日	時間	内容	演者
10月9日（木）	9:00–9:10	お知らせ	石川隆二
	9:10–9:30	開催の挨拶	佐藤洋一郎
	9:30–10:00	ベトナムにおけるイネ育種の現状	Nguyen thi Lang ベトナム （クーロンデルタ・イネ研究所（CLRRI））
	10:00–10:20	質疑	
	10:20–10:50	カンボジアにおけるイネの育種方法	Sakhan Sophany カンボジア （カンボジア農業&開発研究所（CARDI））
	10:50–11:10	質疑	
	11:10–11:40	地球研施設の案内	
	11:40–13:00	昼食	
	17:30	懇親会	
10月10日（金	10:00–10:30	タイにおけるイネ育種の現状：気候変動に伴う育種の現状と未来への戦略	Somsong Chotechuen タイ タイ・イネ研究所事務局
	10:30–10:50	質疑	
	10:50–11:10	ラオスのモチ米遺伝資源（赤米）における遺伝的多様性とその適用	Chay Bounphanousay ラオス イネ・商業作物研究所（RCCRC）
	11:10–11:40	ラオスが目指す水稲の品種改良戦略：2006–2020年度	Phoumi Inthapanya ラオス イネ・商業作物研究所（RCCRC）
	11:40–12:00	質疑	
	12:00–13:20	昼食	
	13:20–13:40	野生イネの遺伝的多様性と育種への貢献	佐藤洋一郎 （総合地球環境学研究所）
	13:40–14:00	総合討論	

DEVELOPMENT AND SELECTING FOR RICE IN VIE TNAM

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ABSTRACT. Environment degradation and climatic change become global problem. Development of rice plant tolerance to environment stress such as drought, salinity, submergence is required to feed rapid increase of population. Thus, there is urgent necessity to maintain breeding materials including wild rice to breed new varieties. Challenges to breed novel rice varieties in Viet Nam are for: several types for pests and diseases, and these are these are essential to compensate against indiscriminate applications of pesticides. Abiotic stress must be also considered as overcome subjects. Improving of grain quality is essential for customer need. Since most agronomic traits are composed of more than two genes and, in extreme cases, ten to more genes, rice researchers must apply advances in molecular biology to acquire extensive knowledge of genetic basis for every traits needed to be improved.

The tools and techniques in biotechnology have now become available which promise to solve grain quality inheritance and can be available to improve it. For example some traits such as aroma, MAS has been tried to improve aroma trait at CLRRI, with a marker, RG 28 on chromosome 8 closely linked to fragrant gene (fgr1). We also detected one STS marker for fgr1 in plant breeding. Eating quality is being also improved.

Breeding Methods for Rice in Cambodia

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ABSTRACT. During the last 10 years, Cambodian rice production has about double from 3.44 to 6.73 million tones with a significant contribution from the Plant Breeding Program of the Cambodian Agricultural Research and Development Institute (CARDI). Although rice production provides enough food for Cambodians, but its productivity is still relatively low in the region. This is mainly due to more than 80% of rice growing area is under fragile rainfed environments, where drought and flood are the main factors contributed to this low productivity. To achieve government target, rice productivity of 3.0 t/ha in 2012, and to contribute to increased world demand in both quantity and quality, the Rice Breeding Program of CARDI is concentrated in improving drought and submergence tolerance of improved popular rice varieties for fragile rainfed environments and developing very early maturity duration with high yield potential for direct seeded irrigated environment through increasing the selection intensity, the genetic correlation between the selection and target environments and the heritability of genotype means in the selection environment.

Rice Breeding in Thailand: Current Status and Future Strategies on Global Climate Change

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ABSTRACT. In Thailand rice is cultivated in different agroecological conditions which are classified as irrigated, rainfed lowland, upland, deepwater and floating ecosystems. About 75% of the rice area is rainfall dependent and rainfed lowland is the major rice ecosystem in the country. Breeding objectives during the early phase of rice varietal improvement program aimed at improving cultivars that performed high yields, acceptable grain quality and wide adaptation to the environment in each region. Recently the breeding objectives have been revised and focused on solving lodging, disease and insect problems in both photoperiod insensitive and photoperiod sensitive materials. As global warming and climate changes become a matter of great concern, Thai rice breeders are setting up breeding strategies to cope with extreme weather events. The strategies include (1) use of diverse rice cultivars suitable for specific locations (2) identification of new genetic donors from diverse sources for tolerance to various environmental stresses and (3) development of rice cultivars for tolerance to high temperature, submergence/flooding, lodging, salinity and drought. Extreme climate changes such as immediately high and cool temperature can dramatically affect rice yield. Increased temperature by itself could lead to spikelet sterility (Yoshida and Parao, 1976), which becomes very severe near 40 degree celsius resulting in complete loss of crop production. Genetic variation in the tolerance to high-temperature induced spikelet sterility has been reported among and between indica- and japonica- type rice genotypes (Matsui et al., 1987). Some rice cultivars have the ability to flower early in the morning, thereby potentially avoiding the damaging effects of higher temperatures later in the day (Imaki *et al*., 1987). Recently genetic materials have been introduced from IRRI to be used for improving new rice cultivars that are tolerant to cold temperature. The rice line 'sub1' that provides genes for flood tolerance is being used by research group at Ubon Ratchathani Rice Research Center to develop new cultivars with submergence tolerance. Evaluation of rice germplasm from the National Rice Seed Storage and Laboratory for Genetic Resources has been conducted at Chumpae Rice Research Center to screen for salinity and drought tolerance. In addition, rice breeders are working in cooperation with other research groups including production technology, plant protection and crop physiology to examine the effects of climate change on optimum planting time, days to flowering, diseases, insects, and chalkiness of rice seeds. Selection and development of the new rice cultivars and further integration of conventional breeding with physiological and molecular approaches to combine other favorable traits with tolerance and adaptability to extreme weather events will be the promising mitigation strategies toward global climatic changes.

