

ICAR-Indian Institute of Wheat and Barley Research, Karnal-132001, Haryana

Proceedings of the 22nd Meeting of Research Advisory Committee



Held on October 26-27, 2017

**Proceedings of the 22nd RAC Meeting Held during October 26-27, 2017 at
ICAR-IIWBR, Karnal**

The 22nd Research Advisory Committee (RAC) meeting was held at the ICAR-Indian Institute of Wheat and Barley Research, Karnal during 26-27th October, 2017. The following members attended the meeting:

Dr. HS Gupta, Former Director Indian Agricultural Research Institute and Former Director General, Borlaug Institute for South Asia	Chairman
Dr. RM Singh, Former Dean, Banaras Hindu University, Varanasi	Member
Dr. VC Sinha, Ex-Principal Scientist, India Agricultural Research Institute, New Delhi	Member
Dr. B. S. Mahapatra, Professor Agronomy, G B Pant University of Agriculture & Technology, Pantnagar, Uttarakhand	Member
Dr. SM Bhatnagar, Former Head, Regional Agricultural Research Station, Durgapura, Rajasthan	Member
Shri Sukhminder Pal Singh Grewal (Farmer's Representative & IMC Member)	Member
Ms. Pradeep Kaur Arya (Farmer's Representative & IMC Member)	Member
Dr. GP Singh, Director, ICAR-Indian Institute of Wheat and Barley Research, Karnal, Haryana	Member
Dr. Bhudeva S Tyagi, Principal Scientist, ICAR- Indian Institute of Wheat and Barley Research, Karnal, Haryana	Member Secretary

The meeting was also attended by all the Principal Investigators of various programs and the Scientists of IIWBR, Karnal including the representatives of its Regional Station, Flowerdale, Shimla.

Dr. BS Tyagi, Secretary, RAC welcomed the Chairman, the Members of RAC and all other participants. This was followed by introduction of all RAC members and IIWBR staff. Dr. GP Singh, Director, IIWBR presented a comprehensive overview of wheat & barley research in India during the previous year. He informed the house that this year we may touch the record production of wheat (98 million tonnes) from an acreage of around 31.8 million ha with all time high average productivity of 3216 Kg/ha. He also stated that there was no major outbreak of any disease during the year especially in Jammu, Punjab and Haryana. He further added that six wheat and three barley genotypes were identified for release during the wheat and barley workshop at Varanasi in Uttar Pradesh.

While discussing the achievements of *Multilocal and Multidisciplinary Research Program on Wheat and Barley Improvement*, he informed that one of the major achievements of the year was the release of world's first biofortified wheat variety WB-2. In addition, the mosaic of three varieties viz., HD 2967, WH 1105 and HD 3086 occupy quiet a large area in North Western as well as in Eastern plain zones. The heat/thermal tolerance is the priority area of research and a genotype, DBW 150 has been identified and registered for the purpose. He further informed the house that draft genome sequence of Karnal Bunt and yellow rust pathogen has been decoded and a new *Lr* gene has been identified. Wheat Blast disease is the major emerging threat from Bangladesh and necessary steps are being taken along the Indo-Bangladesh border to check its spread in India. Furthermore, on the basis of preliminary screening, many of the Indian varieties including HD 2967 have been found tolerant to this disease. The Institute has initiated several steps to reach to the farmers' door steps using Helpline, WhatsApp group, face book, besides organizing scientist-farmers interaction and *Kisanmela*.

Dr. BS Tyagi presented the action taken report on the last year's RAC recommendations. This was endorsed by the house and it was suggested that some of the activities recommended are of continuous in nature and thus be continued with (details of ATR is presented in ANNEXURE-I).

Addressing the house, Dr. HS Gupta, Chairman RAC, stated that the Institute should prioritize the current problems and find out solution(s) thereof. He further added that wheat is an important cereal, which has helped the country in attaining self-sufficiency in food grains. Dr. Gupta complimented the R&D program of wheat for making the country surplus in wheat production. He asked the researchers to work with the goal of MLM (More with Less for More) to help attain the objective of doubling the farmer's income by 2022, an objective set by the Govt. of India. Dr. Gupta emphasized on spread of high yielding varieties and associated production technology to Uttar Pradesh, Bihar and Madhya Pradesh so that the average productivity of these states can be increased by one tonne per ha.

The members, while addressing the house, expressed their concern about degradation of natural resources and suggested to set goal of sustainability for the next 50 years taking into account the soil health and water scarcity into consideration. They were deeply concerned about burning of crop residue in north India which causes pollution and health hazards in addition to adverse effect on soil health. They asked the scientists of natural resource management and social sciences to take it on priority and come up with effective solution.

The Chairman and members had deliberations on following points with the scientists of the institute:

- Along with increasing productivity, quality improvement of wheat should also be taken on priority. The RAC commended the efforts of the institute in developing zinc-rich variety, WB 2 and it was suggested to further strengthen the efforts in developing genotypes with

higher iron, zinc and beta carotene. Protein quantity and quality in conjunction with micronutrients should be increased to fight deficiency of protein and the hidden hunger respectively.

