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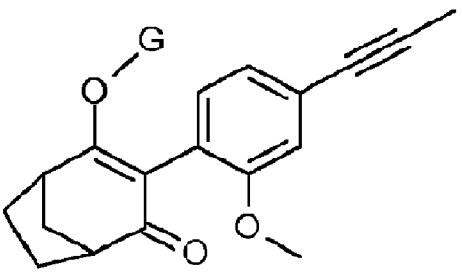
(54) **Titre : COMPOSITIONS HERBICIDES**
(54) **Title: HERBICIDAL COMPOSITIONS**



(I)

(57) **Abrégé/Abstract:**
The present invention relates to a herbicidal composition comprising (A) a herbicidally effective amount of a compound of Formula (I) or an agrochemically acceptable ester or salt thereof; and (B) at least one herbicide, agrochemically acceptable ester or salt thereof, selected from the group consisting of: B1 glufosinate; B2 glyphosate; B3 a protoporphyrinogen oxidase (PPO)-inhibiting herbicide; and B4 a herbicide selected from the group consisting of paraquat (B4a), diquat (B4b) and a herbicidal pyridazine a compound of Formula (II) (B4c). The present invention further relates to methods of controlling weeds comprising the herbicidal compositions of the invention.

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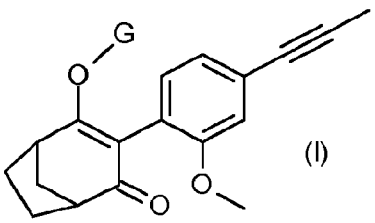
HERBICIDAL COMPOSITIONS

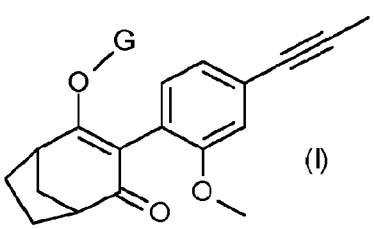
The present invention relates to novel herbicidal compositions comprising a combination of herbicidal active ingredients which provides control of weeds in crops of useful plants. The invention further provides methods of controlling weeds in crops of useful plants, and to the use of the herbicidal composition to control weeds. Compounds of Formula (I)



(I)

are known from WO2015/197468 and provide effective control of problematic weeds in crops. Combinations of herbicidal active ingredients are often used in agriculture to increase and/or broaden the control of problematic plants (weeds) in crops of useful plants. In some instances, the combination can give rise to a valuable greater-than-additive (synergistic) effect which can, for example, enable efficient weed control through lower application rates. The present invention is based upon novel compositions comprising compounds of Formula (I).

Thus, according to the present invention there is provided a herbicidal composition comprising (A) a herbicidally effective amount of a compound of Formula (I)



(I)

wherein G is selected from the group consisting of hydrogen, $-C(O)CH_3$ and $-C(O)OCH_3$; and

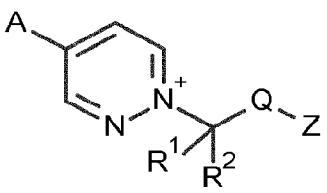
(B) at least one herbicide, or an agrochemically acceptable ester or salt thereof, selected from the group consisting of:

B1 glufosinate;

B2 glyphosate;

B3 a protoporphyrinogen oxidase (PPO)-inhibiting herbicide; and

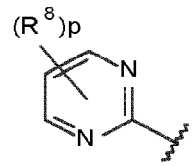
B4 a herbicide selected from the group consisting of paraquat (B4a), diquat (B4b) and a herbicidal pyridazine compound of Formula (II) (B4c)



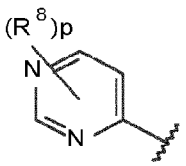
(II),

wherein:

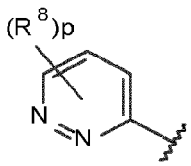
A is 6-membered heteroaryl selected from the group consisting of:



A-I



A-II



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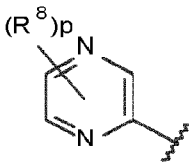

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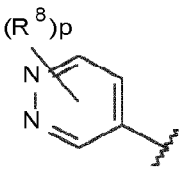

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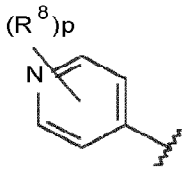

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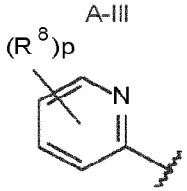


A-VII

wherein the jagged line defines the point of attachment to the remaining part of a compound of Formula (I),

p is 0, 1 or 2, and

each R^8 is independently selected from the group consisting of NH_2, methyl, and methoxy;

R^1 and R^2 are each independently hydrogen or methyl;

Q is $(CR^{1a}R^{2b})_m$;

m is 0, 1, or 2;

each R^{1a} and R^{2b} are independently selected from the group consisting of hydrogen, hydroxy, -methyl, and NH_2;

Z is $–S(O)_2OR^{10}$, $-C(O)OR^{10}$, $-C(O)NHS(O)_2R^{12}$ and –C(O)NHCN;

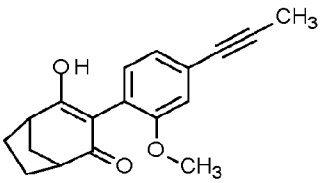
R^{10} is hydrogen, methyl, benzyl or phenyl;

and R^{12} is methyl, $-NH_2$, $-N(CH_3)_2$, or $-NHCH_3$

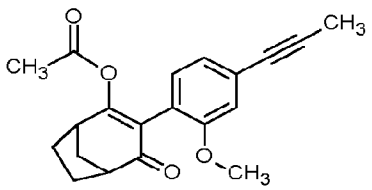
or a zwitterionic species thereof.

Such herbicidally active pyridazine derivatives (B4c) are known from WO2019/034757.

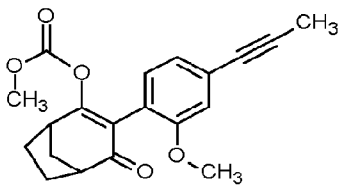
In a preferred embodiment of the present invention the compound of Formula (I) is selected from the group consisting of Formula (Ia), (Ib) and (Ic).



(Ia)



(Ib)



(Ic)

In one embodiment of the present invention the compound of Formula (I) is a compound of Formula (Ia) – including agrochemically acceptable salts thereof. In another embodiment of the present invention the compound of Formula (I) is a compound of Formula (Ib). In another embodiment of the present invention the compound of Formula (I) is a compound of Formula (Ic).

In one embodiment of the present invention component B is glufosinate (B1). In this embodiment B1 can be in the form of a salt e.g the sodium salt of glufosinate (B1a) or the ammonium salt of glufosinate (B1b). Glufosinate may also be provided in an enantiomer enriched or enantiomer pure form as L-glufosinate / glufosinate-P (B1c), which can also be provided in the form of a salt e.g the sodium salt of L-glufosinate / glufosinate-P (B1d) or the ammonium salt of L-glufosinate / glufosinate-P (B1e).

