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(54) Title: HERBICIDAL MIXTURES COMPRISING L-GLUFOSINATE AND THEIR USE IN CANOLA CULTURES

(57) **Abstract:** The present invention relates to herbicidal mixtures and their methods and uses for controlling undesirable vegetation in glufosinate-tolerant canola, wherein the herbicidal mixture comprises L-glufosinate and a herbicidal compound II selected from clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, tritosulfuron, imazamethabenz, imazamethabenz-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, tribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, bentazone, bentazone-sodium, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, picolinafen, clomazone, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone, tolypyralate, fenquinotrione, ethalfluralin, pendimethalin, triallate, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, diflufenzopyr, diflufenzopyr-sodium, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, topramezone, sethoxydim, pethoxamid, clopyralid, picloram, fluroxypyr and other compounds.



Herbicidal mixtures comprising L-glufosinate and their use in canola cultures

Description

- 5 The present invention relates to herbicidal mixture comprising L-glufosinate and and a herbicidal compound II selected from clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, tritosulfuron, imazamethabenz, imazamethabenz-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, tribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, bentazone, bentazone-sodium, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, 15 tiafenacil, picolinafen, clomazone, mesotrione, tembotrione, pyrasulfotole, bicyclopypyrone, tolpyralate, fenquitrione, ethalfluralin, pendimethalin, triallate, trifluralin, propyzamide, carbamethide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, 20 diflufenzopyr, diflufenzopyr-sodium, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, topramezone, sethoxydim, pethoxamid, clopyralid, picloram, fluroxypyr, II-83: ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate (CAS 353292-31-6, S-3100), II-84: 2-[2-chloro-5-[3-chloro-5-(trifluoromethyl)-2-pyridinyl]-4-fluorophenoxy]-2-methoxy-acetic acid methyl ester (CAS 1970221-16-9), II-85: 2-[[3-[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-N-(methylsulfonyl)-acetamide (CAS 2158276-22-1), II-86: 2-[[3-[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid ethyl ester (CAS 2158274-56-5), II-87: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-N-(methylsulfonyl)-acetamide (CAS 2158274-53-2), II-88: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid 35 ethyl ester (CAS 2158274-50-9), II-89: ethyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-triazol-1-yl]-4-fluoro-phenoxy]-2-pyridyl]oxy]acetate (CAS 2230679-62-4), II-90: 2-[[3-[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid methyl ester (CAS 2158275-73-9), II-91: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid methyl ester (CAS 2158274-96-3) and II-92: methyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-triazol-1-yl]-4-fluoro-phenoxy]-2-pyridyl]oxy]acetate.

The invention also relates to methods and uses for controlling undesirable vegetation in glufosinate-tolerant canola.

Tolerant or resistant canola varieties (e.g. transgenic canola varieties) provide the option to use herbicides, which are originally not selective in respective tolerant or resistant canola in addition to conventional weed control system. One example is glufosinate, which can not only be used for pre-plant burn-down both in conventional canola, and canola that is tolerant against herbicides including glufosinate; but which can also achieve effective weed control by post-emergence application in glufosinate tolerant canola. Glufosinate is a broad-spectrum herbicide that controls most grass and broadleaf herbicide species; however, there are a few tough to control species or resistant biotypes that it does not fully control. Another challenge is the duration of action, or the degradation rate of the herbicide. Furthermore, changes in the sensitivity of harmful plants, which may occur upon prolonged use of the herbicides or within a geographical limited area, must also be taken into consideration. The resulting loss of action against individual plants can sometimes be compensated for to a certain extent by higher application rates of the herbicides. However, there is always a demand for methods to achieve the herbicidal effect with lower application rates of active compounds to reduce not only the amount of an active compound required for application, but also the amount of formulation auxiliaries. Thus, low application rates are for economic and environmental reasons an object of eco-friendliness of the herbicide treatment.

One possibility for improving the use profile of a herbicide is the combination of the herbicide in question with one or more other active compounds which have the desired additional properties. However, the combined use of a plurality of active compounds may lead to phenomena of a chemical, physical and biological incompatibility (e.g. instability of a coformulation, decomposition of an active compound or antagonism in the biological action of the active compounds). Thus, finding effective glufosinate combinations with an additional herbicide faces the challenge that in many instances the effectiveness of such combinations is not satisfactory and high application rates are still required to achieve an acceptable weed control.

Thus, it is an object of the present invention to find combinations of active compounds with a favorable profile of action, high stability and, ideally, synergistically enhanced activity for application in glufosinate tolerant canola, which allows the application rate to be reduced in comparison with solutions provided by prior art mixtures. Moreover, the persistence of the herbicidal activity of the mixture should be sufficiently long in order to achieve control of the weeds over a sufficient long time period thus allowing a more flexible application. The mixtures should also show an accelerated action on harmful plants and not affect the growth of the canola plant.

Glufosinate is a racemate of two enantiomers, out of which only one shows sufficient herbicidal activity (see e.g. US 4265654 and JP92448/83). Even though various methods to prepare L-glufosinate (and respective salts) are known, the mixtures known in the art do not point at the stereochemistry, meaning that the racemate is present (e.g. WO 2003024221, WO2009141367, WO2013154396, DE 19815820).

Surprisingly, it has been found that mixtures of L-glufosinate or its salt and the herbicidal compound II show enhanced herbicide action against undesirable vegetation in pre-plant burn-down prior to planting of conventional canola and canola that is tolerant against herbicides including glufosinate and in post-emergence use in glufosinate tolerant canola and/or show superior compatibility with canola, i.e. their use leads to a reduced damage of the canola plants and/or does not result in increased damage of the canola plants, if compared to mixtures of racemic glufosinate and the herbicidal compound II, or if compared to L-glufosinate or its salts alone.

Thus, the present invention relates to herbicidal mixtures of

- 1) L-glufosinate or its salt as compound I and
- 2) a herbicidal compound II selected from clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, tritosulfuron, imazamethabenz, imazamethabenz-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, tribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, bentazone, bentazone-sodium, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, picolinafen, clomazone, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate, fenquitrione, ethalfluralin, pendimethalin, triallate, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, diflufenzopyr, diflufenzopyr-sodium, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, topramezone, sethoxydim, pethoxamid, clopyralid, picloram, fluroxypyr, II-83: ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate (CAS 353292-31-6, S-3100), II-84: 2-[2-chloro-5-[3-chloro-5-(trifluoromethyl)-2-pyridinyl]-4-fluorophenoxy]-2-methoxy-acetic acid methyl ester (CAS 1970221-16-9), II-85: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-N-(methylsulfonyl)-acetamide (CAS 2158276-22-1), II-86: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid ethyl ester (CAS 2158274-56-5), II-87: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-N-(methylsulfonyl)-acetamide (CAS 2158274-53-2), II-88: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid ethyl ester (CAS 2158274-50-9), II-89: ethyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-

triazol-1-yl]-4-fluoro-phenoxy]-2-pyridyl]oxy]acetate (CAS 2230679-62-4) , II-90: 2-[[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid methyl ester (CAS 2158275-73-9), II-91: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid methyl ester (CAS 2158274-96-3) and II-92: methyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-triazol-1-yl]-4-fluoro-phenoxy]-2-pyridyl]oxy]acetate.

Glufosinate [common name of DL-4-[hydroxyl(methyl)phosphinoyl]-DL-homoalaninate] and its salts such as glufosinate ammonium and its herbicidal activity have been described e.g. by F. Schwerdtle et al. Z. Pflanzenkr. Pflanzenschutz, 1981, Sonderheft IX, pp. 431-440. Racemic glufosinate and its salts are commercially available, e.g. from Bayer CropScience under the tradenames Basta™ and Liberty™.

L-Glufosinate, also called glufosinate-P, is (2S)-2-amino-4-[hydroxy(methyl)phosphinoyl]butyric acid (CAS Reg. No. 35597-44-5). Relevant salts of L-glufosinate are L-glufosinate-ammonium (also called glufosinate-P-ammonium), which is ammonium (2S)-2-amino-4-(methylphosphinato)butyric acid (CAS Reg. No. 73777-50-1); L-glufosinate-sodium (also called glufosinate-P-sodium), which is sodium (2S)-2-amino-4-(methylphosphinato)butyric acid (CAS Reg. No. 70033-13-5) and L-glufosinate-potassium (also called glufosinate-P-potassium), which is potassium (2S)-2-amino-4-(methylphosphinato)butyric acid.

L-Glufosinate as used in the present invention comprises more than 70% by weight of the L-enantiomer; preferably more than 80% by weight of the L-enantiomer; more preferably more than 90% of the L-enantiomer, most preferably more than 95% of the L-enantiomer and can be prepared as referred to above.

In a preferred embodiment, the abovementioned invention relates to herbicidal mixtures as described above, wherein L-glufosinate comprises more than 70% by weight of the L-enantiomer.

L-glufosinate can be prepared according to methods known in the art, e.g. as described in WO2006/104120, US5530142, EP0127429 and J. Chem. Soc. Perkin Trans. 1, 1992, 1525-1529.

Compounds II as well as their pesticidal action and methods for producing them are generally known, for example in the Pesticide Manual V5.2 (ISBN 978 1 901396 85 0) (2008-2011) amongst other sources. Compound II-83 is known from EP 1122244. Compound II-84 is known from WO2016/120116. Compounds II-85, II-86, II-87, II-88, II-90 and II-91 are known from WO2017/202768. Compounds II-89 and II-92 are known from WO2018/108695. Compound II-93 is known from WO 2014/151005.

In the inventive mixtures the weight ratio of compound I to compound II is preferably from 1000:1 to 1:500, 400:1 to 1:40, more preferably 500:1 to 1:250, in particular from 200:1 to 1:20, even more preferably from 100:1 to 1:10, most preferably 50:1 to 1:5.

Furthermore, mixtures are preferred, which contain L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid. Especially preferred are mixtures, which contain L-glufosinate-ammonium as L-glufosinate salt.

- 5 In one embodiment, the present invention relates to herbicidal mixtures of
- 1) L- glufosinate and its salts, and
 - 2) a herbicidal compound II selected from the group consisting of clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, tritosulfuron, imazamethabenz, imazamethabenz-methyl, imazamox, imazapic, imazapyr, imazethapyr, cyanazine, bromoxynil and its salts and esters, bentazone, bentazone-sodium, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, trifludimoxazin, picolinafen, clomazone, mesotrione, Fenquintione, ethalfluralin, pendimethalin, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, metolachlor-S, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, diflufenzopyr, diflufenzopyr-sodium, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, topramezone, sethoxydim, pethoxamid, clopyralid and picloram.

In one embodiment, compounds II are clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, cyanazine, bromoxynil and its salts and esters, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, trifludimoxazin, clomazone, mesotrione, fenquintione, ethalfluralin, pendimethalin, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, topramezone, sethoxydim, pethoxamid, clopyralid, picloram.

In one embodiment, compounds II are clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium

um, tribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, clomazone, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone, tolypyralate, fenquinotrione, ethalfluralin, pendimethalin, triallate, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, topramezone, sethoxydim, pethoxamid, clopyralid, picloram, fluroxypyr, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92.

In a preferred embodiment, compounds II are clethodim, cycloxydim, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, imazapyr, imazapyr isopropylammoniumtribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone, tolypyralate, ethalfluralin, pendimethalin, triallate, propyzamide, carbetamide, metazachlor, napropamide, 2,4-D and its salts and esters, aminopyralid and its salts, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, topramezone, sethoxydim, pethoxamid, picloram, fluroxypyr, II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92.

In a preferred embodiment, compounds II are imazapyr, tribenuron-methyl, florasulam; carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92; mesotrione, topramezone, bromoxynil, tembotrione, pyrasulfotole, bicyclopyrone, tolypyralate; II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram, fluroxypyr, pendimethalin, ethalfluralin, triallate.

In another preferred embodiment, compounds II are carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92; mesotrione, topramezone, tembotrione, pyrasulfotole, bicyclopyrone, tolypyralate; II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram, fluroxypyr.

In another embodiment, the compounds II in the mixtures of the invention are selected from the group consisting of imazapyr, tribenuron-methyl and florasulam.

In another preferred embodiment, the compounds II in the mixtures of the invention are selected from the group consisting of carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92.

In another embodiment, the compounds II in the mixtures of the invention are selected from the group consisting of mesotrione, topramezone, bromoxynil, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate; preferably selected from the group of mesotrione, topramezone, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate.

- 5 In another preferred embodiment, the compounds II in the mixtures of the invention are selected from the group consisting of II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram and fluroxypyr.

10 In another embodiment, the compounds II in the mixtures of the invention are selected from the group consisting of pendimethalin, ethalfluralin, triallate.

Thus, preferred mixtures of the present invention are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxydim, ethametsulfuron, ethametsulfuron-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, cyanazine, bromoxynil and its salts and esters, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, trifludimoxazin, clomazone, mesotrione, fenquinotrione, ethalfluralin, pendimethalin, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, topramezone, sethoxydim, pethoxamid, clopyralid, picloram.

Preferred mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxydim, ethametsulfuron, ethametsulfuron-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, tribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, clomazone, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate, fenquinotrione, ethalfluralin, pendimethalin, triallate, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters,

clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, topramezone, sethoxydim, pethoxamid, clopyralid, picloram, fluroxypyr compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91 and II-92.

In a preferred embodiment, the mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of clethodim, cycloxydim, tepraloxydim, ethametsulfuron, ethametsulfuron-methyl, imazapyr, imazapyr isopropylammoniumtribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate, ethalfluralin, pendimethalin, triallate, propyzamide, carbetamide, metazachlor, napropamide, 2,4-D and its salts and esters, aminopyralid and its salts, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, topramezone, sethoxydim, pethoxamid, picloram, fluroxypyr, II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91 and II-92.

Preferred mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of imazapyr, tribenuron-methyl, florasulam; carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92; mesotrione, topramezone, bromoxynil, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate; II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram, fluroxypyr, pendimethalin, ethalfluralin and triallate.

Preferred mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92; mesotrione, topramezone, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate; II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram, fluroxypyr.

In one embodiment, the mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of imazapyr, tribenuron-methyl and florasulam.

In another preferred embodiment, the mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of carfentrazone-ethyl, trifludimoxazin, sulfentra-

zone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92.

In another embodiment, the mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of mesotrione, topramezone, bromoxynil, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate; preferably selected from the group of mesotrione, topramezone, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate.

In another preferred embodiment, the mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram and fluroxypyr.

In another embodiment, the mixtures are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and a herbicidal compound II selected from the group consisting of pendimethalin, ethalfluralin, triallate.

All preferred mixtures are listed in table 2, wherein the following abbreviations are used in table 1:

Table 1

Compound	Abbreviation
L-glufosinate-ammonium	I-1
L-glufosinate-sodium	I-2
L-glufosinate as free acid	I-3
clethodim	II-1
cycloxydim	II-2
haloxyfop	II-3
haloxyfop-methyl	II-4
haloxyfop-P	II-5
haloxyfop-P-methyl	II-6
quizalofop	II-7
quizalofop-ethyl	II-8
quizalofop-tefuryl	II-9
quizalofop-P	II-10
quizalofop-P-ethyl	II-11
quizalofop-P-tefuryl	II-12
tepraloxym	II-13
imazamox	II-14
imazamox ammonium	II-14a
imazapic	II-15
imazapic ammonium	II-15a
imazapyr	II-16
imazapyr isopropylammo-	II-16a

Compound	Abbreviation
nium	
imazethapyr	II-17
imazethapyr ammonium	II-17a
bromoxynil and its salts and esters	II-18
carfentrazone	II-19
carfentrazone-ethyl	II-20
saflufenacil	II-21
trifludimoxazin	II-22
clomazone	II-23
fenquinotrione	II-24
ethalfluralin	II-25
pendimethalin	II-26
trifluralin	II-27
propyzamide	II-28
acetochlor	II-29
butachlor	II-30
dimethachlor	II-31
metazachlor	II-32
napropamide	II-33
napro-pamide-M	II-34
aminopyralid and its salts such as aminopyralid-	II-35

Compound	Abbreviation
dimethylammonium	
aminopyralid-tris(2-hydroxypropyl)ammonium and its esters	II-36
clopyralid and its salts and esters	II-37
dicamba and its salts and esters	II-38
quin-merac	II-39
cinmethylin	II-40
dimethenamid	II-41
dimethen-amid-P	II-42
quinclorac	II-43
quinclorac dimethylammonium	II-43a
topramezone	II-44
sethoxydim	II-45
pethoxamid	II-46
clopyralid	II-47
picloram	II-48
fenoxaprop	II-49
fenoxaprop-ethyl	II-50
fenoxaprop-P	II-51
fenoxaprop-P-ethyl	II-52
fluazifop	II-53
fluazifop-butyl	II-54
fluazifop-P	II-55
fluazifop-P-butyl	II-56
propaquizafop	II-57
ethametsulfuron	II-58
ethametsulfuron-methyl	II-59
cyanazine	II-60
pyridate	II-61

Compound	Abbreviation
mesotrione	II-62
alachlor	II-63
metolachlor	II-64
S-metolachlor	II-65
carbetamide	II-66
2,4-D and its salts and esters	II-67
tribenuron-methyl	II-68
florasulam	II-69
sulfentrazone	II-70
pyraflufen-ethyl	II-71
tembotrione	II-72
pyrasulfotole	II-73
bicyclopyrone	II-74
triallate	II-75
2,4-D and its salts and esters	II-76
aminopyralid and its salts	II-77
fluroxypyr	II-78
see below	II-83
see below	II-84
see below	II-85
see below	II-86
see below	II-87
see below	II-88
see below	II-89
see below	II-90
see below	II-91
see below	II-92
see below	II-93
tiafenacil	II-94
tolpyralate	II-95

II-83: ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate (CAS 353292-31-6; S-3100).

