

International Symposium on Rice Breeding through the Utilization of Unexploited Genetic Resources

—Collaborative Research between Japan and China—

Sponsored by

Tropical Agriculture Research Center, Ministry of Agriculture, Forestry and Fisheries
(October 29-31, 1987, Tsukuba, Ibaraki, Japan)



The 21st TARC (Tropical Agriculture Research Center) International Symposium, which was held at the Tsukuba Center for Institutes in Tsukuba, was centered in the theme "Rice Breeding through the Utilization

of Unexploited Genetic Resources –Collaborative Research between Japan and China–".

The Collaborative Research Project on Rice Breeding between the Tropical Agriculture Research Center in Tsukuba, Japan and the

Yunnan Academy of Agricultural Sciences in Kunming, China was initiated in 1979 under the sponsorship of the Ministry of Agriculture, Forestry and Fisheries of Japan and the Ministry of Agriculture, Animal Husbandry and Fishery of China.

The first phase of the Research Project covered the period 1982-84. The objectives of the present symposium were to summarize the achievements of the Research Project and other rice breeding or cultivation research works in both countries as well as to plan for the third phase (1988-90) of the Project.

Ten Chinese scientists were invited, one from Beijing, six from Yunnan Province, one from Heilongjian Province, one from Guizhou Province and one from Sichuan Province, respectively.

Most salient feature of the symposium in this year was the use of Japanese and Chinese instead of English as official language. Thus, all the presentations, questions and answers, and discussions were interpreted from one language to the other simultaneously or sequentially. The proceedings of the symposium will be published in the Tropical Agriculture Research Series No. 21 as Japanese or Chinese texts with English summary and Chinese or Japanese translations. The program of the symposium and the name and title of the speakers are listed below.

Opening Session

Inaugural Address:

Toshihiro KAJIWARA
Director General, Tropical Agriculture
Research Center

Message of Congratulation:

HE Kang
Minister of Agriculture, Animal Husbandry and Fishery (Read by QU Ning-kang)

Welcome Address:

Takaharu HATANAKA
Director General, Secretariat of the Agriculture, Forestry and Fisheries Research Council

Scientific Technological Development and

Perspective of Rice Cultivation in China:

QU Ningkang
Department Chief Engineer, Department of Science and Technology, Ministry of Agriculture, Animal Husbandry and Fishery

Keynote Address:

WU Ziquan
Director General, Yunnan Academy of Agricultural Sciences

Keynote Address:

Ken-ichi HAYASHI
Director General, National Institute of Agrobiological Resources

Reports on Yunnan Rice

Sino-Japanese Cooperative Research for the Breeding of Cold Tolerant, Blast-Resistant Varieties with High Quality and High Yield
JIANG Zhinong, HUANG Yinmei, SUN You-quian, ZHOU Yiping, et al. (Yunnan Academy of Agricultural Sciences: YAAS)

Hiroshi UCHIYAMADA, Kunio MORIYA, Tadaaki HIGASHI, Noboru HORISUE and Atsushi TODOROKI (TARC)

Evaluation of the Yielding Ability of the Newly Selected Lines of Rice Developed under the Cooperative Breeding Program between Japan and P.R. China

Kunio MORIYA (TARC: Presently Kagoshima Agricultural Experiment Station) and Noboru HORISUE (TARC)

JIAN Zhinon and WANG Yonghua (YAAS)
Joint Field Observation on the Performance of the New Lines at Yunnan

WANG Yonghua (YAAS)

Evaluation of the Performance of the Hejiao (Go-kei) Lines Cultivated in the Kanto and Tohoku Districts of Japan

Akira NAKANE (National Agriculture Research Center)

Screening for Cold Tolerance of Chinese and Japanese Rice Varieties and Selection of Standard Varieties

Noboru HORISUE (TARC: Presently Aomori Agricultural Experiment Station), Yasufumi KUNIHIRO, Tadaaki HIGASHI and Zenzo OYAMADA (TARC)

WANG Huaiyi, XIONG Jianhua, ZHANG Sizhu, LI Zhiyong and WANG Yonghua (YAAS)
Anther Length and Cold Tolerance in Rice in Relation to Breeding

WANG Huaiyi, XIONG Jianhua and ZHANG Sizhu (YAAS)
Yasufumi KUNIHRO and Noboru HORISUE (TARC)

Suggestions for the Collaborative Breeding Program to Improve the Tolerance of Rice Varieties to Low Temperature in Yunnan Province

Yasufumi KUNIHRO (TARC: Presently Hokkaido Prefectural Kamikawa Agricultural Experiment Station)

Varietal Differences and Geographical Distribution of Rice Varieties in Yunnan Province Based on the Esterase Isozymic Loci

XIONG Jianhua and WANG Huaiyi (YAAS)
Masahiro NAKAGAHRA and Masakatsu INOUE (TARC)

Identification of Pathogenicity of *Pyricularia oryzae* and Resistance of Rice Varieties in Yunnan Province

WANG Yonghua, HE Yunkun, LI Jiarui, LI Chengyun and KONG Ping (YAAS)
Tadaaki HIGASHI, Masataka IWANO et al. (TARC)

Suggestions for Breeding for Resistance to Rice Blast

Tadaaki HIGASHI (TARC: Presently Tohoku National Agricultural Experiment Station)

Genic Analysis of Rice Blast Resistance of Yunnan Upland Rice Cultivar Haonaihuan

HE Yunkun, WANG Yonghua, LI Jiarui and LI Chengyun (YAAS)
Tadaaki HIGASHI and Noboru HORISUE (TARC)

