Sub1 Rice News

A publication of the IRRI-Japan Project on Submergence-Tolerant Rice Varieties

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In the Spotlight

Sub1 accomplishments highlight project review and planning meeting

Documentation of accomplishments for 2007 of the six participating Southeast Asian countries (Cambodia, Indonesia, Lao PDR, Philippines, Thailand, and Vietnam) highlighted the annual review and planning meeting for the project *Implementation plans to disseminate submergence-tolerant rice varieties and associated new production practices to Southeast Asia*. The event was held on 29-31 January 2008 in Ho Chi Minh City, Vietnam.

Mr. Tatsuo Hirayama, deputy consul general of Japan in Ho Chi Minh City, formally opened the meeting, reiterating that the project was *"an affirmation of Japan's steadfast support to assist in the efforts of IRRI in developing innovative rice technologies to increase rice production and ultimately contribute to food security and reduce hunger in the Southeast Asian Region."*

Similarly, the keynote speaker, Dr. Bui Ba Bong, vice minister of the Vietnamese Ministry of Agriculture and Rural Development (MARD), acknowledged IRRI's *"leadership in activities on submergence-tolerant rice as a conversion of a dream to reality."*

Other highlights of the meeting included IRRI scientists reporting on the progress of research in developing genotypes with higher tolerance of, and faster recovery from, submergence; combined tolerances of different stresses; and proper management options for new varieties. Forty-five NARES scientists also developed their work and financial plans, and refined strategies to disseminate developed technologies using approaches such as seed systems, participatory varietal selection (PVS) or "mother-baby trials," technology demonstration ("technodemo") farms, and information, education, and communication (IEC). For more information on this story, go to http://cps-connex/irribulletin/2008.04/default.asp.

The Japan Ministry of Foreign Affairs funds the project.

Group photo of the participants in Ho Chi Minh City, Vietnam, 29 January 2008.

In this issue…..

Gates Project on rice research is launched…p. 2

Stakeholders convened for dissemination strategies for rice with submergence tolerance…p. 2

IRRI poster on submergence-tolerant rice wins…p. 3

Swarna-*Sub1* variety performs well in West Bengal…p.5

Recent Developments in Basic Research on Rice with Submergence Tolerance

The following two papers by E.M. Septiningsih et al and A.M. Ismail were presented during the project review in Ho Chi Minh City, 29 January 2008.

The *Sub1* gene: progress in breeding and genetics

E.M. Septiningsih et al.

The *Sub1* QTL (quantitative trait locus) was first mapped in 1996 (Xu and Mackill 1996) and was finally cloned and revealed as three ERF (ethylene responsive factor) genes, named *Sub1A*, *Sub1B*, and *Sub1C*. It was also demonstrated that *Sub1A* is the primary contributor for tolerance (Xu et al 2006), and this gene could provide tolerance for up to 2 weeks of complete submergence. Our phenotypic and expression studies on the two fixed lines of recombinants identified within the *Sub1* cluster also confirmed the importance of *Sub1A* in conferring the tolerant phenotype. In addition, we found that *Sub1C* by itself did not significantly contribute to tolerance.

DNA (deoxyribonucleic acid) sequences surrounding the region that were available upon the cloning of *Sub1* provided the opportunity to develop improved markers. This has helped speed up our efforts in converting six mega-varieties through marker-assisted backcrossing (MAB). Different sets of field trials have evaluated the performance of the first three converted

Continued on page 5 .

Gates Project on rice research is launched

National and international rice specialists came together to launch a multimillion dollar project on "Stress-tolerant rice for poor farmers in Africa and South Asia" at the Africa Rice Center (WARDA), Cotonou, Benin, on 5-7 March 2008, and at the Indian Council of Agricultural Research (ICAR) in New Delhi, India, on 16-19 March 2008.

The project, being carried out by IRRI and its partners, has been approved for funding by the Bill & Melinda Gates Foundation through a grant to IRRI for US$19.9 million over three years.

Scientists and the directors general of the Africa Rice Center and IRRI headed their delegations, which included about 20 participants from IRRI headquarters in the Philippines and representatives from eastern and southern Africa. IRRI staff members who joined DG Robert Zeigler were T.P. Tuong, David Mackill, Abdelbagi Ismail, Casiana Vera Cruz, Arvind Kumar, Ed Redoña, Rachid Serraj, R.K. Singh, Joe Rickman, Glenn Gregorio, Kei Kajisa, Noel Magor, David Shires, Eugene Castro, and Zhikang Li.

