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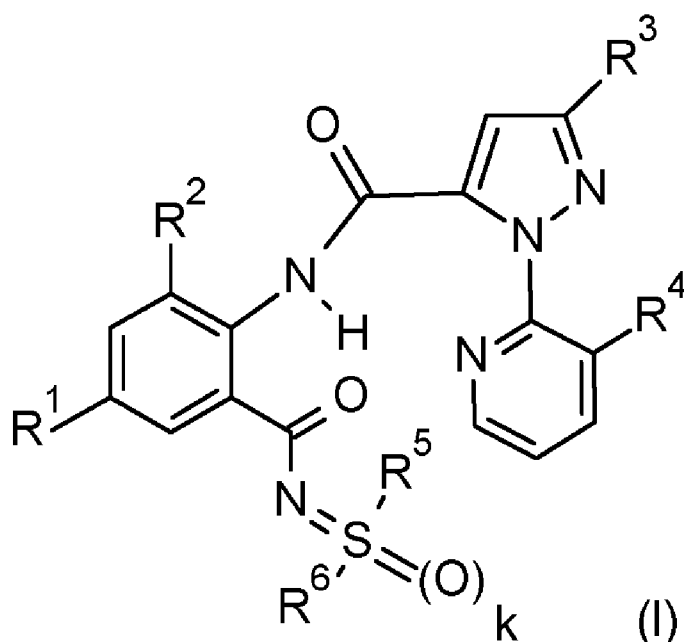
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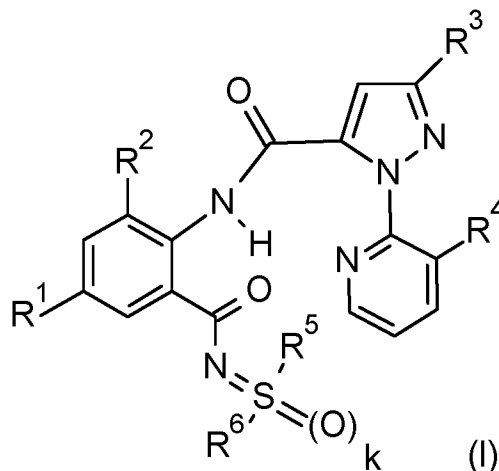
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(54) Title: USE OF N-THIO-ANTHRANILAMIDE COMPOUNDS ON CULTIVATED PLANTS

(57) Abstract: The present invention relates to agricultural methods for controlling pests and/or increasing the plant health of a cultivated plant with at least one modification, using anthranilamide compounds of formula (I) wherein R¹, R², R³, R⁴, R⁵, R⁶ and k are as defined in the description; and mixtures thereof. In particular, the invention relates to methods of controlling harmful insects on special soybean varieties. In particular, the invention relates to methods of controlling harmful insects, which are resistant to an insecticidal trait of the plant.

Use of N-thio-anthranilamide compounds on cultivated plants

The present invention relates to a method for controlling pests and/or increasing the plant health of a cultivated plant with at least one modification (hereinafter abbreviated as "cultivated plant") as compared to the respective non-modified control plant, comprising the application of a pesti-



wherein

R¹ is selected from the group consisting of H, F, Cl, Br and CN;

R² is selected from the group consisting of F, Cl, Br, I, CH₃;

R³ is selected from the group consisting of Br, Cl, CHF₂, CF₃ and OCH₂F;

R⁴ is Cl or CF₃;

R⁵, R⁶ are selected independently of one another from the group consisting of hydrogen, C₁-C₄-alkyl, C₃-C₈-cycloalkyl, or

R⁵ and R⁶ together represent a C₂-C₇-alkylene, C₂-C₇-alkenylene or C₆-C₉-alkynylene chain forming together with the sulfur atom to which they are attached a 3-, 4-, 5-, 6-, 7-, 8-, 9- or 10-membered saturated, partially unsaturated or fully unsaturated ring,

k is 0 or 1;

or a stereoisomer, salt, tautomer or N-oxide, or a polymorphic crystalline form, a co-crystal or a solvate of a compound or a stereoisomer, salt, tautomer or N-oxide thereof; to a cultivated plant, parts of such plant, plant propagation material, or at its locus of growth.

The term "compound of formula (I) or a stereoisomer, salt, tautomer or N-oxide thereof" is understood to include a polymorphic crystalline form, a co-crystal or a solvate of a compound or a stereoisomer, salt, tautomer or N-oxide, even if not mentioned explicitly.

One typical problem arising in the field of pest control lies in the need to reduce the dosage rates of the active ingredient in order to reduce the dosage rates of the active ingredient in order to reduce or avoid unfavourable environmental or toxicological effects whilst still allowing effective pest control. Another problem underlying the invention is the desire for compositions that improve the health of a plant, a process which is commonly and hereinafter referred to as "plant health". The term plant health comprises various sorts of improvements of plants that are not connected to the control of pests and which do not embrace the reduction of negative conse-

quences of harmful insects. The term "plant health" is to be understood to denote a condition of the plant and/or its products which is determined by several indicators alone or in combination with each other such as yield (e.g. increased biomass and/or increased content of valuable ingredients), plant vigor (e.g. improved plant growth and/or greener leaves ("greening effect"), quality (e.g. improved content or composition of certain ingredients) and tolerance to abiotic and/or biotic stress. The above identified indicators for the health condition of a plant may be interdependent or may result from each other.

It was therefore the object of the present invention to provide a method, which solves the problems as outlined above and which especially reduces the dosage rate and/or promotes the health of a plant.

Surprisingly, it has now been found that the use of a compound of formula (I) as defined above in cultivated plants displays a synergistic effect between the trait of the cultivated plant and the applied compound of formula (I).

In a first embodiment, cultivated plants are plants that have at least one insecticidal trait. It is a wide-spread problem that insects, that are combatted with insecticides, develop resistance, i.e. they become less or not all anymore susceptible to the insecticidal effect.

Surprisingly, it has now been found that compounds of formula (I) are useful in methods of controlling harmful insects by treating cultivated plants, parts of such plants or their locus of growth, wherein the plant has at least one insecticidal trait, and wherein the harmful insects are resistant to an insecticidal trait of the plant.

In a second embodiment, cultivated plants are specific plants that have at least one herbicidal and at least one insecticidal trait, preferably soybeans, more preferably the soybeans known as "Intacta RR2 PRO" soybean (Monsanto). Surprisingly, it has now been found that compounds of formula (I) are also useful in methods of controlling harmful insects by treating those mentioned cultivated plants, parts of such plants or their locus of growth.

In a third embodiment, cultivated plants are plants that have at least one trait or trait combination which has not yet been described in connection with the use of compounds of formula (I) on cultivated plants, e.g. as listed in Table A14 or Table B2.

Surprisingly, it has now been found that compounds of formula (I) are also useful in methods of controlling harmful insects by treating those mentioned cultivated plants, parts of such plants or their locus of growth.

Compounds of formula I

WO2007/006670, WO2013/024009, WO2013/024010 and WO2013/174645 describe N-thio-anthranilamide compounds with a sulfilimine or sulfoximine group and their use as pesticides. WO2014/053395 describes the use of N-thio-anthranilamide compounds on certain cultivated plants.

The compounds of formula (I) can be prepared according to standard methods of organic chemistry, or by the processes as described in WO2013/024007, WO2013/024008, WO2013/076092, and the unpublished applications PCT/EP2014/056164, EP13173044.2, PCT/EP2014/060082, and EP14166089.4 d, without being limited to the routes given therein.

The preparation of the compounds of formula I above may lead to them being obtained as isomer mixtures. If desired, these can be resolved by the methods customary for this purpose, such as crystallization or chromatography, also on optically active adsorbate, to give the pure isomers. Agronomically acceptable salts of the compounds I can be formed in a customary manner, e.g. by reaction with an acid of the anion in question.

However, although the anthranilamide compounds of formula (I) themselves have been described in methods and uses for controlling harmful pests on certain cultivated plants, there are further cultivated plants on which the compounds of formula (I) are surprisingly effective.

The compounds of formula (I) as well as the terms "compounds for methods according to the (present) invention", "compounds according to the (present) invention" or "compounds of formula (I)" or "compound(s) II", which all compound(s) are applied in methods and uses according to the present invention comprise the compound(s) as defined herein as well as a known stereoisomer, salt, tautomer or N-oxide thereof (including a polymorphic crystalline form, a co-crystal or a solvate of a compound or a stereoisomer, salt, tautomer or N-oxide thereof).

The term "composition(s) according to the invention" or "composition(s) of the present invention" encompasses composition(s) comprising at least one compound of formula (I) or mixtures of the compounds of formula (I) with other pesticidally active compound(s) II for being used and/or applied in methods according to the invention as defined above.

Depending on the substitution pattern, the compounds of the formula (I) may have one or more centers of chirality, in which case they are present as mixtures of enantiomers or diastereomers.

The invention provides both the pure enantiomers or pure diastereomers of the compounds of formula (I), and their mixtures and the use according to the invention of the pure enantiomers or pure diastereomers of the compound of formula (I) or its mixtures. Suitable compounds of the formula (I) also include all possible geometrical stereoisomers (cis/trans isomers) and mixtures thereof. Cis/trans isomers may be present with respect to an alkene, carbon-nitrogen double bond, nitrogen-sulfur double bond or amide group. The term "stereoisomer(s)" encompasses both optical isomers, such as enantiomers or diastereomers, the latter existing due to more than one center of chirality in the molecule, as well as geometrical isomers (cis/trans isomers).

Salts of the compounds of the present invention are preferably agriculturally and veterinarily acceptable salts. They can be formed in a customary method, e.g. by reacting the compound with an acid if the compound of the present invention has a basic functionality or by reacting the compound with a suitable base if the compound of the present invention has an acidic functionality.

In general, suitable "agriculturally useful salts" or "agriculturally acceptable salts" are especially the salts of those cations or the acid addition salts of those acids whose cations and anions, respectively, do not have any adverse effect on the action of the compounds according to the present invention. Suitable cations are in particular the ions of the alkali metals, preferably lithium, sodium and potassium, of the alkaline earth metals, preferably calcium, magnesium and barium, and of the transition metals, preferably manganese, copper, zinc and iron, and also ammonium (NH_4^+) and substituted ammonium in which one to four of the hydrogen atoms are replaced by C_1 - C_4 -alkyl, C_1 - C_4 -hydroxyalkyl, C_1 - C_4 -alkoxy, C_1 - C_4 -alkoxy- C_1 - C_4 -alkyl, hydroxy- C_1 - C_4 -alkoxy- C_1 - C_4 -alkyl, phenyl or benzyl. Examples of substituted ammonium ions comprise methylammonium, isopropylammonium, dimethylammonium, diisopropylammonium, trimethylammonium, tetramethylammonium, tetraethylammonium, tetrabutylammonium, 2-

hydroxyethylammonium, 2-(2-hydroxyethoxy)ethyl-ammonium, bis(2-hydroxyethyl)ammonium, benzyltrimethylammonium and benzyltriethylammonium, furthermore phosphonium ions, sulfonium ions, preferably tri(C₁-C₄-alkyl)sulfonium, and sulfoxonium ions, preferably tri(C₁-C₄-alkyl)sulfoxonium.

- 5 Anions of useful acid addition salts are primarily chloride, bromide, fluoride, hydrogen sulfate, sulfate, dihydrogen phosphate, hydrogen phosphate, phosphate, nitrate, hydrogen carbonate, carbonate, hexafluorosilicate, hexafluorophosphate, benzoate, and the anions of C₁-C₄-alkanoic acids, preferably formate, acetate, propionate and butyrate. They can be formed by reacting the compounds of the formulae I with an acid of the corresponding anion, preferably of hydrochloric acid, hydrobromic acid, sulfuric acid, phosphoric acid or nitric acid.

10 The compounds of the formula (I) may be present in the form of their N-oxides. The term "N-oxide" includes any compound of the present invention which has at least one tertiary nitrogen atom that is oxidized to an N-oxide moiety. N-oxides of compounds (I) can in particular be prepared by oxidizing the ring nitrogen atom(s) of the pyridine ring and/or the pyrazole ring with a suitable oxidizing agent, such as peroxy carboxylic acids or other peroxides. The person skilled in the art knows if and in which positions compounds of the formula (I) of the present invention may form N-oxides.

15 The compounds of the present invention may be amorphous or may exist in one or more different crystalline states (polymorphs) which may have different macroscopic properties such as stability or show different biological properties such as activities. The present invention includes both amorphous and crystalline compounds of formula (I), their enantiomers or diastereomers, mixtures of different crystalline states of the respective compound of formula (I), its enantiomers or diastereomers, as well as amorphous or crystalline salts thereof.

20 The term "co-crystal" denotes a complex of the compounds according to the invention or a stereoisomer, salt, tautomer or N-oxide thereof, with one or more other molecules (preferably one molecule type), wherein usually the ratio of the compound according to the invention and the other molecule is a stoichiometric ratio.

25 The term "solvate" denotes a co-complex of the compounds according to the invention, or a stereoisomer, salt, tautomer or N-oxide thereof, with solvent molecules. The solvent is usually liquid. Examples of solvents are methanol, ethanol, toluol, xylol. A preferred solvent which forms solvates is water, which solvates are referred to as "hydrates". A solvate or hydrate is usually characterized by the presence of a fixed number of n molecules solvent per m molecules compound according to the invention.

30 The remarks made below as to preferred embodiments of the variables (substituents) of the compounds of formulae (I) are valid on their own as well as preferably in combination with each other, as well as in combination with the stereoisomers, tautomers, N-oxides or salts thereof, and, where applicable, as well as concerning the uses and methods according to the invention and the compositions according to the invention.

35 The organic moieties mentioned in the above definitions of the variables are - like the term halogen - collective terms for individual listings of the individual group members. The prefix C_n-C_m indicates in each case the possible number of carbon atoms in the group.

40 The term halogen denotes in each case fluorine, bromine, chlorine or iodine, in particular fluorine, chlorine or bromine.

The term "partially or fully halogenated" will be taken to mean that 1 or more, e.g. 1, 2, 3, 4 or 5 or all of the hydrogen atoms of a given radical have been replaced by a halogen atom, in particular by fluorine or chlorine. A partially or fully halogenated radical is termed below also "halo-radical". For example, partially or fully halogenated alkyl is also termed haloalkyl.

- 5 The term "alkyl" as used herein (and in the alkyl moieties of other groups comprising an alkyl group, e.g. alkoxy, alkylcarbonyl, alkylthio, alkylsulfinyl, alkylsulfonyl and alkoxyalkyl) denotes in each case a straight-chain or branched alkyl group having usually from 1 to 6 or 1 to 4 carbon atoms, preferably 1 to 4 carbon atoms and in particular from 1 to 3 carbon atoms. Examples of C₁-C₄-alkyl are methyl, ethyl, n-propyl, isopropyl, n-butyl, 2-butyl (sec-butyl), isobutyl and tert-butyl. Examples for C₁-C₆-alkyl are, apart those mentioned for C₁-C₄-alkyl, n-pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 2,2-dimethylpropyl, 1-ethylpropyl, n-hexyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl and 1-ethyl-2-methylpropyl.

The term "alkylene" (or alkanediyl) as used herein in each case denotes an alkyl radical as defined above, wherein one hydrogen atom at any position of the carbon backbone is replaced by one further binding site, thus forming a bivalent moiety.

- 20 The term "cycloalkyl" as used herein (and in the cycloalkyl moieties of other groups comprising a cycloalkyl group, e.g. cycloalkoxy and cycloalkylalkyl) denotes in each case a mono- or bicyclic cycloaliphatic radical having usually from 3 to 10 carbon atoms ("C₃-C₁₀-cycloalkyl"), preferably 3 to 8 carbon atoms ("C₃-C₈-cycloalkyl") or in particular 3 to 6 carbon atoms ("C₃-C₆-cycloalkyl"). Examples of monocyclic radicals having 3 to 6 carbon atoms comprise cyclopropyl, cyclobutyl, cyclopentyl and cyclohexyl. Examples of monocyclic radicals having 3 to 8 carbon atoms comprise cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl and cyclooctyl. Examples of bicyclic radicals having 7 or 8 carbon atoms comprise bicyclo[2.1.1]hexyl, bicyclo[2.2.1]heptyl, bicyclo[3.1.1]heptyl, bicyclo[2.2.1]heptyl, bicyclo[2.2.2]octyl and bicyclo[3.2.1]octyl.

- 30 The term "alkenyl" as used herein denotes in each case a monounsaturated straight-chain or branched hydrocarbon radical having usually 2 to 7 carbon atoms ("C₂-C₇-alkenyl"), in particular 2 to 4 carbon atoms ("C₂-C₄-alkenyl"), and a double bond in any position, for example C₂-C₄-alkenyl, such as ethenyl, 1-propenyl, 2-propenyl, 1-methylethenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1-methyl-1-propenyl, 2-methyl-1-propenyl, 1-methyl-2-propenyl or 2-methyl-2-propenyl; C₂-C₆-alkenyl, such as ethenyl, 1-propenyl, 2-propenyl, 1-methylethenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1-methyl-1-propenyl, 2-methyl-1-propenyl, 1-methyl-2-propenyl, 2-methyl-2-propenyl, 1-pentenyl, 2-pentenyl, 3-pentenyl, 4-pentenyl, 1-methyl-1-butenyl, 2-methyl-1-butenyl, 3-methyl-1-butenyl, 1-methyl-2-butenyl, 2-methyl-2-butenyl, 3-methyl-2-butenyl, 1-methyl-3-butenyl, 2-methyl-3-butenyl, 3-methyl-3-butenyl, 1,1-dimethyl-2-propenyl, 1,2-dimethyl-1-propenyl, 1,2-dimethyl-2-propenyl, 1-ethyl-1-propenyl, 1-ethyl-2-propenyl, 1-hexenyl, 2-hexenyl, 3-hexenyl, 4-hexenyl, 5-hexenyl, 1-methyl-1-pentenyl, 2-methyl-1-pentenyl, 3-methyl-1-pentenyl, 4-methyl-1-pentenyl, 1-methyl-2-pentenyl, 2-methyl-2-pentenyl, 3-methyl-2-pentenyl, 4-methyl-2-pentenyl, 1-methyl-3-pentenyl, 2-methyl-3-pentenyl, 3-methyl-3-pentenyl, 4-methyl-3-pentenyl, 1-methyl-4-pentenyl, 2-methyl-4-pentenyl, 3-methyl-4-pentenyl, 4-methyl-4-pentenyl, 1,1-dimethyl-2-butenyl, 1,1-dimethyl-3-butenyl, 1,2-dimethyl-1-butenyl, 1,2-dimethyl-2-butenyl,

1,2-dimethyl-3-butenyl, 1,3-dimethyl-1-butenyl, 1,3-dimethyl-2-butenyl, 1,3-dimethyl-3-butenyl, 2,2-dimethyl-3-butenyl, 2,3-dimethyl-1-butenyl, 2,3-dimethyl-2-butenyl, 2,3-dimethyl-3-butenyl, 3,3-dimethyl-1-butenyl, 3,3-dimethyl-2-butenyl, 1-ethyl-1-butenyl, 1-ethyl-2-butenyl, 1-ethyl-3-butenyl, 2-ethyl-1-butenyl, 2-ethyl-2-butenyl, 2-ethyl-3-butenyl, 1,1,2-trimethyl-2-propenyl, 1-ethyl-1-methyl-2-propenyl, 1-ethyl-2-methyl-1-propenyl, 1-ethyl-2-methyl-2-propenyl and the like.

The term "alkenylene" (or alkenediyl) as used herein in each case denotes an alkenyl radical as defined above, wherein one hydrogen atom at any position of the carbon backbone is replaced by one further binding site, thus forming a bivalent moiety.

The term "alkynyl" as used herein denotes unsaturated straight-chain or branched hydrocarbon radicals having usually 2 to 10 ("C₂-C₁₀-alkynyl"), frequently 2 to 6 ("C₂-C₆-alkynyl"), preferably 2 to 4 carbon atoms ("C₂-C₄-alkynyl") and one or two triple bonds in any position, for example C₂-C₄-alkynyl, such as ethynyl, 1-propynyl, 2-propynyl, 1-butylnyl, 2-butylnyl, 3-butylnyl, 1-methyl-2-propynyl and the like, C₂-C₆-alkynyl, such as ethynyl, 1-propynyl, 2-propynyl, 1-butylnyl, 2-butylnyl, 3-butylnyl, 1-methyl-2-propynyl, 1-pentylnyl, 2-pentylnyl, 3-pentylnyl, 4-pentylnyl, 1-methyl-2-butylnyl, 1-methyl-3-butylnyl, 2-methyl-3-butylnyl, 3-methyl-1-butylnyl, 1,1-dimethyl-2-propynyl, 1-ethyl-2-propynyl, 1-hexynyl, 2-hexynyl, 3-hexynyl, 4-hexynyl, 5-hexynyl, 1-methyl-2-pentylnyl, 1-methyl-3-pentylnyl, 1-methyl-4-pentylnyl, 2-methyl-3-pentylnyl, 2-methyl-4-pentylnyl, 3-methyl-1-pentylnyl, 3-methyl-4-pentylnyl, 4-methyl-1-pentylnyl, 4-methyl-2-pentylnyl, 1,1-dimethyl-2-butylnyl, 1,1-dimethyl-3-butylnyl, 1,2-dimethyl-3-butylnyl, 2,2-dimethyl-3-butylnyl, 3,3-dimethyl-1-butylnyl, 1-ethyl-2-butylnyl, 1-ethyl-3-butylnyl, 2-ethyl-3-butylnyl, 1-ethyl-1-methyl-2-propynyl and the like.

The term "alkynylene" (or alkynediyl) as used herein in each case denotes an alkynyl radical as defined above, wherein one hydrogen atom at any position of the carbon backbone is replaced by one further binding site, thus forming a bivalent moiety.

The term "alkoxy" as used herein denotes in each case a straight-chain or branched alkyl group usually having usually from 1 to 4 carbon atoms ("C₁-C₄-alkoxy"), which is bound to the remainder of the molecule via an oxygen atom. C₁-C₂-Alkoxy is methoxy or ethoxy. C₁-C₄-Alkoxy is additionally, for example, n-propoxy, 1-methylethoxy (isopropoxy), butoxy, 1-methylpropoxy (sec-butoxy), 2-methylpropoxy (isobutoxy) or 1,1-dimethylethoxy (tert-butoxy). C₁-C₆-Alkoxy is additionally, for example, pentoxy, 1-methylbutoxy, 2-methylbutoxy, 3-methylbutoxy, 1,1-dimethylpropoxy, 1,2-dimethylpropoxy, 2,2-dimethylpropoxy, 1-ethylpropoxy, hexoxy, 1-methylpentoxy, 2-methylpentoxy, 3-methylpentoxy, 4-methylpentoxy, 1,1-dimethylbutoxy, 1,2-dimethylbutoxy, 1,3-dimethylbutoxy, 2,2-dimethylbutoxy, 2,3-dimethylbutoxy, 3,3-dimethylbutoxy, 1-ethylbutoxy, 2-ethylbutoxy, 1,1,2-trimethylpropoxy, 1,2,2-trimethylpropoxy, 1-ethyl-1-methylpropoxy or 1-ethyl-2-methylpropoxy.

The term "alkoxyalkyl" as used herein denotes in each case alkyl usually comprising 1 to 4 carbon atoms, wherein 1 carbon atom carries an alkoxy radical usually comprising 1 to 4 carbon atoms as defined above. "C₁-C₄-Alkoxy-C₁-C₆-alkyl" is a C₁-C₄-alkyl group, as defined above, in which one hydrogen atom is replaced by a C₁-C₄-alkoxy group, as defined above. Examples are CH₂OCH₃, CH₂-OC₂H₅, n-propoxymethyl, CH₂-OCH(CH₃)₂, n-butoxymethyl, (1-methylpropoxy)-methyl, (2-methylpropoxy)-methyl, CH₂-OC(CH₃)₃, 2-(methoxy)ethyl, 2-(ethoxy)ethyl, 2-(n-propoxy)-ethyl, 2-(1-methylethoxy)-ethyl, 2-(n-butoxy)ethyl, 2-(1-methylpropoxy)-ethyl, 2-(2-methylpropoxy)-ethyl, 2-(1,1-dimethylethoxy)-ethyl, 2-(methoxy)-propyl, 2-(ethoxy)-propyl, 2-(n-

propoxy)-propyl, 2-(1-methylethoxy)-propyl, 2-(n-butoxy)-propyl, 2-(1-methylpropoxy)-propyl, 2-(2-methylpropoxy)-propyl, 2-(1,1-dimethylethoxy)-propyl, 3-(methoxy)-propyl, 3-(ethoxy)-propyl, 3-(n-propoxy)-propyl, 3-(1-methylethoxy)-propyl, 3-(n-butoxy)-propyl, 3-(1-methylpropoxy)-propyl, 3-(2-methylpropoxy)-propyl, 3-(1,1-dimethylethoxy)-propyl, 2-(methoxy)-butyl, 2-(ethoxy)-butyl, 2-(n-propoxy)-butyl, 2-(1-methylethoxy)-butyl, 2-(n-butoxy)-butyl, 2-(1-methylpropoxy)-butyl, 2-(2-methylpropoxy)-butyl, 2-(1,1-dimethylethoxy)-butyl, 3-(methoxy)-butyl, 3-(ethoxy)-butyl, 3-(n-propoxy)-butyl, 3-(1-methylethoxy)-butyl, 3-(n-butoxy)-butyl, 3-(1-methylpropoxy)-butyl, 3-(2-methylpropoxy)-butyl, 3-(1,1-dimethylethoxy)-butyl, 4-(methoxy)-butyl, 4-(ethoxy)-butyl, 4-(n-propoxy)-butyl, 4-(1-methylethoxy)-butyl, 4-(n-butoxy)-butyl, 4-(1-methylpropoxy)-butyl, 4-(2-methylpropoxy)-butyl, 4-(1,1-dimethylethoxy)-butyl and the like.

The terms "alkylsulfinyl" and "S(O)_n-alkyl" (wherein n is 1) are equivalent and, as used herein, denote an alkyl group, as defined above, attached via a sulfinyl [S(O)] group. For example, the term "C₁-C₂-alkylsulfinyl" refers to a C₁-C₂-alkyl group, as defined above, attached via a sulfinyl [S(O)] group. The term "C₁-C₄-alkylsulfinyl" refers to a C₁-C₄-alkyl group, as defined above, attached via a sulfinyl [S(O)] group. The term "C₁-C₆-alkylsulfinyl" refers to a C₁-C₆-alkyl group, as defined above, attached via a sulfinyl [S(O)] group. C₁-C₂-alkylsulfinyl is methylsulfinyl or ethylsulfinyl. C₁-C₄-alkylsulfinyl is additionally, for example, n-propylsulfinyl, 1-methylethylsulfinyl (isopropylsulfinyl), butylsulfinyl, 1-methylpropylsulfinyl (sec-butylsulfinyl), 2-methylpropylsulfinyl (isobutylsulfinyl) or 1,1-dimethylethylsulfinyl (tert-butylsulfinyl). C₁-C₆-alkylsulfinyl is additionally, for example, pentylsulfinyl, 1-methylbutylsulfinyl, 2-methylbutylsulfinyl, 3-methylbutylsulfinyl, 1,1-dimethylpropylsulfinyl, 1,2-dimethylpropylsulfinyl, 2,2-dimethylpropylsulfinyl, 1-ethylpropylsulfinyl, hexylsulfinyl, 1-methylpentylsulfinyl, 2-methylpentylsulfinyl, 3-methylpentylsulfinyl, 4-methylpentylsulfinyl, 1,1-dimethylbutylsulfinyl, 1,2-dimethylbutylsulfinyl, 1,3-dimethylbutylsulfinyl, 2,2-dimethylbutylsulfinyl, 2,3-dimethylbutylsulfinyl, 3,3-dimethylbutylsulfinyl, 1-ethylbutylsulfinyl, 2-ethylbutylsulfinyl, 1,1,2-trimethylpropylsulfinyl, 1,2,2-trimethylpropylsulfinyl, 1-ethyl-1-methylpropylsulfinyl or 1-ethyl-2-methylpropylsulfinyl.

The terms "alkylsulfonyl" and "S(O)_n-alkyl" (wherein n is 2) are equivalent and, as used herein, denote an alkyl group, as defined above, attached via a sulfonyl [S(O)₂] group. The term "C₁-C₂-alkylsulfonyl" refers to a C₁-C₂-alkyl group, as defined above, attached via a sulfonyl [S(O)₂] group. The term "C₁-C₄-alkylsulfonyl" refers to a C₁-C₄-alkyl group, as defined above, attached via a sulfonyl [S(O)₂] group. The term "C₁-C₆-alkylsulfonyl" refers to a C₁-C₆-alkyl group, as defined above, attached via a sulfonyl [S(O)₂] group. C₁-C₂-alkylsulfonyl is methylsulfonyl or ethylsulfonyl. C₁-C₄-alkylsulfonyl is additionally, for example, n-propylsulfonyl, 1-methylethylsulfonyl (isopropylsulfonyl), butylsulfonyl, 1-methylpropylsulfonyl (sec-butylsulfonyl), 2-methylpropylsulfonyl (isobutylsulfonyl) or 1,1-dimethylethylsulfonyl (tert-butylsulfonyl). C₁-C₆-alkylsulfonyl is additionally, for example, pentylsulfonyl, 1-methylbutylsulfonyl, 2-methylbutylsulfonyl, 3-methylbutylsulfonyl, 1,1-dimethylpropylsulfonyl, 1,2-dimethylpropylsulfonyl, 2,2-dimethylpropylsulfonyl, 1-ethylpropylsulfonyl, hexylsulfonyl, 1-methylpentylsulfonyl, 2-methylpentylsulfonyl, 3-methylpentylsulfonyl, 4-methylpentylsulfonyl, 1,1-dimethylbutylsulfonyl, 1,2-dimethylbutylsulfonyl, 1,3-dimethylbutylsulfonyl, 2,2-dimethylbutylsulfonyl, 2,3-dimethylbutylsulfonyl, 3,3-dimethylbutylsulfonyl, 1-ethylbutylsulfonyl, 2-ethylbutylsulfonyl, 1,1,2-trimethylpropylsulfonyl, 1,2,2-trimethylpropylsulfonyl, 1-ethyl-1-methylpropylsulfonyl or 1-ethyl-2-methylpropylsulfonyl.

The suffix „-carbonyl“ in a group denotes in each case that the group is bound to the remainder

of the molecule via a carbonyl C=O group. This is the case e.g. in alkylcarbonyl, haloalkylcarbonyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, alkoxycarbonyl, haloalkoxycarbonyl.

The term "aryl" as used herein refers to a mono-, bi- or tricyclic aromatic hydrocarbon radical such as phenyl or naphthyl, in particular phenyl.

The term "het(ero)aryl" as used herein refers to a mono-, bi- or tricyclic heteroaromatic hydrocarbon radical, preferably to a monocyclic heteroaromatic radical, such as pyridyl, pyrimidyl and the like.

A saturated, partially unsaturated or unsaturated 3- to 8-membered ring system which contains 1 to 4 heteroatoms selected from oxygen, nitrogen, sulfur, is a ring system wherein two oxygen atoms must not be in adjacent positions and wherein at least 1 carbon atom must be in the ring system e.g. thiophene, furan, pyrrole, thiazole, oxazole, imidazole, isothiazole, isoxazole, pyrazole, 1,3,4-oxadiazole, 1,3,4-thiadiazole, 1,3,4-triazole, 1,2,4-oxadiazole, 1,2,4-thiadiazole, 1,2,4-triazole, 1,2,3-triazole, 1,2,3,4-tetrazole, benzo[b]thiophene, benzo[b]furan, indole, benzo[c]thiophene, benzo[c]furan, isoindole, benzoxazole, benzthiazole, benzimidazole, benzisoxazole, benzisothiazole, benzopyrazole, benzothiadiazole, benztriazole, dibenzofuran, dibenzothienophene, carbazole, pyridine, pyrazine, pyrimidine, pyridazine, 1,3,5-triazine, 1,2,4-triazine, 1,2,4,5-tetrazine, quinoline, isoquinoline, quinoxaline, quinazoline, cinnoline, 1,8-naphthyridine, 1,5-naphthyridine, 1,6-naphthyridine, 1,7-naphthyridine, phthalazine, pyridopyrimidine, purine, pteridine, 4H-quinolizine, piperidine, pyrrolidine, oxazoline, tetrahydrofuran, tetrahydropyran, isoxazolidine or thiazolidine, oxirane or oxetane.

A saturated, partially unsaturated or unsaturated 3- to 8-membered ring system which contains 1 to 4 heteroatoms selected from oxygen, nitrogen, sulfur also is e.g.

a saturated, partially unsaturated or unsaturated 5- or 6-membered heterocycle which contains 1 to 4 heteroatoms selected from oxygen, nitrogen and sulfur, such as pyridine, pyrimidine, (1,2,4)-oxadiazole, (1,3,4)-oxadiazole, pyrrole, furan, thiophene, oxazole, thiazole, imidazole, pyrazole, isoxazole, 1,2,4-triazole, tetrazole, pyrazine, pyridazine, oxazoline, thiazoline, tetrahydrofuran, tetrahydropyran, morpholine, piperidine, piperazine, pyrroline, pyrrolidine, oxazolidine, thiazolidine; or

a saturated, partially unsaturated or unsaturated 5- or 6-membered heterocycle which contains 1 nitrogen atom and 0 to 2 further heteroatoms selected from oxygen, nitrogen and sulfur, preferably from oxygen and nitrogen, such as piperidine, piperazine and morpholine.

Preferably, this ring system is a saturated, partially unsaturated or unsaturated 3- to 6-membered ring system which contains 1 to 4 heteroatoms selected from oxygen, nitrogen, sulfur, wherein two oxygen atoms must not be in adjacent positions and wherein at least 1 carbon atom must be in the ring system.

Most preferably, this ring system is a radical of pyridine, pyrimidine, (1,2,4)-oxadiazole, 1,3,4-oxadiazole, pyrrole, furan, thiophene, oxazole, thiazole, imidazole, pyrazole, isoxazole, 1,2,4-triazole, tetrazole, pyrazine, pyridazine, oxazoline, thiazoline, tetrahydrofuran, tetrahydropyran, morpholine, piperidine, piperazine, pyrroline, pyrrolidine, oxazolidine, thiazolidine, oxirane or oxetane.

The compounds of formula (I) can be prepared according to standard methods of organic chemistry, or by the processes as described in WO2013/024007, WO2013/024008, WO2013/076092,

and the unpublished applications PCT/EP2014/056164, EP13173044.2, PCT/EP2014/060082, and EP14166089.4 d, without being limited to the routes given therein.

The preparation of the compounds of formula I above may lead to them being obtained as isomer mixtures. If desired, these can be resolved by the methods customary for this purpose, such as crystallization or chromatography, also on optically active adsorbate, to give the pure isomers.

Agronomically acceptable salts of the compounds I can be formed in a customary manner, e.g. by reaction with an acid of the anion in question.

10 Preferences

The remarks made below as to preferred embodiments of the variables (substituents) of the compounds of formulae (I) are valid on their own as well as preferably in combination with each other, as well as in combination with the stereoisomers, tautomers, N-oxides or salts thereof, and, where applicable, as well as concerning the uses and methods according to the invention and the compositions according to the invention.

Preferred are methods and uses of compounds of formula (I), wherein the compound of formula (I) is as preferred in the following embodiments.

In one embodiment of the, R^1 is selected from the group consisting of Cl, Br and CN.

20 In a further embodiment, R^1 is Cl.

In a further embodiment, R^1 is CN.

In one embodiment, R^2 is selected from the group consisting of Cl, Br and CH_3 (Me).

In a further embodiment, R^2 is Cl.

In a further embodiment, R^2 is CH_3 .

25 In one embodiment, the invention relates to methods and uses, in which in the compound of formula I

R^1 is selected from the group consisting of Br, Cl, CN, preferably Cl;

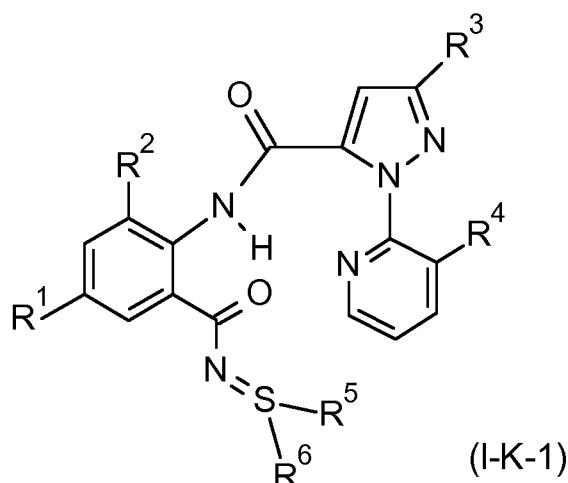
R^2 is selected from the group consisting of Cl, CH_3 ; preferably CH_3 .

In a preferred embodiment, R^1 is Cl, and R^2 is CH_3 .

30 In a further embodiment, R^1 is Cl, and R^2 is Cl.

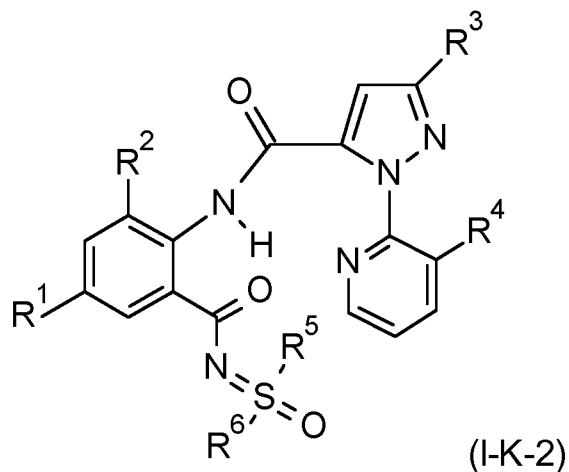
In a further embodiment, R^1 is CN, and R^2 is CH_3 .

In one embodiment, k is 0 in the compounds of formula (I):



wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 are as defined herein.

In one embodiment, k is 1 in the compounds of formula (I):



wherein R¹, R², R³, R⁴, R⁵, R⁶ are as defined herein.

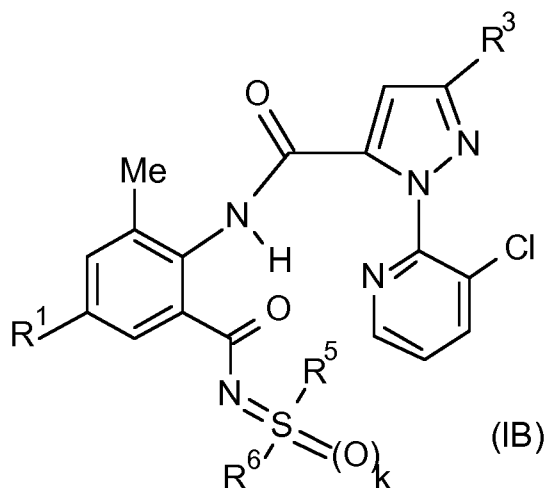
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In one embodiment, the invention relates to methods and uses, in which in the compound of formula I

R³ is CF₃ or Br, preferably CF₃.

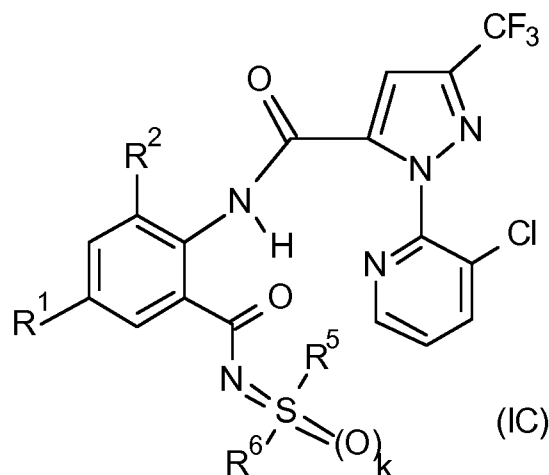
R⁴ is Cl.

10 Preferred are methods and uses of compounds of formula (I), in which the compound of formula I is a compound of formula IB:



wherein the variables R¹, R³, R⁵, R⁶ and k are as defined herein.

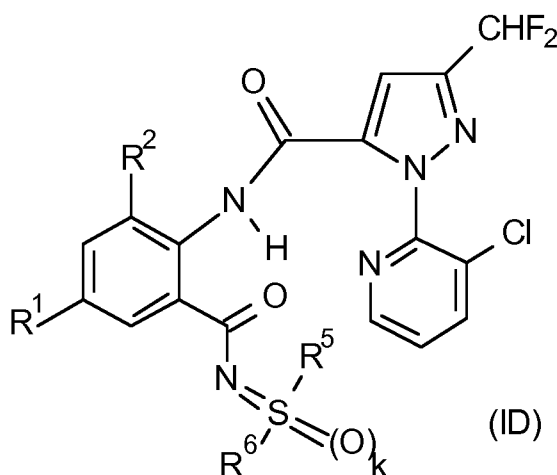
15 Preferred are methods and uses of compounds of formula (I), in which the compound of formula I is a compound of formula IC:



wherein the variables R^1 , R^2 , R^5 , R^6 and k are as defined herein.

Preferred are methods and uses of compounds of formula (I), in which the compound of formula

5 I is a compound of formula ID:



wherein the variables R^1 , R^2 , R^5 , R^6 and k are as defined herein.

In one embodiment, the invention relates to methods and uses, in which in the compound of

10 formula I

R^1 is selected from the group consisting of Br, Cl, CN, preferably Cl;

R^2 is selected from the group consisting of Cl, CH_3 ; preferably CH_3 ;

R^3 is CF_3 or Br, preferably CF_3 ;

R^4 is Cl.

15

In a preferred embodiment, the invention relates to methods and uses of compounds of formula (I), in which R^5 and R^6 are selected independently of one another from the group consisting of hydrogen, C_1 - C_4 -alkyl and C_3 - C_8 -cycloalkyl.

In a further preferred embodiment, the invention relates to methods and uses of compounds of

20

formula (I), in which R^5 and R^6 are selected from C_1 - C_4 -alkyl, preferably selected from methyl, ethyl, isopropyl, n-propyl, n-butyl, isobutyl, tert-butyl, cyclopropyl, cyclopropylmethyl, preferably

selected from methyl, ethyl, n-propyl, isopropyl, n-butyl, more preferably methyl, ethyl, isopropyl, most preferably ethyl.

In an analogously preferred embodiment, the invention relates to methods and uses of compounds of formula (IB), in which R⁵ and R⁶ are selected from methyl, ethyl, isopropyl, n-propyl, n-butyl, isobutyl, tert-butyl, cyclopropyl, cyclopropylmethyl, preferably methyl, ethyl, isopropyl, most preferably ethyl.

In an analogously preferred embodiment, the invention relates to methods and uses of compounds of formula (IC), in which R⁵ and R⁶ are selected from methyl, ethyl, isopropyl, n-propyl, n-butyl, isobutyl, tert-butyl, cyclopropyl, cyclopropylmethyl, preferably methyl, ethyl, isopropyl, most preferably ethyl.

In an analogously preferred embodiment, the invention relates to methods and uses of compounds of formula (ID), in which R⁵ and R⁶ are selected from methyl, ethyl, isopropyl, n-propyl, n-butyl, isobutyl, tert-butyl, cyclopropyl, cyclopropylmethyl, preferably methyl, ethyl, isopropyl, most preferably ethyl.

In another embodiment, R⁵ and R⁶ together represent a C₂-C₇-alkylene, C₂-C₇-alkenylene or C₆-C₉-alkynylene chain forming together with the sulfur atom to which they are attached a 3-, 4-, 5-, 6-, 7-, 8-, 9- or 10-membered saturated, partially unsaturated or fully unsaturated ring.

In a preferred embodiment, R⁵ and R⁶ are identical, and preferably selected from methyl, ethyl, and isopropyl.

A group of especially preferred compounds of formula I in the methods and uses according to the invention are compounds I-1 to I-82 of formula IA which are listed in the table A.