II-84: 2-[2-chloro-5-[3-chloro-5-(trifluoromethyl)-2-pyridinyl]-4-fluorophenoxy]-2-methoxy-acetic acid methyl ester (CAS 1970221-16-9)

II-85: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-N-(methylsulfonyl)-acetamide (CAS 2158276-22-1)

II-86: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid ethyl ester (CAS 2158274-56-5)

- II-87: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-N-(methylsulfonyl)-acetamide (CAS 2158274-53-2)
- II-88: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid ethyl ester (CAS 2158274-50-9)
- 5 II-89: ethyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-triazol-1-yl]-4-fluorophenoxy]-2-pyridyl]oxy]acetate (CAS 2230679-62-4)
- II-90: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid methyl ester (CAS 2158275-73-9)
- II-91: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid methyl ester (CAS 2158274-96-3)
- 10 II-92: methyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-triazol-1-yl]-4-fluorophenoxy]-2-pyridyl]oxy]acetate
- II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2)

15

Table 2

No	I	II
M-1	I-1	II-1
M-2	I-1	II-2
M-3	I-1	II-3
M-4	I-1	II-4
M-5	I-1	II-5
M-6	I-1	II-6
M-7	I-1	II-7
M-8	I-1	II-8
M-9	I-1	II-9
M-10	I-1	II-10
M-11	I-1	II-11
M-12	I-1	II-12
M-13	I-1	II-13
M-14	I-1	II-14
M-15	I-1	II-15
M-16	I-1	II-16
M-17	I-1	II-17
M-18	I-1	II-18
M-19	I-1	II-19
M-20	I-1	II-20
M-21	I-1	II-21
M-22	I-1	II-22
M-23	I-1	II-23
M-24	I-1	II-24
M-25	I-1	II-25
M-26	I-1	II-26

No	I	II
M-27	I-1	II-27
M-28	I-1	II-28
M-29	I-1	II-29
M-30	I-1	II-30
M-31	I-1	II-31
M-32	I-1	II-32
M-33	I-1	II-33
M-34	I-1	II-34
M-35	I-1	II-35
M-36	I-1	II-36
M-37	I-1	II-37
M-38	I-1	II-38
M-39	I-1	II-39
M-40	I-1	II-40
M-41	I-1	II-41
M-42	I-1	II-42
M-43	I-1	II-43
M-44	I-1	II-44
M-45	I-1	II-45
M-46	I-1	II-46
M-47	I-1	II-47
M-48	I-1	II-48
M-49	I-1	II-49
M-50	I-1	II-50
M-51	I-1	II-51
M-52	I-1	II-52

No	I	II
M-53	I-1	II-53
M-54	I-1	II-54
M-55	I-1	II-55
M-56	I-1	II-56
M-57	I-1	II-57
M-58	I-1	II-58
M-59	I-1	II-59
M-60	I-1	II-60
M-61	I-1	II-61
M-62	I-1	II-62
M-63	I-1	II-63
M-64	I-1	II-64
M-65	I-1	II-65
M-66	I-1	II-66
M-67	I-1	II-67
M-68	I-2	II-1
M-69	I-2	II-2
M-70	I-2	II-3
M-71	I-2	II-4
M-72	I-2	II-5
M-73	I-2	II-6
M-74	I-2	II-7
M-75	I-2	II-8
M-76	I-2	II-9
M-77	I-2	II-10
M-78	I-2	II-11
M-79	I-2	II-12
M-80	I-2	II-13
M-81	I-2	II-14
M-82	I-2	II-15
M-83	I-2	II-16
M-84	I-2	II-17
M-85	I-2	II-18
M-86	I-2	II-19
M-87	I-2	II-20
M-88	I-2	II-21
M-89	I-2	II-22
M-90	I-2	II-23
M-91	I-2	II-24
M-92	I-2	II-25
M-93	I-2	II-26

No	I	II
M-94	I-2	II-27
M-95	I-2	II-28
M-96	I-2	II-29
M-97	I-2	II-30
M-98	I-2	II-31
M-99	I-2	II-32
M-100	I-2	II-33
M-101	I-2	II-34
M-102	I-2	II-35
M-103	I-2	II-36
M-104	I-2	II-37
M-105	I-2	II-38
M-106	I-2	II-39
M-107	I-2	II-40
M-108	I-2	II-41
M-109	I-2	II-42
M-110	I-2	II-43
M-111	I-2	II-44
M-112	I-2	II-45
M-113	I-2	II-46
M-114	I-2	II-47
M-115	I-2	II-48
M-116	I-2	II-49
M-117	I-2	II-50
M-118	I-2	II-51
M-119	I-2	II-52
M-120	I-2	II-53
M-121	I-2	II-54
M-122	I-2	II-55
M-123	I-2	II-56
M-124	I-2	II-57
M-125	I-2	II-58
M-126	I-2	II-59
M-127	I-2	II-60
M-128	I-2	II-61
M-129	I-2	II-62
M-130	I-2	II-63
M-131	I-2	II-64
M-132	I-2	II-65
M-133	I-2	II-66
M-134	I-2	II-67

No	I	II
M-135	I-3	II-1
M-136	I-3	II-2
M-137	I-3	II-3
M-138	I-3	II-4
M-139	I-3	II-5
M-140	I-3	II-6
M-141	I-3	II-7
M-142	I-3	II-8
M-143	I-3	II-9
M-144	I-3	II-10
M-145	I-3	II-11
M-146	I-3	II-12
M-147	I-3	II-13
M-148	I-3	II-14
M-149	I-3	II-15
M-150	I-3	II-16
M-151	I-3	II-17
M-152	I-3	II-18
M-153	I-3	II-19
M-154	I-3	II-20
M-155	I-3	II-21
M-156	I-3	II-22
M-157	I-3	II-23
M-158	I-3	II-24
M-159	I-3	II-25
M-160	I-3	II-26
M-161	I-3	II-27
M-162	I-3	II-28
M-163	I-3	II-29
M-164	I-3	II-30
M-165	I-3	II-31
M-166	I-3	II-32
M-167	I-3	II-33
M-168	I-3	II-34
M-169	I-3	II-35
M-170	I-3	II-36
M-171	I-3	II-37
M-172	I-3	II-38
M-173	I-3	II-39
M-174	I-3	II-40
M-175	I-3	II-41

No	I	II
M-176	I-3	II-42
M-177	I-3	II-43
M-178	I-3	II-44
M-179	I-3	II-45
M-180	I-3	II-46
M-181	I-3	II-47
M-182	I-3	II-48
M-183	I-3	II-49
M-184	I-3	II-50
M-185	I-3	II-51
M-186	I-3	II-52
M-187	I-3	II-53
M-188	I-3	II-54
M-189	I-3	II-55
M-190	I-3	II-56
M-191	I-3	II-57
M-192	I-3	II-58
M-193	I-3	II-59
M-194	I-3	II-60
M-195	I-3	II-61
M-196	I-3	II-62
M-197	I-3	II-63
M-198	I-3	II-64
M-199	I-3	II-65
M-200	I-3	II-66
M-201	I-3	II-67
M-202	I-1	II-14a
M-203	I-1	II-15a
M-204	I-1	II-16a
M-205	I-1	II-17a
M-206	I-1	II-43a
M-207	I-1	II-68
M-208	I-1	II-69
M-209	I-1	II-70
M-210	I-1	II-71
M-211	I-1	II-72
M-212	I-1	II-73
M-213	I-1	II-74
M-214	I-1	II-75
M-215	I-1	II-76
M-216	I-1	II-77

No	I	II
M-217	I-1	II-78
M-218	I-1	II-83
M-219	I-1	II-84
M-220	I-1	II-85
M-221	I-1	II-86
M-222	I-1	II-87
M-223	I-1	II-88
M-224	I-1	II-89
M-225	I-1	II-90
M-226	I-1	II-91
M-227	I-1	II-92
M-228	I-2	II-14a
M-229	I-2	II-15a
M-230	I-2	II-16a
M-231	I-2	II-17a
M-232	I-2	II-43a
M-233	I-2	II-68
M-234	I-2	II-69
M-235	I-2	II-70
M-236	I-2	II-71
M-237	I-2	II-72
M-238	I-2	II-73
M-239	I-2	II-74
M-240	I-2	II-75
M-241	I-2	II-76
M-242	I-2	II-77
M-243	I-2	II-78
M-244	I-2	II-83
M-245	I-2	II-84
M-246	I-2	II-85
M-247	I-2	II-86
M-248	I-2	II-87
M-249	I-2	II-88
M-250	I-2	II-89
M-251	I-2	II-90
M-252	I-2	II-91
M-253	I-2	II-92

No	I	II
M-254	I-3	II-14a
M-255	I-3	II-15a
M-256	I-3	II-16a
M-257	I-3	II-17a
M-258	I-3	II-43a
M-259	I-3	II-68
M-260	I-3	II-69
M-261	I-3	II-70
M-262	I-3	II-71
M-263	I-3	II-72
M-264	I-3	II-73
M-265	I-3	II-74
M-266	I-3	II-75
M-267	I-3	II-76
M-268	I-3	II-77
M-269	I-3	II-78
M-270	I-3	II-83
M-271	I-3	II-84
M-272	I-3	II-85
M-273	I-3	II-86
M-274	I-3	II-87
M-275	I-3	II-88
M-276	I-3	II-89
M-277	I-3	II-90
M-278	I-3	II-91
M-279	I-3	II-92
M-280	I-1	II-93
M-281	I-2	II-93
M-282	I-3	II-93
M-283	I-1	II-94
M-284	I-2	II-94
M-285	I-3	II-94
M-286	I-1	II-95
M-287	I-2	II-95
M-288	I-3	II-95

More preferred mixtures of the present invention are mixtures of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts or L-glufosinate as free acid and at least one compound II selected from the group consisting of clethodim, cycloxydim, haloxyfop, haloxyfop-

- methyl, haloxyfop-P, haloxyfop-P-methyl, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxydim, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, tribenuron-methyl, florasulam, bromoxynil and its salts and esters,
- 5 carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, clomazone, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate, fenquinotrine, ethalfluralin, pendimethalin, triallate, trifluralin, propyzamide, acetochlor, butachlor, dimethachlor, metazachlor, napropamide, napropamide-M, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-
- 10 hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, topramezone, sethoxydim, pethoxamid, clopyralid, picloram, fluroxypyr, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92 and II-93.
- 15 Thus, preferred are mixtures M-1, M-2, M-3, M-4, M-5, M-6, M-7, M-8, M-9, M-10, M-11, M-12, M-13, M-14, M-15, M-16, M-17, M-18, M-19, M-20, M-21, M-22, M-23, M-24, M-25, M-26, M-27, M-28, M-29, M-30, M-31, M-32, M-33, M-34, M-35, M-36, M-37, M-38, M-39, M-40, M-41, M-42, M-43, M-44, M-45, M-46, M-47, M-48, M-49, M-50, M-51, M-52, M-53, M-54, M-55, M-56, M-57, M-58, M-59, M-60, M-61, M-62, M-63, M-64, M-65, M-66, M-67, M-68, M-69, M-70, M-71, M-72,
- 20 M-73, M-74, M-75, M-76, M-77, M-78, M-79, M-80, M-81, M-82, M-83, M-84, M-85, M-86, M-87, M-88, M-89, M-90, M-91, M-92, M-93, M-94, M-95, M-96, M-97, M-98, M-99, M-100, M-101, M-102, M-103, M-104, M-105, M-106, M-107, M-108, M-109, M-110, M-111, M-112, M-113, M-114, M-115, M-116, M-117, M-118, M-119, M-120, M-121, M-122, M-123, M-124, M-125, M-126, M-127, M-128, M-129, M-130, M-131, M-132, M-133, M-134, M-135, M-136, M-137, M-
- 25 138, M-139, M-140, M-141, M-142, M-143, M-144, M-145, M-146, M-147, M-148, M-149, M-150, M-151, M-152, M-153, M-154, M-155, M-156, M-157, M-158, M-159, M-160, M-161, M-162, M-163, M-164, M-165, M-166, M-167, M-168, M-169, M-170, M-171, M-172, M-173, M-174, M-175, M-176, M-177, M-178, M-179, M-180, M-181, M-182, M-183, M-184, M-185, M-186, M-187, M-188, M-189, M-190, M-191, M-192, M-193, M-194, M-195, M-196, M-197, M-
- 30 198, M-199, M-200, M-201, M-202, M-203, M-204, M-205, M-206, M-207, M-208, M-209, M-210, M-211, M-212, M-213, M-214, M-215, M-216, M-217, M-218, M-219, M-220, M-221, M-222, M-223, M-224, M-225, M-226, M-227, M-228, M-229, M-230, M-231, M-232, M-233, M-234, M-235, M-236, M-237, M-238, M-239, M-240, M-241, M-242, M-243, M-244, M-245, M-246, M-247, M-248, M-249, M-250, M-251, M-252, M-253, M-254, M-255, M-256, M-257, M-
- 35 258, M-259, M-260, M-261, M-262, M-263, M-264, M-265, M-266, M-267, M-268, M-269, M-270, M-271, M-272, M-273, M-274, M-275, M-276, M-277, M-278, M-279, M-280, M-281, M-282, M-283, M-284, M-285, M-286, M-287 and M-288..

- More preferred are mixtures M-16, M-18, M-19, M-20, M-22, M-25, M-26, M-38, M-44, M-48, M-
- 40 62, M-67, M-83, M-85, M-86, M-87, M-89, M-92, M-93, M-105, M-111, M-115, M-129, M-134, M-150, M-152, M-153, M-154, M-156, M-159, M-160, M-172, M-178, M-182, M-196, M-201, M-204, M-207, M-208, M-209, M-210, M-211, M-212, M-213, M-214, M-215, M-216, M-217, M-218, M-219, M-220, M-221, M-222, M-223, M-224, M-225, M-226, M-227, M-230, M-233, M-

234, M-235, M-236, M-237, M-238, M-239, M-240, M-241, M-242, M-243, M-244, M-245, M-246, M-247, M-248, M-249, M-250, M-251, M-252, M-253, M-256, M-259, M-260, M-261, M-262, M-263, M-264, M-265, M-266, M-267, M-268, M-269, M-270, M-271, M-272, M-273, M-274, M-275, M-276, M-277, M-278, M-279, M-280, M-281, M-282, M-283, M-284, M-285, M-286, M-287 and M-288.

Also preferred are mixtures M-1, M-2, M-3, M-4, M-5, M-6, M-7, M-8, M-9, M-10, M-11, M-12, M-13, M-14, M-15, M-16, M-17, M-18, M-19, M-20, M-21, M-22, M-23, M-24, M-25, M-26, M-27, M-28, M-29, M-30, M-31, M-32, M-33, M-34, M-35, M-36, M-37, M-38, M-39, M-40, M-41, M-42, M-43, M-44, M-45, M-46, M-47 and M-48.

Most preferred are mixtures M-19, M-20, M-22, M-38, M-44, M-48, M-62, M-67, M-86, M-87, M-89, M-105, M-111, M-115, M-129, M-134, M-153, M-154, M-156, M-172, M-178, M-182, M-196, M-201, M-209, M-210, M-211, M-212, M-213, M-215, M-216, M-217, M-218, M-219, M-220, M-221, M-222, M-223, M-224, M-225, M-226, M-227, M-235, M-236, M-237, M-238, M-239, M-241, M-242, M-243, M-244, M-245, M-246, M-247, M-248, M-249, M-250, M-251, M-252, M-253, M-261, M-262, M-263, M-264, M-265, M-267, M-268, M-269, M-270, M-271, M-272, M-273, M-274, M-275, M-276, M-277, M-278, M-279, M-280, M-281, M-282, M-283, M-284, M-285, M-286, M-287 and M-288.

All above-referred mixtures are herein below referred to as "inventive mixtures".

The inventive mixtures can further contain one or more insecticides, fungicides, herbicides.

The inventive mixtures can be converted into customary types of agrochemical mixtures, e. g. solutions, emulsions, suspensions, dusts, powders, pastes, granules, pressings, capsules, and mixtures thereof. Examples for mixture types are suspensions (e.g. SC, OD, FS), emulsifiable concentrates (e.g. EC), emulsions (e.g. EW, EO, ES, ME), capsules (e.g. CS, ZC), pastes, pastilles, wettable powders or dusts (e.g. WP, SP, WS, DP, DS), pressings (e.g. BR, TB, DT), granules (e.g. WG, SG, GR, FG, GG, MG), insecticidal articles (e.g. LN), as well as gel formulations for the treatment of plant propagation materials such as seeds (e.g. GF). These and further mixtures types are defined in the "Catalogue of pesticide formulation types and international coding system", Technical Monograph No. 2, 6th Ed. May 2008, CropLife International.

The mixtures are prepared in a known manner, such as described by Mollet and Grubemann, Formulation technology, Wiley VCH, Weinheim, 2001; or Knowles, New developments in crop protection product formulation, Agrow Reports DS243, T&F Informa, London, 2005.

Suitable auxiliaries are solvents, liquid carriers, solid carriers or fillers, surfactants, dispersants, emulsifiers, wetters, adjuvants, solubilizers, penetration enhancers, protective colloids, adhesion agents, thickeners, humectants, repellents, attractants, feeding stimulants, compatibilizers, bactericides, anti-freezing agents, anti-foaming agents, colorants, tackifiers and binders.

Suitable solvents and liquid carriers are water and organic solvents, such as mineral oil fractions of medium to high boiling point, e.g. kerosene, diesel oil; oils of vegetable or animal origin; aliphatic, cyclic and aromatic hydrocarbons, e. g. toluene, paraffin, tetrahydronaphthalene, al-

kylated naphthalenes; alcohols, e.g. ethanol, propanol, butanol, benzylalcohol, cyclohexanol; glycols; DMSO; ketones, e.g. cyclohexanone; esters, e.g. lactates, carbonates, fatty acid esters, gamma-butyrolactone; fatty acids; phosphonates; amines; amides, e.g. N-methylpyrrolidone, fatty acid dimethylamides; and mixtures thereof.