For more details on this story, please go to http://bulletin.irri.cgiar.org/bulletin/2008.09/default.asp or http://cps-connex/irribulletin/bulletin/2008.11/default.asp.

Some of the participants in the Gates project launched in India.

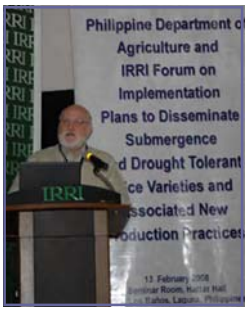
Stakeholders convened for dissemination strategies for rice with submergence tolerance

The Philippine Department of Agriculture (DA) and the International Rice Research Institute (IRRI) involved rice stakeholders in the formulation of dissemination strategies for submergence- and drought-tolerant rice varieties.

In a national forum held at IRRI on 13 February 2008, the DA and IRRI recognized that the first and crucial step for fast and effective dissemination was to make the stakeholders—regional GMA (*Ginintuang Masaganang Ani*) rice program coordinators, local government units, rice specialists, extension workers, and farmers—aware of the availability and potential of the submergence- and drought-tolerant rice varieties in alleviating production losses in flash-flooded and drought-stricken areas in the Philippines.

"If these technologies get deployed, they can be our strongest weapons in our battle against food insecurity," Dr. Robert Zeigler, IRRI director general, said.

Highlighting the forum were the developed technologies of growing rice in flash-flooded and drought-stricken areas in the Philippines presented by Dr. David J. Mackill, IRRI senior plant breeder and Program 1 leader, and Dr. Arvind Kumar, IRRI scientist, respectively.



Dr. R. Zeigler during the forum's opening program.

Likewise, the Philippines' undertakings on submergence-tolerant rice were presented by PhilRice chief science research specialist Dr. Nenita V. Desamero. As for the country's program on drought interventions for rice, Dr. Frisco M. Malabanan, DA's GMA rice program director, conveyed the rice industry status in the Philippines, focusing on flood-prone and drought-stricken areas.

Apart from informing stakeholders, the main concerns of the forum were mapping out dissemination, adoption, and diffusion strategies for the technologies and identifying areas of possible improvement of the technologies, and potential partners and collaborators for their dissemination. Hence, a national agenda for the strategic dissemination of the use of submergence-tolerant rice varieties as well as increased adoption of the technology was crafted.

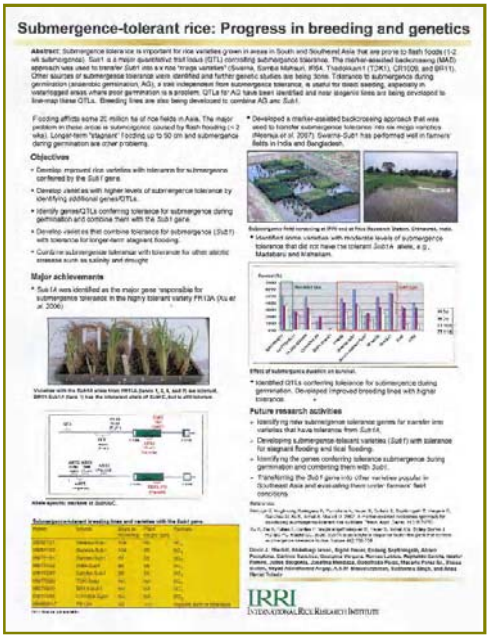
In identifying submergence-prone areas, stakeholders agreed that an area experiencing 5 to 12 days of submergence at the vegetative stage, and with a water depth of 100 cm, is considered a target site.

"We are not losing the battle; instead, we are winning it, but not fast enough," DA Secretary Arthur C. Yap said. In addition, Yap also said there should be seeds available for the dry season of 2008 and 2009, and wet season of 2009. (*Hanna Hazel Mavi Biag/PhilRice & Maria Rowena M. Baltazar/IRRI*)

DA Secretary Arthur Yap (left) during field visit in *Sub1* demo area. Also in picture are (from left to right) Dr. David Mackill and Mr. Alvaro Pamplona.