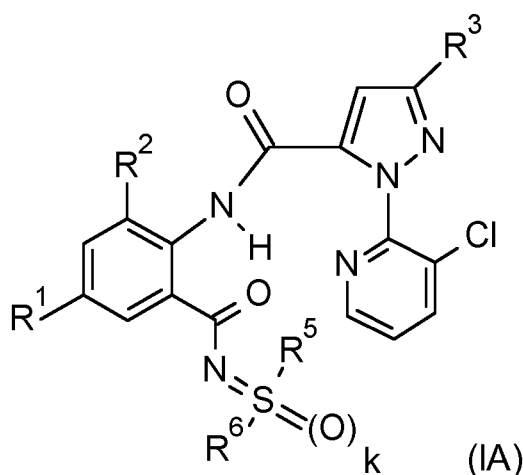


Table A

	R ¹	R ²	R ³	R ⁵	R ⁶	k		R ¹	R ²	R ³	R ⁵	R ⁶	k
I-1	Cl	CH ₃	CF ₃	CH ₃	CH ₃	0	I-10	Cl	Cl	CN	CH ₃	CH ₃	0
I-2	Cl	CH ₃	CHF ₂	CH ₃	CH ₃	0	I-11	Cl	CH ₃	CF ₃	C ₂ H ₅	C ₂ H ₅	0
I-3	Cl	CH ₃	Br	CH ₃	CH ₃	0	I-12	Cl	CH ₃	CHF ₂	C ₂ H ₅	C ₂ H ₅	0
I-4	Cl	CH ₃	Cl	CH ₃	CH ₃	0	I-13	Cl	CH ₃	Br	C ₂ H ₅	C ₂ H ₅	0
I-5	Cl	CH ₃	CN	CH ₃	CH ₃	0	I-14	Cl	CH ₃	Cl	C ₂ H ₅	C ₂ H ₅	0
I-6	Cl	Cl	CF ₃	CH ₃	CH ₃	0	I-15	Cl	CH ₃	CN	C ₂ H ₅	C ₂ H ₅	0
I-7	Cl	Cl	CHF ₂	CH ₃	CH ₃	0	I-16	Cl	Cl	CF ₃	C ₂ H ₅	C ₂ H ₅	0
I-8	Cl	Cl	Br	CH ₃	CH ₃	0	I-17	Cl	Cl	CHF ₂	C ₂ H ₅	C ₂ H ₅	0
I-9	Cl	Cl	Cl	CH ₃	CH ₃	0	I-18	Cl	Cl	Br	C ₂ H ₅	C ₂ H ₅	0

	R ¹	R ²	R ³	R ⁵	R ⁶	k
I-19	Cl	Cl	Cl	C ₂ H ₅	C ₂ H ₅	0
I-20	Cl	Cl	CN	C ₂ H ₅	C ₂ H ₅	0
I-21	Cl	CH ₃	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-22	Cl	CH ₃	CHF ₂	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-23	Cl	CH ₃	Br	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-24	Cl	CH ₃	Cl	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-25	Cl	CH ₃	CN	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-26	Cl	Cl	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-27	Cl	Cl	CHF ₂	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-28	Cl	Cl	Br	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-29	Cl	Cl	Cl	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-30	Cl	Cl	CN	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-31	Br	Br	CF ₃	C ₂ H ₅	C ₂ H ₅	0
I-32	Br	Br	CHF ₂	C ₂ H ₅	C ₂ H ₅	0
I-33	Br	Br	Br	C ₂ H ₅	C ₂ H ₅	0
I-34	Br	Br	Cl	C ₂ H ₅	C ₂ H ₅	0
I-35	Br	Br	CN	C ₂ H ₅	C ₂ H ₅	0
I-36	Br	Br	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-37	Br	Br	CHF ₂	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-38	Br	Br	Br	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-39	Br	Br	Cl	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-40	Br	Br	CN	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-41	CN	Cl	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-42	Cl	CH ₃	CF ₃	CH ₃	CH ₃	1
I-43	Cl	CH ₃	CHF ₂	CH ₃	CH ₃	1
I-44	Cl	CH ₃	Br	CH ₃	CH ₃	1
I-45	Cl	CH ₃	Cl	CH ₃	CH ₃	1
I-46	Cl	CH ₃	CN	CH ₃	CH ₃	1
I-47	Cl	Cl	CF ₃	CH ₃	CH ₃	1
I-48	Cl	Cl	CHF ₂	CH ₃	CH ₃	1
I-49	Cl	Cl	Br	CH ₃	CH ₃	1
I-50	Cl	Cl	Cl	CH ₃	CH ₃	1

	R ¹	R ²	R ³	R ⁵	R ⁶	k
I-51	Cl	Cl	CN	CH ₃	CH ₃	1
I-52	Cl	CH ₃	CF ₃	C ₂ H ₅	C ₂ H ₅	1
I-53	Cl	CH ₃	CHF ₂	C ₂ H ₅	C ₂ H ₅	1
I-54	Cl	CH ₃	Br	C ₂ H ₅	C ₂ H ₅	1
I-55	Cl	CH ₃	Cl	C ₂ H ₅	C ₂ H ₅	1
I-56	Cl	CH ₃	CN	C ₂ H ₅	C ₂ H ₅	1
I-57	Cl	Cl	CF ₃	C ₂ H ₅	C ₂ H ₅	1
I-58	Cl	Cl	CHF ₂	C ₂ H ₅	C ₂ H ₅	1
I-59	Cl	Cl	Br	C ₂ H ₅	C ₂ H ₅	1
I-60	Cl	Cl	Cl	C ₂ H ₅	C ₂ H ₅	1
I-61	Cl	Cl	CN	C ₂ H ₅	C ₂ H ₅	1
I-62	Cl	CH ₃	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-63	Cl	CH ₃	CHF ₂	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-64	Cl	CH ₃	Br	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-65	Cl	CH ₃	Cl	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-66	Cl	CH ₃	CN	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-67	Cl	Cl	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-68	Cl	Cl	CHF ₂	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-69	Cl	Cl	Br	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-70	Cl	Cl	Cl	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-71	Cl	Cl	CN	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-72	Br	Br	CF ₃	C ₂ H ₅	C ₂ H ₅	1
I-73	Br	Br	CHF ₂	C ₂ H ₅	C ₂ H ₅	1
I-74	Br	Br	Br	C ₂ H ₅	C ₂ H ₅	1
I-75	Br	Br	Cl	C ₂ H ₅	C ₂ H ₅	1
I-76	Br	Br	CN	C ₂ H ₅	C ₂ H ₅	1
I-77	Br	Br	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-78	Br	Br	CHF ₂	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-79	Br	Br	Br	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-80	Br	Br	Cl	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-81	Br	Br	CN	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-82	CN	Cl	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	1

In one embodiment, a compound selected from compounds I-11, I-16, I-21, I-26, I-31 as in Table A' is the compound I in the methods and uses according to the invention.

In a further embodiment, a compound selected from compounds I-52, I-57, I-62, I-67, I-72 as in

5 Table A'' is the compound I in the methods and uses according to the invention.

Table A'

	R ¹	R ²	R ³	R ⁵	R ⁶	k
I-11	Cl	CH ₃	CF ₃	C ₂ H ₅	C ₂ H ₅	0
I-16	Cl	Cl	CF ₃	C ₂ H ₅	C ₂ H ₅	0

	R ¹	R ²	R ³	R ⁵	R ⁶	k
I-21	Cl	CH ₃	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-26	Cl	Cl	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-31	Br	Br	CF ₃	C ₂ H ₅	C ₂ H ₅	0

Table A''

	R ¹	R ²	R ³	R ⁵	R ⁶	k
I-52	Cl	CH ₃	CF ₃	C ₂ H ₅	C ₂ H ₅	1
I-57	Cl	Cl	CF ₃	C ₂ H ₅	C ₂ H ₅	1

	R ¹	R ²	R ³	R ⁵	R ⁶	k
I-62	Cl	CH ₃	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-67	Cl	Cl	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	1
I-72	Br	Br	CF ₃	C ₂ H ₅	C ₂ H ₅	1

In one embodiment, I-11 is the compound I in the methods and uses according to the invention.

In one embodiment, I-16 is the compound I in the methods and uses according to the invention.

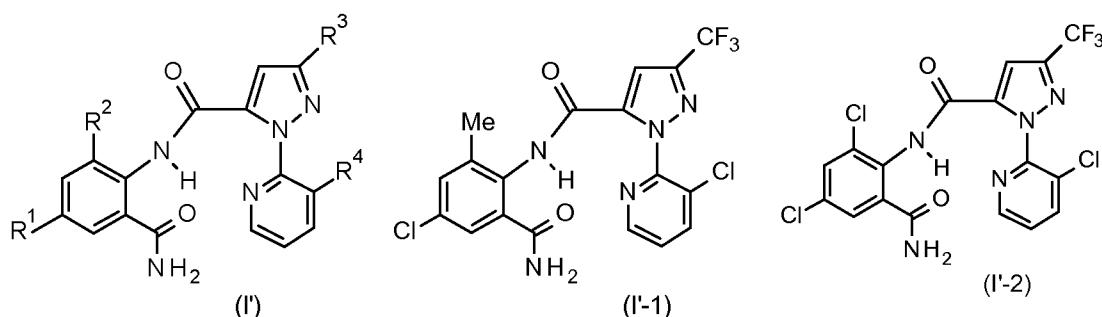
5 In one embodiment, I-21 is the compound I in the methods and uses according to the invention.

In one embodiment, I-26 is the compound I in the methods and uses according to the invention.

In one embodiment, I-31 is the compound I in the methods and uses according to the invention.

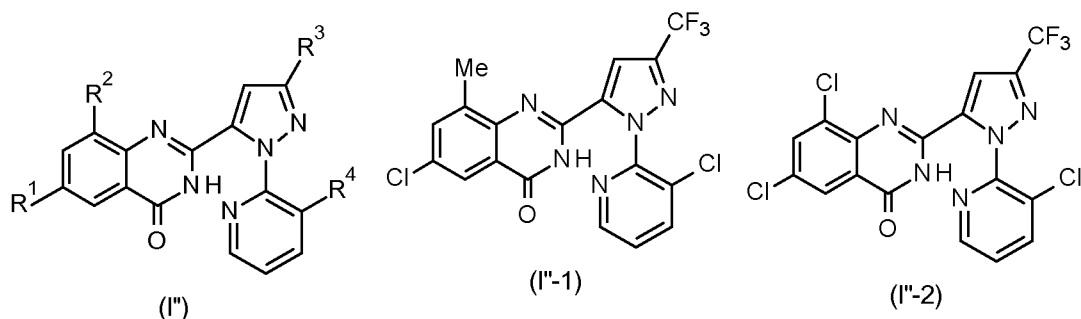
It is understood that also derivatives of the compounds of formula (I) are encompassed by the

10 present invention, e.g. methods and uses of compounds of formula I', and methods and uses of compounds of formula I''.



wherein the variables R¹, R², R³, R⁴ are as defined herein and are preferably I'-1 or I'-2.

It is understood that also quinazolinone derivatives of the compounds of formula (I) are encompassed by the present invention, e.g. methods and uses of compounds of formula I''.



wherein the variables R¹, R², R³, R⁴ are as defined herein and are preferably I''-1 or I''-2.

20 Pests

In the methods according to the invention, the compounds of formula I are especially suitable for efficiently combating animal pests such as arthropods, gastropods and nematodes including but not limited to:

insects from the order of **Lepidoptera**, for example *Achroia grisella*, *Acleris* spp. such as *A. fimbriana*, *A. gloverana*, *A. variana*; *Acrolepiopsis assectella*, *Acronicta major*, *Adoxophyes* spp. such as *A. cyrtosema*, *A. orana*; *Aedia leucomelas*, *Agrotis* spp. such as *A. exclamationis*, *A. fucosa*, *A. ipsilon*, *A. orthogoma*, *A. segetum*, *A. subterranea*; *Alabama argillacea*, *Aleurodicus*

dispersus, *Alsophila pometaria*, *Ampelophaga rubiginosa*, *Amyelois transitella*, *Anacampsis sarcitella*, *Anagasta kuehniella*, *Anarsia lineatella*, *Anisota senatoria*, *Antheraea pernyi*, *Anticarsia* (= *Thermesia*) spp. such as *A. gemmatalis*; *Apamea* spp., *Aproaerema modicella*, *Archips* spp. such as *A. argyrospila*, *A. fuscocupreanus*, *A. rosana*, *A. xyloseanus*; *Argyresthia conjugella*, *Argyroplote* spp., *Argyrotaenia* spp. such as *A. velutinana*; *Athetis mindara*, *Austroasca viridigrisea*, *Autographa gamma*, *Autographa nigrisigna*, *Barathra brassicae*, *Bedellia* spp., *Bonagota salubricola*, *Borbo cinnara*, *Bucculatrix thurberiella*, *Bupalus piniarius*, *Busseola* spp., *Cacoecia* spp. such as *C. murinana*, *C. podana*; *Cactoblastis cactorum*, *Cadra cautella*, *Calingo braziliensis*, *Caloptilis theivora*, *Capua reticulana*, *Carposina* spp. such as *C. niponensis*, *C. sasakii*; *Cephus* spp., *Chaetocnema aridula*, *Cheimatobia brumata*, *Chilo* spp. such as *C. Indicus*, *C. suppressalis*, *C. partellus*; *Choreutis pariana*, *Choristoneura* spp. such as *C. conflictana*, *C. fumiferana*, *C. longicellana*, *C. murinana*, *C. occidentalis*, *C. rosaceana*; *Chrysodeixis* (= *Pseudoplusia*) spp. such as *C. eriosoma*, *C. includens*; *Cirphis unipuncta*, *Clysia ambiguella*, *Cnaphalocerus* spp., *Cnaphalocrocis medinalis*, *Cnephasia* spp., *Cochylis hospes*, *Coleophora* spp., *Colias eurytheme*, *Conopomorpha* spp., *Conotrachelus* spp., *Copitarsia* spp., *Corcyra cephalonica*, *Crambus caliginosellus*, *Crambus teterrellus*, *Crociosema* (= *Epinotia*) *aporema*, *Cydalima* (= *Diaphania*) *perspectalis*, *Cydia* (= *Carpocapsa*) spp. such as *C. pomonella*, *C. latiferreana*; *Dalaca noctuides*, *Datana integerrima*, *Dasychira pinicola*, *Dendrolimus* spp. such as *D. pini*, *D. spectabilis*, *D. sibiricus*; *Desmia funeralis*, *Diaphania* spp. such as *D. nitidalis*, *D. hyalinata*; *Diatraea grandiosella*, *Diatraea saccharalis*, *Diphthera festiva*, *Earias* spp. such as *E. insulana*, *E. vittella*; *Ecdytolopha aurantianu*, *Egira* (= *Xylomyges*) *curialis*, *Elasmopalpus lignosellus*, *Eldana saccharina*, *Endopiza viteana*, *Ennomos subsignaria*, *Eoreuma loftini*, *Ephestia* spp. such as *E. cautella*, *E. elutella*, *E. kuehniella*; *Epinotia aporema*, *Epiphyas postvittana*, *Erannis tiliaria*, *Erionota thrax*, *Etiella* spp., *Eulia* spp., *Eupoecilia ambiguella*, *Euproctis chrysorrhoea*, *Euxoa* spp., *Evetria bouliana*, *Faronta albilinea*, *Feltia* spp. such as *F. subterranean*; *Galleria mellonella*, *Gracillaria* spp., *Grapholita* spp. such as *G. funebrana*, *G. molesta*, *G. inopinata*; *Halysidota* spp., *Harrisina americana*, *Hedylepta* spp., *Helicoverpa* spp. such as *H. armigera* (= *Heliothis armigera*), *H. zea* (= *Heliothis zea*); *Heliothis* spp. such as *H. assulta*, *H. subflexa*, *H. virescens*; *Hellula* spp. such as *H. undalis*, *H. rogatalis*; *Helocoverpa gelatopoeon*, *Hemileuca oliviae*, *Herpetogramma licarsisalis*, *Hibernia defoliaria*, *Hofmannophila pseudospretella*, *Homoeosoma electellum*, *Homona magnanima*, *Hypena scabra*, *Hyphantria cunea*, *Hyponomeuta padella*, *Hyponomeuta malinellus*, *Kakivoria flavofasciata*, *Keiferia lycopersicella*, *Lambdina fiscellaria fiscellaria*, *Lambdina fiscellaria lugubrosa*, *Lamprosema indicata*, *Laspeyresia molesta*, *Leguminivora glycinivorella*, *Lerodea eufala*, *Leucinodes orbonalis*, *Leucoma salicis*, *Leucoptera* spp. such as *L. coffeella*, *L. scitella*; *Leuminivora lycinivorella*, *Lithocolletis blancardella*, *Lithophane antennata*, *Llattia octo* (= *Amyna axis*), *Lobesia botrana*, *Lophocampa* spp., *Loxagrotis albicosta*, *Loxostege* spp. such as *L. sticticalis*, *L. cerealis*; *Lymantria* spp. such as *L. dispar*, *L. monacha*; *Lyonetia clerkella*, *Lyonetia prunifoliella*, *Malacosoma* spp. such as *M. americanum*, *M. californicum*, *M. constrictum*, *M. neustria*; *Mamestra* spp. such as *M. brassicae*, *M. configurata*; *Mamstra brassicae*, *Manduca* spp. such as *M. quinquemaculata*, *M. sexta*; *Marasmia* spp., *Marmara* spp., *Maruca testulalis*, *Megalopyge lanata*, *Melanchra picta*, *Melanitis leda*, *Mocis* spp. such as *M. lapites*, *M. repanda*; *Mocis latipes*, *Monochroa fragariae*, *Mythimna separata*, *Nemapogon cloacella*, *Neoleucinodes elegantalis*,

- Nepytia* spp., *Nymphula* spp., *Oiketicus* spp., *Omiodes indicata*, *Omphis anastomosalis*, *Operophtera brumata*, *Orgyia pseudotsugata*, *Oria* spp., *Orthaga thyrisalis*, *Ostrinia* spp. such as *O. nubilalis*; *Oulema oryzae*, *Paleacrita vernata*, *Panolis flammea*, *Parnara* spp., *Papaipema nebris*, *Papilio cresphontes*, *Paramyelois transitella*, *Paranthrene regalis*, *Paysandisia archon*,
5 *Pectinophora* spp. such as *P. gossypiella*; *Peridroma saucia*, *Perileucoptera* spp., such as *P. coffeella*; *Phalera bucephala*, *Phryganidia californica*, *Phthorimaea* spp. such as *P. operculella*; *Phyllocnistis citrella*, *Phyllonorycter* spp. such as *P. blancardella*, *P. crataegella*, *P. issikii*, *P. ringoniella*; *Pieris* spp. such as *P. brassicae*, *P. rapae*, *P. napi*; *Pilocrocis tripunctata*, *Plathypena scabra*, *Platynota* spp. such as *P. flavedana*, *P. idaeusalis*, *P. stultana*; *Platyptilia carduidactyla*, *Plebejus argus*, *Plodia interpunctella*, *Plusia* spp., *Plutella maculipennis*, *Plutella xylostella*, *Pontia protodica*, *Prays* spp., *Prodenia* spp., *Proxenus lepigone*, *Pseudaletia* spp. such
10 as *P. sequax*, *P. unipuncta*; *Pyrausta nubilalis*, *Rachiplusia nu*, *Richia albicosta*, *Rhizobius ventralis*, *Rhyacionia frustrana*, *Sabulodes aegrotata*, *Schizura concinna*, *Schoenobius* spp., *Schreckensteinia festaliella*, *Scirpophaga* spp. such as *S. incertulas*, *S. innotata*; *Scotia segetum*, *Sesamia* spp. such as *S. inferens*, *Seudyra subflava*, *Sitotroga cerealella*, *Sparganothis pilleriana*, *Spilonota lechriaspis*, *S. ocellana*, *Spodoptera* (=Lamphygma) spp. such as *S. eridania*, *S. exigua*, *S. frugiperda*, *S. latifascia*, *S. littoralis*, *S. litura*, *S. omithogalli*; *Stigmella* spp., *Stomopteryx subsecivella*, *Strymon bazochii*, *Sylepta derogata*, *Synanthedon* spp. such as
15 *S. exitiosa*, *Tecia solanivora*, *Telehin licus*, *Thaumatopoea pityocampa*, *Thaumatotibia* (=Cryptophlebia) *leucotreta*, *Thaumatopoea pityocampa*, *Thecla* spp., *Theresimima ampelophaga*, *Thyrintina* spp., *Tildenia inconspicua*, *Tinea* spp. such as *T. cloacella*, *T. pelionella*; *Tineola bisselliella*, *Tortrix* spp. such as *T. viridana*; *Trichophaga tapetzella*, *Trichoplusia* spp. such as *T. ni*; *Tuta* (=Scrobipalpula) *absoluta*, *Udea* spp. such as *U. rubigalis*, *U. rubigalis*; *Virachola* spp., *Yponomeuta padella*, and *Zeiraphera canadensis*;
20 insects from the order of **Coleoptera**, for example *Acalymma vittatum*, *Acanthoscehdes obtectus*, *Adoretus* spp., *Agelastica alni*, *Agrilus* spp. such as *A. anxius*, *A. planipennis*, *A. sinuatus*; *Agriotes* spp. such as *A. fuscicollis*, *A. lineatus*, *A. obscurus*; *Alphitobius diaperinus*, *Amphimallus solstitialis*, *Anisandrus dispar*, *Anisoplia austriaca*, *Anobium punctatum*, *Anomala corpulenta*, *Anomala rufocuprea*, *Anoplophora* spp. such as *A. glabripennis*; *Anthonomus* spp. such as
30 *A. eugenii*, *A. grandis*, *A. pomorum*; *Anthrenus* spp., *Aphthona euphoridae*, *Apion* spp., *Apogonia* spp., *Athous haemorrhoidalis*, *Atomaria* spp. such as *A. linearis*; *Attagenus* spp., *Aulacophora femoralis*, *Blastophagus piniperda*, *Blitophaga undata*, *Bruchidius obtectus*, *Bruchus* spp. such as *B. lentis*, *B. pisorum*, *B. rufimanus*; *Byctiscus betulae*, *Callidiellum rufipenne*, *Callopietria floridensis*, *Callosobruchus chinensis*, *Cameraria ohridella*, *Cassida nebulosa*, *Cerotoma trifurcata*, *Cetonia aurata*, *Ceuthorhynchus* spp. such as *C. assimilis*, *C. napi*; *Chaetocnema tibialis*, *Cleonus mendicus*, *Conoderus* spp. such as *C. vespertinus*; *Conotrachelus nenuphar*, *Cosmopolites* spp., *Costelytra zealandica*, *Crioceris asparagi*, *Cryptolestes ferrugineus*, *Cryptorhynchus lapathi*, *Ctenicera* spp. such as *C. destructor*; *Curculio* spp., *Cylindrocopturus* spp.,
35 *Cyclocephala* spp., *Dactylispa balyi*, *Dectes texanus*, *Dermestes* spp., *Diabrotica* spp. such as
40 *D. undecimpunctata*, *D. speciosa*, *D. longicornis*, *D. semipunctata*, *D. virgifera*; *Diaprepes abbreviatus*, *Dichocrocis* spp., *Diadraspa armigera*, *Diloboderus abderus*, *Diocalandra frumenti* (*Diocalandra stigmaticollis*), *Enaphalodes rufulus*, *Epilachna* spp. such as *E. varivestis*, *E. vigintioctomaculata*; *Epitrix* spp. such as *E. hirtipennis*, *E. similis*; *Eutheola humilis*, *Eu-*

- tinobothrus brasiliensis*, *Faustinus cubae*, *Gibbium psylloides*, *Gnathocerus cornutus*, *Hellula undalis*, *Heteronychus arator*, *Hylamorphia elegans*, *Hylobius abietis*, *Hylotrupes bajulus*, *Hypopora* spp. such as *H. brunneipennis*, *H. postica*; *Hypomeces squamosus*, *Hypothenemus* spp., *Ips typographus*, *Lachnosterna consanguinea*, *Lasioderma serricorne*, *Latheticus oryzae*, *Lathridius* spp., *Lema* spp. such as *L. bilineata*, *L. melanopus*; *Leptinotarsa* spp. such as *L. decemlineata*; *Leptispa pygmaea*, *Limonius californicus*, *Lissorhoptrus oryzophilus*, *Lixus* spp., *Luperodes* spp., *Lyctus* spp. such as *L. bruneus*; *Liogenys fuscus*, *Macroductylus* spp. such as *M. subspinosus*; *Maladera matrida*, *Megaplatypus mutates*, *Megascelis* spp., *Melanotus communis*, *Meligethes* spp. such as *M. aeneus*; *Melolontha* spp. such as *M. hippocastani*, *M. melolontha*; *Metamasius hemipterus*, *Microtheca* spp., *Migdolus* spp. such as *M. fryanus*, *Monochamus* spp. such as *M. alternatus*; *Naupactus xanthographus*, *Niptus hololeucus*, *Oberia brevis*, *Oemona hirta*, *Oryctes rhinoceros*, *Oryzaephilus surinamensis*, *Oryzaphagus oryzae*, *Otiorrhynchus sulcatus*, *Otiorrhynchus ovatus*, *Otiorrhynchus sulcatus*, *Oulema melanopus*, *Oulema oryzae*, *Oxycetonia jucunda*, *Phaedon* spp. such as *P. brassicae*, *P. cochleariae*; *Phoracantha recurva*, *Phyllobius pyri*, *Phyllopertha horticola*, *Phyllophaga* spp. such as *P. helleri*; *Phyllotreta* spp. such as *P. chrysocephala*, *P. nemorum*, *P. striolata*, *P. vittula*; *Phyllopertha horticola*, *Popillia japonica*, *Premnotypes* spp., *Psacotha hilaris*, *Psylliodes chrysocephala*, *Prostephanus truncates*, *Psylliodes* spp., *Ptinus* spp., *Pulga saltona*, *Rhizopertha dominica*, *Rhynchophorus* spp. such as *R. billineatus*, *R. ferrugineus*, *R. palmarum*, *R. phoenicis*, *R. vulneratus*; *Saperda candida*, *Scolytus schevyrewi*, *Scyphophorus acupunctatus*, *Sitona lineatus*, *Sitophilus* spp. such as *S. granaria*, *S. oryzae*, *S. zeamais*; *Sphenophorus* spp. such as *S. levis*; *Stegobium paniceum*, *Sternechus* spp. such as *S. subsignatus*; *Strophomorphus ctenotus*, *Symphyletes* spp., *Tanymecus* spp., *Tenebrio molitor*, *Tenebrioides mauretanicus*, *Tribolium* spp. such as *T. castaneum*; *Trogoderma* spp., *Tychius* spp., *Xylotrechus* spp. such as *X. pyrrhoderus*; and, *Zabrus* spp. such as *Z. tenebrioides*;
- insects from the order of **Diptera** for example *Aedes* spp. such as *A. aegypti*, *A. albopictus*, *A. vexans*; *Anastrepha ludens*, *Anopheles* spp. such as *A. albimanus*, *A. crucians*, *A. freeborni*, *A. gambiae*, *A. leucosphyrus*, *A. maculipennis*, *A. minimus*, *A. quadrimaculatus*, *A. sinensis*; *Bactrocera invadens*, *Bibio hortulanus*, *Calliphora erythrocephala*, *Calliphora vicina*, *Ceratitis capitata*, *Chrysomyia* spp. such as *C. bezziana*, *C. hominivorax*, *C. macellaria*; *Chrysops atlanticus*, *Chrysops discalis*, *Chrysops silacea*, *Cochliomyia* spp. such as *C. hominivorax*; *Contarinia* spp. such as *C. sorghicola*; *Cordylobia anthropophaga*, *Culex* spp. such as *C. nigripalpus*, *C. pipiens*, *C. quinquefasciatus*, *C. tarsalis*, *C. tritaeniorhynchus*; *Culicoides furens*, *Culiseta inornata*, *Culiseta melanura*, *Cuterebra* spp., *Dacus cucurbitae*, *Dacus oleae*, *Dasineura brassicae*, *Dasineura oxycoccana*, *Delia* spp. such as *D. antique*, *D. coarctata*, *D. platura*, *D. radicum*; *Dermatobia hominis*, *Drosophila* spp. such as *D. suzukii*, *Fannia* spp. such as *F. canicularis*; *Gastrophilus* spp. such as *G. intestinalis*; *Geomyza tipunctata*, *Glossina* spp. such as *G. fuscipes*, *G. morsitans*, *G. palpalis*, *G. tachinoides*; *Haematobia irritans*, *Haplodiplosis equestris*, *Hippelates* spp., *Hylemyia* spp. such as *H. platura*; *Hypoderma* spp. such as *H. lineata*; *Hypobosca* spp., *Hydrellia philippina*, *Leptoconops torrens*, *Liriomyza* spp. such as *L. sativae*, *L. trifolii*; *Lucilia* spp. such as *L. caprina*, *L. cuprina*, *L. sericata*; *Lycoria pectoralis*, *Mansonina titillanus*, *Mayetiola* spp. such as *M. destructor*; *Musca* spp. such as *M. autumnalis*, *M. domestica*; *Muscina stabulans*, *Oestrus* spp. such as *O. ovis*; *Opomyza florum*, *Oscinella* spp. such as *O. frit*;

Orseolia oryzae, *Pegomya hysocyami*, *Phlebotomus argentipes*, *Phorbia* spp. such as *P. antiqua*, *P. brassicae*, *P. coarctata*; *Phytomyza gymnostoma*, *Prosimulium mixtum*, *Psila rosae*, *Psorophora columbiae*, *Psorophora discolor*, *Rhagoletis* spp. such as *R. cerasi*, *R. cingulate*, *R. indifferens*, *R. mendax*, *R. pomonella*; *Rivellia quadrifasciata*, *Sarcophaga* spp. such as *S. haemorrhoidalis*; *Simulium vittatum*, *Sitodiplosis mosellana*, *Stomoxys* spp. such as *S. calcitrans*; *Tabanus* spp. such as *T. atratus*, *T. bovinus*, *T. lineola*, *T. similis*; *Tannia* spp., *Thecodiplosis japonensis*, *Tipula oleracea*, *Tipula paludosa*, and *Wohlfahrtia* spp;

insects from the order of **Thysanoptera** for example, *Baliothrips biformis*, *Dichromothrips corbeti*, *Dichromothrips* spp., *Echinothrips americanus*, *Enneothrips flavens*, *Frankliniella* spp. such as *F. fusca*, *F. occidentalis*, *F. tritici*; *Heliothrips* spp., *Hercinothrips femoralis*, *Kakothrips* spp., *Microcephalothrips abdominalis*, *Neohydatothrips samayunkur*, *Pezothrips kellyanus*, *Rhipiphorothrips cruentatus*, *Scirtothrips* spp. such as *S. citri*, *S. dorsalis*, *S. perseae*; *Stenchaetothrips* spp, *Taeniothrips cardamoni*, *Taeniothrips inconsequens*, *Thrips* spp. such as *T. images*, *T. hawaiiensis*, *T. oryzae*, *T. palmi*, *T. parvispinus*, *T. tabaci*;

insects from the order of **Hemiptera** for example, *Acizzia jamatonica*, *Acrosternum* spp. such as *A. hilare*; *Acyrtosipon* spp. such as *A. onobrychis*, *A. pisum*; *Adelges laricis*, *Adelges tsugae*, *Adelphocoris* spp., such as *A. rapidus*, *A. superbus*; *Aeneolamia* spp., *Agonosцена* spp., *Aulacorthum solani*, *Aleurocanthus woglumi*, *Aleurodes* spp., *Aleurodicus disperses*, *Aleurolobus barodensis*, *Aleurothrixus* spp., *Amrasca* spp., *Anasa tristis*, *Antestiopsis* spp., *Anuraphis cardui*, *Aonidiella* spp., *Aphanostigma piri*, *Aphidula nasturtii*, *Aphis* spp. such as *A. craccivora*, *A. fabae*, *A. forbesi*, *A. gossypii*, *A. grossulariae*, *A. maidiradicis*, *A. pomi*, *A. sambuci*, *A. schneideri*, *A. spiraecola*; *Arboridia apicalis*, *Arilus critatus*, *Aspidiella* spp., *Aspidiotus* spp., *Atanus* spp., *Aulacaspis yasumatsui*, *Aulacorthum solani*, *Bactericera cockerelli* (*Paratrioza cockerelli*), *Bemisia* spp. such as *B. argentifolii*, *B. tabaci* (*Aleurodes tabaci*); *Blissus* spp. such as *B. leucopterus*; *Brachycaudus* spp. such as *B. cardui*, *B. helichrysi*, *B. persicae*, *B. prunicola*; *Brachycolus* spp., *Brachycorynella asparagi*, *Brevicoryne brassicae*, *Cacopsylla* spp. such as *C. fulguralis*, *C. pyricola* (*Psylla piri*); *Calligypona marginata*, *Calocoris* spp., *Campylomma livida*, *Capitophorus horni*, *Carneocephala fulgida*, *Cavelerius* spp., *Ceraplastes* spp., *Ceratovacuna lanigera*, *Ceroplastes ceriferus*, *Cerosipha gossypii*, *Chaetosiphon fragaefolii*, *Chionaspis te galensis*, *Chlorita onukii*, *Chromaphis juglandicola*, *Chrysomphalus ficus*, *Cicadulina mbila*, *Cimex* spp. such as *C. hemipterus*, *C. lectularius*; *Coccomytilus halli*, *Coccus* spp. such as *C. hesperidum*, *C. pseudomagnoliarum*; *Corythucha arcuata*, *Creontiades dilutus*, *Cryptomyzus ribis*, *Chrysomphalus aonidum*, *Cryptomyzus ribis*, *Ctenarytaina spatulata*, *Cyrtopeltis notatus*, *Dalbulus* spp., *Dasynus piperis*, *Dialeurodes* spp. such as *D. citrifolii*; *Dalbulus maidis*, *Diaphorina* spp. such as *D. citri*; *Diaspis* spp. such as *D. bromeliae*; *Dichelops furcatus*, *Diconocoris hewetti*, *Doralis* spp., *Dreyfusia nordmanniana*, *Dreyfusia piceae*, *Drosicha* spp., *Dysaphis* spp. such as *D. plantaginea*, *D. pyri*, *D. radicola*; *Dysaulacorthum pseudosolani*, *Dysdercus* spp. such as *D. cingulatus*, *D. intermedius*; *Dysmicoccus* spp., *Edessa* spp., *Geocoris* spp., *Empoasca* spp. such as *E. fabae*, *E. solana*; *Epidiaspis leperii*, *Eriosoma* spp. such as *E. lanigerum*, *E. pyricola*; *Erythroneura* spp., *Eurygaster* spp. such as *E. integriceps*; *Euscelis bilobatus*, *Euschistus* spp. such as *E. heros*, *E. impictiventris*, *E. servus*; *Fiorinia theae*, *Geococcus coffeae*, *Glycaspis brimblecombei*, *Halyomorpha* spp. such as *H. halys*; *Heliopeltis* spp., *Homalodisca vitripennis* (= *H. coagulata*), *Horcias nobilellus*, *Hyalopterus pruni*, *Hyperomyzus lactucae*,

- Icerya* spp. such as *I. purchasei*; *Idiocerus* spp., *Idioscopus* spp., *Laodelphax striatellus*, *Lecanium* spp., *Lecanoideus floccissimus*, *Lepidosaphes* spp. such as *L. ulmi*; *Leptocorisa* spp., *Lep-
toghlossus phyllopus*, *Lipaphis erysimi*, *Lygus* spp. such as *L. hesperus*, *L. lineolaris*, *L. pratensis*; *Maconellicoccus hirsutus*, *Marchalina hellenica*, *Macropes excavatus*, *Macrosiphum* spp.
5 such as *M. rosae*, *M. avenae*, *M. euphorbiae*; *Macrosteles quadrilineatus*, *Mahanarva fimbriolata*, *Megacopta cribraria*, *Megoura viciae*, *Melanaphis pyraeae*, *Melanaphis sacchari*, *Melanocallis* (= *Tinocallis*) *caryaefoliae*, *Metcalfeella* spp., *Metopolophium dirhodum*, *Monellia costalis*, *Monelliopsis pecanalis*, *Myzocallis coryli*, *Murgantia* spp., *Myzus* spp. such as *M. ascalonicus*, *M. cerasi*, *M. nicotianae*, *M. persicae*, *M. varians*; *Nasonovia ribis-nigri*, *Neotoxoptera formosana*,
10 *Neomegalotomus* spp., *Nephotettix* spp. such as *N. malayanus*, *N. nigropictus*, *N. parvus*, *N. virescens*; *Nezara* spp. such as *N. viridula*; *Nilaparvata lugens*, *Nysius huttoni*, *Oebalus* spp. such as *O. pugnax*; *Oncometopia* spp., *Orthezia praelonga*, *Oxycaraenus hyalinipennis*, *Parabemisia myricae*, *Parlatoria* spp., *Parthenolecanium* spp. such as *P. corni*, *P. persicae*; *Pemphigus* spp. such as *P. bursarius*, *P. populivenerae*; *Peregrinus maidis*, *Perkinsiella saccharicida*,
15 *Phenacoccus* spp. such as *P. aceris*, *P. gossypii*; *Phloeomyzus passerinii*, *Phorodon humuli*, *Phylloxera* spp. such as *P. devastatrix*, *Piesma quadrata*, *Piezodorus* spp. such as *P. guildinii*; *Pinnaspis aspidistrae*, *Planococcus* spp. such as *P. citri*, *P. ficus*; *Prosapia bicincta*, *Protopulvinaria pyriformis*, *Psallus seriatus*, *Pseudacysta perseae*, *Pseudaulacaspis pentagona*, *Pseudococcus* spp. such as *P. comstocki*; *Psylla* spp. such as *P. mali*; *Pteromalus* spp., *Pulvinaria amygdali*, *Pyrilla* spp., *Quadraspidotus* spp., such as *Q. perniciosus*; *Quesada gigas*, *Rastrococcus* spp., *Reduvius senilis*, *Rhizococcus americanus*, *Rhodnius* spp., *Rhopalomyzus ascalonicus*, *Rhopalosiphum* spp. such as *R. pseudobrassicarum*, *R. insertum*, *R. maidis*, *R. padi*; *Sagatodes* spp., *Sahlbergella singularis*, *Saissetia* spp., *Sappaphis mala*, *Sappaphis mali*, *Scaptocoris* spp., *Scaphoides titanus*, *Schizaphis graminum*, *Schizoneura lanuginosa*, *Scotinophora*
25 spp., *Selenaspis articulatus*, *Sitobion avenae*, *Sogata* spp., *Sogatella furcifera*, *Solubea insularis*, *Spissistilus festinus* (= *Stictocephala festina*), *Stephanitis nashi*, *Stephanitis pyrioides*, *Stephanitis takeyai*, *Tenalaphara malayensis*, *Tetraleurodes perseae*, *Therioaphis maculata*, *Thyanta* spp. such as *T. accerra*, *T. perditor*; *Tibraca* spp., *Tomaspis* spp., *Toxoptera* spp. such as *T. aurantii*; *Trialetrodes* spp. such as *T. abutilonea*, *T. ricini*, *T. vaporariorum*; *Triatoma* spp.,
30 *Trioza* spp., *Typhlocyba* spp., *Unaspis* spp. such as *U. citri*, *U. yanonensis*; and *Viteus vitifolii*,
Insects from the order **Hymenoptera** for example *Acanthomyops interjectus*, *Athalia rosae*, *Atta* spp. such as *A. capiguara*, *A. cephalotes*, *A. cephalotes*, *A. laevigata*, *A. robusta*, *A. sexdens*, *A. texana*, *Bombus* spp., *Brachymyrmex* spp., *Camponotus* spp. such as *C. floridanus*, *C. pennsylvanicus*, *C. modoc*; *Cardiocondyla nuda*, *Chalibion* sp, *Crematogaster* spp.,
35 *Dasytilla occidentalis*, *Diprion* spp., *Dolichovespula maculata*, *Dorymyrmex* spp., *Dryocosmus kuriphilus*, *Formica* spp., *Hoplocampa* spp. such as *H. minuta*, *H. testudinea*; *Iridomyrmex humilis*, *Lasius* spp. such as *L. niger*, *Linepithema humile*, *Liometopum* spp., *Leptocybe invasa*, *Monomorium* spp. such as *M. pharaonis*, *Monomorium*, *Nylandria fulva*, *Pachycondyla chinensis*, *Paratrechina longicornis*, *Paravespula* spp., such as *P. germanica*, *P. pennsylvanica*, *P. vulgaris*; *Pheidole* spp. such as *P. megacephala*; *Pogonomyrmex* spp. such as *P. barbatus*, *P. californicus*, *Polistes rubiginosa*, *Prenolepis imparis*, *Pseudomyrmex gracilis*, *Scheliopron* spp.,
40 *Sirex cyaneus*, *Solenopsis* spp. such as *S. geminata*, *S. invicta*, *S. molesta*, *S. richteri*, *S. xyloni*, *Sphecius speciosus*, *Sphex* spp., *Tapinoma* spp. such as *T. melanocephalum*, *T. sessile*;

Tetramorium spp. such as *T. caespitum*, *T. bicarinatum*, *Vespa* spp. such as *V. crabro*; *Vespula* spp. such as *V. squamosa*; *Wasmannia auropunctata*, *Xylocopa* sp;

Insects from the order **Orthoptera** for example *Acheta domesticus*, *Calliptamus italicus*, *Chortoicetes terminifera*, *Ceuthophilus* spp., *Diastrammena asynamora*, *Dociostaurus maroccanus*,
 5 *Gryllotalpa* spp. such as *G. africana*, *G. gryllotalpa*; *Gryllus* spp., *Hieroglyphus daganensis*,
Kraussaria angulifera, *Locusta* spp. such as *L. migratoria*, *L. pardalina*; *Melanoplus* spp. such
 as *M. bivittatus*, *M. femurrubrum*, *M. mexicanus*, *M. sanguinipes*, *M. spretus*; *Nomadacris septemfasciata*, *Oedaleus senegalensis*, *Scapteriscus* spp., *Schistocerca* spp. such as *S. americana*,
S. gregaria, *Stemopelmatus* spp., *Tachycines asynamorus*, and *Zonozerus variegatus*;

10 Pests from the Class **Arachnida** for example **Acari**, e.g. of the families Argasidae, Ixodidae and Sarcoptidae, such as *Amblyomma* spp. (e.g. *A. americanum*, *A. variegatum*, *A. maculatum*),
Argas spp. such as *A. persicu*), *Boophilus* spp. such as *B. annulatus*, *B. decoloratus*, *B. microplus*, *Dermacentor* spp. such as *D. silvarum*, *D. andersoni*, *D. variabilis*, *Hyalomma* spp. such
 as *H. truncatum*, *Ixodes* spp. such as *I. ricinus*, *I. rubicundus*, *I. scapularis*, *I. holocyclus*, *I.*
 15 *pacificus*, *Rhipicephalus sanguineus*, *Ornithodoros* spp. such as *O. moubata*, *O. hermsi*, *O. turicata*, *Ornithonyssus bacoti*, *Otobius megnini*, *Dermanyssus gallinae*, *Psoroptes* spp. such as
P. ovis, *Rhipicephalus* spp. such as *R. sanguineus*, *R. appendiculatus*, *Rhipicephalus evertsi*,
Rhizoglyphus spp., *Sarcoptes* spp. such as *S. Scabiei*; and Family **Eriophyidae** including *Aceria*
 spp. such as *A. sheldoni*, *A. anthocoptes*, *Acallitus* spp., *Aculops* spp. such as *A. lycopersici*, *A.*
 20 *pelekassi*; *Aculus* spp. such as *A. schlechtendali*; *Colomerus vitis*, *Epitrimerus pyri*, *Phyllocoptruta oleivora*; *Eriophytes ribis* and *Eriophyes* spp. such as *Eriophyes sheldoni*; Family **Tarsonemidae** including *Hemitarsonemus* spp., *Phytonemus pallidus* and *Polyphagotarsonemus latus*,
Stenotarsonemus spp. *Steneotarsonemus spinki*; Family **Tenuipalpidae** including *Brevipalpus* spp. such as *B. phoenicis*; Family **Tetranychidae** including *Eotetranychus* spp., *Eutetranychus* spp.,
 25 *Oligonychus* spp., *Petrobia latens*, *Tetranychus* spp. such as *T. cinnabarinus*, *T. evansi*, *T. kanzawai*, *T. pacificus*, *T. phaseolus*, *T. telarius* and *T. urticae*; *Bryobia praetiosa*;
Panonychus spp. such as *P. ulmi*, *P. citri*; *Metatetranychus* spp. and *Oligonychus* spp. such as
O. pratensis, *O. perseae*, *Vasates lycopersici*; *Raoiella indica*, Family **Carpoglyphidae** including
Carpoglyphus spp.; *Penthaleidae* spp. such as *Halotydeus destructor*; Family **Demodicidae** with
 30 species such as *Demodex* spp.; Family **Trombicidae** including *Trombicula* spp.; Family **Macronyssidae** including *Ornithonyssus* spp.; Family **Pyemotidae** including *Pyemotes tritici*; *Tyrophagus putrescentiae*; Family **Acaridae** including *Acarus siro*; Family **Araneida** including *Latrodectus mactans*,
Tegenaria agrestis, *Chiracanthium* sp, *Lycosa* sp *Achaearanea tepidariorum* and
Loxosceles reclusa;

