Innovation, Sciences et Développement économique Canada
Office de la Propriété Intellectuelle du Canada

Innovation, Science and Economic Development Canada
Canadian Intellectual Property Office

CA 3091848 A1 2021/03/03

(21) 3 091 848

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2020/09/02

(41) Mise à la disp. pub./Open to Public Insp.: 2021/03/03

(30) Priorité/Priority: 2019/09/03 (US62/895,032)

(51) Cl.Int./Int.Cl. *C12N 5/04* (2006.01),
A01H 1/00 (2006.01), *A01H 5/00* (2018.01),
A01H 5/10 (2018.01), *A01H 6/46* (2018.01),
A23L 7/00 (2016.01), *C12N 15/82* (2006.01),
C12N 5/10 (2006.01), *C12Q 1/68* (2018.01)

(71) Demandeur/Applicant:
PIONEER HI-BRED INTERNATIONAL, INC., US

(72) Inventeurs/Inventors:
CLARKSON, ROBERT LEWIS, US;
LASKAR, WILLIAM JOSEPH, US;
LIVELY, KYLE JAY, US;
MARSHALL, GREGORY CHARLES, US;
UPHAUS, JAMES JOSEPH, US

(74) Agent: TORYS LLP

(54) Titre : VARIETE DE BLE 6PZRK73B
(54) Title: WHEAT VARIETY 6PZRK73B

(57) Abrégé/Abstract:
A wheat variety designated 6PZRK73B, the plants and seeds of wheat variety 6PZRK73B, methods for producing a wheat plant produced by crossing the variety 6PZRK73B with another wheat plant, and hybrid wheat seeds and plants produced by crossing the variety 6PZRK73B with another wheat line or plant, and the creation of variants by backcrossing, mutagenesis or transformation of variety 6PZRK73B are disclosed. Methods for producing other wheat varieties or breeding lines derived from wheat variety 6PZRK73B and to wheat varieties or breeding lines produced by those methods are also provided.

ABSTRACT

A wheat variety designated 6PZRK73B, the plants and seeds of wheat variety 6PZRK73B, methods for producing a wheat plant produced by crossing the variety 6PZRK73B with another wheat plant, and hybrid wheat seeds and plants produced by crossing the variety 6PZRK73B with another wheat line or plant, and the creation of variants by backcrossing, mutagenesis or transformation of variety 6PZRK73B are disclosed. Methods for producing other wheat varieties or breeding lines derived from wheat variety 6PZRK73B and to wheat varieties or breeding lines produced by those methods are also provided.

Date Reçue/Date Received 2020-09-02

WHEAT VARIETY 6PZRK73B

FIELD OF INVENTION

This invention is in the field of wheat (*Triticum aestivum* L.) breeding, specifically relating to a wheat variety designated 6PZRK73B.

BACKGROUND OF INVENTION

There are numerous steps involving significant intervention in the development of any novel, desirable plant germplasm. The goal is to combine in a single variety an improved combination of desirable traits from the parental germplasm. These traits may include, but are not limited to, higher seed yield, resistance to diseases and/or insects, tolerance to drought and/or heat, altered milling properties, abiotic stress tolerance, improvements in compositional traits, and better agronomic characteristics.

Wheat is grown worldwide and is the most widely adapted cereal. There are five main wheat market classes. They include the four common wheat (*Triticum aestivum* L.) classes: hard red winter, hard red spring, soft red winter, and white (hard and soft). The fifth class is durum (*Triticum turgidum* L.). Common wheats are used in a variety of food products such as bread, cookies, cakes, crackers, and noodles. In general, the hard wheat classes are milled into flour used for breads and the soft wheat classes are milled into flour used for pastries and crackers. Wheat starch is also used in the paper industries, as laundry starches, and in other products.

SUMMARY OF THE INVENTION

Seeds of the wheat variety 6PZRK73B are provided. Also provided are plants produced by growing the seed of the wheat variety 6PZRK73B, as well as the derivatives of such plants. Further provided are plant parts, including cells, plant protoplasts, plant cells of a tissue culture from which wheat plants can be regenerated, plant calli, plant clumps, and plant cells that are intact in plants or parts of plants, such as leaves, stems, roots, root tips, anthers, pistils, seed, grain, pericarp, embryo, pollen, ovules, cotyledon,

Date Reçue/Date Received 2020-09-02

hypocotyl, spike, floret, awn, lemma, shoot, tissue, petiole, cells, and meristematic cells, and the like.

In a further aspect, a composition comprising a seed of wheat variety 6PZRK73B comprised in plant seed growth media is provided. The plant seed growth media can be, for example, a soil or synthetic cultivation medium. The growth medium may be comprised in a container or may, for example, be soil in a field. Plant seed growth media are well known to those of skill in the art and include, but are in no way limited to, soil or synthetic cultivation medium. Advantageously, plant seed growth media can provide adequate physical support for seeds and can retain moisture and/or nutritional components. Examples of characteristics for soils that may be desirable in certain embodiments can be found, for instance, in U.S. Pat. Nos. 3,932,166 and 4,707,176. Synthetic plant cultivation media include those known in the art and may, for example, comprise polymers or hydrogels. Examples of such compositions are described in U.S. Pat. No. 4,241,537.

A tissue culture of regenerable cells of the wheat variety 6PZRK73B is provided, as well as plants and plant parts regenerated therefrom, wherein the regenerated wheat plant is capable of expressing all the physiological and morphological characteristics of a plant grown from the wheat seed designated 6PZRK73B.

A wheat plant comprising a locus conversion or single locus conversion of the wheat variety 6PZRK73B, wherein the wheat plant is otherwise capable of expressing all the physiological and morphological, or phenotypic, characteristics of the wheat variety 6PZRK73B is provided. The locus conversion may comprise, for example, a transgenic gene which has been introduced by genetic transformation into the wheat variety 6PZRK73B or a progenitor thereof. The locus conversion may, for example, comprise a dominant or recessive allele or a genetic modification introduced by manipulation of the plant genome. The locus conversion may confer potentially any trait upon the converted plant, including, but not limited to, herbicide resistance, insect resistance, resistance to bacterial, fungal, or viral disease, male fertility or sterility, abiotic stress, altered phosphorus content, altered antioxidants, altered essential amino acids, and altered nutritional quality, such as altered starch, sugars, non-digestible carbohydrate, protein,

Date Reçue/Date Received 2020-09-02

oil or fatty acids. The altered trait can be compared to a wheat variety 6PZRK73B not comprising the locus conversion.

