry
Last Date of Seed Receipt : October 5

* Final year entry;

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	RI-TS-TAS
Zone	:	North Western Plains Zone
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No. of Trial Centres	:	7
<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Uttarakhand	1	Pantnagar
Haryana	2	Hisar, Uchani
Punjab	2	Ludhiana, Bathinda
Rajasthan	1	Durgapura
Delhi	1	Delhi
<hr/>		
<u>No. of Varieties including Checks</u>	:	14(11+3)
<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
PAU, Ludhiana	4	PBW 629*, PBW 644, PBW 645, TL 2968
IARI, N.Delhi	2	HD 3043, HD 3045
CSCS HAU, Hisar	2	WH 1080*, WH 1081*
GBPUAT, Pantnagar	2	UP 2744*, UP 2768
MPKVV, Niphad	1	NIAW 1549
Checks	3	C 306, PBW 175, PBW 396
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Experimental Design	:	R.B.D.
Replication	:	Four
Plot Size	:	Gross : 2.76 x 6.0 m (12 rows) Net : 2.30 x 6.0 m (10 middle rows)
Fertilizer Dose	:	60:30:15 kg/ha (N:P:K)
Date of sowing	:	20-31 October
Seed Rate (kg/ha)	:	100 kg
Seed Requirement	:	9 kg per entry
Last Date of Seed Receipt	:	October 5

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : AVT-IR-TS-TAS
Zone : North Eastern Plains Zone

No. of Trial Centres : 15

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Uttar Pradesh	7	Barabanki, BHU Varanasi, Faizabad, Kanpur, Araul, Deegh, DAA Alahabad
Bihar	2	IARI Pusa, Sabour
West Bengal	4	Coochbehar, Kalyani, Burdhan, Malda
Jharkhand	1	Ranchi
Assam	1	Shillongani

No. of Varieties including Checks : 24 (19+5)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
DWR, Karnal	4	DBW 46*, DBW 54, DBW 55, DBW 58
SKUAST, Jammu	2	RSP 561*, RSP 566
IARI N Delhi	2	HD 2997*, HD 3028
NDUA&T, Faizabad	2	NW4091, NW 4092
PAU, Ludhiana	2	PBW634, PBW 636
RAU, Sabour	2	RW 3684, RW 3686
MPUA&T, Durgapura	2	Raj 4201, Raj 4205
CSAUA&T, Kanpur	2	K 0807, K 0808
BHU, Varanasi	1	HUW 635
Checks	5	K 0307, PBW 343, HD 2733, DBW 39(I), HD 2967(I)

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 2.76 x 6.0 m (12 rows)
Net : 2.30 x 6.0 m (10 middle rows)
Fertilizer Dose : 120:60:30 kg/ha (N:P:K)
Date of sowing : 10th -25th Nov.
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 20 kg per entry
Last Date of Seed Receipt : October 10

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	IR-LS-TAS
Zone	:	North Eastern Plains Zone
<hr/>		
No. of Trial Centres	:	15
<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Uttar Pradesh	7	Barabanki, Varanasi, Araul, Faizabad, Kanpur, Mau, Deegh
Bihar	2	IARI Pusa, Sabour
West Bengal	4	Burdman, Coochbehar, Kalyani, Mohitnagar
Jharkhand	1	Ranchi
Assam	1	Shillongani
<hr/>		
<u>No. of Varieties including Checks</u>	:	9 (5+4)
<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
DWR Karnal	2	DBW 51*, DBW 52*
Faizabad	2	NW 4035*, NW 4081
Indore	1	HI 1563*
Checks	4	DBW 14, NW 2036, HUW 234, HD 2985(I)
<hr/>		
Experimental Design	:	R.B.D.
Replication	:	Four
Plot Size	:	Gross : 2.16 x 6m (12 rows) Net : 1.80 x 6.0 m (10 middle rows)
Fertilizer Dose	:	100:60:30 kg/ha (N:P:K)
Date of sowing	:	10-25 December
Seed Rate (kg/ha)	:	120 kg
Seed Requirement	:	16 kg per entry
Last Date of Seed receipt	:	10 th October

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : TS-RF-TAS
Zone : North Eastern Plains Zone

No. of Trial Centres : 12

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Uttar Pradesh	6	Barabanki, BHU Varanasi, Faizabad, Kanpur, Araul, Deegh
Bihar	2	IARI Pusa, Sabour
West Bengal	2	Coochbehar, Kalyani
Jharkhand	1	Ranchi
Assam	1	Shillongani

No. of Varieties including Checks : 6 (3+3)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
BHU, Varanasi	1	HUW 639
PDKV, Akola	1	AKAW 4635
IARI N Delhi	1	HD 3016*
Checks	3	C 306, K 8027, HD 2888

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 2.76 x 6.0 m (12 rows)
Net : 2.30 x 6.0 m (10 middle rows)
Fertilizer Dose : 40:20:00 kg/ha (N:P:K)
Date of sowing : 25th Oct. to 15th Nov.
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 16 kg per entry
Last Date of Seed Receipt : Sept. 30

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	AVT-IR-TS
Zone	:	Central Zone
<hr/>		
No. of Trial Centres	:	20
<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Gujarat	7	Anand, Amreli, Bardoli, Junagarh, Vijapur, S.K. Nagar, Sanosara
MP	7	Gwalior, Indore, Powarkheda, Rewa, Bhopal, Jabalpur, Sagar
UP	1	Mauranipur
Chhattisgarh	2	Bilaspur, Raipur
Rajasthan	3	Banswara, Kota, Udaipur
<hr/>		
<u>No. of Varieties including Checks</u>	:	21 (16+5)
<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
SDAU, Vijapur	1	GW 408
IARI, RS, Indore	5	HI 8691(d)*, HI 1567, HI 1568, HI 8703(d), HI 8704 (d)
IARI, Wellington	1	HW 5207-1*
MACS Pune	3	MACS 3742(d)*, MACS 3744 (d), MACS 6274,
JAU, Junagard	1	GW 411
PDKV, Akola	2	AKDW 4021(d)*, AKAW 4493
Lok Bharti, Sanosara	1	Lok-62
NPKV, Niphad	1	NIAW 1549@
UAS, Dharwad	1	UAS 321
Checks	5	Lok-1, GW 322, HI 8498 (d), HI 1544 MPO 1215(d)(l)
<hr/>		
Experimental Design	:	R.B.D.
Replication	:	Four
Plot Size	:	Gross : 2.76 x 6 m (12 rows) Net : 2.30 m x 6 m (10 middle rows)
Fertilizer Dose	:	120:60:30 kg/ha (N:P:K)
Seed Rate (kg/ha)	:	100 kg
Seed Requirement	:	20 kg per entry
Date of sowing	:	10 th Nov. to 25 th Nov.

* Final year entry

@ Based on quality traits

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : AVT-IR-LS
Zone : Central Zone

No. of Trial Centres : 16

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Gujarat	5	Anand, Bardoli, Junagarh, Vijapur, S.K. Nagar
MP	5	Indore, Jabalpur, Gwalior, Powarkheda, Rewa
Chattisgarh	3	Bilaspur, Jagdalpur, Ambikapur
Rajasthan	3	Banswara, Udaipur, Kota

No. of Varieties including Checks : 7 (3+4)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
Jabalpur	1	MP 3304
Gwalior	1	MP 4106*
Powerkheda	1	MP 1237
Checks	4	DL 788-2, MP 4010, HD 2864, HD 2932

Experimental Design : R.B.D.

Replication : Four

Plot Size : Gross : 2.16 x 6 m (12 rows)
Net : 1.80 m x 6 m (10 middle rows)

Fertilizer Dose : 80:40:20 kg/ha (N:P:K)

Seed Rate (kg/ha) : 125 kg

Seed Requirement : 15 kg per entry

Date of sowing : 5th - 25th Dec.

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : AVT-RF-TS
Zone : Central Zone

No. of Trial Centres : 10

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Gujarat	3	Arnej, Dhandhuka, Tancha
MP	5	Indore, Jabalpur, Sagar, Damoh, Ganjbasoda
Rajasthan	2	Kota, Pratapgarh

No. of Varieties including Checks : 15 (10+5)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
JNKVV, Jabalpur	2	MP 3288*, MP 3299
JNKVV, Powarkheda	2	MP 1230, MPO 1232(d)
SDAU, Vijapur	1	GW 1260(d)
Indore	3	HI 1572, HI 8708 (d), HI 8709 (d)
UAS, Dharwad	2	UAS 431(d), UAS 432 (d)
Checks	5	HI 1531, A-9-30-1(d), HD 4672(d), HI 8627(d), HI 1500

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 3.60 m x 6 m (12 rows)
Net : 3.00 m x 6 m (10 middle rows)
Fertilizer Dose : 40:20:00 kg/ha (N:P:K)
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 12 kg per entry
Date of sowing : 15th Oct. to 31st Oct.

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : AVT- RI- TS

Zone : Central Zone

No. of Trial Centres : 13

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Gujarat	2	Dhanduka, Arnej
MP	5	Indore, Jabalpur, Sagar, Bhopal, Ganjbasoda
Chattisgarh	3	Bilaspur, Ambikapur, Jagdalpur
Rajasthan	2	Kota, Banswara
UP	1	Belatal

No. of Varieties including Checks : 15 (10+5)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
JNKVV, Jabalpur	2	MP 3288*, MP 3299
JNKVV, Powarkheda	2	MP 1230, MPO 1232(d)
SDAU, Vijapur	1	GW 1260(d)
Indore	3	HI 1572, HI 8708(d), HI 8709 (d)
UAS, Dharwad	2	UAS 431 (d), UAS 432 (d)
Checks	5	HI 1531, Lok 1, HD 4672 (d), HI 8627 (d), HI 1500

Experimental Design : R.B.D.

Replication : Four

Plot Size : Gross : 3.60 m x 6 m (12 rows)
Net : 3.00 m x 6 m (10 middle rows)

Fertilizer Dose : 60:30:15 kg/ha (N:P:K)

Seed Rate (kg/ha) : 100 kg

Seed Requirement : 12 kg per entry

Date of sowing : 25th Oct. to 10th November

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	TS Irrigated
Zone	:	Peninsular Zone
<hr/>		
No. of Trial Centres	:	18
<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Maharashtra	10	Niphad, Pravaranagar, Pune, Karad, K.Digraj, Akola, Parbhani, Nasik, Savalvahir, Amaravati
Karnataka	5	Dharwad, Ugar, Arbhavi, Kalloli, Mudhol
Andhra Pradesh	3	Adilabad, Rudrur, Rajendra Nagar
<hr/>		
<u>No. of Varieties including Checks</u>	:	19 (12+7)
<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, Indore	2	HI 1569, HI 8702(d)
Dharwad	2	UAS 428(d), UAS 320@
IARI, Delhi	1	HD 3037
Akola	2	AKDW 4021(d)*, AKAW 4493
Ludhiana	1	PDW 315(d)*
Lok Bharti	1	LOK 62
JAU Junagarh	2	GW 410, GW 411
ARS Niphad	1	NIDW 577(d)
Checks	7	NIAW 917, NIDW 295(d), HI 8663(d), GW 322, MACS 6222(I), MACS 6273(I), UAS 304(I)
<hr/>		
Experimental Design	:	R.B.D.
Replication	:	Four
Plot Size	:	Gross : 6.00 × 2.76 m (12 rows) Net : 6.00 × 2.30 m (10 middle rows)
Fertilizer Dose	:	120:60:30 kg/ha (N:P:K)
Seed Rate (kg/ha)	:	100 kg
Date of sowing	:	1 st to 15 th Nov.
Seed Requirement	:	18 kg per entry
<hr/>		

* Final year entry @ Based on quality traits

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition	:	IR-LS-TAS
Zone	:	Peninsular Zone
<hr/>		
No. of Trial Centres	:	10
<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Maharashtra	7	Niphad, Pravaranagar, Karad, Pune, Akola, Amaravati, Savalvahir
Karnataka	3	Ugar, Dharwad, Kalloli
<hr/>		
<u>No. of Varieties including Checks</u>	:	9 (5+4)
<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, New Delhi	1	HD 3040
PDKV, Akola	1	AKAW 4210-6
PAU, Ludhiana	1	PBW 640
IARA, Indore	1	HI 1571
Pantnagar	1	UP 2766
Checks	4	HI 977, RAJ 4083, HD 2932, AKAW 4627(I)
<hr/>		
Experimental Design	:	R.B.D.
Replication	:	Four
Plot Size	:	Gross : 6.00 × 2.16 m (12 rows) Net : 6.00 × 1.80 m (10 middle rows)
Fertilizer Dose	:	80:40:20 kg/ha (N:P:K)
Date of sowing	:	1 st to 15 th Dec.
Seed Rate (kg/ha)	:	125 kg
Seed Requirement	:	15 kg per entry
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* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : RF-TS-TAD

Zone : Peninsular Zone

No. of Trial Centres : 8

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Maharashtra	4	Niphad, Pune, Parbhani, Washim,
Karnataka	4	Dharwad, Annegiri, Bijapur, Bagalkot

No. of Varieties including Checks : 13 (9+4)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, N Delhi	1	HD 3045
UAS, Dharwad	1	UAS 316*
Niphad	1	NIAW 1415*
ARI, Pune	2	MACS 6348, MACS 6350
Powerkheda	2	MP 1227, MPO 1232(d)
JNKKV, Jabalpur	1	MP 3299
Akola (Dr. PDKV)	1	AKDW 4132-3
Checks	4	NI 5439, HD 2781, AKDW 2997-16(d) , HD 2987(l)

Experimental Design : R.B.D.

Replication : Four

Plot Size : Gross : 6.00 × 2.76 m (12 rows)
Net : 6.00 × 2.30 m (10 middle rows)

Fertilizer Dose : 60:30:15 kg/ha (N:P:K)

Date of sowing : 15-31 Oct.

Seed rate (kg/ha) : 100 kg

Seed Requirement : 10 kg per entry

* Final year entry

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

ADVANCE VARIETAL TRIAL (2008-09)

Production Condition : RI-TS-TAD
Zone : Peninsular Zone

No. of Trial Centres : 5

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Maharashtra	3	Niphad, Pune, Akola
Karnataka	2	Dharwad, Bailhongal

No. of Varieties including Checks : 13 (9+4)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, Delhi	1	HD 3045
Niphad	1	NIAW 1415*
ARI, Pune	2	MACS 6348, MACS 6350
Powerdheda	2	MP 1227, MPO 1232(d)
JNKVV, Jabalpur	1	MP 3299
Dr. PDKV, Akola	1	AKDW 4132-3
UAS Dharwad	1	UAS 316*
Checks	4	NI 5439, AKDW 2997-16(d), PBW 596, HD 2987(l)

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 6.00 × 2.76 m (12 rows)
Net : 6.00 × 2.30 m (10 middle rows)
Fertilizer Dose : 60:30:15 kg/ha (N:P:K)
Date of sowing : 1st - 10 Nov.
Seed Rate (kg/ha) : 100 kg
Sowing Period : 1st – 15th Nov.
Seed Requirement : 8 kg per entry

* Final year entry

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

ADVANCE VARIETAL TRIAL (2009-10)

Production Condition : RI-MF-TS-LS-TAS
Zone : Southern Hills Zone

No. of Trial Centres : 5

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
Tamilnadu	4	Wellington (TS), Wellington (LS), Paiyur, Thalawadi
Karnataka	1	Mandya

No. of Varieties including Checks : 10 (7+3)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
IARI, Wellington	1	HW 5216
IARI, New Delhi	3	HD 3048, HD 3052, HD 3053
IARI, Indore	1	HI 1573
UAS, Dharwad	2	UAS 326, UAS 327
Checks	3	HW 2044, CoW (W) 1, HW 5207(I)

Experimental Design : R.B.D.
Replication : Six
Plot Size : Gross : 6.00 × 1.38 m(6 rows)
Net : 6.00 × 0.92 m (4 middle rows)
Fertilizer Dose : 100:60:30 kg/ha (N:P:K)
Date of sowing : 15th Nov. to 15th Dec.(TS); 25 Dec. to 15 Jan (LS)
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 4 kg per entry

* Final year testing

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

INITIAL VARIETAL TRIAL (2009-10)

Production Condition : RI-MF-TS/LS-TAS

Zone : Southern Hills Zone

No. of Trial Centres : 4

State **No.** **Name of Centres**

Tamilnadu 3 Wellington, Paiyur, Thalawadi

Karnataka 1 Mandya

No. of Varieties including Checks : 14 (12+2)

Contributing Centres **No.** **Name of Varieties**

IARI, RS,Wellington 7 HW 5220, HW 5221, HW 5222, HW 5224, HW 5225,
HW 5226, HW 5227

IARI, New Delhi 4 HD 3072, HD 3073, HD 3074, HD 3075

IARI, Indore 1 HS 527

Checks 2 HW 2044, CoW (W) 1

Experimental Design : R.B.D.

