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FILING DATE: October 16, 2014

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US62/064,493

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<td><strong>Title of Invention:</strong></td>
<td>Method and pesticidal mixtures for controlling Pentatomidae pests</td>
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<tr>
<td><strong>First Named Inventor/Applicant Name:</strong></td>
<td>Daniel Sälinger</td>
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<td><strong>Correspondence Address:</strong></td>
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Method and pesticidal mixtures for controlling Pentatomidae pests

The invention relates to a method for controlling Pentatomidae pests, particularly in soybean crops, by applying a pesticidal mixture comprising insecticidal components of the ginkgo tree.

The invention further relates to pesticidal mixtures comprising insecticidal components of the ginkgo tree, their production and uses thereof.

Stink bugs (order of Hemiptera, family of Pentatomidae) are animal pests and true bugs. They are probably one of the most common pest problems in soybean (Stewart et al., Soybean Insects - Stink bugs, University of Tennessee Institute of Agriculture, W200 09-0098).

Stink bugs feed on over 52 plants, including native and ornamental trees, shrubs, vines, weeds, and many cultivated crops such as corn and cotton, as well as numerous uncultivated plants, and their preferred hosts are nearly all wild plants. They build up on these hosts and move to soybeans late in the season as their preferred foods mature.

Stink bugs may feed on many parts of the plant, however they typically target developing seed including the pods, meaning that injury to soybean seed is the primary problem associated with stink bug infestations.

Control of stinkbugs in soybean is often vital to prevent significant economic damage.

Insecticides commonly used to control stinkbugs include pyrethroids, neonicotinoids and organophosphates, though pyrethroid insecticides are usually the method of choice for controlling stink bugs in soybean. However, there are increasing problems with insecticide resistance, particularly in brown stink bug populations and particularly to pyrethroids. *Euschistus heros* can also be difficult to manage using organophosphates or endosulfan (Sosa-Gomez et al., 2009). There is therefore a need for effective ecological methods of controlling stinkbugs in soybean.

Particularly insecticides acting on the gamma-aminobutyric acid (GABA)-gated chloride channel (disclosed in e.g. WO 2005/085216 (EP1731512), WO2009/002809 and WO2009/080250) seem to be effective for controlling stinkbugs, especially in soybean such as described in WO2012/104331.

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.

Another problem encountered concerns the need to have available pest control agents which are effective against a broad spectrum of pests.

There also exists the need for pest control agents that combine knock-down activity with prolonged control, that is, fast action with long lasting action.
Another difficulty in relation to the use of pesticides is that the repeated and exclusive application of an individual pesticidal compound leads in many cases to a rapid selection of pests which have developed natural or adapted resistance against the active compound in question. Therefore there is a need for pest control agents that help prevent or overcome resistance.

It was therefore an object of the present invention to provide pesticidal mixtures for the control of Pentatomidae pests which solve at least one of the discussed problems such as reducing the dosage rate, enhancing the spectrum of activity or combining knock-down activity with prolonged control or as to resistance management.

It has been found that this object is in part or in whole achieved by applying the combination of active components of the ginkgo tree and further pesticides defined below.

Accordingly, in one aspect of the invention there is provided a method for controlling pests from the family of Pentatomidae, comprising the step of contacting the pests, their food supply, habitat or breeding grounds with a pesticidal mixture comprising as active compounds

1) at least one compound I, which is a component of the ginkgo tree selected from the group consisting of bilobalide, ginkgolide A, ginkgolide B, ginkgolide C, ginkgolide J and ginkgolide M, and

2) at least one pesticidally active compound II selected from group M consisting of

II-M.1 Acetylcholine esterase (AChE) inhibitors from the class of carbamates, for example aldicarb, alanycarb, bendiocarb, benfuracarb, butocarboxim, butoxyacetoxim, carbaryl, carbofuran, carbosulfan, ethiofoncarb, fenobucarb, formetanate, furathiocarb, isoprocarb, methiocarb, methomyl, metolcarb, oxamyl, pirimicarb, propoxur, thiodicarb, thiofanox, trimethacarb, XMC, xylylcarb and triazamate; or from the class of organophosphates, for example acephate, azametaphos, azinphos-ethyl, azinphosmethyl, cadusafos, chlorothoxyfos, chlorfenvinphos, chlorphemox, chlorpyrifos, chlorpyrifos-methyl, coumaphos, cyanophos, demeton-S-methyl, diazinon, dichlorvos/ DDVP, dicrotophos, dimethoate, dimethylvinphos, disulfoton, EPN, ethion, ethoprophos, famphur, fenamiphos, fenitrothion, fenthion, fenthiazate, 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, propanthamphos, prothiofos, pyrethofo, pyridaphenthion, quinalphos, sulfotep, tebupirimfos, temephos, terbufos, tetrachlorvinphos, thiometon, triazophos, trichlorfon and vamidothion;

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

Sodium channel modulators from the class of
pyrethroids, for example acrinathrin, allethrin, d-cis-trans allethrin, d-trans allethrin,
bifenthrin, bioallethrin, bioallethrin S-cyclopropenyl, birosmethrin, cycloprothrin,
cyfluthrin, beta-cyfluthrin, cyhalothrin, lambda-cyhalothrin, gamma-cyhalothrin, cyper-
permethrin, alpha-cypermethrin, beta-cypermethrin, theta-cypermethrin, zeta-
cypermethrin, cyphenothrin, deltamethrin, empenthrin, esfenvalerate, etofenprox,
fenpropathrin, fenvalerate, flucythrin, flumethrin, tau-fluvalinate, halifenprox, hept-
afluthrin, imiprothrin, meperfluthrin, metofluthrin, momfluorathrin, permethrin, phe-
nothrin, prallethrin, profluthrin, pyrethrin (pyrethrums), resmethrin, silarfloufen, tefluth-
rin, tetramethyllumfluthrin, tetramethrin, triafoxmethrin and transfluthrin; or
sodium channel modulators such as DDT or methoxychlor;

Nicotinic acetylcholine receptor agonists (nAChR) from the class of
neonicotinoids, for example acetamiprid, chlothianidin, cycloxaprid, dinofeturan, im-
idaclorpid, nitenpyram, thiacloprid and thiamethoxam; or the compounds

(2E)-1-[(6-Chloropyridin-3-yl)methyl]-N'-nitro-2-
pentylidenedihyrazinecarboximidamide; or

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

nicotine;

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

Chloride channel activators from the class of avermectins and milbemycins, for ex-
ample abamectin, emamectin benzoate, ivermectin, leepimectin or milbemectin;

Juvenile hormone mimics, such as
juvenile hormone analogues as hydroprene, kinoprene and methoprene; or others as
fenoxy carb, or
pyriproxyfen;

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

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

II-M.10  Mite growth inhibitors, including
II-M.10A  clofentezine, hexythiazox and diflubenzuron, or
II-M.10B  etoxidazole;

II-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. te-
nebrionis, or the Bt crop proteins: Cry1Ab, Cry1Ac, Cry1Fa, Cry2Ab, mCry3A,
Cry3Ab, Cry3Bb and Cry34/35Ab1;

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

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

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

II-M.15  Inhibitors of the chitin biosynthesis type 0, such as benzoylureas as for example
bistrifloruron, chlorfluanuron, diflubenzuron, flucycloxuron, flufenoxuron, hexaflumuron,
lufenuron, novaluron, noviflumuron, tefubenzuron or triflumuron;

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

II-M.17  Moultng disruptors, Dipteran, as for example cyromazine;

II-M.18  Ecdyson receptor agonists such as diacylhydrazines, for example methoxyfenozide,
tebufenzoxide, halofenozide, fufenoide or chromafenoide;

II-M.19  Octopamin receptor agonists, as for example amitraz;
Mitochondrial complex III electron transport inhibitors, for example
- hydramethylnon, or
- acequinocyl, or
- fluacrypyrim;

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

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

Inhibitors of the of acetyl CoA carboxylase, such as tetronic and tetramic acid derivatives, for example spiroidiclofen, spiromesifen or spirotetramat;

Mitochondrial complex IV electron transport inhibitors, for example
- phosphine such as aluminium phosphate, calcium phosphate, phosphine or zinc phosphate, or
- cyanide;

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

Ryanodine receptor-modulators from the class of diamides, as for example flubendiamide, chlorantraniliprole (rynaxypyr®), cyantraniliprole (cyazypyr®), or the phthalalamide compounds
- (R)-3-Chloro-N1-[2-methyl-4-[1,2,2,2-tetrafluor-1-(trifluoromethyl)ethyl]phenyl]-N2-(1-
  methyl-2-methylsulfonylethyl)phthalalamid and
- (S)-3-Chloro-N1-[2-methyl-4-[1,2,2,2-tetrafluor-1-(trifluoromethyl)ethyl]phenyl]-N2-(1-
  methyl-2-methylsulfonylethyl)phthalalamid, or the compound
- 3-bromo-N-[2-bromo-4-chloro-6-[[1-cyclopropylethyl]carbamoy]phenyl]-1-(3-
  chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (proposed ISO name: cyclaniliprole), or
- the compound
- methyl-2-[3,5-dibromo-2-[[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-
  yl]carbonyl]amino]benzoyl]-1,2-dimethylhydrazinecarboxylate; or
- a compound selected from M.28.5a) to M.28.5l):
II-M.28.5a) N-[4,6-dichloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5b) N-[4-chloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-6-methyl-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5c) N-[4-chloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-6-methyl-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5d) N-[4,6-dichloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5e) N-[4,6-dichloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(difluoromethyl)pyrazole-3-carboxamide;
II-M.28.5f) N-[4,6-dibromo-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5g) N-[4-chloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-6-cyano-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5h) N-[4,6-dibromo-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5i) N-[2-(5-Amino-1,3,4-thiadiazol-2-yl)-4-chloro-6-methyl[phenyl]-3-bromo-1-(3-chloro-2-pyridyl)-1H-pyrazole-5-carboxamide;
II-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;
II-M.28.5k) 3-Bromo-N-[2,4-dichloro-6-(methylcarbamoyl)phenyl]-1-(3,5-dichloro-2-pyridyl)-1H-pyrazole-5-carboxamide;
II-M.28.5l) N-[4-Chloro-2-[[1,1-dimethylethyl]amino[carbonyl]-6-methyl[phenyl]-1-(3-chloro-2-pyridinyl)-3-(fluoromethoxy)-1H-pyrazole-5-carboxamide;
or a compound selected from
II-M.28.6: N-(2-cyanopropan-2-yl)-N(2,4-dimethyl[phenyl]-3-iodobenzene-1,2-dicarboxamide;
or
II-M.28.7: 3-Chloro-N-(2-cyanopropan-2-yl)-N-(2,4-dimethyl[phenyl]-benzene-1,2-dicarboxamide;
II-M.28.8a) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino[carbonyl]phenyl]-3-[[5-(trifluoromethyl)-2H-tetrazol-2-yl)methyl]-1H-pyrazole-5-carboxamide (proposed ISO name: tetraniliprole); or
II-M.28.8b) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino[carbonyl]phenyl]-3-[[5-(trifluoromethyl)-1H-tetrazol-1-yl)methyl]-1H-pyrazole-5-carboxamide;
II-M.UN Insecticidally active compounds of unknown or uncertain mode of action, as for example afidopyropen, afoxolaner, azadirachtin, amidoflumet, benzoximate, bifena-zate, bromopropylate, chinomethionat, cryolite, dicofol, flufeneturin, fluen-sulfone, fluopyram, flupyradifurone, fluralaner, metuxadiazone, piperonyl butox-ide, pyflubumide, pyridalyl, pyri fluquinazon, sulfoxaflor, tioxazafen, triflume zopyrim, or the compounds
II-M.UN.3: 11-(4-chloro-2,6-dimethyl[phenyl]-12-hydroxy-1,4-dioxaa-9-azadispiro[4.2.4.2]-tetradecc-11-en-10-one, or the compound
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II-M.UN.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

II-M.UN.5: 1-[2-fluoro-4-methyl-5-[(2,2,2-trifluoroethyl)sulfinyl]phenyl]-3-(trifluoromethyl)-1H-1,2,4-triazole-5-amine; or a compound selected from the group of M.UN.6, wherein the compound is selected from M.UN.6a to M.UN.6k:

II-M.UN.6a) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;
II-M.UN.6b) (E/Z)-N-[1-[(6-chloro-5-fluoro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoroacetamide;
II-M.UN.6c) (E/Z)-2,2,2-trifluoro-N-[1-[(6-fluoro-3-pyridyl)methyl]-2-pyridylidene]acetamide;
II-M.UN.6d) (E/Z)-N-[1-[(6-bromo-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;
II-M.UN.6e) (E/Z)-N-[1-[(6-chloro-3-pyridyl)ethyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;
II-M.UN.6f) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2-difluoro-acetamide;
II-M.UN.6g) (E/Z)-2-chloro-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2-difluoroacetamide;
II-M.UN.6h) (E/Z)-N-[1-[(2-chloropyrimidin-5-yl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;
II-M.UN.6i) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,3,3,3-pentafluoro-
propanamide;)
II-M.UN.6j) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-thioacetamide or of the compound

II-M.UN.6k) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-N'-isopropyl-
acetamide or the compounds

II-M.UN.8: 8-chloro-N-[2-chloro-5-methoxyphenyl)sulfonyl]-6-trifluoromethyl]-imidazo[1,2-
a]pyridine-2-carboxamide; or
II-M.UN.9: 4-[5-(3,5-dichlorophenyl)-5-(trifluoromethyl)-4H-isoxazol-3-yl]-2-methyl-N-(1-
oxothietan-3-yl)benzamide; or
II-M.UN.10: 5-[3-[2,6-dichloro-4-(3,3-dichloroallyloxy)phenoxy]propoxy]-1H-pyrazole; or a compound selected from the group of M.UN.12, wherein the compound is selected from M.UN.12a to M.UN.12m:

II-M.UN.12.a) 2-(1,3-Dioxan-2-yl)-6-[2-(3-pyridinyl)-5-thiazolyl]-pyridine;
II-M.UN.12.b) 2-[6-(2-[5-Fluoro-3-pyridinyl]-5-thiazolyl]-2-pyridinyl]-pyrimidine;
II-M.UN.12.c) 2-[6-(2-[3-Pyridyl]-5-thiazolyl]-2-pyridinyl]-pyrimidine;
II-M.UN.12.d) N-Methylsulfonfonyl-6-[2-(3-pyridyl)thiazol-5-yl]pyridine-2-carboxamide
II-M.UN.12.e) N-Methylsulfonfonyl-6-[2-(3-pyridyl)thiazol-5-yl]pyridine-2-carboxamide
II-M.UN.12.f) N-Ethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.g) N-Methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.h) N,2-Dimethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II.M.UN.12.i) N-Ethyl-2-methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.j) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-2-methyl-3-methylthio-propanamide
II-M.UN.12.k) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N,2-dimethyl-3-methylthio-propanamide
II-M.UN.12.l) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-methyl-3-methylthio-propanamide
II-M.UN.12.m) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-3-methylthio-propanamide; or the compound

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II-M.UN.13: 2-(4-methoxyiminocyclohexyl)-2-(3,3,3-trifluoropropylsulfonyl)acetonitrile; or the compounds

II-M.UN.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

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II-M.UN.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 compound

II-M.UN.15: 1-[(2-Chloro-1,3-thiazol-5-yl)methyl]-3-(3,5-dichlorophenyl)-9-methyl-4-oxo-4H-pyrirdio[1,2-a]pyrimidin-1-ium-2-olate; or

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II-M.BP

Biopesticides, being pesticidal compounds of biological origin with insecticidal, acaricidal, molluscidal and/or nematicidal activity, including

II-M.BP-1: Microbial pesticides: Bacillus firmus, B. thuringiensis ssp. israelensis, B. t. ssp. galleriae, B. t. ssp. kurstaki, Beauveria bassiana, Burkholderia sp., Chromobacterium subsugae, Cydia pomonella granulosis virus, Isaria fumosorosea, Lecanicillium longisporum, L. muscarium (formerly Verticillium lecanii), Metarhizium anisopliae, M. anisopliae var. acridum, Paecilomyces fumosoroseus, P. illacinus, Paenibacillus popilliae, Pasteuria spp., P. nishizawae, P. reniformis, P. usagae, Pseudomonas fluorescens, Steinernema feltiae, Streptomces galbus; or

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and/or

at least one fungicidally active compound III selected from group F consisting of:

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F.I

Respiration inhibitors

F.I 1) Inhibitors of complex III at Qo site (e.g. strobilurins): azoxystrobin, coumehxystrobin, coumoxystrobin, dimoxystrobin, enestrobirin, fenaminstrobin, fenoxystrobin/flufenoxystrobin, fluoxastrobirin, kresoxim-methyl, mandonstrobin, metominostrinobin, orysastrobirin, picoxystrobin, pyraclostrobin, pyrametstrobin, pyraoxystrobin, trifloxystrobin and 2-(2-(3-(2,6-dichlorophenyl)-1-methyl-allylidene-aminooxymethyl)-phenyl)-2-methoxyimino-N-methyl-acetamide, pyribencarirb, triclopyricarb/chlorodincarb, famoxadone, fenamidon;

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inhibitors of complex III at Q₁ site: cyazofamid, amisulbrom, [(3S,6S,7R,8R)-8-benzy1-3-[(3-acetoxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl] 2-methylpropanoate, [(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, [(3S,6S,7R,8R)-8-benzyl-3-[(3-isobutoxycarboxyloxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-(1,3-benzodioxol-5-ylmethyl)oxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate; (3S,6S,7R,8R)-3-[(3-hydroxy-4-methoxy-2-pyridinyl)carbonyl]amino]-6-methyl-4,9-dioxo-8-(phenylmethyl)-1,5-dioxonan-7-yl 2-methylpropanoate;

inhibitors of complex II (e.g. carboxamides): benodanil, benzovindiflupyr, bixafen, boscalid, carboxin, fenfuram, fluopyram, flutolanil, fluxapyroxad, furametpyr, isofetamid, isopyrazam, mepronil, oxycarboxin, penflufen, penthiopyrad, sedaxane, tecloftalam, thifluazon, N-(4′-trifluoromethylthyiobiphenyl-2-yl)-3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxamide, N-(2-(1,3,3-trimethyl-butyl)-phenyl)-1,3-dimethyl-5-fluoro-1H-pyrazole-4-carboxamide, 3-(difluoromethyl)-1-methyl-N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, 3-(trifluoromethyl)-1-methyl-N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, 3-(trifluoromethyl)-1,5-dimethyl-N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, 1,3,5-trimethyl-N-(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, N-(7-fluoro-1,1,3-trimethyl-indan-4-yl)-1,3-dimethyl-pyrazole-4-carboxamide, N-[2-(2,4-dichlorophenyl)-2-methoxy-1-methyl-ethyl]-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide, N-[2-(2,4-difluorophenyl)phenyl]-3-(trifluoromethyl)pyrazine-2-carboxamide;

other respiration inhibitors (e.g. complex I, uncouplers): diflumetorim, (5,8-difluoroquinazolin-4-yl)-[2-[2-fluoro-4-(4-trifluoromethylpyridin-2-yl)-phenyl]-ethyl]-amine; nitrophenyl derivates: binapacryl, dinobuton, dinocap, fluazinam; ferimzone; organometal compounds: fentin salts, such as fentin-acetate, fentin chloride or fentin hydroxide; ametocradin; and silthiofam;

Sterol biosynthesis inhibitors (SBI fungicides)

C14 demethylase inhibitors (DMI fungicides): triazoles: azaconazole, bitertanol, bromuconazole, cyproconazole, difenoconazole, diniconazole, diniconazole-M, epoxiconazole, fenbuconazole, fluquinconazole, flusilazole, flutriafol, hexaconazole, imibenconazole, ipconazole, metconazole, myclobutanil, oxpoconazole, paclobutrazole, penconazole, propiconazole, prothioconazole, simeconazole, tebuconazole, tetraconazole, triadimefon, triadimenol, trityconazole, uniconazole, 1-[rel-(2S;3R)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)-oxiranymethyl]-5-thiocyanato-1H-[1,2,4]triazole, 2-[rel-(2S;3R)]-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)-

