**CLAIMS**

1. An RNA molecule comprising a first RNA component, a second RNA component which is covalently linked to the first RNA component and, optionally, one or more or all of (i) a linking ribonucleotide sequence which covalently links the first and second RNA components, (ii) a 5' leader sequence and (iii) a 3' trailer sequence,

wherein the first RNA component consists of, in 5' to 3' order, a first 5' ribonucleotide, a first RNA sequence and a first 3' ribonucleotide, wherein the first 5' and 3' ribonucleotides basepair with each other in the first RNA component, wherein the first RNA sequence comprises a first sense ribonucleotide sequence of at least 20 contiguous ribonucleotides, a first loop sequence of at least 4 ribonucleotides and a first antisense ribonucleotide sequence of at least 20 contiguous ribonucleotides, wherein the first antisense ribonucleotide sequence hybridises with the first sense ribonucleotide sequence in the RNA molecule, wherein the first antisense ribonucleotide sequence is capable of hybridising to a first region of a target RNA molecule,

wherein the second RNA component is covalently linked, via the linking ribonucleotide sequence if present or directly if the linking ribonucleotide sequence is not present, to the first 5' ribonucleotide or the first 3' ribonucleotide,

wherein the second RNA component consists of, in 5' to 3' order, a second 5' ribonucleotide, a second RNA sequence and a second 3' ribonucleotide, wherein the second 5' and 3' ribonucleotides basepair to each other in the RNA molecule, wherein the second RNA sequence comprises a second sense ribonucleotide sequence, a second loop sequence of at least 4 ribonucleotides and a second antisense ribonucleotide sequence, wherein the second sense ribonucleotide sequence hybridises with the second antisense ribonucleotide sequence in the RNA molecule,

wherein the 5' leader sequence, if present, consists of a sequence of ribonucleotides which is covalently linked to the first 5' ribonucleotide if the second RNA component is linked to the first 3' ribonucleotide or to the second 5' ribonucleotide if the second RNA component is linked to the first 5' ribonucleotide, and

wherein the 3' trailer sequence, if present, consists of a sequence of ribonucleotides which is covalently linked to the second 3' ribonucleotide if the second RNA component is linked to the first 3' ribonucleotide or to the first 3' ribonucleotide if the second RNA component is linked to the first 5' ribonucleotide,

wherein the RNA molecule is a single strand of ribonucleotides which comprises a 5' end and a 3' end, and

wherein the target RNA molecule is in an arthropod cell or in a plant cell.

2. An RNA molecule comprising a first RNA component, a second RNA component which is covalently linked to the first RNA component and, optionally, one or more or all of (i) a linking ribonucleotide sequence which covalently links the first and second RNA components, (ii) a 5’ leader sequence and (iii) a 3’ trailer sequence,

wherein the first RNA component consists of, in 5’ to 3’ order, a first 5’ ribonucleotide, a first RNA sequence and a first 3’ ribonucleotide, wherein the first 5’ and 3’ ribonucleotides basepair, wherein the first RNA sequence comprises a first sense ribonucleotide sequence, a first loop sequence of at least 4 ribonucleotides and a first antisense ribonucleotide sequence, wherein the first sense ribonucleotide sequence and first antisense ribonucleotide sequence each of at least 20 contiguous ribonucleotides whereby the at least 20 contiguous ribonucleotides of the first sense ribonucleotide sequence fully basepair with the at least 20 contiguous ribonucleotides of the first antisense ribonucleotide sequence, wherein the at least 20 contiguous ribonucleotides of the first sense ribonucleotide sequence are identical in sequence to a first region of a target RNA molecule,

wherein the second RNA component is covalently linked, via the linking ribonucleotide sequence if present, to the first 5’ ribonucleotide or the first 3’ ribonucleotide,

wherein the second RNA component consists of, in 5’ to 3’ order, a second 5’ ribonucleotide, a second RNA sequence and a second 3’ ribonucleotide, wherein the second 5’ and 3’ ribonucleotides basepair, wherein the second RNA sequence comprises a second sense ribonucleotide sequence, a second loop sequence of at least 4 ribonucleotides and a second antisense ribonucleotide sequence, wherein the second sense ribonucleotide sequence basepairs with the second antisense ribonucleotide sequence,