35 Pests from the Phylum **Nematoda**, for example, plant parasitic nematodes such as root-knot nematodes, *Meloidogyne* spp. such as *M. hapla*, *M. incognita*, *M. javanica*; cyst-forming nematodes, *Globodera* spp. such as *G. rostochiensis*; *Heterodera* spp. such as *H. avenae*, *H. glycines*,
H. schachtii, *H. trifolii*; Seed gall nematodes, *Anguina* spp.; Stem and foliar nematodes, *Aphelenchoides* spp. such as *A. besseyi*; Sting nematodes, *Belonolaimus* spp. such as *B. longicaudatus*;
 40 Pine nematodes, *Bursaphelenchus* spp. such as *B. lignicolus*, *B. xylophilus*; Ring nematodes, *Criconema* spp., *Criconemella* spp. such as *C. xenoplax* and *C. ornata*; and, *Criconemoides* spp. such as *Criconemoides informis*; *Mesocriconema* spp.; Stem and bulb nematodes, *Ditylenchus* spp. such as *D. destructor*, *D. dipsaci*; Awl nematodes, *Dolichodorus*

spp.; Spiral nematodes, *Heliocotylenchus multicinctus*; Sheath and sheathoid nematodes, *Hemicycliophora* spp. and *Hemicriconemoides* spp.; *Hirshmanniella* spp.; Lance nematodes, *Hoploaimus* spp.; False rootknot nematodes, *Nacobbus* spp.; Needle nematodes, *Longidorus* spp. such as *L. elongatus*; Lesion nematodes, *Pratylenchus* spp. such as *P. brachyurus*, *P. neglectus*, *P. penetrans*, *P. curvatus*, *P. goodeyi*; Burrowing nematodes, *Radopholus* spp. such as *R. similis*; *Rhadopholus* spp.; *Rhodopholus* spp.; Reniform nematodes, *Rotylenchus* spp. such as *R. robustus*, *R. reniformis*; *Scutellonema* spp.; Stubby-root nematode, *Trichodorus* spp. such as *T. obtusus*, *T. primitivus*; *Paratrichodorus* spp. such as *P. minor*; Stunt nematodes, *Tylenchorhynchus* spp. such as *T. claytoni*, *T. dubius*; Citrus nematodes, *Tylenchulus* spp. such as *T. semipenetrans*; Dagger nematodes, *Xiphinema* spp.; and other plant parasitic nematode species;

Insects from the order **Isoptera** for example *Calotermes flavicollis*, *Coptotermes* spp. such as *C. formosanus*, *C. gestroi*, *C. acinaciformis*; *Cornitermes cumulans*, *Cryptotermes* spp. such as *C. brevis*, *C. cavifrons*; *Globitermes sulfureus*, *Heterotermes* spp. such as *H. aureus*, *H. longiceps*, *H. tenuis*; *Leucotermes flavipes*, *Odontotermes* spp., *Incisitermes* spp. such as *I. minor*, *I. Snyder*, *Marginitermes hubbardi*, *Mastotermes* spp. such as *M. darwiniensis* *Neocapritermes* spp. such as *N. opacus*, *N. parvus*; *Neotermes* spp., *Procornitermes* spp., *Zootermopsis* spp. such as *Z. angusticollis*, *Z. nevadensis*, *Reticulitermes* spp. such as *R. hesperus*, *R. tibialis*, *R. speratus*, *R. flavipes*, *R. grassei*, *R. lucifugus*, *R. santonensis*, *R. virginicus*; *Termes natalensis*,

Insects from the order **Blattaria** for example *Blatta* spp. such as *B. orientalis*, *B. lateralis*; *Blattella* spp. such as *B. asahinae*, *B. germanica*; *Leucophaea maderae*, *Panchlora nivea*, *Periplaneta* spp. such as *P. americana*, *P. australasiae*, *P. brunnea*, *P. fuliginosa*, *P. japonica*; *Supella longipalpa*, ***Parcoblatta pennsylvanica***, ***Eurycotis floridana***, *Pycnoscelus surinamensis*,

Insects from the order **Siphonoptera** for example *Cediopsylla simplex*, *Ceratophyllus* spp., *Ctenocephalides* spp. such as *C. felis*, *C. canis*, *Xenopsylla cheopis*, *Pulex irritans*, *Trichodectes canis*, *Tunga penetrans*, and *Nosopsyllus fasciatus*,

Insects from the order **Thysanura** for example *Lepisma saccharina*, *Ctenolepisma urbana*, and *Thermobia domestica*,

Pests from the class **Chilopoda** for example *Geophilus* spp., *Scutigera* spp. such as *Scutigera coleoptrata*;

Pests from the class **Diplopoda** for example *Blaniulus guttulatus*, *Julus* spp., *Narceus* spp.,

Pests from the class **Symphyla** for example *Scutigera immaculata*,

Insects from the order **Dermaptera**, for example *Forficula auricularia*,

Insects from the order **Collembola**, for example *Onychiurus* spp., such as *Onychiurus armatus*,

Pests from the order **Isopoda** for example, *Armadillidium vulgare*, *Oniscus asellus*, *Porcellio scaber*,

Insects from the order **Phthiraptera**, for example *Damalinia* spp., *Pediculus* spp. such as *Pediculus humanus capitis*, *Pediculus humanus corporis*, *Pediculus humanus humanus*; *Phthirus pubis*, *Haematopinus* spp. such as *Haematopinus eurysternus*, *Haematopinus suis*; *Linognathus* spp. such as *Linognathus vituli*; *Bovicola bovis*, *Menopon gallinae*, *Menacanthus stramineus* and *Solenopotes capillatus*, *Trichodectes* spp.,

Examples of further pest species which may be controlled by compounds of formula (I) include: from the Phylum **Mollusca**, class **Bivalvia**, for example, *Dreissena* spp.; class **Gastropoda**, for

example, *Arion* spp., *Biomphalaria* spp., *Bulinus* spp., *Deroceras* spp., *Galba* spp., *Lymnaea* spp., *Oncomelania* spp., *Pomacea canaliculata*, *Succinea* spp.; from the class of the **helminths**, for example, *Ancylostoma duodenale*, *Ancylostoma ceylanicum*, *Ancylostoma braziliensis*, *Ancylostoma* spp., *Ascaris lubricoides*, *Ascaris* spp., *Brugia malayi*, *Brugia timori*, *Bunostomum* spp.,
5 *Chabertia* spp., *Clonorchis* spp., *Cooperia* spp., *Dicrocoelium* spp., *Dictyocaulus filaria*, *Diphyllobothrium latum*, *Dracunculus medinensis*, *Echinococcus granulosus*, *Echinococcus multilocularis*, *Enterobius vermicularis*, *Faciola* spp., *Haemonchus* spp. such as *Haemonchus contortus*; *Heterakis* spp., *Hymenolepis nana*, *Hyostrongylus* spp., *Loa Loa*, *Nematodirus* spp., *Oesophagostomum* spp., *Opisthorchis* spp., *Onchocerca volvulus*, *Ostertagia* spp., *Paragonimus* spp.,
10 *Schistosomen* spp., *Strongyloides fuelleborni*, *Strongyloides stercoralis*, *Strongyloides* spp., *Taenia saginata*, *Taenia solium*, *Trichinella spiralis*, *Trichinella nativa*, *Trichinella britovi*, *Trichinella nelsoni*, *Trichinella pseudopsiralis*, *Trichostrongylus* spp., *Trichuris trichuria*, *Wuchereria bancrofti*.

Compounds and mixtures of the present invention are particularly useful for controlling insects, preferably sucking or piercing insects such as insects from the genera Thysanoptera, Diptera and Hemiptera, and chewing-biting pests such as insects from the genera of Lepidoptera and Coleoptera, in particular the following species: *Thysanoptera* : *Frankliniella fusca*, *Frankliniella occidentalis*, *Frankliniella tritici*, *Scirtothrips citri*, *Thrips oryzae*, *Thrips palmi* and *Thrips tabaci*.

Mixtures of the present invention are particularly useful for controlling insects of the orders Lepidoptera, Coleoptera, Hemiptera and Thysanoptera.

The mixtures of the present invention are especially suitable for efficiently combating pests like insects from the order of the lepidopterans (Lepidoptera), beetles (Coleoptera), flies and mosquitoes (Diptera), thrips (Thysanoptera), termites (Isoptera), bugs, aphids, leafhoppers, whiteflies, scale insects, cicadas (Hemiptera), ants, bees, wasps, sawflies (Hymenoptera), crickets, grasshoppers, locusts (Orthoptera), and also Arachnoidea, such as arachnids (Acarina).

Compounds (II)

In one embodiment of the invention, the compounds of formula I are employed as a solo product.

One typical problem arising in the field of pest control lies in the need to reduce the dosage rates of the active ingredient in order to reduce or avoid unfavorable environmental or toxicological effects whilst still allowing effective pest control.

The present invention also relates to methods for controlling pests and/or increasing the plant health of a cultivated plant, comprising in the application of a mixture of a compound of formula I and a pesticide II to a cultivated plant, parts of such plant, plant propagation material, or at its locus of growth.

Therefore, in another embodiment of the invention, the compounds of formula I are employed in combination (e.g. a mixture) with one or more compounds II which is a preferably a further insecticide or a fungicide.

The pesticidally active compounds II with which the compounds of formula I are combined with for the methods according to present invention are the following:

The compound (II) pesticides, together with which the compounds of formula I may be used according to the purpose of the present invention, and with which potential synergistic effects with regard to the method of uses might be produced, are selected and grouped according to the Mode of Action Classification from the Insecticide Resistance Action Committee (IRAC) and are selected from group M consisting of

M.1 Acetylcholine esterase (AChE) inhibitors from the class of: M.1A carbamates, for example aldicarb, alanycarb, bendiocarb, benfuracarb, butocarboxim, butoxycarboxim, carbaryl, carbofuran, carbosulfan, ethiofencarb, fenobucarb, formetanate, furathiocarb, isoprocarb, methiocarb, methomyl, metolcarb, oxamyl, pirimicarb, propoxur, thiodicarb, thiofanox, trimethacarb, XMC, xylylcarb and triazamate; or from the class of M.1B organophosphates, for example acephate, azamethiphos, azinphos-ethyl, azinphosmethyl, cadusafos, chlorethoxyfos, chlorfenvinphos, chlormephos, chlorpyrifos, chlorpyrifos-methyl, coumaphos, cyanophos, demeton-S-methyl, diazinon, dichlorvos/ DDVP, dicrotophos, dimethoate, dimethylvinphos, disulfoton, EPN, ethion, ethoprophos, famphur, fenamiphos, fenitrothion, fenthion, fosthiazate, heptenophos, imicyafos, isofenphos, isopropyl O- (methoxyaminothio-phosphoryl) salicylate, isoxathion, malathion, mecarbam, methamidophos, methidathion, mevinphos, monocrotophos, naled, omethoate, oxydemeton-methyl, parathion, parathion-methyl, phenthoate, phorate, phosalone, phosmet, phosphamidon, phoxim, pirimiphos- methyl, profenofos, propetamphos, prothiofos, pyraclofos, pyridaphenthion, quinalphos, sulfotep, tebupirimfos, temephos, terbufos, tetrachlorvinphos, thiometon, triazophos, trichlorfon and vamidothion;

M.2. GABA-gated chloride channel antagonists such as: M.2A cyclodiene organochlorine compounds, as for example endosulfan or chlordane; or M.2B fiproles (phenylpyrazoles), as for example ethiprole, fipronil, flufiprole, pyrafluprole and pyriprole;

M.3 Sodium channel modulators from the class of M.3A pyrethroids, for example acrinathrin, allethrin, d-cis-trans allethrin, d-trans allethrin, bifenthrin, bioallethrin, bioallethrin S-cyclopentenyl, bioresmethrin, cycloprothrin, cyfluthrin, beta-cyfluthrin, cyhalothrin, lambda-cyhalothrin, gamma-cyhalothrin, cypermethrin, alpha-cypermethrin, beta-cypermethrin, theta-cypermethrin, zeta-cypermethrin, cyphenothrin, deltamethrin, empenthrin, esfenvalerate, etofenprox, fenpropathrin, fenvalerate, flucythrinate, flumethrin, tau-fluvalinate, halfenprox, heptafluthrin, imiprothrin, meperfluthrin, metofluthrin, momfluorothrin, permethrin, phenothrin, prallethrin, profluthrin, pyrethrin (pyrethrum), resmethrin, silafluofen, tefluthrin, tetramethylfluthrin, tetramethrin, tralomethrin and transfluthrin; or M.3B sodium channel modulators such as DDT or methoxychlor;

M.4 Nicotinic acetylcholine receptor agonists (nAChR) from the class of M.4A neonicotinoids, for example acetamiprid, clothianidin, cycloxaprid, dinotefuran, imidacloprid, nitenpyram, thiacloprid and thiamethoxam; or the compounds M.4A.2: (2E)-1-[(6-Chloropyridin-3-yl)methyl]-N'-nitro-2-pentylidenehydrazinecarboximidamide; or M.4A.3: 1-[(6-Chloropyridin-3-yl)methyl]-7-methyl-8-nitro-5-propoxy-1,2,3,5,6,7-hexahydroimidazo[1,2-a]pyridine; or from the class M.4B nicotine;

M.5 Nicotinic acetylcholine receptor allosteric activators from the class of spinosyns, for example spinosad or spinetoram;

M.6 Chloride channel activators from the class of avermectins and milbemycins, for example abamectin, emamectin benzoate, ivermectin, lepipimectin or milbemectin;

M.7 Juvenile hormone mimics, such as M.7A juvenile hormone analogues as hydroprene, kinoprene and methoprene; or others as M.7B fenoxycarb or M.7C pyriproxyfen;

M.8 miscellaneous non-specific (multi-site) inhibitors, for example M.8A alkyl halides as methyl bromide and other alkyl halides, or M.8B chloropicrin, or M.8C sulfuric fluoride, or M.8D borax, or M.8E tartar emetic;

M.9 Selective homopteran feeding blockers, for example M.9B pymetrozine, or M.9C flonicamid;

M.10 Mite growth inhibitors, for example M.10A clofentezine, hexythiazox and diflovidazin, or M.10B etoxazole;

M.11 Microbial disruptors of insect midgut membranes, for example *bacillus thuringiensis* or *bacillus sphaericus* and the insecticidal proteins they produce such as *bacillus thuringiensis subsp. israelensis*, *bacillus sphaericus*, *bacillus thuringiensis subsp. aizawai*, *bacillus thuringiensis subsp. kurstaki* and *bacillus thuringiensis subsp. tenebrionis*, or the Bt crop proteins: Cry1Ab, Cry1Ac, Cry1Fa, Cry2Ab, mCry3A, Cry3Ab, Cry3Bb and Cry34/35Ab1;

M.12 Inhibitors of mitochondrial ATP synthase, for example M.12A diafenthiuron, or M.12B organotin miticides such as azocyclotin, cyhexatin or fenbutatin oxide, or M.12C propargite, or M.12D tetradifon;

M.13 Uncouplers of oxidative phosphorylation via disruption of the proton gradient, for example chlorfenapyr, DNOC or sulfluramid;

M.14 Nicotinic acetylcholine receptor (nAChR) channel blockers, for example nereistoxin analogues as bensultap, cartap hydrochloride, thiocyclam or thiosultap sodium;

M.15 Inhibitors of the chitin biosynthesis type 0, such as benzoylureas as for example bistrifluron, chlorfluazuron, diflubenzuron, flucyclohexuron, flufenoxuron, hexaflumuron, lufenuron, novaluron, noviflumuron, teflubenzuron or triflumuron;

M.16 Inhibitors of the chitin biosynthesis type 1, as for example buprofezin;

M.17 Moulting disruptors, Dipteran, as for example cyromazine;

M.18 Ecdyson receptor agonists such as diacylhydrazines, for example methoxyfenozide, tebufenozide, halofenozide, fufenozide or chromafenozide;

M.19 Octopamin receptor agonists, as for example amitraz;

M.20 Mitochondrial complex III electron transport inhibitors, for example M.20A hydramethylnon, or M.20B acequinocyl, or M.20C fluacrypyrim;

M.21 Mitochondrial complex I electron transport inhibitors, for example M.21A METI acaricides and insecticides such as fenazaquin, fenpyroximate, pyrimidifen, pyridaben, tebufenpyrad or tolfenpyrad, or M.21B rotenone;

M.22 Voltage-dependent sodium channel blockers, for example M.22A indoxacarb, or M.22B metaflumizone, or M.22B.1: 2-[2-(4-Cyanophenyl)-1-[3-(trifluoromethyl)phenyl]ethylidene]-N-[4-(difluoromethoxy)phenyl]-hydrazinecarboxamide or M.22B.2: N-(3-Chloro-2-methylphenyl)-2-[(4-chlorophenyl)[4-[methyl(methylsulfonyl)amino]phenyl]methylene]-hydrazinecarboxamide;

M.23 Inhibitors of the of acetyl CoA carboxylase, such as Tetronic and Tetramic acid derivatives, for example spiroadiclofen, spiromesifen or spirotetramat;

M.24 Mitochondrial complex IV electron transport inhibitors, for example M.24A phosphine such as aluminium phosphide, calcium phosphide, phosphine or zinc phosphide, or M.24B cyanide;

M.25 Mitochondrial complex II electron transport inhibitors, such as beta-ketonitrile derivatives, for example cyenopyrafen or cyflumetofen;

M.28 Ryanodine receptor-modulators from the class of diamides, as for example flubendiamide, chlorantraniliprole (rynaxypyr®), cyantraniliprole (cyazypyr®), tetraniliprole, or the

- 5 phthalamide compounds M.28.1: (R)-3-Chlor-N1-{2-methyl-4-[1,2,2,2-tetrafluor-1-(trifluormethyl)ethyl]phenyl}-N2-(1-methyl-2-methylsulfonyl)phthalamid and M.28.2: (S)-3-Chlor-N1-{2-methyl-4-[1,2,2,2-tetrafluor-1-(trifluormethyl)ethyl]phenyl}-N2-(1-methyl-2-methylsulfonyl)phthalamid, or the compound M.28.3: 3-bromo-N-{2-bromo-4-chloro-6-[(1-cyclopropylethyl)carbonyl]phenyl}-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (proposed ISO name: cyclaniliprole), or the compound M.28.4: methyl-2-[3,5-dibromo-2-({[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl]carbonyl}amino)benzoyl]-1,2-
- 10 dimethylhydrazinecarboxylate; or a compound selected from M.28.5i) N-[2-(5-Amino-1,3,4-thiadiazol-2-yl)-4-chloro-6-methylphenyl]-3-bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide; M.28.5j) 3-Chloro-1-(3-chloro-2-pyridinyl)-N-[2,4-dichloro-6-[(1-cyano-1-methylethyl)amino]carbonyl]phenyl]-1H-pyrazole-5-carboxamide; M.28.5k) 3-Bromo-N-[2,4-dichloro-6-(methylcarbonyl)phenyl]-1-(3,5-dichloro-2-pyridyl)-1H-pyrazole-5-carboxamide; M.28.5l) N-[4-Chloro-2-[(1,1-dimethylethyl)amino]carbonyl]-6-methylphenyl]-1-(3-chloro-2-pyridinyl)-3-(fluoromethoxy)-1H-pyrazole-5-carboxamide; or

M.28.6: cyhalodiamide; or;

- 20 M.29. insecticidal active compounds of unknown or uncertain mode of action, as for example afidopyropen, afoxolaner, azadirachtin, amidoflumet, benzoximate, bifenazate, broflanilide, bromopropylate, chinomethionat, cryolite, dicloromezotiaz, dicofol, flufenerim, flometoquin, fluensulfone, fluhexafon, fluopyram, flupyradifurone, fluralaner, metoxadiazone, piperonyl butoxide, pyflubumide, pyridalyl, pyrfluquinazon, sulfoxaflor, tioxazafen, triflumezopyrim, or the compounds

M.29.3: 11-(4-chloro-2,6-dimethylphenyl)-12-hydroxy-1,4-dioxo-9-azadispiro[4.2.4.2]-tetradec-11-en-10-one, or the compound

M.29.4: 3-(4'-fluoro-2,4-dimethylbiphenyl-3-yl)-4-hydroxy-8-oxa-1-azaspiro[4.5]dec-3-en-2-one, or the compound

- 30 M.29.5: 1-[2-fluoro-4-methyl-5-[(2,2,2-trifluoroethyl)sulfinyl]phenyl]-3-(trifluoromethyl)-1H-1,2,4-triazole-5-amine, or actives on basis of *bacillus firmus* (Votivo, I-1582); or

a compound selected from the group of M.29.6, wherein the compound is selected from

- M.29.6a) to M.29.6k): M.29.6a) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide; M.29.6b) (E/Z)-N-[1-[(6-chloro-5-fluoro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide; M.29.6c) (E/Z)-2,2,2-trifluoro-N-[1-[(6-fluoro-3-pyridyl)methyl]-2-pyridylidene]acetamide; M.29.6d) (E/Z)-N-[1-[(6-bromo-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide; M.29.6e) (E/Z)-N-[1-[1-(6-chloro-3-pyridyl)ethyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide; M.29.6f) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2-difluoro-acetamide; M.29.6g) (E/Z)-2-chloro-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2-difluoro-acetamide; M.29.6h) (E/Z)-N-[1-[(2-chloropyrimidin-5-yl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide; M.29.6i) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,3,3,3-pentafluoropropanamide.; M.29.6j) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-
- 40

thioacetamide; or M.29.6k) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-N'-isopropyl-acetamidine; or the compounds

M.29.8: fluazaindolizine; or the compounds

M.29.9.a): 4-[5-(3,5-dichlorophenyl)-5-(trifluoromethyl)-4H-isoxazol-3-yl]-2-methyl-N-(1-oxothietan-3-yl)benzamide; or M.29.9.b): fluxametamide; or

M.29.10: 5-[3-[2,6-dichloro-4-(3,3-dichloroallyloxy)phenoxy]propoxy]-1H-pyrazole; or

a compound selected from the group of M.29.11, wherein the compound is selected from M.29.11b) to M.29.11p): M.29.11.b) 3-(benzoylmethylamino)-N-[2-bromo-4-[1,2,2,3,3,3-

hexafluoro-1-(trifluoromethyl)propyl]-6-(trifluoromethyl)phenyl]-2-fluoro-benzamide; M.29.11.c)

3-(benzoylmethylamino)-2-fluoro-N-[2-iodo-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-6-

(trifluoromethyl)phenyl]-benzamide; M.29.11.d) N-[3-[[[2-iodo-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-6-(trifluoromethyl)phenyl]amino]carbonyl]phenyl]-N-methyl-benzamide;

M.29.11.e) N-[3-[[[2-bromo-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-6-

(trifluoromethyl)phenyl]amino]carbonyl]-2-fluorophenyl]-4-fluoro-N-methyl-benzamide; M.29.11.f)

4-fluoro-N-[2-fluoro-3-[[[2-iodo-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-6-

(trifluoromethyl)phenyl]amino]carbonyl]phenyl]-N-methyl-benzamide; M.29.11.g) 3-fluoro-N-[2-fluoro-3-[[[2-iodo-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-6-

(trifluoromethyl)phenyl]amino]carbonyl]phenyl]-N-methyl-benzamide; M.29.11.h) 2-chloro-N-[3-[[[2-iodo-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-6-

(trifluoromethyl)phenyl]amino]carbonyl]phenyl]- 3-pyridinecarboxamide; M.29.11.i) 4-cyano-N-[2-cyano-5-[[2,6-dibromo-4-[1,2,2,3,3,3-hexafluoro-1-(trifluoromethyl)-

propyl]phenyl]carbamoyl]phenyl]-2-methyl-benzamide; M.29.11.j) 4-cyano-3-[(4-cyano-2-methyl-benzoyl)amino]-N-[2,6-dichloro-4-[1,2,2,3,3,3-hexafluoro-1-(trifluoromethyl)propyl]phenyl]-2-

fluoro-benzamide; M.29.11.k) N-[5-[[2-chloro-6-cyano-4-[1,2,2,3,3,3-hexafluoro-1-

(trifluoromethyl)propyl]phenyl]carbamoyl]-2-cyano-phenyl]-4-cyano-2-methyl-benzamide;

M.29.11.l) N-[5-[[2-bromo-6-chloro-4-[2,2,2-trifluoro-1-hydroxy-1-

(trifluoromethyl)ethyl]phenyl]carbamoyl]-2-cyano-phenyl]-4-cyano-2-methyl-benzamide;

M.29.11.m) N-[5-[[2-bromo-6-chloro-4-[1,2,2,3,3,3-hexafluoro-1-(trifluoromethyl)-

propyl]phenyl]carbamoyl]-2-cyano-phenyl]-4-cyano-2-methyl-benzamide; M.29.11.n) 4-cyano-N-

[2-cyano-5-[[2,6-dichloro-4-[1,2,2,3,3,3-hexafluoro-1-(trifluoromethyl)-

propyl]phenyl]carbamoyl]phenyl]-2-methyl-benzamide; M.29.11.o) 4-cyano-N-[2-cyano-5-[[2,6-dichloro-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]phenyl]carbamoyl]phenyl]-2-methyl-

benzamide; M.29.11.p) N-[5-[[2-bromo-6-chloro-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]phenyl]carbamoyl]-2-cyano-phenyl]-4-cyano-2-methyl-benzamide; or

a compound selected from the group of M.29.12, wherein the compound is selected from

M.29.12a) to M.29.12m): M.29.12.a) 2-(1,3-Dioxan-2-yl)-6-[2-(3-pyridinyl)-5-thiazolyl]-pyridine;

M.29.12.b) 2-[6-[2-(5-Fluoro-3-pyridinyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine; M.29.12.c) 2-[6-[2-

(3-Pyridinyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine; M.29.12.d) N-Methylsulfonyl-6-[2-(3-

pyridyl)thiazol-5-yl]pyridine-2-carboxamide; M.29.12.e) N-Methylsulfonyl-6-[2-(3-pyridyl)thiazol-

5-yl]pyridine-2-carboxamide; M.29.12.f) N-Ethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-

methylthio-propanamide; M.29.12.g) N-Methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-

methylthio-propanamide; M.29.12.h) N,2-Dimethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-

methylthio-propanamide; M.29.12.i) N-Ethyl-2-methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-

methylthio-propanamide; M.29.12.j) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-2-methyl-3-methylthio-propanamide; M.29.12.k) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N,2-dimethyl-3-methylthio-propanamide; M.29.12.l) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-methyl-3-methylthio-propanamide; M.29.12.m) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-3-methylthio-propanamide; or the compounds

M.29.14a) 1-[(6-Chloro-3-pyridinyl)methyl]-1,2,3,5,6,7-hexahydro-5-methoxy-7-methyl-8-nitroimidazo[1,2-a]pyridine; or M.29.14b) 1-[(6-Chloropyridin-3-yl)methyl]-7-methyl-8-nitro-1,2,3,5,6,7-hexahydroimidazo[1,2-a]pyridin-5-ol; or the compounds

M.29.16a) 1-isopropyl-N,5-dimethyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; or M.29.16b) 1-(1,2-dimethylpropyl)-N-ethyl-5-methyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; M.29.16c) N,5-dimethyl-N-pyridazin-4-yl-1-(2,2,2-trifluoro-1-methyl-ethyl)pyrazole-4-carboxamide; M.29.16d) 1-[1-(1-cyanocyclopropyl)ethyl]-N-ethyl-5-methyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; M.29.16e) N-ethyl-1-(2-fluoro-1-methyl-propyl)-5-methyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; M.29.16f) 1-(1,2-dimethylpropyl)-N,5-dimethyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; M.29.16g) 1-[1-(1-cyanocyclopropyl)ethyl]-N,5-dimethyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; M.29.16h) N-methyl-1-(2-fluoro-1-methyl-propyl)-5-methyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; M.29.16i) 1-(4,4-difluorocyclohexyl)-N-ethyl-5-methyl-N-pyridazin-4-yl-pyrazole-4-carboxamide; or M.29.16j) 1-(4,4-difluorocyclohexyl)-N,5-dimethyl-N-pyridazin-4-yl-pyrazole-4-carboxamide, or

M.29.17 a compound selected from the compounds M.29.17a) to M.29.17j): M.29.17a) N-(1-methylethyl)-2-(3-pyridinyl)-2H-indazole-4-carboxamide; M.29.17b) N-cyclopropyl-2-(3-pyridinyl)-2H-indazole-4-carboxamide; M.29.17c) N-cyclohexyl-2-(3-pyridinyl)-2H-indazole-4-carboxamide; M.29.17d) 2-(3-pyridinyl)-N-(2,2,2-trifluoroethyl)-2H-indazole-4-carboxamide; M.29.17e) 2-(3-pyridinyl)-N-[(tetrahydro-2-furanyl)methyl]-2H-indazole-5-carboxamide; M.29.17f) methyl 2-[[2-(3-pyridinyl)-2H-indazol-5-yl]carbonyl]hydrazinecarboxylate; M.29.17g) N-[(2,2-difluorocyclopropyl)methyl]-2-(3-pyridinyl)-2H-indazole-5-carboxamide; M.29.17h) N-(2,2-difluoropropyl)-2-(3-pyridinyl)-2H-indazole-5-carboxamide; M.29.17i) 2-(3-pyridinyl)-N-(2-pyrimidinylmethyl)-2H-indazole-5-carboxamide; M.29.17j) N-[(5-methyl-2-pyrazinyl)methyl]-2-(3-pyridinyl)-2H-indazole-5-carboxamide, or

M.29.18 a compound selected from the compounds M.29.18a) to M.29.18d): M.29.18a) N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-N-ethyl-3-(3,3,3-trifluoropropylsulfanyl)propanamide; M.29.18b) N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-N-ethyl-3-(3,3,3-trifluoropropylsulfinyl)propanamide; M.29.18c) N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-3-[(2,2-difluorocyclopropyl)methylsulfanyl]-N-ethyl-propanamide; M.29.18d) N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-3-[(2,2-difluorocyclopropyl)methylsulfinyl]-N-ethyl-propanamide; or the compound

M.29.19 sarolaner, or the compound

M.29.20 lotilaner.

The commercially available compounds of the group M listed above may be found in The Pesticide Manual, 16th Edition, C. MacBean, British Crop Protection Council (2013) among other publications. The online Pesticide Manual is updated regularly and is accessible through <http://bcpdata.com/pesticide-manual.html>.

Another online data base for pesticides providing the ISO common names is
<http://www.alanwood.net/pesticides>.

The M.4 neonicotinoid cycloxaprid is known from WO2010/069266 and WO2011/069456, the neonicotinoid M.4A.2, sometimes also to be named as guadipyr, is known from

5 WO2013/003977, and the neonicotinoid M.4A.3 (approved as paichongding in China) is known from WO2007/101369. The metaflumizone analogue M.22B.1 is described in CN10171577 and the analogue M.22B.2 in CN102126994. The phthalamides M.28.1 and M.28.2 are both known from WO2007/101540. The anthranilamide M.28.3 is described in WO2005/077934. The hydra-
10 zide compound M.28.4 is described in WO2007/043677. The anthranilamide M.28.5i) is described in WO2011/085575, M.28.5j) in WO2008/134969, M.28.5k) in US2011/046186 and M.28.5l) in WO2012/034403. The diamide compound M.28.6 can be found in WO2012/034472. The spiroketal-substituted cyclic ketoenol derivative M.29.3 is known from WO2006/089633 and the biphenyl-substituted spirocyclic ketoenol derivative M.29.4 from WO2008/067911. The tri-
15 azoylphenylsulfide M.29.5 is described in WO2006/043635, and biological control agents on the basis of *bacillus firmus* are described in WO2009/124707. The compounds M.29.6a) to M.29.6i) listed under M.29.6 are described in WO2012/029672, and M.29.6j) and M.29.6k) in WO2013/129688. The nematicide M.29.8 is known from WO2013/055584. The isoxazoline M.29.9.a) is described in WO2013/050317. The isoxazoline M.29.9.b) is described in WO2014/126208. The pyridalyl-type analogue M.29.10 is known from WO2010/060379. The
20 carboxamides broflanilide and M.29.11.b) to M.29.11.h) are described in WO2010/018714, and the carboxamides M.29.11i) to M.29.11.p) in WO2010/127926. The pyridylthiazoles M.29.12.a) to M.29.12.c) are known from WO2010/006713, M.29.12.d) and M.29.12.e) are known from WO2012/000896, and M.29.12.f) to M.29.12.m) from WO2010/129497. The compounds M.29.14a) and M.29.14b) are known from WO2007/101369. The pyrazoles M.29.16.a) to
25 M.29.16h) are described in WO2010/034737, WO2012/084670, and WO2012/143317, respectively, and the pyrazoles M.29.16i) and M.29.16j) are described in US 61/891437. The pyridinyl-indazoles M.29.17a) to M.29.17.j) are described in WO2015/038503. The pyridylpyrazoles M.29.18a) to M.29.18d) are described in US2014/0213448. The isoxazoline M.29.19 is described in WO2014/036056. The isoxazoline M.29.20 is known from WO2014/090918.

30 In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with fipronil is applied, preferably in the methods for seed treatment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the plant propagation material of the cultivated plant, preferably seeds, wherein the compound of formula (I) is
35 preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with ethiprole is applied, preferably in the methods for seed treatment, i.e.
40 methods, wherein the compound of formula (I) or a mixture thereof is applied to the plant propagation material of the cultivated plant, preferably seeds wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically

compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with chlorfenapyr is applied, preferably in the methods for foliar treatment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the cultivated plant, parts of the cultivated plant or to their habitat, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with teflubenzuron is applied, preferably in the methods for foliar treatment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the cultivated plant, parts of the cultivated plant or to their habitat, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with chlorfenapyr and teflubenzuron is applied, preferably in the methods for foliar treatment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the cultivated plant, parts of the cultivated plant or to their habitat, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with dinotefuran is applied, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with chlorantraniliprole is applied, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with cyantraniliprole is applied, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with pyrethroids, preferably alpha-cypermethrin, is applied, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically

compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

The following mixtures are preferred:

- 5 With regard to the methods and uses of the present invention, in an embodiment of the invention, the pesticide II is selected from the group of fipronil, alpha-cypermethrin, dinotefuran, chlorfenapyr, teflubenzuron and sulfoxaflor.
- With regard to the methods and uses of pesticidal mixtures of the present invention, a compound II selected from group M.2 (GABA-gated chloride channel antagonists) as defined above
- 10 is preferred, in particular group M.2B (fiproles), especially preferred ethiprole and fipronil. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with fipronil as compound II are particularly preferred.
- With regard to the methods and uses of pesticidal mixtures of the present invention, a compound II selected from group M.3 (Sodium channel modulators) as defined above is preferred,
- 15 in particular group M.3A (pyrethroids), especially preferred alpha-cypermethrin and cyhalothrin.. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with alpha-cypermethrin as compound II are particularly preferred.
- Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with cyhalothrin as compound II are particularly preferred.
- 20 With regard to the methods and uses of pesticidal mixtures of the present invention, a compound II selected from group M.4A (Neonicotinoids) as defined above is preferred, in particular clothianidin, dinotefuran, imidacloprid, thiacloprid, or thiamethoxam.
- Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with thiamethoxam as compound II are especially preferred.
- 25 Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with clothianidin as compound II are also preferred. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with dinotefuran as compound II are also preferred. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with imidacloprid as compound II are also preferred. Mixtures of compounds
- 30 of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with thiacloprid as compound II are also preferred. Mixtures of compounds of formula I with sulfoxaflor as compound II are also preferred.
- With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.5 (Nicotinic acetylcholine receptor allosteric activators) and is preferably spinosad or spinetoram.
- 35 With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.6 (Chloride channel activators) and is preferably an avermectin.
- Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with abamectin as compound II are especially preferred.
- 40 With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.9 (Selective homopteran feeding blockers) and is preferably pymetrozine or flonicamid. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with pymetrozine as compound II are especially preferred.

la I as individualized herein, e.g. in Table A, Table A' or Table A'', with pymetrozine as compound II are especially preferred. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with flonicamid as compound II are especially preferred. With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.13 (Uncouplers of oxidative phosphorylation via disruption of the proton gradient) and is preferably chlorfenapyr. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with chlorfenapyr as compound II are especially preferred.

With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.16 (Inhibitors of the chitin biosynthesis type 1) and is preferably buprofezin.

With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.22 (Voltage-dependent sodium channel blockers) and is preferably metaflumizone.

With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.23 (Inhibitors of the of acetyl CoA carboxylase) and is preferably a Tetronic or Tetramic acid derivative, spiroadiclofen, spiromesifen or spirotetramat.

Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with Tetronic Acid as compound II are preferred. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with Tetramic Acid as compound II are also preferred. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with Tetramic Acid as compound II are also preferred.

With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is selected from group M.26 (Ryanodine receptor-modulators) and is preferably chlorantraniliprole or cyantraniliprole. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with chlorantraniliprole as compound II are especially preferred. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with cyantraniliprole as compound II are especially preferred.

With regard to the methods and uses of pesticidal mixtures of the present invention, in an embodiment of the invention, the compound II is sulfoxaflor. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with sulfoxaflor as compound II are especially preferred.

In another embodiment of the invention, the compound (II) pesticides, together with which the compounds of formula I may be used according to the purpose of the present invention, and with which potential synergistic effects with regard to the method of uses might be produced, are selected from fungicides. The following list of fungicides, in conjunction with which the compounds of the present invention can be used, is intended to illustrate the possible combinations but does not limit them:

A) Respiration inhibitors

- Inhibitors of complex III at Q_o site (e. g. strobilurins): azoxystrobin (A.1.1), coumethoxy-

- strobilin (A.1.2), coumoxystrobin (A.1.3), dimoxystrobin (A.1.4), enestroburin (A.1.5), fenamin-
strobin (A.1.6), fenoxystrobin/flufenoxystrobin (A.1.7), fluoxastrobin (A.1.8), kresoxim-methyl
(A.1.9), mandestrobin (A.1.10), metominostrobin (A.1.11), orysastrobin (A.1.12), picoxystrobin
(A.1.13), pyraclostrobin (A.1.14), pyrametostrobin (A.1.15), pyraoxystrobin (A.1.16), tri-
5 floxystrobin (A.1.17), 2-(2-(3-(2,6-dichlorophenyl)-1-methyl-allylideneaminooxymethyl)-phenyl)-
2-methoxyimino-N-methyl-acetamide (A.1.18), pyribencarb (A.1.19), triclopyricarb/chlorodincarb
(A.1.20), famoxadone (A.1.21), fenamidone (A.1.21), methyl-N-[2-[(1,4-dimethyl-5-phenyl-
pyrazol-3-yl)oxymethyl]phenyl]-N-methoxy-carbamate (A.1.22), 1-[3-chloro-2-[[1-(4-
chlorophenyl)-1H-pyrazol-3-yl]oxymethyl]phenyl]-4-methyl-tetrazol-5-one (A.1.23), 1-[3-bromo-
10 2-[[1-(4-chlorophenyl)pyrazol-3-yl]oxymethyl]phenyl]-4-methyl-tetrazol-5-one (A.1.24), 1-[2-[[1-
(4-chlorophenyl)pyrazol-3-yl]oxymethyl]-3-methyl-phenyl]-4-methyl-tetrazol-5-one (A.1.25), 1-[2-
[[1-(4-chlorophenyl)pyrazol-3-yl]oxymethyl]-3-fluoro-phenyl]-4-methyl-tetrazol-5-one (A.1.26), 1-
[2-[[1-(2,4-dichlorophenyl)pyrazol-3-yl]oxymethyl]-3-fluoro-phenyl]-4-methyl-tetrazol-5-one
(A.1.27), 1-[2-[[4-(4-chlorophenyl)thiazol-2-yl]oxymethyl]-3-methyl-phenyl]-4-methyl-tetrazol-5-
15 one (A.1.28), 1-[3-chloro-2-[[4-(p-tolyl)thiazol-2-yl]oxymethyl]phenyl]-4-methyl-tetrazol-5-one
(A.1.29), 1-[3-cyclopropyl-2-[[2-methyl-4-(1-methylpyrazol-3-yl)phenoxy]methyl]phenyl]-
4-methyl-tetrazol-5-one (A.1.30), 1-[3-(difluoromethoxy)-2-[[2-methyl-4-(1-methylpyrazol-
3-yl)phenoxy]methyl]phenyl]-4-methyl-tetrazol-5-one (A.1.31), 1-methyl-4-[3-methyl-
2-[[2-methyl-4-(1-methylpyrazol-3-yl)phenoxy]methyl]phenyl]tetrazol-5-one (A.1.32), 1-methyl-4-
20 [3-methyl-2-[[1-[3-(trifluoromethyl)phenyl]-ethylideneamino]oxymethyl]phenyl]tetrazol-5-one
(A.1.33), (Z,E)-5-[1-(2,4-dichlorophenyl)pyrazol-3-yl]-oxy-2-methoxyimino-N,3-dimethyl-pent-3-
enamide (A.1.34), (Z,E)-5-[1-(4-chlorophenyl)pyrazol-3-yl]oxy-2-methoxyimino-N,3-dimethyl-
pent-3-enamide (A.1.35), (Z,E)-5-[1-(4-chloro-2-fluoro-phenyl)pyrazol-3-yl]oxy-2-
methoxyimino-N,3-dimethyl-pent-3-enamide (A.1.36),
25 - inhibitors of complex III at Q_i site: cyazofamid (A.2.1), amisulbrom (A.2.2), [(3S,6S,7R,8R)-
8-benzyl-3-[(3-acetoxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxonan-
7-yl] 2-methylpropanoate (A.2.3), [(3S,6S,7R,8R)-8-benzyl-3-[[3-(acetoxymethoxy)-4-methoxy-
pyridine-2-carbonyl]amino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl] 2-methylpropanoate (A.2.4),
[(3S,6S,7R,8R)-8-benzyl-3-[(3-isobutoxycarbonyloxy-4-methoxy-pyridine-2-carbonyl)amino]-6-
30 methyl-4,9-dioxo-1,5-dioxonan-7-yl] 2-methylpropanoate (A.2.5), [(3S,6S,7R,8R)-8-benzyl-3-[[3-
(1,3-benzodioxol-5-ylmethoxy)-4-methoxy-pyridine-2-carbonyl]amino]-6-methyl-4,9-dioxo-1,5-
dioxonan-7-yl] 2-methylpropanoate (A.2.6); (3S,6S,7R,8R)-3-[[3-(3-hydroxy-4-methoxy-2-
pyridinyl)carbonyl]amino]-6-methyl-4,9-dioxo-8-(phenylmethyl)-1,5-dioxonan-7-yl 2-
methylpropanoate (A.2.7), (3S,6S,7R,8R)-8-benzyl-3-[3-[(isobutyryloxy)methoxy]-4-
35 methoxypicolinamido]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl isobutyrate (A.2.8);
- inhibitors of complex II (e. g. carboxamides): benodanil (A.3.1), benzovindiflupyr (A.3.2),
bixafen (A.3.3), boscalid (A.3.4), carboxin (A.3.5), fenfuram (A.3.6), fluopyram (A.3.7), flutolanil
(A.3.8), fluxapyroxad (A.3.9), furametpyr (A.3.10), isofetamid (A.3.11), isopyrazam (A.3.12),
mepronil (A.3.13), oxycarboxin (A.3.14), penflufen (A.3.14), penthiopyrad (A.3.15), sedaxane
40 (A.3.16), tecloftalam (A.3.17), thifluzamide (A.3.18), N-(4'-trifluoromethylthiobiphenyl-2-yl)-
3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxamide (A.3.19), N-(2-(1,3,3-trimethyl-butyl)-
phenyl)-1,3-dimethyl-5-fluoro-1H-pyrazole-4-carboxamide (A.3.20), 3-(difluoromethyl)-1-methyl-
N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide (A.3.21), 3-(trifluoromethyl)-1-methyl-N-

(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide (A.3.22), 1,3-dimethyl-N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide (A.3.23), 3-(trifluoromethyl)-1,5-dimethyl-N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide (A.3.24), 1,3,5-trimethyl-N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide (A.3.25), N-(7-fluoro-1,1,3-trimethylindan-4-yl)-1,3-dimethylpyrazole-4-carboxamide (A.3.26), N-[2-(2,4-dichlorophenyl)-2-methoxy-1-methyl-ethyl]-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide (A.3.27);