The Use of phenotypic characters for classification of genetic diversity in black glutinous rice germplasm of the Lao PDR

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ABSTRACT. The Lao PDR is rich in glutinous rice germplasm diversity. A unique feature of many of the traditional glutinous rice from Laos is the occurrence of black rice, whose pericarp ranges from dark purple to light brown. During the wet season 2004, 53 varieties of lowland black glutinous rice (BGR) and three lowland glutinous white rice (out group) were evaluated, with 46 morphological characters as well as yield potential and eating quality. A randomized complete block design (RCBD) with three replications was employed with the following features: A total of 168 plots were evaluated, with plot size 1.25m x 5.25 m, 25cm x 25cm spacing between plants, total fertilizer rate 40-30-30 kg/ha (N-P_2O_5-K_2O). This experiment showed considerable diversity of BGR. Traits were analysed in three groups: colour traits, qualitative scores, and quantitative measurements. The BGR varieties fell into two major but highly heterogeneous groups, the first major group divided in to five subgroups, four varieties from groups A1, A2 and A3 are clearly separated from the major group (LG 6730, LG8140, LG 2816 and LG6740) with open hill and slender culm, the next subgroup consist of 5 varieties. The distinguish characters of those five varieties are long culm, long and large leaf blade and leaf sheath, more purple color in the plant part and the last subgroup had the biggest members, these are short and slender culm, narrow shot leaf, most of the plant parts have purple. The distinguish characters of the second major group (B) were classified by green color of leaf sheath and leaf blade, internodes and node, cleft shape of ligules, three varieties of group B1, B2 and B4 (LG 6732, LG1655a and TDK5) are clearly separated from this major group. Other characters also had high variation in this group such as the grain yield ranged from 1.3 to 3.6 t/ha. Seven varieties of BGR varieties LG 583, LG 2156, LG 2198, LG 2419, LG 5142, LG7694, LG7942 yielded more than 3 t/ha. From out group only Hom Nang Nouan, traditional varieties, yielded up to 3.6 t/ha, whereas an improved variety, TDK5 gave 2.289 t/ha. The lowland BGR varieties of the Lao PDR are significantly variable in many phenotypic and genotypic characters and these data will be available for further breeding program.

Keywords: Laos, germplasm diversity, black rice, morphological characters, distinct varieties

Lowland Rice Variety Improvement Strategies Year 2006-2020 of the Lao PDR

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ABSTRACT. Rice is the most important staple food crop in Lao PDR and occupies 73% of the total harvested area. There are two rice growing environments: the lowland rice occupies the largest areas accounting for 85% of total rice areas (75% of wet season rice and 10% of dry season irrigated rice) and upland rice, accounting for 15%. Annual rice production fluctuates because it is rainfed, and is at risk of yield loss from drought and flooding, pest and disease infestations (rice blast disease, gall midge and brown plant hopper). The production system predominantly subsistence style with only modest application of inputs.

In 1990, about 95% of the lowland wet season rice was based on traditional varieties (LTV). Since 1993, the National Rice Research Program has released Lao high yielding glutinous rice varieties (LHGV) to many of the Lao traditional varieties. As of 2000, about 60% of total wet season and 80% of dry season rice areas of the central and southern regions of Laos were LHGV. LHGV's higher and more reliable yields make them highly significant in improving rice production in Laos. Since year 2000, the rice self-sufficiency ratio (production to consumption) has been about 130%. To protect the loss of the LTV, from 1995-2000 by the support of the Swiss Government, more than 14,000 accessions of the LTV were collected. One set is kept at IRRI-Philippines and 1 set in Laos, but with a unreliable cool room and poor seed regeneration system; a new cool room and seed regeneration facilities are required. The evaluation for grain quality, biotic and a-biotic stresses is less done. Only a few number of LTV are recommended for direct use due to good eating quality, such as Hom nang nouane and Kai noi. A few very promising lines from the crosses with LTV were disseminated in wet season rice of year 2008.

By the year 2020, the population will increase by 33%, whilst climate change may lead to more flooding and drought, outbreak of rice blast disease; increased incidence of gall midge and changes in BPH and GLH population dynamics. The Lao economy is expected to further open to the international economy. The future rice varieties improvement program will be focus on the following areas:

* Evaluation for grain quality, biotic and a-biotic stresses of LTV collected since 1995-2003

* Improve drought and flood tolerance of variety grown under rain-fed condition in the Mekong River Valley
* Develop of variety well suited to direct seeding rather than transplanting
* Develop of variety better adapted to specific growing environment of the montane lowland
* Incorporation of improved disease resistance into varieties particularly for blast disease
* Incorporation of improved resistance to gall midge in areas prone to gall midge infestation
* Improve eating quality of LHGV
* Development of improved non-glutinous variety to meet an expected increase in consumption of non-glutinous rice in the main population centers
* Development of specialty or boutique rice for a limited export market through the evaluation of the LTV/or indicator geographic (e.g Khao kai noi of Huaphanh province; Khao Chao deng and non-glutinous purpose rice of Vientiane Capital etc..)
* Development hybrid glutinous rice
* Development of aerobic rice
* Continue to conduct in-situ and ex-situ conservation of wild rice and cultivated rice varieties

Keywords: Lao PDR, Strategies, Rice improvement, Traditional varieties.