

UNITED STATES DEPARTMENT OF AGRICULTURE
Science and Education Administration
and
Agricultural Experiment Station of the
University of Puerto Rico

ANNOUNCE

THE RELEASE OF FOUR BULK SELECTIONS OF DRY BEANS AS RUST RESISTANT
GERMPLASM: MITA-RSP-1, -2, -3, and -4

The Science and Education Administration, Agricultural Research, United States Department of Agriculture, and the Agricultural Experiment Station of the University of Puerto Rico (UPR) announce the release of four bulk selections of dry beans as rust resistant germplasm: MITA-RSP-1, -2, -3, and -4.

A portion of the project carried out by the USDA and UPR is supported in part by the Agency for International Development under a contract (AID/ta-C-1296) entitled "Improvement of Tropical Production of Beans and Cowpeas Through Disease and Insect Control."

This rust resistant germplasm is the product of a scheme in which screening for rust resistance was combined with recurrent selection population (RSP) breeding. In each recurrent selection cycle, plants were exposed to rust epiphytotic during their growth period, while carpenter bees (Xylocopa brasilianorum L.) caused cross-pollination in a certain portion of flowers they visited. The four bulk selection releases are the result of seven recurrent selection cycles.

Rust trials were conducted at three locations having different climatic conditions. The rust population on the island has a wide range of virulence. Selection for rust resistance was made on the basis of: 1) compatible foliage response or the absence of hypersensitive reaction, 2) persistence of rusted foliage or resistance to defoliation, 3) minute uredinia to absence of infection, 4) vigorous growth, and 5) high yield as indicated by the number of pods per plant at harvest. Any rust resistant line with field susceptibility to viruses or the soil-borne complex of diseases was not included in the succeeding population. The soils of the plots at the three locations where rust trials were conducted were heavily infested with soil-borne pathogens. The abundance of alternative hosts and insect vectors served as a reservoir of viruses. No fungicides were applied during the screening and insecticides were used when leaf damage by leafhopper and bean leaf beetle began to appear. The severity of disease pressure either killed or stunted the growth of the susceptible plants. Plant mortality before inflorescence was high during the early recurrent selection cycles. By the seventh cycle, at harvest, 63% of the selections had 40 to 100% living plants bearing a minimum of 50% of their normal functional foliage.

Entries for the recurrent selection population included selections from Plant Introduction accessions, cultivars from Central and South America, and natural hybrids developed at MITA. The first recombination-selection cycle for rust resistance was initiated in 1970-71. Until 1975, the number of entries into each population varied between 700 to 1,100. The population was

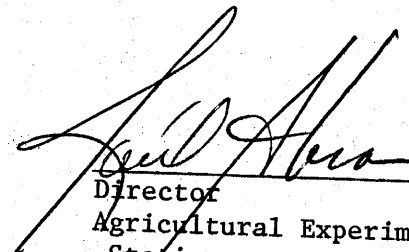
reduced to between 350 and 450 entries during 1975 and 1976. In 1975, a sub-population of 52 highly rust resistant and high yielding lines was selected, and in 1976, 46 of the 52 lines with the widest range of disease resistance were selected from that group. In 1978 the progenies of the 46 lines were separated into 84 lines according to seed color. However, except for rust resistance and vigor, these lines segregated for a number of agronomic characteristics. In 1979, a bulk selection of 38 out of the 84 lines was based on: 1) high percentage of viable plants at harvest, 2) seed yields of 1 gram per pod and over 1,000 kilograms per hectare (based on 1 m row distance), and 3) seed color.

The four bulk selections for 1979 release of the rust resistant germplasm are suggested for use in breeding for yield and rust resistance. The bulk selections are:

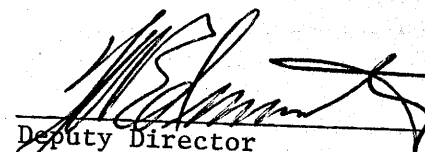
<u>Identity</u>	<u>Seed Color</u>
MITA-RSP-1	White
MITA-RSP-2	Black
MITA-RSP-3	Cream-tan/ brown speckled
MITA-RSP-4	Tan to brown

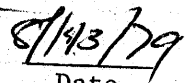
A limited amount of seed is available on a pro-rata basis to qualified persons who request it in writing on or before December 30, 1979, from Mayaguez Institute of Tropical Agriculture, USDA-SEA, P.O. Box 70, Mayaguez, Puerto Rico 00708.

Approved:


 Director
 Agricultural Experiment
 Station
 University of Puerto Rico


 Date


 Deputy Director
 Agricultural Research
 Science and Education
 Administration


 Date