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Use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides or their salts for controlling unwanted plants in areas of transgenic crop plants being tolerant to hppd inhibitor herbicides

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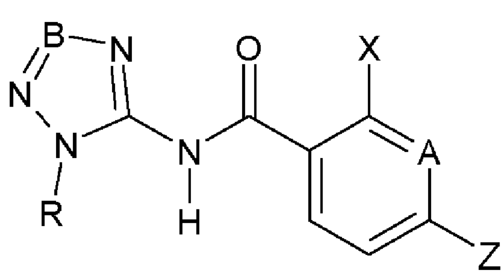
(54) Title: USE OF N-(TETRAZOL-4-YL)- OR N-(TRIAZOL-3-YL)ARYLCARBOXAMIDES OR THEIR SALTS FOR CONTROLLING UNWANTED PLANTS IN AREAS OF TRANSGENIC CROP PLANTS BEING TOLERANT TO HPPD INHIBITOR HERBICIDES



(I)

(57) Abstract: Use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides of formula (I) or salts thereof formula (I), for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) comprising (I) a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, (b) Pseudomonas, (c) Synechococcoideae, (d) Blepharismidae, (e) Rhodococcus, (f) Picrophilaceae, (g) Kordia, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms.

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Use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides or their salts for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides

Description

The invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides or their for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides.

EP 10174893 (being filed in the name of Bayer CropScience AG at the EPO on September 1, 2010) and its corresponding international application PCT/EP2011/064820 disclose several new N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides and their use as HPPD inhibitor herbicides for weed control.

However, the herbicidal activity of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides might cause damages on several crop plants which limit their use in such crop growing areas as herbicides for weed control.

HPPD inhibitor herbicides can be used against grass and/or broad leaf weeds in crop plants that display metabolic tolerance, such as maize (Zea mays) in which they are rapidly degraded (Schulz et al., (1993). FEBS letters, 318, 162-166; Mitchell et al., (2001) Pest Management Science, Vol 57, 120-128; Garcia et al., (2000) Biochem., 39, 7501-7507; Pallett et al., (2001) Pest Management Science, Vol 57, 133-142). In order to extend the scope of these HPPD inhibitor herbicides, several efforts have been developed in order to confer to plants, particularly plants without or with an underperforming metabolic tolerance, a tolerance level acceptable under agronomic field conditions.

Meanwhile transgeninc plants have been engineered by by-passing HPPD-mediated production of homogentisate (US 6,812,010), overexpressing the sensitive enzyme so as to produce quantities of the target enzyme in the plant which are sufficient in relation to the herbicide has been performed (WO96/38567).

Alternatively, transgenic plants have been generated expressing HPPD proteins that have been mutated at various positions in order to obtain a target enzyme which, while retaining its properties of catalysing the transformation of HPP into homogentisate, is less sensitive to HPPD inhibitor herbicides than is the native HPPD before mutation (for example see at EP496630, WO 99/24585).

More recently, the introduction of a *Pseudomonas* HPPD gene into the plastid genome of tobacco and soybean has shown to be more effective than nuclear transformation, conferring even tolerance to post-emergence application of at least one HPPD inhibitor (Dufourmantel et al., 2007, Plant Biotechnol J.5(1):118-33).

In WO 2009/144079, a nucleic acid sequence encoding a mutated hydroxyphenylpyruvate dioxygenase (HPPD) at position 336 of the *Pseudomonas fluorescens* HPPD protein and its use for obtaining plants which are tolerant to HPPD inhibitor herbicides is disclosed.

In WO 04/024928, the inventors have sought to increase the prenylquinone biosynthesis (e.g., synthesis of plastoquinones, tocopherols) in the cells of plants by increasing the flux of the HPP precursor into the cells of these plants. This has been done by connecting the synthesis of said precursor to the "shikimate" pathway by overexpression of the prephenate-dehydrogenase (PDH). They have also noted that the transformation of plants with a gene encoding a PDH enzyme makes it possible to increase the tolerance of said plants to HPPD inhibitors.

In WO 2002/046387, an gene obtained from Avena sativa encoding an HPPD was described to generate plants overexpressing such gene and thereby causing tolerance to various HPPD-inhobitor herbicides.

In WO 2008/150473, the combination of two distinct tolerance mechanisms – a modified *Avena sativa* gene coding for a mutant HPPD enzyme and a CYP450 Maize monooxygenase (nsf1 gene) – was exemplified in order to obtain an improved tolerance to HPPD inhibitor herbicides, but no data have been disclosed demonstrating the synergistic effects based on the combination of both proteins.

In WO 2010/085705, several mutants of the Avena sativa HPPD were described as well as plants comprising genes encoding such mutated HPPD and thereby causing an increased tolerance to various HPPD-inhibitor herbicides compared to non-mutated HPPD.

Recently, several new genes encoding HPPD enzymes from various organisms have been identified and employed for obtaining crop plants that show an agronomically useful level of tolerance concerning the application of various HPPD inhibitor herbicides.
The work concerning the implementation of such tolerance against HPPD inhibitor herbicides have extensively been described in the PCT-applications being filed in the name of Bayer CropScience AG on December 22, 2010, having the filing numbers (PCT/EP2010/070561 (published as WO 2011/076877; relates to nucleic acid sequences encoding a hydroxyphenylpyruvate dioxygenase (HPPD) obtained from bacteria belonging to the subfamily Synechococcoideae and certain mutants thereof); PCT/EP2010/070567 (published as WO 2011/076882; encoding a hydroxyphenylpyruvate dioxygenase obtained from protists belonging to the family Blepharismidae); PCT/EP2010/070578 (published as WO 2011/076892; encoding a hydroxyphenylpyruvate dioxygenase obtained from bacteria belonging to the genus Rhodococcus and certain mutants thereof); PCT/EP2010/070570 (published as WO 2011/076885; encoding a hydroxyphenylpyruvate dioxygenase obtained from Euryarchaeota belonging to the family Picrophilaceae and certain mutants thereof); PCT/EP2010/070575 (published as WO 2011/076889; encoding a hydroxyphenylpyruvate dioxygenase obtained from bacteria belonging to the genus Kordia and certain mutants thereof) and which are hereby incorporated by reference

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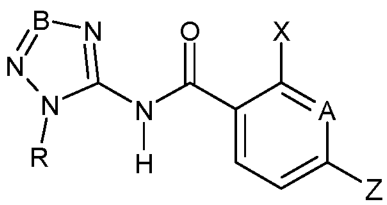
concerning the production of the respective transgenic plants conferring tolerance to HPPD inhibitor heribicides.

It has now been found that N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides can be employed on transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more genes conferring tolerance to HPPD inhibitor herbicides.

The present invention as claimed herein is described in the following items 1 to 7:

1. The use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides of the formula (I) or their salts



(I),

for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) comprising (I) a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, (b) Pseudomonas, (c) Synechococcoideae, (d) Blepharismidae, (e) Rhodococcus, (f) Picrophilaceae, (g) Kordia, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms

in which

A is N or CY,

B is N or CH,

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X is nitro, halogen, cyano, formyl, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $C(O)NR^1OR^1$, OR^1, $OCOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, NR_1R_2, $P(O)(OR^5)_2$, $CH_2P(O)(OR^5)_2$, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy and/or halo-(C_1-C_6)-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups,

Y is hydrogen, nitro, halogen, cyano, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$,$OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $CO(NOR^1)R^1$, $NR^1SO_2R^2$, NR^1COR^1, OR^1, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$ (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-CN, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, $N(R^1)_2$, $P(O)(OR^5)_2$, $CH_2P(O)(OR^5)_2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano,

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$(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, $S(O)_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy, halo-$(C_1\text{-}C_6)$-alkoxy, $(C_1\text{-}C_6)$-alkoxy-$(C_1\text{-}C_4)$-alkyl and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, thiocyanato, halo-$(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, halo-$(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, halo-$(C_2\text{-}C_6)$-alkynyl, $(C_3\text{-}C_6)$-cycloalkyl, halo-$(C_3\text{-}C_6)$-cycloalkyl, $(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, halo-$(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, COR^1, $COOR^1$, $OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $C(O)NR^1OR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, $(C_1\text{-}C_6)$-alkyl-$S(O)_nR^2$, $(C_1\text{-}C_6)$-alkyl-OR^1, $(C_1\text{-}C_6)$-alkyl-$OCOR^1$, $(C_1\text{-}C_6)$-alkyl-OSO_2R^2, $(C_1\text{-}C_6)$-alkyl-CO_2R^1, $(C_1\text{-}C_6)$-alkyl-SO_2OR^1, $(C_1\text{-}C_6)$-alkyl-$CON(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-$SO_2N(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-NR^1COR^1, $(C_1\text{-}C_6)$-alkyl-$NR^1SO_2R^2$, $N(R^1)_2$, $P(O)(OR^5)_2$, heteroaryl, heterocyclyl or phenyl, the last three radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, $S(O)_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy or halo-$(C_1\text{-}C_6)$-alkoxy, and where heterocyclyl carries 0 to 2 oxo groups, or Z may else be hydrogen, $(C_1\text{-}C_6)$-alkyl or $(C_1\text{-}C_6)$-alkoxy if Y is the radical $S(O)_nR^2$,

