terminator etc.) [Carbonell et al., *Plant Physiology* (2014) pp.113.234989], are processed via small RNA biogenesis and silencing machinery and downregulate target expression. According to Schwab et al. [Schwab et al. *The Plant Cell* (2006) Vol. 18, 1121–1133], amiRNAs are active when expressed under tissue-specific or inducible promoters and can be used for specific gene silencing in plants, especially when several related, but not identical, target genes need to be downregulated.

Senis et al. [Senis et al., *Nucleic Acids Research* (2017) Vol. 45(1): e3] disclose engineering of a promoterless anti-viral RNAi hairpin into an endogenous miRNA locus. Specifically, Senis et al. insert an amiRNA precursor transgene (hairpin pri-amiRNA) adjacent to a naturally occurring miRNA gene (e.g. miR122) by homology-directed DNA recombination that is induced by sequence-specific nuclease such as Cas9 or TALEN nucleases. This approach uses promoter- and terminator-free amiRNAs by utilizing transcriptionally active DNA locus that expresses a natural miRNA (miR122), that is, the endogenous promoter and terminator drove and regulated the transcription of the inserted amiRNA transgene.

Various DNA-free methods of introducing RNA and/or proteins into cells have been previously described. For example, RNA transfection using electroporation and lipofection has been described in U.S. Patent Application No. 20160289675. Direct delivery of Cas9/sgRNA ribonucleoprotein (RNPs) complexes to cells by microinjection of the Cas9 protein and sgRNA complexes was described by Cho [Cho et al., "Heritable gene knockout in Caenorhabditis elegans by direct injection of Cas9-sgRNA ribonucleoproteins," *Genetics* (2013) 195:1177-1180]. Delivery of Cas9 protein/sgRNA complexes via electroporation was described by Kim [Kim et al., "Highly efficient RNA-guided genome editing in human cells via delivery of purified Cas9 ribonucleoproteins" *Genome Res.* (2014) 24:1012-1019]. Delivery of Cas9 protein-associated sgRNA complexes via liposomes was reported by Zuris [Zuris et al., "Cationic lipid-mediated delivery of proteins enables efficient protein-based genome editing in vitro and in vivo" *Nat Biotechnol.* (2014) doi: 10.1038/nbt.3081].

SUMMARY

According to an aspect of some examples of the present disclosure there is provided a method of producing a long dsRNA molecule in a plant cell that is capable of silencing a pest gene, the method comprising: (a) selecting in a genome of a plant a nucleic acid sequence encoding a silencing molecule having a plant gene as a target, the silencing molecule capable of recruiting RNA-dependent RNA Polymerase (RdRp); and (b) modifying a nucleic acid sequence of the plant gene so as to impart a silencing specificity towards the pest gene, such that a transcript of the plant

gene comprising the silencing specificity forms base complementation with the silencing molecule capable of recruiting the RdRp to produce the long dsRNA molecule capable of silencing the pest gene, thereby producing the long dsRNA molecule in the plant cell that is capable of silencing the pest gene.

According to an example of the present disclosure there is provided a method of producing a long dsRNA molecule in a plant cell that is capable of silencing a pest gene in a plant cell, the method comprising: (a) selecting in a genome of a plant a nucleic acid sequence encoding a silencing molecule having a plant gene as a target, the silencing molecule capable of recruiting RNA-dependent RNA Polymerase (RdRp); (b) modifying a nucleic acid sequence of the plant gene so as to impart a silencing specificity towards the pest gene, such that a transcript of the plant gene comprising the silencing specificity forms base complementation with the silencing molecule capable of recruiting the RdRp to produce the long dsRNA molecule capable of silencing the pest gene, thereby producing the long dsRNA molecule in the plant cell that is capable of silencing the pest gene in the plant cell.

