

*rebra* spp., *Dacus* spp., *Drosophila melanogaster*, *Fannia* spp., *Gastrophilus* spp., *Glossina* spp., *Hypoderma* spp., *Hyppobosca* spp., *Liriomyza* spp., *Lucilia* spp., *Melanogromyza* spp., *Musca* ssp., *Oestrus* spp., *Orseolia* spp., *Oscinella fit*, *Pegomyia hyoscyami*, *Phorbia* spp., *Rhagoletis pomonella*, *Sciara* spp., *Stomoxys* spp., *Tabanus* spp., *Tannia* spp. and *Tipula* spp.,

[0067] from the order Siphonaptera, for example, *Ceratomyxus* spp. and *Xenopsylla cheopis* and

[0068] from the order Thysanura, for example, *Lepisma saccharina*.

[0069] Monocotyledonous plant (monocot) is a flowering plant having embryos with one cotyledon or seed leaf, parallel leaf veins, and flower parts in multiples of three. Examples of monocots include, but are not limited to turfgrass, maize, rice, oat, wheat, barley, sorghum, orchid, iris, lily, onion, and palm.

[0070] Pest or target pest refers to insects, arachnids, crustaceans, fungi, bacteria, viruses, nematodes, flatworms, roundworms, pinworms, hookworms, tapeworms, trypanosomes, schistosomes, botflies, fleas, ticks, mites, and lice and the like that are pervasive in the human environment. A pest may ingest or contact one or more cells, tissues, or products produced by an organism transformed with a double stranded gene suppression agent, as well as a material or surface treated with a double stranded gene suppression agent.

[0071] Nematodes, or roundworms, are one of the most common phyla of animals, with over 20,000 different described species (over 15,000 are parasitic). They are ubiquitous in freshwater, marine, and terrestrial environments, where they often outnumber other animals in both individual and species counts, and are found in locations as diverse as Antarctica and oceanic trenches. Further, there are a great many parasitic forms, including pathogens in most plants and animals.

[0072] Nematode pests of a particular interest include, for example, *A. caninum*, *A. ceylanicum*, *H. contortus*, *O. osteragi*, *C. elegans*, *C. briggsae*, *P. pacificus*, *S. stercoralis*, *S. ratti*, *P. trichosuri*, *M. arenaria*, *M. chitwoodi*, *M. hapla*, *M. incognita*, *M. javanica*, *M. paraensis*, *G. rostochiensis*, *G. pallida*, *H. glycines*, *H. schattii*, *P. penetrans*, *P. vulnus*, *R. similis*, *Z. punctata*, *A. suum*, *T. canis*, *B. malayi*, *D. immitis*, *O. volvulus*, *T. vulpis*, *T. spiralis*, *X. index*, *A. duodenale*, *A. lumbricoïdes*, as well as species from the following genera: *Aphelenchoides*, *Nacobbus*, *Ditylenchus*, *Longidorus*, *Trichodorus*, and *Bursaphelenchus*.

[0073] Normal cell refers to a cell of an untransformed phenotype or exhibiting a morphology of a non-transformed cell of the tissue type being examined.

[0074] Operably linked: combining two or more molecules in such a fashion that in combination they function properly in a cell. For instance, a promoter is operably linked to a structural gene when the promoter controls transcription of the structural gene.

[0075] Orthologs are genes that are related by vertical descent from a common ancestor and encode proteins with the same function in different species. Due to their separation following a speciation event, orthologs may diverge, but usually have similarity at the sequence and structure levels. Two genes that are derived from a common ancestor and encode proteins with similar function are referred to as orthologous. Identification of orthologs is critical for reliable predictions of gene function in newly sequenced genomes.

[0076] "Pest control agent", or "gene suppression agent" refers to a particular RNA molecule comprising a first RNA segment and a second RNA segment, wherein the complementarity between the first and the second RNA segments results in the ability of the two segments to hybridize in vivo and in vitro to form a double stranded molecule. It may generally be preferable to include a third RNA segment linking and stabilizing the first and second sequences such that a stem can be formed linked together at one end of each of the first and second segments by the third segment to form a loop, so that the entire structure forms into a stem and loop structure, or even more tightly hybridizing structures may form into a stem-loop knotted structure. Alternatively, a symmetrical hairpin could be formed without a third segment in which there is no designed loop, but for steric reasons a hairpin would create its own loop when the stem is long enough to stabilize itself. The first and the second RNA segments will generally lie within the length of the RNA molecule and be substantially inverted repeats of each other and linked together by the third RNA segment. The first and the second segments correspond invariably and not respectively to a sense and an antisense sequence with respect to the target RNA transcribed from the target gene in the target insect pest that is suppressed by the ingestion of the dsRNA molecule.

[0077] The pest control agent can also be a substantially purified (or isolated) nucleic acid molecule and more specifically nucleic acid molecules or nucleic acid fragment molecules thereof from a genomic DNA (gDNA) or cDNA library. Alternatively, the fragments may comprise smaller oligonucleotides having from about 15 to about 250 nucleotide residues, and more preferably, about 15 to about 30 nucleotide residues.

[0078] Pesticide refers to any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. A pesticide may be a chemical substance or biological agent used against pests including insects, pathogens, weeds, nematodes, and microbes that compete with humans for food, destroy property, spread disease, or are a nuisance.

[0079] Phenotype is a distinguishing feature or characteristic of an organism, which may be altered according to the present invention by integrating one or more "desired polynucleotides" and/or screenable/selectable markers into the genome of at least one cell of a transformed organism. The "desired polynucleotide(s)" and/or markers may confer a change in the phenotype of a transformed organism, by modifying any one of a number of genetic, molecular, biochemical, physiological, or morphological characteristics or properties of the transformed cell or organism as a whole.

[0080] Plant and plant tissue: a "plant" is any of various photosynthetic, eukaryotic, multicellular organisms of the kingdom Plantae characteristically producing embryos, containing chloroplasts, and having cellulose cell walls. A part of a plant, i.e., a "plant tissue" may be treated according to the methods of the present invention to prevent pest infestation on the plant or on the part of the plant. Many suitable plant tissues can be treated according to the present invention and include, but are not limited to, somatic embryos, pollen, leaves, stems, calli, stolons, microtubers, and shoots. Thus, the present invention envisions the treatment of angiosperm and gymnosperm plants such as acacia, alfalfa, apple, apricot, artichoke, ash tree, asparagus, avocado, banana, barley, beans, beet, birch, beech, blackberry, blueberry, broccoli, brussels sprouts, cabbage, canola, cantaloupe, carrot, cas-