- 5 Suitable solid carriers or fillers are mineral earths, e.g. silicates, silica gels, talc, kaolins, limestone, lime, chalk, clays, dolomite, diatomaceous earth, bentonite, calcium sulfate, magnesium sulfate, magnesium oxide; polysaccharides, e.g. cellulose, starch; fertilizers, e.g. ammonium sulfate, ammonium phosphate, ammonium nitrate, ureas; products of vegetable origin, e.g. cereal meal, tree bark meal, wood meal, nutshell meal, and mixtures thereof.
- 10 Suitable surfactants are surface-active compounds, such as anionic, cationic, nonionic and amphoteric surfactants, block polymers, polyelectrolytes, and mixtures thereof. Such surfactants can be used as emulsifier, dispersant, solubilizer, wetter, penetration enhancer, protective colloid, or adjuvant. Examples of surfactants are listed in McCutcheon's, Vol.1: Emulsifiers & Detergents, McCutcheon's Directories, Glen Rock, USA, 2008 (International Ed. or North American
- 15 Ed.).
- Suitable anionic surfactants are alkali, alkaline earth or ammonium salts of sulfonates, sulfates, phosphates, carboxylates, and mixtures thereof. Examples of sulfonates are alkylarylsulfonates, diphenylsulfonates, alpha-olefin sulfonates, lignine sulfonates, sulfonates of fatty acids and oils, sulfonates of ethoxylated alkylphenols, sulfonates of alkoxyated arylphenols, sulfonates of condensed naphthalenes, sulfonates of dodecyl- and tridecylbenzenes, sulfonates of naphthalenes and alkylnaphthalenes, sulfosuccinates or sulfosuccinamates. Examples of sulfates are sulfates
- 20 of fatty acids and oils, of ethoxylated alkylphenols, of alcohols, of ethoxylated alcohols, or of fatty acid esters. Examples of phosphates are phosphate esters. Examples of carboxylates are alkyl carboxylates, and carboxylated alcohol or alkylphenol ethoxylates.
- 25 Suitable nonionic surfactants are alkoxyates, N-substituted fatty acid amides, amine oxides, esters, sugar-based surfactants, polymeric surfactants, and mixtures thereof. Examples of alkoxyates are compounds such as alcohols, alkylphenols, amines, amides, arylphenols, fatty acids or fatty acid esters which have been alkoxyated with 1 to 50 equivalents. Ethylene oxide and/or propylene oxide may be employed for the alkoxyation, preferably ethylene oxide. Examples
- 30 of N-substituted fatty acid amides are fatty acid glucamides or fatty acid alkanolamides. Examples of esters are fatty acid esters, glycerol esters or monoglycerides. Examples of sugar-based surfactants are sorbitans, ethoxylated sorbitans, sucrose and glucose esters or alkylpolyglucosides. Examples of polymeric surfactants are home- or copolymers of vinylpyrrolidone, vinylalcohols, or vinylacetate.
- 35 Suitable cationic surfactants are quaternary surfactants, for example quaternary ammonium compounds with one or two hydrophobic groups, or salts of long-chain primary amines. Suitable amphoteric surfactants are alkylbetains and imidazolines. Suitable block polymers are block polymers of the A-B or A-B-A type comprising blocks of polyethylene oxide and polypropylene oxide, or of the A-B-C type comprising alkanol, polyethylene oxide and polypropylene oxide.
- 40 Suitable polyelectrolytes are polyacids or polybases. Examples of polyacids are alkali salts of polyacrylic acid or polyacid comb polymers. Examples of polybases are polyvinylamines or polyethyleneamines.
- Suitable adjuvants are compounds, which have a neglectable or even no pesticidal activity

themselves, and which improve the biological performance of the inventive mixtures on the target. Examples are surfactants, mineral or vegetable oils, and other auxiliaries. Further examples are listed by Knowles, Adjuvants and additives, Agrow Reports DS256, T&F Informa UK, 2006, chapter 5.

- 5 Suitable thickeners are polysaccharides (e.g. xanthan gum, carboxymethylcellulose), anorganic clays (organically modified or unmodified), polycarboxylates, and silicates.
Suitable bactericides are bronopol and isothiazolinone derivatives such as alkylisothiazolinones and benzisothiazolinones.
Suitable anti-freezing agents are ethylene glycol, propylene glycol, urea and glycerin.
- 10 Suitable anti-foaming agents are silicones, long chain alcohols, and salts of fatty acids.
Suitable colorants (e.g. in red, blue, or green) are pigments of low water solubility and water-soluble dyes. Examples are inorganic colorants (e.g. iron oxide, titan oxide, iron hexacyanoferrate) and organic colorants (e.g. alizarin-, azo- and phthalocyanine colorants).
Suitable tackifiers or binders are polyvinylpyrrolidons, polyvinylacetates, polyvinyl alcohols, polyacrylates, biological or synthetic waxes, and cellulose ethers.
- 15

Examples for mixture types and their preparation are:

- i) Water-soluble concentrates (SL, LS)
10-60 wt% of an inventive mixture and 5-15 wt% wetting agent (e.g. alcohol alkoxylates) are dissolved in water and/or in a water-soluble solvent (e.g. alcohols) ad 100 wt%. The active substance dissolves upon dilution with water.
- 20 ii) Dispersible concentrates (DC)
5-25 wt% of an inventive mixture and 1-10 wt% dispersant (e. g. polyvinylpyrrolidone) are dissolved in organic solvent (e.g. cyclohexanone) ad 100 wt%. Dilution with water gives a dispersion.
- 25 iii) Emulsifiable concentrates (EC)
15-70 wt% of an inventive mixture and 5-10 wt% emulsifiers (e.g. calcium dodecylbenzenesulfonate and castor oil ethoxylate) are dissolved in water-insoluble organic solvent (e.g. aromatic hydrocarbon) ad 100 wt%. Dilution with water gives an emulsion.
- 30 iv) Emulsions (EW, EO, ES)
5-40 wt% of an inventive mixture and 1-10 wt% emulsifiers (e.g. calcium dodecylbenzenesulfonate and castor oil ethoxylate) are dissolved in 20-40 wt% water-insoluble organic solvent (e.g. aromatic hydrocarbon). This mixture is introduced into water ad 100 wt% by means of an emulsifying machine and made into a homogeneous emulsion. Dilution with water gives an emulsion.
- 35 v) Suspensions (SC, OD, FS)
In an agitated ball mill, 20-60 wt% of an inventive mixture are comminuted with addition of 2-10 wt% dispersants and wetting agents (e.g. sodium lignosulfonate and alcohol ethoxylate), 0.1-2 wt% thickener (e.g. xanthan gum) and water ad 100 wt% to give a fine active substance suspension. Dilution with water gives a stable suspension of the active substance. For FS type mixture up to 40 wt% binder (e.g. polyvinylalcohol) is added.
- 40 vi) Water-dispersible granules and water-soluble granules (WG, SG)
50-80 wt% of an inventive mixture are ground finely with addition of dispersants and wetting

agents (e.g. sodium lignosulfonate and alcohol ethoxylate) ad 100 wt% and prepared as water-dispersible or water-soluble granules by means of technical appliances (e. g. extrusion, spray tower, fluidized bed). Dilution with water gives a stable dispersion or solution of the active substance.

5 vii) Water-dispersible powders and water-soluble powders (WP, SP, WS)

50-80 wt% of an inventive mixture are ground in a rotor-stator mill with addition of 1-5 wt% dispersants (e.g. sodium lignosulfonate), 1-3 wt% wetting agents (e.g. alcohol ethoxylate) and solid carrier (e.g. silica gel) ad 100 wt%. Dilution with water gives a stable dispersion or solution of the active substance.

10 viii) Gel (GW, GF)

In an agitated ball mill, 5-25 wt% of an inventive mixture are comminuted with addition of 3-10 wt% dispersants (e.g. sodium lignosulfonate), 1-5 wt% thickener (e.g. carboxymethylcellulose) and water ad 100 wt% to give a fine suspension of the active substance. Dilution with water gives a stable suspension of the active substance.

15 ix) Microemulsion (ME)

5-20 wt% of an inventive mixture are added to 5-30 wt% organic solvent blend (e.g. fatty acid dimethylamide and cyclohexanone), 10-25 wt% surfactant blend (e.g. alcohol ethoxylate and arylphenol ethoxylate), and water ad 100 %. This mixture is stirred for 1 h to produce spontaneously a thermodynamically stable microemulsion.

20 x) Microcapsules (CS)

An oil phase comprising 5-50 wt% of an inventive mixture, 0-40 wt% water insoluble organic solvent (e.g. aromatic hydrocarbon), 2-15 wt% acrylic monomers (e.g. methylmethacrylate, methacrylic acid and a di- or triacrylate) are dispersed into an aqueous solution of a protective colloid (e.g. polyvinyl alcohol). Radical polymerization initiated by a radical initiator results in the formation of poly(meth)acrylate microcapsules. Alternatively, an oil phase comprising 5-50 wt% of an inventive mixture according to the invention, 0-40 wt% water insoluble organic solvent (e.g. aromatic hydrocarbon), and an isocyanate monomer (e.g. diphenylmethene-4,4'-diisocyanate) are dispersed into an aqueous solution of a protective colloid (e.g. polyvinyl alcohol). The addition of a polyamine (e.g. hexamethylenediamine) results in the formation of polyurea microcapsules. The monomers amount to 1-10 wt%. The wt% relate to the total CS mixture.

30 xi) Dustable powders (DP, DS)

1-10 wt% of an inventive mixture are ground finely and mixed intimately with solid carrier (e.g. finely divided kaolin) ad 100 wt%.

35 x) Granules (GR, FG)

0.5-30 wt% of an inventive mixture is ground finely and associated with solid carrier (e.g. silicate) ad 100 wt%. Granulation is achieved by extrusion, spray-drying or fluidized bed.

xii) Ultra-low volume liquids (UL)

1-50 wt% of an inventive mixture are dissolved in organic solvent (e.g. aromatic hydrocarbon) ad 100 wt%.

The mixtures types i) to xii) may optionally comprise further auxiliaries, such as 0.1-1 wt% bactericides, 5-15 wt% anti-freezing agents, 0.1-1 wt% anti-foaming agents, and 0.1-1 wt% colorants.

The resulting agrochemical mixtures generally comprise between 0.01 and 95%, preferably between 0.1 and 90%, and in particular between 0.5 and 75%, by weight of active substance. The active substances are employed in a purity of from 90% to 100%, preferably from 95% to 100% (according to NMR spectrum).

Solutions for seed treatment (LS), Suspoemulsions (SE), flowable concentrates (FS), powders for dry treatment (DS), water-dispersible powders for slurry treatment (WS), water-soluble powders (SS), emulsions (ES), emulsifiable concentrates (EC) and gels (GF) are usually employed for the purposes of treatment of plant propagation materials, particularly seeds.

The mixtures in question give, after two-to-tenfold dilution, active substance concentrations of from 0.01 to 60% by weight, preferably from 0.1 to 40%, in the ready-to-use preparations. Application can be carried out before or during sowing. Methods for applying the inventive mixtures and mixtures thereof, respectively, on to plant propagation material, especially seeds include dressing, coating, pelleting, dusting, soaking and in-furrow application methods of the propagation material. Preferably, the inventive mixtures or the mixtures thereof, respectively, are applied on to the plant propagation material by a method such that germination is not induced, e. g. by seed dressing, pelleting, coating and dusting.

Various types of oils, wetters, adjuvants, fertilizer, or micronutrients, and further pesticides (e.g. herbicides, insecticides, fungicides, growth regulators, safeners) may be added to the active substances or the inventive mixtures comprising them as premix or, if appropriate not until immediately prior to use (tank mix). These agents can be admixed with the inventive mixtures in a weight ratio of 1:100 to 100:1, preferably 1:10 to 10:1.

The user applies the mixture according to the invention usually from a predosage device, a knapsack sprayer, a spray tank, a spray plane, or an irrigation system. Usually, the agrochemical mixture is made up with water, buffer, and/or further auxiliaries to the desired application concentration and the ready-to-use spray liquor or the agrochemical mixture according to the invention is thus obtained. Usually, 20 to 2000 liters, preferably 50 to 400 liters, of the ready-to-use spray liquor are applied per hectare of agricultural useful area.

The inventive mixtures provide excellent pre-plant burn-down, pre- and post-emergence control of weeds in canola, including canola that is tolerant to herbicides including glufosinate. Thus, in the methods and uses of the invention, the compounds present in the inventive mixtures can be applied for pre-plant burn-down (to control emerged weeds prior to planting), pre-emergence (before the emergence of undesirable vegetation) or post-emergence (i.e., during and/or after emergence of the undesirable vegetation).

Thus, the invention relates to a method of an inventive mixture for controlling undesirable vegetation in canola, including canola that is tolerant to herbicides including glufosinate, which comprises applying the compounds present in the inventive mixtures to a locus of planted crops where undesirable vegetation occurs or might occur. The application is done before the emergence of undesirable vegetation or during and/or after emergence of the undesirable vegetation. The application can be done after seeding of the canola or during and/or after emergence of the canola.

Canola is also called oil seed rape.

The term "locus", as used herein, means the area in which the vegetation or plants are growing or will grow, typically a field.

As used herein, the terms "controlling" and "combating" are synonyms.

As used herein, the terms "undesirable vegetation", "undesirable species", "undesirable plants", "harmful plants", "undesirable weeds", or "harmfull weeds" are synonyms.

When using the inventive mixtures in the methods of the present invention, the active compounds present in the inventive mixtures can be applied simultaneously or in succession, where undesirable vegetation may occur. Herein, it is immaterial whether compounds present in the inventive mixtures are formulated jointly or separately and applied jointly or separately, and, in the case of separate application, in which order the application takes place. It is only necessary, that the compounds present in the inventive mixtures are applied in a time frame, which allows simultaneous action of the active ingredients on the undesirable plants.

In the above-mentioned methods of controlling weeds by application of the inventive mixtures, the inventive mixtures have an outstanding herbicidal activity against a broad spectrum of economically important monocotyledonous and dicotyledonous harmful plants. The inventive mixtures also act efficiently on perennial weeds which produce shoots from rhizomes, rootstocks or other perennial organs and which are difficult to control. In this context, it does not matter whether the compounds of the inventive mixtures are applied before sowing, pre-emergence or post-emergence. Pre-plant burn-down, post-emergence application, or early pre-sowing or pre-emergence application, are preferred.

Specifically, examples may be mentioned of some representatives of the monocotyledonous and dicotyledonous weed flora which can be controlled by the compositions according to the invention, without the enumeration being a restriction to certain species.

Both L-glufosinate alone as well as, in the methods of the present invention, the inventive mixtures are suitable for controlling a large number of harmful plants in agricultural crops, including monocotyledonous weeds, in particular annual weeds such as gramineous weeds (grasses) including *Echinochloa* species such as barnyardgrass (*Echinochloa crusgalli* var. *crus-galli*), *Echinochloa walteri* (Pursh) Heller, jungle rice (*Echinochloa colona*), *Echinochloa crus-pavonis*, *Echinochloa oryzicola*, *Digitaria* species such as crabgrass (*Digitaria sanguinalis*), *Digitaria horizontalis*, sourgrass (*Digitaria insularis*) or naked crabgrass (*Digitaria nuda*), *Setaria* species such as green foxtail (*Setaria viridis*), giant foxtail (*Setaria faberii*), yellow foxtail (*Setaria glauca* or *Setaria pumila*) or *Setaria verticillata*, *Sorghum* species such as johnsongrass (*Sorghum halepense* Pers.), *Avena* species such as wild oats (*Avena fatua*), *Avena sterilis* or *Avena stri-gosa*, *Cenchrus* species such as *Cenchrus* species such as field sandbur (*Cenchrus pauciflorus*) or *Cenchrus echinatus*, *Bromus* species such as *Bromus japonicus* Thunb, *Bromus sterilis* or *Bromus tectorum*, *Lolium* species, *Phalaris* species such as *Phalaris brachystachys*, *Phalaris minor* or *Phalaris persicaria*, *Eriochloa* species, *Panicum* species such as fall panicum (*Panicum*

- dichotomiflorum), *Panicum fasciculatum* or *Panicum maximum*, *Brachiaria* species, annual bluegrass (*Poa annua*), *Alopecurus* species such as blackgrass (*Alopecurus myosuroides*), *Alopecurus aequalis* Sobol or *Alopecurus japonicus* Steud, *Aegilops* species such as *Aegilops cylindrica* or *Aegilops tauschii*, *Apera spica-venti*, *Eleusine indica*, *Cynodon dactylon*, couch grass (*Agropyron repens* or *Elymus repens*), *Agrostis alba*, *Beckmannia syzigachne* (Steud.) Fernald, *Chloris* species such as *Chloris virgata*, *Commelina* species such as *Commelina benghalensis*, *Commelina communis*, *Commelina diffusa* or *Commelina erecta*, *Dactyloctenium aegyptium*, *Hordeum jubatum*, *Hordeum leporinum*, *Imperata cylindrica*, *Ischaemum rogusum*, *Ixophorus unisetus*, *Leerisa hexandra*, *Leersia japonica*, *Leptochloa* species such as *Leptochloa chinensis*, *Leptochloa fascicularis*, *Leptochloa filiformis* or *Leptochloa panicoides*, *Lolium* species such as *Lolium multiflorum*, *Lolium perenne*, *Lolium persicum* or rigid ryegrass (*Lolium rigidum*), *Luziola subintegra*, *Murdannia nudiflora* (L.) Brenan, *Oryza latifolia*, *Oryza rufipogon*, *Paspalum distichum*, *Paspalum* species, *Pennisetum americanum*, *Pennisetum purpureum*, *Phleum paniculatum*, *Phragmites australis*, *Ploypogon fugax* N., *Poa* species such as *Poa annua* or *Poa trivialis* L., *Puccinellia distans*, *Rottboellia cochinchinensis*, *Sclerochloa kengiana* (Ohwi) Tzvel., *Trichloris crinita*, *Urochloa* or *Brachiaria* species such as *Brachiaria decumbens*, *Brachiaria plantaginea*, *Brachiaria platyphylla*, *Urochloa panicoides*, *Urochloa ramosa* and the like.
- Both L-glufosinate alone as well as the inventive mixtures are also suitable for controlling a large number of dicotyledonous weeds, in particular broad leaf weeds including *Polygonum* species such as wild buckwheat (*Polygonum convolvulus*), *Polygonum pensilvanicum*, *Polygonum persicaria* or prostrate knotweed (*Polygonum aviculare*), *Amaranthus* species such as pigweed (*Amaranthus retroflexus*), Palmer amaranth (*Amaranthus palmeri*), tall waterhemp (*Amaranthus tuberculatus* or *Amaranthus rudis*), redroot pigweed (*Amaranthus retroflexus*), green amaranth (*Amaranthus hybridus*), purple amaranth (*Amaranthus lividus*), prickly amaranth (*Amaranthus spinosus*) or *Amaranthus quitensis*, *Chenopodium* species such as common lambsquarters (*Chenopodium album* L.), *Chenopodium serotinum* or Quinoa (*Chenopodium quinoa*), *Sida* species such as prickly sida (*Sida spinosa* L.), *Ambrosia* species such as common ragweed (*Ambrosia artemisiifolia*) or giant ragweed (*Ambrosia trifida*), *Acanthospermum* species, *Anthemis* species such as *Anthemis arvensis* or *Anthemis cotula*, *Atriplex* species, *Cirsium* species such as *Cirsium arvense*, *Convolvulus* species such as field bindweed (*Convolvulus arvensis*), *Conyza* species such as horseweed (*Conyza canadensis*, *Erigeron canadensis*) or hairy fleabane (*Conyza bonariensis*, *Erigeron bonariensis*), *Cassia* species, *Datura* species such as jimsonweed (*Datura stramonium*), *Euphorbia* species such as toothed spurge (*Euphorbia dentata*), *Euphorbia hirta*, *Euphorbia helioscopia* or fireplant (*Euphorbia heterophylla*), *Geranium* species such as *Geranium donianum* or *Geranium pusillum*, *Galinsoga* species, morningglory (*Ipomoea* species), *Lamium* species such as henbit dead-nettle (*Lamium amplexicaule*), *Malva* species such as dwarf mallow (*Malva neglecta*) or cheeseweed (*Malva parviflora*), *Matricaria* species such as chamomile (*Matricaria chamomilla*) or *Matricaria inodora*, *Sysimbrium* species, *Solanum* species such as black nightshade (*Solanum nigrum*), *Xanthium* species, *Veronica* species such as *Veronica polita*, *Viola* species, common chickweed (*Stellaria media*), velvetleaf (*Abutilon theophrasti*), *Sesbania* species such as *Sesbania exaltata*, *Ses-*