Group photo of participants in the IRRI-DA forum, 13 February 2008.

IRRI poster on submergence-tolerant rice wins



IRRI's poster entitled "Submergence-tolerant rice: progress in breeding and genetics" won the Best Poster award under the Biological Sciences, Agriculture, and Forestry category. The award was given by the National Research Council of the Philippines during its 75th Annual Meeting held at the Manila Hotel on 12 March 2008. The award included a certificate and a PhP15,000 prize.

Presenting the poster were Romeo Labios and Darlene Sanchez, the poster's co-authors and project implementers, along with David J. Mackill, Abdelbagi Ismail, Sigrid Heuer, Endang Septiningsih, Georgina Vergara, Alvaro Pamplona, Reynaldo Garcia, Nestor Ramos, Julius Borgonia, Josefina Mendoza, Godofredo Perez, Macario Perez, Sr., Eloisa Suiton, Seyed Abdolhamid Angaji, A.S.M. Masuduzzaman, Sudhansu Singh, and Anna Mariel Toledo.

The National Research Council of the Philippines (NRCP) is a council under the Department of Science and Technology. Formerly the National Research Council of the Philippine Islands, it was created on 8 December 1933 by virtue of Act No. 4120 of the Ninth Philippine Legislature**.** It was established to promote the advancement of science through research that will build up a body of Filipino men and women devoted to scientific research. It was to convene regularly as an organization and formulate national plans to solve problems on health, sanitation, agriculture, industry, and others. A group of 114 prominent scientists and technologists were then selected as charter members to form a corporate entity known as the National Research Council of the Philippine Islands. It was renamed the National Research Council of the Philippines after the country's independence in 1946.

Among the principal mandates of NRCP is the provision of assistance for the development of the research capabilities of Filipino scientists. It also acts as an advisory body in selecting priority sectors for the national government on problems and issues affecting the country.

News From NARES Partners

Philippines

Diseases: potential setbacks in upscaling dissemination of a submergence-tolerant variety in the Philippines

Five rice diseases prevailed in the on-farm trial of *Sub1* cultivars IR64-*Sub1*, Samba Mahsuri-*Sub1*, Swarna-*Sub1,* and IR49830-7-1-2-3, conducted from July to November 2007 in Papaya, San Antonio, Nueva Ecija. At tillering, bacterial leaf blight (BLB), with 77%, 88%, and 93% incidence and corresponding severity of 0.2%, 7%, and 9%, was observed in IR49830-7-1-2-3, IR64, and IR64-*Sub1*, respectively. IR49830-7-1-2-3 had 28% leaf blast incidence with severity of 1.5%. The other varieties had negligible BLB and leaf blast incidence. Leaf streak was a minor occurrence. At maturity, 50% and 83% of IR64-*Sub1* plants were affected by neck blast and sheath blight, respectively, manifesting 5% severity for neck blast and 14% for sheath blight. Continuous rain aggravated the spread of the diseases, increasing the infection rate (incidence × severity) to 3% for neck blast and 12% for sheath blight. A yield reduction of 11% to 46% may result from blast disease and 31% from sheath blight with low to moderate severity. False smut was observed on the grains of Samba Mahsuri-*Sub1*.

In scaling up the dissemination of IR64-*Sub1*, site selection must focus on regions where BLB, blast, and sheath blight are not endemic, and a disease management strategy must be packaged. Other *Sub1* cultivars with field resistance to the diseases may also be considered. Introgression of genes for resistance into IR64-*Sub1* or, alternatively, introgressing the *Sub1* gene into a high-yielding variety with field-blast and BLB resistance through marker-aided backcrossing must be pursued for future wide-scale dissemination. *(Amelita T. Angeles, Nenita V. Desamero, Norvie L. Manigbas, Myrna D. Malabayabas, Maria Gloria Vivian A. Sacupon/PhilRice).*

Indonesia

Annual average flood-damaged areas in Indonesia were about 268,800 ha, including completely damaged areas of about 58,000 ha. The planting of new submergence-tolerant rice varieties has potential to overcome problems in flash-flood areas.

