

HRDC Bulletin IRR

IRRI- Hybrid Rice Development Consortium

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HRDC members gather for 7th annual meeting

By C. Arlegui

The 7th HRDC annual meeting was held on 18-20 March 2014 at IRRI headquarters, Los Baños, Laguna, Philippines. Out of 69 member companies, 39 were able to join; thus, a total of 75 people from the public and private sector participated in the meeting and selection of lines. The participants were welcomed by the new deputy director general for research, Dr. Matthew Morell. The following is a part of his remarks.

"IRRI is committed to continue this important work. The HRDC has been in operation since 2008 and it is an important time now to pause and reflect on what is happening and what we will be doing in IRRI. I think it's also a very important time for the whole consortium to reflect on how the HRDC operates and how it can go forward. One of the things we'd like to see from today is feedback on how the consortium is going and how it could be improved. There are some issues we need to work out. Going forward, it is important to provide new thinking so that the new advisory committee may review and discuss among themselves in order to improve HRDC's operations."

The expectations of the HRDC members both from the public and private sector were presented by Dr. Ish Kumar of Rasi Seeds Ltd. and Dr. Manuel Regalado of PhilRice.

Presentations are found at the HRDC website, http://hrdc.irri. org/. Other topics presented at the meeting were:

- Rice market research (Alice Laborte, IRRI)
- IRRI's new inbred breeding program (Bertrand Collard, IRRI)
- Characterization and mapping of long stigma trait for improvement of outcrossing in rice (Balram Marathi, IRRI)
- Rice grain chalk research update (Nese Sreenivasulu, IRRI)
- Marker Lab Service for HRDC members (Michael Thomson, IRRI)
- HRDC General Report (Charisse Grace Arlegui, IRRI)
- HRDC MRYT Report and HRDC research update (Fangming Xie, IRRI)

On 19 March, the participants visited IRRI's inbred breeding, multi-environment rice varietal testing (MET), and the HRDC multi-location replicated yield trial (MRYT) plots.

Two days were allotted for the breeders to select breeding lines in the F_4 - F_6 stages. This year, 2,445 lines were selected by 26 private and 14 public HRDC members.

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HRDC's new advisory committee for 2014 to 2017

By C. Arlegui

IRRI Director General Robert Zeigler thanked the former HRDC advisory committee members who provided excellent service to the consortium, as the new members accepted the next three-year term, which begins on 1 May 2014 and ends on 30 April 2017.

The new members of the HRDC Advisory Committee were chosen through an online election done by the members between 14 February and 7 March 2014. From a total of 69 member companies, 45 (65%) cast their votes.

The committee is composed of the following:

- 1. Dr. Matthew Morell, deputy director general for research, IRRI
- 2. Dr. Fangming Xie, senior scientist and hybrid rice breeder, IRRI
- **3.** Dr. Yog Raj, rice breeding manager-Asia region, Bayer BioScience Pvt. Ltd.

- 4. Mr. Tu Hehua, assistant general manager, Longping High-tech Philippines R&D Center, Inc.
- **6. Dr. Alex Rigor**, research scientist, Pioneer Hi-Bred International, Inc.
- 7. Dr. Manuel Jose C. Regalado, acting deputy executive director for research and Scientist I, Philippine Rice Research Institute (PhilRice)
- 8. Dr. Peisong Hu, deputy director general, China National Rice Research Institute (CNRRI)

The committee will oversee the operations of the consortium by complying with the agreed-upon guidelines. The members of the HRDC, on the other hand, are expected to give full support to the committee by providing feedback and suggestions for improvement.

HRDC growth continues

By C. Arlegui

In a span of 6 years, the number of members of the HRDC has almost doubled. From 39 members in 2008, HRDC now has a total of 72, with 33 from the private sector and 39 from the public as of 30 April 2014. India (36%) and China (13%) have the largest number of HRDC members.



The increasing number of members also means a continued increase in the number of germplasm shared. In 2013, a total of 5,403 germplasm were shared among HRDC members.



MRYT in 5 years: conclusions and issues

By C. Arlegui

During the 7th meeting held on 19 March, Dr. Fangming Xie reported about the MRYT (multi-location replicated yield trial) to assess whether the hybrid rice community has made progress in hybrid rice yield in the last five years (2008 WS to 2013 WS). The data conclude that (1) there is NO significant increase on the **average** hybrid rice yield and yield advantage over the inbred CK and (2) there is NO significant increase in the **best** hybrid rice yield and yield advantage over the inbred CK.

Dr. Xie pointed out that there is a very strong interaction between genotyping and seasons. What we have learned in the MRYT in the past 5 years is that, there is no significant improvement in yield and yield heterosis for the hybrid rice community. **Therefore, HRDC members** were encouraged to give the best high-quality and newly released hybrids for testing in different locations. Members who have offered their site as a testing location should manage the MRYT fields carefully so as to reduce variation. Lastly, data collection must be improved.