- other respiration inhibitors (e. g. complex I, uncouplers): diflumetorim (A.4.1), (5,8-difluoroquinazolin-4-yl)-{2-[2-fluoro-4-(4-trifluoromethylpyridin-2-yloxy)-phenyl]-ethyl}-amine (A.4.2); nitrophenyl derivatives: binapacryl (A.4.3), dinobuton (A.4.4), dinocap (A.4.5), fluazinam (A.4.6); ferimzone (A.4.7); organometal compounds: fentin salts, such as fentin-acetate (A.4.8), fentin chloride (A.4.9) or fentin hydroxide (A.4.10); ametocetradin (A.4.11); and silthiofam (A.4.12);

B) Sterol biosynthesis inhibitors (SBI fungicides)

- C14 demethylase inhibitors (DMI fungicides): triazoles: azaconazole (B.1.1), bitertanol (B.1.2), bromuconazole (B.1.3), cyproconazole (B.1.4), difenoconazole (B.1.5), diniconazole (B.1.6), diniconazole-M (B.1.7), epoxiconazole (B.1.8), fenbuconazole (B.1.9), fluquinconazole (B.1.10), flusilazole (B.1.11), flutriafol (B.1.12), hexaconazole (B.1.13), imibenconazole (B.1.14), ipconazole (B.1.15), metconazole (B.1.17), myclobutanil (B.1.18), oxpoconazole (B.1.19), paclobutrazole (B.1.20), penconazole (B.1.21), propiconazole (B.1.22), prothioconazole (B.1.23), simeconazole (B.1.24), tebuconazole (B.1.25), tetraconazole (B.1.26), triadimefon (B.1.27), triadimenol (B.1.28), triticonazole (B.1.29), uniconazole (B.1.30), 1-[*rel*-(2*S*;3*R*)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)-oxiranylmethyl]-5-thiocyanato-1H-[1,2,4]triazolo (B.1.31), 2-[*rel*-(2*S*;3*R*)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)-oxiranylmethyl]-2H-[1,2,4]triazole-3-thiol (B.1.32), 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol (B.1.33), 1-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-cyclopropyl-2-(1,2,4-triazol-1-yl)ethanol (B.1.34), 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol (B.1.35), 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol (B.1.36), 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol (B.1.37), 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol (B.1.38), 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol (B.1.39), 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol (B.1.40), 2-[4-(4-fluorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol (B.1.41), 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)pent-3-yn-2-ol (B.1.51); imidazoles: imazalil (B.1.42), pefurazoate (B.1.43), prochloraz (B.1.44), triflumizol (B.1.45); pyrimidines, pyridines and piperazines: fenarimol (B.1.46), nuarimol (B.1.47), pyrifenoxy (B.1.48), triforine (B.1.49), [3-(4-chloro-2-fluoro-phenyl)-5-(2,4-difluorophenyl)isoxazol-4-yl]-(3-pyridyl)methanol (B.1.50);

- Delta14-reductase inhibitors: aldimorph (B.2.1), dodemorph (B.2.2), dodemorph-acetate (B.2.3), fenpropimorph (B.2.4), tridemorph (B.2.5), fenpropidin (B.2.6), piperalin (B.2.7), spiroxamine (B.2.8);

- Inhibitors of 3-keto reductase: fenhexamid (B.3.1);

C) Nucleic acid synthesis inhibitors

- phenylamides or acyl amino acid fungicides: benalaxyl (C.1.1), benalaxyl-M (C.1.2), kiralaxyl (C.1.3), metalaxyl (C.1.4), metalaxyl-M (mefenoxam, C.1.5), ofurace (C.1.6), oxadixyl (C.1.7);

- others: hymexazole (C.2.1), oclthilnone (C.2.2), oxolinic acid (C.2.3), bupirimate (C.2.4), 5-fluorocytosine (C.2.5), 5-fluoro-2-(p-tolylmethoxy)pyrimidin-4-amine (C.2.6), 5-fluoro-2-(4-fluorophenylmethoxy)pyrimidin-4-amine (C.2.7);
- D) Inhibitors of cell division and cytoskeleton
- 5 - tubulin inhibitors, such as benzimidazoles, thiophanates: benomyl (D1.1), carbendazim (D1.2), fuberidazole (D1.3), thiabendazole (D1.4), thiophanate-methyl (D1.5); triazolopyrimidines: 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)-[1,2,4]triazolo[1,5-a]pyrimidine (D1.6);
- other cell division inhibitors: diethofencarb (D2.1), ethaboxam (D2.2), pencycuron (D2.3),
10 fluopicolide (D2.4), zoxamide (D2.5), metrafenone (D2.6), pyriofenone (D2.7);
- E) Inhibitors of amino acid and protein synthesis
- methionine synthesis inhibitors (anilino-pyrimidines): cyprodinil (E.1.1), mepanipyrim (E.1.2), pyrimethanil (E.1.3);
- protein synthesis inhibitors: blasticidin-S (E.2.1), kasugamycin (E.2.2), kasugamycin hydrochloride-hydrate (E.2.3), mildiomyacin (E.2.4), streptomycin (E.2.5), oxytetracyclin (E.2.6),
15 polyoxine (E.2.7), validamycin A (E.2.8);
- F) Signal transduction inhibitors
- MAP / histidine kinase inhibitors: fluoroimid (F.1.1), iprodione (F.1.2), procymidone (F.1.3), vinclozolin (F.1.4), fencpiclonil (F.1.5), fludioxonil (F.1.6);
- 20 - G protein inhibitors: quinoxifen (F.2.1);
- G) Lipid and membrane synthesis inhibitors
- Phospholipid biosynthesis inhibitors: edifenphos (G.1.1), iprobenfos (G.1.2), pyrazophos (G.1.3), isoprothiolane (G.1.4);
- lipid peroxidation: dicloran (G.2.1), quintozone (G.2.2), tecnazene (G.2.3), tolclofos-methyl
25 (G.2.4), biphenyl (G.2.5), chloroneb (G.2.6), etridiazole (G.2.7);
- phospholipid biosynthesis and cell wall deposition: dimethomorph (G.3.1), flumorph (G.3.2), mandipropamid (G.3.3), pyrimorph (G.3.4), benthiavalicarb (G.3.5), iprovalicarb (G.3.6), valifenalate (G.3.7) and N-(1-(1-(4-cyano-phenyl)ethanesulfonyl)-but-2-yl) carbamic acid-(4-fluorophenyl) ester (G.3.8);
- 30 - compounds affecting cell membrane permeability and fatty acids: propamocarb (G.4.1);
- fatty acid amide hydrolase inhibitors: oxathiapiprolin (G.5.1), 2-{3-[2-(1-[[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]acetyl]piperidin-4-yl)-1,3-thiazol-4-yl]-4,5-dihydro-1,2-oxazol-5-yl}phenyl methanesulfonate (G.5.2), 2-{3-[2-(1-[[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]acetyl]piperidin-4-yl)-1,3-thiazol-4-yl]-4,5-dihydro-1,2-oxazol-5-yl}-3-chlorophenyl methanesul-
35 fonate (G.5.3);
- H) Inhibitors with Multi Site Action
- inorganic active substances: Bordeaux mixture (H.1.1), copper acetate (H.1.2), copper hydroxide (H.1.3), copper oxychloride (H.1.4), basic copper sulfate (H.1.5), sulfur (H.1.6);
- thio- and dithiocarbamates: ferbam (H.2.1), mancozeb (H.2.2), maneb (H.2.3), metam
40 (H.2.4), metiram (H.2.5), propineb (H.2.6), thiram (H.2.7), zineb (H.2.8), ziram (H.2.9);
- organochlorine compounds (e. g. phthalimides, sulfamides, chloronitriles): anilazine (H.3.1), chlorothalonil (H.3.2), captafol (H.3.3), captan (H.3.4), folpet (H.3.5), dichlofluanid (H.3.6), dichlorophen (H.3.7), hexachlorobenzene (H.3.8), pentachlorophenol (H.3.9) and its

salts, phthalide (H.3.10), tolylfluanid (H.3.11), N-(4-chloro-2-nitro-phenyl)-N-ethyl-4-methyl-benzenesulfonamide (H.3.12);

- guanidines and others: guanidine (H.4.1), dodine (H.4.2), dodine free base (H.4.3), guazatine (H.4.4), guazatine-acetate (H.4.5), iminoctadine (H.4.6), iminoctadine-triacetate (H.4.7), iminoctadine-tris(albesilate) (H.4.8), dithianon (H.4.9), 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetraone (H.4.10);

I) Cell wall synthesis inhibitors

- inhibitors of glucan synthesis: validamycin (I.1.1), polyoxin B (I.1.2);
- melanin synthesis inhibitors: pyroquilon (I.2.1), tricyclazole (I.2.2), carpropamid (I.2.3), di-cyclomet (I.2.4), fenoxanil (I.2.5);

J) Plant defence inducers

- acibenzolar-S-methyl (J.1.1), probenazole (J.1.2), isotianil (J.1.3), tiadinil (J.1.4), prohexa-dione-calcium (J.1.5); phosphonates: fosetyl (J.1.6), fosetyl-aluminum (J.1.7), phosphorous acid and its salts (J.1.8), potassium or sodium bicarbonate (J.1.9);

K) Unknown mode of action

- bronopol (K.1.1), chinomethionat (K.1.2), cyflufenamid (K.1.3), cymoxanil (K.1.4), dazomet (K.1.5), debacarb (K.1.6), diclomezine (K.1.7), difenzoquat (K.1.8), difenzoquat-methylsulfate (K.1.9), diphenylamin (K.1.10), fenpyrazamine (K.1.11), flumetover (K.1.12), flusulfamide (K.1.13), flutianil (K.1.14), methasulfocarb (K.1.15), nitrapyrin (K.1.16), nitrothal-isopropyl (K.1.18), oxathiapiprolin (K.1.19), tolprocarb (K.1.20), oxin-copper (K.1.21), proquinazid (K.1.22), tebufloquin (K.1.23), tecloftalam (K.1.24), triazoxide (K.1.25), 2-butoxy-6-iodo-3-propylchromen-4-one (K.1.26), 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-{5-[2-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl}-1,3-thiazol-2-yl)piperidin-1-yl]ethanone (K.1.27), 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-{5-[2-fluoro-6-(prop-2-yn-1-yl-oxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl}-1,3-thiazol-2-yl)piperidin-1-yl]ethanone (K.1.28), 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-{5-[2-chloro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl}-1,3-thiazol-2-yl)piperidin-1-yl]ethanone (K.1.29), N-(cyclo-propylmethoxyimino-(6-difluoro-methoxy-2,3-difluoro-phenyl)-methyl)-2-phenyl acetamide (K.1.30), N'-(4-(4-chloro-3-trifluoromethyl-phenoxy)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine (K.1.31), N'-(4-(4-fluoro-3-trifluoromethyl-phenoxy)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine (K.1.32), N'-(2-methyl-5-trifluoromethyl-4-(3-trimethylsilanyl-propoxy)-phenyl)-N-ethyl-N-methyl formamidine (K.1.33), N'-(5-difluoromethyl-2-methyl-4-(3-tri-methylsilanyl-propoxy)-phenyl)-N-ethyl-N-methyl formamidine (K.1.34), methoxy-acetic acid 6-tert-butyl-8-fluoro-2,3-dimethyl-quinolin-4-yl ester (K.1.35), 3-[5-(4-methylphenyl)-2,3-dimethyl-isoxazolidin-3-yl]-pyridine (K.1.36), 3-[5-(4-chloro-phenyl)-2,3-dimethyl-isoxazolidin-3-yl]-pyridine (pyrisoxazole) (K.1.37), N-(6-methoxy-pyridin-3-yl) cyclopropanecarboxylic acid amide (K.1.38), 5-chloro-1-(4,6-dimethoxy-pyrimidin-2-yl)-2-methyl-1H-benzoimidazole (K.1.39), 2-(4-chloro-phenyl)-N-[4-(3,4-dimethoxy-phenyl)-isoxazol-5-yl]-2-prop-2-ynyloxy-acetamide, ethyl (Z)-3-amino-2-cyano-3-phenyl-prop-2-enoate (K.1.40), picarbutrazox (K.1.41), pentyl N-[6-[[[(Z)-[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate (K.1.42), 2-[2-[(7,8-difluoro-2-methyl-3-quinolyl)oxy]-6-fluoro-phenyl]propan-2-ol (K.1.43), 2-[2-fluoro-6-[(8-fluoro-2-methyl-3-quinolyl)oxy]phen-yl]propan-2-ol (K.1.44), 3-(5-fluoro-3,3,4,4-tetramethyl-3,4-dihydroisoquinolin-1-yl)quinoline (K.1.45), 3-(4,4-difluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-

yl)quinoline (K.1.46), 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-yl)quinoline (K.1.47), 9-fluoro-2,2-dimethyl-5-(3-quinolyl)-3H-1,4-benzoxazepine (K.1.48).

The fungicides described by common names, their preparation and their activity e.g. against harmful fungi is known (cf.: <http://www.alanwood.net/pesticides/>); these substances are commercially available.

The fungicides described by IUPAC nomenclature, their preparation and their pesticidal activity is also known (cf. Can. J. Plant Sci. 48(6), 587-94, 1968; EP-A 141 317; EP-A 152 031; EP-A 226 917; EP-A 243 970; EP-A 256 503; EP-A 428 941; EP-A 532 022; EP-A 1 028 125; EP-A 1 035 122; EP-A 1 201 648; EP-A 1 122 244, JP 2002316902; DE 19650197; DE 10021412; DE 102005009458; US 3,296,272; US 3,325,503; WO 98/46608; WO 99/14187; WO 99/24413; WO 99/27783; WO 00/29404; WO 00/46148; WO 00/65913; WO 01/54501; WO 01/56358; WO 02/22583; WO 02/40431; WO 03/10149; WO 03/11853; WO 03/14103; WO 03/16286; WO 03/53145; WO 03/61388; WO 03/66609; WO 03/74491; WO 04/49804; WO 04/83193; WO 05/120234; WO 05/123689; WO 05/123690; WO 05/63721; WO 05/87772; WO 05/87773; WO 06/15866; WO 06/87325; WO 06/87343; WO 07/82098; WO 07/90624, WO 11/028657, WO2012/168188, WO 2007/006670, WO 2011/77514; WO13/047749, WO 10/069882, WO 13/047441, WO 03/16303, WO 09/90181, WO 13/007767, WO 13/010862, WO 13/127704, WO 13/024009, WO 13/024010 and WO 13/047441, WO 13/162072, WO 13/092224, WO 11/135833).

The following compounds are preferred in mixtures with compounds of formula (I):

With regard to the methods and uses of pesticidal mixtures of the present invention, a compound II selected from the group of the azoles is preferred, especially prochloraz, prothioconazole, tebuconazole and triticonazole, especially prothioconazole and triticonazole.

Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with triticonazole as compound II are particularly preferred. Mixtures of compounds of formula I as individualized herein, e.g. in Table A, Table A' or Table A'', with prothioconazole as compound II are particularly preferred.

With regard to the methods and uses of pesticidal mixtures of the present invention, preferred is a compound II selected from the group of benomyl, carbendazim, epoxiconazole, fluquinconazole, flutriafol, flusilazole, metconazole, prochloraz, prothioconazole, tebuconazole, triticonazole, pyraclostrobin, trifloxystrobin, boscalid, dimethomorph, penthiopyrad, dodemorph, famoxadone, fenpropimorph, proquinazid, pyrimethanil, tridemorph, compound II-TFPTAP (5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)-[1,2,4]triazolo[1,5-a]pyrimidine), maneb, mancozeb, metiram, thiram, chlorothalonil, dithianon, flusulfamide, metrafenone, fluxapyroxad (N-(3',4',5' trifluorobiphenyl-2 yl)-3-difluoromethyl-1-methyl-1H-pyrazole-4 carboxamide), bixafen, penflufen, sedaxane, isopyrazam. Especially preferred is pyraclostrobin and fluxapyroxad.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with pyraclostrobin is applied, preferably in the methods for seed treatment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the plant propagation material of the cultivated plant, preferably seeds, wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more

specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with pyraclostrobin is applied, preferably in the methods for foliar treat-

5 ment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the cultivated plant, parts of the cultivated plant or to their habitat wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

10 In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with fluxapyroxad is applied, preferably in the methods for foliar treatment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the cultivated plant, parts of the cultivated plant or to their habitat wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically
15 compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

In a preferred embodiment, in the methods and uses according to the invention, a compound of formula (I) in mixture with an azole is applied, preferably in the methods for foliar treatment, i.e. methods, wherein the compound of formula (I) or a mixture thereof is applied to the cultivated
20 plant, parts of the cultivated plant or to their habitat wherein the compound of formula (I) is preferably selected from the compounds I-1 to I-82 as defined in Table A, more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31 as defined in Table A'.

25 Surprisingly, it has now been found that the use of compounds of formula I and their mixtures as defined herein in cultivated plants displays a synergistic effect between the trait of the cultivated plant and the applied compounds of formula I and their mixtures.

In a particular preferred embodiment, the mixtures comprise as an additional component which is the compound against which the cultivated plant is resistant.

30 In general, the ratios by weight for the respective mixtures comprising the insecticidal compound I and compound II are from 1:500 to 500:1, preferably from 1:100 to 100:1, more preferably from 1:25 to 25:1.

We have found that the application of compounds of formula I and their mixtures (in case of the mixtures, the simultaneous, that is joint or separate, application of the compound I and compound II or successive application of the compound I and compound II) on cultivated plants allows enhanced control of animal pests, compared to the control rates that are possible by application of compounds of formula I and their mixtures on non-cultivated plants.

Formulations

40 The invention also relates to agrochemical compositions comprising an auxiliary and at least one compound of the present invention or a mixture thereof.

An agrochemical composition comprises a pesticidally effective amount of a compound of the present invention or a mixture thereof. The term "pesticidally effective amount" is defined below. The compounds of the present invention or the mixtures thereof can be converted into customary types of agro-chemical compositions, e. g. solutions, emulsions, suspensions, dusts, powders, pastes, granules, pressings, capsules, and mixtures thereof. Examples for composition types are suspensions (e.g. SC, OD, FS), emulsifiable concentrates (e.g. EC), emulsions (e.g. EW, EO, ES, ME), capsules (e.g. CS, ZC), pastes, pastilles, wettable powders or dusts (e.g. WP, SP, WS, DP, DS), pressings (e.g. BR, TB, DT), granules (e.g. WG, SG, GR, FG, GG, MG), insecticidal articles (e.g. LN), as well as gel formulations for the treatment of plant propagation materials such as seeds (e.g. GF). These and further compositions types are defined in the "Catalogue of pesticide formulation types and international coding system", Technical Monograph No. 2, 6th Ed. May 2008, CropLife International.

The compositions are prepared in a known manner, such as described by Mollet and Grubemann, Formulation technology, Wiley VCH, Weinheim, 2001; or Knowles, New developments in crop protection product formulation, Agrow Reports DS243, T&F Informa, London, 2005.

Examples for suitable auxiliaries are solvents, liquid carriers, solid carriers or fillers, surfactants, dispersants, emulsifiers, wetters, adjuvants, solubilizers, penetration enhancers, protective colloids, adhesion agents, thickeners, humectants, repellents, attractants, feeding stimulants, compatibilizers, bactericides, anti-freezing agents, anti-foaming agents, colorants, tackifiers and binders.

Suitable solvents and liquid carriers are water and organic solvents, such as mineral oil fractions of medium to high boiling point, e.g. kerosene, diesel oil; oils of vegetable or animal origin; aliphatic, cyclic and aromatic hydrocarbons, e. g. toluene, paraffin, tetrahydronaphthalene, alkylated naphthalenes; alcohols, e.g. ethanol, propanol, butanol, benzylalcohol, cyclohexanol; glycols; DMSO; ketones, e.g. cyclohexanone; esters, e.g. lactates, carbonates, fatty acid esters, gamma-butyrolactone; fatty acids; phosphonates; amines; amides, e.g. N-methylpyrrolidone, fatty acid dimethylamides; and mixtures thereof.

Suitable solid carriers or fillers are mineral earths, e.g. silicates, silica gels, talc, kaolins, limestone, lime, chalk, clays, dolomite, diatomaceous earth, bentonite, calcium sulfate, magnesium sulfate, magnesium oxide; polysaccharide powders, e.g. cellulose, starch; fertilizers, e.g. ammonium sulfate, ammonium phosphate, ammonium nitrate, ureas; products of vegetable origin, e.g. cereal meal, tree bark meal, wood meal, nutshell meal, and mixtures thereof.

Suitable surfactants are surface-active compounds, such as anionic, cationic, nonionic and amphoteric surfactants, block polymers, polyelectrolytes, and mixtures thereof. Such surfactants can be used as emulsifier, dispersant, solubilizer, wetter, penetration enhancer, protective colloid, or adjuvant. Examples of surfactants are listed in McCutcheon's, Vol.1: Emulsifiers & Detergents, McCutcheon's Directories, Glen Rock, USA, 2008 (International Ed. or North American Ed.).

Suitable anionic surfactants are alkali, alkaline earth or ammonium salts of sulfonates, sulfates, phosphates, carboxylates, and mixtures thereof. Examples of sulfonates are alkylaryl-sulfonates, diphenylsulfonates, alpha-olefin sulfonates, lignine sulfonates, sulfonates of fatty acids and oils, sulfonates of ethoxylated alkylphenols, sulfonates of alkoxylated arylphenols, sulfonates of condensed naphthalenes, sulfonates of dodecyl- and tridecylbenzenes, sulfonates

of naphthalenes and alkyl-naphthalenes, sulfosuccinates or sulfosuccinamates. Examples of sulfates are sulfates of fatty acids and oils, of ethoxylated alkylphenols, of alcohols, of ethoxylated alcohols, or of fatty acid esters. Examples of phosphates are phosphate esters. Examples of carboxylates are alkyl carboxylates, and carboxylated alcohol or alkylphenol ethoxylates.

Suitable nonionic surfactants are alkoxyates, N-substituted fatty acid amides, amine oxides, esters, sugar-based surfactants, polymeric surfactants, and mixtures thereof. Examples of alkoxyates are compounds such as alcohols, alkylphenols, amines, amides, arylphenols, fatty acids or fatty acid esters which have been alkoxyated with 1 to 50 equivalents. Ethylene oxide and/or propylene oxide may be employed for the alkoxylation, preferably ethylene oxide. Examples of N-substituted fatty acid amides are fatty acid glucamides or fatty acid alkanolamides. Examples of esters are fatty acid esters, glycerol esters or monoglycerides. Examples of sugar-based surfactants are sorbitans, ethoxylated sorbitans, sucrose and glucose esters or alkylpolyglucosides. Examples of polymeric surfactants are homo- or copolymers of vinylpyrrolidone, vinylalcohols, or vinylacetate.

Suitable cationic surfactants are quaternary surfactants, for example quaternary ammonium compounds with one or two hydrophobic groups, or salts of long-chain primary amines. Suitable amphoteric surfactants are alkylbetains and imidazolines. Suitable block polymers are block polymers of the A-B or A-B-A type comprising blocks of polyethylene oxide and polypropylene oxide, or of the A-B-C type comprising alkanol, polyethylene oxide and polypropylene oxide. Suitable polyelectrolytes are polyacids or polybases. Examples of polyacids are alkali salts of polyacrylic acid or polyacid comb polymers. Examples of polybases are polyvinylamines or polyethylenamines.

Suitable adjuvants are compounds, which have a neglectable or even no pesticidal activity themselves, and which improve the biological performance of the compounds of the present invention on the target. Examples are surfactants, mineral or vegetable oils, and other auxiliaries. Further examples are listed by Knowles, Adjuvants and additives, Agrow Reports DS256, T&F Informa UK, 2006, chapter 5.

Suitable thickeners are polysaccharides (e.g. xanthan gum, carboxymethylcellulose), anorganic clays (organically modified or unmodified), polycarboxylates, and silicates.

Suitable bactericides are bronopol and isothiazolinone derivatives such as alkylisothiazolinones and benzisothiazolinones.

Suitable anti-freezing agents are ethylene glycol, propylene glycol, urea and glycerin.

Suitable anti-foaming agents are silicones, long chain alcohols, and salts of fatty acids.

Suitable colorants (e.g. in red, blue, or green) are pigments of low water solubility and water-soluble dyes. Examples are inorganic colorants (e.g. iron oxide, titan oxide, iron hexacyanoferrate) and organic colorants (e.g. alizarin-, azo- and phthalocyanine colorants).

Suitable tackifiers or binders are polyvinylpyrrolidons, polyvinylacetates, polyvinyl alcohols, polyacrylates, biological or synthetic waxes, and cellulose ethers.

The agrochemical compositions generally comprise between 0.01 and 95%, preferably between 0.1 and 90%, and most preferably between 0.5 and 75%, by weight of active substance. The active substances are employed in a purity of from 90% to 100%, preferably from 95% to 100% (according to NMR spectrum).

Various types of oils, wetters, adjuvants, fertilizer, or micronutrients, and other pesticides (e.g. herbicides, insecticides, fungicides, growth regulators, safeners) may be added to the active substances or the compositions comprising them as premix or, if appropriate not until immediately prior to use (tank mix). These agents can be admixed with the compositions according to the invention in a weight ratio of 1:100 to 100:1, preferably 1:10 to 10:1.

The user applies the composition according to the invention usually from a predosage device, a knapsack sprayer, a spray tank, a spray plane, or an irrigation system. Usually, the agrochemical composition is made up with water, buffer, and/or further auxiliaries to the desired application concentration and the ready-to-use spray liquor or the agrochemical composition according to the invention is thus obtained. Usually, 20 to 2000 liters, preferably 50 to 400 liters, of the ready-to-use spray liquor are applied per hectare of agricultural useful area.

According to one embodiment, individual components of the composition according to the invention such as parts of a kit or parts of a binary or ternary mixture may be mixed by the user himself in a spray tank and further auxiliaries may be added, if appropriate.

In a further embodiment, either individual components of the composition according to the invention or partially premixed components, e. g. components comprising compounds of the present invention and/or mixing partners as defined above, may be mixed by the user in a spray tank and further auxiliaries and additives may be added, if appropriate.

In a further embodiment, either individual components of the composition according to the invention or partially premixed components, e. g. components comprising compounds of the present invention and/or mixing partners as defined above, can be applied jointly (e.g. after tank mix) or consecutively.

Application methods

The compounds of the present invention are suitable for use in protecting crops, plants, plant propagation materials, such as seeds, or soil or water, in which the plants are growing, from attack or infestation by animal pests. Therefore, the present invention also relates to a plant protection method, which comprises contacting crops, plants, plant propagation materials, such as seeds, or soil or water, in which the plants are growing, to be protected from attack or infestation by animal pests, with a pesticidally effective amount of a compound of the present invention.

The compounds of the present invention are also suitable for use in combating or controlling animal pests. Therefore, the present invention also relates to a method of combating or controlling animal pests, which comprises contacting the animal pests, their habitat, breeding ground, or food supply, or the crops, plants, plant propagation materials, such as seeds, or soil, or the area, material or environment in which the animal pests are growing or may grow, with a pesticidally effective amount of a compound of the present invention.

The compounds of the present invention are effective through both contact and ingestion. Furthermore, the compounds of the present invention can be applied to any and all developmental stages, such as egg, larva, pupa, and adult.

The compounds of the present invention can be applied as such or in form of compositions comprising them as defined above. Furthermore, the compounds of the present invention can be applied together with a mixing partner as defined above or in form of compositions compris-

ing said mixtures as defined above. The components of said mixture can be applied simultaneously, jointly or separately, or in succession, that is immediately one after another and thereby creating the mixture "in situ" on the desired location, e.g. the plant, the sequence, in the case of separate application, generally not having any effect on the result of the control measures.

- 5 The application can be carried out both before and after the infestation of the crops, plants, plant propagation materials, such as seeds, soil, or the area, material or environment by the pests.

Suitable application methods include inter alia soil treatment, seed treatment, in furrow application, and foliar application. Soil treatment methods include drenching the soil, drip irrigation (drip application onto the soil), dipping roots, tubers or bulbs, or soil injection. Seed treatment techniques include seed dressing, seed coating, seed dusting, seed soaking, and seed pelleting. In furrow applications typically include the steps of making a furrow in cultivated land, seeding the furrow with seeds, applying the pesticidally active compound to the furrow, and closing the furrow. Foliar application refers to the application of the pesticidally active compound to plant foliage, e.g. through spray equipment. For foliar applications, it can be advantageous to modify the behavior of the pests by use of pheromones in combination with the compounds of the present invention. Suitable pheromones for specific crops and pests are known to a skilled person and publicly available from databases of pheromones and semiochemicals, such as <http://www.pherobase.com>.

- 20 As used herein, the term "contacting" includes both direct contact (applying the compounds/compositions directly on the animal pest or plant - typically to the foliage, stem or roots of the plant) and indirect contact (applying the compounds/compositions to the locus, i.e. habitat, breeding ground, plant, seed, soil, area, material or environment in which a pest is growing or may grow, of the animal pest or plant).

- 25 The term "animal pest" includes arthropods, gastropods, and nematodes. Preferred animal pests according to the invention are arthropods, preferably insects and arachnids, in particular insects. Insects, which are of particular relevance for crops, are typically referred to as crop insect pests.

The term "crop" refers to both, growing and harvested crops.

- 30 The term "plant" includes cereals, e.g. durum and other wheat, rye, barley, triticale, oats, rice, or maize (fodder maize and sugar maize / sweet and field corn); beet, e.g. sugar beet or fodder beet; fruits, such as pomes, stone fruits or soft fruits, e.g. apples, pears, plums, peaches, nectarines, almonds, cherries, papayas, strawberries, raspberries, blackberries or gooseberries; leguminous plants, such as beans, lentils, peas, alfalfa or soybeans; oil plants, such as rape-seed (oilseed rape), turnip rape, mustard, olives, sunflowers, coconut, cocoa beans, castor oil plants, oil palms, ground nuts or soybeans; cucurbits, such as squashes, pumpkins, cucumber or melons; fiber plants, such as cotton, flax, hemp or jute; citrus fruit, such as oranges, lemons, grapefruits or mandarins; vegetables, such as eggplant, spinach, lettuce (e.g. iceberg lettuce), chicory, cabbage, asparagus, cabbages, carrots, onions, garlic, leeks, tomatoes, potatoes, cucurbits or sweet peppers; lauraceous plants, such as avocados, cinnamon or camphor; energy and raw material plants, such as corn, soybean, rapeseed, sugar cane or oil palm; tobacco; nuts, e.g. walnuts; pistachios; coffee; tea; bananas; vines (table grapes and grape juice grape vines); hop; sweet leaf (also called Stevia); natural rubber plants or ornamental and forestry

plants, such as flowers (e.g. carnation, petunias, geranium/pelargoniums, pansies and impatiens), shrubs, broad-leaved trees (e.g. poplar) or evergreens, e.g. conifers; eucalyptus; turf; lawn; grass such as grass for animal feed or ornamental uses. Preferred plants include potatoes sugar beets, tobacco, wheat, rye, barley, oats, rice, corn, cotton, soybeans, rapeseed, legumes, sunflowers, coffee or sugar cane; fruits; vines; ornamentals; or vegetables, such as cucumbers, tomatoes, beans or squashes.

The term "plant" is to be understood as including wild type plants and plants, which have been modified by either conventional breeding, or mutagenesis or genetic engineering, or by a combination thereof.

Plants, which have been modified by mutagenesis or genetic engineering, and are of particular commercial importance, include alfalfa, rapeseed (e.g. oilseed rape), bean, carnation, chicory, cotton, eggplant, eucalyptus, flax, lentil, maize, melon, papaya, petunia, plum, poplar, potato, rice, soybean, squash, sugar beet, sugarcane, sunflower, sweet pepper, tobacco, tomato, and cereals (e.g. wheat), in particular maize, soybean, cotton, wheat, and rice. In plants, which have been modified by mutagenesis or genetic engineering, one or more genes have been mutagenized or integrated into the genetic material of the plant. The one or more mutagenized or integrated genes are preferably selected from *pat*, *epsps*, *cry1Ab*, *bar*, *cry1Fa2*, *cry1Ac*, *cry34Ab1*, *cry35AB1*, *cry3A*, *cryF*, *cry1F*, *mcry3a*, *cry2Ab2*, *cry3Bb1*, *cry1A.105*, *dfr*, *barnase*, *vip3Aa20*, *barstar*, *als*, *bxn*, *bp40*, *asn1*, and *ppo5*. The mutagenesis or integration of the one or more genes is performed in order to improve certain properties of the plant. Such properties, also known as traits, include abiotic stress tolerance, altered growth/yield, disease resistance, herbicide tolerance, insect resistance, modified product quality, and pollination control. Of these properties, herbicide tolerance, e.g. imidazolinone tolerance, glyphosate tolerance, or glufosinate tolerance, is of particular importance. Several plants have been rendered tolerant to herbicides by mutagenesis, for example Clearfield® oilseed rape being tolerant to imidazolinones, e.g. imazamox. Alternatively, genetic engineering methods have been used to render plants, such as soybean, cotton, corn, beets and oil seed rape, tolerant to herbicides, such as glyphosate and glufosinate, some of which are commercially available under the trade names RoundupReady® (glyphosate) and LibertyLink® (glufosinate). Furthermore, insect resistance is of importance, in particular lepidopteran insect resistance and coleopteran insect resistance. Insect resistance is typically achieved by modifying plants by integrating *cry* and/or *vip* genes, which were isolated from *Bacillus thuringiensis* (Bt), and code for the respective Bt toxins. Genetically modified plants with insect resistance are commercially available under trade names including WideStrike®, Bollgard®, Agrisure®, Herculex®, YieldGard®, Genuity®, and Intacta®.

Plants may be modified by mutagenesis or genetic engineering either in terms of one property (singular traits) or in terms of a combination of properties (stacked traits). Stacked traits, e.g. the combination of herbicide tolerance and insect resistance, are of increasing importance. In general, all relevant modified plants in connection with singular or stacked traits as well as detailed information as to the mutagenized or integrated genes and the respective events are available from websites of the organizations "International Service for the Acquisition of Agri-biotech Applications (ISAAA)" (<http://www.isaaa.org/gmaprovaldatabase>) and "Center for Environmental Risk Assessment (CERA)" (<http://cera-gmc.org/GMCropDatabase>).

It has surprisingly been found that the pesticidal activity of the compounds of the present invention may be enhanced by the insecticidal trait of a modified plant. Furthermore, it has been found that the compounds of the present invention are suitable for preventing insects to become resistant to the insecticidal trait or for combating pests, which already have become resistant to the insecticidal trait of a modified plant. Moreover, the compounds of the present invention are suitable for combating pests, against which the insecticidal trait is not effective, so that a complementary insecticidal activity can advantageously be used.

The term "plant propagation material" refers to all the generative parts of the plant such as seeds and vegetative plant material such as cuttings and tubers (e.g. potatoes), which can be used for the multiplication of the plant. This includes seeds, roots, fruits, tubers, bulbs, rhizomes, shoots, sprouts and other parts of plants. Seedlings and young plants, which are to be transplanted after germination or after emergence from soil, may also be included. These plant propagation materials may be treated prophylactically with a plant protection compound either at or before planting or transplanting.

The term "seed" embraces seeds and plant propagules of all kinds including but not limited to true seeds, seed pieces, suckers, corms, bulbs, fruit, tubers, grains, cuttings, cut shoots and the like, and means in a preferred embodiment true seeds.

In general, "pesticidally effective amount" means the amount of active ingredient needed to achieve an observable effect on growth, including the effects of necrosis, death, retardation, prevention, and removal, destruction, or otherwise diminishing the occurrence and activity of the target organism. The pesticidally effective amount can vary for the various compounds/compositions used in the invention. A pesticidally effective amount of the compositions will also vary according to the prevailing conditions such as desired pesticidal effect and duration, weather, target species, locus, mode of application, and the like.

In the case of soil treatment, in furrow application or of application to the pests dwelling place or nest, the quantity of active ingredient ranges from 0.0001 to 500 g per 100 m², preferably from 0.001 to 20 g per 100 m².

For use in treating crop plants, e.g. by foliar application, the rate of application of the active ingredients of this invention may be in the range of 0.0001 g to 4000 g per hectare, e.g. from 1 g to 2 kg per hectare or from 1 g to 750 g per hectare, desirably from 1 g to 100 g per hectare, more desirably from 10 g to 50 g per hectare, e.g., 10 to 20 g per hectare, 20 to 30 g per hectare, 30 to 40 g per hectare, or 40 to 50 g per hectare.

The compounds of the present invention are particularly suitable for use in the treatment of seeds in order to protect the seeds from insect pests, in particular from soil-living insect pests, and the resulting seedling's roots and shoots against soil pests and foliar insects. The present invention therefore also relates to a method for the protection of seeds from insects, in particular from soil insects, and of the seedling's roots and shoots from insects, in particular from soil and foliar insects, said method comprising treating the seeds before sowing and/or after pregermination with a compound of the present invention. The protection of the seedling's roots and shoots is preferred. More preferred is the protection of seedling's shoots from piercing and sucking insects, chewing insects and nematodes.

The term "seed treatment" comprises all suitable seed treatment techniques known in the art, such as seed dressing, seed coating, seed dusting, seed soaking, seed pelleting, and in-furrow application methods. Preferably, the seed treatment application of the active compound is carried out by spraying or by dusting the seeds before sowing of the plants and before emergence of the plants.

The present invention also comprises seeds coated with or containing the active compound. The term "coated with and/or containing" generally signifies that the active ingredient is for the most part on the surface of the propagation product at the time of application, although a greater or lesser part of the ingredient may penetrate into the propagation product, depending on the method of application. When the said propagation product is (re)planted, it may absorb the active ingredient.

Suitable seed is for example seed of cereals, root crops, oil crops, vegetables, spices, ornamentals, for example seed of durum and other wheat, barley, oats, rye, maize (fodder maize and sugar maize / sweet and field corn), soybeans, oil crops, crucifers, cotton, sunflowers, bananas, rice, oilseed rape, turnip rape, sugarbeet, fodder beet, eggplants, potatoes, grass, lawn, turf, fodder grass, tomatoes, leeks, pumpkin/squash, cabbage, iceberg lettuce, pepper, cucumbers, melons, Brassica species, melons, beans, peas, garlic, onions, carrots, tuberous plants such as potatoes, sugar cane, tobacco, grapes, petunias, geranium/pelargoniums, pansies and impatiens.

In addition, the active compound may also be used for the treatment of seeds from plants, which have been modified by mutagenesis or genetic engineering, and which e.g. tolerate the action of herbicides or fungicides or insecticides. Such modified plants have been described in detail above.

Conventional seed treatment formulations include for example flowable concentrates FS, solutions LS, suspoemulsions (SE), powders for dry treatment DS, water dispersible powders for slurry treatment WS, water-soluble powders SS and emulsion ES and EC and gel formulation GF. These formulations can be applied to the seed diluted or undiluted. Application to the seeds is carried out before sowing, either directly on the seeds or after having pregerminated the latter. Preferably, the formulations are applied such that germination is not included.

The active substance concentrations in ready-to-use formulations, which may be obtained after two-to-tenfold dilution, are preferably from 0.01 to 60% by weight, more preferably from 0.1 to 40 % by weight.

In a preferred embodiment a FS formulation is used for seed treatment. Typically, a FS formulation may comprise 1-800 g/l of active ingredient, 1-200 g/l Surfactant, 0 to 200 g/l antifreezing agent, 0 to 400 g/l of binder, 0 to 200 g/l of a pigment and up to 1 liter of a solvent, preferably water.

Especially preferred FS formulations of the compounds of the present invention for seed treatment usually comprise from 0.1 to 80% by weight (1 to 800 g/l) of the active ingredient, from 0.1 to 20 % by weight (1 to 200 g/l) of at least one surfactant, e.g. 0.05 to 5 % by weight of a wetter and from 0.5 to 15 % by weight of a dispersing agent, up to 20 % by weight, e.g. from 5 to 20 % of an anti-freeze agent, from 0 to 15 % by weight, e.g. 1 to 15 % by weight of a pigment and/or a dye, from 0 to 40 % by weight, e.g. 1 to 40 % by weight of a binder (sticker /adhesion agent), optionally up to 5 % by weight, e.g. from 0.1 to 5 % by weight of a thickener, optionally from 0.1

to 2 % of an anti-foam agent, and optionally a preservative such as a biocide, antioxidant or the like, e.g. in an amount from 0.01 to 1 % by weight and a filler/vehicle up to 100 % by weight.

In the treatment of seed, the application rates of the compounds of the invention are generally from 0.1 g to 10 kg per 100 kg of seed, preferably from 1 g to 5 kg per 100 kg of seed, more preferably from 1 g to 1000 g per 100 kg of seed and in particular from 1 g to 200 g per 100 kg of seed, e.g. from 1 g to 100 g or from 5 g to 100 g per 100 kg of seed.

The invention therefore also relates to seed comprising a compound of the present invention, or an agriculturally useful salt thereof, as defined herein. The amount of the compound of the present invention or the agriculturally useful salt thereof will in general vary from 0.1 g to 10 kg per 100 kg of seed, preferably from 1 g to 5 kg per 100 kg of seed, in particular from 1 g to 1000 g per 100 kg of seed. For specific crops such as lettuce the rate can be higher.

The compounds of the present invention may also be used for improving the health of a plant. Therefore, the present invention also relates to a method for improving plant health by treating a plant, plant propagation material and/or the locus where the plant is growing or is to grow with an effective and non-phytotoxic amount of a compound of the present invention.

As used herein "an effective and non-phytotoxic amount" means that the compound is used in a quantity which allows to obtain the desired effect but which does not give rise to any phytotoxic symptom on the treated plant or on the plant grown from the treated propagule or treated soil.

The terms "plant" and "plant propagation material" are defined above.

"Plant health" is defined as a condition of the plant and/or its products which is determined by several aspects alone or in combination with each other such as yield (for example increased biomass and/or increased content of valuable ingredients), quality (for example improved content or composition of certain ingredients or shelf life), plant vigour (for example improved plant growth and/or greener leaves ("greening effect"), tolerance to abiotic (for example drought) and/or biotic stress (for example disease) and production efficiency (for example, harvesting efficiency, processability).

The above identified indicators for the health condition of a plant may be interdependent and may result from each other. Each indicator is defined in the art and can be determined by methods known to a skilled person.

Plant health

In a preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of a cultivated plant, in particular the yield of a cultivated plant, by treating plant propagation material, preferably seeds with compounds of formula I and their mixtures.

The present invention also comprises plant propagation material, preferably seed, of a cultivated plant treated with compounds of formula I and their mixtures.

In another preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of a cultivated plant, in particular the yield of a cultivated plant by treating the cultivated plant, part(s) of such plant or at its locus of growth with compounds of formula I and their mixtures.

The term cultivated plant(s) includes “modified plant(s)” and “transgenic plant(s)”.

In one embodiment of the invention, the term “cultivated plants” refers to “modified plants”. In one embodiment of the invention, the term “cultivated plants” refers to “transgenic plants”. “Modified plants” are those which have been modified by conventional breeding techniques. The term “modification” means in relation to modified plants a change in the genome, epigenome, transcriptome or proteome of the modified plant, as compared to the control, wild type, mother or parent plant whereby the modification confers a trait (or more than one trait) or confers the increase of a trait (or more than one trait) as listed below.

The modification may result in the modified plant to be a different, for example a new plant variety than the parental plant.

“Transgenic plants” are those, which genetic material has been modified by the use of recombinant DNA techniques that under natural circumstances can not readily be obtained by cross breeding, mutations or natural recombination, whereby the modification confers a trait (or more than one trait) or confers the increase of a trait (or more than one trait) as listed below as compared to the wild-type plant.

In one embodiment, one or more genes have been integrated into the genetic material of a genetically modified plant in order to improve certain properties of the plant, preferably increase a trait as listed below as compared to the wild-type plant. Such genetic modifications also include but are not limited to targeted post-translational modification of protein(s), or to post-transcriptional modifications of oligo- or polypeptides e.g. by glycosylation or polymer additions such as prenylated, acetylated, phosphorylated or farnesylated moieties or PEG moieties.

In one embodiment under the term “modification” when referring to a transgenic plant or parts thereof is understood that the activity, expression level or amount of a gene product or the metabolite content is changed, e.g. increased or decreased, in a specific volume relative to a corresponding volume of a control, reference or wild-type plant or plant cell, including the de novo creation of the activity or expression.

