‘Hawaiian Super-sweet #9’ Corn

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‘Hawaiian Super-sweet #9’ is a high-sucrose vegetable corn cultivar bred for the tropics, based on the gene brittle-1. It is harvestable over a longer period than traditional sweet corns (sugary-1) and retains its quality much longer following harvest. It produces high yields on plants of a field corn appearance, with high lodging resistance, low ear position, and large seeds on well-covered ears.

Origin

‘Hawaiian Super-sweet #9’ is the Hawaiian brittle-1 composite 3h, derived following 18 generations of hybridization, and of mass and pedigree selection. Its parentage includes Hawaiian sweet corn cultivars and inbreds converted to the brittle-1 gene. The pedigree is somewhat complex (Fig. 1) involving the production of 2 prior brittle-1 composites (2) of the following pedigrees:

- bt COMP le = (bt x AA’s)S4HSBC)S2
- bt COMP le = (bt x HSX)S2

The brittle-1 gene was obtained from the Maize Genetics Cooperative in the linkage group 2 at bt pr of a red-aleurone (ACR) genotype. Other abbreviations in the pedigree include: S = sb generation, BC = backcross to composite, HSX = 3 ‘Hawaiian Sugar’ composites (2) and AA’s = 15 inbreds from the ‘Hawaiian Sugar’ cultivar. The inbreds AA8 and B14 Rp-d 2 (Fig. 1) are from Hawaii and Illinois (courtesy Dr. A. Hooker), respectively. Most generations of selection were conducted under severe epiphytotics of maize mosaic virus, Puccinia sorghi Schw. rust, Helminthosporium turcicum Pass. blight and Fusarium moniliforme Sheldon kernel rot and epibiotics of earworms and Periglissus maidis leafhoppers. Limited or no smut, borers, Puccinia polysora Underw. H. maydis Nisik. & Miyake or other viruses were present.

Description

In many respects, ‘Hawaiian Super-sweet #9’ is very similar to the previous supersweets released from our program, including ‘Hawaiian Super-sweet #6’ (3) based on the gene brittle-2, a gene independent and unlinked to brittle-1. ‘Hawaiian Super-sweet #9’ was bred for the tropics, and should have very late maturity under longer daylengths. In Hawaii, it flowers in 52 to 56 days, maturing to the preferred roasting-ear stage in 19 days after pollination. It remains palatable many days later, however, unlike other sweet corn cultivars, and is generally preferred quite ripe in the tropics.

Cultivar #9 produces large ears on a sturdy plant, about 245 cm (8.0 feet) tall with uppermost ear at 95 cm (3.1 feet). It roots very well, rarely lodging in Hawaii, and has no tillers. Plants are green, including silks and tassel. It is a prolific cultivar, bearing well at populations between 50 and 65 thousand per ha (25–32,000/acre). It was selected intensively for pest tolerance, as noted, and is essentially homozygous for the genes Ht (Northern leaf blight, race 1), Mv (maize mosaic virus), and Rp-d (2) (rust); it also carries good general resistance to Northern blight.

Ears of the new cultivar (Fig. 2) are largely golden yellow, but segregate rare white (yy) and red (ACR) kernels. The ears of ‘Hawaiian Super-sweet #9’ average 17.5 cm (6.9 inch) in length, filling almost to the tip. They are slightly tapered with 14 or 16 rows, and have a high no. (14.6) of tight husks with long husk extension and little or no flag leaf. The kernels average 560 per ear, and are large for supersweets with a mature dry wt of 122 g/1000 kernels at 11% moisture (or 8190 kernels per kg). Field viability of seed under Hawaiian conditions is excellent, between 85 and 95% germination. Tenderness has been judged highly acceptable by panels, who ranked the parental bt COMP 1 as well or better than all supersweets in our program, both at 18 and 25 days after pollination. In sweetness and flavor, #9 was judged superior to all sweet corns and equal to or better than all supersweets in our studies (1), including shrunken-2, brittle-2, and opaque-2 sugary cultivars.