- The requirements of industry should be taken into account while identifying varieties for release.
- The Chairman lauded the efforts of wheat program in successfully managing wheat rusts in India. This is an outstanding work and he complimented the scientists and urged to continue their efforts to checkmate the pathogens of all the three rusts.
- The house had a very long and exhaustive discussion on crop residue management and to contain the problem of stubble burning. The appropriate technologies should be further refined as per need and passed on to the farmers in different areas of the country with special reference to Punjab, Haryana and western Uttar Pradesh. This year, the *Krishi Vigyan Kendra*, Kaithal may be contacted for collaboration for creating more awareness about the available technologies among the farmers of Kaithal district. Deployment of a scientist in the discipline of Farm Power and Machinery at IIWBR, Karnal was urgently felt to work on the machinery related with crop residue management.
- The research advisory committee and scientists deliberated on the future strategies to bring in second green revolution in the country and the house was of the opinion that transfer of technologies should be made more effective especially for eastern India. Replacement of older varieties of wheat with newer improved cultivars released for eastern region should be propagated aggressively. Hand-in-hand, larger number of front line demonstrations of technologies should be planned in eastern India.
- There was a discussion on isolated demands of dual purpose wheat and barley in Punjab; therefore, it was suggested that a study/survey may be conducted to find out the expected demand of this kind of variety before initiating the work.
- There was discussion of *Triticum boeoticum* and it was suggested to take up anatomical studies on its leaves for studying C4 pathway in wheat.
- The need of the hour is to develop mega varieties like HD 2967 for different sectors/end uses so that there is no mixing of grains and industry can procure product-specific varieties.
- An urgent need was felt for posting of a scientist in Food Science & Technology so that the work on novel product development from wheat & barley can be initiated. Meanwhile, CIPHET & private industries may be contacted for standardization of multi grain *atta* (flour) using improved varieties of wheat & barley.
- The members were of opinion that the crosses should be attempted on targeted traits basis and the collaborating centres/partners should also be involved in the process. Cooperating centres should be encouraged for nominating advance materials developed through hybridization using at least one indigenous widely adapted variety.
- Scientist should devote more time on management of storage pests as well as blast disease of wheat. The house was informed that a project on blast has already been submitted to DAC &FW for funding.

- The RAC members opined that capacity building initiatives for the scientists and technical officers, at the institute, should be further strengthened.

After the observation/comments of RAC, the Division-wise presentations were made by Drs Vinod Tiwari (Crop Improvement), DP Singh (Crop Protection), SC Bhardwaj (Regional Station, Shimla), RK Sharma (Resource Management), RK Gupta (Quality & Basic Sciences), Vishnu Kumar (Barley Improvement) and Satyavir Singh (Social Sciences) on the achievements made in the research and the future research programmes.

After 2 days of exhaustive deliberations, following recommendations and general advisories were given by the RAC:

A. Specific Recommendations:

1. Core/mini-core collection of genetic resources of wheat should be developed by 2019-20 so that they are made available to researchers/collaborators in the country for use in breeding program.
2. Pre-breeding should be strengthened and winter \times spring hybridization program can be a part of this activity from Feb. 2018 onwards.
3. Development of varieties for restricted irrigation should be given priority to reduce the adverse effects of climate change and water shortage.
4. Innovative/novel breeding strategies especially hybrid wheat, MAS and other emerging technologies should be strengthened and pursued vigorously to obtain quantum jump in wheat yield.
5. R&D efforts on diversification of rice-wheat system (by including suitable crops especially legumes and green manure) should be strengthened to make the wheat-rice system sustainable. This will help in containing the problem of straw burning also.
6. Efforts on finding out solutions for successful management of *Phalaris minor* should be accelerated in collaboration with Directorate of Weed Research, Jabalpur and solution be found within a time frame.
7. Concerted efforts should be made by the institute to identify wheat blast-like disease along Indo-Bangladesh border. As this disease is knocking at our door, the surveillance and management of this disease should be pursued vigorously.
8. Transfer of technology with special reference to front line demonstration should be strengthened to increase the productivity in north eastern plain zone as about 6-7 million tonnes of extra wheat may come from this zone.

B. General Suggestions and Advisories

1. IIWBR's co-operators in eastern region had been very effective in the past especially in developing new varieties. This needs to be rejuvenated, to help attain next green revolution. Some of the strategic centres viz. Pant Nagar, Cooch Behar, Kanpur, Kalyani and Varanasi need to contribute significantly in wheat research program.
2. RAC noted that a private company has imported malt barley lines which were found susceptible to rust in north western plain zone and now again these lines are being tested in central zone, such susceptible material may be avoided (to test) in other zone/s.

The meeting ended with the vote of thanks to the chair, members of RAC and staff of IIWBR by the Member Secretary, Dr. BS Tyagi.



