



(51) International Patent Classification:

A01N 43/90 (2006.01) A01P 5/00 (2006.01)

A01N 53/00 (2006.01) A01P 7/00 (2006.01)

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(21) International Application Number:

PCT/EP2022/057514

(22) International Filing Date:

22 March 2022 (22.03.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

21165074.2 25 March 2021 (25.03.2021) EP

(71) Applicant: SYNGENTA CROP PROTECTION AG
[CH/CH]; Rosentalstrasse 67, 4058 Basel (CH).(72) Inventors: HOEGGER, Patrik; Syngenta Crop Protection AG, Schaffhauserstrasse, 4332 Stein (CH).
HUETER, Ottmar Franz; Syngenta Crop Protection AG, Schaffhauserstrasse, 4332 Stein (CH).

(74) Agent: HGF B.V.; Benoordenhoutseweg 46, 2596 BC The Hague (NL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

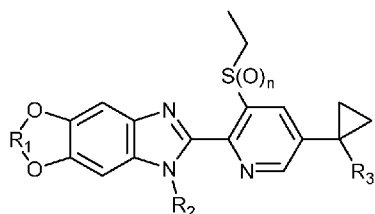
Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- of inventorship (Rule 4.17(iv))

Published:

- with international search report (Art. 21(3))

(54) Title: INSECT, ACARINA AND NEMATODE PEST CONTROL



(I)

(57) Abstract: The present invention relates to a method of controlling or preventing damage to a plant, which comprises applying on the plant, the locus thereof or its propagation material a combination comprising, as component (A), a compound of formula (I): wherein: R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene; R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl; R₃ is H or CN; and n is 0, 1 or 2; or an agrochemically acceptable salt thereof; and, as component (B), a compound selected from a group consisting of mixing partners; and to compositions, formulations and concentrates comprising such combinations.



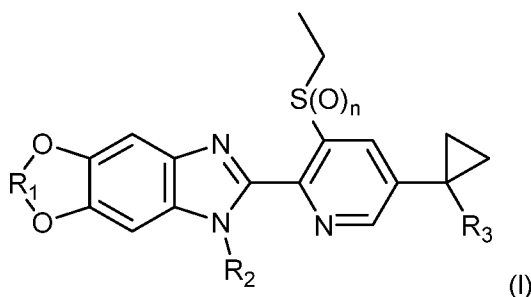
INSECT, ACARINA AND NEMATODE PEST CONTROL

The present invention relates to a combination for the control of damage caused by insect, acarina and/or nematode pests, in particular on plants, which combination comprises a mixture of active ingredients.

Certain active ingredients and combinations of active ingredients for controlling pest attack are described in the literature. For example, EP2952097A1 and WO2019/059244A1 describe compositions comprising a benzimidazole compound and one or more further pesticidal compounds. There is a continuing need to provide pesticidal combinations, which provide improved, for example, biological properties, for example, synergistic properties, especially for controlling insect, acarina and nematode pests. The benefits may also be an increased safety profile, improved physico-chemical properties, or increased biodegradability.

It is now been found that particular combinations of active ingredients provide unexpected control or prevention of damage to a plant, when the particular combination is applied on the plant, the locus thereof or its propagation material.

Accordingly, in a first aspect, the present invention provides a method of controlling or preventing damage to a plant, which comprises applying, in any desired sequence or simultaneously, on the plant, the locus thereof or its propagation material, a combination comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

R₃ is H or CN; and

n is 0, 1 or 2;

or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of:

B-1 nicofluprole (CAS 1771741-86-6)

B-2 broflanilide (CAS 1207727-04-5)

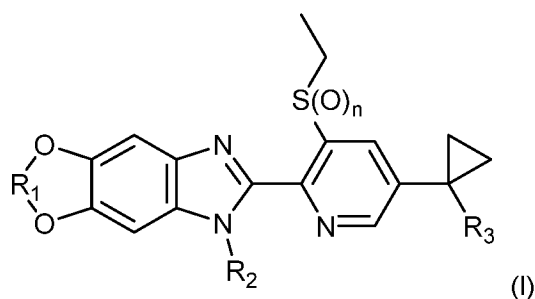
- B-3 fluxametamide (CAS 928783-29-3)
- B-4 tetraniliprole (CAS 1229654-66-3)
- B-5 spidoxamat (CAS 907187-07-9)
- 5 B-6 (S)-N-[[2-fluoro-4-[2-hydroxy-3-(3,4,5-trichlorophenyl)-3-(trifluoromethyl)pyrrolidin-1-yl]phenyl]methyl]cyclopropanecarboxamide (CAS 2044701-44-0)
- B-7 N-[[2-fluoro-4-[2-hydroxy-3-(3,4,5-trichlorophenyl)-3-(trifluoromethyl)pyrrolidin-1-yl]phenyl]methyl]cyclopropanecarboxamide (CAS 1365070-72-9)
- 10 B-8 4-dimethyl-2-[2-(3-pyridyl)indazol-5-yl]-1,2,4-triazolidine-3,5-dione (CAS 2171099-09-3)
- B-9 N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-2-methylsulfonyl-propanamide (CAS 2396747-83-2)
- 15 B-10 (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-5,7-dione (CAS 2246757-58-2)
- B-11 fenmezoditiaz (CAS 2413390-32-4)
- B-12 (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (CAS 2413839-58-2)
- 20 B-13 3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (CAS 2413839-57-1)
- B-14 tyclopyrazoflor (CAS 1477919-27-9)
- B-15 dimpropyridaz (CAS 1403615-77-9)
- B-16 afidopyropen (CAS 915972-17-7)
- B-17 triflumezopyrim (CAS 1263133-33-0)
- 25 B-18 flupyradifurone (CAS 951659-40-8)
- B-19 fluhexafon (CAS 1097630-26-6)
- B-20 tetrachlorantraniliprole (CAS 1104384-14-6)
- B-21 cyhalodiamide (CAS 1262605-53-7)
- B-22 benzpyrimoxan (CAS 1449021-97-9)
- 30 B-23 1-(2-cyanoethyl)-4-oxo-3-[3-(trifluoromethyl)phenyl]pyrido[1,2-a]pyrimidin-1-ium-2-olate (CAS 2032403-97-5)
- B-24 N-isopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680187-98-7)

	B-25	N-cyclopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-04-8)
	B-26	N-cyclohexyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-06-0)
	B-27	2-(3-pyridyl)-N-(2,2,2-trifluoroethyl)indazole-4-carboxamide (CAS 1680188-09-3)
5	B-28	methyl N-[[2-(3-pyridyl)indazole-5-carbonyl]amino]carbamate (CAS 1680188-56-0)
	B-29	2-(3-pyridyl)-N-(tetrahydrofuran-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-55-9)
10	B-30	N-[(2,2-difluorocyclopropyl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-65-1)
	B-31	N-(2,2-difluoropropyl)-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-68-4)
	B-32	2-(3-pyridyl)-N-(pyrimidin-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-69-5)
15	B-33	N-[(5-methylpyrazin-2-yl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-91-3)
	B-34	indazapyroxamet (CAS 1689545-27-4)
	B-35	N-[1-(difluoromethyl)cyclopropyl]-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-90-5)
20	B-36	N-(1,1-dimethyl-2-methylsulfanyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-91-6)
	B-37	N-(1,1-dimethyl-2-methylsulfinyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-92-7)
25	B-38	1,1-dimethyl-2-methylsulfonyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-93-8)
	B-39	cyproflamilide (CAS 2375110-88-4)
	B-40	dicloromezotiaz (CAS 1263629-39-5)
	B-41	dinotefuran (CAS 165252-70-0)
	B-42	flupyrimin (CAS 1363400-41-2)
30	B-43	guadipyr (CAS 1227849-60-6)
	B-44	flometoquin (CAS 875775-74-9)
	B-45	flupentiofenox (CAS 1472050-04-6)
	B-46	(+)-flupentiofenox (CAS 1472050-06-8)

- B-47 (-)-flupentiofenox (CAS 1472050-05-7)
- B-48 cyetpyrafen (CAS 1253429-01-4)
- B-49 pyflubumide (CAS 926914-55-8)
- B-50 pyriminostrobin (CAS 1257598-43-8)
- 5 B-51 acynonapyr (CAS 1333001-59-4)
- B-52 R-(2Z)-2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 2377084-09-6)
- B-53 2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 1445684-82-1)
- 10 B-54 (2Z)-2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 1445683-71-5)
- B-55 oxazosulfinyl (CAS 1616678-32-0)
- B-56 2-(5-cyclopropyl-3-ethylsulfonyl-2-pyridyl)-5-(trifluoromethylsulfonyl)-1,3-benzoxazole (CAS 2128706-05-6)
- 15 B-57 2-[3-ethylsulfonyl-6-(1,2,4-triazol-1-yl)-2-pyridyl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 1808115-49-2)
- B-58 (3-ethylsulfonyl-2-pyridyl)-5-(2,2,3,3,3-pentafluoropropoxy)pyrazine (CAS 2095470-94-1)
- B-59 2-[3-ethylsulfonyl-6-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-31-4)
- 20 B-60 2-[3-ethylsulfonyl-5-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-44-9)
- B-61 fluazaindolizine (CAS 1254304-22-7)
- B-62 tioxazafen (CAS 330459-31-9);

25 or agrochemically acceptable salts thereof.

In a second aspect, the present invention provides a composition comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

R₃ is H or CN; and

n is 0, 1 or 2;

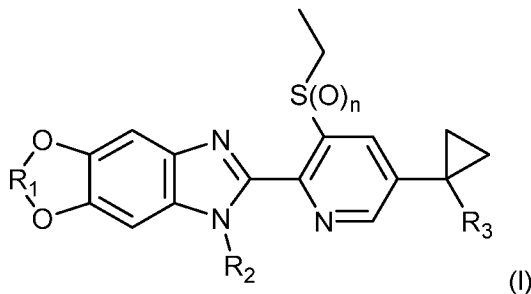
or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of B-1 to B-62 as defined above, or agrochemically acceptable salts thereof.

Optionally, the composition further comprises one or more auxiliaries and/or diluents.

The combination or composition of (A) and (B) may be in a suitable ratio by weight, examples of which are between 500:1 to 1:500, 100:1 to 1:100, 50:1 to 1:50, or 20:1 to 1:20, or preferably 10:1 to 1:10 or 5:1 to 1:5; more preferably 3:1 to 1:3 by weight. In certain examples, the ratio is within the range of 2:1 to 1:2, advantageously 1:1, by weight.

In a third aspect, the present invention provides a method of controlling or preventing damage to a plant, which comprises applying, in any desired sequence or simultaneously, on the plant, the locus thereof or its propagation material, a combination comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

R₃ is H or CN; and

n is 0, 1 or 2;

or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of:

B-63 thiacloprid (CAS 111988-49-9)

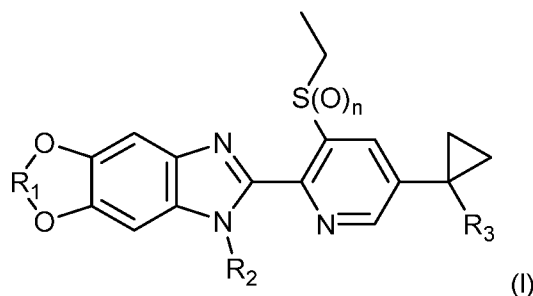
B-64 imidacloprid (CAS 138261-41-3)

- | | | |
|----|------|---------------------------------------|
| | B-65 | sulfoxaflor (CAS 946578-00-3) |
| | B-66 | acetamiprid (CAS 135410-20-7) |
| | B-67 | nitenpyram (CAS 150824-47-8) |
| | B-68 | clothianidin (CAS 210880-92-5) |
| 5 | B-69 | thiamethoxam (CAS 153719-23-4) |
| | B-70 | flubendiamide (CAS 272451-65-7) |
| | B-71 | cyantraniliprole (CAS 736994-63-1) |
| | B-72 | pyridalyl (CAS 179101-81-6) |
| | B-73 | indoxacarb (CAS 173584-44-6) |
| 10 | B-74 | deltamethrin (CAS 52918-63-5) |
| | B-75 | cyfluthrin (CAS 68359-37-5) |
| | B-76 | bifenthrin (CAS 82657-04-3) |
| | B-77 | zeta-cypermethrin (CAS 1315501-18-8) |
| | B-78 | gamma-cyhalothrin (CAS 76703-62-3) |
| 15 | B-79 | acrinathrin (CAS 101007-06-1) |
| | B-80 | permethrin (CAS 52645-53-1) |
| | B-81 | alpha-cypermethrin (CAS 67375-30-8) |
| | B-82 | fenpropathrin (CAS 39515-41-8) |
| | B-83 | fenvalerate (CAS 51630-58-1) |
| 20 | B-84 | esfenvalerate (CAS 66230-04-4) |
| | B-85 | cypermethrin (CAS 52315-07-8) |
| | B-86 | lambda-cyhalothrin (CAS 91465-08-6) |
| | B-87 | chlorantraniliprole (CAS 500008-45-7) |
| | B-88 | chlorfenapyr (CAS 122453-73-0); |

25 or agrochemically acceptable salts thereof;

wherein the combination of (A) and (B) is in a ratio by weight of 500:1 to 1:500, 100:1 to 1:100, 50:1 to 1:50, or 20:1 to 1:20, 10:1 to 1:10; 5:1 to 1:5; or 3:1 to 1:3 by weight.

In a fourth aspect, the present invention provides a composition comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

R₃ is H or CN; and

n is 0, 1 or 2;

or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of B-63 to B-88 as defined above, or agrochemically acceptable salts thereof; wherein the composition comprises (A) and (B) in a ratio by weight of 500:1 to 1:500, 100:1 to 1:100, 50:1 to 1:50, or 20:1 to 1:20, 10:1 to 1:10; 5:1 to 1:5; or 3.1 to 1:3 by weight.

Optionally, the composition further comprises one or more auxiliaries and/or diluents.

In certain examples, the ratio of component (A) to component (B) is within the range of 3:1 to 1:3, 2:1 to 1:2, or about 1:1, by weight.

In a fifth aspect, the present invention provides the use of a composition of the invention as an insecticide, acaricide and/or nematicide.

In a sixth aspect, the present invention provides a formulation comprising a composition of the invention, the formulation comprising from 0.01 to 90% by weight of active agents, from 0 to 25% by weight of agriculturally acceptable surfactant and from 10 to 99.9 percent by weight of solid or liquid formulation inerts and adjuvants.

In a seventh aspect, the present invention provides a concentrate composition for dilution by a user, the concentrate composition comprising a composition of the invention, comprising from 2% to 80% by weight, preferably between about 5% and 70% by weight of active agents.

In an eighth aspect, the present invention also provides the use of the combination or composition as defined above for controlling insect, acarina and/or nematode pests.

In certain examples, the compound of formula (I) is a compound of formula (I) in which R₁ is CF₂.

In certain examples, the compound of formula (I) is a compound of formula (I) in which R₂ is methyl, difluoromethyl, ethyl, or methoxymethyl.