R is $(C_1\text{–}C_6)$-alkyl, $(C_3\text{–}C_7)$-cycloalkyl, halo-$(C_1\text{–}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, halo-$(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, halo-$(C_2\text{-}C_6)$-alkynyl, CH_2R^6, heteroaryl, heterocyclyl or phenyl, the last three radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, $S(O)_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy, halo-$(C_1\text{-}C_6)$-alkoxy and $(C_1\text{-}C_6)$-alkoxy-$(C_1\text{-}C_4)$-alkyl,

R^1 is hydrogen, $(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-haloalkyl, $(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-haloalkenyl, $(C_2\text{-}C_6)$-alkynyl, $(C_2\text{-}C_6)$-haloalkynyl, $(C_3\text{-}C_6)$-cycloalkyl, $(C_3\text{-}C_6)$-cycloalkenyl, $(C_3\text{-}C_6)$-halocycloalkyl, $(C_1\text{-}C_6)$-alkyl-O-$(C_1\text{-}C_6)$-

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alkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl, (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 21 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, thiocyanato, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, $SCOR^4$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $COSR^4$, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, (C_3-C_6)-halocycloalkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl, (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 21 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, thiocyanato, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, $SCOR^4$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $COSR^4$, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^3 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl or (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl,

R^4 is (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl or (C_2-C_6)-alkynyl,

R^5 is methyl or ethyl,

R^6 is acetoxy, acetamido, N-methylacetamido, benzoyloxy, benzamido, N-methylbenzamido, methoxycarbonyl, ethoxycarbonyl, benzoyl,

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methylcarbonyl, piperidinylcarbonyl, morpholinylcarbonyl, trifluoromethylcarbonyl, aminocarbonyl, methylaminocarbonyl, dimethylaminocarbonyl, $(C_1\text{-}C_6)$-alkoxy or $(C_3\text{-}C_6)$-cycloalkyl or is heteroaryl, heterocyclyl or phenyl substituted in each case by s radicals from the group consisting of methyl, ethyl, methoxy, trifluoromethyl, and halogen,

n is 0, 1 or 2,

s is 0, 1, 2 or 3.

2. The use according to claim 1, where, in formula (I)

A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, thiocyanato, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, halo-$(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, halo-$(C_3\text{-}C_6)$-alkynyl, $(C_3\text{-}C_6)$-cycloalkyl, halo-$(C_3\text{-}C_6)$-cycloalkyl, $(C_1\text{-}C_6)$-alkyl-O-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, halo-$(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, COR^1, OR^1, $OCOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, $(C_1\text{-}C_6)$-alkyl-$S(O)_nR^2$, $(C_1\text{-}C_6)$-alkyl-OR^1, $(C_1\text{-}C_6)$-alkyl-$OCOR^1$, $(C_1\text{-}C_6)$-alkyl-OSO_2R^2, $(C_1\text{-}C_6)$-alkyl-CO_2R^1, $(C_1\text{-}C_6)$-alkyl-SO_2OR^1, $(C_1\text{-}C_6)$-alkyl-$CON(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-$SO_2N(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-NR^1COR^1 or $(C_1\text{-}C_6)$-alkyl-$NR^1SO_2R^2$, $(C_1\text{-}C_6)$-alkyl-heteroaryl, $(C_1\text{-}C_6)$-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $S(O)_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy and/or halo-$(C_1\text{-}C_6)$-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups,

Y is hydrogen, nitro, halogen, cyano, thiocyanato, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, halo-$(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, halo-

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(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, OR^1, $COOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2\ N(R^1)_2$, $N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, thiocyanato, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $C(O)N(R^1)_2$, $C(O)NR^1OR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$ or 1,2,4-triazol-1-yl, or
Z may else be hydrogen, (C_1-C_6)-alkyl or (C_1-C_6)-alkoxy if Y is the radical $S(O)_nR^2$,

R is $(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkyl, halo-$(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkylmethyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, acetylmethyl, methoxymethyl, or phenyl or benzyl each substituted by s radicals from the group consisting of methyl, methoxy, trifluoromethyl and halogen,

R^1 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl or (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 16 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl or (C_1-C_6)-alkyl-NR^3-heterocyclyl, these radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, $NR^3SO_2R^4$, COR^3, $OCOR^3$, NR^3COR^3, CO_2R^3, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^3 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl or (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl,

R^4 is (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl or (C_2-C_6)-alkynyl,

n is 0, 1 or 2,

s is 0, 1, 2 or 3.

3. The use according to claim 1, where, in formula (I)

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A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, OR^1, $S(O)_nR^2$, $(C_1\text{-}C_6)$-alkyl-$S(O)_nR^2$, $(C_1\text{-}C_6)$-alkyl-OR^1, $(C_1\text{-}C_6)$-alkyl-$CON(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-$SO_2N(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-NR^1COR^1, $(C_1\text{-}C_6)$-alkyl-$NR^1SO_2R^2$, $(C_1\text{-}C_6)$-alkyl-heteroaryl or $(C_1\text{-}C_6)$-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $S(O)_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy and/or halo-$(C_1\text{-}C_6)$-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups,

Y is hydrogen, nitro, halogen, cyano, $(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-haloalkyl, OR^1, $S(O)_nR^2$, $SO_2N(R^1)_2$, $N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, $(C_1\text{-}C_6)$-alkyl-$S(O)_nR^2$, $(C_1\text{-}C_6)$-alkyl-OR^1, $(C_1\text{-}C_6)$-alkyl-$CON(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-$SO_2N(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-NR^1COR^1, $(C_1\text{-}C_6)$-alkyl-$NR^1SO_2R^2$, $(C_1\text{-}C_6)$-alkyl-phenyl, $(C_1\text{-}C_6)$-alkyl-heteroaryl, $(C_1\text{-}C_6)$-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, $S(O)_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy, halo-$(C_1\text{-}C_6)$-alkoxy, $(C_1\text{-}C_6)$-alkoxy-$(C_1\text{-}C_4)$-alkyl, and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, halo-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl, $S(O)_nR^2$ or 1,2,4-triazol-1-yl, or Z may else be hydrogen, methyl, methoxy or ethoxy if Y is the radical $S(O)_nR^2$,

R is $(C_1\text{–}C_6)$-alkyl, $(C_3\text{–}C_7)$-cycloalkyl, halo-$(C_1\text{–}C_6)$-alkyl, $(C_3\text{–}C_7)$-cycloalkylmethyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, acetylmethyl or methoxymethyl, or is phenyl substituted by s radicals from the group consisting of methyl, methoxy, trifluoromethyl, and halogen;

R^1 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl or (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 16 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $CON(R^3)_2$, and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl or (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, these three aforementioned radicals being substituted in each case by s radicals from the group consisting of halogen and OR^3,

R^3 is hydrogen or (C_1-C_6)-alkyl,

R^4 is (C_1-C_6)-alkyl,

n is 0, 1 or 2,

s is 0, 1, 2 or 3.

4. A method for controlling unwanted plants comprising the application of one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides according to claim 1 in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) comprising (I) a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of

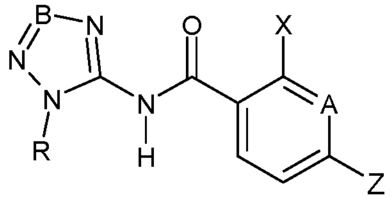
a group of organisms consisting of (a) Avena, (b) Pseudomonas, (c) Synechococcoideae, (d) Blepharismidae, (e) Rhodococcus, (f) Picrophilaceae, (g) Kordia, or comprising (II) one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, and in which the application is performed to (a) the unwanted plants, (b) to the seeds of unwanted plants, and/or (c) to the area on which the plants grow.

5. A method according to claim 4, in which the transgenic crop plant belongs to the group of dicotyledonous crops consisting of Arachis, Beta, Brassica, Cucumis, Cucurbita, Helianthus, Daucus, Glycine, Gossypium, Ipomoea, Lactuca, Linum, Lycopersicon, Nicotiana, Phaseolus, Pisum, Solanum, and Vicia, or to the group of monocotyledonous crops consisting of Allium, Ananas, Asparagus, Avena, Hordeum, Oryza, Panicum, Saccharum, Secale, Sorghum, Triticale, Triticum, Zea.