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oxiranyl methyl]-2H-[1,2,4]triazole-3-thiol, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol, 1-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-cyclopropyl-2-(1,2,4-triazol-1-yl)ethanol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol, 2-[4-(4-fluorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol; imidazoles: imazalil, pefurazoate, prochloraz, triflumizol; pyrimidines, pyridines and piperazines: fenarimol, nuarimol, pyrifeno, triforine, [3-(4-chloro-2-fluoro-phenyl)-5-(2,4-difluorophenyl)isoxazol-4-yl]-[3-pyridyl]methanol;

Delta14-reductase inhibitors: aldimorph, dodemorph, dodemorph-acetate, fenpropimorph, tridemorph, fenpropidin, piperalin, spiroxamine;

Inhibitors of 3-keto reductase: fenhexamid;

Nucleic acid synthesis inhibitors

phenylamides or acyl amino acid fungicides: benalaxyl, benalaxyl-M, kiralaxy, metalaxyl, metalaxyl-M (mefenoxy), ofurace, oxadixyl;

others: hymexazole, ochtholinone, oxolinic acid, bupirimate, 5-fluorocytosine, 5-fluoro-2-(p-tolymethoxy)pyrimidin-4-amine, 5-fluoro-2-(4-fluorophenylimethoxy)pyrimidin-4-amine;

Inhibitors of cell division and cytoskeleton

tubulin inhibitors, such as benzimidazoles, thiophanates: benomyl, carbendazim, fuberidazole, thiabendazole, thiophanate-methyl; triazolopyrimidines: 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)-[1,2,4]triazolo[1,5-a]pyrimidine;

other cell division inhibitors: diethofencarb, ethaboxam, pencycuron, fluopicolide, zoxamide, metrafenone, pyriofenone;

Inhibitors of amino acid and protein synthesis

methionine synthesis inhibitors (anilino-pyrimidines): cyprodine, mepanipyrim, pyrimethanil;
protein synthesis inhibitors: blasticidin-S, kasugamycin, kasugamycin hydrochloride-hydrate, mildiomycin, streptomycin, oxytetracyclin, polyoxine, validamycin A;

Signal transduction inhibitors

MAP / histidine kinase inhibitors: fluoroimid, iprodione, procymidone, vinclozolin, fenpiclonil, fludioxonil;

G protein inhibitors: quinoxyfen;

Lipid and membrane synthesis inhibitors

Phospholipid biosynthesis inhibitors: edifenphos, iprobenfos, pyrazophos, isoprothiolane;

lipid peroxidation: dicloran, quintozone, tecnazene, tolclofos-methyl, biphenyl, chloroneb, etridiazole;

phospholipid biosynthesis and cell wall deposition: dimethomorph, flumorph, mandiproamid, pyrimorph, benthiavalicarb, iprovalicarb, valifenalate and N-(1-(4-cyano-phenyl)ethanesulfonyl)-but-2-yl) carbamic acid-(4-fluorophenyl) ester;

compounds affecting cell membrane permeability and fatty acids: propamocarb, propamocarb-hydrochlorid;

fatty acid amide hydrolase inhibitors: oxathiapiprolin;

Inhibitors with Multi Site Action

inorganic active substances: Bordeaux mixture, copper acetate, copper hydroxide, copper oxychloride, basic copper sulfate, sulfur;

thio- and dithiocarbamates: ferbam, mancozeb, mane, metam, metiram, propineb, thiram, zineb, ziram;

organochlorine compounds (e.g. phthalimides, sulfamides, chloronitriles): anilazine, chlorothalonil, captafol, captan, folpet, dichlofluanid, dichlorophen, hexachlorobenzene, pentachlorophenole and its salts, phthalide, tolyfluanid, N-(4-chloro-2-nitrophenyl)-N-ethyl-4-methyl-benzenesulfonamide;

guanidines and others: guanidine, dodine, dodine free base, guazatine, guazatine-acetate, iminoctadine, iminoctadine-triacetate, iminoctadine-tris(albesilate), dithianon, 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrrole-1,3,5,7(2H,6H)-tetraone;
F.IX) Cell wall synthesis inhibitors

inhibitors of glucan synthesis: validamycin, polypexin B;

F.IX 2) melanin synthesis inhibitors: pyroquilon, tricyclazole, carpropamid, dicyclomet, fenoxanil;

F.X) Plant defence inducers

acibenzolar-S-methyl, probenazole, isotianil, tiadinil, prohexadione-calcium;

F.X 2) phosphonates: fosetyl, fosetyl-aluminum, phosphorous acid and its salts, 4-cyclopropyl-N-(2,4-dimethoxyphenyl)thiadiazole-5-carboxamide;

F.XI) Unknown mode of action

bronopol, chinomethionat, cyfluafenamid, cymoxanil, dazomet, debacarb, dicloemezine, difenzoquat, difenzoquat-methylsulfate, diphenylamin, fenpyrazamine, flumetover, flusulfamide, flutianil, methasulfocarb, nitrapyrin, nitrothial-isopropyl, oxathiapiprolin, picarbutrazox, tolprocarb, 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, 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-{5-[2-fluoro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl)piperidin-1-yl]ethanone, 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, oxin-copper, proquinazid, tebufluquin, teclofalam, triazoxide, 2-butoxy-6-iodo-3-propylchromen-4-one, N-(cyclopropyilmethoxyimino-(6-difluoro-methoxy-2,3-difluoro-phenyl)-methyl)-2-phenyl acetamide, N'-[(4-chloro-3-trifluoromethylphenox)-2,5-dimethyl-phenyl]-N-ethyl-N-methyl formamidine, N'-[(4-fluoro-3-trifluoromethyl-phenox)-2,5-dimethyl-phenyl]-N-ethyl-N-methyl formamidine, N'-[(2-methyl-5-trifluoromethyl-4-(3-trimethylsilanyl-propoxy)-phenyl)-N-ethyl-N-methyl formamidine, N'-(5-difluoromethyl-2-methyl-(4-(3-trimethylsilylanyl-propoxy)-phenyl)-N-ethyl-N-methyl formamidine, methoxy-acetic acid 6-tert-butyl-8-fluoro-2,3-dimethyl-quinolin-4-yl ester, 3-(5-(4-methylphenyl)-2,3-dimethyl-isoxazolidin-3-yl)-pyridine, 3-(5-(4-chloro-phenyl)-2,3-dimethyl-isoxazolidin-3-yl)-pyridine (pyrisoxazole), N-(6-methoxy-pyrindin-3-yl) cyclopropanecarboxylic acid amide, 5-chloro-1-(4,6-dimethoxy-4-pyrindin-2-yl)-2-methyl-1H-benzoimidazole, 2-(4-chloro-phenyl)-N-[4-(3,4-dimethoxy-phenyl)-isoxazol-5-yl]-2-prop-2-ynlyoxy-acetamide, ethyl (Z)-3-amino-2-cyano-3-phenyl-prop-2-enoate, pentyl N-[6-[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridylicarbamate, 2-[2-[(7,8-difluoro-2-methyl-3-quinolyl)oxy]-6-fluoro-phenyl]propan-2-ol, 2-[2-fluoro-6-[(8-fluoro-2-methyl-3-quinolyl)oxy]phenyl]propan-2-ol, 3-(5-fluoro-3,3,4,4-tetramethyl-3,4-dihydroisouquinolin-1-yl)quinoline, 3-(4,4-difluoro-3,3-dimethyl-3,4-dihydro-
isoquinolin-1-yl)quinoline, 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-yl)quinoline;

F.XII) Biopesticides

5  F.XII 1) Microbial pesticides with fungicidal, bactericidal, viricidal and/or plant defense activator activity: Ampelomyces quisqualis, Aspergillus flavus, Aureobasidium pullulans, Bacillus amyloliquefaciens, B. mojavensis, B. pumilus, B. simplex, B. solisalii, B. subtilis, B. subtilis var. amyloliquefaciens, Candida oleophila, C. saitoana, Clavibacter michiganensis (bacteriophages), Coniothyrium mimitans, Cryphonectria parasitica, Cryptococcus albidus, Diophosphora alopecuri, Fusarium oxysporum, Clonostachys rosea f. catenulate (also named Gliocladium catenulatum), Gliocladium roseum, Lysobacter antibioticus, L. enzymogenes, Metschnikowia fructicola, Microdochium dimerum, Microsphaeropsis ochracea, Muscodor albus, Paeonibacillus polymyxa, Pantoea vagans, Phlebiopsis gigantea, Pseudomonas sp., Pseudomonas chloraphis, Pseudozyma flocculosa, Plicha anomala, Pythium oligandrum, Sphaerodes mycoperasitica, Streptomyces griseoviridis, S. lydicus, S. violaceusniger, Talaromyces flavus, Trichoderma asperellum, T. atroviride, T. fertile, T. gamssii, T. harratum, T. harzianum; mixture of T. harzianum and T. viride; mixture of T. polysporum and T. harzianum; T. stromaticum, T. virens (also named Gliocladium virens), T. viride, Typhula phacorrhiza, Ulocladium oudemansii, Verticillium dahlia, zucchini yellow mosaic virus (avirulent strain);

25  F.XII 2) Biochemical pesticides with fungicidal, bactericidal, viricidal and/or plant defense activator activity: chitosan (hydrolysate), harpin protein, laminarin, Menhaden fish oil, natamycin, Plum pox virus coat protein, potassium or sodium bicarbonate, Reynoutria sachlinensis extract, salicylic acid, tea tree oil

30  in a synergistically effective amount.

Moreover, it has been found that simultaneous, that is joint or separate, application of the active compound I and one or more compound(s) II and/or III, or successive application (that is immediately one after another and thereby creating the mixture "in-situ" on the desired location, as e.g. the plant) of the active compound I and one or more active compound(s) II and/or III allows enhanced control of pests compared to the control rates that are possible with the individual compounds.

The invention also provides for the use of a mixture according to the invention as disclosed above for controlling the pests from the family of Pentatomidae, preferably Acrosternum spp., Euschistus spp., Nezara spp and/or Piezodrus spp., in particular Acrosternum hilare, Euschistus heros, Nezara viridula and/or Piezodrus guildini.
The mixtures of the invention are partly novel and partly known. Accordingly, the invention also provides for pesticidal mixtures comprising as active compounds

1) at least one compound I, which is a component of the ginkgo tree selected from the group consisting of bilobalide, ginkgolide A, ginkgolide B, ginkgolide C, ginkgolide J and ginkgolide M, and

2) at least one pesticidally active compound II selected from group M consisting of

II-M.1 Acetylcholine esterase (AChE) inhibitors from the class of

II-M.1A carbamates, for example aldicarb, alanycarb, bendiocarb, benfuracarb, butocarboxim, butoxycarboxim, carbaryl, carbofuran, carbosulfan, ethiofungar, fenobucarb, formetanate, furathiocarb, isoprocarb, methiocarb, methomyl, metolcarb, oxamyl, pirimicar, propoxur, thiocarb, thiofanox, trimethacarb, XMC, xylylcarb and triazamate; or from the class of

II-M.2 GABA-gated chloride channel antagonists such as:

II-M.2A cyclodiene organochlorine compounds, as for example endosulfan or chlordane; or

II-M.2B fiproles (phenylpyrazoles), as for example ethiprole, fipronil, fluprole, pyrafluprole and pyrirole;

II-M.3 Sodium channel modulators selected from sodium channel modulators such as DDT or methoxychlor;

II-M.4 Nicotinic acetylcholine receptor agonists (nAChR) from the class of

II-M.4A neonicotinoids, for example acetamiprid, chlothianidin, cycloxaprid, dinotefuran, imidaclorpid, nitenpyram, thiacloprid and thiamethoxam; or the compounds

II-M.4A.2: (2E)-1-[(6-Chloropyridin-3-yl)methyl]-N'-nitro-2-pentylidenehydrazinecarboximidamide; or

II-M.4A.3: 1-[(6-Chloropyridin-3-yl)methyl]-7-methyl-8-nitro-5-propoxy-1,2,3,5,6,7-hexahydropirimidazo[1,2-a]pyridine; or from the class

II-M.4B nicotine;

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

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

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

5 miscellaneous non-specific (multi-site) inhibitors, for example alkyl halides as methyl bromide and other alkyl halides, or chloropicrin, or sulfuryl fluoride, or borax, or tartar emetic;

Selective homopteran feeding blockers, for example pymetrozine, or flonicamid;

Mite growth inhibitors, including clofentezine, hexythiazox and diflubenzuron, or etoxazole;

20 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. te-nebrionis, or the Bt crop proteins: Cry1Ab, Cry1Ac, Cry1Fa, Cry2Ab, mCry3A, Cry3Ab, Cry3Bb and Cry34/35Ab1;

Inhibitors of mitochondrial ATP synthase, for example diafenthiuron, or organotin miticides such as azocyclotin, cyhexatin or fenbutatin oxide, or propargite, or tetradifon;

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

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

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

Inhibitors of the chitin biosynthesis type 1, as for example buprofezin;
II-M.17 Moulting disruptors, Dipteran, as for example cyromazine;

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

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

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

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

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

II-M.23 Inhibitors of the of acetyl CoA carboxylase, such as tetronic and tetramic acid derivatives, for example spirodiclofen, spiromesifen or spirotetramat;

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

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

II-M.28 Ryanodine receptor-modulators from the class of diamides, as for example flubendiamide, chlorantraniliprole (rynaxypyr®), cyantraniliprole (cyazypyr®), or the phthalamide compounds
40 II-M.28.1: (R)-3-Chloro-N1-[2-methyl-4-[1,2,2,2-tetrafluor-1-(trifluoromethyl)ethy]phenyl]-N2-(1-
methyl-2-methylsulfonyl)ethyl)phthalamid and
II-M.28.2: (S)-3-Chloro-N1-[2-methyl-4-{1,2,2,2-tetrafluor-1-(trifluoromethyl)ethyl}phenyl]-N2-(1-methyl-2-methylsulfonyl)ethyl)phthalamid, or the compound

II-M.28.3: 3-bromo-N-[2-bromo-4-chloro-6-[(1-cyclopropylethyl)carbamoyl]phenyl]-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (proposed ISO name: cyclaniliprole), or the compound

II-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-dimethylhydrazinecarboxylate; or a compound selected from M.28.5a) to M.28.5i):

II-M.28.5a) N-[4,6-dichloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5b) N-[4-chloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-6-methyl-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5c) N-[4-chloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-6-methyl-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5d) N-[4,6-dichloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5e) N-[4,6-dichloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(difluoromethyl)pyrazole-3-carboxamide;

II-M.28.5f) N-[4,6-dibromo-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5g) N-[4-chloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-6-cyano-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5h) N-[4,6-dibromo-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

II-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;

II-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;

II-M.28.5k) 3-Bromo-N-[2,4-dichloro-6-(methylcarbamoyl)]phenyl]-1-(3,5-dichloro-2-pyridyl)-1H-pyrazole-5-carboxamide;

II-M.28.5l) N-[4-Chloro-2-[[1,1-dimethylethyl]amino]carbonyl]-6-methyl[phenyl]-1-(3-chloro-2-pyridinyl)-3-(fluoromethoxy)-1H-pyrazole-5-carboxamide; or a compound selected from

II-M.28.6: N-(2-cyanopropan-2-yl)-N-(2,4-dimethylphenyl)-3-iodobenzene-1,2-dicarboxamide; or

II-M.28.7: 3-Chloro-N-(2-cyanopropan-2-yl)-N-(2,4-dimethylphenyl)-benzene-1,2-dicarboxamide;

II-M.28.8a) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-3-(5-(trifluoromethyl)-2H-tetrazol-2-yl)methyl]-1H-pyrazole-5-carboxamide; or

II-M.28.8b) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-3-(5-(trifluoromethyl)-1H-tetrazol-1-yl)methyl]-1H-pyrazole-5-carboxamide;
Insecticidally active compounds of unknown or uncertain mode of action, as for example afidopropen, afoxolaner, azadirachtin, amidoflumet, benzoximate, bifenazate, bromopropylate, chinomethionat, cryolite, dicofol, flufennerim, flometoquin, fluvensulfone, fluopyram, flupyrazifurone, fluralaner, metoxadiazone, piperonyl butoxide, pyflubumide, pyridalyl, pyriflquinazon, sulfoxaflor, tiozazafen, triflumezopyrim, or the compounds

II-M.UN.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

II-M.UN.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

II-M.UN.5: 1-[2-fluoro-4-methyl-5-[(2,2,2-trifluoroethyl)sulfinyl]phenyl]-3-(trifluoromethyl)-1H-1,2,4-triazole-5-amine; or a compound selected from the group of M.UN.6, wherein the compound is selected from II- II-M.UN.6a) to M.UN.6k):

II-M.UN.6a) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;

II-M.UN.6b) (E/Z)-N-[1-[(6-chloro-5-fluoro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;

II-M.UN.6c) (E/Z)-2,2,2-trifluoro-N-[1-[(6-fluoro-3-pyridyl)methyl]-2-pyridylidene]acetamide;

II-M.UN.6d) (E/Z)-N-[1-[(6-bromo-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;

II-M.UN.6e) (E/Z)-N-[1-[(6-chloro-3-pyridyl)ethyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;

II-M.UN.6f) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2-difluoro-acetamide;

II-M.UN.6g) (E/Z)-2-chloro-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2-difluoro-acetamide;

II-M.UN.6h) (E/Z)-N-[1-[(2-chloropyrimidin-5-yl)methyl]-2-pyridylidene]-2,2,2-trifluoro-acetamide;

II-M.UN.6i) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,3,3,3-pentafluoro-propanamide.);

II-M.UN.6j) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-thioacetamide or of the compound

II-M.UN.6k) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-N‘-isopropylacetamidine or the compounds

II-M.UN.8: 8-chloro-N-[2-chloro-5-methoxyphenyl)sulfonyl]-6-trifluoromethyl]-imidazo[1,2-a]pyridine-2-carboxamide; or

II-M.UN.9: 4-[5-(3,5-dichlorophenyl)-5-(trifluoromethyl)-4H-isoxazol-3-yl]-2-methyl-N-(1-oxothietan-3-yl)benzamide; or

II-M.UN.10: 5-[3-(2,6-dichloro-4-(3,3-dichloroallyloxy)phenoxy)propoxy]-1H-pyrazole; or a compound selected from the group of M.UN.12, wherein the compound is selected from M.UN.12a) to M.UN.12m):

II-M.UN.12.a) 2-(1,3-Dioxan-2-yl)-6-[2-(3-pyridinyl)-5-thiazolyl]-pyridine;

II-M.UN.12.b) 2-[6-[2-(5-fluoro-3-pyridinyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine;

II-M.UN.12.c) 2-[6-[2-(3-Pyridinyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine;

II-M.UN.12.d) N-Methylsulfonyl-6-[2-(3-pyridyl)thiazol-5-yl]pyridine-2-carboxamide

II-M.UN.12.e) N-Methylsulfonyl-6-[2-(3-pyridyl)thiazol-5-yl]pyridine-2-carboxamide

