

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A chimeric plant gene which comprises:
 - (a) a promoter sequence which functions in plant cells;
 - (b) a coding sequence which causes the production of RNA, encoding a chloroplast transit peptide/5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) fusion polypeptide, which chloroplast transit peptide permits the fusion polypeptide to be imported into a chloroplast of a plant cell; and
 - (c) a 3' non-translated region which encodes a polyadenylation signal which functions in plant cells to cause the addition of polyadenylate nucleotides to the 3' end of the RNA;

the promoter being heterologous with respect to the coding sequence and adapted to cause sufficient expression of the fusion polypeptide to enhance the glyphosate resistance of a plant cell transformed with the gene.

2. A chimeric gene of Claim 1 in which the promoter sequence is a plant virus promoter sequence.
3. A chimeric gene of Claim 2 in which the promoter sequence is a promoter sequence from cauliflower mosaic virus (CaMV).
4. A chimeric gene of Claim 3 in which the promoter sequence is the CaMV35S promoter sequence.

68

5. A chimeric gene of Claim 1 in which the coding sequence encodes a mutant 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS).

6. A chimeric gene of Claim 1 in which the EPSPS coding sequence encodes an EPSPS from an organism selected from the group consisting of bacteria, fungi and plants.

7. A chimeric gene of Claim 1 in which the chloroplast transit peptide is from a plant EPSPS gene.

8. A cloning or expression vector comprising a chimeric plant gene of Claim 1.

9. A cloning or expression vector of Claim 8 in which the chimeric plant gene encodes a chloroplast transit peptide of a plant EPSPS gene.

10. A cloning or expression vector of Claim 9 in which the chimeric plant gene comprises a promoter sequence from a plant virus.

11. A cloning or expression vector of Claim 10 in which the promoter sequence is a promoter sequence from cauliflower mosaic virus (CaMV).

12. A cloning or expression vector of Claim 11 in which the promoter sequence is the CaMV35S promoter sequence.

13. A cloning or expression vector of Claim 8 in which the chimeric plant gene comprises a coding sequence encoding a mutant 5-enolpyruvylshikimate-3-phosphate synthase.

14. A cloning or expression vector of Claim 8 in which the coding sequence encodes an EPSPS from an organism

selected from the group consisting of bacteria, fungi and plants.

15 . A plant transformation vector which comprises a chimeric gene of Claim 1 .

16 . A plant transformation vector of Claim 15 in which the chimeric plant gene encodes a chloroplast transit peptide of a plant EPSPS gene.

17 . A plant transformation vector of Claim 15 in which the chimeric plant gene comprises a promoter sequence from a plant virus.

18 . A plant transformation vector of Claim 17 in which the promoter sequence is a promoter sequence from cauliflower mosaic virus (CaMV).

19 . A plant transformation vector of Claim 18 in which the promoter sequence is the CaMV35S promoter sequence.

20. A plant transformation vector of Claim 15 in which the chimeric plant gene comprises a coding sequence encoding a mutant 5-enolpyruvylshikimate-3-phosphate synthase.

21 . A plant transformation vector of Claim 15 in which the coding sequence encodes an EPSPS from an organism selected from the group consisting of bacteria, fungi and plants.

22. A glyphosate-resistant plant cell comprising a chimeric plant gene of Claim 1 .

23. A glyphosate-resistant plant cell of Claim 22 in which the promoter sequence is a plant virus promoter sequence.

24. A glyphosate-resistant plant cell of Claim 23 in which the promoter sequence is a promoter sequence from cauliflower mosaic virus (CaMV).

25. A glyphosate-resistant plant cell of Claim 24 in which the promoter sequence is the CaMV35S promoter sequence.

26. A glyphosate-resistant plant cell of Claim 22 in which the coding sequence encodes a mutant 5-enolpyruvylshikimate-3-phosphate synthase.

27. A glyphosate-resistant plant cell of Claim 22 in which the coding sequence encodes an EPSPS from an organism selected from the group consisting of bacteria, fungi and plants.

28. A glyphosate-resistant plant cell of Claim 22 in which the chloroplast transit peptide is from a plant EPSPS gene.

29. A method for producing a glyphosate-resistant dicotyledonous plant which comprises:

(a) transforming plant cells using an Agrobacterium transformation vector comprising a chimeric plant gene of Claim 1; and

(b) regenerating glyphosate-resistant plants from said transformed plant cells.

30. A method of Claim 29 in which the chimeric plant gene comprises a plant virus promoter sequence.

31. A method of Claim 30 in which the promoter sequence is a promoter sequence from cauliflower mosaic virus (CaMV).

32. A method of Claim 31 in which the promoter sequence is the CaMV35S promoter sequence.

33. A method of Claim 29 in which the chimeric gene comprises a coding sequence encoding a mutant 5-enolpyruvylshikimate-3-phosphate synthase.

34. A method of Claim 29 in which the coding sequence encodes an EPSPS from an organism selected from the group consisting of bacteria, fungi and plants.

35. A method of Claim 29 in which the coding sequence encodes the chloroplast transit peptide from a plant EPSPS gene.

36. A method for producing a glyphosate-resistant plant cell which comprises transforming the plant cell with a plant transformation vector of Claim 15.

37. A method of Claim 36 in which the chimeric gene comprises a promoter sequence from a plant virus.

38. A method of Claim 37 in which the promoter sequence is a promoter sequence from cauliflower mosaic virus (CaMV).

39. A method of Claim 38 in which the promoter sequence is the CaMV35S promoter sequence.

40. A method of Claim 36 in which the chimeric gene comprises a coding sequence encoding a mutant 5-enolpyruvyl-shikimate-3-phosphate synthase.

41. A method of Claim 36 in which the coding sequence encodes an EPSPS from an organism selected from the group consisting of bacteria, fungi and plants.

42. A method of Claim 36 in which the coding sequence encodes the chloroplast transit peptide from a plant EPSPS gene.

43. A glyphosate-resistant tomato cell of Claim 22.

44. A glyphosate-resistant tobacco cell of Claim 22.

45. A glyphosate-resistant oil seed rape cell of Claim 22.

46. A glyphosate-resistant flax cell of Claim 22.

47. A glyphosate-resistant soybean cell of Claim 22.

48. A glyphosate-resistant sunflower cell of Claim 22.

49. A glyphosate-resistant sugar beet cell of Claim 22.

50. A glyphosate-resistant alfalfa cell of Claim 22.

51. A glyphosate-resistant cotton cell of Claim 22.

52. Plasmid pMON546, ATCC accession number 53213.