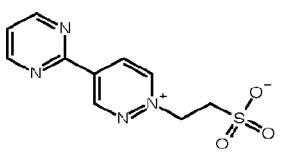
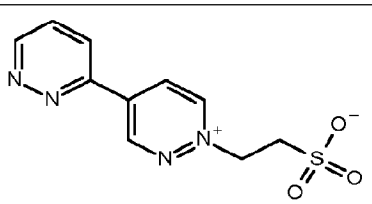
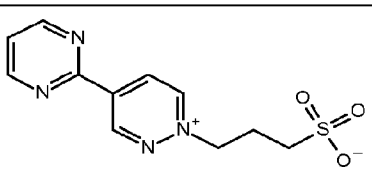
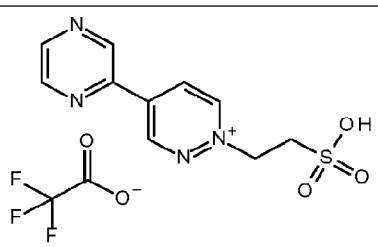
In another embodiment of the present invention component B is glyphosate (B2) (including the diammonium (B2a), isopropylammonium (B2b) and potassium (B2c) salts thereof).

In another embodiment of the present invention component B is a protoporphyrinogen oxidase-inhibiting herbicide (B3). In a more preferred embodiment the protoporphyrinogen oxidase-inhibiting herbicide is selected from the group consisting of butafenacil (B3a), carfentrazone-ethyl (B3b), epyrifenacil (B3c), flumioxazin (B3d), fomesafen (B3e), oxyfluorfen (B3f), pyraflufen-ethyl (B3g), saflufenacil (B3h), sulfentrazone (B3i), tiafenacil (B3j), trifludimoxazin (B3k), 3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydropyrimidin-1(2H)-yl)phenyl)-5-methyl-4,5-dihydroisoxazole-5-carboxylic acid ethyl ester (B3l) and ethyl 2-[[3-[[3-chloro-5-fluoro-6-[3-methyl-2,6-dioxo-4-(trifluoromethyl)pyrimidin-1-

yl]-2-pyridyl]oxy]acetate (B3m) including agrochemically acceptable salts and/or esters of all of the previously mentioned compounds.

In another embodiment of the present invention component (B) is B4 a herbicide selected from the group consisting of paraquat (B4a) (including paraquat dichloride (B4a1)), diquat (B4b) (including diquat dibromide (B4b1)) and a herbicidal pyridazine a compound of Formula (II) (B4c), or an agrochemically acceptable salt or a zwitterionic species thereof.

In a more preferred embodiment, component (B4c) is a compound of Formula (II) wherein Z is selected from the group consisting of: -C(O)OH, -C(O)OCH_3, -$S(O)_2OH$, -$C(O)OCH_2C_6H_5$, -$C(O)OC_6H_5$, and -$C(O)NHS(O)_2N(CH_3)_2$. In a further preferred embodiment, A is selected from A-I, A-II, and A-III as defined in claim 1. Particularly preferred herbicidal pyridazines are selected from the group consisting of B4c.1, B4c.2, B4c.3, B4c.4, B4c.5, B4c.6, B4c.7, B4c.8, B4c.9, B4c.10, B4c.11, B4c.12, B4c.13, B4c.14, B4c.15, B4c.16, B4c.17, B4c.18, B4c.19, B4c.20, B4c.21, B4c.22, B4c.23, B4c.24, B4c.25, B4c.28, B4c.29, B4c.30, B4c.31, B4c.32, B4c.33, B4c.34 and B4c.35.

Compound No.	Structure
B4c.1	
B4c.2	
B4c.3	
B4c.4	

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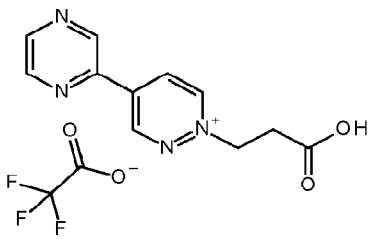
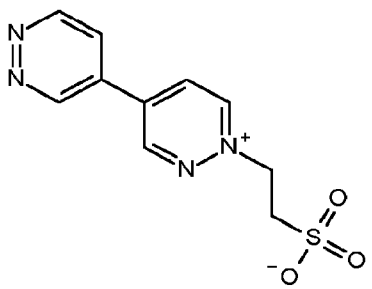
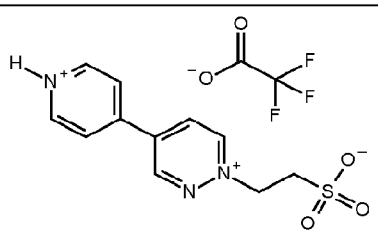
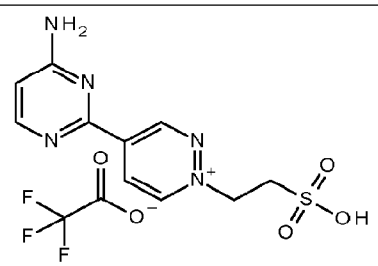
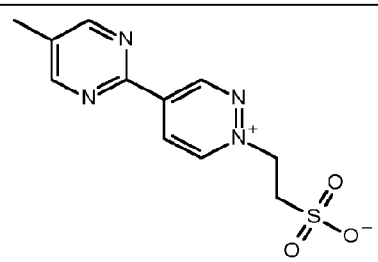
B4c.5	
B4c.6	
B4c.7	
B4c.8	
B4c.9	

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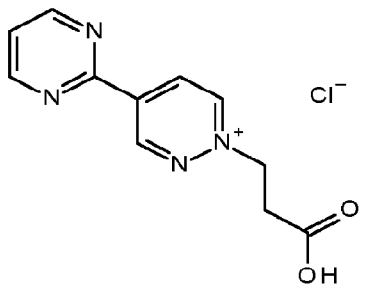
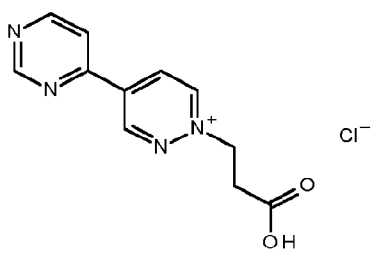
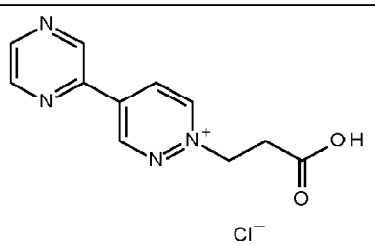
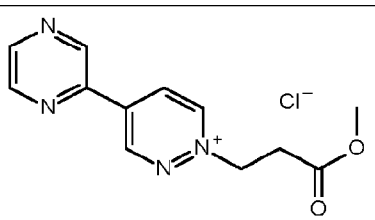
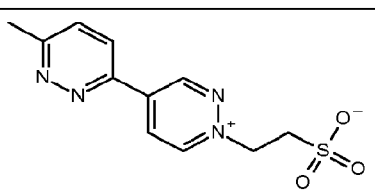
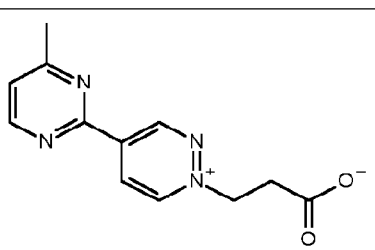
B4c.10	
B4c.11	
B4c.12	
B4c.13	
B4c.14	
B4c.15	

