A GCP Community of Practice: Marker-Assisted Selection of Rice in the Mekong Basin

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Project Rationale:

Mekong Region – includes Thailand, Laos, Myanmar, Cambodia

Rainfed Lowland – Main food production ecosystem and 48% - 85% of total rice production in Mekong Region

Rice suffers from drought, flooding, salinity and diseases.

Biotechnology in Thailand started since 1991 under BIOTEC and supports from Rockefeller Foundation.
- rice improvement programs for famous KDML105 and RD6 using biotechnology

In 2004, RF funded a two-year training on MAS to transfer knowledge and technology to Cambodia (CARDI), Laos (NAFRI) and Myanmar (DAR) – products half way in development.

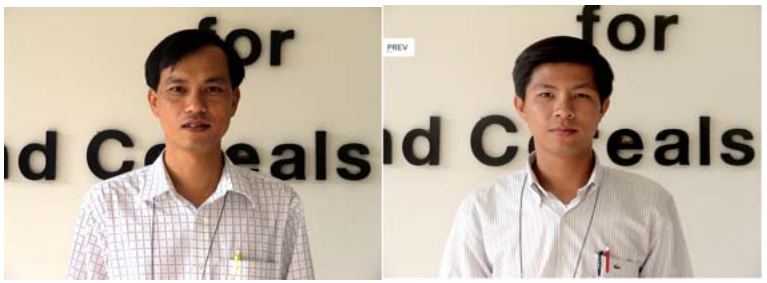
In 2006-07, GCP funded the continuation of unfinished products useful in the improvement of rice production in the Mekong Region.

Activities:

1) First MAS workshop at RGDU (May 21-30, 2007)

Participating Institutes and Representatives

Cambodian Agricultural and Research Development Institute (CARDI)



National Agricultural and Forestry Research Institute (NAFRI)

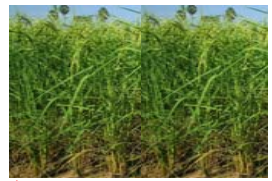
Department of Agricultural Research (DAR)

Ubon Ratchatani University, Thailand (UBU)

Activities and Results:

1) First MAS workshop at RGDU (May 21-30, 2007)

Breeding Scheme and MAS selection in improving cooking quality of a drought resistant rice variety CAR3



CAR3 x PRD
F1 x CAR3
RF — BC1F1 x CAR3 ← MAS
BC2F1
BC2F2 ← MAS
CARDI — BC2F3
GCP — 10 BC2F4 ← MAS

Breeding Scheme and MAS selection in improving cooking quality of a glutinous rice variety TDK1

TDK1 x Homnangnouane
F1 x TDKI
RF — BC1F1 x TDK1 ← MAS
BC2F1
NAFRI — BC2F2 ← MAS
GCP — 7 BC2F3 ← MAS