6. A method according to claim 4 or 5 in which one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides according to claim 1 is/are applied in combination with one or more HPPD inhibitor herbicides selected from the group consisting of triketone or pyrazolinate herbicide in mixed formulations or in the tank mix, and/or with further known active substances which are based on the inhibition of acetolactate synthase, acetyl-CoA carboxylase, cellulose synthase, enolpyruvylshikimate-3-phosphate synthase, glutamine synthetase, p-hydroxyphenylpyruvate dioxygenase, phytoene desaturase, photosystem I, photosystem II, protoporphyrinogen oxidase, or act as growth regulators.

7. A method according to claim 6, in which one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides is/are applied in combination with one or more HPPD inhibitor herbicides selected from the group consisiting of tembotrione, mesotrione, bicyclopyrone, tefuryltrione pyrasulfotole, pyrazolate, diketonitrile, benzofenap, or sulcotrione.

Subject matter of the present invention is the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides of the formula (I) or their salts



(I),

in which

A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, formyl, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $C(O)NR^1OR^1$, OR^1, $OCOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, NR_1R_2, $P(O)(OR^5)_2$, $CH_2P(O)(OR^5)_2$, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy and/or halo-(C_1-C_6)-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups, Y is hydrogen, nitro, halogen, cyano, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$,$OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $CO(NOR^1)R^1$, $NR^1SO_2R^2$, NR^1COR^1, OR^1, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$ (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-CN, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, $N(R^1)_2$, $P(O)(OR^5)_2$, $CH_2P(O)(OR^5)_2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, thiocyanato, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $C(O)NR^1OR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, $N(R^1)_2$, $P(O)(OR^5)_2$, heteroaryl, heterocyclyl or phenyl, the last three radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy or halo-(C_1-C_6)-alkoxy, and where heterocyclyl carries 0 to 2 oxo groups, or

Z may else be hydrogen, (C_1-C_6)-alkyl or (C_1-C_6)-alkoxy if Y is the radical $S(O)_nR^2$, R is $(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkyl, halo-$(C_1–C_6)$-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_2-C_6)-alkynyl, CH_2R^6, heteroaryl, heterocyclyl or phenyl, the last three radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy and (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl,

R^1 is hydrogen, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, (C_3-C_6)-halocycloalkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl, (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 21 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, thiocyanato, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, $SCOR^4$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $COSR^4$, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, (C_3-C_6)-halocycloalkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl, (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 21 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, thiocyanato, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, $SCOR^4$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $COSR^4$, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^3 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl or (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl,

R^4 is $(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl or $(C_2\text{-}C_6)$-alkynyl,

R^5 is methyl or ethyl,

R^6 is acetoxy, acetamido, N-methylacetamido, benzoyloxy, benzamido, N-methylbenzamido, methoxycarbonyl, ethoxycarbonyl, benzoyl, methylcarbonyl, piperidinylcarbonyl, morpholinylcarbonyl, trifluoromethylcarbonyl, aminocarbonyl, methylaminocarbonyl, dimethylaminocarbonyl, $(C_1\text{-}C_6)$-alkoxy or $(C_3\text{-}C_6)$-cycloalkyl or is heteroaryl, heterocyclyl or phenyl substituted in each case by s radicals from the group consisting of methyl, ethyl, methoxy, trifluoromethyl, and halogen,

n is 0, 1 or 2,

s is 0, 1, 2 or 3,

for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

In formula (I) and all the formulae below, alkyl radicals having more than two carbon atoms can be straight-chain or branched. Alkyl radicals are, for example, methyl, ethyl, n- or isopropyl, n-, iso-, t- or 2-butyl, pentyls, hexyls, such as n-hexyl, isohexyl and 1,3-dimethylbutyl. Halogen is fluorine, chlorine, bromine or iodine.

Heterocyclyl is a saturated, partially saturated or fully unsaturated cyclic radical which contains from 3 to 6 ring atoms, of which 1 to 4 are from the group consisting of oxygen, nitrogen and sulfur, and which radical can additionally be fused by a benzo ring. For example, heterocyclyl is piperidinyl, pyrrolidinyl, tetrahydrofuranyl, dihydrofuranyl, 4,5-dihydro-1,2-oxazol-3-yl and oxetanyl.

Heteroaryl is an aromatic cyclic radical which contains 3 to 6 ring atoms, of which 1 to 4 are from the group consisting of oxygen, nitrogen and sulfur, and which radical can additionally be fused by a benzo ring. For example, heteroaryl is benzimidazol-2-yl, furanyl, imidazolyl, isoxazolyl, isothiazolyl, oxazolyl, pyrazinyl, pyrimidinyl, pyridazinyl, pyridinyl, benzisoxazolyl, thiazolyl, pyrrolyl, pyrazolyl, thiophenyl, 1,2,3-oxadiazolyl, 1,2,4-oxadiazolyl, 1,2,5-oxadiazolyl, 1,3,4-oxadiazolyl, 1,2,4-triazolyl, 1,2,3-triazolyl, 1,2,5-triazolyl, 1,3,4-triazolyl, 1,2,4-triazolyl, 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl, 1,2,3-thiadiazolyl, 1,2,5-thiadiazolyl, 2H-1,2,3,4-tetrazolyl, 1H-1,2,3,4-tetrazolyl, 1,2,3,4-oxatriazolyl, 1,2,3,5-oxatriazolyl, 1,2,3,4-thiatriazolyl and 1,2,3,5-thiatriazolyl.

Where a group is substituted by a plurality of radicals, this means that this group is substituted by one or more identical or different representatives of the radicals mentioned.

Depending on the nature and the attachment of the substituents, the compounds of the formula (I) may be present as stereoisomers. If, for example, one or more asymmetric carbon atoms are present, there may be enantiomers and diastereomers. There may also be stereoisomers if n is 1 (sulfoxides). Stereoisomers may be obtained from the mixtures resulting from the preparation using customary separation methods, for example by chromatographic separation techniques. It is also possible to prepare stereoisomers selectively by using stereoselective reactions employing optically active starting materials and/or auxiliaries. The invention also relates to all stereoisomers and mixtures thereof embraced by the general formula (I) but not specifically defined.

Preference is given to the inventive use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamide of general formula (I), in which

A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, thiocyanato, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, halo-$(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, halo-$(C_3\text{-}C_6)$-alkynyl, $(C_3\text{-}C_6)$-cycloalkyl, halo-$(C_3\text{-}C_6)$-cycloalkyl, $(C_1\text{-}C_6)$-alkyl-O-$(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, halo-$(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, COR^1, OR^1, $OCOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, $(C_1\text{-}C_6)$-alkyl-$S(O)_nR^2$, $(C_1\text{-}C_6)$-alkyl-OR^1, $(C_1\text{-}C_6)$-alkyl-$OCOR^1$, $(C_1\text{-}C_6)$-alkyl-OSO_2R^2, $(C_1\text{-}C_6)$-alkyl-CO_2R^1, $(C_1\text{-}C_6)$-alkyl-SO_2OR^1, $(C_1\text{-}C_6)$-alkyl-$CON(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-$SO_2N(R^1)_2$, $(C_1\text{-}C_6)$-alkyl-NR^1COR^1 or $(C_1\text{-}C_6)$-alkyl-$NR^1SO_2R^2$, $(C_1\text{-}C_6)$-alkyl-heteroaryl, $(C_1\text{-}C_6)$-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, $(C_1\text{-}C_6)$-alkyl, halo-$(C_1\text{-}C_6)$-alkyl, $S(O)_n$-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy and/or halo-$(C_1\text{-}C_6)$-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups, Y is hydrogen, nitro, halogen, cyano, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, OR^1, $COOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2\ N(R^1)_2$, $N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, thiocyanato, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $C(O)N(R^1)_2$, $C(O)NR^1OR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$ or 1,2,4-triazol-1-yl, or
Z may else be hydrogen, (C_1-C_6)-alkyl or (C_1-C_6)-alkoxy if Y is the radical $S(O)_nR^2$,

R is $(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkyl, halo-$(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkylmethyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, acetylmethyl, methoxymethyl, or phenyl or benzyl each substituted by s radicals from the group consisting of methyl, methoxy, trifluoromethyl and halogen,

