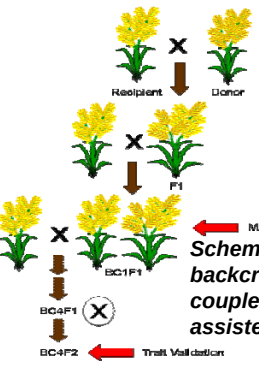
# The community of practices "Concept applied to rice production in the Mekong Region: Quick conversion of popular rice varieties with emphasis on drought, salinity and grain quality improvement"

**Theerayut Toojinda** [1,2], **Jonaliza L. Siangliw** [2], **Sureeporn Katengam** [3], **Watcharapong Wattanakul**[3], **Monthathip Changpangsaey** [4], **Men Sarom** [5], **Toe Aung** [6], Kamonwan Riabroy[3], Daw Myint Yi 6, Daw Tin Tin Myint 6, Daw Thi Da 6, Khun Leang Hak 5, Ouk Sothea 5, Then Rathmuny 5, Uraiwan Kotchasatit [7], Kongpanh Kanyavong [4], Chanthakhone Boulaphanh [4], Souvan Thandavong [4], Khamta Souliyavongsy [4]

Acknowledgement to Rockefeller Foundation (RF), Generation Challenge Program (GCP), National Center for Genetic Engineering and Biotechnology (BIOTEC) and Kasetsart University (KU) for funding this project.

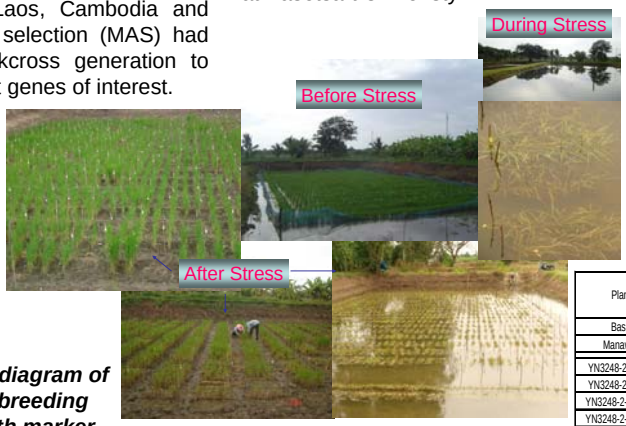
Countries in Mekong Region share similar rice planting ecosystems and constraints in rice production such as drought, flooding, salinity and rice diseases. Biotechnology had been applied in rice breeding at Rice Gene Discovery and the knowledge had been transferred to nations in the Mekong Region including Laos, Cambodia and Myanmar. Marker-assisted selection (MAS) had been applied in every backcross generation to select for lines carrying target genes of interest.




***Schematic diagram of backcross breeding coupled with marker-assisted selection***

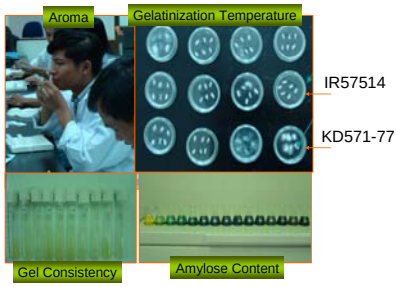
## *IR57514 with improved grain quality*

$BC_3F_4$ Introgression lines of IR57514 were validated for submergence and grain quality traits. At present the materials are now in yield trial testing at Kasetsart Univeristy.




