(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
26 June 2025 (26.06.2025)

WIPO | PCT

(10) International Publication Number
WO 2025/132266 A1

(51) International Patent Classification:
A01N 43/80 (2006.01) *A01P 13/02* (2006.01)
A01P 13/00 (2006.01)

(21) International Application Number:
PCT/EP2024/086659

(22) International Filing Date:
16 December 2024 (16.12.2024)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
23220174.9 22 December 2023 (22.12.2023) EP
24155124.1 31 January 2024 (31.01.2024) EP

(71) Applicant: **BAYER AKTIENGESELLSCHAFT** [DE/DE]; Kaiser-Wilhelm-Allee 1, 51373 Leverkusen (DE).

(72) Inventors: **FRACKENPOHL, Jens**; c/o BAYER AKTIENGESELLSCHAFT, Kaiser-Wilhelm-Allee 1, 51373 Leerkusen (DE). **HELMKE, Hendrik**; c/o BAYER AKTIENGESELLSCHAFT, Kaiser-Wilhelm-Allee 1, 51373 Leverkusen (DE). **HAAF, Klaus**; c/o BAYER AKTIENGESELLSCHAFT, Kaiser-Wilhelm-Allee 1, 51373 Leverkusen (DE). **LEHR, Stefan**; c/o BAYER AKTIENGESELLSCHAFT, Kaiser-Wilhelm-Allee 1, 51373 Leverkusen (DE). **REINGRUBER, Anna**; c/o BAYER AKTIENGESELLSCHAFT, Kaiser-Wilhelm-Allee 1, 51373 Leverkusen (DE). **GATZWEILER, Elmar**; c/o BAYER AKTIENGESELLSCHAFT, Kaiser-Wilhelm-Allee 1, 51373 Leverkusen (DE).

(74) Agent: **BIP PATENTS**; c/o Bayer Intellectual Property GmbH, Alfred-Nobel-Straße 50, 40789 Monheim am Rhein (DE).

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

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, 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).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:
— *with international search report (Art. 21(3))*

(54) Title: HERBICIDAL COMBINATIONS AND COMPOSITIONS

(57) Abstract: The invention relates to novel herbicidal active compound combinations and/or compositions which comprise substituted isoxazoline-carboxamides or agrochemical acceptable salts thereof and substituted N-phenyluraciles. They can be used with particularly good results for the control of weeds in various crops of useful plants.

WO 2025/132266 A1

Herbicidal combinations and compositions

The invention relates to novel herbicidal active compound combinations and/or compositions which comprise substituted isoxazoline-carboxamides or agrochemical acceptable salts thereof and substituted N-phenyluraciles. They can be used with particularly good results for the control of weeds in various crops of useful plants.

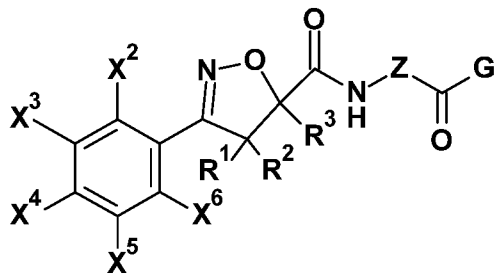
Substituted N-phenyluracile are already known as effective herbicides e.g. from the patent applications/patents with the publication number WO 2021/139482 A1, WO 2010/145992 A1, WO 2010/038953 A1, WO 2016/095768 A1, WO 2021/143677 A1, WO 2023/285222 A1, US 6403534 B1, WO 2023/228935 A1, US 6403534 B1, WO 2023/228935 A1, EP 4353082 A1, WO 2023/197899 A1. The compounds can be used either non-selective or selective depending on the timing and crops. However, the activity and compatibility with crop plants are not entirely satisfactory under all conditions.

Substituted isoxazoline-carboxamides are already known as effective herbicides from e.g. WO 2018/228985 A1 and WO 2019/145245 A1. The compounds can be used either non-selective or selective depending on the timing and crops. However, the activity and compatibility with crop plants are not entirely satisfactory under all conditions.

Surprisingly, it has now been found that certain substituted isoxazoline-carboxamides, when used together with substituted N-phenyluraciles described below, can be used particularly advantageously as broad-spectrum combination preparations for the control of weeds in crops of useful plants, for example, in cereals, maize and soybean excersing a significant synergistic effect.

The invention provides herbicidal combinations comprising

(a) substituted isoxazoline-carboxamides of the formula **(I)** or agrochemical acceptable salts thereof



(I)

in which

G represents OR^4 or NR^7R^8

R^1 and R^2 each represent hydrogen;

R^3 represents (C_1-C_5)-alkyl, (C_3-C_6)-cycloalkyl, (C_2-C_5)-alkenyl, (C_2-C_5)-alkinyl or (C_1-C_5)-alkoxy each optionally substitued "m" times by substituents from the group consisting of halogen, cyano, (C_1-C_5)-alkoxy and hydroxy;

R^4 represents hydrogen,
or
represents (C_1-C_{12})-alkyl, (C_3-C_7)-cycloalkyl, (C_3-C_7)-cycloalkyl-(C_1-C_8)-alkyl, (C_2-C_8)-alkenyl, (C_5-C_6)-cycloalkenyl, (C_1-C_4)-alkylphenyl or (C_2-C_8)-alkinyl each optionally substitued "m" times by substituents from the group consisting of halogen, cyano, (C_1-C_6)-alkoxy, (C_1-C_6)-alkoxycarbonyl, hydroxy, $S(O)_n R^5$;

R^5 represents (C_1-C_8)-alkyl, (C_2-C_8)-alkenyl, (C_3-C_6)-cycloalkyl, benzyl, $CON((C_1$-$C_3)$-alkyl)$_2$ or (C_1-C_8)-alkyl-C(O)-(C_1-C_8)-alkyl each optionally substitued "m" times by substituents from the group consisting of halogen and cyano;

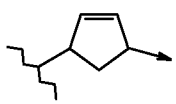
R^6 represents hydrogen,
or
represents (C_1-C_8)-alkyl, (C_3-C_6)-cycloalkyl, (C_3-C_8)-alkenyl or (C_3-C_8)-alkinyl each optionally substitued "m" times by substituents from the group consisting of halogen, cyano und (C_1-C_2)-alkoxy;

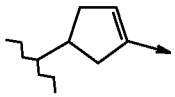
R^7, R^8 independently of each other represent hydrogen, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, $N((C_1$-$C_3)$-alkyl)$_2$, $S(O)_n R^5$,

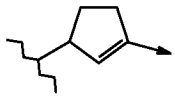
or

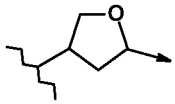
R^7 and R^8 together with the nitrogen atom to which they are attached form a saturated or partially or fully unsaturated five-, six-, or seven-membered ring which may contain apart from the nitrogen ataom "r" carbon atoms, "o" oxygen atoms and is optionally substitued "m" times by substituents from the group consisting of halogen, $(C_1$-$C_6)$-alkyl, halogen-$(C_1$-$C_6)$-alkyl, oxo, CO_2R^6;

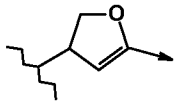
Z represents Z-1 to Z-8:

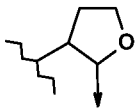

Z-1

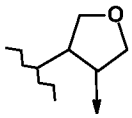

Z-2

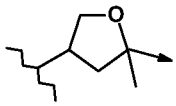

Z-3


Z-4


Z-5


Z-6


Z-7


Z-8

whereas the arrow represents the bonding to the group CO-G of the formula **(I)**;

X^2, X^4 and X^6 independently of one another represent hydrogen or fluorine;

X^3 and X^5 independently of one another represent hydrogen, chlorine, cyano or fluorine;

or

represents $(C_1$-$C_3)$-alkyl, $(C_1$-$C_3)$-alkoxy each optionally substitued "m" times by substituents from the group consisting of fluorine or chlorine;

m represents 0, 1, 2, 3, 4 or 5;

n represents 0, 1 or 2;

o represents 0, 1 or 2;

r represents 3, 4, 5 or 6;

and

(b) one or more of B1 to B35 specified in table 1 below:

Table 1

(b)	Structure Name	CAS-RN/Common Name	Publication
B1	ethyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-5-methyl-4,5-dihydro-1,2-oxazole-5-carboxylate	1949837-17-5/ Isoxafenacil	WO 2016/095768 A1
B2	3-[2-chloro-5-(3,5-dimethyl-2,6-dioxo-4-sulfanylidene-1,3,5-triazinan-1-yl)-4-fluorophenyl]-5-methyl-4,5-dihydro-1,2-oxazole-5-carboxylic acid	2558200-03-4	WO 2021/143677 A1
B3	methyl 2-{[(E)-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]benzylidene}amino]oxy}propanoate	2669111-31-1	WO 2021/139482 A1
B4	methyl-(2R)-2-{[(E)-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]benzylidene}amino]oxy}propanoate	2759011-88-4/ Flufenoximacil	WO 2021/139482 A1
B5	methyl-(2S)-2-{[(E)-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]benzylidene}amino]oxy}propanoate		WO 2021/139482 A1 EP 4353082 A1
B6	Dihydro-1,5-dimethyl-6-thioxo-3-[2,2,7-trifluoro-3,4-dihydro-3-oxo-4-(2-propyn-1-yl)-2*H*-1,4-benzoxazin-6-yl]-1,3,5-triazine-2,4(1*H*,3*H*)-dione	1258836-72-4/ Trifludimoxazin	WO 2010/145992 A1
B7	methyl N-[2-[[2-chloro-5-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-	1220411-29-9/	WO 2010/038953 A2

(b)	Structure Name	CAS-RN/Common Name	Publication
	1(2H)-pyrimidinyl]-4-fluorophenyl]thio]-1-oxopropyl]-β-alaninate	Tiafenacil	
B8	methyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylate	2669819-07-0	WO 2021/143677 A1
B9	ethyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylate	2669819-12-7	WO 2021/143677 A1
B10	methyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-6-methyl-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylate	2669821-71-8	WO 2021/143677 A1
B11	3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-6-methyl-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylic acid	3000495-74-6	WO 2023/197899 A1
B12	3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-	2669819-11-6	WO 2021/143677 A1

(b)	Structure Name	CAS-RN/Common Name	Publication
	dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylic acid		
B13	ethyl [(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-46-5	WO 2023/285222 A1
B14	[(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetic acid	2892260-49-8	WO 2023/285222 A1
B15	ethyl (2-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)acetate	2892260-47-6	WO 2023/285222 A1
B16	(2-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)acetic acid	2892260-48-7	WO 2023/285222 A1
B17	ethyl (2-{2-chloro-4-fluoro-5-[4-(1-fluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate	2892260-50-1	WO 2023/285222 A1
B18	2-methoxyethyl [(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-51-2	WO 2023/285222 A1
B19	tetrahydrofuran-2-ylmethyl [(3-{2-	2892260-52-3	WO 2023/285222 A1

(b)	Structure Name	CAS-RN/Common Name	Publication
	chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate		
B20	cyanomethyl [(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-53-4	WO 2023/285222 A1
B21	methyl (2-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)(methoxy)acetate	2892260-54-5	WO 2023/285222 A1
B22	methyl (2-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)(methoxy)acetate	2892260-55-6	WO 2023/285222 A1
B23	[(3-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetic acid	2892260-56-7	WO 2023/285222 A1
B24	ethyl [(3-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-57-8	WO 2023/285222 A1
B25	2-methoxyethyl [(3-{2-bromo-5-[4-	2892260-58-9	WO 2023/285222 A1

(b)	Structure Name	CAS-RN/Common Name	Publication
	(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate		
B26	tetrahydrofuran-2-ylmethyl [(3-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-59-0	WO 2023/285222 A1
B27	2-ethoxy-2-oxoethyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	1101020-13-6	US 6403534 B1
B28	{[(1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropyl)carbonyl]oxy}acetic acid	1101020-12-5	US 6403534 B1
B29	2-methoxy-2-oxoethyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	1101021-05-9	US 6403534 B1
B30	1-ethoxy-1-oxopropan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	3017139-36-2	WO 2023/228935 A1
B31	2-{[(1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-	1101021-04-8	US 6403534 B1

(b)	Structure Name	CAS-RN/Common Name	Publication
	dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropyl)carbonyl]oxy}propanoic acid		
B32	1-methoxy-1-oxopropan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	1101021-03-7	US 6403534 B1
B33	1-ethoxy-2-methyl-1-oxopropan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	3017139-37-3	WO 2023/228935 A1
B34	1-ethoxy-1-oxobutan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	3017139-38-4	WO 2023/228935 A1
B35	1-(ethoxycarbonyl)cyclopropyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	3017139-39-5	WO 2023/228935 A1

The chemical structures names of the aforementioned herbicides are complemented by the CAS RN (Chemical Abstract Service Registry Number) if available. The CAS RN is a reference number that is widely accepted and utilized to enabling a clear assignment with respect to stereoisomers, esters and salts.

Definitions

Halogen represents radicals of fluorine, chlorine, bromine and iodine. Preference is given to the radicals of fluorine and chlorine.

Alkyl means saturated straight-chain or branched hydrocarbyl radicals having the number of carbon atoms specified in each case, e.g. C_1-C_6-alkyl such as methyl, ethyl, propyl, 1-methylethyl, butyl, 1-methylpropyl, 2-methylpropyl, 1,1-dimethylethyl, pentyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 2,2-dimethylpropyl, 1-ethylpropyl, hexyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl,1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl and 1-ethyl-2-methylpropyl.

Alkenyl means unsaturated straight-chain or branched hydrocarbyl radicals having the number of carbon atoms specified in each case and one double bond in any position, e.g. C_2-C_6-alkenyl such as ethenyl, 1-propenyl, 2-propenyl, 1-methylethenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1-methyl-1-propenyl, 2-methyl-1-propenyl, 1-methyl-2-propenyl, 2-methyl-2-propenyl, 1-pentenyl, 2-pentenyl, 3-pentenyl, 4-pentenyl, 1-methyl-1-butenyl, 2-methyl-1-butenyl, 3-methyl-1-butenyl, 1-methyl-2-butenyl, 2-methyl-2-butenyl, 3-methyl-2-butenyl, 1-methyl-3-butenyl, 2-methyl-3-butenyl, 3-methyl-3-butenyl, 1,1-dimethyl-2-propenyl, 1,2-dimethyl-1-propenyl, 1,2-dimethyl-2-propenyl, 1-ethyl-1-propenyl, 1-ethyl-2-propenyl, 1-hexenyl, 2-hexenyl, 3-hexenyl, 4-hexenyl, 5-hexenyl, 1-methyl-1-pentenyl, 2-methyl-1-pentenyl, 3-methyl-1-pentenyl, 4-methyl-1-pentenyl, 1-methyl-2-pentenyl, 2-methyl-2-pentenyl, 3-methyl-2-pentenyl, 4-methyl-2-pentenyl, 1-methyl-3-pentenyl, 2-methyl-3-pentenyl, 3-methyl-3-pentenyl, 4-methyl-3-pentenyl, 1-methyl-4-pentenyl, 2-methyl-4-pentenyl, 3-methyl-4-pentenyl, 4-methyl-4-pentenyl, 1,1-dimethyl-2-butenyl, 1,1-dimethyl-3-butenyl, 1,2-dimethyl-1-butenyl, 1,2-dimethyl-2-butenyl, 1,2-dimethyl-3-butenyl, 1,3-dimethyl-1-butenyl, 1,3-dimethyl-2-butenyl, 1,3-dimethyl-3-butenyl, 2,2-dimethyl-3-butenyl, 2,3-dimethyl-1-butenyl, 2,3-dimethyl-2-butenyl, 2,3-dimethyl-3-butenyl, 3,3-dimethyl-1-butenyl, 3,3-dimethyl-2-butenyl, 1-ethyl-1-butenyl, 1-ethyl-2-butenyl, 1-ethyl-3-butenyl, 2-ethyl-1-butenyl, 2-ethyl-2-butenyl, 2-ethyl-3-butenyl, 1,1,2-trimethyl-2-propenyl, 1-ethyl-1-methyl-2-propenyl, 1-ethyl-2-methyl-1-propenyl and 1-ethyl-2-methyl-2-propenyl.

Alkynyl represents a straight-chain or branched hydrocarbyl groups having 2 to 8, preferably 2 to 6, carbon atoms and one triple bond in any position. Non-limiting examples include

ethynyl, prop-1-ynyl, prop-2-ynyl, but-1-ynyl, but-2-ynyl, but-3-ynyl, 1-methylprop-2-ynyl, pent-1-ynyl, pent-2-ynyl, pent-3-ynyl, pent-4-ynyl, 1-methylbut-2-ynyl, 1-methylbut-3-ynyl, 2-methylbut-3-ynyl, 3-methylbut-1-ynyl, 1,1-dimethylprop-2-ynyl, 1-ethylprop-2-ynyl, hex-1-ynyl, hex-2-ynyl, hex-3-ynyl, hex-4-ynyl, hex-5-ynyl, 1-methylpent-2-ynyl, 1-methylpent-3-ynyl, 1-methylpent-4-ynyl, 2-methylpent-3-ynyl, 2-methylpent-4-ynyl, 3-methylpent-1-ynyl, 3-methylpent-4-ynyl, 4-methylpent-1-ynyl, 4-methylpent-2-ynyl, 1,1-dimethylbut-2-ynyl, 1,1-dimethylbut-3-ynyl, 1,2-dimethylbut-3-ynyl, 2,2-dimethylbut-3-ynyl, 3,3-dimethylbut-1-ynyl, 1-ethylbut-2-ynyl, 1-ethylbut-3-ynyl, 2-ethylbut-3-ynyl and 1-ethyl-1-methylprop-2-ynyl.