In one embodiment the activity of a polypeptide is increased or generated by expression or overexpression of the gene coding for said polypeptide which confers a trait or confers the increase of a trait as listed below as compared to the control plant. The term “expression” or “gene expression” means the transcription of a specific gene or specific genes or specific genetic construct. The term “expression” or “gene expression” in particular means the transcription of a gene or genes or genetic construct into structural RNA (rRNA, tRNA), regulatory RNA (e.g. miRNA, RNAi, RNAa) or mRNA with or without subsequent translation of the latter into a protein. In another embodiment the term “expression” or “gene expression” in particular means the transcription of a gene or genes or genetic construct into structural RNA (rRNA, tRNA) or mRNA with or without subsequent translation of the latter into a protein. In yet another embodiment it means the transcription of a gene or genes or genetic construct into mRNA.

The process includes transcription of DNA and processing of the resulting mRNA product. The term “increased expression” or “overexpression” as used herein means any form of expression that is additional to the original wild-type expression level.

The term “expression of a polypeptide” is understood in one embodiment to mean the level of said protein or polypeptide, preferably in an active form, in a cell or organism.

In one embodiment the activity of a polypeptide is decreased by decreased expression of the

gene coding for said polypeptide which confers a trait or confers the increase of a trait as listed below as compared to the control plant. Reference herein to “decreased expression” or “reduction or substantial elimination” of expression is taken to mean a decrease in endogenous gene expression and/or polypeptide levels and/or polypeptide activity relative to control plants. It comprises further reducing, repressing, decreasing or deleting of an expression product of a nucleic acid molecule.

The terms “reduction”, “repression”, “decrease” or “deletion” relate to a corresponding change of a property in an organism, a part of an organism such as a tissue, seed, root, tuber, fruit, leave, flower etc. or in a cell. Under “change of a property” it is understood that the activity, expression level or amount of a gene product or the metabolite content is changed in a specific volume or in a specific amount of protein relative to a corresponding volume or amount of protein of a control, reference or wild type. Preferably, the overall activity in the volume is reduced, decreased or deleted in cases if the reduction, decrease or deletion is related to the reduction, decrease or deletion of an activity of a gene product, independent whether the amount of gene product or the specific activity of the gene product or both is reduced, decreased or deleted or whether the amount, stability or translation efficacy of the nucleic acid sequence or gene encoding for the gene product is reduced, decreased or deleted.

The terms “reduction”, “repression”, “decrease” or “deletion” include the change of said property in only parts of the subject of the present invention, for example, the modification can be found in compartment of a cell, like an organelle, or in a part of a plant, like tissue, seed, root, leave, tuber, fruit, flower etc. but is not detectable if the overall subject, i.e. complete cell or plant, is tested. Preferably, the “reduction”, “repression”, “decrease” or “deletion” is found cellular, thus the term “reduction, decrease or deletion of an activity” or “reduction, decrease or deletion of a metabolite content” relates to the cellular reduction, decrease or deletion compared to the wild type cell. In addition the terms “reduction”, “repression”, “decrease” or “deletion” include the change of said property only during different growth phases of the organism used in the inventive process, for example the reduction, repression, decrease or deletion takes place only during the seed growth or during blooming. Furthermore the terms include a transitional reduction, decrease or deletion for example because the used method, e.g. the antisense, RNAi, snRNA, dsRNA, siRNA, miRNA, ta-siRNA, cosuppression molecule, or ribozyme, is not stable integrated in the genome of the organism or the reduction, decrease, repression or deletion is under control of a regulatory or inducible element, e.g. a chemical or otherwise inducible promoter, and has therefore only a transient effect.

Methods to achieve said reduction, decrease or deletion in an expression product are known in the art, for example from the international patent application WO 2008/034648, particularly in paragraphs [0020.1.1.1], [0040.1.1.1], [0040.2.1.1] and [0041.1.1.1].

Reducing, repressing, decreasing or deleting of an expression product of a nucleic acid molecule in modified plants is known. Examples are canola i.e. double nill oilseed rape with reduced amounts of erucic acid and sinapins.

Such a decrease can also be achieved for example by the use of recombinant DNA technology, such as antisense or regulatory RNA (e.g. miRNA, RNAi, RNAa) or siRNA approaches. In particular RNAi, snRNA, dsRNA, siRNA, miRNA, ta-siRNA, cosuppression molecule, ribozyme, or antisense nucleic acid molecule, a nucleic acid molecule conferring the expression of a domi-

nant-negative mutant of a protein or a nucleic acid construct capable to recombine with and silence, inactivate, repress or reduces the activity of an endogenous gene may be used to decrease the activity of a polypeptide in a transgenic plant or parts thereof or a plant cell thereof used in one embodiment of the methods of the invention. Examples of transgenic plants with reduced, repressed, decreased or deleted expression product of a nucleic acid molecule are Carica papaya (Papaya plants) with the event name X17-2 of the University of Florida, *Prunus domestica* (Plum) with the event name C5 of the United States Department of Agriculture - Agricultural Research Service, or those listed in rows T9-48 and T9-49 of table 9 below. Also known are plants with increased resistance to nematodes for example by reducing, repressing, decreasing or deleting of an expression product of a nucleic acid molecule, e.g. from the PCT publication WO 2008/095886.

The reduction or substantial elimination is in increasing order of preference at least 10%, 20%, 30%, 40% or 50%, 60%, 70%, 80%, 85%, 90%, or 95%, 96%, 97%, 98%, 99% or more reduced compared to that of control plants. Reference herein to an "endogenous" gene not only refers to the gene in question as found in a plant in its natural form (i.e., without there being any human intervention), but also refers to that same gene (or a substantially homologous nucleic acid/gene) in an isolated form subsequently (re)introduced into a plant (a transgene). For example, a transgenic plant containing such a transgene may encounter a substantial reduction of the transgene expression and/or substantial reduction of expression of the endogenous gene.

The terms "control" or "reference" are exchangeable and can be a cell or a part of a plant such as an organelle like a chloroplast or a tissue, in particular a plant, which was not modified or treated according to the herein described process according to the invention. Accordingly, the plant used as control or reference corresponds to the plant as much as possible and is as identical to the subject matter of the invention as possible. Thus, the control or reference is treated identically or as identical as possible, saying that only conditions or properties might be different which do not influence the quality of the tested property other than the treatment of the present invention.

It is possible that control or reference plants are wild-type plants. However, "control" or "reference" may refer to plants carrying at least one genetic modification, when the plants employed in the process of the present invention carry at least one genetic modification more than said control or reference plants. In one embodiment control or reference plants may be transgenic but differ from transgenic plants employed in the process of the present invention only by said modification contained in the transgenic plants employed in the process of the present invention.

The term "wild type" or "wild-type plants" refers to a plant without said genetic modification. These terms can refer to a cell or a part of a plant such as an organelle like a chloroplast or a tissue, in particular a plant, which lacks said genetic modification but is otherwise as identical as possible to the plants with at least one genetic modification employed in the present invention. In a particular embodiment the "wild-type" plant is not transgenic.

Preferably, the wild type is identically treated according to the herein described process according to the invention. The person skilled in the art will recognize if wild-type plants will not require certain treatments in advance to the process of the present invention, e.g. non-transgenic wild-type plants will not need selection for transgenic plants for example by treatment with a select-

ing agent such as a herbicide.

The control plant may also be a nullizygote of the plant to be assessed. The term “nullizygotes” refers to a plant that has undergone the same production process as a transgenic, yet has lost the once acquired genetic modification (e.g. due to mendelian segregation) as the corresponding transgenic. If the starting material of said production process is transgenic, then nullizygotes are also transgenic but lack the additional genetic modification introduced by the production process. In the process of the present invention the purpose of wild-type and nullizygotes is the same as the one for control and reference or parts thereof. All of these serve as controls in any comparison to provide evidence of the advantageous effect of the present invention.

Preferably, any comparison is carried out under analogous conditions. The term “analogous conditions” means that all conditions such as, for example, culture or growing conditions, soil, nutrient, water content of the soil, temperature, humidity or surrounding air or soil, assay conditions (such as buffer composition, temperature, substrates, pathogen strain, concentrations and the like) are kept identical between the experiments to be compared. The person skilled in the art will recognize if wild-type, control or reference plants will not require certain treatments in advance to the process of the present invention, e.g. non-transgenic wild-type plants will not need selection for transgenic plants for example by treatment with herbicide.

In case that the conditions are not analogous the results can be normalized or standardized based on the control.

The “reference”, “control”, or “wild type” is preferably a plant, which was not modified or treated according to the herein described process of the invention and is in any other property as similar to a plant, employed in the process of the present invention of the invention as possible. The reference, control or wild type is in its genome, transcriptome, proteome or metabolome as similar as possible to a plant, employed in the process of the present invention of the present invention. Preferably, the term “reference-” “control-” or “wild-type-” plant, relates to a plant, which is nearly genetically identical to the organelle, cell, tissue or organism, in particular plant, of the present invention or a part thereof preferably 90% or more, e.g. 95%, more preferred are 98%, even more preferred are 99,00%, in particular 99,10%, 99,30%, 99,50%, 99,70%, 99,90%, 99,99%, 99,999% or more. Most preferable the “reference”, “control”, or “wild type” is a plant, which is genetically identical to the plant, cell, a tissue or organelle used according to the process of the invention except that the responsible or activity conferring nucleic acid molecules or the gene product encoded by them have been amended, manipulated, exchanged or introduced in the organelle, cell, tissue, plant, employed in the process of the present invention.

Preferably, the reference and the subject matter of the invention are compared after standardization and normalization, e.g. to the amount of total RNA, DNA, or protein or activity or expression of reference genes, like housekeeping genes, such as ubiquitin, actin or ribosomal proteins.

The genetic modification carried in the organelle, cell, tissue, in particular plant used in the process of the present invention is in one embodiment stable e.g. due to a stable transgenic integration or to a stable mutation in the corresponding endogenous gene or to a modulation of the expression or of the behaviour of a gene, or transient, e.g. due to an transient transformation or temporary addition of a modulator such as an agonist or antagonist or inducible, e.g. after transformation with a inducible construct carrying a nucleic acid molecule under control of a inducible

promoter and adding the inducer, e.g. tetracycline.

In one embodiment preferred plants, from which “modified plants” and/or “transgenic plants” are be selected from the group consisting of cereals, such as maize (corn), wheat, barley sorghum, rice, rye, millet, triticale, oat, pseudocereals (such as buckwheat and quinoa), alfalfa, apples, banana, beet, broccoli, Brussels sprouts, cabbage, canola (rapeseed), carrot, cauliflower, cherries, chickpea, Chinese cabbage, Chinese mustard, collard, cotton, cranberries, creeping bentgrass, cucumber, eggplant, flax, grape, grapefruit, kale, kiwi, kohlrabi, melon, mizuna, mustard, papaya, peanut, pears, pepper, persimmons, pigeonpea, pineapple, plum, potato, raspberry, rutabaga, soybean, squash, strawberries, sugar beet, sugarcane, sunflower, sweet corn, tobacco, tomato, turnip, walnut, watermelon and winter squash,

more preferably from the group consisting of alfalfa, canola (rapeseed), cotton, rice, maize, cereals (such as wheat, barley, rye, oat), soybean, fruits and vegetables (such as potato, tomato, melon, papaya), pome fruits (such as apple and pear), vine, sugarbeet, sugarcane, rape, citrus fruits (such as citron, lime, orange, pomelo, grapefruit, and mandarin) and stone fruits (such as cherry, apricot and peach), most preferably from cotton, rice, maize, cereals (such as wheat, barley, rye, oat), sorghum, squash, soybean, potato, vine, pome fruits (such as apple), citrus fruits (such as citron and orange), sugarbeet, sugarcane, rape, oilseed rape and tomatoes,, utmost preferably from cotton, rice, maize, wheat, barley, rye, oat, soybean, potato, vine, apple, pear, citron and orange.

In another embodiment of the invention the cultivated plant is a gymnosperm plant, especially a spruce, pine or fir.

In some embodiments, the invention relates to methods and uses, wherein a compound of formula IA as defined herein, is applied in an application type which corresponds in each case to one row of Table AP-T.

In some embodiments, the invention relates to methods and uses, wherein a compound selected from the compounds of Table A, A' or A'', is applied in an application type which corresponds in each case to one row of Table AP-T.

In some embodiments, the invention relates to methods and uses, wherein a compound of formula I-11, is applied in an application type which corresponds in each case to one row of Table AP-T.

In some embodiments, the invention relates to methods and uses, wherein a compound of formula I-16, is applied in an application type which corresponds in each case to one row of Table AP-T.

In some embodiments, the invention relates to methods and uses, wherein a compound of formula I-21, is applied in an application type which corresponds in each case to one row of Table AP-T.

In some embodiments, the invention relates to methods and uses, wherein a compound of formula I-26, is applied in an application type which corresponds in each case to one row of Table AP-T.

In some embodiments, the invention relates to methods and uses, wherein a compound of formula I-31, is applied in an application type which corresponds in each case to one row of Table AP-T.

- 5 Also preferred is the application of the compounds and mixtures according to the invention, especially the compounds as individualized herein, e.g. in Table A, A', or A'', on specialty crops like fruits and vegetables. In one embodiment thereof, the application is on fruiting vegetables, and especially on tomato, on pepper or on eggplant. In another embodiment thereof, the application is on leafy vegetables, and especially on cabbage or on lettuce. In still another embodiment thereof, the application is on tubers (tuber vegetables), and especially on potato or on onion.

In one embodiment, in the methods and uses according to the invention, the following application types are used:

- 15 (Abbreviations: SPC = specialty crops; SPC-FV = fruiting vegetable; SPC-LV = leafy vegetable; SPC-T: tubers; ST = seed treatment)

Table AP-T

Appl. type	Crop	Pest	Appl. type	Crop	Pest
AP-T-1	Soybeans	Spodoptera littoralis	AP-T-10	Rice	Cnaphalocerus medialis
AP-T-2	Soybeans	Anticarsia gemmatilis	AP-T-11	Rice	Chilo suppressalis
AP-T-3	Soybeans	Spodoptera exigua	AP-T-12	Rice	Leptocorisa oratorius
AP-T-4	Soybeans	Stinkbug	AP-T-13	Rice	Brown plant hopper
AP-T-5	Soybeans	Helicoverpa sp.	AP-T-14	Cotton	Spodoptera littoralis
AP-T-6	Soybeans	Spodoptera eridania	AP-T-15	Cotton	Thrips spp.
AP-T-7	Corn	Spodoptera Frugiper-ta	AP-T-16	Cotton	Spodoptera eridania
AP-T-8	Corn	Spodoptera exigua	AP-T-17	Cotton	Helicoverpa sp.
AP-T-9	Rice	Sesamia inferens			

The cultivated plants are plants, which comprise at least one trait. The term "trait" refers to a property, which is present in the plant either by genetic engineering or by conventional breeding techniques. Each trait has to be assessed in relation to its respective control. Examples of traits are:

- herbicide tolerance,
- insect resistance by expression of bacterial toxins,
- fungal resistance or viral resistance or bacterial resistance,
- antibiotic resistance,
- stress tolerance,
- maturation alteration,

- content modification of chemicals present in the cultivated plant, preferably increasing the content of fine chemicals advantageous for applications in the field of the food and/or feed industry, the cosmetics industry and/or the pharmaceutical industry,
 - modified nutrient uptake, preferably an increased nutrient use efficiency and/or resistance to conditions of nutrient deficiency,
 - improved fiber quality,
 - plant vigor,
 - modified colour,
 - fertility restoration,
- and male sterility.

Principally, cultivated plants may also comprise combinations of the aforementioned traits, e.g. they may be tolerant to the action of herbicides and express bacterial toxins.

Principally, all cultivated plants may also provide combinations of the aforementioned properties, e.g. they may be tolerant to the action of herbicides and express bacterial toxins.

Tolerance to herbicides can be obtained by creating insensitivity at the site of action of the herbicide by expression of a target enzyme which is resistant to herbicide; rapid metabolism (conjugation or degradation) of the herbicide by expression of enzymes which inactivate herbicide; or poor uptake and translocation of the herbicide. Examples are the expression of enzymes which are tolerant to the herbicide in comparison to wild type enzymes, such as the expression of 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS), which is tolerant to glyphosate (see e.g. Heck et.al, Crop Sci. 45, 2005, 329-339; Funke et.al, PNAS 103, 2006, 13010-13015; US 5188642, US 4940835, US 5633435, US 5804425, US 5627061), the expression of glutamine synthase which is tolerant to glufosinate and bialaphos (see e.g. US 5646024, US 5561236) and DNA constructs coding for dicamba-degrading enzymes (see e.g. US 7105724). Gene constructs can be obtained, for example, from micro-organism or plants, which are tolerant to said herbicides, such as the *Agrobacterium* strain CP4 EPSPS which is resistant to glyphosate; *Streptomyces* bacteria which are resistance to glufosinate; *Arabidopsis*, *Daucus carota*, *Pseudomonas* spp. or *Zea mays* with chimeric gene sequences coding for HDDP (see e.g. WO 1996/38567, WO 2004/55191); *Arabidopsis thaliana* which is resistant to protox inhibitors (see e.g. US 2002/0073443).

Tolerance to glyphosate can also be achieved by any one of the genes 2mepsps, epsps, gat4601, goxv247 or mepsps.

Tolerance to glufosinate can be achieved by any one of the genes bar, pat or pat(syn).

Preferably, the herbicide tolerant plant can be selected from cereals such as wheat, barley, rye, oat; canola, sorghum, soybean, rice, oil seed rape, sugar beet, sugarcane, grapes, lentils, sunflowers, alfalfa, pome fruits; stone fruits; peanuts; coffee; tea; strawberries; turf; vegetables, such as tomatoes, potatoes, cucurbits and lettuce, more preferably, the plant is selected from soybean, maize (corn), rice, cotton, oilseed rape in particular canola, tomatoes, potatoes, sugarcane, vine, apple, pear, citron, orange and cereals such as wheat, barley, rye and oat. More preferably, the cultivated plant is selected from the group consisting of *Gossypium hirsutum* L. (cotton), *Zea mays* L. (maize), *Glycine max* L. (soybean), *Triticum aestivum* (wheat), and *Oryza*

sativa L. (rice), preferably from the group consisting of *Gossypium hirsutum* L. (cotton), *Zea mays* L. (maize) and *Glycine max* L. (soybean). Particularly preferably, the cultivated plant is *Glycine max* L. (soybean).

Examples of commercial available transgenic plants with tolerance to herbicides, are the corn

- 5 varieties "Roundup Ready Corn", "Roundup Ready 2" (Monsanto), "Agrisure GT", "Agrisure GT/CB/LL", "Agrisure GT/RW", "Agrisure 3000GT" (Syngenta), "YieldGard VT Rootworm/RR2" and "YieldGard VT Triple" (Monsanto) with tolerance to glyphosate; the corn varieties "Liberty Link" (Bayer), "Herculex I", "Herculex RW", "Herculex Xtra" (Dow, Pioneer), "Agrisure GT/CB/LL" and "Agrisure CB/LL/RW" (Syngenta) with tolerance to glufosinate; the soybean varieties
- 10 "Roundup Ready Soybean" (Monsanto) and "Optimum GAT" (DuPont, Pioneer) with tolerance to glyphosate; the cotton varieties "Roundup Ready Cotton" and "Roundup Ready Flex" (Monsanto) with tolerance to glyphosate; the cotton variety "FiberMax Liberty Link" (Bayer) with tolerance to glufosinate; the cotton variety "BXN" (Calgene) with tolerance to bromoxynil; the canola varieties "Navigator" und "Compass" (Rhone-Poulenc) with bromoxynil tolerance; the
- 15 canola variety "Roundup Ready Canola" (Monsanto) with glyphosate tolerance; the canola variety "InVigor" (Bayer) with glufosinate tolerance; the rice variety "Liberty Link Rice" (Bayer) with glufosinate tolerance and the alfalfa variety "Roundup Ready Alfalfa" with glyphosate tolerance. Further transgenic plants with herbicide tolerance are commonly known, for instance alfalfa,
- 20 apple, eucalyptus, flax, grape, lentils, oil seed rape, peas, potato, rice, sugar beet, sunflower, tobacco, tomato turf grass and wheat with tolerance to glyphosate (see e.g. US 5188642, US 4940835, US 5633435, US 5804425, US 5627061); beans, soybean, cotton, peas, potato, sunflower, tomato, tobacco, corn, sorghum and sugarcane with tolerance to dicamba (see e.g. US 7105724 and US 5670454); pepper, apple, tomato, millet, sunflower, tobacco, potato, corn, cucumber, wheat and sorghum with tolerance to 2,4-D (see e.g. US 6153401, US 6100446, WO
- 25 2005107437, US 5608147 and US 5670454); sugarbeet, potato, tomato and tobacco with tolerance to glufosinate (see e.g. US 5646024, US 5561236); canola, barley, cotton, lettuce, melon, millet, oats, potato, rice, rye, sorghum, soybean, sugarbeet, sunflower, tobacco, tomato and wheat with tolerance to acetolactate synthase (ALS) inhibiting herbicides, such as triazolopyrimidine sulfonamides, sulfonylureas and imidazolinones (see e.g. US 5013659, WO 2006060634,
- 30 US 4761373, US 5304732, US 6211438, US 6211439 and US 6222100); cereals, sugar cane, rice, corn, tobacco, soybean, cotton, rapeseed, sugar beet and potato with tolerance to HPPD inhibitor herbicides (see e.g. WO 2004/055191, WO 199638567, WO 1997049816 and US 6791014); wheat, soybean, cotton, sugar beet, rape, rice, sorghum and sugar cane with tolerance to protoporphyrinogen oxidase (PPO) inhibitor herbicides (see e.g. US 2002/0073443, US
- 35 20080052798, Pest Management Science, 61, 2005, 277-285). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

Plants, which are capable of synthesising one or more selectively acting bacterial toxins, comprise for example at least one toxin from toxin-producing bacteria, especially those of the genus

- 40 *Bacillus*, in particular plants capable of synthesising one or more insecticidal proteins from *Bacillus cereus* or *Bacillus popilliae*; or insecticidal proteins from *Bacillus thuringiensis*, such as delta.-endotoxins, e.g. CryIA(b), CryIA(c), CryIF, CryIF(a2), CryIIA(b), CryIIIA, CryIIIB(b1) or Cry9c, or vegetative insecticidal proteins (VIP), e.g. VIP1, VIP2, VIP3 or VIP3A; or insecticidal proteins

of bacteria colonising nematodes, for example *Photorhabdus* spp. or *Xenorhabdus* spp., such as *Photorhabdus luminescens*, *Xenorhabdus nematophilus*; toxins produced by animals, such as scorpion toxins, arachnid toxins, wasp toxins and other insect-specific neurotoxins; toxins produced by fungi, such as *Streptomyces* toxins, plant lectins, such as pea lectins, barley lectins or snowdrop lectins; agglutinins; proteinase inhibitors, such as trypsin inhibitors, serine protease inhibitors, patatin, cystatin, papain inhibitors; ribosome-inactivating proteins (RIP), such as ricin, maize-RIP, abrin, luffin, saporin or bryodin; steroid metabolism enzymes, such as 3-hydroxysteroid oxidase, ecdysteroid-UDP-glycosyl-transferase, cholesterol oxidases, ecdysone inhibitors, HMG-CoA-reductase, ion channel blockers, such as blockers of sodium or calcium channels, juvenile hormone esterase, diuretic hormone receptors, stilbene synthase, bibenzyl synthase, chitinases and glucanases.

In one embodiment a plant is capable of producing a toxin, lectin or inhibitor if it contains at least one cell comprising a nucleic acid sequence encoding said toxin, lectin, inhibitor or inhibitor producing enzyme, and said nucleic acid sequence is transcribed and translated and if appropriate the resulting protein processed and/or secreted in a constitutive manner or subject to developmental, inducible or tissue-specific regulation.

In the context of the present invention there are to be understood delta-endotoxins, for example CryIA(b), CryIA(c), CryIF, CryIF(a2), CryIIA(b), CryIIIA, CryIIIB(b1) or Cry9c, or vegetative insecticidal proteins (VIP), for example VIP1, VIP2, VIP3 or VIP3A, expressly also hybrid toxins, truncated toxins and modified toxins. Hybrid toxins are produced recombinantly by a new combination of different domains of those proteins (see, for example, WO 02/15701). An example for a truncated toxin is a truncated CryIA(b), which is expressed in the Bt11 maize from Syngenta Seed SAS, as described below. In the case of modified toxins, one or more amino acids of the naturally occurring toxin are replaced. In such amino acid replacements, preferably non-naturally present protease recognition sequences are inserted into the toxin, such as, for example, in the case of CryIIIA055, a cathepsin-D-recognition sequence is inserted into a CryIIIA toxin (see WO 2003/018810).

Examples of such toxins or transgenic plants capable of synthesising such toxins are disclosed, for example, in EP-A-0 374 753, WO 93/07278, WO 95/34656, EP-A-0 427 529, EP-A-451 878 and WO 2003/052073.

Examples of genes conferring resistance to coleopteran insects include cry34Ab1, cry35 Ab1, cry3A, cry3Bb1, dvsnf7, and mcry3A.

Examples of genes conferring resistance to lepidopteran insects include cry1A, cry1A.105, cry1Ab, cry1Ab-Ac, cry1Ac, cry1C, cry1F, cry1Fa2, cry2Ab2, cry2Ae, cry9c, mocry1F, pinII, vip3A(a), and vip3Aa20.

The processes for the preparation of such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. CryI-type deoxyribonucleic acids and their preparation are known, for example, from WO 95/34656, EP-A-0 367 474, EP-A-0 401 979 and WO 1990/13651.

The toxin contained in the transgenic plants imparts to the plants tolerance to harmful insects. Such insects can occur in any taxonomic group of insects, but are especially commonly found in the beetles (Coleoptera), two-winged insects (Diptera) and butterflies (Lepidoptera).

Preferably, the plant capable of expression of bacterial toxins is selected from cereals such as

wheat, barley, rye, oat; canola, cotton, eggplant, lettuce, sorghum, soybean, rice, oil seed rape, sugar beet, sugarcane, grapes, lentils, sunflowers, alfalfa, pome fruits; stone fruits; peanuts; coffee; tea; strawberries; turf; vegetables, such as tomatoes, potatoes, cucurbits and lettuce, more preferably, the plant is selected from cotton, soybean, maize (corn), rice, tomatoes, potatoes, oilseed rape and cereals such as wheat, barley, rye and oat, most preferably from cotton, soybean, maize, vine, apple, pear, citron, orange and cereals such as wheat, barley, rye and oat. More preferably, the cultivated plant is selected from the group consisting of *Gossypium hirsutum* L. (cotton), *Zea mays* L. (maize), *Glycine max* L. (soybean), *Triticum aestivum* (wheat), and *Oryza sativa* L. (rice), preferably from the group consisting of *Gossypium hirsutum* L. (cotton), *Zea mays* L. (maize) and *Glycine max* L. (soybean). Particularly preferably, the cultivated plant is *Glycine max* L. (soybean).

Examples of commercial available transgenic plants capable of expression of bacterial toxins are the corn varieties "YieldGard corn rootworm" (Monsanto), "YieldGard VT" (Monsanto), "Herculex RW" (Dow, Pioneer), "Herculex Rootworm" (Dow, Pioneer) and "Agrisure CRW" (Syngenta) with resistance against corn rootworm; the corn varieties "YieldGard corn borer" (Monsanto), "YieldGard VT Pro" (Monsanto), "Agrisure CB/LL" (Syngenta), "Agrisure 3000GT" (Syngenta), "Hercules I", "Hercules II" (Dow, Pioneer), "KnockOut" (Novartis), "NatureGard" (Mycogen) and "StarLink" (Aventis) with resistance against corn borer, the corn varieties "Herculex I" (Dow, Pioneer) and "Herculex Xtra" (Dow, Pioneer) with resistance against western bean cutworm, corn borer, black cutworm and fall armyworm; the corn variety "YieldGard Plus" (Monsanto) with resistance against corn borer and corn rootworm; the cotton variety "Bollgard I" (Monsanto) with resistance against tobacco budworm; the cotton varieties "Bollgard II" (Monsanto), "WideStrike" (Dow) and "VipCot" (Syngenta) with resistance against tobacco budworm, cotton bollworm, fall armyworm, beet armyworm, cabbage looper, soybean looper and pink bollworm; the potato varieties "NewLeaf", "NewLeaf Y" and "NewLeaf Plus" (Monsanto) with tobacco hornworm resistance and the eggplant varieties "Bt brinjal", "Dumaguete Long Purple", "Mara" with resistance against brinjal fruit and shoot borer, brinjal borer and cotton bollworm (see e.g. US5128130). Further transgenic plants with insect resistance are commonly known, such as yellow stemborer resistant rice (see e.g. Molecular Breeding, Volume 18, 2006, Number 1), lepidopteran resistant lettuce (see e.g. US 5349124), resistant soybean (see e.g. US 7432421) and rice with resistance against Lepidopterans, such as rice stemborer, rice skipper, rice cutworm, rice caseworm, rice leafroller and rice armyworm (see e.g. WO 2001021821). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

Preferably, plants, which are capable of synthesising antipathogenic substances are selected from soybean, maize (corn), rice, tomatoes, potato, banana, papaya, tobacco, grape, plum and cereals such as wheat, barley, rye and oat, most preferably from soybean, maize (corn), rice, cotton, tomatoes, potato, banana, papaya, oil seed rape, vine, apple, pear, citron, orange and cereals such as wheat, barley, rye and oat.

Plants, which are capable of synthesising antipathogenic substances having a selective action are for example plants expressing the so-called "pathogenesis-related proteins" (PRPs, see e.g. EP-A-0 392 225) or so-called "antifungal proteins" (AFPs, see e.g. US 6864068). A wide range of antifungal proteins with activity against plant pathogenic fungi have been isolated from certain

plant species and are common knowledge. Examples of such antipathogenic substances and transgenic plants capable of synthesising such antipathogenic substances are known, for example, from EP-A-0 392 225, WO 93/05153, WO 95/33818, and EP-A-0 353 191. Transgenic plants which are resistant against fungal, viral and bacterial pathogens are produced by introducing plant resistance genes. Numerous resistant genes have been identified, isolated and were used to improve plant resistant, such as the N gene which was introduced into tobacco lines that are susceptible to Tobacco Mosaic Virus (TMV) in order to produce TMV-resistant tobacco plants (see e.g. US 5571706), the Prf gene, which was introduced into plants to obtain enhanced pathogen resistance (see e.g. WO 199802545) and the Rps2 gene from *Arabidopsis thaliana*, which was used to create resistance to bacterial pathogens including *Pseudomonas syringae* (see e.g. WO 199528423). Plants exhibiting systemic acquired resistance response were obtained by introducing a nucleic acid molecule encoding the TIR domain of the N gene (see e.g. US 6630618). Further examples of known resistance genes are the Xa21 gene, which has been introduced into a number of rice cultivars (see e.g. US 5952485, US 5977434, WO 1999/09151, WO 1996/22375), the Rcg1 gene for colletotrichum resistance (see e.g. US 2006/225152), the prp1 gene (see e.g. US 5859332, WO 2008/017706), the ppv-cp gene to introduce resistance against plum pox virus (see e.g. US PP15,154Ps), the P1 gene (see e.g. US5968828), genes such as Blb1, Blb2, Blb3 and RB2 to introduce resistance against *Phytophthora infestans* in potato (see e.g. US 7148397), the LRPKml gene (see e.g. WO1999064600), the P1 gene for potato virus Y resistance (see e.g. US 5968828), the HA5-1 gene (see e.g. US5877403 and US6046384), the PIP gene to introduce a broad resistant to viruses, such as potato virus X (PVX), potato virus Y (PVY), potato leafroll virus (PLRV) (see e.g. EP 0707069) and genes such as *Arabidopsis* NI16, ScaM4 and ScaM5 genes to obtain fungal resistance (see e.g. US 6706952 and EP 1018553). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

Antipathogenic substances which can be expressed by such transgenic plants include, for example, ion channel blockers, such as blockers for sodium and calcium channels, for example the viral KP1, KP4 or KP6 toxins; stilbene synthases; bibenzyl synthases; chitinases; glucanases; the so-called "pathogenesis-related proteins" (PRPs; see e.g. EP-A-0 392 225); antipathogenic substances produced by microorganisms, for example peptide antibiotics or heterocyclic antibiotics (see e.g. WO 1995/33818) or protein or polypeptide factors involved in plant pathogen defense (so-called "plant disease resistance genes", as described in WO 2003/000906).

Antipathogenic substances produced by the plants are able to protect the plants against a variety of pathogens, such as fungi, viruses and bacteria. Useful plants of elevated interest in connection with present invention are cereals, such as wheat, barley, rye and oat; soybean; maize; rice; alfalfa, cotton, sugar beet, sugarcane, tobacco, potato, banana, oil seed rape; pome fruits; stone fruits; peanuts; coffee; tea; strawberries; turf; vines and vegetables, such as tomatoes, potatoes, cucurbits, papaya, melon, lenses and lettuce, more preferably selected from soybean, maize (corn), alfalfa, cotton, potato, banana, papaya, rice, tomatoes and cereals such as wheat, barley, rye and oat, most preferably from soybean, maize (corn), rice, cotton, potato, tomato, oilseed rape, vine, apple, pear, citron, orange and cereals such as wheat, barley, rye and oat.

- Transgenic plants with resistance against fungal pathogens, are, for examples, soybeans with resistance against Asian soybean rust (see e.g. WO 2008/017706); plants such as alfalfa, corn, cotton, sugar beet, oilseed, rape, tomato, soybean, wheat, potato and tobacco with resistance against *Phytophthora infestans* (see e.g. US5859332, US 7148397, EP 1334979); corn with resistance against leaf blights, ear rots and stalk rots (such as anthracnose leaf blight, anthracnose stalk rot, diplodia ear rot, *Fusarium verticillioides*, *Gibberella zeae* and top dieback, see e.g. US 2006/225152); apples with resistance against apple scab (*Venturia inaequalis*, see e.g. WO 1999064600); plants such as rice, wheat, barley, rye, corn, oats, potato, melon, soybean and sorghum with resistance against fusarium diseases, such as *Fusarium graminearum*, *Fusarium sporotrichioides*, *Fusarium lateritium*, *Fusarium pseudograminearum*, *Fusarium sambucinum*, *Fusarium culmorum*, *Fusarium poae*, *Fusarium acuminatum*, *Fusarium equiseti* (see e.g. US 6646184, EP 1477557); plants, such as corn, soybean, cereals (in particular wheat, rye, barley, oats, rye, rice), tobacco, sorghum, sugarcane and potatoes with broad fungal resistance (see e.g. US 5689046, US 6706952, EP 1018553 and US 6020129).
- Transgenic plants with resistance against bacterial pathogens and which are covered by the present invention, are, for examples, rice with resistance against *Xylella fastidiosa* (see e.g. US 6232528); plants, such as rice, cotton, soybean, potato, sorghum, corn, wheat, barley, sugarcane, tomato and pepper, with resistance against bacterial blight (see e.g. WO 2006/42145, US 5952485, US 5977434, WO 1999/09151, WO 1996/22375); tomato with resistance against *Pseudomonas syringae* (see e.g. Can. J. Plant Path., 1983, 5: 251-255).
- Transgenic plants with resistance against viral pathogens, are, for examples, stone fruits, such as plum, almond, apricot, cherry, peach, nectarine, with resistance against plum pox virus (PPV, see e.g. US PP15,154Ps, EP 0626449); potatoes with resistance against potato virus Y (see e.g. US 5968828); plants such as potato, tomato, cucumber and leguminosae which are resistant against tomato spotted wilt virus (TSWV, see e.g. EP 0626449, US 5973135); corn with resistance against maize streak virus (see e.g. US 6040496); papaya with resistance against papaya ring spot virus (PRSV, see e.g. US 5877403, US 6046384); cucurbitaceae, such as cucumber, melon, watermelon and pumpkin, and solanaceae, such as potato, tobacco, tomato, eggplant, paprika and pepper, with resistance against cucumber mosaic virus (CMV, see e.g. US 6849780); cucurbitaceae, such as cucumber, melon, watermelon and pumpkin, with resistance against watermelon mosaic virus and zucchini yellow mosaic virus (see e.g. US 6015942); potatoes with resistance against potato leafroll virus (PLRV, see e.g. US 5576202); potatoes with a broad resistance to viruses, such as potato virus X (PVX), potato virus Y (PVY), potato leafroll virus (PLRV) (see e.g. EP 0707069).
- Further examples of deregulated or commercially available transgenic plants with modified genetic material capable of expression of antipathogenic substances are the following plants: *Carica papaya* (papaya), Event: 55-1/63-1; Cornell University, *Carica papaya* (Papaya); Event: (X17-2); University of Florida, *Cucurbita pepo* (Squash); Event: (CZW-3); Asgrow (USA); Seminis Vegetable Inc. (Canada), *Cucurbita pepo* (Squash); Event: (ZW20); Upjohn (USA); Seminis Vegetable Inc. (Canada), *Prunus domestica* (Plum); Event: (C5); United States Department of Agriculture - Agricultural Research Service, *Solanum tuberosum* L. (Potato); Event: (RBMT15-101, SEMT15-02, SEMT15-15); Monsanto Company and *Solanum tuberosum* L. (Potato); Event: (RBMT21-129, RBMT21-350, RBMT22-082); Monsanto Company.

Transgenic plants with resistance against nematodes and which may be used in the methods of the present invention are, for examples, soybean plants with resistance to soybean cyst nematodes.

Methods have been proposed for the genetic transformation of plants in order to confer increased resistance to plant parasitic nematodes. U.S. Patent Nos. 5,589,622 and 5,824,876 are directed to the identification of plant genes expressed specifically in or adjacent to the feeding site of the plant after attachment by the nematode.

Also known in the art are transgenic plants with reduced feeding structures for parasitic nematodes, e.g. plants resistant to herbicides except of those parts or those cells that are nematode feeding sites and treating such plant with a herbicide to prevent, reduce or limit nematode feeding by damaging or destroying feeding sites (e.g. US 5866777).

Use of RNAi to target essential nematode genes has been proposed, for example, in PCT Publication WO 2001/96584, WO 2001/17654, US 2004/0098761, US 2005/0091713, US 2005/0188438, US 2006/0037101, US 2006/0080749, US 2007/0199100, and US 2007/0250947.

Transgenic nematode resistant plants have been disclosed, for example in the PCT publications WO 2008/095886 and WO 2008/095889.

Plants which are resistant to antibiotics, such as kanamycin, neomycin and ampicillin. The naturally occurring bacterial *nptII* gene expresses the enzyme that blocks the effects of the antibiotics kanamycin and neomycin. The ampicillin resistance gene *ampR* (also known as *blaTEM1*) is derived from the bacterium *Salmonella paratyphi* and is used as a marker gene in the transformation of micro-organisms and plants. It is responsible for the synthesis of the enzyme beta-lactamase, which neutralises antibiotics in the penicillin group, including ampicillin. Transgenic plants with resistance against antibiotics, are, for examples potato, tomato, flax, canola, oilseed rape and corn (see e.g. Plant Cell Reports, 20, 2001, 610-615. Trends in Plant Science, 11, 2006, 317-319. Plant Molecular Biology, 37, 1998, 287-296. Mol Gen Genet., 257, 1998, 606-13.). Plant Cell Reports, 6, 1987, 333-336. Federal Register (USA), Vol.60, No.113, 1995, page 31139. Federal Register (USA), Vol.67, No.226, 2002, page 70392. Federal Register (USA), Vol.63, No.88, 1998, page 25194. Federal Register (USA), Vol.60, No.141, 1995, page 37870. Canadian Food Inspection Agency, FD/OFB-095-264-A, October 1999, FD/OFB-099-127-A, October 1999. Preferably, the plant is selected from soybean, maize (corn), rice, cotton, oilseed rape, potato, sugarcane, alfalfa, tomatoes and cereals, such as wheat, barley, rye and oat, most preferably from soybean, maize (corn), rice, cotton, oilseed rape, tomato, potato, vine, apple, pear, citron, orange and cereals such as wheat, barley, rye and oat.

Plants which are tolerant to stress conditions (see e.g. WO 2000/04173, WO 2007/131699, CA 2521729 and US 2008/0229448) are plants, which show increased tolerance to abiotic stress conditions such as drought, high salinity, high light intensities, high UV irradiation, chemical pollution (such as high heavy metal concentration), low or high temperatures, limited supply of nutrients (i.e. nitrogen, phosphorous) and population stress. Preferably, transgenic plants with resistance to stress conditions, are selected from rice, corn, soybean, sugarcane, alfalfa, wheat, tomato, potato, barley, rapeseed, beans, oats, sorghum and cotton with tolerance to drought (see e.g. WO 2005/048693, WO 2008/002480 and WO 2007/030001); corn, soybean, wheat, cotton, rice, rapeseed and alfalfa with tolerance to low temperatures (see e.g. US 4731499 and

WO 2007/112122); rice, cotton, potato, soybean, wheat, barley, rye, sorghum, alfalfa, grape, tomato, sunflower and tobacco with tolerance to high salinity (see e.g. US 7256326, US 7034139, WO 2001/030990). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. Preferably, the plant is selected from soybean, maize (corn), rice, cotton, sugarcane, alfalfa, sugar beet, potato, oilseed rape, tomatoes and cereals such as wheat, barley, rye and oat, most preferably from soybean, maize (corn), rice, cotton, oilseed rape, tomato, potato, sugarcane, vine, apple, pear, citron, orange and cereals such as wheat, barley, rye and oat. Altered maturation properties, are for example delayed ripening, delayed softening and early maturity. Preferably, transgenic plants with modified maturation properties, are, selected from tomato, melon, raspberry, strawberry, muskmelon, pepper and papaya with delayed ripening (see e.g. US 5767376, US 7084321, US 6107548, US 5981831, WO 1995035387, US 5952546, US 5512466, WO 1997001952, WO 1992/008798, Plant Cell. 1989, 53–63. Plant Molecular Biology, 50, 2002). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. Preferably, the plant is selected from fruits, such as tomato, vine, melon, papaya, banana, pepper, raspberry and strawberry; stone fruits, such as cherry, apricot and peach; pome fruits, such as apple and pear; and citrus fruits, such as citron, lime, orange, pomelo, grapefruit, and mandarin; more preferably from tomato, vine, apple, banana, orange and strawberry, most preferably tomatoes.

Content modification is synthesis of modified chemical compounds (if compared to the corresponding control plant) or synthesis of enhanced amounts of chemical (if compounds compared to the corresponding control plant) and corresponds to an increased or reduced amount of vitamins, amino acids, proteins and starch, different oils and a reduced amount of nicotine.

Commercial examples are the soybean varieties “Vistive II” and “Vistive III” with low-linolenic/medium oleic content; the corn variety “Mavera high-value corn” with increased lysine content; and the soybean variety “Mavera high value soybean” with yielding 5% more protein compared to conventional varieties when processed into soybean meal. Further transgenic plants with altered content are, for example, potato and corn with modified amylopectin content (see e.g. US 6784338, US 20070261136); canola, corn, cotton, grape, catalpa, cattail, rice, soybean, wheat, sunflower, balsam pear and vernonia with a modified oil content (see e.g. US 7294759, US 7157621, US 5850026, US 6441278, US 6380462, US 6365802, US 6974898, WO 2001/079499, US 2006/0075515 and US 7294759); sunflower with increased fatty acid content (see e.g. US 6084164); soybeans with modified allergens content (so called “hypoallergenic soybean, see e.g. US 6864362); tobacco with reduced nicotine content (see e.g. US 20060185684, WO 2005000352 and WO 2007064636); canola and soybean with increased lysine content (see e.g. Bio/Technology 13, 1995, 577 - 582); corn and soybean with altered composition of methionine, leucine, isoleucine and valine (see e.g. US 6946589, US 6905877); soybean with enhanced sulfur amino acid content (see e.g. EP 0929685, WO 1997041239); tomato with increased free amino acid contents, such as asparagine, aspartic acid, serine, threonine, alanine, histidine and glutamic acid (see e.g. US 6727411); corn with enhanced amino acid content (see e.g. WO 05077117); potato, corn and rice with modified starch content (see e.g. WO 1997044471 and US 7317146); tomato, corn, grape, alfalfa, apple, beans and peas

with modified flavonoid content (see e.g. WO 2000/04175); corn, rice, sorghum, cotton, soybeans with altered content of phenolic compounds (see e.g. US 20080235829). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. Preferably, the plant is selected from soybean, maize (corn), rice, cotton, sugarcane, potato, tomato, oilseed rape, flax and cereals such as wheat, barley, rye and oat, most preferably soybean, maize (corn), rice, oilseed rape, potato, tomato, cotton, vine, apple, pear, citron, orange and cereals such as wheat, barley, rye and oat.