Replication : Four

Plot Size : Gross : 6.00 × 1.38 m (6 rows)
Net : 6.00 × 0.92 m (4 middle rows)

Fertilizer Dose : 100:60:30 kg/ha (N:P:K)

Date of sowing : 15th Nov. to 15th Dec.(TS); 25 Dec. to 15 Jan (LS)

Seed Rate (kg/ha) : 100 kg

Seed Requirement : 3 kg per entry

* Final year testing

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

SPECIAL TRIAL (TRITICALE) (2009-10)

Production Condition : RF-TS/TCL
Zone : Northern Hills Zone

No. of Trial Centres : 4

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
H.P	3	Bajaura, Malan, Dhaulakuan
Karnataka	1	Ranichauri

No. of Varieties including Checks : 10 (8+2)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
PAU, Ludhiana	4	TL 2973, TL 2974, TL 2975, TL 2976
IARI, New Delhi	4	DT 195, DT 196, DT 197, DT 198
Checks	2	VL 804, TL 2942

Experimental Design : R.B.D.
Replication : Four
Plot Size : Gross : 4.00 × 1.38 m (6 rows)
Net : 4.00 × 0.92 m (4 middle rows)
Fertilizer Dose : 40:20:0 kg/ha (N:P:K)
Date of sowing : 15th October to 31 October
Seed Rate (kg/ha) : 100 kg
Seed Requirement : 3 kg per entry
Last Date of Seed Receipt : 25th September, 2009

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

SPECIAL TRIAL (2009-10)
SALINITY/ALKALINITY TOLERANCE VARIETAL TRIAL

Production Condition : IR-TS-TAS

Zone : All Zones

No. of Trial Centres : 10

<u>State</u>	<u>No.</u>	<u>Name of Centres</u>
UP	4	Dalipnagar, Kanpur, Faizabad, Lucknow
Rajasthan	2	Durgapura, Bhilwara
Haryana	3	Hisar, Bawal, Karnal (CSSRI)
Gujarat	1	Bharuch

No. of Varieties including Checks : 15 (11+4)

<u>Contributing Centres</u>	<u>No.</u>	<u>Name of Varieties</u>
Faizabad	1	NW 4098
CSSRI, Karnal	6	KRL 238*, KRL 240*, KRL 249, KRL 250, KRL 273, KRL 283
Durgapura	1	Raj 4188
Hisar	2	WH 1052, WH 1095
DWR, Karnal	1	DBW 73
Checks	4	Kharchia 65, KRL 19, KRL 210(I), KRL 213(I)

Experimental Design : R.B.D.

Replication : Four

Plot Size : Gross : 6.00 x 2.76 m (12 rows)
Net : 6.00 x 2.30 m (10 middle rows)

Fertilizer Dose : NPK: 120:60:30 kg/ka (N:P:K) +10 kg ZnSo₄

Date of sowing : 5th to 20th Nov. (or as recommended in each zone)

Seed Rate (kg/ha) : 125 kg

Seed Requirement : 15 kg per entry

* Final year testing

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

Allocation of breeder seed production during 2009-10

The Directorate has received an indent of 32380.99q breeder seed of 152 wheat and 2495.70q and 31 barley varieties from the Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, Government of India for the production during 2009-10 to meet the breeder seed demand of various states and other public corporations and private companies for the season Rabi 2010-2011. A tentative allocation of this indent is made on the basis of following guidelines.

1. The allocation of breeder seed production for Rabi 2009-10 is made on priority basis to the coordinating centers where effective nucleus seed production programme existing.
2. The quantity of breeder seed to be produced is allocated in consideration with the quantity of nucleus seed produced by the centre as per their BNS-IV (Nucleus Seed Production Report).
3. Preference of allotment is given to the parent institution of the variety subjected to the fulfilment of first two requirements.
4. In a view to minimize the cost of transportation, the indent allocation is preferred to the institute relatively nearer to the indenting agency.

The tentative allocation is presented below for finalization. Any change required at your end may please be communicated for correction;

Production Centre	Variety	Year of release	DAC Indent	Target
ARI, Pune	HD 2189	1980	585.44	100.00
	Lok 1	1982	2677.23	50.00
	MACS 2496	1991	163.00	163.00
	MACS 3125	2003	21.00	21.00
	MACS 6145	2005	2.00	2.00
				336.00
CCS HAU, Hisar	C 306	1969	328.20	20.00
	PBW 343	1996	1936.80	26.00
	Raj 3765	1996	1093.60	30.00
	WH 147	1978	565.00	111.00
	WH 283	1985	88.40	88.40
	WH 416	1990	64.00	64.00
	WH 542	1992	157.00	32.80
	WH 711	2002	1008.40	670.40

Production Centre	Variety	Year of release	DAC Indent	Target
	WH 896	1995	100.00	15.00
	WH 1021	2008	110.20	110.20
	WH 1025	2008	1.20	1.20
				1169.00
	BH-393	2002	86.40	86.40
	BH-75	1985	1.80	1.80
				88.20
CSAUAT, Kanpur	C 306	1969	328.20	50.00
	DBW 14	2002	109.20	30.00
	HD 2329	1985	252.50	5.00
	HD 2643 (Ganga)	1997	311.00	111.00
	HD 2733	2001	507.00	50.00
	HD 2824 (Purva)	2004	151.00	46.00
	HUW 234	1986	79.20	6.00
	HUW 468	1999	368.00	68.00
	K 0307 (Shatabdi)	2007	55.00	50.00
	K 7903 (Halana)	2001	140.00	90.00
	K 8434 (Prasad)	2001	100.00	100.00
	K 9107	1996	102.00	102.00
	K 9162 (Gangotri)	2001	100.00	100.00
	K 9351 (Mandakni)	2006	100.00	100.00
	K 9423 (Unnat Halna)	2005	329.00	329.00
	K 9465 (Gomati)	1998	100.00	100.00
	K 9533 (Naina)	2002	100.00	100.00
	NW 1014	1998	201.00	50.00
	NW 2036	2003	413.70	60.00
	PBW 343	1996	1936.80	250.00
	PBW 373	1997	882.20	100.00
	PBW 443	2000	503.00	203.00
	PBW 502	2003	2170.50	100.00
	Raj 3077	1989	468.00	50.00
	Raj 3765	1996	1093.60	200.00
	UP 2338	1995	441.00	100.00
	UP 2382	1999	275.00	50.00
	UP 2425	1999	459.40	150.00
				2750.00
	K 1149 (Gitanjali)	1997	50.00	50.00
	Jagriti	1985	2.30	2.30
	K 409 (Priti)	2001	61.00	61.00
	K 508 (Pragati)	1998	35.00	35.00
	K 551(Ritambhra)	1998	10.00	10.00
				158.30
CSSRI, Karnal	KRL 19	2000	102.00	25.00

Production Centre	Variety	Year of release	DAC Indent	Target
Dr. PDKV, Akpla	HD 2189	1980	585.44	50.00
DSR, Mau	HD 2733	2001	507.00	30.00
	Raj 3765	1996	1093.60	50.00
	Raj 3777	2006		60.00
				140.00
DWR, Karnal	CBW 38	2009	2.00	2.00
	DBW 14	2002	109.20	20.00
	DBW 16	2006	202.20	102.20
	DBW 17	2006	948.00	598.00
				722.20
	DWR-28	2002	0.60	0.60
GBPUAT, Pantnagar	DBW 16	2006	202.20	100.00
	DBW 17	2006	948.00	250.00
	DL 153-2 (Kundan)	1985	52.00	5.00
	HD 2329	1985	252.50	5.00
	HD 2687	1999	260.00	130.00
	HD 2733	2001	507.00	105.00
	HD 2851 (Pusa Vishesh)	2005	244.40	50.00
	HS 365	1998	20.00	15.00
	PBW 226	1989	40.00	10.00
	PBW 343	1996	1936.80	210.00
	PBW 373	1997	882.20	284.60
	PBW 502	2003	2170.50	650.00
	PBW 550	2008	944.00	77.80
	Pusa Gold (WR 544)	2005	108.80	20.00
	Raj 3765	1996	1093.60	213.20
	Sonalika	1969	120.50	64.00
	UP 262	1978	136.40	121.90
	UP 1109	1987	4.40	4.40
	UP 2338	1995	441.00	243.80
	UP 2382	1999	275.00	175.00
	UP 2425	1999	459.40	100.00
	UP 2526	2007	12.00	12.00
	UP 2554	2007	14.00	14.00
	UP 2565	2006	13.00	11.00
	UP 2572	2007	96.80	96.80
	WH 542	1992	157.00	85.20
	WH 711	2002	1008.40	200.00
				3253.70
HPKVV, Palampur	HPW 42 (Aradhana)	1992	2.00	2.00
	HPW 89 (Surbhi)	1998	5.00	5.00
	HPW 147 (Palam)	2004	10.00	10.00
	HPW 155 (Onkar)	2006	10.00	10.00

Production Centre	Variety	Year of release	DAC Indent	Target
	HPW 184 (Chandrika)	2005	10.00	10.00
	HPW 251	2008	7.00	7.00
	HS 240	1989	10.00	5.00
	HS 295	1992	53.00	48.00
	Raj 3765	1996	1093.60	50.00
	Raj 3777	2006	643.60	25.00
	Raj 4037	2004	715.00	49.00
	VL 738	1997	49.00	25.00
	VL 829	2003	48.00	16.00
				262.00
	Dolma	1982	0.10	0.10
	Sonu (HBL 87)	1982	0.30	0.30
	HBL 316	1995	0.70	0.70
				1.10
IARI, Indore	DL 788-2 (Vidisha)	1997	97.00	97.00
	HD 4672 (Malav Ratna)	2000	113.00	113.00
	HI 1418	2000	248.00	248.00
	HI 1500 (Amrita)	2003	286.00	286.00
	HI 1544	2008	65.00	65.00
	HI 8381 (Malav Shree)	1995	2.00	2.00
	HI 8498 (Malav Shakti)	1999	552.00	547.00
	HI 8627 (Malav Kirti)	2007	4.00	4.00
	HW 2004 (Amar)	1997	352.00	352.00
				1714.00
IARI, Karnal	HD 2733	2001	507.00	186.00
	HS 365	1998	20.00	5.00
	HD 2285	1984	74.20	74.20
	HD 2329	1985	252.50	142.50
	HD 2851 (Pusa Vishesh)	2005	244.40	175.40
	HD 2894	2008	164.60	114.60
	HD 2932 (Pusa Wheat 111)	2008	102.00	32.00
	HS 240	1989	10.00	5.00
	HS 277	1992	5.00	5.00
	HS 295	1992	53.00	5.00
	HS 420 (Shivalik)	2002	5.00	5.00
	Pusa Gold (WR 544)	2005	108.80	43.80
	HD 2687	1999	260.00	130.00
				923.50
IARI, New Delhi	HD 2380	1989	11.00	11.00
	HD 2781 (Aditya)	2002	2.00	2.00
	HD 2851 (Pusa Vishesh)	2005	244.40	19.00
	HD 2894	2008	164.60	50.00
	HD 2932 (Pusa Wheat 111)	2008	102.00	50.00

Production Centre	Variety	Year of release	DAC Indent	Target
	HD 2329	1985	252.50	20.00
	HD 2733	2001	507.00	26.00
				178.00
IARI, Pusa	DBW 14	2002	109.20	29.20
	HD 2643 (Ganga)	1997	311.00	200.00
	HD 2733	2001	507.00	30.00
	HD 2824 (Purva)	2004	151.00	105.00
	HD 2888 (Pusa Wheat 107)	2006	19.50	19.50
	HP 1633 (Sonali)	1992	4.50	4.50
	HP 1731 (Raj Laxmi)	1995	3.00	3.00
	HW 2045 (Kaushambi)	2002	18.00	18.00
	NW 2036	2003	413.70	103.70
	PBW 343	1996	1936.80	30.00
	PBW 373	1997	882.20	60.00
	Pusa Gold (WR 544)	2005	108.80	25.00
				627.90
IARI, Wellington	HD 2833 (Pusa Wheat 105)	2006	4.00	4.00
IGAU, Raipur	DL 803-3 (Kanchan)	1995	27.00	27.00
	GW 273	1998	1260.30	19.00
	Lok 1	1982	2677.23	50.00
	HI 617 (Sujata)	1982	241.00	41.00
				137.00
JAU, Junagarh	GW 366	2007	418.00	101.00
JNKVV, Jabalpur	C 306	1969	328.20	142.00
	GW 273	1998	1260.30	914.50
	GW 322	2002	1159.48	925.00
	GW 366	2007	418.00	92.00
	HD 2864 (Urja)	2005	125.00	61.00
	HD 2932 (Pusa Wheat 111)	2008	102.00	20.00
	JW 1106 (Sudha)	2003	44.00	44.00
	JW 3020	2005	129.00	129.00
	JWS 17(Swapnil)	1997	61.00	61.00
	Lok 1	1982	2677.23	608.00
	MP 1142 (Snehil)	2007	80.00	80.00
	HI 617 (Sujata)	1982	241.00	190.00
	WH 147	1978	565.00	254.00
	MP 1203	2009	5.00	5.00
				3525.50
	JB 58	2005	2.00	2.00
Lok Bharti, Sanasora	Lok 1	1982	2677.23	757.23
MPKV, Niphad	HD 2189	1980	585.44	320.00
	NIAW 301 (Trimbak)	2002	20.00	20.00
	NIAW 917 (Tapovan)	1973	5.00	5.00

Production Centre	Variety	Year of release	DAC Indent	Target
	NIDW 15 (Panchwati)	2005	5.00	5.00
	NIDW 295 (Godavari)	2007	4.00	4.00
				354.00
MPUA&T, Kota	C 306	1969	328.20	116.20
	GW 173	1994	228.00	6.00
	GW 273	1998	1260.30	100.00
	GW 322	2002	1159.48	54.48
	GW 496	1990	529.44	179.44
	HI 8498 (Malav Shakti)	1999	552.00	5.00
	Lok 1	1982	2677.23	606.00
	PBW 343	1996	1936.80	100.00
	Raj 1482	1983	419.80	319.80
	Raj 3077	1989	468.00	226.00
	Raj 3765	1996	1093.60	335.40
	Raj 3777	2006	643.60	388.60
	Raj 4037	2004	715.00	356.00
	Raj 4120	2009	5.00	5.00
	HI 617 (Sujata)	1982	241.00	10.00
	UP 2338	1995	441.00	97.20
	WH 147	1978	565.00	200.00
				3198.32
NDUAT, Faizabad	DBW 14	2002	109.20	30.00
	DL 153-2 (Kundan)	1985	52.00	47.00
	HD 2329	1985	252.50	80.00
	HD 2733	2001	507.00	50.00
	HUW 234	1986	79.20	20.00
	K 0307 (Shatabdi)	2007	55.00	5.00
	K 7903 (Halana)	2001	140.00	50.00
	NW 1012	1998	206.00	206.00
	NW 1014	1998	201.00	151.00
	NW 1067	2005	2.00	2.00
	NW 2036	2003	413.70	250.00
	PBW 154	1988	156.80	119.40
	PBW 343	1996	1936.80	250.00
	PBW 373	1997	882.20	100.00
	PBW 443	2000	503.00	150.00
	PBW 502	2003	2170.50	250.00
	Raj 3077	1989	468.00	40.00
	Sonalika	1969	120.50	56.50
	UP 2382	1999	275.00	50.00
	UP 2425	1999	459.40	30.00
	UP 262	1978	136.40	14.50
				1951.40