II-M.UN.12.f) N-Ethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide

II-M.UN.12.g) N-Methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide

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II-M.UN.12.h) N,2-Dimethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.i) N-Ethyl-2-methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.j) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-2-methyl-3-methylthio-propanamide
II-M.UN.12.k) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N,2-dimethyl-3-methylthio-propanamide
II-M.UN.12.l) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-methyl-3-methylthio-propanamide
II-M.UN.12.m) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-3-methylthio-propanamide; or the compound
II-M.UN.13: 2-(4-methoxyiminocyclohexyl)-2-(3,3,3-trifluoropropylsulfanyl)acetonitrile; or the compounds
II-M.UN.14a) 1-[(6-Chloro-3-pyridinyl)methyl]-1,2,3,5,6,7-hexahydro-5-methoxy-7-methyl-8-nitro-imidazo[1,2-a]pyridine; or
II-M.UN.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 compound
II-M.UN.15:1-[(2-Chloro-1,3-thiazol-5-yl)methyl]-3-(3,5-dichlorophenyl)-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidin-1-ium-2-olate; or
II-M.BP Biopesticides, being pesticidal compounds of biological origin with insecticidal, acaricidal, molluscidal and/or nematicidal activity, including
II-M.BP-1: Microbial pesticides: Bacillus firmus, B. thuringiensis ssp. israelensis, B. t. ssp. galleriae, B. t. ssp. kurstaki, Beauveria bassiana, Burkholderia sp., Chromobacterium subsugae, Cydia pomonella granulosis virus, Isaria fumosorosea, Lecanicillium longisporum, L. muscarium (formerly Verticillium lecanii), Metarhizium anisopliae, M. anisopliae var. acidum, Paecilomyces fumosoroseus, P. illacinus, Paenibacillus popilliae, Pasteuria spp., P. nishizawae, P. reneformis, P. usgaeae, Pseudomonas fluorescens, Steinernema feltiae, Streptomces galbus; or
F.I) Respiration inhibitors
F.I 1) Inhibitors of complex III at Q₆ site (e.g. strobilurins): azoxystrobin, coumethoxy-strobin, coumoxystrobin, dimoxystrobin, enestroburin, fenaminstrob, fenoxo-
strobil/flufenoxystrobin, fluoxastrobin, kresoxim-methyl, mandestrobin, metominostrobin, orysastrobin, picoxystrobin, pyraclostrobin, pyrametostrobin, pyraoxystrobin, trifloxystrobin and 2-[(3-(2,6-dichlorophenyl)-1-methyl-allylideneaminooxy methyl)-phenyl]-2-methoxyimino-N-methyl-acetamide, pyribencarb, triclopyracarb/chlorodinecarb, famoxadone, fenamidone;

F.I 2) inhibitors of complex III at Q site: cyazofamid, amisulbrom, [(3S,6S,7R,8R)-8-benzyl-3-[(3-acetoxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-(acetoxy)methoxy)-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-isobutoxy carbonyloxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-(1,3-benzodioxol-5-yl)methoxy)-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate; (3S,6S,7R,8R)-3-[(3-hydroxy-4-methoxy-2-pyridinyl)carbonyl]amino]-6-methyl-4,9-dioxo-8-(phenylmethyl)-1,5-dioxan-7-yl 2-methylpropanoate;

F.I 3) inhibitors of complex II (e.g. carboxamides): benodanil, benzovindiflupyr, bixafen, boscalid, carboxin, fenfuram, fluopyram, flutolanil, fluxapyroxad, furametpyr, isofetamid, isopyrazam, mepronil, oxyxcarboxin, penfluen, penthiopyrad, sedaxane, tecloftalam, thifluzamide, N-(4'-trifluoromethylthiobiphenyl-2-yl)-3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxamide, N-(2-(1,3,3-trimethyl-butyl)-phenyl)-1,3-dimethyl-5-fluoro-1H-pyrazole-4-carboxamide, N-(2-[(3-(2,4-dichlorophenyl)-2-methoxy-1-methyl-ethyl)-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide, N-[2-(2,4-difluorophenyl)phenyl]-3-(trifluoromethyl)pyrazine-2-carboxamide;

F.I 4) other respiration inhibitors (e.g. complex I, uncouplers): diflumetorm, (5,8-difluoro-quinazolin-4-yl)-[2-[2-fluoro-4-(4-trifluoromethylpyridin-2- yl)-phenyl]-ethyl]-amine; nitrophenyl derivates: binapacryl, dinobuton, dinocap, fluazinaf; ferimzone; organo metal compounds: fenit salts, such as fenit-acetate, fenit chloride or fenit hydroxide; ametoctradin; and silthiofam;

F.II) Sterol biosynthesis inhibitors (SBI fungicides)

F.II 1) C14 demethylase inhibitors (DMI fungicides): triazoles: azaconazole, bitertanol, bromuconazole, cyproconazole, difenoconazole, diniconazole, diniconazole-M, epoxiconazole, fenbuconazole, fluquinconazole, flusilazole, flutriafol, hexaconazole,
imibenconazole, ipconazole, metconazole, myclobutanil, oxpoconazole, paclobutrazole, penconazole, propiconazole, prothioconazole, simeconazole, tebuconazole, tetracnazole, triadimefon, triadimenol, triticonazole, uniconazole, 1-[reH(2S;3R)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)-oxiranyl methyl]-5-thiocyanato-1H-[1,2,4]triazole, 2-[reH(2S;3R)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)-oxiranyl methyl]-2H-[1,2,4]triazole-3-thiol, 2-[2-chloro-4-(4-chlorophenoxo)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol, 1-[4-(4-chlorophenoxo)-2-(trifluoromethyl)phenyl]-1-cyclopropyl-2-(1,2,4-triazol-1-yl)ethanol, 2-[4-(4-chlorophenoxo)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[2-chloro-4-(4-chlorophenoxo)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxo)-2-(trifluoromethyl)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxo)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol, 2-[2-chloro-4-(4-chlorophenoxo)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxo)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol, 2-[4-(4-fluorophenoxo)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol; imidazoles: imazalil, pefurazone, prochloraz, triflumizol; pyrimidines, pyridines and piperezines: fenarimol, nuaimar, pyriflumox, triflumox, triflurine, [3-(4-chloro-2-fluoro-phenyl)-5-(2,4-difluorophenyl)]isoxazol-4-yl]-(3-pyridyl)methanol;

Delta14-reductase inhibitors: aldorph, dodemorph, dodemorph-acetate, fenpropimorph, tridemorph, fenpropidin, piperalin, spiroxamine;

Inhibitors of 3-keto reductase: fenhexamid;

Nucleic acid synthesis inhibitors

Phenylamides or acyl amino acid fungicides: benalaxyl, benalaxyl-M, kiralaxyl, metalaxyl, metalaxyl-M (mefenoxam), ofurace, oxadixyl;

others: hymexazol, ochthlinone, oxolinic acid, bupirimate, 5-fluorocytosine, 5-fluoro-2-(p-tolylmethoxy)pyrimidin-4-amime, 5-fluoro-2-(4-fluorophenylmehoxy)pyrimidin-4-amime;

Inhibitors of cell division and cytoskeleton

tubulin inhibitors, such as benzimidazoles, thiophanates: benomyl, carbendazim, fuberidazole, thiabendazole, thiophanate-methyl; triazolopyrimidines: 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)-[1,2,4]triazolo[1,5-a]pyrimidine;

other cell division inhibitors: diethofencarb, ethaboxam, pencycuron, fluopicolide, zoamide, metrafenone, pyriofenone;

Inhibitors of amino acid and protein synthesis
methionine synthesis inhibitors (anilino-pyrimidines): cyprodinil, mepanipyrim, pyrimethanil;

protein synthesis inhibitors: blasticidin-S, kasugamycin, kasugamycin hydrochloride-hydrate, mildiomycin, streptomycin, oxytetracyclin, polyoxine, validamycin A;

Signal transduction inhibitors

MAP / histidine kinase inhibitors: fluoroimid, iprodione, procymidone, vinclozolin, fenpiclonil, fludioxonil;

G protein inhibitors: quinoxyfen;

Lipid and membrane synthesis inhibitors

Phospholipid biosynthesis inhibitors: edifenphos, iprobenfos, pyrazophos, isoprothiolane;

lipid peroxidation: dicloran, quintozone, tecnazene, tolclofos-methyl, biphenyl, chloroneb, etridiazole;

phospholipid biosynthesis and cell wall deposition: dimethormorph, flumorph, mandipropamid, pyrimorph, benthialvalcarb, iprovalicarb, valifenalate and N-(1-(1-(4-cyano-phenyl)ethanesulfonyl)-but-2-yl) carbamic acid-(4-fluorophenyl) ester;

compounds affecting cell membrane permeability and fatty acides: propamocarb, propamocarb-hydrochlorid;

fatty acid amide hydrolase inhibitors: oxathiapiprolin;

Inhibitors with Multi Site Action

inorganic active substances: Bordeaux mixture, copper acetate, copper hydroxide, copper oxychloride, basic copper sulfate, sulfur;

thio- and dithiocarbamates: ferbam, mancozeb, manebe, metam, metiram, propineb, thiram, zineb, ziram;

organochlorine compounds (e.g. phthalimides, sulfamides, chloronitriles): anilazine, chlorothalonil, captafol, captan, folpet, dichlofluanid, dichlorphen, hexachlorobenzene, pentachlorphenole and its salts, phthalide, tolyfluanid, N-(4-chloro-2-nitrophenyl)-N-ethyl-4-methyl-benzenesulfonamide;
guanidines and others: guanidine, dodine, dodine free base, guazatine, guazatine-acetate, iminocadine, iminocadine-triacetate, iminocadine-tris(albesilate), dithianon, 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrrole-1,3,5,7(2H,6H)-tetrone;

Cell wall synthesis inhibitors

inhibitors of glucan synthesis: validamycin, polyoxin B;

melanin synthesis inhibitors: pyroquilon, tricyclazole, carproamid, dicyclomet, fenoxanil;

Plant defence inducers

acibenzolar-S-methyl, probenazole, isothianil, tiadinil, prohexadione-calcium;

phosphonates: fosetyl, fosetyl-aluminum, phosphorous acid and its salts, 4-cyclopropyl-N-(2,4-dimethoxyphenyl)thiadiazole-5-carboxamide;

Unknown mode of action

bronopol, chinomethionat, cyflufenamid, cymoxanil, dazomet, debacarb, dicloemezine, difenzoquat, difenzoquat-methysulfate, diphenylamin, fenpyrazamine, flumetover, flusulfamide, flutianil, methasulfocarb, nitrapyrin, nitrothal-isopropyl, oxi thiapiprolin, picarbutrazox, tolprocarb, 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-[2-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl)-1,3-thiazol-2-yl)piperidin-1-yl]ethaneone, 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-[2-fluoro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl)-1,3-thiazol-2-yl)piperidin-1-yl]ethaneone, 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-[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]ethaneone, oxin-copper, proquinazid, tebufluquin, tecloftalam, tri azoxide, 2-butoxy-6-iodo-3-propylchromen-4-one, N-(cyclopropylmethoxyrimino-(6-difluoromethoxy-2,3-difluoro-phenyl)-methyl)-2-fluoro acetamide, N'+(4-(4-chloro-3-trifluoromethyl-phenoxy)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine, N'-(4-(4-fluoro-3-trifluoromethyl-phenoxy)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine, N'-(2-methyl-5-trifluoromethyl-4-(3-trimethylsilylpropoxy)-phenyl)-N-ethyl-N-methyl formamidine, N'-(5-difluoromethyl-2-methyl-4-(3-trimethylsilylpropoxy)-phenyl)-N-ethyl-N-methyl formamidine, methoxy-acetic acid 6-tert-butyl-8-fluoro-2,3-dimethyl-quinolin-4-yl ester, 3-[5-(4-methylphenyl)-2,3-dimethyl isoaxazolidin-3-yl]-pyridine, 3-[5-(4-chloro-phenyl)-2,3-dimethyl-isoaxazolidin-3-yl]-pyridine (pyrisoxazole), N-(6-methoxy-pyridin-3-yl) cyclopropanecarboxylic acid amide, 5-chloro-1-(4,4-dimethoxy-pyrimidin-2-yl)-2-methyl-1H-benzoimidazole, 2-(4-chloro-phenyl)-N-[4-(3,4-dimethoxy-phenyl)-isoaxazol-5-yl]-2-prop-2-ynloxy-acetamide, ethyl (Z)-3-amino-2-cyano-3-phenyl-prop-2-enoate, pentyl N-[6-[[Z]-[(1-
methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate, 2-[2-
[(7,8-difluoro-2-methyl-3-quinolyl)oxy]-6-fluoro-phenyl]propan-2-ol, 2-[2-fluoro-6-
[(8-fluoro-2-methyl-3-quinolyl)oxy]phenyl]propan-2-ol, 3-(5-fluoro-3,3,4,4-tetramethyl-
3,4-dihydroisoquinolin-1-yl)quinoline, 3-(4,4-difluoro-3,3-dimethyl-3,4-dihydro-
isoquinolin-1-yl)quinoline, 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-
yl)quinoline;

F.XII) Biopesticides

10 F.XII 1) Microbial pesticides with fungicidal, bactericidal, viricidal and/or plant defense activator activity: Ampelomyces quisqualis, Aspergillus flavus, Aureobasidium pullulans, Bacillus amyloliquefaciens, B. mojavensis, B. pumilus, B. simplex, B. solisalbi, B. subtilis, B. subtilis var. amyloliquefaciens, Candida oleophila, C. saitoana, Clavibacter michiganensis (bacteriophages), Coniothyrium minitans, Cryphonectria parasitica, Cryptococcus albidus, Dilophosphora alopecuri, Fusarium oxysporum, Clonostachys rosea f. catenulate (also named Gliocladium catenulatum), Gliocladium roseum, Lysobacter antibioticus, L. enzymogenes, Metschnikowia fructicola, Microdochium dimerum, Microsphaeropsis ochracea, Muscodor albus, Paenibacillus polymyxa, Pantoea vagans, Phlebiopsis gigantea, Pseudomonas sp., Pseudomonas chloraphis, Pseudopezys flocculosa, Pichia anomala, Pythium oligandrum, Sphaerodes mycoparasitica, Streptomyces griseoviridis, S. lydicus, S. violaceusniger, Talaromyces flavus, Trichoderma asperellum, T. atroviride, T. fertile, T. gamsii, T. harmatum, T. harzianum; mixture of T. harzianum and T. viride; mixture of T. polysporum and T. harzianum; T. stromaticum, T. virens (also named Gliocladium virens), T. viride, Typhula phacorrhiza, Ulocladium oudemansii, Verticillium dahlia, zucchini yellow mosaic virus (avirulent strain);

F.XII 2) Biochemical pesticides with fungicidal, bactericidal, viricidal and/or plant defense activator activity: chitosan (hydrolysate), harpin protein, laminarin, Menhaden fish oil, natamycin, Plum pox virus coat protein, potassium or sodium bicarbonate, Reynoutria sachalinensis extract, salicylic acid, tea tree oil

in a synergistically effective amount.

35 In a further embodiment of the invention there is provided seed, comprising the mixture of the invention in an amount of from 0.1 g to 100 kg per 100 kg of seeds.

The invention provides for a pesticidal composition, comprising a liquid or solid carrier and a novel mixture according to the invention.

40 The simultaneous (that is joint or separate application of one or more active compound(s) I and one or more compound(s) II and/or III), or successive application (that is immediately one after another and thereby creating the mixture "in-situ" on the desired location, as e.g. the plant, of

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one or more active compound(s) I and one or more active compound(s) II and/or III) allows
enhanced control of pests, in particular Pentatomidae pests, and fungi compared to the control
rates that are possible with the individual compounds.

The prior art does not disclose pesticidal mixtures for the control of Pentatomidae pests, particu-
larly stink bugs, comprising such compounds I in combination with the other pesticidically and/or
fungicidally active compounds.

The compound I of formula (I) includes its tautomers, racemic mixtures, individual pure enanti-
omers and diastereomers and the optically active mixtures.

Preferred as compound I are bilobalide, ginkgolide A and a mixture of bilobalide and ginkgolide
A. Further preferred are mixtures comprising bilobalide and/or ginkgolide A and at least one
further compound I which is different from bilobalide and ginkgolide A.

Bilobalide and the ginkgolides are known components of the ginkgo tree having the following
structures:

a) Bilobalide:

![Bilobalide](image)

Bilobalide is the common name for (3aS,5aR,8aS,9R,10aR)-9-tert-butyl-8,9-dihydroxydihydro-
9H-furo[2,3-b]furo[3',2';2,3]cyclopenta[1,2-c]furan-2,4,7(3H,8H)-trione
(CAS 33570-04-6).

b) Ginkgolides:

![Ginkgolides](image)
The above compounds can be used in pure form, as mixtures or in the form of extracts of ginkgo leaves, which may be enriched with the above compounds to a certain degree.

The compounds are commercially available, or can be obtained, preferably from ginkgo leaves by methods known in the art and described e.g. in US 5,700,468, EP-A 360 556, EP-A 0 431 535 and JP-A 09-110713.

Further, the compounds Bilobalide (in enantiopure form), Ginkgolide A (in its racemic form) and Ginkgolide B (in its racemic form) can be obtained by chemical synthesis, as disclosed e.g. in Tetrahedron Letters (1988), 29(28), 3423-6, Tetrahedron Letters (1988), 29(26), 3205-6 and Journal of the American Chemical Society (2000), 122(35), 8453-8463, respectively.

Pesticidal Compounds II

The above list M of pesticides II is grouped and numbered according the Mode of Action Classification of the Insecticide Resistance Action Committee (IRAC).


The quinoline derivative flometoquin is shown in WO2006/013896. The aminofuranone compounds flupyradifurone is known from WO 2007/115644. The pyripyrone derivative afidopyropene has been shown in EP1889540. The sulfoximine compound sulfoxalflor is known from WO2007/149134. The pyrethroid momfluorothrin is known from US6908945. The pyrazole acaricide pyflubumide is known from WO2007/020886. The isoxazoline compound II-M.X.1 has been described in WO2005/085216, II-M.X.8 in WO2009/002809 and in WO2011/149749 and the isoxazoline II-M.X.9 in WO2013/050317. The pyripyrone derivative II-M.X.2 has been described in WO 2006/129714. The spiroketal-substituted cyclic ketoenol derivative II-M.X.3 is known from WO2006/089633 and the biphenyl-substituted spirocyclic ketoenol derivative II-M.X.4 from WO2008/067911. Triazolylphenylsulfide like II-M.X.5 have been described in WO2006/043635 and biological control agents on basis of bacillus firmus in WO2009/124707.

The neonicotinoids II-M4A.1 is known from WO2012/069266 and WO2011/06946, the II-M.4A.2 from WO2013/003977, the II-M4A.3 from WO2010/069266. The metaflumizone analogue II-M.22C is described in CN 10171577.
Cyantraniliprole (Cyazypyr) is known from e.g. WO 2004/067528. The phthalamides II-M.28.1 and II-M.28.2 are both known from WO 2007/101540. The anthranilamide II-M.28.3 has been described in WO 2005/077934. The hydrazide compound II-M.28.4 has been described in WO 2007/043677. The anthranilamides II-M.28.5(a) to II-M.28.5(h) can be prepared as described in WO 2007/006670, WO2013/024009 and WO2013/024010, the anthranilamide II-M.28.5(i) is described in WO2011/085575, the II-M.28.5(j) in WO2008/134969, the II-M.28.5(k) in US2011/046186 and the II-M.28.5(l) in WO2012/034403. The diamide compounds II-M.28.6 and II-M.28.7 can be found in CN102613183.

The compounds II-M.X.6(a) to II-M.X.6(l) listed in II-M.X.6 have been described in WO2012/029672.

The mesoionic antagonist compound II-M.X.8 was described in WO2012/092115, the nematicide II-M.X.9 in WO2013/055584 and the Pyridalyl-type analogue II-M.X.12 in WO2010/060379.

The biopesticides of group II-M.BP are disclosed further below in the paragraphs about biopesticides (from groups II-M.BP and F.XII).

Fungicidal Compounds III

The active compounds III mentioned above of groups F.I to F.XI are fungicidally active pesticides of chemical nature described by common names. Their preparation and their activity against pests is known (cf.: http://www.alanwood.net/pesticides/); these pesticides are often commercially available.

Biopesticides as Compound II or Compound III

The biopesticides from group II.M.BP or F.XII, their preparation and their pesticidal activity e.g. against harmful fungi or insects are known (e-Pesticide Manual V 5.2 (ISBN 978 1 901396 85 0) (2008-2011); http://www.epa.gov/opp00001/biopesticides/, see product lists therein; http://www.omri.org/omri-lists, see lists therein; Bio-Pesticides Database BPDB http://sitem.herts.ac.uk/aeru/bpdb/, see A to Z link therein).

The biopesticides from group II.M.BP or F.XII may also have insecticidal, fungicidal, acaricidal, molluscidal, viricidal, bactericidal, pheromone, nematicidal, plant defense activator, plant stress reducing, plant growth regulator, plant growth promoting, plant growth regulator and/or yield enhancing activity.