For clarification: Alkynyl is identical to Alkinyl.

Cycloalkyl means a carbocyclic saturated ring system having preferably 3-8 ring carbon atoms, for example cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl. In the case of optionally substituted cycloalkyl, cyclic systems with substituents are included, also including substituents with a double bond on the cycloalkyl radical, for example an alkylidene group such as methylidene.

Alkoxy means saturated straight-chain or branched alkoxy radicals having the number of carbon atoms specified in each case, for example C_1-C_6-alkoxy such as methoxy, ethoxy, propoxy, 1-methylethoxy, butoxy, 1-methylpropoxy, 2-methylpropoxy, 1,1-dimethylethoxy, pentoxy, 1-methylbutoxy, 2-methylbutoxy, 3-methylbutoxy, 2,2-dimethylpropoxy, 1-ethylpropoxy, hexoxy, 1,1-dimethylpropoxy, 1,2-dimethylpropoxy, 1-methylpentoxy, 2-methylpentoxy, 3-methylpentoxy, 4-methylpentoxy, 1,1-dimethylbutoxy, 1,2-dimethylbutoxy, 1,3-dimethylbutoxy, 2,2-dimethylbutoxy, 2,3-dimethylbutoxy, 3,3-dimethylbutoxy, 1-ethylbutoxy, 2-ethylbutoxy, 1,1,2-trimethylpropoxy, 1,2,2-trimethylpropoxy, 1-ethyl-1-methylpropoxy and 1-ethyl-2-methylpropoxy. Halogen-substituted alkoxy means straight-chain or branched alkoxy radicals having the number of carbon atoms specified in each case, where some or all of the hydrogen atoms in these groups may be replaced by halogen atoms as specified above, e.g. C_1-C_2-haloalkoxy such as chloromethoxy, bromomethoxy, dichloromethoxy, trichloromethoxy, fluoromethoxy, difluoromethoxy, trifluoromethoxy, chlorofluoromethoxy, dichlorofluoromethoxy, chlorodifluoromethoxy, 1-chloroethoxy, 1-bromoethoxy, 1-fluoroethoxy, 2-fluoroethoxy, 2,2-difluoroethoxy, 2,2,2-trifluoroethoxy, 2-chloro-2-fluoroethoxy, 2-chloro-1,2-

difluoroethoxy, 2,2-dichloro-2-fluoroethoxy, 2,2,2-trichloroethoxy, pentafluoroethoxy and 1,1,1-trifluoroprop-2-oxy.

The invention also relates to all stereoisomers and mixtures thereof which are encompassed by the formula **(I)** but not defined specifically. For the sake of simplicity, however, reference will always be made hereinafter to compounds of the formula **(I)**, even though this means not only the pure compounds but also, if appropriate, mixtures with different proportions of isomeric compounds.

Depending on the nature of the substituents defined above, the compounds of the formula **(I)** might have acidic properties and can form salts, and if appropriate also internal salts or adducts with inorganic or organic bases or with metal ions. If the compounds of the formula **(I)** bear hydroxyl, carboxyl or other groups which induce acidic properties, these compounds can be reacted with bases to give salts. Suitable bases are, for example, hydroxides, carbonates, hydrogencarbonates of the alkali metals and alkaline earth metals, especially those of sodium, potassium, magnesium and calcium, and also ammonia, primary, secondary and tertiary amines having (C_1-C_4)-alkyl groups, mono-, di- and trialkanolamines of (C_1-C_4)-alkanols, choline and chlorocholine, and organic amines, such as trialkylamines, morpholine, piperidine or pyridine. These salts are compounds in which the acidic hydrogen is replaced by an agriculturally suitable cation, for example metal salts, especially alkali metal salts or alkaline earth metal salts, especially sodium and potassium salts, or else ammonium salts, salts with organic amines or quaternary ammonium salts, for example with cations of the formula $[NRR'R''R''']^+$ in which R to R''' are each independently an organic radical, especially alkyl, aryl, aralkyl or alkylaryl. Also suitable are alkylsulfonium and alkylsulfoxonium salts, such as (C_1-C_4)-trialkylsulfonium and (C_1-C_4)-trialkylsulfoxonium salts.

Some of the compounds of the formula **(I)** can form salts by addition of a suitable inorganic or organic acid, for example mineral acids, for example HCl, HBr, H_2SO_4, H_3PO_4 or HNO_3, or organic acids, for example carboxylic acids such as formic acid, acetic acid, propionic acid, oxalic acid, lactic acid or salicylic acid or sulfonic acids, for example p-toluenesulfonic acid, onto a basic group, for example amino, alkylamino, dialkylamino, piperidino, morpholino or pyridino. In such a case, these salts comprise the conjugate base of the acid as the anion.

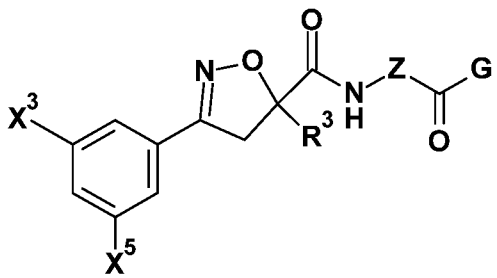
Suitable substituents present in deprotonated form, for example sulfonic acids or carboxylic

acids, may form internal salts with groups which for their part can be protonated, such as amino groups.

The preparation of the compounds of the herbicidal combination is known. Compounds (a) are prepared according to the procedure disclosed in WO 2018/228985 A1. Compounds (b) are prepared according to the procedures disclosed in WO 2021/139482 A1, WO 2010/145992 A1, WO 2010/038953 A1, WO 2016/095768 A1, WO 2021/143677 A1, WO 2023/285222 A1, US 6403534 B1, WO 2023/228935 A1, US 6403534 B1, WO 2023/228935 A1, EP 4353082 A1, WO 2023/197899 A1.

The compounds according to the invention are defined in general terms by the formula **(I)**. Preferred substituents of the radicals given in the formulae mentioned above are illustrated hereinafter:

Preferred are herbicidal combinations wherein compound of formula **(I)** is one of the compounds of the formula **(Ia)** or agrochemical acceptable salts thereof

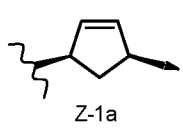


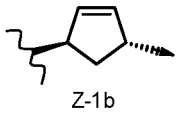
(Ia)

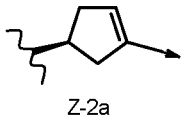
in which

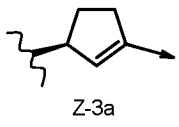
X^3, X^5, R^3 and G are as described above;

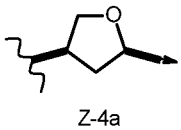
Z means Z-1a, Z-1b, Z-2a, Z-3a, Z-4a, Z-5a, Z-6a, Z-7a, Z-8a,

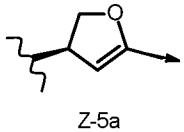

Z-1a

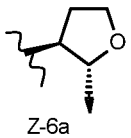

Z-1b

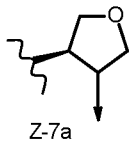

Z-2a

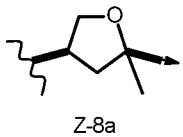

Z-3a


Z-4a

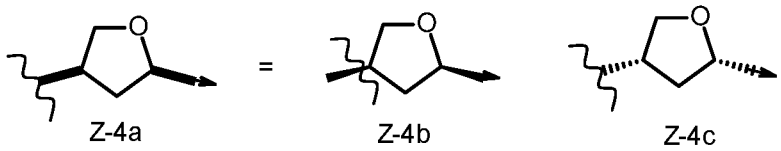

Z-5a


Z-6a

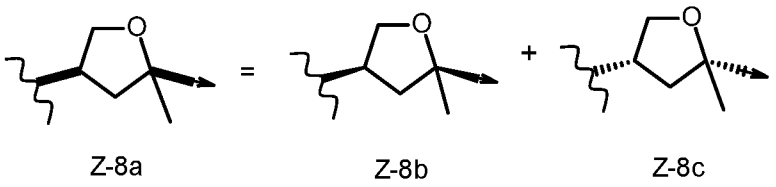

Z-7a


Z-8a ;

wherein Z-4a means the mixture of both structures Z-4b and Z-4c;

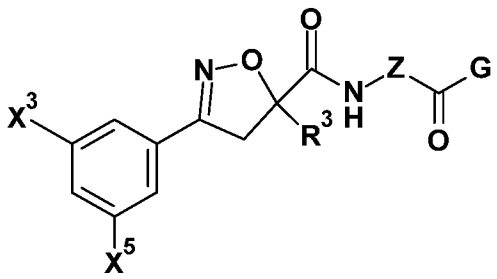

Z-4a = Z-4b Z-4c

and wherein Z-8a means the mixture of both structures Z-8b and Z-8c


Z-8a = Z-8b + Z-8c ;

and wherein the arrow means a bond to the group CO-G in formula (**Ia**).

Especially preferred are herbicidal combinations wherein compound of formula (**Ia**) is one of the compounds of table 2 or agrochemical acceptable salts thereof

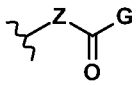
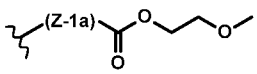
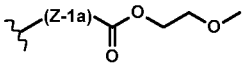
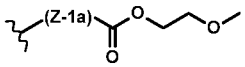
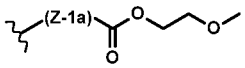
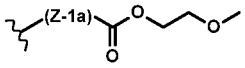
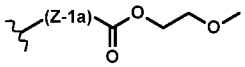
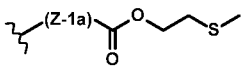


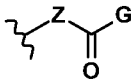
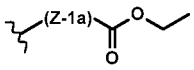
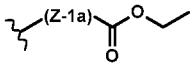
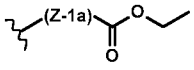
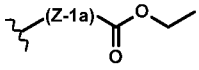
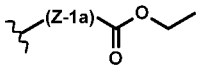
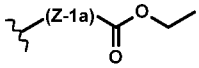
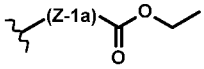
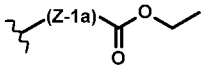
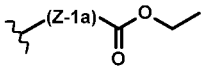
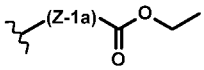
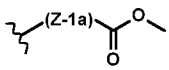
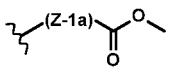
(Ia),

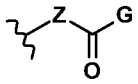
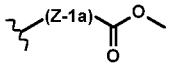
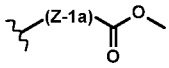
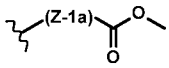
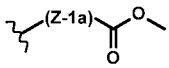
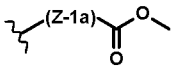
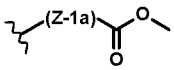
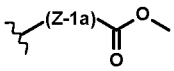
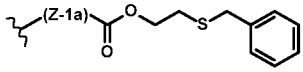
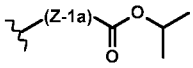
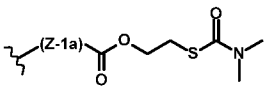
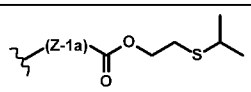
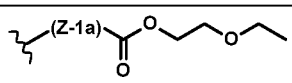
with Z-1a, Z-1b, Z-2a, Z-3a, Z-4a, Z-4c, Z-4b, Z-5a, Z-6a, Z-7a, Z-8a being as defined above.

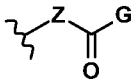
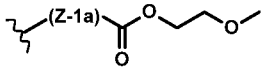
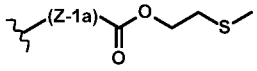
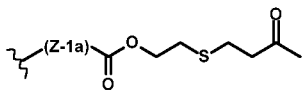
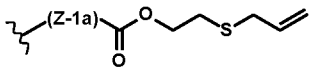
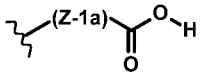
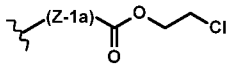
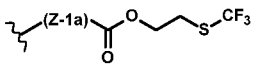
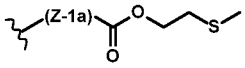
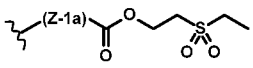
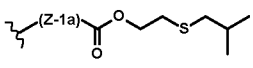
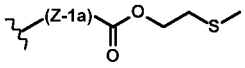
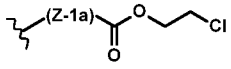
(Ia)

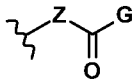
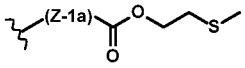
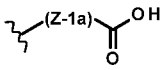
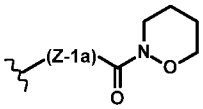
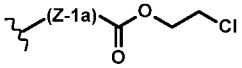
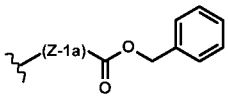
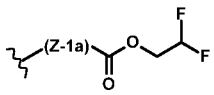
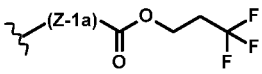
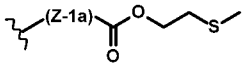
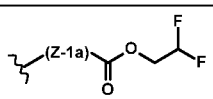
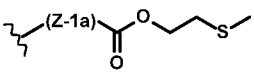
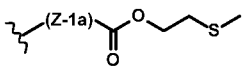
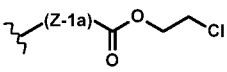
Table 2: Examples for compounds of the formula **(Ia)**

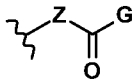
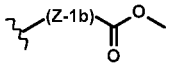
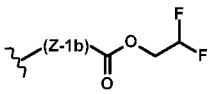
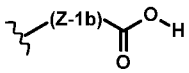
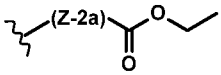
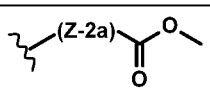
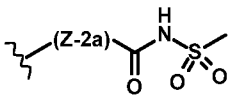
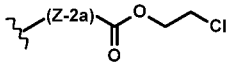
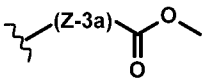
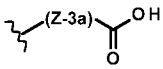
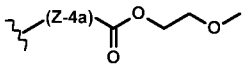
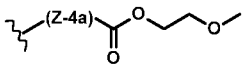
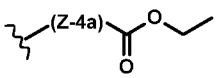
No.	X^3	X^5	R^3	
1.1	F	F	(R)-CH_2Cl	
1.2	F	CN	(R)-CF_3	
1.3	F	F	(R)-CF_3	
1.4	F	H	(R)-CH_3	
1.5	Cl	CN	(R)-CH_3	
1.6	F	H	(S)-vinyl	
1.7	F	F	(R)-CF_3	

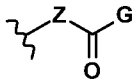
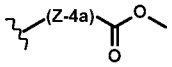
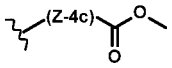
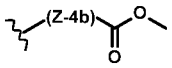
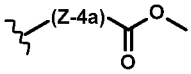
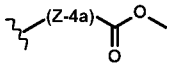
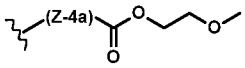
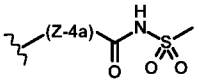
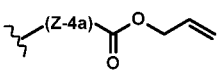
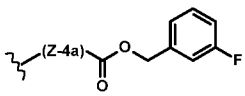
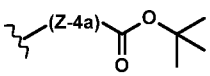
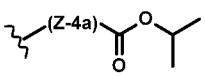
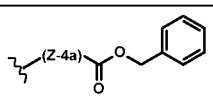
No.	X^3	X^5	R^3	
1.8	F	CH_3	(R)-CF_3	
1.9	H	H	(R)-CF_3	
1.10	F	F	(R)-CH_3	
1.11	H	H	(R,S)-CF_3	
1.12	OCH_3	OCH_3	(R,S)-CF_3	
1.13	F	F	(R,S)-CH_3	
1.14	F	F	(S)-vinyl	
1.15	F	F	(R,S)-OCH_3	
1.16	F	F	(R)-OCH_3	
1.17	F	F	(R)-CH_2F	
1.18	F	H	(R)-CF_3	
1.19	F	F	(R)-CH_3	