According to an aspect of some examples of the present disclosure there is provided a method of producing a long dsRNA molecule in a plant cell that is capable of silencing a pest gene, the method comprising: (a) selecting a nucleic acid sequence of a plant gene exhibiting a predetermined sequence homology to a nucleic acid sequence of the pest gene; (b) modifying a plant endogenous nucleic acid sequence encoding an RNA molecule so as to impart silencing specificity towards the plant gene, such that small RNA molecules capable of recruiting RNA-dependent RNA Polymerase (RdRp) processed from the RNA molecule form base complementation with a transcript of the plant gene to produce the long dsRNA molecule capable of silencing the pest gene, thereby producing the long dsRNA molecule in the plant cell that is capable of silencing the pest gene.

According to an aspect of some examples of the present disclosure there is provided a method of generating a pest tolerant or resistant plant, the method comprising producing a long dsRNA molecule in a plant cell capable of silencing a pest gene according to some examples of the disclosure.

According to an aspect of some examples of the present disclosure there is provided a plant generated by the method of some examples of the disclosure.

According to an aspect of some examples of the present disclosure there is provided a cell of the plant of some examples of the disclosure.

According to an aspect of some examples of the present disclosure there is provided a seed of the plant of some examples of the disclosure.

According to an aspect of some examples of the present disclosure there is provided a method of producing a pest tolerant or resistant plant, the method comprising: (a) breeding the plant of some examples of the disclosure; and (b) selecting for progeny plants that express the long dsRNA molecule capable of suppressing the pest gene, and which do not comprise the DNA editing agent, thereby producing the pest tolerant or resistant plant.

According to an aspect of some examples of the present disclosure there is provided a method producing a plant or plant cell of some examples of the disclosure comprising growing the plant or plant cell under conditions which allow propagation.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp comprises 21-24 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp comprises 21 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp comprises 22 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp comprises 23 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp comprises 24 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp consists of 21 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp consists of 22 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp consists of 23 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp consists of 24 nucleotides.

According to some examples of the disclosure, the silencing molecule capable of recruiting the RdRp is selected from the group consisting of: trans-acting siRNA (tasiRNA), phased small interfering RNA (phasiRNA), microRNA (miRNA), small interfering RNA (siRNA), short hairpin RNA (shRNA), Piwi-interacting RNA (piRNA), transfer RNA (tRNA), small nuclear RNA (snRNA), ribosomal RNA (rRNA), small nucleolar RNA (snoRNA), extracellular RNA (exRNA), repeat-derived RNA, autonomous and non-autonomous transposable RNA.

According to some examples of the disclosure, the miRNA comprises a 22 nucleotides mature small RNA.

According to some examples of the disclosure, the miRNA is selected from the group consisting of: miR-156a, miR-156c, miR-162a, miR-162b, miR-167d, miR-169b, miR-173, miR-393a, miR-393b, miR-402, miR-403, miR-447a, miR-447b, miR-447c, miR-472, miR-771, miR-777, miR-828, miR-830, miR-831, miR-831, miR-833a, miR-833a, miR-840, miR-845b, miR-848, miR-850, miR-853, miR-855, miR-856, miR-864, miR-2933a, miR-2933b, miR-2936, miR-4221, miR-5024, miR-5629, miR-5648, miR-5996, miR-8166, miR-8167a, miR-8167b, miR-8167c, miR-8167d, miR-8167e, miR-8167f, miR-8177 and miR-8182.

According to some examples of the disclosure, the plant gene is a non-protein coding gene.

According to some examples of the disclosure, the plant gene is a coding gene.

According to some examples of the disclosure, the plant gene does not encode for a molecule having an intrinsic silencing activity.

According to some examples of the disclosure, the method further comprises introducing into the plant cell a DNA editing agent conferring a silencing specificity of the plant gene towards the pest gene.

According to some examples of the disclosure, modifying of step (b) comprises introducing into the plant cell a DNA editing agent conferring the silencing specificity of the plant gene towards the pest gene.

According to some examples of the disclosure, the plant gene encodes for a molecule having an intrinsic silencing activity towards a native plant gene.

According to some examples of the disclosure, the method further comprises introducing into the plant cell a DNA editing agent which redirects a silencing specificity of the plant gene towards the pest gene, the pest gene and the native plant gene being distinct.

According to some examples of the disclosure, the method further comprises introducing into the plant cell a DNA editing agent which redirects a silencing specificity of the plant gene towards the pest gene, the pest gene and a native plant gene being distinct.

