SUMMARY OF THE 1976 CORN DOWNY MILDEW DISEASE CONFERENCE

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The conference was sponsored by Thailand's National Corn and Sorghum Program and the Rockefeller Foundation and held in Thailand during October 4-7, 1976. Dr. Riksh Syamananda described the purpose of the conference in his "Reporting Address". This was the third International meeting of this group involved with the DM diseases of the Gramineae. The first was held at Nainital, India, September 1969 and the second in Japan, September 1974. The proceedings of the first were published in Indian Phytopathology 23(2): 173-435, 1970, and the latter in Tropical Agriculture Research Series No.8 (TARC, Tokyo, Japan), March 1975, 259 pages. In addition, the DM workers in SE-Asia had met in the Republic of China in May 1972 to assess progress and develop priorities in their cooperative program (proceedings in mimeograph form only) and in June 1973, 136 persons interested in the DMs of corn and sorghum in the USA and Latin America met in Texas to discuss the potential threat of DM to these two crops in the Americas, develop cooperative activity and establish research priorities; these latter proceedings were published in the Texas Agricultural Experiment Station Technical Report No. 74 - 1: 1973, 77 pages.

Twenty five scientists from 11 countries were official delegates at the conference. They were: M.M. Payak and S.R.S. Dange (India); Triharso (Indonesia); Robert G. Kenneth (Israel); T. Kimigafukuro and Sadao Hatta (Japan; Mr. Hatta is now Research Coordinator, Technical Division, Department of Agriculture, Bangkhen, Bangkok); Carlos De Leon (CIMMYT, Mexico); S. Moin Shah (Nepal); Ofelio R. Exconde (Philippines); Paul M. H. Sun (Republic of China); Richard A. Frederiksen and C. Gardner Shaw (USA); Gino Malaguti (Venezuela); Riksh Syamananda, Ampol Senanarong, Chamnan Chutkaew, Piya Giatgong, Somkiat Titatarn and Sanchai Tontyaporn (Thailand) from the Department of Agriculture, Ministry of Agriculture and Cooperative; Assanee Pachinburavan and Thavorn Winijsanon (Thailand, Department of Plant Protection, Khon Kaen University); Sujin Jinahyon, Sutat Sriwatanapongse, Udom Pupipat (Thailand, Kasetsart University) and, B. L. Renfro, the Rockefeller Foundation (Thailand). Most of these individuals presented formal papers, which are published in this issue of the Kasetsart Journal and their titles and professional postal addresses are listed there.

The first 2 days were spent reviewing the DM situation and research in progress at experimental stations and in farmers' fields. This stimulated numerous discussions on the similarities and differences of methodologies, host reactions, inoculum potential, types of information accumulated and that which is needed, the efficacy of various control measures, and a variety of other topics.

During the last 2 days the delegates presented resumés of knowledge accumulated to-date and the present situation in their areas—varying from a region within a country to entire continents by Frederiksen (The Americas) and Kenneth (Africa and West Asia) – and in group discussions. The attempt was to assess or determine the: (1) present state of knowledge; (2) gaps in knowledge and which laboratories are best equipped or suited to obtain this information; (3) significant constraints to research and how to remedy them; (4) the control practices now recommended, including resistant varieties and the area they occupy; and, (5) the activities that can

be accomplished more thoroughly or rapidly working cooperatively.

At the conference it was emphasized that the eight DM diseases attacking corn have been one of the greatest deterrents to production in SE-Asia through this century. They remain so, and during the past 15 years have also become important in several countries of the Western Hemisphere, Africa and Oceania. W.H. Weston in the 1920-30's furnished most of the descriptive pathological information on the DMs of corn known until mid-1960 when research was intensified at laboratories in several countries. Essentially all of the breeding for resistance and inheritance studies of resistance to the DMs has been accomplished during the last 12 years. The DMR varieties now offer the single best means of control, but control is enhanced by the employment of certain cultural practices. Immunity is not known and resistance is relative to the inoculum potential. In some countries (ROC and USA) sufficient resistance has been incorporated into hybrid corn varieties to obtain control; e.g. no epidemic has occurred during the past 5 years in ROC following replacement of DMS with DMR varieties in both corn and sugarcane. In the Philippines and Thailand the highest known level of resistance in corn has been recently combined with the best agronomic varieties ever grown in lowland tropical Asia and approximately 25 and 50% of the total corn producing areas of these respective countries grow these improved DMR varieties.