***Submergence testing of IR57514***

## *Phenotyping of grain quality traits*




***Grain quality tests of IR57514 introgression lines***

| Plant No. | Aroma | | Amylose Content and Gel Consistency | | |
|---|---|---|---|---|---|
| | BADH Marker | Aroma Score | Waxy Marker | AC Score (%) | GC Score (mm) |
| Basmati# | 3[a] | Aromatic | 3 | 24.28 | 60 |
| Manawthuka* | 1[b] | Non-aromatic | 1 | 31.05 | 60 |
| YN3248-2-34-4-3-75[c] | 3 | Aromatic | 3 | 25.04 | 65 |
| YN3248-2-34-4-3-93[c] | 3 | Aromatic | 3 | 24.14 | 75 |
| YN3248-2-34-4-3-112[c] | 3 | Aromatic | 3 | 26.10 | 70 |
| YN3248-2-34-4-3-118[c] | 3 | Aromatic | 3 | 26.88 | 60 |
| YN3248-2-34-4-3-156[c] | 3 | Aromatic | 3 | 25.60 | 75 |
| YN3248-2-34-4-3-166[c] | 3 | Aromatic | 3 | 21.55 | 65 |

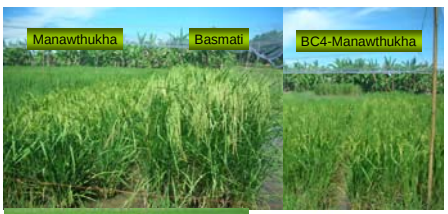
# - donor parent
* - recipient parent
[a] score for band of Basmati
[b] score for band of Manawthuka
[c] progeny of Manawthuka and Basmati

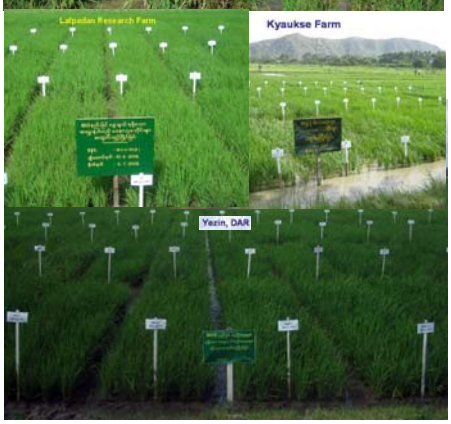
***Genotype and phenotyping of Manawthuka introgression lines***

## *Aromatic TDK1*

ARC, NAFRI will harvest the $BC_3F_3$-TDK1 seeds in September 2008. Aroma evaluation of $BC_3F_3$-TDK1 will be conducted in NAFRI. The materials will be planted in NAFRI this wet season for preliminary yield trial and seed increase. Aromatic TDK1 will increase the price value of TDK1 in the national and international markets.



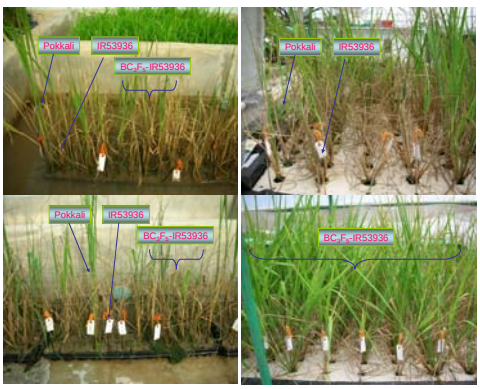



***Manawthukha YT***

## *Aromatic Manawthuka*

$BC_4F_3$-Manawthuka were put in yield trial in Myanmar and in Kasetsart University. In Myanmar, it was planted in 4 provinces such as Yezin, Kyaukse, Kyauktada and Letpadan. The materials are also tested for aroma, GT, GC and AC in DAR in Myanmar. Marker and phenotype data were compared and the introgression lines had aroma and AC similar with Basmati.




***Salinity screening of $BC_3F_5$-IR53936***

## *CAR3 with improve grain quality*

MAS selected $BC_3F_2$-CAR3 that were homozygous for aroma and GC were placed in a dark room to induce flowering. CARDI has the capacity to validate aroma and GC of $BC_3F_3$-CAR3. The materials will be planted in CARDI this wet season for preliminary yield trial and seed increase.

## *IR53936 with salinity tolerance*

DAR also improved the salinity tolerance of IR53936. The trait incorporated will be screened using tissue culture and salinity screening in a concrete pond in Myanmar. Yield trials of $BC_3F_5$-IR53936 will be conducted in 3 provinces nearby the delta area.