R^1 is hydrogen, $(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, $(C_3\text{-}C_6)$-cycloalkyl, $(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkyl-O-$(C_1\text{-}C_6)$-alkyl, phenyl, phenyl-$(C_1\text{-}C_6)$-alkyl, heteroaryl, $(C_1\text{-}C_6)$-alkyl-heteroaryl, heterocyclyl, $(C_1\text{-}C_6)$-alkyl-heterocyclyl, $(C_1\text{-}C_6)$-alkyl-O-heteroaryl, $(C_1\text{-}C_6)$-alkyl-O-heterocyclyl, $(C_1\text{-}C_6)$-alkyl-NR^3-heteroaryl or $(C_1\text{-}C_6)$-alkyl-NR^3-heterocyclyl, the 16 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $CON(R^3)_2$ and $(C_1\text{-}C_4)$-alkoxy-$(C_2\text{-}C_6)$-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is $(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, $(C_3\text{-}C_6)$-cycloalkyl, $(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkyl-O-$(C_1\text{-}C_6)$-alkyl, phenyl, phenyl-$(C_1\text{-}C_6)$-alkyl, heteroaryl, $(C_1\text{-}C_6)$-alkyl-heteroaryl, heterocyclyl, $(C_1\text{-}C_6)$-alkyl-heterocyclyl, $(C_1\text{-}C_6)$-alkyl-O-heteroaryl, $(C_1\text{-}C_6)$-alkyl-O-heterocyclyl, $(C_1\text{-}C_6)$-alkyl-NR^3-heteroaryl or $(C_1\text{-}C_6)$-alkyl-NR^3-heterocyclyl, these radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, $NR^3SO_2R^4$, COR^3, $OCOR^3$, NR^3COR^3, CO_2R^3, $CON(R^3)_2$ and $(C_1\text{-}C_4)$-alkoxy-$(C_2\text{-}C_6)$-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^3 is hydrogen, $(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_6)$-alkynyl, $(C_3\text{-}C_6)$-cycloalkyl or $(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl,

R^4 is $(C_1\text{-}C_6)$-alkyl, $(C_2\text{-}C_6)$-alkenyl or $(C_2\text{-}C_6)$-alkynyl,

n is 0, 1 or 2,

s is 0, 1, 2 or 3,

for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1

encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

Particular preference is given to the inventive use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamide of general formula (I), in which

A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, OR^1, $S(O)_nR^2$, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-heteroaryl or (C_1-C_6)-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy and/or halo-(C_1-C_6)-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups,

Y is hydrogen, nitro, halogen, cyano, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, OR^1, $S(O)_nR^2$, $SO_2N(R^1)_2$, $N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl, and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_nR^2$ or 1,2,4-triazol-1-yl, or Z may else be hydrogen, methyl, methoxy or ethoxy if Y is the radical $S(O)_nR^2$,

R is $(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkyl, halo-$(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkylmethyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, acetylmethyl or methoxymethyl, or is phenyl substituted by s radicals from the group consisting of methyl, methoxy, trifluoromethyl, and halogen;

R^1 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl or (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 16 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $CON(R^3)_2$, and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is $(C_1\text{-}C_6)$-alkyl, $(C_3\text{-}C_6)$-cycloalkyl or $(C_3\text{-}C_6)$-cycloalkyl-$(C_1\text{-}C_6)$-alkyl, these three aforementioned radicals being substituted in each case by s radicals from the group consisting of halogen and OR^3,

R^3 is hydrogen or $(C_1\text{-}C_6)$-alkyl,

R^4 is $(C_1\text{-}C_6)$-alkyl,

n is 0, 1 or 2,

s is 0, 1, 2 or 3,

for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

In all of the formulae below, the substituents and symbols have the same definition as described under formula (I), unless otherwise defined.

Compounds to be used according to the invention can be prepared as described in detail in European patent application "EP 10174893" (being filed in the name of Bayer CropScience AG at the EPO on September 01, 2010) and its corresponding international application PCT/EP2011/064820 which are hereby incorporated by reference.

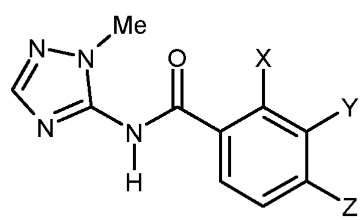
The compounds listed in the tables hereinbelow are very specially preferred to be used for controlling unwanted plants in areas of transgenic plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7 (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f)

Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17,,or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, , PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

The abbreviations used are:

Et = ethyl	Me = methyl	n-Pr = n-propyl	i-Pr = isopropyl
c-Pr = cyclopropyl	Ph = phenyl	Ac = acetyl	Bz = benzoyl

Table 1: Compounds of the general formula (I) according to the invention in which A is CY, B is CH and R is methyl



No.	X	Y	Z
1-1	F	H	Cl
1-2	F	H	Br
1-3	F	H	SO_2Me
1-4	F	H	SO_2Et
1-5	F	H	CF_3
1-6	F	H	NO_2
1-7	Cl	H	F
1-8	Cl	H	Cl
1-9	Cl	H	Br
1-10	Cl	H	SMe
1-11	Cl	H	SOMe
1-12	Cl	H	SO_2Me
1-13	Cl	H	SO_2CH_2Cl

No.	X	Y	Z
1-14	Cl	H	SEt
1-15	Cl	H	SO_2Et
1-16	Cl	H	CF_3
1-17	Cl	H	NO_2
1-18	Cl	H	pyrazol-1-yl
1-19	Cl	H	1H-1,2,4-triazol-1-yl
1-20	Br	H	Cl
1-21	Br	H	Br
1-22	Br	H	SO_2Me
1-23	Br	H	SO_2Et
1-24	Br	H	CF_3
1-25	SO_2Me	H	Cl
1-26	SO_2Me	H	Br
1-27	SO_2Me	H	SMe
1-28	SO_2Me	H	SOMe
1-29	SO_2Me	H	SO_2Me
1-30	SO_2Me	H	SO_2Et
1-31	SO_2Me	H	CF_3
1-32	SO_2Et	H	Cl
1-33	SO_2Et	H	Br
1-34	SO_2Et	H	SMe
1-35	SO_2Et	H	SOMe
1-36	SO_2Et	H	SO_2Me
1-37	SO_2Et	H	CF_3
1-38	NO_2	H	F
1-39	NO_2	H	Cl
1-40	NO_2	H	Br
1-41	NO_2	H	I
1-42	NO_2	H	CN
1-43	NO_2	H	SO_2Me
1-44	NO_2	H	SO_2Et
1-45	NO_2	H	CF_3
1-46	Me	H	Cl
1-47	Me	H	Br
1-48	Me	H	SMe
1-49	Me	H	SO_2Me
1-50	Me	H	SO_2CH_2Cl
1-51	Me	H	SEt
1-52	Me	H	SO_2Et

No.	X	Y	Z
1-53	Me	H	CF_3
1-54	CH_2SO_2Me	H	CF_3
1-55	Et	H	Cl
1-56	Et	H	Br
1-57	Et	H	SMe
1-58	Et	H	SO_2Me
1-59	Et	H	SO_2CH_2Cl
1-60	Et	H	SEt
1-61	Et	H	SO_2Et
1-62	Et	H	CF_3
1-63	CF_3	H	Cl
1-64	CF_3	H	Br
1-65	CF_3	H	SO_2Me
1-66	CF_3	H	SO_2Et
1-67	CF_3	H	CF_3
1-68	NO_2	NH_2	F
1-69	NO_2	NHMe	F
1-70	NO_2	NMe_2	F
1-71	NO_2	Me	Cl
1-72	NO_2	NH_2	Cl
1-73	NO_2	NHMe	Cl
1-74	NO_2	NMe_2	Cl
1-75	NO_2	NH_2	Br
1-76	NO_2	NHMe	Br
1-77	NO_2	NMe_2	Br
1-78	NO_2	NH_2	CF_3
1-79	NO_2	NMe_2	CF_3
1-80	NO_2	NH_2	SO_2Me
1-81	NO_2	NH_2	SO_2Et
1-82	NO_2	NHMe	SO_2Me
1-83	NO_2	NMe_2	SO_2Me
1-84	NO_2	NMe_2	SO_2Et
1-85	NO_2	NH_2	1H-1,2,4-triazol-1-yl
1-86	NO_2	NHMe	1H-1,2,4-triazol-1-yl
1-87	NO_2	NMe_2	1H-1,2,4-triazol-1-yl
1-88	Me	SMe	H
1-89	Me	SOMe	H
1-90	Me	SO_2Me	H
1-91	Me	SEt	H

