DEVELOPMENT OF A CHARACTER IMPROVEMENT PROGRAMME IN DRY BEANS (PHASEOLUS VULGARIS L.) IN ZAMBIA

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Zambia lies between latitudes 8 and 18 degrees South, longitudes 22 and 34 degrees East, altitudes 900 to 1300 m with some valleys lying below 300 m. Average annual rainfall ranges from below 800 mm in the Southern and Western Provinces (Region I) through 1092 mm in the Eastern, Central and Lusaka Provinces (Region II), to above 1300 mm in the Copperbelt, Luapula, Northern and North-Western Provinces (Region III).

Bean Production Areas and Practices: Most beans are grown by small-holder farmers, hence the difficulty to give an estimate of the area under cultivation. Available estimates, not including small-holder farmers, suggest around 10,000 hectares for the country (1). Beans are grown both as an intercrop with maize, sorghum, millet or cassava, and as a sole crop. They are grown both as mixtures and as pure lines. Usually, more than one crop is grown in one season in the high rainfall areas where most beans are grown and also in the "dambo" areas of the medium rainfall areas.

Importance of Dry Beans in Zambia: Beans are one of the most important food legumes in the country as a source of cheaper protein, mineral nutrients and vitamins. They also serve as a source of cash for the relatively poor rural populations.

Bean Production Constraints: Diseases and insect pests are the major constraints to bean production in the country. Acidic soils in Region III, growth habit of the available determinate bean lines and shortage of certified seed also contribute to the current reduced bean yields.

In Region II, Bean Common Mosaic Virus (BCMV) is the major disease occurring in the plateau areas although angular leaf spot (Phaeo-isariopsis griseola (Sacc.) Ferrais) and rust (Uromyces phaseoli) (Reben) wint.) do occur in the "dambo" areas. In Region III, angular leaf spot, rust, scab (Elsinoe phaseoli Jenkins), ascochyta blight (Ascochyta phaseolorum Sacc.) and anthracnose (Colletotrichum lindemuthianum (Sacc. and Mang.) Scrib) are the most predominant. Other fungal and bacterial diseases also occur in both regions but to a lesser extent (2).

The major insect pests are beanflies (Ophiomyia spp.), aphids (Aphis craccivora), mainly as vectors of BCMV, leaf beetles (Ootheca spp.) and spotted pod borer (Maruca testulalis). Of the beanfly species Ophiomyia phaseoli (Region II) and O. spencerella (Regions II and III) are the most predominant. Ophiomyia centrosematis is limited in importance in the country.

Bean Improvement: The initial and partially successful bean improvement programme in Zambia was in 1966 by Mr. A.A. Scrmeyez (3). It lasted for thirteen years and only one variety, Copperbelt 609, from the Tengeru 14RR (Rust Resistant) X Nanzinde (high
yielder and low disease susceptibility) cross was released in 1976. No desirable recombinants were recovered from the other crosses.

The present work on beans by the Food Legumes Research Team is a continuation of that by the Grain Legumes Research Team of 1982 to mid 1988 and an extension of Mr. Sermezey's efforts of 1966 to 1978 (1,2,3).

The strategy for the improvement of desirable characters has taken on the near-standard procedures.

1. Assembling of local exotic germplasm: The CIAT bean programme in Colombia has contributed the largest germplasm accessions followed by Dr. C.A. Leakey's collections in Uganda and the University of Cambridge. Type II archetypes will be introduced from the bean programme at Michigan State University.

2. Evaluation of germplasm and selection of desirable genotypes with resistance to major diseases and insect pests.

3. Initiation of the hybridization programme: This started in August 1989 with the objectives of transferring disease and insect pest resistance genetic factors into desirable medium and large-seeded backgrounds with attractive colours and development of type II archetypes.

4. Utilization of appropriate and standard breeding systems to select desirable recombinants.

5. On-station and on-farm agronomic trials to test yield potential and consumer acceptability.

6. Release of varieties for commercial production upon meeting required Government variety release procedures. Emphasis in this programme will be the improvement of local landraces.

REFERENCES

