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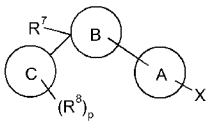
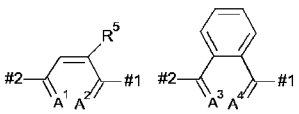
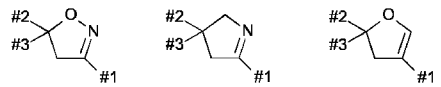
(54) Title: METHODS OF SOIL PEST CONTROL



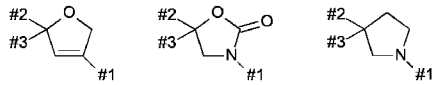
(I)



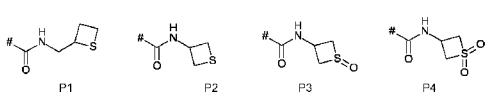
A1a A2a



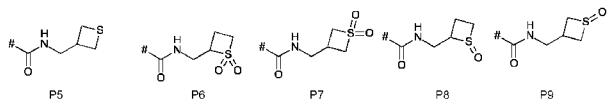
B1 B2 B3



B4 B5 B6



P1 P2 P3 P4



P5 P6 P7 P8 P9

(57) Abstract: The present invention provides methods of controlling and/or preventing soil-dwelling pests in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof a compound of formula (I) wherein cycle A is A1a or A2a wherein A^1, A^2, A^3 and A^4 are independently C-H, or nitrogen and wherein #1 indicates the bond to X and #2 indicates the bond to cycle B; cycle B is selected from B1 to B6 wherein #1 indicates the bond to cycle A, #2 indicates the bond to R^7 and #3 indicates the bond to cycle C; cycle C is phenyl; R^5 is chloro, bromo, CF_3 or methyl; R^7 is chlorodifluoromethyl or trifluoromethyl; each R^8 is independently bromo, chloro, fluoro or trifluoromethyl; p is 1, 2 or 3; and and X is selected from P1 to P9.

WO 2013/190046 A1

GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, 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, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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Published:

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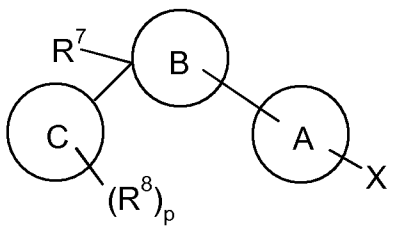
METHODS OF SOIL PEST CONTROL

The present invention relates to methods of soil pest control and in particular to control of corn rootworm, wireworms, grubs, in particular white grubs, termites, subterraneous stinkbugs, cutworms, millipedes and broca gigante.

Compounds that are insecticidally, acaricidally, nematicidally and/or moluscicidally active by antagnonism of the gamma-aminobutyric acid (GABA)-gated chloride channel, and which comprise a partially saturated heterocycle that is substituted by a haloalkyl substituent and one or two optionally substituted aromatic or heteroaromatic rings, represent a new class of pesticides that are described for example in Ozoe et al. Biochemical and Biophysical Research Communications, 391 (2010) 744-749. Compounds from this class are broadly described in WO 2005/085216 (EP1731512), WO 2007/123853, WO 2007/075459, WO2009/002809, WO 2008/019760, WO 2008/122375, WO 2008/128711, WO 2009/097992, WO 2010/072781, WO 2010/072781, WO 2008/126665, WO 2007/125984, WO 2008/130651, JP 2008110971, JP2008133273, JP2009108046, WO2009/022746, WO 2009/022746, WO 2010/032437, WO2009/080250, WO2010/020521, WO2010/025998, WO2010/020522, WO2010/084067, WO2010/086225, WO2010/149506 and WO2010/108733.

It has now surprisingly been found that particular insecticides from this new class of gamma-aminobutyric acid (GABA)-gated chloride channel antagonists (disclosed in e.g. WO2009/080250, WO2010/020522, WO2010/149506, WO2011/101229 and WO2012/045700) are highly effective at controlling soil pests, in particular corn rootworm, wireworms, grubs, in particular white grubs, termites, subterraneous stinkbugs, cutworms, millipedes and broca gigante. The compounds of interest include a thietane amide derivative in which the thietane carbon ring members are unsubstituted. These compounds represent an important new solution for soil pests, particularly corn rootworm, wireworms, grubs, in particular white grubs, termites, subterraneous stinkbugs, cutworms, millipedes and broca gigante, and particularly where the soil pests are resistant to current methods.

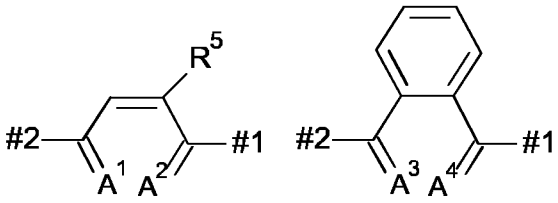
In a first aspect the invention provides a method of controlling and/or preventing soil-dwelling pests in useful plants comprising applying to the locus of the useful plant or treating propagation material thereof, preferably a seed, with a compound of formula I



(I)

wherein

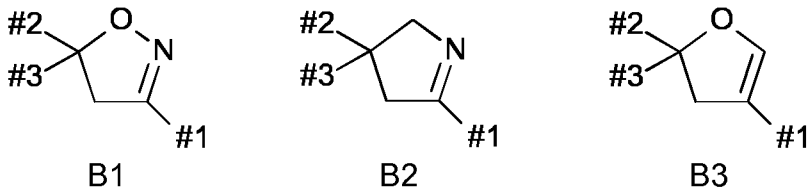
cycle A is A1a or A2a



A1a A2a

wherein A^1, A^2, A^3 and A^4 are independently C-H, or nitrogen and wherein #1 indicates the bond to X and #2 indicates the bond to cycle B;

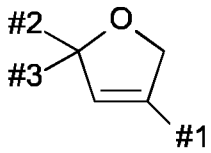
cycle B is selected from B1 to B6



B1

B2

B3



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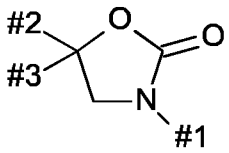
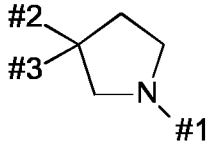


B5



B6

wherein #1 indicates the bond to cycle A, #2 indicates the bond to R^7 and #3 indicates the bond to cycle C;

cycle C is phenyl;

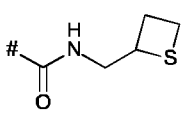
R^5 is chloro, bromo, CF_3 or methyl;

R^7 is chlorodifluoromethyl or trifluoromethyl;

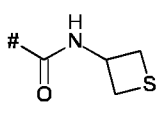
each R^8 is independently bromo, chloro, fluoro or trifluoromethyl;

p is 1, 2 or 3; and

and X is selected from P1 to P9



P1



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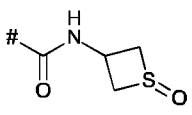

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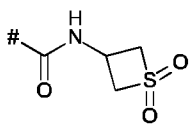

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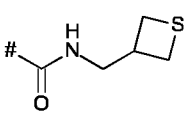

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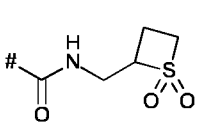

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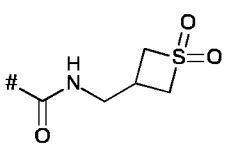

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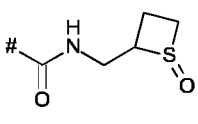
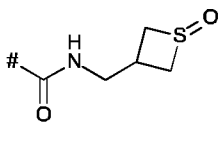


P8



P9

In a further aspect the invention provides use of a compound of formula I for the control of a soil-dwelling pest in useful plants.

Preferably the soil-dwelling pest is selected from corn rootworm, wireworms, grubs, in particular white grubs (e.g. *Phyllophaga sp., Diloboderus sp., Popillia japonica*), termites (in particular for sugar cane), subterraneous stinkbugs (e.g. *Scaptocoris sp.*) , cutworms (e.g. *agrotis sp.*), millipedes (e.g. *Julus sp.*) and broca gigante (e.g. *Telchin licus*).

In one embodiment the invention provides a method of controlling and/or preventing corn rootworm in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing wireworms in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing grubs, in particular white grubs, in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing *Phyllophaga sp.* in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing *Diloboderus sp.* in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing *Popillia japonica* in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing termites (in particular for sugar cane) in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing subterraneous stinkbugs (e.g. *Scaptocoris sp.*) in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing cutworms (e.g. *agrotis sp.*) in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing millipedes (e.g. *Julus sp.*) in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In one embodiment the invention provides a method of controlling and/or preventing broca gigante (e.g. *Telchin licus*) in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In a further aspect the invention provides a method of improving the growth of useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof, preferably a seed, with a compound of formula I.

In a further aspect the invention provides use of a compound of formula I as defined in claims 1 for improving the growth of useful plants.

In a further aspect the invention provides a method comprising applying a compound of formula I to the locus of corn plants by direct soil application. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In a further aspect the invention provides a method of controlling and/or preventing corn rootworm in corn plants comprising applying a compound of formula I to the locus of corn plants by direct soil application. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In a further aspect the invention provides a method comprising applying a compound of formula I to the locus of corn plants by in-furrow application. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In a further aspect the invention provides a method of controlling and/or preventing corn rootworm in corn plants comprising applying a compound of formula I to the locus of corn plants by direct soil application. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

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In a further aspect the invention provides a method of controlling and/or preventing corn rootworm in useful plants comprising applying a compound of formula I to the locus of the useful plants by direct soil application. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In a further aspect the invention provides a method of controlling and/or preventing corn rootworm in useful plants comprising applying a compound of formula I to the locus of the useful plants by in-furrow application. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In a further aspect the invention provides use of a compound of formula I for controlling and/or preventing corn rootworm in useful plants, preferably corn plants, by applying a compound of formula I to the locus of the useful plants directly to soil. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In a further aspect the invention provides use of a compound of formula I for controlling and/or preventing corn rootworm in useful plants, preferably corn rootworm, by applying a compound of formula I to the locus of the useful plants and appliying the compound of formula I by in-furrow application. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In a further aspect the invention provides a method comprising applying a compound of formula I to a field of corn plants, before, during or after planting, and wherein the application of the compound of formula I comprises applying the compound of formula I directly to soil. Prefered compounds are described below, most preferably cycle A is A1a, cycle B is B1, or B2, preferably B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

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Application before planning includes e.g. up to 1, 2, 3, 4, 5, or even up to 10 days before planting. Application after planting includes e.g. up to 1, 2, 3, 4, 5, or even up to 10 days after planting. For example application may be up to 10 days before or after planting, preferably up to 5 days before or after planting, more preferably up to up to 2 days before or after planting, most preferably up to 1 day before or after planting.

Seed treatment is an example of indirect application to soil, e.g. the application of the compound of formula I by direct soil application comprises applying the compound of formula I to the soil other than via seed treatment.

In a further aspect, the invention provides a method for obtaining regulatory approval for the use of one or more of a compound of formula I to control a pest selected from corn rootworm, wireworms, grubs, in particular white grubs, termites, subterraneous stinkbugs, cutworms, millipedes and broca gigante, comprising at least one step of referring to, submitting or relying on biological data showing that said active ingredient reduces insect pressure.

The compounds of the invention may exist in different geometric or optical isomers or tautomeric forms. This invention covers all such isomers and tautomers and mixtures thereof in all proportions as well as isotopic forms such as deuterated compounds. The compounds of the invention may contain one or more asymmetric carbon atoms, for example, at the C(#2)#3 group, and may exist as enantiomers (or as pairs of diastereoisomers) or as mixtures of such. Reference to compounds of the invention also includes reference to salts and N-oxides.

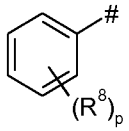
Preferred values of cycle A, cycle B, cycle C, X, p, A^1, A^2, A^3, A^4, R^5, R^7 and R^8 in compounds of formula I are, in any combination, as set out below.

Preferably cycle A is A1a.

Preferably cycle B is a cycle selected from cycle B1, B2 and B3, more preferably cycle B1 or B2, most preferably cycle B1.

In one group of compounds cycle B is B1. In another group of compounds cycle B is B2. In another group of compounds cycle B is B3. In another group of compounds cycle B is B4. In another group of compounds cycle B is B5. In another group of compounds cycle B is B6.

Preferably cycle C is cycle C1



C1

More preferably cycle C is 3,5-dichlorophenyl-, 3-chloro-4-fluorophenyl-, 3-fluoro-4-chlorophenyl-, 3,4-dichlorophenyl-, 3-chloro-4-bromophenyl-, 3,5-dichloro-4-fluorophenyl-, 3,4,5-trichlorophenyl-, 3,5-dichloro-4-iodophenyl-, 3,4,5-trifluorophenyl-, 3-chloro-5-bromophenyl-, 3-chloro-5-fluorophenyl-, 3-chloro-5-(trifluoromethyl)phenyl-, 3,4-dichloro-5-(trifluoromethyl)phenyl-, 3,5-bis(trifluoromethyl)phenyl-, 4-chloro-3,5-bis(trifluoromethyl)phenyl-, 3-(trifluoromethyl)phenyl-, more preferably 3-chloro-5-bromophenyl-, 3-chloro-5-(trifluoromethyl)phenyl-, 3,5-dichloro-4-fluorophenyl-, 3,4,5-trichlorophenyl-, 3,5-bis(trifluoromethyl)phenyl-, 3-(trifluoromethyl)phenyl-, 3,5-dichloro-4-bromophenyl-, 3-bromo-5-(trifluoromethyl)phenyl-, 3,5-dibromophenyl-, or 3,4-dichlorophenyl-, most preferably 3,5-dichloro-phenyl.

Preferably A^1 is C-H or C-R^5, most preferably A^1 is C-H.

Preferably A^2 is C-H or C-R^5, most preferably A^2 is C-H.

Preferably A^3 is C-H or C-R^5, most preferably A^3 is C-H.

Preferably A^4 is C-H or C-R^5, most preferably A^4 is C-H.

Preferably no more than one of A^1 and A^2 is nitrogen. Preferably no more than one of A^3 and A^4 is nitrogen. Preferably A^1 and A^2 are both C-H. Preferably both A^3 and A^4 are C-H.

Preferably R^5 is methyl or chloro, most preferably methyl.

Preferably R^7 is trifluoromethyl.

Preferably each R^8 is independently fluoro, bromo or chloro.

Preferably p is 2 or 3, most preferably 2.

Preferably X is P2, P3 or P4.

In one group of compounds cycle A is A1a, cycle B is B1, B2 or B3, cycle C is phenyl.

In one group of compounds cycle A is A1a, cycle B is B1, B2 or B3, cycle C is phenyl, R^7 is trifluoromethyl.

In one group of compounds cycle A is A1a, cycle B is B1, B2 or B3, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In one group of compounds cycle A is A1a, cycle B is B1, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In one group of compounds cycle A is A1a, cycle B is B2, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

In one group of compounds cycle A is A1a, cycle B is B3, cycle C is phenyl, R^7 is trifluoromethyl and X is P2, P3 or P4.

The following tables illustrate specific compounds of the invention:

Table 1
Table 1 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-CH, Cycle B is B1 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 2
Table 2 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-CH, Cycle B is B1 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 3
Table 3 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are N-CH, Cycle B is B1 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 4
Table 4 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are N-CH, Cycle B is B1 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 5
Table 5 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-N, Cycle B is B1 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 6
Table 6 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-N, Cycle B is B1 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 7
Table 7 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-CH, Cycle B is B2 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 8
Table 8 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-CH, Cycle B is B2 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 9
Table 9 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are N-CH, Cycle B is B2 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 10
Table 10 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are N-CH, Cycle B is B2 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 11
Table 11 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-N, Cycle B is B2 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 12
Table 12 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-N, Cycle B is B2 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 13
Table 13 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-CH, Cycle B is B3 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 14
Table 14 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-CH, Cycle B is B3 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 15
Table 15 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are N-CH, Cycle B is B3 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 16
Table 16 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are N-CH, Cycle B is B3 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 17
Table 17 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-N, Cycle B is B3 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 18
Table 18 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-N, Cycle B is B3 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 19
Table 19 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-CH, Cycle B is B4 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 20
Table 20 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-CH, Cycle B is B4 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 21
Table 21 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are N-CH, Cycle B is B4 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 22
Table 22 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are N-CH, Cycle B is B4 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 23
Table 23 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-N, Cycle B is B4 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 24
Table 24 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-N, Cycle B is B4 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 25

Table 25 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-CH, Cycle B is B5 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 26

Table 26 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-CH, Cycle B is B5 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 27

Table 27 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are N-CH, Cycle B is B5 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 28

Table 28 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are N-CH, Cycle B is B5 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 29

Table 29 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-N, Cycle B is B5 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 30

Table 30 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-N, Cycle B is B5 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 31

Table 31 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-CH, Cycle B is B6 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 32

Table 32 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-CH, Cycle B is B6 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 33

Table 33 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are N-CH, Cycle B is B6 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 34

Table 34 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are N-CH, Cycle B is B6 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 35

Table 35 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is methyl, A1 and A2 are CH-N, Cycle B is B6 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 36

Table 36 provides 338 compounds of Formula I wherein cycle A is cycle A1a, R5 is chloro, A1 and A2 are CH-N, Cycle B is B6 and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 37

Table 37 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-CH, Cycle B is B1, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 38

Table 38 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are N-CH, Cycle B is B1, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 39

Table 39 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-N, Cycle B is B1, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 40

Table 40 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-CH, Cycle B is B2, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 41

Table 41 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are N-CH, Cycle B is B2, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 42

Table 42 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-N, Cycle B is B2, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 43
Table 43 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-CH, Cycle B is B3, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 44
Table 44 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are N-CH, Cycle B is B3, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 45
Table 45 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-N, Cycle B is B3, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 46
Table 46 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-CH, Cycle B is B4, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 47
Table 47 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are N-CH, Cycle B is B4, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 48
Table 48 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-N, Cycle B is B4, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 49
Table 49 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-CH, Cycle B is B5, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 50
Table 50 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are N-CH, Cycle B is B5, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 51
Table 51 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-N, Cycle B is B5, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 52
Table 52 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-CH, Cycle B is B6, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 53
Table 53 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are N-CH, Cycle B is B6, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table 54
Table 54 provides 338 compounds of Formula I wherein cycle A is cycle A2a, A3 and A4 are CH-N, Cycle B is B6, and R7 is trifluoromethyl, and cycle C and X are as defined in Table P.