In certain examples, the compound of formula (I) is a compound of formula (I) in which R₃ is cyano.

In certain examples, the compound of formula (I) is a compound of formula (I) in which n is 0 or 2.

5 In certain preferred examples, R₁ is CF₂, R₂ is methyl, R₃ is H or CN and n is 2.

However, besides any synergistic action, the combinations according to the invention can also have further surprising advantageous properties. Examples of such advantageous properties that may be mentioned are: more advantageous degradability, improved toxicological and/or ecotoxicological behaviour, or improved characteristics of the useful plants including: emergence, crop yields, more developed root system, tillering increase, increase in plant height, bigger leaf blade, less dead basal leaves, stronger tillers, greener leaf colour, less fertilizers needed, less seeds needed, more productive tillers, earlier flowering, early grain maturity, less plant verse (lodging), increased shoot growth, improved plant vigour, and early germination.

Certain weight ratios of component (A) to component (B) may give rise to synergistic activity. Therefore, according to a further aspect of the invention there is provided a composition, wherein component (A) and component (B) are present in the composition in amounts producing a synergistic effect. This synergistic activity is apparent from the fact that the activity of the composition comprising component (A) and component (B) is greater than the sum of the corresponding activities of component (A) and of component (B) alone. This synergistic activity extends the range of action of component (A) and component (B) in two ways. Firstly, the rates of application of component (A) and component (B) are lowered whilst the action remains equally good, meaning that the active ingredient mixture still achieves a high degree of pest control even where the two individual components have become totally ineffective in such a low application rate range. Secondly, there is a substantial broadening of the spectrum of pests that can be controlled.

25 The active ingredients in the combinations of the present invention may be applied to a pest, plant, plant propagation material or plant growing locus either simultaneously (for example as a pre-formulated mixture or a tank mix), or sequentially in a suitable timescale.

The compounds of the combination (i.e. components (A), and (B)), and any other pesticides, may be used either in pure form, i.e., as a solid active ingredient, for example, in a specific particle size, or preferably together with at least one of the auxiliary (also known as adjuvants) customary in formulation technology, such as extenders, e.g., solvents or solid carriers, or surface-active compounds (surfactants), in the form of a formulation, in the present invention. Generally, the compounds (A), and (B) are each in the form of a formulation composition with one or more of customary formulation auxiliaries.

35 Therefore, compounds (A) and (B) can be used in the form of separate formulations. The compounds can be applied to the locus where control is desired either simultaneously or in succession at short interval, for example on the same day, if desired together with further carriers, surfactants or other application-promoting adjuvants customarily employed in formulation technology. In a preferred

embodiment, (A) and (B) are applied simultaneously. Co-application or simultaneous application of components (A) and (B) has the added benefit of minimising farmer time spent applying products to crops. The combination may also encompass specific plant traits incorporated into the plant using any means, for example conventional breeding or genetic modification.

When compounds of the combination (i.e. (A), and (B)) are applied simultaneously in the present invention, they may be applied as a composition containing the combination, in which case each of (A), and (B) can be obtained from a separate formulation source and mixed together (known as a tank-mix, ready-to-apply, spray broth, or slurry), optionally with other pesticides, or (A), and (B) can be obtained as single formulation mixture source (known as a pre-mix, concentrate, formulated product), and optionally mixed together with other pesticides.

In one embodiment, the composition comprises an agriculturally acceptable formulation adjuvant. In a further embodiment, there is provided a composition consisting essentially of component (A), component (B) and an agriculturally acceptable adjuvant. In a further embodiment, there is provided a composition consisting of component (A), component (B) and an agriculturally acceptable adjuvant. The compositions of the present invention are generally formulated using formulation adjuvants, such as carriers, solvents and surface-active agents (SFAs).

The compounds in Table 1 below illustrate compounds of formula (I) in the combinations and compositions of the invention.

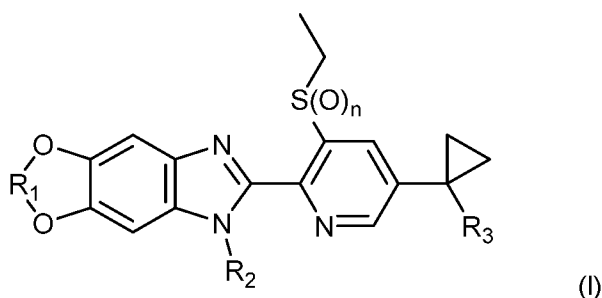


Table 1:

This table discloses six specific compounds of formula (I):

<i>Compound Number</i>	R_1	R_2	R_3	n
A-1	CF ₂	Me	H	0
A-2	CF ₂	Me	H	1
A-3	CF ₂	Me	H	2
A-4	CF ₂	Me	CN	0
A-5	CF ₂	Me	CN	1
A-6	CF ₂	Me	CN	2

The combinations and compositions of the present invention may be useful for the control of pests, such as insects, in improving the tolerance of crop plants to abiotic stress conditions, and/or in improving the yield of crop plants. In one embodiment, the combinations and compositions of the present invention may be useful for the control of insect and/or acarina and/or nematode pests. The present invention provides a method for controlling pests in or on crop plants, improving the tolerance of crop plants to abiotic stress conditions, and/or improving the yield of crop plants, comprising treating the pests, plants, plant part, plant propagation material, or plant growing locus with a composition as described herein.

The combinations and compositions of the present invention may be useful for extending the duration of protection afforded to the plant material. In one embodiment, the combinations and compositions of the present invention may show both a fast-acting curative action and a preventative or protective action.

The combinations and compositions of the present invention may be useful for extending the range of crops with which the combinations and compositions are useful and/or the range of pests against which the combinations and compositions provide effective control.

Accordingly, the combinations and compositions of the present invention provide an enhanced biological profile which may include a more complete activity spectrum and/or complementary modes of activity. Advantageously, the component (A) compounds and the component (B) compounds may provide complementary mobilities in the plant. In certain combinations, the component (A) compound has a greater acropetal movement in the plant compared with the component (B) compound, such that the component (B) compound provides more localised protection. Examples include component (B) compounds B1 to B3, B6 and B7. In other combinations, the component (A) compound has a lower acropetal movement in the plant compared with the component (B) compound, such that the component (A) compound provides more localised protection. Examples include component (B) compound B87, which shows acropetal and basipetal movement and also protects new growth of the plant.

Compounds of formula (I) are described in WO 2020/013147. Compound B-1, nicofluprole (CAS 1771741-86-6), is described in WO 2015067647. B-2, broflanilide (CAS 1207727-04-5), is described in WO 2010018714. B-3, fluxametamide (CAS 928783-29-3), is described in WO 2007026965. B-4,

tetraniliprole (CAS 1229654-66-3), is described in WO 2010069502. B-5, spidoxamat (CAS 907187-07-9), is described in WO 2006089633. B-6 and B-7, N-[[2-fluoro-4-[2-hydroxy-3-(3,4,5-trichlorophenyl)-3-(trifluoromethyl)pyrrolidin-1-yl]phenyl]methyl]cyclopropanecarboxamide (CAS 2044701-44-0 and 1365070-72-9), are described in WO 2012035011. B-8, 4-dimethyl-2-[2-(3-pyridyl)indazol-5-yl]-1,2,4-triazolidine-3,5-dione (CAS 2171099-09-3), is described in WO 2018011111. B-9, N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-2-methylsulfonyl-propanamide (CAS 2396747-83-2), is described in WO 2019236274. B-10, (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-5,7-dione (CAS 2246757-58-2), B-11, fenmezoditiaz (CAS 2413390-32-4), B-12, (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (CAS 2413839-58-2) and B-13, 3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (, CAS 2413839-57-1), are described in WO 2018177970. B-14, tyclopyrazoflor (CAS 1477919-27-9), is described in WO 2013162715. B-15, dimpropyridaz (CAS 1403615-77-9), is described in WO 2012143317. B-16, afidopyropen (CAS 915972-17-7), is described in WO 2006129714. B-17, triflumezopyrim (CAS 1263133-33-0), is described in WO 2011017351. B-18, flupyradifurone (CAS 951659-40-8), is described in DE 102006015467 (2007). B-19, fluhexafon (CAS 1097630-26-6), is described in WO 2009005110. B-20, tetrachlorantraniliprole (CAS 1104384-14-6), is described in WO 2010003350. B-21, cyhalodiamide (CAS 1262605-53-7), is described in WO 2012034472. B-22, benzpyrimoxan (CAS 1449021-97-9), is described in WO 2013115391. B-23, 1-(2-cyanoethyl)-4-oxo-3-[3-(trifluoromethyl)phenyl]pyrido[1,2-a]pyrimidin-1-ium-2-olate (CAS 2032403-97-5), is described in WO 2016171053. B-24, N-isopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680187-98-7), is described in WO 2015038503. B-25, N-cyclopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-04-8), is described in WO 2015038503. B-26, N-cyclohexyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-06-0), is described in WO 2015038503. B-27, 2-(3-pyridyl)-N-(2,2,2-trifluoroethyl)indazole-4-carboxamide (CAS 1680188-09-3), is described in WO 2015038503. B-28, methyl N-[[2-(3-pyridyl)indazole-5-carbonyl]amino]carbamate (CAS 1680188-56-0), is described in WO 2015038503. B-29, 2-(3-pyridyl)-N-(tetrahydrofuran-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-55-9), is described in WO 2015038503. B-30, N-[(2,2-difluorocyclopropyl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-65-1), is described in WO 2015038503. B-31, N-(2,2-difluoropropyl)-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-68-4), is described in WO 2015038503. B-32, 2-(3-pyridyl)-N-(pyrimidin-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-69-5), is described in WO 2015038503. B-33, N-[(5-methylpyrazin-2-yl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-91-3), is described in WO 2015038503. B-34, indazapyroxamet (CAS 1689545-27-4), is described in WO 2015038503. B-35, N-[1-(difluoromethyl)cyclopropyl]-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-90-5), is described in WO 2020018362. B-36, N-(1,1-dimethyl-2-methylsulfonyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-91-6), is described in WO 2020018362. B-37, N-(1,1-dimethyl-2-methylsulfinyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-92-7), is described in WO 2020018362. B-38, 1,1-dimethyl-2-methylsulfonyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-93-8), is described in WO 2020018362. B-39, cyproflanilide (CAS 2375110-88-4), is described in WO 2020001067. B-40, dicloromezotiaz (CAS

1263629-39-5), is described in WO 2011017342. B-41, dinotefuran (CAS 165252-70-0), is described in EP 649845 (1995). B-42, flupyrimin (CAS 1363400-41-2), is described in WO 2012029672. B-43, guadipyr (CAS 1227849-60-6), is described in WO 2010060231. B-44, flometoquin (CAS 875775-74-9), is described in WO 2006013896. B-45 to B-47, flupentiofenox (CAS 1472050-04-6, 1472050-06-8 and 1472050-05-7), are described in WO 2013157229. B-48, cyetpyrafen (CAS 1253429-01-4), is described in WO 2010124617. B-49, pyflubumide (CAS 926914-55-8), is described in WO 2007020986. B-50, pyriminostrobin (CAS 1257598-43-8), is described in WO 2010139271. B-51, acynonapyr (CAS 1333001-59-4), is described in WO 2011105506. B-52 to B-54, 2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 2377084-09-6, 1445684-82-1 and 1445683-71-5), are described in WO 2013092350. B-55, oxazosulfonyl (CAS 1616678-32-0), is described in WO 2014104407. B-56, 2-(5-cyclopropyl-3-ethylsulfonyl-2-pyridyl)-5-(trifluoromethylsulfonyl)-1,3-benzoxazole (CAS 2128706-05-6), is described in WO 2017146226. B-57, 2-[3-ethylsulfonyl-6-(1,2,4-triazol-1-yl)-2-pyridyl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 1808115-49-2), is described in WO 2015133603. B-58, (3-ethylsulfonyl-2-pyridyl)-5-(2,2,3,3,3-pentafluoropropoxy)pyrazine (CAS 2095470-94-1), is described in WO 2017065228. B-59, 2-[3-ethylsulfonyl-6-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-31-4), is described in WO 2017155103. B-60, 2-[3-ethylsulfonyl-5-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-44-9), is described in WO 2017155103. B-61, fluazaindolizine (CAS 1254304-22-7), is described in WO 2010129500. B-62, tioxazafen (CAS 330459-31-9), is described in WO 2006114400. B-63, thiachloprid (CAS 111988-49-9), is described in EP 235725 (1987). B-64, imidachloprid (CAS 138261-41-3), is described in EP 192060 (1986). B-65, sulfoxaflor (CAS 946578-00-3), is described in WO 2007095229. B-66, acetamiprid (CAS 135410-20-7), is described in WO 9104965. B-67, nitenpyram (CAS 150824-47-8), is described in EP 392560 (1990). B-68, clothianidin (CAS 210880-92-5), is described in WO 9827074. B-69, thiamethoxam (CAS 153719-23-4), is described in EP 580553 (1994). B-70, flubendiamide (CAS 272451-65-7), is described in EP 1006107 (2000). B-71, cyantraniliprole (CAS 736994-63-1), is described in WO 2004067528. B-72, pyridalyl (CAS 179101-81-6), is described in WO 9611909. B-73, indoxacarb (CAS 173584-44-6), is described in WO 9529171. B-74, deltamethrin (CAS 52918-63-5), is described in DE 2439177 (1975). B-75, cyfluthrin (CAS 68359-37-5), is described in DE 2709264 (1978). B-76, bifenthrin (CAS 82657-04-3), is described in GB 2085005 (1982). B-77, zeta-cypermethrin (CAS 1315501-18-8), is described in WO 2008005764. B-78, gamma-cyhalothrin (CAS 76703-62-3, GB 2143823 (1985). B-79, acrinathrin (CAS 101007-06-1), is described in US 4542142 (1985). B-80, permethrin (CAS 52645-53-1), is described in DE 2437882 (1975). B-81, alpha-cypermethrin (CAS 67375-30-8), is described in DE 2850502 (1979). B-82, fenpropathrin (CAS 39515-41-8), is described in DE 2231312 (1973). B-83, fenvalerate (CAS 51630-58-1), is described in DE 2335347 (1974). B-84, esfenvalerate (CAS 66230-04-4), is described in DE 2737297 (1978). B-85, cypermethrin (CAS 52315-07-8), is described in DE 2326077 (1974). B-86, lambda-cyhalothrin (CAS 91465-08-6), is described in EP 106469 (1984). B-87, chlorantraniliprole (CAS 500008-45-7), is described in WO 2003015518. B-88, chlorfenapyr (CAS 122453-73-0), is described in BR 8803788 (1989).