- bania herbacea or hemp sesbania (*Sesbania exaltata* Cory), *Anoda cristata*, *Bidens* species such as *Bidens frondosa* or *Bidens pilosa*, *Brassica kaber*, *Capsella* species such as *Capsella media* or *Capsella bursa-pastoris*, *Centaurea cyanus*, *Galeopsis tetrahit*, *Galium aparine*, *Heli-anthus annuus*, *Desmodium tortuosum*, *Kochia scoparia*, *Mercurialis annua*, *Myosotis arvensis*,
5 *Papaver rhoeas*, *Raphanus* species such as wild radish (*Raphanus raphanistrum*), *Salsola* species such as *Salsola tragus* or *Salsola kali*, *Sinapis arvensis*, *Sonchus* species such as *Sonchus asper*, *Sonchus arvensis* or *Sonchus oleraceus*, *Thlaspi arvense*, *Tagetes minuta*, *Richardia* species such as *Richardia scabra* or *Richardia brasiliensis*, *Aeschynomene* species such as *Aeschynomene denticulata*, *Aeschynomene indica* or *Aeschynomene rudis*, *Alisma* species such
10 as *Alisma canaliculatum* or *Alisma plantago-aquatica*, *Borreria* species such as *Borreria verticillata*, *Brassica rapa*, *Carduus acanthoides*, *Parietaria debilis*, *Portulaca oleracea*, *Ipomoea* species such as *Ipomoea grandifolia*, *Ipomoea hederacea*, *Ipomoea indivisa*, *Ipomoea lacunose*, *Ipomoea lonchophylla* or *Ipomoea wrightii*, *Senna obtusifolia*, *Sida* species such as arrowleaf sida (*Sida rhombifolia*) or prickly sida (*Sida spinosa*), *Spermacoce latifolia*, *Tridax procumbens*,
15 *Trianthema portulacastrum*, *Parthenium hysterophorus*, *Portulaca oleracea*, *Acalypha australis*, *Ammi majus*, *Atriplex* species, *Orobanche* species, *Mercurialis annua*, *Cirsium arvense*, *Calystegia sepium*, *Stellaria media*, *Lamium* species, *Viola* species, *Celosia argentea*, *Melampodium divaricatum*, *Cleome viscosa*, *Molugo verticillatus*, *Borhevia erecta*, *Gomphrena* species, *Nican-dra physalodes*, *Ricinus communis*, *Geranium dissectum*, *Alternanthera* species such as *Al-*
20 *thernanthera philoxeroides* or *Alternanthera tenella*, *Ammannia* species such as *Ammania coc-cinea*, *Anacamtodon fortunei* Mitt., *Anagallis arvensis*, *Aneilema keisak*, *Arenaria serpyllifolia*, *Argemone mexicana*, *Asphodelus tenuifolius*, *Atriplex patula*, *Bacopa rotundifolia*, *Brassica na-pus*, *Caperonia* species such as *Caperonia castaneifolia* or *Caperonia palustris*, *Cephalano-plos segetum*, *Corynopus didymus*, *Crepis capillaris*, *Crepis tectorum*, *Croton lobatus*, *Descu-*
25 *minia sophia* (L.), *Descurainia pinnata*, *Echinodorus grandiflorus*, *Eclipta alba*, *Eclipta prostrata*, *Eichhornia crassipes*, *Eleocharis* species, *Equisetum arvense*, *Fallopia convolvulus*, *Fallopia convolvulus*, *Heteranthera limosa*, *Jussiaea* species, *Kallstroemia maxima*, *Lactuca serriola*, *Lathyrus aphaca*, *Launea nudicaulis*, *Leucas chinensis*, *Limnocharis flava*, *Lindernia dubia*, *Lindernia pyxidaria*, *Litospermum arvense*, *Ludwigia* species such as *Ludwigia octovalis*, *Mac-*
30 *roptilium lathyroides*, *Malachium aquaticum* (L.), *Melilotus* species, *Merremia aegyptia*, *Momor-dica charantia*, *Monochoria hastata*, *Monochoria vaginalis*, *Mucuna* species, *Murdannia nudiflo-ra*, *Oxalis neaei*, *Phylanthus* species, *Physalis* species, *Pistia stratiotes*, *Potamogeton distinc-tus*, *Rorippa islandica*, *Rotala indica*, *Rotala ramosior*, *Rumex dentatus*, *Rumex obtusifolius*, *Sagittaria montevidensis*, *Sagittaria pygmaea* Miq., *Sagittaria sagittifolia*, *Sagittaria trifolia* L.,
35 *Senecio vulgaris*, *Sicyos polyacanthus*, *Silene gallica*, *chenopo**Sisymbrium* species such as *Sisymbrium officinale*, *Solanum* species, *Spergula arvensis*, *Sphenoclea zeylanica*, *Trianthema* spp., *Tripleurospermum inodorum*, *Veronica* species such as *Veronica persica* or *Veronica polita* *Vicia sativa* and the like.
- 40 Both L-glufosinate alone as well as the inventive mixtures are also suitable for controlling a large number of annual and perennial sedge weeds including *Cyperus* species such as purple nutsedge (*Cyperus rotundus* L.), yellow nutsedge (*Cyperus esculentus* L.), hime-kugu (*Cyperus brevifolius* H.), sedge weed (*Cyperus microiria* Steud), rice flatsedge (*Cyperus iria* L.), *Cyperus*

difformis, *Cyperus difformis* L., *Cyperus esculentus*, *Cyperus ferax*, *Cyperus flavus*, *Cyperus*
iria, *Cyperus lanceolatus*, *Cyperus odoratus*, *Cyperus rotundus*, *Cyperus serotinus* Rottb., *Eleo-*
charis acicularis, *Eleocharis kuroguwai*, *Fimbristylis dichotoma*, *Fimbristylis miliacea*, *Scirpus*
grossus, *Scirpus juncoideus*, *Scirpus juncoideus* Roxb, *Scirpus* or *Bolboschoenus maritimus*,
 5 *Scirpus* or *Schoenoplectus mucronatus*, *Scirpus planiculmis* Fr. Schmidt and the like.

Both L-glufosinate alone as well as the inventive mixtures are also suitable for controlling weeds
 that are resistant to commonly used herbicides such as, for example, weeds that are resistant to
 glyphosate, weeds that are resistant to auxin inhibitor herbicides such as e. g. 2,4-D or dicam-
 10 ba, weeds that are resistant to photosynthesis inhibitors such as e. g. atrazine, weeds that are
 resistant to ALS inhibitors such as e. g. sulfonylureas, imidazolinones or triazolopyrimidines,
 weeds that are resistant to ACCase inhibitors such as e. g. clodinafop, clethodim or pinoxaden
 or weeds that are resistant to protoporphyrinogen-IX-oxidase inhibitors such as e. g. sulfentra-
 zone, flumioxazine, fomesafen or acifluorfen, for example the weeds that are listed in the Inter-
 15 national Survey of Resistant Weeds
 (<http://www.weedscience.org/Summary/SpeciesbySOATable.aspx>). In particular, they are suita-
 ble for controlling the resistant weeds that are listed in the International Survey of Resistant
 Weeds, for example ACCase resistant *Echinochloa crus-galli*, *Avena fatua*, *Alopecurus myosu-*
roides, *Echinochloa colona*, *Alopecurus japonicus*, *Bromus tectorum*, *Hordeum murinum*, *Is-*
 20 *chaemum rugosum*, *Setaria viridis*, *Sorghum halepense*, *Alopecurus aequalis*, *Apera spica-*
venti, *Avena sterilis*, *Beckmannia syzigachne*, *Bromus diandrus*, *Digitaria sanguinalis*, *Echi-*
nochloa oryzoides, *Echinochloa phyllopogon*, *Phalaris minor*, *Phalaris paradoxa*, *Setaria faberi*,
Setaria viridis, *Brachypodium distachyon*, *Bromus diandrus*, *Bromus sterilis*, *Cynosurus echina-*
tus, *Digitaria insularis*, *Digitaria ischaemum*, *Leptochloa chinensis*, *Phalaris brachystachis*, *Rot-*
 25 *boellia cochinchinensis*, *Digitaria ciliaris*, *Ehrharta longiflora*, *Eriochloa punctata*, *Leptochloa*
panicoides, *Lolium persicum*, *Polypogon fugax*, *Sclerochloa kengiana*, *Snowdenia polystacha*,
Sorghum sudanese and *Brachiaria plantaginea*, ALS inhibitor resistant *Echinochloa crus-galli*,
Poa annua, *Avena fatua*, *Alopecurus myosuroides*, *Echinochloa colona*, *Amaranthus hybridus*,
Amaranthus palmeri, *Amaranthus rudis*, *Conyza sumatrensis*, *Amaranthus retroflexus*, *Ambro-*
 30 *sia artemisifolia*, *Conyza canadensis*, *Kochia scoparia*, *Raphanus raphanistrum*, *Senecio ver-*
nalis, *Alopecurus japonicus*, *Bidens pilosa*, *Bromus tectorum*, *Chenopodium album*, *Conyza*
bonariensis, *Hordeum murinum*, *Ischaemum rugosum*, *Senecio vulgaris*, *Setaria viridis*, *Sisym-*
brium orientale, *Sorghum halepense*, *Alopecurus aequalis*, *Amaranthus blitum*, *Amaranthus*
powellii, *Apera spica-venti*, *Avena sterilis*, *Brassica rapa*, *Bromus diandrus*, *Descurainia sophia*,
 35 *Digitaria sanguinalis*, *Echinochloa oryzoides*, *Echinochloa phyllopogon*, *Euphorbia heterophylla*,
Lactuca serriola, *Phalaris minor*, *Phalaris paradoxa*, *Setaria faberi*, *Setaria viridis*, *Sinapis*
arvensis, *Solanum ptycanthum*, *Sonchus oleraceus*, *Stellaria media*, *Amaranthus blitoides*, *Am-*
aranthus spinosus, *Amaranthus viridis*, *Ambrosia trifida*, *Bidens subalternans*, *Bromus diandrus*,
Bromus sterilis, *Capsella bursa-pastoris*, *Centaurea cyanus*, *Cynosurus echinatus*, *Cyperus*
 40 *difformis*, *Fimbristylis miliacea*, *Galeopsis tetrahit*, *Galium aparine*, *Galium spurium*, *Helianthus*
annuus, *Hirschfeldia incana*, *Limncharis flava*, *Limnophila erecta*, *Papaver rhoeas*, *Parthenium*
hysterophorus, *Phalaris brachystachis*, *Polygonum convolvulus*, *Polygonum lapathifolium*, *Po-*
lygonum persicaria, *Ranunculus acris*, *Rottboellia cochinchinensis*, *Sagittaria montevidensis*,

Salsola tragus, Schoenoplectus mucronatus, Setaria pumila, Sonchus asper, Xanthium strumarium, Ageratum conyzoides, Alisma canaliculatum, Alisma plantago-aquatica, Ammannia auriculata, Ammannia coccinea, Ammannia arvensis, Anthemis cotula, Bacopa rotundifolia, Bifora radians, Blyxa aubertii, Brassica tournefortii, Bromus japonicus, Bromus secalinus, Lithospermum arvense, Camelina microcarpa, Chamaesyce maculata, Chrysanthemum coronarium, Clidemia hirta, Crepis tectorum, Cuscuta pentagona, Cyperus brevifolis, Cyperus compressus, Cyperus esculentus, Cyperus iria, Cyperus odoratus, Damasonium minus, Diplotaxis eruroides, Diplotaxis tenuifolia, Dopatrum junceum, Echium plantagineum, Elatine triandra, Eleocharis acicularis, Erucaria hispanica, Erysimum repandum, Galium tricornutum, Iva xanthifolia, Ixophorus unisetus, Lamium amplexicaule, Limnophylla sessiliflora, Lindernia dubia, Lindernia micrantha, Lindernia procumbens, Ludwigia prostrata, Matricaria recutita, Mesembryanthemum crystallinum, Monochoria korsakowii, Monochoria vaginalis, Myosoton aquaticum, Neslia paniculata, Oryza sativa var. sylvatica, Pentzia suffruticosa, Picris hieracioides, Raphanus sativus, Rapistrum rugosum, Rorippa indica, Rotala indica, Rotala pusilla, Rumex dentatus, Sagittaria guayensis, Sagittaria pygmaea, Sagittaria trifolia, Schoenoplectus fluviatilis, Schoenoplectus juncoideus, Schoenoplectus wallichii, Sida spinosa, Silene gallica, Sinapis alba, Sisymbrium thelungii, Sorghum bicolor, Spargula arvensis, Thlaspi arvense, Tripleurospermum perforatum, Vaccaria hispanica and Vicia sativa, photosynthesis inhibitor resistant Echinochloa crus-galli, Poa annua, Alopecurus myosuroides, Echinochloa colona, Amaranthus hybridus, Amaranthus palmeri, Amaranthus rudis, Conyza sumatrensis, Amaranthus retroflexus, Ambrosia artemisiifolia, Conyza canadensis, Kochia scoparia, Raphanus raphanistrum, Senecio vernalis, Alopecurus japonicus, Bidens pilosa, Bromus tectorum, Chenopodium album, Conyza bonariensis, Ischaemum rugosum, Senecio vulgaris, Setaria viridis, Sisymbrium orientale, Amaranthus blitum, Amaranthus powellii, Apera spica-venti, Beckmannia syzigachne, Brassica rapa, Digitaria sanguinalis, Euphorbia heterophylla, Phalaris minor, Phalaris paradoxa, Setaria faberi, Setaria viridis, Sinapis arvensis, Solanum ptycanthum, Stellaria media, Amaranthus blitoides, Amaranthus viridis, Bidens subalternans, Brachypodium distachyon, Capsella bursa-pastoris, Chloris barbata, Cyperus difformis, Echinochloa erecta, Epilobium ciliatum, Polygonum aviculare, Polygonum convolvulus, Polygonum lapathifolium, Polygonum persicaria, Portulaca oleracea, Schoenoplectus mucronatus, Setaria pumila, Solanum nigrum, Sonchus asper, Urochloa panicoides, Vulpia bromoides, Abutilon theophrasti, Amaranthus albus, Amaranthus cruentus, Arabidopsis thaliana, Arenaria serpyllifolia, Bidens tripartita, Chenopodium album, Chenopodium ficifolium, Chenopodium polyspermum, Crypsis schoenoides, Datura stramonium, Epilobium tetragonum, Galinsoga ciliata, Matricaria discoidea, Panicum capillare, Panicum dichotomiflorum, Plantago lagopus, Polygonum hydropiper, Polygonum pensylvanicum, Polygonum monspeliensis, Rostaria, smyrnacea, Rumex acetosella, Setaria verticillata and Urtica urens, PS-I-electron diversion inhibitor resistant Poa annua, Conyza sumatrensis, Conyza canadensis, Alopecurus japonicus, Bidens pilosa, Conyza bonariensis, Hordeum murinum, Ischaemum rugosum, Amaranthus blitum, Solanum ptycanthum, Arctotheca calendula, Epilobium ciliatum, Hedyotis verticillata, Solanum nigrum, Vulpia bromoides, Convolvulus arvensis, Crassocephalum crepidioides, Cuphea carthagensis, Erigeron philadelphicus, Gamochaeta pensylvanica, Landoltia punctata, Lepidium virginicum, Mazus fauriei, Mazus pumilus, Mitracarpus hirtus, Sclerochloa dura, Solanum americanum and Youngia japonica, glyphosate resistant Poa annua, Echinochloa colona,

Amaranthus hybridus, Amaranthus palmeri, Amaranthus rudis, Conyza sumatrensis, Ambrosia artemisifolia, Conyza canadensis, Kochia scoparia, Raphanus raphanistrum, Bidens pilosa, Conyza bonariensis, Hordeum murinum, Sorghum halepense, Brassica rapa, Bromus diandrus, Lactuca serriola, Sonchus oleraceus, Amaranthus spinosus, Ambrosia trifida, Digitaria insularis, Hedyotis verticillata, Helianthus annuus, Parthenium hysterophorus, Plantago lanceolata, Salso-
 5 la tragus, Urochloa panicoides, Brachiaria eruciformis, Bromus rubens, Chloris elata, Chloris truncata, Chloris virgata, Cynodon hirsutus, Lactuca saligna, Leptochloa virgata, Paspalum paniculatum and Tridax procumbens, microtubule assembly inhibitor resistant Echinochloa crus-galli, Poa annua, Avena fatua, Alopecurus myosuroides, Amaranthus palmeri, Setaria viridis,
 10 Sorghum halepense, Alopecurus aequalis, Beckmannia syzigachne and Fumaria densiflora, auxin herbicide resistant Echinochloa crus-galli, Echinochloa colona, Amaranthus hybridus, Amaranthus rudis, Conyza sumatrensis, Kochia scoparia, Raphanus raphanistrum, Chenopodium album, Sisymbrium orientale, Descurainia sophia, Lactuca serriola, Sinapis arvensis, Sonchus oleraceus, Stellaria media, Arctotheca calendula, Centaurea cyanus, Digitaria ischaemum, Fimbristylis miliacea, Galeopsis tetrahit, Galium aparine, Galium spurium, Hirschfeldia
 15 incana, Limnocharis flava, Limnocharis erecta, Papaver rhoeas, Plantago lanceolata, Ranunculus acris, Carduus nutans, Carduus pycnocephalus, Centaurea solstitialis, Centaurea stoebe ssp. Micranthos, Cirsium arvense, Commelina diffusa, Echinochloa crus-pavonis, Soliva sessilis and Sphenoclea zeylanica, HPPD inhibitor resistant Amaranthus palmeri and Amaranthus rudis,
 20 PPO inhibitor resistant Acalypha australis, Amaranthus hybridus, Amaranthus palmeri, Amaranthus retroflexus, Amaranthus rudis, Ambrosia artemisifolia, Avena fatua, Conyza sumatrensis, Descurainia sophia, Euphorbia heterophylla and Senecio vernalis, carotenoid biosynthesis inhibitor resistant Hydrilla verticillata, Raphanus raphanistrum, Senecio vernalis and Sisymbrium orientale, VLCFA inhibitor resistant Alopecurus myosuroides, Avena fatua and Echinochloa
 25 crus-galli.