Wheat plants are provided which comprise a transgene or genetic modification and which were produced by transforming or modifying the plant, plant part, seed or cell of wheat variety 6PZRK73B, or which had the transgene or the genetic modification introgressed through back-crossing.

Methods for producing a wheat plant are provided in which plant breeding techniques are applied to a wheat plant grown from seed of wheat variety 6PZRK73B comprising a locus conversion, or to a plant grown from seed of a cross of such a wheat plant to a different wheat plant.

First generation (F1) hybrid wheat seed produced by crossing a plant of the wheat variety 6PZRK73B to a second wheat plant are provided. Also provided are the F1 hybrid wheat plants grown from the hybrid seed produced by crossing the wheat variety 6PZRK73B to a second wheat plant. Still further provided are the seeds of an F1 hybrid plant produced with the wheat variety 6PZRK73B as one parent, the second generation (F2) hybrid wheat plant grown from the seed of the F1 hybrid plant, and the seeds of the F2 hybrid plant.

Methods of producing wheat seeds are provided which comprise crossing a plant of the wheat variety 6PZRK73B to any second wheat plant, including itself or another plant of the variety 6PZRK73B. For example, the method of crossing can comprise the steps of: (a) planting seeds of the wheat variety 6PZRK73B; (b) cultivating wheat plants resulting from said seeds until said plants bear flowers; (c) allowing fertilization of the flowers of said plants; and (d) harvesting seeds produced from said plants.

A method of producing hybrid wheat seeds is provided which comprises crossing the wheat variety 6PZRK73B to a second, distinct wheat plant that is nonisogenic to the wheat variety 6PZRK73B. For example, the crossing can comprise the steps of: (a) planting seeds of wheat variety 6PZRK73B and a second, distinct wheat plant, (b) cultivating the wheat plants grown from the seeds until the plants bear flowers; (c) cross

Date Reçue/Date Received 2020-09-02

pollinating a flower on one of the two plants with the pollen of the other plant, and (d) harvesting the seeds resulting from the cross pollinating.

A method for developing a wheat plant in a wheat breeding program is provided comprising: (a) obtaining or providing a wheat plant, or its parts, of the variety 6PZRK73B; and (b) employing said plant or parts as a source of breeding material in a plant breeding program such as using plant breeding techniques. In the method, the plant breeding techniques may be selected, for example, from recurrent selection, mass selection, bulk selection, backcrossing, pedigree breeding, genetic marker-assisted selection and genetic transformation. The wheat plant of variety 6PZRK73B may be used as the male or female parent.

A method of producing a wheat plant derived from the wheat variety 6PZRK73B is provided, the method comprising the steps of: (a) preparing a progeny plant derived from wheat variety 6PZRK73B by crossing a plant of the wheat variety 6PZRK73B with a second wheat plant; and (b) crossing the progeny plant with itself or a second plant to produce a progeny plant of a subsequent generation which is derived from a plant of the wheat variety 6PZRK73B. Optionally, the method may further comprise: (c) crossing the progeny plant of a subsequent generation with itself or a second plant; and (d) repeating steps (b) and (c) for at least, for example 2, 3, 4 or more additional generations to produce an inbred wheat plant derived from the wheat variety 6PZRK73B. Also provided is a plant produced by this and other methods described herein.

A method of producing a wheat plant derived from the wheat variety 6PZRK73B can, for example, further comprise: (a) crossing the wheat variety 6PZRK73B-derived wheat plant with itself or another wheat plant to yield additional wheat variety 6PZRK73B-derived progeny wheat seed; (b) growing the progeny wheat seed of step (a) under plant growth conditions to yield additional wheat variety 6PZRK73B-derived wheat plants; and (c) repeating the crossing and growing steps of (a) and (b) to generate further wheat variety 6PZRK73B-derived wheat plants., Steps (a) and (b) can be repeated if desired at least 1, 2, 3, 4, or 5 or more times. Also provided is a wheat plant produced by this and other methods described herein.

Date Reçue/Date Received 2020-09-02

Methods for producing double haploid wheat plants from wheat variety 6PZRK73B are provided. For example, a wheat plant produced by growing a seed of the cross of wheat variety 6PZRK73B with a different wheat plant or plant part can be crossed with another plant to form haploid cells. The chromosomes of the haploid cells can be doubled to form double haploid cells which are grown into a double haploid wheat plant or plant part. Haploid seed generated from a cross of a wheat plant disclosed herein with a different wheat plant can be doubled to produce a wheat plant having doubled haploid chromosomes.

Methods for cleaning, conditioning, or applying a seed treatment to the seed of wheat variety 6PZRK73B are provided.

Methods of milling the seed of wheat variety 6PZRK73B and the flour produced from such milling are provided. The flour may include a cell of wheat variety 6PZRK73B.

This invention relates to:

<1> A plant cell from a wheat plant designated variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115.

<2> The plant cell of <1>, wherein the plant cell is a seed cell.

<3> A transformed plant cell from a transformed plant, obtained by transforming wheat variety 6PZRK73B with a transgene, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the transformed plant cell is the same as a cell from variety 6PZRK73B except for the transgene, and the transformed plant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions.

Date Reçue/Date Received 2020-09-02

<4> A plant cell from a wheat plant, or a plant cell from a part of the wheat plant, wherein the wheat plant is produced by growing seed of wheat variety 6PZRK73B, and wherein representative seed of variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115.

<5> A plant cell from (i) a wheat plant or (ii) a wheat seed wherein the plant or seed is a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, and wherein the descendant is produced by self-pollinating 6PZRK73B.

<6> A plant cell from (i) a wheat plant or (ii) a wheat seed wherein the plant or seed is a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is derived from wheat variety 6PZRK73B, and wherein the descendant is produced by self-pollinating 6PZRK73B.

<7> A plant cell from a plant tissue culture produced from protoplasts or regenerable cells from the plant cell of <1>.

<8> A plant cell from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is homozygous for all of its alleles and wherein the descendant is produced by self-pollinating 6PZRK73B.

<9> The plant cell of <8> wherein the plant cell is a seed cell.

<10> A plant cell from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC

Date Reçue/Date Received 2020-09-02

Accession Number PTA-126115, wherein the descendant is produced by self-pollinating 6PZRK73B and expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, wherein the descendant comprises a transgene, wherein the transgene was introduced by transforming the descendant, and wherein the plant cell is the same as a cell from variety 6PZRK73B except for the transgene.