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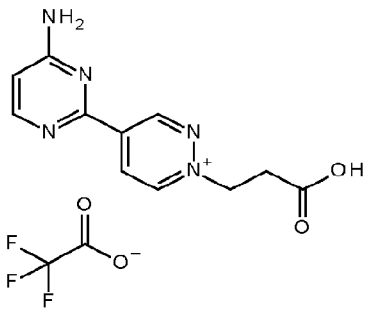
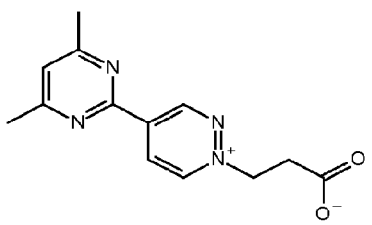
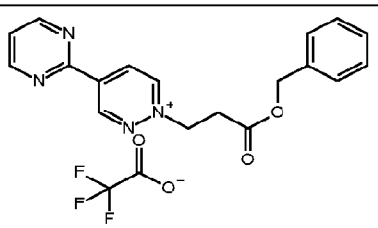
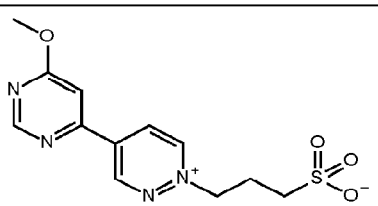
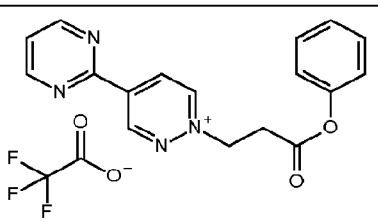
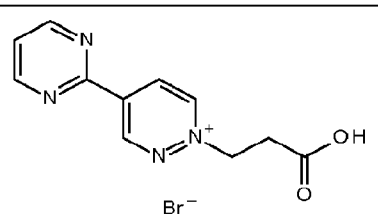
B4c.16	
B4c.17	
B4c.18	
B4c.19	
B4c.20	
B4c.21	

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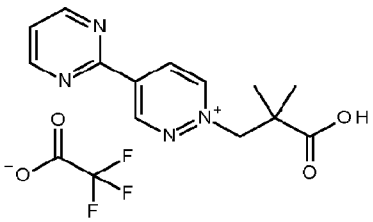
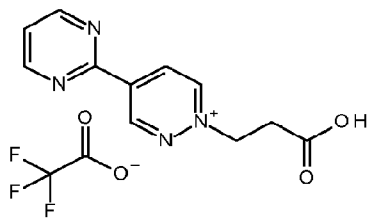
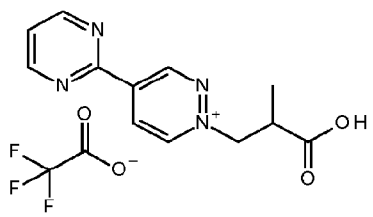
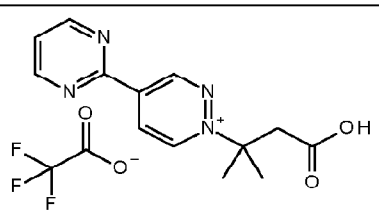
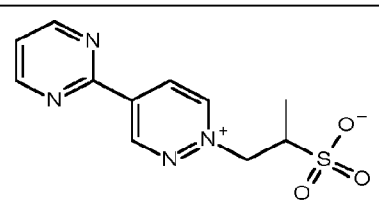
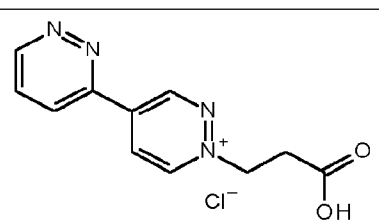
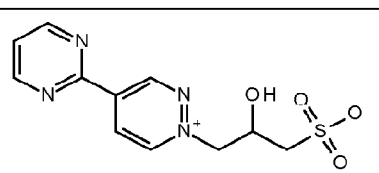
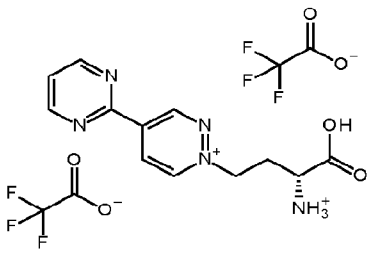
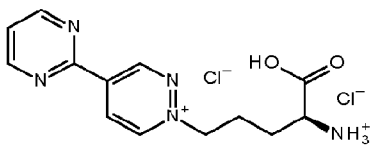
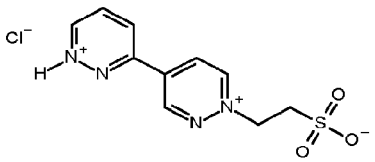
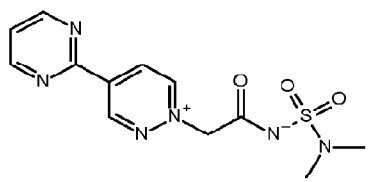
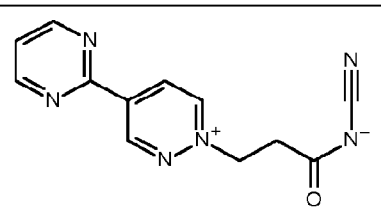
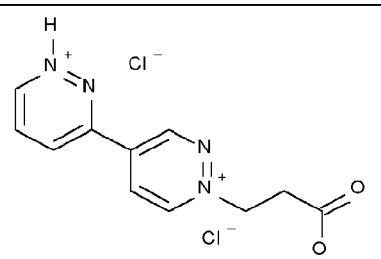
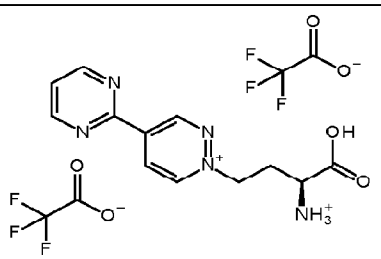
B4c.22	
B4c.23	
B4c.24	
B4c.25	
B4c.26	
B4c.27	
B4c.28	

Compound No.	Structure
B4c.29	
B4c.30	
B4c.31	
B4c.32	
B4c.33	
B4c.34	
B4c.35	

In another embodiment of the present invention the compound of Formula (I) is a compound of Formula (Ic) and component B is selected from the group consisting of glufosinate (B1), glyphosate (B2) carfentrazone-ethyl (B3b), epyrifenacil (B3c), flumioxazin (B3d), fomesafen (B3e), saflufenacil (B3h), sulfentrazone (B3i), tiafenacil (B3j), trifludimoxazin (B3k) and 3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydropyrimidin-1(2H)-yl)phenyl)-5-methyl-4,5-dihydroisoxazole-5-carboxylic acid ethyl ester (B3l) including agrochemically acceptable salts and/or esters of all of the previously mentioned compounds.