If the compounds of the inventive mixtures are applied to the soil surface before germination, then the weed seedlings are either prevented completely from emerging, or the weeds grow until they have reached the cotyledon stage but then their growth stops, and, eventually, after three to four weeks have elapsed, they die completely.

30 If the active compounds of the inventive mixtures are applied post-emergence to the green parts of the plants, growth likewise stops drastically a very short time after the treatment and the weed plants remain at the growth stage of the point of time of application, or they die completely after a certain time, so that in this manner competition by the weeds, which is harmful to the canola plants, is eliminated at a very early point in time and in a sustained manner.

35 When the active compounds of the inventive mixtures are used jointly, superadditive (=synergistic) effects are observed. This means that the effect in the combinations exceeds the expected total of the effects of the individual herbicides employed. The synergistic effects allow the application rate to be reduced, a broader spectrum of broad-leaved weeds and weed grasses to be controlled, the herbicidal effect to take place more rapidly, the duration of action to be
 40 longer, the harmful plants to be controlled better while using only one, or few, applications, and the application period which is possible to be extended. In some cases, uptake of the compositions also reduces the amount of harmful constituents in the crop plant, such as nitrogen or oleic acid.

The active compounds of the inventive mixtures can be used jointly or in succession. They can also conveniently be combined with further herbicide treatments to treatment combinations that ensure a more complete or long-lasting weed control, or to ensure control of weeds that are resistant against certain herbicides through combined action of multiple herbicides with different modes of action. In particular, the active compounds of the inventive mixtures and further herbicides can be used in any of the treatment combinations outlined below that consist of pre-plant burn down, pre-emergence/pre-plant volunteer canola control, post-emergence and pre-harvest desiccation treatments. These treatment combinations can be particularly suitable if the canola crop is tolerant to the action of one or more herbicides present in the treatment combination, including tolerance that is a result of breeding and/or genetic modification. Such tolerant plants include glufosinate tolerant canola, glyphosate tolerant canola, canola that is tolerant to imidazolinone herbicides (e. g. imazamox, imazapyr), HPPD herbicides (e. g. topramezone, mesotrione, tembotrione, pyrasulfotole, bicyclopyrone), auxin herbicides (e. g. 2,4-D, dicamba) and/or PPO herbicides (e. g. carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, sulfentrazone).

The following active compounds of the inventive mixtures and further herbicides are particularly suitable as pre-plant burn-down weed control components in such treatment combinations: L-Glufosinate, L-glufosinate ammonium, L-glufosinate sodium, glyphosate, glyphosate dimethylammonium, glyphosate potassium, glyphosate isopropylammonium, paraquat, trifludimoxazin, saflufenacil, 2,4-D, 2,4-D choline salt, dicamba, dicamba ethanolamine salt, dicamba diglycolamine salt, dicamba potassium and dicamba BAPMA salt (i. e. dicamba N,N-bis(3-aminopropyl)methylamine salt).

The following active compounds of the inventive mixtures and further herbicides are particularly suitable as pre-emergence weed control components or components for pre-plant control of volunteer canola in such treatment combinations: Pendimethalin, trifluralin, ethalfluralin, triallate, trifludimoxazin, saflufenacil, sulfentrazone, isoxaflutole, bicyclopyrone, tembotrione, topramezone, topramezone/bromoxynil, pyrasulfotole and mesotrione.

The following active compounds of the inventive mixtures and further herbicides are particularly suitable for post-emergence weed control components in such treatment combinations: L-Glufosinate, L-glufosinate ammonium, L-glufosinate sodium, glyphosate, glyphosate dimethylammonium, glyphosate potassium, glyphosate isopropylammonium, imazamox, imazapyr, tribenuron-methyl, florasulam, ethametsulfuron-methyl, carfentrazone-ethyl, saflufenacil, trifludimoxazin, sulfentrazone, mesotrione, topramezone, bicyclopyrone, tolypyralate, tembotrione, pyrasulfotole, aminopyralid, aminopyralid triisopropanolamine salt, clopyralid, clopyralid ethanolamine salt, picloram, picloram potassium salt, fluroxypyr 1-methylheptyl ester, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (II-93), 2,4-D, 2,4-D choline salt, dicamba, dicamba sodium, dicamba ethanolamine salt, dicamba diglycolamine salt, dicamba potassium and dicamba BAPMA salt.

The following active compounds of the inventive mixtures and further herbicides are particularly suitable as pre-harvest desiccation components in such treatment combinations: L-Glufosinate,

L-glufosinate ammonium, L-glufosinate sodium, glyphosate, glyphosate dimethylammonium, glyphosate potassium, glyphosate isopropylammonium, carfentrazone-ethyl, saflufenacil, trifludimoxazin and sulfentrazone.

Particularly suitable treatment combinations of active compounds of the inventive mixtures and further herbicides are:

5

The treatment combinations 1.1 to 1.478 in which one of the treatment combinations listed in the following table is combined with post-emergence use of L-glufosinate.

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
1	L-Glufosinate	Pendimethalin	-
2	L-Glufosinate	Trifluralin	-
3	L-Glufosinate	Ethalfuralin	-
4	L-Glufosinate	Triallate	-
5	L-Glufosinate	Trifludimoxazin	-
6	L-Glufosinate	Saflufenacil	-
7	L-Glufosinate	Sulfentrazone	-
8	L-Glufosinate	Isoxaflutole	-
9	L-Glufosinate	Bicyclopyrone	-
10	L-Glufosinate	Tembotrione	-
11	L-Glufosinate	Mesotrione	-
12	L-Glufosinate	Pyrasulfotole	-
13	L-Glufosinate	Topramezone	-
14	L-Glufosinate	Topramezone + bromoxynil	-
15	L-Glufosinate ammonium	Pendimethalin	-
16	L-Glufosinate ammonium	Trifluralin	-
17	L-Glufosinate ammonium	Ethalfuralin	-
18	L-Glufosinate ammonium	Triallate	-
19	L-Glufosinate ammonium	Trifludimoxazin	-
20	L-Glufosinate ammonium	Saflufenacil	-
21	L-Glufosinate ammonium	Sulfentrazone	-
22	L-Glufosinate ammonium	Isoxaflutole	-
23	L-Glufosinate ammonium	Bicyclopyrone	-
24	L-Glufosinate ammonium	Tembotrione	-
25	L-Glufosinate ammonium	Mesotrione	-
26	L-Glufosinate ammonium	Pyrasulfotole	-
27	L-Glufosinate ammonium	Topramezone	-
28	L-Glufosinate ammonium	Topramezone + bromoxynil	-
29	L-Glufosinate sodium	Pendimethalin	-

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
30	L-Glufosinate sodium	Trifluralin	-
31	L-Glufosinate sodium	Ethalfuralin	-
32	L-Glufosinate sodium	Triallate	-
33	L-Glufosinate sodium	Trifludimoxazin	-
34	L-Glufosinate sodium	Saflufenacil	-
35	L-Glufosinate sodium	Sulfentrazone	-
36	L-Glufosinate sodium	Isoxaflutole	-
37	L-Glufosinate sodium	Bicyclopyrone	-
38	L-Glufosinate sodium	Tembotrione	-
39	L-Glufosinate sodium	Mesotrione	-
40	L-Glufosinate sodium	Pyrasulfotole	-
41	L-Glufosinate sodium	Topramezone	-
42	L-Glufosinate sodium	Topramezone + bromoxynil	-
43	Glyphosate	Pendimethalin	-
44	Glyphosate	Trifluralin	-
45	Glyphosate	Ethalfuralin	-
46	Glyphosate	Triallate	-
47	Glyphosate	Trifludimoxazin	-
48	Glyphosate	Saflufenacil	-
49	Glyphosate	Sulfentrazone	-
50	Glyphosate	Isoxaflutole	-
51	Glyphosate	Bicyclopyrone	-
52	Glyphosate	Tembotrione	-
53	Glyphosate	Mesotrione	-
54	Glyphosate	Pyrasulfotole	-
55	Glyphosate	Topramezone	-
56	Glyphosate	Topramezone + bromoxynil	-
57	Glyphosate dimethylammonium	Pendimethalin	-
58	Glyphosate dimethylammonium	Trifluralin	-
59	Glyphosate dimethylammonium	Ethalfuralin	-
60	Glyphosate dimethylammonium	Triallate	-
61	Glyphosate dimethylammonium	Trifludimoxazin	-

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
62	Glyphosate dimethylammonium	Saflufenacil	-
63	Glyphosate dimethylammonium	Sulfentrazone	-
64	Glyphosate dimethylammonium	Isoxaflutole	-
65	Glyphosate dimethylammonium	Bicyclopyrone	-
66	Glyphosate dimethylammonium	Tembotrione	-
67	Glyphosate dimethylammonium	Mesotrione	-
68	Glyphosate dimethylammonium	Pyrasulfotole	-
69	Glyphosate dimethylammonium	Topramezone	-
70	Glyphosate dimethylammonium	Topramezone + bromoxynil	-
71	Glyphosate potassium	Pendimethalin	-
72	Glyphosate potassium	Trifluralin	-
73	Glyphosate potassium	Ethalfuralin	-
74	Glyphosate potassium	Triallate	-
75	Glyphosate potassium	Trifludimoxazin	-
76	Glyphosate potassium	Saflufenacil	-
77	Glyphosate potassium	Sulfentrazone	-
78	Glyphosate potassium	Isoxaflutole	-
79	Glyphosate potassium	Bicyclopyrone	-
80	Glyphosate potassium	Tembotrione	-
81	Glyphosate potassium	Mesotrione	-
82	Glyphosate potassium	Pyrasulfotole	-
83	Glyphosate potassium	Topramezone	-
84	Glyphosate potassium	Topramezone + bromoxynil	-
85	Glyphosate isopropylammonium	Pendimethalin	-
86	Glyphosate isopropylammonium	Trifluralin	-
87	Glyphosate isopropylammonium	Ethalfuralin	-
88	Glyphosate isopropylammonium	Triallate	-

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
	nium		
89	Glyphosate isopropylammonium	Trifludimoxazin	-
90	Glyphosate isopropylammonium	Saflufenacil	-
91	Glyphosate isopropylammonium	Sulfentrazone	-
92	Glyphosate isopropylammonium	Isoxaflutole	-
93	Glyphosate isopropylammonium	Bicyclopyrone	-
94	Glyphosate isopropylammonium	Tembotrione	-
95	Glyphosate isopropylammonium	Mesotrione	-
96	Glyphosate isopropylammonium	Pyrasulfotole	-
97	Glyphosate isopropylammonium	Topramezone	-
98	Glyphosate isopropylammonium	Topramezone + bromoxynil	-
99	Saflufenacil	Pendimethalin	-
100	Saflufenacil	Trifluralin	-
101	Saflufenacil	Ethalfuralin	-
102	Saflufenacil	Triallate	-
103	Saflufenacil	Trifludimoxazin	-
104	Saflufenacil	Saflufenacil	-
105	Saflufenacil	Sulfentrazone	-
106	Saflufenacil	Isoxaflutole	-
107	Saflufenacil	Bicyclopyrone	-
108	Saflufenacil	Tembotrione	-
109	Saflufenacil	Mesotrione	-
110	Saflufenacil	Pyrasulfotole	-
111	Saflufenacil	Topramezone	-
112	Saflufenacil	Topramezone + bromoxynil	-
113	Trifludimoxazin	Pendimethalin	-
114	Trifludimoxazin	Trifluralin	-
115	Trifludimoxazin	Ethalfuralin	-
116	Trifludimoxazin	Triallate	-

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
117	Trifludimoxazin	Trifludimoxazin	-
118	Trifludimoxazin	Saflufenacil	-
119	Trifludimoxazin	Sulfentrazone	-
120	Trifludimoxazin	Isoxaflutole	-
121	Trifludimoxazin	Bicyclopyrone	-
122	Trifludimoxazin	Tembotrione	-
123	Trifludimoxazin	Mesotrione	-
124	Trifludimoxazin	Pyrasulfotole	-
125	Trifludimoxazin	Topramezone	-
126	Trifludimoxazin	Topramezone + bromoxynil	-
127	Saflufenacil + trifludimoxazin	Pendimethalin	-
128	Saflufenacil + trifludimoxazin	Trifluralin	-
129	Saflufenacil + trifludimoxazin	Ethalfuralin	-
130	Saflufenacil + trifludimoxazin	Triallate	-
131	Saflufenacil + trifludimoxazin	Trifludimoxazin	-
132	Saflufenacil + trifludimoxazin	Saflufenacil	-
133	Saflufenacil + trifludimoxazin	Sulfentrazone	-
134	Saflufenacil + trifludimoxazin	Isoxaflutole	-
135	Saflufenacil + trifludimoxazin	Bicyclopyrone	-
136	Saflufenacil + trifludimoxazin	Tembotrione	-
137	Saflufenacil + trifludimoxazin	Mesotrione	-
138	Saflufenacil + trifludimoxazin	Pyrasulfotole	-
139	Saflufenacil + trifludimoxazin	Topramezone	-
140	Saflufenacil + trifludimoxazin	Topramezone + bromoxynil	-
141	Dicamba	Pendimethalin	-
142	Dicamba	Trifluralin	-
143	Dicamba	Ethalfuralin	-
144	Dicamba	Triallate	-
145	Dicamba	Trifludimoxazin	-
146	Dicamba	Saflufenacil	-
147	Dicamba	Sulfentrazone	-
148	Dicamba	Isoxaflutole	-
149	Dicamba	Bicyclopyrone	-
150	Dicamba	Tembotrione	-
151	Dicamba	Mesotrione	-
152	Dicamba	Pyrasulfotole	-
153	Dicamba	Topramezone	-

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
154	Dicamba	Topramezone + bromoxynil	-
155	Dicamba ethanolamine salt	Pendimethalin	-
156	Dicamba ethanolamine salt	Trifluralin	-
157	Dicamba ethanolamine salt	Ethalfuralin	-
158	Dicamba ethanolamine salt	Triallate	-
159	Dicamba ethanolamine salt	Trifludimoxazin	-
160	Dicamba ethanolamine salt	Saflufenacil	-
161	Dicamba ethanolamine salt	Sulfentrazone	-
162	Dicamba ethanolamine salt	Isoxaflutole	-
163	Dicamba ethanolamine salt	Bicyclopyrone	-
164	Dicamba ethanolamine salt	Tembotrione	-
165	Dicamba ethanolamine salt	Mesotrione	-
166	Dicamba ethanolamine salt	Pyrasulfotole	-
167	Dicamba ethanolamine salt	Topramezone	-
168	Dicamba ethanolamine salt	Topramezone + bromoxynil	-
169	Dicamba diglycolamine salt	Pendimethalin	-
170	Dicamba diglycolamine salt	Trifluralin	-
171	Dicamba diglycolamine salt	Ethalfuralin	-
172	Dicamba diglycolamine salt	Triallate	-
173	Dicamba diglycolamine salt	Trifludimoxazin	-
174	Dicamba diglycolamine salt	Saflufenacil	-
175	Dicamba diglycolamine salt	Sulfentrazone	-
176	Dicamba diglycolamine salt	Isoxaflutole	-
177	Dicamba diglycolamine salt	Bicyclopyrone	-
178	Dicamba diglycolamine salt	Tembotrione	-
179	Dicamba diglycolamine salt	Mesotrione	-
180	Dicamba diglycolamine salt	Pyrasulfotole	-
181	Dicamba diglycolamine salt	Topramezone	-
182	Dicamba diglycolamine salt	Topramezone + bromoxynil	-
183	Dicamba potassium	Pendimethalin	-
184	Dicamba potassium	Trifluralin	-
185	Dicamba potassium	Ethalfuralin	-
186	Dicamba potassium	Triallate	-
187	Dicamba potassium	Trifludimoxazin	-
188	Dicamba potassium	Saflufenacil	-
189	Dicamba potassium	Sulfentrazone	-

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
190	Dicamba potassium	Isoxaflutole	-
191	Dicamba potassium	Bicyclopyrone	-
192	Dicamba potassium	Tembotrione	-
193	Dicamba potassium	Mesotrione	-
194	Dicamba potassium	Pyrasulfotole	-
195	Dicamba potassium	Topramezone	-
196	Dicamba potassium	Topramezone + bromoxynil	-
197	Dicamba BAPMA salt	Pendimethalin	-
198	Dicamba BAPMA salt	Trifluralin	-
199	Dicamba BAPMA salt	Ethalfuralin	-
200	Dicamba BAPMA salt	Triallate	-
201	Dicamba BAPMA salt	Trifludimoxazin	-
202	Dicamba BAPMA salt	Saflufenacil	-
203	Dicamba BAPMA salt	Sulfentrazone	-
204	Dicamba BAPMA salt	Isoxaflutole	-
205	Dicamba BAPMA salt	Bicyclopyrone	-
206	Dicamba BAPMA salt	Tembotrione	-
207	Dicamba BAPMA salt	Mesotrione	-
208	Dicamba BAPMA salt	Pyrasulfotole	-
209	Dicamba BAPMA salt	Topramezone	-
210	Dicamba BAPMA salt	Topramezone + bromoxynil	-
211	-	Pendimethalin	-
212	-	Trifluralin	-
213	-	Ethalfuralin	-
214	-	Triallate	-
215	-	Trifludimoxazin	-
216	-	Saflufenacil	-
217	-	Sulfentrazone	-
218	-	Isoxaflutole	-
219	-	Bicyclopyrone	-
220	-	Tembotrione	-
221	-	Mesotrione	-
222	-	Pyrasulfotole	-
223	-	Topramezone	-
224	-	Topramezone + bromoxynil	-
225	L-Glufosinate	-	-