Evaluation of submergence-tolerant rice varieties

New submergence-tolerant lines were evaluated at the experiment station and in farmers' fields. On-station evaluation of tolerant lines was carried out at the Muara Experimental Station, Indonesian Center for Rice Research (ICRR). The screening procedure followed the standard method as described in *Sub1* Rice News 1(2), 2007. Using this method, tolerant and intolerant lines can be clearly differentiated. Tolerant rice lines IR64-*Sub1*, Swarna-*Sub1*, Samba Mahsuri-*Sub1*, IR49830-7-1-2-3, and IR40931-1-3-2 could survive until 14 days of submergence treatment, whereas two susceptible varieties, IR42 and Batanghari, were completely damaged (Fig. 1). Two other IRRI tolerant lines (IR70213-10-CPA-2-UBN-B-1-1-3 and IR70181-5-PMI-1-2-B-1), which were introduced in Indonesia in 2004, survived for only 6 days of submergence treatment.

Multilocation yield trials of submergence-tolerant lines are being conducted at two flash-flood-susceptible areas, Indramayu and Bojonegoro. The trials began in January 2008. IRRI submergence-tolerant lines, as well as promising Indonesian breeding lines, are being evaluated in a randomized complete block design with four replications. At Indramayu, 1 week after transplanting, the trial was completely flooded for 4 days but all varieties were found to survive. The crop will be harvested at the end of April 2008.

Seed multiplication of submergence-tolerant rice varieties
Seeds of submergence-tolerant rice are being increased on about 0.5 ha at the Muara Experimental Station. The seeds will be used as material for participatory varietal selection in the target areas. *(Aris Hairmansis, ICRR)*

Fig. 1. Performance of submergence-tolerant and intolerant lines after submergence treatment for 14 days in a greenhouse, Muara Experimental Station, ICRR.

South-Central Vietnam

Survey results in four provinces of south-central Vietnam (Quang Nam, Quang Ngai, Binh Dinh, Phu Yen) indicated an annual average of 125–142 rainy days. Total annual average rainfall varies from 1,853 to 2,282 mm, mainly during the 9th to 12th months (73–86% of total rainfall), which causes great flooding damage for rice, especially in lowland areas (Table 1).

Table 1. Rice areas damaged from typhoons and floods in south-central Vietnam.

Year	Damaged rice areas (ha)			
	Quang Nam	*Quang Ngai*	*Binh Dinh*	*Phu Yen*
1998	4,206	–	17,919	12,800
1999	15,168	–	10,249	9,877
2000	19,461	–	8,656	3,233
2001	2,291	–	3,811	6,152
2002	500	–	12,585	565
2003	–	–	7,404	5,016
2004	958	5,935	19	3,274
2005	2,707	6,561	47,169	12,195
2006	3,603	1,224	2,302	–
Total	**48,894**	**13,720**	**110,114**	**53,112**

To reduce damage from typhoons and floods, farmers seek rice varieties having 2–3 weeks of submergence-tolerance ability. At present, in collaboration with the program on submergence-tolerant rice (*Sub-1* Rice Project), the Agricultural Science Institute for South Coastal Central of Vietnam (ASISOV) is deploying six major activities encompassing rice variety selection and cultivation techniques suitable for frequently flooded rice production. Experiments conducted on-farm are located at two sites: Nhon Hanh village, An Nhon District, Binh Dinh Province, and Phuoc Thuan village, Tuy Phuoc District, Binh Dinh Province; and one site at the Rice Research Station in An Nhon District, Binh Dinh Province.

Rice varieties for selection include DV108 (control), IR82810-407, IR84194-139, OM 4900, BC15, TBR1, and DT50. *(Hoang Minh Tam and Lai Dinh Hoe, ASISOV)*

South Vietnam

Submergence damage in rice and challenges in expanding its adaptability to submerged conditions in Vietnam

Project collaboration focuses on improving the living standards of farmers by increasing the productivity of submergence-tolerant rice varieties; contributing to natural resource management and environmental protection; developing new varieties resistant to pests/diseases; adopting submergence-tolerant rice varieties; and applying low-input production by poor farmers in flood-prone conditions. Experiments were carried out at Vinh Thanh, CLRRI, Vinh Hung (Long An), and Phung Hiep (Hau Giang), including assessment of production losses from typhoons and floods; socioeconomic analysis; inventory of *Sub1*-tolerant rice varieties from the Mekong Delta; rice breeding for submergence-tolerant varieties; and further plans for development in 2008.