Many of these biopesticides are registered and/or are commercially available. E.g. Beauveria bassiana ATCC 74040 (e.g. in Naturalis® from CBC (Europe) S.r.l., Italy), B. bassiana DSM 12256 (US 200020031495; e.g. BioExpert® SC from Live Sytems Technology S.A., Colombia), B. bassiana GHA (BotaniGard® 22WGP from Laverlam Int. Corp., USA), and B. bassiana PPRI 5339 (ARSEF number 5339 in the USDA ARS collection of entomopathogenic fungal cultures; NRRL 50757) (e.g. BroadBand® from Becker Underwood, South Africa).

Preferred Embodiments

Preferred compounds I are stated above.

The methods and mixtures of the invention preferably include one or more pesticidal compounds II. More preferred the active compounds II and III employed in the methods and mixtures of the inventions consist of one or more compounds II, or of one or more compounds II and/or one or more compounds III. If more than one compound of formula II and/or III is employed it is preferably 2 or 3 compounds that are used.

Preferred active compounds II selected from group M

With respect to their use in the methods and pesticidal mixtures of the present invention preference is given to compounds II selected from the groups II-M.2B, II-M.3A, II-M.4A, II-M.5, II-M.6, II-M.10, II-M.13, II-M.21A, II-M.25, II-M.22, II-M.23, II-M.28, II-M.UN and II-M.BP-1. Particular preference is given to the groups II-M wherein the at least one active compound II is selected from

II-M.2B within the class of fiproles from fipronil or ethiprole;
II-M.3A within the class of pyrethroids from alpha-cypermethrin;
II-M.4A within the class of neonicotinoids from acetamiprid, chlothianidin, dinofuran, imidacloprid, nitenpyram, thiacloprid or thiamethoxam;

II-M.5 within the class of spinosyns from spinosad or spinetoram;

II-M.6 within the class of mectins from abamectin or emamectin;

II-M.10 within the mite growth inhibitors from etoxazole;

II-M.13 within the uncouplers of oxidative phosphorylation from chlorfenapyr;

II-M.21A within the class of mitochondrial complex I electron transport inhibitors from pyridaben, tebufenpyrad, tolenpyrad or flufenerim;

II-M.25 within the class of mitochondrial complex II electron transport inhibitors from cyanopyrafen and cyflumetofen;

II-M.22 within the voltage-dependent sodium channel blockers from indoxacarb or metflumizone;

II-M.23 within the inhibitors of the lipid synthesis from spirodiclofen, spiromesifen or spirotetramat;

II-M.28 within the class of diamides from flubendiamide, chlorantraniliprole, cyantraniliprole, cyclaniliprole or tetraniiprole;

II-M.UN within the compounds of unknown or uncertain mode of action from afidopyropene, afoxolaner, bifenazate, flupyradifurone, fluralaner, piperonyl butoxide, pyridalyl, pyrimfluquinazon, sulfoxaflor or triflumezopyrim;

II-M.BP-1 within the class of microbial pesticides from Bacillus firmus, B. thuringiensis ssp. israelensis, B. t. ssp. galleriae, B. t. ssp. kurstaki, Beauveria bassiana, Burkholderia sp. or Paenibacillus poppiliae.

With regard to the use in a method and pesticidal mixture of the present invention, the compound II is preferably selected from group M-II.2.B as defined above and is preferably fipronil or ethiprole, more preferably fipronil.

With regard to the use in a method of the present invention, the compound II is preferably selected from group M-II.3A defined above and is preferably alpha-cypermethrin, acrinathrin, bifenthrin, cyfluthrin, lambda-cyhalothrin, cypermethrin, beta-cypermethrin, zeta-cypermethrin, deltamethrin, esfenvalerate, etofenprox, fenpropathrin, flucythrinate, tau-fluvalinate, silafluofen or tralomethrin.

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More preferably the compound II is alpha-cypermethrin, lambda-cyhalothrin, bifenthrin or deltamethrin, most preferably it is alpha-cypermethrin.

With regard to the use in a method and pesticidal mixture of the present invention, the compound II is preferably selected from group M-II.4A as defined above and is preferably acetamiprid, chlothianidin, dinofuran, imidacloprid, nitenpyram, thiacloprid or thiamethoxam.

More preferably the compound II is acetamiprid.
More preferably the compound II is clothianidin.
More preferably the compound II is imidacloprid.
More preferably the compound II is thiamethoxam.
Most preferably the compound II is dinofuran.

With regard to the use in a method and pesticidal mixture of the present invention, the compound II is preferably selected from group M-II.5 as defined above and is preferably spinosad.

With regard to the use in a method and pesticidal mixture of the present invention, the compound II is preferably selected from group M-II.6 as defined above and is preferably abamectin, emamectin benzoate, lepimectin or milbemectin.

More preferably the compound II is abamectin.
More preferably the compound II is emamectin.
Most preferably the compound II is abamectin.

With regard to the use in a pesticidal mixture of the present invention, the compound II is preferably selected from group M-II.X (compounds of unknown or uncertain mode of action) as defined above and is preferably flupyradifurone or sulfoxaflor.

With regard to the use in a method and pesticidal mixture of the present invention, the compound II is preferably selected from group II-M.BP (biopesticides).

More preferably the compound II is a microbial pesticide, most preferably Beaveria bassiana.

Especially preferred are methods employing pesticidal mixtures containing alpha-cypermethrin as compound II.

Especially preferred are pesticidal mixtures containing fipronil or ethiprole as compound II.

Especially preferred are pesticidal mixtures containing imidacloprid as compound II.

Especially preferred are pesticidal mixtures containing acetamiprid as compound II.
Especially preferred are pesticidal mixtures containing chlothianidine as compound II.

Especially preferred are pesticidal mixtures containing dinotefuran as compound II.

Especially preferred are pesticidal mixtures containing nitenpyram as compound II.

Especially preferred are pesticidal mixtures containing thiacloprid as compound II.

Especially preferred are pesticidal mixtures containing spinosad as compound II.

Especially preferred are pesticidal mixtures containing abamectin as compound II.

Especially preferred are pesticidal mixtures containing sulfoxaflor as compound II.

Especially preferred are pesticidal mixtures containing flupyradifurone as compound II.

Especially preferred are pesticidal mixtures containing the compound Beaveria bassiana as compound II.

Preferred fungicidal active compounds III selected from group F

With respect to their use in the pesticidal mixtures of the present invention, particular preference is given to certain fungicidal active compounds III listed in the paragraphs below.

With regard to the use in a pesticidal mixture of the present invention, the compound III is preferably selected from group F.1a).

More preferably the compound III is azoxystrobin, fluoxastrobin, picoxystrobin, pyraclostrobin or trifloxystrobin.

Most preferably the compound III is pyraclostrobin.

With regard to the use in a pesticidal mixture of the present invention, the compound III is preferably selected from group F.1c).

More preferably the compound III is bixafen, boscalid, fluopyram, fluxapyroxad, isopyrazam, penflufen, penthioptad or sedaxane.

More preferably the compound III is fluxapyroxad.

More preferably the compound III is boscalid.

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Most preferably the compound III is fluxapyroxad.

Preferred for application in the method of the invention or as mixture of the invention are the mixtures shown in Table 1.

Table 1: Preferred mixtures of the invention

<table>
<thead>
<tr>
<th>No</th>
<th>Compound I</th>
<th>Compound II</th>
<th>Compound III</th>
</tr>
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</tr>
<tr>
<td>2.</td>
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</tr>
<tr>
<td>3.</td>
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</tr>
<tr>
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<td>chlothianidin</td>
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<tr>
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<td>The compounds applied in the methods of the invention are used, preferably on soybean, to control pests from the family of Pentatomidae, particularly stinkbugs, e.g. Nezara spp. (e.g. Nezara viridula, Nezara antennata, Nezara hilaris), Piezodorus spp. (e.g. Piezodorus guildinii), Acrosternum spp. (e.g. <em>Acrosternum hilare</em>), Euchistus spp. (e.g. Euchistus heros, Euschistus servus), Halyomorpha halys, Megacopta cribraria, Plautia sacciota, Riptortus clavatus, Rhopalus discolor, Anisostriptus orbitalis, Dectes texanus, Dichelops spp. (e.g. Dichelops furcatus, Dichelops melacanthus), Eurygaster spp. (e.g. Eurygaster intericeps, Eurygaster maudri), Oebalus spp. (e.g. Oebalus mexicana, Oebalus pugnax, Oebalus pugnace, Scotinophara spp. (e.g. Scotinophara lurida, Scotinophara coerecta). Preferred targets include <em>Acrosternum hilare</em>, Antestiospis orbitalis, Dichelops furcatus, Dichelops melacanthus, Euchistus heros, Euschistus servus, Megacopta cribraria, Nezara viridula, Nezara hilaris, Piezodorus guildinii, Halyomorpha halys. In one embodiment the stink bug target is Nezara viridula, Piezodorus spp., Acrosternum spp., Euchistus heros. Euschistus and in particular Euchistus heros are preferred targets.</td>
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<td>Further pests of soybeans that can be controlled with the mixtures of the invention include Elasmopalpus lignosellus, Diloboderus abderus, Diabrotica speciosa, Stemnuchus subsignatus, Formicidae, Agrotis ypsilon, Julus spp., Anticarsia gemmatalis, Megacopta spp., Megacelis spp., Procomitermes spp., Gryllotalpidae, Nezara viridula, Neomegalotomus spp., Cerotoma trifurcata, Popillia japonica, Edessa spp., Liogenys fuscus, stem borer, Dectes spp., stalk borer, B13/76404AUSPRO</td>
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Depending on the spectrum of activity of the compounds II, mixtures of the invention can be used for the control of:

- insects from the order of the lepidopterans (*Lepidoptera*),
- beetles (*Coleoptera*),
- flies, mosquitoes (*Diptera*),
- termites (*Isoptera*),
- cockroaches (*Blattaria - Blattodea*),
- bugs, aphids, leafhoppers, whiteflies, scale insects, cicadas (*Hemiptera*),
- ants, bees, wasps, sawflies (*Hymenoptera*),
- crickets, grasshoppers, locusts (*Orthoptera*),
- arachnids (*Arachnida*),
- fleas (*Siphonaptera*),
- silverfish, firebrat (*Thysanura*),
- centipedes (*Chilopoda*),
- millipedes (*Diplopoda*),
- earwigs (*Dermaptera*),
- lice (*Phthiraptera*),
- springtails (*Collembola*),
- and
- plant parasitic nematodes.
Depending on the spectrum of activity of the compounds III, mixtures of the invention can be used for the control of phytopathogenic fungi and fungus-like eukaryotic microorganisms from Ascomycetes, Basidiomycetes, Deuteromycetes and Perenniporomycetes (syn. Domycetes). Some of them are systemically effective and can be employed in crop protection as foliar fungicides, as fungicides for seed dressing and as soil fungicides. They can also be used for treating seed.

They are particularly important in the control of a multitude of fungi on various cultivated plants, such as wheat, rye, barley, oats, rice, corn, lawns, bananas, cotton, soybean, coffee, sugar cane, grapevines, fruits and ornamental plants and vegetables such as cucumbers, beans, tomatoes, potatoes and curcurbits, and on the seeds of these plants.

Formulations

The mixtures according to the invention and applied in the methods of the invention can be converted into the customary formulations, for example solutions, emulsions, suspensions, dusts, powders, pastes and granules. The use form depends on the particular intended purpose; in each case, it should ensure a fine and even distribution of the compounds according to the invention.

Therefore the invention also relates to agrochemical compositions comprising an auxiliary and a mixture of at least one compound I of formula I and of at least one compound II and/or one compound III according to the present invention.

An agrochemical composition comprises a pesticidally effective amount of a compound I. The term "effective amount" denotes an amount of the composition or of the compounds I, which is sufficient for controlling harmful pests on cultivated plants or in the protection of materials and which does not result in a substantial damage to the treated plants. Such an amount can vary in a broad range and is dependent on various factors, such as the fungal species and/or the pest species to be controlled, the treated cultivated plant or material, the climatic conditions and the specific compound I used.

The active compounds I and II and/or III, their N-oxides and salts can be converted into customary types of agrochemical 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.

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, tetrahydrornaphthalene, 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-methylpyrrollidone, fatty acid dimethyiamides; and mixtures thereof.

Suitable solid carriers or fillers are mineral earths, e.g. silicates, silica gels, talc, kaolins, limestone, lime, chalk, clays, dolomites, diatomaceous earth, bentonite, calcium sulfate, magnesium sulfate, magnesium oxide; polysaccharides, 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 alkynaphthalenes, 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 alkoxylates, N-subsituted fatty acid amides, amine oxides, esters, sugar-based surfactants, polymeric surfactants, and mixtures thereof. Examples of alkoxylates are compounds such as alcohols, alkylphenols, amines, amides, arylphenols, fatty
acids or fatty acid esters which have been alkoxylated with 1 to 50 equivalents. Ethylene oxide
and/or propylene oxide may be employed for the alkoxylation, preferably ethylene oxide. Ex-
amples 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 al-
kylpolyglucosides. Examples of polymeric surfactants are homo- or copolymers of vinylpyrrroli-
done, 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 alkylbetaines 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 poly-
yethyleneamines.

Suitable adjuvants are compounds, which have a neglectable or even no pesticidal activity
themselves, and which improve the biological performance of the compound I 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 hexacyanofer-
rate) and organic colorants (e.g. alizarin-, azo- and phthalocyanine colorants).

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

The agrochemical compositions generally comprise between 0.01 and 95 %, preferably be-
tween 0.1 and 90 %, and in particular 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).

Solutions for seed treatment (LS), Suspoemulsions (SE), flowable concentrates (FS), powders for dry treatment (DS), water-dispersible powders for slurry treatment (WS), water-soluble powders (SS), emulsions (ES), emulsifiable concentrates (EC) and gels (GF) are usually employed for the purposes of treatment of plant propagation materials, particularly seeds. The compositions in question give, after two-to-tenfold dilution, active substance concentrations of from 0.01 to 60 % by weight, preferably from 0.1 to 40 % by weight, in the ready-to-use preparations. Application can be carried out before or during sowing. Methods for applying compound I and compositions thereof, respectively, on to plant propagation material, especially seeds include dressing, coating, pelleting, dusting, soaking and in-furrow application methods of the propagation material. Preferably, compound I or the compositions thereof, respectively, are applied on to the plant propagation material by a method such that germination is not induced, e. g. by seed dressing, pelleting, coating and dusting.

When employed in plant protection, the amounts of active substances applied are, depending on the kind of effect desired, from 0.001 to 2 kg per ha, preferably from 0.005 to 2 kg per ha, more preferably from 0.05 to 0.9 kg per ha, and in particular from 0.1 to 0.75 kg per ha.

In treatment of plant propagation materials such as seeds, e. g. by dusting, coating or drenching seed, amounts of active substance of from 0.1 to 1000 g, preferably from 1 to 1000 g, more preferably from 1 to 100 g and most preferably from 5 to 100 g, per 100 kilogram of plant propagation material (preferably seeds) are generally required. In some cases the amount for seed treatment may be up to 100 kilogram per 100 kilogram of seeds, or may even exceed the seed weight.

When used in the protection of materials or stored products, the amount of active substance applied depends on the kind of application area and on the desired effect. Amounts customarily applied in the protection of materials are 0.001 g to 2 kg, preferably 0.005 g to 1 kg, of active substance per cubic meter of treated material.

Various types of oils, wetters, adjuvants, fertilizer, or micronutrients, and further 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 active compound I and active compounds II (and optionally active compounds III), 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 active compound I and active compounds II and/or III, can be applied jointly (e.g. after tank mix) or consecutively.

Applications

The compound I and the one or more compound(s) II and/or III can be applied simultaneously, that is jointly or separately, or in succession, that is immediately one after another and thereby creating the mixture "in-situ" on the desired location, as e.g. the plant, the sequence, in the case of separate application, generally not having any effect on the result of the control measures.

The mixtures of the invention are employed as such or in form of compositions by treating the insects or the plants, plant propagation materials, such as seeds, soil, surfaces, materials or rooms to be protected from insecticidal attack with an insecticidally effective amount of the active compounds. The application can be carried out both before and after the infection of the plants, plant propagation materials, such as seeds, soil, surfaces, materials or rooms by the insects.

In the mixtures and compositions according to the invention, the weight ratio of the compound I and compound II or III generally depends from the properties of the compounds II or III used, usually it is in the range of from 1:100 to 100:1, regularly in the range of from 1:50 to 50:1, preferably in the range of from 1:20 to 20:1, more preferably in the range of from 1:10 to 10:1, even more preferably in the range of from 1:4 to 4:1 and in particular in the range of from 1:2 to 2:1.

According to further embodiments of the mixtures according to the invention, the weight ratio of compound I to compound II or III usually is in the range of from 100:1 to 1:1, regularly in the range of from 50:1 to 1:1, preferably in the range of from 20:1 to 1:1, more preferably in the range of from 10:1 to 1:1, even more preferably in the range of from 4:1 to 1:1 and in particular in the range of from 2:1 to 1:1.
According to further embodiments of the mixtures according to the invention, the weight ratio of compound I to compound II or III usually is in the range of from 1:1 to 1:100, regularly in the range of from 1:1 to 1:50, preferably in the range of from 1:1 to 1:20, more preferably in the range of from 1:1 to 1:10, even more preferably in the range of from 1:1 to 1:4 and in particular in the range of from 1:1 to 1:2.

In one embodiment compound 1 is used in excess as compared to compound II or III, i.e. the weight ratio of compound I to compound II or III usually is in the range of from 100:1 to 1:1, regularly in the range of from 50:1 to 1:1, preferably in the range of from 20:1 to 1:1, more preferably in the range of from 10:1 to 1:1, even more preferably in the range of from 4:1 to 1:1, e.g. of from 3:1 to 1:1, and in particular in the range of from 2:1 to 1:1.

In the ternary mixtures, i.e. compositions according to the invention comprising compound I (component 1) and a compound II (component 2) and a compound III (component 3), the weight ratio of component 1) and component 2) depends from the properties of the active substances used, usually it is in the range of from 1:100 to 100:1, regularly in the range of from 1:50 to 50:1, preferably in the range of from 1:20 to 20:1, more preferably in the range of from 1:10 to 10:1 and in particular in the range of from 4:1 to 4:1, and the weight ratio of component 1) and component 3) usually it is in the range of from 1:100 to 100:1, regularly in the range of from 1:50 to 50:1, preferably in the range of from 1:20 to 20:1, more preferably in the range of from 1:10 to 10:1 and in particular in the range of from 1:4 to 4:1.

Any further active components are, if desired, added in a ratio of from 20:1 to 1:20 to compound I.

In further embodiments of the invention the compound I and the one or more compound(s) II and/or III are applied in a weight ratio of from 500:1 to 1:100, preferably from 20:1 to 1:50, in particular from 5:1 to 1:20.

Depending on the desired effect, the application rates of the mixtures according to the invention are from 5 g/ha to 2000 g/ha, preferably from 50 to 1500 g/ha, in particular from 50 to 750 g/ha.

The mixtures according to the invention are effective through both contact and ingestion.

According to a preferred embodiment of the invention, the mixtures according to the present invention are employed via soil application. Soil application is especially favorable for use against ants, termites, crickets, or cockroaches.

According to another preferred embodiment of the invention, for use against non-crop pests such as ants, termites, wasps, flies, mosquitoes, crickets, locusts, or cockroaches the mixtures according to the present invention are prepared into a bait preparation.

The bait can be a liquid, a solid or a semisolid preparation (e.g. a gel).
Another aspect of the present invention is when preparing the mixtures, it is preferred to employ the pure active compounds I and II, to which further active compounds, e.g. against harmful fungi or having herbicidal activity, or growth-regulating agents or fertilizers can be added.

Compositions of this invention may further contain other active ingredients than those listed above. For example fungicides, herbicides, fertilizers such as ammonium nitrate, urea, potash, and superphosphate, phytotoxicants and plant growth regulators and safeners. These additional ingredients may be used sequentially or in combination with the above-described compositions, if appropriate also added only immediately prior to use (tank mix). For example, the plant(s) may be sprayed with a composition of this invention either before or after being treated with other active ingredients.