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
226	L-Glufosinate ammonium	-	-
227	L-Glufosinate sodium	-	-
228	Glyphosate	-	-
229	Glyphosate dimethylammonium	-	-
230	Glyphosate potassium	-	-
231	Glyphosate isopropylammonium	-	-
232	Saflufenacil	-	-
233	Trifludimoxazin	-	-
234	Saflufenacil + trifludimoxazin	-	-
235	Dicamba	-	-
236	Dicamba ethanolamine salt	-	-
237	Dicamba diglycolamine salt	-	-
238	Dicamba potassium	-	-
239	Dicamba BAPMA salt	-	-
240	L-Glufosinate	Pendimethalin	Saflufenacil
241	L-Glufosinate	Trifluralin	Saflufenacil
242	L-Glufosinate	Ethalfuralin	Saflufenacil
243	L-Glufosinate	Triallate	Saflufenacil
244	L-Glufosinate	Trifludimoxazin	Saflufenacil
245	L-Glufosinate	Saflufenacil	Saflufenacil
246	L-Glufosinate	Sulfentrazone	Saflufenacil
247	L-Glufosinate	Isoxaflutole	Saflufenacil
248	L-Glufosinate	Bicyclopyrone	Saflufenacil
249	L-Glufosinate	Tembotrione	Saflufenacil
250	L-Glufosinate	Mesotrione	Saflufenacil
251	L-Glufosinate	Pyrasulfotole	Saflufenacil
252	L-Glufosinate	Topramezone	Saflufenacil
253	L-Glufosinate	Topramezone + bromoxynil	Saflufenacil
254	L-Glufosinate ammonium	Pendimethalin	Saflufenacil
255	L-Glufosinate ammonium	Trifluralin	Saflufenacil
256	L-Glufosinate ammonium	Ethalfuralin	Saflufenacil
257	L-Glufosinate ammonium	Triallate	Saflufenacil
258	L-Glufosinate ammonium	Trifludimoxazin	Saflufenacil
259	L-Glufosinate ammonium	Saflufenacil	Saflufenacil
260	L-Glufosinate ammonium	Sulfentrazone	Saflufenacil
261	L-Glufosinate ammonium	Isoxaflutole	Saflufenacil

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
262	L-Glufosinate ammonium	Bicyclopyrone	Saflufenacil
263	L-Glufosinate ammonium	Tembotrione	Saflufenacil
264	L-Glufosinate ammonium	Mesotrione	Saflufenacil
265	L-Glufosinate ammonium	Pyrasulfotole	Saflufenacil
266	L-Glufosinate ammonium	Topramezone	Saflufenacil
267	L-Glufosinate ammonium	Topramezone + bromoxynil	Saflufenacil
268	L-Glufosinate sodium	Pendimethalin	Saflufenacil
269	L-Glufosinate sodium	Trifluralin	Saflufenacil
270	L-Glufosinate sodium	Ethalfuralin	Saflufenacil
271	L-Glufosinate sodium	Triallate	Saflufenacil
272	L-Glufosinate sodium	Trifludimoxazin	Saflufenacil
273	L-Glufosinate sodium	Saflufenacil	Saflufenacil
274	L-Glufosinate sodium	Sulfentrazone	Saflufenacil
275	L-Glufosinate sodium	Isoxaflutole	Saflufenacil
276	L-Glufosinate sodium	Bicyclopyrone	Saflufenacil
277	L-Glufosinate sodium	Tembotrione	Saflufenacil
278	L-Glufosinate sodium	Mesotrione	Saflufenacil
279	L-Glufosinate sodium	Pyrasulfotole	Saflufenacil
280	L-Glufosinate sodium	Topramezone	Saflufenacil
281	L-Glufosinate sodium	Topramezone + bromoxynil	Saflufenacil
282	Glyphosate	Pendimethalin	Saflufenacil
283	Glyphosate	Trifluralin	Saflufenacil
284	Glyphosate	Ethalfuralin	Saflufenacil
285	Glyphosate	Triallate	Saflufenacil
286	Glyphosate	Trifludimoxazin	Saflufenacil
287	Glyphosate	Saflufenacil	Saflufenacil
288	Glyphosate	Sulfentrazone	Saflufenacil
289	Glyphosate	Isoxaflutole	Saflufenacil
290	Glyphosate	Bicyclopyrone	Saflufenacil
291	Glyphosate	Tembotrione	Saflufenacil
292	Glyphosate	Mesotrione	Saflufenacil
293	Glyphosate	Pyrasulfotole	Saflufenacil
294	Glyphosate	Topramezone	Saflufenacil
295	Glyphosate	Topramezone + bromoxynil	Saflufenacil
296	Glyphosate dimethylammonium	Pendimethalin	Saflufenacil

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
297	Glyphosate dimethylammonium	Trifluralin	Saflufenacil
298	Glyphosate dimethylammonium	Ethalfuralin	Saflufenacil
299	Glyphosate dimethylammonium	Triallate	Saflufenacil
300	Glyphosate dimethylammonium	Trifludimoxazin	Saflufenacil
301	Glyphosate dimethylammonium	Saflufenacil	Saflufenacil
302	Glyphosate dimethylammonium	Sulfentrazone	Saflufenacil
303	Glyphosate dimethylammonium	Isoxaflutole	Saflufenacil
304	Glyphosate dimethylammonium	Bicyclopyrone	Saflufenacil
305	Glyphosate dimethylammonium	Tembotrione	Saflufenacil
306	Glyphosate dimethylammonium	Mesotrione	Saflufenacil
307	Glyphosate dimethylammonium	Pyrasulfotole	Saflufenacil
308	Glyphosate dimethylammonium	Topramezone	Saflufenacil
309	Glyphosate dimethylammonium	Topramezone + bromoxynil	Saflufenacil
310	Glyphosate potassium	Pendimethalin	Saflufenacil
311	Glyphosate potassium	Trifluralin	Saflufenacil
312	Glyphosate potassium	Ethalfuralin	Saflufenacil
313	Glyphosate potassium	Triallate	Saflufenacil
314	Glyphosate potassium	Trifludimoxazin	Saflufenacil
315	Glyphosate potassium	Saflufenacil	Saflufenacil
316	Glyphosate potassium	Sulfentrazone	Saflufenacil
317	Glyphosate potassium	Isoxaflutole	Saflufenacil
318	Glyphosate potassium	Bicyclopyrone	Saflufenacil
319	Glyphosate potassium	Tembotrione	Saflufenacil
320	Glyphosate potassium	Mesotrione	Saflufenacil
321	Glyphosate potassium	Pyrasulfotole	Saflufenacil
322	Glyphosate potassium	Topramezone	Saflufenacil
323	Glyphosate potassium	Topramezone + bro-	Saflufenacil

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
		moxynil	
324	Glyphosate isopropylammonium	Pendimethalin	Saflufenacil
325	Glyphosate isopropylammonium	Trifluralin	Saflufenacil
326	Glyphosate isopropylammonium	Ethalfuralin	Saflufenacil
327	Glyphosate isopropylammonium	Triallate	Saflufenacil
328	Glyphosate isopropylammonium	Trifludimoxazin	Saflufenacil
329	Glyphosate isopropylammonium	Saflufenacil	Saflufenacil
330	Glyphosate isopropylammonium	Sulfentrazone	Saflufenacil
331	Glyphosate isopropylammonium	Isoxaflutole	Saflufenacil
332	Glyphosate isopropylammonium	Bicyclopyrone	Saflufenacil
333	Glyphosate isopropylammonium	Tembotrione	Saflufenacil
334	Glyphosate isopropylammonium	Mesotrione	Saflufenacil
335	Glyphosate isopropylammonium	Pyrasulfotole	Saflufenacil
336	Glyphosate isopropylammonium	Topramezone	Saflufenacil
337	Glyphosate isopropylammonium	Topramezone + bromoxynil	Saflufenacil
338	Saflufenacil	Pendimethalin	Saflufenacil
339	Saflufenacil	Trifluralin	Saflufenacil
340	Saflufenacil	Ethalfuralin	Saflufenacil
341	Saflufenacil	Triallate	Saflufenacil
342	Saflufenacil	Trifludimoxazin	Saflufenacil
343	Saflufenacil	Saflufenacil	Saflufenacil
344	Saflufenacil	Sulfentrazone	Saflufenacil
345	Saflufenacil	Isoxaflutole	Saflufenacil
346	Saflufenacil	Bicyclopyrone	Saflufenacil
347	Saflufenacil	Tembotrione	Saflufenacil
348	Saflufenacil	Mesotrione	Saflufenacil

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
349	Saflufenacil	Pyrasulfotole	Saflufenacil
350	Saflufenacil	Topramezone	Saflufenacil
351	Saflufenacil	Topramezone + bromoxynil	Saflufenacil
352	Trifludimoxazin	Pendimethalin	Saflufenacil
353	Trifludimoxazin	Trifluralin	Saflufenacil
354	Trifludimoxazin	Ethalfuralin	Saflufenacil
355	Trifludimoxazin	Triallate	Saflufenacil
356	Trifludimoxazin	Trifludimoxazin	Saflufenacil
357	Trifludimoxazin	Saflufenacil	Saflufenacil
358	Trifludimoxazin	Sulfentrazone	Saflufenacil
359	Trifludimoxazin	Isoxaflutole	Saflufenacil
360	Trifludimoxazin	Bicyclopyrone	Saflufenacil
361	Trifludimoxazin	Tembotrione	Saflufenacil
362	Trifludimoxazin	Mesotrione	Saflufenacil
363	Trifludimoxazin	Pyrasulfotole	Saflufenacil
364	Trifludimoxazin	Topramezone	Saflufenacil
365	Trifludimoxazin	Topramezone + bromoxynil	Saflufenacil
366	Saflufenacil + trifludimoxazin	Pendimethalin	Saflufenacil
367	Saflufenacil + trifludimoxazin	Trifluralin	Saflufenacil
368	Saflufenacil + trifludimoxazin	Ethalfuralin	Saflufenacil
369	Saflufenacil + trifludimoxazin	Triallate	Saflufenacil
370	Saflufenacil + trifludimoxazin	Trifludimoxazin	Saflufenacil
371	Saflufenacil + trifludimoxazin	Saflufenacil	Saflufenacil
372	Saflufenacil + trifludimoxazin	Sulfentrazone	Saflufenacil
373	Saflufenacil + trifludimoxazin	Isoxaflutole	Saflufenacil
374	Saflufenacil + trifludimoxazin	Bicyclopyrone	Saflufenacil
375	Saflufenacil + trifludimoxazin	Tembotrione	Saflufenacil
376	Saflufenacil + trifludimoxazin	Mesotrione	Saflufenacil
377	Saflufenacil + trifludimoxazin	Pyrasulfotole	Saflufenacil
378	Saflufenacil + trifludimoxazin	Topramezone	Saflufenacil
379	Saflufenacil + trifludimoxazin	Topramezone + bromoxynil	Saflufenacil
380	Dicamba	Pendimethalin	Saflufenacil
381	Dicamba	Trifluralin	Saflufenacil
382	Dicamba	Ethalfuralin	Saflufenacil
383	Dicamba	Triallate	Saflufenacil
384	Dicamba	Trifludimoxazin	Saflufenacil

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
385	Dicamba	Saflufenacil	Saflufenacil
386	Dicamba	Sulfentrazone	Saflufenacil
387	Dicamba	Isoxaflutole	Saflufenacil
388	Dicamba	Bicyclopyrone	Saflufenacil
389	Dicamba	Tembotrione	Saflufenacil
390	Dicamba	Mesotrione	Saflufenacil
391	Dicamba	Pyrasulfotole	Saflufenacil
392	Dicamba	Topramezone	Saflufenacil
393	Dicamba	Topramezone + bro-moxynil	Saflufenacil
394	Dicamba ethanolamine salt	Pendimethalin	Saflufenacil
395	Dicamba ethanolamine salt	Trifluralin	Saflufenacil
396	Dicamba ethanolamine salt	Ethalfuralin	Saflufenacil
397	Dicamba ethanolamine salt	Triallate	Saflufenacil
398	Dicamba ethanolamine salt	Trifludimoxazin	Saflufenacil
399	Dicamba ethanolamine salt	Saflufenacil	Saflufenacil
400	Dicamba ethanolamine salt	Sulfentrazone	Saflufenacil
401	Dicamba ethanolamine salt	Isoxaflutole	Saflufenacil
402	Dicamba ethanolamine salt	Bicyclopyrone	Saflufenacil
403	Dicamba ethanolamine salt	Tembotrione	Saflufenacil
404	Dicamba ethanolamine salt	Mesotrione	Saflufenacil
405	Dicamba ethanolamine salt	Pyrasulfotole	Saflufenacil
406	Dicamba ethanolamine salt	Topramezone	Saflufenacil
407	Dicamba ethanolamine salt	Topramezone + bro-moxynil	Saflufenacil
408	Dicamba diglycolamine salt	Pendimethalin	Saflufenacil
409	Dicamba diglycolamine salt	Trifluralin	Saflufenacil
410	Dicamba diglycolamine salt	Ethalfuralin	Saflufenacil
411	Dicamba diglycolamine salt	Triallate	Saflufenacil
412	Dicamba diglycolamine salt	Trifludimoxazin	Saflufenacil
413	Dicamba diglycolamine salt	Saflufenacil	Saflufenacil
414	Dicamba diglycolamine salt	Sulfentrazone	Saflufenacil
415	Dicamba diglycolamine salt	Isoxaflutole	Saflufenacil
416	Dicamba diglycolamine salt	Bicyclopyrone	Saflufenacil
417	Dicamba diglycolamine salt	Tembotrione	Saflufenacil
418	Dicamba diglycolamine salt	Mesotrione	Saflufenacil
419	Dicamba diglycolamine salt	Pyrasulfotole	Saflufenacil
420	Dicamba diglycolamine salt	Topramezone	Saflufenacil
421	Dicamba diglycolamine salt	Topramezone + bro-	Saflufenacil

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
		moxynil	
422	Dicamba potassium	Pendimethalin	Saflufenacil
423	Dicamba potassium	Trifluralin	Saflufenacil
424	Dicamba potassium	Ethalfuralin	Saflufenacil
425	Dicamba potassium	Triallate	Saflufenacil
426	Dicamba potassium	Trifludimoxazin	Saflufenacil
427	Dicamba potassium	Saflufenacil	Saflufenacil
428	Dicamba potassium	Sulfentrazone	Saflufenacil
429	Dicamba potassium	Isoxaflutole	Saflufenacil
430	Dicamba potassium	Bicyclopyrone	Saflufenacil
431	Dicamba potassium	Tembotrione	Saflufenacil
432	Dicamba potassium	Mesotrione	Saflufenacil
433	Dicamba potassium	Pyrasulfotole	Saflufenacil
434	Dicamba potassium	Topramezone	Saflufenacil
435	Dicamba potassium	Topramezone + bromoxynil	Saflufenacil
436	Dicamba BAPMA salt	Pendimethalin	Saflufenacil
437	Dicamba BAPMA salt	Trifluralin	Saflufenacil
438	Dicamba BAPMA salt	Ethalfuralin	Saflufenacil
439	Dicamba BAPMA salt	Triallate	Saflufenacil
440	Dicamba BAPMA salt	Trifludimoxazin	Saflufenacil
441	Dicamba BAPMA salt	Saflufenacil	Saflufenacil
442	Dicamba BAPMA salt	Sulfentrazone	Saflufenacil
443	Dicamba BAPMA salt	Isoxaflutole	Saflufenacil
444	Dicamba BAPMA salt	Bicyclopyrone	Saflufenacil
445	Dicamba BAPMA salt	Tembotrione	Saflufenacil
446	Dicamba BAPMA salt	Mesotrione	Saflufenacil
447	Dicamba BAPMA salt	Pyrasulfotole	Saflufenacil
448	Dicamba BAPMA salt	Topramezone	Saflufenacil
449	Dicamba BAPMA salt	Topramezone + bromoxynil	Saflufenacil
450	-	Pendimethalin	Saflufenacil
451	-	Trifluralin	Saflufenacil
452	-	Ethalfuralin	Saflufenacil
453	-	Triallate	Saflufenacil
454	-	Trifludimoxazin	Saflufenacil
455	-	Saflufenacil	Saflufenacil
456	-	Sulfentrazone	Saflufenacil
457	-	Isoxaflutole	Saflufenacil

Treatment combination	Pre-plant burn-down	Pre-emergence or pre-plant control of volunteer canola	Pre-harvest desiccation
458	-	Bicyclopyrone	Saflufenacil
459	-	Tembotrione	Saflufenacil
460	-	Mesotrione	Saflufenacil
461	-	Pyrasulfotole	Saflufenacil
462	-	Topramezone	Saflufenacil
463	-	Topramezone + bromoxynil	Saflufenacil
464	L-Glufosinate	-	Saflufenacil
465	L-Glufosinate ammonium	-	Saflufenacil
466	L-Glufosinate sodium	-	Saflufenacil
467	Glyphosate	-	Saflufenacil
468	Glyphosate dimethylammonium	-	Saflufenacil
469	Glyphosate potassium	-	Saflufenacil
470	Glyphosate isopropylammonium	-	Saflufenacil
471	Saflufenacil	-	Saflufenacil
472	Trifludimoxazin	-	Saflufenacil
473	Saflufenacil + trifludimoxazin	-	Saflufenacil
474	Dicamba	-	Saflufenacil
475	Dicamba ethanolamine salt	-	Saflufenacil
476	Dicamba diglycolamine salt	-	Saflufenacil
477	Dicamba potassium	-	Saflufenacil
478	Dicamba BAPMA salt	-	Saflufenacil

The treatment combinations 2.1 to 2.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium.

The treatment combinations 3.1 to 3.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium.

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The treatment combinations 4.1 to 4.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and clethodim.

The treatment combinations 5.1 to 5.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and clethodim.

10

The treatment combinations 6.1 to 6.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and clethodim.

The treatment combinations 7.1 to 7.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and cycloxydim.

15

The treatment combinations 8.1 to 8.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and cycloxydim.

5 The treatment combinations 9.1 to 9.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and cycloxydim.

The treatment combinations 10.1 to 10.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and sethoxydim.

10 The treatment combinations 11.1 to 11.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and sethoxydim.

The treatment combinations 12.1 to 12.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and sethoxydim.