In a more preferred embodiment the present invention, the herbicidal composition comprises a mixture of components (A) and (B) as disclosed in Table 1 below.

Table 1

Mixture	A	B	Mixture	A	B	Mixture	A	B
M1.001	Ia	B1	M2.001	Ib	B1	M3.001	Ic	B1
M1.002	Ia	B1a	M2.002	Ib	B1a	M3.002	Ic	B1a
M1.003	Ia	B1b	M2.003	Ib	B1b	M3.003	Ic	B1b
M1.004	Ia	B1c	M2.004	Ib	B1c	M3.004	Ic	B1c
M1.005	Ia	B1d	M2.005	Ib	B1d	M3.005	Ic	B1d
M1.006	Ia	B1e	M2.006	Ib	B1e	M3.006	Ic	B1e
M1.007	Ia	B2	M2.007	Ib	B2	M3.007	Ic	B2
M1.008	Ia	B2a	M2.008	Ib	B2a	M3.008	Ic	B2a
M1.009	Ia	B2b	M2.009	Ib	B2b	M3.009	Ic	B2b
M1.010	Ia	B2c	M2.010	Ib	B2c	M3.010	Ic	B2c
M1.011	Ia	B3a	M2.011	Ib	B3a	M3.011	Ic	B3a
M1.012	Ia	B3b	M2.012	Ib	B3b	M3.012	Ic	B3b
M1.013	Ia	B3c	M2.013	Ib	B3c	M3.013	Ic	B3c
M1.014	Ia	B3d	M2.014	Ib	B3d	M3.014	Ic	B3d
M1.015	Ia	B3e	M2.015	Ib	B3e	M3.015	Ic	B3e
M1.016	Ia	B3f	M2.016	Ib	B3f	M3.016	Ic	B3f
M1.017	Ia	B3g	M2.017	Ib	B3g	M3.017	Ic	B3g
M1.018	Ia	B3h	M2.018	Ib	B3h	M3.018	Ic	B3h
M1.019	Ia	B3i	M2.019	Ib	B3i	M3.019	Ic	B3i
M1.020	Ia	B3j	M2.020	Ib	B3j	M3.020	Ic	B3j
M1.021	Ia	B3k	M2.021	Ib	B3k	M3.021	Ic	B3k
M1.022	Ia	B3l	M2.022	Ib	B3l	M3.022	Ic	B3l
M1.023	Ia	B3m	M2.023	Ib	B3m	M3.023	Ic	B3m
M1.024	Ia	B4a	M2.024	Ib	B4a	M3.024	Ic	B4a
M1.025	Ia	B4a1	M2.025	Ib	B4a1	M3.025	Ic	B4a1
M1.026	Ia	B4b	M2.026	Ib	B4b	M3.026	Ic	B4b
M1.027	Ia	B4b1	M2.027	Ib	B4b1	M3.027	Ic	B4b1
M1.028	Ia	B4c.1	M2.028	Ib	B4c.1	M3.028	Ic	B4c.1
M1.029	Ia	B4c.2	M2.029	Ib	B4c.2	M3.029	Ic	B4c.2
M1.030	Ia	B4c.3	M2.030	Ib	B4c.3	M3.030	Ic	B4c.3
M1.031	Ia	B4c.4	M2.031	Ib	B4c.4	M3.031	Ic	B4c.4
M1.032	Ia	B4c.5	M2.032	Ib	B4c.5	M3.032	Ic	B4c.5
M1.033	Ia	B4c.6	M2.033	Ib	B4c.6	M3.033	Ic	B4c.6
M1.034	Ia	B4c.7	M2.034	Ib	B4c.7	M3.034	Ic	B4c.7
M1.035	Ia	B4c.8	M2.035	Ib	B4c.8	M3.035	Ic	B4c.8
M1.036	Ia	B4c.9	M2.036	Ib	B4c.9	M3.036	Ic	B4c.9
M1.037	Ia	B4c.10	M2.037	Ib	B4c.10	M3.037	Ic	B4c.10
M1.038	Ia	B4c.11	M2.038	Ib	B4c.11	M3.038	Ic	B4c.11

Mixture	A	B	Mixture	A	B	Mixture	A	B
M1.039	Ia	B4c.12	M2.039	Ib	B4c.12	M3.039	Ic	B4c.12
M1.040	Ia	B4c.13	M2.040	Ib	B4c.13	M3.040	Ic	B4c.13
M1.041	Ia	B4c.14	M2.041	Ib	B4c.14	M3.041	Ic	B4c.14
M1.042	Ia	B4c.15	M2.042	Ib	B4c.15	M3.042	Ic	B4c.15
M1.043	Ia	B4c.16	M2.043	Ib	B4c.16	M3.043	Ic	B4c.16
M1.044	Ia	B4c.17	M2.044	Ib	B4c.17	M3.044	Ic	B4c.17
M1.045	Ia	B4c.18	M2.045	Ib	B4c.18	M3.045	Ic	B4c.18
M1.046	Ia	B4c.19	M2.046	Ib	B4c.19	M3.046	Ic	B4c.19
M1.047	Ia	B4c.20	M2.047	Ib	B4c.20	M3.047	Ic	B4c.20
M1.048	Ia	B4c.21	M2.048	Ib	B4c.21	M3.048	Ic	B4c.21
M1.049	Ia	B4c.22	M2.049	Ib	B4c.22	M3.049	Ic	B4c.22
M1.050	Ia	B4c.23	M2.050	Ib	B4c.23	M3.050	Ic	B4c.23
M1.051	Ia	B4c.24	M2.051	Ib	B4c.24	M3.051	Ic	B4c.24
M1.052	Ia	B4c.25	M2.052	Ib	B4c.25	M3.052	Ic	B4c.25
M1.053	Ia	B4c.26	M2.053	Ib	B4c.26	M3.053	Ic	B4c.26
M1.054	Ia	B4c.27	M2.054	Ib	B4c.27	M3.054	Ic	B4c.27
M1.055	Ia	B4c.28	M2.055	Ib	B4c.28	M3.055	Ic	B4c.28
M1.056	Ia	B4c.29	M2.056	Ib	B4c.29	M3.056	Ic	B4c.29
M1.057	Ia	B4c.30	M2.057	Ib	B4c.30	M3.057	Ic	B4c.30
M1.058	Ia	B4c.31	M2.058	Ib	B4c.31	M3.058	Ic	B4c.31
M1.059	Ia	B4c.32	M2.059	Ib	B4c.32	M3.059	Ic	B4c.32
M1.060	Ia	B4c.33	M2.060	Ib	B4c.33	M3.060	Ic	B4c.33
M1.061	Ia	B4c.34	M2.061	Ib	B4c.34	M3.061	Ic	B4c.34
M1.062	Ia	B4c.35	M2.062	Ib	B4c.35	M3.062	Ic	B4c.35

In general, the mixing ratio (by weight) of the compound of Formula (I) to the compound of component B is from 0.01:1 to 100:1, more preferably from 0.025:1 to 20:1, even more preferably from 1:30 to 20:1. Thus, the preferred ratio ranges for preferred compositions of the invention are given in Tables 2 to 4 below. * Where component (B) exists in alternative forms (e.g salt / ester) then it should be understood that these can be substituted.