Production Centre	Variety	Year of release	DAC Indent	Target
	NDB 209 (N. Barley-1)	2001	52.00	52.00
	NDB 940 (N. Barley-2)	2001	83.00	83.00
	NDB 1020 (N. Barley-3)	2002	52.00	52.00
				187.00
PAU, Ludhiana	DBW 17	2006	948.00	100.00
	PBW 154	1988	156.80	37.40
	PBW 175	1989	4.40	4.40
	PBW 226	1989	40.00	20.00
	PBW 299	1993	10.40	10.40
	PBW 343	1996	1936.80	852.60
	PBW 373	1997	882.20	331.60
	PBW 396	2000	359.50	150.00
	PBW 443	2000	503.00	150.00
	PBW 502	2003	2170.50	920.50
	PBW 509	2005	696.40	270.60
	PBW 527	2003	7.80	7.80
	PBW 533	2006	254.00	54.00
	PBW 550	2008	944.00	866.20
	PBW 590	2009	5.00	5.00
	PBW 596	2009	5.00	5.00
	PDW 274	2003	0.80	0.80
	PDW 291	2005	2.80	2.80
	WH 542	1992	157.00	39.00
				3828.10
	PL-172	1987	62.15	62.15
	PL-426	1996	140.70	140.70
	PL-751	2007	31.25	31.25
				234.10
RAU, Bikaner	PBW 343	1996	1936.80	50.00
	PBW 502	2003	2170.50	240.00
	Raj 1482	1983	419.80	100.00
	Raj 3077	1989	468.00	147.00
	Raj 3765	1996	1093.60	200.00
	Raj 3777	2006	643.60	170.00
	Raj 4037	2004	715.00	310.00
	Raj 4083	2007	2.00	2.00
	Raj 6560	2005	405.00	250.00
				1469.00
	RD 2035	1994	521.00	521.00
	RD 2052	1991	141.20	141.20
	RD 2503	1997	10.60	10.60
	RD 2508	1997	2.80	2.80
	RD 2552	2000	418.10	418.10

Production Centre	Variety	Year of release	DAC Indent	Target
	RD 2592	2004	250.00	250.00
	RD 2624	2005	50.00	50.00
	RD 2660	2006	153.00	153.00
	RD 2668	2007	179.50	179.50
				1726.20
SDAU, Vijapur	GW 173	1994	228.00	222.00
	GW 190	1994	5.00	5.00
	GW 273	1998	1260.30	226.80
	GW 322	2002	1159.48	180.00
	GW 366	2007	418.00	225.00
	GW 496	1990	529.44	350.00
	GW 1139	2001	4.00	4.00
	Lok 1	1982	2677.23	206.00
				1418.80
SFCI, N. Delhi	HUW 510	2001	362.00	362.00
	HUW 234	1986	79.20	53.20
	HUW 468	1999	368.00	300.00
	Pusa Gold (WR 544)	2005	108.80	20.00
	VL 892	2008	33.00	5.00
	HD 2864 (Urja)	2005	125.00	64.00
	HD 4713	2008	78.20	78.20
	MP 4010	2003	97.00	97.00
	VL 616	1986	43.00	20.00
	VL 804	2002	45.00	20.00
	VL 829	2003	48.00	10.00
				1029.40
SKUA&T, Chatha (Jammu)	PBW 175	1989	4.40	4.00
	PBW 343	1996	1936.80	35.00
	PBW 373	1997	882.20	6.00
	PBW 502	2003	2170.50	10.00
	PBW 509	2005	696.40	20.00
	Raj 3077	1989	468.00	5.00
	Raj 3765	1996	1093.60	15.00
				95.00
SKUA&T, Srinagar	SKW 196 (Shalimar Wheat)	2005	5.00	5.00
	VL 738	1997	49.00	1.00
	VL 804	2002	45.00	1.00
	VL 829	2003	48.00	1.00
	VL 832	2004	1.00	1.00
				9.00
SVPUA&T, Meerut	HD 2733	2001	507.00	30.00
	PBW 226	1989	40.00	10.00
	PBW 343	1996	1936.80	40.00

Production Centre	Variety	Year of release	DAC Indent	Target
	PBW 373	1997	882.20	30.00
	Raj 3765	1996	1093.60	50.00
	UP 2565	2006	13.00	2.00
	WH 711	2002	1008.40	40.00
				202.00
UAS, Dharwad	DWR 162	1993	79.50	79.50
	DWR 195	1995	19.50	19.50
	DDK 1025	2006	2.00	2.00
	DDK 1029	2007	2.00	2.00
	DDK 1066	2007	2.00	2.00
	HD 2189	1980	585.44	115.44
	Lok 1	1982	2677.23	400.00
				620.44
VPKAS, Almora	VL 616	1986	43.00	23.00
	VL 738	1997	49.00	23.00
	VL 802	2005	35.00	35.00
	VL 804	2002	45.00	24.00
	VL 829	2003	48.00	21.00
	VL 892	2008	33.00	28.00
				154.00
	VL 56	2005	5.00	5.00
WHEAT			32280.99	31005.49
BARLEY			2495.70	2464.50

Wheat Physiology Programme

1. Multilocation Heat Tolerance Trial

Same trial conducted in 2007-08 will be repeated at 7 centres during 2009-10:

Centres : Hisar, Karnal, Sagar, Kanpur, Faizabad, Niphad and Pantnagar
Genotypes : 36
Replications: 2
Design: Lattice square
Time of Sowing : Timely (mid Nov.) and Late (mid Dec.)
Plot Size : 6 rows with row length of 2 m spaced at 23 cm

Observation to be recorded

1. Germination (%)
2. Days to heading
3. Days to anthesis
4. Days to maturity
5. Productive tillers/metre
6. Grain no./spike
7. Grain weight/spike
8. Test weight (g)
9. Grain yield/plot (g)

Physiological parameters to be recorded (Emphasis to be given for these traits)

- i) CTD
- ii) Chlorophyll fluorescence
- iii) Chlorophyll content

2. Drought And Heat Tolerance Screening Nursery (DHTSN)

DHTSN will be constituted with 36 genotypes

Replications : 2
No. of rows: 2
Row length: 2m
Spacing: 30cm
Centres: 11 (Bardoli, Dharwad, Hisar, Kanpur, Karnal, Kota, Pune, Sagar, Indore, Coochbehar, Ranchi)
Sowing : Mid Nov.

Observations to be recorded

Main observations	Additional observations may be recorded
Germination (%)	Soil moisture content at sowing, heading and maturity
Days to heading	Excised leaf water loss at 15 days after heading
Days to anthesis	
Days to maturity	
Productive tillers/metre	
Test weight (g)	
Grain yield/plot (g)	

Crop Protection Work Planning Meeting

August 29, 2009

Chairman : Dr. AK Sharma
Co-Chairman : Dr. M Prashar
Rapporteurs: Dr. MS Saharan
Dr. AK Singh
Dr. KS Babu

At the outset, Chairman Dr. AK Sharma extended welcome to all the participants for joining important session for formulating the programme of work (2009-10). Dr. Sharma appreciated the co-operators for executing the programme of work (2008-09) successfully. The programme for the crop season 2008 – 09 was discussed and the needful changes in the programme were made to make it more effective. Chairman emphasized the importance of host resistance in wheat improvement in India. Following decisions were taken to revise the technical programme for 2009-10 crop season. The experiments on Adult Plant Resistance (APR) for rusts and other diseases (IPPSN, PPSN, EPPSN) will be continued. APR (race specific), slow rusting and postulation of rust resistance genes will be continued. For APR (race specific), the group felt the use of following yellow, leaf and stem rusts pathotypes for evaluation.

Leaf rust: 77-5 and 104-2

Yellow rust: 46S119 and 78S84

Stem rust: 40A, 117-6

Discussion was held for use of rust pathotypes for screening of IPPSN, PPSN nurseries at all co-operating centres. It was suggested that DWR Regional Station, Flowerdale (Shimla) and Mahabaleshwar centres will provide the same pathotypes during 2009-10 crop season to all co-operating centres. It was decided to include the following pathotypes in the inoculum supplied for evaluation of IPPSN and PPSN nurseries.

Leaf rust: 77-2, 77-5, 12-2 and 104-2

Yellow rust: 46S119 and 78S84

Stem rust: 11, 40A, 42, 122 and 117-6

For proper screening for stripe rust in IPPSN and PPSN nurseries, Chairman suggested to include PBW 343 in the infectors due to its susceptibility to new stripe rust pathotype, 78S84. Keeping in view the threat of stem rust race Ug99 (not present yet in India), it was felt to evaluate the identified sources of resistance meant for contribution to NGSN at Ethiopia / Kenya.

Identification of slow rusters in AVT lines based on Area Under Disease Progress Curve (AUDPC) will continue for yellow, stem and leaf rusts. For leaf blight screening, it was emphasized that the recording should be made in double-digit scale at three growth stages, viz. Flowering, dough and hard dough stages. The trial for monitoring and management of seedling rot problem in early sown wheat crop will be conducted this year also at Karnal, Ludhiana and Pantnagar in NWPZ and under normal sown conditions at Varanasi, Faizabad, Pusa and Coochbehar in NEPZ. Disease screening nurseries for leaf blight, Karnal bunt, loose smut, powdery mildew, head scab, flag smut, foot rot and hill bunt will be

continued. Basic studies on leaf blight will also be conducted at Karnal, Faizabad, Varanasi and Delhi centres.

Dr. Sharma emphasized the importance of crop health monitoring and dissemination of information on crop health through Wheat Crop Health Newsletter. Experiment on assessment of losses due to powdery mildew disease will be conducted in 2009-2010 crop season also at same locations. Looking into the appearance of yellow rust in PBW 343 in severe form at few locations in Jammu, Punjab and Haryana and the potential threat of stem rust race Ug99, the group felt the need of management of wheat rusts through chemical fungicides as a contingent plan. Thus, experiments on chemical management of yellow rust (4 centres in NWPZ-Karnal, Ludhiana, Bajaura, Pantnagar) and stem rust (3 centres in PZ-Mahabaleshwar, Niphad, Dharwad) will be conducted this year. Experiment on biological control of flag smut conducted at Hisar and Durgapura centres during 2008-09 was discussed. Dr. DV Singh, former Head, Department of Plant Pathology, IARI, New Delhi suggested the alternative approach like use of botanicals and role of cultural practices for reducing the flag smut inoculum in soil for managing the disease effectively. It was decided to conduct the experiment on flag smut management with above alternative approached at Durgapura centre during 2009-10 crop season.

Teams of plant protection scientists were constituted for effective monitoring of crop health with special focus on rusts (Yellow, leaf and stem rust) as well as rusts data recording in PPSN at various centres in NWPZ. All the centres associated with the crop protection programme will supply the information on crop health to the PI (CP), fortnightly during the crop season for compiling Wheat Crop Health Newsletter.

In view of the zero tillage spreading on a large scale, the pest situation will be monitored at Karnal, Pantnagar, Coochbehar, Kanpur and Faizabad. Other experiments on IPM will continue with need based changes in treatments.

Programme of work for Entomology for the coming 2009-10-crop season was also finalized. The following were the salient changes made for testing during the ensuing crop season 2009 – 10.

For screening against root aphid, Ludhiana centre was added in addition to the existing centres. It was decided that the sowing time for different pest should synchronize with their peak activity and uniform sowing time should be followed at all the centres for a particular pest. The dosage of biofenthrin 10EC was increased from 0.3 to 0.5 g . a.i. / kg seed and carbosulfan 2DS from 0.5 to 1.0 g.a.i/kg seed in the experiment on seed treatment for management of termites. An experiment on use of granular formulations of fipronil for the management of termites was planned where the seed treatment was not necessary. For screening of AVTs against storage pests, Ludhiana and Karnal were added in addition to the existing centres.

Programme of work for Nematology for the coming 2009-10 crop season was also finalized.

During 2009-10 crop season, biochemical studies of *M. graminicola* population of Pusa (Bihar) and Ludhiana will be done at Delhi centre. Cereal Cyst Nematode Host Differential Nursery and Soil Borne Pathogen Spring Wheat Nursery, supplied by CIMMYT, Turkey will be evaluated at Ludhiana, Delhi, Hisar, Karnal and Delhi centres.

Programme of work finalized is presented below:

Programme of Work 2009-10

The programme for the crop year 2009-10 was chalked out in the 48th All India Wheat and Barley Research Workers Meet held at IARI, New Delhi during August, 28-31, 2009. The various activities to be executed at respective centres are given below:

Programme 1: Host Resistance: IPPSN and PPSN

Adult Plant Resistance for rusts & other diseases

i. Initial Plant Pathological Screening Nursery (IPPSN)

Objectives

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

(a) Rusts:

North:

Leaf Rust: Delhi, Hisar, Karnal, Durgapura, Ludhiana (5)

Yellow Rust: Gurdaspur, Dhaulakuan, Malan, Karnal, Durgapura, Ludhiana (6)

South: No. of Centres, 5

Stem Rust + Leaf Rust: Mahabaleshwar, Wellington, Powarkheda, Niphad and Indore

(b) Leaf Blight: No. of centres: 6

Faizabad, Pusa (Bihar), Varanasi, Kalyani, Ranchi and Coochbehar

ii. Plant Pathological Screening Nursery (PPSN)

Objectives

Promotion of entries from one stage to the other in the coordinated trials and identification of varieties after AVT level on the basis of their level of disease resistance.

Rusts:

North:

Yellow Rust: Dhaulakuan, Gurdaspur, Malan, Bajaura, Karnal, Ludhiana, Pantnagar, Durgapura (8)

Leaf Rust : Delhi, Hisar, Jammu, Kanpur, Karnal, Ludhiana, Pantnagar, Durgapura (8)

South: No. of Centres, 9

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

Note: The samples of leaves of AVT IInd year entries in PPSN showing rust severity of 40S or more at any of the centres, should be sent immediately to R.S. Flowerdale, Shimla for pathotype analysis, with information to P.I. (Crop Protection).

Monitoring of PPSN

A team of Plant Pathologists was constituted during the work-planning meeting for effective monitoring and data recording in PPSN at various locations in NWPZ. The team consists of Dr. MS Saharan (DWR, Karnal), Dr. UD Singh (IARI, New Delhi), Dr. MK Pandey (SKUAST-Jammu) and Dr. Dhanbir Singh (Dhaulakuan). The team will visit the centres in NWPZ during the middle of March, 2010. The visit will be coordinated by P.I. (Crop Protection).

iii AUDPC based identification of slow rusters in AVT material:

Leaf and yellow rusts - DWR, Karnal; stem and leaf rusts – Mahabaleshwar; stem rust - Indore; Yellow rust – Ludhiana.

Programme 2: Rusts (Brown, Yellow and Black)

A. APR : Race specific and slow rusting

- i. **Leaf rust** : New Delhi (Dr. JB Sharma) and Ludhiana (Dr. Indu Sharma) under field conditions and Flowerdale (under controlled conditions); AVT entries of NWPZ, NHZ and NEPZ, along with the check entries of the respective zones.
- ii. **Stem rust** : Indore, Pune and Mahabaleshwar; AVT of CZ and PZ, along with the check varieties of the respective zone.
- iii. **Yellow rust**: Ludhiana (Dr. Indu Sharma), N. Delhi (Dr. UD Singh) and Karnal (DWR) under field conditions and Flowerdale (under controlled condition), AVT entries of NWPZ and NHZ along with the checks of the respective zones.

Race inoculum to be supplied by Flowerdale with intimation to the P.I. (Crop Protection). Races should be the same for all the respective centres.