15 The treatment combinations 13.1 to 13.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and tepraloxym.

The treatment combinations 14.1 to 14.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and tepraloxym.

20 The treatment combinations 15.1 to 15.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and tepraloxym.

25 The treatment combinations 16.1 to 16.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and fenoxaprop-P-ethyl.

The treatment combinations 17.1 to 17.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and fenoxaprop-P-ethyl.

30 The treatment combinations 18.1 to 18.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and fenoxaprop-P-ethyl.

The treatment combinations 19.1 to 19.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and haloxyfop-P-ethyl.

35 The treatment combinations 20.1 to 20.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and haloxyfop-P-ethyl.

40 The treatment combinations 21.1 to 21.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and haloxyfop-P-ethyl.

The treatment combinations 22.1 to 22.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and quizalofop-P-tefuryl.

5 The treatment combinations 23.1 to 23.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and quizalofop-P-tefuryl.

The treatment combinations 24.1 to 24.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and quizalofop-P-tefuryl.

10 The treatment combinations 25.1 to 25.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and quinclorac.

The treatment combinations 26.1 to 26.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and quinclorac.

15 The treatment combinations 27.1 to 27.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and quinclorac.

20 The treatment combinations 28.1 to 28.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and quinclorac dimethylamine salt.

The treatment combinations 29.1 to 29.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and quinclorac dimethylamine salt.

25 The treatment combinations 30.1 to 30.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and quinclorac dimethylamine salt.

The treatment combinations 31.1 to 31.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac and clethodim.

30 The treatment combinations 32.1 to 32.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac and clethodim.

35 The treatment combinations 33.1 to 33.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac and clethodim.

The treatment combinations 34.1 to 34.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac dimethylamine salt and clethodim.

40 The treatment combinations 35.1 to 35.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac dimethylamine salt and clethodim.

The treatment combinations 36.1 to 36.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac dimethylamine salt and clethodim.

5 The treatment combinations 37.1 to 37.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac and cycloxydim.

The treatment combinations 38.1 to 38.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac and cycloxydim.

10 The treatment combinations 39.1 to 39.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac and cycloxydim.

15 The treatment combinations 40.1 to 40.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac dimethylammonium and cycloxydim.

The treatment combinations 41.1 to 41.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac dimethylammonium and cycloxydim.

20 The treatment combinations 42.1 to 42.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac dimethylammonium and cycloxydim.

The treatment combinations 43.1 to 43.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac and sethoxydim.

25 The treatment combinations 44.1 to 44.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac and sethoxydim.

30 The treatment combinations 45.1 to 45.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac and sethoxydim.

The treatment combinations 46.1 to 46.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac dimethylamine salt and sethoxydim.

35 The treatment combinations 47.1 to 47.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac dimethylamine salt and sethoxydim.

The treatment combinations 48.1 to 48.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac dimethylamine salt and sethoxydim.

The treatment combinations 49.1 to 49.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac and tepraloxydim.

5 The treatment combinations 50.1 to 50.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac and tepraloxydim.

The treatment combinations 51.1 to 51.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac and tepraloxydim.

10 The treatment combinations 52.1 to 52.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac dimethylamine salt and tepraloxydim.

15 The treatment combinations 53.1 to 53.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac dimethylamine salt and tepraloxydim.

The treatment combinations 54.1 to 54.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac dimethylamine salt and tepraloxydim.

20 The treatment combinations 55.1 to 55.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac and fenoxaprop-P-ethyl.

The treatment combinations 56.1 to 56.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac and fenoxaprop-P-ethyl.

25 The treatment combinations 57.1 to 57.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac and fenoxaprop-P-ethyl.

30 The treatment combinations 58.1 to 58.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac dimethylamine salt and fenoxaprop-P-ethyl.

The treatment combinations 59.1 to 59.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac dimethylamine salt and fenoxaprop-P-ethyl.

35 The treatment combinations 60.1 to 60.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac dimethylamine salt and fenoxaprop-P-ethyl.

The treatment combinations 61.1 to 61.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac and haloxyfop-P-ethyl.

The treatment combinations 62.1 to 62.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac and haloxyfop-P-ethyl.

5 The treatment combinations 63.1 to 63.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac and haloxyfop-P-ethyl.

The treatment combinations 64.1 to 64.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac dimethylamine salt and haloxyfop-P-ethyl.

10 The treatment combinations 65.1 to 65.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac dimethylamine salt and haloxyfop-P-ethyl.

15 The treatment combinations 66.1 to 66.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac dimethylamine salt and haloxyfop-P-ethyl.

The treatment combinations 67.1 to 67.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac and quizalofop-P-tefuryl.

20 The treatment combinations 68.1 to 68.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac and quizalofop-P-tefuryl.

The treatment combinations 69.1 to 69.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac and quizalofop-P-tefuryl.

25 The treatment combinations 70.1 to 70.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate, quinclorac dimethylamine salt and quizalofop-P-tefuryl.

30 The treatment combinations 71.1 to 71.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium, quinclorac dimethylamine salt and quizalofop-P-tefuryl.

The treatment combinations 72.1 to 72.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium, quinclorac dimethylamine salt and quizalofop-P-tefuryl.

35 The treatment combinations 73.1 to 73.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of imazamox.

The treatment combinations 74.1 to 74.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of imazamox ammonium.

The treatment combinations 75.1 to 75.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of imazapyr.

40 The treatment combinations 76.1 to 76.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of imazapyr isopropylammonium.

The treatment combinations 77.1 to 77.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of imazapyr and imazamox.

The treatment combinations 78.1 to 78.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of imazapyr isopropylammonium and imazamox ammonium.

The treatment combinations 79.1 to 79.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of tribenuron-methyl.

The treatment combinations 80.1 to 80.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of florasulam.

The treatment combinations 81.1 to 81.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of ethametsulfuron-methyl.

The treatment combinations 82.1 to 82.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of carfentrazone-ethyl.

The treatment combinations 83.1 to 83.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of saflufenacil.

The treatment combinations 84.1 to 84.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of trifludimoxazin.

The treatment combinations 85.1 to 85.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of sulfentrazone.

The treatment combinations 86.1 to 86.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of mesotrione.

The treatment combinations 87.1 to 87.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of topramezone.

The treatment combinations 88.1 to 88.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of tembotrione.

The treatment combinations 89.1 to 89.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of pyrasulfotole.

The treatment combinations 90.1 to 90.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of bicyclopyrone.

The treatment combinations 91.1 to 91.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of 2,4-D.

The treatment combinations 92.1 to 92.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of 2,4-D choline salt.

The treatment combinations 93.1 to 93.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of dicamba.

The treatment combinations 94.1 to 94.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of dicamba sodium.

The treatment combinations 95.1 to 95.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of dicamba ethanolamine salt.

The treatment combinations 96.1 to 96.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of dicamba diglycolamine salt.

The treatment combinations 97.1 to 97.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of dicamba potassium.

The treatment combinations 98.1 to 98.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of dicamba BAPMA salt.

- 5 The treatment combinations 99.1 to 99.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of aminopyralid.

The treatment combinations 100.1 to 100.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of aminopyralid triisopropylamine salt.

- 10 The treatment combinations 101.1 to 101.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of clopyralid.

The treatment combinations 102.1 to 102.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of clopyralid ethanolamine salt.

- 15 The treatment combinations 103.1 to 103.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of picloram.

The treatment combinations 104.1 to 104.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of picloram potassium.

The treatment combinations 105.1 to 105.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of fluroxypyr.

- 20 The treatment combinations 106.1 to 106.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of fluroxypyr 1-methylheptyl ester.

The treatment combinations 107.1 to 107.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate and 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (II-93).

- 25 The treatment combinations 108.1 to 108.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate ammonium and 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (II-93).

The treatment combinations 109.1 to 109.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of L-glufosinate sodium and 4-

- 30 amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (II-93).

The treatment combinations 110.1 to 110.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (II-93).

- 35 The treatment combinations 111.1 to 111.478 in which one of the treatment combinations listed in the preceeding table is combined with post-emergence use of tolpyralate.

The abovementioned properties and advantages are necessary under practical weed control conditions to keep the glufosinate tolerant canola free from undesired competing plants and thus to guarantee and/or increase the yields from the qualitative and quantitative point of view.

- 40 These novel combinations markedly exceed the technical state of the art with a view to the properties described.

While the active compounds of the inventive mixtures have an outstanding herbicidal activity against monocotyledonous and dicotyledonous weeds, the tolerant, or cross-tolerant, glufosinate tolerant canola are damaged only to a minor extent, or not at all.

- 5 As mentioned above, the inventive mixtures are suitable for controlling a large number of harmful plants in glufosinate tolerant canola

Thus, the term " glufosinate tolerant canola" as used herein includes also (canola) plants which have been modified by mutagenesis, genetic engineering or breeding and mutation selection techniques in order to provide a new trait to a plant or to modify an already present trait. Mutagenesis includes techniques of random mutagenesis using X-rays or mutagenic chemicals, but also techniques of targeted mutagenesis, in order to create mutations at a specific locus of a plant genome. Targeted mutagenesis techniques frequently use oligonucleotides or proteins like CRISPR/Cas, zinc-finger nucleases, TALENs or meganucleases to achieve the targeting effect.

15 Genetic engineering usually uses recombinant DNA techniques to create modifications in a plant genome which under natural circumstances cannot readily be obtained by cross breeding, mutagenesis or natural recombination. Typically, one or more genes are integrated into the genome of a plant in order to add a trait or improve a trait. These integrated genes are also referred to as transgenes in the art, while plant comprising such transgenes are referred to as transgenic plants. The process of plant transformation usually produces several transformation events, which differ in the genomic locus in which a transgene has been integrated. Plants comprising a specific transgene on a specific genomic locus are usually described as comprising a specific "event", which is referred to by a specific event name.

25 Glufosinate tolerance has been created by using mutagenesis as well as using genetic engineering. Transgenic canola events comprising glufosinate tolerance genes are for example, but not excluding others, HCN10 (Topas 19/2) (event code: , gene: bar, e.g. commercially available as Liberty Link™ Independence™), HCN28 (T45) (event code: ACS-BNØØ8-2, gene: pat, e.g. commercially available as InVigor™ Canola), HCN92 (Topas 19/2 (event code: ACS-BNØØ7-1, gene: bar, e.g. commercially available as Liberty Link™ Innovator™), MS1 (B91-4) (event code: ACS-BNØØ4-7, gene: bar, e.g. commercially available as InVigor™ Canola), MS1 x RF1 (PGS1) (event code: ACS-BNØØ4-7 x ACS-BNØØ1-4, gene: bar, e.g. commercially available as InVigor™ Canola), MS1 x RF2 (PGS2) (event code: ACS-BNØØ4-7 x ACS-BNØØ2-5, gene: bar, e.g. commercially available as InVigor™ Canola), MS1 x RF3 (event code: ACS-BNØØ4-7 x ACS-BNØØ3-6, gene: bar, e.g. commercially available as InVigor™ Canola), MS8 (event code: ACS-BNØØ5-8, gene: bar, e.g. commercially available as InVigor™ Canola), MS8 x RF3 (event code: ACS-BNØØ5-8 x ACS-BNØØ3-6, gene: bar, e.g. commercially available as InVigor™ Canola), RF1 (B93-101) (event code: ACS-BNØØ1-4, gene: bar, e.g. commercially available as InVigor™ Canola), RF2 (B94-2) (event code: ACS-BNØØ2-5, gene: bar, e.g. commercially available as InVigor™ Canola), RF3 (event code: ACS-BNØØ3-6, gene: bar, e.g. commercially available as InVigor™ Canola), MS1 x MON88302 (event code: ACS-BNØØ4-7 x MON-883Ø2-9, gene: bar, e.g. commercially available as InVigor™ x TruFlex™ Roundup Ready™

Canola), MS8 x MON88302 (event code: ACS-BNØØ5-8 x MON-883Ø2-9, gene: bar, e.g. commercially available as InVigor™ x TruFlex™ Roundup Ready™ Canola), RF1 x MON88302 (event code: ACS-BNØØ1-4 x MON-883Ø2-9, gene: bar, e.g. commercially available as InVigor™ x TruFlex™ Roundup Ready™ Canola), RF2 x MON88302 (event code: ACS-BNØØ2-5 x MON-883Ø2-9, gene: bar, e.g. commercially available as InVigor™ x TruFlex™ Roundup Ready™ Canola), HCN28 x MON88302 (event code: ACS-BNØØ8-2 x MON-883Ø2-9, gene: pat, e.g. commercially available as InVigor™ x TruFlex™ Roundup Ready™ Canola), HCN92 x MON88302 (event code: ACS-BNØØ7-1 x MON-883Ø2-9, gene: bar, e.g. commercially available as Liberty Link™ Innovator™ x TruFlex™ Roundup Ready™ Canola), HCR-1 (gene: pat), MON88302 x MS8 x RF3 (event code: MON-883Ø2-9 x ACS-BNØØ5-8 x ACS-BNØØ3-6, gene: bar), MON88302 x RF3 (event code: MON-883Ø2-9 x ACS-BNØØ3-6, gene: bar), MS8 x RF3 x GT73 (RT73) (event code: , gene: bar), PHY14 (event code: ACS-BNØØ5-8 x ACS-BNØØ3-6 x MON-ØØØ73-7, gene: bar), PHY23 (gene: bar), PHY35 (gene: bar) and PHY36 (gene: bar) and 73496 x RF3 (event code: DP-Ø73496-4 x ACS-BNØØ3-6, gene: bar).

15

In other aspects, canola plants of the invention include those plants which have been subjected to genetic modifications other than glufosinate tolerance by breeding, mutagenesis or genetic engineering, e.g. have been rendered tolerant to applications of specific other classes of herbicides, such as PPO inhibitors (e. g. saflufenacil, trifludimoxazin), AHAS inhibitors (e. g. imidazolinones such as imazamox, imazapyr); auxinic herbicides such as dicamba or 2,4-D; bleaching herbicides such as hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors (e. g. isoxaflutole, mesotrione, tembotrione, topramezone, bicyclopyrone) or phytoene desaturase (PDS) inhibitors; EPSPS inhibitors such as glyphosate; glutamine synthetase (GS) inhibitors such as glufosinate; lipid biosynthesis inhibitors such as acetyl CoA carboxylase (ACCase) inhibitors such as "dims" {e.g., cycloxydim, sethoxydim, clethodim, or tepraloxymid), "fops" {e.g. , clodinafop, diclofop, fluazifop, haloxyfop, or quizalofop), and "dens" (such as pinoxaden); or oxynil {i.e. bromoxynil or ioxynil) herbicides as a result of conventional methods of breeding or genetic engineering. Thus, canola plants of the invention can be made resistant to multiple classes of herbicides through multiple genetic modifications, such as for example resistance to both glyphosate and dicamba; glyphosate and 2,4-D; glyphosate and glufosinate; glyphosate and HPPD inhibitors; glyphosate and AHAS inhibitors; glufosinate and AHAS inhibitors; glyphosate, glufosinate and AHAS inhibitors; glyphosate, glufosinate and HPPD inhibitors; glufosinate and HPPD inhibitors; glyphosate, glufosinate, dicamba and HPPD inhibitors; glyphosate, dicamba and glufosinate; glyphosate and PPO inhibitors; glufosinate and PPO inhibitors; glyphosate, glufosinate and PPO inhibitors; glyphosate, dicamba and PPO inhibitors; glyphosate, 2,4-D and PPO inhibitors; glyphosate, dicamba, glufosinate and PPO inhibitors; glyphosate, 2,4-D, glufosinate and PPO inhibitors; glyphosate, PPO inhibitors and HPPD inhibitors; glufosinate, HPPD inhibitors and PPO inhibitors; glyphosate, glufosinate, HPPD inhibitors and PPO inhibitors; glyphosate, dicamba, HPPD inhibitors and PPO inhibitors; glyphosate, 2,4-D, HPPD inhibitors and PPO inhibitors; glyphosate, dicamba, glufosinate, HPPD inhibitors and PPO inhibitors; glyphosate, 2,4-D, glufosinate, HPPD inhibitors and PPO inhibitors; glyphosate, glufosinate, AHAS inhibitors and HPPD inhibitors; glufosinate, AHAS inhibitors and HPPD inhibitors;

itors; glyphosate, glufosinate, dicamba, AHAS inhibitors and HPPD inhibitors; glyphosate, dicamba, AHAS inhibitors and glufosinate; glyphosate, AHAS inhibitors and PPO inhibitors; glufosinate, AHAS inhibitors and PPO inhibitors; glyphosate, glufosinate, AHAS inhibitors and PPO inhibitors; glyphosate, dicamba, AHAS inhibitors and PPO inhibitors; glyphosate, 2,4-D, AHAS inhibitors and PPO inhibitors; glyphosate, dicamba, glufosinate, AHAS inhibitors and PPO inhibitors; glyphosate, 2,4-D, glufosinate, AHAS inhibitors and PPO inhibitors; glyphosate, PPO inhibitors, AHAS inhibitors and HPPD inhibitors; glufosinate, HPPD inhibitors, AHAS inhibitors and PPO inhibitors; glyphosate, glufosinate, HPPD inhibitors, AHAS inhibitors and PPO inhibitors; glyphosate, dicamba, HPPD inhibitors, AHAS inhibitors and PPO inhibitors; glyphosate, 2,4-D, HPPD inhibitors, AHAS inhibitors and PPO inhibitors; glyphosate, dicamba, glufosinate, HPPD inhibitors, AHAS inhibitors and PPO inhibitors; glyphosate, 2,4-D, glufosinate, HPPD inhibitors, AHAS inhibitors and PPO inhibitors; or to one of the aforementioned canola plants that are tolerant to further classes of herbicides such as ACCase inhibitors. These herbicide resistance technologies are, for example, described in Pest Management Science (at volume, year, page): 61, 2005, 246; 61, 2005, 258; 61, 2005, 277; 61, 2005, 269; 61, 2005, 286; 64, 2008, 326; 64, 2008, 332; Weed Science 57, 2009, 108; Australian Journal of Agricultural Research 58, 2007, 708; Science 316, 2007, 1185; and references quoted therein. In addition to these classes of inhibitors, canola plants of the invention may also be tolerant to herbicides having other modes of action, for example, chlorophyll/carotenoid pigment inhibitors, cell membrane disrupters, photosynthesis inhibitors, cell division inhibitors, root inhibitors, shoot inhibitors, and combinations thereof.