Table 2: Exemplar ratio ranges for specific compositions of the invention

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M1.001	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.002	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.003	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.004	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.005	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.006	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.007	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.008	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.009	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.010	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M1.011	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.012	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.013	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.014	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.015	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.016	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.017	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.018	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.019	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.020	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.021	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.022	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.023	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.024	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.025	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.026	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.027	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.028	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.029	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.030	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.031	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.032	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.033	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.034	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.035	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.036	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.037	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.038	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.039	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.040	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.041	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.042	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.043	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M1.044	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.045	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.046	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.047	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.048	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.049	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.050	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.051	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.052	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.053	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.054	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.055	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.056	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.057	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.058	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.059	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.060	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.061	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M1.062	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Table 3: Exemplar ratio ranges for specific compositions of the invention

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M2.001	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.002	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.003	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.004	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.005	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.006	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.007	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.008	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.009	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.010	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M2.011	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.012	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.013	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.014	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.015	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.016	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.017	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.018	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.019	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.020	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.021	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.022	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.023	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.024	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.025	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.026	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.027	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.028	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.029	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.030	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.031	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.032	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.033	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.034	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.035	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.036	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.037	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.038	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.039	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.040	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.041	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.042	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.043	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M2.044	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.045	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.046	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.047	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.048	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.049	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.050	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.051	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.052	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.053	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.054	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.055	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.056	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.057	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.058	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.059	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.060	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.061	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M2.062	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Table 4: Exemplar ratio ranges for specific compositions of the invention

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M3.001	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.002	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.003	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.004	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.005	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.006	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.007	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.008	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.009	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.010	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M3.011	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.012	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.013	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.014	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.015	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.016	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.017	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.018	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.019	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.020	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.021	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.022	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.023	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.024	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.025	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.026	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.027	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.028	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.029	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.030	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.031	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.032	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.033	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.034	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.035	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.036	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.037	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.038	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.039	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.040	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.041	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.042	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.043	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

Mixture	Typical Weight Ratio	Preferred Weight Ratio	More Preferred Weight Ratio
M3.044	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.045	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.046	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.047	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.048	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.049	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.050	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.051	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.052	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.053	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.054	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.055	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.056	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.057	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.058	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.059	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.060	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.061	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1
M3.062	0.01:1 to 100:1	0.025:1 to 20:1	1:30 to 16:1

The skilled person will appreciate that the most preferred ratio range of A:B for any one of composition numbers M1.001 to M1.062, M2.001 to M2.062 and M3.001 to M3.062 described in Tables 2, 3 and 4 above is likely to be from 1:30 to 16:1, and that each ratio can be optimised depending on the mixture partners. Thus approximate ratios of 1:30, 1:20, 1:10, 1:5, 1:4, 1:3, 1:2, 1:1, 2:1, 3:1, 4:1, 5:1, 10:1, 20:1 30:1 are also envisaged.

It should be further understood that the compositions of the present invention may further comprise one or more additional herbicidal active ingredient(s), thus providing 3-way, 4-way or even 5-way or more mixes. Thus, the composition of the present invention may contain more than one (B) component, for example two, three or four (B) components. For example, the composition may comprise (i) a compound of Formula I (especially Ic), (ii) B1 (or B1a, B1b, B1c, B1d or B1e) and (iii) B3 (e.g B3a, B3b, B3c, B3d, B3e, B3f, B3g, B3h, B3i, B3j, B3k, B3l and B3m). Alternatively, the composition may comprise (i) a compound of Formula (I), (ii) B2 (or B2a, B2b, B2c) and (iii) B3 (e.g B3a, B3b, B3c, B3d, B3e, B3f, B3g, B3h, B3i,

B3j, B3k, B3l and B3m). In another embodiment of the invention the herbicidal composition further comprises one or more additional herbicidal component(s) (C). Component (C) can, for example, be an auxin herbicide (e.g 2,4-D or dicamba including acceptable salts thereof), an HPPD-inhibiting herbicide, an ACCase-inhibiting herbicide (e.g clethodim) or a VLCFA herbicide, especially those selected from the group consisting of acetochlor, metolachlor and *S*-metolachlor and pyroxasulfone, preferably *S*-metolachlor.

According to another aspect of the present invention there is provided a method of controlling weeds at a locus comprising applying to the locus of a weed controlling amount of a composition of the present invention.

In another embodiment of the present invention there is provided a method of selectively controlling weeds at a locus comprising crop plants and weeds, said method comprising applying to the locus a weed controlling amount of a composition according to the invention. In a preferred embodiment the crop plant is soybean. In this context, weeds could include, for example, volunteer maize (corn), including genetically-modified maize.

When applied in a composition of the invention component (A) is typically applied at a rate of 25 to 2000 g ha, more particularly 25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500, 750, 800, 1000, 1250, 1500, 1800, or 2000 g/ha. Such rates of component (A) are applied typically in association with 5 to 2000g/ha of component B, and more specifically in association with 5, 10, 15, 20, 25, 50, 75, 100, 120, 125, 140, 150, 200, 240, 250, 300, 400, 480, 500, 750, 1000, 1250, 1500, 1800, or 2000g/ha of component (B). The Examples described herein illustrate but do not limit the range of rates of components A and B that may be employed in the invention.

The amount of a composition according to the invention to be applied, will depend on various factors, such as the compounds employed; the subject of the treatment, such as, for example plants, soil or seeds; the type of treatment, such as, for example spraying, dusting or seed dressing; or the application time. In agricultural practice the application rates of the composition according to the invention depend on the type of effect desired, and typically range from 30 to 4000 g of total composition per hectare, and more commonly between 30 and 2000g/ha. The application is generally made by spraying the composition, typically by tractor mounted sprayer for large areas, but other methods such as dusting (for powders), drip or drench can also be used.

When active ingredients are combined, the activity to be expected (E) for any given active ingredient combination obeys the so-called Colby Formula and can be calculated as follows (Colby, S.R., Calculating synergistic and antagonistic responses of herbicide combination, Weeds, Vol. 15, pages 20-22; 1967):

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

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

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

According to Colby, the expected action of active ingredients A +B using p + q ppm of active ingredient is represented by the following formula:

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

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

Accordingly, the combination of the present invention takes advantage of any additive herbicidal activity, and certain embodiments may even exhibit a synergistic effect. This occurs whenever the action of an active ingredient combination is greater than the sum of the actions of the individual components.

Combinations of the invention may also provide for an extended spectrum of activity in comparison to that obtained by each individual component, and/or permit the use of lower rates of the individual components when used in combination to that when used alone, in order to mediate effective herbicidal activity.

In addition, it is also possible that the composition of the invention may show increased crop tolerance, when compared with the effect of the compound A alone. This occurs when the action of an active ingredient combination is less damaging to a useful crop than the action of one of the active ingredients alone.

Throughout this document the expression “composition” should be interpreted as meaning the various mixtures or combinations of components (A) and (B), for example in a single “ready-mix” form, in a combined spray mixture composed from separate formulations of the single active ingredient components, such as a “tank-mix”, and in a combined use of the single active ingredients when applied in a sequential manner, i.e. one after the other with a reasonably short period, such as a few hours or days. The order of applying the components (A) and (B) is not essential for working the present invention.