<11> A plant cell from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B and comprises a transgene, wherein the transgene was introduced by transforming the descendant, and wherein the plant cell is the same as a cell from variety 6PZRK73B except for the transgene, and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions.

<12> Use of a wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, to breed a wheat plant.

<13> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, to breed a wheat plant.

<14> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-

Date Reçue/Date Received 2020-09-02

126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, to breed a wheat plant.

<15> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a recipient of a conversion locus.

<16> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a recipient of a conversion locus.

<17> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a recipient of a conversion locus.

<18> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, to cross with another wheat plant.

<19> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, to cross with another wheat plant.

Date Reçue/Date Received 2020-09-02

<20> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, to cross with another wheat plant.

<21> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a recipient of a transgene.

<22> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is produced by self-pollinating 6PZRK73B, and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a recipient of a transgene.

<23> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a recipient of a transgene.

<24> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, for flour, starch, or protein production.

<25> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat

Date Reçue/Date Received 2020-09-02

variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, for flour, starch, or protein production.

<26> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, for flour, starch or protein production.

<27> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a crop.

<28> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a crop.

<29> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a crop.

<30> Milled non-viable wheat seeds from wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115.

<31> Milled non-viable wheat seeds from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under

Date Reçue/Date Received 2020-09-02

ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions.

<32> Milled non-viable wheat seeds from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B.

<33> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, to produce a genetic marker profile.

<34> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, to produce a genetic marker profile.

<35> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, to produce a genetic marker profile.

<36> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a source of cleaned wheat seed.

Date Reçue/Date Received 2020-09-02

<37> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a source of cleaned wheat seed.

<38> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a source of cleaned wheat seed.

<39> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a source of treated wheat seed.

<40> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a source of treated wheat seed.

<41> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a source of treated wheat seed.

Date Reçue/Date Received 2020-09-02

<42> The use of any one of <39>, <40>, or <41>, wherein wheat variety 6PZRK73B is treated with a seed treatment comprising metalaxyl, mefenoxam™, imidacloprid, Bacillus subtilis, difenoconazole, tebuconazole, or any combination thereof.

<43> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, for haploid production.

<44> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions for haploid production.

<45> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, for haploid production.

<46> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a source of propagating material.

<47> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a source of propagating material.

Date Reçue/Date Received 2020-09-02

<48> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a source of propagating material.

<49> Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, for consumption.

<50> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, for consumption.

<51> Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, for consumption.

DETAILED DESCRIPTION

The present invention relates to a new and distinctive wheat (*Triticum aestivum* L.) variety designated 6PZRK73B, its seeds, plants, plant parts and hybrids. Variety 6PZRK73B represents a significant advancement in elite germplasm.

Also provided are methods for making 6PZRK73B that comprise crossing wheat variety 6PZRK73B with another wheat plant and processes for making a wheat plant containing in its genetic material one or more traits introgressed into 6PZRK73B through backcross conversion and/or transformation or genetic modification, and to the wheat seed, plant and plant parts produced thereby. Variants of wheat 6PZRK73B created by

Date Reçue/Date Received 2020-09-02

mutagenesis or transformation, such as genetic modification, as well as a hybrid wheat seed, plant or plant part produced by crossing the variety 6PZRK73B or a locus conversion of 6PZRK73B with another wheat variety are also provided.

Wheat variety 6PZRK73B has shown uniformity and stability for all traits, as described in the variety description information provided herein. It has been self-pollinated a sufficient number of generations, with careful attention to uniformity of plant type to ensure homozygosity and phenotypic stability. The line has been increased with continued observation for uniformity. No variant traits have been observed or are expected in 6PZRK73B, as described, for example, in Table 2 at the end of this section.

Field crops are bred through techniques that take advantage of the plant's method of pollination, such as self-pollination, sib-pollination or cross-pollination. As used herein, the term cross-pollination includes pollination with pollen from a flower on a different plant from a different family or line and does not include self-pollination or sib-pollination. Wheat plants (*Triticum aestivum* L.), are recognized to be naturally self-pollinated plants which, while capable of undergoing cross-pollination, rarely do so in nature. Thus intervention for control of pollination is needed for the establishment of superior varieties.

Provided are methods of producing progeny with a new combination of genetic traits by cross pollinating one wheat plant with another by emasculating flowers of a designated female plant and pollinating the female parent with pollen from the designated male parent. Suitable methods of cross-pollination of wheat plants are described, for example, in U.S. Patent No. 8,809,654, but other methods can be used, or modified, as is known to those skilled in the art.

A cross between two different homozygous lines produces a uniform population of hybrid plants that may be heterozygous for many gene loci. A cross of two heterozygous plants each that differ at a number of gene loci will produce a population of plants that differ genetically and will not be uniform. Regardless of parentage, plants that have been self-pollinated and selected for type for many generations become homozygous at almost all gene loci and produce a uniform population of true breeding progeny. The

Date Reçue/Date Received 2020-09-02

term “homozygous plant” is hereby defined as a plant with homozygous genes at 95% or more of its loci.

Choice of breeding or selection methods depends on the mode of plant reproduction, the heritability of the trait(s) being improved, and the type of variety used commercially (e.g., F1 hybrid variety, pureline variety, etc.). For highly heritable traits, a choice of superior individual plants evaluated at a single location will be effective, whereas for traits with low heritability, selection can be based on mean values obtained from replicated evaluations of families of related plants. Popular selection methods which can be used include pedigree selection, modified pedigree selection, mass selection, and recurrent selection.

The complexity of inheritance influences choice of the breeding method. For example, pedigree breeding, backcross breeding, single seed descent, and bulk breeding, which are each described in U.S. Patent No. 8,809,654, can be used. Each wheat breeding program may include a periodic, objective evaluation of the efficiency of the breeding procedure. Evaluation criteria vary depending on the goal and objectives, but may include gain from selection per year based on comparisons to an appropriate standard, overall value of the advanced breeding lines, and number of successful varieties produced per unit of input (e.g., per year, per dollar expended, etc.).