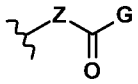
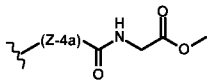
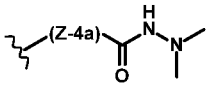
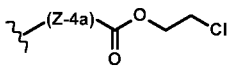
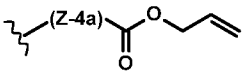
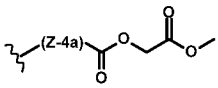
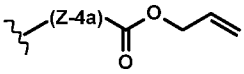
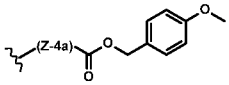
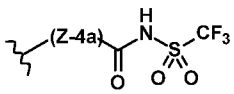
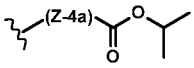
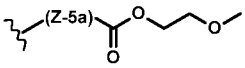
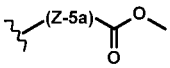
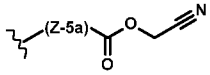
No.	X^3	X^5	R^3	
1.20	F	H	(R)-CH_3	
1.21	F	Cl	(R)-CH_3	
1.22	F	CH_3	(R,S)-CF_3	
1.23	Cl	CN	(R,S)-CH_3	
1.24	F	CN	(R,S)-CH_3	
1.25	F	H	(S)-vinyl	
1.26	F	F	(S)-vinyl	
1.27	F	F	(R)-CH_3	
1.28	F	H	(R)-CH_3	
1.29	F	F	(R)-CH_3	
1.30	F	F	(R)-CH_3	
1.31	F	F	(R)-CH_3	

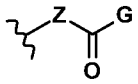
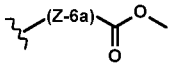
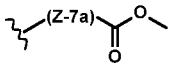
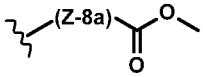
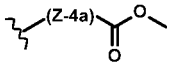
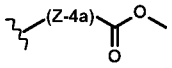
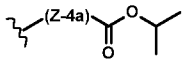
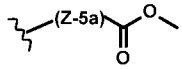
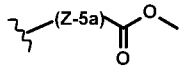
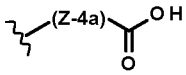
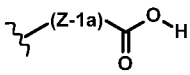
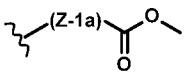
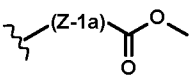
No.	X^3	X^5	R^3	
1.32	F	H	(R)-CH_3	
1.33	F	F	(R)-CH_3	
1.34	F	F	(R)-CH_3	
1.35	F	F	(R)-CH_3	
1.36	F	F	(R)-CH_3	
1.37	F	F	(R)-CH_3	
1.38	F	F	(R)-CH_3	
1.39	F	H	(R)-CH_3	
1.40	F	F	(R)-CH_3	
1.41	F	F	(R)-CH_3	
1.42	F	F	(R)-CH_3	
1.43	F	CN	(R,S)-CF_3	

No.	X^3	X^5	R^3	
1.44	F	CN	(R,S)-CF_3	
1.45	Cl	CN	(R,S)-CH_3	
1.46	F	F	(R,S)-CH_3	
1.47	F	F	(R,S)-CH_3	
1.48	F	F	(R,S)-vinyl	
1.49	F	F	(R,S)-vinyl	
1.50	F	F	(S)-vinyl	
1.51	F	H	(S)-vinyl	
1.52	F	F	(S)-vinyl	
1.53	F	Cl	(R,S)-CH_3	
1.54	F	F	(R)-cPr	
1.55	F	F	(R)-CH_2Cl	

No.	X^3	X^5	R^3	
1.56	F	F	(R)-CF_3	
1.57	F	F	(S)-vinyl	
1.58	F	F	(S)-vinyl	
1.59	F	H	(R,S)-CH_3	
1.60	F	F	(R,S)-vinyl	
1.61	F	F	(R,S)-CH_3	
1.62	F	F	(R,S)-CH_3	
1.63	F	F	(R)-CH_3	
1.64	F	F	(R)-CH_3	
1.65	F	CH_3	(S)-vinyl	
1.66	F	F	(S)-vinyl	
1.67	F	H	(R,S)-CH_3	

No.	X^3	X^5	R^3	
1.68	F	F	(S)-vinyl	
1.69	F	F	(S)-vinyl	
1.70	F	F	(S)-vinyl	
1.71	F	CH_3	(S)-vinyl	
1.72	F	F	(R,S)-OCH_3	
1.73	F	F	(R)-CH_3	
1.74	F	F	(R)-CH_3	
1.75	F	F	(R)-CH_3	
1.76	F	F	(R)-CH_3	
1.77	F	H	(R,S)-CH_3	
1.78	F	H	(R,S)-CH_3	
1.79	F	H	(R,S)-CH_3	

No.	X^3	X^5	R^3	
1.80	F	F	(S)-vinyl	
1.81	F	F	(S)-vinyl	
1.82	F	F	(S)-vinyl	
1.83	F	F	(S)-vinyl	
1.84	F	F	(S)-vinyl	
1.85	F	CH_3	(S)-vinyl	
1.86	F	CH_3	(S)-vinyl	
1.87	F	F	(S)-vinyl	
1.88	F	F	(R)-CF_2CH_3	
1.89	F	CH_3	(S)-vinyl	
1.90	CH_3	CH_3	(S)-vinyl	
1.91	F	F	(S)-vinyl	

No.	X^3	X^5	R^3	
1.92	F	F	(R)-CH_3	
1.93	F	F	(R,S)-CH_3	
1.94	F	F	(R)-CF_2CH_3	
1.95	Cl	Cl	(R,S)-OCH_3	
1.96	Cl	Cl	(R,S)-vinyl	
1.97	F	H	(R,S)-CH3	
1.98	F	F	(S)-vinyl	
1.99	F	F	(R)-CH3	
1.100	F	F	(S)-vinyl	
1.101	F	F	(R)-CH3	
1.102	F	F	(R)-CH3	
1.103	F	F	(S)-vinyl	

Preferred is a combination comprising No. 1.68 of formula (Ia) and B1.

Preferred is a combination comprising No. 1.68 of formula (Ia) and B2.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B3.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B4.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B5.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B6.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B7.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B8.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B9.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B10.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B11.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B12.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B13.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B14.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B15.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B16.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B17.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B18.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B19.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B20.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B21.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B22.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B23.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B24.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B25.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B26.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B27.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B28.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B29.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B30.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B31.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B32.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B33.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B34.
Preferred is a combination comprising No. 1.68 of formula (Ia) and B35.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B1.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B2.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B3.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B4.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B5.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B6.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B7.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B8.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B9.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B10.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B11.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B12.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B13.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B14.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B15.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B16.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B17.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B18.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B19.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B20.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B21.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B22.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B23.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B24.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B25.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B26.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B27.

Preferred is also a combination comprising No 1.100 of formula (Ia) and B28.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B29.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B30.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B31.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B32.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B33.

Preferred is also a combination comprising No. 1.100 of formula (Ia) and B34.

Preferred is also a combination comprising No 1.100 of formula (Ia) and B35.

The above-mentioned herbicidal combinations may be combined with a safener, e.g. isoxadifen-ethyl, cyprosulfamide, mefenpyr-diethyl, cloquintocet-mexyl and methyl-{[5-(4-chloro-2-fluorophenyl)-1-(2,4-difluorophenyl)-1H-1,2,4-triazole-3-yl]oxy}acetate including its hydrates and salts, for example its lithium, sodium, potassium, calcium, magnesium, aluminium, iron, ammonium, quaternary ammonium, sulphonium or phosphonium salts.

Surprisingly, it has now been found that the above-defined active compound combinations of (a) substituted isoxazoline-carboxamides of the general formula (**I**) and/or their salts and (b) one or more of B1 to B35, have particularly high herbicidal activity – higher than the mere addition of the activities of the herbicides applied alone (synergism) - and can be used in various crops, in particular in cereals (especially wheat and barley), soybean, maize, oil seed rape/canola, sugar cane, cotton and also members of the tree-fruit, nut and vines crop group: like Annona-, citrus fruit-, nut-, pome fruit-, small fruit- and stone fruit-crops including vines, banana, olives and palm crops, for the control of weeds.

The active compound combinations according to the invention can be applied before and after emergence of the plants, that is to say by the pre-emergence and post-emergence method.

The synergistic effects are observed in the case of joint deployment of active ingredients (a) and (b), but can also frequently occur in the case of offset application (splitting). It is also possible to apply the herbicides (a) or (b) or the herbicidal combination (a) and (b) in multiple portions (sequential application). For example, one or more pre-emergence applications may be followed by a post-emergence application, or an early post-emergence application may be followed by a moderately late or late post-emergence application. Preference is given to the simultaneous or immediately successive application of the active ingredients of the respective combination, if appropriate in several portions. But application of the individual active ingredients of a combination at different times is also possible and may be advantageous in the individual case. It is also possible to integrate other crop protection products into the system for application, for example the other active ingredients mentioned (other herbicides, fungicides, insecticides, acaricides etc.) and/or various auxiliaries, adjuvants and/or applications of fertilizer.

The active compound combinations according to the invention can be used, for example, in connection with the following plants:

Dicotyledonous weeds of the genera: Sinapis, Lepidium, Galium, Stellaria, Matricaria, Anthemis, Galinsoga, Chenopodium, Urtica, Senecio, Amaranthus, Portulaca, Xanthium, Convolvulus, Ipomoea, Polygonum, Sesbania, Ambrosia, Cirsium, Carduus, Sonchus, Solanum, Rorippa, Rotala, Lindernia, Lamium, Veronica, Abutilon, Emex, Datura, Viola, Galeopsis, Papaver, Centaurea, Trifolium, Ranunculus, Taraxacum.

Dicotyledonous crops of the genera: Gossypium, Glycine, Beta, Daucus, Phaseolus, Pisum, Solanum, Linum, Ipomoea, Vicia, Nicotiana, Lycopersicon, Arachis, Brassica, Lactuca, Cucumis, Cuburbita, Helianthus.

Monocotyledonous weeds of the genera: Echinochloa, Setaria, Panicum, Digitaria, Phleum, Poa, Festuca, Eleusine, Brachiaria, Lolium, Bromus, Avena, Cyperus, Sorghum, Agropyron, Cynodon, Monochoria, Fimbristylis, Sagittaria, Eleocharis, Scirpus, Paspalum, Ischaemum, Sphenoclea, Dactyloctenium, Agrostis, Alopecurus, Apera.

Monocotyledonous crops of the genera: Oryza, Zea, Triticum, Hordeum, Avena, Secale, Sorghum, Panicum, Saccharum, Ananas, Asparagus, Allium.

However, the use of the active compound combinations according to the invention is in no way restricted to these genera, but also extends in the same manner to other plants. According to the invention, crop plants are all plants and plant varieties including transgenic plants and plant varieties, where on transgenic plants and plant varieties it is also possible for synergistic effects to occur.

The invention furthermore relates to a method of reducing crop damage by treating the seed of the crop with the safener before sowing. This can be done in addition to the use of herbicide/safener combinations and compositions comprising thereof, which are highly suitable to protect crops from herbicide damage in pre-and post-emergence treatments.

Composition

Compositions within the context of the present invention comprise in addition to the combinations according to the invention one or more further component(s) selected from the group consisting of formulation auxiliaries, additives customary in crop protection, and further agrochemically active compounds, such as fungicides, insecticides, acaricides etc.

Additives

Additives are for example, fertilizers and colorants.

The active compounds or active compound combinations can be converted into the customary formulations, such as solutions, emulsions, wettable powders, suspensions, powders, dusting agents, pastes, soluble powders, granules, suspoemulsion concentrates, natural and synthetic materials impregnated with active compound, and very fine capsules in polymeric substances.

These formulations are produced in a known manner, for example by mixing the active compounds with extenders, that is liquid solvents and/or solid carriers, optionally with the use of surfactants, that is emulsifiers and/or dispersants and/or foam-formers.

If the extender used is water, it is also possible to use, for example, organic solvents as auxiliary solvents. Suitable liquid solvents are essentially: aromatics, such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics and chlorinated aliphatic hydrocarbons, such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons, such as cyclohexane or paraffins, for example petroleum fractions, mineral and vegetable oils, alcohols, such as butanol or glycol, and also their ethers and esters, ketones, such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents, such as dimethylformamide and dimethyl sulphoxide, and also water.

Suitable solid carriers are:
for example ammonium salts and ground natural minerals, such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, ground synthetic minerals, such as finely divided silica, alumina and silicates, suitable solid carriers for granules are: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, and also synthetic granules of inorganic and organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; suitable emulsifiers and/or foam-formers are: for example non-ionic and anionic emulsifiers, such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers,

alkylsulphonates, alkyl sulphates, arylsulphonates and protein hydrolysates; suitable dispersants are: for example lignosulphite waste liquors and methylcellulose.

Tackifiers such as carboxymethylcellulose and natural and synthetic polymers in the form of powders, granules or latices, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, and also natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids, can be used in the formulations. Other possible additives are mineral and vegetable oils.

It is possible to use colorants such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyestuffs, such as alizarin dyestuffs, azo dyestuffs and metal - phthalocyanine dyestuffs, and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

The formulations generally comprise from 0.1 to 95 per cent by weight of active compounds including the safeners, preferably between 0.5 and 90%.

The active compound combinations/composition according to the invention are generally used in the form of finished formulations. However, the active compounds contained in the active compound combinations/composition can also be mixed in individual formulations when used, i.e. in the form of tank mixes.

The novel active compound combinations, as such or in their formulations, can furthermore be used as a mixture with other known herbicides, finished formulations or tank mixes again being possible. A mixture with other known active compounds, such as fungicides, insecticides, acaricides, nematicides, bird repellents, growth factors, plant nutrients and agents which improve soil structure, is also possible. For certain intended uses, in particular in the post-emergence method, it may furthermore be advantageous to include, as further additives in the formulations, mineral or vegetable oils which are tolerated by plants (for example the commercial preparation “Rako Binol”), or ammonium salts such as, for example, ammonium sulphate or ammonium thiocyanate.

The novel active compound combinations can be used as such, in the form of their formulations or the use forms prepared therefrom by further dilution, such as ready-to-use solutions, suspensions, emulsions, powders, pastes and granules. They are used in the customary manner, for example by washing, spraying, atomizing, dusting or scattering.

The advantageous effect of the crop plant compatibility of the active compound combinations according to the invention is particularly highly pronounced at certain amounts of herbicide and safener.

The amounts of the active compound combinations according to the invention applied can be varied within a certain range; they depend, inter alia, on the weather and on soil factors.

In general, the application rates of the herbicides are between 0.1 and 500 g a.i./ha, preferably between 1.0 and 250 g a.i./ha.

The ratios of (a):(b) based on weight, depending on the effective application rates, are generally in the range of 1:10 000 to 5000:1, preferably in the range of 1:1000 to 500:1, further preferably in the range of 1:100 to 50:1 and most preferably in the range of 1:10 to 5:1.

The herbicidal combination of the invention can also be combined with further herbicides and plant growth regulators, for example to supplement the activity spectrum or to exert additional synergism. Combination partners usable for the compounds according to the invention in mixed formulations or in a tankmix are, for example, known active ingredients based on inhibition of, for example, acetolactate synthase, acetyl-CoA carboxylase, cellulose synthase, enolpyruvylshikimate-3-phosphate synthase, glutamine synthetase, p-hydroxyphenylpyruvate dioxygenase, phytoene desaturase, photosystem I, photosystem II, protoporphyrinogen oxidase, as known, for example, from Weed Research 26 (1986) 441-445 or "The Pesticide Manual", 14th edition, The British Crop Protection Council and the Royal Soc. of Chemistry, 2006, the corresponding "e-Pesticide Manual Version 4 (2006)", and literature cited therein. Further trade names and "common names" are listed in the "Compendium of Pesticide Common Names" (available on the Internet under http://www.alanwood.net/pesticides).