The term "herbicide" as used herein means a compound that controls or modifies the growth of plants. The term "herbicidally effective amount" means the quantity of such a compound or combination of such compounds that is capable of producing a controlling or modifying effect on the growth of plants. Controlling or modifying effects include all deviation from natural development, for example killing, retardation, leaf burn, albinism, dwarfing and the like.

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

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

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

The term "safener" as used herein means a chemical that when used in combination with a herbicide reduces the undesirable effects of the herbicide on non-target organisms, for example, a safener protects crops from injury by herbicides but does not prevent the herbicide from killing the weeds.

Crops of useful plants in which the composition according to the invention can be used include perennial and annual crops, such as berry plants for example blackberries, blueberries, cranberries, raspberries and strawberries; cereals for example barley, maize (corn), millet, oats, rice, rye, sorghum triticale and wheat; fibre plants for example cotton, flax, hemp, jute and sisal; field crops for example sugar and fodder beet, coffee, hops, mustard, oilseed rape (canola), poppy, sugar cane, sunflower, tea and tobacco; fruit trees for example apple, apricot, avocado, banana, cherry, citrus, nectarine, peach, pear and plum; grasses for example Bermuda grass, bluegrass, bentgrass, centipede grass, fescue, ryegrass, St. Augustine grass and Zoysia grass; herbs such as basil, borage, chives, coriander, lavender, lovage, mint, oregano, parsley, rosemary, sage and thyme; legumes for example beans, lentils, peas and soya beans; nuts for example almond, cashew, ground nut, hazelnut, peanut, pecan, pistachio and walnut; palms for example oil palm; ornamentals for example flowers, shrubs and trees; other trees, for example cacao, coconut, olive and rubber; vegetables for example asparagus, aubergine, broccoli, cabbage, carrot, cucumber, garlic, lettuce, marrow, melon, okra, onion, pepper, potato, pumpkin, rhubarb, spinach and tomato; and vines for example grapes. However, the compositions of the present invention are particularly useful in controlling weeds in cotton or soybean crops, especially soybean crops.

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

Crops are to be understood as also including those crops which have been rendered tolerant to herbicides or classes of herbicides (e.g. ALS-, GS-, EPSPS-, PPO-, ACCase- and HPPD-inhibitors) by conventional methods of breeding or by genetic engineering. An example of a crop that has been rendered tolerant to imidazolinones, e.g. imazamox, by conventional methods of breeding is Clearfield® summer rape (canola). Examples of crops that have been rendered tolerant to herbicides by genetic engineering methods include e.g. glyphosate- and glufosinate-resistant varieties commercially available under the trade names RoundupReady® and LibertyLink®. Examples of crops that have been rendered tolerant to PPO inhibiting herbicides by genetic engineering are known in the art, for example as described in WO95/34659. Examples of crops that have been rendered tolerant to HPPD inhibiting herbicides by genetic engineering are known in the art, for example as described in WO2011/063411, WO2011/063413, WO2012/082542, WO2012/082548, WO2010/085705 and WO2011/068567. The compositions of the present invention comprising glufosinate and/or glyphosate have potential utility in glyphosate- and glufosinate-resistant crops respectively, especially engineered soybean crops. The compositions of the present invention comprising a PPO-inhibiting herbicide have potential utility in PPO-resistant crops, especially engineered soybean crops. The compositions of the present invention, especially any comprising 2,4-D (or an agrochemically acceptable ester or salt thereof), have potential utility in crops which are have been engineered to tolerate 2,4-D herbicides, for example Enlist™ crops, especially EnlistE3™ Soybeans. The compositions of the present invention, especially any comprising dicamba (or an agrochemically acceptable ester or salt thereof) have potential utility in crops which are have been engineered to tolerate dicamba herbicides, for example Roundup Ready 2 Xtend™ Soybeans.

The compositions of the invention can typically be used to control a wide variety of monocotyledonous and dicotyledonous weed species in the crop. The compositions of the present invention provide particular good control of *Alopecurus sp.* (e.g *Alopecurus myosuroides (ALOMY)), Avena sp. Digitaria sp.* (e.g *Digitaria sanguinalis* (DIGSA), *Digitaria insularis* (TRCIN)), *Echinochloa sp.* (e.g *Echinochloa crus-galli* (ECHCG)), *Eleusine sp. (e.g Eleusine indica* (ELEIN)), *Lolium sp.*, *Setaria sp.* (e.g *Setaria faberi* (SETFA)) and *Sorghum sp.* (e.g *Sorghum halepense* (SORHA). In all aspects of the invention, in any particular embodiment, the weeds, e.g. to be controlled and/or growth-inhibited, may be monocotyledonous or dicotyledonous weeds, which are tolerant or resistant to one or more

herbicides for example, HPPD inhibitor herbicides such as mesotrione, PSII inhibitor herbicides such as atrazine or EPSPS inhibitors such as glyphosate.

Similarly compositions of the invention (which includes those comprising one or more additional pesticide(s)) can further include one or more safeners. In particular, the following safeners are especially preferred: benoxacor, cloquintocet (including cloquintocet-mexyl), cyprosulfamide, dichlormid, fenchlorazole (including fenchlorazole-ethyl), fenclorim, fluxofenim, furilazole, isoxadifen (including isoxadifen-ethyl), mefenpyr (including mefenpyr-diethyl), metcamifen and oxabetrinil.

The compositions of the invention can be applied before or after planting of the crops, before weeds emerge (pre-emergence application) or after weeds emerge (post-emergence application). Where a safener is combined with mixtures of the invention, it is preferred that the mixing ratio of compound of Formula (I) to safener is from 100:1 to 1:10, especially from 20:1 to 1:1.

It is possible that the safener and the compositions of the invention are applied simultaneously. For example, the safener and the composition of the invention might be applied to the locus pre-emergence or might be applied to the crop post-emergence. It is also possible that the safener and the composition of the invention are applied sequentially. For example, the safener might be applied before sowing the seeds as a seed treatment and the composition of the invention might be applied to the locus pre-emergence or might be applied to the crop post-emergence.

The compositions of the invention can advantageously be used in formulations as described, for example, in WO2015/197468.

BIOLOGICAL EFFICACY

B1 Post-emergence efficacy

The efficacy of various compositions of the present invention were tested against plants including the following species: *Amaranthus retroflexus* (AMARE) *Cenchrus echinatus (CCHEC), Echinochloa crus-gali* (ECHCG), *Eleusine indica* (ELEIN), *Setaria faberi* (SETFA) *Sorghum halapense* (SORHA) *and Digitaria insularis* (TRCIN). The compositions are applied post-emergence, and the tests evaluated at certain days-after-application (DAA) as indicated. The tests were evaluated (100 = total damage to plant; 0 = no damage to plant), and the results are shown below in tables B1 to B13.

Table B1: Combination of Compound of Formula Ic and B1c (glufosinate ammonium).