Various recurrent selection techniques can be used to improve quantitatively inherited traits controlled by numerous genes. The use of recurrent selection in self-pollinating crops depends on the ease of pollination and the number of hybrid offspring from each successful cross. Recurrent selection can be used to improve populations of either self- or cross-pollinated crops. A genetically variable population of heterozygous individuals is either identified or created by intercrossing several different parents. The best plants are selected based on individual superiority, outstanding progeny, or excellent combining ability. The selected plants are intercrossed to produce a new population in which further cycles of selection are continued. Plants from the populations can be selected and selfed to create new varieties.

Date Reçue/Date Received 2020-09-02

Wheat variety 6PZRK73B can be used as the female or the male parent in biparental crosses in order to develop new and valuable wheat varieties or hybrids. Wheat normally self-pollinates in nature. Cross pollination of one wheat plant with another to produce progeny with a new combination of genetic traits, can be carried out according to methods known to those skilled in the art. Wheat cross-pollination is achieved by emasculating flowers of a designated female plant and pollinating the female parent with pollen from the designated male parent. Methods of cross-pollinating wheat plants for use in selection and advancement are described, for example in US Patent No. 9,282,712.

Plant breeding methods may include analysis , comparison and characterization of the plant genome and the use of molecular markers, including techniques such as Starch Gel Electrophoresis, Isozyme Electrophoresis, Restriction Fragment Length Polymorphisms (RFLPs), Randomly Amplified Polymorphic DNAs (RAPDs), Arbitrarily Primed Polymerase Chain Reaction (AP-PCR), DNA Amplification Fingerprinting (DAF), Sequence Characterized Amplified Regions (SCARs), Amplified Fragment Length Polymorphisms (AFLPs), Simple Sequence Repeats (SSRs), Single Nucleotide Polymorphisms (SNPs) and Quantitative Trait Loci (QTL) mapping.

Molecular markers can also be used during the breeding process for the selection of qualitative traits. For example, markers closely linked to alleles or markers containing sequences within the actual alleles of interest can be used to select plants that contain the alleles of interest during a crossing or backcrossing breeding program. The markers can also be used to select for the genome of the recurrent parent and against the markers of the donor parent. Using this procedure can minimize the amount of genome from the donor parent that remains in the selected plants. It can also be used to reduce the number of crosses back to the recurrent parent needed in a backcrossing program.

The production of double haploids can also be used for the development of homozygous lines in the breeding program and in the production of, for example, hybrid wheat using variety 6PZRK73B. Double haploids are produced by the doubling of a set of chromosomes (1N) from a heterozygous plant to produce a completely homozygous individual. This can be advantageous because the process omits the generations of

Date Reçue/Date Received 2020-09-02

selfing needed to obtain a homozygous plant from a heterozygous source. Hybrid wheat can be produced, for example, in methods utilizing cytoplasmic male sterility, nuclear genetic male sterility, chemicals, genetic modification or a combination thereof.

Wheat variety 6PZRK73B can be crossed with one or more parental lines, followed by repeated selfing and selection, producing many new genetic combinations. Selected germplasm can be grown under unique and different geographical, climatic and soil conditions with further selections being made during and at the end of the growing season.

Wheat varieties that are highly homogeneous, homozygous and reproducible are useful as commercial varieties. There are many analytical methods, such as those described herein, which can be used to determine the homozygotic stability, phenotypic stability, and identity of these varieties produced or derived from variety 6PZRK73B. Gel electrophoresis is particularly useful in wheat. Wheat variety identification can occur, for example, through electrophoresis of gliadin, glutenin, albumin and globulin, and total protein extracts.

Disclosed are plant breeding methods in which plant populations as well as individual plants are evaluated for general health, agronomics, and stability at one or more stages. These evaluations can include, but are not limited to, one or more of the following characteristics: plant architecture traits such as seedling coleoptile length, coleoptile color (presence of anthocyanin), juvenile plant growth habit, tillering, plant height, straw strength or lodging, flag leaf carriage at boot stage, leaf width and length, glaucosity of stems, leaves and spikes, pubescence of leaves and spikes, spike shape, spike density, spike awnedness, and plant color through-out stages of growth; plant growth characteristics, such as vernalization requirement, date for first stem joint emergence, heading date, flowering date, physiological maturity date and harvest maturity; tolerance to weather conditions, such as cold tolerance, resistance to heaving, tolerance to wet soils and standing water, drought and heat tolerance; and grain characteristics, such as grain yield, test weight, 1000 kernel weight, grain moisture, grain color, grain shape, grain protein, flour milling yield and baking characteristics.

Date Reçue/Date Received 2020-09-02

During its development, wheat variety 6PZRK73B was assayed and/or planted in field trials and evaluated for a variety of traits and/or characteristics as compared to check varieties. The property(s) of appropriate check varieties include but are not limited to varieties with a similar relative maturity, varieties known to be susceptible to one or more particular diseases, insect, pathogen, field condition, weather condition, soil type or condition, and/or crop management practice, varieties known to be tolerant or resistant to one or more particular diseases, insect, pathogen, field condition, weather condition, soil type or condition, and/or crop management practice, varieties comprising one or more particular marker locus, and/or varieties derived from another appropriate variety or having a particular pedigree. Appropriate choice of check varieties for comparison assures an appropriate baseline and valid qualitative or quantitative assessment of any test varieties.

In the development of 6PZRK73B, the plants can be tested for various traits including, but not limited to grain yield, test weight, heading date, harvest maturity, plant height, straw strength, pre-harvest sprout tolerance, resistance levels to leaf rust, stripe rust, tan spot, *Septoria tritici* blotch, *Stagnospora nodorum* blotch, powdery mildew, *Fusarium* (scab), wheat yellow mosaic virus and soilborne mosaic virus, and grain characteristics such as flour yield, flour protein, and baking characteristics.

Wheat variety 6PZRK73B, being substantially homozygous, can be reproduced by planting seeds of the line, growing the resulting wheat plants under self-pollinating or sib-pollinating conditions, and harvesting the resulting seed, using techniques familiar to the agricultural arts.

In one aspect, wheat plants, plant parts and seeds are provided which have all or essentially all of the characteristics set forth in Table 2. In one aspect wheat plants, plant parts and seeds are provided which have all or essentially all of the physiological and morphological characteristics of wheat variety 6PZRK73B, or all or essentially all of the phenotypic characteristics of wheat variety 6PZRK73B, representative seed having been deposited with the ATCC as disclosed herein.