Examples of the above mentioned animal pests are:

from the order *Acarina*, for example,

Acalitus spp, Aculus spp, Acaricalus spp, Aceria spp, Acarus siro, Amblyomma spp., Argas spp., Boophilus spp., Brevipalpus spp., Bryobia spp, Calipitimerus spp., Chorioptes spp., Dermanyssus gallinae, Dermatophagoides spp, Eotetranychus spp, Eriophyes spp., Hemitarsonemus spp, Hyalomma spp., Ixodes spp., Olygonychus spp, Ornithodoros spp., Polyphagotarsonemus latus, Panonychus spp., Phyllocoptruta oleivora, Phytonemus spp, Polyphagotarsonemus spp, Psoroptes spp., Rhipicephalus spp., Rhizoglyphus spp., Sarcoptes spp., Steneotarsonemus spp, Tarsonemus spp. and Tetranychus spp.;

from the order *Anoplura*, for example,

Haematopinus spp., Linognathus spp., Pediculus spp., Pemphigus spp. and Phylloxera spp.;

from the order *Coleoptera*, for example,

Agriotes spp., Amphimallon majale, Anomala orientalis, Anthonomus spp., Aphodius spp, Astylus atromaculatus, Ataenius spp, Atomaria linearis, Chaetocnema tibialis, Cerotoma spp, Conoderus spp, Cosmopolites spp., Cotinis nitida, Curculio spp., Cyclocephala spp, Dermestes spp., Diabrotica spp., Diloboderus abderus, Epilachna spp., Eremnus spp., Heteronychus arator, Hypothenemus hampei, Lagria vilosa, Leptinotarsa decemlineata, Lissorhoptrus spp., Liogenys spp, Maecolaspis spp, Maladera castanea, Megascelis spp, Meligethes aeneus, Melolontha spp., Myochrous armatus, Oryzaephilus spp., Otorhynchus spp., Phyllophaga spp, Phlyctinus spp., Popillia spp., Psylliodes spp., Rhyssomatus aubtilis, Rhizopertha spp., Scarabeidae, Sitophilus spp., Sitotroga spp., Somaticus spp, Sphenophorus spp, Sternechus subsignatus, Tenebrio spp., Tribolium spp. and Trogoderma spp.;

from the order *Diptera*, for example,

Aedes spp., Anopheles spp, Antherigona soccata, Bactrocea oleae, Bibio hortulanus, Bradysia spp, Calliphora erythrocephala, Ceratitis spp., Chrysomyia spp., Culex spp., Cuterebra spp., Dacus spp., Delia spp, Drosophila melanogaster, Fannia spp., Gastrophilus spp., Geomyza tripunctata, Glossina spp., Hypoderma spp., Hyppobosca spp., Liriomyza spp., Lucilia spp., Melanagromyza spp., Musca spp., Oestrus spp., Orseolia spp., Oscinella frit, Pegomyia hyoscyami, Phorbia spp., Rhagoletis spp, Rivelia quadrifasciata, Scatella spp, Sciara spp., Stomoxys spp., Tabanus spp., Tannia spp. and Tipula spp.;

from the order *Hemiptera*, for example,

Acanthocoris scabrator, Acrosternum spp, Adelphocoris lineolatus, Aleurodes spp., Amblypelta nitida, Bathycoelia thalassina, Blissus spp, Cimex spp., Clavigralla tomentosicollis, Creontiades spp, Distantiella theobroma, Dichelops furcatus, Dysdercus spp., Edessa spp, Euchistus spp., Eurydema pulchrum, Eurygaster spp., Halyomorpha halys, Horcias nobilellus, Leptocoris spp., Lygus spp, Margarodes spp, Murgantia histrionic, Neomegalotomus spp, Nesidiocoris tenuis, Nezara spp., Nysius simulans, Oebalus insularis, Piesma spp., Piezodorus spp, Rhodnius spp., Sahlbergella singularis, Scaptocoris castanea, Scotinophara spp. , Thyanta spp , Triatoma spp., Vatica illudens; Acyrthosium

pisum, Adalges spp, Agalliana ensigera, Agonosцена targionii, Aleurodicus spp, Aleurocanthus spp, Aleurolobus barodensis, Aleurothrixus floccosus, Aleyrodes brassicae, Amarasca biguttula, Amritodus atkinsoni, Aonidiella spp., Aphididae, Aphis spp., Aspidiotus spp., Aulacorthum solani, Bactericera cockerelli, Bemisia spp, Brachycaudus spp, Brevicoryne brassicae, Cacopsylla spp, Cavariella aegopodii Scop., Ceroplaster spp., Chrysomphalus aonidium, Chrysomphalus dictyospermi, Cicadella spp, Cofana spectra, Cryptomyzus spp, Cicadulina spp, Coccus hesperidum, Dalbulus maidis, Dialeurodes spp, Diaphorina citri, Diuraphis noxia, Dysaphis spp, Empoasca spp., Eriosoma larigerum, Erythroneura spp., Gascardia spp., Glycaspis brimblecombei, Hyadaphis pseudobrassicae, Hyalopterus spp, Hyperomyzus pallidus, Idioscopus clypealis, Jacobiasca lybica, Laodelphax spp., Lecanium corni, Lepidosaphes spp., Lopaphis erysimi, Lyogenys maidis, Macrosiphum spp., Mahanarva spp, Metcalfa pruinosa, Metopolophium dirhodum, Myndus crudus, Myzus spp., Neotoxoptera sp, Nephrotettix spp., Nilaparvata spp., Nippolachnus piri Mats, Odonaspis ruthae, Oregma lanigera Zehnter, Parabemisia myricae, Paratrioza cockerelli, Parlatoria spp., Pemphigus spp., Peregrinus maidis, Perkinsiella spp, Phorodon humuli, Phylloxera spp, Planococcus spp., Pseudaulacaspis spp., Pseudococcus spp., Pseudatomoscelis seriatus, Psylla spp., Pulvinaria aethiopica, Quadraspidiotus spp., Quesada gigas, Recilia dorsalis, Rhopalosiphum spp., Saissetia spp., Scaphoideus spp., Schizaphis spp., Sitobion spp., Sogatella furcifera, Spissistilus festinus, Tarophagus Proserpina, Toxoptera spp, Trialeurodes spp, Tridiscus sporoboli, Trionymus spp, Trioza erytreae , Unaspis citri, Zyginia flammigera, Zyginidia scutellaris;

from the order *Hymenoptera*, for example,

Acromyrmex, Arge spp, Atta spp., Cephus spp., Diprion spp., Diprionidae, Gilpinia polytoma, Hoplocampa spp., Lasius spp., Monomorium pharaonis, Neodiprion spp., Pogonomyrmex spp, Slenopsis invicta, Solenopsis spp. and Vespa spp.;

from the order *Isoptera*, for example,

Coptotermes spp, Cornitermes cumulans, Incisitermes spp, Macrotermes spp, Mastotermes spp, Microtermes spp, Reticulitermes spp.; Solenopsis geminate;

from the order *Lepidoptera*, for example,

Acleris spp., Adoxophyes spp., Aegeria spp., Agrotis spp., Alabama argillaceae, Amylois spp., Anticarsia gemmatilis, Archips spp., Argyrothia spp, Argyrotaenia spp., Autographa spp., Bucculatrix thurberiella, Busseola fusca, Cadra cautella, Carposina nipponensis, Chilo spp., Choristoneura spp., Chrysoteuchia topiaria, Clysia ambiguella, Cnaphalocrocis spp., Cnephasia spp., Cochylis spp., Coleophora spp., Colias lesbia, Cosmophila flava, Crambus spp, Crocidolomia binotalis, Cryptophlebia leucotreta, Cydalima perspectalis, Cydia spp., Diaphania perspectalis, Diatraea spp., Diparopsis castanea, Earias spp., Elasmopalpus lignosellus, Eldana saccharina, Ephestia spp., Epinotia spp, Estigmene acrea, Etiella zinckenella, Eucosma spp., Eupoecilia ambiguella, Euproctis spp., Euxoa spp., Feltia jaculiferia, Grapholita spp., Hedya nubiferana, Heliothis spp., Hellula undalis, Herpetogramma spp, Hyphantria cunea, Keiferia lycopersicella, Lasmopalpus lignosellus, Leucoptera scitella, Lithocolletis spp., Lobesia botrana, Loxostege bifidalis, Lymantria spp., Lyonetia spp., Malacosoma

spp., *Mamestra brassicae*, *Manduca sexta*, *Mythimna* spp, *Noctua* spp, *Operophtera* spp., *Orniodes indica*, *Ostrinia nubilalis*, *Pammene* spp., *Pandemis* spp., *Panolis flammea*, *Papaipema nebris*, *Pectinophora gossypiella*, *Perileucoptera coffeella*, *Pseudaletia unipuncta*, *Phthorimaea operculella*, *Pieris rapae*, *Pieris* spp., *Plutella xylostella*, *Prays* spp., *Pseudoplusia* spp, *Rachiplusia nu*, *Richia albicosta*, *Scirpophaga* spp., *Sesamia* spp., *Sparganothis* spp., *Spodoptera* spp., *Sylepta derogate*, *Synanthedon* spp., *Thaumetopoea* spp., *Tortrix* spp., *Trichoplusia ni*, *Tuta absoluta*, and *Yponomeuta* spp.;

from the order *Mallophaga*, for example,

Damalinea spp. and *Trichodectes* spp.;

from the order *Orthoptera*, for example,

Blatta spp., *Blattella* spp., *Gryllotalpa* spp., *Leucophaea maderae*, *Locusta* spp., *Neocurtilla hexadactyla*, *Periplaneta* spp. , *Scapteriscus* spp, and *Schistocerca* spp.;

from the order *Psocoptera*, for example,

Liposcelis spp.;

from the order *Siphonaptera*, for example,

Ceratophyllus spp., *Ctenocephalides* spp. and *Xenopsylla cheopis*;

from the order *Thysanoptera*, for example,

Calliothrips phaseoli, *Frankliniella* spp., *Heliothrips* spp, *Hercinothrips* spp., *Parthenothrips* spp, *Scirtothrips aurantii*, *Sericothrips variabilis*, *Taeniothrips* spp., *Thrips* spp;

from the order *Thysanura*, for example, *Lepisma saccharina*.

In a further aspect, the invention may also relate to a method of controlling damage to plant and parts thereof by plant parasitic nematodes (Endoparasitic-, Semiendoparasitic- and Ectoparasitic nematodes), especially plant parasitic nematodes such as root knot nematodes, *Meloidogyne hapla*, *Meloidogyne incognita*, *Meloidogyne javanica*, *Meloidogyne arenaria* and other *Meloidogyne* species; cyst-forming nematodes, *Globodera rostochiensis* and other *Globodera* species; *Heterodera avenae*, *Heterodera glycines*, *Heterodera schachtii*, *Heterodera trifolii*, and other *Heterodera* species; Seed gall nematodes, *Anguina* species; Stem and foliar nematodes, *Aphelenchoides* species; Sting nematodes, *Belonolaimus longicaudatus* and other *Belonolaimus* species; Pine nematodes, *Bursaphelenchus xylophilus* and other *Bursaphelenchus* species; Ring nematodes, *Criconema* species, *Criconemella* species, *Criconemoides* species, *Mesocriconema* species; Stem and bulb nematodes, *Ditylenchus destructor*, *Ditylenchus dipsaci* and other *Ditylenchus* species; Awl nematodes, *Dolichodorus* species; Spiral nematodes, *Helicotylenchus multicinctus* and other *Helicotylenchus* species; Sheath and sheathoid nematodes, *Hemicyclophora* species and *Hemicriconemoides* species; *Hirshmanniella* species; Lance nematodes, *Hoploaimus* species; false rootknot nematodes, *Nacobbus* species; Needle nematodes, *Longidorus elongatus* and other *Longidorus* species; Pin nematodes, *Pratylenchus* species; Lesion nematodes, *Pratylenchus neglectus*, *Pratylenchus penetrans*, *Pratylenchus curvatus*,

Pratylenchus goodeyi and other Pratylenchus species; Burrowing nematodes, Radopholus similis and other Radopholus species; Reniform nematodes, Rotylenchus robustus, Rotylenchus reniformis and other Rotylenchus species; Scutellonema species; Stubby root nematodes, Trichodorus primitivus and other Trichodorus species, Paratrichodorus species; Stunt nematodes, Tylenchorhynchus claytoni, Tylenchorhynchus dubius and other Tylenchorhynchus species; Citrus nematodes, Tylenchulus species; Dagger nematodes, Xiphinema species; and other plant parasitic nematode species, such as Subanguina spp., Hypsoperine spp., Macroposthonia spp., Melinius spp., Punctodera spp., and Quinisulcius spp..

The combinations and compositions of the invention may also have activity against the molluscs. Examples of which include, for example, Ampullariidae; Arion (A. ater, A. circumscriptus, A. hortensis, A. rufus); Bradybaenidae (Bradybaena fruticum); Cepaea (C. hortensis, C. Nemoralis); ochlodina; Deroceras (D. agrestis, D. empiricorum, D. laeve, D. reticulatum); Discus (D. rotundatus); Euomphalia; Galba (G. trunculata); Helicella (H. itala, H. obvia); Helicidae Helicigona arbustorum; Helicodiscus; Helix (H. aperta); Limax (L. cinereoniger, L. flavus, L. marginatus, L. maximus, L. tenellus); Lymnaea; Milax (M. gagates, M. marginatus, M. sowerbyi); Opeas; Pomacea (P. canaticulata); Vallonia and Zanioides.

The combinations and compositions according to the invention can be used for controlling, i. e. containing or destroying, pests of the abovementioned type which occur in particular on plants, especially on useful plants and ornamentals in agriculture, in horticulture and in forests, or on organs, such as fruits, flowers, foliage, stalks, tubers or roots, of such plants, and in some cases even plant organs which are formed at a later point in time remain protected against these pests.

Suitable target crops are, in particular, cereals, such as wheat, barley, rye, oats, rice, maize or sorghum; beet, such as sugar or fodder beet; fruit, for example pomaceous fruit, stone fruit or soft fruit, such as apples, pears, plums, peaches, almonds, cherries or berries, for example strawberries, raspberries or blackberries; leguminous crops, such as beans, lentils, peas or soya; oil crops, such as oilseed rape, mustard, poppies, olives, sunflowers, coconut, castor, cocoa or ground nuts; cucurbits, such as pumpkins, cucumbers or melons; fibre plants, such as cotton, flax, hemp or jute; citrus fruit, such as oranges, lemons, grapefruit or tangerines; vegetables, such as spinach, lettuce, asparagus, cabbages, carrots, onions, tomatoes, potatoes or bell peppers; Lauraceae, such as avocado, Cinnamomum or camphor; and also tobacco, nuts, coffee, eggplants, sugarcane, tea, pepper, grapevines, hops, the plantain family and latex plants.

The combinations and compositions of the present invention may be also used on any ornamental and/or vegetable crops, including flowers, shrubs, broad-leaved trees and evergreens.