Table P

	Cycle C	**X**	**Stereochemistry**
1	3,5-dichloro-phenyl-	P1	I**
2	3,4,5-trichloro-phenyl-	P1	I**
3	3,5-dichloro-4-fluoro-phenyl-	P1	I**
4	3-chloro-4-fluoro-phenyl-	P1	I**
5	3,4-dichloro-phenyl-	P1	I**
6	3,5-dichloro-4-bromo-phenyl-	P1	I**
7	3,4,5-trifluoro-phenyl-	P1	I**
8	3-chloro-5-bromo-phenyl-	P1	I**
9	3-chloro-5-trifluoromethyl-phenyl-	P1	I**
10	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P1	I**

11	3,5-di-trifluoromethyl-phenyl-	P1	I**
12	3,5-di-trifluoromethyl-4-chloro-phenyl-	P1	I**
13	3-trifluoromethyl-phenyl-	P1	I**
14	3,5-dichloro-phenyl-	P2	I**
15	3,4,5-trichloro-phenyl-	P2	I**
16	3,5-dichloro-4-fluoro-phenyl-	P2	I**
17	3-chloro-4-fluoro-phenyl-	P2	I**
18	3,4-dichloro-phenyl-	P2	I**
19	3,5-dichloro-4-bromo-phenyl-	P2	I**
20	3,4,5-trifluoro-phenyl-	P2	I**
21	3-chloro-5-bromo-phenyl-	P2	I**
22	3-chloro-5-trifluoromethyl-phenyl-	P2	I**
23	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P2	I**
24	3,5-di-trifluoromethyl-phenyl-	P2	I**
25	3,5-di-trifluoromethyl-4-chloro-phenyl-	P2	I**
26	3-trifluoromethyl-phenyl-	P2	I**
27	3,5-dichloro-phenyl-	P3	I**
28	3,4,5-trichloro-phenyl-	P3	I**
29	3,5-dichloro-4-fluoro-phenyl-	P3	I**
30	3-chloro-4-fluoro-phenyl-	P3	I**
31	3,4-dichloro-phenyl-	P3	I**
32	3,5-dichloro-4-bromo-phenyl-	P3	I**
33	3,4,5-trifluoro-phenyl-	P3	I**
34	3-chloro-5-bromo-phenyl-	P3	I**
35	3-chloro-5-trifluoromethyl-phenyl-	P3	I**
36	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P3	I**
37	3,5-di-trifluoromethyl-phenyl-	P3	I**
38	3,5-di-trifluoromethyl-4-chloro-phenyl-	P3	I**
39	3-trifluoromethyl-phenyl-	P3	I**
40	3,5-dichloro-phenyl-	P3 (cis)	I**
41	3,4,5-trichloro-phenyl-	P3 (cis)	I**
42	3,5-dichloro-4-fluoro-phenyl-	P3 (cis)	I**
43	3-chloro-4-fluoro-phenyl-	P3 (cis)	I**
44	3,4-dichloro-phenyl-	P3 (cis)	I**
45	3,5-dichloro-4-bromo-phenyl-	P3 (cis)	I**
46	3,4,5-trifluoro-phenyl-	P3 (cis)	I**
47	3-chloro-5-bromo-phenyl-	P3 (cis)	I**
48	3-chloro-5-trifluoromethyl-phenyl-	P3 (cis)	I**
49	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P3 (cis)	I**
50	3,5-di-trifluoromethyl-phenyl-	P3 (cis)	I**
51	3,5-di-trifluoromethyl-4-chloro-phenyl-	P3 (cis)	I**
52	3-trifluoromethyl-phenyl-	P3 (cis)	I**
53	3,5-dichloro-phenyl-	P3 (trans)	I**
54	3,4,5-trichloro-phenyl-	P3 (trans)	I**
55	3,5-dichloro-4-fluoro-phenyl-	P3 (trans)	I**

56	3-chloro-4-fluoro-phenyl-	P3 (trans)	I**
57	3,4-dichloro-phenyl-	P3 (trans)	I**
58	3,5-dichloro-4-bromo-phenyl-	P3 (trans)	I**
59	3,4,5-trifluoro-phenyl-	P3 (trans)	I**
60	3-chloro-5-bromo-phenyl-	P3 (trans)	I**
61	3-chloro-5-trifluoromethyl-phenyl-	P3 (trans)	I**
62	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P3 (trans)	I**
63	3,5-di-trifluoromethyl-phenyl-	P3 (trans)	I**
64	3,5-di-trifluoromethyl-4-chloro-phenyl-	P3 (trans)	I**
65	3-trifluoromethyl-phenyl-	P3 (trans)	I**
66	3,5-dichloro-phenyl-	P4	I**
67	3,4,5-trichloro-phenyl-	P4	I**
68	3,5-dichloro-4-fluoro-phenyl-	P4	I**
69	3-chloro-4-fluoro-phenyl-	P4	I**
70	3,4-dichloro-phenyl-	P4	I**
71	3,5-dichloro-4-bromo-phenyl-	P4	I**
72	3,4,5-trifluoro-phenyl-	P4	I**
73	3-chloro-5-bromo-phenyl-	P4	I**
74	3-chloro-5-trifluoromethyl-phenyl-	P4	I**
75	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P4	I**
76	3,5-di-trifluoromethyl-phenyl-	P4	I**
77	3,5-di-trifluoromethyl-4-chloro-phenyl-	P4	I**
78	3-trifluoromethyl-phenyl-	P4	I**
79	3,5-dichloro-phenyl-	P5	I**
80	3,4,5-trichloro-phenyl-	P5	I**
81	3,5-dichloro-4-fluoro-phenyl-	P5	I**
82	3-chloro-4-fluoro-phenyl-	P5	I**
83	3,4-dichloro-phenyl-	P5	I**
84	3,5-dichloro-4-bromo-phenyl-	P5	I**
85	3,4,5-trifluoro-phenyl-	P5	I**
86	3-chloro-5-bromo-phenyl-	P5	I**
87	3-chloro-5-trifluoromethyl-phenyl-	P5	I**
88	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P5	I**
89	3,5-di-trifluoromethyl-phenyl-	P5	I**
90	3,5-di-trifluoromethyl-4-chloro-phenyl-	P5	I**
91	3-trifluoromethyl-phenyl-	P5	I**
92	3,5-dichloro-phenyl-	P6	I**
93	3,4,5-trichloro-phenyl-	P6	I**
94	3,5-dichloro-4-fluoro-phenyl-	P6	I**
95	3-chloro-4-fluoro-phenyl-	P6	I**
96	3,4-dichloro-phenyl-	P6	I**
97	3,5-dichloro-4-bromo-phenyl-	P6	I**
98	3,4,5-trifluoro-phenyl-	P6	I**
99	3-chloro-5-bromo-phenyl-	P6	I**
100	3-chloro-5-trifluoromethyl-phenyl-	P6	I**
101	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P6	I**

102	3,5-di-trifluoromethyl-phenyl-	P6	I**
103	3,5-di-trifluoromethyl-4-chloro-phenyl-	P6	I**
104	3-trifluoromethyl-phenyl-	P6	I**
105	3,5-dichloro-phenyl-	P7	I**
106	3,4,5-trichloro-phenyl-	P7	I**
107	3,5-dichloro-4-fluoro-phenyl-	P7	I**
108	3-chloro-4-fluoro-phenyl-	P7	I**
109	3,4-dichloro-phenyl-	P7	I**
110	3,5-dichloro-4-bromo-phenyl-	P7	I**
111	3,4,5-trifluoro-phenyl-	P7	I**
112	3-chloro-5-bromo-phenyl-	P7	I**
113	3-chloro-5-trifluoromethyl-phenyl-	P7	I**
114	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P7	I**
115	3,5-di-trifluoromethyl-phenyl-	P7	I**
116	3,5-di-trifluoromethyl-4-chloro-phenyl-	P7	I**
117	3-trifluoromethyl-phenyl-	P7	I**
118	3,5-dichloro-phenyl-	P8	I**
119	3,4,5-trichloro-phenyl-	P8	I**
120	3,5-dichloro-4-fluoro-phenyl-	P8	I**
121	3-chloro-4-fluoro-phenyl-	P8	I**
122	3,4-dichloro-phenyl-	P8	I**
123	3,5-dichloro-4-bromo-phenyl-	P8	I**
124	3,4,5-trifluoro-phenyl-	P8	I**
125	3-chloro-5-bromo-phenyl-	P8	I**
126	3-chloro-5-trifluoromethyl-phenyl-	P8	I**
127	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P8	I**
128	3,5-di-trifluoromethyl-phenyl-	P8	I**
129	3,5-di-trifluoromethyl-4-chloro-phenyl-	P8	I**
130	3-trifluoromethyl-phenyl-	P8	I**
131	3,5-dichloro-phenyl-	P9	I**
132	3,4,5-trichloro-phenyl-	P9	I**
133	3,5-dichloro-4-fluoro-phenyl-	P9	I**
134	3-chloro-4-fluoro-phenyl-	P9	I**
135	3,4-dichloro-phenyl-	P9	I**
136	3,5-dichloro-4-bromo-phenyl-	P9	I**
137	3,4,5-trifluoro-phenyl-	P9	I**
138	3-chloro-5-bromo-phenyl-	P9	I**
139	3-chloro-5-trifluoromethyl-phenyl-	P9	I**
140	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P9	I**
141	3,5-di-trifluoromethyl-phenyl-	P9	I**
142	3,5-di-trifluoromethyl-4-chloro-phenyl-	P9	I**
143	3-trifluoromethyl-phenyl-	P9	I**
144	3,5-dichloro-phenyl-	P9 (cis)	I**
145	3,4,5-trichloro-phenyl-	P9 (cis)	I**
146	3,5-dichloro-4-fluoro-phenyl-	P9 (cis)	I**
147	3-chloro-4-fluoro-phenyl-	P9 (cis)	I**

148	3,4-dichloro-phenyl-	P9 (cis)	I**
149	3,5-dichloro-4-bromo-phenyl-	P9 (cis)	I**
150	3,4,5-trifluoro-phenyl-	P9 (cis)	I**
151	3-chloro-5-bromo-phenyl-	P9 (cis)	I**
152	3-chloro-5-trifluoromethyl-phenyl-	P9 (cis)	I**
153	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P9 (cis)	I**
154	3,5-di-trifluoromethyl-phenyl-	P9 (cis)	I**
155	3,5-di-trifluoromethyl-4-chloro-phenyl-	P9 (cis)	I**
156	3-trifluoromethyl-phenyl-	P9 (cis)	I**
157	3,5-dichloro-phenyl-	P9 (trans)	I**
158	3,4,5-trichloro-phenyl-	P9 (trans)	I**
159	3,5-dichloro-4-fluoro-phenyl-	P9 (trans)	I**
160	3-chloro-4-fluoro-phenyl-	P9 (trans)	I**
161	3,4-dichloro-phenyl-	P9 (trans)	I**
162	3,5-dichloro-4-bromo-phenyl-	P9 (trans)	I**
163	3,4,5-trifluoro-phenyl-	P9 (trans)	I**
164	3-chloro-5-bromo-phenyl-	P9 (trans)	I**
165	3-chloro-5-trifluoromethyl-phenyl-	P9 (trans)	I**
166	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P9 (trans)	I**
167	3,5-di-trifluoromethyl-phenyl-	P9 (trans)	I**
168	3,5-di-trifluoromethyl-4-chloro-phenyl-	P9 (trans)	I**
169	3-trifluoromethyl-phenyl-	P9 (trans)	I**
170	3,5-dichloro-phenyl-	P1	
171	3,4,5-trichloro-phenyl-	P1	
172	3,5-dichloro-4-fluoro-phenyl-	P1	
173	3-chloro-4-fluoro-phenyl-	P1	
174	3,4-dichloro-phenyl-	P1	
175	3,5-dichloro-4-bromo-phenyl-	P1	
176	3,4,5-trifluoro-phenyl-	P1	
177	3-chloro-5-bromo-phenyl-	P1	
178	3-chloro-5-trifluoromethyl-phenyl-	P1	
179	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P1	
180	3,5-di-trifluoromethyl-phenyl-	P1	
181	3,5-di-trifluoromethyl-4-chloro-phenyl-	P1	
182	3-trifluoromethyl-phenyl-	P1	
183	3,5-dichloro-phenyl-	P2	
184	3,4,5-trichloro-phenyl-	P2	
185	3,5-dichloro-4-fluoro-phenyl-	P2	
186	3-chloro-4-fluoro-phenyl-	P2	
187	3,4-dichloro-phenyl-	P2	
188	3,5-dichloro-4-bromo-phenyl-	P2	
189	3,4,5-trifluoro-phenyl-	P2	
190	3-chloro-5-bromo-phenyl-	P2	
191	3-chloro-5-trifluoromethyl-phenyl-	P2	
192	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P2	
193	3,5-di-trifluoromethyl-phenyl-	P2	

194	3,5-di-trifluoromethyl-4-chloro-phenyl-	P2	
195	3-trifluoromethyl-phenyl-	P2	
196	3,5-dichloro-phenyl-	P3	
197	3,4,5-trichloro-phenyl-	P3	
198	3,5-dichloro-4-fluoro-phenyl-	P3	
199	3-chloro-4-fluoro-phenyl-	P3	
200	3,4-dichloro-phenyl-	P3	
201	3,5-dichloro-4-bromo-phenyl-	P3	
202	3,4,5-trifluoro-phenyl-	P3	
203	3-chloro-5-bromo-phenyl-	P3	
204	3-chloro-5-trifluoromethyl-phenyl-	P3	
205	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P3	
206	3,5-di-trifluoromethyl-phenyl-	P3	
207	3,5-di-trifluoromethyl-4-chloro-phenyl-	P3	
208	3-trifluoromethyl-phenyl-	P3	
209	3,5-dichloro-phenyl-	P3 (cis)	
210	3,4,5-trichloro-phenyl-	P3 (cis)	
211	3,5-dichloro-4-fluoro-phenyl-	P3 (cis)	
212	3-chloro-4-fluoro-phenyl-	P3 (cis)	
213	3,4-dichloro-phenyl-	P3 (cis)	
214	3,5-dichloro-4-bromo-phenyl-	P3 (cis)	
215	3,4,5-trifluoro-phenyl-	P3 (cis)	
216	3-chloro-5-bromo-phenyl-	P3 (cis)	
217	3-chloro-5-trifluoromethyl-phenyl-	P3 (cis)	
218	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P3 (cis)	
219	3,5-di-trifluoromethyl-phenyl-	P3 (cis)	
220	3,5-di-trifluoromethyl-4-chloro-phenyl-	P3 (cis)	
221	3-trifluoromethyl-phenyl-	P3 (cis)	
222	3,5-dichloro-phenyl-	P3 (trans)	
223	3,4,5-trichloro-phenyl-	P3 (trans)	
224	3,5-dichloro-4-fluoro-phenyl-	P3 (trans)	
225	3-chloro-4-fluoro-phenyl-	P3 (trans)	
226	3,4-dichloro-phenyl-	P3 (trans)	
227	3,5-dichloro-4-bromo-phenyl-	P3 (trans)	
228	3,4,5-trifluoro-phenyl-	P3 (trans)	
229	3-chloro-5-bromo-phenyl-	P3 (trans)	
230	3-chloro-5-trifluoromethyl-phenyl-	P3 (trans)	
231	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P3 (trans)	
232	3,5-di-trifluoromethyl-phenyl-	P3 (trans)	
233	3,5-di-trifluoromethyl-4-chloro-phenyl-	P3 (trans)	
234	3-trifluoromethyl-phenyl-	P3 (trans)	
235	3,5-dichloro-phenyl-	P4	
236	3,4,5-trichloro-phenyl-	P4	
237	3,5-dichloro-4-fluoro-phenyl-	P4	
238	3-chloro-4-fluoro-phenyl-	P4	
239	3,4-dichloro-phenyl-	P4	

240	3,5-dichloro-4-bromo-phenyl-	P4	
241	3,4,5-trifluoro-phenyl-	P4	
242	3-chloro-5-bromo-phenyl-	P4	
243	3-chloro-5-trifluoromethyl-phenyl-	P4	
244	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P4	
245	3,5-di-trifluoromethyl-phenyl-	P4	
246	3,5-di-trifluoromethyl-4-chloro-phenyl-	P4	
247	3-trifluoromethyl-phenyl-	P4	
248	3,5-dichloro-phenyl-	P5	
249	3,4,5-trichloro-phenyl-	P5	
250	3,5-dichloro-4-fluoro-phenyl-	P5	
251	3-chloro-4-fluoro-phenyl-	P5	
252	3,4-dichloro-phenyl-	P5	
253	3,5-dichloro-4-bromo-phenyl-	P5	
254	3,4,5-trifluoro-phenyl-	P5	
255	3-chloro-5-bromo-phenyl-	P5	
256	3-chloro-5-trifluoromethyl-phenyl-	P5	
257	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P5	
258	3,5-di-trifluoromethyl-phenyl-	P5	
259	3,5-di-trifluoromethyl-4-chloro-phenyl-	P5	
260	3-trifluoromethyl-phenyl-	P5	
261	3,5-dichloro-phenyl-	P6	
262	3,4,5-trichloro-phenyl-	P6	
263	3,5-dichloro-4-fluoro-phenyl-	P6	
264	3-chloro-4-fluoro-phenyl-	P6	
265	3,4-dichloro-phenyl-	P6	
266	3,5-dichloro-4-bromo-phenyl-	P6	
267	3,4,5-trifluoro-phenyl-	P6	
268	3-chloro-5-bromo-phenyl-	P6	
269	3-chloro-5-trifluoromethyl-phenyl-	P6	
270	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P6	
271	3,5-di-trifluoromethyl-phenyl-	P6	
272	3,5-di-trifluoromethyl-4-chloro-phenyl-	P6	
273	3-trifluoromethyl-phenyl-	P6	
274	3,5-dichloro-phenyl-	P7	
275	3,4,5-trichloro-phenyl-	P7	
276	3,5-dichloro-4-fluoro-phenyl-	P7	
277	3-chloro-4-fluoro-phenyl-	P7	
278	3,4-dichloro-phenyl-	P7	
279	3,5-dichloro-4-bromo-phenyl-	P7	
280	3,4,5-trifluoro-phenyl-	P7	
281	3-chloro-5-bromo-phenyl-	P7	
282	3-chloro-5-trifluoromethyl-phenyl-	P7	
283	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P7	
284	3,5-di-trifluoromethyl-phenyl-	P7	
285	3,5-di-trifluoromethyl-4-chloro-phenyl-	P7	

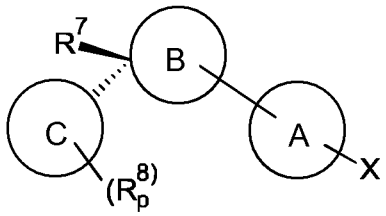
286	3-trifluoromethyl-phenyl-	P7	
287	3,5-dichloro-phenyl-	P8	
288	3,4,5-trichloro-phenyl-	P8	
289	3,5-dichloro-4-fluoro-phenyl-	P8	
290	3-chloro-4-fluoro-phenyl-	P8	
291	3,4-dichloro-phenyl-	P8	
292	3,5-dichloro-4-bromo-phenyl-	P8	
293	3,4,5-trifluoro-phenyl-	P8	
294	3-chloro-5-bromo-phenyl-	P8	
295	3-chloro-5-trifluoromethyl-phenyl-	P8	
296	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P8	
297	3,5-di-trifluoromethyl-phenyl-	P8	
298	3,5-di-trifluoromethyl-4-chloro-phenyl-	P8	
299	3-trifluoromethyl-phenyl-	P8	
300	3,5-dichloro-phenyl-	P9	
301	3,4,5-trichloro-phenyl-	P9	
302	3,5-dichloro-4-fluoro-phenyl-	P9	
303	3-chloro-4-fluoro-phenyl-	P9	
304	3,4-dichloro-phenyl-	P9	
305	3,5-dichloro-4-bromo-phenyl-	P9	
306	3,4,5-trifluoro-phenyl-	P9	
307	3-chloro-5-bromo-phenyl-	P9	
308	3-chloro-5-trifluoromethyl-phenyl-	P9	
309	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P9	
310	3,5-di-trifluoromethyl-phenyl-	P9	
311	3,5-di-trifluoromethyl-4-chloro-phenyl-	P9	
312	3-trifluoromethyl-phenyl-	P9	
313	3,5-dichloro-phenyl-	P9 (cis)	
314	3,4,5-trichloro-phenyl-	P9 (cis)	
315	3,5-dichloro-4-fluoro-phenyl-	P9 (cis)	
316	3-chloro-4-fluoro-phenyl-	P9 (cis)	
317	3,4-dichloro-phenyl-	P9 (cis)	
318	3,5-dichloro-4-bromo-phenyl-	P9 (cis)	
319	3,4,5-trifluoro-phenyl-	P9 (cis)	
320	3-chloro-5-bromo-phenyl-	P9 (cis)	
321	3-chloro-5-trifluoromethyl-phenyl-	P9 (cis)	
322	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P9 (cis)	
323	3,5-di-trifluoromethyl-phenyl-	P9 (cis)	
324	3,5-di-trifluoromethyl-4-chloro-phenyl-	P9 (cis)	
325	3-trifluoromethyl-phenyl-	P9 (cis)	
326	3,5-dichloro-phenyl-	P9 (trans)	
327	3,4,5-trichloro-phenyl-	P9 (trans)	
328	3,5-dichloro-4-fluoro-phenyl-	P9 (trans)	
329	3-chloro-4-fluoro-phenyl-	P9 (trans)	
330	3,4-dichloro-phenyl-	P9 (trans)	
331	3,5-dichloro-4-bromo-phenyl-	P9 (trans)	

332	3,4,5-trifluoro-phenyl-	P9 (trans)	
333	3-chloro-5-bromo-phenyl-	P9 (trans)	
334	3-chloro-5-trifluoromethyl-phenyl-	P9 (trans)	
335	3-chloro-4-chloro-5-trifluoromethyl-phenyl-	P9 (trans)	
336	3,5-di-trifluoromethyl-phenyl-	P9 (trans)	
337	3,5-di-trifluoromethyl-4-chloro-phenyl-	P9 (trans)	
338	3-trifluoromethyl-phenyl-	P9 (trans)	

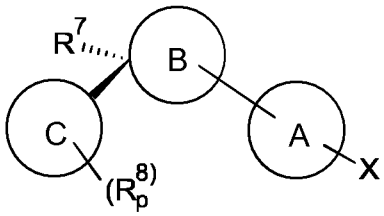
I** refers to compounds of formula I**.

