

UNITED STATES DEPARTMENT OF AGRICULTURE  
Agricultural Research Service  
Mayaguez, Puerto Rico  
and  
Michigan State University  
East Lansing, Michigan  
and  
University of Puerto Rico  
Mayaguez, Puerto Rico

RELEASE OF TWO NAVY DRY BEAN BREEDING GERM PLASM LINES  
L-226-10 and L-227-1

The Agricultural Research Service, U. S. Department of Agriculture, the Agricultural Experiment Stations of Michigan State University and the University of Puerto Rico announce the release of two navy dry bean breeding germ plasm lines, L-226-10 and L-227-1. These lines have been developed by a cooperative research program between the Tropical Agriculture Research Station (ARS/USDA), Michigan State University and the University of Puerto Rico (supported in part by the Agency for International Development through contracts AID/CM/TA-C-73-26 and AID/TA-C-1296, and lately by Grant AID/DSAN/XII-G-0261, Bean/Cowpea CRSP). These two lines combine very high levels of disease resistance with an erect, lodging-resistant plant type.

The original crosses were made in Puerto Rico in 1976 to combine the multiple disease resistance of the Puerto Rico black bean line 2B-5-1 with the erect plant type and high yield of the Michigan State University line N 76012. It was then backcrossed to N 76012. A selection of this progeny, MSU N 80051, was subsequently crossed with MSU N 81009 (Bunsi/NEP-2) to produce L-226-10 (MSU N 82152), and crossed to MSU X80101 (W-18/Kent//Bunsi/NEP-2) to produce L-227-1 (MSU N 82160). Selections of these lines were made in the F<sub>3</sub> generation in Puerto Rico for multiple disease resistance, erect plant type, and vigor. In the F<sub>4</sub> generation the lines were grown in a preliminary yield trial and rated for disease resistance and agronomic type. The F<sub>5</sub> generation was rogued in Puerto Rico in the spring off-season. The F<sub>6</sub> generation was tested in a replicated yield trial at 3 locations in Puerto Rico during the 1982-83 winter season.

These two lines were inoculated at Beltsville with 14 U.S. rust races and found highly resistant (necrotic spots) to 6 races and resistant (pustules less than 300 u) to 7 races, expressing susceptibility only to race 15-G from the Dakotas. This resistance pattern is inherited from Mex. 309 via 2B-5-1 and is field resistant to all rust races in Puerto Rico. According to preliminary inheritance studies conducted at Beltsville, this resistance consists of a series of closely linked dominant genes. It has given stable resistance in Puerto Rico for 9 years. These lines also carry the dominant l-gene resistance to bean common mosaic virus, show high field resistance

to viruses in Puerto Rico, and high resistance to soil root rot pathogens including Macrophomina. Both lines are susceptible to the alpha and delta races of anthracnose.


The plant types are erect, short semi-vines (L-226-10 is somewhat more elongate) with few lateral branches, well developed root systems and stout stems, remaining erect through harvest. High fertility tends to increase the vining tendency. Blooming occurs 35-40 days and maturity 95-100 days after planting both in Michigan and in Puerto Rico. In trials in Puerto Rico these lines show no daylength sensitivity and have grown and yielded well even under hot (30-35 C) and humid tropical conditions. Preliminary trials under these conditions at three locations indicate yields in the range of 1400-1600 K/ha which is approximately 1/3 more than the standard white bean cultivar W-117. These yields are in the range of the best black tropical bean cultivars; thus these are the first white bean lines showing this high yield potential. The seed type of these lines is within the normal standards of the navy class, a dull chalky white, with a very low percentage of blemished grain. Seed weight is about 19 g/100 seed for L-226-10 and 18 g/100 seed for L-227-1.

Breeder seed may be obtained from Tropical Agriculture Research Station, ARS/SR/USDA, P. O. Box 70, Mayaguez, Puerto Rico 00709.

  
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Director, Michigan Agricultural Experiment Station

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Date

  
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Director, Agricultural Experiment Station,  
University of Puerto Rico

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Date

  
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Administrator, Agricultural Research Service

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