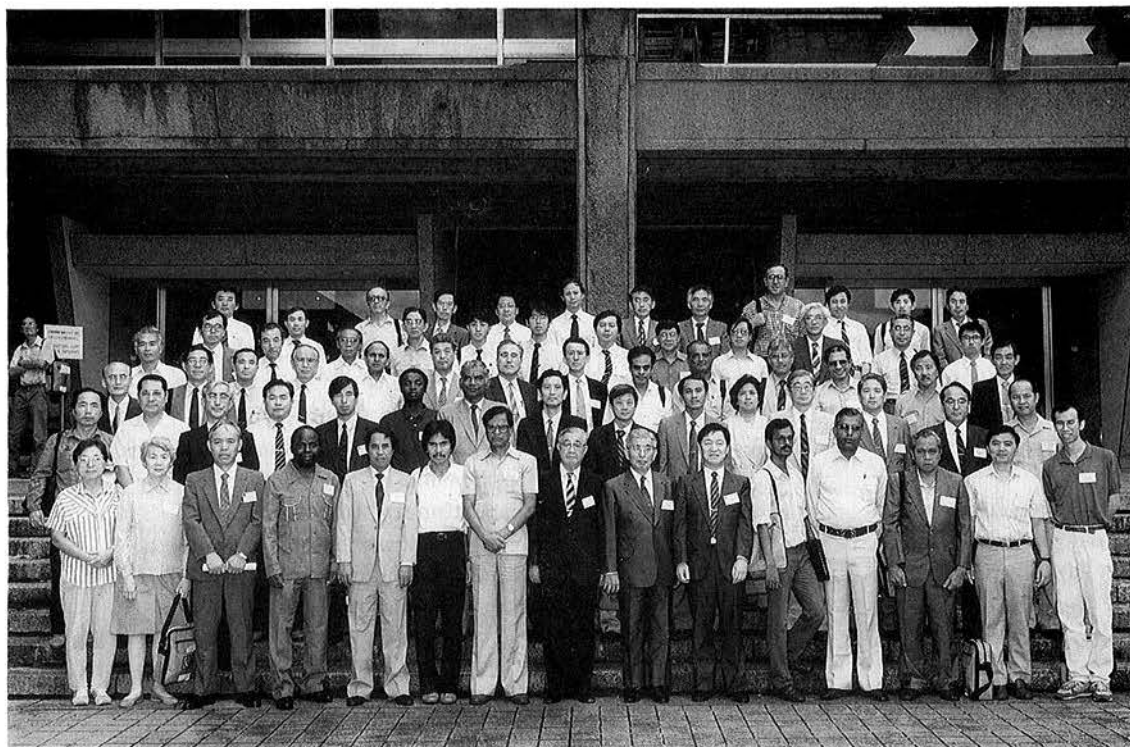


International Symposium on Crop Losses due to Disease Outbreaks in the Tropics and Countermeasures

Sponsored by
Tropical Agriculture Research Center, Ministry of Agriculture,
Forestry and Fisheries
(August 25-27, 1988, Kyoto, Japan)



The 22nd TARC (Tropical Agriculture Research Center) International Symposium on "Crop Losses due to Disease Outbreaks in the Tropics and Countermeasures" was held at the Kyoto International Conference Hall (KICH) as a satellite symposium of the 5th International Congress of Plant Pathology (ICPP).

The objective of the present symposium was to give the opportunity to consider and estimate more accurately the yield losses of crops due to disease outbreaks in the tropics.

It is well recognized that the incidence of diseases is one of the important factors for the instability of crop production. There are, however, few statistical data on the yield losses associated with disease outbreaks, mainly due to the lack of standardization of assessment methods of yield losses and partly due to the limited understanding of crop diseases.

Delegates from the People's Republic of China, the Philippines, Thailand, Malaysia, Indonesia, India, Sri Lanka, Japan and inter-

national agriculture research organizations, including the International Rice Research Institute (IRRI), International Institute of Tropical Agriculture (IITA), Centro Internacional de Agricultura Tropical (CIAT), International Potato Center (CIP) and International Center for Agricultural Research in the Dry Areas (ICARDA) participated in the symposium and presented reports on the crop losses due to diseases in each country and area. In the country reports, the delegates from eight Asian countries presented reports concerning losses of each major crops. Seven countries out of eight referred to the rice diseases and principals of them were blast, sheath blight and tungro.

Thereafter the most recent research developments relating to diagnosis, estimation of loss due to diseases and control measures of major diseases of rice, cassava, citrus, potato and legumes were presented in nine technical reports.

The program of the symposium and the speakers are listed below.