Reports on Rice in Other Provinces

Rice Production and Breeding in Guizhou Plateau

LIAO Chang-Li (Guizhou Academy of Agricultural Sciences)

Inheritance of Biological Yield and Harvest Index and Their Relationship with Grain Yield in Rice

LIAO Peiyan (Sichuan Academy of Agri-

cultural Sciences, Chengdu, Sichuan, China)
Studies on the Application of High-Yielding Techniques for Rice Production in Cold Areas by Upland-Nurseries and Low-Density Transplanting Practice

Li Zhao-fang (Northeast Agricultural College, Harbin, Heilongjiang Province)

Reports on Rice Breeding in Japan

Breeding for Improving the Quality of Rice Grains in Japan

Kazutoshi OKUNO (Hokuriku National Agricultural Experiment Station)

Breeding for High Yielding Rice Cultivars in Japan

Kiyooki MARUYAMA (National Agriculture Research Center)

Breeding for Resistance to Several Rice Diseases in Japan

Tadashi MORINAKA (TARC)

General Discussion

The general discussion was co-presided by H. Kato (Japan), T. Higashi (Japan) and Y. Wang (China). Kato summarized the main topics discussed and the questions raised during the presentations and classified them into four categories, i.e. breeding strategies, genetic sources, cold tolerance and resistance to blast disease as follows:

At first the discussion was focused on the breeding results achieved in Yunnan. Among the Japanese cultivars tested as parents, the cultivar 'Todoroki-wase' was considered to be the most suitable and was used to breed new lines. Y. Wang mentioned that the cultivar was characterized by 1) an optimal heading period in Yunnan, 2) field resistance to blast disease and 3) cold tolerance in the ripening stage. Z. Jiang also pointed out that it gave rise to progenies with an outstanding plant-type, good color of glumes and high quality of grains. A. Kobayashi added that in many of the lines bred by using this cultivar as the parent ripening in Japan was very good. A. Todoroki pointed out that the quality of grains in the lines was not always good.

E. Shimura mentioned that this cultivar was characterized by 1) an optimum number of grains per panicle, 2) outstanding vegetative growth and ripening under low temperature conditions, and 3) optimal ripening stage in Yunnan. This cultivar and the derived lines showed the highest cold tolerance among the Japanese cultivars. Utilization of cultivars such as Mutsu-nishiki and Himeno-mochi as parents was suggested by H. Wang and N. Horisue. S. Akita asked the reasons for the difference in the ripening ratio in highly productive cultivars. K. Moriya answered that the ripening period affected the difference in the ripening ratio under low temperature. N. Qu stated that it would be desirable to introduce Japanese cultivars harboring resistance genes to diseases such as blast, bacterial leaf blight and leaf stripe virus along with a high quality. Areas where the newly bred lines 'Hejiao' 1 to 13 could be adapted were discussed. In 1986 the lines were grown in Guizhou and Sichuan. The highest productivity was observed in 'Hejiao 7' and 'Hejiao 10'. There are some regions in Guizhou and Sichuan in addition to Yunnan where these lines could become commercial cultivars. C. Kaneda provided data on the performance of Hejiao lines in Yunnan for two years. Hejiao 2, 4 and 9 seemed to be promising in Yunnan. Hejiao 7 may be suitable in Sichuan, but difficult to cultivate in Yunnan due to its susceptibility to blast disease. Since Hejiao 10 and 13 showed differences in the plant-type and in the time of the late ripening stage, it is considered that they may be used in other areas than in those areas where Hejiao 1 to 9 are distributed. Finally two to three lines may become commercial cultivars, i.e. Z. Wu and N. Qu explained the process of release of commercial cultivars from the lines bred in China; 1) test cultivation in a determined area for more than two years, 2) cultivation over 0.5% of total area based on selection by farmers, and 3) grain yield 10% higher than that of an average cultivar.

Among the various genetic sources of rice plants, Japanese scientists were interested in

the origin of plants with semidwarf genes in China. C. Liao mentioned that Aijiaonante originated in Guangdong, Aizinian in Guangxi, Guiyangai in Hunan, and Dijiaowujian in Taiwan. F. Kikuchi suggested that the dwarf genes in Aijiaonante and Dijiaowujian were the same. H. Wang mentioned the close relationships between the length of anthers and cold tolerance. I. Nishiyama pointed out that the higher number of pollen grains within a longer anther was the reason for the higher cold tolerance. He also suggested that the balance between development and damage of pollen in cold environments must be studied. G. Hashimoto mentioned that it is necessary to analyze this problem in cultivars which produce a large number of tillers and in indica rice. M. Iwano mentioned that the isolate of blast fungus in Yunnan showed differences in the ability of preserving its pathogenicity in repeated inoculation tests, especially in the case of some Japanese cultivars such as Kanto 51, Tsuyuake and Shin 2. Regarding the resistance to blast disease, M. Yokoo suggested that the use of true resistance only was not reliable strategy. On the basis of the history of rice cultivation in Japan it was important to take into account.

Closing Session

Closing Remarks:

Chukichi KANEDA

Chairman of the Symposium Organizing Committee

Research Coordinator General,

National Agriculture Research Center

Excursion

The Chinese participants were invited by the Tropical Agriculture Research Center to participate in pre-symposium excursion, during which they had the opportunity to visit Kagoshima Agricultural Experiment Station, Kyushu National Agricultural Experiment Station and Kyoto University in order to observe the various aspects relating to rice breeding in Japan.