The mixtures according to the invention can be applied to any and all developmental stages, such as egg, larva, pupa, and adult. The pests may be controlled by contacting the target pest, its food supply, habitat, breeding ground or its locus with a pesticidally effective amount of the inventive mixtures or of compositions comprising the mixtures.

"Locus" means a plant, seed, soil, area, material or environment in which a pest is growing or may grow.

In general, "pesticidally effective amount" means the amount of the inventive mixtures or of compositions comprising the mixtures 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 mixtures and/or compositions used in the invention. A pesticidally effective amount of the mixtures and/or 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.

The inventive mixtures or compositions of these mixtures can also be employed for protecting plants from attack or infestation by insects, acarids or nematodes comprising contacting a plant, or soil or water in which the plant is growing.

The inventive mixtures are effective through both contact (via soil, glass, wall, bed net, carpet, plant parts or animal parts), and ingestion (bait, or plant part) and through trophallaxis and transfer.

Preferred application methods are into water bodies, via soil, cracks and crevices, pastures, manure piles, sewers, into water, on floor, wall, or by perimeter spray application and bait.
According to another preferred embodiment of the invention, for use against non-crop pests such as ants, termites, wasps, flies, mosquitoes, crickets, locusts, or cockroaches the inventive mixtures are prepared into a bait preparation.

The bait can be a liquid, a solid or a semisolid preparation (e.g. a gel). The bait employed in the composition is a product which is sufficiently attractive to incite insects such as ants, termites, wasps, flies, mosquitoes, crickets etc. or cockroaches to eat it. This attractant may be chosen from feeding stimulants or para and / or sex pheromones readily known in the art.

Methods to control infectious diseases transmitted by insects (e.g. malaria, dengue and yellow fever, lymphatic filariasis, and leishmaniasis) with the inventive mixtures and their respective compositions also comprise treating surfaces of huts and houses, air spraying and impregnation of curtains, tents, clothing items, bed nets, tsetse-fly trap or the like. Insecticidal compositions for application to fibers, fabric, knit goods, non-wovens, netting material or foils and tarpaulins preferably comprise a composition including the inventive mixtures, optionally a repellent and at least one binder.

The inventive mixtures and the compositions comprising them can be used for protecting wooden materials such as trees, board fences, sleepers, etc. and buildings such as houses, out-houses, factories, but also construction materials, furniture, leathers, fibers, vinyl articles, electric wires and cables etc. from ants and/or termites, and for controlling ants and termites from doing harm to crops or human being (e.g. when the pests invade into houses and public facilities).

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

Customary application rates in the protection of materials are, for example, from 0.01 g to 1000 g of active compound(s) per m² treated material, desirably from 0.1 g to 50 g per m².

Insecticidal compositions for use in the impregnation of materials typically contain from 0.001 to 95 weight %, preferably from 0.1 to 45 weight %, and more preferably from 1 to 25 weight % of at least one repellent and / or insecticide.

For use in bait compositions, the typical content of active ingredient(s) is from 0.0001 weight % to 15 weight %, desirably from 0.001 weight % to 5 weight % of active compound. The composition used may also comprise other additives such as a solvent of the active material, a flavoring agent, a preserving agent, a dye or a bitter agent. Its attractiveness may also be enhanced by a special color, shape or texture.
For use in spray compositions, the content of the mixture of the active ingredients is from 0.001 to 80 weight %, preferably from 0.01 to 50 weight % and most preferably from 0.01 to 15 weight %.

For use in treating crop plants, the rate of application of the mixture of the active ingredients of this invention may be in the range of 0.1 g to 4000 g per hectare, desirably from 25 g to 600 g per hectare, more desirably from 50 g to 500 g per hectare.

In the context of the present invention, the term plant refers to an entire plant, a part of the plant or the plant propagation material.

The mixtures of the present invention and the compositions comprising them are particularly important in the control of a multitude of insects on various cultivated plants.

Plants which can be treated with the inventive mixtures include all genetically modified plants or transgenic plants, e.g. crops which tolerate the action of herbicides or fungicides or insecticides owing to breeding, including genetic engineering methods, or plants which have modified characteristics in comparison with existing plants, which can be generated for example by traditional breeding methods and/or the generation of mutants, or by recombinant procedures.

The term "plant propagation material" is to be understood to denote 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 mentioned. These young plants may also be protected before transplantation by a total or partial treatment by immersion or pouring.

The term "cultivated plants" is to be understood as including plants which have been modified by breeding, mutagenesis or genetic engineering. Genetically modified plants are plants, which genetic material has been so modified by the use of recombinant DNA techniques that under natural circumstances cannot be obtained by cross breeding, mutations or natural recombination. Typically, 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.

The term "cultivated plants" is to be understood also including plants that have been rendered tolerant to applications of specific classes of herbicides, such as hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors; acetolactate synthase (ALS) inhibitors, such as sulfonyle ureas (see e.g. US 6,222,100, WO 01/82685, WO 00/26390, WO 97/41218, WO 98/02526, WO 98/02527, WO 04/106529, WO 05/20673, WO 03/14357, WO 03/13225, WO 03/14356, WO 04/16073) or imidazolinones (see e.g. US 6,222,100, WO 01/82685, WO 00/26390, WO 97/41218, WO 98/02526, WO 98/02527, WO 04/106529, WO 05/20673, WO 03/14357, WO 03/13225, WO 03/14356, WO 04/16073); enolpyruvylshikimate-3-phosphate synthase (EPSPS) inhibitors, such
as glyphosate (see e.g. WO 92/00377); glutamine synthetase (GS) inhibitors, such as glufosinate (see e.g. EP-A-0242236, EP-A-242246) or oxyth herbicides (see e.g. US 5,559,024) as a result of conventional methods of breeding or genetic engineering. Several cultivated plants have been rendered tolerant to herbicides by conventional methods of breeding (mutagenesis), for example Clearfield® summer rape (Canola) being tolerant to imidazolinones, e.g. imazamox. Genetic engineering methods have been used to render cultivated plants, such as soybean, cotton, corn, beets and rape, tolerant to herbicides, such as glyphosate and glufosinate, some of which are commercially available under the trade names RoundupReady® (glyphosate) and LibertyLink® (glufosinate).

The term "cultivated plants" is to be understood also including plants that are by the use of recombinant DNA techniques capable to synthesize one or more insecticidal proteins, especially those known from the bacterial genus Bacillus, particularly from Bacillus thuringiensis, such as α-endotoxins, e.g. CryIA(b), CryIA(c), CryIF, CryF(a2), CryIIA(b), CryIIIA, CryIIB(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.; toxins produced by animals, such as scorpion toxins, arachnid toxins, wasp toxins, or other insect-specific neurotoxins; toxins produced by fungi, such Streptomycetes toxins, plant lectins, such as pea or barley lectins; agglutinins; proteinase inhibitors, such as trypsin inhibitors, serine protease inhibitors, patatin, cystatin or papain inhibitors; ribosome-inactivating proteins (RIP), such as ricin, maiz-RIP, abrin, luffin, saporin or bryodin; steroid metabolism enzymes, such as 3-hydroxysteroid oxidase, ecdysteroid-IDP-glycosyl-transferase, cholesterol oxidases, ecdysone inhibitors or HMG-CoA-reductase; ion channel blockers, such as blockers of sodium or calcium channels; juvenile hormone esterase; diuretic hormone receptors (helicokinin receptors); stilbene synthase, bibenzyl synthase, chitinases or glucanases. In the context of the present invention these insecticidal proteins or toxins are to be understood expressly also as pre-toxins, hybrid proteins, truncated or otherwise modified proteins. Hybrid proteins are characterized by a new combination of protein domains, (see, for example WO 02/015701). Further examples of such toxins or genetically-modified plants capable of synthesizing such toxins are disclosed, for example, in EP-A 374 753, WO 93/007278, WO 95/34656, EP-A 427 528, EP-A 451 878, WO 03/018810 und WO 03/052073. The methods for producing such genetically modified plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. These insecticidal proteins contained in the genetically modified plants impart to the plants producing these proteins tolerance to harmful pests from all taxonomic groups of insects, especially to beetles (Coleoptera), two-winged insects (Diptera), and butterflies (Lepidoptera).

The term "cultivated plants" is to be understood also including plants that are by the use of recombinant DNA techniques capable to synthesize one or more proteins to increase the resistance or tolerance of those plants to bacterial, viral or fungal pathogens. Examples of such proteins are the so-called "pathogenesis-related proteins" (PR proteins, see, for example EP-A 0 392 225), plant disease resistance genes (for example potato cultivars, which express resistance genes acting against Phytophthora infestans derived from the mexican wild potato So-
Ilanum bulbocastanum) or T4-lysozym (e.g. potato cultivars capable of synthesizing these proteins with increased resistance against bacteria such as Erwinia amylovora). The methods for producing such genetically modified plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

The term “cultivated plants” is to be understood also including plants that are by the use of recombinant DNA techniques capable to synthesize one or more proteins to increase the productivity (e.g. bio mass production, grain yield, starch content, oil content or protein content), tolerance to drought, salinity or other growth-limiting environmental factors or tolerance to pests and fungal, bacterial or viral pathogens of those plants.

The term “cultivated plants” is to be understood also including plants that contain by the use of recombinant DNA techniques a modified amount of substances of content or new substances of content, specifically to improve human or animal nutrition, for example oil crops that produce health-promoting long-chain omega-3 fatty acids or unsaturated omega-9 fatty acids (e.g. Nexera® rape).

The term “cultivated plants” is to be understood also including plants that contain by the use of recombinant DNA techniques a modified amount of substances of content or new substances of content, specifically to improve raw material production, for example potatoes that produce increased amounts of amyllopectin (e.g. Amflora® potato).

Some of the mixtures of the invention have systemic action and can therefore be used for the protection of the plant shoot against foliar pests as well as for the treatment of the seed and roots against soil pests.

Seed treatment

Mixtures according to the present invention with systematic action are suitable for the treatment of seeds in order to protect the seed from insect pest, in particular from soil-living insect pests and the resulting plant’s roots and shoots against soil pests and foliar insects.

The protection of the resulting plant’s roots and shoots is preferred.

More preferred is the protection of resulting plant’s shoots from piercing and sucking insects.

The present invention therefore comprises a method for the protection of seeds from insects, in particular from soil insects and of the seedlings’ roots and shoots from insects, in particular from soil and foliar insects, said method comprising contacting the seeds before sowing and/or after pregermination with mixtures according to the present invention. Particularly preferred is a method, wherein the plant’s roots and shoots are protected, more preferably a method, wherein the plants shoots are protected from piercing and sucking insects, most preferably a method, wherein the plants shoots are protected from aphids.
The term seed embraces seeds and plant propagules of all kinds including but not limited to true seeds, seed pieces, suckers, corns, bulbs, fruit, tubers, grains, cuttings, cut shoots and the like and means in a preferred embodiment true seeds.

The term seed treatment comprises all suitable seed treatment techniques known in the art, such as seed dressing, seed coating, seed dusting, seed soaking and seed pelleting.

The present invention also comprises seeds coated with or containing the active compound(s). The term “coated with and/or containing” generally signifies that the active ingredient(s) are 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 seeds are seeds 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 mixtures according to the invention may also be used for the treatment seeds from plants, which tolerate the action of herbicides or fungicides or insecticides owing to breeding, including genetic engineering methods.

For example, the active mixtures can be employed in treatment of seeds from plants, which are resistant to herbicides from the group consisting of the sulfonylureas, imidazolinones, glufosinate-ammonium or glyphosate-isopropylammonium and analogous active substances (see for example, EP-A-0242236, EP-A-242246) (WO 92/00377) (EP-A-0257993, U.S. Pat. No. 5,013,659) or in transgenic crop plants, for example cotton, with the capability of producing Bacillus thuringiensis toxins (Bt toxins) which make the plants resistant to certain pests (EP-A-0142924, EP-A-0193259).

Furthermore, the mixtures according to the present invention can be used also for the treatment of seeds from plants, which have modified characteristics in comparison with existing plants consist, which can be generated for example by traditional breeding methods and/or the generation of mutants, or by recombinant procedures). For example, a number of cases have been described of recombinant modifications of crop plants for the purpose of modifying the starch synthesized in the plants (e.g. WO 92/11376, WO 92/14827, WO 91/19806) or of transgenic crop plants having a modified fatty acid composition (WO 91/13972).
The seed treatment application of the mixtures is carried out by spraying or by dusting the seeds before sowing of the plants and before emergence of the plants.

In the treatment of seeds the corresponding formulations are applied by treating the seeds with an effective amount of the mixture according to the present invention. Herein, the application rates of the active compound(s) 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, in particular from 1 g to 2.5 kg per 100 kg of seed. For specific crops such as lettuce the rate can be higher.

Compositions, which are especially useful for seed treatment, are e.g.:

A Soluble concentrates (SL, LS)
D Emulsions (EW, EO, ES)
E Suspensions (SC, OD, FS)
F Water-dispersible granules and water-soluble granules (WG, SG)
G Water-dispersible powders and water-soluble powders (WP, SP, WS)
H Gel-Formulations (GF)
I Dustable powders (DP, DS)

Conventional seed treatment formulations include for example flowable concentrates FS, solutions LS, 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.

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(s), 1-200 g/l Surfactant, 0 to 200 g/l antifreeze 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.

Preferred FS formulations of compounds of formula I for seed treatment usually comprise from 0.1 to 80 % by weight (1 to 800 g/l) of the active ingredient(s), 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.

Seed treatment formulations may additionally also comprise binders and optionally colorants.

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Binders can be added to improve the adhesion of the active materials on the seeds after treatment. Suitable binders are block copolymers EO/PO surfactants but also polyvinylalcohols, polyvinylpyrrolidones, polyacrylates, polymethacrylates, polybutenes, polyisobutenes, polystyrene, polyethyleneamines, polyethyleneamides, polyethyleneimines (Lupasol®, Polymin®), polyethers, polyurethans, polyvinylacetate, tylose and copolymers derived from these polymers.

Optionally, also colorants can be included in the formulation. Suitable colorants or dyes for seed treatment formulations are Rhodamin B, C.I. Pigment Red 112, C.I. Solvent Red 1, pigment blue 15:4, pigment blue 15:3, pigment blue 15:2, pigment blue 15:1, pigment blue 80, pigment yellow 1, pigment yellow 13, pigment red 112, pigment red 48:2, pigment red 48:1, pigment red 57:1, pigment red 53:1, pigment orange 43, pigment orange 34, pigment orange 5, pigment green 36, pigment green 7, pigment white 6, pigment brown 25, basic violet 10, basic violet 49, acid red 51, acid red 52, acid red 14, acid blue 9, acid yellow 23, basic red 10, basic red 108.

The invention also relates to seed comprising mixtures according to the present invention. The amount of the compound I or the agriculturally useful salt thereof will in general vary from 0.1 g to 100 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, e.g. such as lettuce, the rate can be higher. Also in some other cases the amount for seed treatment may be up to 100 kilogram of the active compound(s) per 100 kilogram of seeds, or may even exceed the seed weight.

Examples

A. Compounds

Bilobalide, ginkgolide A, ginkgolide B, ginkgolide C and ginkgolide J are commercially available (e.g. from Interchim).

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):

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

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

1. A method for controlling pests from the family of Pentatomidae, comprising the step of contacting the pests, their food supply, habitat or breeding grounds with a pesticidal mixture comprising as active compounds

1) at least one compound I, which is a component of the ginkgo tree selected from the group consisting of bilobalide, ginkgolide A, ginkgolide B, ginkgolide C, ginkgolide J and ginkgolide M,

and

2) at least one pesticidally active compound II selected from group M consisting of

II-M.1 Acetylcholine esterase (AChE) inhibitors from the class of carbamates, for example aldicarb, alanycarb, bendiocarb, benfuracarb, butoxcarb, butoxycarb, carbaryl, carbofuran, carbosulfan, ethiofencarb, fenobucarb, formetanate, furathiocarb, isoprocarb, methiocarb, methomyl, metolcarb, oxamyl, pirimicarb, propoxur, thiodicarb, thiofanox, trimethacarb, XMC, xylcarb and triazamate; or from the class of

II-M.1A organophosphates, for example acephate, azamethiphos, azinphos-ethyl, azinphosmethyl, cadusafos, chlorethoxyfos, chlorfenvinphos, chlormethoephos, chlorpyrifos, chlorpyrifos-methyl, coumaphos, cyanophos, demeton-S-methyl, diazinon, dichlorvos/ DDVP, dicrotophos, dimethoate, dimethlyphos, disulfoton, EPN, ethion, ethophos, 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, phosphet, phosphamidon, phoxim, pirimiphos- methyl, profenofos, propetamphos, prothiofos, pyraclfos, pyridaphenthion, quinalphos, sulprofen, tebufenoz, temephos, terbufos, tetrachlorvinphos, thiometon, triazophos, trichlorfon and vanidothion;

II-M.2 GABA-gated chloride channel antagonists such as:

II-M.2A cyclodiene organochlorine compounds, as for example endosulfan or chlor dane; or

II-M.2B fiproles (phenylpyrazoles), as for example ethiprole, fipronil, flupirel, pyra fluore and pyrirole;

M.3 Sodium channel modulators from the class of

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M.3A pyrethroids, for example acrinathrin, allethrin, d-cis-trans allethrin, d-trans allethrin, bifenthrin, bioallethrin, bioallethrin S-cyclopropenyl, 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, phenothon, prallethrin, profluthrin, pyrethrin (pyrethrum), resmethrin, silafluofen, tefluthrin, tetramethylylfluthrin, tetramethrin, tralomethrin and transfluthrin; or

M.3B sodium channel modulators such as DDT or methoxychlor;

II-M.4 Nicotinic acetylcholine receptor agonists (nAChR) from the class of
II-M.4A neonicotinoids, for example acetamiprid, chlothianidin, cycloxaprid, dinoter-
furan, imidacloprid, nitenpyram, thiacloprid and thiamethoxam; or the com-
ounds
II-M.4A.2: (2E)-1-[(6-Chloropyridin-3-yl)methyl]-N'-nitro-2-
pentyliidenehydrazinecarboximidamide; or
II-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
II-M.4B nicotine;

II-M.5 Nicotinic acetylcholine receptor allosteric activators from the class of spi-
inosyns, for example spinosad or spinetoram;

II-M.6 Chloride channel activators from the class of avermectins and milbemycins, for example abamectin, emamectin benzoate, ivermectin, lepimectin or mil-
bemectin;

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

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

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

II-M.10  Mite growth inhibitors, including
II-M.10A clofentezine, hexythiazox and difludazin, or
II-M.10B etoxazole;

II-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;

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

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

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

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

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

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

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

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

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

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

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

II-M.23 Inhibitors of the of acetyl CoA carboxylase, such as tetronic and tetramic acid derivatives, for example spirodiclofen, spiromesifen or spirotetramat;

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

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

II-M.28 Ryanodine receptor-modulators from the class of diamides, as for example flubendiamide, chlorantraniliprole (rynaxypyr®), cyantraniliprole (cyazypyr®), or the phthalamide compounds
II-M.28.1: (R)-3-Chloro-N1-[2-methyl-4-[(1,2,2,2-tetrafluor-1-(trifluoromethyl)ethyl]phenyl]-N2-(1-methyl-2-methylsulfonylethyl)phthalamid and
II-M.28.2: (S)-3-Chloro-N1-[2-methyl-4-[(1,2,2,2-tetrafluor-1-(trifluoromethyl)ethyl]phenyl]-N2-(1-methyl-2-methylsulfonylethyl)phthalamid, or the compound
II-M.28.3: 3-bromo-N-[2-bromo-4-chloro-6-[(1-cyclopropylethyl)carbamoyl]phenyl]-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (proposed ISO name: cyclaniliprole), or the compound
II-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-dimethylhydrazinecarboxylate; or a compound selected from M.28.5a) to M.28.5l):
II-M.28.5a) N-[4,6-dichloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;
II-M.28.5b) N-[4-chloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-6-methyl-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

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II-M.28.5c) N-[4-chloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-6-methylphenyl]-2-(3-chloro-2-pyridyl)-5(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5d) N-[4,6-dichloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5e) N-[4,6-dichloro-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5f) N-[4,6-dibromo-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5g) N-[4-chloro-2-[(di-2-propyl-lambda-4-sulfanylidene)carbamoyl]-6-cyanophenyl]-2-(3-chloro-2-pyridyl)-5(trifluoromethyl)pyrazole-3-carboxamide;