Opening Session

Inaugural Address:

Toshihiro KAJIWARA

Director General, Tropical Agriculture Research Center

Welcome Address:

Toshihiko NISHIO

Research Councilor, Secretariat of the Agriculture, Forestry and Fisheries Research Council

Country Reports

Brief Report on Some Important Diseases of Three Major Crops in China

Jiayun LU (the People's Republic of China)

Selected Economically Important Diseases of Some Major Crops in the Philippines

Tiburcio T. REYES (the Philippines)

Epidemiology and Loss of Rice, Wheat and Pearl Millet Crops due to Diseases

S. NAGARAJAN (India)

Trends of Damages Caused by Some Rice Diseases in Major Irrigation Schemes of Peninsular Malaysia

SUPAAD bin Mohd. Amin (Malaysia)

Sheath Blight Disease of Rice in the Low Country Wet Zone of Sri Lanka: Effect on Yield and Factors Influencing Spread and Distribution

D. L. WICKREMASINGHA and Y. J. P. K. MITHRASENA (Sri Lanka)

Control of Aflatoxin in Maize

Prawat TANBOON-EK (Thailand)

Effect of Infection with Tungro-Associated Virus on Rice Yield

Andi HASANUDDIN (Indonesia) and Hiroyuki HIBINO (IRRI, the Philippines)

Damage Caused by Major Plant Diseases and Plant Pest Forecasting Program in Japan

Tetsuya OTOMO (Japan)

Technical Reports

Yield Loss due to Rice Virus Diseases in Asian Tropics

Hiroyuki HIBINO, P. S. TENG and H. LEUNG (IRRI, the Philippines)

Application of Sero-Diagnosis for Field Virus Inspection in Japan

Ken-ichiro SHOHARA (Japan)

Major Economic Diseases of Cassava and Plantain in Africa

S. K. HAHN, T. IOTUN, R. L. THEBERGE and R. SWENNEN (IITA, Nigeria)

Outbreaks of Cassava Diseases and Losses Induced

J. Carlos LOZANO* (CIAT, Colombia)

Estimating Yield Loss in Potato due to Bacterial Wilt Caused by *Pseudomonas solanacearum*

John G. ELPHINSTONE (CIP, Perú)

Occurrence, Losses and Control of Important Cereal and Food Legume Diseases in ICARDA Region

Omar F. MAMLUK, M. P. HAWARE and

* The paper and abstract prepared by him were presented to the symposium, but, regrettably, he was unable to attend the symposium.

K. M. MAKKOUK (ICARDA, Syria)

Methods for Estimating Yield Loss in Tropical Rice Diseases

P. S. TENG, T. W. MEW, J. M. BONMAN and H. LEUNG (IRRI, the Philippines)

Recent Advances in Forecasting of Rice Blast Epidemics Using Computers in Japan

Kiyoshi ISHIGURO and Akira HASHIMOTO (Japan)

Estimation of Yield Loss and Computerised Forecasting System (BLIGHTAS) for Rice Sheath Blight Disease

Teruyoshi HASHIBA and Tsutomu IJIRI (Japan)

General Discussion

The general discussion was co-presided by Mew, T. W. (IRRI, the Philippines), Nagarajan, S. (India) and Mamluk, O. F. (ICARDA, Syria).

At first, the discussion was focused how to arrange these problems. Mew, T. W. suggested to focus on four issues; (1) What are the major diseases of the major crops in the tropics, (2) What are the measures taken to prevent the outbreaks, (3) What is the methodology to assess the crop losses, (4) What kind of organization structure should be adopted to implement those methods? Nagarajan, S. proposed that the new emerging diseases in the tropics should be included. Mamluk, O. F. proposed that the discussion should be centered on the implementation of the models so far developed in the crop loss assessment.

After several discussions, in methodology on the integration of the general discussion, Kajiwara, T. (Japan) commented that the assessment of crop losses is a difficult problem. Each country should select the key disease at first and the damage as well as crop losses should be evaluated even roughly.

After a few suggestions, Nagarajan, S. agreed to a proposal of Teng, P. S. (IRRI, the Philippines) and asked the representatives of various countries and areas whether they were in a position to interact in the program.

Lu, J. Y. (the People's Republic of China): I regret that I cannot answer your question as I am not familiar with forecasts of crop diseases. Raguhanan, V. (India): In India the major food grain crops are rice, wheat and sorghum in rain-fed areas. Among the annual crops, rice could be selected as a model system for studies on loss assessment, while among the perennial crops, coconut would be suitable for a model system. Wickremasingha, D. L. (Sri Lanka): Rice is one of the most important crops in Sri Lanka and the major diseases include rice blast, rice sheath blight and rice grain spotting. Among the perennial crops, mango is perhaps the most important one in Sri Lanka. I believe that a crop loss assessment network should be established and coordinated by a well organized institute. Hasanuddin, A. (Indonesia): An important issue is to identify the major diseases but the incoming diseases which are becoming important should be included in the discussion. In Indonesia, there are two main food crops, rice, corn in addition to legumes. The major diseases of rice are tungro, blast, sheath blight and new bacterial diseases. Corn diseases have not been identified but appear to be viruses. Mosaic virus diseases are very important in the legume crops such as peanuts and soybeans. Reyes, T. T. (the Philippines): In the Philippines there are a large number of diseases affecting the major crops, for example, rice (tungro, blast, BLB, sheath blight, etc.). The main diseases of corn are downy mildew, rust, and bacterial stalk rot. In the case of coconut, the main diseases are cadang-cadang, lethal wilt. Sugarcane diseases consist of smut, downy mildew and mosaic. Bananas which are important export crops are affected by bunchy top (a virus disease) and nematode infestation (black head). Mangoes are affected by anthracnose and by storage diseases. Supaad, M. A. (Malaysia): In Malaysia, among the cereal crops, rice is important. The main diseases are tungro, BLB, sheath blight and blast. Although blast is well controlled, tungro requires more effort. Tanboon-ek, Prawat (Thailand): Rice which is a major crop in Thailand is affected by the same dis-

