Patent Protection for Plants

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Patent Protection for Plants

1) Plant Patent Act (PPA)
2) Plant Variety Protection Act (PVPA)
3) Utility Patent Statute

Plant Patent Act of 1930

patent rights for developers of new varieties of many asexually propagated plants (excluded tuber-propagated plants)

Plant Variety Protection Act of 1970

patent rights for developers of new varieties of seed-propagated plants

Ex parte Hibberd (1985)

utility patents available for plants

Confirmed by Supreme Court in *J.E.M. v. Pioneer* (2001).

Utility Patents

- method to engineer a plant
- genetic sequences
- resulting plants
- research tools

PPA and PVPA

- prevent unlawful proliferation of variety
- no restriction on use of protected plant materials for breeding purposes

Utility Patents

protect plant breeders' rights to control the use, sale, import, and reproduction of protected plants

Utility Patents (cont'd.)

With a utility patent, one can prevent others from using a protected plant for subsequent breeding.

Requirements for Utility Patent

- Utility
- Novelty
- Nonobviousness

Additional Requirements

- Written description
  - described to convey that inventor was in possession of the invention
  - for biological inventions, a deposit of material may be required

Additional Requirements

- Enablement

  invention must be described to allow one of skill to make and use the invention

Issued Patents

Inbred Maize Line

1. A seed comprising at least one set of the chromosomes of maize inbred line PH876, representative seed of said line having been deposited under ATCC Accession No. PTA-4689.
2. A maize plant produced by growing the seed of claim 1.

Inbred Maize Line (cont'd.)

4. An F1 hybrid maize seed produced by crossing a plant of maize inbred line designated PH876, representative seed of said line having been deposited under ATCC Accession No. PTA-4689, with a different maize plant and harvesting the resultant F1 hybrid maize seed, wherein said F1 hybrid maize seed comprises two sets of chromosomes and one set of the chromosomes is the same as maize inbred line PH876.

Inbred Maize Line (cont'd.)

14. A process of producing maize seed, comprising crossing a first parent maize plant with a second parent maize plant, wherein one or both of the first or the second parent maize plants is the plant of claim 13, wherein seed is allowed to form.

16. The maize seed of claim 15, wherein the maize seed is hybrid seed.

Soybean Variety

1. A seed of soybean variety XB21S05, representative seed of said soybean variety XB21S05 having been deposited under ATCC Accession No: PTA-7686.
2. A soybean plant, or a part thereof, produced by growing the seed of claim 1.

Soybean Variety (cont'd.)

4. A soybean plant, or a part thereof, expressing all of the physiological and morphological characteristics of soybean variety XB21S05, representative seed of said soybean variety having been deposited under ATCC Accession No: PTA-7686.
5. A tissue culture produced from protoplasts or regenerable cells from the plant of claim 2.

Soybean Variety (cont'd.)

8. A method for producing a soybean seed comprising crossing two soybean plants and harvesting the resultant soybean seed, wherein at least one soybean plant is the soybean plant of claim 2.

Promoters

1. An isolated nucleic acid molecule comprising a polynucleotide which initiates transcription in a plant cell and comprises the sequence of SEQ ID NO:1.
2. An expression cassette comprising the nucleic acid molecule of claim 1 operably linked to a polynucleotide of interest.
5. The plant cell of claim 4, wherein said plant cell is from a monocot.

Promoters (cont'd.)

13. A method for expressing a first polynucleotide in a plant, said method comprising introducing into a plant an expression cassette comprising a promoter and a first polynucleotide operably linked thereto, wherein said promoter comprises a second polynucleotide that initiates transcription of an operably linked polynucleotide in a plant cell, and wherein said second polynucleotide comprises SEQ ID NO:1.

Methods for controlling gene silencing using site-specific recombination

Bacillus thuringiensis Crystal Polypeptides

Claims to:

- polypeptide sequences
- nucleotide sequences
- transformed plants
- methods

Novel Genes

Claims to:

- nucleotide sequences
- transformed plants
- methods

Methods of Transformation

Improved Plants

3. An expression cassette comprising the isolated polynucleotide of claim 1, wherein the isolated polynucleotide is operably linked to a promoter, and wherein the polynucleotide is in sense or antisense orientation.

4. A plant comprising the expression cassette of claim 3.

Improved Plants (cont'd.)

9. A method of generating a plant having increased oil or protein content, as compared to a substantially similar plant not subjected to this method, comprising:

a) preparing a chimeric gene comprising a polynucleotide sufficient to suppress the endogenous expression of TTG1, wherein said polynucleotide comprises at least a portion of the polynucleotide of claim 1, operably linked in sense or antisense orientation on the upstream side to a promoter that directs gene expression, and operably linked on the downstream side to a regulatory sequence for transcriptional termination; and

b) transforming the plant with the chimeric gene of step (a).

Pending Applications

Plants with Increased Oil Content

1. A method of producing a monocot plant having increased oil in its seed, comprising introducing into said plant a polynucleotide encoding a phosphofructokinase, operably linked to a seed-enhanced promoter whereby the oil content of the seed is increased as compared to a seed of an isogenic plant lacking the nucleic acid sequence.

Plants with Increased Oil Content (cont'd.)

11. A monocot plant comprising a polynucleotide encoding a phosphofructokinase, operably linked to a seed-enhanced promoter.

14. A monocot plant cell comprising a polynucleotide encoding a phosphofructokinase, operably linked to a seed-enhanced promoter.

16. A meal produced from the seed of claim 15 comprising a polynucleotide encoding a phosphofructokinase according to claim 11.

Business Methods

1. A method for recovering licensing fees from growers of seeds or plants derived from plants that have been genetically modified to contain one or more proprietary traits comprising a phenotypic marker, grown to produce grain with one or more of the proprietary traits comprising: i) accepting harvested grain from the grower at a predetermined collection point; ii) taking a sample from the harvested grain;

Business Methods (cont'd.)

iii) determining the presence of the proprietary trait in the harvested grain either by the grower's declaration of its presence, or through detection of the phenotypic marker in the sample; iv) calculating the licensing fee as set forth in one or more contracts governing the terms and conditions for the use of the proprietary trait and based on the presence of the proprietary trait in the grain; and v) collecting the licensing fee.

Methods for Modifying Flower Development

1. A method for modifying flower development in a plant, said method comprising transforming a plant with a polynucleotide construct comprising a polynucleotide molecule operably linked to a promoter that is expressed in a plant cell, . . .