No.	X	Y	Z
1-92	Me	SOEt	H
1-93	Me	SO_2Et	H
1-94	Me	$S(CH_2)_2OMe$	H
1-95	Me	$SO(CH_2)_2OMe$	H
1-96	Me	$SO_2(CH_2)_2OMe$	H
1-97	Me	F	F
1-98	Me	F	Cl
1-99	Me	SEt	F
1-100	Me	SOEt	F
1-101	Me	SO_2Et	F
1-102	Me	Me	Cl
1-103	Me	F	Cl
1-104	Me	Cl	Cl
1-105	Me	NH_2	Cl
1-106	Me	NHMe	Cl
1-107	Me	NMe_2	Cl
1-108	Me	$O(CH_2)_2OMe$	Cl
1-109	Me	$O(CH_2)_3OMe$	Cl
1-110	Me	$O(CH_2)_4OMe$	Cl
1-111	Me	OCH_2CONMe_2	Cl
1-112	Me	$O(CH_2)_2$-CO-NMe_2	Cl
1-113	Me	$O(CH_2)_2$-NH(CO)NMe_2	Cl
1-114	Me	$O(CH_2)_2$-NH(CO)$NHCO_2Et$	Cl
1-115	Me	$O(CH_2)_2$-$NHCO_2Me$	Cl
1-116	Me	OCH_2-$NHSO_2cPr$	Cl
1-117	Me	$O(CH_2)$-5-2,4-dimethyl-2,4-dihydro-3H-1,2,4-triazol-3-on	Cl
1-118	Me	$O(CH_2)$-3,5-dime-thyl-1,2-oxazol-4-yl	Cl
1-119	Me	SMe	Cl
1-120	Me	SOMe	Cl
1-121	Me	SO_2Me	Cl
1-122	Me	SEt	Cl
1-123	Me	SOEt	Cl
1-124	Me	SO_2Et	Cl
1-125	Me	$S(CH_2)_2OMe$	Cl
1-126	Me	$SO(CH_2)_2OMe$	Cl
1-127	Me	$SO_2(CH_2)_2OMe$	Cl
1-128	Me	NH_2	Br
1-129	Me	NHMe	Br

No.	X	Y	Z
1-130	Me	NMe_2	Br
1-131	Me	$OCH_2(CO)NMe_2$	Br
1-132	Me	$O(CH_2)$-5-pyrrolidin-2-on	Br
1-133	Me	SMe	Br
1-134	Me	SOMe	Br
1-135	Me	SO_2Me	Br
1-136	Me	SEt	Br
1-137	Me	SOEt	Br
1-138	Me	SO_2Et	Br
1-139	Me	SMe	I
1-140	Me	SOMe	I
1-141	Me	SO_2Me	I
1-142	Me	SEt	I
1-143	Me	SOEt	I
1-144	Me	SO_2Et	I
1-145	Me	Cl	CF_3
1-146	Me	SMe	CF_3
1-147	Me	SOMe	CF_3
1-148	Me	SO_2Me	CF_3
1-149	Me	SEt	CF_3
1-150	Me	SOEt	CF_3
1-151	Me	SO_2Et	CF_3
1-152	Me	$S(CH_2)_2OMe$	CF_3
1-153	Me	$SO(CH_2)_2OMe$	CF_3
1-154	Me	$SO_2(CH_2)_2OMe$	CF_3
1-155	Me	Me	SO_2Me
1-156	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
1-157	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
1-158	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Me
1-159	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Et
1-160	Me	NH_2	SO_2Me
1-161	Me	NHMe	SO_2Me
1-162	Me	NMe_2	SO_2Me
1-163	Me	$NH(CH_2)_2OMe$	SO_2Me
1-164	Me	pyrazol-1-yl	SO_2Me
1-165	Me	OH	SO_2Me
1-166	Me	OMe	SO_2Me
1-167	Me	OMe	SO_2Et

No.	X	Y	Z
1-168	Me	OEt	SO_2Me
1-169	Me	OEt	SO_2Et
1-170	Me	OiPr	SO_2Me
1-171	Me	OiPr	SO_2Et
1-172	Me	$O(CH_2)_2OMe$	SO_2Me
1-173	Me	$O(CH_2)_2OMe$	SO_2Et
1-174	Me	$O(CH_2)_3OMe$	SO_2Me
1-175	Me	$O(CH_2)_3OMe$	SO_2Et
1-176	Me	$O(CH_2)_4OMe$	SO_2Me
1-177	Me	$O(CH_2)_4OMe$	SO_2Et
1-178	Me	$O(CH_2)_2NHSO2Me$	SO_2Me
1-179	Me	$O(CH_2)_2NHSO2Me$	SO_2Et
1-180	Me	$OCH_2(CO)NMe_2$	SO_2Me
1-181	Me	$OCH_2(CO)NMe_2$	SO_2Et
1-182	Me	[1,4]dioxan-2-yl-methoxy	SO_2Me
1-183	Me	[1,4]dioxan-2-yl-methoxy	SO_2Et
1-184	Me	$O(CH_2)_2$-O(3,5-di-methoxypyrimidin-2-yl	SO_2Me
1-185	Me	Cl	SO_2Me
1-186	Me	SMe	SO_2Me
1-187	Me	SOMe	SO_2Me
1-188	Me	SO_2Me	SO_2Me
1-189	Me	SO_2Me	SO_2Et
1-190	Me	SEt	SO_2Me
1-191	Me	SOEt	SO_2Me
1-192	Me	SO_2Et	SO_2Me
1-193	Me	$S(CH_2)_2OMe$	SO_2Me
1-194	Me	$SO(CH_2)_2OMe$	SO_2Me
1-195	Me	$SO_2(CH_2)_2OMe$	SO2Me
1-196	CH_2SMe	OMe	SO_2Me
1-197	CH_2OMe	OMe	SO_2Me
1-198	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OEt$	SO_2Me
1-199	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OEt$	SO_2Me
1-200	$CH_2O(CH_2)_3OMe$	OMe	SO_2Me
1-201	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OMe$	SO_2Me
1-202	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OMe$	SO_2Me
1-203	Et	SMe	Cl
1-204	Et	SO_2Me	Cl
1-205	Et	SMe	CF_3

No.	X	Y	Z
1-206	Et	SO_2Me	CF_3
1-207	Et	F	SO_2Me
1-208	Et	$NH(CH_2)_2OMe$	SO_2Me
1-209	iPr	SO_2Me	CF_3
1-210	cPr	SO_2Me	CF_3
1-211	CF_3	$O(CH_2)_2OMe$	F
1-212	CF_3	$O(CH_2)_3OMe$	F
1-213	CF_3	OCH_2CONMe_2	F
1-214	CF_3	[1,4]dioxan-2-yl-methoxy	F
1-215	CF_3	$O(CH_2)_2OMe$	Cl
1-216	CF_3	$O(CH_2)_3OMe$	Cl
1-217	CF_3	OCH_2CONMe_2	Cl
1-218	CF_3	[1,4]dioxan-2-yl-methoxy	Cl
1-219	CF_3	$O(CH_2)_2OMe$	Br
1-220	CF_3	$O(CH_2)_3OMe$	Br
1-221	CF_3	OCH_2CONMe_2	Br
1-222	CF_3	[1,4]dioxan-2-yl-methoxy	Br
1-223	CF_3	$O(CH_2)_2OMe$	I
1-224	CF_3	$O(CH_2)_3OMe$	I
1-225	CF_3	OCH_2CONMe_2	I
1-226	CF_3	[1,4]dioxan-2-yl-methoxy	I
1-227	CF_3	F	SO_2Me
1-228	CF_3	F	SO_2Et
1-229	CF_3	$O(CH_2)_2OMe$	SO_2Me
1-230	CF_3	$O(CH_2)_2OMe$	SO_2Et
1-231	CF_3	$O(CH_2)_3OMe$	SO_2Me
1-232	CF_3	$O(CH_2)_3OMe$	SO_2Et
1-233	CF_3	OCH_2CONMe_2	SO_2Me
1-234	CF_3	OCH_2CONMe_2	SO_2Et
1-235	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Me
1-236	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Et
1-237	F	SMe	CF_3
1-238	F	SOMe	CF_3
1-239	Cl	Me	Cl
1-240	Cl	OCH_2CHCH_2	Cl
1-241	Cl	OCH_2CHF_2	Cl
1-242	Cl	$O(CH_2)_2OMe$	Cl
1-243	Cl	OCH_2CONMe_2	Cl
1-244	Cl	$O(CH_2)$-5-pyrrolidin-2-on	Cl