Enhanced nutrient utilization is e.g. assimilation or metabolism of nitrogen or phosphorous.

Preferably, transgenic plants with enhanced nitrogen assimilatory and utilization capacities are selected from for example, canola, corn, wheat, sunflower, rice, tobacco, soybean, cotton, alfalfa, tomato, wheat, potato, sugar beet, sugar cane and rapeseed (see e.g. WO 1995/009911, WO 1997/030163, US 6084153, US 5955651 and US 6864405). Plants with improved phosphorous uptake are, for example, tomato and potato (see e.g. US 7417181). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. Preferably, the plant is selected from soybean, maize (corn), rice, cotton, sugarcane, alfalfa, potato, oilseed rape and cereals such as wheat, barley, rye and oat, most preferably from soybean, maize (corn), rice, cotton, oilseed rape, tomato, potato, vine, apple, pear, citron, orange and cereals such as wheat, barley.

Transgenic plants with male sterility are preferably selected from canola, corn, tomato, rice, Indian mustard, wheat, soybean and sunflower (see e.g. US 6720481, US 6281348, US 5659124, US 6399856, US 7345222, US 7230168, US 6072102, EP1 135982, WO 2001/092544 and WO 1996/040949). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

Preferably, the plant is selected from soybean, maize (corn), rice, cotton, oilseed rape, tomato, potato, vine, apple, pear, citron, orange and cereals such as wheat, barley.

Further examples of deregulated or commercially available transgenic plants with modified genetic material being male sterile are

Brassica napus (Argentine Canola:(Event: MS1, RF1 =>PGS1 ; Bayer CropScience (formerly Plant Genetic Systems); Brassica napus (Event: MS1, RF2 =>PGS2 ; Bayer CropScience (formerly Plant Genetic Systems); Brassica napus (Event: MS8xRF3 ; Bayer CropScience (Aventis CropScience(AgrEvo)); Brassica napus (Event: PHY14, PHY35 ; Bayer CropScience (formerly Plant Genetic Systems); Brassica napus (Event: PHY36 ; Bayer CropScience (formerly Plant Genetic Systems); Cichorium intybus (Chicory:(Event: RM3-3, RM3-4, RM3-6 ; Bejo Zaden BV; Zea mays L. (Maize:(Event: 676, 678, 680 ; Pioneer Hi-Bred International Inc.; Zea mays L. (Event: MS3 ; Bayer CropScience (Aventis CropScience(AgrEvo)) and Zea mays L. (Event: MS6 ; Bayer CropScience (Aventis CropScience(AgrEvo)).

Plants, which produce higher quality fiber are e.g. transgenic cotton plants. The such improved quality of the fiber is related to improved micronaire of the fiber, increased strength, improved staple length, improved length uniformity and color of the fibers (see e.g. WO 1996/26639, US 7329802, US 6472588 and WO 2001/17333). The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

As set forth above, cultivated plants may comprise one or more traits, e.g. selected from the group consisting of herbicide tolerance, insect resistance, fungal resistance, viral resistance, bacterial resistance, stress tolerance, maturation alteration, content modification, modified nutrient uptake and male sterility (see e.g. WO 2005033319 and US 6376754).

- 5 Examples of commercial available transgenic plants with two combined properties are the corn varieties "YieldGard Roundup Ready" and YieldGard Roundup Ready 2" (Monsanto) with glyphosate tolerance and resistance to corn borer; the corn variety "Agrisure CB/LL" (Syntenta) with glufosinate tolerance and corn borer resistance; the corn variety "Yield Gard VT Rootworm/RR2" with glyphosate tolerance and corn rootworm resistance; the corn variety "Yield
10 Gard VT Triple" with glyphosate tolerance and resistance against corn rootworm and corn borer; the corn variety "Herculex I" with glufosinate tolerance and lepidopteran resistance (Cry1F), i.e. against western bean cutworm, corn borer, black cutworm and fall armyworm; the corn variety "YieldGard Corn Rootworm/Roundup Ready 2" (Monsanto) with glyphosate tolerance and corn rootworm resistance; the corn variety "Agrisure GT/RW" (Syngenta) with glufosinate tolerance
15 and lepidopteran resistance (Cry3A), i.e. against western corn rootworm, northern corn rootworm and Mexican corn rootworm; the corn variety "Herculex RW" (Dow, Pioneer) with glufosinate tolerance and lepidopteran resistance (Cry34/35Ab1), i.e. against western corn rootworm, northern corn rootworm and Mexican corn rootworm; the corn variety "Yield Gard VT Rootworm/RR2" with glyphosate tolerance and corn rootworm resistance; the soybean variety
20 "Optimum GAT" (DuPont, Pioneer) with glyphosate tolerance and ALS herbicide tolerance; the corn variety "Mavera high-value corn" with glyphosate tolerance, resistance to corn rootworm and European corn borer and high lysine trait.

- Examples of commercial available transgenic plants with three traits are the corn variety "Herculex I / Roundup Ready 2" with glyphosate tolerance, glufosinate tolerance and lepidopteran
25 resistance (Cry1F), i.e. against western bean cutworm, corn borer, black cutworm and fall armyworm; the corn variety "YieldGard Plus / Roundup Ready 2" (Monsanto) with glyphosate tolerance, corn rootworm resistance and corn borer resistance; the corn variety "Agrisure GT/CB/LL" (Syngenta) with tolerance to glyphosate tolerance, tolerance to glufosinate and corn borer resistance; the corn variety "Herculex Xtra" (Dow, Pioneer) with glufosinate tolerance
30 and lepidopteran resistance (Cry1F + Cry34/35Ab1), i.e. against western corn rootworm, northern corn rootworm, Mexican corn rootworm, western bean cutworm, corn borer, black cutworm and fall armyworm; the corn varieties "Agrisure CB/LL/RW" (Syngenta) with glufosinate tolerance, corn borer resistance (Cry1Ab) and lepidopteran resistance (Cry3A), i.e. against western corn rootworm, northern corn rootworm and Mexican corn rootworm; the corn variety "Agrisure
35 3000GT" (Syngenta) with glyphosate tolerance + corn borer resistance (Cry1Ab) and lepidopteran resistance (Cry3A), i.e. against western corn rootworm, northern corn rootworm and Mexican corn rootworm. The methods of producing such transgenic plants are generally known to the person skilled in the art.

- An example of a commercial available transgenic plant with four traits is „Hercules Quad-Stack“
40 with glyphosate tolerance, glufosinate tolerance, corn borer resistance and corn rootworm resistance.

Second embodiment of the invention

In one embodiment of the invention, the commercial transgenic plant is a soybean variety with glyphosate tolerance and lepidopteran resistance, preferably with one trait of glyphosate tolerance and two traits of lepidopteran resistance. Preferably, the glyphosate tolerance is through
5 expression of the EPSPS encoding gene from *A. tumefaciens* strain CP4 (cp4epsps gene), more preferably it is based on the transgenic event MON89788. Also preferably, the lepidopteran resistance is a resistance to lepidopteran pests of soybean, preferably through expression of the Cry1AC encoding gene from *B. thuringiensis*, preferably against velvetbean caterpillar (*Anticarsia gemmatilis*) and soybean looper (*Pseudoplusia includens*), more preferably it is
10 based on the transgenic event MON87701.

More preferably, the glyphosate tolerance is based on the transgenic event MON89788 and the trait of lepidopteran resistance is achieved through expression of the Cry1AC encoding gene from *B. thuringiensis*, preferably against velvetbean caterpillar (*Anticarsia gemmatilis*) and soybean looper (*Pseudoplusia includens*), more preferably based on the transgenic event
15 MON87701. *Pseudoplusia includens* is a synonym for *Chrysodeixis includens*.

Most preferably, the commercial transgenic plant is "Intacta RR2 PRO" soybean (Monsanto) which claims to offer tolerance to glyphosate herbicide and protection against major soybean pests (velvetbean caterpillar, soybean looper, soybean budborer, bean shoot borer, bollworm, corn stalk borer, *Helicoverpa*, e.g. *Helicoverpa armigera*), along with increased yield potential.

It is understood that "Intacta RR2 Pro" is used as a synonym for "Intacta™ Roundup Ready™ 2 Pro" soybean variety.
20

Therefore, in one embodiment, the invention relates to methods according to the invention wherein the cultivated plant is a soybean variety with glyphosate tolerance and lepidopteran
25 resistance.

In a further embodiment, the invention relates to methods according to the invention, wherein the glyphosate tolerance is through the expression of the cp4epsps gene, or wherein the lepidopteran resistance is through expression of the Cry1AC encoding gene from *B. thuringiensis*, or wherein both the glyphosate tolerance is through the expression of the cp4epsps gene and
30 the lepidopteran resistance is through expression of the Cry1AC encoding gene from *B. thuringiensis*.

In a further embodiment, the invention relates to methods according to the invention, wherein the glyphosate tolerance is based on the transgenic event MON89788, or wherein the lepidopteran resistance is based on the transgenic event MON87701, or wherein both the glyphosate
35 tolerance is based on the transgenic event MON89788 and the lepidopteran resistance is based on the transgenic event MON87701.

In a further embodiment, the invention relates to methods according to the invention, wherein the lepidopteran resistance is against a species selected from the group of velvetbean caterpillar (*Anticarsia gemmatilis*) and soybean looper (*Pseudoplusia includens*, *Chrysodeixis in-*
40 *cludens*).

In a further embodiment, the invention relates to methods according to the invention, wherein the cultivated plant is "Intacta RR2 PRO" soybean (Monsanto), which claims to offer tolerance to glyphosate herbicide and protection against major soybean pests (velvetbean caterpillar, soy-

bean looper, soybean budborer, bean shoot borer, bollworm, corn stalk borer, *Helicoverpa*, e.g. *Helicoverpa armigera*), along with increased yield potential.

In a further embodiment, the invention relates to such methods according to the invention, wherein the pest is selected from the group of stinkbug species (preferably *Euschistus heros*),

5 *Spodoptera frugiperda* and *Helicoverpa*.

In another embodiment, the commercial transgenic plant is a soybean variety selected from "Roundup Ready 2 Yield", "Intacta RR2 Pro" and "Vistive Gold" (all Monsanto), or "Stearidonic Acid (SDA) Omega-3" (higher content of SDA in soybean, Monsanto). In another embodiment,

10 the trait is *Bacillus thuringiensis* Cry1A.105 and cry2Ab2 and Vector PV-GMIR13196, for Mon87751 soybean (Monsanto).

In a further embodiment, the commercial transgenic plant is a soybean variety with herbicide tolerance and lepidopteran resistance, wherein the control of Lepidopteran pest is based on Bt

15 Cry1Ac and Cry1F toxins. Preferably, the insect-resistant and herbicide-tolerant soybean is DAS81419 (see Table A1, entry A1-334).

Preferably, the plant has one trait of glyphosate tolerance and two traits of lepidopteran resistance. Preferably, the glyphosate tolerance is through expression of the EPSPS encoding gene from *A. tumefaciens* strain CP4, more preferably it is based on the transgenic event

20 MON89788. Also preferably, the lepidopteran resistance is a resistance to lepidopteran pests of soybean, preferably through expression of the Cry1AC encoding gene from *B. thuringiensis*, preferably against velvetbean caterpillar (*Anticarsia gemmatilis*) and soybean looper (*Pseudoplusia includens*), more preferably it is based on the transgenic event MON87701.

More preferably, the glyphosate tolerance is based on the transgenic event MON89788 and the

25 trait of lepidopteran resistance is achieved through expression of the Cry1AC encoding gene from *B. thuringiensis*, preferably against velvetbean caterpillar (*Anticarsia gemmatilis*) and soybean looper (*Pseudoplusia includens*), more preferably based on the transgenic event MON87701. *Pseudoplusia includens* is a synonym for *Chrysodeixis includens*.

Most preferably, the commercial transgenic plant is "Intacta RR2 PRO" soybean (Monsanto)

30 which claims to offer tolerance to glyphosate herbicide and protection against major soybean pests (velvetbean caterpillar, soybean looper, soybean budborer, bean shoot borer, bollworm, corn stalk borer, *Helicoverpa*, e.g. *Helicoverpa armigera*), along with increased yield potential.

In a further embodiment, the commercial transgenic plant is a corn variety which has above-

35 ground insect protection from "Genuity VT Triple PRO" or "Herculex Xtra" or both of them, and herbicide tolerance from "Roundup Ready 2" and Liberty Link, preferably corn varieties selected from "Genuity SmartStax", "Genuity VT Triple PRO" and "Genuity VT Double PRO" (all Monsanto), optionally as RIB (refuge-in-bag) solution. In a further embodiment, the commercial transgenic corn plant variety has a drought tolerance trait, preferably "Genuity DroughtGard". In another

40 embodiment, the trait is double-stranded ribonucleic acid (dsRNA), *Bacillus thuringiensis* Cry3Bb1 protein and vector PV-ZMIR10871 for MON87411 corn.

In a further embodiment, the commercial transgenic plant is a cotton variety selected from "Bollgard II" (insect protection), "Roundup Ready Flex" (herbicide tolerance) and "Bollgard II with Roundup Ready Flex" (both), all Monsanto.

- 5 Preferably, the cultivated plants are plants, which comprise at least one trait of insect resistance (preferably by expression of bacterial toxins) and at least one trait selected from herbicide tolerance, fungal resistance or viral resistance or bacterial resistance by expression of antipathogenic substances
- 10 stress tolerance, content modification of chemicals present in the cultivated plant compared to the corresponding control plant.

Most preferably, the cultivated plants are plants, which are tolerant to the action of herbicides and plants, which express bacterial toxins, which provides resistance against animal pests

15 (such as insects or arachnids or nematodes), wherein the bacterial toxin is preferably a toxin from *Bacillus thuringiensis*. Herein, the plant is preferably selected from cotton, rice, maize, wheat, barley, rye, oat, soybean, potato, vine, apple, pear, citron and orange.

In one embodiment, the plant is soybean.

- In one embodiment, the invention relates to a method for controlling pests and/or increasing the
- 20 plant health of a cultivated plant with at least one modification as compared to the respective non-modified control plant, wherein the plant is soybean, which method comprises applying a compound of formula I, which is selected from the compounds I-1 to I-82 as defined in Table A,.
- More specifically, the compound I is selected from compounds I-11, I-16, I-21, I-26, I-31 as defined in Table A', more specifically compound I-11, more specifically compound I-16, more specifically compound I-21, more specifically compound I-26, more specifically compound I-31.
- 25

In an utmost preferred embodiment, the cultivated plants are plants, which are tolerant to the action of herbicides. Further guidance for specific combinations within this utmost preferred embodiment can be found in Table A1.

- 30 If such plants are used in the methods according to the present invention, compounds of formula I and their mixtures may additionally comprise a herbicide III, to which the plant is tolerant. For example, if the cultivated plant is a cultivated plant tolerant to glyphosate, compounds of formula I and their mixtures may additionally comprise glyphosate.
- For example, if the cultivated plant is a cultivated plant tolerant to glufonsinate, compounds of
- 35 formula I and their mixtures may additionally comprise glufonisate.
- For example, if the cultivated plant is a cultivated plant tolerant to a imidazolione herbicide, compounds of formula I and their mixtures may additionally comprise at least one imidazolione-herbicide. Herein, the imidazolione-herbicide is selected from imazamox, imazethapyr, imazapic, imazapyr, imazamethabenz or imazaquin.
- 40 For example, if the cultivated plant is a cultivated plant tolerant to dicamba, compounds of formula I and their mixtures may additionally comprise dicamba.
- For example, if the cultivated plant is a cultivated plant tolerant to sethoxidim, compounds of formula I and their mixtures may additionally comprise sethoxidim.

For example, if the cultivated plant is a cultivated plant tolerant to cycloxdim, compounds of formula I and their mixtures may additionally comprise cycloxdim.

Thus, the present invention also relates to ternary mixtures, comprising a compound of formula I, an insecticide II and a herbicide III. In particular, the present invention also relates to ternary mixtures comprising two insecticides and a fungicide.

In another particular embodiment, the present invention also relates to ternary mixtures comprising two fungicides and one insecticide.

In another particular embodiment, the present invention also relates to ternary mixtures comprising an insecticide, a fungicide and a herbicide.

In one embodiment of the invention the cultivated plant is selected from the group of plants as mentioned in the paragraphs and tables of this disclosure, preferably as mentioned above.

Preferably, the cultivated plants are plants, which comprise at least one trait selected from herbicide tolerance, insect resistance for example by expression of one or more bacterial toxins, fungal resistance or viral resistance or bacterial resistance by expression of one or more antipathogenic substances, stress tolerance, nutrient uptake, nutrient use efficiency, content modification of chemicals present in the cultivated plant compared to the corresponding control plant. More preferably, the cultivated plants are plants, which comprise at least one trait selected from herbicide tolerance, insect resistance by expression of one or more bacterial toxins, fungal resistance or viral resistance or bacterial resistance by expression of one or more antipathogenic substances, stress tolerance, content modification of one or more chemicals present in the cultivated plant compared to the corresponding control plant.

Most preferably, the cultivated plants are plants, which are tolerant to the action of herbicides and plants, which express one or more bacterial toxins, which provides resistance against one or more animal pests (such as insects or arachnids or nematodes), wherein the bacterial toxin is preferably a toxin from *Bacillus thuringiensis*. Herein, the cultivated plant is preferably selected from soybean, maize (corn), rice, cotton, sugarcane, alfalfa, potato, oilseed rape, tomatoes and cereals such as wheat, barley, rye and oat, most preferably from soybean, maize (corn), cotton, rice and cereals such as wheat, barley, rye and oat.

In another utmost preference, the cultivated plants are plants, which are given in table 1.

Sources: AgBios database and GMO-compass database (AG BIOS, P.O. Box 475, 106 St. John St. Merrickville, Ontario K0G1N0, Canada, access: <http://cera-gmc.org/>, also see Bio-Techniques, Volume 35, No. 3, Sept. 2008, p. 213, and <http://www.gmo-compass.org/eng/gmo/db/>).

Thus, in one preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of cultivated plants by treating cultivated plants, parts of such plants, plant propagation materials, or at their locus of growth with compounds of formula I and their mixtures, wherein the plant is a plant, which is rendered tolerant to herbicides, more preferably to herbicides such as glutamine synthetase inhibitors, 5-enol-pyrovylshikimate-3-phosphate-synthase inhibitors, acetolactate synthase (ALS) inhibitors, protoporphyrinogen oxidase (PPO) inhibitors, auxine type herbicides, most preferably to herbicides such as glyphosate, glufosinate, imazapyr, imazapic, imazamox, imazethapyr, imazaquin, imazamethabenz methyl, dicamba and 2,4-D.

In a more preferred embodiment, the present invention relates to a method of controlling harmful pests, especially insects, by treating cultivated plants, parts of such plants, plant propagation materials, or at their locus of growth with compounds of formula I and their mixtures, wherein the plant corresponds to a row of table A1.

- 5 In a more preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of cultivated plants by treating plant propagation materials, preferably seeds with compounds of formula I and their mixtures selected from endosulfan, ethiprole and fipronil, wherein the plant corresponds to row of table A1.

- 10 Furthermore, the invention relates to a method for increasing the health of cultivated plants by treating cultivated plants, parts of such plants, plant propagation materials, or at their locus of growth with the compound of formula I, wherein the plant corresponds to a row of table A1.
- 15 In another more preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of cultivated plants by treating cultivated plants, parts of such plants or their locus of growth with a compound of formula I, which is selected from the compounds I-1 to I-82 as defined in Table A, wherein the plant has a property or a transgenic event of a plant which corresponds to a row of table A1, table 1 or table 2. In this embodiment the compound of formula I is more specifically selected from compounds I-11, I-16, I-21, I-26, I-31 as defined in Table A'.

- Especially, the properties of the mentioned plants are present in addition to the insecticidal trait.
- 20 In a most preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula I, wherein the plant has a property or a transgenic event of a plant which corresponds to a row of table A1, wherein the compound of formula I is compound I-11.
- 25 In a most preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula I, wherein the plant has a property or a transgenic event of a plant which corresponds to a row of table A1, wherein the compound of formula I is compound I-16.
- 30 In a most preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula I, wherein the plant has a property or a transgenic event of a plant which corresponds to a row of table A1 wherein the compound of formula I is compound I-26.
- 35 In a most preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula I, wherein the plant has a property or a transgenic event of a plant which corresponds to a row of table A1 wherein the compound of formula I is compound I-31.

Table A1

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-1	Alfalfa Medicago sativa	J101	MON-ØØ1Ø1-8	Roundup Ready™ Alfalfa	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-2	Alfalfa Medicago sativa	J101 x J163	MON-ØØ1Ø1-8 x MON-ØØ163-7	Roundup Ready™ Alfalfa	HT (Gly) / cp4 epsps (aroA:CP4) HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-3	Alfalfa Medicago sativa	J163	MON-ØØ163-7	Roundup Ready™ Alfalfa	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-4	Alfalfa Medicago sativa	KK179	MON-ØØ179-5	Not available	ST (Lignin) / ccomt (inverted repeat)	Monsanto
A1-5	Argentine Canola Brassica napus	23-18-17 (Event 18)	CGN-89111-8	Laurical™ Canola	ST (Oil) / te (thioesterase)	Monsanto
A1-6	Argentine Canola Brassica napus	23-198 (Event 23)	CGN-89465-2	Laurical™ Canola	ST (Oil) / te (thioesterase)	Monsanto
A1-7	Argentine Canola Brassica napus	61061	DP-Ø61Ø61-7	not available	HT (Gly) / gat4621	Dupont
A1-8	Argentine Canola Brassica napus	73496	DP-Ø73496-4	Optimum® Gly canola	HT (Gly) / gat4621	Dupont
A1-9	Argentine Canola Brassica napus	GT200 (RT200)	MON-89249-2	Roundup Ready™ Canola	HT (Gly) / EPSPS HT (Gly) / goxv247	Monsanto
A1-10	Argentine Canola Brassica napus	GT73 (RT73)	MON-ØØØ73-7	Roundup Ready™ Canola	HT (Gly) / EPSPS HT (Gly) / goxv247	Monsanto
A1-11	Argentine Canola Brassica napus	HCN10 (To- pas 19/2)	not available	Liberty Link™ Independence™	HT (Glu) / bar	Bayer Crop Science
A1-12	Argentine Canola Brassica napus	HCN28 (T45)	ACS-BNØØ8-2	InVigor™ Canola	HT (Glu) / pat (syn)	Bayer Crop Science
A1-13	Argentine Canola Brassica napus	HCN92 (To- pas 19/2)	ACS-BNØØ7-1	Liberty Link™ Innovator™	HT (Glu) / bar	Bayer Crop Science
A1-14	Argentine Canola Brassica napus	MON88302	MON-883Ø2-9	TruFlex™ Roundup	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
				Ready™ Canola		
A1-15	Argentine Canola Brassica napus	MON88302 x MS8 x RF3	MON-88302-9 x ACS- BN005-8 x ACS-BN003- 6	not available	HT (Gly) / cp4 epsps (aroA:CP4) HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Monsanto
A1-16	Argentine Canola Brassica napus	MON88302 x RF3	MON-88302-9 x ACS- BN003-6	not available	HT (Gly) / cp4 epsps (aroA:CP4) HT (Glu) / bar PC (FR) / barstar	Monsanto
A1-17	Argentine Canola Brassica napus	MPS961	not available	Phytaseed™ Canola	ST (P) / phyA	BASF
A1-18	Argentine Canola Brassica napus	MPS962	not available	Phytaseed™ Canola	ST (P) / phyA	BASF
A1-19	Argentine Canola Brassica napus	MPS963	not available	Phytaseed™ Canola	ST (P) / phyA	BASF
A1-20	Argentine Canola Brassica napus	MPS964	not available	Phytaseed™ Canola	ST (P) / phyA	BASF
A1-21	Argentine Canola Brassica napus	MPS965	not available	Phytaseed™ Canola	ST (P) / phyA	BASF
A1-22	Argentine Canola Brassica napus	MS1 (B91-4)	ACS-BN004-7	InVigor™ Canola	HT (Glu) / bar PC (MS) / barnase	Bayer Crop Science
A1-23	Argentine Canola Brassica napus	MS1 x RF1 (PGS1)	ACS-BN004-7 x ACS- BN001-4	InVigor™ Canola	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-24	Argentine Canola Brassica napus	MS1 x RF2 (PGS2)	ACS-BN004-7 x ACS- BN002-5	InVigor™ Canola	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-25	Argentine Canola Brassica napus	MS1 x RF3	ACS-BN004-7 x ACS- BN003-6	InVigor™ Canola	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-26	Argentine Canola Brassica napus	MS8	ACS-BN005-8	InVigor™ Canola	HT (Glu) / bar PC (MS) / barnase	Bayer Crop

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
						Science
A1-27	Argentine Canola Brassica napus	MS8 x RF3	ACS-BNØ05-8 x ACS-BNØ03-6	InVigor™ Canola	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-28	Argentine Canola Brassica napus	MS8 x RF3 x GT73 (RT73)	ACS-BNØ05-8 x ACS-BNØ03-6 x MON-ØØØ73-7	not available	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar HT (Gly) / EPSPS HT (Gly) / goxv247	Bayer Crop Science
A1-29	Argentine Canola Brassica napus	OXY-235	ACS-BNØ11-5	Navigator™ Ca-nola	HT (Ox) / bxn	Bayer Crop Science
A1-30	Argentine Canola Brassica napus	PHY14	not available	not available	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-31	Argentine Canola Brassica napus	PHY23	not available	not available	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-32	Argentine Canola Brassica napus	PHY35	not available	not available	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-33	Argentine Canola Brassica napus	PHY36	not available	not available	HT (Glu) / bar PC (MS) / barnase PC (FR) / barstar	Bayer Crop Science
A1-34	Argentine Canola Brassica napus	RF1 (B93-101)	ACS-BNØØ1-4	InVigor™ Canola	HT (Glu) / bar PC (FR) / barstar	Bayer Crop Science
A1-35	Argentine Canola Brassica napus	RF2 (B94-2)	ACS-BNØØ2-5	InVigor™ Canola	HT (Glu) / bar PC (FR) / barstar	Bayer Crop Science
A1-36	Argentine Canola Brassica napus	RF3	ACS-BNØØ3-6	InVigor™ Canola	HT (Glu) / bar PC (FR) / barstar	Bayer Crop Science

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-37	Argentine Canola Brassica napus	45A37, 46A40	45A37, 46A40	not available	ST (Oil) / fad2 (mutant)	Pioneer
A1-38	Argentine Canola Brassica napus	46A12, 46A16	46A12, 46A16	not available	ST (Oil) / fad2 (mutant)	Pioneer
A1-39	Argentine Canola Brassica napus	NS738, NS1471, NS1473	NS738, NS1471, NS1473	Clearfield Canola	HT (lmi) / als (mutant)	Pioneer
A1-40	Bean Phaseolus vulgaris	EMB6X 5.1	EMB-PVØ51-1	not available	VR (BGMV) / ac1 (sense and anti-sense)	Embrapa
A1-41	Carnation Dianthus caryophyllus	11 (7442)	FLO-Ø7442-4	Moondust™	ST (Color) / dfr ST (Color) / hfl (f3'5'h)	Florigene Pty. Ltd.
A1-42	Carnation Dianthus caryophyllus	11363 (1363A)	FLO-11363-1	Moonshadow™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h)	Florigene Pty. Ltd.
A1-43	Carnation Dianthus caryophyllus	1226A (11226)	FLO-11226-8	Moonshade™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h)	Florigene Pty. Ltd.
A1-44	Carnation Dianthus caryophyllus	123.2.2 (40619)	FLO-4Ø619-7	Moonshade™	ST (Color) / dfr ST (Color) / hfl (f3'5'h)	Florigene Pty. Ltd.
A1-45	Carnation Dianthus caryophyllus	123.2.38 (40644)	FLO-4Ø644-4	Moonlite™	ST (Color) / dfr ST (Color) / hfl (f3'5'h)	Florigene Pty. Ltd.
A1-46	Carnation Dianthus caryophyllus	123.8.12	FLO-4Ø689-6	Moonaqua™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h)	Florigene Pty. Ltd.
A1-47	Carnation Dianthus caryophyllus	123.8.8 (40685)	FLO-4Ø685-1	Moonvista™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h)	Florigene Pty. Ltd.
A1-48	Carnation	1351A	FLO-11351-7	Moonshade™	ST (Color) / dfr	Florigene

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	Dianthus caryophyllus	(11351)			ST (Color) / bp40 (f3'5'h)	Pty. Ltd.
A1-49	Carnation Dianthus caryophyllus	1400A (11400)	FLO-11400-2	Moonshade™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h)	Florigene Pty. Ltd.
A1-50	Carnation Dianthus caryophyllus	15	FLO-00015-2	Moondust™	ST (Color) / dfr ST (Color) / hfl (f3'5'h)	Florigene Pty. Ltd.
A1-51	Carnation Dianthus caryophyllus	16	FLO-00016-3	Moondust™	ST (Color) / dfr ST (Color) / hfl (f3'5'h)	Florigene Pty. Ltd.
A1-52	Carnation Dianthus caryophyllus	19907	IFD-19907-9	Moonique™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h) ST (Color) / sfl (f3'5'h) HT (SU) / surB	Suntory Ltd.
A1-53	Carnation Dianthus caryophyllus	25947	IFD-25947-1	Moonpearl™	ST (Color) / bp40 (f3'5'h) ST (Color) / dfr ST (Color) / dfr-diaca HT (SU) / surB	Suntory Ltd.
A1-54	Carnation Dianthus caryophyllus	25958	IFD-25958-3	Moonberry™	ST (Color) / bp40 (f3'5'h) ST (Color) / dfr ST (Color) / dfr-diaca HT (SU) / surB	Suntory Ltd.
A1-55	Carnation Dianthus caryophyllus	26407	IFD-26407-2	Moonvelvet™	ST (Color) / hfl (f3'5'h) ST (Color) / cytb5 HT (SU) / surB	Suntory Ltd.
A1-56	Carnation Dianthus caryophyllus	4	FLO-00004-9	Moondust™	ST (Color) / dfr ST (Color) / hfl (f3'5'h)	Florigene Pty. Ltd.
A1-57	Carnation Dianthus caryophyllus	66	FLO-00066-8	not available	ST (Ripe) / acc (truncated)	Florigene Pty. Ltd.

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	lus					
A1-58	Carnation Dianthus caryophyllus	959A (11959)	FLO-11959-3	Moonshade™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h)	Florigene Pty. Ltd.
A1-59	Carnation Dianthus caryophyllus	988A (11988)	FLO-11988-7	Moonshade™	ST (Color) / dfr ST (Color) / bp40 (f3'5'h)	Florigene Pty. Ltd.
A1-60	Chicory Cichorium intybus	RM3-3	not available	Seed Link™	HT (Glu) / bar PC (MS) / barnase	Bejo Zaden BV
A1-61	Chicory Cichorium intybus	RM3-4	not available	Seed Link™	HT (Glu) / bar PC (MS) / barnase	Bejo Zaden BV
A1-62	Chicory Cichorium intybus	RM3-6	not available	Seed Link™	HT (Glu) / bar PC (MS) / barnase	Bejo Zaden BV
A1-63	Cotton Gossypium hirsutum	19-51a	DD-Ø1951A-7	not available	HT (SU) / S4-hrA	Dupont
A1-64	Cotton Gossypium hirsutum	281-24-236	DAS-24236-5	not available	IR (BL) / cry1F	Dow
A1-65	Cotton Gossypium hirsutum	281-24-236 x 3006-210-23 (MXB-13)	DAS-24236-5 x DAS-21Ø23-5	WideStrike™ Cotton	IR (BL) / cry1F IR (BL) / cry1Ac	Dow
A1-66	Cotton Gossypium hirsutum	3006-210-23	DAS-21Ø23-5	not available	IR (BL) / Cry1Ac	Dow
A1-67	Cotton Gossypium hirsutum	3006-210-23 x 281-24-236 x MON1445	DAS-21Ø23-5 x DAS-24236-5 x MON-Ø1445-2	WideStrike™ Roundup Ready™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1F IR (BL) / cry1Ac HT (Glu) / bar	Monsanto
A1-68	Cotton Gossypium hirsutum	3006-210-23 x 281-24-236 x MON88913	DAS-21Ø23-5 x DAS-24236-5 x MON-88913-8	Widestrike™ Roundup Ready Flex™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1F IR (BL) / cry1Ac HT (Glu) / bar	Dow & Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-69	Cotton Gossypium hirsutum	3006-210-23 x 281-24- 236 x MON88913 x COT102	DAS-21Ø23-5 x DAS- 24236-5 x MON-88913-8 x SYN-IR1Ø2-7	Widestrike™ x Roundup Ready Flex™ x VIP- COT™ Cotton	IR (BL) / cry1Ac IR (BL) / vip3A(a) IR (BL) / cry1F HT (Gly) / cp4 epsps (aroA:CP4) HT (Glu) / pat	Dow
A1-70	Cotton Gossypium hirsutum	31707	not available	BXN™ Plus Bollgard™ Cot- ton	HT (Ox) / bxn IR (BL) / cry1Ac	Monsanto
A1-71	Cotton Gossypium hirsutum	31803	not available	BXN™ Plus Bollgard™ Cot- ton	HT (Ox) / bxn IR (BL) / cry1Ac	Monsanto
A1-72	Cotton Gossypium hirsutum	31807 x 31808	not available	not available	2HT (Ox) / bxn 2IR (BL) / cry1Ac / /	Monsanto
A1-73	Cotton Gossypium hirsutum	31807	not available	BXN™ Plus Bollgard™ Cot- ton	HT (Ox) / bxn IR (BL) / cry1Ac	Monsanto
A1-74	Cotton Gossypium hirsutum	31808	not available	BXN™ Plus Bollgard™ Cot- ton	HT (Ox) / bxn IR (BL) / cry1Ac	Monsanto
A1-75	Cotton Gossypium hirsutum	42317	not available	BXN™ Plus Bollgard™ Cot- ton	HT (Ox) / bxn IR (BL) / cry1Ac	Monsanto
A1-76	Cotton Gossypium hirsutum	BNLA-601	not available	not available	IR (BL) / cry1Ac	Central Insti- tute for Cot- ton Re- search and University of Agricultural

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
						Sciences Dharwad (India)
A1-77	Cotton Gossypium hirsutum	BXN10211 (10211)	BXN-1Ø211-9	BXN™ Cotton	HT (Ox) / bxn	Monsanto
A1-78	Cotton Gossypium hirsutum	BXN10215 (10215)	BXN-1Ø215-4	BXN™ Cotton	HT (Ox) / bxn	Monsanto
A1-79	Cotton Gossypium hirsutum	BXN10222 (10222)	BXN-1Ø222-2	BXN™ Cotton	HT (Ox) / bxn	Monsanto
A1-80	Cotton Gossypium hirsutum	BXN10224 (10224)	BXN-1Ø224-4	BXN™ Cotton	HT (Ox) / bxn	Monsanto
A1-81	Cotton Gossypium hirsutum	COT102 (IR102)	SYN-IR1Ø2-7	VIPCOT™ Cotton	IR (BL) / vip3A(a)	Syngenta
A1-82	Cotton Gossypium hirsutum	COT102 x COT67B	SYN-IR1Ø2-7 x SYN- IR67B-1	VIPCOT™ Cotton	IR (BL) / vip3A(a) IR (BL) / cry1Ab	Syngenta
A1-83	Cotton Gossypium hirsutum	COT102 x COT67B x MON88913	SYN-IR1Ø2-7 x SYN- IR67B-1 x MON-88913-8	VIPCOT™ Roundup Ready Flex™ Cotton	IR (BL) / vip3A(a) IR (BL) / cry1Ab	Syngenta
A1-84	Cotton Gossypium hirsutum	COT102 x MON15985	SYN-IR1Ø2-7 x MON- 15985-7	Bollgard® III	IR (BL) / vip3A(a) IR (BL) / cry1Ac IR (BL) / cry2Ab2	Monsanto
A1-85	Cotton Gossypium hirsutum	COT102 x MON15985 x MON88913	SYN-IR1Ø2-7 x MON- 15985-7 x MON-88913-8	Bollgard® III x Roundup Ready™ Flex™	IR (BL) / vip3A(a) IR (BL) / cry1Ac IR (BL) / cry2Ab2 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-86	Cotton Gossypium hirsutum	COT67B (IR67B)	SYN-IR67B-1	not available	IR (BL) / cry1Ab	Syngenta
A1-87	Cotton Gossypium hirsutum	Event1	not available	JK 1	IR (BL) / cry1Ac	JK Agri Ge- netics Ltd. (India)

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A1-88	Cotton Gossypium hirsutum	GFM Cry1A	GTL-GFM311-7	not available	IR (BL) / cry1Ab-Ac	Nath Seeds/Globa I Transgenes Ltd (India)
A1-89	Cotton Gossypium hirsutum	GHB119	BCS-GHØØ5-8	not available	HT (Glu) / bar IR (BL) / cry2Ae	Bayer Crop Science
A1-90	Cotton Gossypium hirsutum	GHB614	BCS-GHØØ2-5	GlyTol™	HT (Gly) / 2mepsps	Bayer Crop Science
A1-91	Cotton Gossypium hirsutum	GHB614 x LLCotton25	BCS-GHØØ2-5 x ACS- GHØØ1-3	GlyTol™ Liberty Link™	HT (Gly) / 2mepsps HT (Glu) / bar	Bayer Crop Science
A1-92	Cotton Gossypium hirsutum	GHB614 x LLCotton25 x MON15985	BCS-GHØØ2-5 x ACS- GHØØ1-3 x MON-15985-7	not available	HT (Gly) / 2mepsps HT (Glu) / bar IR (BL) / cry1Ac IR (BL) / cry2Ab2	Bayer Crop Science
A1-93	Cotton Gossypium hirsutum	GHB614 x MON15985	BCS-GHØØ2-5 x MON- 15985-7	not available	HT (Gly) / 2mepsps IR (BL) / cry1Ac IR (BL) / cry2Ab2	Bayer Crop Science
A1-94	Cotton Gossypium hirsutum	GHB614 x T304-40 x GHB119	BCS-GHØØ2-5 x BCS- GHØØ4-7 x BCS-GHØØ5- 8	Glytol™ x Twin- link™	HT (Gly) / 2mepsps HT (Glu) / bar IR (BL) / cry1Ab IR (BL) / cry2Ae	Bayer Crop Science
A1-95	Cotton Gossypium hirsutum	GK12	not available	not available	IR (BL) / cry1Ab-Ac	Chinese Academy of Agricultural Sciences
A1-96	Cotton Gossypium hirsutum	LLCotton25	ACS-GHØØ1-3	Fibermax™ Li- berty Link™	HT (Glu) / bar	Bayer Crop Science

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A1-97	Cotton Gossypium hirsutum	LLCotton25 x MON15985	ACS-GHØ1-3 x MON-15985-7	Fibermax™ Liberty Link™ Bollgard II™	HT (Glu) / bar IR (BL) / cry1Ac IR (BL) / cry2Ab2	
A1-98	Cotton Gossypium hirsutum	MLS 9124	not available	not available	IR (BL) / cry1C	Metahelix Life Sciences Pvt. Ltd (India)
A1-99	Cotton Gossypium hirsutum	MON 887Ø1-3	MON88701	not available	HT (Dic) / dmo HT (Glu) / bar	Monsanto
A1-100	Cotton Gossypium hirsutum	MON1076	MON-89924-2	Bollgard™ Cotton	IR (BL) / cry1Ac	Monsanto
A1-101	Cotton Gossypium hirsutum	MON1445	MON-Ø1445-2	Roundup Ready™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-102	Cotton Gossypium hirsutum	MON15985	MON-15985-7	Bollgard II™ Cotton	IR (BL) / cry1Ac IR (BL) / cry2Ab2	Monsanto
A1-103	Cotton Gossypium hirsutum	MON15985 x MON1445	MON-15985-7 x MON-Ø1445-2	Roundup Ready™ Bollgard II™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1Ac IR (BL) / cry2Ab2	Monsanto
A1-104	Cotton Gossypium hirsutum	MON1698	MON-89383-1	Roundup Ready™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-105	Cotton Gossypium hirsutum	MON531	MON-ØØ531-6	Bollgard™ Cotton, Ingard™	IR (BL) / cry1Ac	Monsanto
A1-106	Cotton Gossypium hirsutum	MON531 x MON1445	MON-Ø531-6 x MON-Ø1445-2	Roundup Ready™ Bollgard™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1Ac	Monsanto
A1-107	Cotton Gossypium hirsutum	MON757	MON-ØØ757-7	Bollgard™ Cotton	IR (BL) / cry1Ac	Monsanto
A1-108	Cotton Gossypium hirsutum	MON88913	MON-88913-8	Roundup Ready™ Flex™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto

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A1-109	Cotton Gossypium hirsutum	MON88913 x MON15985	MON-88913-8 x MON-15985-7	Roundup Ready™ Flex™ Bollgard II™ Cotton	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1Ac IR (BL) / cry2Ab2	Monsanto
A1-110	Cotton Gossypium hirsutum	Ngwe Chi 6 Bt	not available	Ngwe Chi 6 Bt		Cotton and Sericulture Department (Myanmar)
A1-111	Cotton Gossypium hirsutum	SGK321	not available	not available	IR (BL) / cry1A IR (BRun) / CpTI	Chinese Academy of Agricultural Sciences
A1-112	Cotton Gossypium hirsutum	T303-3	BCS-GHØØ3-6	not available	IR (BL) / cry1Ab HT (Glu) / bar	Bayer Crop Science
A1-113	Cotton Gossypium hirsutum	T304-40	BCS-GHØØ4-7	not available	IR (BL) / cry1Ab HT (Glu) / bar	Bayer Crop Science
A1-114	Cotton Gossypium hirsutum	T304-40 x GHB119	BCS-GHØØ4-7 x BCS-GHØØ5-8	TwinLink™ Cotton	IR (BL) / cry1Ab HT (Glu) / bar	Bayer Crop Science
A1-115	Cotton Gossypium hirsutum	81910	DAS-81910-7	not available	HT (2,4-D) / aad-12 HT (Glu) / pat	Dow
A1-116	Creeping Bentgrass Agrostis stolonifera	ASR368	SMG-368ØØ-2	Roundup Ready™ Creeping Bentgrass	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-117	Eggplant Solanum melongena	Bt Brinjal Event EE1	Bt Brinjal Event EE1	BARI Bt Begun-1, -2, -3 and -4	IR (BL) / cry1Ac	Maharashtra Hybrid Seed Company (MAHYCO)

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-118	Flax <i>Linum usitatissimum</i>	FP967 (CDC Triffid)	CDC-FLØØ1-2	CDC Triffid Flax	HT (SU) / als	University of Saskatchewan
A1-119	Lentil <i>Lens culinaris</i>	RH44	RH44	not available	HT (lmi) / als (mutant)	BASF
A1-120	Maize <i>Zea mays</i>	32138	DP-32138-1	32138 SPT maintainer	PC (FR) / ms45 PC (MS) / zm-aa1	Dupont
A1-121	Maize <i>Zea mays</i>	3272	SYN-E3272-5	Enogen™	ST (CA) / amy797E	Syngenta
A1-122	Maize <i>Zea mays</i>	3272 x Bt11	SYN-E3272-5 x SYN-BTØ11-1	not available	ST (CA) / amy797E IR (BL) / cry1Ab HT (Glu) / pat	Syngenta
A1-123	Maize <i>Zea mays</i>	3272 x Bt11 x GA21	SYN-E3272-5 x SYN-BTØ11-1 x MON-ØØØ21-9	not available	ST (CA) / amy797E IR (BL) / cry1Ab HT (Glu) / pat HT (Gly) / mepsps	Syngenta
A1-124	Maize <i>Zea mays</i>	3272 x Bt11 x MIR604	SYN-E3272-5 x SYN-BTØ11-1 x SYN-IR6Ø4-5	not available	ST (CA) / amy797E IR (BL) / cry1Ab HT (Glu) / pat IR (Col) / mcry3A	Syngenta
A1-125	Maize <i>Zea mays</i>	3272 x Bt11 x MIR604 x GA21	SYN-E3272-5 x SYN-BTØ11-1 x SYN-IR6Ø4-5 x MON-ØØØ21-9	not available	ST (CA) / amy797E IR (BL) / cry1Ab HT (Glu) / pat IR (Col) / mcry3A HT (Gly) / mepsps	Syngenta
A1-126	Maize <i>Zea mays</i>	3272 x GA21	SYN-E3272-5 x MON-ØØØ21-9	not available	ST (CA) / amy797E HT (Gly) / mepsps	Syngenta
A1-127	Maize <i>Zea mays</i>	3272 x MIR604	SYN-E3272-5 x SYN-IR6Ø4-5	not available	ST (CA) / amy797E IR (Col) / mcry3A	Syngenta