Isues that need to be addressed in the next cropping season (2015) were also discussed as follows:

- Trial site: Decide on and adjust the locations for testing.
- Field management: Strictly follow the standardized protocol provided by the HRDC.
- Traits investigated: Common traits are to be agreed upon by the members with a list provided by the HRDC.
- Seed quality and shipment: Provide high-quality seeds to be tested.
- Communication: Frequent communication on the updates and issues between HRDC and the contact person assigned to manage the trial site.
- Breeding for season: Is there a need to start on this?
- High-yielding potential: Find the best location and field management for maximum yield.

Members were highly encouraged to give their opinions on these issues so that the advisory committee could formulate plans and strategies to further improve the MRYT and other activities.

Shifting research to 2-line hybrid rice breeding

By C. Arlegui

The hybrid rice R&D is now on the move to shift from 3-line to 2-line hybrid rice breeding. In fact, IRRI has invested on building a cold-water facility for TGMS line selection. Construction of the facility has been going on since April 2014 and is expected to be fully operational in the 2015 dry season.

Activities for the IRRI S-line sequential plantings in the greenhouse have already started in December 2013 and will continue until December 2014. This is to examine fertility/sterility performance of S-lines based on sequential planting in the dry and wet seasons, specifically at IRRI, Los Baños, Laguna, Philippines. This involves 5 S-lines and 1 check variety. Weather data from the IRRI weather station are obtained to correlate the temperature with pollen fertility and seed set data.



Hybrid rice breeding with precision farming using the drill-seeding method

By W. Larazo





The hybrid rice R&D breeding program in IRRI was the first to use the drill-seeding method, which is now on its fourth ricegrowing season. For drill seeding, rice seeds are accurately planted in a row on dry fields using the Wintersteiger drillseeding machine. This method was used starting in the 2013 dry season with 342 entries (from the F_2 and F_3 stages) planted on 1 ha of rice field, and has since progressed to 579 entries seeded on 2.5 ha by 2014 (Table 1). This method corresponds to the adjustment in the selection of breeding lines.

Following the efforts of using the drill-seeding method during planting, significant changes have been observed in terms of efficiency in manpower requirements, increase in return of investment (labor and expenditure), and the relatively low operating costs.

Previously, the HRDC spent more than US\$1,000 per ha on crop establishment using the conventional transplanting method for breeding line selection. With the adoption of the drill-seeding method, the cost of crop establishment decreased by 43% from the 2013 expenses (Table 2). We continue to improve the accuracy and efficiency of this method through studies on how to decrease the number of vacant spots and adopting smart maintenance of the drill machine.

Table 1. Total land area and number of rice varietal entries in the 2013-14 cropping.

Growing season	Land area (ha)	Entries planted
2013DS	1	342
2013WS	1.5	360
2014DS	2.5	579

 Table 2. Cost of crop establishment between

 rice transplanting and dry-seeding methods.

Rice seeding method	Unit cost (\$ ha-1)
Transplanting	1,056
Dry seeding	598.5

Exploring more resources for HRDC's operations and activities

By C. Arlegui

With the growing number of HRDC having 54% of its members from the public sector, the management is exploring options to increase the consortium's resources in order to compensate for increasing costs of operations and activities. From 2008 to 2013, budget from the CGIAR decreased. HRDC's major source of income comes from the private members' annual membership fees. This year, the management will review the increase in the membership fee and revise the license fee. The increase in the membership fee will apply only to new applicants and to existing members who will get a renewal. Most of the private memberships will expire in 2015 and 2016. The management will also look into the possibility of collecting membership fees from public members.

The existing HRDC guidelines will be thoroughly reviewed this year and members will be informed about the final decision.

Hybrid rice R&D breeding and yield trials become more efficient and economical

By W. Larazo

For the last five growing seasons of hybrid rice R&D, the management of field activities with regard to breeding and yield trials has dramatically improved because of improved implementation of crop practice and the use of farm machinery. High-quality field data have been achieved and continue to remain reliable as the research team uses mechanized and improved field management. The team made use of the IRRI Experiment Station's farm machinery to facilitate farm operations, such as the small-scale combine harvester for harvest and postharvest operations (Fig. 1).







Fig. 1. Combine harvester for rice.

These mechanized operations reduce the errors associated with harvesting and measuring yield components.

Furthermore, instead of hiring field laborers to protect rice seeds from birds during crop growth, the use of a plastic bird net (Fig. 2) greatly improved field maintenance and significantly reduced the operating cost.





Fig. 2. Experimental rice fields covered with a plastic bird net to protect from damages made by birds.