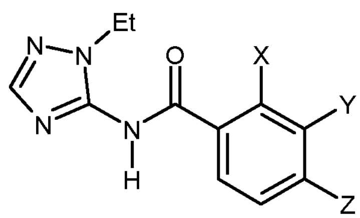
No.	X	Y	Z
1-245	Cl	SMe	Cl
1-246	Cl	SOMe	Cl
1-247	Cl	SO_2Me	Cl
1-248	Cl	F	SMe
1-249	Cl	Cl	SO_2Me
1-250	Cl	COOMe	SO_2Me
1-251	Cl	$CONMe_2$	SO_2Me
1-252	Cl	CONMe(OMe)	SO_2Me
1-253	Cl	CH_2OMe	SO_2Me
1-254	Cl	CH_2OMe	SO_2Et
1-255	Cl	CH_2OEt	SO_2Me
1-256	Cl	CH_2OEt	SO_2Et
1-257	Cl	$CH_2OCH_2CHF_2$	SO_2Me
1-258	Cl	$CH_2OCH_2CF_3$	SO_2Me
1-259	Cl	$CH_2OCH_2CF_3$	SO_2Et
1-260	Cl	$CH_2OCH_2CF_2CHF_2$	SO_2Me
1-261	Cl	CH_2OcPentyl	SO_2Me
1-262	Cl	$CH_2PO(OMe)_2$	SO_2Me
1-263	Cl	4,5-dihydro-1,2-oxazol-3 yl	SMe
1-264	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
1-265	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
1-266	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
1-267	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
1-268	Cl	5-(Methoxyme-thyl)-4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
1-269	Cl	5-(Methoxyme-thyl)-5-Methyl-4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
1-270	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Me
1-271	Cl	CH_2O-tetra-hydrofuran-3-yl	SO_2Et
1-272	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Me
1-273	Cl	CH_2OCH_2-tetra-hydrofuran-2-yl	SO_2Et
1-274	Cl	CH_2OCH_2-tetra-hydrofuran-3-yl	SO_2Me
1-275	Cl	CH_2OCH_2-tetra-hydrofuran-3-yl	SO_2Et
1-276	Cl	OMe	SO_2Me

No.	X	Y	Z
1-277	Cl	OMe	SO_2Et
1-278	Cl	OEt	SO_2Me
1-279	Cl	OEt	SO_2Et
1-280	Cl	OiPr	SO_2Me
1-281	Cl	OiPr	SO_2Et
1-282	Cl	$O(CH_2)_2OMe$	SO_2Me
1-283	Cl	$O(CH_2)_4OMe$	SO_2Me
1-284	Cl	$O(CH_2)_4OMe$	SO_2Et
1-285	Cl	$O(CH_2)_3OMe$	SO_2Me
1-286	Cl	$O(CH_2)_3OMe$	SO_2Et
1-287	Cl	$O(CH_2)_2OMe$	SO_2Me
1-288	Cl	$O(CH_2)_2OMe$	SO_2Et
1-289	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Me
1-290	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Et
1-291	Cl	$OCH_2(CO)NMe_2$	SO_2Me
1-292	Cl	$OCH_2(CO)NMe_2$	SO_2Et
1-293	Cl	SMe	SO_2Me
1-294	Cl	SOMe	SO_2Me
1-295	Br	OMe	Br
1-296	Br	$O(CH_2)_2OMe$	Br
1-297	Br	$O(CH_2)_2OMe$	SO_2Me
1-298	Br	$O(CH_2)_2OMe$	SO_2Et
1-299	Br	$O(CH_2)_3OMe$	SO_2Me
1-300	Br	$O(CH_2)_3OMe$	SO_2Et
1-301	Br	$O(CH_2)_4OMe$	SO_2Me
1-302	Br	$O(CH_2)_4OMe$	SO_2Et
1-303	Br	[1,4]dioxan-2-yl-methoxy	SO_2Me
1-304	Br	[1,4]dioxan-2-yl-methoxy	SO_2Et
1-305	I	$O(CH_2)_2OMe$	SO_2Me
1-306	I	$O(CH_2)_2OMe$	SO_2Et
1-307	I	$O(CH_2)_3OMe$	SO_2Me
1-308	I	$O(CH_2)_3OMe$	SO_2Et
1-309	I	$O(CH_2)_4OMe$	SO_2Me
1-310	I	$O(CH_2)_4OMe$	SO_2Et
1-311	I	[1,4]dioxan-2-yl-methoxy	SO_2Me
1-312	I	[1,4]dioxan-2-yl-methoxy	SO_2Et
1-313	OMe	SMe	CF_3
1-314	OMe	SOMe	CF_3
1-315	OMe	SO_2Me	CF_3

No.	X	Y	Z
1-316	OMe	SOEt	CF_3
1-317	OMe	SO_2Et	CF_3
1-318	OMe	$S(CH_2)_2OMe$	CF_3
1-319	OMe	$SO(CH_2)_2OMe$	CF_3
1-320	OMe	$SO_2(CH_2)_2OMe$	CF_3
1-321	OMe	SMe	Cl
1-322	OMe	SOMe	Cl
1-323	OMe	SO_2Me	Cl
1-324	OMe	SEt	Cl
1-325	OMe	SOEt	Cl
1-326	OMe	SO2Et	Cl
1-327	OMe	$S(CH_2)_2OMe$	Cl
1-328	OMe	$SO(CH_2)_2OMe$	Cl
1-329	OMe	$SO_2(CH_2)_2OMe$	Cl
1-330	OCH_2c-Pr	SMe	CF_3
1-331	OCH_2c-Pr	SOMe	CF_3
1-332	OCH_2c-Pr	SO_2Me	CF_3
1-333	OCH_2c-Pr	SEt	CF_3
1-334	OCH_2c-Pr	SOEt	CF_3
1-335	OCH_2c-Pr	SO_2Et	CF_3
1-336	OCH_2c-Pr	$S(CH_2)_2OMe$	CF_3
1-337	OCH_2c-Pr	$SO(CH_2)_2OMe$	CF_3
1-338	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	CF_3
1-339	OCH_2c-Pr	SMe	Cl
1-340	OCH_2c-Pr	SOMe	Cl
1-341	OCH_2c-Pr	SO_2Me	Cl
1-342	OCH_2c-Pr	SEt	Cl
1-343	OCH_2c-Pr	SOEt	Cl
1-344	OCH_2c-Pr	SO_2Et	Cl
1-345	OCH_2c-Pr	$S(CH_2)_2OMe$	Cl
1-346	OCH_2c-Pr	$SO(CH_2)_2OMe$	Cl
1-347	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	Cl
1-348	OCH_2c-Pr	SMe	SO_2Me
1-349	OCH_2c-Pr	SOMe	SO_2Me
1-350	OCH_2c-Pr	SO_2Me	SO_2Me
1-351	OCH_2c-Pr	SEt	SO_2Me
1-352	OCH_2c-Pr	SOEt	SO_2Me
1-353	OCH_2c-Pr	SO_2Et	SO_2Me
1-354	OCH_2c-Pr	$S(CH_2)_2OMe$	SO_2Me

No.	X	Y	Z
1-355	OCH_2c-Pr	$SO(CH_2)_2OMe$	SO_2Me
1-356	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	SO_2Me
1-357	SO_2Me	F	CF_3
1-358	SO_2Me	NH_2	CF_3
1-359	SO_2Me	NHEt	Cl
1-360	SMe	SEt	F
1-361	SMe	SMe	F

Table 2: Compounds of the general formula (I) according to the invention in which A is CY, B is CH and R is ethyl



No	X	Y	Z
2-1	F	H	Cl
2-2	F	H	Br
2-3	F	H	SO_2Me
2-4	F	H	SO_2Et
2-5	F	H	CF_3
2-6	F	H	NO_2
2-7	Cl	H	F
2-8	Cl	H	Cl
2-9	Cl	H	Br
2-10	Cl	H	SMe
2-11	Cl	H	SOMe
2-12	Cl	H	SO_2Me
2-13	Cl	H	SO_2CH_2Cl
2-14	Cl	H	SEt
2-15	Cl	H	SO_2Et
2-16	Cl	H	CF_3

No	X	Y	Z
2-17	Cl	H	NO_2
2-18	Cl	H	pyrazol-1-yl
2-19	Cl	H	1H-1,2,4-triazol-1-yl
2-20	Br	H	Cl
2-21	Br	H	Br
2-22	Br	H	SO_2Me
2-23	Br	H	SO_2Et
2-24	Br	H	CF_3
2-25	SO_2Me	H	Cl
2-26	SO_2Me	H	Br
2-27	SO_2Me	H	SMe
2-28	SO_2Me	H	SOMe
2-29	SO_2Me	H	SO_2Me
2-30	SO_2Me	H	SO_2Et
2-31	SO_2Me	H	CF_3
2-32	SO_2Et	H	Cl
2-33	SO_2Et	H	Br
2-34	SO_2Et	H	SMe
2-35	SO_2Et	H	SOMe
2-36	SO_2Et	H	SO_2Me
2-37	SO_2Et	H	CF_3
2-38	NO_2	H	F
2-39	NO_2	H	Cl
2-40	NO_2	H	Br
2-41	NO_2	H	I
2-42	NO_2	H	CN
2-43	NO_2	H	SO_2Me
2-44	NO_2	H	SO_2Et
2-45	NO_2	H	CF_3
2-46	Me	H	Cl
2-47	Me	H	Br
2-48	Me	H	SMe
2-49	Me	H	SO_2Me
2-50	Me	H	SO_2CH_2Cl
2-51	Me	H	SEt
2-52	Me	H	SO_2Et
2-53	Me	H	CF_3
2-54	CH_2SO_2Me	H	CF_3
2-55	Et	H	Cl