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A1-128	Maize Zea mays	3272 x MIR604 x GA21	SYN-E3272-5 x SYN- IR604-5 x MON-ØØØ21-9	not available	ST (CA) / amy797E IR (Col) / mcr3A HT (Gly) / mepsps	Syngenta
A1-129	Maize Zea mays	33121	DP-Ø33121-3	not available	IR (BL) / cry2Ae IR (BL) / cry1A IR (BL) / vip3Aa20 HT (Glu) / pat	Dupont
A1-130	Maize Zea mays	4114	DP-ØØ4114-3	not available	IR (BL) / cry1F IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 HT (Glu) / pat	Dupont
A1-131	Maize Zea mays	5307	SYN-Ø53Ø7-1	Agrisure® Duracade™	IR (Col) / ecry3.1Ab	Syngenta
A1-132	Maize Zea mays	5307 x MIR604 x Bt11 x TC1507 x GA21	SYN-Ø53Ø7-1 x SYN- IR604-5 x SYN-BTØ11-1 x DAS-Ø15Ø7-1 x MON- ØØØ21-9	Agrisure® Duracade™ 5122	IR (Col) / ecry3.1Ab IR (Col) / mcr3A IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / cry1Fa2 HT (Gly) / mepsps	Syngenta
A1-133	Maize Zea mays	5307 x MIR604 x Bt11 x TC1507 x GA21 x MIR162	SYN-Ø53Ø7-1 x SYN- IR604-5 x SYN-BTØ11-1 x DAS-Ø15Ø7-1 x MON- ØØØ21-9 x SYN-IR162-4	Agrisure® Duracade™ 5222	IR (Col) / ecry3.1Ab IR (Col) / mcr3A IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / cry1Fa2 HT (Gly) / mepsps IR (BL) / vip3Aa20	Syngenta
A1-134	Maize Zea mays	59122	DAS-59122-7	Herculex™ RW	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1	Dow
A1-135	Maize Zea mays	59122 x GA21	DAS-59122-7 x MON- ØØØ21-9	not available	HT (Glu) / pat IR (Col) / cry34Ab1	Syngenta

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					IR (Col) / cry35Ab1 HT (Gly) / mepsps	
A1-136	Maize Zea mays	59122 x MIR604	DAS-59122-7 x SYN- IR604-5	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / mcr3A	Syngenta
A1-137	Maize Zea mays	59122 x MIR604 x GA21	DAS-59122-7 x SYN- IR604-5 x MON-ØØ21-9	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / mcr3A HT (Gly) / mepsps	Syngenta
A1-138	Maize Zea mays	59122 x MIR604 x TC1507	DAS-59122-7 x SYN- IR604-5 x DAS-Ø15Ø7-1	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / mcr3A IR (BL) / cry1Fa2	Syngenta
A1-139	Maize Zea mays	59122 x MIR604 x TC1507 x GA21	DAS-59122-7 x SYN- IR604-5 x DAS-Ø15Ø7-1 x MON-ØØØ21-9	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / mcr3A IR (BL) / cry1Fa2 HT (Gly) / mepsps	Syngenta
A1-140	Maize Zea mays	59122 x MON810	DAS-59122-7 x MON- ØØ81Ø-6	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab	Dupont
A1-141	Maize Zea mays	59122 x MON810 x NK603	DAS-59122-7 x MON- ØØ81Ø-6 x MON-ØØ6Ø3- 6	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab HT (Gly) / cp4 epsps (aroA:CP4)	Dupont

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-142	Maize Zea mays	59122 x MON88017	DAS-59122-7 x MON- 88017-3	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto & Dow
A1-143	Maize Zea mays	59122 x NK603	DAS-59122-7 x MON- 00603-6	Herculex™ RW Roundup Ready™ 2	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 HT (Gly) / cp4 epsps (aroA:CP4)	Dupont
A1-144	Maize Zea mays	59122 x TC1507 x GA21	DAS-59122-7 x DAS- 01507-1 x MON-00021- 9	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Fa2 HT (Gly) / mepsps	Syngenta
A1-145	Maize Zea mays	676	PH-0000676-7	not available	HT (Glu) / pat PC (MS) / dam	Dupont
A1-146	Maize Zea mays	678	PH-0000678-9	not available	HT (Glu) / pat PC (MS) / dam	Dupont
A1-147	Maize Zea mays	680	PH-0000680-2	not available	HT (Glu) / pat PC (MS) / dam	Dupont
A1-148	Maize Zea mays	98140	DP-098140-6	Optimum™ GAT™	HT (SU) / zm-hra HT (Gly) / gat4621	Dupont
A1-149	Maize Zea mays	98140 x 59122	DP-098140-6 x DAS- 59122-7	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 HT (SU) / zm-hra HT (Gly) / gat4621	Dow & Du- pont
A1-150	Maize Zea mays	98140 x TC1507	DP-098140-6 x DAS- 01507-1	not available	HT (SU) / zm-hra HT (Gly) / gat4621 IR (BL) / cry1Fa2 HT (Glu) / pat	Dow & Du- pont

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A1-151	Maize Zea mays	98140 x TC1507 x 59122	DP-Ø9814Ø-6 x DAS- Ø15Ø7-1 x DAS-59122-7	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 HT (SU) / zm-hra HT (Gly) / gat4621 IR (BL) / cry1Fa2	Dow & Du- pont
A1-152	Maize Zea mays	Bt10	not available	Bt10	IR (BL) / cry1Ab HT (Glu) / pat	Syngenta
A1-153	Maize Zea mays	Bt11 (X4334CBR, X4734CBR)	SYN-BTØ11-1	Agrisure™ CB/LL	IR (BL) / cry1Ab HT (Glu) / pat	Syngenta
A1-154	Maize Zea mays	Bt11 x 59122	SYN-BTØ11-1 x DAS- 59122-7	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab	Syngenta
A1-155	Maize Zea mays	Bt11 x 59122 x GA21	SYN-BTØ11-1 x DAS- 59122-7 x MON-ØØØ21-9	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab HT (Gly) / mepsps	Syngenta
A1-156	Maize Zea mays	Bt11 x 59122 x MIR604	SYN-BTØ11-1 x DAS- 59122-7 x SYN-IR6Ø4-5	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab IR (Col) / mcry3a	Syngenta
A1-157	Maize Zea mays	Bt11 x 59122 x MIR604 x GA21	SYN-BTØ11-1 x DAS- 59122-7 x SYN-IR6Ø4-5 x MON-ØØØ21-9	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab IR (Col) / mcry3a HT (Gly) / mepsps	Syngenta

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A1-158	Maize Zea mays	Bt11 x 59122 x MIR604 x TC1507	SYN-BTØ11-1 x DAS- 59122-7 x SYN-IR6Ø4-5 x DAS-Ø15Ø7-1	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab IR (BL) / cry1Fa2 IR (Col) / mcr3a	Syngenta
A1-159	Maize Zea mays	BT11 x 59122 x MIR604 x TC1507 x GA21	SYN-BTØ11-1 x DAS- 59122-7 x SYN-IR6Ø4-5 x DAS-Ø15Ø7-1 x MON- ØØØ21-9	Agrisure® 3122	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab IR (BL) / cry1Fa2 IR (Col) / mcr3a HT (Gly) / mepsps	Syngenta
A1-160	Maize Zea mays	Bt11 x 59122 x TC1507	SYN-BTØ11-1 x DAS- 59122-7 x DAS-Ø15Ø7-1	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab IR (BL) / cry1Fa2	Syngenta
A1-161	Maize Zea mays	Bt11 x 59122 x TC1507 x GA21	SYN-BTØ11-1 x DAS- 59122-7 x DAS-Ø15Ø7-1 x MON-ØØØ21-9	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab IR (BL) / cry1Fa2 HT (Gly) / mepsps	Syngenta
A1-162	Maize Zea mays	Bt11 x GA21	SYN-BTØ11-1 x MON- ØØØ21-9	Agrisure™ GT/CB/LL	HT (Gly) / mepsps IR (BL) / cry1Ab HT (Glu) / pat	Syngenta
A1-163	Maize Zea mays	Bt11 x MIR162	SYN-BTØ11-1 x SYN- IR162-4	Agrisure® Vipte- ra™ 2100	IR (BL) / cry1Ab (truncated) HT (Glu) / pat IR (BL) / vip3Aa20	Syngenta

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A1-164	Maize Zea mays	Bt11 x MIR162 x GA21	SYN-BTØ11-1 x SYN- IR162-4 x MON-ØØØ21-9	Agrisure® Vipte- ra™ 3110	IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / vip3Aa20 HT (Gly) / mepsps	Syngenta
A1-165	Maize Zea mays	Bt11 x MIR162 x MIR604	SYN-BTØ11-1 x SYN- IR162-4 x SYN-IR6Ø4-5	Agrisure® Vipte- ra™ 3100	IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / vip3Aa20 IR (Col) / mcry3a	Syngenta
A1-166	Maize Zea mays	Bt11 x MIR162 x MIR604 x GA21	SYN-BTØ11-1 x SYN- IR162-4 x SYN-IR6Ø4-5 x MON-ØØØ21-9	Agrisure® Vipte- ra™ 3111, Agri- sure® Viptera™ 4	IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / vip3Aa20 IR (Col) / mcry3a HT (Gly) / mepsps	Syngenta
A1-167	Maize Zea mays	Bt11 x MIR162 x TC15Ø7	SYN-BTØ11-1 x SYN- IR162-4 x DAS-Ø15Ø7-1	not available	IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / vip3Aa20 IR (BL) / cry1Fa2	Syngenta
A1-168	Maize Zea mays	Bt11 x MIR162 x TC15Ø7 x GA21	SYN-BTØ11-1 x SYN- IR162-4 x DAS-Ø15Ø7-1 x MON-ØØØ21-9	Agrisure™ Vipte- ra 3220	IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / vip3Aa20 IR (BL) / cry1Fa2 HT (Gly) / mepsps	Syngenta
A1-169	Maize Zea mays	Bt11 x MIR604	SYN-BTØ11-1 x SYN- IR6Ø4-5	Agrisure™ CB/LL/RW	IR (BL) / cry1Ab HT (Glu) / pat IR (Col) / mcry3a	Syngenta
A1-170	Maize Zea mays	Bt11 x MIR604 x GA21	SYN-BTØ11-1 x SYN- IR6Ø4-5 x MON-ØØØ21-9	Agrisure™ 300ØGT	IR (BL) / cry1Ab HT (Glu) / pat IR (Col) / mcry3a HT (Gly) / mepsps	Syngenta
A1-171	Maize Zea mays	Bt11 x MIR604 x	SYN-BTØ11-1 x SYN- IR6Ø4-5 x DAS-Ø15Ø7-1	not available	IR (BL) / cry1Ab HT (Glu) / pat	Syngenta

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
		TC1507			IR (Col) / mcr3a IR (BL) / cry1Fa2	
A1-172	Maize Zea mays	Bt11 x TC1507	SYN-BTØ11-1 x DAS- Ø15Ø7-1	not available	IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / cry1Fa2	Syngenta
A1-173	Maize Zea mays	Bt11 x TC1507 x GA21	SYN-BTØ11-1 x DAS- Ø15Ø7-1 x MON-ØØØ21- 9	not available	IR (BL) / cry1Ab HT (Glu) / pat IR (BL) / cry1Fa2 HT (Gly) / mepsps	Syngenta
A1-174	Maize Zea mays	Bt176 (176)	SYN-EV176-9	NaturGard KnockOut™, Maximizer™	IR (BL) / cry1Ab HT (Glu) / bar	Syngenta
A1-175	Maize Zea mays	BVLA43010 1	not available	not available	ST (P) / phyA2	Origin Agri- tech (China)
A1-176	Maize Zea mays	CBH-351	ACS-ZMØØ4-3	Starlink™ Maize	IR (BL) / cry9c HT (Glu) / bar	Bayer Crop Sciences
A1-177	Maize Zea mays	DAS40278	DAS-4Ø278-9	Enlist™ Maize	HT (2,4-D) / aad1	Dow
A1-178	Maize Zea mays	DAS40278 x NK603	DAS-4Ø278-9 x MON- ØØ6Ø3-6	not available	HT (2,4-D) / aad1 HT (Gly) / cp4 epsps (aroA:CP4)	Dow
A1-179	Maize Zea mays	DBT418	DKB-89614-9	Bt Xtra™ Maize	IR (BL) / Cry1Ac IR (BL) / pinII HT (Glu) / bar	Monsanto
A1-180	Maize Zea mays	DLL25 (B16)	DKB-8979Ø-5	not available	HT (Glu) / bar	Monsanto
A1-181	Maize Zea mays	GA21	MON-ØØØØ21-9	Roundup Ready™ Maize, Agrisure™ GT	HT (Gly) / mepsps	Monsanto
A1-182	Maize Zea mays	GA21 x MON810	MON-ØØØØ21-9 x MON- ØØ81Ø-6	Roundup Ready™ Yield-	IR (BL) / cry1Ab HT (Gly) / mepsps	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
				Gard™ maize		
A1-183	Maize Zea mays	GA21 x T25	MON-ØØØ21-9 x ACS-ZMØØ3-2	not available	HT (Gly) / mepsps HT (Glu) / pat (syn)	Syngenta
A1-184	Maize Zea mays	HCEM485	HCEM485	not available	HT (Gly) / 2mepsps	Stine Seed Farm, Inc (USA)
A1-185	Maize Zea mays	LY038	REN-ØØØ38-3	Mavera™ Maize	ST (AA) / cordapA	Renessen LLC (Netherlands)
A1-186	Maize Zea mays	LY038 x MON810	REN-ØØØ38-3 x MON-ØØ81Ø-6	Mavera™ Yield-Gard™ Maize	ST (AA) / cordapA IR (BL) / cry1Ab	Renessen LLC (Netherlands) & Monsanto
A1-187	Maize Zea mays	MIR162	SYN-IR162-4	Agrisure™ Viptera	IR (BL) / vip3Aa20	Syngenta
A1-188	Maize Zea mays	MIR162 x GA21	SYN-IR162-4 x MON-ØØØ21-9	not available	IR (BL) / vip3Aa20 HT (Gly) / mepsps	Syngenta
A1-189	Maize Zea mays	MIR162 x MIR604	SYN-IR162-4 x SYN-IR6Ø4-5	not available	IR (BL) / vip3Aa20 IR (Col) / mcry3a	Syngenta
A1-190	Maize Zea mays	MIR162 x MIR604 x GA21	SYN-IR162-4 x SYN-IR6Ø4-5 x MON-ØØØ21-9	not available	IR (BL) / vip3Aa20 IR (Col) / mcry3a HT (Gly) / mepsps	Syngenta
A1-191	Maize Zea mays	MIR162 x TC1507	SYN-IR162-4 x DAS-Ø15Ø7-1	not available	IR (BL) / vip3Aa20 IR (BL) / cry1Fa2 HT (Glu) / pat	Syngenta
A1-192	Maize Zea mays	MIR162 x TC1507 x GA21	SYN-IR162-4 x DAS-Ø15Ø7-1 x MON-ØØØ21-9	not available	IR (BL) / vip3Aa20 IR (BL) / cry1Fa2 HT (Glu) / pat	Syngenta

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
					HT (Gly) / mepsps	
A1-193	Maize Zea mays	MIR604	SYN-IR604-5	Agrisure™ RW	IR (Col) / mcr3a	Syngenta
A1-194	Maize Zea mays	MIR604 x GA21	SYN-IR604-5 x MON- ØØØ21-9	Agrisure™ GT/RW	IR (Col) / mcr3a HT (Gly) / mepsps	Syngenta
A1-195	Maize Zea mays	MIR604 x NK603	SYN-IR604-5 x MON- ØØØ63-6	not available	IR (Col) / mcr3a HT (Gly) / cp4 epsps (aroA:CP4)	Dupont
A1-196	Maize Zea mays	MIR604 x TC1507	SYN-IR604-5 x DAS- Ø15Ø7-1	not available	IR (Col) / mcr3a IR (BL) / cry1Fa2 HT (Glu) / pat	Syngenta
A1-197	Maize Zea mays	MON801 (MON80100)	MON801	not available	IR (BL) / cry1Ab	Monsanto
A1-198	Maize Zea mays	MON802	MON-8Ø2ØØ-7	not available	IR (BL) / cry1Ab	Monsanto
A1-199	Maize Zea mays	MON809	PH-MON-8Ø9-2	not available	IR (BL) / cry1Ab	Monsanto & Dupont
A1-200	Maize Zea mays	MON810	MON-ØØ81Ø-6	YieldGard™, MaizeGard™	IR (BL) / cry1Ab	Monsanto
A1-201	Maize Zea mays	MON810 x MON88017	MON-ØØ81Ø-6 x MON- 88Ø17-3	YieldGard™ VT Triple	IR (BL) / cry1Ab IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-202	Maize Zea mays	MON832	not available	Roundup Ready™ Maize	HT (Gly) / gov247 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-203	Maize Zea mays	MON863	MON-ØØ863-5	YieldGard™ Rootworm RW, MaxGard™	IR (Col) / cry3Bb1	Monsanto
A1-204	Maize Zea mays	MON863 x MON810	MON-ØØ863-5 x MON- ØØ81Ø-6	YieldGard™ Plus	IR (BL) / cry1Ab IR (Col) / cry3Bb1	Monsanto
A1-205	Maize Zea mays	MON863 x MON810 x	MON-ØØ6Ø3-6 x MON- ØØ81Ø-6 x MON-ØØ863-	YieldGard™ Plus with RR	IR (BL) / cry1Ab IR (Col) / cry3Bb1	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
		NK603	5		HT (Gly) / cp4 epsps (aroA:CP4)	
A1-206	Maize Zea mays	MON863 x NK603	MON-ØØ863-5 x MON- ØØ6Ø3-6	YieldGard™ RW + RR	IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-207	Maize Zea mays	MON87411	MON-87411-9	Not available	IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4) IR (Rw) / dvnf7	Monsanto
A1-208	Maize Zea mays	MON87427	MON-87427-7	Roundup Ready™ Maize	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-209	Maize Zea mays	MON87427 x MON89034 x MON88017	MON-87427-7 x MON- 89Ø34-3 x MON-88Ø17-3	not available	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry2Ab2 IR (BL) / cry1A.105 IR (Col) / cry3Bb1	Monsanto
A1-210	Maize Zea mays	MON87427 x MON89034 x NK603	MON-87427-7 x MON- 89Ø34-3 x MON-ØØ6Ø3- 6	not available	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry2Ab2 IR (BL) / cry1A.105	Monsanto
A1-211	Maize Zea mays	MON87427 x MON89Ø34 x TC15Ø7 x MON88Ø17 x 59122	MON-87427-7 x MON- 89Ø34-3 x DAS-Ø15Ø7-1 x MON-88Ø17-3 x DAS- 59122-7	not available	HT (Gly) / cp4 epsps (aroA:CP4) IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Fa2 HT (Glu) / pat IR (BL) / cry2Ab2	Monsanto
A1-212	Maize Zea mays	MON87460	MON-8746Ø-4	Genuity® DroughtGard™	YS (DT) / cspB	Monsanto & BASF
A1-213	Maize Zea mays	MON87460 x MON89034 x MON88017	MON-8746Ø-4 x MON- 89Ø34-3 x MON-88Ø17-3	not available	YS (DT) / cspB IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-214	Maize Zea mays	MON87460 x MON89034 x NK603	MON-87460-4 x MON-89034-3 x MON-00603-6	not available	YS (DT) / cspB IR (BL) / cry1A.105 IR (BL) / cry2Ab2 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-215	Maize Zea mays	MON87460 x NK603	MON-87460-4 x MON-00603-6	not available	YS (DT) / cspB HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-216	Maize Zea mays	MON88017	MON-88017-3	YieldGard™ VT™ Root- worm™ RR2	IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-217	Maize Zea mays	MON89034	MON-89034-3	YieldGard™ VT Pro™	IR (BL) / cry1A.105	Monsanto
A1-218	Maize Zea mays	MON89034 x 59122	MON-89034-3 x DAS-59122-7	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1A.105 IR (BL) / cry2Ab2	Monsanto
A1-219	Maize Zea mays	MON89034 x 59122 x MON88017	MON-89034-3 x DAS-59122-7 x MON-88017-3	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1A.105 IR (BL) / cry2Ab2	Monsanto
A1-220	Maize Zea mays	MON89034 x MON88017	MON-89034-3 x MON-88017-3	Genuity® VT Triple Pro™	IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-221	Maize Zea mays	MON89034 x NK603	MON-89034-3 x MON-00603-6	Genuity® VT Double Pro™	IR (BL) / cry1A.105 IR (BL) / cry2Ab2 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-222	Maize	MON89034	MON-89034-3 x DAS-	not available	IR (BL) / cry1A.105	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	Zea mays	x TC1507	Ø15Ø7-1		IR (BL) / cry2Ab2 IR (BL) / cry1Fa2 HT (Glu) / pat	
A1-223	Maize Zea mays	MON89034 x TC1507 x 59122	MON-89Ø34-3 x DAS- Ø15Ø7-1 x DAS-59122-7	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (BL) / cry1Fa2	Monsanto
A1-224	Maize Zea mays	MON89034 x TC1507 x MON88017	MON-89Ø34-3 x DAS- Ø15Ø7-1 x MON-88Ø17-3	not available	IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (BL) / cry1Fa2 HT (Glu) / pat	Monsanto & Dow
A1-225	Maize Zea mays	MON89034 x TC1507 x MON88017 x 59122	MON-89Ø34-3 x DAS- Ø15Ø7-1 x MON-88Ø17-3 x DAS-59122-7	Genuity® SmartStax™	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (BL) / cry1Fa2	Monsanto & Dow
A1-226	Maize Zea mays	MON89034 x TC1507 x MON88017 x 59122 x DAS40278	MON-89Ø34-3 x DAS- Ø15Ø7-1 x MON-88Ø17-3 x DAS-59122-7 x DAS- 4Ø278-9	not available	HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (BL) / cry1Fa2	Dow

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
					HT (2,4-D) / aad1	
A1-227	Maize Zea mays	MON89034 x TC1507 x MON88017 x DAS40278	MON-89Ø34-3 x DAS- Ø15Ø7-1 x MON-88Ø17-3 x DAS-59122-7 x DAS- 4Ø278-9	not available	IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (BL) / cry1Fa2 HT (Glu) / pat HT (2,4-D) / aad1	Dow
A1-228	Maize Zea mays	MON89034 x TC1507 x NK603	MON-89Ø34-3 x DAS- Ø15Ø7-1 x MON-ØØ6Ø3- 6	Power Core™	IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (BL) / cry1Fa2 HT (Gly) / cp4 epsps (aroA:CP4) HT (Glu) / pat	Monsanto & Dow
A1-229	Maize Zea mays	MON89034 x TC1507 x NK603 x DAS40278	MON-89Ø34-3 x DAS- Ø15Ø7-1 x MON-ØØ6Ø3- 6 x DAS-4Ø278-9	not available	IR (BL) / cry1A.105 IR (BL) / cry2Ab2 IR (BL) / cry1Fa2 HT (Gly) / cp4 epsps (aroA:CP4) HT (Glu) / pat HT (2,4-D) / aad1	Dow
A1-230	Maize Zea mays	MS3	ACS-ZMØØ1-9	InVigor™ Maize	PC (MS) / barnase	Bayer Crop Science
A1-231	Maize Zea mays	MS6	ACS-ZMØØ5-4	InVigor™ Maize	PC (MS) / barnase	Bayer Crop Science
A1-232	Maize Zea mays	NK603	MON-ØØ6Ø3-6	Roundup Ready™ 2 Maize	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-233	Maize Zea mays	NK603 x MON810 x 4114 x MIR	MON-00603-6 x MON- 00810-6 x DP004114-3 x SYN-IR604-4	Not available	HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1Ab IR (BL) / cry1F	Syngenta & Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
		604			IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 HT (Glu) / pat	
A1-234	Maize Zea mays	NK603 x MON810	MON-ØØ6Ø3-6 x MON- ØØ81Ø-6	YieldGard™ CB + RR	IR (BL) / cry1Ab HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-235	Maize Zea mays	NK603 x T25	MON-ØØ6Ø3-6 x ACS- ZMØØ3-2	Roundup Ready™ Liberty Link™ Maize	HT (Gly) / cp4 epsps (aroA:CP4) HT (Glu) / pat (syn)	Monsanto
A1-236	Maize Zea mays	T14	ACS-ZMØØ2-1	Liberty Link™ Maize	HT (Glu) / pat (syn)	Bayer Crop Science
A1-237	Maize Zea mays	T25	ACS-ZMØØ3-2	Liberty Link™ Maize	HT (Glu) / pat (syn)	Bayer Crop Science
A1-238	Maize Zea mays	T25 x MON810	ACS-ZMØØ3-2 x MON- ØØ81Ø-6	Liberty Link™ Yieldgard™ Mai- ze	IR (BL) / cry1Ab HT (Glu) / pat (syn)	Bayer Crop Science & Monsanto
A1-239	Maize Zea mays	TC1507	DAS-Ø15Ø7-1	Herculex™ I, Herculex™ CB	IR (BL) / cry1Fa2 HT (Glu) / pat	Dow & Du- pont
A1-240	Maize Zea mays	TC1507 x 59122 x MON810 x MIR604 x NK603	DAS-Ø15Ø7-1 x DAS- 59122-7 x MON-ØØ81Ø-6 x SYN-IR6Ø4-5 x MON- ØØ6Ø3-6	Optimum™ In- trasect Xtreme	IR (BL) / cry1Fa2 HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1	Dupont
A1-241	Maize Zea mays	TC1507 x MON810 x MIR604 x NK603	DAS-Ø15Ø7-1 x MON- ØØ81Ø-6 x SYN-IR6Ø4-5 x MON-ØØ6Ø3-6	not available	IR (Col) / mcr3A IR (BL) / cry1Fa2 HT (Glu) / pat IR (BL) / cry1Ab HT (Gly) / cp4 epsps (aroA:CP4)	Dupont
A1-242	Maize Zea mays	TC1507 x 59122	DAS-Ø15Ø7-1 x DAS- 59122-7	Herculex XTRA™	IR (BL) / cry1Fa2 HT (Glu) / pat	Dow & Du- pont

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
					IR (Col) / cry34Ab1 IR (Col) / cry35Ab1	
A1-243	Maize Zea mays	TC1507 x 59122 x MON810	DAS-Ø15Ø7-1 x DAS- 59122-7 x MON-ØØ81Ø-6	not available	IR (BL) / cry1Fa2 HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (BL) / cry1Ab	Dupont
A1-244	Maize Zea mays	TC1507 x 59122 x MON810 x NK603	DAS-Ø15Ø7-1 x DAS- 59122-7 x MON-ØØ81Ø-6 x MON-ØØ6Ø3-6	Optimum™ In- trasect XTRA	IR (BL) / cry1Fa2 HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / cry1Ab	Dupont
A1-245	Maize Zea mays	TC1507 x 59122 x MON88017	DAS-Ø15Ø7-1 x DAS- 59122-7 x MON-88Ø17-3	not available	IR (BL) / cry1Fa2 HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto & Dow
A1-246	Maize Zea mays	TC1507 x 59122 x NK603	DAS-Ø15Ø7-1 x DAS- 59122-7 x MON-ØØ6Ø3-6	Herculex XTRA™ RR	IR (BL) / cry1Fa2 HT (Glu) / pat IR (Col) / cry34Ab1 IR (Col) / cry35Ab1 HT (Gly) / cp4 epsps (aroA:CP4)	Dow & Du- pont
A1-247	Maize Zea mays	TC1507 x GA21	DAS-Ø15Ø7-1 x MON- ØØØ21-9	not available	IR (BL) / cry1Fa2 HT (Glu) / pat HT (Gly) / mepsps	Dupont
A1-248	Maize Zea mays	TC1507 x MIR604 x NK603	DAS-Ø15Ø7-1 x SYN- IR6Ø4-5 x MON-ØØ6Ø3-6	Optimum™ TRI- sect	IR (BL) / cry1Fa2 HT (Glu) / pat HT (Gly) / cp4 epsps (aroA:CP4) IR (Col) / mcry3A	Dupont

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-249	Maize Zea mays	TC1507 x MON810	DAS-Ø15Ø7-1 x MON- ØØ81Ø-6	not available	IR (BL) / cry1Fa2 HT (Glu) / pat IR (BL) / cry1Ab	Dow & Du- pont
A1-250	Maize Zea mays	TC1507 x MON810 x MIR162 x NK603	DAS-Ø15Ø7-1 x MON- ØØ81Ø-6 x SYN-IR162-4 x MON-ØØ6Ø3-6	not available	IR (BL) / cry1Fa2 HT (Glu) / pat IR (BL) / cry1Ab HT (Gly) / cp4 epsps (aroA:CP4) IR (BL) / vip3Aa20	Dupont
A1-251	Maize Zea mays	TC1507 x MON810 x NK603	DAS-Ø15Ø7-1 x MON- ØØ81Ø-6 x MON-ØØ6Ø3- 6	Optimum™ In- trasect	IR (BL) / cry1Fa2 HT (Glu) / pat IR (BL) / cry1Ab HT (Gly) / cp4 epsps (aroA:CP4)	Dupont
A1-252	Maize Zea mays	TC1507 x MON88017	DAS-Ø15Ø7-1 x MON- 88Ø17-3	not available	IR (BL) / cry1Fa2 HT (Glu) / pat IR (Col) / cry3Bb1 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-253	Maize Zea mays	TC1507 x NK603	DAS-Ø15Ø7-1 x MON- ØØ6Ø3-6	Herculex™ I RR	IR (BL) / cry1Fa2 HT (Glu) / pat HT (Gly) / cp4 epsps (aroA:CP4)	Dow
A1-254	Maize Zea mays	TC6275	DAS-Ø6275-8	not available	IR (BL) / mocry1F HT (Glu) / bar	Dow
A1-255	Maize Zea mays	VCO- Ø1981-5	VCO-Ø1981-5	not available	HT (Gly) / epsps grg23ace5	Genective S.A.
A1-256	Maize Zea mays	DK404SR	DK404SR	not available	HT (Cyc) / ACCase (mutant)	BASF
A1-257	Maize Zea mays	EXP1910IT	EXP1910IT	not available	HT (Imi) / als (mutant)	Syngenta
A1-258	Melon Cucumis melo	Melon A	not available	not available	ST (Ripe) / sam-k	Agrirope Inc. (USA)
A1-259	Melon	Melon B	not available	not available	ST (Ripe) / sam-k	Agrirope Inc.

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	Cucumis melo					(USA)
A1-260	Papaya Carica papaya	55-1	CUH-CP551-8	Rainbow, SunUp	VR (PRSV) / prsv-cp	Cornell University and University of Hawaii
A1-261	Papaya Carica papaya	63-1	CUH-CP631-7	not available	VR (PRSV) / prsv-cp	Cornell University and University of Hawaii
A1-262	Papaya Carica papaya	Huanong No. 1	not available	Huanong No. 1	VR (PRSV) / prsv-rep	South China Agricultural University
A1-263	Papaya Carica papaya	X17-2	UFL-X17CP-6	not available	VR (PRSV) / prsv-cp	University of Florida
A1-264	Petunia Petunia hybrida	Petunia-CHS	not available	not available		Beijing University
A1-265	Plum Prunus domestica	C-5	ARS-PLMC5-6	not available	VR (PPV) / ppv-cp	United States Department of Agriculture - Agricultural Research Service
A1-266	Polish canola Brassica rapa	HCR-1	not available	not available	HT (Glu) / pat	Bayer Crop Sciences

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-267	Polish canola Brassica rapa	ZSR500	not available	Hysyn 101 RR Roundup-Ready™	HT (Gly) / cp4 epsps (aroA:CP4) HT (Gly) / gov247	University of Florida
A1-268	Polish canola Brassica rapa	ZSR502	not available	Hysyn 101 RR Roundup-Ready™	HT (Gly) / cp4 epsps (aroA:CP4) HT (Gly) / gov247	University of Florida
A1-269	Polish canola Brassica rapa	ZSR503	not available	Hysyn 101 RR Roundup-Ready™	HT (Gly) / cp4 epsps (aroA:CP4) HT (Gly) / gov247	University of Florida
A1-270	Poplar Populus sp.	Bt poplar, poplar 12 (Populus nigra)	not available	not available	IR (BL) / cry1Ac	Research Institute of Forestry (China)
A1-271	Poplar Populus sp.	Hybrid pop- lar clone 741	not available	not available	IR (BL) / cry1Ac IR (BRun) / API	Research Institute of Forestry (China)
A1-272	Potato Solanum tuberosum	1210 amk	not available	Lugovskoi plus	IR (Col) / cry3A	Centre Bio- engineering, Russian Academy of Sciences
A1-273	Potato Solanum tuberosum	2904/1 kgs	not available	Elizaveta plus	IR (Col) / cry3A	Centre Bio- engineering, Russian Academy of Sciences

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-274	Potato Solanum tuberosum	ATBT04-27	NMK-89367-8	Atlantic New- Leaf™ potato	IR (Col) / cry3A	Monsanto
A1-275	Potato Solanum tuberosum	ATBT04-30	NMK-89613-2	Atlantic New- Leaf™ potato	IR (Col) / cry3A	Monsanto
A1-276	Potato Solanum tuberosum	ATBT04-31	NMK-89170-9	Atlantic New- Leaf™ potato	IR (Col) / cry3A	Monsanto
A1-277	Potato Solanum tuberosum	ATBT04-36	NMK-89279-1	Atlantic New- Leaf™ potato	IR (Col) / cry3A	Monsanto
A1-278	Potato Solanum tuberosum	ATBT04-6	NMK-89761-6	Atlantic New- Leaf™ potato	IR (Col) / cry3A	Monsanto
A1-279	Potato Solanum tuberosum	BT06	NMK-89812-3	New Leaf™ Russet Burbank potato	IR (Col) / cry3A	Monsanto
A1-280	Potato Solanum tuberosum	BT10	NMK-89175-5	New Leaf™ Russet Burbank potato	IR (Col) / cry3A	Monsanto
A1-281	Potato Solanum tuberosum	BT12	NMK-89601-8	New Leaf™ Russet Burbank potato	IR (Col) / cry3A	Monsanto
A1-282	Potato Solanum tuberosum	BT16	NMK-89167-6	New Leaf™ Russet Burbank potato	IR (Col) / cry3A	Monsanto
A1-283	Potato Solanum tuberosum	BT17	NMK-89593-9	New Leaf™ Russet Burbank potato	IR (Col) / cry3A	Monsanto
A1-284	Potato Solanum tuberosum	BT18	NMK-89906-7	New Leaf™ Russet Burbank potato	IR (Col) / cry3A	Monsanto
A1-285	Potato Solanum tuberosum	BT23	NMK-89675-1	New Leaf™ Russet Burbank potato	IR (Col) / cry3A	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-286	Potato Solanum tuberosum	EH92-527-1	BPS-25271-9	Amflora™	ST (Starch) / gbss (antisense-fragment)	BASF
A1-287	Potato Solanum tuberosum	HLMT15-15	not available	Hi-Lite NewLeaf™ Y potato	IR (Col) / cry3A VR (PVY) / pvy-cp	Monsanto
A1-288	Potato Solanum tuberosum	HLMT15-3	not available	Hi-Lite NewLeaf™ Y potato	IR (Col) / cry3A VR (PVY) / pvy-cp	Monsanto
A1-289	Potato Solanum tuberosum	HLMT15-46	not available	Hi-Lite NewLeaf™ Y potato	IR (Col) / cry3A VR (PVY) / pvy-cp	Monsanto
A1-290	Potato Solanum tuberosum	RBMT15-101	NMK-89653-6	New Leaf™ Y Russet Burbank potato	IR (Col) / cry3A VR (PVY) / pvy-cp	Monsanto
A1-291	Potato Solanum tuberosum	RBMT21-129	NMK-89684-1	New Leaf™ Plus Russet Burbank potato	IR (Col) / cry3A VR (PLRV) / plrv-orf1 VR (PLRV) / plrv-orf2	Monsanto
A1-292	Potato Solanum tuberosum	RBMT21-152	not available	New Leaf™ Plus Russet Burbank potato	IR (Col) / cry3A VR (PLRV) / plrv-orf1 VR (PLRV) / plrv-orf2	Monsanto
A1-293	Potato Solanum tuberosum	RBMT21-350	NMK-89185-6	New Leaf™ Plus Russet Burbank potato	IR (Col) / cry3A VR (PLRV) / plrv-orf1 VR (PLRV) / plrv-orf2	Monsanto
A1-294	Potato Solanum tuberosum	RBMT22-082	NMK-89896-6	New Leaf™ Plus Russet Burbank potato	IR (Col) / cry3A HT (Gly) / cp4 epsps (aroA:CP4) VR (PLRV) / plrv-orf1 VR (PLRV) / plrv-orf2	Monsanto
A1-295	Potato Solanum tuberosum	RBMT22-186	not available	New Leaf™ Plus Russet Burbank potato	IR (Col) / cry3A HT (Gly) / cp4 epsps (aroA:CP4) VR (PLRV) / plrv-orf1 VR (PLRV) / plrv-orf2	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-296	Potato Solanum tuberosum	RBMT22-238	not available	New Leaf™ Plus Russet Burbank potato	IR (Col) / cry3A HT (Gly) / cp4 epsps (aroA:CP4) VR (PLRV) / plrv-orf1 VR (PLRV) / plrv-orf2	Monsanto
A1-297	Potato Solanum tuberosum	RBMT22-262	not available	New Leaf™ Plus Russet Burbank potato	IR (Col) / cry3A HT (Gly) / cp4 epsps (aroA:CP4) VR (PLRV) / plrv-orf1 VR (PLRV) / plrv-orf2	Monsanto
A1-298	Potato Solanum tuberosum	SEMT15-02	NMK-89935-9	Shepody New- Leaf™ Y potato	IR (Col) / cry3A VR (PVY) / pv-y-cp	Monsanto
A1-299	Potato Solanum tuberosum	SEMT15-07	not available	Shepody New- Leaf™ Y potato	IR (Col) / cry3A VR (PVY) / pv-y-cp	Monsanto
A1-300	Potato Solanum tuberosum	SEMT15-15	NMK-89930-4	Shepody New- Leaf™ Y potato	IR (Col) / cry3A VR (PVY) / pv-y-cp	Monsanto
A1-301	Potato Solanum tuberosum	SPBT02-5	NMK-89576-1	Superior New- Leaf™ potato	IR (Col) / cry3A	Monsanto
A1-302	Potato Solanum tuberosum	SPBT02-7	NMK-89724-5	Superior New- Leaf™ potato	IR (Col) / cry3A	Monsanto
A1-303	Potato Solanum tuberosum	E12	SPS-00E12-8	Innate™ Russet Burbank Potato	ST (AA) / asn1 ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	J.R. Simplot Co.
A1-304	Potato Solanum tuberosum	E24	SPS-00E24-2	Innate™ Russet Burbank Potato	ST (AA) / asn1 ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	J.R. Simplot Co.
A1-305	Potato Solanum tuberosum	F10	SPS-00F10-7	Innate™ Ranger Russet Potato	ST (AA) / asn1 ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	J.R. Simplot Co.
A1-306	Potato	F37	SPS-00F37-7	Innate™ Ranger	ST (AA) / asn1	J.R. Simplot

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	Solanum tuberosum			Russet Potato	ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	Co.
A1-307	Potato Solanum tuberosum	G11	SPS-ØØG11-9	Innate™ G Potato	ST (AA) / asn1 ST (BSB) / ppo5	J.R. Simplot Co.
A1-308	Potato Solanum tuberosum	H37	SPS-ØØH37-9	Innate™ H Potato	ST (AA) / asn1 ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	J.R. Simplot Co.
A1-309	Potato Solanum tuberosum	H50	SPS-ØØH50-4	Innate™ H Potato	ST (AA) / asn1 ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	J.R. Simplot Co.
A1-310	Potato Solanum tuberosum	J3	SPS-ØØØJ3-4	Innate™ Atlantic Potato	ST (AA) / asn1 ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	J.R. Simplot Co.
A1-311	Potato Solanum tuberosum	J55	SPS-ØØJ55-2	Innate™ Atlantic Potato	ST (AA) / asn1 ST (Starch) / pPhL ST (BSB) / ppo5 ST (Starch) / pR1	J.R. Simplot Co.
A1-312	Potato Solanum tuberosum	J78	SPS-ØØJ78-7	Innate™ Atlantic Potato	ST (AA) / asn1 ST (BSB) / ppo5	J.R. Simplot Co.
A1-313	Rice Oryza sativa	7Crp#10	not available	not available	ST (All) / 7crp	National Institute of Agrobiologi- cal Sciences (Japan)
A1-314	Rice	GM Shany-	not available	BT Shanyou 63	IR (BL) / cry1Ab	Huazhong

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	Oryza sativa	ou 63			IR (BL) / cry1Ac	Agricultural University (China)
A1-315	Rice Oryza sativa	Huahui-1/TT51-1	not available	Huahui-1	IR (BL) / cry1Ab IR (BL) / cry1Ac	Huazhong Agricultural University (China)
A1-316	Rice Oryza sativa	LLRICE06	ACS-OS001-4	Liberty Link™ rice	HT (Glu) / bar	Bayer Crop Science
A1-317	Rice Oryza sativa	LLRICE601	BCS-OS003-7	Liberty Link™ rice	HT (Glu) / bar	Bayer Crop Science
A1-318	Rice Oryza sativa	LLRICE62	ACS-OS002-5	Liberty Link™ rice	HT (Glu) / bar	Bayer Crop Science
A1-319	Rice Oryza sativa	Tarom molaii + cry1Ab	not available	not available	IR (BL) / cry1Ab (truncated)	Agricultural Biotech Research Institute (Iran)
A1-320	Rice Oryza sativa	CL121, CL141, CFX51	CL121, CL141, CFX51	Clearfield Rice	HT (Imi) / als (mutant)	BASF
A1-321	Rice Oryza sativa	IMINTA-1, IMINTA-4	IMINTA-1, IMINTA-4	Clearfield Rice	HT (Imi) / als (mutant)	BASF
A1-322	Rice Oryza sativa	PWC16	PWC16	not available	HT (Imi) / als (mutant)	BASF
A1-323	Rose Rosa hybrida	WKS82/130-4-1	IFD-52401-4	not available	ST (Color) / 5AT ST (Color) / bp40 (f3'5'h)	Suntory Limited (Japan)

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-324	Rose Rosa hybrida	WKS92/130-9-1	IFD-529Ø1-9	not available	ST (Color) / 5AT ST (Color) / bp40 (f3'5'h)	Suntory Limited (Japan)
A1-325	Soybean Glycine max	260-05 (G94-1, G94-19, G168)	DD-Ø26ØØ5-3	not available	ST (Oil) / gm-fad2-1 (silencing locus)	Dupont
A1-326	Soybean Glycine max	A2704-12	ACS-GMØØ5-3	Liberty Link™ soybean	HT (Glu) / pat	Bayer Crop Science
A1-327	Soybean Glycine max	A2704-21	ACS-GMØØ4-2	Liberty Link™ soybean	HT (Glu) / pat	Bayer Crop Science
A1-328	Soybean Glycine max	A5547-127	ACS-GMØØ6-4	Liberty Link™ soybean	HT (Glu) / pat	Bayer Crop Science
A1-329	Soybean Glycine max	A5547-35	ACS-GMØØ8-6	Liberty Link™ soybean	HT (Glu) / pat	Bayer Crop Science
A1-330	Soybean Glycine max	CV127	BPS-CV127-9	Cultivance	HT (lmi) / csr1-2	BASF
A1-331	Soybean Glycine max	DAS44406-6	DAS-444Ø6-6	not available	HT (2,4-D) / aad-12 HT (Gly) / 2mepsps HT (Glu) / pat	Dow
A1-332	Soybean Glycine max	DAS68416-4	DAS-68416-4	Enlist™ Soybean	HT (2,4-D) / aad-12 HT (Glu) / pat	Dow
A1-333	Soybean Glycine max	DAS68416-4 x MON-89788-1 MON89788	DAS-68416-4 x MON-89788-1	not available	HT (2,4-D) / aad-12 HT (Glu) / pat HT (Gly) / cp4 epsps (aroA:CP4)	Dow
A1-334	Soybean Glycine max	DAS81419	DAS-81419-2	not available	IR (BL) / cry1Ac IR (BL) / cry1F	Dow
A1-335	Soybean Glycine max	DP305423	DP-3Ø5423-1	Treus™, Plenish™	ST (Oil) / gm-fad2-1 (partial sequence)	Dupont