According to some examples of the disclosure, modifying of step (b) comprises introducing into the plant cell a DNA editing agent which redirects a silencing specificity of the plant gene towards the pest gene, the pest gene and a native plant gene being distinct.

According to some examples of the disclosure, the plant gene having the intrinsic silencing activity is selected from the group consisting of trans-acting siRNA (tasiRNA), phased small interfering RNA (phasiRNA), microRNA (miRNA), small interfering RNA (siRNA), short

hairpin RNA (shRNA), Piwi-interacting RNA (piRNA), transfer RNA (tRNA), small nuclear RNA (snRNA), ribosomal RNA (rRNA), small nucleolar RNA (snoRNA), extracellular RNA (exRNA), autonomous and non-autonomous transposable RNA.

According to some examples of the disclosure, the plant gene having the intrinsic silencing activity encodes for a phased secondary siRNA-producing molecule.

According to some examples of the disclosure, the plant gene having the intrinsic silencing activity is a trans-acting-siRNA-producing (TAS) molecule.

According to some examples of the disclosure, the silencing specificity of the plant gene is determined by measuring a transcript level of the pest gene.

According to some examples of the disclosure, the silencing specificity of the plant gene is determined phenotypically.

According to some examples of the disclosure, determined phenotypically is effected by determination of pest resistance of the plant.

According to some examples of the disclosure, the silencing specificity of the plant gene is determined genotypically.

According to some examples of the disclosure, the plant phenotype is determined prior to a plant genotype.

According to some examples of the disclosure, the plant genotype is determined prior to a plant phenotype.

According to some examples of the disclosure, the silencing specificity of the plant gene is determined by measuring a transcript level of the pest gene.

According to some examples of the disclosure, the determined phenotypically is effected by determination of pest resistance of the plant.

According to some examples of the disclosure, the predetermined sequence homology comprises 75-100 % identity.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp comprise 21-24 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp comprise 21 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp comprise 22 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp comprise 23 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp comprise 24 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp consist of 21 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp consist of 22 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp consist of 23 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp consist of 24 nucleotides.

According to some examples of the disclosure, the small RNA molecules capable of recruiting the RdRp are selected from the group consisting of microRNA (miRNA), small interfering RNA (siRNA), short hairpin RNA (shRNA), Piwi-interacting RNA (piRNA), trans-acting siRNA (tasiRNA), phased small interfering RNA (phasiRNA), transfer RNA (tRNA), small nuclear RNA (snRNA), ribosomal RNA (rRNA), small nucleolar RNA (snoRNA), extracellular RNA (exRNA), repeat-derived RNA, autonomous and non-autonomous transposable RNA.

According to some examples of the disclosure, the RNA molecule does not have an intrinsic silencing activity.

According to some examples of the disclosure, the method further comprises introducing into the plant cell a DNA editing agent conferring a silencing specificity of the RNA molecule towards the plant gene.

According to some examples of the disclosure, the RNA molecule has an intrinsic silencing activity towards a native plant gene.

According to some examples of the disclosure, the method further comprises introducing into the plant cell a DNA editing agent which redirects a silencing specificity of the RNA molecule towards the plant gene, the plant gene and the native plant gene being distinct.

According to some examples of the disclosure, modifying of step (b) comprises introducing into the plant cell a DNA editing agent which redirects a silencing specificity of the RNA molecule towards the plant gene, the plant gene and a native plant gene being distinct.

According to some examples of the disclosure, the plant gene exhibiting the predetermined sequence homology to the nucleic acid sequence of the pest gene does not encode a silencing molecule.

According to some examples of the disclosure, the silencing specificity of the RNA molecule is determined by measuring a transcript level of the plant gene or the pest gene.

According to some examples of the disclosure, the silencing specificity of the RNA molecule is determined phenotypically.

According to some examples of the disclosure, the determined phenotypically is effected by determination of pest resistance of the plant.

According to some examples of the disclosure, the silencing specificity of the RNA molecule is determined genotypically.

According to some examples of the disclosure, the plant phenotype is determined prior to a plant genotype.

According to some examples of the disclosure, the plant genotype is determined prior to a plant phenotype.