- (i) Leaf rust: 77-5 and 104-2
- (ii) Yellow rust: 46S119 and 78S84
- (iii) Stem rust: 40A and 117-6

B. Seedling Resistance Tests and postulation of Rust Resistance Genes

- i. **Leaf, Stem and Yellow rusts (All races)**: DWR, Regional Station, Flowerdale, Shimla for AVT's (aestivum) entries. Flowerdale centre 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.
- ii **Stem and Leaf rusts** : Mahabaleshwar for SRT on AVT entries of CZ, PZ and NIVT, durum entries.

Programme 3 : Leaf Blight

- i. **Leaf Blight Screening Nursery (LBSN)**: No. of Centres : 16
This nursery will consist of earlier identified resistant materials as well as the AVT's and special trials.

NWPZ: Pantnagar, Ludhiana, Karnal, Kaul and Hisar.
NEPZ: Varanasi, Faizabad, IARI Pusa, Coochbehar, Shillongani, Ranchi and Kalyani.
PZ: Dharwad
NHZ: Almora
SHZ: Wellington

- ii. **Monitoring of seedling mortality due to seed and soilborne diseases in early sown crop of wheat and its management using seed treatment:** The seedborne and soil borne infection of *B. sorokiniana* and other pathogens will be monitored in early sown crop and managed using seed treatment.
Centres: NWPZ :Karnal, Ludhiana, Pantnagar
NEPZ: Varanasi, Faizabad, Pusa and Coochbehar
- iii. **Basic studies on foliar blights:** These will be undertaken at Karnal, Faizabad, Varanasi and Delhi.

Programme 4: Karnal Bunt

- i. **Karnal Bunt Screening Nursery (KBSN):** This nursery will consist of the earlier identified resistant materials and the AVT-II year entries of 2009-10. These evaluations will be done under artificially inoculated conditions.
No. of Centres, 7
Dhaulakuan, Ludhiana, Delhi, Pantnagar, Hisar, Karnal and Jammu.
Karnal will also evaluate AVT-Ist year entries. Ludhiana and Dhaulakuan will evaluate AVT-I and NIVT entries also.
- ii. **Basic studies in Karnal bunt:** Ludhiana and Karnal

Programme 5: Loose Smut

- i. **Loose Smut Screening Nursery:** It will contain resistant materials identified in the past and AVT Ist year entries.
Centres: Ludhiana, Almora, Durgapura and Hisar.

Programme 6: Powdery Mildew

- i. **Powdery Mildew Screening Nursery:** No. of Centres , 10
Almora, Pantnagar, Ranichauri, Shimla, Malan, Bajaura, Dhaulakuan, Majhera (Pantnagar), Wellington and Kaul.

Programme 7: Region Specific Diseases

Disease Screening Nurseries of the region specific diseases will include resistant materials identified during the past, along with AVT entries at the locations given below:

- i. **Head scab:** Karnal, Ludhiana and Dhaulakuan (AVT). At Gurdaspur, evaluation for head scab will be done under natural conditions. Basic studies will be done at Karnal.
- ii. **Flag smut:** Ludhiana, Hisar and Durgapura.
- iii. **Foot rot:** Sagar and Dharwad.
- iv. **Hill bunt:** Malan, Bajaura and Almora.

Programme 8: Crop Health

- i **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 2009 till the harvest of crop.
'Wheat Crop Health Newsletter' will be issued on monthly basis from DWR, Karnal, during the crop season.

Monitoring of new virulences of rusts in NWPZ by specially constituted teams:

Specially constituted teams will visit the areas as per the schedules given below for effective monitoring of crop health in general and appearance and spread of yellow rust in particular, along the areas near the western border in NWPZ.

Team 1: 1st Week of January 2010 (Dr. SC Bhardwaj, Dr. R Devlash, Dr. (Mrs.) Indu Sharma)

Team 2: 1st week of February, 2010 (Dr. MS Saharan, Dr. SS Karwasara, Dr. Madhu Meeta)

Team 3: Last week of Feb./1st Week of March, 2010 (Dr. AK Sharma, Dr. M Prashar, Dr. MK Pandey). Visit will be arranged as per need).

Teams will cover the following areas: Ropar, Hoshiarpur, Mukerian, Pathankote, RS Pura, Gurdaspur, Dera Baba Nanak, Ajnala, Attari, Harike, Ferozepur, Fazilka, Abohar and Sri Ganganagar. The visit will be coordinated by P.I.(Crop Protection). The exact dates will be decided depending upon the weather conditions.

Monitoring the pathotype distribution of rust pathogens: It will be undertaken by DWR, Regional Station, Flowerdale, Shimla (all three rusts from all zones) and Rust Research Station, Mahabaleshwar (brown and black rust from CZ and PZ)

All the cooperating centres are required to send the rust infected samples (natural infection) for pathotype analysis to the concerned centres.

Wheat Disease Trap Plot Nursery, TPN (To be co-ordinated by Flowerdale, Shimla): TPN will be planted at 35 locations. Samples from this nursery be sent regularly to R.S. Flowerdale, Shimla for virulence analysis and information.

Off-season TPN (To be coordinated by DWR Reg. Station, Flowerdale): This nursery will be planted in Dalang Maidan, Kukumseri, Sangla, Sarahan (HP) and Leh (J&K). High altitude varieties and one hulless barley variety will also be included in this nursery.

SAARC- Nursery (To be co ordinated 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.

Monitoring of Karnal bunt and blackpoint 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, Vijapur, Jabalpur) and PZ (Pune, Niphad and Dharwad) may also supply grain samples to DWR Karnal for analysis.

Monitoring of Mealy bug on wheat in cotton-wheat system: Survey will also be conducted to monitor the situation of mealy bug in wheat under cotton-wheat system.

Monitoring of Nematodes: *Anguina tritici*: Pusa (Bihar), Hisar, Ludhiana, Karnal, Jammu and Durgapura centres.

CCN: Durgapura, Delhi, Hisar, Karnal and Ludhiana centers.

Soil-borne nematodes: Surveys will be conducted in Bihar (RAU, Pusa center), parts of NWPZ (Karnal), parts of Rajasthan (Durgapura center), southern Haryana (Hisar Centre), Chatta (Jammu), Delhi and Punjab (Ludhiana Centre).

Programme 9: IPM in Wheat

A. Genetical (Host Resistance)

(a) Elite Plant Pathological Screening Nursery (EPPSN) :

North: No. of Centres, 8

Delhi, Karnal, Ludhiana, Pantnagar, Durgapura, Hisar, Almora and Ranichauri.

South: No. of Centres, 4

Wellington, Mahabaleshwar, Dharwad and Indore.

(b) Multiple Disease Screening Nursery (MDSN): It will be subjected to artificial epiphytotics as detailed below:-

(i) Diseases

North: No. of Centres, 14

Yellow rust: Karnal, Ludhiana, Dhaulakuan, Pantnagar

Brown rust: Karnal, Ludhiana, Delhi

Karnal Bunt: Karnal, Ludhiana, Dhaulakuan

Powdery mildew: Dhaulakuan, Almora, Pantnagar, Kaul, Udheywala

Foliar blights: Kaul, Faizabad, Varanasi, Coochbehar

Loose smut: Hisar, Durgapura, Almora, Ludhiana

Flag smut: Hisar, Durgapura, Ludhiana

South: No. of Centres, 3

Leaf and Stem rust: Mahabaleshwar, Indore and Wellington

(ii) Nematodes (CCN) : Durgapura, Hisar, Ludhiana

(c) **Contribution to NGSN:** The resistant entries to major diseases identified after multilocation & over years of testing will be contributed to NGSN for the use of breeders in crossing programme. (Centre : Karnal)

B. Management of Flag Smut Through Alternative Approaches

(a) Studies on management of flag smut through alternative approaches will be carried out at Durgapura.

(b) **Chemical control of wheat rusts**

Yellow Rust : Karnal, Ludhiana, Bajaura, Pantnagar

Stem rust : Mahabaleshwar, Niphad, Dharwad)

(c) **Chemical control of powdery mildew and assessment losses**

Centres: Pantnagar, Dhaulakuan, Karnal, Ludhiana, Malan and Jammu.

C. Systems Based Research

(i) **Population dynamics of nematodes:**

Rice-Wheat: Ludhiana, Karnal, Pusa (Bihar) and Chatta (Jammu)

Cotton-Wheat: Hisar and Ludhiana

Maize-Wheat : Chatta (Jammu)

Bajra-Wheat : Durgapura and Hisar

Groundnut-Wheat : Durgapura

Til-wheat : Pusa (Bihar)

- (ii) **Evaluation of ecofriendly approaches in management of CCN**
Hisar (in pot), Ludhiana (in pot) and Durgapura (in field)

- (b) **Development of IPM module for management of wheat crop health problems: Centres: Niphad, Kanpur, Faizabad, Varanasi and Karnal**

This trial will involve management of diseases and insect pests problems through host resistance, biocontrol agents and judicious use of chemicals. This will be taken under farmers' fields at Karnal and other cooperating centres.

- (c) **Tillage options and Pest situation**

(i) Monitoring of diseases, insects and nematodes under new tillage options in rice-wheat system at farmers' fields (Centres : Karnal, Coochbehar, Ludhiana and Faizabad).

(ii) Plant parasitic nematode including CCN and *M. graminicola* studies in different tillage systems at Ludhiana.

Programme 10: Resistance Against Nematodes :

- a. *Heterodera avenae*: Screening of entries of AVT-I and AVT-II year at Durgapura, Hisar, Ludhiana, Delhi and Karnal.
- b. Screening against *M. graminicola* of AVT entries of NWPZ and NEPZ at Pusa (Bihar) and Ludhiana.
- c. Biochemical studies of *M. graminicola* population of Pusa and Ludhiana will be done at Delhi.
- d. Cereal Cyst Nematode Host Differential Nursery and Soil Borne Pathogen Spring Wheat Nursery, supplied by CIMMYT, Turkey will be evaluated at Ludhiana, Delhi, Hisar, Karnal and Delhi centres.

Wheat Entomology

(A) Host Plant Resistance

- EXPT.1. Entomological Screening Nursery For
- (a) Shoot fly (Durgapura, Dharwad, Kanpur and Ludhiana).
 - (b) Brown wheat mite (Durgapura, Niphad, Kanpur and Ludhiana).
 - (c) Wheat Aphids (Niphad, Ludhiana, Shillongani, Karnal, and Jammu).
 - (d) Root aphid (Entkhedi, Ludhiana and Karnal).
- EXPT.2 Multiple Pest Screening Nursery
- (a) Shootfly (Dharwad, Durgapura, Ludhiana and Kanpur)
 - (b) Brown mite (Durgapura and Ludhiana)
 - (c) Foliar aphids (Ludhiana, Karnal, Kanpur and Niphad)
 - (d) Root aphid (Entkhedi, Ludhiana and Karnal)

(B) Chemical Control

- EXPT.3 Effect of insecticidal seed treatment on germination, termite damage and yield (Centres: Niphad, Durgapura, Kanpur, Ludhiana, Jammu and Vijapur).
- EXPT.4 Eco-friendly management of termites through biorationals (Centre: Vijapur only).
- EXPT.5 Chemical control of foliage feeding wheat aphids (Centres: Niphad, Ludhiana, Pantnagar, Karnal, Jammu and Kanpur).
- EXPT. 6 Biorationals for the management of foliage feeding aphids (Centres: Niphad, Ludhiana, Pantnagar and Karnal).

(C) Integrated Pest Management

- EXPT.7 Survey of pests infesting wheat and their natural enemies (All centres).
- EXPT.8 Basic studies for development of IPM strategies
- (a) Pest modeling for Foliage aphids (Niphad, Ludhiana, Karnal and Pantnagar)
 - (b) Brown mite (Durgapura)
 - (c) Root aphid (Powarkheda/Entkhedi)
 - (d) Shootfly (Kanpur)

(D) Stored Grain Pests

- EXPT.9 Identification of newer sources of resistance to major stored grain insect pests (Pantnagar, Karnal and Ludhiana).

Crop Protection

Recommendations

Promising genotypes possessing multiple disease resistance are enlisted below:

I. Resistant to three rusts +

MR to Leaf Blight (LB) + R to Karnal bunt (KB)+ Flag smut (FS): **VL 912.**

R to Karnal bunt (KB)+ Flag smut (FS)+ Powdery mildew (Pm):**HPW 285, HW 2308.**

R to FS and Pm: **TL 2955 (T).**

HR (infection 0.0%) to KB)+FS: **UAS 414 (d)**

R to KB+ FS: **HS 471, UP 2719. DDW 11 (d), HI 8672 (d), GW 385,**

II. Resistant to leaf and stem rusts +

R to FS and Pm: **MACS 2980 (dic.), DDK 1033 (dic.)**

R to KB+ FS: **HW 3094.**

III. Resistant to stem and stripe rusts+

R to KB+ FS: **HPW 267, VL 895.**

IV. Resistant to leaf and stripe rusts+

R to KB+ FS: **RAJ 4130, NIAW 1188.**

V. Resistant to rusts and loose smut: (Highest loose smut infection up to 5.0%): **HW 5202, TL 2945 (T).**

VI. Resistant to stem and leaf rusts + loose smut: MACS 2963 (dic), MACS 2971 (dic), DDK 1031 (dic), DDK 1032 (dic), HW 1095 (dic), HW 5305 (dic), WHD 938 (d),

VII. Resistant to all Three Rusts+

+ Root aphids (RA): **VL 898, HW 5030, Raj 4101**

+Flag smut (FS)+RA: **HS 493**

+ Leaf blight (LB)+RA: **VL 912**

+Karnal bunt (KB)+FS+RA: **DDW 11**

+ Shoot Fly (SF): **HW 5207, HW 5209**

VIII. Resistant to Stem and Leaf Rusts+

+RA: **KRL 210**

+LB+RA: **MP 1194**

+KB+RA: **DBW 32, KRL 213, MP 1200**

+FS+RA: **Raj 4119, PBW 573, HW 5104, HW 5103, PBW 587**

+ SF: **DBW 32, MACS 3598**

+Brown wheat mite (BWM): **HW 2308, HD 2957, Raj 4119, HD 2956**

+BWM+MR to FA: **HW 3094, MACS 3598**

IX. Resistant to Leaf and Stripe Rusts+

KB+FS+RA: **MPO 1204**

2. It is again emphasized that for resistance against yellow rust, resistant genetic stocks like FLW 10, FLW 16, FLW 17, FLW 18 and FLW 2 carrying *Yr5*, *Yr10*, *Yr32* in the background of WH 542 and UP 2338 and *Lr39* in the background of PBW 343 should be utilized in the breeding programme. As a pre-emptive measure, yellow rust resistance (through uses of genetic stocks) should be introgressed on priority.
3. For resistance against stem rust (*Ug99*) resistance, use of resistance genes like *Sr26* should be utilized in the breeding programme.
4. Growing of rust susceptible varieties like Lok-1 and WH-147 in central India (M.P.) be discouraged to avoid any chances of epidemic built up during the crop season.
5. Monitoring for Karnal bunt and other seed borne diseases be continued for demarcating Karnal bunt free or low KB zones / areas in the country. (Action : PI, CP & Cooperating Centres)
6. For maintaining uniformity in data recording and to monitor the level of disease epiphytotics, PPSN monitoring and data recording team should visit the centers in NWPZ. (Action : PI, CP)
7. As a part of our alertness, a constant vigil should be kept in order to detect new variation in wheat pathogens with special emphasis on yellow rust and black rust. Hence, extensive crop health surveys be organized during the crop season. (Action : PI, CP)
8. A refresher course on techniques in wheat crop protection for wheat workers under AICW&BIP be organized during the crop season. (Action : PI, CP).

Resource Management Work Planning Meeting

August 29, 2009 **Chairman** : **Dr. RK Sharma**
 Co-Chairman : **Dr. Randhir Singh**
 Rapporteurs : **Dr. SC Gill**
 Dr. RS Chhokar

At the outset, after welcoming the participants Dr. RK Sharma, PI, Resource Management, Programme and the Chairman of the session, stressed that conducting All India Coordinated varietal evaluation trials are mandatory and all the centres must conduct the allotted trials strictly as per the technical programme. Dr. RK Sharma also pointed out that all the cooperating centres should send the data to DWR before the cut off date and reporting of the data should be strictly as per the technical programme. He also requested that it will be more appropriate if all the cooperating centres also send the soft copy of the data by electronic mail to expedite the data processing at the Directorate.