No significant improvement in chemical control has been found over that reported at the first meeting of this group in India in 1969. However, more positive results have been obtained under low inoculum potentials or, more importantly, by integrating chemical control with culture of DMR varieties and certain other practices which would either promote rapid seedling growth or a reduction of primary inoculum.

The consensus was that sufficient descriptive pathology information to understand the diseases had been obtained in ROC, Philippines, Southern India, Israel and USA on the *Sclerospora*-incited DMs occurring there and for crazy top; and, in India for brown stripe DM. This type of information is either lacking or incomplete in other areas of the world. Both pathogenic and morphologic variability among the *Sclerospora* spp. needs much further investigation. TARC will collect the species from SE-Asia for comparative studies beginning in about 1 year following the completion of their containment laboratory. While no representative from the USDA containment laboratory in Frederick, Maryland, USA, was present, the conference attendees wished them to continue to collect and make comparisons among species and pathotypes of *Sclerospora*. Other decisions made concerning the graminicolous DMs were to:

1) Set up a repository of literature (reprints) and an available photocopy service at the International Maize and Wheat Improvement Center; a repository of herbarium materials at the University of the Philippines at Los Banos, and, a repository of microscopic slides and photographs at Kasetsart University, Bangkok, Thailand;

2) Up-date the bibliography prepared in 1970-71 by Drs. C.G. Shaw and K.M. Safeeulla–R. G. Kenneth would assisst these two in preparation;

3) Prepare a descriptive, illustrative manual and a monograph to begin in about 2 years, and, if funding is available, an annotated review;

4) Continue the International DM Nursery, especially in order to monitor virulence patterns among the *Sclerospora*-incited DMs;

5) Inform the world that all available evidence to-date indicates that the seed-borne phases of the *Sclerospora* spp. and brown stripe DM represents very little to no threat for the introduction of these diseases on or in corn seed to new areas. The precautions are to harvest seed from only non-systemically infected corn plants (only occasionally do such plants set any seed anyway and they are usually scattered kernels on ill-formed ears); dry the seed to 12 1/2% moisture and hold for at least 6 weeks before planting; and then, if one is concerned with the unlikely event that the seed surface is infested with oospores as

occurs in sorghum and the millets, treat with 1:1000 bichloride of mercury for 10 minutes and, for extra special precautions, subject to an ultra-sonic treatment before this to dislodge oospores; and,

6) To prepare a formal request for a DM subgroup – all DMs, not just this graminicolous DM group – to be admitted into the International Society for Plant Pathology.

Many of the participants brought prepared microscopic slides of the DM pathogens occurring in their countries. These were set up as an exhibit. In addition, they were photographed, a set of 51 black and white prints were presented to each delegate and 22 were chosen for inclusion here in plates I and II. Figures I 3-4 and II 3 were submitted by S.R.S. Dange, I 7-8 by O.R. Exconde, II 8 by R.A. Frederiksen, I 1 and II 2 and 7 by R.G. Kenneth, II 1 by G. Malaguti, I 5 and II 5 by P.M. H. Sun, I 6 by Triharso and I 2, 9–12 and II 4, 6, 9 and 10 by the Kasetsart University pathology group.