According to some examples of the disclosure, the DNA editing agent comprises at least one sgRNA.

According to some examples of the disclosure, the DNA editing agent comprises at least one sgRNA operatively linked to a plant expressible promoter.

According to some examples of the disclosure, the DNA editing agent does not comprise an endonuclease.

According to some examples of the disclosure, the DNA editing agent comprises an endonuclease.

According to some examples of the disclosure, the DNA editing agent is of a DNA editing system selected from the group consisting of a meganuclease, a zinc finger nucleases (ZFN), a transcription-activator like effector nuclease (TALEN), CRISPR-endonuclease, dCRISPR-endonuclease and a homing endonuclease.

According to some examples of the disclosure, the endonuclease comprises Cas9.

According to some examples of the disclosure, the DNA editing agent is applied to the cell as DNA, RNA or RNP.

According to some examples of the disclosure, the DNA editing agent is linked to a reporter for monitoring expression in a plant cell.

According to some examples of the disclosure, the reporter is a fluorescent protein.

According to some examples of the disclosure, the plant cell is a protoplast.

According to some examples of the disclosure, the dsRNA molecule is processable by cellular RNAi processing machinery.

According to some examples of the disclosure, the dsRNA molecule is processed into secondary small RNAs.

According to some examples of the disclosure, the dsRNA and/or the secondary small RNAs comprise a silencing specificity towards a pest gene.

According to some examples of the disclosure, the pest is an invertebrate.

According to some examples of the disclosure, the pest is selected from the group consisting of a virus, an ant, a termite, a bee, a wasp, a caterpillar, a cricket, a locust, a beetle, a snail, a slug, a nematode, a bug, a fly, a fruitfly, a whitefly, a mosquito, a grasshopper, a planthopper, an earwig, an aphid, a scale, a thrip, a spider, a mite, a psyllid, a tick, a moth, a worm, a scorpion and a fungus.

According to some examples of the disclosure, the plant is selected from the group consisting of a crop, a flower, a weed, and a tree.

According to some examples of the disclosure, the plant is non-transgenic.

According to some examples of the disclosure, the plant is a transgenic plant.

According to some examples of the disclosure, the plant is non-genetically modified (non-GMO).

According to some examples of the disclosure, the plant is genetically modified (GMO).

Unless otherwise defined, all technical and/or scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the disclosure pertains. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of examples of the disclosure, exemplary methods and/or materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and are not intended to be necessarily limiting.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Some embodiments of the invention are herein described, by way of example only, with reference to the accompanying drawings. With specific reference now to the drawings in detail, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of embodiments of the invention. In this regard, the description taken with the drawings makes apparent to those skilled in the art how embodiments of the invention may be practiced.

In the drawings:

FIG. 1 is a is a photograph illustrating the first proposed model (referred to as Model 1) for target gene amplification by Gene Editing induced Gene Silencing (GEiGS). According to this model (see the corresponding numbers in the figures):

1. The pest gene “X” is the target gene (when silenced, the pest is controlled)

WHAT IS CLAIMED IS:

1. A method of producing a long dsRNA molecule in a plant cell that is capable of silencing a pest gene, the method comprising:

(a) selecting in a genome of a plant a nucleic acid sequence encoding a silencing molecule having a plant gene as a target, said silencing molecule capable of recruiting RNA-dependent RNA Polymerase (RdRp);

(b) modifying a nucleic acid sequence of the plant gene so as to impart a silencing specificity towards the pest gene, such that a transcript of said plant gene comprising said silencing specificity forms base complementation with said silencing molecule capable of recruiting said RdRp to produce the long dsRNA molecule capable of silencing the pest gene,

thereby producing the long dsRNA molecule in the plant cell that is capable of silencing the pest gene.