eases as those described in other parts of Southeast Asia. Field crops and fruit trees are affected by virus diseases, for example, sugarcane (white leaf virus) as well as citrus (tristeza) and papaya (ring spot virus). Regarding post-harvest diseases, the fungi belonging to the *Colletotrichum* spp. damage fruits such as papaya, mangoes, bananas, etc. and cannot be easily controlled. Mycotoxin contamination is very serious in Thailand which is characterized by a humid climate.

Accepting the request of Nagarajan S. (Chairman), Kajiwara T. gave his opinion: In Southeast Asia, rice is the most important crop and is affected by several virus diseases such as tungro and grassy stunt. Seath blight which is often misdiagnosed may become a very important disease in the region as indicated in Sri Lanka. Blast disease occurs in limited areas in Southeast Asia because of the climatic conditions. Bacterial leaf blight which used to occur severely in Southeast Asia has become less serious since the release of resistant varieties by IRRI. Field crops are often affected by a large number of virus diseases, some of which have not been identified. The identification of the viruses would be important because the transmission and the characteristics of the diseases vary markedly depending on the virus involved.

Hahn, S. K. (IITA, Nigeria): Cassava and plantain/banana are very important staple food crops in Africa. The major diseases of the crops are cassava mosaic virus disease and bacterial blight for cassava and black Sigatoka disease for plantain and banana in Africa. There are some yield loss studies for these diseases but they are all limited to those at experimental stations. The yield loss assessment should be carried out at the farm level and on a large scale to make the data relevant and reliable. The methods of yield loss assessment for these vegetatively propagated and long season crops should be different from those of short season and seed-propagated crops. Other major crops include maize and rice. Elphinstone, J. G. (CIP, Perú): Potato is not yet a major crop in

the tropics. However the acreage of potato is increasing considerably. The major diseases studied are late blight, virus diseases (leaf roll virus, potato X virus) as well as bacterial wilt. Bacterial wilt will undoubtedly become one of the most important diseases in the tropics. The disease affects not only potato but many other vegetable and food crops grown in the tropics. The bacterium can survive for long periods in soil. It would be desirable that the research on losses not only in potato but also in other crops be initiated in various parts of the tropics.

Nagarajan S.: It is obvious that rice has been ranked first frequently in most of the nations. On the other hand, since various crops have been listed second to rice, the selection of a second crop as a model to estimate yield loss should be postponed. There is a general consensus on the need to estimate various biotic constraints faced in the increase of rice production. The next step would be to discuss how to organize a program of monitoring and collection of information on loss caused by various diseases. A standard experimental procedure should be developed to record observations and a data bank should be established on the diseases affecting crops as well as meteorological conditions in a particular location. Mew, T. W. (Chairman): Undoubtedly there is a need to assess the loss due to major diseases of the main crops in the tropics. It is also important to develop a critical mass of scientists in the tropical countries to undertake this task. To collect accurate information, quality research should be carried out. It is equally important that the research be recognized and supported. I would thus like to suggest that the teams of work be organized and that the international agricultural research centers and donors become involved in the development of a methodology for the assessment of disease losses incurred by various crops. Zadoks, J. C. (the Netherlands): It may be possible to initiate an "International Information Network on Crop Losses" using modern information exchange technology in the form of international network such as BITNET and EARN.

A collective data bank could be developed, where all kinds of information on crop losses are collected and stored. The methods would not involve the optimum quality work only or the most precise and comprehensive data. Fragmentary information available would be classified according to reliability classes and worked out.

Through the discussions it was recognized that the studies on mechanism of occurrence of damage and on assessment of crop loss caused by various diseases have to be intensified. As many nations do not have the expertise to make an accurate estimation of loss for various reasons, it would be desirable that a reference institute should be selected for interacting and exchanging information. After data are collected during a period of two to three years, a symposium could be again organized to report on the information thus obtained.

Closing Session

Closing Remarks:

Hajime KATO

Chairman of the Symposium Organizing Committee

Director, Department of Plant Protection,
National Agriculture Research Center

Excursion

The foreign participants, delegates from seven Asian countries, were invited by the Tropical Agriculture Research Center to participate in the post-symposium excursion, in which they had the opportunity to visit several institutes of agricultural science in Tsukuba science city in order to observe the various aspects relating to phytopathology and researches of disease control in Japan.