In one embodiment the compound of formula I is a compound selected from Tables 1 to 54.

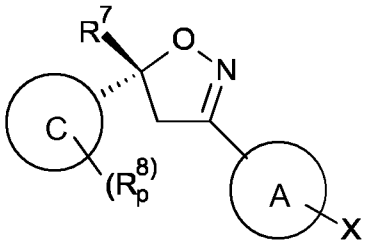
Compounds of formula I where cycle B is selected from B1 to B6 include at least one chiral centre and may exist as compounds of formula I* (IA*, IB*, IC*, ID*, IE*, IF*) or compounds of formula I** (IA**, IB**, IC**, ID**, IE**, IF**).



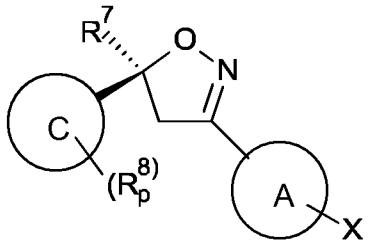
I*



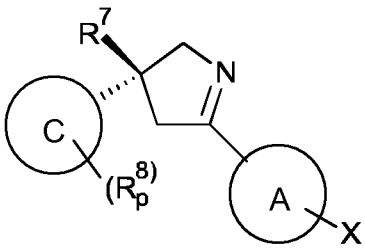
I**



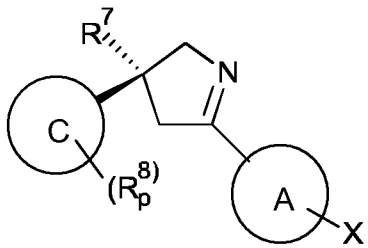
(IA*)



(IA**)



(IB*)



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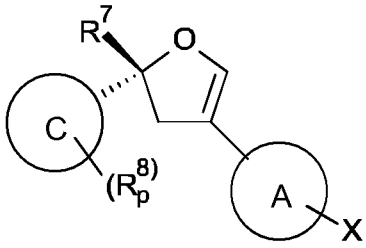

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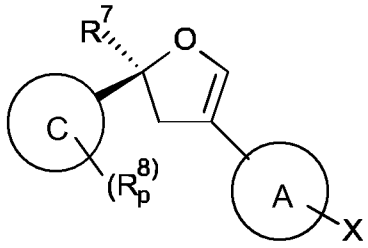

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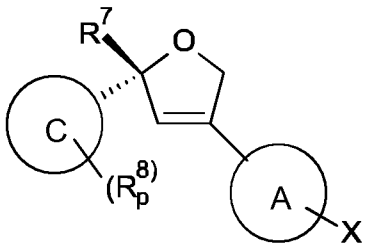

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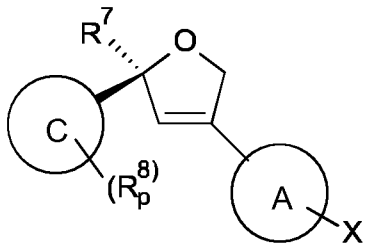

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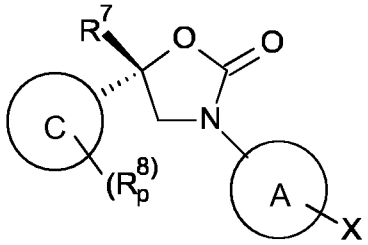

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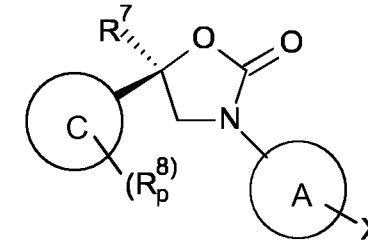
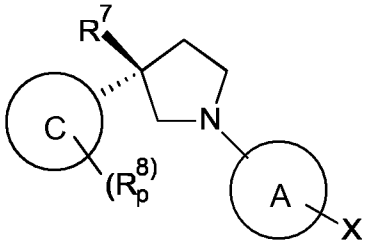
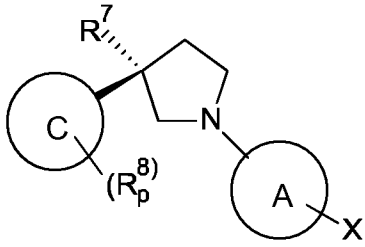


(IE**)



(IF*)



(IF**)

The compounds of formula I** are more biologically active than the respective compounds of formula I*. The invention includes mixtures of compounds I* and I** in any ratio e.g. in a molar ratio of 1:99 to 99:1, e.g. 10:1 to 1:10, e.g. a substantially 50:50 molar ratio. In an enantiomerically (or epimerically) enriched mixture of formula I**, the molar proportion of compound I** compared to the total amount of both enantiomers is for example greater than 50%, e.g. at least 55, 60, 65, 70, 75, 80, 85, 90, 95, 96, 97, 98, or at least 99%. Likewise, in enantiomerically (or epimerically) enriched mixture of

formula II*, the molar proportion of the compound of formula II* compared to the total amount of both enantiomers (or epimerically) is for example greater than 50%, e.g. at least 55, 60, 65, 70, 75, 80, 85, 90, 95, 96, 97, 98, or at least 99%. Enantiomerically (or epimerically) enriched mixtures of formula I** are preferred.

Each compound disclosed in Tables 1 to 54 represents a specific disclosure of the isomer according to the compound of formula I* and the isomer according to the compound of formula I**, as indicated in the Tables as well as mixtures enriched for the compound according to the compound of formula I*, and mixtures enriched for the compound according to the compound of formula I**, as described above.

The term "soil-dwelling pest" refers to a pest that causes plant damage whilst in a life cycle phase that lives in the soil, and for example, damages plant roots. Examples of specific pests are described below. Soil dwelling pests may be insects, acarines and/or nematodes, preferably insects, or acarines, most preferably insects.

The compounds of formula I may be prepared using the information provided in e.g.WO2009/080250, WO2010/020522, WO2010/149506, WO2011/101229 and WO2012/045700. WO2011/104089 and WO2011/154555 describe enantioselective routes to the compounds of formula I. The compounds in Scheme 1 may be prepared according to the methods described in WO2011/104089.

Scheme 1

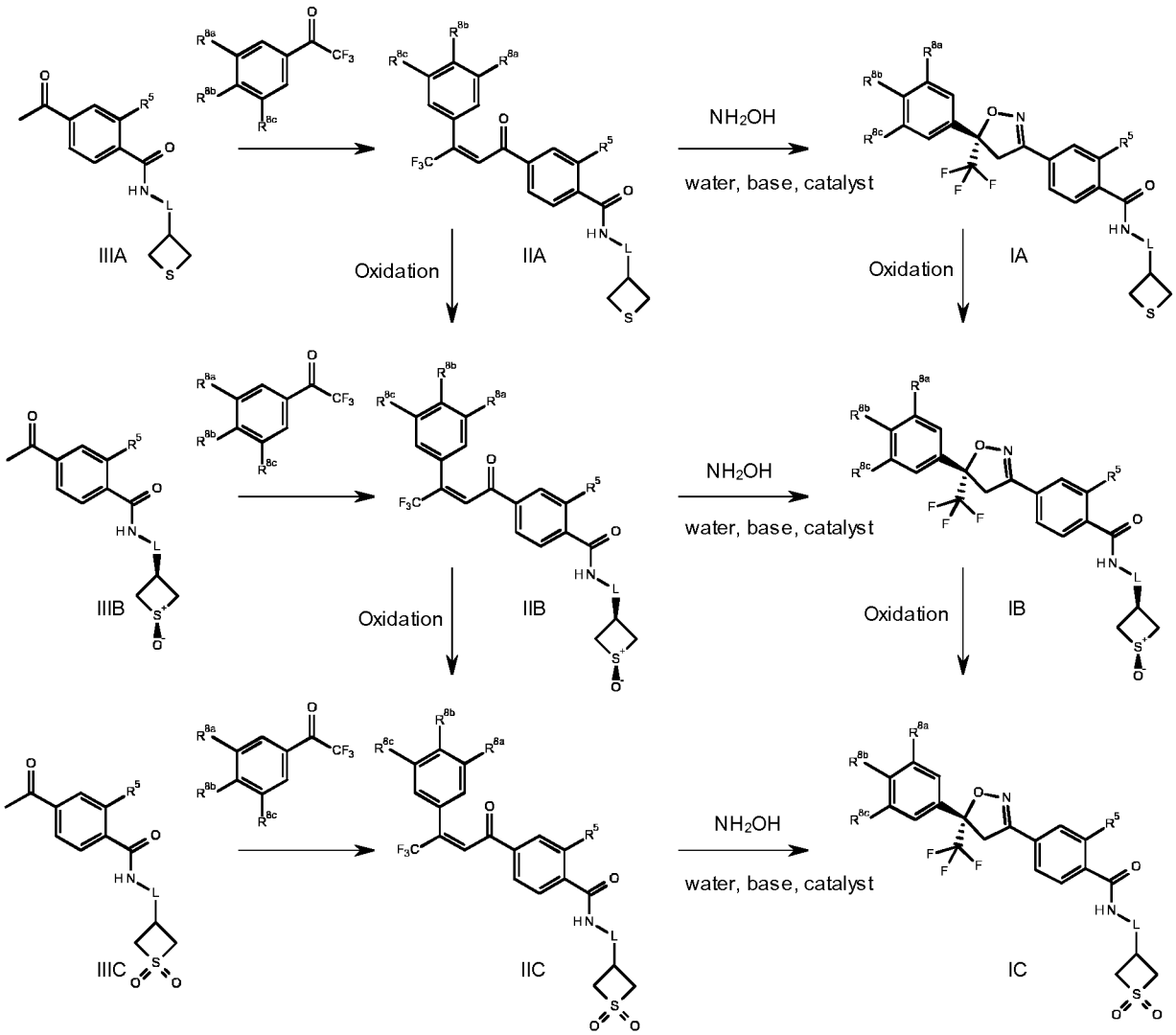


Table Q provides 792 preferred substituent combinations for the compounds illustrated in Scheme 1

Table Q

	R8a	R8b	R8c	R5	L		R8a	R8b	R8c	R5	L
1	Br	H	H	CH3	-	397	Br	H	H	CH3	CH2
2	Cl	H	H	CH3	-	398	Cl	H	H	CH3	CH2
3	F	H	H	CH3	-	399	F	H	H	CH3	CH2
4	CF3	H	H	CH3	-	400	CF3	H	H	CH3	CH2
5	H	Br	H	CH3	-	401	H	Br	H	CH3	CH2
6	Br	Br	H	CH3	-	402	Br	Br	H	CH3	CH2
7	Cl	Br	H	CH3	-	403	Cl	Br	H	CH3	CH2
8	F	Br	H	CH3	-	404	F	Br	H	CH3	CH2
9	CF3	Br	H	CH3	-	405	CF3	Br	H	CH3	CH2
10	H	Cl	H	CH3	-	406	H	Cl	H	CH3	CH2
11	Br	Cl	H	CH3	-	407	Br	Cl	H	CH3	CH2
12	Cl	Cl	H	CH3	-	408	Cl	Cl	H	CH3	CH2

13	F	Cl	H	CH3	-
14	CF3	Cl	H	CH3	-
15	H	F	H	CH3	-
16	Br	F	H	CH3	-
17	Cl	F	H	CH3	-
18	F	F	H	CH3	-
19	CF3	F	H	CH3	-
20	H	H	Br	CH3	-
21	Br	H	Br	CH3	-
22	Cl	H	Br	CH3	-
23	F	H	Br	CH3	-
24	CF3	H	Br	CH3	-
25	H	Br	Br	CH3	-
26	Br	Br	Br	CH3	-
27	Cl	Br	Br	CH3	-
28	F	Br	Br	CH3	-
29	CF3	Br	Br	CH3	-
30	H	Cl	Br	CH3	-
31	Br	Cl	Br	CH3	-
32	Cl	Cl	Br	CH3	-
33	F	Cl	Br	CH3	-
34	CF3	Cl	Br	CH3	-
35	H	F	Br	CH3	-
36	Br	F	Br	CH3	-
37	Cl	F	Br	CH3	-
38	F	F	Br	CH3	-
39	CF3	F	Br	CH3	-
40	H	H	Cl	CH3	-
41	Br	H	Cl	CH3	-
42	Cl	H	Cl	CH3	-
43	F	H	Cl	CH3	-
44	CF3	H	Cl	CH3	-
45	H	Br	Cl	CH3	-
46	Br	Br	Cl	CH3	-
47	Cl	Br	Cl	CH3	-
48	F	Br	Cl	CH3	-
49	CF3	Br	Cl	CH3	-
50	H	Cl	Cl	CH3	-
51	Br	Cl	Cl	CH3	-
52	Cl	Cl	Cl	CH3	-
53	F	Cl	Cl	CH3	-
54	CF3	Cl	Cl	CH3	-
55	H	F	Cl	CH3	-
56	Br	F	Cl	CH3	-
57	Cl	F	Cl	CH3	-
58	F	F	Cl	CH3	-

409	F	Cl	H	CH3	CH2
410	CF3	Cl	H	CH3	CH2
411	H	F	H	CH3	CH2
412	Br	F	H	CH3	CH2
413	Cl	F	H	CH3	CH2
414	F	F	H	CH3	CH2
415	CF3	F	H	CH3	CH2
416	H	H	Br	CH3	CH2
417	Br	H	Br	CH3	CH2
418	Cl	H	Br	CH3	CH2
419	F	H	Br	CH3	CH2
420	CF3	H	Br	CH3	CH2
421	H	Br	Br	CH3	CH2
422	Br	Br	Br	CH3	CH2
423	Cl	Br	Br	CH3	CH2
424	F	Br	Br	CH3	CH2
425	CF3	Br	Br	CH3	CH2
426	H	Cl	Br	CH3	CH2
427	Br	Cl	Br	CH3	CH2
428	Cl	Cl	Br	CH3	CH2
429	F	Cl	Br	CH3	CH2
430	CF3	Cl	Br	CH3	CH2
431	H	F	Br	CH3	CH2
432	Br	F	Br	CH3	CH2
433	Cl	F	Br	CH3	CH2
434	F	F	Br	CH3	CH2
435	CF3	F	Br	CH3	CH2
436	H	H	Cl	CH3	CH2
437	Br	H	Cl	CH3	CH2
438	Cl	H	Cl	CH3	CH2
439	F	H	Cl	CH3	CH2
440	CF3	H	Cl	CH3	CH2
441	H	Br	Cl	CH3	CH2
442	Br	Br	Cl	CH3	CH2
443	Cl	Br	Cl	CH3	CH2
444	F	Br	Cl	CH3	CH2
445	CF3	Br	Cl	CH3	CH2
446	H	Cl	Cl	CH3	CH2
447	Br	Cl	Cl	CH3	CH2
448	Cl	Cl	Cl	CH3	CH2
449	F	Cl	Cl	CH3	CH2
450	CF3	Cl	Cl	CH3	CH2
451	H	F	Cl	CH3	CH2
452	Br	F	Cl	CH3	CH2
453	Cl	F	Cl	CH3	CH2
454	F	F	Cl	CH3	CH2

59	CF3	F	Cl	CH3	-
60	H	H	F	CH3	-
61	Br	H	F	CH3	-
62	Cl	H	F	CH3	-
63	F	H	F	CH3	-
64	CF3	H	F	CH3	-
65	H	Br	F	CH3	-
66	Br	Br	F	CH3	-
67	Cl	Br	F	CH3	-
68	F	Br	F	CH3	-
69	CF3	Br	F	CH3	-
70	H	Cl	F	CH3	-
71	Br	Cl	F	CH3	-
72	Cl	Cl	F	CH3	-
73	F	Cl	F	CH3	-
74	CF3	Cl	F	CH3	-
75	H	F	F	CH3	-
76	Br	F	F	CH3	-
77	Cl	F	F	CH3	-
78	F	F	F	CH3	-
79	CF3	F	F	CH3	-
80	H	H	CF3	CH3	-
81	Br	H	CF3	CH3	-
82	Cl	H	CF3	CH3	-
83	F	H	CF3	CH3	-
84	CF3	H	CF3	CH3	-
85	H	Br	CF3	CH3	-
86	Br	Br	CF3	CH3	-
87	Cl	Br	CF3	CH3	-
88	F	Br	CF3	CH3	-
89	CF3	Br	CF3	CH3	-
90	H	Cl	CF3	CH3	-
91	Br	Cl	CF3	CH3	-
92	Cl	Cl	CF3	CH3	-
93	F	Cl	CF3	CH3	-
94	CF3	Cl	CF3	CH3	-
95	H	F	CF3	CH3	-
96	Br	F	CF3	CH3	-
97	Cl	F	CF3	CH3	-
98	F	F	CF3	CH3	-
99	CF3	F	CF3	CH3	-
100	Br	H	H	Br	-
101	Cl	H	H	Br	-
102	F	H	H	Br	-
103	CF3	H	H	Br	-
104	H	Br	H	Br	-

455	CF3	F	Cl	CH3	CH2
456	H	H	F	CH3	CH2
457	Br	H	F	CH3	CH2
458	Cl	H	F	CH3	CH2
459	F	H	F	CH3	CH2
460	CF3	H	F	CH3	CH2
461	H	Br	F	CH3	CH2
462	Br	Br	F	CH3	CH2
463	Cl	Br	F	CH3	CH2
464	F	Br	F	CH3	CH2
465	CF3	Br	F	CH3	CH2
466	H	Cl	F	CH3	CH2
467	Br	Cl	F	CH3	CH2
468	Cl	Cl	F	CH3	CH2
469	F	Cl	F	CH3	CH2
470	CF3	Cl	F	CH3	CH2
471	H	F	F	CH3	CH2
472	Br	F	F	CH3	CH2
473	Cl	F	F	CH3	CH2
474	F	F	F	CH3	CH2
475	CF3	F	F	CH3	CH2
476	H	H	CF3	CH3	CH2
477	Br	H	CF3	CH3	CH2
478	Cl	H	CF3	CH3	CH2
479	F	H	CF3	CH3	CH2
480	CF3	H	CF3	CH3	CH2
481	H	Br	CF3	CH3	CH2
482	Br	Br	CF3	CH3	CH2
483	Cl	Br	CF3	CH3	CH2
484	F	Br	CF3	CH3	CH2
485	CF3	Br	CF3	CH3	CH2
486	H	Cl	CF3	CH3	CH2
487	Br	Cl	CF3	CH3	CH2
488	Cl	Cl	CF3	CH3	CH2
489	F	Cl	CF3	CH3	CH2
490	CF3	Cl	CF3	CH3	CH2
491	H	F	CF3	CH3	CH2
492	Br	F	CF3	CH3	CH2
493	Cl	F	CF3	CH3	CH2
494	F	F	CF3	CH3	CH2
495	CF3	F	CF3	CH3	CH2
496	Br	H	H	Br	CH2
497	Cl	H	H	Br	CH2
498	F	H	H	Br	CH2
499	CF3	H	H	Br	CH2
500	H	Br	H	Br	CH2