Future Plan

7 BC2F3 x TDK1
Oct. 2007 → BC3F1 ← MAS
Feb. 2008 → BC3F2
Jun. 2008 → Field Testing of BC3F3

Future Plan

BC2F4 x CAR3
Oct. 2007 → BC3F1 ← MAS
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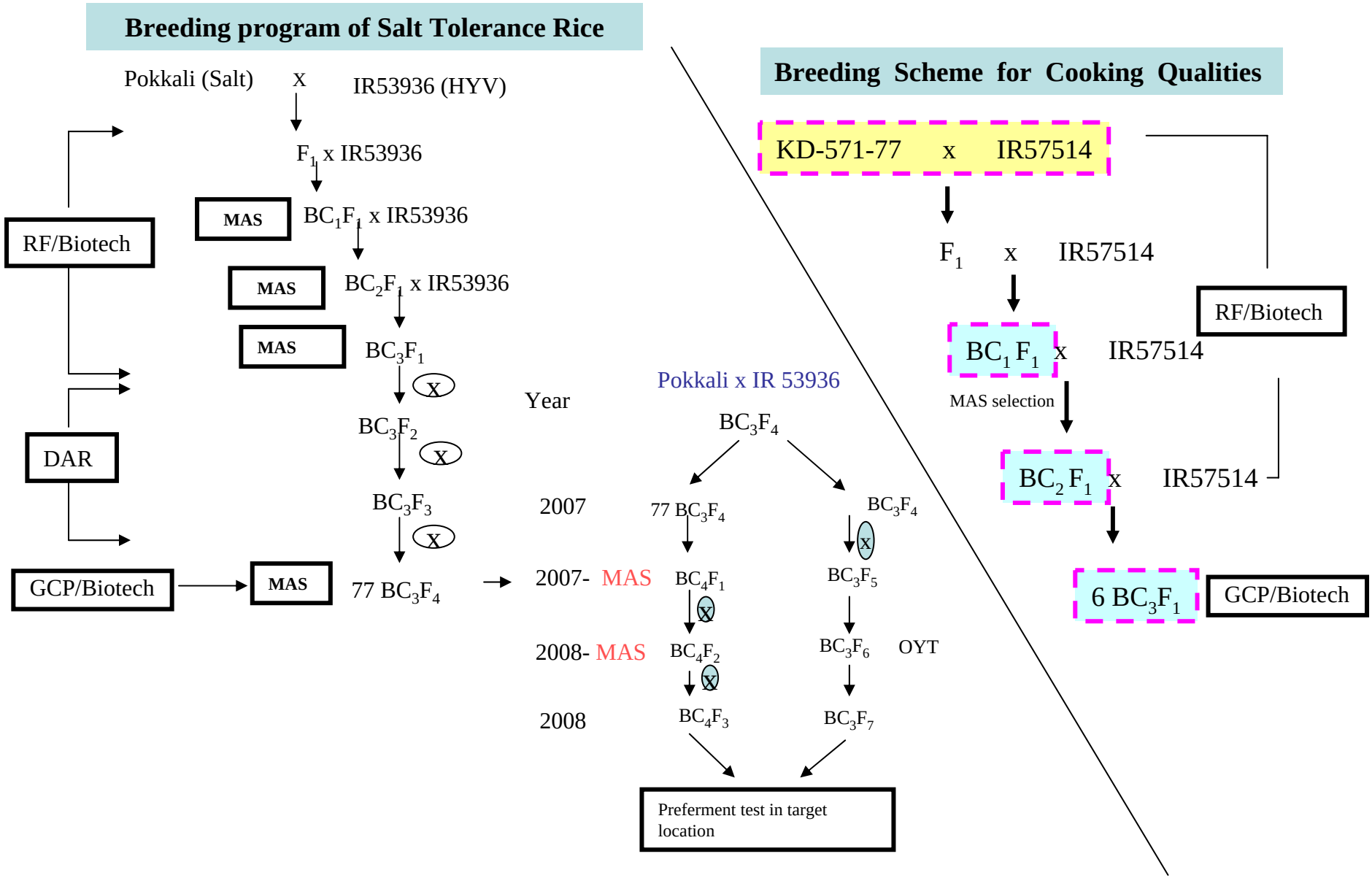
Results:

First MAS workshop at RGDU (May 21-30, 2007)



Activities:

2) Workshop on site: Workshop on QTL and MAS for Plant Breeding

July 3-4, 2007

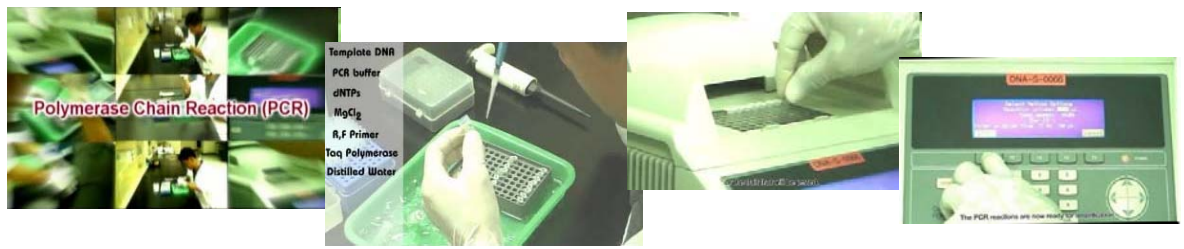
June 19-20, 2007

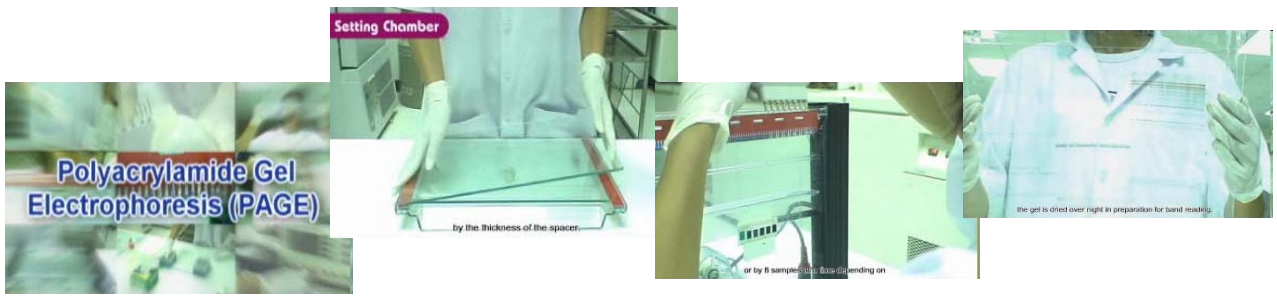
August 20-21, 2007

Activities:

2.) Workshop on site

RGDU production on laboratory techniques needed in MAS program in plant breeding. This video comes in four different languages with English subtitle which was used in the on site workshop.





Results:

2) Workshop on site:

- Participants in three institutes appreciated biotechnology and its potential in plant breeding and in other applications

  - Educators used the information they learned in teaching through our teaching materials and video on laboratory techniques.
  - Institute personnel are asking for more scholarships

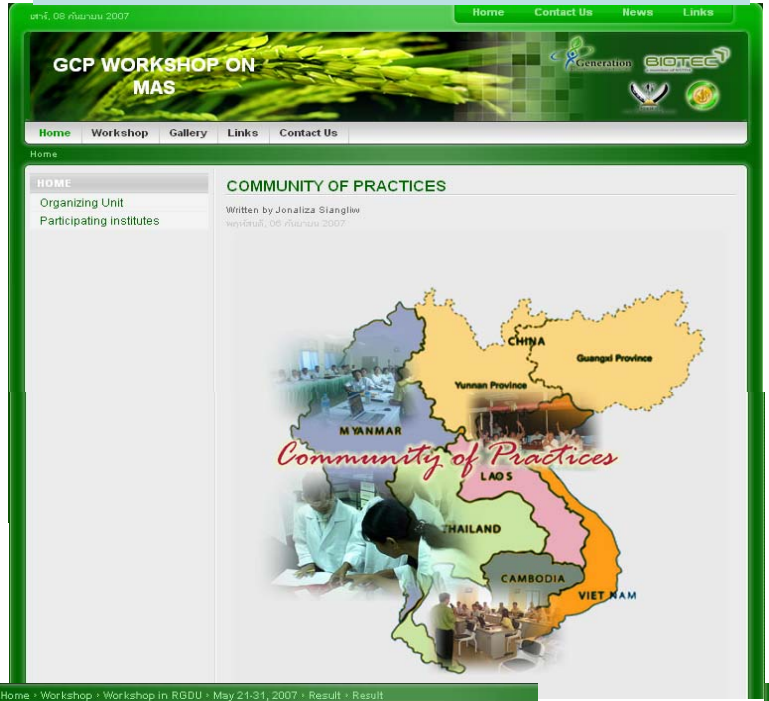
- CARDI and NAFRI started developing their molecular lab but they lacked skilled people.
- DAR needs funding in developing molecular lab.

