

MICHIGAN AGRICULTURAL EXPERIMENT STATION
MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN 48824

and

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WASHINGTON, D.C. 20250

NOTICE OF NAMING AND RELEASE OF MACKINAC, A NEW MID-SEASON,
UPRIGHT, DISEASE RESISTANT, NAVY BEAN FOR MICHIGAN AND THE GREAT
LAKES REGION

The Michigan Agricultural Experiment Station and the Agricultural Research Service, United States Department of Agriculture, announce the joint release of Mackinac, a new upright, mid-season, navy bean cultivar with excellent canning quality and resistance to BCMV, anthracnose, and rust.

Mackinac, tested as MSU No. N93296, was derived from a cross made in 1991 between navy bean breeding line N90435 and 'Avanti.' N90435, is a mid-season, disease resistant, upright, indeterminate (Type II) breeding line; Avanti is a Type II, mid-season, disease resistant cultivar with excellent seed and canning quality. The cross was designed to incorporate canning quality into the upright navy bean growth habit. The cross was coded 90N011 and subsequently single-plant F₂ selection number 17 was identified as possessing the desired agronomic and seed traits. Progeny were advanced to the F₆ generation where breeding line numbered 90N011-26-01-01 entered replicated yield trials in 1993 and was coded with the permanent accession number N93296.

Mackinac was developed by the dry bean breeding team at East Lansing, Michigan, consisting of Dr. J.D. Kelly and Mr. J. Taylor of Michigan State University, Department of Crop and Soil Sciences; Dr. G.L. Hosfield of ARS, U.S. Department of Agriculture, Sugarbeet and Bean Research Unit; Dr. M.A. Uebersax of Michigan State University, Department of Food Science and Human Nutrition; and Mr. G.V. Varner of the Michigan Dry Bean Production Research and Advisory Board.

Mackinac was extensively tested for yield and agronomic traits at 27 locations in Michigan over four seasons (1993-1996); averaged 2340 kilograms per hectare; and out yielded Avanti by 6% over 20 locations. Over 17 to 24 locations, Mackinac out yielded seven commercial navy bean cultivars: 'Mayflower', 'Huron', 'Schooner', 'Newport', 'Midland', 'Albion', and 'Seafarer' by a margin of 1 to 16%, whereas, 'Vista' yielded 5% more.

Mackinac averages 55 centimeters in height and exhibits an upright Type II indeterminate growth habit with excellent resistance to lodging.

Mackinac is a mid-season bean, maturing 95 days after planting and with a range in maturity from 87 to 97 days, depending on season and location. The new cultivar has demonstrated uniform maturity and excellent dry-down across a broad range of environments.

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Mackinac carries the single dominant hypersensitive *I* gene for resistance to bean common mosaic virus (BCMV), but is sensitive to temperature-insensitive necrosis-inducing strains of BCMV like NL 3 and NL 8, which induce the black root reaction. Mackinac carries the *Co-1* gene which conditions resistance to Races 65 and 73 of anthracnose, and the *Ur-3* rust resistance gene which conditions resistance to Race 53 and all indigenous bean rust races prevalent in Michigan. Mackinac has tolerance to white mold [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary.] similar to Avanti.

Mackinac has an ovoid seed, averaging 21 grams per 100 seed. Mackinac was rated for cooking quality and scored 3.5 on a five-point hedonic scale (where 5 is best). This evaluation showed Mackinac equivalent in whole bean integrity (no splitting or clumping), uniformity of size (uniform water uptake), color (no after darkening), and clear brine (no starch extruded into canning liquid) to Avanti. After it is processed, Mackinac does not differ significantly from other commercial navy bean cultivars for cooked color, texture, hydration and drained weight ratios.

Seed of Mackinac for experimental purposes may be obtained from Dr. J.D. Kelly, Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824. The Agricultural Research Service has no seed for distribution.

Mackinac navy bean is being released as a public nonexclusive variety, with the option that Mackinac may be sold for seed by name only under the certified class. A research fee will be assessed on each hundred weight of certified seed sold. Breeder seed is maintained by the Michigan Agricultural Experiment Station, East Lansing, MI 48824, in cooperation with the Michigan Foundation Seed Association.

Director
Michigan Agricultural Experiment Station

Date

Administrator
Agricultural Research Service

Date