105	Br	Br	H	Br	-
106	Cl	Br	H	Br	-
107	F	Br	H	Br	-
108	CF3	Br	H	Br	-
109	H	Cl	H	Br	-
110	Br	Cl	H	Br	-
111	Cl	Cl	H	Br	-
112	F	Cl	H	Br	-
113	CF3	Cl	H	Br	-
114	H	F	H	Br	-
115	Br	F	H	Br	-
116	Cl	F	H	Br	-
117	F	F	H	Br	-
118	CF3	F	H	Br	-
119	H	H	Br	Br	-
120	Br	H	Br	Br	-
121	Cl	H	Br	Br	-
122	F	H	Br	Br	-
123	CF3	H	Br	Br	-
124	H	Br	Br	Br	-
125	Br	Br	Br	Br	-
126	Cl	Br	Br	Br	-
127	F	Br	Br	Br	-
128	CF3	Br	Br	Br	-
129	H	Cl	Br	Br	-
130	Br	Cl	Br	Br	-
131	Cl	Cl	Br	Br	-
132	F	Cl	Br	Br	-
133	CF3	Cl	Br	Br	-
134	H	F	Br	Br	-
135	Br	F	Br	Br	-
136	Cl	F	Br	Br	-
137	F	F	Br	Br	-
138	CF3	F	Br	Br	-
139	H	H	Cl	Br	-
140	Br	H	Cl	Br	-
141	Cl	H	Cl	Br	-
142	F	H	Cl	Br	-
143	CF3	H	Cl	Br	-
144	H	Br	Cl	Br	-
145	Br	Br	Cl	Br	-
146	Cl	Br	Cl	Br	-
147	F	Br	Cl	Br	-
148	CF3	Br	Cl	Br	-
149	H	Cl	Cl	Br	-
150	Br	Cl	Cl	Br	-

501	Br	Br	H	Br	CH2
502	Cl	Br	H	Br	CH2
503	F	Br	H	Br	CH2
504	CF3	Br	H	Br	CH2
505	H	Cl	H	Br	CH2
506	Br	Cl	H	Br	CH2
507	Cl	Cl	H	Br	CH2
508	F	Cl	H	Br	CH2
509	CF3	Cl	H	Br	CH2
510	H	F	H	Br	CH2
511	Br	F	H	Br	CH2
512	Cl	F	H	Br	CH2
513	F	F	H	Br	CH2
514	CF3	F	H	Br	CH2
515	H	H	Br	Br	CH2
516	Br	H	Br	Br	CH2
517	Cl	H	Br	Br	CH2
518	F	H	Br	Br	CH2
519	CF3	H	Br	Br	CH2
520	H	Br	Br	Br	CH2
521	Br	Br	Br	Br	CH2
522	Cl	Br	Br	Br	CH2
523	F	Br	Br	Br	CH2
524	CF3	Br	Br	Br	CH2
525	H	Cl	Br	Br	CH2
526	Br	Cl	Br	Br	CH2
527	Cl	Cl	Br	Br	CH2
528	F	Cl	Br	Br	CH2
529	CF3	Cl	Br	Br	CH2
530	H	F	Br	Br	CH2
531	Br	F	Br	Br	CH2
532	Cl	F	Br	Br	CH2
533	F	F	Br	Br	CH2
534	CF3	F	Br	Br	CH2
535	H	H	Cl	Br	CH2
536	Br	H	Cl	Br	CH2
537	Cl	H	Cl	Br	CH2
538	F	H	Cl	Br	CH2
539	CF3	H	Cl	Br	CH2
540	H	Br	Cl	Br	CH2
541	Br	Br	Cl	Br	CH2
542	Cl	Br	Cl	Br	CH2
543	F	Br	Cl	Br	CH2
544	CF3	Br	Cl	Br	CH2
545	H	Cl	Cl	Br	CH2
546	Br	Cl	Cl	Br	CH2

151	Cl	Cl	Cl	Br	-
152	F	Cl	Cl	Br	-
153	CF3	Cl	Cl	Br	-
154	H	F	Cl	Br	-
155	Br	F	Cl	Br	-
156	Cl	F	Cl	Br	-
157	F	F	Cl	Br	-
158	CF3	F	Cl	Br	-
159	H	H	F	Br	-
160	Br	H	F	Br	-
161	Cl	H	F	Br	-
162	F	H	F	Br	-
163	CF3	H	F	Br	-
164	H	Br	F	Br	-
165	Br	Br	F	Br	-
166	Cl	Br	F	Br	-
167	F	Br	F	Br	-
168	CF3	Br	F	Br	-
169	H	Cl	F	Br	-
170	Br	Cl	F	Br	-
171	Cl	Cl	F	Br	-
172	F	Cl	F	Br	-
173	CF3	Cl	F	Br	-
174	H	F	F	Br	-
175	Br	F	F	Br	-
176	Cl	F	F	Br	-
177	F	F	F	Br	-
178	CF3	F	F	Br	-
179	H	H	CF3	Br	-
180	Br	H	CF3	Br	-
181	Cl	H	CF3	Br	-
182	F	H	CF3	Br	-
183	CF3	H	CF3	Br	-
184	H	Br	CF3	Br	-
185	Br	Br	CF3	Br	-
186	Cl	Br	CF3	Br	-
187	F	Br	CF3	Br	-
188	CF3	Br	CF3	Br	-
189	H	Cl	CF3	Br	-
190	Br	Cl	CF3	Br	-
191	Cl	Cl	CF3	Br	-
192	F	Cl	CF3	Br	-
193	CF3	Cl	CF3	Br	-
194	H	F	CF3	Br	-
195	Br	F	CF3	Br	-
196	Cl	F	CF3	Br	-

547	Cl	Cl	Cl	Br	CH2
548	F	Cl	Cl	Br	CH2
549	CF3	Cl	Cl	Br	CH2
550	H	F	Cl	Br	CH2
551	Br	F	Cl	Br	CH2
552	Cl	F	Cl	Br	CH2
553	F	F	Cl	Br	CH2
554	CF3	F	Cl	Br	CH2
555	H	H	F	Br	CH2
556	Br	H	F	Br	CH2
557	Cl	H	F	Br	CH2
558	F	H	F	Br	CH2
559	CF3	H	F	Br	CH2
560	H	Br	F	Br	CH2
561	Br	Br	F	Br	CH2
562	Cl	Br	F	Br	CH2
563	F	Br	F	Br	CH2
564	CF3	Br	F	Br	CH2
565	H	Cl	F	Br	CH2
566	Br	Cl	F	Br	CH2
567	Cl	Cl	F	Br	CH2
568	F	Cl	F	Br	CH2
569	CF3	Cl	F	Br	CH2
570	H	F	F	Br	CH2
571	Br	F	F	Br	CH2
572	Cl	F	F	Br	CH2
573	F	F	F	Br	CH2
574	CF3	F	F	Br	CH2
575	H	H	CF3	Br	CH2
576	Br	H	CF3	Br	CH2
577	Cl	H	CF3	Br	CH2
578	F	H	CF3	Br	CH2
579	CF3	H	CF3	Br	CH2
580	H	Br	CF3	Br	CH2
581	Br	Br	CF3	Br	CH2
582	Cl	Br	CF3	Br	CH2
583	F	Br	CF3	Br	CH2
584	CF3	Br	CF3	Br	CH2
585	H	Cl	CF3	Br	CH2
586	Br	Cl	CF3	Br	CH2
587	Cl	Cl	CF3	Br	CH2
588	F	Cl	CF3	Br	CH2
589	CF3	Cl	CF3	Br	CH2
590	H	F	CF3	Br	CH2
591	Br	F	CF3	Br	CH2
592	Cl	F	CF3	Br	CH2

197	F	F	CF3	Br	-
198	CF3	F	CF3	Br	-
199	Br	H	H	Cl	-
200	Cl	H	H	Cl	-
201	F	H	H	Cl	-
202	CF3	H	H	Cl	-
203	H	Br	H	Cl	-
204	Br	Br	H	Cl	-
205	Cl	Br	H	Cl	-
206	F	Br	H	Cl	-
207	CF3	Br	H	Cl	-
208	H	Cl	H	Cl	-
209	Br	Cl	H	Cl	-
210	Cl	Cl	H	Cl	-
211	F	Cl	H	Cl	-
212	CF3	Cl	H	Cl	-
213	H	F	H	Cl	-
214	Br	F	H	Cl	-
215	Cl	F	H	Cl	-
216	F	F	H	Cl	-
217	CF3	F	H	Cl	-
218	H	H	Br	Cl	-
219	Br	H	Br	Cl	-
220	Cl	H	Br	Cl	-
221	F	H	Br	Cl	-
222	CF3	H	Br	Cl	-
223	H	Br	Br	Cl	-
224	Br	Br	Br	Cl	-
225	Cl	Br	Br	Cl	-
226	F	Br	Br	Cl	-
227	CF3	Br	Br	Cl	-
228	H	Cl	Br	Cl	-
229	Br	Cl	Br	Cl	-
230	Cl	Cl	Br	Cl	-
231	F	Cl	Br	Cl	-
232	CF3	Cl	Br	Cl	-
233	H	F	Br	Cl	-
234	Br	F	Br	Cl	-
235	Cl	F	Br	Cl	-
236	F	F	Br	Cl	-
237	CF3	F	Br	Cl	-
238	H	H	Cl	Cl	-
239	Br	H	Cl	Cl	-
240	Cl	H	Cl	Cl	-
241	F	H	Cl	Cl	-
242	CF3	H	Cl	Cl	-

593	F	F	CF3	Br	CH2
594	CF3	F	CF3	Br	CH2
595	Br	H	H	Cl	CH2
596	Cl	H	H	Cl	CH2
597	F	H	H	Cl	CH2
598	CF3	H	H	Cl	CH2
599	H	Br	H	Cl	CH2
600	Br	Br	H	Cl	CH2
601	Cl	Br	H	Cl	CH2
602	F	Br	H	Cl	CH2
603	CF3	Br	H	Cl	CH2
604	H	Cl	H	Cl	CH2
605	Br	Cl	H	Cl	CH2
606	Cl	Cl	H	Cl	CH2
607	F	Cl	H	Cl	CH2
608	CF3	Cl	H	Cl	CH2
609	H	F	H	Cl	CH2
610	Br	F	H	Cl	CH2
611	Cl	F	H	Cl	CH2
612	F	F	H	Cl	CH2
613	CF3	F	H	Cl	CH2
614	H	H	Br	Cl	CH2
615	Br	H	Br	Cl	CH2
616	Cl	H	Br	Cl	CH2
617	F	H	Br	Cl	CH2
618	CF3	H	Br	Cl	CH2
619	H	Br	Br	Cl	CH2
620	Br	Br	Br	Cl	CH2
621	Cl	Br	Br	Cl	CH2
622	F	Br	Br	Cl	CH2
623	CF3	Br	Br	Cl	CH2
624	H	Cl	Br	Cl	CH2
625	Br	Cl	Br	Cl	CH2
626	Cl	Cl	Br	Cl	CH2
627	F	Cl	Br	Cl	CH2
628	CF3	Cl	Br	Cl	CH2
629	H	F	Br	Cl	CH2
630	Br	F	Br	Cl	CH2
631	Cl	F	Br	Cl	CH2
632	F	F	Br	Cl	CH2
633	CF3	F	Br	Cl	CH2
634	H	H	Cl	Cl	CH2
635	Br	H	Cl	Cl	CH2
636	Cl	H	Cl	Cl	CH2
637	F	H	Cl	Cl	CH2
638	CF3	H	Cl	Cl	CH2

243	H	Br	Cl	Cl	-
244	Br	Br	Cl	Cl	-
245	Cl	Br	Cl	Cl	-
246	F	Br	Cl	Cl	-
247	CF3	Br	Cl	Cl	-
248	H	Cl	Cl	Cl	-
249	Br	Cl	Cl	Cl	-
250	Cl	Cl	Cl	Cl	-
251	F	Cl	Cl	Cl	-
252	CF3	Cl	Cl	Cl	-
253	H	F	Cl	Cl	-
254	Br	F	Cl	Cl	-
255	Cl	F	Cl	Cl	-
256	F	F	Cl	Cl	-
257	CF3	F	Cl	Cl	-
258	H	H	F	Cl	-
259	Br	H	F	Cl	-
260	Cl	H	F	Cl	-
261	F	H	F	Cl	-
262	CF3	H	F	Cl	-
263	H	Br	F	Cl	-
264	Br	Br	F	Cl	-
265	Cl	Br	F	Cl	-
266	F	Br	F	Cl	-
267	CF3	Br	F	Cl	-
268	H	Cl	F	Cl	-
269	Br	Cl	F	Cl	-
270	Cl	Cl	F	Cl	-
271	F	Cl	F	Cl	-
272	CF3	Cl	F	Cl	-
273	H	F	F	Cl	-
274	Br	F	F	Cl	-
275	Cl	F	F	Cl	-
276	F	F	F	Cl	-
277	CF3	F	F	Cl	-
278	H	H	CF3	Cl	-
279	Br	H	CF3	Cl	-
280	Cl	H	CF3	Cl	-
281	F	H	CF3	Cl	-
282	CF3	H	CF3	Cl	-
283	H	Br	CF3	Cl	-
284	Br	Br	CF3	Cl	-
285	Cl	Br	CF3	Cl	-
286	F	Br	CF3	Cl	-
287	CF3	Br	CF3	Cl	-
288	H	Cl	CF3	Cl	-

639	H	Br	Cl	Cl	CH2
640	Br	Br	Cl	Cl	CH2
641	Cl	Br	Cl	Cl	CH2
642	F	Br	Cl	Cl	CH2
643	CF3	Br	Cl	Cl	CH2
644	H	Cl	Cl	Cl	CH2
645	Br	Cl	Cl	Cl	CH2
646	Cl	Cl	Cl	Cl	CH2
647	F	Cl	Cl	Cl	CH2
648	CF3	Cl	Cl	Cl	CH2
649	H	F	Cl	Cl	CH2
650	Br	F	Cl	Cl	CH2
651	Cl	F	Cl	Cl	CH2
652	F	F	Cl	Cl	CH2
653	CF3	F	Cl	Cl	CH2
654	H	H	F	Cl	CH2
655	Br	H	F	Cl	CH2
656	Cl	H	F	Cl	CH2
657	F	H	F	Cl	CH2
658	CF3	H	F	Cl	CH2
659	H	Br	F	Cl	CH2
660	Br	Br	F	Cl	CH2
661	Cl	Br	F	Cl	CH2
662	F	Br	F	Cl	CH2
663	CF3	Br	F	Cl	CH2
664	H	Cl	F	Cl	CH2
665	Br	Cl	F	Cl	CH2
666	Cl	Cl	F	Cl	CH2
667	F	Cl	F	Cl	CH2
668	CF3	Cl	F	Cl	CH2
669	H	F	F	Cl	CH2
670	Br	F	F	Cl	CH2
671	Cl	F	F	Cl	CH2
672	F	F	F	Cl	CH2
673	CF3	F	F	Cl	CH2
674	H	H	CF3	Cl	CH2
675	Br	H	CF3	Cl	CH2
676	Cl	H	CF3	Cl	CH2
677	F	H	CF3	Cl	CH2
678	CF3	H	CF3	Cl	CH2
679	H	Br	CF3	Cl	CH2
680	Br	Br	CF3	Cl	CH2
681	Cl	Br	CF3	Cl	CH2
682	F	Br	CF3	Cl	CH2
683	CF3	Br	CF3	Cl	CH2
684	H	Cl	CF3	Cl	CH2

289	Br	Cl	CF3	Cl	-
290	Cl	Cl	CF3	Cl	-
291	F	Cl	CF3	Cl	-
292	CF3	Cl	CF3	Cl	-
293	H	F	CF3	Cl	-
294	Br	F	CF3	Cl	-
295	Cl	F	CF3	Cl	-
296	F	F	CF3	Cl	-
297	CF3	F	CF3	Cl	-
298	Br	H	H	CF3	-
299	Cl	H	H	CF3	-
300	F	H	H	CF3	-
301	CF3	H	H	CF3	-
302	H	Br	H	CF3	-
303	Br	Br	H	CF3	-
304	Cl	Br	H	CF3	-
305	F	Br	H	CF3	-
306	CF3	Br	H	CF3	-
307	H	Cl	H	CF3	-
308	Br	Cl	H	CF3	-
309	Cl	Cl	H	CF3	-
310	F	Cl	H	CF3	-
311	CF3	Cl	H	CF3	-
312	H	F	H	CF3	-
313	Br	F	H	CF3	-
314	Cl	F	H	CF3	-
315	F	F	H	CF3	-
316	CF3	F	H	CF3	-
317	H	H	Br	CF3	-
318	Br	H	Br	CF3	-
319	Cl	H	Br	CF3	-
320	F	H	Br	CF3	-
321	CF3	H	Br	CF3	-
322	H	Br	Br	CF3	-
323	Br	Br	Br	CF3	-
324	Cl	Br	Br	CF3	-
325	F	Br	Br	CF3	-
326	CF3	Br	Br	CF3	-
327	H	Cl	Br	CF3	-
328	Br	Cl	Br	CF3	-
329	Cl	Cl	Br	CF3	-
330	F	Cl	Br	CF3	-
331	CF3	Cl	Br	CF3	-
332	H	F	Br	CF3	-
333	Br	F	Br	CF3	-
334	Cl	F	Br	CF3	-

685	Br	Cl	CF3	Cl	CH2
686	Cl	Cl	CF3	Cl	CH2
687	F	Cl	CF3	Cl	CH2
688	CF3	Cl	CF3	Cl	CH2
689	H	F	CF3	Cl	CH2
690	Br	F	CF3	Cl	CH2
691	Cl	F	CF3	Cl	CH2
692	F	F	CF3	Cl	CH2
693	CF3	F	CF3	Cl	CH2
694	Br	H	H	CF3	CH2
695	Cl	H	H	CF3	CH2
696	F	H	H	CF3	CH2
697	CF3	H	H	CF3	CH2
698	H	Br	H	CF3	CH2
699	Br	Br	H	CF3	CH2
700	Cl	Br	H	CF3	CH2
701	F	Br	H	CF3	CH2
702	CF3	Br	H	CF3	CH2
703	H	Cl	H	CF3	CH2
704	Br	Cl	H	CF3	CH2
705	Cl	Cl	H	CF3	CH2
706	F	Cl	H	CF3	CH2
707	CF3	Cl	H	CF3	CH2
708	H	F	H	CF3	CH2
709	Br	F	H	CF3	CH2
710	Cl	F	H	CF3	CH2
711	F	F	H	CF3	CH2
712	CF3	F	H	CF3	CH2
713	H	H	Br	CF3	CH2
714	Br	H	Br	CF3	CH2
715	Cl	H	Br	CF3	CH2
716	F	H	Br	CF3	CH2
717	CF3	H	Br	CF3	CH2
718	H	Br	Br	CF3	CH2
719	Br	Br	Br	CF3	CH2
720	Cl	Br	Br	CF3	CH2
721	F	Br	Br	CF3	CH2
722	CF3	Br	Br	CF3	CH2
723	H	Cl	Br	CF3	CH2
724	Br	Cl	Br	CF3	CH2
725	Cl	Cl	Br	CF3	CH2
726	F	Cl	Br	CF3	CH2
727	CF3	Cl	Br	CF3	CH2
728	H	F	Br	CF3	CH2
729	Br	F	Br	CF3	CH2
730	Cl	F	Br	CF3	CH2