Examples of known herbicides which can be combined with the compounds of the invention include the active ingredients which follow (comment.: the compounds are designated either by the common name according to the International Organization for Standardization (ISO) or by the chemical name, in some cases together with a standard code number) and always encompass all use forms, such as acids, salts, esters and isomers, such as stereoisomers and optical isomers. The list includes one and, in some cases, also more than one application

form:

Acetochlor, acifluorfen, acifluorfen-methyl, acifluorfen-sodium, aclonifen, alachlor, allidochlor, alloxydim, alloxydim-sodium, ametryn, amicarbazone, amidochlor, amidosulfuron, 4-amino-3-chloro-6-(4-chloro-2-fluoro-3-methylphenyl)-5-fluoropyridine-2-carboxylic acid, aminocyclopyrachlor, aminocyclopyrachlor-potassium, aminocyclopyrachlor-methyl, aminopyralid, aminopyralid-dimethylammonium, aminopyralid-tripromine, amitrole, ammoniumsulfamate, anilofos, asulam, asulam-potassium, asulam sodium, atrazine, azafenidin, azimsulfuron, beflubutamid, (S)-(-)-beflubutamid, beflubutamid-M, benazolin, benazolin-ethyl, benazolin-dimethylammonium, benazolin-potassium, benfluralin, benfuresate, bensulfuron, bensulfuron-methyl, bensulide, bentazone, bentazone-sdium, benzobicyclon, benzofenap, bicyclopyrone, bifenox, bilanafos, bilanafos-sodium, bipyrazone, bispyribac, bispyribac-sodium, *bixlozone,* bromacil, bromacil-lithium, bromacil-sodium, bromobutide, bromofenoxim, bromoxynil, bromoxynil-butyrate, -potassium, -heptanoate und -octanoate, busoxinone, butachlor, butafenacil, butamifos, butenachlor, butralin, butroxydim, butylate, cafenstrole, cambendichlor, carbetamide, carfentrazone, carfentrazone-ethyl, chloramben, chloramben-ammonium, chloramben-diolamine, chlroamben-methyl, chloramben-methylammonium, chloramben-sodium, chlorbromuron, chlorfenac, chlorfenac-ammonium, chlorfenac-sodium, chlorfenprop, chlorfenprop-methyl, chlorflurenol, chlorflurenol-methyl, chloridazon, chlorimuron, chlorimuron-ethyl, chlorophthalim, chlorotoluron, chlorsulfuron, chlorthal, chlorthal-dimethyl, chlorthal-monomethyl, cinidon, cinidon-ethyl, cinmethylin, , exo-(+)-cinmethylin, i.e. (1R,2S,4S)-4-isopropyl-1-methyl-2-[(2-methylbenzyl)oxy]-7-oxabicyclo[2.2.1]heptane, exo-(-)-cinmethylin, i.e. (1R,2S,4S)-4-isopropyl-1-methyl-2-[(2-methylbenzyl)oxy]-7-oxabicyclo[2.2.1]heptane, cinosulfuron, clacyfos, clethodim, clodinafop, clodinafop-ethyl, clodinafop-propargyl, clomazone, clomeprop, clopyralid, clopyralid-methyl, clopyralid-olamine, clopyralid-potassium, clopyralid-tripomine, cloransulam, cloransulam-methyl, cumyluron, cyanamide, cyanazine, cycloate, cyclopyranil, cyclopyrimorate, cyclosulfamuron, cycloxydim, cyhalofop, cyhalofop-butyl, cyprazine, 2,4-D (including theammonium, butotyl, -butyl, choline, diethylammonium, -dimethylammonium, -diolamine, -doboxyl, -dodecylammonium, etexyl, ethyl, 2-ethylhexyl, heptylammonium, isobutyl, isooctyl, isopropyl, isopropylammonium, lithium, meptyl, methyl, potassium, tetradecylammonium, triethylammonium, triisopropanolammonium, tripromine and trolamine salt thereof), 2,4-DB, 2,4-DB-butyl, -dimethylammonium, isooctyl, -potassium und -sodium, daimuron (dymron), dalapon, dalapon-calcium, dalapon-magnesium, dalapon-

sodium, dazomet, dazomet-sodium, n-decanol, 7-deoxy-D-sedoheptulose, desmedipham, detosyl-pyrazolate (DTP), dicamba and its salts, e. g. dicamba-biproamine, dicamba-N,N-Bis(3-aminopropyl)methylamine, dicamba-butotyl, dicamba-choline, dicamba-diglycolamine, dicamba-dimethylammonium, dicamba-diethanolaminemmonium, dicamba-diethylammonium, dicamba-isopropylammonium, dicamba-methyl, dicamba-monoethanolaminedicamba-olamine, dicamba-potassium, dicamba-sodium, dicamba-triethanolamine, dichlobenil, 2-(2,4-dichlorobenzyl)-4,4-dimethyl-1,2-oxazolidin-3-one, 2-(2,5-dichlorobenzyl)-4,4-dimethyl-1,2-oxazolidin-3-one, dichlorprop, dichlorprop-butotyl, dichlroprop-dimethylammonium, dichhlorprop-etexyl, dichlorprop-ethylammonium, dichlorprop-isoctyl, dichlorprop-methyl, dichlorprop-postassium, dichlorprop-sodium, dichlorprop-P, dichlorprop-P-dimethylammonium, dichlorprop-P-etexyl, dichlorprop-P-potassium, dichlorprop-sodium, diclofop, diclofop-methyl, diclofop-P, diclofop-P-methyl, diclosulam, difenzoquat, difenzoquat-metilsulfate, diflufenican, diflufenzopyr, diflufenzopyr-sodium, dimefuron, dimepiperate, dimesulfazet, dimethachlor, dimethametryn, dimethenamid, dimethenamid-P, dimetrasulfuron, dinitramine, dinoterb, dinoterb-acetate, diphenamid, diquat, diquat-dibromid, diquat-dichloride, dithiopyr, diuron, DNOC, DNOC-ammonium, DNOC-potassium, DNOC-sodium, endothal, endothal-diammonium, endothal-dipotassium, endothal-disodium, Epyrifenacil (S-3100), EPTC, esprocarb, ethalfluralin, ethametsulfuron, ethametsulfuron-methyl, ethiozin, ethofumesate, ethoxyfen, ethoxyfen-ethyl, ethoxysulfuron, etobenzanid, F-5231, i.e. N-[2-Chlor-4-fluor-5-[4-(3-fluorpropyl)-4,5-dihydro-5-oxo-1H-tetrazol-1-yl]-phenyl]-ethansulfonamid, F-7967, i.e. 3-[7-Chlor-5-fluor-2-(trifluormethyl)-1H-benzimidazol-4-yl]-1-methyl-6-(trifluormethyl)pyrimidin-2,4(1H,3H)-dion, fenoxaprop, fenoxaprop-P, fenoxaprop-ethyl, fenoxaprop-P-ethyl, fenoxasulfone, fenpyrazone, fenquinotrione, fentrazamide, flamprop, flamprop-isoproyl, flamprop-methyl, flamprop-M-isopropyl, flamprop-M-methyl, flazasulfuron, florasulam, florpyrauxifen, florpyrauxifen-benzyl, fluazifop, fluazifop-butyl, fluazifop-methyl, fluazifop-P, fluazifop-P-butyl, flucarbazone, flucarbazone-sodium, flucetosulfuron, fluchloralin, flufenacet, flufenpyr, flufenpyr-ethyl, flumetsulam, flumiclorac, flumiclorac-pentyl, flumioxazin, fluometuron, flurenol, flurenol-butyl, -dimethylammonium und -methyl, fluoroglycofen, fluoroglycofen-ethyl, flupropanate, flupropanate-sdium, flupyrsulfuron, flupyrsulfuron-methyl, flupyrsulfuron-methyl-sodium, fluridone, flurochloridone, fluroxypyr, fluroxypyr-butometyl, fluroxypyr-meptyl, flurtamone, fluthiacet, fluthiacet-methyl, fomesafen, fomesafen-sodium, foramsulfuron, foramsulfuron sodium salt, fosamine, fosamine-ammonium, glufosinate, glufosinate-ammonium, glufosinate-sodium, L-glufosinate-ammonium, L-glufosiante-sodium, glufosinate-P-sodium, glufosinate-P-ammonium,

glyphosate, glyphosate-ammonium, -isopropylammonium, -diammonium, -dimethylammonium, -potassium, -sodium, sesquisodium and -trimesium, H-9201, i.e. O-(2,4-Dimethyl-6-nitrophenyl)-O-ethyl-isopropylphosphoramidothioat, halauxifen, halauxifen-methyl, halosafen, halosulfuron, halosulfuron-methyl, haloxyfop, haloxyfop-P, haloxyfop-ethoxyethyl, haloxyfop-P-ethoxyethyl, haloxyfop-methyl, haloxyfop-P-methyl, haloxifop-sodium, hexazinone, HNPC-A8169, i.e. prop-2-yn-1-yl (2S)-2-{3-[(5-tert-butylpyridin-2-yl)oxy]phenoxy}propanoate, HW-02, i.e. 1-(Dimethoxyphosphoryl)-ethyl-(2,4-dichlorphenoxy)acetat, hydantocidin, imazamethabenz, imazamethabenz-methyl, imazamox, imazamox-ammonium, imazapic, imazapic-ammonium, imazapyr, imazapyr-isopropylammonium, imazaquin, imazaquin-ammonium, imazaquin.methyl, imazethapyr, imazethapyr-immonium, imazosulfuron, indanofan, indaziflam, iodosulfuron, iodosulfuron-methyl, iodosulfuron-methyl-sodium, ioxynil, ioxynil-lithium, -octanoate, -potassium und sodium, ipfencarbazone, isoproturon, isouron, isoxaben, isoxaflutole, karbutilate, KUH-043, i.e. 3-({[5-(Difluormethyl)-1-methyl-3-(trifluormethyl)-1H-pyrazol-4-yl]methyl}sulfonyl)-5,5-dimethyl-4,5-dihydro-1,2-oxazol, ketospiradox, ketospiradox-potassium, lactofen, lenacil, linuron, MCPA, MCPA-butotyl, -butyl, -dimethylammonium, -diolamine, -2-ethylhexyl, -ethyl, -isobutyl, isoctyl, -isopropyl, -isopropylammonium, -methyl, olamine, -potassium, –sodium and -trolamine, MCPB, MCPB-methyl, -ethyl und -sodium, mecoprop, mecoprop-butotyl, mecoprop- demethylammonium, mecoprop-diolamine, mecoprop-etexyl, mecoprop-ethadyl, mecoprop-isoctyl, mecoprop-methyl, mecoprop-potassium, mecoprop-sodium, and mecoprop-trolamine, mecoprop-P, mecoprop-P-butotyl, -dimethylammonium, -2-ethylhexyl and -potassium, mefenacet, mefluidide, mefluidide-diolamine, mefluidide-potassium, mesosulfuron, mesosulfuron-methyl, mesosulfuron sodium salt, mesotrione, methabenzthiazuron, metam, metamifop, metamitron, metazachlor, metazosulfuron, methabenzthiazuron, methiopyrsulfuron, methiozolin, methyl isothiocyanate, metobromuron, metolachlor, S-metolachlor, metosulam, metoxuron, metribuzin, metsulfuron, metsulfuron-methyl, molinate, monolinuron, monosulfuron, monosulfuron-methyl, MT-5950, i.e. N-[3-chlor-4-(1-methylethyl)-phenyl]-2-methylpentanamid, NGGC-011, napropamide, NC-310, i.e. 4-(2,4-Dichlorbenzoyl)-1-methyl-5-benzyloxypyrazol, NC-656, i.e. 3-[(isopropylsulfonyl)methyl]-N-(5-methyl-1,3,4-oxadiazol-2-yl)-5-(trifluoromethyl)[1,2,4]triazolo[4,3-a]pyridine-8-carboxamide, neburon, nicosulfuron, nonanoic acid (pelargonic acid), norflurazon, oleic acid (fatty acids), orbencarb, orthosulfamuron, oryzalin, oxadiargyl, oxadiazon, oxasulfuron, oxaziclomefone, oxyfluorfen, paraquat, paraquat-dichloride, paraquat-dimethylsulfate, pebulate, pendimethalin, penoxsulam, pentachlorphenol, pentoxazone, pethoxamid, petroleum oils,

phenmedipham, phenmedipham-ethyl, picloram, picloram-dimethylammonium, picloram-etexyl, picloram-isoctyl, picloram-methyl, picloram-olamine, picloram-potassium, picloram-triethylammonium, picloram-tripromine, picloram-trolamine, picolinafen, pinoxaden, piperophos, pretilachlor, primisulfuron, primisulfuron-methyl, prodiamine, profoxydim, prometon, prometryn, propachlor, propanil, propaquizafop, propazine, propham, prop-isochlor, propoxycarbazone, propoxycarbazone-sodium, propyrisulfuron, propyzamide, prosulfocarb, prosulfuron, pyraclonil, pyraflufen, pyraflufen-ethyl, pyrasulfotole, pyrazolynate (pyrazolate), pyrazosulfuron, pyrazosulfuron-ethyl, pyrazoxyfen, pyribambenz, pyribambenz-isopropyl, pyribambenz-propyl, pyribenzoxim, pyributicarb, pyridafol, pyridate, pyriftalid, pyriminobac, pyriminobac-methyl, pyrimisulfan, pyrithiobac, pyrithiobac-sodium, pyroxasulfone, pyroxsulam, quinclorac, quinclorac-dimethylammonium, quinclorac-methyl, quinmerac, quinoclamine, quizalofop, quizalofop-ethyl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, QYM201, i.e. 1-{2-chloro-3-[(3-cyclopropyl-5-hydroxy-1-methyl-1H-pyrazol-4-yl)carbonyl]-6-(trifluoromethyl)phenyl}piperidin-2-one, rimsulfuron, saflufenacil, sethoxydim, siduron, simazine, simetryn, SL-261, sulcotrione, sulfentrazone, sulfometuron, sulfometuron-methyl, sulfosulfuron, , SYP-249, i.e. 1-Ethoxy-3-methyl-1-oxobut-3-en-2-yl-5-[2-chlor-4-(trifluormethyl)phenoxy]-2-nitrobenzoat, SYP-300, i.e. 1-[7-Fluor-3-oxo-4-(prop-2-in-1-yl)-3,4-dihydro-2H-1,4-benzoxazin-6-yl]-3-propyl-2-thioxoimidazolidin-4,5-dion, 2,3,6-TBA, TCA (trichloro acetic acid) and its salts, e.g. TCA-ammonium, TCA-calcium, TCA-ethyl, TCA-magnesium, TCA-sodium, tebuthiuron, tefuryltrione, tembotrione, tepraloxydim, terbacil, terbucarb, terbumeton, terbuthylazine, terbutryn, tetflupyrolimet, thaxtomin, thenylchlor, thiazopyr, thiencarbazone, thiencarbazone-methyl, thifensulfuron, thifensulfuron-methyl, thiobencarb, tiafenacil, tolpyralate, topramezone, tralkoxydim, triafamone, tri-allate, triasulfuron, triaziflam, tribenuron, tribenuron-methyl, triclopyr, triclopyr-butotyl, triclopyr-choline, triclopyr-ethyl, triclopyr-triethylammonium, trietazine, trifloxysulfuron, trifloxysulfuron-sodium, trifludimoxazin, trifluralin, triflusulfuron, triflusulfuron-methyl, tritosulfuron, urea sulfate, vernolate, XDE-848, ZJ-0862, i.e. 3,4-Dichlor-N-{2-[(4,6-dimethoxypyrimidin-2-yl)oxy]benzyl}anilin, 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, 3-chloro-2-[3-(difluoromethyl)isoxazolyl-5-yl]phenyl-5-chloropyrimidin-2-yl ether, 2-(3,4-dimethoxyphenyl)-4-[(2-hydroxy-6-oxocyclohex-1-en-1-yl)carbonyl]-6-methylpyridazine-3(*2H*)-one, 2-({2-[(2-methoxyethoxy)methyl]-6-methylpyridin-3-yl}carbonyl)cyclohexane-1,3-dione, (5-hydroxy-1-methyl-1H-pyrazol-4-yl)(3,3,4-trimethyl-1,1-dioxido-2,3-dihydro-1-benzothiophen-5-

yl)methanone, 1-methyl-4-[(3,3,4-trimethyl-1,1-dioxido-2,3-dihydro-1-benzothiophen-5-yl)carbonyl]-1H-pyrazol-5-yl propane-1-sulfonate, 4-{2-chloro-3-[(3,5-dimethyl-1H-pyrazol-1-yl)methyl]-4-(methylsulfonyl)benzoyl}-1-methyl-1H-pyrazol-5-yl 1,3-dimethyl-1H-pyrazole-4-carboxylate; cyanomethyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, prop-2-yn-1-yl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, methyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylic acid, benzyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, ethyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, methyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1-isobutyryl-1H-indol-6-yl)pyridine-2-carboxylate, methyl 6-(1-acetyl-7-fluoro-1H-indol-6-yl)-4-amino-3-chloro-5-fluoropyridine-2-carboxylate, methyl 4-amino-3-chloro-6-[1-(2,2-dimethylpropanoyl)-7-fluoro-1H-indol-6-yl]-5-fluoropyridine-2-carboxylate, methyl 4-amino-3-chloro-5-fluoro-6-[7-fluoro-1-(methoxyacetyl)-1H-indol-6-yl]pyridine-2-carboxylate, potassium 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, sodium 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, butyl 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)pyridine-2-carboxylate, 4-hydroxy-1-methyl-3-[4-(trifluoromethyl)pyridin-2-yl]imidazolidin-2-one, 3-(5-tert-butyl-1,2-oxazol-3-yl)-4-hydroxy-1-methylimidazolidin-2-one,

Abscisic acid, acibenzolar, acibenzolar-S-methyl, 1-aminocyclopro-1-yl carboxylic acid and derivatives thereof,5-Aminolävulinsäure, ancymidol, 6-benzylaminopurine, brassinolide, brassinolide-ethyl, catechin, chitooligosaccharides (CO; COs differ from LCOs in that they lack the pendant fatty acid chain that is characteristic of LCOs. COs, sometimes referred to as N-acetylchitooligosaccharides, are also composed of GlcNAc residues but have side chain decorations that make them different from chitin molecules [$(C_8H_{13}NO_5)_n$, CAS No. 1398-61-4] and chitosan molecules [$(C_5H_{11}NO_4)_n$, CAS No. 9012-76-4]), chitinous compounds, chlormequat chloride, cloprop, cyclanilide, 3-(Cycloprop-1-enyl)propionic acid, daminozide, dazomet, dazomet-sodium, n-decanol, dikegulac, dikegulac-sodium, endothal, endothal-dipotassium, -disodium, and mono(N,N-dimethylalkylammonium), ethephon, flumetralin, flurenol, flurenol-butyl, flurenol-methyl, flurprimidol, forchlorfenuron, gibberellic acid, inabenfide, indol-3-acetic acid (IAA), 4-indol-3-ylbutyric acid, isoprothiolane, probenazole, jasmonic acid, Jasmonic acid or derivatives thereof (e.g. Jasmonic acid methyl ester), lipo-chitooligosaccharides (LCO, sometimes referred to as symbiotic nodulation (Nod) signals (or Nod factors) or as Myc factors, consist of an

oligosaccharide backbone of β-l,4-linked *N*-acetyl-D-glucosamine ("GlcNAc") residues with an N-linked fatty acyl chain condensed at the non-reducing end. As understood in the art, LCOs differ in the number of GlcNAc residues in the backbone, in the length and degree of saturation of the fatty acyl chain and in the substitutions of reducing and non-reducing sugar residues), linoleic acid or derivatives thereof, linolenic acid or derivatives thereof, maleic hydrazide, mepiquat chloride, mepiquat pentaborate, 1-methylcyclopropene, 3'-methyl abscisic acid, 2-(1-naphthyl)acetamide, 1-naphthylacetic acid, 2- naphthyloxyacetic acid, nitrophenolate-mixture, 4-Oxo-4[(2-phenylethyl)amino]butyric acid, paclobutrazol, 4-phenylbutyric acid, N-phenylphthalamic acid, prohexadione, prohexadione-calcium, prohydrojasmon, salicylic acid, , salicylic acid methyl ester, strigolacton, tecnazene, thidiazuron, triacontanol, trinexapac, trinexapac-ethyl, tsitodef, uniconazole, uniconazole-P, 2-fluoro-N-(3-methoxyphenyl)-*9H*-purin-6-amine.