wherein the 5’ leader sequence, if present, consists of a sequence of ribonucleotides which is covalently linked to the first 5’ ribonucleotide if the second RNA component is linked to the first 3’ ribonucleotide or to the second 5’ ribonucleotide if the second RNA component is linked to the first 5’ ribonucleotide, and

wherein the 3’ trailer sequence, if present, consists of a sequence of ribonucleotides which is covalently linked to the second 3’ ribonucleotide if the second RNA component is linked to the first 3’ ribonucleotide or to the first 3’ ribonucleotide if the second RNA component is linked to the first 5’ ribonucleotide,

wherein the RNA molecule is a single strand of ribonucleotides which comprises a 5’ end and a 3’ end, and

wherein the target RNA molecule is in an arthropod cell or is in a plant cell.

3. The RNA molecule of claim 1 or 2, wherein (a) the first sense ribonucleotide sequence or the first antisense ribonucleotide sequence, or both, is at least 40 contiguous nucleotides in length, or (b) wherein the second sense ribonucleotide sequence or the second antisense

ribonucleotide sequence, or both, is at least 40 contiguous nucleotides in length, or both (a) and (b).

4. The RNA molecule according to any one of claims 1 to 3, wherein either (a) the first and second antisense ribonucleotide sequences flank the first and second sense ribonucleotide sequences, or (b) the first and second sense ribonucleotide sequences flank the first and second antisense ribonucleotide sequences.

5. The RNA molecule according to any one of claims 1 to 4, which is characterised by one or more of the following:

(i) the at least 21 contiguous ribonucleotides of the first antisense ribonucleotide sequence are all capable of basepairing to nucleotides of the first region of the target RNA molecule,

(ii) the first sense ribonucleotide sequence is linked covalently to the first 5' ribonucleotide without any intervening nucleotides, or the first antisense ribonucleotide sequence is linked covalently to the first 3' ribonucleotide without any intervening nucleotides, or both,

(iii) the RNA molecule comprises the linking ribonucleotide sequence, wherein the linking ribonucleotide sequence is less than 20 ribonucleotides,

(iv) the linking ribonucleotide sequence hybridizes to the target RNA molecule,

(v) the linking ribonucleotide sequence is identical to a portion of the complement of the target RNA molecule,

(vi) wherein the linking ribonucleotide sequence is between 1 and 10 ribonucleotides in length,

(vii) the RNA molecule comprises two or more sense ribonucleotide sequences, and antisense ribonucleotide sequences fully based paired thereto, which are identical in sequence to a region of a target RNA molecule,

(viii) the first and second sense ribonucleotide sequences are identical in sequence to different regions of the same target RNA molecule,

(ix) the first and second sense ribonucleotide sequences are identical in sequence to a region of different target RNA molecules,

(x) the first and second sense ribonucleotide sequences have no intervening loop sequences,

(xi) the first and second antisense ribonucleotide sequencesare fully based paired to the first and second sense ribonucleotide sequences, respectively, and are each complementary to a region of a target RNA molecule,

(xii) the first and second antisense ribonucleotide sequences are complementary to different regions of the same target RNA molecule,

(xiii) the second antisense ribonucleotide sequence is complementary to region of a different target RNA molecule than the first antisense ribonucleotide sequence,

(xiv) the first and second sense ribonucleotide sequences have no intervening loop sequences,

(xv) either (a) the first 5’ ribonucleotide and the second 3’ ribonucleotide are adjacent, each base paired and not directly covalently bonded to each other, or (b) the second 5’ ribonucleotide and the first 3’ ribonucleotide are adjacent, each base paired and not directly covalently bonded to each other,

(xvi)the first antisense ribonucleotide sequence hybridizes to a first region of a target RNA, the second antisense ribonucleotide sequence hybridizes to a second region of a target RNA, the second region of the target RNA being different to the first region of the target RNA, and the first and second sense ribonucleotide sequences are contiguous, wherein the two antisense sequences are not contiguous in the RNA molecule,