335	F	F	Br	CF3	-
336	CF3	F	Br	CF3	-
337	H	H	Cl	CF3	-
338	Br	H	Cl	CF3	-
339	Cl	H	Cl	CF3	-
340	F	H	Cl	CF3	-
341	CF3	H	Cl	CF3	-
342	H	Br	Cl	CF3	-
343	Br	Br	Cl	CF3	-
344	Cl	Br	Cl	CF3	-
345	F	Br	Cl	CF3	-
346	CF3	Br	Cl	CF3	-
347	H	Cl	Cl	CF3	-
348	Br	Cl	Cl	CF3	-
349	Cl	Cl	Cl	CF3	-
350	F	Cl	Cl	CF3	-
351	CF3	Cl	Cl	CF3	-
352	H	F	Cl	CF3	-
353	Br	F	Cl	CF3	-
354	Cl	F	Cl	CF3	-
355	F	F	Cl	CF3	-
356	CF3	F	Cl	CF3	-
357	H	H	F	CF3	-
358	Br	H	F	CF3	-
359	Cl	H	F	CF3	-
360	F	H	F	CF3	-
361	CF3	H	F	CF3	-
362	H	Br	F	CF3	-
363	Br	Br	F	CF3	-
364	Cl	Br	F	CF3	-
365	F	Br	F	CF3	-
366	CF3	Br	F	CF3	-
367	H	Cl	F	CF3	-
368	Br	Cl	F	CF3	-
369	Cl	Cl	F	CF3	-
370	F	Cl	F	CF3	-
371	CF3	Cl	F	CF3	-
372	H	F	F	CF3	-
373	Br	F	F	CF3	-
374	Cl	F	F	CF3	-
375	F	F	F	CF3	-
376	CF3	F	F	CF3	-
377	H	H	CF3	CF3	-
378	Br	H	CF3	CF3	-
379	Cl	H	CF3	CF3	-
380	F	H	CF3	CF3	-

731	F	F	Br	CF3	CH2
732	CF3	F	Br	CF3	CH2
733	H	H	Cl	CF3	CH2
734	Br	H	Cl	CF3	CH2
735	Cl	H	Cl	CF3	CH2
736	F	H	Cl	CF3	CH2
737	CF3	H	Cl	CF3	CH2
738	H	Br	Cl	CF3	CH2
739	Br	Br	Cl	CF3	CH2
740	Cl	Br	Cl	CF3	CH2
741	F	Br	Cl	CF3	CH2
742	CF3	Br	Cl	CF3	CH2
743	H	Cl	Cl	CF3	CH2
744	Br	Cl	Cl	CF3	CH2
745	Cl	Cl	Cl	CF3	CH2
746	F	Cl	Cl	CF3	CH2
747	CF3	Cl	Cl	CF3	CH2
748	H	F	Cl	CF3	CH2
749	Br	F	Cl	CF3	CH2
750	Cl	F	Cl	CF3	CH2
751	F	F	Cl	CF3	CH2
752	CF3	F	Cl	CF3	CH2
753	H	H	F	CF3	CH2
754	Br	H	F	CF3	CH2
755	Cl	H	F	CF3	CH2
756	F	H	F	CF3	CH2
757	CF3	H	F	CF3	CH2
758	H	Br	F	CF3	CH2
759	Br	Br	F	CF3	CH2
760	Cl	Br	F	CF3	CH2
761	F	Br	F	CF3	CH2
762	CF3	Br	F	CF3	CH2
763	H	Cl	F	CF3	CH2
764	Br	Cl	F	CF3	CH2
765	Cl	Cl	F	CF3	CH2
766	F	Cl	F	CF3	CH2
767	CF3	Cl	F	CF3	CH2
768	H	F	F	CF3	CH2
769	Br	F	F	CF3	CH2
770	Cl	F	F	CF3	CH2
771	F	F	F	CF3	CH2
772	CF3	F	F	CF3	CH2
773	H	H	CF3	CF3	CH2
774	Br	H	CF3	CF3	CH2
775	Cl	H	CF3	CF3	CH2
776	F	H	CF3	CF3	CH2

381	CF3	H	CF3	CF3	-		777	CF3	H	CF3	CF3	CH2
382	H	Br	CF3	CF3	-		778	H	Br	CF3	CF3	CH2
383	Br	Br	CF3	CF3	-		779	Br	Br	CF3	CF3	CH2
384	Cl	Br	CF3	CF3	-		780	Cl	Br	CF3	CF3	CH2
385	F	Br	CF3	CF3	-		781	F	Br	CF3	CF3	CH2
386	CF3	Br	CF3	CF3	-		782	CF3	Br	CF3	CF3	CH2
387	H	Cl	CF3	CF3	-		783	H	Cl	CF3	CF3	CH2
388	Br	Cl	CF3	CF3	-		784	Br	Cl	CF3	CF3	CH2
389	Cl	Cl	CF3	CF3	-		785	Cl	Cl	CF3	CF3	CH2
390	F	Cl	CF3	CF3	-		786	F	Cl	CF3	CF3	CH2
391	CF3	Cl	CF3	CF3	-		787	CF3	Cl	CF3	CF3	CH2
392	H	F	CF3	CF3	-		788	H	F	CF3	CF3	CH2
393	Br	F	CF3	CF3	-		789	Br	F	CF3	CF3	CH2
394	Cl	F	CF3	CF3	-		790	Cl	F	CF3	CF3	CH2
395	F	F	CF3	CF3	-		791	F	F	CF3	CF3	CH2
396	CF3	F	CF3	CF3	-		792	CF3	F	CF3	CF3	CH2

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing soil pests.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing corn rootworm.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing wireworms.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing grubs, in particular white grubs.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing *Phyllophaga sp.*.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing *Diloboderus sp.*.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing *Popillia japonica.*

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing termites, e.g. for sugarcane.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing subterraneous stinkbugs, e.g. *Scaptocoris sp.*.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing *cutworms, e.g. agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing cutworms, e.g. *agrotis sp.*.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing millipedes, e.g. *Julus sp.*.

In one embodiment the invention provides a compound selected from Tables 1 to 6 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus.*

In one embodiment the invention provides a compound selected from Tables 7 to 12 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 13 to 18 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 19 to 24 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 25 to 30 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 31 to 36 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 37 to 39 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 40 to 42 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 43 to 45 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 46 to 48 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 49 to 51 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the invention provides a compound selected from Tables 52 to 54 for use in controlling and/or preventing broca gigante, e.g. *Telchin licus*.

In one embodiment the compounds of formula (I), in particular those in in Tables 1 to 54 above may be used to combat soil grubs e.g. *Migdolus sp.; Phyllophaga sp.; Diloboderus sp.; Cyclocephala sp; Lyogenys fuscus*; *Popillia japonica*; sugar cane weevils e.g. *Sphenophorus levis* and *Metamasius hemipterus;* termites e.g. *Heterotermes tenuis; Heterotermes longiceps; Cornitermes cumulans; Procornitermes triacifer; Neocapritermes opacus; Neocapritermes parvus*; corn rootworms e.g. *Diabrotica sp.*, seed Maggot e.g. *Delia platura*; soil stinkbugs e.g. *Scaptocoris castanea*; wireworms e.g. *Agriotes sp.; Athous sp.; Hipnodes bicolor; Ctenicera destructor; Limonius canu; Limonius californicus*.

In another embodiment the compounds of formula (I), in particular those in in Tables 1 to 54 above may be used for seed applications at least on the following: soil grubs for corn, soybeans, sugarcane: e.g. *Migdolus sp.; Phyllophaga sp.; Diloboderus sp.; Cyclocephala sp.; Lyogenys fuscus; Popillia japonica*; termites for soybeans, sugarcane, pasture: e.g. *Heterotermes tenuis; Heterotermes longiceps; Cornitermes cumulans; Procornitermes triacifer; Neocapritermes opacus; Neocapritermes parvus*; corn rootworms for corn and potatoes: e.g. *Diabrotica sp.*, rice water weevil e.g. *Lissorhoptrus oryzophilus*; red legged earth mites e.g. *Halotydeus destructor.*

In one embodiment the compounds of formula (I), in particular those in Tables 1 to 54 above, may be used for soil applications, including as a seed application, to target at least the following: sucking pests such as aphids, thrips, brown plant hopper (e.g. on rice), sting bugs, white flies (e.g. on cotton and vegetables), mites; on soil pests such as corn rootworm, wireworms, white grubs, zabrus, termites (e.g. on sugar cane, soy, pasture), maggots, cabbage root fly, red legged earth mite; on lepidoptera, such as spodoptera, cutworms, *elasmoplpus*, *plutella* (e.g. brassica), stem borers, leaf miners, flea beetle, *Sternechus*; on nematicides, such as *Heterodera glycines* (e.g. on soybean), *Pratylenchus brachyurus* (e.g. on corn), *P. zeae* (e.g. oncorn), *P. penetrans* (e.g. on corn), *Meloidogyne incognita* (e.g. on vegetables),

Heterodera schachtii (e.g. on sugar beet), *Rotylenchus reniformis* (e.g. on cotton), *Heterodera avenae* (e.g. on cereals), *Pratylenchus neglectus* (e.g. on cereals*), thornei* (e.g. on cereals).

In one embodiment the methods and uses of the invention are for controlling and/or preventing infestation of useful plants by corn rootworm, wireworms, grubs, in particular white grubs, termites, subterraneous stinkbugs, cutworms, millipedes and broca gigante that are resistant to other insecticides. Corn rootworm, wireworms, grubs and whitefly that are "resistant" to a particular insecticide refers e.g. to strains of corn rootworm, wireworms, grubs and whitefly that are less sensitive to that insecticide compared to the expected sensitivity of the same species of the respective pest. The expected sensitivity can be measured using e.g. a strain that has not previously been exposed to the insecticide.

Useful plants include soybean, corn, sugarcane, alfalfa, brassicas, oilseed rape (e.g. canola), potatoes (including sweet potatoes), cotton, rice, coffee, citrus, almonds, fruiting vegetables, cucurbits and pulses (e.g. tomatoes, pepper, chili, eggplant, cucumber, squash etc.), tea, bulb vegetables (e.g. onion, leek etc.), grapes, pome fruit (e.g. apples, pears etc.), stone fruit (e.g. pears, plums etc.), and cereals.

The term "locus" of a useful plant as used herein is intended to embrace the place on which the useful plants are growing, where the plant propagation materials of the useful plants are sown or where the plant propagation materials of the useful plants will be placed into the soil. An example for such a locus is a field, on which crop plants are growing.

The term "plant propagation material" is understood to denote generative parts of a plant, such as seeds, which can be used for the multiplication of the latter, and vegetative material, such as cuttings or tubers, for example potatoes. There may be mentioned for example seeds (in the strict sense), roots, fruits, tubers, bulbs, rhizomes and parts of plants. Germinated plants and young plants which are to be transplanted after germination or after emergence from the soil, may also be mentioned. These young plants may be protected before transplantation by a total or partial treatment by immersion. Preferably "plant propagation material" is understood to denote seeds.

Application of the compound of formula I may be before infestation or before the pest is present, or may be after the presence of the pest or at the time of infestation.

The compound of formula I may be applied directly to soil or may be applied to soil by treating plant propagation material, e.g. a seed, with the compound of formula I.

Methods of applying to the soil can be via any suitable method, which ensures that the combination penetrates the soil, for example, nursery tray application, in furrow application, soil drenching, soil injection, drip irrigation, application through sprinklers or central pivot, incorporation into soil (broad cast or in band) are such methods. Alternatively or in addition one or more materials may be applied on a suitable substrate, for example a seed which is not intended for germination, and "sowing" the treated substrate with the plant propagation material. A preferred method of applying to soil is in-furrow at sowing, e.g. as liquid spray or as granule. An extension to in-furrow application is so-called t-band application at sowing in which some of the spray or granule is additionally deposited at the soil surface.

Methods for applying or treating active ingredients on to plant propagation material, especially seeds, are known in the art, and include dressing, coating, pelleting and soaking application methods of the propagation material. Conventional treating techniques and machines can be used, such as fluidized beds, roller mills, rotostatic seed treaters, drum coaters, and spouted beds.

Even distribution of ingredients and good adherence is particularly desired for seed treatment. Treatment could vary from a thin film or dressing of the formulation, for example, a mixture of active ingredients, on a plant propagation material, such as a seed, where the original size and/or shape are recognizable to an intermediary state to a thicker film such as pelleting with many layers of different materials (such as carriers, for example, clays; different formulations, such as of other active ingredients; polymers; and colourants) where the original shape and/or size of the seed is no longer recognisable.

Application onto plant propagation material can include controlled release coatings, wherein the ingredients of the combinations are incorporated into materials that release the ingredients over time. Examples of controlled release technologies are generally known in the art and include polymer films and waxes, wherein the ingredients may be incorporated into the controlled release material or applied between layers of materials, or both.

The compounds of the invention are suitable for use on any plant, including those that have been genetically modified to be resistant to active ingredients such as herbicides, or to produce biologically active compounds that control infestation by plant pests.

The term "plants" are to be understood as also including those plants which have been rendered tolerant to herbicides or classes of herbicides (e.g. ALS-, GS-, EPSPS-, PPO- and HPPD-inhibitors) by conventional methods of breeding or by genetic engineering. An example of a plant that has been rendered tolerant to imidazolinones, e.g. imazamox, by conventional methods of breeding is Clearfield® summer rape (canola). Examples of plants 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® and LibertyLink®.

Compounds of formula I may be used on transgenic plants (including cultivars) obtained by genetic engineering methods and/or by conventional methods. These are understood as meaning plants having novel properties ("traits") which have been obtained by conventional breeding, by mutagenesis or by recombinant DNA techniques. Depending on the plant species or plant cultivars, their location and growth conditions (soils, climate, vegetation period, diet), the treatment according to the invention may also result in superadditive "synergistic") effects.

Thus, for example, reduced application rates and/or a widening of the activity spectrum and/or an increase in the activity of the substances and compositions which can be used according to the invention, better plant growth, increased tolerance to high or low temperatures, increased tolerance to drought or to water or soil salt content, increased flowering performance, easier harvesting, accelerated maturation, higher harvest yields, higher quality and/or a higher nutritional value of the harvested products, better

storage stability and/or processability of the harvested products are possible, which exceed the effects which were actually to be expected.

The preferred transgenic plants or plant cultivars which are to be treated according to the invention include all plants which, by virtue of the genetic modification, received genetic material which imparts particularly advantageous, useful traits to these plants. Examples of such traits are better plant growth, increased tolerance to high or low temperatures, increased tolerance to drought or to water or soil salt content, increased flowering performance, easier harvesting, accelerated maturation, higher harvest yields, higher quality and/or a higher nutritional value of the harvested products, better storage stability and/or processability of the harvested products.

Further and particularly emphasized examples of such traits are a better defence of the plants against animal and microbial pests, such as against insects, mites, phytopathogenic fungi, bacteria and/or viruses, and also increased tolerance of the plants to certain herbicidally active compounds.

Examples of transgenic plants which may be mentioned are the important crop plants, such as cereals (wheat, rice), maize, soybean, potatoes, sugar beet, tomatoes, peas and other vegetable varieties, cotton, tobacco, oilseed rape and also fruit plants (with the fruits apples, pears, citrus fruits and grapes).

Compounds of formula I may be used on transgenic plants that are capable of producing one or more pesticidal proteins which confer upon the transgenic plant tolerance or resistance to harmful pests, e.g. insect pests, nematode pests and the like. Such pesticidal proteins include, without limitation, Cry proteins from *Bacillus thuringiensis* Cry1Ab, Cry1Ac, Cry1F, Cry2Ab, Cry2Ae, Cry3A, Cry3Bb, or Cry9C; engineered proteins such as modified Cry3A (US Patent 7,030,295) or Cry1A.105; or vegetative insecticidal proteins such as Vip1, Vip2 or Vip3. A full list of Bt Cry proteins and VIPs useful in the invention can be found on the worldwide web at *Bacillus thuringiensis* Toxin Nomenclature Database maintained by the University of Sussex (*see also*, Crickmore *et al.* (1998) *Microbiol. Mol. Biol. Rev.* 62:807-813). Other pesticidal proteins useful in the invention include proteins of bacteria colonizing nematodes, e.g. *Photorhabdus spp.* or *Xenorhabdus spp.*; toxins produced by animals, such as scorpion toxins, arachnid toxins, wasp toxins, or other insect-specific neurotoxins; toxins produced by fungi, such *Streptomycetes* toxins, plant lectins, such as pea or barley lectins; agglutinins; proteinase inhibitors, such as trypsin inhibitors, serine protease inhibitors, patatin, cystatin or papain inhibitors; ribosome-inactivating proteins (RIP), such as ricin, maize-RIP, abrin, luffin, saporin or bryodin; steroid metabolism enzymes, such as 3-hydroxysteroid oxidase, ecdysteroid-IDP-glycosyl-transferase, cholesterol oxidases, ecdysone inhibitors or HMG-CoA-reductase; ion channel blockers, such as blockers of sodium or calcium channels; juvenile hormone esterase; diuretic hormone receptors (helicokinin receptors); stilben synthase, bibenzyl synthase, chitinases or glucanases. Further examples of such pesticidal proteins or transgenic plants capable of synthesizing such proteins are disclosed, e.g., in EP-A 374753, WO 93/007278, WO 95/34656, EP-A 427529, EP-A 451878, WO 03/18810 and WO 03/52073. The methods for producing such transgenic plants are generally known to the person skilled in the art and some of which are commercially available such as Agrisure®CB (P1) (corn producing Cry1Ab), Agrisure®RW (P2) (corn

producing mCry3A), Agrisure® Viptera (P3) (corn hybrids producing Vip3Aa); Agrisure300GT (P4) (corn hybrids producing Cry1Ab and mCry3A); YieldGard® (P5) (corn hybrids producing the Cry1Ab protein), YieldGard® Plus (P6) (corn hybrids producing Cry1Ab and Cry3Bb1), Genuity® SmartStax® (P7) (corn hybrids with Cry1A.105, Cry2Ab2, Cry1F, Cry34/35, Cry3Bb) ; Herculex® I (P8) (corn hybrids producing Cry1Fa) and Herculex®RW (P9) (corn hybrids producing Cry34Ab1, Cry35Ab1 and the enzyme Phosphinothricin-N-Acetyltransferase [PAT]) ; NuCOTN®33B (P10) (cotton cultivars producing Cry1Ac), Bollgard®I (P11) (cotton cultivars producing Cry1Ac), Bollgard®II (P12) (cotton cultivars producing Cry1Ac and Cry2Ab2) and VIPCOT® (P13) (cotton cultivars producing a Vip3Aa). Soybean Cyst Nematode resistance soybean (SCN® - Syngenta (P14)) and soybean with Aphid resistant trait (AMT® (P15)) are also of interest.

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 (P16). 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 CryIA(b) 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 (P17). 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 CryIA(b) 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 (P18). Maize which has been rendered insect-resistant by transgenic expression of a modified CryIIIA toxin. This toxin is Cry3A055 modified by insertion of a cathepsin-D-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 (P19). MON *863* expresses a CryIIIB(b1) 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. (P20)

6. **1507 Maize** from Pioneer Overseas Corporation, Avenue Tedesco, 7 B-1160 Brussels, Belgium, registration number C/NL/00/10. (P21) 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 CryIA(b) toxin obtained from *Bacillus thuringiensis subsp. kurstaki* which brings about tolerance to certain Lepidoptera, include the European corn borer.

Further examples of transgenic plants, and of very high interest, are those carrying traits conferring resistance to 2.4D (e.g. Enlist®) (e.g. WO 2011066384) (, glyphosate (e.g. Roundup Ready® (P24), Roundup Ready 2 Yield® (P25)), sulfonylurea (e.g. STS®) (P26), glufosinate (e.g. Liberty Link® (P27), Ignite® (P28)), Dicamba (P29) (Monsanto), HPPD tolerance (P30) (e.g. isoxaflutole herbicide) (Bayer CropScience, Syngenta). Double or triple stacks of any of the traits described here are also of interest, including glyphosate and sulfonyl-urea tolerance ((e.g. Optimum GAT®) (P31), plants stacked with STS® and Roundup Ready® (P32) or plants stacked with STS® and Roundup Ready 2 Yield® (P33)), dicamba and glyphosate tolerance (P34) (Monsanto). Of particular interest are soybean plants carrying trains conferring resistance to 2.4D (e.g. Enlist®), glyphosate (e.g. Roundup Ready®, Roundup Ready 2 Yield®), sulfonylurea (e.g. STS®), glufosinate (e.g. Liberty Link®, Ignite®), Dicamba (Monsanto) HPPD tolerance (e.g. isoxaflutole herbicide) (Bayer CropScience, Syngenta).