For example the invention may be used on any of the following ornamental species: *Ageratum* spp., *Alonsoa* spp., *Anemone* spp., *Anisodonta capensis*, *Anthemis* spp., *Antirrhinum* spp., *Aster* spp., *Begonia* spp. (e.g. *B. elatior*, *B. semperflorens*, *B. tuberosa*), *Bougainvillea* spp., *Brachycome* spp., *Brassica* spp. (ornamental), *Calceolaria* spp., *Capsicum annuum*, *Catharanthus roseus*, *Canna* spp., *Centaurea* spp., *Chrysanthemum* spp., *Cineraria* spp. (*C. maritime*), *Coreopsis* spp., *Crassula*

coccinea, *Cuphea ignea*, *Dahlia* spp., *Delphinium* spp., *Dicentra spectabilis*, *Dorotheantus* spp., *Eustoma grandiflorum*, *Forsythia* spp., *Fuchsia* spp., *Geranium gnaphalium*, *Gerbera* spp., *Gomphrena globosa*, *Heliotropium* spp., *Helianthus* spp., *Hibiscus* spp., *Hortensia* spp., *Hydrangea* spp., *Hypoestes phyllostachya*, *Impatiens* spp. (*I. Walleriana*), *Iresines* spp., *Kalanchoe* spp., *Lantana camara*, *Lavatera trimestris*, *Leonotis leonurus*, *Lilium* spp., *Mesembryanthemum* spp., *Mimulus* spp., *Monarda* spp., *Nemesia* spp., *Tagetes* spp., *Dianthus* spp. (carnation), *Canna* spp., *Oxalis* spp., *Bellis* spp., *Pelargonium* spp. (*P. peltatum*, *P. Zonale*), *Viola* spp. (pansy), *Petunia* spp., *Phlox* spp., *Plecthranthus* spp., *Poinsettia* spp., *Parthenocissus* spp. (*P. quinquefolia*, *P. tricuspidata*), *Primula* spp., *Ranunculus* spp., *Rhododendron* spp., *Rosa* spp. (rose), *Rudbeckia* spp., *Saintpaulia* spp., *Salvia* spp., *Scaevola aemola*, *Schizanthus wisetonensis*, *Sedum* spp., *Solanum* spp., *Surfinia* spp., *Tagetes* spp., *Nicotinia* spp., *Verbena* spp., *Zinnia* spp. and other bedding plants.

For example the invention may be used on any of the following vegetable species: *Allium* spp. (*A. sativum*, *A. cepa*, *A. oschaninii*, *A. Porrum*, *A. ascalonicum*, *A. fistulosum*), *Anthriscus cerefolium*, *Apium graveolus*, *Asparagus officinalis*, *Beta vulgaris*, *Brassica* spp. (*B. Oleracea*, *B. Pekinensis*, *B. rapa*), *Capsicum annuum*, *Cicer arietinum*, *Cichorium endivia*, *Cichorium* spp. (*C. intybus*, *C. endivia*), *Citrillus lanatus*, *Cucumis* spp. (*C. sativus*, *C. melo*), *Cucurbita* spp. (*C. pepo*, *C. maxima*), *Cyanara* spp. (*C. scolymus*, *C. cardunculus*), *Daucus carota*, *Foeniculum vulgare*, *Hypericum* spp., *Lactuca sativa*, *Lycopersicon* spp. (*L. esculentum*, *L. lycopersicum*), *Mentha* spp., *Ocimum basilicum*, *Petroselinum crispum*, *Phaseolus* spp. (*P. vulgaris*, *P. coccineus*), *Pisum sativum*, *Raphanus sativus*, *Rheum rhaponticum*, *Rosemarinus* spp., *Salvia* spp., *Scorzonera hispanica*, *Solanum melongena*, *Spinacea oleracea*, *Valerianella* spp. (*V. locusta*, *V. eriocarpa*) and *Vicia faba*.

Preferred ornamental species include African violet, *Begonia*, *Dahlia*, *Gerbera*, *Hydrangea*, *Verbena*, *Rosa*, *Kalanchoe*, *Poinsettia*, *Aster*, *Centaurea*, *Coreopsis*, *Delphinium*, *Monarda*, *Phlox*, *Rudbeckia*, *Sedum*, *Petunia*, *Viola*, *Impatiens*, *Geranium*, *Chrysanthemum*, *Ranunculus*, *Fuchsia*, *Salvia*, *Hortensia*, rosemary, sage, St. Johnswort, mint, sweet pepper, tomato and cucumber.

The combinations and compositions of the invention are particularly suitable for control of

- a pest of the order Hemiptera, for example, one or more of the species *Bemisia tabaci*, *Aphis craccivora*, *Myzus persicae*, *Rhopalosiphum Padi*, *Nilaparvata lugens*, and *Euschistus heros* (preferably in vegetables, soybeans, and sugarcane);
- a pest of the order Lepidoptera, for example, one or more of the species *Spodoptera littoralis*, *Spodoptera frugiperda*, *Plutella xylostella*, *Cnaphalocrocis medinalis*, *Cydia pomonella*, *Chrysodeixis* includes, *Chilo suppressalis*, *Elasmopalpus lignosellus*, *Pseudoplusia includens*, and *Tuta absoluta* (preferably in rice, vegetables and corn);
- a pest of the order Thysanoptera, such as the family Thripidae, for example, one or more of *Thrips tabaci* and *Frankliniella occidentalis* (preferably in vegetables); and
- soil pests (such as of the order Coleoptera), for example, the species *Diabrotica balteata*, *Agriotes* spp. and *Leptinotarsa decemlineata* (preferably in vegetables and corn).

The term "crops" is to be understood as including also crop plants which have been so transformed by the use of recombinant DNA techniques that they are capable of synthesising one or more selectively acting toxins, such as are known, for example, from toxin-producing bacteria, especially those of the genus *Bacillus*.

Toxins that can be expressed by such transgenic plants include, for example, insecticidal proteins, for example insecticidal proteins from *Bacillus cereus* or *Bacillus popilliae*; or insecticidal proteins from *Bacillus thuringiensis*, such as δ -endotoxins, e.g. Cry1Ab, Cry1Ac, Cry1F, Cry1Fa2, Cry2Ab, Cry3A, Cry3Bb1 or Cry9C, or vegetative insecticidal proteins (Vip), e.g. Vip1, Vip2, Vip3 or Vip3A; or insecticidal proteins of bacteria colonising nematodes, for example *Photorhabdus* spp. or *Xenorhabdus* spp., such as *Photorhabdus luminescens*, *Xenorhabdus nematophilus*; toxins produced by animals, such as scorpion toxins, arachnid toxins, wasp toxins and other insect-specific neurotoxins; toxins produced by fungi, such as *Streptomyces* toxins, plant lectins, such as pea lectins, barley lectins or snowdrop lectins; agglutinins; proteinase inhibitors, such as trypsin inhibitors, serine protease inhibitors, patatin, cystatin, papain inhibitors; ribosome-inactivating proteins (RIP), such as ricin, maize-RIP, abrin, luffin, saporin or bryodin; steroid metabolism enzymes, such as 3-hydroxysteroidoxidase, ecdysteroid-UDP-glycosyl-transferase, cholesterol oxidases, ecdysone inhibitors, HMG-CoA-reductase, ion channel blockers, such as blockers of sodium or calcium channels, juvenile hormone esterase, diuretic hormone receptors, stilbene synthase, bibenzyl synthase, chitinases and glucanases.

In the context of the present invention there are to be understood by δ -endotoxins, for example Cry1Ab, Cry1Ac, Cry1F, Cry1Fa2, Cry2Ab, Cry3A, Cry3Bb1 or Cry9C, or vegetative insecticidal proteins (Vip), for example Vip1, Vip2, Vip3 or Vip3A, expressly also hybrid toxins, truncated toxins and modified toxins. Hybrid toxins are produced recombinantly by a new combination of different domains of those proteins (see, for example, WO 02/15701). Truncated toxins, for example a truncated Cry1Ab, are known. In the case of modified toxins, one or more amino acids of the naturally occurring toxin are replaced. In such amino acid replacements, preferably non-naturally present protease recognition sequences are inserted into the toxin, such as, for example, in the case of Cry3A055, a cathepsin-G-recognition sequence is inserted into a Cry3A toxin (see WO 03/018810).

Examples of such toxins or transgenic plants capable of synthesising such toxins are disclosed, for example, in EP-A-0 374 753, WO 93/07278, WO 95/34656, EP-A-0 427 529, EP-A-451 878 and WO 03/052073.

The processes for the preparation of such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. CryI-type deoxyribonucleic acids and their preparation are known, for example, from WO 95/34656, EP-A-0 367 474, EP-A-0 401 979 and WO 90/13651.

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

Transgenic plants containing one or more genes that code for an insecticidal resistance and express one or more toxins are known and some of them are commercially available. Examples of such plants are: YieldGard® (maize variety that expresses a Cry1Ab toxin); YieldGard Rootworm® (maize variety that expresses a Cry3Bb1 toxin); YieldGard Plus® (maize variety that expresses a Cry1Ab and a Cry3Bb1 toxin); Starlink® (maize variety that expresses a Cry9C toxin); Herculex I® (maize variety that expresses a Cry1Fa2 toxin and the enzyme phosphinothricine N-acetyltransferase (PAT) to achieve tolerance to the herbicide glufosinate ammonium); NuCOTN 33B® (cotton variety that expresses a Cry1Ac toxin); Bollgard I® (cotton variety that expresses a Cry1Ac toxin); Bollgard II® (cotton variety that expresses a Cry1Ac and a Cry2Ab toxin); VipCot® (cotton variety that expresses a Vip3A and a Cry1Ab toxin); NewLeaf® (potato variety that expresses a Cry3A toxin); NatureGard®, Agrisure® GT Advantage (GA21 glyphosate-tolerant trait), Agrisure® CB Advantage (Bt11 corn borer (CB) trait) and Protecta®.

Further examples of such transgenic crops are:

1. **Bt11 Maize** from Syngenta Seeds SAS, Chemin de l'Hobit 27, F-31 790 St. Sauveur, France, registration number C/FR/96/05/10. Genetically modified *Zea mays* which has been rendered resistant to attack by the European corn borer (*Ostrinia nubilalis* and *Sesamia nonagrioides*) by transgenic expression of a truncated Cry1Ab toxin. Bt11 maize also transgenically expresses the enzyme PAT to achieve tolerance to the herbicide glufosinate ammonium.
2. **Bt176 Maize** from Syngenta Seeds SAS, Chemin de l'Hobit 27, F-31 790 St. Sauveur, France, registration number C/FR/96/05/10. Genetically modified *Zea mays* which has been rendered resistant to attack by the European corn borer (*Ostrinia nubilalis* and *Sesamia nonagrioides*) by transgenic expression of a Cry1Ab toxin. Bt176 maize also transgenically expresses the enzyme PAT to achieve tolerance to the herbicide glufosinate ammonium.
3. **MIR604 Maize** from Syngenta Seeds SAS, Chemin de l'Hobit 27, F-31 790 St. Sauveur, France, registration number C/FR/96/05/10. Maize which has been rendered insect-resistant by transgenic expression of a modified Cry3A toxin. This toxin is Cry3A055 modified by insertion of a cathepsin-G-protease recognition sequence. The preparation of such transgenic maize plants is described in WO 03/018810.
4. **MON 863 Maize** from Monsanto Europe S.A. 270-272 Avenue de Tervuren, B-1150 Brussels, Belgium, registration number C/DE/02/9. MON 863 expresses a Cry3Bb1 toxin and has resistance to certain Coleoptera insects.
5. **IPC 531 Cotton** from Monsanto Europe S.A. 270-272 Avenue de Tervuren, B-1150 Brussels, Belgium, registration number C/ES/96/02.
6. **1507 Maize** from Pioneer Overseas Corporation, Avenue Tedesco, 7 B-1160 Brussels, Belgium, registration number C/NL/00/10. Genetically modified maize for the expression of the protein Cry1F for

achieving resistance to certain Lepidoptera insects and of the PAT protein for achieving tolerance to the herbicide glufosinate ammonium.

7. **NK603 × MON 810 Maize** from Monsanto Europe S.A. 270-272 Avenue de Tervuren, B-1150 Brussels, Belgium, registration number C/GB/02/M3/03. Consists of conventionally bred hybrid maize varieties by crossing the genetically modified varieties NK603 and MON 810. NK603 × MON 810 Maize transgenically expresses the protein CP4 EPSPS, obtained from *Agrobacterium sp.* strain CP4, which imparts tolerance to the herbicide Roundup® (contains glyphosate), and also a Cry1Ab toxin obtained from *Bacillus thuringiensis subsp. kurstaki* which brings about tolerance to certain Lepidoptera, include the European corn borer.

Transgenic crops of insect-resistant plants are also described in BATS (Zentrum für Biosicherheit und Nachhaltigkeit, Zentrum BATS, Clarastrasse 13, 4058 Basel, Switzerland) Report 2003, (<http://bats.ch>).

The term "crops" is to be understood as including also crop plants which have been so transformed by the use of recombinant DNA techniques that they are capable of synthesising antipathogenic substances having a selective action, such as, for example, the so-called "pathogenesis-related proteins" (PRPs, see e.g. EP-A-0 392 225). Examples of such antipathogenic substances and transgenic plants capable of synthesising such antipathogenic substances are known, for example, from EP-A-0 392 225, WO 95/33818 and EP-A-0 353 191. The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

Crops may also be modified for enhanced resistance to fungal (for example Fusarium, Anthracnose, or Phytophthora), bacterial (for example Pseudomonas) or viral (for example potato leafroll virus, tomato spotted wilt virus, cucumber mosaic virus) pathogens.

Crops also include those that have enhanced resistance to nematodes, such as the soybean cyst nematode.

Crops that are tolerance to abiotic stress include those that have enhanced tolerance to drought, high salt, high temperature, chill, frost, or light radiation, for example through expression of NF-YB or other proteins known in the art.

Antipathogenic substances which can be expressed by such transgenic plants include, for example, ion channel blockers, such as blockers for sodium and calcium channels, for example the viral KP1, KP4 or KP6 toxins; stilbene synthases; bibenzyl synthases; chitinases; glucanases; the so-called "pathogenesis-related proteins" (PRPs; see e.g. EP-A-0 392 225); antipathogenic substances produced by microorganisms, for example peptide antibiotics or heterocyclic antibiotics (see e.g. WO 95/33818) or protein or polypeptide factors involved in plant pathogen defence (so-called "plant disease resistance genes", as described in WO 03/000906).

Further areas of use of the compositions according to the invention are the protection of stored goods and store rooms and the protection of raw materials, such as wood, textiles, floor coverings or

buildings, and also in the hygiene sector, especially the protection of humans, domestic animals and productive livestock against pests of the mentioned type.

The present invention provides a method of improving the tolerance of a plant to abiotic stress, wherein the method comprises applying to the plant, plant part, plant propagation material, or plant growing locus a composition as described herein.

The present invention provides a method for regulating or improving the growth of a plant, wherein the method comprises applying to the plant, plant part, plant propagation material, or plant growing locus a composition as described herein. In one embodiment, plant growth is regulated or improved when the plant is subject to abiotic stress conditions.

The term "regulating or improving the growth of a crop" means an improvement in plant vigour, an improvement in plant quality, improved tolerance to stress factors, and/or improved input use efficiency.

