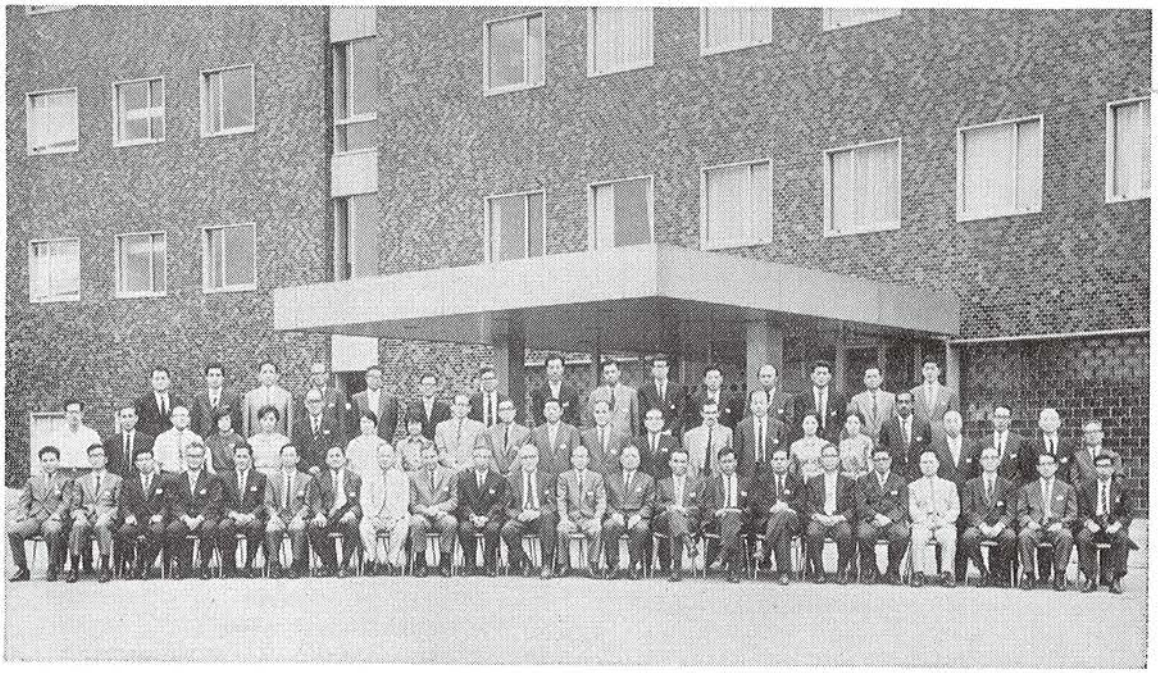
Symposium on Maize Production in Southeast Asia

—Present Situation and Future Problems—
September 2 to 8, 1968, in Tokyo



In recent years maize's importance as a crop which ranks next only to rice in Southeast Asia has gained recognition and studies are being pursued as how to increase this crop's production with growing zeal and enthusiasm there.

In Japan, meanwhile, the demand for dry maize grains has annually risen but, far from self-sufficient in this crop, she is dependent heavily upon imports in meeting this demand, with Thailand as one of the biggest overseas supplier.

In the light of all this, this year's Symposium was conducted on "Maize Production in Southeast Asia -Present Situation and Future Problems.-"

Among the participants in the Symposium invited from Southeast Asia were one expert each from Pakistan, India, and Taiwan and two each from Thailand, the Philippines and Indonesia. with one Asian representative of the International Maize and wheat Improvement Center also on hand, a total of 10 foreign experts took part with reports on the present situation of maize production in their respective countries and future problems involved therein. From Japan, on the other hand, an equal number of experts reported on matters related to this country's maize demand and production as well as farming techniques.

Besides, the Symposium had a special guest speaker in Dr. R. A. Brink of University of Wisconsin, U. S. A. The participants' mutual understanding was enhanced as a result of their active debates on all given subject matters. It was noted with regret that among the Southeast Asian countries invited to take part there was no participation from Burma and Cambodia.