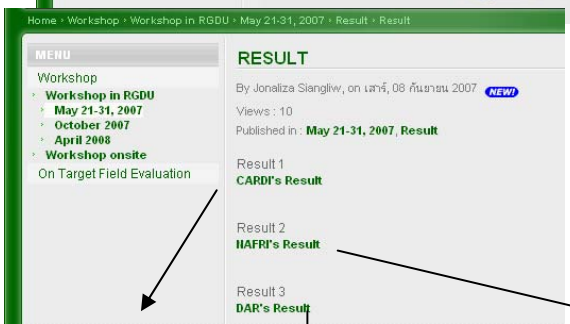
  - Need for more workshop/training to train their personnel to help start the molecular lab.

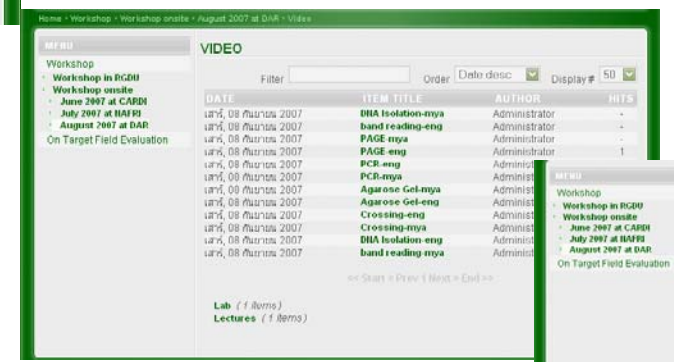
- The three institutes are asking for more collaborations specifically on breeding programs.

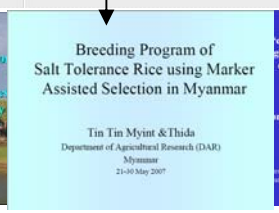
Data format and release:

http://dna.kps.ku.ac.th/mas_gcp









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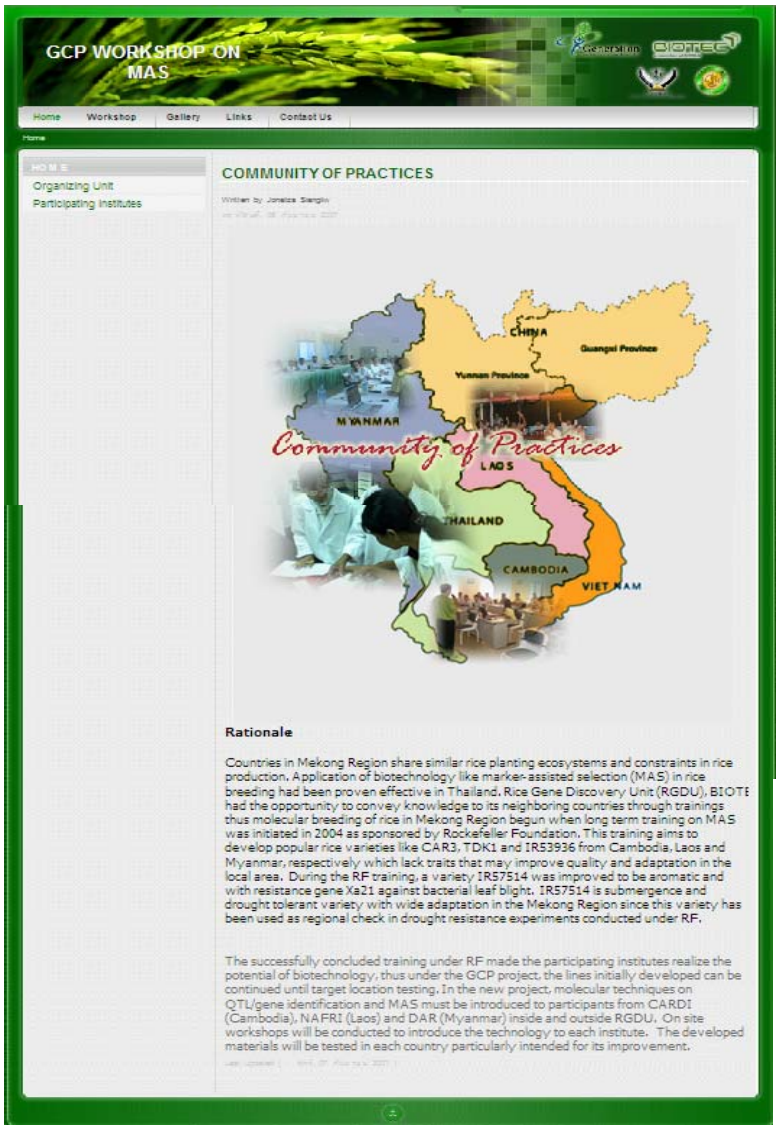

