



Use of Induced Mutations for the Improvement of Grain Legume Production in Southeast Asia

The seminar was attended by plant breeders and specialists of related disciplines of 11 countries of the Southeast Asia region and of two international institutes of agricultural research.

There are roughly thirty species of grain legumes (e.g., soy bean, chick pea, mung bean) which are grown in Southeast Asia and of these, the major ones are cultivated on many millions of hectares (55 000 000 ha – 1973 FAO Yearbook) either as monocultures or in combination with other crops. From the economic standpoint, these crops may represent very substantial resources for obtaining hard currency through export. However, the crucial importance of these crops lies in their key role in the nutrition of the population of Southeast Asia. Grain legumes constitute the major source of protein in the diet when consumed in combination with root crops such as cassava. More frequently in these regions these crops are eaten in combination with cereals such as rice, wheat, sorghum and millet in which case the legumes provide both a significant quantity of protein and the nutritional balance for optimizing the value of whatever cereal protein is available.

The past decade has witnessed great changes in the agriculture of this region with the introduction of higher yielding varieties of cereals. These changes have produced notable shifts in the proportions of the various crops grown by farmers. In general, it has become more profitable to grow high yielding cereal varieties than grain legumes. As a consequence, many of the lands traditionally planted to legumes have been preempted by cereals while the grain legumes have been relegated to more marginal lands. In some countries the area devoted to legume cultivation has shrunk and this has been followed by a noticeable rise in the price of grain legumes over and above the general price rises encountered all over the world. Nevertheless, there is no apparent trend to plant more grain legumes, as the farmer obtains only poor and unstable yields with these crops. In a number of cases, the grain legumes are grown as a secondary and supplemental crop, taking advantage of residual moisture following other crops. Farmers also benefit from legume culture, over and above whatever yield may accrue, in having a replenishment of the soil nitrogen which results from the nitrogen fixing ability of these species. In these days of high fertilizer prices, this has assumed increasing importance.

Despite the obvious importance of these crops, the amount of attention given to the breeding and other cultural aspects has been surprisingly little until now.

The improvement of grain legume production encompasses numerous possible actions. Some of these include (1) the upgrading of the quality of seeds used by farmers, (2) insurance that effective symbiotic nitrogen fixation is carried out through the use of effective inoculants, and (3) the development of superior, high-yielding, pathogen-resistant new varieties of crop varieties through plant breeding. It is only the last of these topics which was considered in detail at the Sri Lanka seminar.

This meeting was organized with the dual purpose of identifying breeding objectives in the grain legumes and also to suggest ways in which induced mutations may be used in attaining these objectives. The work of the meeting was systematized by considering the complex task of defining breeding objectives as follows:

- A. Plant architecture: Breeders put forth ideas as to what the most desirable features of plant morphology should be with respect to different crop species and for local conditions.
- B. Disease and pest resistance: Breeders spoke about the major pathogens and pests which affect specific grain legume crops grown in different countries at different times. The magnitude of the problem was also indicated along with the availability of genetic resources with which to breed against particular pests.
- C. Physiological characters: Such topics as photoperiodic sensitivity, seed viability, nitrogen fixation, maturity time and other characteristics were considered and the ways in which these factors affect production.

Following these discussions, the group documented the breeding needs for the major grain legumes of the region. In this context the participants were asked to identify potential situations where the induced mutation approach to plant breeding would prove valuable.

During the meeting, breeders from different countries, unknown to one another previously, who work towards almost identical objectives, established communication and even arranged to begin to exchange germ plasm.

With intense interest in grain legume production improvement in the Southeast Asia Region, this seminar stimulated the beginning of new exchanges and activities designed to make broad gains through cooperative action. It is planned that some of the information as well as the conclusions and recommendations will be available to interested parties later in 1976.