Date Reçue/Date Received 2020-09-02

Wheat variety 6PZRK73B can be further reproduced by tissue culture and regeneration. Tissue culture of various tissues of wheat and regeneration of plants therefrom is well known and widely published. Thus, in another aspect provided are cells which upon growth and differentiation produce wheat plants capable of having the physiological and morphological characteristics of wheat variety 6PZRK73B.

As used herein, the term "plant parts" includes, without limitation, plant protoplasts, plant cell tissue cultures from which wheat plants can be regenerated, plant calli, plant clumps, plant cells, embryos, pollen, ovules, pericarp, seed, flowers, florets, heads, spikes, stems, stalks, leaves, roots, root tips, anthers, and the like. When indicating that a plant is crossed or selfed this indicates that any plant part of the plant can be used. For instance, the plant part does not need to be attached to the plant during the crossing or selfing, only the pollen might be used.

In one aspect, a wheat plant containing a locus conversion or an essentially derived variety of 6PZRK73B is provided. Essentially derived varieties may be obtained, for example, by the selection of a natural or induced mutant, or of a somaclonal variant, the selection of a variant individual from plants of the initial variety, backcrossing, or transformation by genetic engineering, from the repeated use of variety 6PZRK73B or being predominately derived from variety 6PZRK73B.

A locus conversion refers to plants within a variety that have been modified in a manner that retains the overall genetics of the variety and further comprises one or more loci with a specific desired trait, such as male sterility, insect, disease or herbicide resistance. Examples of single locus conversions include mutant genes, transgenes and native traits finely mapped to a single locus. One or more locus conversion traits may be introduced into a single wheat variety.

Transgenes and transformation methods provide means to engineer the genome of plants to contain and express heterologous genetic elements, including but not limited to foreign genetic elements, additional copies of endogenous elements, and/or modified versions of native or endogenous genetic elements, in order to alter at least one trait of a plant in a specific manner. Any heterologous DNA sequence(s), whether from a different

Date Reçue/Date Received 2020-09-02

species or from the same species, which are inserted into the genome using transformation, backcrossing, or other methods known to one of skill in the art are referred to herein collectively as transgenes. The sequences are heterologous based on sequence source, location of integration, operably linked elements, or any combination thereof. One or more transgenes of interest can be introduced into wheat variety 6PZRK73B.

In some examples, transgenic variants of wheat variety 6PZRK73B are produced by introducing at least one transgene of interest into wheat variety 6PZRK73B by transforming wheat variety 6PZRK73B with a polynucleotide comprising the transgene of interest. In other examples, transgenic variants of wheat variety 6PZRK73B are produced by introducing at least one transgene by introgressing the transgene into wheat variety 6PZRK73B by crossing.

In one example, a process for modifying wheat variety 6PZRK73B with the addition of a desired trait, said process comprising transforming a wheat plant of wheat variety 6PZRK73B with a transgene that confers a desired trait is provided. In other examples, the genome of wheat variety 6PZRK73B is transformed by genetic modification using techniques described herein, such as the CRISPR/Cas system adapted for use in plants. Therefore, transgenic wheat variety 6PZRK73B cells, plants, plant parts, and seeds produced from this process are provided. In some examples one or more desired traits may include traits such as herbicide resistance, insect resistance, disease resistance, decreased phytate, modified fatty acid profile, modified fatty acid content, carbohydrate metabolism, protein content, or oil content.

Numerous methods for plant transformation are known in the art, including biological, such as the use of *Agrobacteria*, and physical, such as biolistic and particle bombardment, plant transformation protocols. In addition, expression vectors and i*n vitro* culture methods for plant cell or tissue transformation and regeneration of plants such as those known in the art can be used.

In general, methods to transform, modify, edit or alter plant endogenous genomic DNA include altering the plant native DNA sequence or a pre-existing transgenic

Date Reçue/Date Received 2020-09-02

sequence including regulatory elements, coding and non-coding sequences. These methods can be used, for example, to target nucleic acids to pre-engineered target recognition sequences in the genome. Such pre-engineered target sequences may be introduced by genetic transformation such as genome editing or modification. As an example, a genetically modified plant variety can be generated using “custom" or engineered endonucleases such as meganucleases produced to modify plant genomes (see e.g., WO 2009/114321; Gao et al. (2010) Plant Journal 1:176-187). Another site-directed engineering method is through the use of zinc finger domain recognition coupled with the restriction properties of restriction enzyme. See e.g., Urnov, et al., (2010) Nat Rev Genet. 11(9):636-46; Shukla, et al., (2009) Nature 459 (7245):437-41. A transcription activator-like (TAL) effector-DNA modifying enzyme (TALE or TALEN) is also used to engineer changes in plant genome. See e.g., US20110145940, Cermak et al., (2011) Nucleic Acids Res. 39(12) and Boch et al., (2009), Science 326(5959): 1509-12. Site-specific modification of plant genomes can also be performed using the bacterial type II CRISPR (clustered regularly interspaced short palindromic repeats)/Cas (CRISPR-associated) system. See e.g., Belhaj et al., (2013), Plant Methods 9: 39; The Cas9/guide RNA-based system allows targeted cleavage of genomic DNA guided by a customizable small noncoding RNA in plants (see e.g., WO 2015026883A1).

Plant transformation methods may involve the construction of an expression vector. Such a vector or recombinant construct comprises a DNA sequence that contains a coding sequence, such as a protein and/or RNA coding sequence under the control of or operatively linked to a regulatory element, for example a promoter. The vector or construct may contain one or more coding sequences and one or more regulatory elements.

A genetic trait which has been engineered into the genome of a particular wheat plant may then be moved into the genome of another variety using traditional breeding techniques that are well known in the plant breeding arts. For example, a backcrossing approach is commonly used to move a transgene from a transformed wheat variety into an elite wheat variety, and the resulting backcross conversion plant would then contain the transgene(s).

Date Reçue/Date Received 2020-09-02

Various genetic elements can be introduced into the plant genome using transformation. These elements include, but are not limited to genes; coding sequences; inducible, constitutive, and tissue specific promoters; enhancing sequences; and signal and targeting sequences.

Provided are plants genetically engineered or transformed to express various phenotypes of agronomic interest. Expression of genes can be altered to enhance disease resistance, insect resistance, herbicide resistance, agronomic, grain quality, and other traits relative to a comparable wheat plant that does not contain the transformed element or to a comparable non-transformed plant. Transformation can also be used to insert DNA sequences which control or help control male-sterility. DNA sequences native to wheat as well as non-native DNA sequences can be transformed into the wheat plants described herein and used to alter levels of native or non-native proteins. Various promoters, targeting sequences, enhancing sequences, and other DNA sequences can be inserted into the genome for the purpose of altering the expression of proteins. Reduction or increase in the activity of specific genes by genetic transformation or modification can effect gene silencing, gene suppression or gene over expression in the plants described herein.