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-336	Soybean Glycine max	DP305423 x GTS 40-3-2	DP-305423-1 x MON- 04032-6	not available	ST (Oil) / gm-fad2-1 (partial se- quence) HT (Gly) / cp4 epsps (aroA:CP4)	Dupont
A1-337	Soybean Glycine max	DP356043	DP-356043-5	Optimum GAT™	HT (Gly) / gat4601 HT (SU) / gm-hra	Dupont
A1-338	Soybean Glycine max	FG72 (FG072-2, FG072-3)	MST-FG072-3	not available	HT (Gly) / 2mepsps HT (HPPD) / hppdPF W336	Bayer Crop- Science and MS Tech- nologies LLC
A1-339	Soybean Glycine max	GTS 40-3-2 (40-3-2)	MON-04032-6	Roundup Ready™ soybe- an	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-340	Soybean Glycine max	GU262	ACS-GM003-1	Liberty Link™ soybean	HT (Glu) / pat	Bayer Crop Science
A1-341	Soybean Glycine max	MON 87712	MON-87712-4	Not available	Y&S (Y) / bbx32	Monsanto
A1-342	Soybean Glycine max	MON87701	MON-87701-2	not available	IR (BL) / cry1Ac	Monsanto
A1-343	Soybean Glycine max	MON87701 x MON89788	MON-87701-2 x MON- 89788-1	Intacta™ Roundup Ready™ 2 Pro	IR (BL) / cry1Ac HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-344	Soybean Glycine max	MON87705	MON-87705-6	Vistive Gold™	ST (Oil) / fatb1-A (sense and anti- sense segments) ST (Oil) / fatb2-1-A (sense and anti- sense) HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-345	Soybean Glycine max	MON87705 x MON89788	MON-87705-6 x MON- 89788-1	not available	ST (Oil) / fatb1-A (sense and anti- sense segments) ST (Oil) / fatb2-1-A (sense and anti- sense)	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
					sense) HT (Gly) / cp4 epsps (aroA:CP4)	
A1-346	Soybean Glycine max	MON87708	MON-87708-9	Genuity® Roundup Ready™ 2 Xtend™	HT (Dic) / dmo	Monsanto
A1-347	Soybean Glycine max	MON87708 x MON89788	MON-87708-9 x MON- 89788-1	not available	HT (Dic) / dmo HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-348	Soybean Glycine max	MON87751	MON-87751-7	not available	IR (BL) / cry1A.105 IR (BL) / cry2Ab2	Monsanto
A1-349	Soybean Glycine max	MON87769	MON87769-7	not available	ST (Oil) / Pj.D6D ST (Oil) / Nc.fad3	Monsanto
A1-350	Soybean Glycine max	MON87769 x MON89788	MON-87769-7 x MON- 89788-1	not available	ST (Oil) / Pj.D6D ST (Oil) / Nc.fad3 HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-351	Soybean Glycine max	MON89788	MON-89788-1	Genuity® Roundup Ready 2 Yield™	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-352	Soybean Glycine max	SYHT0H2	SYN-000H2-5	Herbicide- tolerant Soybean line	HT (Glu) / pat HT (HPPD) / avhppd-03	Bayer Crop Science & Syngenta
A1-353	Soybean Glycine max	W62	ACS-GM002-9	Liberty Link™ soybean	HT (Glu) / bar	Bayer Crop Science
A1-354	Soybean Glycine max	W98	ACS-GM001-8	Liberty Link™ soybean	HT (Glu) / bar	Bayer Crop Science
A1-355	Soybean Glycine max	OT96-15	OT96-15	not available	ST (Oil) / fan1 (mutant)	Agriculture & Agri-Food Canada

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
A1-356	Squash Cucurbita pepo	CZW3	SEM-ØCZW3-2	not available	VR (CMV) / cmv-cp VR (zymv) / zymv-cp VR (wmv) / wmv-cp	Seminis Vegetable Seeds (Canada) and Mon- santo Com- pany (As- grow)
A1-357	Squash Cucurbita pepo	ZW20	SEM-ØZW2Ø-7	not available	VR (CYMV) / zymv-cp VR (WMV) / wmv-cp	Seminis Vegetable Seeds (Canada) and Mon- santo Com- pany (As- grow)
A1-358	Sugar beet Beta vulgaris	GTSB77 (T9100152)	SY-GTSB77-8	InVigor™ suga- rbeet	HT (Gly) / cp4 epsps (aroA:CP4) HT (Gly) / gov247	Novartis Seeds and Monsanto Company
A1-359	Sugar beet Beta vulgaris	H7-1	KM-ØØØH71-4	Roundup Ready™ sugar beet	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-360	Sugar beet Beta vulgaris	T120-7	ACS-BVØØ1-3	Liberty Link™ sugarbeet	HT (Glu) / pat	Bayer Crop Science
A1-361	Sugarcane	NXI-1T	NXI-1T	not available	Y&S (DT) / EcBeta	PT Perke-

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	Saccharum sp.					bunan Nusantara XI (Persero)
A1-362	Sugarcane Saccharum sp.	NXI-4T	NXI-4T	not available	Y&S (DT) / RmBeta	PT Perkebunan Nusantara XI (Persero)
A1-363	Sugarcane Saccharum sp.	NXI-6T	NXI-6T	not available	Y&S (DT) / RmBeta	PT Perkebunan Nusantara XI (Persero)
A1-364	Sunflower Helianthus annuus	X81359	X81359	Clearfield Sunflower	HT (Imi) / als (mutant)	BASF
A1-365	Sweet pepper Capsicum annuum	PK-SP01	not available	not available	VR (CMV) / cmv-cp	Beijing University
A1-366	Tobacco Nicotiana tabacum	C/F/93/08-02	not available	not available	HT (Ox) / bxn	SEITA S.A. (France)
A1-367	Tobacco Nicotiana tabacum	Vector 21-41	not available	not available	ST (Nic) / NtQPT1 (antisense)	Vector Tobacco Inc. (USA)
A1-368	Tomato Lycopersicon esculentum	1345-4	not available	not available	ST (Ripe) / acc (truncated)	DNA Plant Technology Corporation (USA)
A1-369	Tomato Lycopersicon es-	35-1-N	not available	not available	ST (Ripe) / sam-k	Agrotech Inc. (USA)

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	culentum					
A1-370	Tomato Lycopersicon esculentum	5345	not available	not available	IR (BL) / cry1Ac	Monsanto
A1-371	Tomato Lycopersicon esculentum	8338	CGN-89322-3	not available	ST (Ripe) / accd	Monsanto
A1-372	Tomato Lycopersicon esculentum	B	SYN-ØØØØB-6	not available	ST (Ripe) / pg (sense or antisense)	Zeneca Plant Science and Petoseed Company
A1-373	Tomato Lycopersicon esculentum	Da	SYN-ØØØØDA-9	not available	ST (Ripe) / pg (sense or antisense)	Zeneca Plant Science and Petoseed Company
A1-374	Tomato Lycopersicon esculentum	Da Dong No 9	not available	not available		Institute of Microbiology, CAS (China)
A1-375	Tomato Lycopersicon esculentum	F (1401F, h38F, 11013F, 7913F)	SYN-ØØØØF-1	not available	ST (Ripe) / pg (sense or antisense)	Zeneca Plant Science and Petoseed Company
A1-376	Tomato	FLAVR	CGN-89564-2	FLAVR SAVR	ST (Ripe) / pg (sense or antisense)	Monsanto

row No.	Crop Crop, latin name	Event Name	Event Code	Tradename	All Trait Genes - Details & Genes	Company
	Lycopersicon esculentum	SAVR™				
A1-377	Tomato Lycopersicon esculentum	Huafan No 1	not available	not available	ST (Ripe) / anti-efe	Huazhong Agricultural University (China)
A1-378	Tomato Lycopersicon esculentum	PK-TM8805R (8805R)	not available	not available	VR (CMV) / cmv-cp	Beijing University
A1-379	Wheat Triticum aestivum	MON71800	MON-71800-3	Roundup Ready™ wheat	HT (Gly) / cp4 epsps (aroA:CP4)	Monsanto
A1-380	Wheat Triticum aestivum	AP205CL	AP205CL	Clearfield Wheat	HT (Imi) / als (mutant)	BASF
A1-381	Wheat Triticum aestivum	AP602CL	AP602CL	Clearfield Wheat	HT (Imi) / als (mutant)	BASF
A1-382	Wheat Triticum aestivum	BW255-2, BW238-3	BW255-2, BW238-3	Clearfield Wheat	HT (Imi) / als (mutant)	BASF
A1-383	Wheat Triticum aestivum	BW7	BW7	Clearfield Wheat	HT (Imi) / als (mutant)	BASF
A1-384	Wheat Triticum aestivum	Teal 11A	Teal 11A	Clearfield Wheat	HT (Imi) / als (mutant)	BASF
A1-385	Wheat Triticum aestivum	SWP965001	SWP965001	not available	HT (Imi) / als (mutant)	American Cyanamid

In a special embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of cultivated plants by treating cultivated plants, parts of such plants, plant propagation materials, or at their locus of growth with the compound of formula I and its mixtures, wherein the plant is a plant, which express at least one insecticidal toxin, preferably a toxin from *Bacillus speices*, more preferably from *Bacillus thuringiensis*.

In one embodiment, these are the insecticidal traits, against which the insects to be controlled are resistant in the methods of the first embodiment of the present invention.

In another embodiment, these are the traits, which have not yet been described in a trait combination for the the compound of formula (I) and its mixtures, accordingt to the second or third embodiment of the invention.

In a more preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of cultivated plants by treating plant propagation materials, preferably seeds with the compound of formula I or its mixtures as defined above, preferably wherein the plant corresponds to a row of table A2 or table 3. In one sub-embodiment, the compound of formula I is compound I-11. In one sub-embodiment, the compound of formula I is compound I-16. In one sub-embodiment, the compound of formula I is compound I-21. In one sub-embodiment, the compound of formula I is compound I-26. . In one sub-embodiment, the compound of formula I is compound I-31.

In another more preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of cultivated plants by treating cultivated plants, parts of such plants or at their locus of growth with the compound of formula I and its mixtures wherein the plant corresponds to a row of table A2 or table 3. . In one sub-embodiment, the compound of formula I is compound I-11. In one sub-embodiment, the compound of formula I is compound I-16. In one sub-embodiment, the compound of formula I is compound I-21. In one sub-embodiment, the compound of formula I is compound I-26. In one sub-embodiment, the compound of formula I is compound I-31.

In a most preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or at their locus of growth with the compound of formula I and its mixtures, wherein the plant corresponds to a row of table A2 or table 3. In one sub-embodiment, the compound of formula I is compound I-11. In one sub-embodiment, the compound of formula I is compound I-16. In one sub-embodiment, the compound of formula I is compound I-21. In one sub-embodiment, the compound of formula I is compound I-26. . In one sub-embodiment, the compound of formula I is compound I-31.

In a most preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating plant propagation materials, preferably seeds of cultivated plants of cultivated crops with the compound of formula I and its mixtures, wherein the plant corresponds to a row of table A2 or table 3. In one sub-embodiment, the compound of formula I is compound I-11. In one sub-embodiment, the compound of formula I is compound I-16. In one sub-embodiment, the compound of formula I is compound I-21. In one sub-embodiment, the compound of formula I is compound I-26. . In one sub-embodiment, the compound of formula I is compound I-31.

Table A2

No	description	transgenic event	plant	literature / commercial plants
A2-1	Lepidoptera resistance	281-24-236 (DAS-24236-5)	<i>Gossypium hirsutum</i> L. (cotton)	available, DOW AgroSciences LLC
A2-2	Lepidoptera resistance	281-24-236 x 3006-210-23	<i>Gossypium hirsutum</i> L. (cotton)	available, Dow AgroSciences
A2-3	Lepidoptera resistance	3006-210-23 (DAS-21Ø23-5)	<i>Gossypium hirsutum</i> L. (cotton)	available, DOW AgroSciences LLC
A2-4	Lepidoptera resistance	COT102 (SYN-IR1Ø2-7)	<i>Gossypium hirsutum</i> L. (cotton)	available, Syngenta Seeds, Inc.
A2-5	Lepidoptera resistance	DAS-21Ø23-5 x DAS-24236-5	<i>Gossypium hirsutum</i> L. (cotton)	available, DOW AgroSciences LLC
A2-6	Lepidoptera resistance	Event-1	<i>Gossypium hirsutum</i> L. (cotton)	available, JK Agri Genetics Ltd (India)
A2-7	Lepidoptera resistance	MON531/757/1076	<i>Gossypium hirsutum</i> L. (cotton)	available, Monsanto Company
A2-8	Lepidoptera resistance	15985 (MON-15985-7)	<i>Gossypium hirsutum</i> L. (cotton)	available, Monsanto Company
A2-9	Lepidoptera resistance	5345	<i>Lycopersicon esculentum</i> (tomato)	available, Monsanto Company
A2-10	Lepidoptera resistance	MIR162	<i>Zea mays</i> L. (corn, maize)	available, Syngenta Seeds, Inc.
A2-11	Lepidoptera resistance	MON89034	<i>Zea mays</i> L. (corn, maize)	available, Monsanto Company
A2-12	Corn Rootworm resistance	MIR604	<i>Zea mays</i> L. (corn, maize)	available, Syngenta Seeds, Inc.
A2-13	Corn Rootworm resistance	MON863	<i>Zea mays</i> L. (corn, maize)	available, Monsanto Company
A2-14	European Corn Borer resistance	176	<i>Zea mays</i> L. (corn, maize)	available, Syngenta Seeds, Inc.
A2-15	European Corn Borer resistance	MON80100	<i>Zea mays</i> L. (corn, maize)	available, Monsanto Company
A2-16	European Corn Borer resistance	MON810	<i>Zea mays</i> L. (corn, maize)	available, Monsanto Company
A2-17	Colorado potato beetle resistance	ATBT04-6, ATBT04-27,	<i>Solanum tuberosum</i> L. (potato)	available, Monsanto Company

No	description	transgenic event	plant	literature / commercial plants
	tance	ATBT04-30, ATBT04-31, ATBT04-36, SPBT02-5, SPBT02-7	to)	
A2-18	Colorado potato beetle resistance	BT6, BT10, BT12, BT16, BT17, BT18, BT23	<i>Solanum tuberosum</i> L. (potato)	available, Monsanto Company
A2-19	Colorado potato beetle resistance	RBMT15-101, SEMT15-02, SEMT15-15	<i>Solanum tuberosum</i> L. (potato)	available, Monsanto Company
A2-20	Colorado potato beetle resistance	RBMT21-129, RBMT21-350, RBMT22-082	<i>Solanum tuberosum</i> L. (potato)	available, Monsanto Company
A2-21	resistance to lepidopteran pests	COT67B	<i>Gossypium hirsutum</i> L. (Cotton)	available, Syngenta Seeds

Table 3

No	detailed description [Event]	plant	Literature / commercial plants
T3-1	corn rootworm resistance	maize	B*
T3-2	corn borer resistance	maize	C*
T3-3	western bean cutworm resistance	maize	D*
T3-4	black cutworm resistance	maize	E*
T3-5	fall armyworm resistance	maize	„Herculex I“ (Dow, Pioneer), „Herculex Xtra“ (Dow, Pioneer)
T3-6	tobacco budworm resistance	cotton	“Bollgard I” (Monsanto), E*
T3-7	cotton bollworm resistance	cotton	E*
T3-8	fall armyworm resistance	cotton	E*
T3-9	beet armyworm resistance	cotton	E*
T3-10	cabbage looper resistance	cotton	E*
T3-11	soybean looper resistance	cotton	E*
T3-12	pink bollworm resistance	cotton	E*
T3-13	rice stemborer resistance	rice	A*
T3-14	striped rice borer resistance	rice	A*
T3-15	rice leaf roller resistance	rice	A*

No	detailed description [Event]	plant	Literature / commercial plants
T3-16	yellow stemborer resistance	rice	A*
T3-17	rice skipper resistance	rice	A*
T3-18	rice caseworm resistance	rice	A*
T3-19	rice cutworm resistance	rice	A*
T3-20	rice armyworm resistance	rice	A*
T3-21	brinjal fruit and shoot borer resistance	eggplant	F*
T3-22	cotton bollworm resistance	eggplant	F**
T3-23	tobacco hornworm resistance	potato	D*
T3-24	lepidopteran resistance	lettuce	US 5349124
T3-25	lepidopteran resistance	soybean	US 7432421

A* refers to „Zhuxian B“, WO2001021821, Molecular Breeding, Volume 18, Number 1 / August 2006.

B* “YieldGard corn rootworm” (Monsanto), “YieldGard Plus” (Monsanto), “YieldGard VT” (Monsanto), “Herculex RW” (Dow, Pioneer), “Herculex Rootworm” (Dow, Pioneer), “Agrisure 0CRW” (Syngenta)

C* “YieldGard corn borer” (Monsanto), „YieldGard Plus“ (Monsanto), „YieldGard VT Pro“ (Monsanto), “Agrisure CB/LL” (Syngenta), “Agrisure 3000GT” (Syngenta), “Hercules I”, “Hercules II” (Dow, Pioneer), “KnockOut” (Novartis), „NatureGard“ (Mycogen), „StarLink“ (Aventis)

D* “NewLeaf” (Monsanto), “NewLeaf Y” (Monsanto), “NewLeaf Plus” (Monsanto), US6100456

E* “Bollgard II” (Monsanto), „WideStrike“ (Dow), „VipCot“ (Syngenta)

F* US 5128130, “Bt brinjal”, “Dumaguete Long Purple”, “Mara”

First embodiment of the invention

In the cases, where the cultivated plant has an arthropodicidal, preferably insecticidal, trait, it often occurs that the pest that should be combatted becomes resistant to that trait.

Resistance may be defined as 'a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to the label recommendation for that pest species'. (IRAC) Resistance therefore means that the original activity of a pesticide against the target organisms (arthropods, insects) decreases or is even lost, due to genetic or metabolic adaptation of the target organism.

“Resistant” to an insecticide is understood to mean resistant to at least one insecticide or insecticidal trait, i.e. the insect may be resistant to only one, but also to several insecticides or insecticidal traits.

In the present context of cultivated plants with at least one insecticidal trait, the resistance is against an insecticidal effect which is due to a genetic modification of a plant (modified or transgenic plant), which caused a resistance of the plant or crop to certain pests, especially insect pests, in susceptible insects.

This is to be understood to include plants that are by the use of recombinant DNA techniques capable to synthesize one or more insecticidal proteins, especially those mentioned herein, es-

pecially those known from the bacterial genus *Bacillus*, particularly from *Bacillus thuringiensis*, such as endotoxins, e. g. CryIA(b), CryIA(c), CryIF, CryIF(a2), CryIIA(b), CryIIIA, CryIIIB(b1) or Cry9c; vegetative insecticidal proteins (VIP), e. g. VIP1, VIP2, VIP3 or VIP3A; insecticidal proteins of bacteria colonizing nematodes, for example *Photorhabdus* spp. or *Xenorhabdus* spp., and so on.

Therefore, in a most preferred embodiment, the present invention relates to a method of controlling harmful insects by treating cultivated plants, parts of such plants or their locus of growth with a compound of formula (I) or a mixture thereof, wherein the plant has at least one insecticidal trait, and wherein the harmful insects are resistant to that at least one insecticidal trait of the plant.

Preferably, the present invention relates to a method of controlling harmful insects by treating cultivated plants, parts of such plants or their locus of growth with a compound of formula (I) or a mixture thereof, wherein the plant has at least one lepidopteran or coleopteran trait, and wherein the harmful insects are resistant to that lepidopteran or coleopteran insecticidal trait of the plant.

In particular, the present invention relates to a method of controlling harmful insects by treating cultivated plants, parts of such plants or their locus of growth with a compound of formula (I) or a mixture thereof, wherein the plant having the insecticidal trait corresponds to a row of table A2 or Table 3 or Table A1, and wherein the harmful insects are resistant to an insecticidal trait of the plant.

In a further embodiment, the invention relates to such methods according to the invention, wherein the pest is selected from the group of stinkbug species (preferably *Euschistus heros*), *Spodoptera frugiperda* and *Helicoverpa*.

It is to be understood, that also in the mentioned methods of controlling resistant insects, the compound of formula (I) may optionally be mixed with one or more further pesticides.

Methods and uses of the invention as described herein may also involve a step of assessing whether insects are resistant to certain insecticides. This step will in general involve collecting a sample of insects from the area (e.g. crop, field, habitat) to be treated, before actually applying a compound of formula (I), and testing (for example using any suitable phenotypic, biochemical or molecular biological technique applicable) for resistance/sensitivity.

Apart from the traits and events that the plants have in the methods according to the invention, the plants may have more traits and/or events, e.g. those described in Table A1.

For the purpose of the present invention, the cultivated plant is preferably selected from the group consisting of soybean, cotton and maize, wherein the plant has been made tolerant to the action of certain herbicides as described above. It is particularly preferred that the cultivated plant is selected from the group consisting of soybean, cotton and maize, wherein the plant has been made tolerant to the action of glyphosate herbicides.

In one embodiment, the cultivated plant is a plant, which has been made tolerant to the action of glyphosate herbicides. In addition to the tolerance to glyphosate herbicides, the plant may have been made tolerant to other herbicides and/or resistant to certain insects, and/or the plant may have been genetically modified otherwise, e.g. in terms of abiotic stress tolerance, altered growth/yield, disease resistance, modified product quality or pollination control system.

Third embodiment of the invention

In a particularly preferred embodiment, the present invention therefore relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula (I) and their mixtures, wherein the plant is a glyphosate herbicide tolerant plant and corresponds to a row of table A1, table A2 or table 3.

In a particularly preferred embodiment, the present invention therefore relates to a method of controlling harmful insects and/or increasing the health of plants by treating plant propagation material, preferably seeds with compounds of formula (I) and their mixtures, wherein the plant is a glyphosate herbicide tolerant plant and corresponds to a row of table A1, table A2 or table 3.

In another particularly preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula (I) and their mixtures, wherein the plant is a glyphosate herbicide tolerant plant and corresponds to a row of table A1, table A2 or table 3.

In another particularly preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating plant propagation material, preferably seeds with compounds of formula (I) and their mixtures, wherein the plant is a glyphosate herbicide tolerant plant and corresponds to a row of table A1, table A2 or table 3.

In another particularly preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula (I) and their mixtures, wherein the plant is a glyphosate herbicide tolerant plant and corresponds to a row of table A1, table A2 or table 3.

In another particularly preferred embodiment, the present invention relates to a method of controlling harmful insects and/or increasing the health of plants by treating plant propagation material, preferably seeds with compounds of formula (I) and their mixtures wherein the plant is a glyphosate herbicide tolerant plant and corresponds to a row of table A1, table A2 or table 3.

Insect resistance, in particular lepidopteran resistance is of growing importance in GMO crops. Furthermore, it has been found that insects often become resistant to the crops, which have been modified in terms of insect resistance. In one embodiment, the cultivated plant is soybean, which has been made resistant to lepidopteran insects. In addition to the resistance to lepidopteran insects, the soybean may have been made tolerant to certain herbicides and/or resistant to other insects, and/or the soybean may have been genetically modified otherwise, e.g. in terms of abiotic stress tolerance, altered growth/yield, disease resistance, modified product quality or pollination control system.

In a particularly preferred embodiment, the present invention therefore relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with compounds of formula (I) and their mixtures, wherein the plant is a lepidopteran insect resistant soybean and corresponds to a row of table A1, A2 or table 3.

Lepidopteran resistance of soybeans is typically achieved by introducing a gene selected from the group consisting of: cry1Ac (gene source: *Bacillus thuringiensis* subsp. Kurstaki strain HD73), cry1F (gene source: *Bacillus thuringiensis* var. aizawai), cry1A.105 (gene source: *Bacillus thuringiensis* subsp. Kumamotoensis), cry2Ab2 (gene source: *Bacillus thuringiensis* subsp. Kumamotoensis), and combinations thereof. In addition, the soybeans may be modified e.g. in terms of herbicide tolerance by introducing a suitable gene such as pat (gene source: *Streptomyces viridochromogenes*), which provides glufosinate tolerance or cp4 epsps (aroA:CP4) (gene source: *Agrobacterium tumefaciens* strain CP4), which provides glyphosate tolerance. Preferably, the soybeans are additionally modified in terms of glyphosate tolerance by introducing the gene cp4 epsps (aroA:CP4).

In a particularly preferred embodiment, the present invention therefore relates to a method of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or their locus of growth with c compounds of formula (I) and their mixtures, wherein the plant is a lepidopteran insect resistant soybean, which has been modified by introducing at least one gene or at least one gene combination, which corresponds to a row of table C.

Table C

No	Gene for lepidopteran resistance	Gene for lepidopteran resistance	Gene for lepidopteran resistance	Gene for glyphosate tolerance
C-1	cry1Ac			
C-2	cry1Ac			cp4 epsps
C-3	cry1A.105			
C-4	cry1A.105			cp4 epsps
C-5	cry2Ab2			
C-6	cry2Ab2			cp4 epsps
C-7	cry1Ac	cry1A.105		
C-8	cry1Ac	cry1A.105		cp4 epsps
C-9	cry1A.105	cry2Ab2		
C-10	cry1A.105	cry2Ab2		cp4 epsps
C-11	cry1Ac	cry2Ab2		
C-12	cry1Ac	cry2Ab2		cp4 epsps
C-13	cry1A.105	cry2Ab2	cry1Ac	
C-14	cry1A.105	cry2Ab2	cry1Ac	cp4 epsps

The present invention also relates to a method for controlling pests and/or increasing the plant health of a cultivated plant as compared to the respective non-modified control plant, comprising the application of compounds of formula (I) and their mixtures, to a plant with at least one modification, parts of such plant, plant propagation material, or at its locus of growth, wherein the cultivated plant is

- (i) *Gossypium hirsutum* L. (cotton) or *Zea mays* L. (maize) and comprises at least one gene selected from the group consisting of *dvsnf7*, *cry1A*, *cry1Ab-Ac*, *cry1C*, *cry2Ab2*, *cry2Ae*, *mocry1F*; or
- (ii) *Glycine max* L. (soybean), *Triticum aestivum* (wheat) or *Oryza sativa* L. (rice) and comprises at least one gene selected from the group consisting of *cry34Ab1*, *cry35 Ab1*, *cry3A*, *cry3Bb1*, *dvsnf7*, *mcry3A*, *cry1A*, *cry1A.105*, *cry1Ab*, *cry1Ab-Ac*, *cry1Ac*, *cry1C*, *cry1F*, *cry1Fa2*, *cry2Ab2*, *cry2Ae*, *cry9c*, *mocry1F*, *pinII*, *vip3A(a)*, *vip3Aa20*.

Preferably, the present invention also relates to a method for controlling pests and/or increasing the plant health of a cultivated plant as compared to the respective non-modified control plant, comprising the application of compounds of formula (I) and their mixtures, to a plant with at least one modification, parts of such plant, plant propagation material, or at its locus of growth, wherein the cultivated plant is modified by at least one gene according to one row of table D2. Preferably, the compound of formula I is selected from the compounds I-1 to I-82 as defined in Table A., wherein the plant corresponds to a row of table 76. In this embodiment the compound of formula I is more specifically selected from compounds I-11, I-16, I-21, I-26, I-31 as defined in Table A'.

Preferably, the compound of formula I is compound I-11.

Preferably, the compound of formula I is compound I-16.

Preferably, the compound of formula I is compound I-21.

Preferably, the compound of formula I is compound I-26.

Preferably, the compound of formula I is compound I-31.

Table D2

No.	crop	gene
D2-1	cotton	<i>dvsnf7</i>
D2-2	cotton	<i>cry1A</i>
D2-3	cotton	<i>cry1Ab-Ac</i>
D2-4	cotton	<i>cry1C</i>
D2-5	cotton	<i>cry2Ab2</i>
D2-6	cotton	<i>cry2Ae</i>
D2-7	cotton	<i>mocry1F</i>
D2-8	maize	<i>dvsnf7</i>
D2-9	maize	<i>cry1A</i>
D2-10	maize	<i>cry1Ab-Ac</i>
D2-11	maize	<i>cry1C</i>
D2-12	maize	<i>cry2Ab2</i>
D2-13	maize	<i>cry2Ae</i>
D2-14	maize	<i>mocry1F</i>
D2-15	soybean	<i>cry34Ab1</i>
D2-16	soybean	<i>cry35 Ab1</i>
D2-17	soybean	<i>cry3A</i>
D2-18	soybean	<i>cry3Bb1</i>

No.	crop	gene
D2-19	soybean	<i>dvsnf7</i>
D2-20	soybean	<i>mcry3A</i>
D2-21	soybean	<i>cry1A</i>
D2-22	soybean	<i>cry1A.105</i>
D2-23	soybean	<i>cry1Ab</i>
D2-24	soybean	<i>cry1Ab-Ac</i>
D2-25	soybean	<i>cry1Ac</i>
D2-26	soybean	<i>cry1C</i>
D2-27	soybean	<i>cry1F</i>
D2-28	soybean	<i>cry1Fa2</i>
D2-29	soybean	<i>cry2Ab2</i>
D2-30	soybean	<i>cry2Ae</i>
D2-31	soybean	<i>cry9c</i>
D2-32	soybean	<i>mocry1F</i>
D2-33	soybean	<i>pinII</i>
D2-34	soybean	<i>vip3A(a)</i>
D2-35	soybean	<i>vip3Aa20</i>
D2-36	wheat	<i>cry34Ab1</i>

No.	crop	gene
D2-37	wheat	cry35 Ab1
D2-38	wheat	cry3A
D2-39	wheat	cry3Bb1
D2-40	wheat	dvsnf7
D2-41	wheat	mcry3A
D2-42	wheat	cry1A
D2-43	wheat	cry1A.105
D2-44	wheat	cry1Ab
D2-45	wheat	cry1Ab-Ac
D2-46	wheat	cry1Ac
D2-47	wheat	cry1C
D2-48	wheat	cry1F
D2-49	wheat	cry1Fa2
D2-50	wheat	cry2Ab2
D2-51	wheat	cry2Ae
D2-52	wheat	cry9c
D2-53	wheat	mocry1F
D2-54	wheat	pinII
D2-55	wheat	vip3A(a)
D2-56	wheat	vip3Aa20
D2-57	rice	cry34Ab1

No.	crop	gene
D2-58	rice	cry35 Ab1
D2-59	rice	cry3A
D2-60	rice	cry3Bb1
D2-61	rice	dvsnf7
D2-62	rice	mcry3A
D2-63	rice	cry1A
D2-64	rice	cry1A.105
D2-65	rice	cry1Ab
D2-66	rice	cry1Ab-Ac
D2-67	rice	cry1Ac
D2-68	rice	cry1C
D2-69	rice	cry1F
D2-70	rice	cry1Fa2
D2-71	rice	cry2Ab2
D2-72	rice	cry2Ae
D2-73	rice	cry9c
D2-74	rice	mocry1F
D2-75	rice	pinII
D2-76	rice	vip3A(a)
D2-77	rice	vip3Aa20

Further preferred embodiments of the invention are those methods of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or at their locus of growth with compounds of formula I or their mixtures, wherein the plant expresses one or more genes selected from CP4 epsps, pat, bar, Cry1Ab, Cry1Ac, Cry3Bb1, Cry2Ab, Cry1F, Cry34Ab1 and Cry35Ab1.

In a more preferred embodiment, the present invention relates to methods of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or at their locus of growth with compounds of formula I or their mixtures, wherein the mixing partner of the compound of formula I is fipronil and the plant expresses one or more genes selected from CP4 epsps, pat, bar, Cry1Ab, Cry1Ac, Cry3Bb1, Cry2Ab, Cry1F, Cry34Ab1 and Cry35Ab1.

In a more preferred embodiment, the present invention relates to methods of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or at their locus of growth with compounds of formula I or their mixtures, wherein the mixing partner of the compound of formula I is ethiprole and the plant expresses one or more genes selected from CP4 epsps, pat, bar, Cry1Ab, Cry1Ac, Cry3Bb1, Cry2Ab, Cry1F, Cry34Ab1 and Cry35Ab1.

In a more preferred embodiment, the present invention relates to methods of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants

or at their locus of growth with compounds of formula I or their mixtures, wherein the mixing partner of the compound of formula I compound is chlorfenapyr and the plant expresses one or more genes selected from CP4 epsps, pat, bar, Cry1Ab, Cry1Ac, Cry3Bb1, Cry2Ab, Cry1F, Cry34Ab1 and Cry35Ab1.

- 5 Furthermore, the present invention also relates to a method for controlling pests and/or increasing the plant health of a cultivated plant as compared to the respective non-modified control plant, comprising the application of compounds of formula (I) and their mixtures, to a plant with at least one modification, parts of such plant, plant propagation material, or at its locus of growth, wherein the cultivated plant is modified by at least one gene as described in the following. Preferably, the compound of formula I is selected from the compounds I-1 to I-82 as defined in Table A., wherein the plant corresponds to a row of table 76. In this embodiment the compound of formula I is more specifically selected from compounds I-11, I-16, I-21, I-26, I-31 as defined in Table A'.

Preferably, the compound of formula I is compound I-11.

- 15 Preferably, the compound of formula I is compound I-16.

Preferably, the compound of formula I is compound I-21.

Preferably, the compound of formula I is compound I-26.

Preferably, the compound of formula I is compound I-31.

- Therefore, further embodiments of the invention are those methods of controlling harmful insects and/or increasing the health of plants by treating cultivated plants, parts of such plants or at their locus of growth with a compound of formula (I) or a mixture thereof according to the invention, wherein the plant expresses one or more genes selected from aad, ACCase, ALS, AMY797E, APH4, bar, barnase, barstar, bla, bxn, cDHDPs, CP, cmv-cp, Cry1Ab, Cry1Ac, Cry1A.105, Cry1F, Cry1Fa2, Cry2Ab, Cry34Ab1, Cry35Ab1, Cry3A, Cry3Bb1, Cry9C, dam, DHFR, fad2, fan1, FH, flcry1Ab, GAT4601, GAT4602, gmFAD2-1, GM-HRA, goxv247, gus, hel, mCry3A, nos, NPTII, pat, PG, pinII, PMI, prsv-cp, QTPASE, rep, SAMase, spc, TE, vip3A, vip3A(a), wmv2-cp and zymv-cp.

Examples

- 30 The present invention is now illustrated in further detail by the following examples.

As stated above, the compounds of formula (I) can be prepared according to standard methods of organic chemistry, or by the processes as described in WO 2007/006670, WO2013/024007, WO2013/024008, WO2013/076092, and the unpublished applications PCT/EP2014/056164, EP13173044.2, PCT/EP2014/060082, and EP14166089.4 d, without being limited to the routes given therein.

- 35 The characterization can be done by coupled High Performance Liquid Chromatography / mass spectrometry (HPLC/MS), by NMR or by their melting points.

40 B. Biology

Synergism can be described as an interaction where the combined effect of two or more compounds is greater than the sum of the individual effects of each of the compounds. The presence of a synergistic effect in terms of percent control, between two mixing partners (X and Y)

can be calculated using the Colby equation (Colby, S. R., 1967, Calculating Synergistic and Antagonistic Responses in Herbicide Combinations, *Weeds*, 15, 20-22):

$$E = X + Y - \frac{XY}{100}$$

- 5 When the observed combined control effect is greater than the expected combined control effect (E), then the combined effect is synergistic.

The following tests can demonstrate the control efficacy of compounds, mixtures or compositions of this invention on specific pests. However, the pest control protection afforded by the compounds, mixtures or compositions is not limited to the species described. In certain instances, combinations of a compound of this invention with other invertebrate pest control compounds or agents are found to exhibit synergistic effects against certain important invertebrate pests.

10 The analysis of synergism or antagonism between the mixtures or compositions is determined using Colby's equation.

B1: Test on GMO soybeans

Trial is carried out under greenhouse conditions on soybean (GMO plant variety, e.g. roundup, growth stage 109). 12 treatments are compared in a complete randomized blocks (4 replications) with plot size of 1 m x 3 meters. Only selected plants are considered for artificial infestation and evaluations.

Due to glyphosate timing for application on GMO-soybeans, all treatments are applied in older plants (GS 109) otherwise a significant phytotoxicity is expected. Application is done, using 400 l/ha. All treatments are applied using a CO₂ backpack (nozzle type TXVK-10). Temperature at the time of applications is around 25 to 30 °C and air humidity is between 30 and 100%. Soil condition is e.g. R4 (when <75% of surface is dried up) and the moisture is moist (normal).

Roundup Original® (Glyfosate-sal isopropilamina @360g/L) is used in the rate of 867 g a.i./ha. Artificial infestation is done one day after the application. The species used is *Anticarsia gemmatalis* (Hübner) [*Thermesia elegantula* (Herrich-Schaffer, 1869)], Noctuidae. 5 plants/plot are infested with 3 larvae (stage L2) using a entomological metallic tweezers, totaling 15 larvae per repetition. Larvae used in this trial are e.g. provided by BASF rearing laboratory, Campinas, Brazil.

A second infestation is held seven days after application in the same plants and using the same larval numbers. A third infestation might be done if necessary in order to observe residual activity.

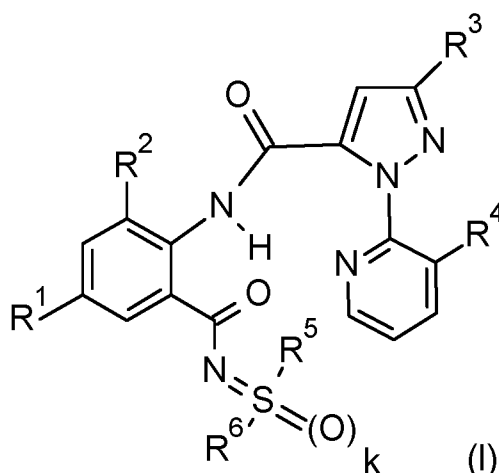
The mortality (number) and eating damage (%) are evaluated with 01, 02, 05, 07, 14 and 21 DAA (days after application), comparing to untreated control plants.

Increased mortalities in combination with the application of roundup can be observed when compared to the untreated control plants:

40 Additionally, after 5 days after application at 12.5 g a.i./ha a reduction of feeding damage compared to the untreated controls can be observed. In another test, a non-GM soybean variety is treated with 12.5 g a.i./ha and showed less reduction in feeding damage compared to the untreated controls.

Claims

1. A method for controlling pests and/or increasing the plant health of a cultivated plant with at least one modification as compared to the respective non-modified control plant, comprising the application of at least one pesticide to a plant with at least one modification, parts of such plant, plant propagation material, or at its locus of growth, wherein the pesticide is a pesticide compound of formula (I):



wherein

R¹ is selected from the group consisting of H, F, Cl, Br and CN;

R² is selected from the group consisting of F, Cl, Br, I, CH₃;

R³ is selected from the group consisting of Br, Cl, CHF₂, CF₃ and OCH₂F;

R⁴ is Cl or CF₃;

R⁵, R⁶ are selected independently of one another from the group consisting of hydrogen,

C₁-C₄-alkyl, C₃-C₈-cycloalkyl, or

R⁵ and R⁶ together represent a C₂-C₇-alkylene, C₂-C₇-alkenylene or

C₆-C₉-alkynylene chain forming together with the sulfur atom to which they are attached a 3-, 4-, 5-, 6-, 7-, 8-, 9- or 10-membered saturated, partially unsaturated or fully unsaturated ring,

k is 0 or 1;

or a stereoisomer, salt, tautomer or N-oxide, or a polymorphic crystalline form, a co-crystal or a solvate of a compound or a stereoisomer, salt, tautomer or N-oxide thereof.

2. Method according to claim 1 or 2, in which in the compound of formula I

R³ is CF₃ or Br, preferably CF₃;

R⁴ is Cl.

3. Method according to claim 1, 2 or 3, in which in the compound of formula I

R¹ is selected from the group consisting of Br, Cl, CN, preferably Cl;

R² is selected from the group consisting of Cl, CH₃; preferably CH₃.

4. Method according to claim 1, 2 or 3, in which in the compound of formula I

R⁵ and R⁶ are selected from methyl, ethyl, isopropyl, n-propyl, n-butyl, isobutyl, tert-butyl, cyclopropyl, cyclopropylmethyl, preferably ethyl or isopropyl, and

wherein preferably R⁵ and R⁶ are identical.

5. Method according to claim 1, 2 or 3, in which the compound of formula I is selected from the group consisting of the following compounds I-11, I-16, I-21, I-26, I-31:

5

	R ¹	R ²	R ³	R ⁵	R ⁶	k
I-11	Cl	CH ₃	CF ₃	C ₂ H ₅	C ₂ H ₅	0
I-16	Cl	Cl	CF ₃	C ₂ H ₅	C ₂ H ₅	0
I-21	Cl	CH ₃	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-26	Cl	Cl	CF ₃	CH(CH ₃) ₂	CH(CH ₃) ₂	0
I-31	Br	Br	CF ₃	C ₂ H ₅	C ₂ H ₅	0

6. Method according to any of claims 1 to 5, wherein the cultivated plant is a soybean variety with glyphosate tolerance and lepidopteran resistance.

- 10 7. Method according to any of claims 1 to 6, wherein the glyphosate tolerance is through the expression of the cp4epsps gene, or wherein the lepidopteran resistance is through expression of the Cry1AC encoding gene from *B. thuringiensis*, or wherein both the glyphosate tolerance is through the expression of the cp4epsps gene and the lepidopteran resistance is through expression of the Cry1AC encoding gene from *B. thuringiensis*.

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8. Method according to any of claims 1 to 7, wherein the glyphosate tolerance is based on the transgenic event MON89788, or wherein the lepidopteran resistance is based on the transgenic event MON87701, or wherein both the glyphosate tolerance is based on the transgenic event MON89788 and the lepidopteran resistance is based on the transgenic event MON87701.

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9. Method according to any of claims 1 to 8, wherein the lepidopteran resistance is against a species selected from the group of velvetbean caterpillar (*Anticarsia gemmatilis*) and soybean looper (*Pseudoplusia includens*, *Chrysodeixis includens*).

25

10. The method according to any of claims 1 to 9, wherein the cultivated plant is "Intacta RR2 PRO" soybean (Monsanto), which claims to offer tolerance to glyphosate herbicide and protection against major soybean pests (velvetbean caterpillar, soybean looper, soybean budborer, bean shoot borer, bollworm, corn stalk borer, *Helicoverpa*, e.g. *Helicoverpa armigera*), along with increased yield potential.

30

11. Method according to any of claims 1 to 10, wherein the plant has at least one insecticidal trait, and wherein the pests are harmful insects which are resistant to that at least one insecticidal trait of the plant.

35

12. The method according to any of claims 1 to 11, wherein the pest is selected from the group of stinkbug species (preferably *Euschistus heros*), *Spodoptera frugiperda* and *Helicoverpa*..

13. The method according to any of claims 1 to 12, comprising the application of a mixture of a pesticide of formula I and at least one pesticide II to a plant with at least one modification, parts of such plant, plant propagation material, or at its locus of growth, preferably
5 wherein the pesticide II is selected from the group of fipronil, alpha-cypermethrin, dinotefuran, chlorfenapyr, teflubenzuron and sulfoxaflor.
14. The method according to any of claims 1 to 13, additionally comprising the application of a herbicide, to which the plant is tolerant.
10
15. Method according to any of claims 1 to 5 wherein the modification is selected from the events listed in table A1, table A2 and table 3.
16. Seed of a cultivated plant as defined in any one of claims 5 to 15 treated with at least one
15 pesticide as defined in any of claims 1 to 5.

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2015/068006

A. CLASSIFICATION OF SUBJECT MATTER

INV. A01N43/56

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, BEILSTEIN Data, CHEM ABS Data, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2014/053395 A1 (BASF SE [DE]) 10 April 2014 (2014-04-10) cited in the application page 72, line 34 - page 73, line 38; claims 1-12,17-20; table C pages 188-189	1-16
X	WO 2014/053403 A1 (BASF SE [DE]) 10 April 2014 (2014-04-10) page 76, lines 10-23; claims 1-14,19,20; table C pages 85-89	1-16
X	WO 2013/024009 A1 (BASF SE [DE]) 21 February 2013 (2013-02-21) cited in the application page 59, line 41 - page 60, line 11; claims 17-20; examples S.1,S.6 pages 73-79	1-16



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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