The term "plants" refers to all physical parts of a plant, including seeds, seedlings, saplings, roots, tubers, stems, stalks, foliage, and fruits.

The term "locus" as used herein means fields in or on which plants are growing, or where seeds of cultivated plants are sown, or where seed will be placed into the soil. It includes soil, seeds, and seedlings, as well as established vegetation.

The term "plant propagation material" denotes all generative parts of a plant, for example seeds or vegetative parts of plants such as cuttings and tubers. It includes seeds in the strict sense, as well as roots, fruits, tubers, bulbs, rhizomes, and parts of plants.

Where a range of numbers is disclosed herein (for example, 1 to 10), this is intended to include all numbers and intervening values within that range (for example, 1, 1.1, 2, 3, 3.9, 4, 5, 6, 6.5, 7, 8, 9 and 10) and also any sub-range of numbers and intervening values within that range (for example, 2 to 8, 1.5 to 5.5 and 3.1 to 4.7). Additionally, it is intended that the both the upper and lower limits specified are included within the range.

Where ranges or values used herein are preceded by the term "about", this term is intended to provide support for both the exact number that it precedes, and also a number that is near to or approximately the number that it precedes. In determining whether a number is near to or approximately a specifically recited number, the near or approximating number may be a number, which would be rounded to or be substantially equivalent to the specifically recited number. For example, the term "about 5" includes 5.0, 4.5, 5.4, 4.92, 5.01, and so on.

The composition can be in the form of concentrates which are diluted prior to use, although ready-to-use compositions can also be made. The final dilution is usually made with water, but can be made instead of, or in addition to, water, with, for example, liquid fertilisers, micronutrients, biological organisms, oil or solvents.

The compositions according to the invention are generally formulated in various ways using formulation adjuvants, such as carriers, solvents and surface-active substances. The formulations can

be in various physical forms, e.g. in the form of dusting powders, gels, wettable powders, water-dispersible granules, water-dispersible tablets, effervescent pellets, emulsifiable concentrates, micro-emulsifiable concentrates, oil-in-water emulsions, oil-flowables, aqueous dispersions, oily dispersions, suspo-emulsions, capsule suspensions, emulsifiable granules, soluble liquids, water-soluble concentrates (with water or a water-miscible organic solvent as carrier), impregnated polymer films or in other forms known e.g. from the Manual on Development and Use of FAO and WHO Specifications for Pesticides, United Nations, First Edition, Second Revision (2010). Such formulations can either be used directly or diluted prior to use. The dilutions can be made, for example, with water, liquid fertilisers, micronutrients, biological organisms, oil or solvents.

The formulations can be prepared e.g. by mixing the active ingredient with the formulation adjuvants in order to obtain compositions in the form of finely divided solids, granules, solutions, dispersions or emulsions. The active ingredients can also be formulated with other adjuvants, such as finely divided solids, mineral oils, oils of vegetable or animal origin, modified oils of vegetable or animal origin, organic solvents, water, surface-active substances or combinations thereof.

The active ingredients can also be contained in very fine microcapsules. Microcapsules contain the active ingredients in a porous carrier. This enables the active ingredients to be released into the environment in controlled amounts (e.g. slow-release). Microcapsules usually have a diameter of from 0.1 to 500 microns. They contain active ingredients in an amount of about from 25 to 95 % by weight of the capsule weight. The active ingredients can be in the form of a monolithic solid, in the form of fine particles in solid or liquid dispersion or in the form of a suitable solution. The encapsulating membranes can comprise, for example, natural or synthetic rubbers, cellulose, styrene/butadiene copolymers, polyacrylonitrile, polyacrylate, polyesters, polyamides, polyureas, polyurethane or chemically modified polymers and starch xanthates or other polymers that are known to the person skilled in the art. Alternatively, very fine microcapsules can be formed in which the active ingredient is contained in the form of finely divided particles in a solid matrix of base substance, but the microcapsules are not themselves encapsulated.

The formulation adjuvants that are suitable for the preparation of the compositions according to the invention are known per se. As liquid carriers there may be used: water, toluene, xylene, petroleum ether, vegetable oils, acetone, methyl ethyl ketone, cyclohexanone, acid anhydrides, acetonitrile, acetophenone, amyl acetate, 2-butanone, butylene carbonate, chlorobenzene, cyclohexane, cyclohexanol, alkyl esters of acetic acid, diacetone alcohol, 1,2-dichloropropane, diethanolamine, p-diethylbenzene, diethylene glycol, diethylene glycol abietate, diethylene glycol butyl ether, diethylene glycol ethyl ether, diethylene glycol methyl ether, N,N-dimethylformamide, dimethyl sulfoxide, 1,4-dioxane, dipropylene glycol, dipropylene glycol methyl ether, dipropylene glycol dibenzoate, diproxitol, alkylpyrrolidone, ethyl acetate, 2-ethylhexanol, ethylene carbonate, 1,1,1-trichloroethane, 2-heptanone, alpha-pinene, d-limonene, ethyl lactate, ethylene glycol, ethylene glycol butyl ether, ethylene glycol methyl ether, gamma-butyrolactone, glycerol, glycerol acetate, glycerol diacetate, glycerol triacetate, hexadecane, hexylene glycol, isoamyl acetate, isobornyl acetate, isooctane, isophorone, isopropylbenzene, isopropyl myristate, lactic acid, laurylamine, mesityl oxide,

methoxypropanol, methyl isoamyl ketone, methyl isobutyl ketone, methyl laurate, methyl octanoate, methyl oleate, methylene chloride, m-xylene, n-hexane, n-octylamine, octadecanoic acid, octylamine acetate, oleic acid, oleylamine, o-xylene, phenol, polyethylene glycol, propionic acid, propyl lactate, propylene carbonate, propylene glycol, propylene glycol methyl ether, p-xylene, toluene, triethyl phosphate, triethylene glycol, xylenesulfonic acid, paraffin, mineral oil, trichloroethylene, perchloroethylene, ethyl acetate, amyl acetate, butyl acetate, propylene glycol methyl ether, diethylene glycol methyl ether, methanol, ethanol, isopropanol, and alcohols of higher molecular weight, such as amyl alcohol, tetrahydro-furfuryl alcohol, hexanol, octanol, ethylene glycol, propylene glycol, glycerol, N-methyl-2-pyrrolidone and the like.

Suitable solid carriers are, for example, talc, titanium dioxide, pyrophyllite clay, silica, attapulgite clay, kieselguhr, limestone, calcium carbonate, bentonite, calcium montmorillonite, cottonseed husks, wheat flour, soybean flour, pumice, wood flour, ground walnut shells, lignin and similar substances.

A large number of surface-active substances can advantageously be used in both solid and liquid formulations, especially in those formulations which can be diluted with a carrier prior to use. Surface-active substances may be anionic, cationic, non-ionic or polymeric and they can be used as emulsifiers, wetting agents or suspending agents or for other purposes. Typical surface-active substances include, for example, salts of alkyl sulfates, such as diethanolammonium lauryl sulfate

salts of alkylarylsulfonates, such as calcium dodecyl-benzenesulfonate

alkylphenol/alkylene oxide addition products, such as nonylphenol ethoxylate

alcohol/alkylene oxide addition products, such as tridecylalcohol ethoxylate

soaps, such as sodium stearate

salts of alkyl naphthalenesulfonates, such as sodium dibutyl naphthalenesulfonate

dialkyl esters of sulfosuccinate salts, such as sodium di(2-ethylhexyl)sulfosuccinate

sorbitol esters, such as sorbitol oleate

quaternary amines, such as lauryltrimethylammonium chloride, polyethylene glycol esters of fatty acids, such as polyethylene glycol stearate

block copolymers of ethylene oxide and propylene oxide

and salts of mono and di-alkylphosphate esters

and also further substances described e.g. in McCutcheon's Detergents and Emulsifiers Annual, MC Publishing Corp., Ridgewood New Jersey (1981).

Further adjuvants that can be used in pesticidal formulations include crystallisation inhibitors, viscosity modifiers, suspending agents, dyes, anti-oxidants, foaming agents, light absorbers, mixing auxiliaries, antifoams, complexing agents, neutralising or pH-modifying substances and buffers, corrosion inhibitors, fragrances, wetting agents, take-up enhancers, micro-nutrients, plasticisers, glidants, lubricants, dispersants, thickeners, antifreezes, microbicides, and liquid and solid fertilisers.

The compositions according to the invention can include an additive comprising an oil of vegetable or animal origin, a mineral oil, alkyl esters of such oils or mixtures of such oils and oil derivatives. The amount of oil additive in the composition according to the invention is generally from 0.01 to 10 %, based on the mixture to be applied. For example, the oil additive can be added to a spray tank in the desired concentration after a spray mixture has been prepared. Preferred oil additives comprise mineral oils or an oil of vegetable origin, for example rapeseed oil, olive oil or sunflower oil, emulsified vegetable oil, alkyl esters of oils of vegetable origin, for example the methyl derivatives, or an oil of animal origin, such as fish oil or beef tallow. Preferred oil additives comprise alkyl esters of C8 C22 fatty acids, especially the methyl derivatives of C12-C18 fatty acids, for example the methyl esters of lauric acid, palmitic acid and oleic acid (methyl laurate, methyl palmitate and methyl oleate, respectively). Many oil derivatives are known from the Compendium of Herbicide Adjuvants, 10th Edition, Southern Illinois University, 2010.

The inventive compositions generally comprise from 0.1 to 99 % by weight, especially from 0.1 to 95 % by weight, of active ingredients and from 1 to 99.9 % by weight of a formulation adjuvant which preferably includes from 0 to 25 % by weight of a surface-active substance. Whereas commercial products may preferably be formulated as concentrates, the end user will normally employ dilute formulations.

The rates of application vary within wide limits and depend on the nature of the soil, the method of application, the crop plant, the pest to be controlled, the prevailing climatic conditions, and other factors governed by the method of application, the time of application and the target crop. As a general guideline active ingredients may be applied at a rate of from 1 to 2000 g/ha, especially from 10 to 1000 g/ha.

In certain examples, the rate of application of component (A) is from 20 to 200 g/ha. In some examples, the rate of application of component (A) is from 50 to 150 g/ha, optionally from 50 to 70 g/ha or about 100 g/ha.

In certain examples, the rate of application of component (B) is from 20 to 200 g/ha.

Preferred formulations can have the following compositions (weight %):

Emulsifiable concentrates:

active ingredient:	1 to 95 %, preferably 60 to 90 %
surface-active agent:	1 to 30 %, preferably 5 to 20 %
liquid carrier:	1 to 80 %, preferably 1 to 35 %

Dusts:

active ingredient:	0.1 to 10 %, preferably 0.1 to 5 %
solid carrier:	99.9 to 90 %, preferably 99.9 to 99 %

Suspension concentrates:

active ingredient: 5 to 75 %, preferably 10 to 50 %
 water: 94 to 24 %, preferably 88 to 30 %
 surface-active agent: 1 to 40 %, preferably 2 to 30 %

Wettable powders:

5 active ingredient: 0.5 to 90 %, preferably 1 to 80 %
 surface-active agent: 0.5 to 20 %, preferably 1 to 15 %
 solid carrier: 5 to 95 %, preferably 15 to 90 %

Granules:

active ingredient: 0.1 to 30 %, preferably 0.1 to 15 %
 10 solid carrier: 99.5 to 70 %, preferably 97 to 85 %

The following Examples further illustrate, but do not limit, the invention.

<u>Wettable powders</u>	a)	b)	c)
active ingredients	25 %	50 %	75 %
sodium lignosulfonate	5 %	5 %	-
sodium lauryl sulfate	3 %	-	5 %
sodium diisobutyl naphthalenesulfonate	-	6 %	10 %
phenol polyethylene glycol ether	-	2 %	-
(7-8 mol of ethylene oxide)			
highly dispersed silicic acid	5 %	10 %	10 %
Kaolin	62 %	27 %	-

The combination is thoroughly mixed with the adjuvants and the mixture is thoroughly ground in a suitable mill, affording wettable powders that can be diluted with water to give suspensions of the desired concentration.

<u>Powders for dry seed treatment</u>	a)	b)	c)
active ingredients	25 %	50 %	75 %
light mineral oil	5 %	5 %	5 %
highly dispersed silicic acid	5 %	5 %	-

Kaolin	65 %	40 %	-
Talcum	-		20

The combination is thoroughly mixed with the adjuvants and the mixture is thoroughly ground in a suitable mill, affording powders that can be used directly for seed treatment.

<u>Emulsifiable concentrate</u>	
active ingredients	10 %
octylphenol polyethylene glycol ether (4-5 mol of ethylene oxide)	3 %
calcium dodecylbenzenesulfonate	3 %
castor oil polyglycol ether (35 mol of ethylene oxide)	4 %
Cyclohexanone	30 %
xylene mixture	50 %

Emulsions of any required dilution, which can be used in plant protection, can be obtained from this concentrate by dilution with water.

<u>Dusts</u>	a)	b)	c)
Active ingredients	5 %	6 %	4 %
Talcum	95 %	-	-
Kaolin	-	94 %	-
mineral filler	-	-	96 %

Ready-for-use dusts are obtained by mixing the combination with the carrier and grinding the mixture in a suitable mill. Such powders can also be used for dry dressings for seed.

<u>Extruder granules</u>	
Active ingredients	15 %
sodium lignosulfonate	2 %
carboxymethylcellulose	1 %
Kaolin	82 %

The combination is mixed and ground with the adjuvants, and the mixture is moistened with water. The mixture is extruded and then dried in a stream of air.

<u>Coated granules</u>	
Active ingredients	8 %
polyethylene glycol (mol. wt. 200)	3 %
Kaolin	89 %

The finely ground combination is uniformly applied, in a mixer, to the kaolin moistened with polyethylene glycol. Non-dusty coated granules are obtained in this manner.

Suspension concentrate

active ingredients	40 %
propylene glycol	10 %
nonylphenol polyethylene glycol ether (15 mol of ethylene oxide)	6 %
Sodium lignosulfonate	10 %
carboxymethylcellulose	1 %
silicone oil (in the form of a 75 % emulsion in water)	1 %
Water	32 %

The finely ground combination is intimately mixed with the adjuvants, giving a suspension concentrate from which suspensions of any desired dilution can be obtained by dilution with water. Using such dilutions, living plants as well as plant propagation material can be treated and protected against infestation by microorganisms, by spraying, pouring or immersion.

Flowable concentrate for seed treatment

active ingredients	40 %
propylene glycol	5 %
copolymer butanol PO/EO	2 %
Tristyrenephenole with 10-20 moles EO	2 %
1,2-benzisothiazolin-3-one (in the form of a 20% solution in water)	0.5 %

monoazo-pigment calcium salt	5 %
Silicone oil (in the form of a 75 % emulsion in water)	0.2 %
Water	45.3 %

The finely ground combination is intimately mixed with the adjuvants, giving a suspension concentrate from which suspensions of any desired dilution can be obtained by dilution with water. Using such dilutions, living plants as well as plant propagation material can be treated and protected against infestation by microorganisms, by spraying, pouring or immersion.