II-M.28.5h) N-[4,6-dibromo-2-[(diethyl-lambda-4-sulfanylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5(trifluoromethyl)pyrazole-3-carboxamide;

II-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;

II-M.28.5j) 3-Chloro-1-(3-chloro-2-pyridinyl)-N-[2,4-dichloro-6-[[1-cyano-1-methyllethyl]amino]carbonyl]phenyl]-1H-pyrazole-5-carboxamide;

II-M.28.5k) 3-Bromo-N-[2,4-dichloro-6-(methylcarbamoyl)phenyl]-1-(3,5-dichloro-2-pyridyl)-1H-pyrazole-5-carboxamide;

II-M.28.5l) N-[4-Chloro-2-[[1,1-dimethyllethyl]amino]carbonyl]-6-methylphenyl]-1-(3-chloro-2-pyridinyl)-3(4-fluoromethoxy)-1H-pyrazole-5-carboxamide; or a compound selected from

II-M.28.6: N-(2-cyanopropan-2-yl)-N-(2,4-dimethylphenyl)-3-iodobenzene-1,2-dicarboxamide; or

II-M.28.7: 3-Chloro-N-(2-cyanopropan-2-yl)-N-(2,4-dimethylphenyl)-benzene-1,2-dicarboxamide;

II-M.28.8a) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-3-[5-(trifluoromethyl)-2H-tetrazol-2-yl]methyl]-1H-pyrazole-5-carboxamide (proposed ISO name: tetraaniilprole); or

II-M.28.8b) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-3-[5-(trifluoromethyl)-1H-tetrazol-1-yl]methyl]-1H-pyrazole-5-carboxamide;

II-M.UN Insecticidally active compounds of unknown or uncertain mode of action, as for example afidopyropen, afoxolaner, azadirachtin, amidoflumet, benzoate, bifencinate, bromopropylate, chinomethionat, cryolute, dicofol, fluferinim, flometoquin, flusulofone, fluopyram, flupyradifurone, fluralaner, metoxadiazone, piperonyl butoxide, pyflubumide, pyridalyl, pyrifluquinazon, sulfoxaflor, tioxazafen, triflumezopyrim, or the compounds

II-M.UN.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

II-M.UN.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
II-M.UN.5: 1-[2-fluoro-4-methyl-5-[(2,2,2-trifluoroethyl)sulfinyl]phenyl]-3-( trifluoromethyl)-1H-1,2,4-triazole-5-amine; or a compound selected from the group of M.UN.6, wherein the compound is selected from M.UN.6a) to M.UN.6k):

II-M.UN.6a) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridyldiene]-2,2,2-trifluoroacetamide;

II-M.UN.6b) (E/Z)-N-[1-[(6-chloro-5-fluoro-3-pyridyl)methyl]-2-pyridyldiene]-2,2,2-trifluoroacetamide;

II-M.UN.6c) (E/Z)-2,2,2-trifluoro-N-[1-[(6-fluoro-3-pyridyl)methyl]-2-pyridyldiene]acetamide;

II-M.UN.6d) (E/Z)-N-[1-[(6-bromo-3-pyridyl)methyl]-2-pyridyldiene]-2,2,2-trifluoroacetamide;

II-M.UN.6e) (E/Z)-N-[1-[(6-chloro-3-pyridyl)ethyl]-2-pyridyldiene]-2,2,2-trifluoroacetamide;

II-M.UN.6f) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridyldiene]-2,2-difluoroacetamide;

II-M.UN.6g) (E/Z)-2-chloro-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridyldiene]-2,2-difluoroacetamide;

II-M.UN.6h) (E/Z)-N-[1-[(2-chloropyrimidin-5-yl)methyl]-2-pyridyldiene]-2,2,2-trifluoroacetamide;

II-M.UN.6i) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridyldiene]-2,2,3,3,3-pentafluoropropanamide.;

II-M.UN.6j) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridyldiene]-2,2,2-trifluoro-thioacetamide or of the compound

II-M.UN.6k) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridyldiene]-2,2,2-trifluoro-N'-isopropylacetamidine or the compounds

II-M.UN.8: 8-chloro-N-[2-chloro-5-methoxyphenyl]sulfonyl]-6-trifluoromethyl-imidazo[1,2-a]pyridine-2-carboxamide; or

II-M.UN.9: 4-[5-(3,5-dichlorophenyl)-5-(trifluoromethyl)-4H-isoazol-3-yl]-2-methyl-N-(1-oxothietan-3-yl)benzamide; or

II-M.UN.10: 5-[3-(2,6-dichloro-4-(3,3-dichloroallyloyloxy)phenoxy)propoxy]-1H-pyrazole; or a compound selected from the group of M.UN.12, wherein the compound is selected from M.UN.12a) to M.UN.12m):

II-M.UN.12.a) 2-(1,3-Dioxan-2-yl)-6-[(2-(3-pyridinyl))-5-thiazolyl]-pyridine;

II-M.UN.12.b) 2-[6-[(5-Fluoro-3-pyridinyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine;

II-M.UN.12.c) 2-[6-[(3-Pyridinyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine;

II-M.UN.12.d) N-Methylsulfonyl-6-[(2-(3-pyridyl)]thiazol-5-yl]pyridine-2-carboxamide

II-M.UN.12.e) N-Methylsulfonyl-6-[(2-(3-pyridyl)]thiazol-5-yl]pyridine-2-carboxamide

II-M.UN.12.f) N-Ethyl-N-[4-methyl-2-(3-pyridyl)]thiazol-5-yl)-3-methylthio-propanamide

II-M.UN.12.g) N-Methyl-N-[4-methyl-2-(3-pyridyl)]thiazol-5-yl)-3-methylthio-propanamide

II-M.UN.12.h) N,2-Dimethyl-N-[4-methyl-2-(3-pyridyl)]thiazol-5-yl)-3-methylthio-propanamide

II-M.UN.12.i) N-Ethyl-2-methyl-N-[4-methyl-2-(3-pyridyl)]thiazol-5-yl]-3-methylthio-propanamide

II-M.UN.12.j) N-[4-Chloro-2-(3-pyridyl)]thiazol-5-yl]-N-ethyl-2-methyl-3-methylthio-propanamide
II-M.UN.12.k) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N,2-dimethyl-3-methylthio-
propanamide
II-M.UN.12.l) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-methyl-3-methylthio-propanamide
II-M.UN.12.m) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-3-methylthio-propanamide; or
the compound
II-M.UN.13: 2-(4-methoxyiminocyclohexyl)-2-(3,3,3-trifluoropropylsulfonyl)acetonitrile; or
the compounds
II-M.UN.14a) 1-[(6-Chloro-3-pyridinyl)methyl]-1,2,3,5,6,7-hexahydro-5-methoxy-7-methyl-
8-nitro-imidazo[1,2-a]pyridine; or
II-M.UN.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 compound
II-M.UN.15: 1-[(2-Chloro-1,3-thiazol-5-yl)methyl]-3-(3,5-dichlorophenyl)-9-methyl-4-oxo-
4H-pyrido[1,2-a]pyrimidin-1-ium-2-oiate; or

II-M.BP Biocides, being pesticidal compounds of biological origin with insecticidal,
acaricidal, molluscidal and/or nematicidal activity, including
II-M.BP-1: Microbial pesticides: Bacillus firmus, B. thuringiensis ssp. israelensis, B. t. ssp.
galliae, B. t. ssp. kurstaki, Beauveria bassiana, Burkholderia sp., Chromobacterium
subtsugae, Cydia pomonella granulosis virus, Isaria fumosorosea,
Lecanicillium longisporum, L. muscarium (formerly Verticillium lecanii), Metarhizium anisopliae, M. anisopliae var. acridum, Paecilomyces fumosoroseus,
P. lilacinus, Paenibacillus popilliae, Pasteuria spp., P. nishizawai, P. rene-
formis, P. usagae, Pseudomonas fluorescens, Steinernema feltiae, Streptococcus galbus; or

II-M.BP-2: Biochemical pesticides: L-carvone, citral, (E,Z)-7,9-dodecadien-1-yl acetate,
ethyl formate, (E,Z)-2,4-ethyl decadienoate (pear ester), (Z,Z,E)-7,11,13-
hexadecatrienial, heptyl butyrate, isopropyl myristate, lanuylnol seneicatoe, 2-
methyl 1-butanol, methyl eugenol, methyl jasmonate, (E,Z)-2,13-
octadecadien-1-ol, (E,Z)-2,13-octadecadien-1-ol acetate, (E,Z)-3,13-
octadecadien-1-ol, R-1-octen-3-ol, pentatermanone, potassium silicate, sorbi-
tol acetanoate, (E,Z)-3,8,11-tetradecatrienyl acetate, (Z,E)-9,12-
tetradecadien-1-yl acetate, Z-7-tetradecen-2-one, Z-9-tetradecen-1-yl acetate,
Z-11-tetradecenal, Z-11-tetradecen-1-ol, Acacia negra extract, extract of
grapefruit seeds and pulp, extract of Chenopodium ambrosioidae, Catnip oil,
Neem oil, Quillay extract, Tagetes oil,

and/or

at least one fungicidally active compound III selected from group F consisting of:

F.I) Respiration inhibitors

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F.I 1) Inhibitors of complex III at Q₀ site (e.g. strobilurins): azoxystrobin, coumestroxystrobin, coumoxystrobin, dimoxystrobin, enestroburin, fenaminstrob, fenoxystrobin/flufenoxystrobin, fluoxastrob, kresoxim-methyl, mandestrobine, metominostrob, orybasstrobin, picoxystrobin, pyraclostrob, pyrametostrob, pyraoxystrobin, trifloxystrobin and 2-(2-(3-(2,6-dichlorophenyl)-1-methylallylidenanoinooxymethyl)-phenyl)-2-methoxyimino-N-methyl-acetamide, pyribencarb, triclopyricarb/chlorodincarb, famoxadone, fenamidone;

F.I 2) inhibitors of complex III at Q site: cyazofamid, amisulbrom, [(3S,6S,7R,8R)-8-benzyl-3-[(3-acetoxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-acetoxy-methoxy)4-methoxy-pyridine-2-carbonyl]amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-isobutoxy-carbonyloxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(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-dioxan-7-yl] 2-methylpropanoate; (3S,6S,7R,8R)-3-[(3-hydroxy-4-methoxy-2-pyridinyl)carbonyl]amino]-6-methyl-4,9-dioxo-8-(phenylmethyl)-1,5-dioxan-7-yl 2-methylpropanoate;

F.I 3) inhibitors of complex II (e.g. carboxamides): benodanil, benzovindiflupyr, bixafen, boscalid, carboxin, fenfuram, fluopyram, flutolanil, fluxapyroxad, furametpyr, isofetamid, isopyrazam, mepronil, oxycarboxin, penflufen, penthiopyrad, sedaxane, tecloftalam, thifluzamide, N-(4'-trifluoromethylthiophenyl-2-yl)-3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxamide, N-(2-(1,3,3-trimethyl-butyl)-phenyl)-1,3-dimethyl-5-fluoro-1H-pyrazole-4-carboxamide, 3-(difluoromethyl)-1-methyl-N(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, 3-(trifluoromethyl)-1-methyl-N(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, 1,3-dimethyl-N(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, 3-(trifluoromethyl)-1,5-dimethyl-N(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, 1,3,5-trimethyl-N(1,1,3-trimethylindan-4-yl)pyrazole-4-carboxamide, N-(7-fluoro-1,1,3-trimethyl-indan-4-yl)-3-dimethyl-pyrazole-4-carboxamide, N-[2-(2,4-dichlorophenyl)-2-methoxy-1-methyl-ethyl]-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide, N-[2-(2,4-difluorophenyl)phenyl]-3-(trifluoromethyl)pyrazine-2-carboxamide;

F.I 4) other respiration inhibitors (e.g. complex I, uncouplers): diflumetorim, (5,8-difluoroquinazolin-4-yl)-2-[2-fluoro-4-(3-trifluoromethyl-pyridin-2-yloxy)-phenyl]-ethyl]-amine; nitrophenyl derivates: binapacryl, dinobuton, dinocap, fluazinam; ferimzone; organometal compounds: fentin salts, such as fentin-acetate, fentin chloride or fentin hydroxide; ametoctran; and silthiofam;

F.II) Sterol biosynthesis inhibitors (SBI fungicides)

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F.II 1) C14 demethylase inhibitors (DMI fungicides): triazoles: azaconazole, bitertanol, bromuconazole, cyproconazole, difenoconazole, diniconazole, diniconazole-M, epoxiconazole, fenbuconazole, fluquinconazole, flusilazole, flutriafol, hexaconazole, imibenconazole, ipconazole, metconazole, myclobutanil, oxpoconazole, paclobutrazole, penconazole, propiconazole, prothioconazole, simeconazole, tebuconazole, tetciconazole, triadimefon, triadimenol, triticonazole, uniconazole,
1-[rel-(2S;3R)-3-(2-chlorophenyl)-2-(4-difluorophenyl)-oxiranyl methyl]-5-thiocyanato-1H-[1,2,4]triazole, 2-[rel-(2S;3R)-3-(2-chlorophenyl)-2-(4-difluorophenyl)-oxiranylmethyl]-2H-[1,2,4]triazole-3-thiol, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol, 1-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-cyclopropyl-2-(1,2,4-triazol-1-yl)ethanol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol; imidazoles: imazalil, metalazal, prochloraz, trifloxizol; pyrimidines, pyridines and piperazines: fenarimol, nufurimol, pyriflurom, triforine, [3-(4-chloro-2-fluorophenyl)-5-(2,4-difluorophenyl)]isoazol-4-yl]-[3-pyridyl]methanol;

F.II 2) Delta14-reductase inhibitors: aldimorph, dodemorph, dodemorph-acetate, fenpropimorph, tridemorph, fenpropidin, piperalin, spiroxamine;

F.II 3) Inhibitors of 3-keto reductase: fenhexamid;

F.III) Nucleic acid synthesis inhibitors

F.III 1) phenylamides or acyl amino acid fungicides: benalaxyl, benalaxyl-M, kiraxayl, metalaxyl, metalaxyl-M (mefenoxam), ofurace, oxadixyl;

F.III 2) others: hymexazol, ochthilinone, oxolinic acid, bupirimate, 5-fluorocytosine, 5-fluoro-2-(p-tolylmethoxy)pyrimidin-4-amine, 5-fluoro-2-(4-fluorophenylmethoxy)pyrimidin-4-amine;

F.IV) Inhibitors of cell division and cytoskeleton

F.IV 1) tubulin inhibitors, such as benzimidazoles, thiophanates: benomyl, carbendazim, fuberidazole, thiabendazole, thiophanate-methyl; triazolopyrim-
idines: 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)-[1,2,4]triazolo[1,5-a]pyrimidine;

other cell division inhibitors: diethofencarb, ethaboxam, pencycluron, fluopicolide, zoxamide, metrafenone, pyriofenone;

Inhibitors of amino acid and protein synthesis

methionine synthesis inhibitors (anilino-pyrimidines): cyprodinil, mepanipyrim, pyrimethanil;

protein synthesis inhibitors: blastidin-S, kasugamycin, kasugamycin hydrochloride-hydrate, mildiomycin, streptomycin, oxytetracyclin, polyoxine, valdamiycin A;

Signal transduction inhibitors

MAP / histidine kinase inhibitors: fluoroimid, iprodione, procymidone, vinclozolin, fenpiclonil, fludioxonil;

G protein inhibitors: quinoxyfen;

Lipid and membrane synthesis inhibitors

Phospholipid biosynthesis inhibitors: edifenphos, iprobenfos, pyrazophos, isoprothiolane;

lipid peroxidation: dicloran, quintezone, tecnazene, tolclofos-methyl, biphenyl, chloroneb, etridiazole;

phospholipid biosynthesis and cell wall deposition: dimethomorph, flumorph, mandipropamid, pyrimorph, benthiavalicarb, iprovalicarb, valifenalate and N-(1-(4-cyano-phenyl)ethanesulfonyl)-but-2-yl) carbamic acid-(4-fluorophenyl) ester;

compounds affecting cell membrane permeability and fatty acides: propamocarb, propamocarb-hydrochlorid;

fatty acid amide hydrolase inhibitors: oxathiapiprolin;

Inhibitors with Multi Site Action

inorganic active substances: Bordeaux mixture, copper acetate, copper hydroxide, copper oxychloride, basic copper sulfate, sulfur;
thio- and dithiocarbamates: ferbam, mancozeb, manebe, metam, metiram, pro-
pineb, thiram, zineb, ziram;

organochlorine compounds (e.g. phthalimides, sulfamides, chloronitrides):
aniazine, chlorothalonil, captafol, captan, folpet, dichlofluanid, dichlorphen,
hexachlorobenzene, pentachlorphenole and its salts, phthalide, tolylfluanid, N-
(4-chloro-2-nitro-phenyl)-N-ethyl-4-methyl-benzenesulfonamide;

guanidines and others: guanidine, dodine, dodine free base, guazatine,
guazatine-acetate, iminoctadine, iminoctadine-triacetate, iminoctadine-
tris(alsbesilate), dithianon, 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-
c']dipyrrrole-1,3,5,7(2H,6H)-tetraone;

Cell wall synthesis inhibitors

inhibitors of glucan synthesis: validamycin, polyoxin B;

melanin synthesis inhibitors: pyroquilon, tricyclazole, carpropanid, dicyclomet,
fenoxanil;

Plant defence inducers

acibenzolar-S-methyl, probenazole, isotianil, tiadinil, prohexadione-calcium;

phosphonates: fosetyl, fosetyl-aluminum, phosphorous acid and its salts, 4-
cyclopropyl-N-(2,4-dimethoxyphenyl)thiadiazole-5-carboxamide;

Unknown mode of action

bronopol, chinomethionat, cyflufenamid, cymoxanil, dazomet, debacarb, diclo-
mezine, difenozoquat, difenzoquat-methylsulfate, diphenylamin, fenpyrazamine,
flumetover, flusulfamide, flutianil, methasulfocarb, nitrapyrin, nitrothal-
isopropyl, oxathiapiprolin, picarbutrazox, tolprocarb, 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, 2-[3,5-bis(difluoromethyl)-
1H-pyrazol-1-yl]-1-[4-(4-[5-2-fluoro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-
1,2-oxazol-3-yl]-1,3-thiazol-2-yl]piperidin-1-yl]ethanone, 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-
ylethanone, oxin-copper, proquinazid, tebufluquin, tecloftalam, triazoxide,
2-butoxy-6-iodo-3-propylchromen-4-one, N-(cyclopropylmethoxyimino-(6-
difluoro-methoxy-2,3-difluoro-phenyl)-methyl)-2-phenyl acetamide, N'-(4-(4-
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chloro-3-trifluoromethyl-phenoxy)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine, N’-(4-(4-fluoro-3-trifluoromethyl-phenoxy)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine, N’-(2-methyl-5-trifluoromethyl-4-(3-trimethyl-silanyloxy)-phenyl)-N-ethyl-N-methyl formamidine, N’-(5-difluoromethyl-2-methyl-4-(3-trimethylsilyloxy)-phenyl)-N-ethyl-N-methyl formamidine, methoxy-acetic acid 6-tert-butyl-8-fluoro-2,3-dimethyl-quinolin-4-yl ester, 3-[5-(4-methylphenyl)-2,3-dimethyl-isoxazolidin-3-yl]pyridine, 3-[5-(4-chlorophenyl)-2,3-dimethyl-isoxazolidin-3-yl]pyridine (pyrisoxazole), N-(6-methoxy-pyridin-3-yl) cyclopropylcarboxylic acid amide, 5-chloro-1-(4,6-dimethoxy-pyrimidin-2-yl)-2-methyl-1H-benzolimidazole, 2-(4-chlorophenyl)-N’-[4-(3,4-dimethoxy-phenyl)-isoxazol-5-yl]-2-prop-2-ynloyx-acetamide, ethyl (Z)-3-aminoc-2-cyano-3-phenyl-prop-2-enoate, penty1 N-[6-[[1-methyltetrazol-5-yl]-phenyl-methylene]amino]oxyethyl[2-pyrrolid]carbamate, 2-[2-[7,8-difluoro-2-methyl-3-quinolyl]oxy]-6-fluoro-phenyl]propan-2-ol, 2-[2-fluoro-6-(8-fluoro-2-methyl-3-quinolyl)oxy]phenyl]propan-2-ol, 3-(5-fluoro-3,3,4,4-tetramethyl-3,4-dihydroisoquinolin-1-yl)quinoline, 3-(4,4-difluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-yl)quinoline, 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-yl)quinoline;

Biopesticides

Microbial pesticides with fungicidal, bactericidal, viricidal and/or plant defense activator activity: Ampelomyces quisqualis, Aspergillus flavus, Aureobasidium pullulans, Bacillus amyloliquefaciens, B. mojavensis, B. pumilus, B. simplex, B. solisalsi, B. subtilis, B. subtilis var. amyloliquefaciens, Candida oleophila, C. saitoana, Clavibacter michiganensis (bacteriophages), Coniothyrium minitans, Cryphonectria parasitica, Cryptococcus albidus, Dileptospora alopecuri, Fusarium oxysporum, Clonostachys rosea f. catenulate (also named Gliocladium catenulatum), Gliocladium roseum, Lysobacter antibioticus, L. enzymogenes, Metschnikowia fructicola, Microdochium dimerum, Microsphaeropsis ochracea, Muscodor albus, Paenibacillus polymyxa, Pantomoe vagans, Phlebiopsis gigantea, Pseudomonas sp., Pseudomonas chlorophis, Pseudozyma flocculosa, Pichia anomala, Pythium oligandrum, Sphaerodes mycoparasitica, Streptomyces griseoviridis, S. lydicus, S. violaceusniger, Talaromyces flavus, Trichoderma asperellum, T. atroviride, T. fertile, T. gamsii, T. harzatum, T. harzianum; mixture of T. harzianum and T. viride; mixture of T. polysporum and T. harzianum; T. stromaticum, T. virens (also named Gliocladium virens), T. viride, Typhula phacorrhiza, Ulocladium oudemansii, Verticillium dahlia, zucchini yellow mosaic virus (avirulent strain);
haden fish oil, natamycin, Plum pox virus coat protein, potassium or sodium bicarbonate, Reynoutria sachalinensis extract, salicylic acid, tea tree oil

in a synergistically effective amount.