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).

Herbicide-resistant plants (plants bred in a conventional manner for herbicide tolerance) which may be mentioned include the varieties sold under the name Clearfield(®) (for example maize).

These statements also apply to plant cultivars having these genetic traits or genetic traits still to be developed, which plant cultivars will be developed and/or marketed in the future.

A compound of the invention may be used in mixtures with fertilizers (for example nitrogen-, potassium- or phosphorus-containing fertilizers). Suitable formulation types include granules of fertilizer. The mixtures preferably contain up to 25% by weight of the compound of the invention.

The invention therefore also provides a fertilizer composition comprising a fertilizer and a compound of the invention.

The compositions of this invention may contain other compounds having biological activity, for example micronutrients or compounds having fungicidal activity or which possess plant growth regulating, herbicidal, insecticidal, nematicidal or acaricidal activity.

The compositions of this invention may contain other compounds having biological activity, for example micronutrients or compounds having fungicidal activity or which possess plant growth regulating, herbicidal, insecticidal, nematicidal or acaricidal activity.

The compound of formula (I) may be the sole active ingredient of the composition or it may be admixed with one or more additional active ingredients such as a pesticide, e.g. a insecticide, fungicide or herbicide, or a synergist or plant growth regulator where appropriate. An additional active ingredient may

provide a composition having a broader spectrum of activity or increased persistence at a locus; synergize the activity or complement the activity (for example by increasing the speed of effect or overcoming repellency) of the compound of formula (I); or help to overcome or prevent the development of resistance to individual components. The particular additional active ingredient will depend upon the intended utility of the composition. Examples of suitable pesticides include the following:

a) Pyrethroids, such as permethrin, cypermethrin, fenvalerate, esfenvalerate, deltamethrin, cyhalothrin (in particular lambda-cyhalothrin and gamma cyhalothrin), bifenthrin, fenpropathrin, cyfluthrin, tefluthrin, fish safe pyrethroids (for example ethofenprox), natural pyrethrin, tetramethrin, S-bioallethrin, fenfluthrin, prallethrin, acrinathirin, etofenprox or 5-benzyl-3-furylmethyl-(E)-(1R,3S)-2,2-dimethyl- 3-(2-oxothiolan-3-ylidenemethyl)cyclopropane carboxylate;

b) Organophosphates, such as profenofos, sulprofos, acephate, methyl parathion, azinphos-methyl, demeton-s-methyl, heptenophos, thiometon, fenamiphos, monocrotophos, profenofos, triazophos, methamidophos, dimethoate, phosphamidon, malathion, chlorpyrifos, phosalone, terbufos, fensulfothion, fonofos, phorate, phoxim, pirimiphos-methyl, pirimiphos-ethyl, fenitrothion, fosthiazate or diazinon;

c) Carbamates (including aryl carbamates), such as pirimicarb, triazamate, cloethocarb, carbofuran, furathiocarb, ethiofencarb, aldicarb, thiofurox, carbosulfan, bendiocarb, fenobucarb, propoxur, methomyl or oxamyl;

d) Benzoyl ureas, such as diflubenzuron, triflumuron, hexaflumuron, flufenoxuron, diafenthiuron, lufeneron, novaluron, noviflumuron or chlorfluazuron;

e) Organic tin compounds, such as cyhexatin, fenbutatin oxide or azocyclotin;

f) Pyrazoles, such as tebufenpyrad, tolfenpyrad, ethiprole, pyriprole, fipronil, and fenpyroximate;

g) Macrolides, such as avermectins or milbemycins, for example abamectin, emamectin benzoate, ivermectin, milbemycin, spinosad, azadirachtin, milbemectin, lepimectin or spinetoram;

h) Hormones or pheromones;

i) Organochlorine compounds, such as endosulfan (in particular alpha-endosulfan), benzene hexachloride, DDT, chlordane or dieldrin;

j) Amidines, such as chlordimeform or amitraz;

k) Fumigant agents, such as chloropicrin, dichloropropane, methyl bromide or metam;

l) Neonicotinoid compounds, such as imidacloprid, thiacloprid, acetamiprid, nitenpyram, dinotefuran, thiamethoxam, clothianidin, or nithiazine;

m) Diacylhydrazines, such as tebufenozide, chromafenozide or methoxyfenozide;

n) Diphenyl ethers, such as diofenolan or pyriproxifen;

o) Ureas such as Indoxacarb or metaflumizone;

p) Ketoenols, such as Spirotetramat, spirodiclofen or spiromesifen;

q) Diamides, such as flubendiamide, chlorantraniliprole (Rynaxypyr®) or cyantraniliprole;

r) Essential oils such as Bugoil® - (PlantImpact); or

s) a comopund selected from buprofezine, flonicamid, acequinocyl, bifenazate, cyenopyrafen, cyflumetofen, etoxazole, flometoquin, fluacrypyrim, fluensulfone, flufenerim, flupyradifuone, harpin, iodomethane, dodecadienol, pyridaben, pyridalyl, pyrimidifen, flupyradifurone, 4-[(6-Chloro-pyridin-3-ylmethyl)-(2,2-difluoro-ethyl)-amino]-5H-furan-2-one (DE 102006015467), CAS: 915972-17-7 (WO 2006129714; WO2011/147953; WO2011/147952), CAS: 26914-55-8 (WO 2007020986), chlorfenapyr, pymetrozine, sulfoxaflor and pyrifluqinazon.

In addition to the major chemical classes of pesticide listed above, other pesticides having particular targets may be employed in the composition, if appropriate for the intended utility of the composition. For instance, selective insecticides for particular crops, for example stemborer specific insecticides (such as cartap) or hopper specific insecticides (such as buprofezin) for use in rice may be employed. Alternatively insecticides or acaricides specific for particular insect species/stages may also be included in the compositions (for example acaricidal ovo-larvicides, such as clofentezine, flubenzimine, hexythiazox or tetradifon; acaricidal motilicides, such as dicofol or propargite; acaricides, such as bromopropylate or chlorobenzilate; or growth regulators, such as hydramethylnon, cyromazine, methoprene, chlorfluazuron or diflubenzuron).

Examples of fungicidal compounds which may be included in the composition of the invention are (E)-*N*-methyl-2-[2-(2,5-dimethylphenoxymethyl)phenyl]-2-methoxy-iminoacetamide (SSF-129), 4-bromo-2-cyano-*N*,*N*-dimethyl-6-trifluoromethylbenzimidazole-1-sulfonamide, α-[*N*-(3-chloro-2,6-xylyl)-2-methoxyacetamido]-γ-butyrolactone, 4-chloro-2-cyano-*N*,*N*-dimethyl-5-*p*-tolylimidazole-1-sulfonamide (IKF-916, cyamidazosulfamid), 3-5-dichloro-*N*-(3-chloro-1-ethyl-1-methyl-2-oxopropyl)-4-methylbenzamide (RH-7281, zoxamide), *N*-allyl-4,5,-dimethyl-2-trimethylsilylthiophene-3-carboxamide (MON65500), *N*-(1-cyano-1,2-dimethylpropyl)-2-(2,4-dichlorophenoxy)propionamide (AC382042), *N*-(2-methoxy-5-pyridyl)-cyclopropane carboxamide, acibenzolar (CGA245704) (e.g. acibenzolar-S-methyl), alanycarb, aldimorph, anilazine, azaconazole, azoxystrobin, benalaxyl, benomyl, benthiavalicarb, biloxazol, bitertanol, bixafen, blasticidin S, boscalid, bromuconazole, bupirimate, captafol, captan, carbendazim, carbendazim chlorhydrate, carboxin, carpropamid, carvone, CGA41396, CGA41397, chinomethionate, chlorothalonil, chlorozolinate, clozylacon, copper containing compounds such as copper oxychloride, copper oxyquinolate, copper sulfate, copper tallate and Bordeaux mixture, cyclufenamid, cymoxanil, cyproconazole, cyprodinil, debacarb, di-2-pyridyl disulfide 1,1'-dioxide, dichlofluanid, diclomezine, dicloran, diethofencarb, difenoconazole, difenzoquat, diflumetorim, *O*,*O*-di-*iso*-propyl-*S*-benzyl thiophosphate, dimefluazole, dimetconazole, dimethomorph, dimethirimol, diniconazole, dinocap, dithianon, dodecyl dimethyl ammonium chloride, dodemorph, dodine, doguadine, edifenphos, epoxiconazole, ethirimol, ethyl-(Z)-*N*-benzyl-*N*-([methyl(methyl-thioethylideneamino-oxycarbonyl)amino]thio)-β-alaninate, etridiazole, famoxadone, fenamidone (RPA407213), fenarimol, fenbuconazole, fenfuram, fenhexamid (KBR2738), fenpiclonil, fenpropidin, fenpropimorph, fentin acetate, fentin hydroxide, ferbam, ferimzone, fluazinam, fludioxonil, flumetover, fluopyram, fluoxastrobin, fluoroimide, fluquinconazole, flusilazole, flutolanil, flutriafol, fluxapyroxad, folpet,

fuberidazole, furalaxyl, furametpyr, guazatine, hexaconazole, hydroxyisoxazole, hymexazole, imazalil, imibenconazole, iminoctadine, iminoctadine triacetate, ipconazole, iprobenfos, iprodione, iprovalicarb (SZX0722), isopropanyl butyl carbamate, isoprothiolane, isopyrazam, kasugamycin, kresoxim-methyl, LY186054, LY211795, LY248908, mancozeb, mandipropamid, maneb, mefenoxam, metalaxyl, mepanipyrim, mepronil, metalaxyl, metconazole, metiram, metiram-zinc, metominostrobin, myclobutanil, neoasozin, nickel dimethyldithiocarbamate, nitrothal-*iso*propyl, nuarimol, ofurace, organomercury compounds, oxadixyl, oxasulfuron, oxolinic acid, oxpoconazole, oxycarboxin, pefurazoate, penconazole, pencycuron, penflufen, penthiopyrad, phenazin oxide, phosetyl-Al, phosphorus acids, phthalide, picoxystrobin (ZA1963), polyoxinD, polyram, probenazole, prochloraz, procymidone, propamocarb, propiconazole, propineb, propionic acid, prothioconazole, pyrazophos, pyrifenox, pyrimethanil, pyraclostrobin, pyroquilon, pyroxyfur, pyrrolnitrin, quaternary ammonium compounds, quinomethionate, quinoxyfen, quintozene, sedaxane, sipconazole (F-155), sodium pentachlorophenate, spiroxamine, streptomycin, sulfur, tebuconazole, tecloftalam, tecnazene, tetraconazole, thiabendazole, thifluzamid, 2-(thiocyanomethylthio)benzothiazole, thiophanate-methyl, thiram, timibenconazole, tolclofos-methyl, tolylfluanid, triadimefon, triadimenol, triazbutil, triazoxide, tricyclazole, tridemorph, trifloxystrobin (CGA279202), triforine, triflumizole, triticonazole, validamycin A, vapam, vinclozolin, zineb and ziram, N-[9-(dichloromethylene)-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide [1072957-71-1], 1-methyl-3-difluoromethyl-1H-pyrazole-4-carboxylic acid (2-dichloromethylene-3-ethyl-1-methyl-indan-4-yl)-amide, and 1-methyl-3-difluoromethyl-4H-pyrazole-4-carboxylic acid [2-(2,4-dichloro-phenyl)-2-methoxy-1-methyl-ethyl]-amide.

In addition, biological agents may be included in the composition of the invention e.g. *Baciullus* species such as *Bacillus firmus*, *Bacillus cereus*, *Bacillus subtilis*, and *Pasteuria* species such as *Pasteuria penetrans* and *Pasteuria nishiza*wae. A suitable *Bacillus firmus* strain is strain CNCM I-1582 which is commercially available as BioNem™. A suitable *Bacillus cereus* strain is strain CNCM I-1562. Of both *Bacillus* strains more details can be found in US 6,406,690. Other biological organisms that may be included in the compositions of the invention are bacteria such as *Streptomyces spp.* such as *S. avermitilis*, and fungi such as *Pochonia spp.* such as P. *chlamydosporia*. Also of interest are *Metarhizium spp.* such as *M. anisopliae*; *Pochonia spp.* such as *P. chlamydosporia*.

Preferred mixing partners are abamectin and/or pymetrozine.

The compounds of the invention may be mixed with soil, peat or other rooting media for the protection of plants against seed-borne, soil-borne or foliar fungal diseases.

Examples of suitable synergists for use in the compositions include piperonyl butoxide, sesamex, safroxan and dodecyl imidazole.

Suitable herbicides and plant-growth regulators for inclusion in the compositions will depend upon the intended target and the effect required.

An example of a rice selective herbicide which may be included is propanil. An example of a plant growth regulator for use in cotton is PIX™.

Some mixtures may comprise active ingredients which have significantly different physical, chemical or biological properties such that they do not easily lend themselves to the same conventional formulation type. In these circumstances other formulation types may be prepared. For example, where one active ingredient is a water insoluble solid and the other a water insoluble liquid, it may nevertheless be possible to disperse each active ingredient in the same continuous aqueous phase by dispersing the solid active ingredient as a suspension (using a preparation analogous to that of an SC) but dispersing the liquid active ingredient as an emulsion (using a preparation analogous to that of an EW). The resultant composition is a suspoemulsion (SE) formulation.

For soil applications using compounds of formula I on sugar cane, including application on sugar cane propogation material such as buds, the following mixing partners are of particular interest: insecticides selected from neonicotinoids, in particular thiamethoxam, imidacloprid and clothianidin, sulfoxaflor, abamectin, carbofuran, tefluthrin, fipronil, ethiprole, spinosad, lamda-cyhalothrin, bisamides, in particular chlorantraniliprole, cyantraniliprole, flubendiamide; optionally with fungicides selected from azoxystrobin, cyproconazole, thiabendazole, fluazinam, fludioxonil, mefenoxam, Sedaxane. Particular combinations of interest for sugar cane, particularly on sugar cane propogation material such as buds, include a compound of formula I with thiamethoxam and abamectin, a compound of formula I with thiamethoxam and cyantraniliprole, a compound of formula I with thiamethoxam and chlorantraniliprole. Further combinations of particular interestfor sugar cane include a compound selected from Tables 1 to 54 + thiamethoxam + abamectin + mefenoxam + fludioxonil + azoxystrobin + thiabendazole; a compound selected from Tables 1 to 54 + abamectin + mefenoxam + fludioxonil + azoxystrobin + thiabendazole, a compound selected from Tables 1 to 54+ thiamethoxam + mefenoxam + fludioxonil + azoxystrobin + thiabendazole, a compound selected from Tables 1 to 54+ thiamethoxam + abamectin + mefenoxam + fludioxonil + azoxystrobin + thiabendazole, a compound selected from Tables 1 to 54 + thiamethoxam + abamectin + fludioxonil + azoxystrobin + thiabendazole, a compound selected from Tables 1 to 54 + thiamethoxam + abamectin + mefenoxam + azoxystrobin + thiabendazole, a compound selected from Tables 1 to 54 + thiamethoxam + abamectin + mefenoxam + fludioxonil + thiabendazole, a compound selected from Tables 1 to 54 + thiamethoxam + abamectin + mefenoxam + fludioxonil + azoxystrobin. Example of ratios are below.

Unless otherwise stated the weight ratio of the compound of I with an additional active ingredient may generally be between 1000 : 1 and 1 : 1000. In other embodiments that weight ratio of A to B may be between 500 : 1 to 1 : 500, for example between 100 : 1 to 1 : 100, for example between 1 : 50 to 50 : 1, for example 1 : 20 to 20 : 1, for example 1:10 to 10:1, for example 1:5 to 5:1, for example 1:1, 1:2, 1:3, 1:4, 1:5, 2:1, 3:1, 4:1, or 5:1.

In general, mixtures thiamethoxam, imidacloprid and clothianidin are of particular interest, as well as with pymetrozine and abamectin.

Compositions of the invention include those prepared by premixing prior to application, e.g. as a readymix or tankmix, or by simultaneous application or sequential application to the plant.

In order to apply a compounds of the invention as an insecticide, acaricide, nematicide or molluscicide to a pest, a locus of pest, or to a plant susceptible to attack by a pest, compounds of the invention is usually formulated into a composition which includes, in addition to the compound of the invention, a suitable inert diluent or carrier and, optionally, a surface active agent (SFA). SFAs are chemicals which are able to modify the properties of an interface (for example, liquid/solid, liquid/air or liquid/liquid interfaces) by lowering the interfacial tension and thereby leading to changes in other properties (for example dispersion, emulsification and wetting). It is preferred that all compositions (both solid and liquid formulations) comprise, by weight, 0.0001 to 95%, more preferably 1 to 85%, for example 5 to 60%, of a compound of the invention. The composition is generally used for the control of pests such that a compound of the invention is applied at a rate of from 0.1g to10kg per hectare, preferably from 1g to 6kg per hectare, more preferably from 1g to 1kg per hectare.

Compositions comprising a compound of the invention can be chosen from a number of formulation types, including dustable powders (DP), soluble powders (SP), water soluble granules (SG), water dispersible granules (WG), wettable powders (WP), granules (GR) (slow or fast release), soluble concentrates (SL), oil miscible liquids (OL), ultra low volume liquids (UL), emulsifiable concentrates (EC), dispersible concentrates (DC), emulsions (both oil in water (EW) and water in oil (EO)), micro-emulsions (ME), suspension concentrates (SC), aerosols, fogging/smoke formulations, capsule suspensions (CS) and seed treatment formulations. The formulation type chosen in any instance will depend upon the particular purpose envisaged and the physical, chemical and biological properties of the compound of the invention.

Dustable powders (DP) may be prepared by mixing a compound of the invention with one or more solid diluents (for example natural clays, kaolin, pyrophyllite, bentonite, alumina, montmorillonite, kieselguhr, chalk, diatomaceous earths, calcium phosphates, calcium and magnesium carbonates, sulfur, lime, flours, talc and other organic and inorganic solid carriers) and mechanically grinding the mixture to a fine powder.

Soluble powders (SP) may be prepared by mixing a compound of the invention with one or more water-soluble inorganic salts (such as sodium bicarbonate, sodium carbonate or magnesium sulfate) or one or more water-soluble organic solids (such as a polysaccharide) and, optionally, one or more wetting agents, one or more dispersing agents or a mixture of said agents to improve water dispersibility/solubility. The mixture is then ground to a fine powder. Similar compositions may also be granulated to form water soluble granules (SG).

Wettable powders (WP) may be prepared by mixing a compound of the invention with one or more solid diluents or carriers, one or more wetting agents and, preferably, one or more dispersing agents and, optionally, one or more suspending agents to facilitate the dispersion in liquids. The mixture is then ground to a fine powder. Similar compositions may also be granulated to form water dispersible granules (WG).

Granules (GR) may be formed either by granulating a mixture of a compound of the invention and one or more powdered solid diluents or carriers, or from pre-formed blank granules by absorbing a compound of the invention (or a solution thereof, in a suitable agent) in a porous granular material (such as pumice, attapulgite clays, fuller's earth, kieselguhr, diatomaceous earths or ground corn cobs) or by adsorbing a compound of the invention (or a solution thereof, in a suitable agent) on to a hard core material (such as sands, silicates, mineral carbonates, sulfates or phosphates) and drying if necessary. Agents which are commonly used to aid absorption or adsorption include solvents (such as aliphatic and aromatic petroleum solvents, alcohols, ethers, ketones and esters) and sticking agents (such as polyvinyl acetates, polyvinyl alcohols, dextrins, sugars and vegetable oils). One or more other additives may also be included in granules (for example an emulsifying agent, wetting agent or dispersing agent).