Based on research results, the amount of rainfall was found to decrease in the regions, such as Vinh Thanh, Phung Hiep, Co Do, and Vinh Hung. However, there was still a gradual increase in the water level for the last ten years (2000-07) in these regions. This caused seedling damage, re-transplanting, yield loss, and income loss. Further, disease frequency increased rapidly, such as stem borer, leaf-rolling caterpillar, and brown leaf spot, leading to increased fertilizer and pesticide applications. However, collection and screening of local materials as potential new sources of submergence tolerance continued. Two varieties, *Nang Tay Do* and *Bong Sen,* were found adaptable to drought conditions and waterlogging problems. Biophysicial and socioeconomic characterization are problems that should also be given attention.

The following is a stakeholder analysis report on the southern coastal region of Vietnam on flooding management for increasing productivity: (1) problems on water and soil; (2) crop production hampered by flooding stress; (3) the rice crop in medium lands and medium lowlands; (4) more than 80% of farm households are landless; (5) livelihoods are agriculture-dependent; (6) lack of training on *Sub* tolerance selection; and (7) greater use of local varieties despite low yield.

On plant breeding for submergence-tolerant varieties, experiments were conducted at CLRRI for four selected regions: Co Do, Phung Hiep, Vinh Hung, and Vinh Thanh. The following process was followed. First, a *Sub* breeding population was formed, which consisted of F_2, F_3, F_4, and F_5-F_6 generations with 25, 4, 4, and 10 crosses, respectively. An observational trial

followed, in which two genotypes from IRRI and 41 genotypes from CLRRI were checked. In evaluating advanced lines for *Sub* tolerance, a total of 62 lines, including 27 for AC-derived lines and 49 for breeding lines, correspond with the evaluation of varietal parameters as shown in Table 1. (*Nguyen Thi Lang/ CLRRI)*

Table 1. Populations constructed for submergence-tolerant rice varieties.

Generation	No. of crosses	Remarks
F_2	25	Without *Sub* screening
F_3	4	*Sub* stress in F_2
F_4	4	At CLRRI
F_5-F_6	10	At CLRRI

In preparation for the implementation of the activities on biophysical and socioeconomic losses and risk assessment of Activities 1, 2, and 6, a series of training of trainers activities was implemented. Dr. Yann Chemin, GIS expert and postdoc of Activity 1, took the lead in providing NARES partners with training in the following countries: (1) the Philippines on 13-14 January at PhilRice, Nueva Ecija, with 22 participants; (2) Thailand on 4-5 February at Prachinburi Rice Research Center with nine participants; (3) Indonesia on 26-27 February at the Indonesian Center for Food Crop Research and Development (ICFORD), Bogor, with 21 participants; and (4) Laos on 4-5 March at the National Agriculture and Forestry Research Institute (NAFRI), Vientiane, with 19 participants.

Digna Manzanilla and Lourdes Velasco took the lead in providing NARES partners in Vietnam with training on data management and analysis of socioeconomic losses and risk assessment on 5-13 March.

The training covered database structure using ACCESS application, techniques in data entry, preparation of dummy tables/tabulation, and some notes on data analysis. It also discussed the objectives of the baseline survey and village characterization in relation to the overall analytical framework for the assessment of flooding.

Breakthroughs

Swarna-*Sub1* variety performs well in West Bengal

S.K. Bardhan Roy and S. Malik

Cultivar Swarna-*Sub1* was found to outperform cultivar Swarna. Based on research results reported by S.K.B. Roy and S. Malik of the Rice Research Station based in West Bengal, Swarna-*Sub1* showed clear superiority over Swarna in terms of tolerance of prolonged submergence. The results came from their evaluation of the two cultivars for degree of submergence tolerance and yield under field conditions in nine locations of West Bengal's different flood plains.

Swarna (MTU 7029) is the leading variety planted by farmers on 60% (1.2 million hectares) of rainfed lowland areas vulnerable to water stagnation. Among the recommended rice varieties for rainfed lowland, Swarna contributes higher average grain yield of 4 t/ha, but cannot withstand prolonged submergence after 3–4 days. A variety similar to Swarna in production but more submergence tolerant could provide more grain harvest to farmers and Swarna-*Sub1* proved to be that variety.