No	X	Y	Z
2-56	Et	H	Br
2-57	Et	H	SMe
2-58	Et	H	SO_2Me
2-59	Et	H	SO_2CH_2Cl
2-60	Et	H	SEt
2-61	Et	H	SO_2Et
2-62	Et	H	CF_3
2-63	CF_3	H	Cl
2-64	CF_3	H	Br
2-65	CF_3	H	SO_2Me
2-66	CF_3	H	SO_2Et
2-67	CF_3	H	CF_3
2-68	NO_2	NH_2	F
2-69	NO_2	NHMe	F
2-70	NO_2	NMe_2	F
2-71	NO_2	Me	Cl
2-72	NO_2	NH_2	Cl
2-73	NO_2	NHMe	Cl
2-74	NO_2	NMe_2	Cl
2-75	NO_2	NH_2	Br
2-76	NO_2	NHMe	Br
2-77	NO_2	NMe_2	Br
2-78	NO_2	NH_2	CF_3
2-79	NO_2	NMe_2	CF_3
2-80	NO_2	NH_2	SO_2Me
2-81	NO_2	NH_2	SO_2Et
2-82	NO_2	NHMe	SO_2Me
2-83	NO_2	NMe_2	SO_2Me
2-84	NO_2	NMe_2	SO_2Et
2-85	NO_2	NH_2	1H-1,2,4-triazol-1-yl
2-86	NO_2	NHMe	1H-1,2,4-triazol-1-yl
2-87	NO_2	NMe_2	1H-1,2,4-triazol-1-yl
2-88	Me	SMe	H
2-89	Me	SOMe	H
2-90	Me	SO_2Me	H
2-91	Me	SEt	H
2-92	Me	SOEt	H
2-93	Me	SO_2Et	H
2-94	Me	$S(CH_2)_2OMe$	H

No	X	Y	Z
2-95	Me	$SO(CH_2)_2OMe$	H
2-96	Me	$SO_2(CH_2)_2OMe$	H
2-97	Me	F	F
2-98	Me	F	Cl
2-99	Me	SEt	F
2-100	Me	SOEt	F
2-101	Me	SO_2Et	F
2-102	Me	Me	Cl
2-103	Me	F	Cl
2-104	Me	Cl	Cl
2-105	Me	NH_2	Cl
2-106	Me	NHMe	Cl
2-107	Me	NMe_2	Cl
2-108	Me	$O(CH_2)_2OMe$	Cl
2-109	Me	$O(CH_2)_3OMe$	Cl
2-110	Me	$O(CH_2)_4OMe$	Cl
2-111	Me	OCH_2CONMe_2	Cl
2-112	Me	$O(CH_2)_2$-CO-NMe_2	Cl
2-113	Me	$O(CH_2)_2$-NH(CO)NMe_2	Cl
2-114	Me	$O(CH_2)_2$-NH(CO)$NHCO_2Et$	Cl
2-115	Me	$O(CH_2)_2$-$NHCO_2Me$	Cl
2-116	Me	O-CH_2-$NHSO_2$cPr	Cl
2-117	Me	$O(CH_2)$ -5-2,4-dime-thyl-2,4-dihydro-3H-1,2,4-triazol-3-on	Cl
2-118	Me	$O(CH_2)$-3,5-dime-thyl-1,2-oxazol-4-yl	Cl
2-119	Me	SMe	Cl
2-120	Me	SOMe	Cl
2-121	Me	SO_2Me	Cl
2-122	Me	SEt	Cl
2-123	Me	SOEt	Cl
2-124	Me	SO_2Et	Cl
2-125	Me	$S(CH_2)_2OMe$	Cl
2-126	Me	$SO(CH_2)_2OMe$	Cl
2-127	Me	$SO_2(CH_2)_2OMe$	Cl
2-128	Me	NH_2	Br
2-129	Me	NHMe	Br
2-130	Me	NMe_2	Br
2-131	Me	$O(CH_2)CONEt_2$	Br
2-132	Me	$O(CH_2)$-5-pyrrolidin-2-on	Br

No	X	Y	Z
2-133	Me	SMe	Br
2-134	Me	SOMe	Br
2-135	Me	SO_2Me	Br
2-136	Me	SEt	Br
2-137	Me	SOEt	Br
2-138	Me	SO_2Et	Br
2-139	Me	SMe	I
2-140	Me	SOMe	I
2-141	Me	SO_2Me	I
2-142	Me	SEt	I
2-143	Me	SOEt	I
2-144	Me	SO_2Et	I
2-145	Me	Cl	CF_3
2-146	Me	SMe	CF_3
2-147	Me	SOMe	CF_3
2-148	Me	SO_2Me	CF_3
2-149	Me	SEt	CF_3
2-150	Me	SOEt	CF_3
2-151	Me	SO_2Et	CF_3
2-152	Me	$S(CH_2)_2OMe$	CF_3
2-153	Me	$SO(CH_2)_2OMe$	CF_3
2-154	Me	$SO_2(CH_2)_2OMe$	CF_3
2-155	Me	Me	SO_2Me
2-156	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
2-157	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
2-158	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Me
2-159	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Et
2-160	Me	NH_2	SO_2Me
2-161	Me	NHMe	SO_2Me
2-162	Me	NMe_2	SO_2Me
2-163	Me	$NH(CH_2)_2OMe$	SO_2Me
2-164	Me	Pyrazol-1-yl	SO_2Me
2-165	Me	OH	SO_2Me
2-166	Me	OMe	SO_2Me
2-167	Me	OMe	SO_2Et
2-168	Me	OEt	SO_2Me
2-169	Me	OEt	SO_2Et
2-170	Me	OiPr	SO_2Me

No	X	Y	Z
2-171	Me	OiPr	SO_2Et
2-172	Me	$O(CH_2)_2OMe$	SO_2Me
2-173	Me	$O(CH_2)_2OMe$	SO_2Et
2-174	Me	$O(CH_2)_3OMe$	SO_2Me
2-175	Me	$O(CH_2)_3OMe$	SO_2Et
2-176	Me	$O(CH_2)_4OMe$	SO_2Me
2-177	Me	$O(CH_2)_4OMe$	SO_2Et
2-178	Me	$O(CH_2)_2NHSO2Me$	SO_2Me
2-179	Me	$O(CH_2)_2NHSO2Me$	SO_2Et
2-180	Me	$OCH_2(CO)NMe_2$	SO_2Me
2-181	Me	$OCH_2(CO)NMe_2$	SO_2Et
2-182	Me	[1,4]dioxan-2-yl-methoxy	SO_2Me
2-183	Me	[1,4]dioxan-2-yl-methoxy	SO_2Et
2-184	Me	$O(CH_2)_2$-O(3,5-di-methoxypyrimidin-2-yl	SO_2Me
2-185	Me	Cl	SO_2Me
2-186	Me	SMe	SO_2Me
2-187	Me	SOMe	SO_2Me
2-188	Me	SO_2Me	SO_2Me
2-189	Me	SO_2Me	SO_2Et
2-190	Me	SEt	SO_2Me
2-191	Me	SOEt	SO_2Me
2-192	Me	SO_2Et	SO_2Me
2-193	Me	$S(CH_2)_2OMe$	SO_2Me
2-194	Me	$SO(CH_2)_2OMe$	SO_2Me
2-195	Me	$SO_2(CH_2)_2OMe$	SO2Me
2-196	CH_2SMe	OMe	SO_2Me
2-197	CH_2OMe	OMe	SO_2Me
2-198	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OEt$	SO_2Me
2-199	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OEt$	SO_2Me
2-200	$CH_2O(CH_2)_3OMe$	OMe	SO_2Me
2-201	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OMe$	SO_2Me
2-202	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OMe$	SO_2Me
2-203	Et	SMe	Cl
2-204	Et	SO_2Me	Cl
2-205	Et	SMe	CF_3
2-206	Et	SO_2Me	CF_3
2-207	Et	F	SO_2Me
2-208	Et	$NH(CH_2)_2OMe$	SO_2Me