2. The method of claim 1, wherein said silencing molecule capable of recruiting said RdRp comprises 21-24 nucleotides.

3. The method of any one of claims 1-2, wherein said silencing molecule capable of recruiting said RdRp is selected from the group consisting of: trans-acting siRNA (tasiRNA), phased small interfering RNA (phasiRNA), microRNA (miRNA), small interfering RNA (siRNA), short hairpin RNA (shRNA), Piwi-interacting RNA (piRNA), transfer RNA (tRNA), small nuclear RNA (snRNA), ribosomal RNA (rRNA), small nucleolar RNA (snoRNA), extracellular RNA (exRNA), repeat-derived RNA, autonomous and non-autonomous transposable RNA, optionally wherein (i) said miRNA comprises a 22 nucleotides mature small RNA and/or (ii) said miRNA is selected from the group consisting of: miR-156a, miR-156c, miR-162a, miR-162b, miR-167d, miR-169b, miR-173, miR-393a, miR-393b, miR-402, miR-403, miR-447a, miR-447b, miR-447c, miR-472, miR-771, miR-777, miR-828, miR-830, miR-831, miR-831, miR-833a, miR-833a, miR-840, miR-845b, miR-848, miR-850, miR-853, miR-855, miR-856, miR-864, miR-2933a, miR-2933b, miR-2936, miR-4221, miR-5024, miR-5629, miR-5648, miR-5996, miR-8166, miR-8167a, miR-8167b, miR-8167c, miR-8167d, miR-8167e, miR-8167f, miR-8177, and miR-8182.

4. The method of any one of claims 1-3, wherein said plant gene is a non-protein coding gene, and/or wherein the plant gene encodes for a molecule having an intrinsic silencing activity towards a native plant gene.

5. The method of any one of claims 1-4, wherein said modifying of step (b) comprises introducing into the plant cell a DNA editing agent which redirects a silencing specificity of said plant gene towards said pest gene, said pest gene and a native plant gene being distinct.

6. The method of claim 4 or 5, wherein said plant gene having said intrinsic silencing activity is selected from the group consisting of trans-acting siRNA (tasiRNA), phased small interfering RNA (phasiRNA), microRNA (miRNA), small interfering RNA (siRNA), short hairpin RNA (shRNA), Piwi-interacting RNA (piRNA), transfer RNA (tRNA), small nuclear RNA (snRNA), ribosomal RNA (rRNA), small nucleolar RNA (snoRNA), extracellular RNA (exRNA), autonomous and non-autonomous transposable RNA.

7. The method of any one of claims 4-6, wherein said plant gene having said intrinsic silencing activity encodes for a phased secondary siRNA-producing molecule, optionally wherein:

(i) modifying the gene encoding said phased secondary siRNA-producing molecule comprises modifying at least one secondary silencing RNA molecule formed by processing of said phased secondary siRNA-producing molecule; or

(ii) modifying the gene encoding said phased secondary siRNA-producing molecule comprises modifying all the secondary silencing RNA molecules formed by processing of said phased secondary siRNA-producing molecule,

or wherein said plant gene having said intrinsic silencing activity is a trans-acting-siRNA-producing (TAS) molecule.

8. The method of any one of claims 1-7, wherein:

(i) said silencing specificity of said plant gene is determined by measuring a transcript level of said pest gene; and/or

(ii) said silencing specificity of said plant gene is determined phenotypically, optionally wherein said determined phenotypically is effected by determination of pest resistance of said plant; and/or

(iii) said silencing specificity of said plant gene is determined genotypically, optionally wherein a plant phenotype is determined prior to a plant genotype, or wherein a plant genotype is determined prior to a plant phenotype.

9. A method of producing a long dsRNA molecule in a plant cell that is capable of silencing a pest gene, the method comprising:

(a) selecting a nucleic acid sequence of a plant gene exhibiting a predetermined sequence homology to a nucleic acid sequence of the pest gene;

(b) modifying a plant endogenous nucleic acid sequence encoding an RNA molecule so as to impart silencing specificity towards said plant gene, such that small RNA molecules capable of recruiting RNA-dependent RNA Polymerase (RdRp) processed from said RNA molecule form base complementation with a transcript of said plant gene to produce the long dsRNA molecule capable of silencing the pest gene,

thereby producing the long dsRNA molecule in the plant cell that is capable of silencing the pest gene.