Dispersible Concentrates (DC) may be prepared by dissolving a compound of the invention in water or an organic solvent, such as a ketone, alcohol or glycol ether. These solutions may contain a surface active agent (for example to improve water dilution or prevent crystallization in a spray tank).

Emulsifiable concentrates (EC) or oil-in-water emulsions (EW) may be prepared by dissolving a compound of the invention in an organic solvent (optionally containing one or more wetting agents, one or more emulsifying agents or a mixture of said agents). Suitable organic solvents for use in ECs include aromatic hydrocarbons (such as alkylbenzenes or alkylnaphthalenes, exemplified by SOLVESSO 100, SOLVESSO 150 and SOLVESSO 200; SOLVESSO is a Registered Trade Mark), ketones (such as cyclohexanone or methylcyclohexanone) and alcohols (such as benzyl alcohol, furfuryl alcohol or butanol), *N*-alkylpyrrolidones (such as *N*-methylpyrrolidone or *N*-octylpyrrolidone), dimethyl amides of fatty acids (such as C_8-C_{10} fatty acid dimethylamide) and chlorinated hydrocarbons. An EC product may spontaneously emulsify on addition to water, to produce an emulsion with sufficient stability to allow spray application through appropriate equipment. Preparation of an EW involves obtaining a compound of the invention either as a liquid (if it is not a liquid at room temperature, it may be melted at a reasonable temperature, typically below 70°C) or in solution (by dissolving it in an appropriate solvent) and then emulsifiying the resultant liquid or solution into water containing one or more SFAs, under high shear, to produce an emulsion. Suitable solvents for use in EWs include vegetable oils, chlorinated hydrocarbons (such as chlorobenzenes), aromatic solvents (such as alkylbenzenes or alkylnaphthalenes) and other appropriate organic solvents which have a low solubility in water.

Microemulsions (ME) may be prepared by mixing water with a blend of one or more solvents with one or more SFAs, to produce spontaneously a thermodynamically stable isotropic liquid formulation. A compound of the invention is present initially in either the water or the solvent/SFA blend. Suitable solvents for use in MEs include those hereinbefore described for use in ECs or in EWs. An ME may be either an oil-in-water or a water-in-oil system (which system is present may be determined by conductivity measurements) and may be suitable for mixing water-soluble and oil-soluble pesticides in the same formulation. An ME is suitable for dilution into water, either remaining as a microemulsion or forming a conventional oil-in-water emulsion.

Suspension concentrates (SC) may comprise aqueous or non-aqueous suspensions of finely divided insoluble solid particles of a compound of the invention. SCs may be prepared by ball or bead milling the solid compound of the invention in a suitable medium, optionally with one or more dispersing agents, to produce a fine particle suspension of the compound. One or more wetting agents may be included in the composition and a suspending agent may be included to reduce the rate at which the particles settle. Alternatively, a compound of the invention may be dry milled and added to water, containing agents hereinbefore described, to produce the desired end product.

Aerosol formulations comprise a compound of the invention and a suitable propellant (for example *n*-butane). A compound of the invention may also be dissolved or dispersed in a suitable medium (for example water or a water miscible liquid, such as *n*-propanol) to provide compositions for use in non-pressurized, hand-actuated spray pumps.

A compound of the invention may be mixed in the dry state with a pyrotechnic mixture to form a composition suitable for generating, in an enclosed space, a smoke containing the compound.

Capsule suspensions (CS) may be prepared in a manner similar to the preparation of EW formulations but with an additional polymerization stage such that an aqueous dispersion of oil droplets is obtained, in which each oil droplet is encapsulated by a polymeric shell and contains a compound of the invention and, optionally, a carrier or diluent therefor. The polymeric shell may be produced by either an interfacial polycondensation reaction or by a coacervation procedure. The compositions may provide for controlled release of the compound of the invention and they may be used for seed treatment. A compound of the invention may also be formulated in a biodegradable polymeric matrix to provide a slow, controlled release of the compound.

A composition may include one or more additives to improve the biological performance of the composition (for example by improving wetting, retention or distribution on surfaces; resistance to rain on treated surfaces; or uptake or mobility of a compound of the invention). Such additives include surface active agents, spray additives based on oils, for example certain mineral oils or natural plant oils (such as soy bean and rape seed oil), and blends of these with other bio-enhancing adjuvants (ingredients which may aid or modify the action of a compound of the invention).

A compound of the invention may also be formulated for use as a seed treatment, for example as a powder composition, including a powder for dry seed treatment (DS), a water soluble powder (SS) or a water dispersible powder for slurry treatment (WS), or as a liquid composition, including a flowable concentrate (FS), a solution (LS) or a capsule suspension (CS). The preparations of DS, SS, WS, FS and LS compositions are very similar to those of, respectively, DP, SP, WP, SC and DC compositions described above. Compositions for treating seed may include an agent for assisting the adhesion of the composition to the seed (for example a mineral oil or a film-forming barrier).

Wetting agents, dispersing agents and emulsifying agents may be surface SFAs of the cationic, anionic, amphoteric or non-ionic type.

Suitable SFAs of the cationic type include quaternary ammonium compounds (for example cetyltrimethyl ammonium bromide), imidazolines and amine salts.

Suitable anionic SFAs include alkali metals salts of fatty acids, salts of aliphatic monoesters of sulfuric acid (for example sodium lauryl sulfate), salts of sulfonated aromatic compounds (for example sodium dodecylbenzenesulfonate, calcium dodecylbenzenesulfonate, butylnaphthalene sulfonate and mixtures of sodium di-*iso*propyl- and tri-*iso*propyl-naphthalene sulfonates), ether sulfates, alcohol ether sulfates (for example sodium laureth-3-sulfate), ether carboxylates (for example sodium laureth-3-carboxylate), phosphate esters (products from the reaction between one or more fatty alcohols and phosphoric acid (predominately mono-esters) or phosphorus pentoxide (predominately di-esters), for example the reaction between lauryl alcohol and tetraphosphoric acid; additionally these products may be ethoxylated), sulfosuccinamates, paraffin or olefine sulfonates, taurates and lignosulfonates.

Suitable SFAs of the amphoteric type include betaines, propionates and glycinates.

Suitable SFAs of the non-ionic type include condensation products of alkylene oxides, such as ethylene oxide, propylene oxide, butylene oxide or mixtures thereof, with fatty alcohols (such as oleyl alcohol or cetyl alcohol) or with alkylphenols (such as octylphenol, nonylphenol or octylcresol); partial esters derived from long chain fatty acids or hexitol anhydrides; condensation products of said partial esters with ethylene oxide; block polymers (comprising ethylene oxide and propylene oxide); alkanolamides; simple esters (for example fatty acid polyethylene glycol esters); amine oxides (for example lauryl dimethyl amine oxide); and lecithins.

Suitable suspending agents include hydrophilic colloids (such as polysaccharides, polyvinylpyrrolidone or sodium carboxymethylcellulose) and swelling clays (such as bentonite or attapulgite).

Compositions for use as aqueous preparations (aqueous solutions or dispersions) are generally supplied in the form of a concentrate containing a high proportion of the active ingredient, the concentrate being added to water before use. These concentrates, which may include DCs, SCs, ECs, EWs, MEs, SGs, SPs, WPs, WGs and CSs, are often required to withstand storage for prolonged periods and, after such storage, to be capable of addition to water to form aqueous preparations which remain homogeneous for a sufficient time to enable them to be applied by conventional spray equipment. Such aqueous preparations may contain varying amounts of a compound of the invention (for example 0.0001 to 10%, by weight) depending upon the purpose for which they are to be used.

A seed dressing formulation is applied in a manner known per se to the seeds employing the combination of the invention and a diluent in suitable seed dressing formulation form, e.g. as an aqueous suspension or in a dry powder form having good adherence to the seeds. Such seed dressing formulations are known in the art. Seed dressing formulations may contain the single active ingredients or the combination of active ingredients in encapsulated form, e.g. as slow release capsules or microcapsules. A typical a tank-mix formulation for seed treatment application comprises 0.25 to 80%, especially 1 to 75 %, of the desired ingredients, and 99.75 to 20 %, especially 99 to 25 %, of a solid or liquid auxiliaries

(including, for example, a solvent such as water), where the auxiliaries can be a surfactant in an amount of 0 to 40 %, especially 0.5 to 30 %, based on the tank-mix formulation. A typical pre-mix formulation for seed treatment application comprises 0.5 to 99.9 %, especially 1 to 95 %, of the desired ingredients, and 99.5 to 0.1 %, especially 99 to 5 %, of a solid or liquid adjuvant (including, for example, a solvent such as water), where the auxiliaries can be a surfactant in an amount of 0 to 50 %, especially 0.5 to 40 %, based on the pre-mix formulation.

The rates of application of a plant propagation material treatment varies, for example, according to type of use, type of crop, the specific compound(s) and/or agent(s) used, and type of plant propagation material. The suitable rate is an effective amount to provide the desired action (such as disease or pest control) and can be determined by trials and routine experimentation known to one of ordinary skill in the art.

Generally for soil treatments, application rates can vary from 0.05 to 3 kg per hectare (g/ha) of ingredients. Generally for seed treatments, application rates can vary from 0.5 to 1000g / 100kg of seeds of ingredients.

In general, the formulations include from 0.01 to 90% by weight of active agent, from 0 to 20% agriculturally acceptable surfactant and 10 to 99.99% solid or liquid formulation inerts and adjuvant(s), the active agent consisting of at least the compound of formula I together with a compound of component B, and optionally other active agents, particularly microbiocides or conservatives or the like. Concentrated forms of compositions generally contain in between about 2 and 80%, preferably between about 5 and 70% by weight of active agent. Application forms of formulation may for example contain from 0.01 to 20% by weight, preferably from 0.01 to 5% by weight of active agent. Whereas commercial products will preferably be formulated as concentrates, the end user will normally employ diluted formulations.

Formulation Examples

Powders for dry seed treatment	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.

Dusts	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.

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, seeds can be treated and protected against infestation 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, seeds can be treated and protected against infestation by spraying, pouring or immersion.

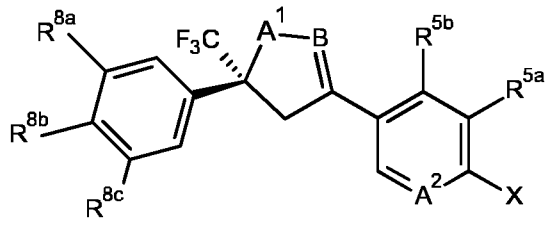
The invention further pertains to a product for use in agriculture or horticulture comprising a capsule wherein at least a seed treated with the inventive compound is located. In another embodiment, the product comprises a capsule wherein at least a treated or untreated seed and the inventive compound are located.

Slow Release Capsule Suspension

28 parts of the inventive compound 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 ingredient. The medium capsule diameter is 8-15 microns. The resulting formulation is applied to seeds as an aqueous suspension in a suitable apparatus.

The following non-limiting Examples illustrate the invention.

Table P provides compounds of formula Ia wherein R^{8a}, R^{8b}, R^{8c}, A^1, B, R^{5a}, R^{5b}, A^2 and X are defined in Table P



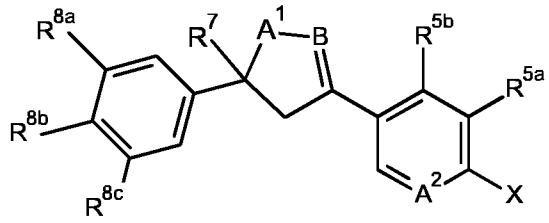
(Ia)

Table P

No	R8a	R8b	R8c	A1	B	R5a	R5b	A2	X
A1	Cl	H	Cl	O	N	CH3	H	CH	P3
A2	Cl	H	Cl	CH2	N	CH3	H	CH	P4
A3	Cl	Cl	Cl	O	N	CH3	H	CH	P4
A4	Cl	F	Cl	O	N	CH3	H	CH	P4
A5	Cl	H	Cl	O	N	CH3	H	CH	P7
A6	Cl	Cl	Cl	O	N	CH3	H	CH	P3
A7	Cl	H	Cl	O	N	Cl	H	CH	P3
A8	Cl	Cl	Cl	O	N	Br	H	CH	P7
A9	Cl	Cl	Cl	O	N	Br	H	CH	P2
A10	Cl	H	Cl	O	N	CF3	H	CH	P7
A11	Cl	Cl	Cl	O	N	CF3	H	CH	P7
A12	CF3	H	H	O	N	CH3	H	CH	P4
A13	Cl	Cl	Cl	O	N	CF3	H	CH	P2
A14	Cl	Cl	Cl	O	N	CF3	H	CH	P3
A15	Cl	Cl	Cl	O	N	CF3	H	CH	P4
A16	Cl	H	Cl	O	N	CF3	H	CH	P3

A17	Cl	H	Cl	O	N	CF3	H	CH	P4
A18	Cl	Cl	Cl	O	N	Br	H	CH	P4
A19	Cl	Cl	Cl	O	N	Br	H	CH	P3
A20	Cl	H	Cl	O	N	Br	H	CH	P2
A21	Cl	H	Cl	O	N	Br	H	CH	P4
A22	Cl	H	Cl	O	N	Br	H	CH	P3
A23	CF3	H	H	O	N	CH3	H	CH	P3
A24	CF3	H	Cl	O	N	CH=CH-CH=CH		CH	P3
A25	Cl	F	Cl	O	N	Cl	H	CH	P2
A26	CF3	F	H	O	N	CH3	H	CH	P4
A27	CF3	F	H	O	N	CH3	H	CH	P3
A28	CF3	F	H	O	N	CH3	H	CH	P2
A29	Cl	Cl	Cl	O	N	CH3	H	CH	P2
A30	Cl	F	Cl	O	N	CH3	H	CH	P2
A31	Cl	H	Cl	O	N	Cl	H	CH	P2
A32	Cl	F	Cl	O	N	CH3	H	CH	P3
A33	Cl	F	Cl	O	N	Cl	H	CH	P3
A34	Cl	Cl	Cl	O	N	Cl	H	CH	P3
A35	Cl	F	Cl	O	N	Cl	H	CH	P4
A36	Cl	F	Cl	O	N	Cl	H	CH	P7
A37	Cl	H	Cl	O	N	Cl	H	CH	P4
A38	Cl	H	Cl	CH2	N	CH3	H	CH	P2
A39	Cl	H	Cl	CH2	N	CH3	H	CH	P3
A40	Cl	H	Cl	CH2	N	CH3	H	CH	P5
A41	Cl	H	Cl	O	N	CF3	H	CH	P2
A42	Cl	Cl	Cl	O	N	Cl	H	CH	P4
A43	Cl	H	Cl	O	N	CH3	H	N	P3

Table Q provides compounds of formula Ib wherein R^{8a}, R^{8b}, R^{8c}, R^{7}, A^{1}, B, R^{5a}, R^{5b}, A^{2} and X are defined in Table Q



(Ib)

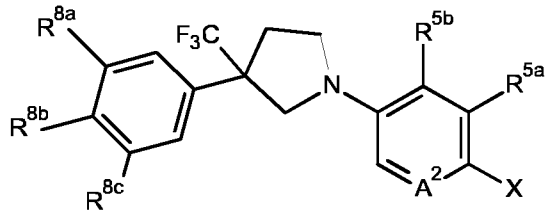
Table Q

No	R8a	R8b	R8c	R7	A1	B	R5a	R5b	A2	X
B1	Cl	H	Cl	CF3	O	CH	CH3	H	CH	P4
B2	Cl	H	Cl	CF3	O	CH	CH3	H	CH	P3
B3	Cl	H	Cl	CF3	O	CH	CH3	H	CH	P2
B4	Cl	H	Cl	CF2Cl	O	N	CH3	H	CH	P4
B5	Cl	H	Cl	CF2Cl	O	N	CH3	H	CH	P3
B6	Cl	H	Cl	CF2Cl	CH2	N	CH3	H	CH	P4
B7	Cl	H	Cl	CF2Cl	CH2	N	CH3	H	CH	P2
B8	Cl	H	Cl	CF2Cl	O	N	CH3	H	CH	P2
B9	Cl	H	Cl	CF3	O	N	CH3	H	CH	P3
B10	Cl	H	Cl	CF3	O	N	Br	H	CH	P4
B11	Cl	Cl	Cl	CF3	CH2	N	CH3	H	CH	P7
B12	Cl	Br	Cl	CF3	O	N	CH3	H	CH	P3
B13	Cl	Br	Cl	CF3	O	N	CH3	H	CH	P4
B14	Cl	H	Cl	CF3	O	N	CH3	H	CH	P2
B15	Cl	F	Cl	CF3	CH2	N	CH3	H	CH	P4
B16	Cl	F	Cl	CF3	CH2	N	CH3	H	CH	P3
B17	Cl	F	Cl	CF3	CH2	N	CH3	H	CH	P2
B18	Cl	Cl	Cl	CF3	CH2	N	CH3	H	CH	P3
B19	Cl	F	Cl	CF3	O	N	CH3	H	CH	P4
B20	Cl	Cl	Cl	CF3	O	N	CH3	H	CH	P2
B21	Cl	Cl	Cl	CF3	O	N	CH3	H	CH	P3
B22	Cl	Cl	Cl	CF3	O	N	CH3	H	CH	P4
B23	Cl	H	Cl	CF3	O	N	CH3	H	CH	P4
B24	CF3	H	CF3	CF3	O	N	CH3	H	CH	P3
B25	Cl	H	Cl	CF3	O	N	Br	H	CH	P3
B26	Cl	Br	Cl	CF3	O	N	CH3	H	CH	P2
B27	Cl	H	Cl	CF3	O	N	CH=CH-CH=CH		CH	P4
B28	CF3	H	H	CF3	O	N	CH3	H	CH	P2

B29	CF3	H	H	CF3	O	N	CH3	H	CH	P3
B30	CF3	H	CF3	CF3	O	N	CH3	H	CH	P2
B31	Cl	H	Cl	CF3	O	N	Br	H	CH	P2
B32	Cl	H	Cl	CF3	O	N	Cl	H	CH	P2
B33	Cl	Cl	Cl	CF3	CH2	N	CH3	H	CH	P5
B34	Cl	H	Cl	CF3	CH2	N	CH3	H	CH	P9
B35	Cl	H	Cl	CF3	CH2	N	CH3	H	CH	P7
B36	Cl	H	Cl	CF3	CH2	N	CH=CH-CH=CH		CH	P2
B37	Cl	H	Cl	CF3	CH2	N	CH=CH-CH=CH		CH	P3
B38	Cl	H	Cl	CF3	O	N	CF3	H	CH	P3
B39	Cl	H	Cl	CF3	CH2	N	Cl	H	CH	P4
B40	Cl	Cl	Cl	CF3	CH2	N	CH3	H	CH	P4
B41	Cl	Cl	Cl	CF3	CH2	N	CH3	H	CH	P2
B42	Cl	H	Cl	CF3	O	N	CH3	H	CH	P7
B43	Br	H	Cl	CF3	O	N	CH3	H	CH	P3
B44	CF3	H	Cl	CF3	O	N	CH3	H	CH	P3
B45	Cl	Cl	H	CF3	O	N	CH3	H	CH	P3
B46	Cl	H	Cl	CF3	O	N	Cl	H	CH	P3
B47	Cl	H	Cl	CF3	CH2	N	CH3	H	CH	P3
B48	Cl	H	F	CF3	O	N	CH3	H	CH	P3
B49	Cl	H	Cl	CF3	O	N	CH=CH-CH=CH		CH	P3
B50	Cl	H	Cl	CF3	O	N	CH=CH-CH=CH		CH	P2
B51	Cl	H	F	CF3	O	N	CH3	H	CH	P2
B52	Cl	H	Cl	CF3	O	N	CF3	H	CH	P2
B53	CF3	H	Cl	CF3	O	N	CH3	H	CH	P4
B54	CF3	H	Cl	CF3	O	N	CH3	H	CH	P2
B55	Cl	H	Cl	CF3	O	N	CH3	H	CH	P9
B56	Cl	Cl	Cl	CF3	CH2	N	CH3	H	CH	P9
B57	CF3	Cl	CF3	CF3	O	N	CH3	H	CH	P2
B58	CF3	Cl	CF3	CF3	O	N	CH3	H	CH	P3
B59	CF3	Cl	CF3	CF3	O	N	CH3	H	CH	P4
B60	Cl	H	Cl	CF3	CH2	N	CH=CH-		CH	P4