5

Slow Release Capsule Suspension

28 parts of the combination are mixed with 2 parts of an aromatic solvent and 7 parts of toluene diisocyanate/polymethylene-polyphenylisocyanate-mixture (8:1). This mixture is emulsified in a mixture of 1.2 parts of polyvinylalcohol, 0.05 parts of a defoamer and 51.6 parts of water until the desired particle size is achieved. To this emulsion a mixture of 2.8 parts 1,6-diaminohexane in 5.3 parts of water is added. The mixture is agitated until the polymerization reaction is completed. The obtained capsule suspension is stabilized by adding 0.25 parts of a thickener and 3 parts of a dispersing agent. The capsule suspension formulation contains 28% of the active ingredients. The medium capsule diameter is 8-15 microns. The resulting formulation is applied to seeds as an aqueous suspension in an apparatus suitable for that purpose.

15

The combination or composition of the present invention may be applied to a plant, part of the plant, plant organ, plant propagation material or a plant growing locus.

The application is generally made by spraying (A) and (B) separately (i.e the combination) or (A) and (B) together (i.e the composition), typically by tractor mounted sprayer for large areas, but other methods such as dusting (for powders), drip or drench can also be used. Alternatively the combination or composition may be applied in furrow or directly to a seed before or at the time of planting.

20

The combination or composition of the present invention may be applied pre-emergence or post-emergence. Where the combination or composition is used to regulate the growth of crop plants or enhance the tolerance to abiotic stress, it may be applied post-emergence of the crop. Where the combination or composition is used to inhibit or delay the germination of seeds, it may be applied pre-emergence. Where the combination or composition is used to control pests, it may be applied as a preventative (before pest establishment) or curative (after pest establishment) treatment.

25

The present invention envisages application of the combinations and compositions of the invention to plant propagation material prior to, during, or after planting, or any combination of these.

30

Although active ingredients can be applied to plant propagation material in any physiological state, a common approach is to use seeds in a sufficiently durable state to incur no damage during the treatment process. Typically, seed would have been harvested from the field removed from the plant and separated from any cob, stalk, outer husk, and surrounding pulp or other non-seed plant material.

Seed would preferably also be biologically stable to the extent that treatment would not cause biological damage to the seed. It is believed that treatment can be applied to seed at any time between seed harvest and sowing of seed including during the sowing process.

Methods for applying or treating active ingredients on to plant propagation material or to the locus of planting are known in the art and include dressing, coating, pelleting and soaking as well as nursery tray application, in furrow application, soil drenching, soil injection, drip irrigation, application through sprinklers or central pivot, or incorporation into soil (broad cast or in band). Alternatively or in addition active ingredients may be applied on a suitable substrate sown together with the plant propagation material.

The rates of application of combinations and compositions of the present invention may vary within wide limits and depend on the nature of the soil, the method of application (pre- or post-emergence, seed dressing, application to the seed furrow, no tillage application etc.), the crop plant, the prevailing climatic conditions, and other factors governed by the method of application, the time of application and the target crop. For foliar or drench application, the combinations and compositions of the present invention are generally applied at a rate of from 1 to 2000 g/ha, especially from 5 to 1000 g/ha. For seed treatment the rate of application is generally between 0.0005 and 150g per 100kg of seed.

The combinations and compositions according to the invention can be used in combination with other pesticides, including other pesticides such as insecticides, acaricides, nematocides, fungicides, or agents that enhance the activity of the composition according to the invention, in for example chemical treatment or pest control programs. The combination may have further surprising advantages, which could be described as synergistic effects.

Suitable other pesticides are, for example, pesticides of the following classes of active ingredients: organophosphates, nitrophenol derivatives, thioureas, juvenile hormones, formamidines, benzophenone derivatives, ureas, pyrrole derivatives, carbamates, pyrethroids, chlorinated hydrocarbons, acylureas, pyridylmethylethylamine derivatives, macrolides, benzoylureas, neonicotinoids and biological agents such as *Bacillus thuringiensis* strains or bacterially-derived pesticides such as spinosads, avermectins and Cry proteins.

The compositions of the present invention may be applied to dicotyledonous or monocotyledonous crops. Crops of useful plants in which the composition according to the invention can be used include perennial and annual crops, such as berry plants for example blackberries, blueberries, cranberries, raspberries and strawberries, cereals for example barley, maize (corn), millet, oats, rice, rye, sorghum tritcale and wheat, fibre plants for example cotton, flax, hemp, jute and sisal, field crops for example sugar and fodder beet, coffee, hops, mustard, oilseed rape (canola), poppy, sugar cane, sunflower, tea and tobacco, fruit trees for example apple, apricot, avocado, banana, cherry, citrus, nectarine, peach, pear and plum, grasses for example Bermuda grass, bluegrass, bentgrass, centipede grass, fescue, ryegrass, St. Augustine grass and Zoysia grass, herbs such as basil, borage, chives, coriander, lavender, lovage, mint, oregano, parsley, rosemary, sage and thyme, legumes for

example beans, lentils, peas and soya beans, nuts for example almond, cashew, ground nut, hazelnut, peanut, pecan, pistachio and walnut, palms for example oil palm, ornamentals for example flowers, shrubs and trees, other trees, for example cacao, coconut, olive and rubber, vegetables for example asparagus, aubergine, broccoli, cabbage, carrot, cucumber, garlic, lettuce, marrow, melon, okra, onion, pepper, potato, pumpkin, rhubarb, spinach and tomato, and vines for example grapes.

Crops are to be understood as being those which are naturally occurring, obtained by conventional methods of breeding, or obtained by genetic engineering. They include crops which contain so-called output traits (e.g. improved storage stability, higher nutritional value and improved flavour).

Crops are to be understood as also including those crops which have been rendered tolerant to herbicides like bromoxynil or classes of herbicides such as ALS-, EPSPS-, GS-, HPPD- and PPO-inhibitors. An example of a crop that has been rendered tolerant to imidazolinones, e.g. imazamox, by conventional methods of breeding is Clearfield® summer canola. Examples of crops that have been rendered tolerant to herbicides by genetic engineering methods include e.g. glyphosate- and glufosinate-resistant maize varieties commercially available under the trade names RoundupReady®, Herculex I® and LibertyLink®.

Crops are also to be understood as being those which naturally are or have been rendered resistant to harmful insects. This includes plants transformed by the use of recombinant DNA techniques, for example, to be capable of synthesising one or more selectively acting toxins, such as are known, for example, from toxin-producing bacteria. Examples of toxins which can be expressed include d-endotoxins, vegetative insecticidal proteins (Vip), insecticidal proteins of bacteria colonising nematodes, and toxins produced by scorpions, arachnids, wasps and fungi.

An example of a crop that has been modified to express the *Bacillus thuringiensis* toxin is the Bt maize KnockOut (Syngenta Seeds). An example of a crop comprising more than one gene that codes for insecticidal resistance and thus expresses more than one toxin is VipCot® (Syngenta Seeds). Crops or seed material thereof can also be resistant to multiple types of pests (so-called stacked transgenic events when created by genetic modification). For example, a plant can have the ability to express an insecticidal protein while at the same time being herbicide tolerant, for example Herculex I® (Dow AgroSciences, Pioneer Hi-Bred International).

Normally, in the management of a crop a grower would use one or more other agronomic chemicals or biologicals in addition to the composition of the present invention.

The present invention also provides the use of the combination or composition as defined above for controlling insect and/or acarina and/or nematode pests.

A synergistic effect exists whenever the action of an active ingredient combination is greater than the sum of the actions of the individual components. The action to be expected E for a given active ingredient combination obeys the so-called COLBY formula and can be calculated as follows (COLBY, S.R. "Calculating synergistic and antagonistic responses of herbicide combination". Weeds, Vol. 15, pages 20-22 1967):

ppm = milligrams of active ingredient (a.i.) per liter

X = % action by first active ingredient using p ppm of the active ingredient

Y = % action by second active ingredient using q ppm of the active ingredient.

According to Colby, the expected (additive) action of active ingredients A + B using p + q ppm
 5 of active ingredient is $E = X + Y - \frac{X \cdot Y}{100}$

If the action actually observed O is greater than the expected action E, then the action of the
 combination is super-additive, i.e. there is a synergistic effect. In mathematical terms, synergism
 corresponds to a positive value for the difference of (O-E). In the case of purely complementary addition
 of activities (expected activity), said difference (O-E) is zero. A negative value of said difference (O-E)
 10 signals a loss of activity compared to the expected activity.

Table 2 sets out certain preferred combinations. Table 1 lists example application rates, stating
 the application rate for component (A), the compound of formula (I), and each specified compound
 forming component (B). Application rates are given as grams per hectare. Table 1 also lists key pests
 against which the combinations are particularly effective and key crops for which the inventive
 15 combinations are particularly advantageous.

TABLE 2

Composition	Application rate: g A/ha:g B/ha	Pests	Crops
A-1/B-1 A-2/B-1 A-3/B-1 A-4/B-1 A-5/B-1 A-6/B-1	60 / 50	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limoniusspp.	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		Melanotus spp. wireworms	
A-1/B-2 A-2/B-2 A-3/B-2 A-4/B-2 A-5/B-2 A-6/B-2	60 / 50	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-3 A-2/B-3 A-3/B-3 A-4/B-3 A-5/B-3 A-6/B-3	60 / 50	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	
A-1/B-4 A-2/B-4 A-3/B-4 A-4/B-4 A-5/B-4 A-6/B-4	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-5 A-2/B-5 A-3/B-5 A-4/B-5 A-5/B-5 A-6/B-5	60 / 120	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	soybean cotton vegetables pome fruits stone fruits citrus cereals rice

A-1/B-6 A-2/B-6 A-3/B-6 A-4/B-6 A-5/B-6 A-6/B-6	60 / 50	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-7 A-2/B-7 A-3/B-7 A-4/B-7 A-5/B-7 A-6/B-7	60 / 50	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

A-1/B-8 A-2/B-8 A-3/B-8 A-4/B-8 A-5/B-8 A-6/B-8	60 / 75	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	soybean cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-9 A-2/B-9 A-3/B-9 A-4/B-9 A-5/B-9 A-6/B-9	60 / 75	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	soybean cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-10 A-2/B-10 A-3/B-10 A-4/B-10 A-5/B-10 A-6/B-10	60 / 75	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	rice vegetables pome fruits stone fruits citrus
A-1/B-11 A-2/B-11 A-3/B-11 A-4/B-11 A-5/B-11 A-6/B-11	60 / 75	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	rice vegetables pome fruits stone fruits citrus
A-1/B-12 A-2/B-12 A-3/B-12 A-4/B-12 A-5/B-12 A-6/B-12	60 / 75	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens	rice vegetables pome fruits stone fruits citrus

		Laodelphax striatellus Sogatella furcifera	
A-1/B-13 A-2/B-13 A-3/B-13 A-4/B-13 A-5/B-13 A-6/B-13	60 / 75	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	rice vegetables pome fruits stone fruits citrus
A-1/B-14 A-2/B-14 A-3/B-14 A-4/B-14 A-5/B-14 A-6/B-14	60 / 75	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	soybean cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-15 A-2/B-15 A-3/B-15 A-4/B-15 A-5/B-15 A-6/B-15	60 / 75	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	soybean cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-16 A-2/B-16 A-3/B-16 A-4/B-16 A-5/B-16 A-6/B-16	60 / 75	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	soybean cotton vegetables pome fruits stone fruits citrus cereals rice

A-1/B-17 A-2/B-17 A-3/B-17 A-4/B-17 A-5/B-17 A-6/B-17	60 / 30	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-18 A-2/B-18 A-3/B-18 A-4/B-18 A-5/B-18 A-6/B-18	60 / 30	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-19 A-2/B-19 A-3/B-19 A-4/B-19 A-5/B-19 A-6/B-19	60 / 120	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera	soybean corn cotton vegetables pome fruits stone fruits citrus cereals

		<i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp. <i>Agriotes</i> spp. <i>Limonius</i> spp. <i>Melanotus</i> spp. wireworms	rice
A-1/B-63 A-2/B-63 A-3/B-63 A-4/B-63 A-5/B-63 A-6/B-63	60 / 30	<i>Myzus persicae</i> <i>Aphis gossypii</i> <i>Aphis</i> spp. <i>Rhopalosiphum padi</i> <i>Sitobion</i> spp. <i>Bemisia tabaci</i> <i>Bemisia</i> spp. <i>Trialeurodes vaporarum</i> <i>Nilaparvata lugens</i> <i>Laodelphax striatellus</i> <i>Sogatella furcifera</i> <i>Euschistus heros</i> <i>Nezara viridula</i> <i>Piezodorus</i> spp. <i>Dichelops</i> spp. <i>Frankliniella occidentalis</i> <i>Thrips tabaci</i> <i>Thrips palmi</i> <i>Thrips</i> spp. <i>Scirtothrips dorsalis</i> <i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp. <i>Agriotes</i> spp. <i>Limonius</i> spp. <i>Melanotus</i> spp. wireworms	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-64 A-2/B-64 A-3/B-64 A-4/B-64 A-5/B-64 A-6/B-64	60 / 30	<i>Myzus persicae</i> <i>Aphis gossypii</i> <i>Aphis</i> spp. <i>Rhopalosiphum padi</i> <i>Sitobion</i> spp. <i>Bemisia tabaci</i> <i>Bemisia</i> spp. <i>Trialeurodes vaporarum</i> <i>Nilaparvata lugens</i> <i>Laodelphax striatellus</i> <i>Sogatella furcifera</i> <i>Euschistus heros</i> <i>Nezara viridula</i> <i>Piezodorus</i> spp. <i>Dichelops</i> spp. <i>Frankliniella occidentalis</i> <i>Thrips tabaci</i> <i>Thrips palmi</i> <i>Thrips</i> spp. <i>Scirtothrips dorsalis</i> <i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp. <i>Agriotes</i> spp. <i>Limonius</i> spp. <i>Melanotus</i> spp. wireworms	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice

A-1/B-65 A-2/B-65 A-3/B-65 A-4/B-65 A-5/B-65 A-6/B-65	60 / 30	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-66 A-2/B-66 A-3/B-66 A-4/B-66 A-5/B-66 A-6/B-66	60 / 30	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-67 A-2/B-67 A-3/B-67 A-4/B-67 A-5/B-67 A-6/B-67	60 / 30	Myzus persicae Aphis gossypii Aphis spp. Rhopalosiphum padi Sitobion spp. Bemisia tabaci Bemisia spp. Trialeurodes vaporarum	soybean corn cotton vegetables pome fruits stone fruits citrus cereals

