RELEASE OF GREAT NORTHERN 'SAWTOOTH' DRY BEAN
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Abstract. Sawtooth is a large-seeded, broadly adapted, high yielding, and full-season great northern cultivar that has the I gene resistance to BCMV. Sawtooth is also resistant to Fusarium root and to the race 38 and exhibits an intermediate reaction to the race 53 of Uromyces appendiculatus, the cause of bean rust. Sawtooth has moderate to high levels of resistance to heat, drought, and to soil zinc deficiency and manganese toxicity. Sawtooth has an indeterminate semi-prostrate growth habit Type III with medium to large vine. Sawtooth was tested in the Idaho Bean Adaptation Nursery (IBAN), Idaho Dry Bean Trial (IDBT), Western Regional Bean Trial (WRBT), and National Cooperative Dry Bean Nursery (CDBN) as UIG4-53P-2P, ABL 6, or 0611 from 2003 to 2006.

Pedigree and Breeding History. Sawtooth was derived from the double-cross population UIG4 = ‘Matterhorn’/‘Starlight’/‘Beryl’/‘Weihing’ made in 1999-2000. The Michigan Agricultural Experiment Station released great northern Matterhorn (Kelly et al., 1999). High yielding broadly adapted Matterhorn (Hang, 2006) has an indeterminate upright or erect growth habit Type II (Singh, 1982) with small to medium length vine in southern Idaho. Matterhorn carries the I gene resistance to the US-6 and NY-15 strains of the BCMV. However, when inoculated with the Bean common mosaic necrosis virus (BCMNV, a potyvirus) strain NL-3K Matterhorn exhibits top or systemic necrosis including black root. Matterhorn is resistant (no disease symptoms) to the race 38 (Andean) of U. appendiculatus but exhibits an intermediate reaction or small pustules when inoculated with the race 53 (Middle American) of the pathogen. The Nebraska Agricultural Experiment Station released high quality great northern Starlight (Coyne et al., 1991) and Weihing (Coyne et al., 2000). Starlight has an indeterminate semi-prostrate growth habit Type III and is susceptible to BCMV (US-6) and BCMNV (NL-3K). However, Weihing has a similar growth habit and resistance to BCMV and rust as Matterhorn. Beryl is a Rogers/Syngenta great northern cultivar with growth habit Type III. In addition to the I gene, Beryl carries a recessive resistance gene such that it exhibits local necrosis or pinpoint lesions when inoculated with the NL-3K strain of the BCMNV. Beryl is resistant to the race 38 and susceptible to the race 53 of U. appendiculatus.

Bulk seed of the double-cross F2 was space-planted in the field at Parma, Idaho. A single plant selection was made that exhibited the large white great northern seed. The F2-derived F3 (F2:3) progeny-row was grown in the greenhouse where a single-plant selection was made for resistance to the US-6 strain of BCMV and large white great northern seed. The F3:4 plant-to-progeny-row was grown in the field at Kimberly, Idaho and plants selected for large white great northern seed were harvested in bulk. A single-plant selection for large white great northern seed was made in F5 in the field at Parma. The F6 progeny-row was screened in the greenhouse for BCMV resistance and large white great northern seed, all plants harvested in bulk, followed by seed increase in the field at Kimberly. Six F6 plants were screened each for the NY-15 and US-6 strains of BCMV, NL-3K strain of the BCMNV, and the races 38 and 53 of U. appendiculatus in the separate greenhouse nurseries.
Maturity. Sawtooth is a full-season cultivar, taking 91 to 103 days with mean of 96 days in southern Idaho in 2005 and 2006 compared with a range of 90 to 105 days and a mean of 97 days for UI 425. Sawtooth’s maturity ranged from 92 to 102 days with a mean of 99 days compared with a range of 86 to 97 days and mean of 91 days for ‘Orion’ across five locations in the WRBT. In the CDBN, maturity of Sawtooth across 10 locations ranged from 84 to 116 days with a mean of 98 days compared with the respective values of 79 to 94 and 89 days for Matterhorn.

Seed Yield. Average yield of Sawtooth was 2219 lbs A⁻¹ compared with 2140 lbs A⁻¹ for UI 425 across 15 environments in southern Idaho in 2005 and 2006. In the WRBT, the average yield of Sawtooth was 2333 lbs A⁻¹ compared with 2086 lbs A⁻¹ for Orion. In the CDBN across six western states Sawtooth yielded 2995 lbs A⁻¹ compared with 3019 for Matterhorn in 2006. However, across all 10 locations in the U.S. and Canada the respective yields in the CDBN were 2239 lbs A⁻¹ and 2791 lbs A⁻¹.

Seed Weight. Mean weight of the 100 seeds of Sawtooth of 40 g was similar to that of UI 425 in the IDBT in Idaho in 2005 and 2006. In the WRBT in 2006, the respective values for Sawtooth and Orion were 45 g and 36 g. In the CDBN across 10 environments in 2006, 100 seeds of Sawtooth weighed 43 g compared with 34 g for Matterhorn.

Seed Status. Breeder and Foundation seed of Sawtooth will be maintained by the Idaho Foundation Seed Program under the direction of the Idaho Agricultural Experiment Station, University of Idaho, Moscow, ID 83844. However, a small quantity of seed of Sawtooth for research purposes is available from S. Singh for the first five years. Appropriate acknowledgement of its developers and the University of Idaho for the use of Sawtooth as germplasm would be highly appreciated. The PVP for Sawtooth is pending.

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References