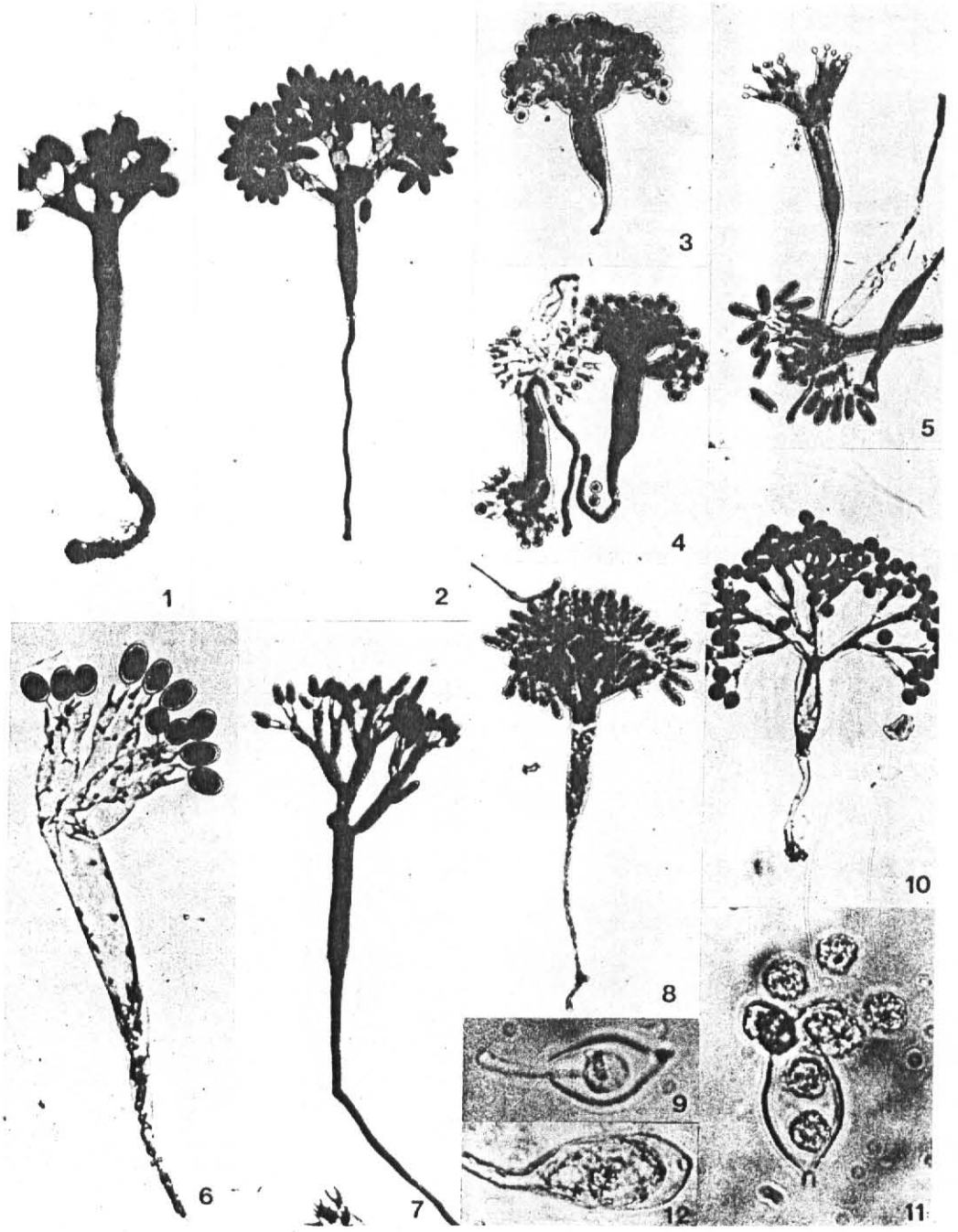


Plate I - (Figs. 1-12). Asexual stages of: 1) *Sclerospora sorghi* on forage sorghum in Israel (X 280); 2) *S. sorghi* on corn in Thailand (X 140); 3) *S. sorghi* "maize pathotype" in North-West India (X 140); 4) *S. sorghi* on teosinte in North-West India (X 140); 5) *S. sacchari* on corn in Republic of China (X 140); 6) *S. maydis* on corn in Indonesia (X 270); 7) and 8) *S. philippinensis* on corn in Philippines (X 140); 10) *Sclerospora* sp. on *Panicum cambogiense* in Thailand (X 140); 9), 11) and 12) *Sclerophthora rayssiae* var. *zeae* on White birdfoot Grass *(Digitaria bicornis)* in Thailand (X 480).