Many techniques for gene silencing are well known to one of skill in the art, including but not limited to, knock-outs, such as by insertion of a transposable element, antisense technology, (see U.S. Patents 5,107,065; 5,453,566; and 5,759,829), co-suppression, RNA interference, virus-induced gene silencing, hairpin structures, ribozymes, oligonucleotide-mediated targeted modification (see, e.g., WO03/076574 and WO99/25853), Zn-finger targeted molecules (see, e.g., WO01/52620; WO03/048345; and WO00/42219), use of exogenously applied RNA (see, e.g., US20110296556), and other methods known to those of skill in the art or combinations of the above methods.

A genetic trait, engineered into a wheat plant using transformation techniques can be transferred into another line using traditional breeding techniques that are well known in the plant breeding arts. The wheat plants described herein can be the donor or the recipient of the transformed genetic trait. For example, a backcrossing approach can be used to move a transgene from a transformed wheat plant to an elite wheat variety to

Date Reçue/Date Received 2020-09-02

provide resulting progeny comprising a transgene. As used herein, "crossing" can refer to a simple X by Y cross, or the process of backcrossing, depending on the context. The term “breeding cross” excludes the processes of selfing or sibbing.

Transgenic or genetically modified wheat plants described herein can be harvested to produce a foreign or modified protein in commercial quantities. The foreign or modified protein can be extracted from a tissue of interest, such as a seed, or from total biomass by known methods. The approximate chromosomal location of the integrated or modified DNA molecule can be determined from a genetic map generated, for example, via conventional RFLP, PCR, and SSR analysis.

Particular markers used for these purposes may include any type of marker and marker profile which provides a means of distinguishing varieties. A genetic marker profile can be used, for example, to identify plants of the same variety or related varieties or to determine or validate a pedigree. In addition to being used for identification of wheat variety 6PZRK73B and its plant parts, the genetic marker profile is also useful in developing a locus conversion of variety 6PZRK73B.

Methods of isolating nucleic acids from wheat plants and methods for performing genetic marker profiles using SNP and SSR polymorphisms are well known in the art. SNPs are genetic markers based on a polymorphism in a single nucleotide. A marker system based on SNPs can be highly informative in linkage analysis relative to other marker systems in that multiple alleles may be present. Methods for analyzing polynucleotides from plants, plant parts or seeds described herein may include contacting a polynucleotide from the plant, plant part or seed, such as from wheat variety 6PZRK73B with a molecular marker or with modified nucleotides that facilitate sequencing of the polynucleotide. The polynucleotide may be isolated, separated or otherwise obtained from the plant, plant part or seed. Modified nucleotides such as dNTPs may be incorporated with the polynucleotides along with appropriate primers in a reaction mixture that facilitates sequencing. Sequencing can be done using any method known in the art.

Date Reçue/Date Received 2020-09-02

A method comprising isolating nucleic acids, such as DNA, from a plant, a plant part, plant cell or a seed of the wheat varieties disclosed herein is provided. The method can include mechanical, electrical and/or chemical disruption of the plant, plant part, plant cell or seed, contacting the disrupted plant, plant part, plant cell or seed with a buffer or solvent, to produce a solution or suspension comprising nucleic acids, optionally contacting the nucleic acids with a precipitating agent to precipitate the nucleic acids, optionally extracting the nucleic acids, and optionally separating the nucleic acids such as by centrifugation or by binding to beads or a column, with subsequent elution, or a combination thereof. If DNA is being isolated, an RNase can be included in one or more of the method steps. The nucleic acids isolated can comprise all or substantially all of the genomic DNA sequence, all or substantially all of the chromosomal DNA sequence or all or substantially all of the coding sequences (cDNA) of the plant, plant part, or plant cell from which they were isolated. The nucleic acids isolated can comprise all, substantially all, or essentially all of the genetic complement of the plant. The nucleic acids isolated can comprise a genetic complement of the wheat variety. The amount and type of nucleic acids isolated may be sufficient to permit whole genome sequencing of the plant from which they were isolated or chromosomal marker analysis of the plant from which they were isolated.

The methods can be used to produce nucleic acids from the plant, plant part, seed or cell, which nucleic acids can be, for example, analyzed to produce data. The data can be recorded. The nucleic acids from the disrupted cell, the disrupted plant, plant part, plant cell or seed or the nucleic acids following isolation or separation can be contacted with primers and nucleotide bases, and/or a polymerase to facilitate PCR sequencing or marker analysis of the nucleic acids. In some examples, the nucleic acids produced can be sequenced or contacted with markers to produce a genetic profile, a molecular profile, a marker profile, a haplotype, or any combination thereof. In some examples, the genetic profile or nucleotide sequence is recorded on a computer readable medium. In other examples, the methods may further comprise using the nucleic acids produced from plants, plant parts, plant cells or seeds in a plant breeding program, for example in making crosses, selection and/or advancement decisions in a breeding program. Crossing includes any type of plant breeding crossing method,

Date Reçue/Date Received 2020-09-02

including but not limited to crosses to produce hybrids, outcrossing, selfing, backcrossing, locus conversion, introgression and the like.