10. The method of claim 9, wherein:

(i) said predetermined sequence homology comprises 75-100 % identity; and/or

(ii) said small RNA molecules capable of recruiting said RdRp comprise 21-24 nucleotides; and/or

(iii) said small RNA molecules capable of recruiting said RdRp are selected from the group consisting of microRNA (miRNA), small interfering RNA (siRNA), short hairpin RNA (shRNA), Piwi-interacting RNA (piRNA), trans-acting siRNA (tasiRNA), phased small interfering RNA (phasiRNA), transfer RNA (tRNA), small nuclear RNA (snRNA), ribosomal RNA (rRNA), small nucleolar RNA (snoRNA), extracellular RNA (exRNA), repeat-derived RNA, autonomous and non-autonomous transposable RNA; and/or

(iv) said RNA molecule has an intrinsic silencing activity towards a native plant gene.

11. The method of claim 9 or 10, wherein:

(i) said modifying of step (b) comprises introducing into the plant cell a DNA editing agent which redirects a silencing specificity of said RNA molecule towards said plant gene, said plant gene and a native plant gene being distinct; and/or

(ii) said plant gene exhibiting said predetermined sequence homology to said nucleic acid sequence of the pest gene does not encode a silencing molecule; and/or

(iii) said silencing specificity of said RNA molecule is determined by measuring a transcript level of said plant gene or said pest gene; and/or

(iv) said silencing specificity of the RNA molecule is determined phenotypically, optionally wherein said determined phenotypically is effected by determination of pest resistance of said plant; and/or

(v) said silencing specificity of the RNA molecule is determined genotypically, optionally wherein a plant phenotype is determined prior to a plant genotype or wherein a plant genotype is determined prior to a plant phenotype.

12. The method of any one of claims 5-8 or 11, wherein:

(i) said DNA editing agent comprises at least one sgRNA,

optionally wherein said DNA editing agent comprises an endonuclease,

optionally wherein said DNA editing agent is of a DNA editing system selected from the group consisting of a meganuclease, a zinc finger nucleases (ZFN), a transcription-activator like effector nuclease (TALEN), CRISPR-endonuclease, dCRISPR-endonuclease and a homing endonuclease,

optionally wherein said endonuclease comprises Cas9; or

(ii) said DNA editing agent does not comprise an endonuclease.

13. The method of any one of claims 5-8, 11 or 12, wherein said DNA editing agent is applied to the cell as DNA, RNA or RNP.

14. The method of any one of claims 1-13, wherein said plant cell is a protoplast.

15. The method of any one of claims 1-14, wherein:

(i) said dsRNA molecule is processable by cellular RNAi processing machinery; and/or

(ii) said dsRNA molecule is processed into secondary small RNAs; and/or

(iii) said dsRNA and/or said secondary small RNAs comprise a silencing specificity towards a pest gene.

16. A method of generating a pest tolerant or resistant plant, the method comprising producing a long dsRNA molecule in a plant cell capable of silencing a pest gene according to any one of claims 1-15.

17. The method of claim 16, wherein said pest is an invertebrate and/or wherein said pest is selected from the group consisting of a virus, an ant, a termite, a bee, a wasp, a caterpillar, a cricket, a locust, a beetle, a snail, a slug, a nematode, a bug, a fly, a fruitfly, a whitefly, a mosquito, a grasshopper, a planthopper, an earwig, an aphid, a scale, a thrip, a spider, a mite, a psyllid, a tick, a moth, a worm, a scorpion and a fungus.

18. A plant generated by the method of any one of claims 1-17.

19. The plant of claim 18, wherein the plant is selected from the group consisting of a crop, a flower, a weed, and a tree and/or wherein said plant is non-transgenic.

20. A cell of the plant of claim 18 or 19.

21. A seed of the plant of claim 18 or 19.

22. A method of producing a pest tolerant or resistant plant, the method comprising:

(a) breeding the plant of claim 18 or 19; and

(b) selecting for progeny plants that express the long dsRNA molecule capable of suppressing the pest gene, and which do not comprise said DNA editing agent,

thereby producing said pest tolerant or resistant plant.

23. A method producing a plant or plant cell of any one of claims 18-20 comprising growing the plant or plant cell under conditions which allow propagation.