Such additional tolerance traits may be expressed, e.g.: as mutant or wildtype PPO proteins, as mutant AHASL proteins, mutant ACCase proteins, mutant EPSPS proteins, or mutant glutamine synthetase proteins; or as mutant native, inbred, or transgenic aryloxyalkanoate dioxygenase (AAD or DHT), haloarylnitrilase (BXN), 2,2-dichloropropionic acid dehalogenase (DEH), glyphosate-N- acetyltransferase (GAT), glyphosate decarboxylase (GDC), glyphosate oxidoreductase (GOX), glutathione-S-transferase (GST), phosphinothricin acetyltransferase (PAT or bar), or CYP450s proteins having an herbicide-degrading activity.

Glufosinate tolerant canola plants hereof can also be stacked with other traits including, but not limited to, pesticidal traits such as Bt Cry and other proteins having pesticidal activity toward coleopteran, lepidopteran, nematode, or other pests; nutrition or nutraceutical traits such as modified oil content or oil profile traits, high protein or high amino acid concentration traits, and other trait types known in the art.

In all treatments according to the methods of the present invention, the inventive mixtures can be applied in conventional manner by using techniques as skilled person is familiar with. Suitable techniques include spraying, atomizing, dusting, spreading or watering. The type of application depends on the intended purpose in a well known manner; in any case, they should ensure the finest possible distribution of the active ingredients according to the invention.

In one embodiment, the inventive mixtures are applied to locus mainly by spraying, in particular foliar spraying of an aqueous dilution of the active ingredients of the mixture. Application can be carried out by customary spraying techniques using, for example, water as carrier and spray liquor rates of from about 10 to 2000 l/ha or 50 to 1000 l/ha (for example from 100 to 500 l/ha).

- 5 Application of the inventive mixtures by the low-volume and the ultra-low-volume method is possible, as is their application in the form of microgranules.

The required application rate of the mixture of the pure active compounds depends on the density of the undesired vegetation, on the development stage of the plants, on the climatic conditions of the location where the mixture is used and on the application method.

- 10 In general, the rate of application of L-glufosinate is usually from 50 g/ha to 3000 g/ha and preferably in the range from 100 g/ha to 2000 g/ha or from 200 g/ha to 1500 g/ha of active substance (a.i.), and the rate of application of the second herbicidal compound II is from 1 g/ha to 2000 g/ha and preferably in the range from 5 g/ha to 1500 g/ha, more preferably from 25 g/ha to 900 g/ha of active substance (a.i.).

15

The examples which follow illustrate the invention without imposing any limitation.

Biological examples

- 20 Synergism can be described as an interaction where the combined effect of two or more compounds is greater than the sum of the individual effects of each of the compounds. The presence of a synergistic effect in terms of percent control, between two mixing partners (X and Y) can be calculated using the Colby equation (Colby, S. R., 1967, Calculating Synergistic and Antagonistic Responses in Herbicide Combinations, Weeds, 15, 21-22):

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

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

- 30 The following tests demonstrate the control efficacy of compounds, mixtures or compositions of this invention on specific weeds. However, the weed control afforded by the compounds, mixtures or compositions is not limited to these species. The analysis of synergism or antagonism between the mixtures or compositions was determined using Colby's equation.

Test method:

- 35 The culture containers used were plastic flowerpots containing loamy sand with approximately 3.0% of humus as the substrate. The seeds of the test plants were sown separately for each species and/or resistant biotype. For the pre-emergence treatment, the active ingredients, which had been suspended or emulsified in water, were applied directly after sowing by means of finely distributing nozzles. The containers were irrigated gently to promote germination and growth and subsequently covered with transparent plastic hoods until the plants had rooted. This cover
40 caused uniform germination of the test plants, unless this had been impaired by the active ingredients. For the post-emergence treatment, the test plants were first grown to a height of 3 to 15 cm, depending on the plant habit, and only then treated with the active ingredients which had

been suspended or emulsified in water. For this purpose, the test plants were either sown directly and grown in the same containers, or they were first grown separately as seedlings and transplanted into the test containers a few days prior to treatment. Depending on the species, the plants were kept at 10 – 25°C or 20 – 35°C, respectively. The test period extended to 20 days after treatment. During this time, the plants were tended, and their response to the individual treatments was evaluated. The evaluation was carried out by using a scale from 0 to 100. 100 means no emergence of the plants or complete destruction of at least the above-ground parts, and 0 means no damage, or normal course of growth. Data shown are the mean of two replications.

Products:

L-Glufosinate: 5 % EC formulation

Saflufenacil: 342 g/l SC formulation

Compound II-83: 5 % EC formulation (Compound II-16: ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate)

Trifludimoxazin: 500 g/l SC formulation

Pyroxasulfone: 85 % WG formulation

Pethoxamid: 5 % EC formulation

2,4-D dimethylammonium salt: 500 g/l SL formulation (concentration calculated for 2,4-D acid)

Dicamba dimethylammonium salt: 480 g/l SL formulation (concentration calculated for dicamba acid)

Bicyclopyrone: 5 % EC formulation

Dimethenamid-P: 720 g/l EC formulation

S-Metolachlor: 960 g/l EC formulation

Sulfentrazone: 480 g/l SC formulation

Weeds in the study:

EPPO Code	Scientific Name
ABUTH	Abutilon theophrasti
ECHCG	Echinochloa crus-galli
AVEFA	Avena fatua
SETVI	Setaria viridis
COMBE	Commelina benghalensis
KCHSC	Kochia scoparia
CHEAL	Chenopodium album
AVEFA	Avena fatua
CYPIR	Cyperus iria
ERICA	Erigeron Canadensis, Conyza canadensis

Example 1: Post emergence treatment with the mixture of L-glufosinate with saflufenacil

Application rate in g ai/ha		Herbicidal activity against	
		ECHCG	
L-Glufosinate	Saflufenacil	Found	Calculated
400	--	65	--
--	0.5	0	--
400	0.5	97	65
200	--	0	--
--	0.5	0	--
200	0.5	35	0

Example 2: Post emergence treatment with the mixture of L-glufosinate with Compound II-83

5 (ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate)

Application rate in g ai/ha		Herbicidal activity against	
		CYPIR	
L-Glufosinate	Compound II-83	Found	Calculated
200	--	0	--
--	0.25	0	--
200	0.25	35	0

Example 3: Post emergence treatment with the mixture of L-glufosinate with trifludimoxazin

10

Application rate in g ai/ha		Herbicidal activity against	
		ECHCG	
L-Glufosinate	Trifludimoxazin	Found	Calculated
400	--	65	--
--	0.25	10	--
400	0.25	75	69
200	--	0	--
--	0.25	10	--
200	0.25	33	10

Example 4: Post emergence treatment with the mixture of L-glufosinate with pyroxasulfone

Application rate in g ai/ha		Herbicidal activity against	
		ABUTH	
L-Glufosinate	Pyroxasulfone	Found	Calculated
200	--	65	--
--	50	70	--
200	50	100	90
200	--	65	--
--	25	40	--
200	25	100	79

Example 5: Post emergence treatment with the mixture of L-glufosinate with pethoxamid

5

Application rate in g ai/ha		Herbicidal activity against			
		ABUTH		AVEFA	
L-Glufosinate	Pethoxamid	Found	Calculated	Found	Calculated
150	--	55	--	0	--
--	100	0	--	0	--
150	100	98	55	40	0
75	--	0	--	0	--
--	50	0	--	0	--
75	50	35	0	5	0

Example 6: Post emergence treatment with the mixture of L-glufosinate with 2,4-D dimethylammonium salt

Application rate in g ai/ha		Herbicidal activity against			
		AVEFA		SETVI	
L-Glufosinate	2,4-D as dimethyl-ammonium salt	Found	Calculated	Found	Calculated
100	--	35	--	30	--
--	140	0	--	0	--
100	140	65	35	65	30
100	--	35	--	30	--
--	70	0	--	0	--
100	70	40	35	65	30

Example 7: Post emergence treatment with the mixture of L-glufosinate with dicamba dimethylammonium salt

Application rate in g ai/ha		Herbicidal activity against	
		SETVI	
L-Glufosinate	Dicamba as dimethylammonium salt	Found	Calculated
100	--	30	--
--	140	30	--
100	140	80	51
100	--	30	--
--	70	0	--
100	70	65	30
100	--	30	--
--	35	0	--
100	35	60	30

5

Example 8: Post emergence treatment with the mixture of L-glufosinate with bicyclopyrone

Application rate in g ai/ha		Herbicidal activity against			
		COMBE		ECHCG	
L-Glufosinate	Bicyclopyrone	Found	Calculated	Found	Calculated
100	--	0	--	0	--
--	2	10	--	0	--
100	2	30	10	55	0
100	--	0	--	0	--
--	1	0	--	0	--
100	1	25	0	30	0

Example 9: Post emergence treatment with the mixture of L-glufosinate with dimethenamid-P

Application rate in g ai/ha		Herbicidal activity against	
		KCHSC	
L-Glufosinate	Dimethenamid-P	Found	Calculated
200	--	90	--
--	1000	70	--
200	1000	100	97
200	--	90	--
--	500	0	--
200	500	100	90

Example 10: Post emergence treatment with the mixture of L-glufosinate with S-metolachlor

5

Application rate in g ai/ha		Herbicidal activity against	
		CHEAL	
L-Glufosinate	S-Metolachlor	Found	Calculated
100	--	0	--
--	1000	75	--
100	1000	85	75
100	--	0	--
--	500	20	--
100	500	85	20

Example 11: Post emergence treatment with the mixture of L-glufosinate with sulfentrazone

Application rate in g ai/ha		Herbicidal activity against	
		ERICA	
L-Glufosinate	Sulfentrazone	Found	Calculated
75	--	90	--
--	2.5	0	--
75	2.5	100	90
75	--	90	--
--	1.25	0	--
75	1.25	100	90

Example 12: Post emergence treatment with the mixture of L-glufosinate with tembotrione

Application rate in g ai/ha		Herbicidal activity against	
		ECHCG	
L-Glufosinate	Tembotrione	Found	Calculated
200	--	0	--
--	0.5	0	--
200	0.5	50	0
100	--	0	--
--	0.5	0	--
100	0.5	40	0

5 Example 13: Post emergence treatment with the mixture of L-glufosinate with bicyclopyrone

Application rate in g ai/ha		Herbicidal activity against	
		ECHCG	
L-Glufosinate	Bicyclopyrone	Found	Calculated
200	--	0	--
--	2	0	--
200	2	60	0
100	--	0	--
--	2	0	--
100	2	55	0

Example 14: Post emergence treatment with the mixture of L-glufosinate with topramezone

Application rate in g ai/ha		Herbicidal activity against	
		ECHCG	
L-Glufosinate	Topramezone	Found	Calculated
200	--	0	--
--	1	0	--
200	1	90	0
100	--	0	--
--	1	0	--
100	1	35	0

Claims

1. Use of a herbicidal mixture for controlling undesirable vegetation in canola, wherein the herbicidal mixture comprises
 - 1) L- glufosinate and its salts, and
 - 2) a herbicidal compound II selected from the group consisting of clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxymethyl, ethametsulfuron, ethametsulfuron-methyl, tritosulfuron, imazamethabenz, imazamethabenz-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, tribenuron-methyl, florasulam, cyanazine, bromoxynil and its salts and esters, bentazone, bentazone-sodium, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, sulfentrazone, trifludimoxazin, pyraflufen-ethyl, flumioxazin, tiafenacil, picolinafen, clomazone, mesotrione, tembotrione, pyrasulfotole, bicyclopypyrone, tolypyralate, fenquinotrione, ethalfluralin, pendimethalin, triallate, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, diflufenzopyr, diflufenzopyr-sodium, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, topramezone, sethoxydim, pethoxamid, clopyralid, picloram, fluroxypyr, II-83: ethyl [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetate (CAS 353292-31-6, S-3100), II-84: 2-[2-chloro-5-[3-chloro-5-(trifluoromethyl)-2-pyridinyl]-4-fluorophenoxy]-2-methoxy-acetic acid methyl ester (CAS 1970221-16-9), II-85: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-N-(methylsulfonyl)-acetamide (CAS 2158276-22-1), II-86: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid ethyl ester (CAS 2158274-56-5), II-87: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-N-(methylsulfonyl)-acetamide (CAS 2158274-53-2), II-88: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid ethyl ester (CAS 2158274-50-9), II-89: ethyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-triazol-1-yl]-4-fluoro-phenoxy]-2-pyridyl]oxy]acetate (CAS 2230679-62-4), II-90: 2-[[3-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]-2-pyridinyl]oxy]-acetic acid methyl ester (CAS 2158275-73-9),

II-91: 2-[2-[[3-chloro-6-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-5-fluoro-2-pyridinyl]oxy]phenoxy]-acetic acid methyl ester (CAS 2158274-96-3) and II-92: methyl 2-[[3-[2-chloro-5-[4-(difluoromethyl)-3-methyl-5-oxo-1,2,4-triazol-1-yl]-4-fluoro-phenoxy]-2-pyridyl]oxy]acetate,

wherein L-glufosinate comprises more than 70% by weight of the L-enantiomer.

2. The use as claimed in claim 1, wherein compound I in the herbicidal mixture is selected from the group consisting of L-glufosinate-ammonium or L-glufosinate-sodium as L-glufosinate salts and L-glufosinate as free acid.

3. The use as claimed in claim 1, wherein compound I in the herbicidal mixture is L-glufosinate-ammonium.

4. The use as claimed in any of claims 1 to 3, wherein L-glufosinate in the herbicidal mixture comprises more than 80% by weight, preferably more than 90% by weight, even more preferably 95% by weight of the L-enantiomer.

5. The use as claimed in any of claims 1 to 3, wherein compound II in the herbicidal mixture is selected from the group consisting of clethodim, cycloxydim, fenoxaprop, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, fluazifop, fluazifop-butyl, fluazifop-P, fluazifop-P-butyl, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, propaquizafop, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, ethametsulfuron, ethametsulfuron-methyl, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, cyanazine, bromoxynil and its salts and esters, pyridate, carfentrazone, carfentrazone-ethyl, saflufenacil, trifludimoxazin, clomazone, mesotrione, fenquitrione, ethalfluralin, pendimethalin, trifluralin, propyzamide, carbetamide, acetochlor, alachlor, butachlor, dimethachlor, metazachlor, metolachlor, S-metolachlor, napropamide, napropamide-M, 2,4-D and its salts and esters, aminopyralid and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinclorac, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, topramezone, sethoxydim, pethoxamid, clopyralid and picloram;

preferably wherein compound II is selected from the group consisting of clethodim, cycloxydim, haloxyfop, haloxyfop-methyl, haloxyfop-P, haloxyfop-P-methyl, quizalofop, quizalofop-ethyl, quizalofop-tefuryl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, tepraloxym, imazamox, imazamox ammonium, imazapic, imazapic ammonium, imazapyr, imazapyr isopropylammonium, imazethapyr, imazethapyr ammonium, bromoxynil and its salts and esters, carfentrazone, carfentrazone-ethyl, saflufenacil, trifludimoxazin, clomazone, fenquitrione, ethalfluralin, pendimethalin, trifluralin, propyzamide, acetochlor, butachlor, dimethachlor, metazachlor, napropamide, napropamide-M, aminopyralid

and its salts such as aminopyralid-dimethylammonium, aminopyralid-tris(2-hydroxypropyl)ammonium and its esters, clopyralid and its salts and esters, dicamba and its salts and esters, quinmerac, cinmethylin, dimethenamid, dimethenamid-P, quinclorac, quinclorac dimethylammonium, topramezone, sethoxydim, pethoxamid, clopyralid and picloram.

6. The use as claimed in any of claims 1 to 4 wherein the compound II in the herbicidal mixture is selected from the group of imazapyr, tribenuron-methyl, florasulam; carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92; mesotrione, topramezone, bromoxynil, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate; 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram, fluroxypyr, pendimethalin, ethalfluralin and triallate;

preferably selected from the group of carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91, II-92; mesotrione, topramezone, tembotrione, pyrasulfotole, bicyclopyrone, tolpyralate; II-93: 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram and fluroxypyr.

7. The use as claimed in any of claims 1 to 6, wherein the compound II in the herbicidal mixture is selected from the group of carfentrazone-ethyl, trifludimoxazin, sulfentrazone, pyraflufen-ethyl, tiafenacil, compounds II-83, II-84, II-85, II-86, II-87, II-88, II-89, II-90, II-91 and II-92.

8. The use as claimed in any of claims 1 to 6, wherein the compound II in the herbicidal mixture is selected from the group of mesotrione, topramezone, bromoxynil, tembotrione, pyrasulfotole, bicyclopyrone and tolpyralate;
preferably selected from the group of mesotrione, topramezone, tembotrione, pyrasulfotole, bicyclopyrone and tolpyralate.

9. The use as claimed in any of claims 1 to 6, wherein the compound II in the herbicidal mixture is selected from the group of 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (II-93; CAS 1628702-28-2) and its salts and esters, 2,4-D and its salts and esters, dicamba and its salts and esters, aminopyralid, picloram and fluroxypyr; preferably selected from the group of 4-amino-3-chloro-5-fluoro-6-(7-fluoro-1H-indol-6-yl)-2-pyridinecarboxylic acid (II-93; CAS 1628702-28-2) and its salts and esters; or preferably selected from the group of 2,4-D and its salts and esters, dicamba and its salts and esters; or

preferably selected from the group of picloram and fluroxypyr.

10. The use as claimed as claimed in any of claims 1 to 5, wherein the weight ratio of compound I to compound II is from 1000:1 to 1:500;.

5

preferably wherein the weight ratio of compound I to compound II is from 500:1 to 1:250.

11. A pesticidal mixture, wherein the compounds I and II are as defined in any of claims 1 to 10.

10

12. A pesticidal composition, comprising a liquid or solid carrier and a mixture as defined in any of claims 1 to 10.

13. A method for controlling undesirable vegetation in glufosinate tolerant canola, which method comprises applying a mixture as defined in claims 1 to 10 to the undesirable vegetation or the locus thereof or applying to the soil or water.

15

14. The method as claimed in claim 13, wherein the glufosinate tolerant canola is a transgenic canola plant.

20

15. The method as claimed in any of claims 13 to 14, wherein compounds I and II of the mixture as defined in any of claims 1 to 10 are applied simultaneously, that is jointly or separately, or in succession.

25