The Symposium took place for seven days from Sept. 2, 1968 to Sept. 8. The first three days (Sept. 2 to 4) were devoted to the delivery of and debate on individual participants' reports at the Azabu Green Assembly Hall in Tokyo.

Then on Sept. 5 the participants went on a study tour of the Kawasaki Feed plant of the National Purchasing Federation of Agricultural Cooperative Associations (Zenkoren) in Kawasaki, Kanagawa Prefecture, and the Department of Physiology and Genetics of the National Institute of Agricultural Sciences in Hiratsuka of the same prefecture, and from Sept. 6 to 8 a similar tour was made of Nagano Prefecture where they visited the seed multiplication farm and the Kikyogahara Branch of the Nagano Prefectural Agricultural Experiment Station.

The following are the gists of the Participating experts' reports delivered to the Symposium:

Reports of Japanese side

In the first report titled "Maize Production in Japan" facts and figures concerning maize production in this country were given with respect to various forms of this crop as is used here such as dry grain, green fodder and silage, immature and sweet grains, etc. The report cited the shortage of manpower and the relatively low profitability of this crop as factors behind the increasing production cost of dry maize grains in Japan.

The second report titled "Demand and Required Quality of Maize as Feed in Japan" explained from which countries and in what quantities Japan has annually imported maize in the past as well as the fact that the bulk of such imports is in use here as an ingredient of the mixed feed. Analytical results of some experiments were presented at the same time to show that Southeast Asian maize is not far inferior in terms of the contents of moisture, crude protein, zinc and carotinoide.

In the third report titled "Demand for and Required Quality of Maize as Industrial Raw Material in Japan," it was explained that out of Japan's annual maize imports totaling about 800,000 tons at present, as much as 85 per cent is processed into starch for industrial uses and the bulk of the remaining 15 per cent is in use for brewage. The report cited as a quality required of imported maize as industrial material a relatively low moisture content which makes for an easier protein separation.

Made public in the fourth report titled "Insect Pests of Stored Maize and Their Control" were the results of some studies conducted with regard to such pests in Japan.

The report said that there are 11 major species of such pests which breed in the tropical and temperate zones and that they invariably infest such other cereal crops in storage as wheat and rice, as well.

Also detailed were various control measures against these major pests.

In the fifth report titled "A New Technique for High Yield Maize Culture in Japan," maize cultivation techniques developed here were discussed primarily in terms of how to improve the volcanic ash soil characterized by a high degree of phosphorus absorption. Some research data included in the report provided the basis for its conclusion that the optimum conditions for a high yielding culture of maize can be attained by applying 150 kg of nitrogen, 450 kg of phosphorus and 120 kg of potassium in addition to 10 tons of farm manure, under spacing of 65,000 plants per hectare.

Contained in the sixth report titled "Progress in the Breeding of Superior Maize varieties in Japan" was a historical account of what improvements there have been in this country in the breeding of maize varieties so far and what further improvements appear possible in the future for the drastic increase in maize productivity per hectare.

In the seventh report titled "Evaluation of Synthetic Varieties in the Breeding of Hybrid Maize in Japan," the reporter established on the basis of his research data that F_1 hybrids between synthetic and open-pollinated varieties or between synthetic varieties themselves are not inferior to those bred through double-crossing.

Next in the eighth report titled "Breeding of Short-Term Variety of Maize and Its Adaptability in Hokkaido, Japan," the reporter dealt with a process of breeding superior maize hybrids in Hokkaido while giving references to the five flint-type varieties of the Oriental maize. Mentioned also in the report was the usefulness of the "effective integration temperature" for varieties' classification in terms of "adaptation belts."

The ninth report titled "Important Diseases of Maize in Japan" described a variety of maize diseases with particular emphasis on such serious infections as maize streaked dwarf virus (corn stunt), northern leaf blight, Southern leaf spot and *Kubatiella* leaf spot. The report also detailed these major diseases' symptoms, pathogenes and control mearures. It was emphasized that the most effective control over these diseases was to breed out resistant varieties.