During discussions, Dr. BN Patil raised the issue of bifurcation of trials of *aestivum* and *durum* genotypes evaluation for date of sowing in CZ and PZ and the house agreed for the same. In view of the emerging problem of water scarcity, the house decided to initiate the RIR (Restricted Irrigation) trial in NWPZ and NEPZ as already in practice in CZ and PZ for timely sown trial.

Dr. RK Gupta, Head CIMMYT-India flagged the issue of evaluating the effect of pre and post sowing irrigation for wheat crop establishment. Dr. RS Chhokar also suggested that dry seeding followed by irrigation can be efficiently introduced under bed planting system. After thorough discussion, a multi location across zone trial was formulated to address this issue. Five centres (Varanasi, Karnal, Ludhiana, RAU Pusa and Ranchi) volunteered to conduct this trial. Dr. HS Sidhu, from Punjab, proposed to explore the possibility of relay cropping in cotton-wheat system to increase the system's productivity as the delayed sowing of wheat results in lower yield under this system. A trial was formulated and two centres *i.e.* Ludhiana and Indore agreed to conduct this trial. Another trial was formulated on sugarcane-wheat intercropping for increased production and profitability.

The resource management group also critically reviewed the results of the special trials in progress at different centres and decided to continue the all the special trials except effect of boron application on the productivity of wheat in NEPZ, which was concluded. Dr. Kumar from FMC proposed a sponsored trial for the evaluation of ready mix combination of metsulfuron + carfentrazone against broad-leaved weeds at three centres namely Karnal, Pantnagar and Varanasi and all the centres agreed.

On-going special coordinated trials to be continued:

1. Evaluation of sulfosulfuron+ carfentrazone for the control of complex weed flora in wheat under rice-wheat system.
2. Improving water use efficiency by surface rice residue retention in wheat.
3. Intensification of rice-wheat system for higher productivity and profitability under different tillage practices.
4. Rice residue management for enhancing productivity and sustainability of rice-wheat system.

5. Effect of bio-regulators on wheat productivity.
6. Effect of RCT's on productivity and profitability of soybean-wheat system in Central Zone.
7. Integrated nutrient management in soybean-wheat system in Peninsular Zone.

To address the zone-wise issues concerning the wheat productivity and production, the group also modified/formulated the new special coordinated trials as follows:

New trials formulated

Trial 1. Evaluation of metsulfuron + carfentrazone for the control of broad-leaved weeds.

Centres: Karnal, Pantnagar, Varanasi.

Trial 2: Effect of pre and post seeding irrigation on wheat establishment.

Treatments: Seeding/Pre-seeding irrigation in the first week of November.

1. Conventional practice (Pre seeding irrigation fb sowing- 5 cm depth)
2. Dry seeding (2 cm depth) on flat bed fb irrigation
3. Dry seeding on bed fb irrigation
4. Dry seeding (2 cm depth) in ZT fb irrigation.
5. Pre-seeding irrigation fb ZT seeding
6. Irrigation fb broad casting soaked seed

Design: RBD

Replications: Four

Locations: Karnal, Ludhiana, Ranchi, RAU Pusa, Varanasi.

Observations:

1. Crop stand (plant/sq.m) 15 days after seeding
2. Number of irrigation applied in each planting options
3. Yield and Yield attributes

Trial 3: Improving productivity of cotton-wheat through relay cropping

Treatments:

1. Cotton-wheat (Conventional practice)- Line to line spacing- 60 cm
2. Cotton on wide beds (140 cm wide beds)- wheat relayed by drilling
3. Cotton on wide beds (140 cm wide beds) defoliated - wheat relayed by drilling
4. Cotton+ Green Gram on wide beds (140 cm wide beds)- wheat relay by drilling
5. Cotton (Conventional practice)- Wheat relay (Broadcasting)
6. Cotton- on wide beds (140 cm wide beds)- Wheat relay (Broadcasting)
7. Cotton- on wide beds (140 cm wide beds) defoliated - Wheat relay (Broadcasting)

Design: RBD

Replications: Three

Locations: Ludhiana, Indore

Observations:

1. Yield and Yield attributes
2. Irrigation water use
3. Weed infestation

Trial 4: Sugarcane-wheat intercropping for increased wheat production and system productivity.

Treatments:

1. Autumn Sugarcane at 70 cm row spacing
2. Autumn Sugarcane along row + wheat on 70 cm beds
3. Autumn Sugarcane* + Wheat on 140 cm wide beds
4. Autumn Sugarcane* + Wheat on 140 cm wide beds-Green Gram
5. Wheat-Summer Sugarcane
6. Wheat-Summer Sugarcane + Green Gram

Note: *Two budded sets to be planted across row 15 cm apart

Design: RBD

Replications: Three

Locations: Nagina, Karnal.

Observations:

1. Plant stand.
2. Yield and Yield attributes

Work Plan of Social science

Dr. Randhir Singh, co-chairman of the session said that the wheat and barley frontline demonstrations allocated for 2009-10 will be conducted and coordinated as per the approval of the Ministry of agriculture. In this connection, Dr. Ajmer Singh raised the issue of conductance of FLDs strictly as per the guidelines issued by DAC/DWR Karnal. He also asserted that technological guidelines must be followed uniformly for logical comparison of new technologies. He further said that the comparisons of treatments under FLDS should be by following similar standard recommended package of practices.

At the end of session, Dr. RK Sharma, on behalf of the Directorate and IARI thanked all the participants for valuable suggestions.

Quality Improvement Work Planning Meeting

August 30, 2009

Chairman : Dr. RK Gupta
Rapporteur : Dr. RPSingh

The Wheat Quality Group met on 30th August, 2009 and formulated the plan of work. The group decided to continue recording data for grain appearance score, test weight, protein content, sedimentation value and phenol test on all the entries of the three species, namely *T. aestivum*, *T. durum* and *T. diccocom* as well as triticales. Durum will also be analyzed for the incidence of yellow berry and yellow pigment in addition to the earlier mentioned traits. Yellow pigment will also be recorded on *diccocom*. The allocation of the work will be as under:

1. Ludhiana laboratory will analyze NIVT 1A samples from Ludhiana, Hisar, Durgapura, Delhi, Pantnagar, Kanpur, Pusa and Sabour.
2. The Quality laboratory at Durgapura will undertake the analytical work for NIVT 1B samples from all those centers, which have been identified for Ludhiana laboratory (NIVT 1A).
3. NIVT 2 samples will be analyzed by the laboratory at Vijapur for all the traits related to bread wheat. The centres to send the samples are Indore, Kota, Vijapur, Junagarh, Powarkheda, Dharwad, Pune and Niphad.
4. NIVT 3 work will be looked after by Pantnagar quality laboratory. The samples from Pusa, Sabour, Kanpur, Pantnagar, Hisar, Ludhiana, Durgapura, Delhi, Vijapur, Indore, Powarkheda, Junagarh, Dharwad, Niphad and Pune will be analyzed for the five quality traits related to bread wheat.
5. The samples of irrigated timely sown durum trial NIVT 4 will be analyzed by the quality laboratory at Rahuri for the traits related to durum samples from Ludhiana, Delhi, Hisar, Durgapura, Kota, Indore, Powarkheda, Junagarh, Vijapur, Pune, Dharwad and Niphad.
6. NIVT 5A entries will be analyzed at Hisar laboratory from Ludhiana, Delhi, Pusa, Kanpur, Indore, Dhandhuka, Powarkheda, Pune, Dharwad and Niphad. It will also undertake the analytical work for salinity/alkalinity trials from the centres already identified.
7. NIVT 5B durum trial samples will be analysed by the laboratory at Dharwad. The centres namely, Kota, Dhandhuka, Indore, Powarkheda, Pune, Dharwad and Niphad will send the samples to the concerned lab.
8. All diccocom samples will be analysed by Dharwad centre. The material will be from Dharwad, Pune, Arabhavi, Wellington, Vijapur and Junagarh.
9. Grain Quality Laboratory at IARI, New Delhi will analyse wheat samples of Quality Components Screening Nursery (QCSN) for grain appearance score, test weight, protein content, grain hardness index, sedimentation value, and phenol test.
10. All the AVT samples from all those centres, which were subjected to analysis in 2008-09, will be analyzed by DWR Quality lab. All the IInd year AVT entries including checks will be analyzed for various quality parameters including baking evaluation.

11. The durum entries both from NIVT 4 and NIVT 5B will be analyzed by Pune laboratory for γ -gliadin 45.
12. The last dates for supplying the samples by respective centres were finalised as follows:

NHZ & SHZ	15 th June 2010
NWPZ & NEPZ	20 th May 2010
CZ	10 th May 2010
PZ	30 th April 2010
13. 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 dehusking.
14. All the co-operators, who are analyzing the wheat samples of various NIVTs, Special Trials and QCSN should send the data to DWR, Karnal positively by 20th July, 2010, by e-mail and also hard copy with C.D.

Recommendations

1. To address the important issue of malnutrition, a mega network project on wheat biofortification on the lines of Harvest+ would be developed so as to evaluate the germplasm (indigenous and exotic) and utilization of promising lines in the breeding programme to develop nutritionally rich wheat varieties (Action : DWR, Karnal).
2. There are two distinct classes as hard and soft wheat. Hard wheat with strong and extensible gluten and high protein content are required for making good quality bread. For Chapati, hard wheat with medium strong gluten and medium to high protein are required. Soft wheat with low protein and weak & extensible gluten are required for biscuit. Hard durum wheat with high protein, strong gluten and high yellow pigment are needed to improve pasta quality. Therefore, breeding should be initiated separately for hard and soft wheat along with other desirable product specific quality traits for the development of wheat varieties best suited for industrial purposes. (Action : Breeders and Quality Scientists).
3. The Quality Component Screening Nursery (QCSN) has been further strengthened by involving 5 more sites and 4 more quality parameters. The breeders are requested to : (a) provide more quantity of grains for plot size, 4 lines X 2.5 m length), (b) mention the parentage of the entries supplied for QCSN, (c) contribute the entries only after initial quality evaluation. (Action : Concerned Quality Scientists and Breeders).
4. The centres having facilities for molecular work should actively utilize molecular markers, for example marker related to softness/hardness to enhance the screening efficiency of advancing progenies for the improvement of wheat quality. (Action : Breeders, Molecular Biologists and Quality Scientists).
5. The studies on therapeutical / clinical aspects of *T.dicoccum* wheat should be further strengthened at U.A.S., Dharwad centre. (Action : Nutritionists,

Biochemists, Food and Technology Scientists and Breeders at U.A.S.,Dharwad).

6. As some new scientists have joined the wheat quality programme, it is proposed to organize a short duration hands-on training programme for human resource development. (Action : DWR, Karnal).
7. Information on released varieties with specific end-use, where ever necessary, should be highlighted to seed producers and industry as well. (Action : DWR, Karnal).
8. Attempts should be made to sign M.O.U. with industries involved in preparing various wheat products like atta for chapatti, bread, biscuit and pasta for growing promising wheat varieties developed for these products by All India Wheat & Barley Improvement Project. (Action : DWR, Karnal).

BARLEY NETWORK

Work Planning Meeting

August 29, 2009

Chairman : Dr. RPS Verma
Rapporteurs: Dr. M Shrimali
Dr. R Selvakumar

Finalization of work plan and Recommendations

The barley scientists belonging to breeding, agronomy and pathology disciplines deliberated and reviewed the results of each trial series. Following the set norms on yield, disease (rust diseases), and quality parameters, the desirable test entries were promoted / retained in different trials. Finally, the constitution of various trial series in NWPZ/ NEPZ/CZ/NHZ was completed with the collective wisdom. The details of various breeding yield trials/ agronomical experiments and plant pathological nurseries/experiments finalized for conduction during 2009-10 crop season are as given hereunder:

A) Yield Evaluation Trials

Trial name		AVT-RF-NHZ (Pooled AVT+IVT)
Test entries	18	BHS387, BHS392, BHS393, BHS394, BHS395, UPB1008, UPB1010, UPB1011, UPB1012, VLB114, VLB118, VLB119, VLB120, VLB121, VLB122, HBL704, HBL706, HBL707
Checks	3	HBL113, BHS169, BHS352
Locations	13	Bajaura, Berthein, Kangra, Katrain, Malan, Shimla, Sundernagar, Almora, Ranichauri, Majhera, Gaggar, Nagau, Rajauri

Trial name		AVT-IR-NWPZ
Test entries	2	RD2743*, PL830
Checks	3	RD 2035, RD 2552, BH902 (I)
Locations	9	Bawal, Hisar, Pantnagar, Bathinda, Ludhiana, Durgapura, Navgaon, Tabiji, Sriganganagar

Trial name		AVT-IR-MB-NWPZ
Test entries	2	DWR81, DWR85
Checks	4	K551, DWRUB52, RD2668, RD2552
Locations	10	Hisar, Karnal, Bawal, Bhatinda, Ludhiana, Navgaon, Durgapura, Modipuram, Mathura, Pantnagar

Trial name		AVT-IR-LS-MB-NWPZ
Test entries	5	DWRUB73, DWR81, DWR83, DWR84, PL838
Checks	4	DWRUB52, RD2668, K551, RD2552
Locations	7	Hisar, Karnal, Bathinda, Ludhiana, Modipuram, Durgapura, Pantnagar

Trial name		SAL/ALK (Pooled)
Test entries	16	RD2792, RD2793, RD2794, RD2795, RD2796, RD2797, BH 932, BH 933, BH 938, NDB1465 (AVT), NDB 1487,

		NDB 1488, NDB 1498, HUB205 (AVT), HUB 211, HUB 212
Checks	2	RD2552, NDB1173
Locations	6	Dalipnagar, Faizabad (2 sets), Hisar, Bawal, Rampura

Trial name		AVT-Dual-RF-NHZ (Pooled)
Test entries	14	BHS 392, BHS 393, BHS 394, BHS 395, HBL704 (AVT) , HBL706, HBL707, UPB1011, UPB1012, VLB 118, VLB 119, VLB 120, VLB 121, VLB 122
Checks	3	HBL276, BHS169, BHS380,
Locations	5	Shimla, Bajaura, Almora, Majhera, Palampur (AICRP-FC Centre)

Trial name		IVT-IR-TS-MB-NWPZ
Test entries	16	BH 935, BH 936, BH 937, DWR87, DWR88, DWR89, DWR90, DWR91, RD 2798, RD 2799, RD 2800, RD 2801, PL 845, PL846, PL 847, PL 848
Checks	3	DWRUB52, K551, RD2552
Locations	10	Bawal, Hisar, Karnai, Ludhiana, Durgapura, Navgaon, Modipuram, Pantnagar, Mathura

Trial name		IVT-IR-MB-LS-NWPZ
Test entries	15	BH 938, BH 941, BH 942, DWR87, DWR88, DWR89, DWR90, DWR91, RD 2798, RD 2799, RD2800, RD 2801, PL 847, PL 849, PL 850
Checks	3	DWRUB52, K551, RD2552
Locations	7	Hisar, Ludhiana, Bathinda , Modipuram, Pantnagar, Durgapura, Karnal

Trial name		IVT-IR-NWP/NEP/CZ
Test entries	24	BH 932, BH 933, BH 934, HUB 208, HUB 209, HUB 210, JB186, JB187, JB 188, RD 2784 RD 2785, RD 2786, RD 2787, PL 841, PL842, PL 843, PL844, K 944, K 958, NDB 1475, NDB 1476, UPB 1002, UPB 1013, UPB 1014
Checks	4	RD2035, RD2552, PL751, Jyoti
Locations	12	Hisar, Ludhiana, Durgapura, Pantnagar, Kanpur, Varanasi, Faizabad, Rewa, Vijapur, SK Nagar, Pusa, Ranchi