		<i>Nilaparvata lugens</i> <i>Laodelphax striatellus</i> <i>Sogatella furcifera</i> <i>Euschistus heros</i> <i>Nezara viridula</i> <i>Piezodorus</i> spp. <i>Dichelops</i> spp. <i>Frankliniella occidentalis</i> <i>Thrips tabaci</i> <i>Thrips palmi</i> <i>Thrips</i> spp. <i>Scirtothrips dorsalis</i> <i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp. <i>Agriotes</i> spp. <i>Limonius</i> spp. <i>Melanotus</i> spp. wireworms	rice
A-1/B-68 A-2/B-68 A-3/B-68 A-4/B-68 A-5/B-68 A-6/B-68	60 / 50	<i>Myzus persicae</i> <i>Aphis gossypii</i> <i>Aphis</i> spp. <i>Rhopalosiphum padi</i> <i>Sitobion</i> spp. <i>Bemisia tabaci</i> <i>Bemisia</i> spp. <i>Trialeurodes vaporarum</i> <i>Nilaparvata lugens</i> <i>Laodelphax striatellus</i> <i>Sogatella furcifera</i> <i>Euschistus heros</i> <i>Nezara viridula</i> <i>Piezodorus</i> spp. <i>Dichelops</i> spp. <i>Frankliniella occidentalis</i> <i>Thrips tabaci</i> <i>Thrips palmi</i> <i>Thrips</i> spp. <i>Scirtothrips dorsalis</i> <i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp. <i>Agriotes</i> spp. <i>Limonius</i> spp. <i>Melanotus</i> spp. wireworms	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice
A-1/B-69 A-2/B-69 A-3/B-69 A-4/B-69 A-5/B-69 A-6/B-69	60 / 50	<i>Myzus persicae</i> <i>Aphis gossypii</i> <i>Aphis</i> spp. <i>Rhopalosiphum padi</i> <i>Sitobion</i> spp. <i>Bemisia tabaci</i> <i>Bemisia</i> spp. <i>Trialeurodes vaporarum</i> <i>Nilaparvata lugens</i> <i>Laodelphax striatellus</i> <i>Sogatella furcifera</i> <i>Euschistus heros</i> <i>Nezara viridula</i> <i>Piezodorus</i> spp.	soybean corn cotton vegetables pome fruits stone fruits citrus cereals rice

		Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	
A-1/B-70 A-2/B-70 A-3/B-70 A-4/B-70 A-5/B-70 A-6/B-70	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-71 A-2/B-71 A-3/B-71 A-4/B-71 A-5/B-71 A-6/B-71	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	
A-1/B-72 A-2/B-72 A-3/B-72 A-4/B-72 A-5/B-72 A-6/B-72	60 / 150	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. Wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-73 A-2/B-73 A-3/B-73 A-4/B-73 A-5/B-73 A-6/B-73	60 / 120	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. Wireworms	
A-1/B-74 A-2/B-74 A-3/B-74 A-4/B-74 A-5/B-74 A-6/B-74	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-75 A-2/B-75 A-3/B-75 A-4/B-75 A-5/B-75 A-6/B-75	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		<i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp. <i>Agriotes</i> spp. <i>Limonius</i> spp. <i>Melanotus</i> spp. wireworms	
A-1/B-76 A-2/B-76 A-3/B-76 A-4/B-76 A-5/B-76 A-6/B-76	60 / 30	<i>Spodoptera frugiperda</i> <i>Spodoptera</i> spp. <i>Helicoverpa armigera</i> <i>Heliothis</i> spp. <i>Chrysodeixis includens</i> <i>Scirpophaga incertulas</i> <i>Chilo</i> spp. <i>Plutella xylostella</i> <i>Tuta absoluta</i> <i>Cydia pomonella</i> <i>Leucinodes</i> spp. <i>Nilaparvata lugens</i> <i>Laodelphax striatellus</i> <i>Sogatella furcifera</i> <i>Euschistus heros</i> <i>Nezara viridula</i> <i>Piezodorus</i> spp. <i>Dichelops</i> spp. <i>Frankliniella occidentalis</i> <i>Thrips tabaci</i> <i>Thrips palmi</i> <i>Thrips</i> spp. <i>Scirtothrips dorsalis</i> <i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp. <i>Agriotes</i> spp. <i>Limonius</i> spp. <i>Melanotus</i> spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-77 A-2/B-77 A-3/B-77 A-4/B-77 A-5/B-77 A-6/B-77	60 / 30	<i>Spodoptera frugiperda</i> <i>Spodoptera</i> spp. <i>Helicoverpa armigera</i> <i>Heliothis</i> spp. <i>Chrysodeixis includens</i> <i>Scirpophaga incertulas</i> <i>Chilo</i> spp. <i>Plutella xylostella</i> <i>Tuta absoluta</i> <i>Cydia pomonella</i> <i>Leucinodes</i> spp. <i>Nilaparvata lugens</i> <i>Laodelphax striatellus</i> <i>Sogatella furcifera</i> <i>Euschistus heros</i> <i>Nezara viridula</i> <i>Piezodorus</i> spp. <i>Dichelops</i> spp. <i>Frankliniella occidentalis</i> <i>Thrips tabaci</i> <i>Thrips palmi</i> <i>Thrips</i> spp. <i>Scirtothrips dorsalis</i> <i>Diabrotica virgifera virgifera</i> <i>Diabrotica</i> spp.	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		Agriotes spp. Limonius spp. Melanotus spp. wireworms	
A-1/B-78 A-2/B-78 A-3/B-78 A-4/B-78 A-5/B-78 A-6/B-78	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-79 A-2/B-79 A-3/B-79 A-4/B-79 A-5/B-79 A-6/B-79	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp.	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		Melanotus spp. wireworms	
A-1/B-80 A-2/B-80 A-3/B-80 A-4/B-80 A-5/B-80 A-6/B-80	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-81 A-2/B-81 A-3/B-81 A-4/B-81 A-5/B-81 A-6/B-81	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp.	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		wireworms	
A-1/B-82 A-2/B-82 A-3/B-82 A-4/B-82 A-5/B-82 A-6/B-82	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-83 A-2/B-83 A-3/B-83 A-4/B-83 A-5/B-83 A-6/B-83	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp.	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

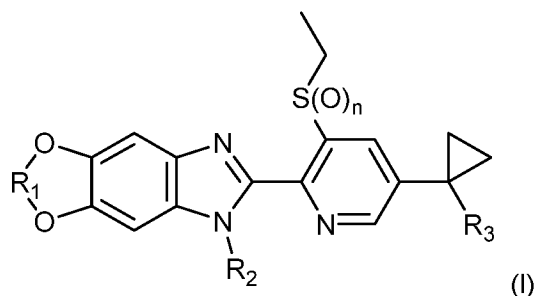
		wireworms	
A-1/B-84 A-2/B-84 A-3/B-84 A-4/B-84 A-5/B-84 A-6/B-84	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-85 A-2/B-85 A-3/B-85 A-4/B-85 A-5/B-85 A-6/B-85	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp.	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		wireworms	
A-1/B-86 A-2/B-86 A-3/B-86 A-4/B-86 A-5/B-86 A-6/B-86	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus
A-1/B-87 A-2/B-87 A-3/B-87 A-4/B-87 A-5/B-87 A-6/B-87	60 / 30	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp.	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

		wireworms	
A-1/B-88 A-2/B-88 A-3/B-88 A-4/B-88 A-5/B-88 A-6/B-88	60 / 180	Spodoptera frugiperda Spodoptera spp. Helicoverpa armigera Heliothis spp. Chrysodeixis includens Scirpophaga incertulas Chilo spp. Plutella xylostella Tuta absoluta Cydia pomonella Leucinodes spp. Nilaparvata lugens Laodelphax striatellus Sogatella furcifera Euschistus heros Nezara viridula Piezodorus spp. Dichelops spp. Frankliniella occidentalis Thrips tabaci Thrips palmi Thrips spp. Scirtothrips dorsalis Diabrotica virgifera virgifera Diabrotica spp. Agriotes spp. Limonius spp. Melanotus spp. wireworms	soybean corn cotton rice vegetables cereals pome fruits stone fruits citrus

CLAIMS

1. A method of controlling or preventing damage to a plant, which comprises applying on the plant, the locus thereof or its propagation material a combination comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

R₃ is H or CN; and

n is 0, 1 or 2;

or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of:

B-1 nicofluprole (CAS 1771741-86-6)

B-2 broflanilide (CAS 1207727-04-5)

B-3 fluxametamide (CAS 928783-29-3)

B-4 tetraniliprole (CAS 1229654-66-3)

B-5 spidoxamat (CAS 907187-07-9)

B-6 (S)-N-[[2-fluoro-4-[2-hydroxy-3-(3,4,5-trichlorophenyl)-3-(trifluoromethyl)pyrrolidin-1-yl]phenyl]methyl]cyclopropanecarboxamide (CAS 2044701-44-0)

B-7 N-[[2-fluoro-4-[2-hydroxy-3-(3,4,5-trichlorophenyl)-3-(trifluoromethyl)pyrrolidin-1-yl]phenyl]methyl]cyclopropanecarboxamide (CAS 1365070-72-9)

B-8 4-dimethyl-2-[2-(3-pyridyl)indazol-5-yl]-1,2,4-triazolidine-3,5-dione (CAS 2171099-09-3)

B-9 N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-2-methylsulfonyl-propanamide (CAS 2396747-83-2)

- 5 B-10 (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-5,7-dione (CAS 2246757-58-2)
- B-11 fenmezoditiaz (CAS 2413390-32-4)
- B-12 (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (CAS 2413839-58-2)
- B-13 3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (CAS 2413839-57-1)
- B-14 tyclopyrazoflor (CAS 1477919-27-9)
- B-15 dimpropyridaz (CAS 1403615-77-9)
- 10 B-16 afidopyropen (CAS 915972-17-7)
- B-17 triflumezopyrim (CAS 1263133-33-0)
- B-18 flupyradifurone (CAS 951659-40-8)
- B-19 fluhexafon (CAS 1097630-26-6)
- B-20 tetrachlorantraniliprole (CAS 1104384-14-6)
- 15 B-21 cyhalodiamide (CAS 1262605-53-7)
- B-22 benzpyrimoxan (CAS 1449021-97-9)
- B-23 1-(2-cyanoethyl)-4-oxo-3-[3-(trifluoromethyl)phenyl]pyrido[1,2-a]pyrimidin-1-ium-2-olate (CAS 2032403-97-5)
- B-24 N-isopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680187-98-7)
- 20 B-25 N-cyclopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-04-8)
- B-26 N-cyclohexyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-06-0)
- B-27 2-(3-pyridyl)-N-(2,2,2-trifluoroethyl)indazole-4-carboxamide (CAS 1680188-09-3)
- B-28 methyl N-[[2-(3-pyridyl)indazole-5-carbonyl]amino]carbamate (CAS 1680188-56-0)
- 25 B-29 2-(3-pyridyl)-N-(tetrahydrofuran-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-55-9)
- B-30 N-[(2,2-difluorocyclopropyl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-65-1)
- 30 B-31 N-(2,2-difluoropropyl)-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-68-4)

- B-32 2-(3-pyridyl)-N-(pyrimidin-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-69-5)
- B-33 N-[(5-methylpyrazin-2-yl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-91-3)
- 5 B-34 indazapyroxamet (CAS 1689545-27-4)
- B-35 N-[1-(difluoromethyl)cyclopropyl]-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-90-5)
- B-36 N-(1,1-dimethyl-2-methylsulfanyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-91-6)
- 10 B-37 N-(1,1-dimethyl-2-methylsulfinyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-92-7)
- B-38 1,1-dimethyl-2-methylsulfonyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-93-8)
- B-39 cyproflamilide (CAS 2375110-88-4)
- 15 B-40 dicloromezotiaz (CAS 1263629-39-5)
- B-41 dinotefuran (CAS 165252-70-0)
- B-42 flupyrimin (CAS 1363400-41-2)
- B-43 guadipyr (CAS 1227849-60-6)
- B-44 flometoquin (CAS 875775-74-9)
- 20 B-45 flupentiofenox (CAS 1472050-04-6)
- B-46 (+)-flupentiofenox (CAS 1472050-06-8)
- B-47 (-)-flupentiofenox (CAS 1472050-05-7)
- B-48 cyetpyrafen (CAS 1253429-01-4)
- B-49 pyflubumide (CAS 926914-55-8)
- 25 B-50 pyriminostrobin (CAS 1257598-43-8)
- B-51 acynonapyr (CAS 1333001-59-4)
- B-52 R-(2Z)-2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 2377084-09-6)
- B-53 2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 1445684-82-1)
- 30 B-54 (2Z)-2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 1445683-71-5)

B-55 oxazosulfyl (CAS 1616678-32-0)

B-56 2-(5-cyclopropyl-3-ethylsulfonyl-2-pyridyl)-5-(trifluoromethylsulfonyl)-1,3-benzoxazole (CAS 2128706-05-6)

B-57 2-[3-ethylsulfonyl-6-(1,2,4-triazol-1-yl)-2-pyridyl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 1808115-49-2)

B-58 (3-ethylsulfonyl-2-pyridyl)-5-(2,2,3,3,3-pentafluoropropoxy)pyrazine (CAS 2095470-94-1)

B-59 2-[3-ethylsulfonyl-6-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-31-4)

B-60 2-[3-ethylsulfonyl-5-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-44-9)

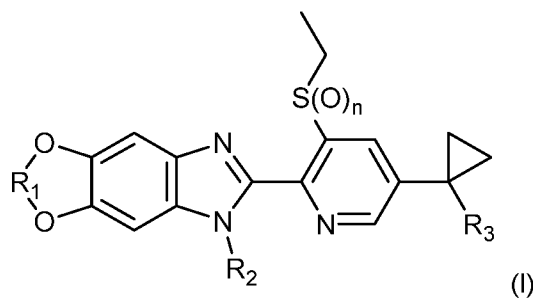
B-61 fluazaindolizine (CAS 1254304-22-7)

B-62 tioxazafen (CAS 330459-31-9);

or agrochemically acceptable salts thereof.

2. The method according to claim 1 wherein the ratio by weight of (A) to (B) is from 100:1 to 1:100, 50:1 to 1 :50 or 20:1 to 1 :20, or preferably 10:1 to 1:10 or 5:1 to 1:5; more preferably 3.1 to 1:3.