(BS Tyagi)
Member Secretary



(HS Gupta)
Chairman

ANNEXURE-I

Action Taken Report of the 21st RAC Meeting held On April 7-8, 2017, at ICAR-IIWBR, Karnal

On the basis of the presentations, interventions and deliberations of the meeting, some important recommendations were made during the RAC meeting and the same were intimated to all staff. The following is action taken report:

SN	Recommendations	Action Taken
Major recommendations		
1.	Climate change is an issue of paramount importance. To address it, management of genetic resources and genomic research should be the priority in years to come. For additional funding, research projects can be submitted in the network mode to DBT, DST, CSIR etc.	<p>Under NICRA project, identification of new genetic resources tolerant to heat/ drought/ both the stresses is one of the activities at IIWBR. Germplasm accessions are screened at four locations under four conditions and controlled conditions at Karnal.</p> <p>Under CIMMYT funded project, ~1000 shortlisted genotypes for heat tolerance were further evaluated for terminal heat stress tolerance under very late sown conditions at three locations to identify sources.</p>
2.	Efforts should be made to develop core/ minicore collection of wheat germplasm in collaboration with NBPGR. Large scale phenotyping should be continued as it is an important aspect for any genetic and molecular work leading to wheat improvement.	The core collection of wheat from NBPGR consist 1285 lines were obtained from NBPGR for evaluation at our end. Core collection: NBPGR (1285 lines) + IIWBR (122)
3.	Utilization of wheat and pathogen genome sequencing be explored. Projects should be explored in collaboration with institutes like NRCPB, NABI.etc.	<p>Marker based on genome sequence of wheat rust pathogens got synthesized and are being used in cloning of avirulence genes/gene silencing and other studies.</p> <p>Full length Karnal Bunt (<i>Tilletia indica</i>) genome sequence dataset has been generated and submitted at NCBI.</p> <p>Investigations for identification of genomic regions associated with heat and drought tolerance using transcriptomics and comparative genomics routes are underway.</p> <p>A DST funded project on allele mining for heat stress tolerance is operational.</p> <p>MoU has been signed with: Indian Institute of Science Education and Research, Kolkata; Banasthali University, Rajasthan and National Agri-Food Biotechnology Institute, Mohali</p>

4.	The reasons limiting the popularization of Conservation Agriculture among farmers need to be studied. Appropriate machines for conservation agriculture with low cost be developed.	<p>The limiting factors for the popularization of Conservation Agriculture among farmers have been identified and are as follows:</p> <ul style="list-style-type: none"> • Only limited area can be sown (6-7 acres) in a day • It is difficult to sow wheat with full residue before 10.00 AM and after 5.00 PM due to high moisture content • Availability of Turbo Happy Seeder machine during peak sowing is a concern • High cost of machine (Rs.1.3 to 1.6 lacs) is limiting the adoption • Limited time frame is available for sowing especially under timely sown conditions (almost a month) which require more machines <p>The Rotary Disc Drill developed by this institute in collaboration with private manufacturer has only problem of blunting of front powered discs for which CIAE Bhopal has agreed to help in overcoming this.</p>
5.	Preliminary studies on the effect of spraying of trehalose-6-phosphate on wheat yield can be taken up.	The chemical, T6P (trehalose-6-phosphate) has been procured from Dr Ram Sagar Mishra working at Shiv Nadar University, Noida and the trial has been initiated in rice and will also be taken up in wheat during <i>Rabi</i> season.
6.	Remote sensing studies need to be taken at a larger scale for disease dynamics, yield and area estimates.	ISRO collaborated project ended a year before. Identification of area affected due to diseases of wheat through hyper spectral method is possible at block level. Future collaboration is being explored to map the yellow rust affected areas but for detection of early infection, through remote sensing is not possible at present. Use of drone will be explored at field level during current crop season to detect yellow rust appearance during survey and surveillance exercises.
General suggestions and advisories		
1.	Bio-availability of Zn and Fe should be seen in bio-fortified varieties.	10 varieties were evaluated for <i>in vitro</i> bioavailability of Fe and Zn at NIN, Hyderabad. 100 new varieties with sufficient variations in Fe and Zn have been submitted to NIN for evaluation.
2.	A theme paper on doubling the income of farmer needs to be brought out.	A chapter on doubling the income of wheat producers has been drafted and communicated to DAC&FW for inclusion in the Committee Report on Doubling Farmers Income by 2022 headed by Shri Ashok Dalwai. Apart from the above chapter; commentary article, strategy paper and popular article have been published on the DFI theme.
3.	Documentation of 2 to 3 success stories be done to show the impact of technologies. BAU Sabour model can be taken up to highlight these stories. These should also be uploaded on the Institute web site.	The Success Stories of three farmers have been documented and uploaded on the ICAR-IIWBR website. The success story of Sh. Anil Kumar was published in <i>Dainik Jagran</i> . WhatsApp Group has been created to update farmers about wheat and barley related information.

4.	Impact assessment of the technologies of the Institute be undertaken by Extension Scientists/ Economists. Work on storage pests and management should be initiated to mitigate the losses in storage.	A project on Impact assessment of RCTs is undergoing. Studies have been initiated on screening wheat and barley varieties for resistance against three important storage pests (rice weevil, lesser grain borer and rust red flour beetle). Observations are recorded on number of adults emerged, grain weight loss, and germination percentage. Besides, botanicals are being tested for their efficacy against three storage pests under laboratory conditions.
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