Genotype data – Sept. 2007

- Dec. 2007
- March 2008

Trait Validation – May 2008

Observe Trials – Nov. 2008

Table 2. MAS selection of BC2F4 plants derived from the cross between CAR3 and PRD

No.	Designatn/Parent	Marker		
		BADH	RM587	RM589
1	PRD	1	1	1
2	CAR3	3	3	3
4	CIR 808-1-2	1	2	2
5	CIR 808-1-3	1	3	3
6	CIR 808-2-2	1	3	2
10	CIR 808-2-3	1	3	2
11	CIR 808-2-4	1	3	1
13	CIR 808-3-1	1	1	1
20	CIR 808-4-3	1	3	3
29	CIR 808-6-2	1	2	2
30	CIR 808-6-3	1	1	1
31	CIR 808-6-4	1	1	1
33	CIR 808-7-1	1	2	3
38	CIR 808-8-1	1	1	1
39	CIR 808-8-2	1	3	3
42	CIR 808-8-5	1	2	1
45	CIR 808-9-3	1	1	2
51	CIR 808-10-4	1	3	3
53	CIR 808-11-1	1	2	2
54	CIR 808-11-2	1	2	3
60	CIR 808-12-3	1	2	3
65	CIR 808-13-3	1	1	1
66	CIR 808-13-4	1	1	1
67	CIR 808-13-5	1	3	3
70	CIR 808-14-3	1	1	1
71	CIR 808-14-4	1	2	2
73	CIR 808-15-1	1	3	3
74	CIR 808-15-2	1	1	1
80	CIR 808-16-3	1	3	3
84	CIR 808-17-2	1	1	1
89	CIR 808-18-2	1	1	3
90	CIR 808-18-3	1	3	3
91	CIR 808-18-4	1	2	2
95	CIR 808-19-3	1	1	1
119	CIR 808-24-2	1	3	3
120	CIR 808-24-3	1	3	3
121	CIR 808-24-4	1	3	3
124	CIR 808-25-2	1	2	1
126	CIR 808-25-4	1	3	3
17	CIR 808-3-5	2	2	2
18	CIR 808-4-1	2	1	1

Selected progenies

Link with other projects:

Rainfed Lowland Project (RLP):

-Project collaboration between BIOTEC and Rice Department
-Improving KDML105 and RD6
- resistance to blast, bacterial leaf blight and brown plant hopper
- tolerance to flooding, drought and salinity
-Using information from (RLP) to be applied on GCP-MAS project.

Product delivery:

1) Building effective team and network.
2) GCP web on MAS with information on markers, genotyping and phenotyping protocols and other training materials.

Impact on users:

1) Fast line conversion of elite varieties.
2) Materials will be planted in the target location/s in each country to observe the adaptation of the newly developed.
3) Rice with good quality and adaptation.

The 6th Asian Crop Science Association Conference
The 2nd International Conference on Rice for the Future

5-9 November 2007, Bangkok, Thailand

BIOTEC
a member of NSTDA

Generation
A CGIAR Challenge Programme

HarvestPlus
Breeding Crops for Better Nutrition

JSB 日本育種学会
Japanese Society of Breeding

日本作物学会
Crop Science Society of Japan

Local organizers:
BIOTEC, Kasetsart University, Department of Agriculture and Rice Department

In partnership with:
Generation Challenge Programme, Harvest Plus, Japan Society of Breeding and Crop Science Society of Japan

http://www.biotec.or.th/BioAsia2007

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CONFIRMED SPEAKERS

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