Favorable genotypes and or marker profiles, optionally associated with a trait of interest, may be identified by one or more methodologies. In some examples one or more markers are used, including but not limited to AFLPs, RFLPs, ASH, SSRs, SNPs, indels, padlock probes, molecular inversion probes, microarrays, sequencing, and the like. In some methods, a target nucleic acid is amplified prior to hybridization with a probe. In other cases, the target nucleic acid is not amplified prior to hybridization, such as methods using molecular inversion probes (see, for example Hardenbol et al. (2003) Nat Biotech 21:673-678). In some examples, the genotype related to a specific trait is monitored, while in other examples, a genome-wide evaluation including but not limited to one or more of marker panels, library screens, association studies, microarrays, gene chips, expression studies, or sequencing such as whole-genome resequencing and genotyping-by-sequencing (GBS) may be used. In some examples, no target-specific probe is needed, for example by using sequencing technologies, including but not limited to next-generation sequencing methods (see, for example, Metzker (2010) Nat Rev Genet 11:31-46; and, Egan et al. (2012) Am J Bot 99:175-185) such as sequencing by synthesis (e.g., Roche 454 pyrosequencing, Illumina Genome Analyzer, and Ion Torrent PGM or Proton systems), sequencing by ligation (e.g., SOLiD from Applied Biosystems, and Polnator system from Azco Biotech), and single molecule sequencing (SMS or third-generation sequencing) which eliminate template amplification (e.g., Helicos system, and PacBio RS system from Pacific BioSciences). Further technologies include optical sequencing systems (e.g., Starlight from Life Technologies), and nanopore sequencing (e.g., GridION from Oxford Nanopore Technologies). Each of these may be coupled with one or more enrichment strategies for organellar or nuclear genomes in order to reduce the complexity of the genome under investigation via PCR, hybridization, restriction enzyme (see, e.g., Elshire et al. (2011) PLoS ONE 6:e19379), and expression methods. In some examples, no reference genome sequence is needed in order to complete the analysis. Variety 6PZRK73B and its plant parts can be identified through a molecular marker profile. Such plant parts may be either diploid or haploid.

Date Reçue/Date Received 2020-09-02

As described herein, genes or coding sequences can be expressed in transformed plants. More particularly, plants can be genetically engineered to express various phenotypes of agronomic interest. A single gene or locus conversion or at least about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 25, 30, 35 or 40 or more genes or locus conversions and less than about 100, 90, 80, 70, 60, 50, 40, 30, 20, 15, or 10 genes or locus conversions may be introduced into a plant or comprised in the genome of the wheat plant. Combinations or stacks of two or more genes or coding sequences described herein can be used. Through the transformation of wheat, the expression of genes can be modulated to enhance disease resistance, insect resistance, herbicide resistance, water stress tolerance and agronomic traits as well as grain quality traits. These traits and the genes and organisms which may be targets are described in US Patent No. 8,809,554. Transformation can also be used to insert or modify DNA sequences which control or alter male-sterility. DNA sequences native to wheat can be modified as well as native and non-native DNA sequences can be introduced into wheat and used to modulate levels of native or non-native proteins. The sequences introduced can be heterologous comprising a coding sequence operably linked to a heterologous regulatory element, such as a promoter.

Exemplary genes which can be targeted include, but are not limited to, genes that confer resistance to pests such as Hessian fly, wheat stem sawfly, cereal leaf beetle, and/or green bug or disease, to pathogens *Cladosporium fulvum, Pseudomonas syringae, Fusarium graminearum* Schwabe, wheat rusts, *Septoria tritici*, *Septoria nodorum*, powdery mildew, *Helminthosporium* diseases, smuts, bunts, *Fusarium* diseases, bacterial diseases, and viral diseases.

Other genes, coding sequences or targets which can be used include those encoding *Bacillus thuringiensis* protein, a derivative thereof or a synthetic polypeptide modeled thereon. Examples of *Bacillus thuringiensis* transgenes encoding an endotoxin and being genetically engineered are given in the following patents and patent publications: 5,188,960; 5,689,052; 5,880,275; 8,809,654; WO 91/14778; WO 99/31248; WO 01/12731; WO 99/24581; WO 97/40162 and US Patent Nos. 7,605,304 and 7,696,412 and US Patent Publication No. US2004/0091505.

Date Reçue/Date Received 2020-09-02

Other genes, coding sequences or targets which can be used include those encoding an insect-specific hormone or pheromone such as an ecdysteroid and juvenile hormone, a variant thereof, a mimetic based thereon, or an antagonist or agonist thereof, an insect diuretic hormone receptor, such as an allostatin (see also U.S. Patent No. 5,266,317), an enzyme responsible for a hyper accumulation of a monoterpene, a sesquiterpene, a steroid, hydroxamic acid, a phenylpropanoid derivative or another non-protein molecule with insecticidal activity, an enzyme involved in the modification, including the post-translational modification, of a biologically active molecule, for example, a glycolytic enzyme, a proteolytic enzyme, a lipolytic enzyme, a nuclease, a cyclase, a transaminase, an esterase, a hydrolase, a phosphatase, a kinase, a phosphorylase, a polymerase, an elastase, a chitinase and a glucanase, whether natural or synthetic; a molecule that stimulates signal transduction, for example mung bean calmodulin cDNA clones and maize calmodulin cDNA clones; a hydrophobic peptide (see US Patent Nos. 5,580,852 and US 5,607,914); a membrane permease, a channel former or a channel blocker, for example, cropin-beta lytic peptide analog conferring *Pseudomonas solanacearum*; an insect-specific antibody or an immunotoxin derived therefrom, or a virus-specific antibody; a developmental-arrestive protein such as a endopolygalacturonase-inhibiting protein or a ribosome-inactivating gene; genes involved in the Systemic Acquired Resistance (SAR) Response and/or the pathogenesis related genes,

In some embodiments, coat protein-mediated resistance can be conferred in plants against one or more of alfalfa mosaic virus, cucumber mosaic virus, tobacco streak virus, potato virus X, potato virus Y, tobacco etch virus, tobacco rattle virus and tobacco mosaic virus. Such resistance may be conferred using, for example, a viral-invasive protein or a complex toxin derived therefrom.

In some embodiments, genes, coding sequences or targets which can be used include, without limitation, antifungal genes (see, for example, US Publication No: 20020166141); detoxification genes, such as for fumonisin, beauvericin, moniliformin and zearalenone and their structurally related derivatives (see, for example, US Patent No. 5,792,931); cystatin and cysteine proteinase inhibitors (see for example, US Patent

Date Reçue/Date Received 2020-09-02

Publication Serial No: 20050102717), defensin genes (see for example, PCT Publication WO03000863 and US Patent Publication Serial No: 20030041348); and genes conferring resistance to nematodes, see for example, WO 03/033651.