With reports of tolerating 2 weeks of submergence, Swarna-*Sub1* was field tested at the Rice Research Station in Chinsurah in 2006 and was found more promising than Swarna. Hence, a state-level program was initiated to test the adaptability of Swarna-*Sub1* under different flood plains of West Bengal in 2007.

The study further reported that Swarna-*Sub1* contains more starch under submergence than Swarna. Grain yield of Swarna-*Sub1* at 4.35 t/ha was 11% higher than that of Swarna, which registered only 3.91 t/ha.

Roy and Malik emphasized that the adoption of Swarna-*Sub1* on Swarna lands (12 lakh hectares) would add an extra 5.28 lakh of paddy during the kharif (aman) season there. It would also add 440 kg/ha at the current grain yield of Swarna. The researchers highly recommend the use of Swarna-*Sub1* for West Bengal during the wet season.

The Sub1 gene.... From page 1.

mega-varieties, namely, Swarna-*Sub1*, Samba Mahsuri-*Sub1*, and IR64-*Sub1,* under shallow and submerged conditions. The *Sub1* lines outperformed the original parents under stress, with no significant differences under shallow conditions. Upon completion of all six mega-*Sub1* lines, a preliminary evaluation of the lines together revealed significantly higher tolerance than that of the original mega-varieties. However, there were some differences in the level of tolerance among them. Varieties that recovered faster after de-submergence tended to have better vegetative growth.

F_1 progenies derived from crosses of IR64/IR64-*Sub1* were less tolerant than the tolerant parent, IR64-*Sub1*. *Sub1A* expression of the F_1 plants was less than that of IR64-*Sub1*. This preliminary study suggests that the tolerant alleles of *Sub1* should be in both parents in hybrid varieties to maintain the high level of tolerance.

In order to develop new lines having higher tolerance for stagnant flood conditions lasting more than 2 weeks, we screened a set of 76 rice accessions under stagnant flooding

conditions. Several rice accessions were identified as tolerant based on yield performance. The most tolerant one was a hybrid variety with an average yield of 3.6 t/ha. The first three developed *Sub1* lines were not tolerant of this condition. However, PSB Rc68, which also possesses *Sub1*, survived well, with an average yield of 2.3 t/ha. This variety is taller than the three converted *Sub1* varieties.

Tolerance of flooding during germination, referred to as anaerobic germination (AG), is a very important trait for regions practicing direct seeding. A genetic study for this trait has been completed using Khao Hlan On (KHO) as the donor, and NIL (near-isogenic line) development and fine mapping of a major QTL are under way. These developed NILs will be used as parents in pyramiding the AG trait with other traits, such as *Sub1*. In addition, multiple crosses were made to develop lines with tolerance of AG using several tolerant donors, such as Khaiyan, KHO, Mazan Red, and Cody. Some promising lines having high tolerance of AG, high yield, and good grain quality were identified. Some crosses were also made to combine tolerance of submergence and AG in one package. The donor for *Sub1* was Swarna-*Sub1* and the donor for AG was Khaiyan. Promising lines having good grain quality and showing tolerance of both traits are now at the F_6 generation, and seed multiplication is ongoing.

In relation to our efforts in converting additional popular varieties with tolerance under the Japan project, we have modified our approach to be able to finish our new *Sub1* varieties in the BC_1F_2 generation, especially for the condition in which the recipient genomes are closely related to the *Sub1* donor. Our case study on PSB Rc18, PSB Rc 82, and Ciherang, which are closely related to IR64-*Sub1*, showed that, among 188 markers surveyed, 31%, 34%, and 23% were polymorphic, respectively. Furthermore, the carrier chromosome (chromosome 9) of these three varieties was similar to the one of IR64-*Sub1*, except on the tip of the chromosome where *Sub1* is located. These two factors increase the chance of finding the best plant having the *Sub1* gene and yet carrying very little donor genetic background.