Finally in the 10th report titled "Classification of Local Strains of Maize in Japan and Selection of Breeding Materials by Application of Principal Component Analysis," basic researches done so far in the specified fields of breeding techniques here were reported on.

Reports of Southeast Asian side

The reports delivered by the Southeast Asian participants in the Symposium invariably dealt with one and the same subject -maize production in their respective countries and the present situation and future problems thereof. Meanwhile, Dr. E. W. Sprague of the International Maize and Wheat Improvement Center-an authority on maize production in Southeast Asia, delivered a summary report on "Problems Confronting Maize Production in Asia" The gists of all these reports are as follows:

1) Pakistan

Maize is produced in the northwestern part of West Pakistan. With an acreage of 640, 000 hectares under maize cultivation, the output totaled 780, 000 tons in 1967. Although the per-hectare output is still at a low level, it is considered possible to increase it through the diffusion of such superior composite varieties as J I, effective use of irrigation facilities and improved cultivation techniques.

As for the problems to be solved, it is desirable to introduce such supierior characteristics into varieties as low moisture content of grain, resistance to corn borer, diseases, heat and drought, and protectiveness against birds' injury. Breeding of short-term varieties is also desirable for rotation of maize and wheat.

2) India

India has a total maize acreage of 2, 800, 000 hectares which is divided into four belts. And studies are under way to develop varieties which are best suited to each belt as well as those which have broad adaptability. With due importance thus attached to the breeding of composite varieties, already six such varieties have been developed and recommended to farmers. Also under way are attempts to develop F_1 hybrids through double cross. Important among maize diseases in India are northern leaf blight, streaked dwarf virus and brown spot for which breeding of resistant varieties is in progress.

Also important are attempts being made to breed out short-term or short-stem as well as those with a high lysine content or resistance to drought.

3) Thailand

This country's maize output has witnessed a marked increase in the past decade and in 1968 its acreage under maize cultivation came up to 580, 000 hectares. And as much as 90 per cent of this output is exported. Thailand's maize growers are divided into three groups; one group is made up of so-called "shifting cultivators" who shift from one piece of land reclaimed from the forest to another for maize farming while the two other groups are composed of "smaller owner farmers" whose farms are scattered along the roads and highways and "progressive owner farmers" who operate on a relatively large scale.

Among various problems confronting the Thai maize growers are the backwardness of their production techniques resulting from their lack of experience, their crops, liability to suffer from drought, the lack of superior

varieties, the increasing rampancy of insect pests and the instability of maize's market prices on account of the ill-organized distribution setup. However, Thailand's maize output can be expected to grow further in the future if the local growers enrich their technical experiences and actively induce modern farming techniques along with superior varieties of the maize seed.

4) The Philippines

Since maize ranks next only to rice in importance as the Philippines' stable food, the acreage under cultivation is on a sharp increase. However, the output is still at a low level of less than 0.7 tons per hectare because of such various problems in maize production as rampancy of downy mildew and other maize diseases and the insect pests as well as the lack of distribution facilities for the crops.

The currently recommended varieties are called into question because, although high-yielding, they have too much of dent-type characteristics. Since the consumers prefer flint-type corn to dent-type, studies are under way to breed out new recommendable varieties of more flint-type characteristics.

5) Indonesia.

This country's maize production centers around Java and there is now a total acreage of 3 million hectares under this crop with an average yield of 0.9 tons per hectare. A campaign to increase the output got under way from 1962/63 crop year with emphasis on the diffusion of a superior variety known as Metro and advanced corn growing techniques, as well. Although successfully pushed forward until 1964, the drive has since been in a slump.

Most of the varieties now in use are of early maturity and low productivity. It is desired, therefore, to breed out superior synthetic, composite or open-pollinated varieties which are medium or late-maturing and high yielding, and to establish techniques of suitable fertilizer application, as well.