If the respective common name encompasses more than one form of the active ingredient, the name preferably defines the commercially available form.

Each of the further active ingredients mentioned (= active ingredients (C*), (C1*), (C2*) etc.) may then preferably be combined with one of the binary combinations according to the present invention, according to the scheme (a)+(b)+(C*) or else according to the scheme (a)+(b)+(C1*)+(C2*) etc.

The stated amounts are application rates (g a.i./ha = grams of active substance per hectare) and hence also define the ratios in a co-formulation, a premix, a tankmix or a sequential application of the combined active ingredients.

The combinations/compositions can be applied both by the pre-emergence method and by the post-emergence method. This applies both to pre- and post-emergence with respect to the harmful plants and, in the case of selective control of the harmful plants, to pre- or post-emergence of the crop plants. Mixed forms are also possible, for example control of the harmful plants at their pre- or post-emergence stage after emergence of the crop plants.

The active ingredient combinations/compositions of the invention are suitable for control of a broad spectrum of weeds on uncultivated land, on pathways, on railway tracks, in industrial areas ("industrial weed control") or in plantation crops, such as temperate, subtropical and tropical climates or geographies. Examples of plantation crops are oil palms, nuts (e.g. almonds, hazelnuts, walnuts, macadamia), coconut, berries, rubber trees, citrus (e.g. oranges,

lemons, mandarins), bananas, pineapples, cotton, sugarcane, tea, coffee, cacao and the like. They are likewise suitable for use in pomiculture (e.g. pomaceous fruits such as apples, pears, cherries, mangoes and kiwis) and viticulture. The combination/compositions can also be used for preparation for seeding ("burn-down", "no-till" or "zero-till" method) or for treatment after harvesting ("chemical fallow"). The possible uses of the active ingredient combinations also extend to weed control in tree crops, for example young Christmas tree crops or eucalyptus crops, in each case before planting or after planting (including "over-top" treatment).

The combination/compositions can also be used to control unwanted plant growth in economically important crop plants ("useful plants") such as wheat (hard and soft wheat), maize, soya, sugarbeet, sugarcane, cotton, rice, beans (for example, bush beans and broad beans), flax, barley, oats, rye, triticale, potato and millet/sorghum, pastureland and areas of grass/lawn and plantation crops. Plantation crops are, *inter alia*, pomaceous fruit (apple, pear, quince), *Ribes* species (blackberry, raspberry), citrus, *Prunus* species (cherries, nectarines, almonds), nuts (walnut, pecan nut, hazelnut, cashew, macadamia), mango, cacao, coffee, grapevines (for eating or for making wine), palms (such as oil palms, date palms, coconut palms), eucalyptus, kaki, persimmon, caoutchouc, pineapple, banana, avocado, lychee, forest cultures (Eucalypteae, Piniaceae, Piceae, Meliaceae, etc.).

The active herbicidal ingredient combinations of the invention, in the respective use forms (= herbicidal products), have synergies with regard to herbicidal action and selectivity, and favourable action with regard to the spectrum of weeds. They have excellent herbicidal efficacy against a broad spectrum of economically important monocotyledonous and dicotyledonous annual harmful plants. The active ingredients also have good control over perennial harmful plants which are difficult to control and produce shoots from rhizomes, rootstocks or other perennial organs.

For application, the active ingredient combinations can be deployed onto the plants (e.g. harmful plants such as mono- or dicotyledonous weeds or unwanted crop plants), the seed (e.g. grains, seeds or vegetative propagation organs such as tubers or parts of shoots having buds), or the area in which the plants grow (e.g. the growing area).

The substances can be deployed prior to sowing (if appropriate also by incorporation into the soil), prior to emergence or after emergence. Preference is given to use by the early post-seeding pre-emergence method or by the post-emergence method in plantation crops against

harmful plants that have not yet emerged or have already emerged. The application can also be integrated into weed management systems with divided repeated applications (sequentials).

Specific examples of some representatives of the mono- and dicotyledonous weed flora which can be controlled by the combinations/compositions according to the invention are as follows, although the enumeration is not intended to impose a restriction to particular species.

Among the monocotyledonous weed species, for example, Aegilops, Agropyron, Agrostis, Alopecurus, Apera, Avena, Brachicaria, Bromus, Cynodon, Dactyloctenium, Digitaria, Echinochloa, Eleocharis, Eleusine, Eragrostis, Eriochloa, Festuca, Fimbristylis, Imperata, Ischaemum, Heteranthera, Imperata, Leptochloa, Lolium, Monochoria, Panicum, Paspalum, Phalaris, Phleum, Poa, Rottboellia, Sagittaria, Scirpus, Setaria, Sorghum, Sphenoclea and Cyperus species are covered by the annual group.

In the case of dicotyledonous weed species, the spectrum of action extends to species such as, for example, Abutilon, Amaranthus, Ambrosia, Anoda, Anthemis, Aphanes, Artemisia, Atriplex, Bellis, Bidens, Capsella, Carduus, Cassia, Centaurea, Chenopodium, Cirsium, Convolvulus, Datura, Desmodium, Emex, Erodium, Erysimum, Euphorbia, Galeopsis, Galinsoga, Galium, Geranium, Hibiscus, Ipomoea, Kochia, Lamium, Lepidium, Lindernia, Matricaria, Mentha, Mercurialis, Mullugo, Myosotis, Papaver, Pharbitis, Plantago, Polygonum, Portulaca, Ranunculus, Raphanus, Rorippa, Rotala, Rumex, Salsola, Senecio, Sesbania, Sida, Sinapis, Solanum, Sonchus, Sphenoclea, Stellaria, Taraxacum, Thlaspi, Trifolium, Urtica, Veronica, Viola, Xanthium.

If the active ingredient combinations of the invention are applied to the soil surface before germination, either the emergence of the weed seedlings is prevented completely or the weeds grow until they have reached the cotyledon stage, but then stop growing and ultimately die completely after three to four weeks have passed.

If the active ingredients are applied post-emergence to the green parts of the plants, growth stops after the treatment, and the harmful plants remain at the growth stage at the time of application, or they die completely after a certain time, and so this eliminates competition by the weeds, which is harmful to the crop plants, very early and in a sustained manner.

The herbicidal products of the invention are notable for a rapid onset and long duration of herbicidal action. In general, the rainfastness of the active ingredients in the combinations of the invention is favourable. A particular advantage is that the effective dosages of compounds (a) and (b) that are used in the combinations can be adjusted to such a low level that their soil action is optimally low. Therefore, the use thereof in sensitive crops is not just enabled, but groundwater contamination is also virtually prevented. The inventive combination of active ingredients allows the required application rate of the active ingredients to be reduced considerably.

The combined use of herbicides (a) and (b) achieves performance properties extending beyond what was to be expected on account of the known properties of the individual herbicides for the combination thereof. For example, the herbicidal effects for a particular harmful plant species exceed the expected value as can be estimated by standard methods, for example according to Colby or other extrapolation methods.

A synergistic effect exists whenever the effect, the herbicidal effect here, of the active ingredient combination is greater than the sum total of the effects of the active ingredients applied individually. The expected activity for a given combination of two active ingredients can be calculated according to S.R. Colby ("Calculating Synergistic and Antagonistic Responses of Herbicide Combinations", Weeds 15 (1967), 20-22) (see below).

The synergistic effects therefore permit, for example, a reduction in the application rates of the individual active ingredients, a higher efficacy at the same application rate, the control of species of harmful plants which are as yet uncovered (gaps), elevated residual action, an extended period of efficacy, an elevated speed of action, an extension of the period of application and/or a reduction in the number of individual applications required and - as a result for the user - weed control systems which are more advantageous economically and ecologically.

Even though the combinations of the invention have excellent herbicidal activity with respect to mono- and dicotyledonous weeds, many economically important crop plants, depending on the structure of the respective active ingredient combinations of the invention and the application rate thereof, are damaged only insignificantly, if at all. Economically important crops here are, for example, dicotyledonous crops from the genera of Arachis, Beta, Brassica, Cucumis, Cucurbita, Helianthus, Daucus, Glycine, Gossypium, Ipomoea, Lactuca, Linum, Lycopersicon, Nicotiana, Phaseolus, Pisum, Solanum, Vicia, or

monocotyledonous crops from the genera of Allium, Ananas, Asparagus, Avena, Hordeum, Oryza, Panicum, Saccharum, Secale, Sorghum, Triticale, Triticum and Zea.

In addition, the combination/compositions of the invention in some cases have outstanding growth-regulating properties in crop plants. They intervene in the plants' own metabolism with regulatory effect, and can thus be used for the controlled influencing of plant constituents and to facilitate harvesting, for example by triggering desiccation and stunted growth. Furthermore, they are also suitable for the general control and inhibition of unwanted vegetative growth without killing the plants in the process. Inhibition of vegetative growth plays a major role for many mono- and dicotyledonous crops since this can reduce or completely prevent lodging.

Owing to their herbicidal and plant growth-regulatory properties, the combinations/compositions can be used to control harmful plants in known plant crops or in tolerant crop plants still to be developed, modified by conventional mutagenesis or modified by genetic engineering. In general, transgenic plants feature particular advantageous properties in addition to resistances to the combinations/compositions of the invention, for example resistances to plant diseases or the organisms that cause plant diseases such as certain insects, or microorganisms such as fungi, bacteria or viruses. Other particular properties relate, for example, to the harvested material with regard to quantity, quality, storability, combinations/composition and specific constituents. For instance, there are known transgenic plants with an elevated starch content or altered starch quality, or those with a different fatty acid combinations/composition in the harvested material. Other particular properties may be tolerance or resistance to abiotic stressors, for example heat, low temperatures, drought, salinity and ultraviolet radiation.

The active ingredient combinations of the invention can preferably be used as herbicides in crops of crop plants that are resistant, or have been made resistant by genetic engineering, to the phytotoxic effects of the herbicides.

The active ingredient combinations of the invention can preferably be used in transgenic crops that are tolerant or have been rendered tolerant to the active ingredients used.

The active ingredient combinations of the invention can preferably also be used in transgenic crops which are resistant to growth regulators, for example dicamba, or to herbicides which inhibit essential plant enzymes, for example acetolactate synthases (ALS), EPSP synthases, glutamine synthases (GS) or hydroxyphenylpyruvate dioxygenases (HPPD), or to herbicides

from the group of the sulfonylureas, the glyphosates, glufosinates or benzoylisoxazoles and analogous active ingredients.

The invention therefore also provides a method of controlling unwanted plant growth, optionally in crops of crop plants, preferably on uncultivated land or in plantation crops, characterized in that one or more herbicides of type (a) is/are applied with one or more herbicides of type (b) to the harmful plants, parts of plants or plant seeds (seed) or to the growing area.

The invention also provides for the use of the novel combinations of compounds (a)+(b) for control of harmful plants, optionally in crops of crop plants, preferably on uncultivated land and plantation crops, but also for control of harmful plants before the sowing of the subsequent crop plant, such as, in particular, for preparation for seeding ("burn-down application").

The active ingredient combinations of the invention may either take the form of mixed formulations of the two components, if appropriate with further active ingredients, additives and/or customary formulation auxiliaries, which are then applied in a customary manner diluted with water, or can be prepared as what are called tankmixes by joint dilution of the separately formulated or partially separately formulated components with water.

The compounds (a) and (b) or their combinations can be formulated in various ways according to which biological and/or physicochemical parameters are required. Examples of general formulation options are: wettable powders (WP), water-soluble powders (SP), emulsifiable concentrates (EC), water-soluble concentrates, aqueous solutions (SL), emulsions (EW), such as oil-in-water and water-in-oil emulsions, sprayable solutions or emulsions, dispersions based on oil or water, oil dispersions (OD), suspoemulsions, suspension concentrates (SC), oil-miscible solutions, capsule suspensions (CS), dusting products (DP), dressings, granules for soil application or scattering, granules (GR) in the form of microgranules, spray granules, absorption and adsorption granules, water-dispersible granules (WG), water-soluble granules (SG), ULV formulations, microcapsules or waxes.

The invention therefore also provides herbicidal and plant-growth-regulating compositions containing the active ingredient combinations of the invention.

The individual types of formulation are known in principle and are described, for example, in: Winnacker-Küchler, "Chemische Technologie" [Chemical Technology], Volume 7, C.

Hanser Verlag Munich, 4th Ed. 1986; van Valkenburg, "Pesticides Formulations", Marcel Dekker, N.Y., 1973; K. Martens, "Spray Drying Handbook", 3rd Ed. 1979, G. Goodwin Ltd. London.

The formulation auxiliaries required, such as inert materials, surfactants, solvents and further additives, are likewise known and are described, for example, in: Watkins, "Handbook of Insecticide Dust Diluents and Carriers", 2nd Ed., Darland Books, Caldwell N.J.; H.v. Olphen, "Introduction to Clay Colloid Chemistry"; 2nd Ed., J. Wiley & Sons, N.Y. Marsden, "Solvents Guide", 2nd Ed., Interscience, N.Y. 1963; McCutcheon's "Detergents and Emulsifiers Annual", MC Publ. Corp., Ridgewood N.J.; Sisley and Wood, "Encyclopedia of Surface Active Agents", Chem. Publ. Co. Inc., N.Y. 1964, Schönfeldt, "Grenzflächenaktive Äthylenoxidaddukte" ["Interface-active Ethylene Oxide Adducts"], Wiss. Verlagsgesellschaft, Stuttgart 1976, Winnacker-Küchler, "Chemische Technologie", Volume 7, C. Hanser Verlag Munich, 4th Ed. 1986.

On the basis of these formulations, it is also possible to produce combinations with other pesticidally active substances, such as other herbicides, fungicides, insecticides or other pesticides (for example acaricides, nematicides, molluscicides, rodenticides, aphicides, avicides, larvicides, ovicides, bactericides, viricides etc.), and also with fertilizers and/or growth regulators, for example in the form of a finished formulation or as a tankmix.

Wettable powders are preparations which can be dispersed uniformly in water and, in addition to the active ingredient, apart from a diluent or inert substance, also comprise surfactants of the ionic and/or nonionic type (wetting agents, dispersants), for example polyoxyethylated alkylphenols, polyoxyethylated fatty alcohols, polyoxyethylated fatty amines, fatty alcohol polyglycol ether sulfates, alkanesulfonates, alkylbenzenesulfonates, sodium lignosulfonate, sodium 2,2'-dinaphthylmethane-6,6'-disulfonate, sodium dibutylnaphthalenesulfonate or else sodium oleoylmethyltaurate. To produce the wettable powders, the active herbicidal ingredients are finely ground, for example in customary apparatuses such as hammer mills, blower mills and air-jet mills, and simultaneously or subsequently mixed with the formulation auxiliaries.