Trial name		IVT-RF- NEPZ
Test entries	18	BH 939, BH 940, RD 2802, RD 2803, RD2804, RD2805, K 939, K943, K956 , NDB 1479, NDB 1482, HUB 206, HUB 207, JB 197, JB 206, JB 207, PL 842, PL 844
Checks	2	K 603, Lakhan
Locations	9	Kanpur, Varanasi, Faizabad, Rewa, Mauranipur, Tissuhi, Pusa, Ranchi, Mirzapur

Trial name		IVT-Dual- NWP/NEP/CZ
Test entries	16	BH 932, BH 933, RD 2788, RD 2789, RD 2790, RD2791, NDB 1490, NDB 1494, PL 851, PL 852, HUB208, HUB209, HUB210, JB186, JB187, JB188
Checks	4	RD2035, RD2552, Azad, RD2715
Locations	14	Bikaner, Jalore, Durgapura, Kota, Udaipur, Jabalpur, Rewa, Hisar, Ludhiana, Kanpur, Faizabad, Varanasi, Jhansi, Anand,

B) Crop Protection

1. **Crop Health survey:** Different cooperating centres in their area of command will carry out the survey work. The infected samples of rust are to be sent to DWR, RS Flowerdale and of leaf blight to DWR, Karnal for further analysis. The new entries showing >40S rust reaction in AVT (IIInd year) material have to be informed to DWR, Karnal by e mail and sample has to be sent to Flowerdale. The report on disease survey should be submitted to DWR, Karnal every month in time, by each cooperator.
2. **Foliar blight pathogen monitoring nursery (FBPMN) :** A trial comprising of popular barley varieties and susceptible checks will be planted in different barley centers in NEPZ and NWPZ and occurrence and severity of leaf blight will be monitored at different growth stages and date of recording also. The progress of disease will be seen in relation to weather conditions.
3. **Evaluation for status of host resistance in test entries:**
 - i. **Initial barley Disease screening Nursery (IBDSN):** The nursery will have about 300 test entries of station trial of major barley breeding centers. The entries will be screened against rusts and leaf blight.
 - ii. **National Barley Disease Screening Nursery (NBDSN):** This will comprise of entries of yield trials (IVT and AVTs) which will be screened against three rusts, leaf blight, covered smut and powdery mildew.
 - iii. **Elite Barley Disease and Pests screening nursery:** This will have resistant entries identified in NBDSN and other international nurseries for retesting at hot spot locations. The confirmed sources of resistance would later be shared with different barley breeders for their utilization.
 - iv. **Seedling Resistant Test (SRT) of NBDSN and elite entries:** The test would be conducted against different pathotypes of three rusts at Flowerdale Shimla.
4. **Large plot trial on Integrated Pest Management (IPM) in barley:**

The most effective IPM module identified during past two crop seasons will be evaluated on large plot (min 500 sq.m) along with non IPM.

5. Chemical control of barley leaf blight

- a. Seed treatment with Vitavax 3g/Kg
- b. ST + Tilt spray
- c. Folicur spray @0.1%
- d. ST+ Folicur spray
- e. Control

Replication 3; Plot size 2x2 m;

6. Chemical control of rusts

- a. Tilt @0.1%
- b. Folicur @0.1%
- c. Bayleton @0.1%
- d. Dithane M45
- e. Control

Replication 4; plot size 2x2m; 1st spray first week of February.

Entomology

1. Screening of NBDSN against foliar aphids

A new nursery as national barley aphid screening nursery will be initiated. It will comprise previously identified resistant entries along with new entries of NBDSN.

1. **Chemical Control of Foliar Aphids:** This trial will continue during 2009-10 with following chemicals.
 - a. Confidor
 - b. Actara
 - c. Flu bendomide
 - d. Ekalux
 - e. Dimethoate
 - f. Acetamiprid
 - g. Dantop

Nematology

1. Screening of NBDSN, Elite material against CCN:

The entries of NBDSN as well as of EBDSN will be tested against CCN at Ludhiana, Durgapura and Hisar centers in sick plots/field.

C) Agronomy Trials/ Experiments

1. **Varietal Evaluation:** The trials with AVT final year entries will be conducted in respective zones using the standard checks.
2. **Special experiments on updating package of practices**

SPL-1: N scheduling in dual purpose barley

Objectives

To standardise optimum N scheduling for higher productivity of grain and fodder yield.

Treatments

A. Varieties (Main Plots)

V-I. RD 2552

V-II. RD 2552

B. N schedule (Sub-Plots)

1. $\frac{1}{2}$ basal+ $\frac{1}{2}$ immediate after cut
2. $\frac{1}{2}$ basal+ $\frac{1}{4}$ immediate after cut+ $\frac{1}{4}$ tillering after cut
3. $\frac{1}{2}$ basal+ $\frac{1}{3}$ immediate after cut+ $\frac{1}{3}$ tillering after cut
4. $\frac{1}{3}$ basal+ $\frac{2}{3}$ immediate after cut
5. $\frac{2}{3}$ basal+ $\frac{1}{3}$ immediate after cut

C: Centres: NWPZ (Hisar, Ludhiana, Delhi, Agra, Karnal, Durgapura)
NEPZ (Kanpur, Varanasi, Rewa)

SPL-2 : Evaluation of barley varieties for different tillage options (NWPZ & NEPZ)

Treatments

A. Irrigation (Main Plots)

1. No irrigation without cut
2. No irrigation with cut
3. Irrigation without cut
4. Irrigation with cut

B. Varieties (Sub-Plots)

BHS 169, HBL 276, BHS380

C. Centres: Bajaura, Shimla, Malan, Almora

SPL-6 : Evaluation of irrigated barley varieties for restricted irrigation in NWPZ and NEPZ

Objectives: 1. To evaluate the performance of irrigated barley varieties under restricted water supply in NWPZ and NEPZ.

Treatments

A. Irrigation (Main Plots)

1. No irrigation (only pre sowing)
2. One irrigation (Jointing stage)
3. Two irrigation (Jointing & flowering stage)
4. Three irrigation (Jointing, flowering & grain filling stage)

B. Varieties (Sub-Plots)

RD 2552, BH902 and DWRUB 52 for NWPZ
RD 2552, K 551 and K 508 for NEPZ

C: Centres: NWPZ (Hisar, Karnal, Ludhiana, Agra, Durgapura) NEPZ (Kanpur, Varanasi, Rewa)

Recommendation

During the research review meeting of the barley network, it was pointed out that centres in NWPZ are not able to screen their material for resistance to leaf blight and on the other hand centres in NEPZ are not able to screen material for yellow rust resistance. It was decided by the group that a shuttle breeding approach may be employed to solve this problem. DWR will coordinate the evaluation of segregating material developed by Durgapura centre at Faizabad for leaf blight. The material developed at Faizabad will be evaluated for yellow rust at Durgapura. In case, any material is released from such partnership, the credit will be shared by both the centres.

SESSION V

Varietal Identification Committee Meeting

August 29, 2009

Chairman : Dr. Swapan K Datta
Member Secretary : Dr. SS Singh

The meeting of Varietal Identification Committee of Wheat & Barley was held at IARI, New Delhi on 29th August, 2009 under the Chairmanship of Dr. Swapan K Datta, DDG (CS). The meeting was attended by the following:

Voting Members:

1. Dr. SN Shukla, ADG (FFC), ICAR, Krishi Bhavan, New Delhi -11000
2. Dr. KR Koundal, Joint Director Research, IARI, New Delhi-110012
3. Dr. N Emayavamban, GM (Production), NSC. Beej Bhavan, New Delhi-110012
4. Shri S Selvaraj, DC (Seeds) DAC, New Delhi -110001
5. Dr. JP Tandon, A-72, Sector-14, Noida-201301, UP
6. Dr. BK Mishra, C-5, A/163, Janakpuri, New Delhi-110058
7. Dr. GK Choudhury, Director, Directorate of Wheat Development, Ghaziabad
8. Dr. Gurdev Singh, Deputy General Manager, Sriram Fertilizer & Chemicals, H.No.6, South Model Gram, Ludhiana -141002, Punjab
9. Dr. Ram Parkash, SFCl, New Delhi
10. Dr. SS Singh, Project Director, DWR, Karnal

Non-Voting Members from DWR:

1. Dr. Jag Shoran, PI (Crop Improvement)
2. Dr. RK Gupta, PI (Quality)
3. Dr. AK Sharma, PI (Crop Protection)
4. Dr. Ravish Chatrath, PI (Computer & Statistics)
5. Dr. RK Sharma, PI (Resource Management)
6. Dr. M Prashar, Principal Scientist (Plant Pathology)
7. Dr. RPS Verma, PI (Barley Improvement)
8. Dr. Randhir Singh, PI (Extension)

The committee considered a total of 24 proposals (22 wheat and 2 barley) submitted for identification and after detailed deliberations, made the following recommendations as indicated against each proposal

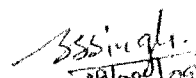
	Name of Variety	Production conditions	Recommendations
WHEAT			
Northern Hills Zone (NHZ): Hills of J & K (except Jammu and Kathua districts), H.P. (except Paonta Valley and Una district), Uttarakhand (excluding Tarai region), Sikkim and hills of W.B. and N.E. States.			
1	VL 907	IR/RF-TS	The proposed entry was considered by the committee. It has shown distinct advantage in yield over the check varieties under irrigated and rainfed conditions. The entry also showed resistance against yellow and brown rust. Hence it is identified for release in the hilly areas of HP, Uttarakhand, J & K and Sikkim.

	Name of Variety	Production conditions	Recommendations
North Western Plains Zone (NWPZ): Punjab, Haryana, Delhi, Rajasthan (except Kota & Udaipur divisions), West U.P. (except Jhansi division), Jammu & Kathua districts of J & K, Paonta Valley & Una district of H.P., and Tarai region of Uttarakhand.			
2	HD 2967	IR-TS	The entry HD 2967 was considered by the committee. The committee noted that proposed entry has diversified genes than the 1B/1R and also showed resistance to yellow rust over the checks, hence was identified.
3 4	PDW 311(d) and PDW 314(d)	IR-TS	The two proposed entries namely, PDW 311 and PDW 314 were considered together. Among these, PDW 314 has advantage in yield as compared to qualifying variety and the checks. Hence, entry PDW 314 was identified for release.
5	PBW 610	IR-LS	The proposed entry PBW 610 was considered by the committee. The proposed entry has no distinct superiority in yield over the check and hence not identified for release.
6	PBW 613	RF-TS	The proposed entry PBW 613 was considered by the committee. No yield advantage was found as compared to the check and performance was not consistence across the zone. Hence, the proposal was not agreed for identification..
North Eastern Plains Zone (NEPZ): East of U.P., Bihar, Jharkhand, West Bengal (excluding hills), Orissa, Assam & Plains of N.E. States.			
7 8 9	HD 2967, HUW 612 and DBW 39	IR-TS	All the three proposals, HD 2967, HUW 612 and DBW 39 were considered together. HD 2967 and DBW 39 as well as HUW 612 are numerically at par in yield. The committee noted HD 2967 and DBW 39 showed moderately resistant reaction against leaf blight which is important disease in NEPZ. Accordingly the committee identified HD 2967 and DBW 39 for release. However, HUW 612 showed susceptible reaction against leaf blight hence was not recommended for identification.
10 11	HD 2982 and HD 2985	IR-LS	The two proposals namely, HD 2982 and HD 2985 were considered together. Among these two, HD 2985 has advantage in yield and also resistance to rust and leaf blight hence the entry HD 2985 was identified.
12	PBW 612	RF-TS	The proposal PBW 612 was considered by the committee and since it has no yield advantage, also it is susceptible to leaf blight, hence was not identified.


	Name of Variety	Production conditions	Recommendations
Central Zone (CZ): Madhya Pradesh, Chhatisgarh, Gujarat, Kota & Udaipur divisions of Rajasthan and Jhansi division of Uttar Pradesh.			
13	MPO 1215(d)	IR-TS	The proposal MPO 1215 (d) was considered by the committee. The committee noted that although the proposal MP 1215 (d) is at par in yield with the best check, but has shown resistance for the two important rust diseases (stem and brown rust) over the checks. The committee also noted that there is only one prominent variety in the zone which was released about ten years back and thus felt that there is need for diversification, hence the proposal is identified. It was suggested to provide the complete details about its parentage while submitting the proposal to CVRC for consideration.
Peninsular Zone (PZ): Maharashtra, Karnataka, Andhra Pradesh, Goa and plains of Tamil Nadu.			
14 15 16	UAS 304, MACS 6222 and MACS 6273	IR-TS	The three proposals namely UAS 304, MACS 6222 and MACS 6273 submitted for the same zone and production condition were considered together. All the proposed entries are at par in yield. The committee also noted that all three proposals have different diversified genes needed for the purpose of having diversified material in the zone and all three were found equally good from quality point of view. Hence, all the three proposal were identified.
17	AKAW 4627	IR-LS	The proposal AKAW 4627 was considered by the committee. The proposed entry has distinct advantage in yield over the checks, resistance against stem rust and leaf rust and was also better for bread making. Hence the proposal is identified.
18 19	HD 2987 HD 2987	RF-TS RI-TS	The two proposals of HD 2987 submitted for rainfed as well as restricted irrigation conditions were considered together. The proposed entry performed well under both the conditions over the checks. The committee also noted that there is less number of varieties available in this zone and the best performing check was released long back. Moreover, the proposed entry has also given better response under restricted irrigation condition, high degree resistance against stem rust and was good for bread and chapatti making qualities hence, it was identified for both rainfed and restricted irrigation conditions

	Name of Variety	Production conditions	Recommendations
Southern Hills Zone (SHZ): Nilgiri Hills – Tamil Nadu			
20	HW 5207	RI-TS	The proposal of HW 5207 was considered by the committee and since it has shown superiority in yield over the checks, hence was identified. It was suggested that while submitting it for release, location wise trial data should be appended with the release proposal.
All Zone (Special Trial on Salinity / Alkalinity)			
21 22	KRL 210 KRL 213	IR-TS	Both the proposals of KRL 210 and KRL 213 were considered together by the committee and it was noted that both are superior over the check, hence both the proposals were identified.
BARLEY			
23	BHS 380	RF-TS-NHZ (Dual purpose)	The proposal of BHS 380 was considered by the committee. The proposed entry has shown superiority in terms of grain yield as well as fodder yield over the checks. The proposed entry also has advantage of better resistance against stripe rust. Hence, it was identified.
24	BH 902	IR-TS- NWPZ	The proposal of BH 902 was considered by the committee. The proposed entry has shown superiority in terms of grain yield, disease resistance and lodging tolerance, hence the proposed entry was identified.

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


29/08/09
(SS Singh)

Project Director &
Member Secretary


(Swapan K. Datta)
Deputy Director General (Crop Sciences)
Chairman

SESSION VI
Special Session
Enhancing wheat and barley production in the country under prevailing climatic condition

August 30 , 2009 **Chairman : Dr. N. Singh**
Co-Chairmen: Dr. SN Shukla & Dr. JP Tandon
Rapporteurs: Dr. SC Tripathi
Dr. Rajbir Yadav

The session was opened by the Chairman, Dr. NB Singh with the remarks that wheat plays a very important role in total food production of the country. Keeping in view in the significant fall (7.0m ha) in rice acreage in the current year, the wheat becomes more important for national food security. However, his concern was that the rate of growth of wheat production in last 10 years has been quite low. He opined that beside stagnating production in Punjab and Haryana, the yield gap between the realized yield and achievable yield is the cause of concern. Beside this the increase in temperature in last several years, imbalance use of fertilizers and micronutrient deficiencies are some of the other problems which need immediate attention. The increased availability of quality seed at subsidized rate along with proper extension campaign for timely sowing and balance fertilization under Food Security Mission has paid dividends during current year. He expressed his serious concern about the non-replacement of old varieties like Lok 1 in MP and UP 262 and HUW 234 in UP and called upon the scientists to chalk out the strategies for each zone separately in active collaboration with officials of state agriculture departments.