Adaptation of rice to flood-prone areas and prospects for cultivar improvement

A. Ismail

Rice faces many challenges in flood-prone areas, starting from flooding during germination, flash-flooding at vegetative growth of 1–2 weeks, and stagnant flooding until maturity at depths of 30–60 cm. Tolerance for flooding during germination is important, especially for direct-seeded rice, and screening of germplasm shows a few genotypes with abilities to produce shoots and roots under hypoxia or anoxia. Important physiological traits such as higher amylase activity, induction and increased alcoholic fermentation, increased ethylene levels, and lower peroxidases were found associated with tolerance. QTLs with reasonably high effects for this trait were identified. Breeding lines combining tolerance for flooding during germination and *Sub1* may enhance flooding tolerance. For flash-flooding, the *Sub1* gene provides protection of 10–18 days based on flood-water characteristics and growth stage. *Sub1* provides a yield advantage of 1–4 t/ha compared with materials without the gene. Improved nursery management options for tolerant varieties include low seeding density, use of balanced NPK and Zn, use of relatively older seedlings, and exclusion of excessive N amounts. Stagnant flooding occurs in large areas and modern varieties are sensitive. Prolonged partial flooding results in high mortality, tiller reduction, and poor yield. The introgression line Swarna-*Sub1*, because of its short stature, does not perform well under prolonged partial flooding. Screening is ongoing to identify rice genotypes with better tolerance for flooding under stagnant flooded conditions. Ongoing and future activities are to combine tolerance for different stresses, efficient seed production and distribution of tolerant lines, large-scale dissemination and testing of *Sub1* introgression lines in target areas, better tolerance of stagnant flooding, and proper management options for the new varieties, including packaging and dissemination.

Upcoming Activities

6-10 April 2008. Data Management and Analysis of Socio-Economic Loss and Risk Assessment. Bangkok, Thailand. Contact persons—Dr. D. Manzanilla, d.manzanilla@cgiar.org, and Ms. L. Velasco, l.velasco@cgiar.org.

14-25 April 2008. Training Workshop on Participatory Approach to Scaling Up the Adoption of Submergence-Tolerant Rice, IRRI HQ, Los Baños, Laguna, Philippines. Contact persons—Dr. R. Labios, r.labios@cgiar.org, and Ms. Ma. Angeli Maghuyop, m.maghuyop@cgiar.org.

28 April-7 June 2008. In-country Trainer's Training on Participatory Varietal Selection (PVS). Venue to be identified by NARES team leaders. Contact persons—Dr. D. Manzanilla, d.manzanilla@cgiar.org, and Dr. R. Labios, r.labios@cgiar.org.

22-24 July 2008. National Rice Week III 2008, ICRR, Sukamandi, Indonesia. There will be demonstrations of rice technologies and a seminar on rice. The event will be attended by the president of the Republic of Indonesia, agribusiness stakeholders, researchers, and farmers. Through this event, submergence-tolerant rice varieties will be demonstrated. Contact person—Dr. H. Sembiring, h.sembiring@telkom.net.

Did you know….?

Maria Rowena M. Baltazar ("Rowie") joined the IRRI-PBGB family on 12 March as the new specialist—research and extension for Program 1—Submergence-Tolerance Rice Project.

Expressions (literary corner)

AMAZING "Rice" GRACE

By Norvie L. Manigbas

I
Millions of farmers around Asia,
Depend on rice in much area,
Daily food for everyone, income source for many,
Amazing rice grace for humanity.

II
Floods destroy huge tracts of paddies,
Overflowing lakes and rivers to communities,
Devastating million rice crops in the country,
Amazing rice grace for humanity?

III
New science brought new strain of rice,
Decades of research, hard work pays its price,
Now offers hope to farmers in dire poverty,
Amazing rice grace for humanity.

IV
The rice type with the submergence gene,
Can survive flood water in 2 weeks' regime,
Attains high yield with beneficial quality,
Amazing rice grace for humanity.

V
Tests undertaken in six flood-prone countries,
Expecting better performance than other varieties,
Uplifting farmers' lives, attaining food security,
Amazing rice grace for humanity.

The ***Sub1* Rice News** updates partners and stakeholders on the IRRI-Japan Project on Submergence-Tolerant Rice Varieties. The project has six major activities:

1) Loss and risk assessment

2) Development of a response plan

3) Technology adaptation and evaluation

4) Training programs for extension workers and researchers in NARES

5) Multiplication and distribution of new seeds

6) A follow-up study of the entire program

The project is being implemented in six Southeast Asian countries: Cambodia, Indonesia, Laos, Philippines, Thailand, and Vietnam.

The Japan Ministry for Foreign Affairs funds the project.

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