Emulsifiable concentrates are produced by dissolving the active ingredient in an organic solvent, for example butanol, cyclohexanone, dimethylformamide, xylene, or else relatively high-boiling aromatics or hydrocarbons or mixtures of the organic solvents, with addition of one or more ionic and/or nonionic surfactants (emulsifiers). Examples of emulsifiers which

may be used are: calcium alkylarylsulfonate salts, such as calcium dodecylbenzenesulfonate, or nonionic emulsifiers such as fatty acid polyglycol esters, alkylaryl polyglycol ethers, fatty alcohol polyglycol ethers, propylene oxide-ethylene oxide condensation products, alkyl polyethers, sorbitan esters, for example sorbitan fatty acid esters, or for example polyoxyethylene sorbitan fatty acid esters.

Dusting products are obtained by grinding the active ingredient with finely distributed solids, for example talc, natural clays, such as kaolin, bentonite and pyrophyllite, or diatomaceous earth.

Suspension concentrates may be water- or oil-based. They may be produced, for example, by wet-grinding by means of commercial bead mills and optional addition of surfactants as already listed above, for example, for the other formulation types.

Emulsions, for example oil-in-water emulsions (EW), can be produced, for example, by means of stirrers, colloid mills and/or static mixers using aqueous organic solvents and optionally surfactants as already listed above, for example, for the other formulation types.

Granules can be produced either by spraying the active ingredient onto granular inert material capable of adsorption or by applying active ingredient concentrates to the surface of carrier substances, such as sand, kaolinites or granular inert material, by means of adhesives, for example polyvinyl alcohol, sodium polyacrylate or else mineral oils. Suitable active ingredients can also be granulated in the manner customary for the production of fertilizer granules - if desired as a mixture with fertilizers.

Water-dispersible granules are produced generally by processes such as spray-drying, fluidized bed granulation, pan granulation, mixing with high-speed mixers and extrusion without solid inert material.

The agrochemical preparations generally contain 0.1 to 99 per cent by weight, especially 0.2% to 95% by weight, of active ingredients of types (a) and/or (b), the following concentrations being customary, depending on the type of formulation:

In wettable powders, the active ingredient concentration is, for example, about 10% to 95% by weight, the remainder to 100% by weight consisting of customary formulation constituents. In the case of emulsifiable concentrates, the active ingredient concentration may be about 1% to 90% by weight, preferably 5 to 80 per cent by weight.

Formulations in the form of dusts usually contain 5% to 20% by weight of active ingredient; sprayable solutions contain about 0.05 to 80, preferably 2 to 50, per cent by weight (% by weight) of active ingredient.

In the case of granules such as dispersible granules, the active ingredient content depends partially on whether the active compound is in liquid or solid form and on which granulation auxiliaries and fillers are used. In general, the content in the water-dispersible granules is between 1% and 95% by weight, preferably between 10% and 80% by weight.

In addition, the active ingredient formulations mentioned optionally comprise the respectively customary adhesives, wetting agents, dispersants, emulsifiers, penetrants, preservatives, antifreeze agents and solvents, fillers, colorants and carriers, antifoams, evaporation inhibitors and pH- or viscosity-modifying agents.

For application, the formulations in commercial form are, if appropriate, diluted in a customary manner, for example in the case of wettable powders, emulsifiable concentrates, dispersions and water-dispersible granules with water. Dust-type preparations, granules for soil application or broadcasting and sprayable solutions are not normally diluted further with other inert substances prior to application.

The active ingredients can be deployed onto the plants, plant parts, plant seeds or the area under cultivation (soil), preferably on the green plants and plant parts, and optionally additionally onto the soil.

One possible use is the joint application of the active ingredients in the form of tankmixes, where the optimally formulated concentrated formulations of the individual active ingredients together are mixed in a tank with water, and the spray liquor obtained is deployed.

A joint herbicidal formulation of the inventive combination of active ingredients (a) and (b) has the advantage that it can be applied more easily since the quantities of the components are already set at the correct ratio to one another. Moreover, the auxiliaries in the formulation can be adjusted optimally to one another, whereas a tank mix of different formulations may result in unwanted combinations of auxiliaries.

General Methods for Testing:

Tank-mix; post-emergence

A) Method Description

Seeds of crops (spring wheat, TRZAS; spring barley, HORVS; maize, ZEAMA) were placed in sandy loam soil in peat pots, covered with soil and cultivated in a greenhouse under good growth conditions. Two to three weeks after sowing, the test plants were treated at the 1 to 3-leaf stage. The herbicide/safener active compound combinations according to the invention, formulated as wettable powders or emulsion concentrates, and, in parallel tests, the correspondingly formulated individual active compounds were sprayed onto the green parts of the plants in various dosages using an amount of water of 300 l/ha (converted).

The pots were returned under good growing conditions in a glasshouse and a visual assessment of herbicidal effects was made at intervals from 1 to 3 weeks after herbicide application (DAT = days after treatment). Assessment was on a percentage basis in comparison with untreated control plants (0% = no injury, 100% = complete kill).

The effectiveness of the safener treatment is displayed as:
Reduction [Difference] = herbicide damage without safener – herbicide damage with safener
Reduction [%] = (Reduction [Difference] * 100) / herbicide damage without safener

Treatment 1 day before

A) Method Description

Seeds of crops (spring wheat, TRZAS; spring barley, HORVS; maize, ZEAMA) were placed in sandy loam soil in pots of a diameter of 7-8 cm, covered with soil, and cultivated in a greenhouse under good growth conditions until plants were at the 1-3 leaf stage (BBCH 11-13). For split safener and herbicide treatment, first the safener was applied followed by the herbicide treatment on the following day. The safener and herbicides were formulated as WP and sprayed onto the green parts of the plants as an aqueous suspension at an equivalent water application rate of 300 l/ha, with addition of wetting agent and adjuvants (e.g. Mero, 1.5 l/ha; ammonium sulphate, 2 kg/ha). An equivalent set of plants was treated with the herbicides but without the prior safener treatment.

After application, the test plants were kept in the greenhouse under good growth conditions. 10 and 21 days after treatment (DAT) with the herbicide, % crop damage observed on the treated plants was scored visually in comparison to control plants that had not received any safener or herbicide treatment.

The effectiveness of the safener treatment is displayed as:
Reduction [Difference] = herbicide damage without safener – herbicide damage with safener
Reduction [%] = (Reduction [Difference] * 100) / herbicide damage without safener

Seed Treatment; pre-emergence

A) Method Description

For the safener seed treatment, sufficient seeds of the respective crops (spring wheat, TRZAS; spring barley, HORVS; maize, ZEAMA) were weighed into screw top glass bottles approximately twice the volume of the seeds.

The specified safeners, formulated as wettable powder (WP) were weighed out so that the specified rates (g a.i./kg seed) would be obtained, dissolved in water (1ml water per 10g of seeds), and added to the seeds to produce a slurry.

The bottles were capped and then placed in an overhead shaker (set at medium speed for ca. 60 minutes) so that the seeds were evenly coated with the slurry. The bottles were uncapped and the seeds were either placed on paper and dried for an interval of 3-4 hours prior to sowing, or directly sown. Seeds were placed in sandy loam soil in pots of a diameter of 7-8 cm, and covered with soil.

Pre-emergence application of the specified herbicides was done subsequently, on two sets of plants:

a) seed treatment with safener, as described above
b) no safener treatment

The herbicides were formulated as WP and was sprayed onto the soil surface as an aqueous suspension at an equivalent water application rate of 300 l/ha.

After application, the test plants were kept in the greenhouse under good growth conditions. At intervals up to 4 weeks after application (=28 days after treatment; DAT), % crop damage observed on the treated plants was scored visually in comparison to control plants that had not received any safener or herbicide treatment.

Values in the table below are mean values of at least 2 replicates. The effectiveness of the safener treatment is displayed as: Reduction [Difference] = herbicide damage without safener – herbicide damage with safener Reduction [%] = (Reduction [Difference] * 100) / herbicide damage without safener.

Seed Treatment; post-emergence

A) Method Description

For the safener seed treatment, sufficient seeds of the respective crops (spring wheat, TRZAS; spring barley, HORVS; maize, ZEAMA) were weighed into screw top glass bottles approximately twice the volume of the seeds.

The specified safeners, formulated as wettable powder (WP) were weighed out so that the specified rates (g a.i./kg seed) would be obtained, dissolved in water (1ml water per 10g of seeds), and added to the seeds to produce a slurry.

The bottles were capped and then placed in an overhead shaker (set at medium speed for ca. 60 minutes) so that the seeds were evenly coated with the slurry. The bottles were uncapped and the seeds were either placed on paper and dried for an interval of 3-4 hours prior to sowing, or directly sown. Seeds were placed in sandy loam soil in pots of a diameter of 7-8 cm, covered with soil, and cultivated in a greenhouse under good growth conditions.

Post-emergence application of the specified herbicides was done when the plants had reached growth stage BBCH11-13, on two sets of plants:

a) seed treatment with safener, as described above b) no safener treatment

The herbicides were formulated as WP and sprayed onto the green parts of the plants as an aqueous suspension at an equivalent water application rate of 300 l/ha, with addition of wetting agent and adjuvants (e.g. Mero, 1.5 l/ha; ammonium sulphate, 2 kg/ha)

After application, the test plants were kept in the greenhouse under good growth conditions. 10 and 21 days after treatment (DAT) with the herbicide, % crop damage observed on the treated plants was scored visually in comparison to control plants that had not received any safener or herbicide treatment.

Values in the table below are mean values of at least 2 replicates. The effectiveness of the safener treatment is displayed as: Reduction [Difference] = herbicide damage without safener – herbicide damage with safener Reduction [%] = (Reduction [Difference] * 100) / herbicide damage without safener

Testing of Compounds according to the Invention:

A. Formulation examples

a) A dusting product is obtained by mixing 10 parts by weight of an active ingredient (a) or (b) or an active ingredient mixture (a) + (b) (and optionally further active ingredient components) and/or salts thereof and 90 parts by weight of talc as inert substance, and comminuting in a beater mill.

b) A wettable powder which is readily dispersible in water is obtained by mixing 25 parts by weight of an active ingredient/active ingredient mixture, 64 parts by weight of kaolin-containing quartz as inert substance, 10 parts by weight of potassium lignosulfonate and 1 part by weight of sodium oleoylmethyltaurate as wetting agent and dispersant, and grinding the mixture in a pinned-disk mill.

c) A dispersion concentrate which is readily dispersible in water is obtained by mixing 20 parts by weight of an active ingredient/active ingredient mixture with 6 parts by weight of alkylphenol polyglycol ether (Triton® X 207), 3 parts by weight of isotridecanol polyglycol ether (8 EO) and 71 parts by weight of paraffinic mineral oil (boiling range for example approximately 255 to 277°C) and grinding the mixture in a friction ball mill to a fineness of below 5 microns.

d) An emulsifiable concentrate is obtained from 15 parts by weight of an active ingredient/active ingredient mixture, 75 parts by weight of cyclohexanone as solvent and 10 parts by weight of oxyethylated nonylphenol as emulsifier.

e) Water-dispersible granules are obtained by mixing
75 parts by weight of an active ingredient/active ingredient mixture,
10 parts by weight of calcium lignosulfonate,
5 parts by weight of sodium lauryl sulfate,
3 parts by weight of polyvinyl alcohol and
7 parts by weight of kaolin,
grinding the mixture in a pinned-disk mill, and granulating the powder in a fluidized bed by spray application of water as a granulating liquid.

f) Water-dispersible granules are also obtained by homogenizing and precomminuting, in a colloid mill,
25 parts by weight of an active ingredient/active ingredient mixture,
5 parts by weight of sodium 2,2'-dinaphthylmethane-6,6'-disulfonate,
2 parts by weight of sodium oleoylmethyltaurate,
1 part by weight of polyvinyl alcohol,
17 parts by weight of calcium carbonate and
50 parts by weight of water,
then grinding the mixture in a bead mill and atomizing and drying the resulting suspension in a spray tower by means of a one-phase nozzle.

B. Biological examples

On employment of the combinations of the invention, herbicidal effects on a harmful plant species that exceed the formal sum total of the effects of the herbicides present when applied alone are frequently observed. Alternatively, in some cases, it is possible to observe that a smaller application rate for the herbicide combination is required in order to achieve the same effect for a harmful plant species compared to the individual preparations. Such increases in action or increases in effectiveness or reductions in application rate are a strong indication of a synergistic effect.

When the observed efficacies already exceed the formal sum total of the values of the tests with individual applications, they also exceed the expected value according to Colby, which is calculated using the formula below and is likewise regarded as an indication of synergism (cf. S. R. Colby; in Weeds 15 (1967) pp. 20 to 22):

$$E^C = A+B - (A \cdot B/100)$$

where:

A = efficacy of the active ingredient (a) in % at an application rate of **a** g a.i./ha;

B = efficacy of the active ingredient (b) in % at an application rate of **b** g a.i./ha;

E^C = expected value of the effect of the combination (a)+(b) in % at the combined application rate **a**+**b** g a.i./ha.

The observed values (E^A) from the experiments, given suitable low dosages, show an effect of the combinations exceeding the expected values according to Colby (Δ).

1. Post-emergence action against weeds (Method 1 - used for the data shown in table 4)

Seeds or rhizome pieces of mono- and dicotyledonous weeds are placed in sandy loam in pots, covered with soil and grown in a greenhouse under good growth conditions (temperature, air humidity, water supply). Approximately three weeks after sowing, the test plants are treated at the three-leaf stage with the combination/compositions of the invention. The combination/compositions of the invention, formulated as spray powders or as emulsion concentrates, are sprayed onto the green plant parts in various dosages with an application rate equivalent to 300 to 800 l/ha of water. After the test plants have been left to stand in the greenhouse under optimal growth conditions for about 2 to 4 weeks, the action of the preparations is scored visually in comparison to untreated controls. The combination /compositions of the invention also have good post-emergence herbicidal activity against a broad spectrum of economically important weed grasses and broadleaved weeds.

Effects of the combinations of the invention that exceed the formal sum total of the effects in the case of individual application of the herbicides are frequently observed here. The observed values from the experiments, given suitable low dosages, show an effect of the combinations exceeding the expected values according to Colby.

2. Herbicidal pre-emergence and post-emergence action (field trials)

The experiments were conducted on outdoor plots in accordance with the greenhouse experiments from section 1. The rating was analogous to the experiment in section 1.

3. Herbicidal action and crop plant compatibility (field trials)

Crop plants were grown in outdoor plots under natural outdoor conditions, by laying out seeds or rhizome pieces of typical harmful plants or utilizing natural weed flora. The treatment with the combinations/compositions of the invention followed the emergence of the harmful plants and of the crop plants, generally at the 2- to 4-leaf stage; in some cases (as specified), individual active ingredients or active ingredient combinations were applied pre-emergence or as a sequential treatment partly pre-emergence and/or post-emergence.

In the case of plantation crops, in general, only the soil between the individual crop plants was treated with the active ingredients.

After application, for example 2, 4, 6 and 8 weeks after application, the effect of the preparations was rated visually by comparison with untreated controls. The combination /compositions of the invention also have synergistic herbicidal activity in field trials against a broad spectrum of economically important weed grasses and broadleaved weeds. The comparison showed that the combinations of the invention usually have greater, and in some cases considerably greater, herbicidal action than the sum total of the effects of the individual herbicides, and therefore suggests synergism. The effects over significant parts of the rating period were also above the expected values according to Colby, and therefore likewise suggest synergism. The crop plants, by contrast, were damaged only insignificantly, if at all, as a result of the treatments with the herbicidal products.

4. Definitions in the examples

The following abbreviations are used in the description and the tables that follow:

g a.i./ha = grams of active substance (active ingredient) (= 100% active ingredient) per hectare;

The sum total of the effects of the individual applications is reported under E^A;
expected values according to Colby are each reported under E^C.

The biological results of the combinations/compositions according to the invention are summarized in Table 4. The rating period is reported in days after application (DAT).

Table 4 shows the synergistic effect (Δ) for herbicidal binary combinations comprising (a) 1.68 a substituted isoxazoline-carboxamides of the formula (**I**) and (b) one of B1 to B35, applied by Post-emergence action against weeds (s. Method 1 above).