Dr. SS Singh, Project Director, DWR in his presentation expressed the need for preparedness for higher wheat production during 2009-10, to fill the likely gap in total food production because of severe short fall in rice acreage. India achieved record wheat production of 80.58 m tones during the current year due to increase in both area and productivity. He elaborated further the gap between the realizable yield (FLD yield) and actual yield in important wheat growing states in India. He stressed that by implementing the resource conservation technologies particularly zero tillage in states like UP, the productivity can probably be increased by about 1 ton/ha. Similarly, the productivity can also be improved in the states of Rajasthan and Bihar. He expressed satisfaction on the achievements made by All India Coordinated Wheat and Barley Improvement programme as up to now it has released 357 wheat varieties. The current wheat varieties like DBW 17 for NWPZ, K0307 for NEPZ, HI 1544 for central zone and HI 8663 peninsular zone have very high yield potential and therefore can provide suitable base for significant gain in wheat production. However, he was concerned about the indent of old varieties under breeder seed production and suggested that there should be close association between the scientists and state officials and extension personnel. He called for a one day meeting with state department (Agriculture) of UP and MP, particularly to create awareness about the recently released varieties and production technologies. He expressed confidence that with the available technologies like varieties, resource conservation technologies, balanced fertilization and proper policies, the target for 2025 can easily be achieved. Significant scope also exists for improvement of barley production as new varieties like DWRUB 52, RD 2668 and RD 2552 and production technologies are made available to the farmers.

Dr. ND Jambhale, ADG (seed) was of the view that production target for wheat breeder seed though was achieved but there were certain mismatch. He was critical of the indent of older varieties like Lok 1, WH 147, UP 262 and HUIW 234, particularly when their suitable replacements like GW 322, HI 1544, K 0307 and HD 2733 are available. He stressed on the proper monitoring of seed production chain. Dr. HS Gupta, Director, IARI, suggested that state extension officials should be educated about the latest development in production technologies including varieties. Dr. SS Singh added that the accounts of conversion rate of different class of seed should be presented in the workshop.

Dr. AK Sharma, PI (Crop Protection) presented the crop protection strategies to increase wheat production. He suggested that beside three rusts i.e. stripe, leaf and stem rust, foliar blight, Karnal bunt, ear cockle and head scab are other important diseases affecting wheat production. He laid emphasis that crop health can be maintained by deploying the proper host resistance, crop health monitoring and implementation of IPM modules. Under the changed climatic condition, the diseases of minor importance or a new pathotype in already important disease can become important and threaten the wheat production. To counter it, he put emphasis on futuristic planning. He also opined that available variability for yellow rust resistance is limited and keeping in view the threat imposed by the high incidence of this disease in Punjab and parts of J&K, there is immediate need to diversify the genetic base for resistance. He also suggested saturating the foot hills of Himalaya and the adjoining area of Punjab with yellow rust resistant varieties like DBW17 and PBW 550 to minimize the inoculum built up.

Dr. RK Gupta, South Asia Coordinator DACST, in his presentation on resource conservation technologies put the emphasis on right choice of cultivars. According to him, under double no till rice-wheat cropping system, ZTR+ZTW+R is the best option for increasing the yield. The new planting machinery like multi crop planter because of adjustable tine/ row spacing and gamma blade results in power and fuel saving. He opined that the crop growth under zero tillage with residue retention is smoother due to temperature modulation. He specifically mentioned on the importance of cropping system weed management module rather than for a single crop. To counter very quickly depleting water reserve, laser land leveling can prove highly effective. Nitrogen management through newer tools like green seeker can save 13-20 per cent nitrogen. Dual purpose wheat can be important source of livelihood in the rain fed area. Autumn sugarcane + wheat can be an alternative mean to increase the area and production under wheat. Session ended with thanks to the chair.

SESSION VII

International Collaboration: Strengthening of Wheat and Barley Research for Enhancing Productivity

August 30 , 2009 **Chairman : Dr. Swapan K Datta, DDG (CS)**
Co-Chairmen: Dr. SN Shukla & Dr. SS Singh
Rapporteurs: Dr. BS Tyagi
Dr. Anju M Singh

The session "International Collaboration – Strengthening of wheat and Barley Research for enhancing productivity" commenced with the welcome of the speakers from India & abroad by the Chairman. At the onset of the session, Dr. Datta emphasized the need of collaborative efforts with international as well as national research organizations.

Project Director (Wheat) Dr. SS Singh presented about the present status and future thrust of research for enhancing productivity to Indian scenario and informed the house about the present research activities being carried in India. He informed the house that however the share of direct selection to released varieties in India is decreasing for last many years, but exotic material is important to diversify the variability. Resistant varieties like DBW 17 and PBW 502 have been released to replace PBW 343 a susceptible variety to yellow rust. In his view, the challenges in future are breaking yield plateau, widening genetic base and increasing biotic and abiotic stress resistance/tolerance. In this regard some heat tolerant stocks like WH 710 have been developed & registered. Pre-breeding, winter x spring and use of wild species are the methodologies to be taken up. In Barley also 2 row x 6 rows barley hybridization and use of winter barley are to be taken up. Chairman was of the view to develop a project involving Almora, Shimla and Palampur as collaborators for winter x spring program.

Dr. AK Joshi informed the house that CIMMYT is working on breaking yield barrier, shuttle breeding, climatic changes and effects, nutritional improvement, quality, rusts and Ug99. CIMMYT is sharing the elite germplasm through SRRSN and EBWYT with India. SRRSN has many Ug99 resistant genotypes while EBWYT and ESWYT have genotypes with APR resistance. Genotypes with good Fe and Zn have been identified along with the reduced crop duration. It was suggested to educate seed certification agencies & breeders for asynchrony of variety as they say it as a mixture. Project Director and co-chairman emphasized to regularize the international visits of scientists.

Dr. (Ms.) S Grando presented about the barely improvement program at ICARDA. She informed that yield level of barley is 2 t/ha and the crop is sown in marginal areas. She informed the house that the barley program was shifted to Aleppo Syria from Mexico in 2006 and addresses about 18 m.ha area of barley. Target areas of research are feed, food, drought tolerance, salinity and heat. Collaborations can be on end use quality, biofortification, malt barley, baby foods and bakery etc. Markers assisted selections for CCN, grain quality, drought, heat and salinity can be used. Chairman suggested for human resource development and training and desired that the barley group should develop a collaborative program.

In the end Dr. Sanjay Rajaram, consultant ICARDA, Aleppo Syria presented the challenges ahead and opportunities in wheat improvement. He felt surprise that there is no MOU with ICARDA in Wheat. He deliberated on "Challenges to Wheat Breeding." He emphasized the need of redesigning the curriculum of graduate courses and other training programs. He informed the house that maximum temperature in India is increasing by 1.3° C per century.

Therefore, heat and drought be integrated into breeding programs. We need to breed site and location specific varieties for different niche. The researchable areas suggested are hybrid wheat, winter X spring wheat, water use efficiency, high temperature tolerance, herbicide tolerance through GM wheat, pyramiding yellow rust resistant genes and foliar blight in East India. ICARDA has the collection of 17, 778 accessions of wheat, which can be used in diversification of the gene pool. Participatory varietal selection can be of use for quick adoption. Dr. Sanjay Rajaram showed his concern about the lack of collaboration work and harmony between different research workers.

At the end Chairman asked the wheat researchers to set a program involving the above mention issues. The session ended with the thanks to the chair and co-chairs.

SESSION VIII

Progress of Barley Research at AICW&BIP centres: A Review

August 30 , 2009

Chairman : Dr. KR Kaundal
Co-Chairmen: Dr. SC Gulati & Dr. SS Singh
Rapporteurs: Dr. SM Bhatnagar
Dr. R Selvakumar

1. Hisar

Dr. SR Verma, informed that, the barley area in Haryana is increasing due to contract farming and higher market prices. In breeding trials, the success rate was 66% and in agronomy trials, the success rate was 91%. The centre will focus on malt barley in the coming years and it was requested that the yield should be assessed based on plant stand in field also.

It was observed that data for assessing year 2008-09 was not presented and the data should be up to date. The numbers of crosses made were very less and the number should be increased.

2. Durgapura

Dr. M Shrimali presented that all the allotted trials were conducted successfully. Facilities for micro malting system are established at Durgapura centre. It was informed that all the RD entries are showing resistance to yellow rust in screening nurseries but are lacking in blight resistance. It was proposed to have collaborative work for screening early generation materials with other hot spot centres for leaf blight. It was also requested for renovation of laboratory for establishment of micromalting system.

3. Faizabad

Dr. SR Vishwakarma informed that the centre has conducted 100% trials allotted to them. One variety NDB 1431 has been promoted from IVT to AVT. Poor germination and grazing by animals are major problems in conducting FLD. In IPM, 16% increase was observed over non IPM plot.

4. Varanasi

Dr. Lal Chand Prasad presented research progress of Varansi centre. During 2008-09, 147 crosses were made. He informed the house that one entry BCU3839 was registered with NBPGR for carrying gene for necrosis resistance.

It was observed that mandate of the centre should be focused and there was no information on agronomy trials and even after 20 years, no varietal contribution is there. He was informed by Dr. RPS.Verma that proper permissions should be taken for genotype registration and the matter would be viewed critically.

5. Kanpur

Dr. LP Tiwari presented progress report of the Kanpur centre. In Kanpur out of 5 trials only 4 were conducted.

It was observed that the field experiment result data was not presented and the number of crosses made was not known. The conduct of trials was not proper during the last five years. The centre has to work as per the mandate to fulfill breeding objectives.

6. Rewa

Dr. Perraraju presented research progress of the centre that all 4 breeding trials were conducted and only 2 out of 4 agronomy trials were successfully conducted during the year. During the year 44 crosses were made and one international trial was also conducted, but its outcome was not presented.

The chairman observed that the germplasm from international nurseries should be used in breeding programme and presentation should be made data based.

7. Bajaura

Dr. Shyam Verma informed that all 12 trials allocated were successfully conducted. The chairman observed that the centre has to be strengthened for screening rust and cold tolerance. The centre should promote barley for feed purpose.

8. DWR, Karnal

Dr. RPS Verma presented the overall research progress of Barley network and ongoing supplementary work at DWR, Karnal. Dr. SC Gulati observed that hybrid barley work should be initiated as earlier some centres like Hisar etc. developed cms lines which may be exploited.

In general discussion, Dr. Shrimali requested that suitable arrangement should be made for placing breeder seed indent well in advance for smooth running of seed production chain system. Uttar Pradesh, being larger barley growing state, should place sufficient quantity of indent.

The meeting ended with vote of thanks to the chair.

Plenary Session

August 31, 2009 **Chairman:** **Dr. HS Gupta**
 Co-Chairpersons: **Dr. SN Shukla & Dr. SS Singh**
 Rapporteurs: **Dr. Vinod Tiwari**
 Dr. DP Singh

The session was chaired by Dr. HS Gupta, Director, IARI, New Delhi in the absence of DDG (CS). At the onset, Dr. Gupta welcomed all the delegates and invited PIs of the different programmes to present the new thrust areas and recommendation arising out of the workshop deliberations.

Crop Improvement

Dr. Jag Shoran, PI (CI) presented the report on finalization of all multilocation yield evaluation trials and informed that no extra trials have been put in the programme of work for 2009-10 crop season. The programme constitutes 37 trial series in national and zonal multilocation yield evaluation trials, besides international and national nurseries and physiological trials during 2009-10. He informed that it was the second year of testing varieties of rainfed conditions under restricted irrigation in the NWPZ. There was consensus in the house that limited irrigation trials were necessary as rainfed area was negligible in NWPZ. At this juncture, Dr. SS Singh, Project Director suggested for conducting irrigated trials also with limited irrigations. The PI (CI) informed about changes in locations of some trials and said that due to very late receipt of indent for breeder seed production during 2009-10 from DAC, allotment of breeder seeds production by different centres would be taken up at DWR and concerned centres would be intimated accordingly. The PI (CI) suggested that the seeds of varieties possessing genes for resistance to Ug99 race of black rust should be multiplied on priority to tackle any future threat arising in the country. The latest list showing the current status of varieties/ entries tested against Ug99 in Kenya and Uganda will be made available to all for this purpose. The nurseries and trials in physiology will be continued aiming to identify genotypes possessing higher levels of tolerance to terminal heat.

The PI (CI) also stressed on uniformity in yield trials conducted by breeding and agronomy groups and desired to have uniform dates of sowing and other agronomic practices for more meaningful interpretations. Dr. Shukla suggested that this matter may be discussed and shorted out at DWR level and it was accepted by the Project Director. The issue of enhancing the amount of contingencies to the zonal coordinating units was raised and it was suggested by ADG (FFC) that savings arising due to non-disbursement of salary to staff not in position at centres, may be re-allocated for meeting the genuine expenses and Zonal Coordinators should provide breakups for different expenses to DWR. The issue of international trainings to scientists beyond the age group of 50 years was also raised by Dr. Jag Shoran and he desired that they may be treated at par with younger scientists for such opportunities. Dr. JP Tandon, Former Project Director, DWR raised the issue of re-initiation of very late sown trial in wheat, keeping in view the substantial area (2-3 mha in UP) under very late sown crop after taking potato, sugarcane and arhar crops. The PI (CI) informed the house that such trials were stopped after getting directions to the contrary in the past. The Co-Chairman suggested for generating promising material from nursery on heat tolerance for

very late sown conditions. Dr. GP Singh, IARI, New Delhi informed that very late sown trial is already in place in resource management programme. Dr. TB Singh, Consultant of JK Seeds Co. Jaipur was of the view that very late sowing (after 25 December) requires varieties which can mature within a period of 120 days. The Chairman emphasized the need to develop such varieties to cater to the needs of large area available for such situations and depending on the entries available for such trial, a decision may be taken during next wheat workshop. The ADG (FFC) was of the view that trial cannot be constituted immediately and it is a problem of specific areas and it may be tackled by planting early maturing varieties like Pusa Gold (WR544) etc. in the affected areas. The Project Director wanted to know the results of trial of very late sown conditions in resource management programme to which PI (RM) replied that some varieties released for late sown conditions are also good under very late sown conditions.

The Chairman stressed on strengthening of physiological research in wheat. He urged the Council to involve more number of centres working on physiology so that higher productivity per day in wheat is achieved on the similar pattern of basmati rice. The ADG (FFC) informed that for this purpose a network project on heat/thermal /drought tolerance has been initiated by the Council. The Project Director also added that an Indo-Australian project is also initiated on abiotic stresses in wheat. Dr. Varma of IARI RS, Indore suggested that a crop physiologist is more suited than a molecular physiologist for such work. The ADG (FFC) suggested that a brain storming session on such issues may be conducted keeping in view the climatic changes. The Chairman desired that it should be done during the current year on a theme "Increasing physiological efficiency in wheat for increasing higher yield". The scientists from centres like Pantnagar and Jabalpur raised issue of higher allocation of funds to which the Project Director agreed for consideration.