6) Taiwan

Taiwan depends upon imports for a large part of its demand for dry maize grains which has risen as a result of the expansion of the local livestock industry. And now efforts are being exerted to improve its degree of self-sufficiency. In 1968 the island had an approximate maize acreage of 10,000 hectares. The per-hectare yield in 1967 stood at a good 2.6 tons thanks to a locally developed superior double cross variety known as Tainan No. 5.

It is feared, however, that due to the eased import restrictions the acreage planted to maize may decline in the future. One important problem lies in the susceptibility of Tainan No. 5 to the downy mildew. It is urgently necessary to breed out new varieties which are resistant to this disease as well as early-maturing and high-yielding ones because maize and rice are grown in rotation in Taiwan.

7) The International Maize and Wheat Improvement Center

Although the F_1 hybrids induced from the United States failed to take hold in Southeast Asian countries because of the difficulty of growing inbred lines, this provided an impetus to these countries' efforts to develop varieties of their own so as to boost their respective maize production. There has thus been a drastic increase in acreage in every one of these countries but the average yield itself has not risen appreciably as it stood at around 1 ton per hectare in 1966.

Among the major hindrances to the smooth expansion of maize production in Southeast Asia are the shortage of skilled scientists in conducting researches and experiments and the lack of funds. Hence is the need for each country to look to every opportunity to educate and train young scientists not only in theory but also in practise. In the region's maize production, close attention needs to be paid to disease and insect pests, especially downy mildew and to breeding of resistant varieties as an important countermeasure thereof. In addition, essential are accumulation of experimental data on growing techniques of maize especially in phases of spacing, feritilizer application and rotation system. Increased investments in research projects are called for if any country is to increase its maize output, with particular

emphasis on its researchers' endeavors to enrich their practical knowledge. Their steady research efforts and aggressive public relations activities are also essential.

Reports and reporters of the symposium

1) Wazir, A. (Indonesia)
Maize Production Conditions in Indonesia and Future Problems.
2) Kitano, S. (Japan)
Maize Production in Japan.
3) Phit, P. (Thailand)
Maize Production Conditions in Thailand Future Problems.
4) Hayakawa, T. (Japan)
Demand and Required Quality of Maize as Feed in Japan.
5) Carangal, V. R. (Philippines)
Maize Production Conditions in the Philippines and Future Problems.
6) Fukuoka, N. (Japan)
Demand for and Required Quality of Maize as Industrial Raw Material in Japan.
7) Sharma, D. (India)
Maize Production Conditions in India and Future Problems.
8) Kawasaki, R. (Japan)
Insect Pests of Stored Maize and Their Control.
9) Bhatti, A. G. (Pakistan)
Maize Production Conditions in Pakistan and Future Problems.
10) Okubo, T. and Iwata, F. (Japan)
A New Technique for High Yield Maize Culture in Japan.
11) Chang, S. C. (Taiwan)
Present Situation and Future Problems of Corn Production in Taiwan.
12) Murakami, K. (Japan)
Progress in the Breeding of Superior Maize Varieties in Japan.
13) Sprague, E. W. (International Maize and Wheat Improvement Center)
Problems Confronting Maize Production in Asia.
14) Effendi, S. (Indonesia)
Various Problems on Cultivation Techniques in Indonesia.
15) Machida, T. (Japan)
Evaluation of Synthetic Varieties in the Breeding of Hybrid Maize in Japan.
16) Ampol, S. (Thailand)
Problems of Maize Cultivation in Thailand.
17) Toda, S. (Japan)
Breeding of Short-Term Variety of Maize and Its Adaptability in Hokkaido, Japan.
18) Gonzales, T. (Philippines)
Various Problems in the Breeding of Maize in the Philippines.
19) Kajiwara, N. (Japan)
Important Diseases of Maize in Japan.
20) Mochizuki, N. (Japan)
Classification of Local Strains of Maize in Japan and Selection of Breeding Materials by Application of Principal Component Analysis.