The following weeds were selected for testing (see table 3):

Table 3

Target	**Bayer code**	
Alopecurus myosuroides	ALOMY_R	**resistant** to herbicidally active compounds of the HRAC groups A and B; population mixture of field origin having increased metabolic resistance (IMR) and some target site resistance (TSR).
Alopecurus myosuroides	ALOMY_S	**sensitive** to customary herbicidally active compounds.
Avena fatua	AVEFA	Wild oat
Brachiaria platyphylla (Griseb.) Nash	BRAPP	broadleaf signalgrass
tectorum L.	BROTE	cheatgrass
Digitaria sanguinalis (L.) Scop.	DIGSA	large crabgrass
barnyardgrass	ECHCG	Echinochloa crus-galli (L.) Beauv.
indica (L.) Gaertn.	ELEIN	*wiregrass*
Hordeum murinum	HORMU	mouse barley
Lolium rigidum	LOLRI	rigid ryegrass
Pharbitis purpurea	PHBPU	Morningglory

Table 4

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ALOMY_R
No. 1.68	2	60
	0,5	30
B4	4	30
	0,4	20
No. 1.68 & B4	2 + 0,4	$E^A = 75$ $(E^C = 68)$ $\Delta = 7$
	0,5 + 4	$E^A = 80$ $(E^C = 51)$ $\Delta = 29$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ALOMY_R
No. 1.68	2	60
B1	0,6	0
No. 1.68 & B1	2 + 0,6	$E^A = 70$ $(E^C = 60)$ $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ALOMY_R
No. 1.68	2	60
	0,5	30
B2	6	20
	0,6	10
No. 1.68 & B2	2 + 6	$E^A = 80$ $(E^C = 68)$ $\Delta = 12$
	2 + 0,6	$E^A = 80$ $(E^C = 64)$ $\Delta = 16$
	0,5 + 6	$E^A = 80$ $(E^C = 44)$ $\Delta = 36$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ALOMY_R
No. 1.68	8	95
	2	60
	0,5	30
B27	4	40
	0,4	20
No. 1.68 & B27	2 + 4	$E^A = 85$ $(E^C = 76)$ $\Delta = 9$
	2 + 0,4	$E^A = 88$ $(E^C = 68)$ $\Delta = 20$
	0,5 + 4	$E^A = 85$ $(E^C = 58)$ $\Delta = 27$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ALOMY_S
No. 1.68	2	85
	0,5	75
B4	4	40
	0,4	20
No. 1.68 & B4	2 + 4	$E^A = 97$ ($E^C = 91$) $\Delta = 6$
	0,5 + 4	$E^A = 100$ ($E^C = 85$) $\Delta = 15$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ALOMY_S
No. 1.68	8	90
	2	85
	0,5	75
B1	6	30
	0,6	10
No. 1.68 & B1	8 + 0,6	$E^A = 97$ ($E^C = 91$) $\Delta = 6$
	2 + 6	$E^A = 95$ ($E^C = 90$) $\Delta = 5$
	2 + 0,6	$E^A = 96$ ($E^C = 87$) $\Delta = 9$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ALOMY_S
No. 1.68	2	85
B27	0,4	40
No. 1.68 & B27	2 + 0,4	$E^A = 97$ ($E^C = 91$) $\Delta = 6$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against AVEFA
No. 1.68	0,5	75
B1	6	20
No. 1.68 & B1	0,5 + 6	$E^A = 85$ ($E^C = 80$) $\Delta = 5$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against BRAPP
No. 1.68	0,5	0
B4	0,4	30
No. 1.68 & B4	0,5 + 0,4	$E^A = 40$ ($E^C = 30$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against BRAPP
No. 1.68	0,5	0
B1	0,6	20
No. 1.68 & B1	0,5 + 0,6	$E^A = 30$ ($E^C = 20$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against BRAPP
No. 1.68	0,5	0
B2	6	40
	0,6	10
No. 1.68 & B2	0,5 + 6	$E^A = 60$ ($E^C = 40$) $\Delta = 20$
	0,5 + 0,6	$E^A = 20$ ($E^C = 10$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against BROTE
No. 1.68	0,5	0
B4	0,4	30
No. 1.68 & B4	0,5 + 0,4	$E^A = 30$ ($E^C = 20$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against BROTE
No. 1.68	8	85
	0,5	0
B1	6	20
	0,6	0
No. 1.68 & B1	8 + 6	$E^A = 99$ ($E^C = 88$) $\Delta = 11$
	8 + 0,6	$E^A = 97$ ($E^C = 85$) $\Delta = 12$
	0,5 + 6	$E^A = 40$ ($E^C = 20$) $\Delta = 20$
	0,5 + 0,6	$E^A = 20$ ($E^C = 0$) $\Delta = 20$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against BROTE
No. 1.68	8	85
	0,5	0
B2	6	30
No. 1.68 & B2	8 + 6	$E^A = 97$ ($E^C = 90$) $\Delta = 7$

	0,5 + 6	$E^A = 70$ ($E^C = 30$) $\Delta = 40$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against BROTE
No. 1.68	0,5	0
B27	0,4	20
No. 1.68 & B27	0,5 + 0,4	$E^A = 30$ ($E^C = 20$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against DIGSA
No. 1.68	0,5	0
B2	6	40
No. 1.68 & B2	0,5 + 6	$E^A = 70$ ($E^C = 40$) $\Delta = 30$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against DIGSA
No. 1.68	0,5	0
B27	4	80
No. 1.68 & B27	0,5 + 4	$E^A = 85$ ($E^C = 80$) $\Delta = 5$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ECHCG
No. 1.68	0,5	0
B2	6	75
No. 1.68 & B2	0,5 + 6	$E^A = 80$ ($E^C = 75$) $\Delta = 5$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ELEIN
No. 1.68	0,5	0
B1	0,6	40
No. 1.68 & B1	0,5 + 0,6	$E^A = 75$ ($E^C = 40$) $\Delta = 35$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against ELEIN
No. 1.68	0,5	0

B27	0,4	80
No. 1.68 & B27	0,5 + 0,4	$E^A = 88$ ($E^C = 80$) $\Delta = 8$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against HORMU
No. 1.68	0,5	0
B1	6	20
	0,6	0
No. 1.68 & B1	0,5 + 6	$E^A = 30$ ($E^C = 20$) $\Delta = 10$
	0,5 + 0,6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against HORMU
No. 1.68	0,5	0
B2	6	10
	0,6	0
No. 1.68 & B2	0,5 + 6	$E^A = 20$ ($E^C = 10$) $\Delta = 10$
	0,5 + 0,6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against HORMU
No. 1.68	0,5	0
B27	4	30
	0,4	20
No. 1.68 & B27	0,5 + 4	$E^A = 95$ ($E^C = 30$) $\Delta = 65$
	0,5 + 0,4	$E^A = 50$ ($E^C = 20$) $\Delta = 30$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against LOLRI
No. 1.68	0,5	40
B1	6	20
No. 1.68 & B1	0,5 + 6	$E^A = 60$ ($E^C = 52$) $\Delta = 8$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against LOLRI
No. 1.68	2	88
	0,5	40

B2	6	20
No. 1.68 & B2	2 + 6	$E^A = 95$ ($E^C = 90$) $\Delta = 5$
	0,5 + 6	$E^A = 60$ ($E^C = 52$) $\Delta = 8$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against LOLRI
No. 1.68	2	88
	0,5	40
B27	0,4	20
No. 1.68 & B27	2 + 0,4	$E^A = 99$ ($E^C = 90$) $\Delta = 9$
	0,5 + 0,4	$E^A = 80$ ($E^C = 52$) $\Delta = 28$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 14 DAT [%] against SORHA
No. 1.68	0,5	0
B27	4	80
No. 1.68 & B27	0,5 + 4	$E^A = 88$ ($E^C = 80$) $\Delta = 8$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY_R
No. 1.68	0,5	0
B4	4	10
No. 1.68 & B4	0,5 + 4	$E^A = 40$ ($E^C = 10$) $\Delta = 30$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY_R
No. 1.68	2	0
B1	6	0
No. 1.68 & B1	2 + 6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY_R
No. 1.68	2	0
	0,5	0
B2	6	0
No. 1.68 & B2	2 + 6	$E^A = 20$ ($E^C = 0$) $\Delta = 20$
	0,5 + 6	$E^A = 20$ ($E^C = 0$) $\Delta = 20$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY_R
No. 1.68	2	0
	0,5	0
B27	4	0
	0,4	0
No. 1.68 & B27	2 + 4	$E^A = 70$ ($E^C = 0$) $\Delta = 70$
	2 + 0,4	$E^A = 75$ ($E^C = 0$) $\Delta = 75$
	0,5 + 4	$E^A = 75$ ($E^C = 0$) $\Delta = 75$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY
No. 1.68	8	88
	2	30
	0,5	10
B4	4	10
	0,4	0
No. 1.68 & B4	8 + 4	$E^A = 100$ ($E^C = 89$) $\Delta = 11$
	8 + 0,4	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	2 + 4	$E^A = 100$ ($E^C = 37$) $\Delta = 63$
	2 + 0,4	$E^A = 60$ ($E^C = 30$) $\Delta = 30$
	0,5 + 4	$E^A = 100$ ($E^C = 19$) $\Delta = 81$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY
No. 1.68	8	88
	2	30
B1	6	0
	0,6	0
No. 1.68 & B1	8 + 6	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	8 + 0,6	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	2 + 6	$E^A = 80$ ($E^C = 30$) $\Delta = 50$
	2 + 0,6	$E^A = 85$ ($E^C = 30$) $\Delta = 55$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY
No. 1.68	8	88

	2	30
	0,5	10
B2	6	10
	0,6	10
No. 1.68 & B2	8 + 6	$E^A = 100$ ($E^C = 89$) $\Delta = 11$
	8 + 0,6	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	2 + 6	$E^A = 80$ ($E^C = 37$) $\Delta = 43$
	2 + 0,6	$E^A = 99$ ($E^C = 30$) $\Delta = 69$
	0,5 + 6	$E^A = 40$ ($E^C = 90$) $\Delta = 21$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ALOMY
No. 1.68	8	88
	2	30
	0,5	10
B27	4	10
	0,4	0
No. 1.68 & B27	8 + 4	$E^A = 100$ ($E^C = 89$) $\Delta = 11$
	8 + 0,4	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	2 + 4	$E^A = 100$ ($E^C = 37$) $\Delta = 63$
	2 + 0,4	$E^A = 100$ ($E^C = 30$) $\Delta = 70$
	0,5 + 4	$E^A = 85$ ($E^C = 19$) $\Delta = 66$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against AVEFA
No. 1.68	8	88
	2	70
	0,5	0
B4	4	20
	0,4	10
No. 1.68 & B4	8 + 4	$E^A = 100$ ($E^C = 90$) $\Delta = 10$
	8 + 0,4	$E^A = 100$ ($E^C = 89$) $\Delta = 11$
	2 + 4	$E^A = 100$ ($E^C = 76$) $\Delta = 24$
	0,5 + 4	$E^A = 30$ ($E^C = 20$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against AVEFA
No. 1.68	8	88
	2	70

	0,5	0
B1	6	0
	0,6	0
No. 1.68 & B1	8 + 6	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	8 + 0,6	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	2 + 6	$E^A = 80$ ($E^C = 70$) $\Delta = 10$
	0,5 + 6	$E^A = 30$ ($E^C = 0$) $\Delta = 30$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against AVEFA
No. 1.68	8	88
	0,5	0
B2	6	10
	0,6	10
No. 1.68 & B2	8 + 6	$E^A = 100$ ($E^C = 89$) $\Delta = 11$
	8 + 0,6	$E^A = 100$ ($E^C = 89$) $\Delta = 11$
	0,5 + 6	$E^A = 20$ ($E^C = 10$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against AVEFA
No. 1.68	8	88
	2	70
	0,5	0
B27	4	40
	0,4	20
No. 1.68 & B27	8 + 4	$E^A = 100$ ($E^C = 93$) $\Delta = 7$
	8 + 0,4	$E^A = 100$ ($E^C = 90$) $\Delta = 10$
	0,5 + 4	$E^A = 100$ ($E^C = 40$) $\Delta = 60$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against BRAPP
No. 1.68	0,5	0
B2	6	10
No. 1.68 & B2	0,5 + 6	$E^A = 20$ ($E^C = 10$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against BROTE
No. 1.68	8	70
	0,5	0

B4	4	30
	0,4	10
No. 1.68 & B4	8 + 4	$E^A = 100$ ($E^C = 79$) $\Delta = 21$
	8 + 0,4	$E^A = 80$ ($E^C = 73$) $\Delta = 7$
	0,5 + 4	$E^A = 50$ ($E^C = 30$) $\Delta = 20$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against BROTE
No. 1.68	8	70
B1	6	0
	0,6	0
No. 1.68 & B1	8 + 6	$E^A = 100$ ($E^C = 70$) $\Delta = 30$
	8 + 0,6	$E^A = 100$ ($E^C = 70$) $\Delta = 30$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against BROTE
No. 1.68	8	70
	2	20
B2	6	0
	0,6	0
No. 1.68 & B2	8 + 6	$E^A = 88$ ($E^C = 70$) $\Delta = 18$
	8 + 0,6	$E^A = 75$ ($E^C = 70$) $\Delta = 5$
	2 + 6	$E^A = 30$ ($E^C = 20$) $\Delta = 10$
	2 + 0,6	$E^A = 40$ ($E^C = 20$) $\Delta = 20$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against BROTE
No. 1.68	8	70
	2	20
B27	0,4	0
No. 1.68 & B27	8 + 0,4	$E^A = 85$ ($E^C = 70$) $\Delta = 15$
	2 + 0,4	$E^A = 60$ ($E^C = 20$) $\Delta = 40$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against DIGSA
No. 1.68	0,5	0
B4	4	70
No. 1.68 & B4	0,5 + 4	$E^A = 75$ ($E^C = 70$) $\Delta = 5$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against DIGSA
No. 1.68	0,5	0
B2	6	0
No. 1.68 & B2	0,5 + 6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against DIGSA
No. 1.68	8	60
	2	30
	0,5	0
B27	4	30
	0,4	0
No. 1.68 & B27	8 + 4	$E^A = 80$ ($E^C = 72$) $\Delta = 8$
	2 + 4	$E^A = 97$ ($E^C = 51$) $\Delta = 46$
	0,5 + 4	$E^A = 40$ ($E^C = 30$) $\Delta = 10$
	0,5 + 0,4	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ECHCG
No. 1.68	0,5	0
B4	4	85
No. 1.68 & B4	0,5 + 4	$E^A = 100$ ($E^C = 85$) $\Delta = 15$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ECHCG
No. 1.68	8	95
	2	80
	0,5	0
B2	6	0
No. 1.68 & B2	8 + 6	$E^A = 100$ ($E^C = 95$) $\Delta = 5$
	2 + 6	$E^A = 85$ ($E^C = 80$) $\Delta = 5$
	0,5 + 6	$E^A = 20$ ($E^C = 0$) $\Delta = 20$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ELEIN

No. 1.68	2	60
	0,5	0
B4	0,4	20
No. 1.68 & B4	2 + 0,4	$E^A = 85$ ($E^C = 68$) $\Delta = 17$
	0,5 + 0,4	$E^A = 60$ ($E^C = 20$) $\Delta = 40$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ELEIN
No. 1.68	0,5	0
B2	6	30
No. 1.68 & B2	0,5 + 6	$E^A = 70$ ($E^C = 30$) $\Delta = 40$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against ELEIN
No. 1.68	8	85
	2	60
	0,5	0
B27	0,4	20
No. 1.68 & B27	8 + 0,4	$E^A = 100$ ($E^C = 88$) $\Delta = 12$
	2 + 0,4	$E^A = 80$ ($E^C = 68$) $\Delta = 12$
	0,5 + 0,4	$E^A = 30$ ($E^C = 20$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against HORMU
No. 1.68	0,5	0
B4	4	10
No. 1.68 & B4	0,5 + 4	$E^A = 30$ ($E^C = 10$) $\Delta = 20$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against HORMU
No. 1.68	0,5	0
B1	6	0
	0,6	0
No. 1.68 & B1	0,5 + 6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$
	0,5 + 0,6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against

		HORMU
No. 1.68	0,5	0
B27	4	20
No. 1.68 & B27	0,5 + 4	$E^A = 80$ ($E^C = 20$) $\Delta = 60$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against LOLRI
No. 1.68	0,5	0
B4	4	80
	0,4	0
No. 1.68 & B4	0,5 + 4	$E^A = 88$ ($E^C = 80$) $\Delta = 8$
	0,5 + 0,4	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against LOLRI
No. 1.68	2	75
	0,5	0
B1	6	0
No. 1.68 & B1	2 + 6	$E^A = 80$ ($E^C = 75$) $\Delta = 5$
	0,5 + 6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against LOLRI
No. 1.68	2	75
	0,5	0
B2	6	0
No. 1.68 & B2	2 + 6	$E^A = 88$ ($E^C = 75$) $\Delta = 13$
	0,5 + 6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against LOLRI
No. 1.68	2	88
	0,5	40
B27	4	20
	0,4	0
No. 1.68 & B27	2 + 4	$E^A = 100$ ($E^C = 80$) $\Delta = 20$
	2 + 0,4	$E^A = 100$ ($E^C = 75$) $\Delta = 25$
	0,5 + 4	$E^A = 85$ ($E^C = 20$) $\Delta = 65$

	0,5 + 0,4	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against SETVI
No. 1.68	8	95
	0,5	0
B1	0,6	0
No. 1.68 & B1	8 + 0,6	$E^A = 100$ ($E^C = 95$) $\Delta = 5$
	0,5 + 0,6	$E^A = 10$ ($E^C = 0$) $\Delta = 10$

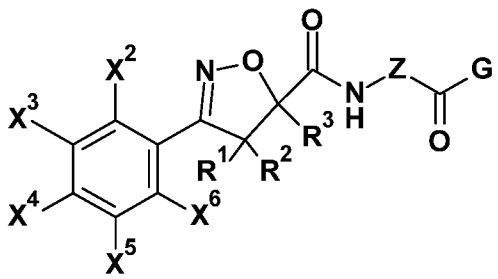
Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against SETVI
No. 1.68	0,5	0
B27	0,4	10
No. 1.68 & B27	0,5 + 0,4	$E^A = 30$ ($E^C = 10$) $\Delta = 20$