Genes, coding sequences, or targets that confer resistance to a herbicide are described, for example, in U.S. Patent No. 8,809,654. Examples include genes or coding sequences encoding acetohydroxy acid synthase, a chimeric protein of rat cytochrome P4507A1, yeast NADPH-cytochrome P450 oxidoreductase, glutathione reductase, superoxide dismutase, phosphotransferases, ALS and AHAS enzymes and other genes or coding sequences which confer resistance to a herbicide such as an imidazalinone or a sulfonylurea (see also, U.S Patent Nos. 5,605,011; 5,013,659; 5,141,870; 5,767,361; 5,731,180; 5,304,732; 4,761,373; 5,331,107; 5,928,937; and 5,378,824; and international publication WO 96/33270); Glyphosate or glufosinate resistance can also be conferred using, for example, sequences encoding mutant 5-enolpyruvl-3-phosphikimate synthase (EPSP), aroA genes, phosphinothricin acetyl transferase (PAT), glyphosate oxido-reductase enzyme, glyphosate N-acetyltransferase, glutamine synthetase, Streptomyces hygroscopicus phosphinothricin acetyl transferase (bar) genes), and pyridinoxy or phenoxy proprionic acids and cycloshexones (ACCase inhibitor-encoding genes). See, for example, U.S. Patent Nos. 4,769,061, 4,975,374, 4,940,835, 5,776,760, 5,463,175, 5,627,061, 6,566,587; 6,338,961; 6,248,876 B1; 6,040,497; 5,804,425; 5,633,435; 5,145,783; 4,971,908; 5,312,910; 5,188,642; 4,940,835; 5,866,775; 6,225,114 B1; 6,130,366; 5,310,667; 4,535,060; 4,769,061; 5,633,448; 5,510,471; Re. 36,449; RE 37,287 E; and 5,491,288; US Patent Publication No. 20040082770 and international publications EP1173580; WO 01/66704; EP1173581 and EP1173582, EP 0 242 246 and EP 0 242 236. See also, U.S. Patent Nos. 5,969,213; 5,489,520; 5,550,318; 5,874,265; 5,919,675; 5,561,236; 5,648,477; 5,646,024; 6,177,616; and 5,879,903.

Triazine resistance can be conferred using, for example, psbA and gs+ genes, sequences encoding a benzonitrile (nitrilase gene) such as disclosed in U.S. Patent No. 4,810,648.

Date Reçue/Date Received 2020-09-02

What is claimed is:

1. A plant cell from a wheat plant designated variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115.

2. The plant cell of claim 1, wherein the plant cell is a seed cell.

3. A transformed plant cell from a transformed plant, obtained by transforming wheat variety 6PZRK73B with a transgene, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the transformed plant cell is the same as a cell from variety 6PZRK73B except for the transgene, and the transformed plant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions.

4. A plant cell from a wheat plant, or a plant cell from a part of the wheat plant, wherein the wheat plant is produced by growing seed of wheat variety 6PZRK73B, and wherein representative seed of variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115.

5. A plant cell from (i) a wheat plant or (ii) a wheat seed wherein the plant or seed is a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, and wherein the descendant is produced by self-pollinating 6PZRK73B.

Date Reçue/Date Received 2020-09-02

6. A plant cell from (i) a wheat plant or (ii) a wheat seed wherein the plant or seed is a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is derived from wheat variety 6PZRK73B, and wherein the descendant is produced by self-pollinating 6PZRK73B.

7. A plant cell from a plant tissue culture produced from protoplasts or regenerable cells from the plant cell of claim 1.

8. A plant cell from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is homozygous for all of its alleles and wherein the descendant is produced by self-pollinating 6PZRK73B.

9. The plant cell of claim 8 wherein the plant cell is a seed cell.

10. A plant cell from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is produced by self-pollinating 6PZRK73B and expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, wherein the descendant comprises a transgene, wherein the transgene was introduced by transforming the descendant, and wherein the plant cell is the same as a cell from variety 6PZRK73B except for the transgene.

11. A plant cell from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B and comprises a transgene, wherein the transgene was introduced by transforming the descendant, and wherein the plant cell is the same as a cell from variety 6PZRK73B except for the

Date Reçue/Date Received 2020-09-02

transgene, and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions.

12. Use of a wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, to breed a wheat plant.

13. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, to breed a wheat plant.

14. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, to breed a wheat plant.

15. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a recipient of a conversion locus.

16. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a recipient of a conversion locus.

Date Reçue/Date Received 2020-09-02

17. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a recipient of a conversion locus.

18. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, to cross with another wheat plant.

19. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, to cross with another wheat plant.

20. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, to cross with another wheat plant.

21. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a recipient of a transgene.

22. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, wherein the descendant is produced by self-pollinating 6PZRK73B, and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level

Date Reçue/Date Received 2020-09-02

when grown under substantially similar environmental conditions, as a recipient of a transgene.

23. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a recipient of a transgene.

24. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, for flour, starch, or protein production.

25. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, for flour, starch, or protein production.

26. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, for flour, starch or protein production.

27. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a crop.

28. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B

Date Reçue/Date Received 2020-09-02

and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a crop.

29. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a crop.

30. Milled non-viable wheat seeds from wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115.

31. Milled non-viable wheat seeds from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions.

32. Milled non-viable wheat seeds from a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B.

33. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, to produce a genetic marker profile.

34. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number

Date Reçue/Date Received 2020-09-02

PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, to produce a genetic marker profile.

35. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, to produce a genetic marker profile.

36. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a source of cleaned wheat seed.

37. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a source of cleaned wheat seed.

38. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a source of cleaned wheat seed.

39. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a source of treated wheat seed.

Date Reçue/Date Received 2020-09-02

40. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a source of treated wheat seed.

41. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a source of treated wheat seed.

42. The use of any one of claims 39, 40, or 41, wherein wheat variety 6PZRK73B is treated with a seed treatment comprising metalaxyl, mefenoxam, imidacloprid, Bacillus subtilis, difenoconazole, tebuconazole, or any combination thereof.

43. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, for haploid production.

44. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions for haploid production.

45. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number

Date Reçue/Date Received 2020-09-02

PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, for haploid production.

46. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, as a source of propagating material.

47. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, as a source of propagating material.

48. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, as a source of propagating material.

49. Use of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, for consumption.

50. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is produced by self-pollinating 6PZRK73B and the descendant expresses the physiological and morphological characteristics of wheat variety 6PZRK73B listed in Table 2 as determined at the 5% significance level when grown under substantially similar environmental conditions, for consumption.

Date Reçue/Date Received 2020-09-02

51. Use of a descendant of wheat variety 6PZRK73B, wherein representative seed of wheat variety 6PZRK73B has been deposited under ATCC Accession Number PTA-126115, and wherein the descendant is derived from wheat variety 6PZRK73B and is produced by self-pollinating 6PZRK73B, for consumption.

Date Reçue/Date Received 2020-09-02