Treatment	TRCIN *Digitaria insularis* – POST - 14DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	100	5		
B1c	600	60		
	100+600	80	62	18

Table B2: Combination of Compound of Formula Ic and B2c (potassium glyphosate).

Treatment	CCHEC *Cenchrus echinatus* – POST – 14DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	3	50		
	6	72		
	12.5	79		
	25	79		
B2c	125	1		
	3+125	76	51	25
	6+125	86	72	14
	12.5+125	85	79	6
	25+125	90	79	11

Table B3: Combination of Compound of Formula Ic and B3c (saflufenacil).

Treatment	ELEIN *Eleusine indica* – POST - 15DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	12.5	72		
	25	79		
B3c	25	16		
	12.5+25	81	76	5
	25+25	87	82	5

Table B4: Combination of Compound of Formula Ic and B4c.27.

Treatment	SETFA *Setaria faberi* – POST - 15DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	3	10		
	6	29		
B4c.27	37.5	37		
	3+37.5	82	43	39
	6+37.5	76	55	21

Table B5: Combination of Compound of Formula Ic and B3b (carfentrazone-ethyl).

Treatment	AMARE *Amaranthus retroflexus* – POST - 13DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	7.5	4		
B3b	3.75	75		
	7.5+3.75	100	76	24

Table B6: Combination of Compound of Formula Ic and B3c (epyrifenacil).

Treatment	TRCIN *Digitaria insularis* – POST - 16DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	3.125	15		
B3c	1	33		
	3.125 + 1	80	43	37

Table B7: Combination of Compound of Formula Ic and B3d (flumioxazin).

Treatment	ECHCG *Echinochloa crus-gali* – POST - 20DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	3.125	14		
	25	87		
B3d	4	8		
	15	49		
	3.125 + 4	55	20	35
	25 + 15	99	93	6

Table B8: Combination of Compound of Formula Ic and B3e (fomesafen).

Treatment	TRCIN *Digitaria insularis* – POST - 14DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	0.47	0		
	0.94	0		
	1.88	11		
B3e	7.5	15		
	15	20		
	30	35		
	0.47 + 7.5	28	15	13
	0.94 + 15	33	20	13
	1.88 + 30	53	42	11

Table B9: Combination of Compound of Formula Ic and B3i (sulfentrazone).

Treatment	SORHA *Sorghum halapense* – POST - 15DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	3.125	28		
	6.25	45		
	12.5	75		
B3i	60	13		
	3.125 + 60	18	37	19
	6.25 + 60	33	52	19
	12.5 + 60	58	78	21

Table B10: Combination of Compound of Formula Ic and B3j (tiafenacil).

Treatment	ECHCG *Echinochloa crus-gali* – POST - 15DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	3.125	45		
	6.25	50		
	12.5	60		
B3j	8	40		
	16	55		
	3.125 + 8	23	67	45
	6.25 + 8	28	70	43
	12.5 + 8	65	76	11
	3.125 + 16	35	75	40
	6.25 + 16	64	78	14
	12.5 + 16	63	82	20

Table B11: Combination of Compound of Formula Ic and B3k (trifludimoxazin).

Treatment	ECHCG *Echinochloa crus-gali* – POST - 20DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	3.125	14		
B3k	4	38		
	30	31		
	3.125 + 4	70	46	24
	3.125 + 30	55	41	14

Table B12: Combination of Compound of Formula Ic and B3l (3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydropyrimidin-1(2H)-yl)phenyl)-5-methyl-4,5-dihydroisoxazole-5-carboxylic acid ethyl ester).

Treatment	ECHCG *Echinochloa crus-gali* – POST - 13DAA			
	Rate g/ha	Observed	Expected	Difference
Ic	0.94	3		
	1.88	24		
	7.5	54		
B3l	0.94	33		
	3.75	73		
	0.94 + 0.94	44	34	10

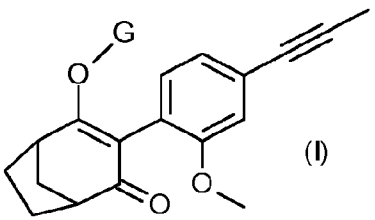
	1.88 + 0.94	59	49	10
	7.5 + 3.75	99	87	11

Table B13: Combination of Compound of Formula Ic and B4b1 (diquat dibromide).

Treatment	**ECHCG *Echinochloa crus-gali* – POST - 15DAA**			
	Rate g/ha	Observed	Expected	Difference
Ic	3.125	45		
	6.25	50		
	12.5	60		
B4b1	60	43		
	3.125 + 60	65	68	3
	6.25 + 60	58	71	14
	12.5 + 60	63	77	15

CLAIMS

1. A herbicidal composition comprising (A) a herbicidally effective amount of a compound of Formula (I)



(I)

wherein G is selected from the group consisting of hydrogen, $-C(O)CH_3$ and $-C(O)OCH_3$; and

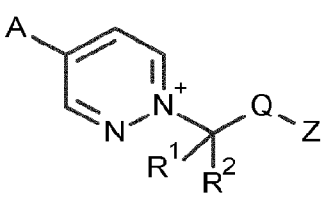
(B) at least one herbicide, or agrochemically acceptable ester or salt thereof, selected from the group consisting of:

B1 glufosinate;

B2 glyphosate;

B3 a protoporphyrinogen oxidase (PPO)-inhibiting herbicide; and

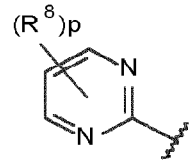
B4 a herbicide selected from the group consisting of paraquat (B4a), diquat (B4b) and a herbicidal pyridazine compound of Formula (II) (B4c)



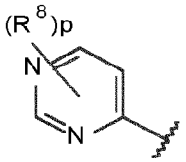
(II),

wherein:

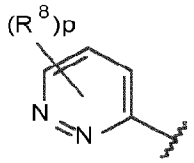
A is 6-membered heteroaryl selected from the group consisting of:



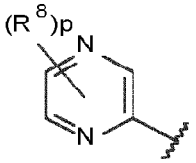
A-I



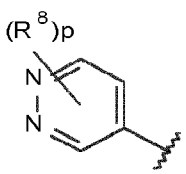
A-II



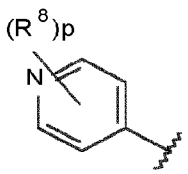
A-III



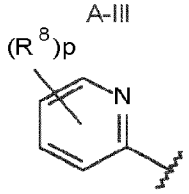
A-IV



A-V



A-VI



A-VII

wherein the jagged line defines the point of attachment to the remaining part of a compound of Formula (I),

p is 0, 1 or 2, and

each R^8 is independently selected from the group consisting of NH_2, methyl, and methoxy;

R^1 and R^2 are each independently hydrogen or methyl;

Q is $(CR^{1a}R^{2b})_m$;

m is 0, 1, or 2;

each R^{1a} and R^{2b} are independently selected from the group consisting of hydrogen, hydroxy, -methyl, and NH_2;

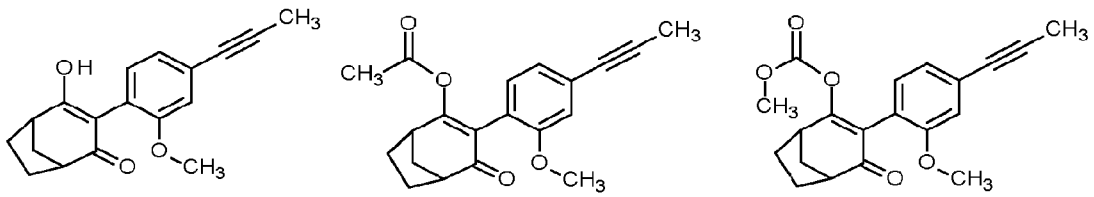
Z is $–S(O)_2OR^{10}$, $-C(O)OR^{10}$, $-C(O)NHS(O)_2R^{12}$ and –C(O)NHCN;

R^{10} is hydrogen, methyl, benzyl or phenyl;

and R^{12} is methyl, $-NH_2$, $-N(CH_3)_2$, or $-NHCH_3$

or a zwitterionic species thereof.