Compound/Combination	application rate [g a.i. / ha]	Herbicidal action 28 DAT [%] against SORHA
No. 1.68	0,5	0
B27	4	20
No. 1.68 & B27	0,5 + 4	$E^A = 80$ ($E^C = 20$) $\Delta = 60$

Patent Claims

1. Combinations comprising

(a) substituted isoxazoline-carboxamides of the formula **(I)** or agrochemical acceptable salts thereof



(I)

in which

G represents OR^4 or NR^7R^8

R^1 and R^2 each represent hydrogen;

R^3 represents $(C_1\text{-}C_5)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, $(C_2\text{-}C_5)$-alkenyl, $(C_2\text{-}C_5)$-alkinyl or $(C_1\text{-}C_5)$-alkoxy each optionally substitued "m" times by substituents from the group consisting of halogen, cyano, $(C_1\text{-}C_5)$-alkoxy and hydroxy;

R^4 represents hydrogen,
or
represents $(C_1\text{-}C_{12})$-alkyl, $(C_3\text{-}C_7)$-cycloalkyl, $(C_3\text{-}C_7)$-cycloalkyl-$(C_1\text{-}C_8)$-alkyl, $(C_2\text{-}C_8)$-alkenyl, $(C_5\text{-}C_6)$-cycloalkenyl, $(C_1\text{-}C_4)$-alkylphenyl or $(C_2\text{-}C_8)$-alkinyl each optionally substitued "m" times by substituents from the group consisting of halogen, cyano, $(C_1\text{-}C_6)$-alkoxy, $(C_1\text{-}C_6)$-alkoxycarbonyl, hydroxy, $S(O)_n R^5$;

R^5 represents $(C_1\text{-}C_8)$-alkyl, $(C_2\text{-}C_8)$-alkenyl, $(C_3\text{-}C_6)$-cycloalkyl, benzyl, $CON((C_1\text{-}C_3)\text{-alkyl})_2$ or $(C_1\text{-}C_8)$-alkyl-C(O)-$(C_1\text{-}C_8)$-alkyl each optionally substitued "m" times by substituents from the group consisting of halogen and cyano;

R^6 represents hydrogen,

or

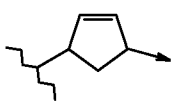
represents (C_1-C_8)-alkyl, (C_3-C_6)-cycloalkyl, (C_3-C_8)-alkenyl or (C_3-C_8)-alkinyl each optionally substitued "m" times by substituents from the group consisting of halogen, cyano und (C_1-C_2)-alkoxy;

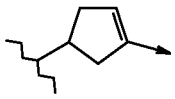
R^7, R^8 independently of each other represent hydrogen, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, $N((C_1$-$C_3)$-alkyl$)_2$, $S(O)_n R^5$,

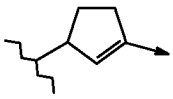
or

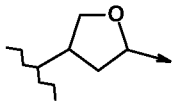
R^7 and R^8 together with the nitrogen atom to which they are attached form a saturated or partially or fully unsaturated five-, six-, or seven-membered ring which may contain apart from the nitrogen ataom "r" carbon atoms, "o" oxygen atoms and is optionally substitued "m" times by substituents from the group consisting of halogen, (C_1-C_6)-alkyl, halogen-(C_1-C_6)-alkyl, oxo, CO_2R^6;

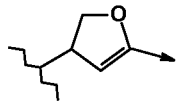
Z represents Z-1 to Z-8:

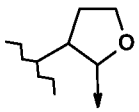

Z-1

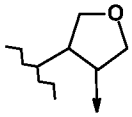

Z-2

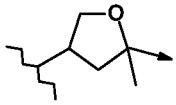

Z-3


Z-4


Z-5


Z-6


Z-7


Z-8

whereas the arrow represents the bonding to the group CO-G of the formula **(I)**;

X^2, X^4 and X^6 independently of one another represent hydrogen or fluorine;

X^3 and X^5 independently of one another represent hydrogen, chlorine, cyano or fluorine;

or

represents (C_1-C_3)-alkyl, (C_1-C_3)-alkoxy each optionally substitued "m" times by substituents from the group consisting of fluorine or chlorine;

m represents 0, 1, 2, 3, 4 or 5;

n represents 0, 1 or 2;

o represents 0, 1 or 2;

r represents 3, 4, 5 or 6;

and

(b) one or more of B1 to B35 specified in table 1 below:

Table 1

(b)	Structure Name	CAS-RN/Common Name	Publication
B1	ethyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-5-methyl-4,5-dihydro-1,2-oxazole-5-carboxylate	1949837-17-5/ Isoxafenacil	WO 2016/095768 A1
B2	3-[2-chloro-5-(3,5-dimethyl-2,6-dioxo-4-sulfanylidene-1,3,5-triazinan-1-yl)-4-fluorophenyl]-5-methyl-4,5-dihydro-1,2-oxazole-5-carboxylic acid	2558200-03-4	WO 2021/143677 A1
B3	methyl 2-{[(E)-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]benzylidene}amino]oxy}propanoate	2669111-31-1	WO 2021/139482 A1
B4	methyl-(2R)-2-{[(E)-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]benzylidene}amino]oxy}propanoate	2759011-88-4/ Flufenoximacil	WO 2021/139482 A1
B5	methyl-(2S)-2-{[(E)-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-		WO 2021/139482 A1 EP 4353082 A1

(b)	Structure Name	CAS-RN/Common Name	Publication
	1(2H)-yl]benzylidene}amino]oxy}propanoate		
B6	Dihydro-1,5-dimethyl-6-thioxo-3-[2,2,7-trifluoro-3,4-dihydro-3-oxo-4-(2-propyn-1-yl)-2*H*-1,4-benzoxazin-6-yl]-1,3,5-triazine-2,4(1*H*,3*H*)-dione	1258836-72-4/ Trifludimoxazin	WO 2010/145992 A1
B7	methyl N-[2-[[2-chloro-5-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-4-fluorophenyl]thio]-1-oxopropyl]-β-alaninate	1220411-29-9/ Tiafenacil	WO 2010/038953 A2
B8	methyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylate	2669819-07-0	WO 2021/143677 A1
B9	ethyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylate	2669819-12-7	WO 2021/143677 A1
B10	methyl 3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-6-methyl-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-	2669821-71-8	WO 2021/143677 A1

(b)	Structure Name	CAS-RN/Common Name	Publication
	carboxylate		
B11	3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-6-methyl-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylic acid	3000495-74-6	WO 2023/197899 A1
B12	3-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenyl}-3a,4,5,6-tetrahydro-6aH-cyclopenta[d][1,2]oxazole-6a-carboxylic acid	2669819-11-6	WO 2021/143677 A1
B13	ethyl [(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-46-5	WO 2023/285222 A1
B14	[(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetic acid	2892260-49-8	WO 2023/285222 A1
B15	ethyl (2-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)acetate	2892260-47-6	WO 2023/285222 A1
B16	(2-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)acetic acid	2892260-48-7	WO 2023/285222 A1

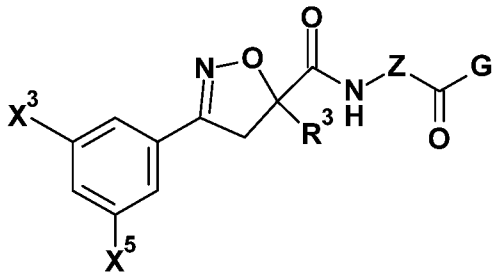
(b)	Structure Name	CAS-RN/Common Name	Publication
B17	ethyl (2-{2-chloro-4-fluoro-5-[4-(1-fluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}phenoxy)acetate	2892260-50-1	WO 2023/285222 A1
B18	2-methoxyethyl [(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-51-2	WO 2023/285222 A1
B19	tetrahydrofuran-2-ylmethyl [(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-52-3	WO 2023/285222 A1
B20	cyanomethyl [(3-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-53-4	WO 2023/285222 A1
B21	methyl (2-{2-chloro-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)(methoxy)acetate	2892260-54-5	WO 2023/285222 A1
B22	methyl (2-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}phenoxy)(methoxy)acetate	2892260-55-6	WO 2023/285222 A1
B23	[(3-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-	2892260-56-7	WO 2023/285222 A1

(b)	Structure Name	CAS-RN/Common Name	Publication
	dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetic acid		
B24	ethyl [(3-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-57-8	WO 2023/285222 A1
B25	2-methoxyethyl [(3-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-58-9	WO 2023/285222 A1
B26	tetrahydrofuran-2-ylmethyl [(3-{2-bromo-5-[4-(1,1-difluoroethyl)-3-methyl-2,6-dioxo-3,6-dihydropyrimidin-1(2H)-yl]-4-fluorophenoxy}pyridin-2-yl)oxy]acetate	2892260-59-0	WO 2023/285222 A1
B27	2-ethoxy-2-oxoethyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	1101020-13-6	US 6403534 B1
B28	{[(1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropyl)carbonyl]oxy}acetic acid	1101020-12-5	US 6403534 B1
B29	2-methoxy-2-oxoethyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-	1101021-05-9	US 6403534 B1

(b)	Structure Name	CAS-RN/Common Name	Publication
	(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate		
B30	1-ethoxy-1-oxopropan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	3017139-36-2	WO 2023/228935 A1
B31	2-{[(1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropyl)carbonyl]oxy}propanoic acid	1101021-04-8	US 6403534 B1
B32	1-methoxy-1-oxopropan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	1101021-03-7	US 6403534 B1
B33	1-ethoxy-2-methyl-1-oxopropan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	3017139-37-3	WO 2023/228935 A1
B34	1-ethoxy-1-oxobutan-2-yl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate	3017139-38-4	WO 2023/228935 A1
B35	1-(ethoxycarbonyl)cyclopropyl 1-{2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-	3017139-39-5	WO 2023/228935 A1

(b)	Structure Name	CAS-RN/Common Name	Publication
	4-(trifluoromethyl)-3,6-dihydropyrimidin-1(2H)-yl]phenoxy}cyclopropanecarboxylate		

2. Combinations according to Claim 1, characterized in that compound of formula **(I)** is **(Ia)** or an agrochemical acceptable salt thereof

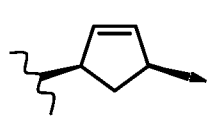


(Ia)

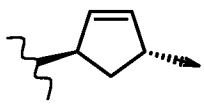
in which

X^3, X^5, R^3 and G are as described above;

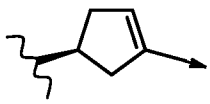
Z means Z-1a, Z-1b, Z-2a, Z-3a, Z-4a, Z-5a, Z-6a, Z-7a, Z-8a,



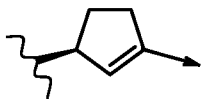
Z-1a



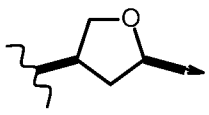
Z-1b



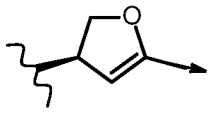
Z-2a



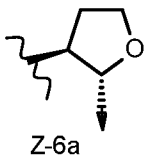
Z-3a



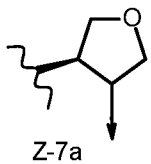
Z-4a



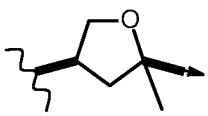
Z-5a



Z-6a



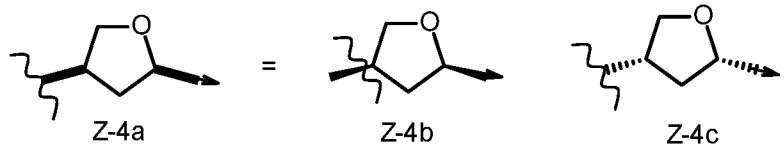
Z-7a



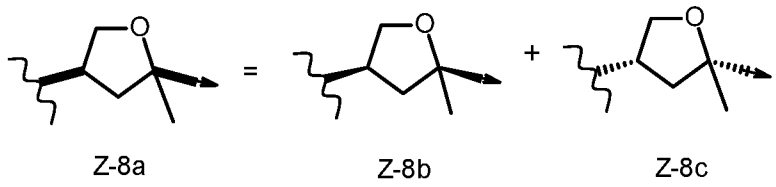
Z-8a

;

wherein Z-4a means the mixture of both structures Z-4b and Z-4c;



and wherein Z-8a means the mixture of both structures Z-8b and Z-8c



;

and wherein the arrow means a bond to the group CO-G in formula (**Ia**).

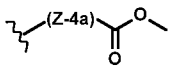
(Ia)

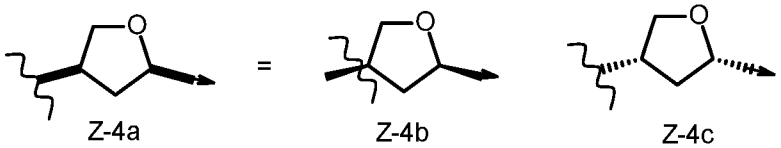
3. Combinations according to Claim 2, characterized in that compound of formula (**Ia**) or an agrochemical acceptable salt thereof is defined as follows:

X^3 is F

X^5 is F

R^3 is (S)-vinyl

-Z-C(O)-G- is 

Z-4a is 

.

4. Combinations according to any of claims 1 to 3, wherein the application rates of the herbicides are between 0.1 and 500 g a.i./ha.

5. Combinations according to any of claims 1 to 3, wherein the application rates of the herbicides are between 1.0 and 250 g a.i./ha.

6. Combinations according to any of claims 1 to 5 comprising the active ingredient components (a) and (b) in a weight ratio of from 1:10 000 to 5000:1.

7. Combinations according to any of claims 1 to 5 comprising the active ingredient components (a) and (b) in a weight ratio of from 1:1000 to 500:1.

8. Combinations according to any of claims 1 to 5 comprising the active ingredient components (a) and (b) in a weight ratio of from 1:100 to 50:1

9. Combinations according to any of claims 1 to 5 comprising the active ingredient components (a) and (b) in a weight ratio of from 1:10 to 5:1.

10. Herbicidal composition comprising a herbicidal combination according to any of Claims 1 to 9 and one or more further component selected from the group consisting of formulation auxiliaries, additives customary in crop protection, and further agrochemically active compounds, such as fungicides, insecticides, acaricides etc.

11. Method of controlling harmful plants or of regulating the growth of plants, wherein the active ingredient components of the herbicidal combination according to any of Claims 1 to 9 or the herbicidal composition according to claim 10 are applied to the plants, plant parts, plant seeds or the area under cultivation.

12. Method according to Claim 11, wherein the active ingredient components of the herbicidal combination according to any of Claims 1 to 9 or the herbicidal composition according to claim 10 are applied to the plants, plant parts, plant seeds or the area under cultivation jointly or separately by the pre-emergence method, the post-emergence method or by the pre- and post-emergence method.

13. Method according to any of Claims 11 to 12 wherein the crop is a genetically modified plant.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/086659

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01N43/80 A01P13/00 A01P13/02
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01N A01P

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2020/114932 A1 (BAYER AG [DE]) 11 June 2020 (2020-06-11) Particularly A3.; compound A1 to A6 table 3.1 to 3.10 claims 1-15 ----- -/--	1-13

[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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

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

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

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 February 2025	11/03/2025

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	Davies, Maxwell

1

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

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/086659

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DA-WEI WANG ET AL: "Discovery of Novel N -Isoxazolinylphenyltriazinones as Promising Protoporphyrinogen IX Oxidase Inhibitors", JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY, vol. 67, no. 45, 21 October 2019 (2019-10-21), pages 12382-12392, XP055705430, US ISSN: 0021-8561, DOI: 10.1021/acs.jafc.9b04844 the whole document -----	1-13

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2024/086659

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2020114932 A1	11-06-2020	AR 117260 A1	21-07-2021
		AU 2019392518 A1	24-06-2021
		BR 112021010094 A2	24-08-2021
		CA 3122156 A1	11-06-2020
		CL 2021001469 A1	19-11-2021
		CN 113347882 A	03-09-2021
		DK 3890488 T3	03-04-2023
		EA 202191563 A1	28-10-2021
		EP 3890488 A1	13-10-2021
		ES 2941285 T3	19-05-2023
		FI 3890488 T3	30-03-2023
		HR P20230284 T1	12-05-2023
		HU E061391 T2	28-06-2023
		JP 2022511487 A	31-01-2022
		KR 20210102295 A	19-08-2021
		LT 3890488 T	11-04-2023
		PH 12021551340 A1	13-12-2021
		PL 3890488 T3	02-05-2023
		PT 3890488 T	11-04-2023
		SI 3890488 T1	31-05-2023
		UA 129190 C2	05-02-2025
		US 2023032505 A1	02-02-2023
		WO 2020114932 A1	11-06-2020
		ZA 202104713 B	18-12-2024