Recommendations:

- Six new varieties of bread wheat, HS 490, PBW 590, Raj 4120, CBW 38, MP 1203, PBW 596 and one each of durum, UAS 415 and dicoccum wheat MACS 2971 have been released by CVRC during 2008-09. The state governments may place indent for breeder seed production of these varieties. (Action: PD for writing to concerned Directors of Agriculture)
- Nine new genetic stocks with novel characters, which were registered during the year, should be utilized in breeding programmes. (Action: All breeders)
- The indent of old rust susceptible varieties like Lok 1, WH 147, HUW 234, UP 262 etc. for breeder seed production may be discouraged. Likewise PBW 343 may be replaced with resistant varieties like DBW 17 and PBW 550 in NWPZ and recently released varieties in NEPZ. (Action: PD for writing to DAC)
- Multiplication of seeds of varieties possessing genes for resistance to Ug99 race of black rust should be done on priority to tackle any future threats in the country. (Action: PD for writing to DAC and SFCI)
- Priority may be given to those scientists posted and working since long in AICW&BIP and who have not visited abroad for training/visits to CGIAR institutions etc. (Action: PD)
- The zonal monitoring teams may be delegated more powers for taking corrective measures for improvement of trial conduct and they should provide report in proper format.(Action: PD, PI-CI and Zonal Coordinators)
- A refresher course on the trial conduct and recording may be conducted at DWR during 2009-10 crop season. (Action: PI-CI)

Crop Protection

Dr. AK Sharma, PI (CP) presented the work plan, recommendations and future strategies of crop protection in different zones. He gave a brief outline of different nurseries and trials to be conducted and emphasized that the programme will continue to provide active support to crop improvement programme. The survey teams would monitor and record the prevalence of new virulence of rusts in NWPZ. The trials on control of termites with new molecules will be initiated. The survey of *Meloidogyne graminicola* nematode will be taken along with biochemical studies at IARI, New Delhi. The ADG (FFC) desired that monitoring of Ug99 pathotype should be undertaken on priority basis along the international border during 2009-10. He also desired that resistant genes be incorporated in variety PBW343. Dr. KV Prabhu, Head, Div. of Genetics, IARI, New Delhi informed that such work is being taken up in a network project on pyramiding of resistance genes in wheat. Dr. R Tiwari informed that durable rust resistant genes have been incorporated in PBW343 and near-isogenic lines are already in station trial. The Chairman stressed on the need to foresee the life of a new variety for such purposes. The ADG (FFC) strongly raised the concern on the extent of losses being caused due to leaf blight and desired to strengthen the research in a network mode for which a project may be proposed to the Council. The PI (CP) proposed to organize a refresher course on techniques in wheat crop protection for newly appointed wheat workers under AICW&BIP during the crop season (Action: PI-CP).

Recommendations:

- Forty genotypes showing multiple resistance against diseases and insect pests would be supplied in NGSN during 2009-10 crop season for use by breeders.(Action: PIs, CP & CI)
- The new yellow rust resistant genetic stocks, FLW10, FLW16, FLW17, FLW18 and FLW2 carrying *Yr5*, *Yr10*, *Yr32* should be utilized in the breeding programme.(Action: Head, DWR Reg. Stn., Flowerdale for supplying seeds for inclusion in NGSN)
- The gene *Sr26* should be utilized in the breeding programme for incorporating resistance against Ug99 (Action: All Breeders).
- The survey teams will visit strategic areas in NWPZ to detect any new pathotype of rusts (Action: PI-CP).

Resource Management and Social Sciences

Dr. RK Sharma, PI (RM) presented the plan of work for Resource Management and Social Sciences groups. He informed that a new trial has been formulated to improve the productivity of cotton-wheat relay cropping system, and another new trial on restricted irrigation with same set of entries as in case of TS, IR trial in NWPZ and NEPZ. Dr. Sharma demanded allocation of Rs. 2 lacs for purchase of tillage equipments in cotton-wheat cropping system to be used at two research centres. While presenting the work plan of Social Sciences, he stressed that the grant for FLDs should reach by 30th September to facilitate proper conduct of FLDs at the centres. He urged the cooperators to submit information on conduct of FLDs by 30th of December and to provide the data to DWR latest by 30th June. The Project Director informed that funds available in mega seed project would be used for purchase of tillage equipments. The ADG (FFC) desired that the recommendations of Resource Management programme may be further elaborated and should be passed on to DAC for state-wise application and may also be included in practices propagated through FLDs.

Recommendations:

- In boron deficient soils of NEPZ, apply 10 kg/ha Borax as basal dose for higher productivity (Action: PIs, RM and SS&E).
- In the rice-wheat cropping system, zero-till sown summer green gram after wheat and vegetable pea after rice may be included to improve the overall system productivity (Action: PIs, RM and SS&E).

Quality and Basic Sciences

Dr. RK Gupta, PI (Q&BS), while presenting the programme of work, informed that the plan of work during 2009-10 will be same as in the previous year. The ADG (FFC) desired that the work relating to quality analysis may also be allotted to Kanpur, Pune and Almora centres to utilize available human resources. He also showed his concern for under utilization of facilities at BHU Varanasi. Dr. GP Singh desired that the testing of entries of NIVT-5A (both for restricted irrigation and rainfed conditions) for quality may also be carried out at Hisar to which the Project Director agreed (Action: PI- Q & BS). Dr. Rangaswamy, IARI, New Delhi raised the issue of developing faster methods for quality analysis. The Project Director asked him to perfect such tests for one more year. The ADG (FFC) desired that MOU may be signed between industry and institute to use HS490 variety for biscuit making. He also suggested to develop a network project on the lines of *Harvest Plus* for identification of genotypes which can be used as potent donors for quality traits and to enrich future wheat's nutritionally (Action: PI- Q & BS).

Recommendations:

- The studies on therapeutical/clinical aspects of *T.dicoccum* wheat may be strengthened at UAS, Dharwad centre. (Action: PI-Q&BS and Scientists at UAS, Dharwad).
- Highlight information on released varieties for specific end uses to seed producers and industry and initiate negotiations with industries to sign MOU for utilizing the varieties developed for specific food products (Action: PI –QBS).
- A training programme on techniques in wheat quality analysis for newly joined scientists should be organized at DWR, Karnal (Action: PI-Q&BS).

Barley

Dr. RPS Verma, PI (Barley) presented the work plan of different disciplines in barley for 2009-10 crop season and pointed out that all programmes of last crop season will be continued with some new trials in crop protection. He informed about the problem of low levels of resistance in breeding material to leaf blight at Durgapura and to yellow rust at Varanasi and suggested for tackling it by using shuttle breeding approach. The ADG (FFC) showed his concern regarding absence of barley breeder from Rewa centre in workshop.

Recommendation:

- The dual purpose barley (for fodder as well as grain) variety RD 2715 was released by CVRC during the crop year 2008-09 for cultivation in Central Zone. The state governments may put indent for breeder seed production of this variety.
(Action: PI-Barley and PD for writing to DAC)

Report of Special Committee on Varietal Identification

The recommendations of Special Committee on Varietal Identification of Wheat and Barley held under the chairmanship of Dr. Swapan K Datta, DDG (CS) on 29th August 2009, were presented by Dr. SS Singh, Project Director. Out of twenty two proposals of wheat and two of barley, the followings varieties were identified for release in the zones and cultural conditions mentioned below:

Entry	Zone	Conditions
Wheat		
VL 907	NHZ	IR/RF-TS
HD 2967	NWPZ, NEPZ	IR- TS
PBW 314 (d)	NWPZ	IR- TS
DBW 39	NEPZ	IR- TS
HD 2985	NEPZ	IR -LS
MPO 1215 (d)*	CZ	IR- TS
UAS 304	PZ	IR- TS
MACS 6222	PZ	IR- TS
MACS 6273	PZ	IR- TS
AKAW 4627	PZ	IR- LS
HD 2987	PZ	IR -TS, RI -TS
HW 5207**	SHZ	RI- TS
KRL 210	All zones	IR- TS
KRL 213	All zones	IR- TS
Barley		
BHS 380	NHZ	RF -TS
BH 902	NWPZ	IR- TS

d- Durum,

* Full details of pedigree to be given by the concerned breeder in release proposal to be submitted to the CVRC.

**Location-wise yield data to be provided in release proposal to be submitted to the CVRC.

Award to scientists whose varieties were released during 2008-09

The scientists from different centres who were involved in developing 8 wheat varieties namely, HS 490, PBW 590, Raj 4120, CBW 38, MP 1203, PBW 596, UAS 415(d) and MACS 2971(dic) and one barley variety, RD 2715, which were released by the CVRC during 2008-09 were presented mementos by Dr. HS Gupta, Director, IARI, New Delhi, Dr. SN Shukla, ADG (FFC), ICAR, New Delhi and Dr. SS Singh, Project Director, DWR, Karnal

Felicitation of superannuating scientists

Eight wheat and barley scientists, named below, who would be superannuating during the year 2009-10, were honoured for their outstanding services and contributions to the AICW&BIP. The retiring scientists were presented with a shawl and memento by Dr. HS Gupta, Director, IARI, New Delhi, Dr. SN Shukla, ADG (FFC), ICAR, New Delhi and Dr. SS Singh, Project Director, DWR, Karnal. Dr. Jag Shoran, PI (CI) read out the significant achievements of each of the scientists.

Dr. SM Bhatnagar	RAU, Durgapura
Dr. SK Gupta	PAU, Ludhiana
Dr. RP Singh	PAU, Ludhiana
Dr. LR Singh	SVBPUAT, Nagina
Dr. RK Rai	IARI, New Delhi
Dr. Bhanwar Singh	IARI, New Delhi
Dr. PK Varma	IARI RS, Indore
Dr. SC Sharma	CSK HPKV, Palampur

Proposal for venue of 2010 AD workshop

There was no proposal from the participating centres of AICW&BIP for hosting the workshop in 2010. It was decided that Project Director would finalize the venue in consultation with the Council.

At the end of the proceedings of the plenary session, Dr. SS Singh, Project Director congratulated all wheat scientists for their contributions in achieving a record wheat production during the crop season 2008-09. He pointed out the challenges ahead in view of the drought situation being faced in many districts of the country and indicated that the country is looking towards ensuing wheat season to fill the shortfall in food grain production. He specifically cited that MP and NEPZ may contribute effectively in increasing the total production and urged for proper planning. Dr. Singh congratulated the wheat and barley scientists whose varieties have been released and identified. He stated that the identification of fourteen wheat and two barley varieties during the workshop is a historic achievement. He also stressed on strengthening of international collaboration in wheat and barley. Dr. Singh said that network projects in strategic fields will be taken up and international trainings and visits by Indian scientists will be rationalized. He extended thanks and appreciations to IARI, New Delhi for providing excellent facilities during the workshop. He extended thanks to all the participants including those from CGIAR institutions and Dr. JP Tandon, Former Project Director for attending the workshop and fruitful interaction. At the end, Dr. Singh conveyed his best wishes to all for a pleasant journey back home.

Dr. SN Shukla, ADG (FFC) congratulated all scientists whose varieties were released and identified during the year. He urged all the scientists to communicate the failure of trials/experiments to Project Director so that corrective remedies may be taken in time. He desired to provide more authority and scope to the monitoring teams. He thanked IARI, New Delhi for extending logistics for conduct of workshop. Dr. Shukla also lauded the hard work done at DWR, Karnal and for smooth conduct of workshop. He extended thanks to the DG, ICAR and the DDG (CS) as well as International collaborators from CIMMYT and ICARDA for their participation and in making fruitful suggestions in the workshop. At the end he also wished safe journey to all.

The Chairman of the session, Dr. HS Gupta, Director, IARI, New Delhi appreciated the scientists for achieving record production of wheat during 2008-09. He cautioned that food security of the country is not robust and pointed out that preliminary estimates project a loss of 8-10 million tons of rice during current *kharif* season. The delayed monsoon, however, may provide new opportunities in *rabi* season and urged to exploit it by enhancing the wheat productivity. He desired that the latest technology may be transferred to farmers immediately for achieving this goal. He also stressed on reduction in the cost of cultivation and improving the

water and input efficiency in wheat. Dr. Gupta emphasized that maintenance of soil health was another challenge and it may be partially solved by using RCTs and retention of crop residues. The Chairman thanked both the Co-Chairmen, rapporteurs and organizers for good conduct of the proceedings. He congratulated scientists whose varieties were identified/released and extended his best wishes to the retiring scientists.

The plenary session ended with a formal vote of thanks proposed by Dr. R Chatrath.

ANNEXURE-I

List of final year entries along with check varieties: 2009-10

I. NORTHERN HILLS ZONE

1. Advance Varietal Trial (IR-TS-TAS)
Varieties : HS 507
Checks : HS 240, VL 804, TL 2942, VL 907(I)
2. Advance Varietal Trial (RF-TS-TAS)
Varieties : HS 507
Checks : HS 240, VL 804, TL 2942, VL 907(I)
3. Advance Varietal Trial (RF-ES-TAS)
Varieties : None
Checks : VL 616, HS 277, VL 829, HPW 251
4. Advance Varietal Trial (RI-LS-TAS)
Varieties : HS 513, VL 925
Checks : Sonalika, HS 295, VL 892, HS 490
5. Advance Varietal Trial (RF-TS-W+B) : Summer Sown
Varieties : DWR 62, DWR 63 (Both barley varieties)
Checks : HS 375, Sonalika, BHS 352 (Barley)

II. NORTH WESTERN PLAINS ZONE

1. Advance Varietal Trial (IR-TS-TAS)
Varieties : PBW 621, DBW 50
Checks : PBW 343, DBW 17, PBW 550, HD 2967(I)
2. Advance Varietal Trial (IR-TS-TDM)
Varieties : PDW 315, PBDW 317, WHD 943
Checks : PDW 233, PDW 291, WH 896, PBW 343, PDW 314(I)
3. Advance Varietal Trial (IR-LS-TAS)
Varieties : None
Checks : PBW 373, PBW 590, WH 1021
4. Advance Varietal Trial (RF-TS-TAS)
Varieties : WH 1080
Checks : C 306, PBW 175, PBW 396
5. Advance Varietal Trial (RI-TS-TAS)
Varieties : PBW 629, WH 1080, WH 1081, UP 2744
Checks : C 306, PBW 175, PBW 396

III. NORTH EASTERN PLAINS ZONE

1. Advance Varietal Trial (IR-TS-TAS)
Varieties : HD 2997, DBW 46, RSP 561
Checks : HD 2733, PBW 343, K 0307, HD 2967(I), DBW 39(I)
2. Advance Varietal Trial (IR-LS-TAS)
Varieties : DBW 51, DBW 52, NW 4035, HI 1563
Checks : HUW 234, DBW 14, NW 2036, HD 2985(I)
3. Advance Varietal Trial (RF-TS-TAS)
Varieties : HD 3016
Checks : C 306, K 8027, HD 2888

IV. CENTRAL ZONE

1. Advance Varietal Trial (IR-TS-TAD)
Varieties : HI 8691(d), HW 5207-1, MSCS 3742(d), ADDW 4021(d)
Checks : GW 322, HI 8498(d), Lok 1, HI 1544, MPO 1215(d)(l)
2. Advance Varietal Trial (IR-LS-TAS)
Varieties : MP 4105
Checks : DL 788-2, MP 4010, HD 2932, HD 2864
3. Advance Varietal Trial (RF-TS-TAD)
Varieties : MP 3288
Checks : HI 1531, HI 1500, A-9-30-1(d), HD 4672(d), HI 8627(d)
4. Advance Varietal Trial (RI-TS-TAD)
Varieties : MP 3288
Checks : HI 1531, HI 1500, Lok-1, HD 4672(d), HI 8627(d)

V. PENINSULAR ZONE

1. Advance Varietal Trial (IR-TS-TAD)
Varieties : None
Checks : GW 322, NIDW 295(d), NIAW 917, HI 8663(d), MACS 6222(l),
MACS 6273(l), UAS 304(l)
2. Advance Varietal Trial (IR-LS-TAS)
Varieties : None
Checks : HI 977, Raj 4083, HD 2932, AKAW 4627(l)
3. Advance Varietal Trial (RF-TS-TAD)
Varieties : UAS 316, NIAW 1415
Checks : NI 5439, HD 2781, AKDW 2997-16(d), HD 2987(l)
4. Advance Varietal Trial (RI-TS-TAD)
Varieties : UAS 316, NIAW 1415
Checks : NI 5439, AKDW 2997-16(d), PBW 596, HD 2987(l)

VI. SOUTHERN HILLS ZONE

1. Advance Varietal Trial (RI-TS-TAS)
Varieties : None
Checks : HW 2044, CoW (W)-1, HW 5207(l)

VII. SPECIAL TRIALS

1. Advance Varietal Trial (*Dicoccum* Trial : IR-TS)
Varieties : None
Checks : DDK 1009, MACS 2496, HI 8663(d), MACS 2971
 2. Advance Varietal Trial (Special SAT-IR-TS)
Varieties : KRL 238, KRL 240
Checks : Kh 65, KRL 19, KRL 210 (l), RL 213(l)
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