2. A herbicidal composition according to claim 1, wherein the compound of Formula (I) is selected from the group consisting of Formula (Ia), (Ib) and (Ic).



(Ia) (Ib) (Ic)

3. A herbicidal composition according to claim 1 or claim 2, wherein the compound of Formula (I) is Formula (Ic).

4. A herbicidal composition according to any one of the previous claims, wherein component (B) is selected from the group consisting of glufosinate (B1), the sodium salt of glufosinate (B1a), the ammonium salt of glufosinate (B1b), L-glufosinate (B1c), the sodium salt of L-glufosinate (B1d) and the ammonium salt of L-glufosinate (B1e).

5. A herbicidal composition according to any one of claims 1 to 3, wherein component (B) is selected from the group consisting of glyphosate (B2) the diammonium salt of glyphosate (B2a), the isopropylammonium salt of glyphosate (B2b) and the potassium salt of glyphosate (B2c).

6. A herbicidal composition according to any one of claims 1 to 3, wherein component (B) is a protoporphyrinogen oxidase-inhibiting herbicide selected from the group consisting of butafenacil (B3a), carfentrazone-ethyl (B3b), epyrifenacil (B3c), flumioxazin (B3d), fomesafen (B3e), oxyfluorfen (B3f), pyraflufen-ethyl (B3g), saflufenacil (B3h), sulfentrazone (B3i), tiafenacil (B3j), trifludimoxazin (B3k), 3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydropyrimidin-1(2H)-yl)phenyl)-5-methyl-4,5-dihydroisoxazole-5-carboxylic acid ethyl ester (B3l) and ethyl 2-[[3-[[3-chloro-5-fluoro-6-[3-methyl-2,6-dioxo-4-(trifluoromethyl)pyrimidin-1-yl]-2-pyridyl]oxy]acetate (B3m) including agrochemically acceptable salts and/or esters of all of the previously mentioned compounds.

7. A herbicidal composition according to any one of claims 1 to 3, wherein component (B) is a herbicide selected from the group consisting of paraquat (B4a), diquat (B4b) and a herbicidal pyridazine selected from the group consisting of B4c.1, B4c.2, B4c.3, B4c.4, B4c.5, B4c.6, B4c.7, B4c.8, B4c.9, B4c.10, B4c.11, B4c.12, B4c.13, B4c.14, B4c.15, B4c.16, B4c.17, B4c.18, B4c.19, B4c.20, B4c.21, B4c.22, B4c.23, B4c.24, B4c.25, B4c.28, B4c.29, B4c.30, B4c.31, B4c.32, B4c.33, B4c.34 and B4c.35.

8. A herbicidal composition according to any one of the previous claims, wherein the composition further comprises an additional herbicidal component (C).

9. A herbicidal composition according to claim 8, wherein component (C) is a herbicide selected from acetochlor, metolachlor, *S*-metolachlor and pyroxasulfone.

10. A method of controlling weeds at a locus comprising applying to the locus of a weed controlling amount of a herbicidal composition according to any one of claims 1 to 9.

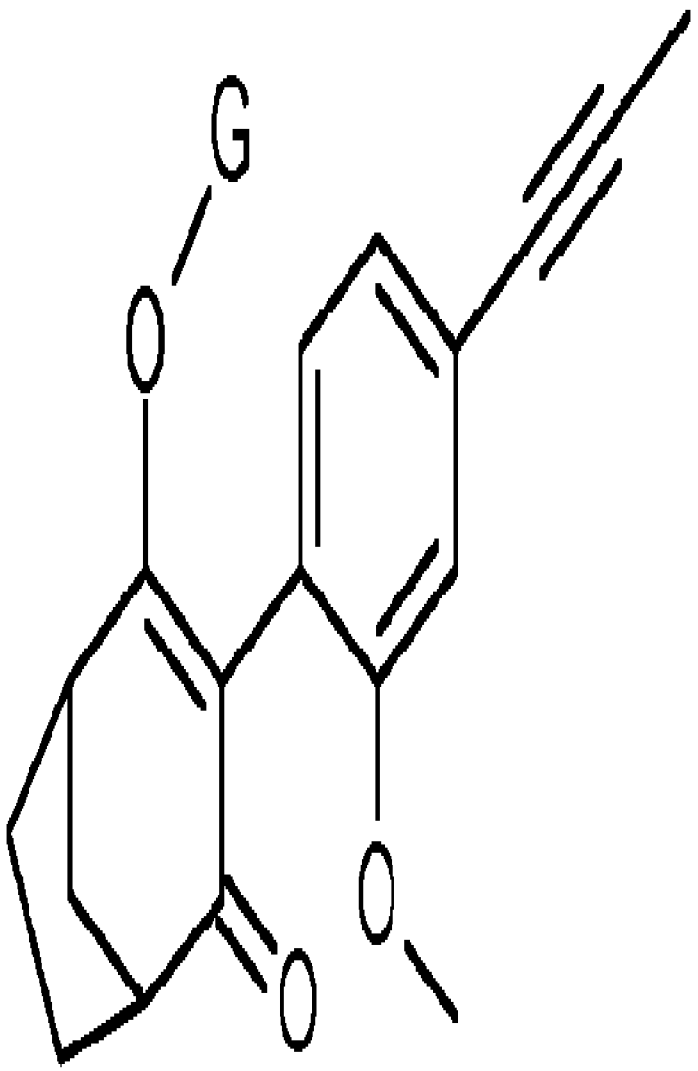
11. A method of selectively controlling weeds at a locus comprising crop plants and weeds, said method comprising applying to the locus a weed controlling amount of a herbicidal composition according to any one of claims 1 to 9.

12. A method according to claim 11, wherein the crop plant comprises a herbicide tolerance trait.

13. A method according to claim 12, wherein the wherein the crop plant comprises a herbicide tolerance trait which provides tolerance to component (B).

14. A method according to claim 12 or 13, wherein the crop plant is soybean or cotton.

15. A method according to any one of claims 10 to 14, wherein the weeds comprise species selected from the group consisting of *Alopecurus sp., Avena sp.*, *Digitaria sp.*, *Echinochloa sp.*, *Eleusine sp., Lolium sp.*, *Setaria sp.* and *Sorghum sp.*



(I)