							CH=CH			
B61	Cl	H	Cl	CF3	CH2	N	Cl	H	CH	P3
B62	CF3	H	CF3	CF3	CH2	N	CH3	H	CH	P3
B63	Cl	Cl	CF3	CF3	O	N	CH3	H	CH	P2
B64	Cl	Cl	CF3	CF3	O	N	CH3	H	CH	P3
B65	Cl	Cl	CF3	CF3	O	N	CH3	H	CH	P4
B66	CF3	H	CF3	CF3	CH2	N	CH3	H	CH	P4
B67	Cl	H	Cl	CF3	CH2	N	Cl	H	CH	P2
B68	Cl	F	Cl	CF3	O	N	CH3	H	CH	P3
B69	Cl	F	Cl	CF3	O	N	CH3	H	CH	P2
B70	Cl	H	Cl	CF3	O	N	CH3	H	CH	P5
B71	Br	H	Cl	CF3	O	N	CH3	H	CH	P2
B72	Br	H	Cl	CF3	O	N	CH3	H	CH	P4
B73	F	F	F	CF3	O	N	CH3	H	CH	P2
B74	Cl	Cl	H	CF3	O	N	CH3	H	CH	P2
B75	Cl	Cl	H	CF3	O	N	CH3	H	CH	P4
B76	Cl	H	Cl	CF3	O	N	Cl	H	CH	P4
B77	Cl	F	H	CF3	O	N	CH3	H	CH	P2
B78	Cl	F	H	CF3	O	N	CH3	H	CH	P3
B79	Cl	F	H	CF3	O	N	CH3	H	CH	P4
B80	F	H	Cl	CF3	O	N	CH3	H	CH	P4
B81	Cl	H	Cl	CF3	O	N	CH3	H	N	P3
B82	Cl	H	Cl	CF3	O	N	CH3	H	N	P4
B83	Cl	H	Cl	CF3	O	N	CH3	H	N	P2

Table R provides compounds of formula Ic wherein R^{8a}, R^{8b}, R^{8c}, R^{5a}, R^{5b}, A^2 and X are defined in Table R



(Ic)

Table R

No	R8a	R8b	R8c	R5a	R5b	A2	X
C1	Cl	H	Cl	CH3	H	CH	P3
C2	Cl	H	Cl	CH3	H	CH	P4

C3	Cl	H	Cl	CH3	H	CH	P5
C4	Cl	H	Cl	CH3	H	CH	P2
C5	Cl	F	Cl	CH3	H	CH	P4

Example 1

Agriotes sp. (Wireworms)

Plastic beakers are prepared with 100 ml drench soil. Afterwards 12.5 ml compound solution is mixed in each plastic beaker and three maize seedlings are added. At the same day five wireworms are placed into each plastic beaker and these are covered up with a lid. Fourteen days after treatment the number of dead and moribund wireworms are evaluated. Wireworms are assessed as moribund if they were not able to burry into the soil in one hour after having been put onto the soil surface.

The results show that the compounds of the invention are significantly more active against wireworms than structurally similar compounds.

Table A

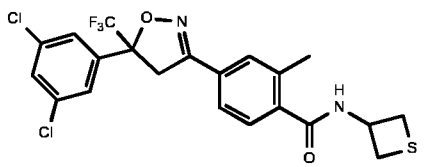
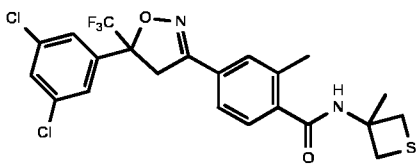
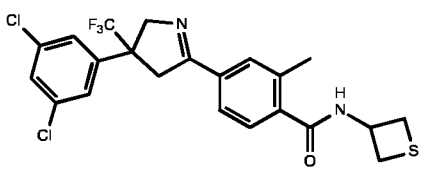
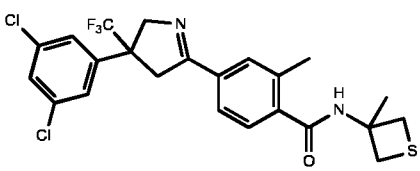
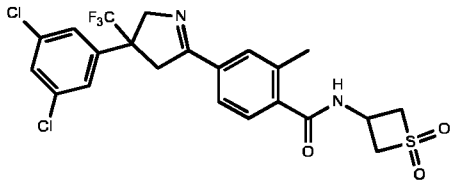
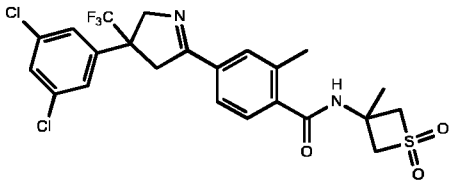
Compound of the invention		Reference compound	
			
Compound	**Test**	**Application rate / ppm**	**Control / %**
Compound of the invention	*Agriotes sp.* (Wireworms)	3	30
		12.5	100
Reference compound	*Agriotes sp.* (Wireworms)	3	10
		12.5	20

Table B

Compound of the invention		Reference compound	
			
Compound	**Test**	**Application rate**	**Control /**

		/ ppm	%
Compound of the invention	*Agriotes sp.* (Wireworms)	3	40
		12.5	100
Reference compound	*Agriotes sp.* (Wireworms)	3	0
		12.5	0

Table C

Compound of the invention	Reference compound
	

Compound	**Test**	**Application rate / ppm**	**Control / %**
Compound of the invention	*Agriotes sp.* (Wireworms)	3	40
		12.5	100
Reference compound	*Agriotes sp.* (Wireworms)	3	0
		12.5	0

The following compounds gave at least 80% control against wireworms at an application rate of 12.5 ppm or less according to the above method: A1, A2, A3, A4, A5, A6, A7, B1. B9, B23. (B9 and B23 were evaluated at 7 days after application.) No additional compounds from Table P, Q or R were tested against wireworms.

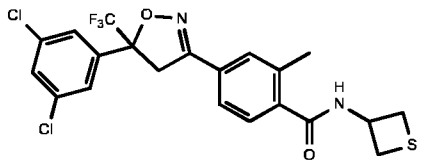
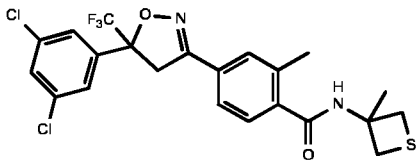
Example 2

Diabrotica balteata (Corn rootworm):

A 24-well microtiter plate (MTP) with artificial diet was treated with test solutions at an application rate of 200 ppm (concentration in well 18 ppm) by pipetting. After drying, the MTPs were infested with L2 larvae (6-10 per well). After an incubation period of 5 days, samples were checked for larval mortality.

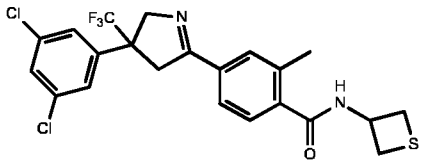
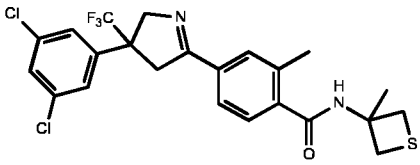
The results show that the compounds of the invention are significantly more active against *Diabrotica balteata* than structurally similar compounds.

Table E

Compound of the invention	Reference compound
	

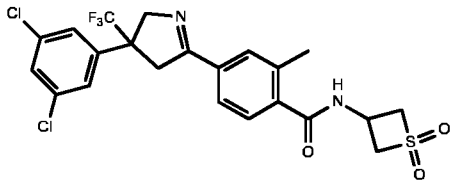
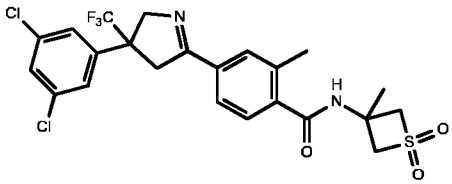
Compound	**Test**	**Application rate / ppm**	**Control / %**
Compound of the invention	*Diabrotica balteata* (Corn rootworm)	3	100
		12.5	100
Reference compound	*Diabrotica balteata* (Corn rootworm)	3	0
		12.5	100

Table F

Compound of the invention	Reference compound
	

Compound	**Test**	**Application rate / ppm**	**Control / %**
Compound of the invention	*Diabrotica balteata* (Corn rootworm)	3	75
		12.5	100
Reference compound	*Diabrotica balteata* (Corn rootworm)	3	0
		12.5	70

Table G

Compound of the invention	Reference compound
	

Compound	**Test**	**Application rate / ppm**	**Control / %**

Compound of the invention	*Diabrotica balteata* (Corn rootworm)	3	65
		12.5	100
Reference compound	*Diabrotica balteata* (Corn rootworm)	3	nt
		12.5	50

All compounds from Tables P (A1 to A43), Q (B1 to B83) and R (C1 to C5) gave at least 80% control against *Diabrotica balteata* at an application rate of 12.5 ppm or less according to the above method.

Example 3

Diabrotica balteata (Corn rootworm):

Plastic boxes (17 x 27 x 22 cm) are filled with 8 L of drench soil and 6 maize seeds are sown into a furrow. 10ml of spray solution are applied with a hand sprayer into the furrow on the planted seeds and the furrow is closed afterwards. Two weeks after sowing each box is infested with 15 *Diabrotica balteata* L2 larvae. 6 days after infestation the plant damage is assessed. Plants are considered as either damaged or healthy. Dead plants, plants with hollow stems or entry holes are considered as damaged. The test is carried out with five replicates (boxes) per treatment. For in-furrow application the control is replicated five times with the application of water.

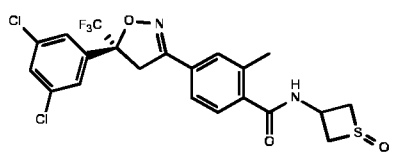
For the assessment as seed treatment 6 treated seeds are planted 0.5 cm deep into the soil. Exactly the same setup is used as with the in furrow treatment described above except that no spray solution is applied. For seed treatment the control is replicated five times without seed coating.

As six seeds are used per replicate, the total amount of active ingredient applied in furrow is six times the rate per seed in the seed treatment test. In that way the total amount of active ingredient used in both test system is adjusted to be directly comparable.

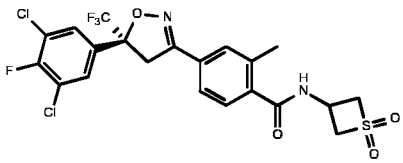
The results show that the potency is significantly higher when the active ingredient is applied in-furrow compared to as a seed treatment.

Compound	**Application rate / mg AI per seed**	**Reduction in plant damage compared to control (in-furrow application) / %**	**Reduction in plant damage compared to control (seed treatment) / %**
Compound 1	0.5	95	64
	0.1	52	30

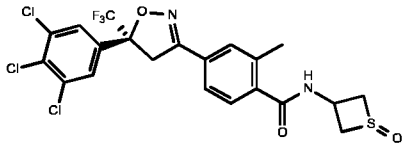
Compound 2	0.5	95	20
	0.1	79	10
Compound 3	0.5	100	35
	0.1	100	15



(1)



(2)

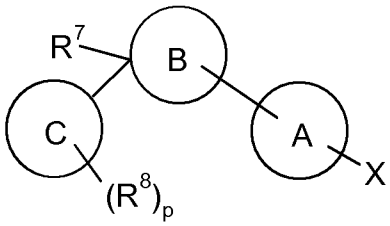


(3)

5

Claims

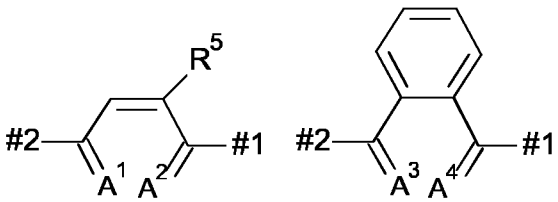
1. A method of controlling and/or preventing soil-dwelling pests in useful plants comprising applying to the locus of the useful plant or treating plant propagation material thereof a compound of formula I



(I)

wherein

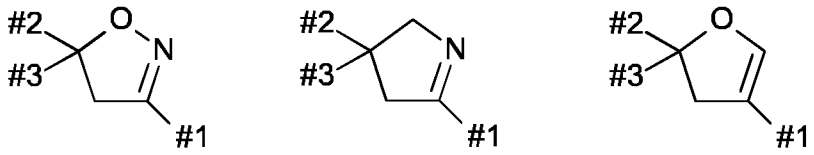
cycle A is A1a or A2a



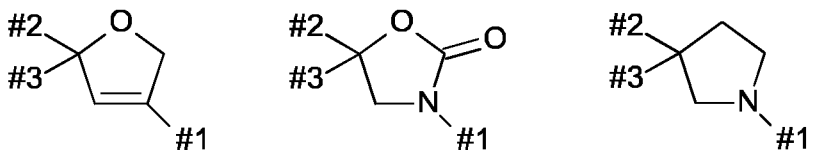
A1a A2a

wherein A^1, A^2, A^3 and A^4 are independently C-H, or nitrogen and wherein #1 indicates the bond to X and #2 indicates the bond to cycle B;

cycle B is selected from B1 to B6



B1 B2 B3



B4 B5 B6

wherein #1 indicates the bond to cycle A, #2 indicates the bond to R^7 and #3 indicates the bond to cycle C;

cycle C is phenyl;

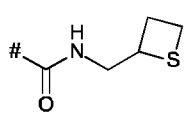
R^5 is chloro, bromo, CF_3 or methyl;

R^7 is chlorodifluoromethyl or trifluoromethyl;

each R^8 is independently bromo, chloro, fluoro or trifluoromethyl;

p is 1, 2 or 3; and

and X is selected from P1 to P9



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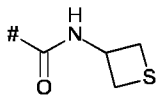

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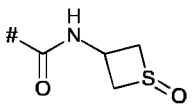

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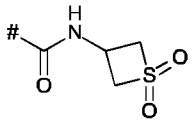

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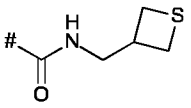
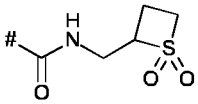


P5



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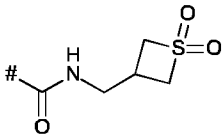
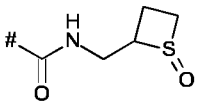
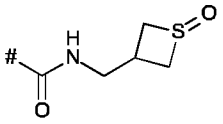


P7



P8



P9

2. Use of a compound of formula I as defined in claim 1 for the control of a soil-dwelling pest in useful plants.

3. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pests are wireworms.

4. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pest is corn rootworm.

5. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pests are grubs, in particular white grubs (e.g. *Phyllophaga sp., Diloboderus sp., Popillia japonica*).

6. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pests are termites (in particular for sugar cane).

7. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pests are subterraneous stinkbugs (e.g. *Scaptocoris sp.*).

8. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pests are cutworms (e.g. *agrotis sp.*).

9. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pests are millipedes (e.g. *Julus sp.*).

10. A method or use according to claim 1 or claim 2, wherein the soil-dwelling pest is broca gigante (e.g. *Telchin licus*).

11. A method or use according to any one of claims 1 to 10, wherein the compound of formula I is applied directly to soil.

12. A method or use according to any one of claims 1 to 10 wherein the compound of formula I is applied to soil by treatment of a seed with a compound of formula I.

13. A method comprising applying a compound of formula I as defined in claim 1 to the locus of corn plants by direct soil application.

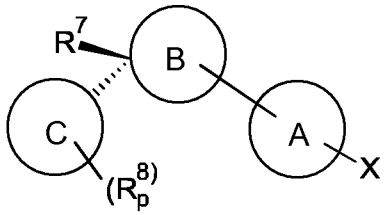
14. A method comprising applying a compound of formula I as defined in claim 1 to a field of corn plants, before, during or after planting, and wherein the application of the compound of formula I comprises applying the compound of formula I directly to soil.

15. A method according to claim 13 or claim 14, wherein the method is for controlling and/or preventing corn rootworm.

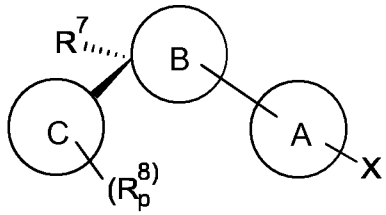
16. Use of a compound of formula I as defined in claim 1 for controlling and/or preventing corn rootworm in useful plants by applying a compound of formula I directly to soil.

17. A method or use according to any one of claims 13 to 16, wherein the compound of formula I is applied in-furrow.

18. A method or use of a compound of formula I according to any one of claims 1 to 17, wherein the compound of formula I is a mixture of the compound of formula I* and the compound of formula I**



I*



I**

wherein the substituents are as defined in claim 1 and wherein said mixture is enriched for the compound of formula I**.

19. A method or use according to any one of claims 1 to 18, wherein X is P2, P3 or P4.

20. A method or use according to any one of claims 1 to 19, wherein cycle A is cycle A1a.

21. A method or use according to any one of claims 1 to 20, wherein cycle B is cycle B1, B2 or B3.

22. A method or use according to any one of claims 1 to 20, wherein cycle B is cycle B1.

23. A method for obtaining regulatory approval for the use of one or more of a compound of formula I as defined in any one the preceding claims to control a pest selected from corn rootworm, wireworms, grubs, termites, subterraneous stinkbugs, cutworms, millipedes and broca gigante comprising at least one step of referring to, submitting or relying on biological data showing that said compound of formula I reduces insect pressure.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/062897

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01P5/00 A01N43/36 A01N43/80 A01N43/06 A01P7/04
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01N

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2009/080250 A2 (SYNGENTA PARTICIPATIONS AG) 2 July 2009 (2009-07-02) page 30 - page 32; table A; compounds I, Ia, 1.01 page 37 - page 38 page 67 -----	1-22
X	WO 2010/149506 A1 (SYNGENTA PARTICIPATIONS AG) 29 December 2010 (2010-12-29) page 30; tables A-D; compound (I) page 59 -----	1-22
X	WO 2010/020522 A1 (SYNGENTA PARTICIPATIONS AG) 25 February 2010 (2010-02-25) page 10 - page 11; table A; compound (I) pages 17, 89 -----	1-22

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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

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"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	Date of mailing of the international search report
10 September 2013	26/09/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Breimaier, Waltraud

2

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/101229 A1 (SYNGENTA PARTICIPATIONS AG) 25 August 2011 (2011-08-25) pages 46, 47; tables A-D, F; compound (I) pages 53,57,99	1-22
X	WO 2012/045700 A1 (SYNGENTA PARTICIPATIONS AG) 12 April 2012 (2012-04-12) pages 73,91; tables A-D; compound (I) page 135	1-22

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2013/062897

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009080250 A2	02-07-2009	AR 069702 A1	10-02-2010
		AU 2008340691 A1	02-07-2009
		CA 2709246 A1	02-07-2009
		CN 101910161 A	08-12-2010
		CO 6300905 A2	21-07-2011
		CR 11531 A	13-09-2010
		DK 2238132 T3	22-10-2012
		DO P2010000196 A	15-09-2010
		EA 201001008 A1	28-02-2011
		EC SP10010304 A	30-07-2010
		EP 2238132 A2	13-10-2010
		EP 2518068 A2	31-10-2012
		EP 2592079 A2	15-05-2013
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