3. A method of controlling or preventing damage to a plant, which comprises applying, in any desired sequence or simultaneously, on the plant, the locus thereof or its propagation material, a combination comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

R₃ is H or CN; and

n is 0, 1 or 2;

or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of:

B-63 thiacloprid (CAS 111988-49-9)

B-64 imidacloprid (CAS 138261-41-3)

5 B-65 sulfoxaflor (CAS 946578-00-3)

B-66 acetamiprid (CAS 135410-20-7)

B-67 nitenpyram (CAS 150824-47-8)

B-68 clothianidin (CAS 210880-92-5)

B-69 thiamethoxam (CAS 153719-23-4)

10 B-70 flubendiamide (CAS 272451-65-7)

B-71 cyantraniliprole (CAS 736994-63-1)

B-72 pyridalyl (CAS 179101-81-6)

B-73 indoxacarb (CAS 173584-44-6)

B-74 deltamethrin (CAS 52918-63-5)

15 B-75 cyfluthrin (CAS 68359-37-5)

B-76 bifenthrin (CAS 82657-04-3)

B-77 zeta-cypermethrin (CAS 1315501-18-8)

B-78 gamma-cyhalothrin (CAS 76703-62-3)

B-79 acrinathrin (CAS 101007-06-1)

20 B-80 permethrin (CAS 52645-53-1)

B-81 alpha-cypermethrin (CAS 67375-30-8)

B-82 fenpropathrin (CAS 39515-41-8)

B-83 fenvalerate (CAS 51630-58-1)

B-84 esfenvalerate (CAS 66230-04-4)

25 B-85 cypermethrin (CAS 52315-07-8)

B-86 lambda-cyhalothrin (CAS 91465-08-6)

B-87 chlorantraniliprole (CAS 500008-45-7)

B-88 chlorfenapyr (CAS 122453-73-0);

or agrochemically acceptable salts thereof;

wherein the combination of (A) and (B) is in a ratio by weight of 500:1 to 1:500, 100:1 to 1:100, 50:1 to 1:50, or 20:1 to 1:20, 10:1 to 1:10; 5:1 to 1:5; or 3.1 to 1:3 by weight.

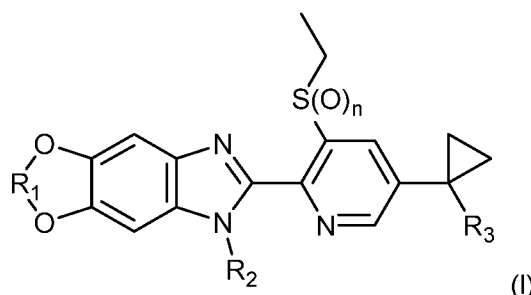
4. The method according to any preceding claim wherein the combination is applied in succession or simultaneously or as a composition comprising (A) and (B).

5. The method according to any preceding claim, wherein the rate of application of (A) is 1 to 2000 g/ha, especially from 10 to 1000 g/ha, more especially from 20 to 200 g/ha; and the rate of application of (B) is 1 to 2000 g/ha, especially from 10 to 1000 g/ha, more especially from 20 to 200 g/ha.

6. The method according to any preceding claim, wherein the combination controls one or more pests selected from insect, acarina and nematode pests.

7. The method according to any preceding claim, wherein the combination is applied on the locus of the plant or on the plant propagation material by soaking or by nursery tray application.

8. A composition comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

R₃ is H or CN; and

n is 0, 1 or 2;

or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of:

B-1 nicofluprole (CAS 1771741-86-6)

B-2 broflanilide (CAS 1207727-04-5)

B-3 fluxametamide (CAS 928783-29-3)

B-4 tetraniliprole (CAS 1229654-66-3)

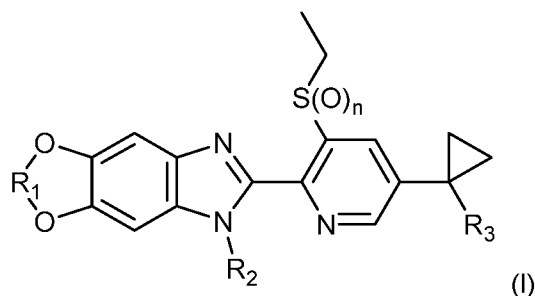
- B-5 spidoxamat (CAS 907187-07-9)
- B-6 (S)-N-[[2-fluoro-4-[2-hydroxy-3-(3,4,5-trichlorophenyl)-3-(trifluoromethyl)pyrrolidin-1-yl]phenyl]methyl]cyclopropanecarboxamide (CAS 2044701-44-0)
- 5 B-7 N-[[2-fluoro-4-[2-hydroxy-3-(3,4,5-trichlorophenyl)-3-(trifluoromethyl)pyrrolidin-1-yl]phenyl]methyl]cyclopropanecarboxamide (CAS 1365070-72-9)
- B-8 4-dimethyl-2-[2-(3-pyridyl)indazol-5-yl]-1,2,4-triazolidine-3,5-dione (CAS 2171099-09-3)
- 10 B-9 N-[3-chloro-1-(3-pyridyl)pyrazol-4-yl]-2-methylsulfonyl-propanamide (CAS 2396747-83-2)
- B-10 (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-5,7-dione (CAS 2246757-58-2)
- B-11 fenmezoditiaz (CAS 2413390-32-4)
- 15 B-12 (3R)-3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (CAS 2413839-58-2)
- B-13 3-(2-chlorothiazol-5-yl)-8-methyl-5-oxo-6-phenyl-2,3-dihydrothiazolo[3,2-a]pyrimidin-8-ium-7-olate (CAS 2413839-57-1)
- B-14 tyclopyrazoflor (CAS 1477919-27-9)
- 20 B-15 dimpropyridaz (CAS 1403615-77-9)
- B-16 afidopyropen (CAS 915972-17-7)
- B-17 triflumezopyrim (CAS 1263133-33-0)
- B-18 flupyradifurone (CAS 951659-40-8)
- B-19 fluhexafon (CAS 1097630-26-6)
- 25 B-20 tetrachlorantraniliprole (CAS 1104384-14-6)
- B-21 cyhalodiamide (CAS 1262605-53-7)
- B-22 benzpyrimoxan (CAS 1449021-97-9)
- B-23 1-(2-cyanoethyl)-4-oxo-3-[3-(trifluoromethyl)phenyl]pyrido[1,2-a]pyrimidin-1-ium-2-olate (CAS 2032403-97-5)
- 30 B-24 N-isopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680187-98-7)
- B-25 N-cyclopropyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-04-8)
- B-26 N-cyclohexyl-2-(3-pyridyl)indazole-4-carboxamide (CAS 1680188-06-0)

	B-27	2-(3-pyridyl)-N-(2,2,2-trifluoroethyl)indazole-4-carboxamide (CAS 1680188-09-3)
	B-28	methyl N-[[2-(3-pyridyl)indazole-5-carbonyl]amino]carbamate (CAS 1680188-56-0)
5	B-29	2-(3-pyridyl)-N-(tetrahydrofuran-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-55-9)
	B-30	N-[(2,2-difluorocyclopropyl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-65-1)
10	B-31	N-(2,2-difluoropropyl)-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-68-4)
	B-32	2-(3-pyridyl)-N-(pyrimidin-2-ylmethyl)indazole-5-carboxamide (CAS 1680188-69-5)
	B-33	N-[(5-methylpyrazin-2-yl)methyl]-2-(3-pyridyl)indazole-5-carboxamide (CAS 1680188-91-3)
15	B-34	indazapyroxamet (CAS 1689545-27-4)
	B-35	N-[1-(difluoromethyl)cyclopropyl]-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-90-5)
	B-36	N-(1,1-dimethyl-2-methylsulfanyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-91-6)
20	B-37	N-(1,1-dimethyl-2-methylsulfinyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-92-7)
	B-38	1,1-dimethyl-2-methylsulfonyl-ethyl)-7-fluoro-2-(3-pyridyl)indazole-4-carboxamide (CAS 2408908-93-8)
	B-39	cyproflamilide (CAS 2375110-88-4)
25	B-40	dicloromezotiaz (CAS 1263629-39-5)
	B-41	dinotefuran (CAS 165252-70-0)
	B-42	flupyrimin (CAS 1363400-41-2)
	B-43	guadipyr (CAS 1227849-60-6)
	B-44	flometoquin (CAS 875775-74-9)
30	B-45	flupentiofenox (CAS 1472050-04-6)
	B-46	(+)-flupentiofenox (CAS 1472050-06-8)
	B-47	(-)-flupentiofenox (CAS 1472050-05-7)
	B-48	cyetpyrafen (CAS 1253429-01-4)

- B-49 pyflubumide (CAS 926914-55-8)
- B-50 pyriminostrobin (CAS 1257598-43-8)
- B-51 acynonapyr (CAS 1333001-59-4)
- 5 B-52 R-(2Z)-2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 2377084-09-6)
- B-53 2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 1445684-82-1)
- B-54 (2Z)-2-[2-fluoro-4-methyl-5-(2,2,2-trifluoroethylsulfinyl)phenyl]imino-3-(2,2,2-trifluoroethyl)thiazolidin-4-one (CAS 1445683-71-5)
- 10 B-55 oxazosulfyl (CAS 1616678-32-0)
- B-56 2-(5-cyclopropyl-3-ethylsulfonyl-2-pyridyl)-5-(trifluoromethylsulfonyl)-1,3-benzoxazole (CAS 2128706-05-6)
- B-57 2-[3-ethylsulfonyl-6-(1,2,4-triazol-1-yl)-2-pyridyl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 1808115-49-2)
- 15 B-58 (3-ethylsulfonyl-2-pyridyl)-5-(2,2,3,3,3-pentafluoropropoxy)pyrazine (CAS 2095470-94-1)
- B-59 2-[3-ethylsulfonyl-6-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-31-4)
- 20 B-60 2-[3-ethylsulfonyl-5-(trifluoromethyl)pyrazolo[1,5-a]pyridin-2-yl]-3-methyl-6-(trifluoromethyl)imidazo[4,5-b]pyridine (CAS 2133042-44-9)
- B-61 fluazaindolizine (CAS 1254304-22-7)
- B-62 tioxazafen (CAS 330459-31-9);

or agrochemically acceptable salts thereof.

- 25 9. A composition according to claim 8 wherein the ratio by weight of (A) to (B) is from 100:1 to 1:100, 50:1 to 1:50 or 20:1 to 1:20, or preferably 10:1 to 1:10 or 5:1 to 1:5; more preferably 3.1 to 1:3.
10. A composition comprising, as component (A), a compound of formula (I):



wherein:

R₁ is C₁-C₃ alkylene or halo C₁-C₃ alkylene;

R₂ is C₁-C₆ alkyl or C₁-C₆alkoxy-C₁-C₆ alkyl or halo- C₁-C₆ alkyl;

5 R₃ is H or CN; and

n is 0, 1 or 2;

or an agrochemically acceptable salt thereof;

and, as component (B), a compound selected from the group consisting of:

B-63 thiacloprid (CAS 111988-49-9)

10 B-64 imidacloprid (CAS 138261-41-3)

B-65 sulfoxaflor (CAS 946578-00-3)

B-66 acetamiprid (CAS 135410-20-7)

B-67 nitenpyram (CAS 150824-47-8)

B-68 clothianidin (CAS 210880-92-5)

15 B-69 thiamethoxam (CAS 153719-23-4)

B-70 flubendiamide (CAS 272451-65-7)

B-71 cyantraniliprole (CAS 736994-63-1)

B-72 pyridalyl (CAS 179101-81-6)

B-73 indoxacarb (CAS 173584-44-6)

20 B-74 deltamethrin (CAS 52918-63-5)

B-75 cyfluthrin (CAS 68359-37-5)

B-76 bifenthrin (CAS 82657-04-3)

B-77 zeta-cypermethrin (CAS 1315501-18-8)

B-78 gamma-cyhalothrin (CAS 76703-62-3)

25 B-79 acrinathrin (CAS 101007-06-1)

B-80 permethrin (CAS 52645-53-1)

B-81 alpha-cypermethrin (CAS 67375-30-8)

B-82 fenpropathrin (CAS 39515-41-8)

B-83 fenvalerate (CAS 51630-58-1)

B-84 esfenvalerate (CAS 66230-04-4)

5 B-85 cypermethrin (CAS 52315-07-8)

B-86 lambda-cyhalothrin (CAS 91465-08-6)

B-87 chlorantraniliprole (CAS 500008-45-7)

B-88 chlorfenapyr (CAS 122453-73-0);

or agrochemically acceptable salts thereof;

10 wherein the composition comprises (A) and (B) in a ratio by weight of 500:1 to 1:500, 100:1 to 1:100, 50:1 to 1:50, or 20:1 to 1:20, 10:1 to 1:10; 5:1 to 1:5; or 3.1 to 1:3 by weight.

11. A composition according to any one of claims 8 to 10 further comprising one or more auxiliaries and/or diluents.

15

12. A method according to any one of claims 1 to 7, or a composition as claimed in any one of claims 8 to 11, wherein R_1 is CF_2 .

13. A method according to any one of claims 1 to 7 and 12, or a composition as claimed in any one of claims 8 to 12, wherein R_3 is CN.

20

14. A method according to any one of claims 1 to 7 and 12, or a composition as claimed in any one of claims 8 to 12, wherein R_3 is H.

15. A method according to any one of claims 1 to 7 and 12 to 14, or a composition as claimed in any one of claims 8 to 14, wherein R_2 is methyl.

25

16. A method according to any one of claims 1 to 7 and 12 to 15, or a composition as claimed in any one of claims 8 to 15, wherein n is 2.

30

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/057514

A. CLASSIFICATION OF SUBJECT MATTER INV. A01N43/90 A01N53/00 A01P5/00 A01P7/00 ADD. 		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A01N A01P		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, CHEM ABS Data, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	EP 3 835 301 A1 (NIHON NOHYAKU CO LTD [JP]) 16 June 2021 (2021-06-16) paragraphs [0001], [0005] - [0007] table 1 paragraphs [0115] - [0117] -----	10,11
X	EP 2 952 097 A1 (SUMITOMO CHEMICAL CO [JP]) 9 December 2015 (2015-12-09) paragraphs [0007], [0023] - [0028] tables 70-126 -----	1-16
X	WO 2019/059244 A1 (NIHON NOHYAKU CO LTD [JP]) 28 March 2019 (2019-03-28) paragraphs [0001] - [0005] tables 70-126 tables 1-5 paragraphs [0106] - [0108] -----	1-16
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 17 June 2022		Date of mailing of the international search report 28/06/2022
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Zanobini, Alessandra

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2022/057514

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 3835301	A1	16-06-2021	BR 112021000338 A2	04-05-2021
			CN 112384516 A	19-02-2021
			EP 3835301 A1	16-06-2021
			JP WO2020013147 A1	05-08-2021
			US 2021329920 A1	28-10-2021
			WO 2020013147 A1	16-01-2020

EP 2952097	A1	09-12-2015	AR 095111 A1	30-09-2015
			AU 2014213387 A1	06-08-2015
			BR 112015018188 A2	18-07-2017
			CA 2898638 A1	07-08-2014
			CN 105163587 A	16-12-2015
			EP 2952097 A1	09-12-2015
			JP 6178345 B2	09-08-2017
			JP WO2014119672 A1	26-01-2017
			KR 20150113094 A	07-10-2015
			PH 12015501634 A1	12-10-2015
			TW 201444817 A	01-12-2014
			US 2015359222 A1	17-12-2015
			WO 2014119672 A1	07-08-2014

WO 2019059244	A1	28-03-2019	BR 112020005516 A2	06-10-2020
			CN 111132970 A	08-05-2020
			EP 3686195 A1	29-07-2020
			JP WO2019059244 A1	05-11-2020
			US 2020214292 A1	09-07-2020
			WO 2019059244 A1	28-03-2019