2. The method according to claim 1, wherein at least one pesticidally active compound II is applied

3. The method according to claim 2, wherein the at least one active compound II is selected from

II-M.2B within the class of fiproles from fipronil or ethiprole;

II-M.3A within the class of pyrethroids alpha-cypermethrin;

II-M.4A within the class of neonicotinoids from acetamiprid, chlothianidin, dinotefuran, imidacloprid, nitenpyram, thiapropoxam or thiamethoxam;

II-M.5 within the class of spinosyns from spinosad or spinetoram;

II-M.6 within the class of mectins from abamectin or emamectin;

II-M.10 within the mite growth inhibitors from etoxazole;

II-M.13 within the uncouplers of oxidative phosphorylation from chlorfenapyr;

II-M.21A within the class of mitochondrial complex I electron transport inhibitors from pyridaben, tebufenpyrad, tolfenpyrad or flufenican;

II-M.25 within the class of mitochondrial complex II electron transport inhibitors from cyenopyrafen and cyflumetofen;

II-M.22 within the voltage-dependent sodium channel blockers from indoxacarb or metamitron;

II-M.23 within the inhibitors of the lipid synthesis from spirodiclofen, spiromesifen or spirotetramat;

II-M.28 within the class of diamides from flubendiamide, chlorantraniliprole, cyantraniliprole, cyclaniliprole or tetraniliprole;
II-M.UN within the compounds of unknown or uncertain mode of action from afidopyropene, afoxolaner, bifenazate, flu pyradifurone, fluralaner, piperonyl butoxide, pyridalyl, pyr ifluquinazon, sulfoxaflor or triflumezopyrim;

II-M.BP-1 within the class of microbial pesticides from Bacillus firmus, B. thuringiensis ssp. israelensis, B. t. ssp. galleriae, B. t. ssp. kurstaki, Beauveria bassiana, Burkholderia sp. or Paenibacillus poppiliae.

4. The method according to claim 1, 2 or 3, wherein at least one active compound II is fipronil or ethiprole.

5. The method according to claim 1, 2 or 3, wherein at least one active compound II is alpha-cypermethrin.

6. The method according to claim 1, 2 or 3, wherein at least one active compound II is selected from acetamiprid, chlothianidin, dinotefuran, imidacloprid, nitenpyram, thiaclorpid, or thiamethoxam.

7. The method according to claim 1, 2 or 3, wherein at least one active compound II is spinosad.

8. The method according to claim 1, 2 or 3 wherein at least one active compound II is abamectin.

9. The method according to claim 1, 2 or 3, wherein at least one active compound II is selected from flupyradifurone or sulfoxaflor.

10. The method according to claim 1, 2 or 3 wherein at least one active compound II is a microbial pesticide.

11. The method according to claim 3, wherein the fungicidally active compound III is pyraclostrobin.

12. The method according to claim 3, wherein the fungicidally active compound III is fluxapyroxad.

13. The method according to any one of claims 1 to 12, comprising the at least one compound I and the at least one active compound II and /or III in a weight ratio of from 500:1 to 1:100.
14. The method according to any one of claims 1 to 13, wherein the pests are *Acrosternum spp.*, *Euschistus spp.*, *Nezara spp* and/or *Piezodrus spp.*, in particular *Acrosternum hilare*, *Euschistus heros*, *Nezara viridula* and/or *Piezodrus guildini*.

15. The method according to any one of claims 1 to 14 for controlling Pentatomidae in soybean plants.

16. The use of a mixture as disclosed in any one of the claims 1 to 13 for controlling the pests from the family of Pentatomidae, preferably *Acrosternum spp.*, *Euschistus spp.*, *Nezara spp* and/or *Piezodrus spp.*, in particular *Acrosternum hilare*, *Euschistus heros*, *Nezara viridula* and/or *Piezodrus guildini*.

17. Pesticidal mixtures comprising as active compounds

1) at least one compound I, which is a component of the ginkgo tree selected from the group consisting of bilobalide, ginkgolide A, ginkgolide B, ginkgolide C, ginkgolide J and ginkgolide M,

and

2) at least one pesticidally active compound II selected from group M consisting of

**II-M.1** Acetylcholine esterase (AChE) inhibitors from the class of

**II-M.1A** carbamates, for example aldicarb, alanycarb, bendiocarb, benfuracarb, butocarboxim, butoxycarboxim, carbaryl, carbofuran, carbosulfan, ethiofencarb, fenobucarb, formetanate, furathiocarb, isoprocarb, methiocarb, methomyl, metalcarb, oxamyl, pirimicarb, propoxur, thiodicarb, thiofanox, trimethacarb, XMC, xylylcarb and triazamate; or from the class of

**II-M.2** GABA-gated chloride channel antagonists such as:

**II-M.2A** cyclodiene organochlorine compounds, as for example endosulfan or chlordane; or

**II-M.2B** fiproles (phenylpyrazoles), as for example ethiprole, fipronil, flufiprole, pyrafluprole and pyriprole;

**II-M.3** Sodium channel modulators selected from sodium channel modulators such as DDT or methoxychlor;

**II-M.4** Nicotinic acetylcholine receptor agonists (nAChR) from the class of

**II-M.4A** neonicotinoids, for example acetamiprid, chlothianidin, cycloxaiprid, dinofuran, imidacloprid, nitenpyram, thiacloprid and thiamethoxam; or the compounds
II-M.4A.2: (2E,1R)-1-[(6-Chloropyridin-3-yl)methyl]-N'-nitro-2-pentylidenehydrazinecarboximidamide; or
II-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
5
II-M.4B nicotine;
II-M.5 Nicotinic acetylcholine receptor allosteric activators from the class of spinosyns, for example spinosad or spinetoram;
10
II-M.6 Chloride channel activators from the class of avermectins and milbemycins, for example abamectin, emamectin benzoate, ivermectin, lepimectin or milbemectin;
II-M.7 Juvenile hormone mimics, such as
15
II-M.7A juvenile hormone analogues as hydroprene, kinoprene and methoprene; or others as
II-M.7B fenoxycarb, or
II-M.7C pyriproxyfen;
20
II-M.8 miscellaneous non-specific (multi-site) inhibitors, for example
II-M.8A alkyl halides as methyl bromide and other alkyl halides, or
II-M.8B chloropicrin, or
II-M.8C sulfuryl fluoride, or
II-M.8D borax, or
25
II-M.8E tartar emetic;
II-M.9 Selective homopteran feeding blockers, for example
II-M.9B pymetrozine, or
II-M.9C fliconicamid;
30
II-M.10 Mite growth inhibitors, including
II-M.10A clofentezine, hexythiazox and diflovidazin, or
II-M.10B etoxicazole;
35
II-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;
40
II-M.12 Inhibitors of mitochondrial ATP synthase, for example
II-M.12A diafenthiuron, or
II-M.12B organotin miticides such as azocyclotin, cyhexatin or fenbutatin oxide, or
II-M.13 Uncouplers of oxidative phosphorylation via disruption of the proton gradient, for example chlorfenapyr, DNOC or sulfuramid;

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

II-M.15 Inhibitors of the chitin biosynthesis type 0, such as benzoylureas as for example bistrifururon, chlorfluazuron, diflubenzuron, flucycoxurion, flufenoxuron, hexaflumuron, lufenuron, novaluron, noviflumuron, teflubenzuron or triflusuron;

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

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

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

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

II-M.20 Mitochondrial complex III electron transport inhibitors, for example hydramethylnon, or acequinocyl, or fluacrypyrim;

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

II-M.22 Voltage-dependent sodium channel blockers, for example indoxacarb, or metaflumizone, or 2-[2-[(4-Cyanophenyl)-1-[3-(trifluoromethyl)phenyl]ethyldene]-N-[4-(difluoromethoxy)phenyl]-hydrazinecarboxamide or 2-[2-[(4-Chloro-2-methylphenyl)-2-[[4-chlorophenyl][4-methyl(methylsulfonyl)amino]phenyl)methylene]-hydrazinecarboxamide;
Inhibitors of the of acetyl CoA carboxylase, such as tetronic and tetramic acid derivatives, for example spirodiclofen, spiromesifen or spirotetramat;

Mitochondrial complex IV electron transport inhibitors, for example phosphine such as aluminium phosphide, calcium phosphide, phosphine or zinc phosphide, or cyanide;

Mitochondrial complex II electron transport inhibitors, such as beta-ketonitrile derivatives, for example cyanopyrafen or cyflumetofen;

Ryanodine receptor-modulators from the class of diamides, as for example flubeniamide, chlorantraniliprole (rynaxypyr®), cyraniliprole (cyazypyr®), or the phtalamide compounds

(R)-3-Chloro-N1-{2-methyl-4-[1,2,2,2 -tetrafluor-1-(trifluormethyl)ethyl]phenyl}-N2-(1-methyl-2-methylsulfonylethyl)phthalimid and

(S)-3-Chloro-N1-{2-methyl-4-[1,2,2,2 -tetrafluor-1-(trifluormethyl)ethyl]phenyl}-N2-(1-methyl-2-methylsulfonylethyl)phthalimid, or the compound

3-bromo-N-{2-bromo-4-chloro-6-[(1-cyclopropylthethyl)carbamoyl]phenyl}-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (proposed ISO name: cyclaniliprole), or the compound

methyl-2-[3,5-dibromo-2-[(3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl)carbonyl]amino]benzoyl]-1,2-dimethylhydrazinecarboxylate; or a compound selected from M.28.5a) to M.28.5i):

N-[4,6-dichloro-2-{(diethyl-lambda-4-sulfonylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

N-[4-chloro-2-{(diethyl-lambda-4-sulfonylidene)carbamoyl]-6-methyl-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

N-[4-chloro-2-{(di2-propyl-lambda-4-sulfonylidene)carbamoyl]-6-methyl-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

N-[4,6-dichloro-2-{(di2-propyl-lambda-4-sulfonylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(difluoromethyl)pyrazole-3-carboxamide;

N-[4,6-dibromo-2-{(di2-propyl-lambda-4-sulfonylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

N-[4-chloro-2-{(di2-propyl-lambda-4-sulfonylidene)carbamoyl]-6-cyanophenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

N-[4,6-dibromo-2-{(diethyl-lambda-4-sulfonylidene)carbamoyl]-phenyl]-2-(3-chloro-2-pyridyl)-5-(trifluoromethyl)pyrazole-3-carboxamide;

N-[2-(5-Amino-1,3,4-thiadiazol-2-yl)-4-chloro-6-methyl phenyl]-3-bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide;}
70

II-M.28.5j) 3-Chloro-1-(3-chloro-2-pyridinyl)-N-[2,4-dichloro-6-[[1-cyano-1-methylpropyl]amino]carbonyl]phenyl]-1H-pyrazole-5-carboxamide;

II-M.28.5k) 3-Bromo-N-[2,4-dichloro-6-(methylcarbamoyl)phenyl]-1-(3,5-dichloro-2-pyridyl)-1H-pyrazole-5-carboxamide;

II-M.28.5j) N-[4-Chloro-2-[[[1,1-dimethylethyl]amino]carbonyl]-6-methylphenyl]-1-(3-chloro-2-pyridinyl)-3-(fluoromethoxy)-1H-pyrazole-5-carboxamide; or a compound selected from

II-M.28.6: N-(2-cyanopropan-2-yl)-N-(2,4-dimethylphenyl)-3-iodobenzene-1,2-dicarboxamide; or

II-M.28.7: 3-Chloro-N-(2-cyanopropan-2-yl)-N-(2,4-dimethylphenyl)benzene-1,2-dicarboxamide;

II-M.28.8a) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-3-[5-(trifluoromethyl)-2H-tetrazol-2-yl]methyl]-1H-pyrazole-5-carboxamide; or

II-M.28.8b) 1-(3-Chloro-2-pyridinyl)-N-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-3-[5-(trifluoromethyl)-1H-tetrazol-1-yl]methyl]-1H-pyrazole-5-carboxamide;

II-M.UN Insecticidally active compounds of unknown or uncertain mode of action, as for example afidopyropen, afloxaner, azadirachtin, amidoflumet, benzoxy-mate, bifenazate, bromopropylate, chinomethionat, cryolute, dicofol, flufenim, flometoquin, fluensulfone, fluopyram, flupyradifurone, fluralaner, meto-xadiazone, piperonyl butoxide, pyflubumide, pyridalyl, pyrifluquinazon, sulfoxaflor, tioxazafen, triflumezopyrim, or the compounds

II-M.UN.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

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

II-M.UN.5: 1-[2-fluoro-4-methyl-5-[2,2,2-trifluoroethyl]sulfonyl]phenyl]-3-(trifluoromethyl)-1H-1,2,4-triazole-5-amine; or a compound selected from the group of M.UN.6, whereby the compound is selected from II- II-M.UN.6a) to M.UN.6k):

II-M.UN.6a) (E/Z)-N-[1-[[6-chloro-3-pyridyl]methyl]-2-pyridylidene]-2,2,2-trifluoroacetamide;

II-M.UN.6b) (E/Z)-N-[1-[[6-chloro-5-fluoro-3-pyridyl]methyl]-2-pyridylidene]-2,2,2-trifluoroacetamide;

II-M.UN.6c) (E/Z)-2,2,2-trifluoro-N-[1-[[6-fluoro-3-pyridyl]methyl]-2-pyridylidene]acetamide;

II-M.UN.6d) (E/Z)-N-[1-[[6-bromo-3-pyridyl]methyl]-2-pyridylidene]-2,2,2-trifluoroacetamide;

II-M.UN.6e) (E/Z)-N-[1-[[6-chloro-3-pyridyl]ethyl]-2-pyridylidene]-2,2,2-trifluoroacetamide;

II-M.UN.6f) (E/Z)-N-[1-[[6-chloro-3-pyridyl]methyl]-2-pyridylidene]-2,2-difluoroacetamide;

II-M.UN.6g) (E/Z)-2-chloro-N-[[6-chloro-3-pyridyl]methyl]-2-pyridylidene]-2,2-difluoroacetamide;
II-M.UN.6h) (E/Z)-N-[1-[(2-chloropyrimidin-5-yl)methyl]-2-pyridylidene]-2,2,2-trifluoroacetamide;
II-M.UN.6i) (E/Z)-N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,3,3,3-pentafluoropropanamide.;
II-M.UN.6j) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-thioacetamide or of the compound
II-M.UN.6k) N-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-2,2,2-trifluoro-N'-isopropylacetamide or the compounds
II-M.UN.8: 8-chloro-N-[2-chloro-5-methoxyphenyl]sulfonyl]-6-trifluoromethyl)-imidazo[1,2-a]pyridine-2-carboxamide; or
II-M.UN.9: 4-[5-(3,5-dichlorophenyl)-5-(trifluoromethyl)-4H-isoxazol-3-yl]-2-methyl-N-(1-oxothietan-3-yl)benzamide; or
II-M.UN.10: 5-[3,2,6-dichloro-4-(3,3-dichloroallyloxy)phenoxy[propoxy]-1H-pyrazole; or a compound selected from the group of M.UN.12, wherein the compound is selected from M.UN.12a to M.UN.12m):
II-M.UN.12.a) 2-(1,3-Dioxan-2-yl)-6-[2-(3-pyridinyl)-5-thiazolyl]-pyridine;
II-M.UN.12.b) 2-[6-[2-(5-fluoro-3-pyridyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine;
II-M.UN.12.c) 2-[6-[2-(3-Pyridinyl)-5-thiazolyl]-2-pyridinyl]-pyrimidine;
II-M.UN.12.d) N-Methylsulfonyl-6-[2-(3-pyridyl)thiazol-5-yl]pyridine-2-carboxamide
II-M.UN.12.e) N-Methylsulfonyl-6-[2-(3-pyridyl)thiazol-5-yl]pyridine-2-carboxamide
II-M.UN.12.f) N-Ethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.g) N-Methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.h) N,2-Dimethyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.i) N-Ethyl-2-methyl-N-[4-methyl-2-(3-pyridyl)thiazol-5-yl]-3-methylthio-propanamide
II-M.UN.12.j) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-2-methyl-3-methylthio-propanamide
II-M.UN.12.k) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N,2-dimethyl-3-methylthio-propanamide
II-M.UN.12.l) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-methyl-3-methylthio-propanamide
II-M.UN.12.m) N-[4-Chloro-2-(3-pyridyl)thiazol-5-yl]-N-ethyl-3-methylthio-propanamide; or the compound
II-M.UN.13: 2-(4-methoxyiminocyclohexyl)-2-(3,3,3-trifluoropropyl)sulfonyl)acetonitrile; or the compounds
II-M.UN.14a) 1-[(6-Chloro-3-pyridinyl)methyl]-1,2,3,5,6,7-hexahydro-5-methoxy-7-methyl-8-nitro-imidazo[1,2-a]pyridine; or
II-M.UN.14b) 1-[(6-Chloropyridin-3-yl)methyl]-7-methyl-8-nitro-1,2,3,5,6,7-hexahydropyrimidazol[1,2-a]pyridin-5-ol; or the compound
II-M.UN.15: 1-[(2-Chloro-1,3-thiazol-5-yl)methyl]-3-(3,5-dichlorophenyl)-9-methyl-4-oxo-4H-pyrido[1,2-a]pyrimidin-1-ium-2-olate; or
II-M.BP  Biopesticides, being pesticidal compounds of biological origin with insecticidal, acaricidal, molluscidal and/or nematicidal activity, including

II-M.BP-1: Microbial pesticides: Bacillus firmus, B. thuringiensis ssp. israelensis, B. t. ssp. galleriae, B. t. ssp. kurstaki, Beauveria bassiana, Burkholderia sp., Chromobacterium subtsgae, Cydia pomonella granulosis virus, Isaria fumosorosea, Lecanicillium longisporum, L. muscarium (formerly Verticillium lecanii), Metarhizium anisopliae, M. anisopliae var. acridum, Paecilomyces fumosoroseus, P. lilacinus, Paenibacillus popilliae, Pasteuria spp., P. nishizawai, P. reneiformis, P. usagae, Pseudomonas fluorescens, Steinernema feltiae, Streptomces gallsus; or