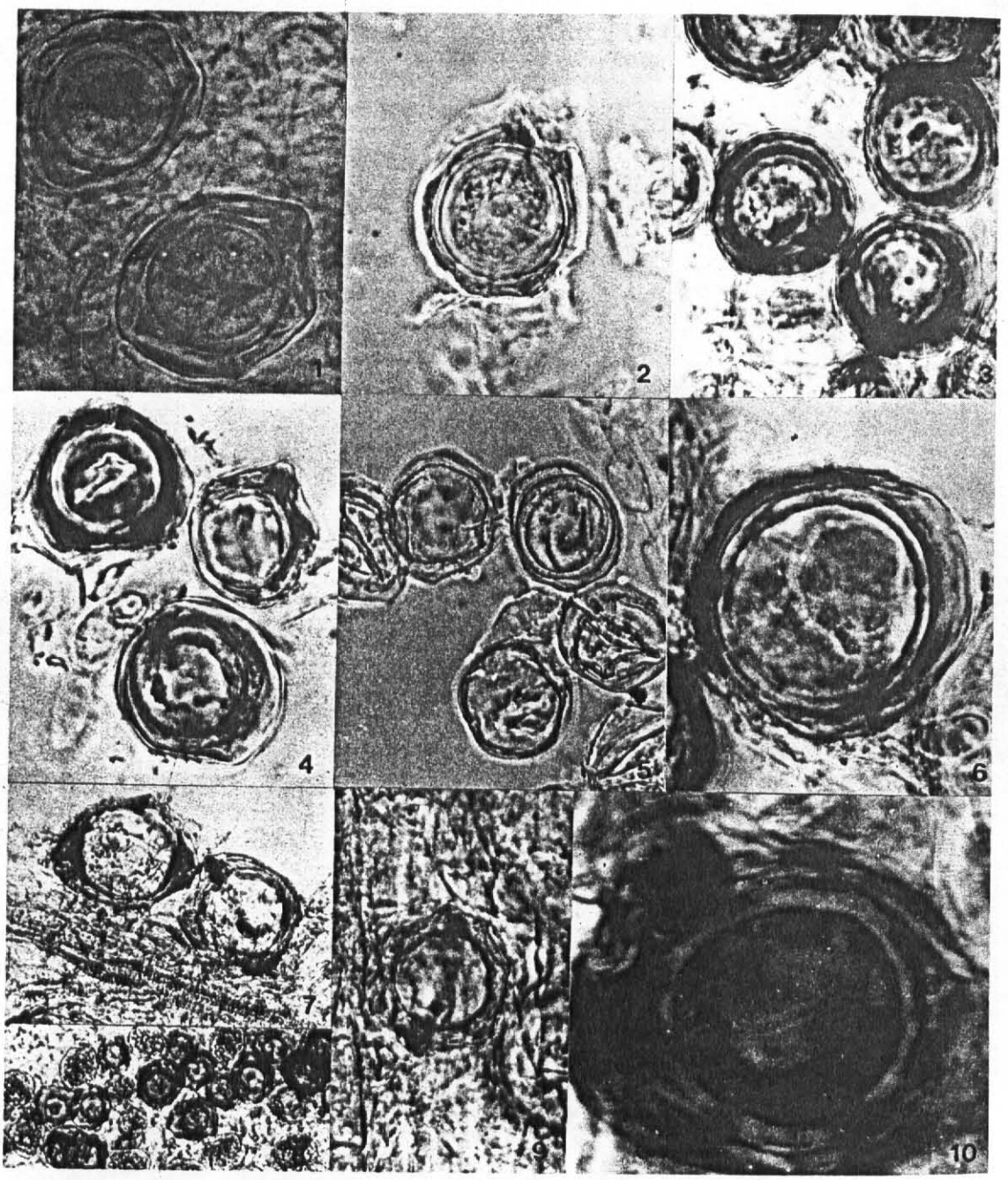


Plate II - (Figs. 1-10). Sexual stages of: 1) *Sclerospora sorghi* on corn in Venezuela (X 520); 2) *S. sorghi* on sorghum in Israel (X 580); 3) *S. sorghi* on *Heteropogon contortus* in North-West India (X 600); 4) *Sclerospora* sp. on *Dichanthium caricosum* in Thailand (X 590); 5) *S. sacchari* on sugarcane in Republic of China (X 300); 6) *Sclerospora* sp. on *Saccharum spontaneum* in Thailand (X 620); 7) *S. miscanthi* on *Miscanthus japonicus* (Philippines, 1930) from Dr. Robert G. Kenneth (X 270); 8) *S. sorghi* on corn in U.S.A. (X 160); 9) *Sclerospora* sp. on *Panicum cambogiense* in Thailand (X 570); 10) *Sclerophthora rayssiae* var. *zeae* on *Digitaria bicornis* in Thailand (X 1,330).