The brittle-1 gene has not been used previously in sweet corn breeding, although it has been the subject of several genetics studies (4). All supersweets are high in protein (14.5% of dry matter) relative to other types of corn, due to their reduced starch content, and their lysine levels are also high. The bt gene blocks starch accumulation in the endosperm in an unknown way distinct from the sh2 and bt1 genes that affect ADPG pyrophosphorylase activity. The three are virtually indistinguishable in sugar levels, ranging around 40% (dry-wt basis) at sweet corn stage. Hawaiian Super-sweet #1 was aewx, Supersweets #2, 3, 4 and 5 were shrunken-2; #6 was brittle-2; #7 was brittle-2 opaque-2, and #8 was shrunken-2 opaque 2. Apart from the poor quality of #1, the others demonstrated no consistent differences in sweetness in reasonably isogenic stocks (1).
Outstanding Characteristics and Uses

'Hawaiian Super-sweet #9' is a vigorous disease-tolerant tropical supersweet corn, an open-pollinated cultivar with large ears on sturdy plants. It is the only commercial corn presently available based on the high-sucrose gene brittle-1, and its outcrosses with any other corns will produce easily recognized flint kernels. The cultivar was selected for its superior yield, sweetness, and tenderness under tropical conditions, and is in wide commercial production in Hawaii. An overwhelming preference has been shown for our supersweets over the sugary-1 sweet corns, both as fresh and canned corns by consumers throughout the tropics. Accordingly, we have stopped generating further Hawaiian cultivars based on the sugary-1 gene for the tropics (14 now available).

Availability

Seed of 'Hawaiian Super-sweet #9' is available from the Seed Specialist, Department of Horticulture, University of Hawaii, 3190 Maile Way, Rm. 102, Honolulu, HI 96822.

Literature Cited


Wisconsin (BBSR) 130 Bean Breeding Line

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Here we report the first bush green bean (Phaseolus vulgaris L.) with excellent resistance to the bacterial brown spot disease (Pseudomonas syringae van Hall). This new green bean breeding line (Fig. 1) has been designated Wis. (BBSR) 130, and is recommended for use in breeding programs.

Origin

Wis. (BBSR) 130 was derived from a cross between a bacterial brown spot resistant (BBSR) selection from PI 313537 and the commercial processing bean cultivar 'Slimgreen'. Resistant selections were made in the greenhouse following repeated inoculations of the F2 through F5 generations. Seed from the F8 generation has been released.

Description

The good bush habit of this new bean is similar to the 'Slimgreen' parent, but maturity is slightly later than this cultivar. Pods are borne quite high and toward the middle of the plant and are medium green in color, straight, and medium in length but they are quite flat and broad—similar to the resistant parent. The plant has a green hypocotyl and white flowers. The seeds are chalky white and unusually plump.

Outstanding characteristics

Wis. 130 combines a good bush habit and good vigor with resistance to an unusually large number of bean diseases. In addition to being the first bush bean resistant to bacterial brown spot, it has shown tolerance to common blight [Xanthomonas phaseoli (E. F. Smith) Dows.] and resistance to halo blight [both races 1 and 2 of Pseudomonas phaseolicola (Burk.) Dows.], bean common mosaic (bean virus 1), anthracnose (gamma race of Colletotrichum lindemuthianum Sacc. and Magr.), rust (two races of Uromyces phaseoli typica Arth.) and bean Fusarium yellows (two races of Fusarium oxysporum f. sp. phaseoli Kendr. and Snyder). This germplasm should be very valuable to breeders because of resistance or tolerance to 7 diseases!

Availability

Small amounts of seed are available and are offered to public and private researchers for use as a parental bean line.

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3 This bean came to us labeled Phaseolus coccineus but it proved to have few, if any, of the characteristics of this species. It may well be Phaseolus vulgaris.

Fig. 1. Wis (BBSR) 130 bean breeding line.