(vxii) the first sense ribonucleotide sequence is at least 60% identical to a first region of a target RNA, the second sense ribonucleotide sequence is at least 60% identical to a second region of a target RNA, the second region of the target RNA being different to the first region of the target RNA, and the first and second antisense ribonucleotide sequences are contiguous and hybridize to the target RNA, wherein the two sense sequences are not contiguous in the RNA molecule,

(xviii) the RNA molecule comprises the 5’ leader sequence, the 3’ trailer sequence, or both,

(xix) at least one or all of the loop sequences in the RNA molecule are longer than 20 nucleotides,

(xx) the RNA molecule has no, or one, or two or more bulges, or a double-stranded region of the RNA molecule comprises one, or two, or more nucleotides which are not base paired in the double-stranded region,

(xxi) the RNA molecule has three, four or more loops, and

(xxii) the RNA molecule has only two loops.

6. The RNA molecule according to any one of claims 1 to 5, wherein the target RNA is in a plant cell.

7. The RNA molecule according to any one of claims 1 to 6 which is produced in a cell by transcription from a genetic construct or which is produced in a eukaryotic cell by transcription from a genetic construct.

8. The RNA molecule according to any one of claims 1 to 7, wherein between 5% and 40% of the ribonucleotides in total of the first sense ribonucleotide sequence and the first antisense ribonucleotide sequence, and/or the second sense ribonucleotide sequence and the second antisense ribonucleotide sequence, are basepaired in a non-canonical basepair.

9. An isolated and/or exogenous polynucleotide or a vector encoding an RNA molecule according to any one of claims 1 to 8.

10. The isolated and/or exogenous polynucleotide or vector according to claim 9, wherein the polynucleotide is operably linked to a promoter capable of directing expression of the RNA molecule in a plant cell or arthropod cell.

11. A host cell, or a plant or a part thereof, comprising one or both of an RNA molecule according to any one of claims 1 to 8, or a vector or polynucleotide according to claim 9 or 10.

12. The host cell or plant or a part thereof according to claim 11, wherein the polynucleotide is stably integrated into the genome of the organism.

13. A method of producing an RNA molecule according to any one of claims 1 to 8, the method comprising expressing the polynucleotide according to claim 9 or 10 in a host cell or cell-free expression system.

14. A method of producing a plant of claim 11, the method comprising introducing the polynucleotide according to claim 9 or 10 into a cell so that it is stably integrated into the genome of the cell, and generating the plant from the cell.

15. An extract of a host cell according to claim 11 or 12, wherein the extract comprises the RNA molecule according to any one of claims 1 to 8, and/or a vector or polynucleotide according to claim 9 or 10.

16. A composition comprising one or more of an RNA molecule according to any one of claims 1 to 8, a vector or a polynucleotide according to claim 9 or 10, a host cell or plant or part thereof according to claim 11 or 12, or an extract of claim 15, and one or more suitable carriers.

17. A method for down-regulating the level and/or activity of a target RNA molecule in an organism or in an arthropod, the method comprising delivering to the plant or arthropod one or more of an RNA molecule according to any one of claims 1 to 8, a vector or a polynucleotide

according to claim 9 or 10, a host cell according to claim 11 or 12, an extract of claim 15, or a composition according to claim 16.

18. A method of controlling a non-human organism, the method comprising delivering to the non-human organism one or more of an RNA molecule according to any one of claims 1 to 8, a vector or a polynucleotide according to claim 9 or 10, a host cell according to claim 11 or 12, an extract of claim 15, or a composition according to claim 16, wherein the RNA molecule has a deleterious effect on the non-human organism, wherein the non-human organism is an arthropod or a plant.

19. A method of preventing or treating a disease in a plant or an arthropod, comprising administering the RNA molecule according to any one of claims 1 to 8, a vector or a polynucleotide claim 9 or 10, a host cell or plant or part thereof according to claim 11 or 12, an extract of claim 15, or a composition according to claim 16, wherein the RNA molecule has a beneficial effect on at least one symptom of the disease or preventing the disease.

20. A method of introducing an RNA molecule to a plant, the method comprising topically applying a composition comprising the RNA molecule according to any one of claims 1 to 8 to the plant or a part thereof.