F.I) Respiration inhibitors

F.I 1) Inhibitors of complex III at Q_0 site (e.g. strobilurins): azoxystrobin, coumestrobin, coumoxystrobin, dimoxystrobin, enestrobin, fenaminstrobin, fenoxystrobin/flufenoxystrobin, fluoxastrobin, kresoxim-methyl, mendorstrobin, metominostrobin, orysastrobin, picoxystrobin, pyraclostrobin, pyrametostrobin, pyraxystrobin, trifloxystrobin and Z-(2-(3-(2,6-dichlorophenyl)-1-methylallylideneaminoxyethyl)-phenyl)-2-methoxyiminomethylacetamide, pyrilencarb, triclopyracarb/chlorodincarb, famoxadone, fenamidine;

F.I 2) inhibitors of complex III at Q_1 site: cyazofamid, amisulbrom, [(3S,6S,7R,8R)-8-benzyl-3-[(3-acetoxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-acetoxyethoxy)-4-methoxy-pyridine-2-carbonyl]amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(3S,6S,7R,8R)-8-benzyl-3-[(3-isobutylxycarbonyloxy-4-methoxy-pyridine-2-carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxan-7-yl] 2-methylpropanoate, [(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-dioxan-7-yl] 2-methylpropanoate; (3S,6S,7R,8R)-3-[[3-hydroxy-4-
methoxy-2-pyridinyl]carbonyl]amino]-6-methyl-4,9-dioxo-8-(phenylmethyl)-1,5-
dioxonan-7-yl 2-methylpropanoate;

inhibitors of complex II (e. g. carboxamides): benodanil, benzovindiflupyr, 5
bixafen, bocscaldil, carboxin, fenfuram, fluopyram, flutolanil, fluxapyroxad, fu-
rametpyr, isofetamid, isopyrazam, mepronil, oxycarboxin, pentulfen, penthi-
oprad, sedaxane, tecloftalam, thifluzamide, N-(4'-trifluoromethylthiobiphenyl-
2-yl)-3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxamide, N-(2-(1,3,3-
trimethyl-buty1)-phenyl)-1,3-dimethyl-5-fluoro-1H-pyrazole-4-carboxamide, 
3-(difluoromethyl)-1-methyl-N-(1,1,3-trimethyldimane-4-yl)pyrazole-4-
carboxamide, 3-(trifluoromethyl)-1-methyl-N-(1,1,3-trimethyldimane-4-
yl)pyrazole-4-carboxamide, 1,3-dimethyl-N-(1,1,3-trimethyldimane-4-yl)pyrazo-
le-4-carboxamide, 3-(trifluoromethyl)-1,5-dimethyl-N-(1,1,3-trimethyldimane-4-yl)-
pyrazole-4-carboxamide, 1,3,5-trimethyl-N-(1,1,3-trimethyldimane-4-yl)pyrazo-
le-4-carboxamide, N-(7-fluoro-1,1,3-trimethyldimane-4-yl)-1,3-dimethyl-pyrazo-
le-4-carboxamide, N-[2-(2,4-dichlorophenyl)-2-methoxy-1-methyl-ethyl]-3-
(difluoromethyl)-1-methyl-pyrazole-4-carboxamide, N-[2-(2,4-
difluorophenyl)phenyl]-3-(trifluoromethyl)pyrazine-2-carboxamide;

other respiration inhibitors (e. g. complex I, uncouplers): diflumetorim, (5,8-
difluoroquinazolin-4-yl)-[2-[fluoro-4-(4-trifluoromethylpyridin-2-yl)-oxy]-
ethyl]-amine; nitrophenyl derivates: binapacryl, dinobuton, dinocap, fluazinam;
ferimzone; organometal compounds: fentin salts, such as fentin-acetate, fentin 
chloride or fentin hydroxide; ametoctradin; and silthiofam;

Sterol biosynthesis inhibitors (SBI fungicides)

C14 demethylase inhibitors (DMI fungicides): triazoles: azaconazole, biterta-

ol, bromuconazole, cyproconazole, difenoconazole, diniconazole, dinicona-
ze-M, epoxiconazole, fenbuconazole, fluquinconazole, flusilazole, flutriafol, 30
hexaconazole, imibenconazole, ipconazole, meconazole, myclobutanil, oxy-
conazole, paclotrazole, penconazole, propiconazole, prothioconazole, sime-
conazole, tebuconazole, tetraconazole, triadimefon, triadimenol, tritoca-
zole, uniconazole,

1-[rel-(2S;3R)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)-oxiranylmethyl]-5-thio-
cyano-1H-[1,2,4]triazole, 2-[rel-(2S;3R)-3-(2-chlorophenyl)-2-(2,4-
difluorophenyl)-oxiranylmethyl]-2H-[1,2,4]triazole-3-thiol, 2-[2-chloro-4-(4-
chlorophenoxoxy)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol, 1-[4-(4-
chlorophenoxoxy)-2-(trifluoromethyl)phenyl]-1-cyclopropyl-2-(1,2,4-triazol-1-
yl)ethanol, 2-[4-(4-chlorophenoxoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-
yl)butan-2-ol, 2-[2-chloro-4-(4-chlorophenoxoxy)phenyl]-1-(1,2,4-triazol-1-
yl)butan-2-ol, 2-[4-(4-chlorophenoxoxy)-2-(trifluoromethyl)phenyl]-3-methyl-1-
(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxoxy)-2-(trifluoromethyl)phenyl]-
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1-(1,2,4-triazol-1-yl)propan-2-ol, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-3-methyl-1-(1,2,4-triazol-1-yl)butan-2-ol, 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)pentan-2-ol, 2-[4-(4-fluorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol; imidazoles: imazalil, pefurazoate, prochloraz, triflumizol; pyrimidines, pyridines and piperazines: fenarimol, nuarimol, pyriflumox, triforine, [3-(4-chloro-2-fluorophenyl)-5-(2,4-difluorophenyl)isoxazol-4-yl]-(3-pyridyl)methanol;

F.II 2) Delta14-reductase inhibitors: aldimorph, dodemorph, dodemorph-acetate, fenpropimorph, tridemorph, fenpropidin, piperalin, spiroxamine;

F.II 3) Inhibitors of 3-keto reductase: fenhexamid;

F.III) Nucleic acid synthesis inhibitors

F.III 1) phenylamides or acyl amino acid fungicides: benalaxyl, benalaxyl-M, kiralaxyl, metalaxyl, metalaxyl-M (mefenoxam), ofurace, oxadixyl;

F.III 2) others: hymexazole, ochthilinone, oxolinic acid, bupirimate, 5-fluorocytosine, 5-fluoro-2-(p-tolylmethoxy)pyrimidin-4-amine, 5-fluoro-2-(4-fluorophenylmethoxy)pyrimidin-4-amine;

F.IV) Inhibitors of cell division and cytoskeleton

F.IV 1) tubulin inhibitors, such as benzimidazoles, thiophanates: benomyl, carbendazim, fuberidazole, thiabendazole, thiophanate-methyl; triazolopyrimidines: 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)-1,5,4-triazolo[1,5-a]pyrimidine;

F.IV 2) other cell division inhibitors: diethofencarb, ethaboxam, pencycuron, fluopicolide, zoaxamide, metrafenone, pyrioxyfen;

F.V) Inhibitors of amino acid and protein synthesis

F.V 1) methionine synthesis inhibitors (anilino-pyrimidines): cyprodinil, mepanipyrim, pyrimethanil;

F.V 2) protein synthesis inhibitors: blasticidin-S, kasugamycin, kasugamycin hydrochloride-hydrate, mildiomycin, streptomyacin, oxytetracyclin, polyoxine, validamycin A;

F.VI) Signal transduction inhibitors

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MAP / histidine kinase inhibitors: fluoroimid, iprodione, procymidone, vinclozolin, fenpiclonil, fludioxonil;

G protein inhibitors: quinoxyfen;

Lipid and membrane synthesis inhibitors

Phospholipid biosynthesis inhibitors: edifenphos, iprobenfos, pyrazophos, isoprothiolane;

lipid peroxidation: dicloran, quintozene, tecnazene, tolclofos-methyl, biphenyl, chloroneb, etridiazole;

phospholipid biosynthesis and cell wall deposition: dimethomorph, flumorph, mandipropamid, pyrimorph, benthiavalicarb, iprovalicarb, valifenalate and N-(1-(1-(4-cyano-phenyl)ethanesulfonyl)-but-2-yl) carbamic acid-(4-fluorophenyl) ester;

compounds affecting cell membrane permeability and fatty acides: propamocarb, propamocarb-hydrochlorid;

fatty acid amide hydrolase inhibitors: oxathiapiprolin;

Inhibitors with Multi Site Action

inorganic active substances: Bordeaux mixture, copper acetate, copper hydroxide, copper oxychloride, basic copper sulfate, sulfur;

thio- and dithiocarbamates: ferbam, mancozeb, manebei, metam, metiram, propineb, thiram, zineb, ziram;

organochlorine compounds (e.g. phthalimides, sulfamides, chloronitriles): anilazine, chlorothalonil, captafol, captan, folpet, dichlofluanid, dichlorophen, hexachlorobenzene, pentachlorophenol and its salts, phthalide, tolylfluanid, N-(4-chloro-2-nitro-phenyl)-N-ethyl-4-methyl-benzenesulfonamide;

guanidines and others: guanidine, dodine, dodine free base, guazatine, guazatine-acetate, iminoctadine, iminoctadine-triacetate, iminoctadine-tris(albesilate), dithianon, 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrrole-1,3,5,7(2H,6H)-tetraone;

Cell wall synthesis inhibitors

inhibitors of glucan synthesis: validamycin, polyoxin B;
F.IX 2) melanin synthesis inhibitors: pyroquillon, tricyclazole, carproamid, dicyclomet, fenoxanil;

F.X) Plant defence inducers

F.X 1) acibenzolar-S-methyl, probenazole, isotianil, tiadinil, prohexadione-calcium;

F.X 2) phosphonates: fosetyl, fosetyl-aluminum, phosphorous acid and its salts, 4-cyclopropyl-N-(2,4-dimethoxyphenyl)thiadiazole-5-carboxamide;

F.XI) Unknown mode of action

bronopol, chinomethionat, cyfluafenamid, cymoxanil, dazomet, debacarb, dicloflazine, difenzoquat, difenzoquat-methyl-sulfate, diphenylamin, fenpyrazamine, flumetover, flusulamid, flutianil, methasulfocarb, nitrapyrin, nitrothal-isopropyl, oxathiapiprolin, picarbutrazox, tolprocarb, 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-[2-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-y)]piperidin-1-yl)ethanone, 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-[2-fluoro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-y)]piperidin-1-yl)ethanone, 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-[2-chloro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-y)]piperidin-1-yl)ethanone, oxin-copper, proquinazid, tebuquin, tecloftalam, triazoxide, 2-butoxy-6-iodo-3-propylchromen-4-one, N-(cyclopropylmethylximino-(6-difluoro-methoxy-2,3-difluoro-phenyl)-methyl)-2-phenyl acetamide, N\(^\prime\)-(4-(4-chloro-3-trifluoromethyl-phenox)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine, N\(^\prime\)-(4-(4-fluoro-3-trifluoromethyl-phenox)-2,5-dimethyl-phenyl)-N-ethyl-N-methyl formamidine, N\(^\prime\)-(2-methyl-5-trifluoromethyl-4-(3-trimethylsilanyl-propanyl)-phenyl)-N-ethyl-N-methyl formamidine, N\(^\prime\)-(5-difluoromethyl-2-methyl-4-(3-trimethylsilanyl-propoxy)-phenyl)-N-ethyl-N-methyl formamidine, methoxy-acetic acid 6-tert-butyl-6-fluoro-2,3-dimethyl-quinolin-4-yl ester, 3-[5-(4-methylphenyl)-2,3-dimethyl-isoxazolidin-3-yl]-pyridine, 3-[5-(4-chlorophenyl)-2,3-dimethyl-isoxazolidin-3-yl]-pyridine (pyrithiobazole), N-(6-methoxy-pyridin-3-yl) cyclopropenecarboxylic acid amide, 5-chloro-1-(4,6-dimethoxy-pyrimidin-2-yl)-2-methyl-1H-benzimidazole, 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, penty N-[6-[[[Z]-[1-methyltetrazol-5-yl]-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate, 2-[2-[7,8-difluoro-2-methyl-3-quinolyl]oxy]-6-fluoro-phenyl]propan-2-ol, 2-[2-fluoro-6-[8-fluoro-2-methyl-3-quinolyl]oxy]phenyl]propan-2-ol, 3-[5-fluoro-3,4,4-tetramethyl-3,4-dihydroisoquinolin-1-yl]quinoline, 3-(4,4-difluoro-3,3-dimethyl-
3,4-dihydroisoquinolin-1-yl)quinoline, 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-
dihydroisoquinolin-1-yl)quinoline;

F.XII) Biopesticides

F.XII 1) Microbial pesticides with fungicidal, bactericidal, viricidal and/or plant defense activator activity: Ampelomyces quisqualis, Aspergillus flavus, Aureobasidium pullulans, Bacillus amyloliquifaciens, B. mojavensis, B. pumilus, B. simplex, B. solisalsi, B. subtilis, B. subtilis var. amyloliquifaciens, Candida oleophila, C. saitoana, Clavibacter michiganensis (bacteriophages), Coniothyrium mimitans, Cryphonectria parasitica, Cryptococcus albidus, Dillosphora alopecuri, Fusarium oxysporum, Clonostachys rosea f. catenulata (also named Gliocladium catenulatum), Gliocladium roseum, Lysobacter antibioticus, L. enyzmogenes, Metschnikowia fructicola, Microdochium dimerum, Microsphaeropsis ochracea, Muscodor albus, Paenibacillus polymyxa, Pantoea vagans, Phlebiopsis gigantea, Pseudomonas sp., Pseudomonas chloraphis, Pseudolzyma flocculosa, Pichia anomala, Pythium oligandrum, Sphaerodes mycoparasitica, Streptomyces griseoviridis, S. lydicus, S. violaceusniger, Talaromyces flavus, Trichoderma asperellum, T. atroviride, T. fertile, T. gamsii, T. harzatum, T. harzianum; mixture of T. harzianum and T. viride; mixture of T. polysporum and T. harzianum; T. stromaticum, T. virens (also named Gliocladium virens), T. viride, Typhula phacorrhiza, Ulocladium oudemansii, Verticillium dahlia, zucchini yellow mosaic virus (avirulent strain);

F.XII 2) Biochemical pesticides with fungicidal, bactericidal, viricidal and/or plant defense activator activity: chitosan (hydrolysate), harpin protein, laminarin, Menhaden fish oil, natamycin, Plum pox virus coat protein, potassium or sodium bicarbonate, Reynoutria sachalinensis extract, salicylic acid, tea tree oil

in a synergistically effective amount.

18. The pesticidal mixtures according to claim 17, comprising at least one active compound II which is selected from

II-M.2.B within the class of fiproles from fipronil or ethiprole;

II-M.4A within the class of neonicotinooids from acetamiprid, chlothianidin, dinotefuran, imidaclorpid, nitenpyram, thiacloprid or thiamethoxam;

II-M.5 within the class of spinosyns from spinosad or spinetoram;

II-M.6 within the class of mectins from abamectin or emamectin;

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II-M.10 within the mite growth inhibitors from etoxazole;

II-M.13 within the uncouplers of oxidative phosphorylation from chlorfenapyr;

II-M.21.A within the class of mitochondrial complex I electron transport inhibitors from pyridaben, tebufenpyrad, tolfenpyrad or flufeneterim;

II-M.25 within the class of mitochondrial complex II electron transport inhibitors from cyenopyrafen and cyflumetofen;

II-M.22 within the voltage-dependent sodium channel blockers from indoxacarb or metaflumizone;

II-M.23 within the inhibitors of the lipid synthesis from spiromesifen or spirotetramat;

II-M.28 within the class of diamides from flubendiamide, chlorantraniliprole, cyantraniliprole, cyclaniliprole or tetraniplrole;

II-M.UN within the compounds of unknown or uncertain mode of action from afidopyropene, afoxolaner, bifenazate, flupyradifurone, fluralaner, piperonylbutoxide, pyridalyl, pyrifluquinazon, sulfoxaflor or triflumezopyrim;

II-M.BP-1 within the class of microbial pesticides from Bacillus firmus, B. thuringiensis ssp. israelensis, B. t. ssp. galleriae, B. t. ssp. kurstaki, Beauveria bassiana, Burkholderia sp. or Paenibacillus poppillae.

19. The pesticidal mixtures according to claim 17 or 18, wherein at least one active compound II is fipronil or ethiprole,

and/or

wherein at least one active compound II is selected from acetamiprid, chlothianidin, dinotefuran, imidacloprid, nitenpyram, thiacloprid, or thiamethoxam,

and/or

wherein at least one active compound II is spinosad,

and/or

wherein at least one active compound II is abamectin,

and/or

wherein at least one active compound II is selected from flupyradifurone or sulfoxaflor,

and/or

at least one active compound II is a microbial pesticide, preferably Beauveria bassiana.

20. The pesticidal mixtures according to any one of claims 17 to 19, comprising a fungicidally active compound III which is pyraclostrobin,

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and/or fluxapyroxad.

21. The pesticidal mixtures according to any one of claims 17 to 20, comprising at least one compound I, and at least one active compound II and/or III in a weight ratio of from 500:1 to 1:100.

22. Seed, comprising the mixture according to any one of claims 17 to 21 in an amount of from 0.1 g to 100 kg per 100 kg of seeds.

23. A pesticidal composition, comprising a liquid or solid carrier and a mixture according to any one of claims 17 to 21.
Method and pesticidal mixtures for controlling Pentatomidae pests

Abstract

The invention relates to a method for controlling pests from the family of Pentatomidae, comprising the step of contacting the pests, their food supply, habitat or breeding grounds with a pesticidal mixture comprising as active compound I at least one component of the ginkgo tree I, selected from the group consisting of bilobalide, ginkgolide A, ginkgolide B, ginkgolide C, ginkgolide J and ginkgolide M, and at least one pesticidally active compound II and/or at least one fungicidally active compound III, as defined in the description, in a synergistically effective amount.

The invention further relates to certain of these mixtures.
Application Data Sheet

Application Information

Application Type: Provisional
Subject Matter: Utility
Suggested Group Art Unit: N/A
CD-ROM or CD-R?: No
Sequence submission?: No
Computer Readable Form (CRF)?: No
Number of copies of CRF: 0
Title: Method and pesticidal mixtures for controlling Pentatomidae pests

Attorney Docket Number: B13/76404AUSPRO
Request for Early Publication?: No
Request for Non-Publication?: No
Total Drawing Sheets: No
Small Entity?: No
Petition Included?: No
Secrecy Order in Parent Appl?: No

Applicant Information

Applicant Authority Type: Inventor
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City of mailing address: Ludwigshafen
State or Province of mailing address: Postal or Zip Code of mailing address: 67071

Applicant Authority Type: Inventor
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Country of Residence: Germany
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State or Province of mailing address:
Postal or Zip Code of mailing address: 69121

Applicant Authority Type: Inventor
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Given Name: Karsten
Family Name: Koerber
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Country of Residence: Germany
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City of mailing address: Eppelheim
State or Province of mailing address:
Postal or Zip Code of mailing address: 69214

Applicant Authority Type: Inventor
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Status: Full Capacity
Given Name: Wolfgang
Family Name: von Deyn
City of Residence: Neustadt
State or Province of Residence:
Country of Residence: Germany
Street of mailing address: An der Bleiche 24
City of mailing address: Neustadt
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                        EASTSITE ONE
                        Seckenheimer Landstraße 4
                        68163 Mannheim
                        Germany

Domestic Priority Information

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Foreign Priority Information

Assignee Information
Assignee name: BASF SE
Street of mailing address:
City of mailing address: Ludwigshafen
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Country of mailing address: Germany
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