No	X	Y	Z
2-209	iPr	SO_2Me	CF_3
2-210	cPr	SO_2Me	CF_3
2-211	CF_3	$O(CH_2)_2OMe$	F
2-212	CF_3	$O(CH_2)_3OMe$	F
2-213	CF_3	OCH_2CONMe_2	F
2-214	CF_3	[1,4]dioxan-2-yl-methoxy	F
2-215	CF_3	$O(CH_2)_2OMe$	Cl
2-216	CF_3	$O(CH_2)_3OMe$	Cl
2-217	CF_3	OCH_2CONMe_2	Cl
2-218	CF_3	[1,4]dioxan-2-yl-methoxy	Cl
2-219	CF_3	$O(CH_2)_2OMe$	Br
2-220	CF_3	$O(CH_2)_3OMe$	Br
2-221	CF_3	OCH_2CONMe_2	Br
2-222	CF_3	[1,4]dioxan-2-yl-methoxy	Br
2-223	CF_3	$O(CH_2)_2OMe$	I
2-224	CF_3	$O(CH_2)_3OMe$	I
2-225	CF_3	OCH_2CONMe_2	I
2-226	CF_3	[1,4]dioxan-2-yl-methoxy	I
2-227	CF_3	F	SO_2Me
2-228	CF_3	F	SO_2Et
2-229	CF_3	$O(CH_2)_2OMe$	SO_2Me
2-230	CF_3	$O(CH_2)_2OMe$	SO_2Et
2-231	CF_3	$O(CH_2)_3OMe$	SO_2Me
2-232	CF_3	$O(CH_2)_3OMe$	SO_2Et
2-233	CF_3	OCH_2CONMe_2	SO_2Me
2-234	CF_3	OCH_2CONMe_2	SO_2Et
2-235	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Me
2-236	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Et
2-237	F	SMe	CF_3
2-238	F	SOMe	CF_3
2-239	Cl	Me	Cl
2-240	Cl	OCH_2CHCH_2	Cl
2-241	Cl	OCH_2CHF_2	Cl
2-242	Cl	$O(CH_2)_2OMe$	Cl
2-243	Cl	$OCH_2(CO)NMe_2$	Cl
2-244	Cl	$O(CH_2)$-5-pyrrolidin-2-on	Cl
2-245	Cl	SMe	Cl
2-246	Cl	SOMe	Cl
2-247	Cl	SO_2Me	Cl

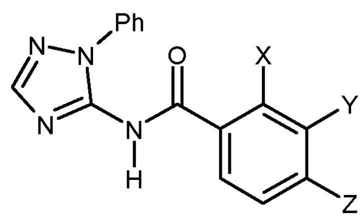
No	X	Y	Z
2-248	Cl	F	SMe
2-249	Cl	Cl	SO_2Me
2-250	Cl	COOMe	SO_2Me
2-251	Cl	$CONMe_2$	SO_2Me
2-252	Cl	CONMe(OMe)	SO_2Me
2-253	Cl	CH_2OMe	SO_2Me
2-254	Cl	CH_2OMe	SO_2Et
2-255	Cl	CH_2OEt	SO_2Me
2-256	Cl	CH_2OEt	SO_2Et
2-257	Cl	$CH_2OCH_2CHF_2$	SO_2Me
2-258	Cl	$CH_2OCH_2CF_3$	SO_2Me
2-259	Cl	$CH_2OCH_2CF_3$	SO_2Et
2-260	Cl	$CH_2OCH_2CF_2CHF_2$	SO_2Me
2-261	Cl	CH_2OcPentyl	SO_2Me
2-262	Cl	$CH_2PO(OMe)_2$	SO_2Me
2-263	Cl	4,5-dihydro-1,2-oxazol-3 yl	SMe
2-264	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
2-265	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
2-266	Cl	5-cyanomethyl-4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
2-267	Cl	5-cyanomethyl-4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
2-268	Cl	5-(Methoxymethyl)-4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
2-269	Cl	5-(Methoxymethyl)-5-Methyl-4,5-dihy-dro-1,2-oxazol-3 yl	SO_2Et
2-270	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Me
2-271	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Et
2-272	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Me
2-273	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Et
2-274	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Me
2-275	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Et
2-276	Cl	OMe	SO_2Me
2-277	Cl	OMe	SO_2Et
2-278	Cl	OEt	SO_2Me
2-279	Cl	OEt	SO_2Et
2-280	Cl	OiPr	SO_2Me

No	X	Y	Z
2-281	Cl	OiPr	SO_2Et
2-282	Cl	$O(CH_2)_2OMe$	SO_2Me
2-283	Cl	$O(CH_2)_4OMe$	SO_2Me
2-284	Cl	$O(CH_2)_4OMe$	SO_2Et
2-285	Cl	$O(CH_2)_3OMe$	SO_2Me
2-286	Cl	$O(CH_2)_3OMe$	SO_2Et
2-287	Cl	$O(CH_2)_2OMe$	SO_2Me
2-288	Cl	$O(CH_2)_2OMe$	SO_2Et
2-289	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Me
2-290	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Et
2-291	Cl	$OCH_2(CO)NMe_2$	SO_2Me
2-292	Cl	$OCH_2(CO)NMe_2$	SO_2Et
2-293	Cl	SMe	SO_2Me
2-294	Cl	SOMe	SO_2Me
2-295	Br	OMe	Br
2-296	Br	$O(CH_2)_2OMe$	Br
2-297	Br	$O(CH_2)_2OMe$	SO_2Me
2-298	Br	$O(CH_2)_2OMe$	SO_2Et
2-299	Br	$O(CH_2)_3OMe$	SO_2Me
2-300	Br	$O(CH_2)_3OMe$	SO_2Et
2-301	Br	$O(CH_2)_4OMe$	SO_2Me
2-302	Br	$O(CH_2)_4OMe$	SO_2Et
2-303	Br	[1,4]dioxan-2-yl-methoxy	SO_2Me
2-304	Br	[1,4]dioxan-2-yl-methoxy	SO_2Et
2-305	I	$O(CH_2)_2OMe$	SO_2Me
2-306	I	$O(CH_2)_2OMe$	SO_2Et
2-307	I	$O(CH_2)_3OMe$	SO_2Me
2-308	I	$O(CH_2)_3OMe$	SO_2Et
2-309	I	$O(CH_2)_4OMe$	SO_2Me
2-310	I	$O(CH_2)_4OMe$	SO_2Et
2-311	I	[1,4]dioxan-2-yl-methoxy	SO_2Me
2-312	I	[1,4]dioxan-2-yl-methoxy	SO_2Et
2-313	OMe	SMe	CF_3
2-314	OMe	SOMe	CF_3
2-315	OMe	SO_2Me	CF_3
2-316	OMe	SOEt	CF_3
2-317	OMe	SO_2Et	CF_3
2-318	OMe	$S(CH_2)_2OMe$	CF_3
2-319	OMe	$SO(CH_2)_2OMe$	CF_3

No	X	Y	Z
2-320	OMe	$SO_2(CH_2)_2OMe$	CF_3
2-321	OMe	SMe	Cl
2-322	OMe	SOMe	Cl
2-323	OMe	SO_2Me	Cl
2-324	OMe	SEt	Cl
2-325	OMe	SOEt	Cl
2-326	OMe	SO2Et	Cl
2-327	OMe	$S(CH_2)_2OMe$	Cl
2-328	OMe	$SO(CH_2)_2OMe$	Cl
2-329	OMe	$SO_2(CH_2)_2OMe$	Cl
2-330	OCH_2c-Pr	SMe	CF_3
2-331	OCH_2c-Pr	SOMe	CF_3
2-332	OCH_2c-Pr	SO_2Me	CF_3
2-333	OCH_2c-Pr	SEt	CF_3
2-334	OCH_2c-Pr	SOEt	CF_3
2-335	OCH_2c-Pr	SO_2Et	CF_3
2-336	OCH_2c-Pr	$S(CH_2)_2OMe$	CF_3
2-337	OCH_2c-Pr	$SO(CH_2)_2OMe$	CF_3
2-338	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	CF_3
2-339	OCH_2c-Pr	SMe	Cl
2-340	OCH_2c-Pr	SOMe	Cl
2-341	OCH_2c-Pr	SO_2Me	Cl
2-342	OCH_2c-Pr	SEt	Cl
2-343	OCH_2c-Pr	SOEt	Cl
2-344	OCH_2c-Pr	SO_2Et	Cl
2-345	OCH_2c-Pr	$S(CH_2)_2OMe$	Cl
2-346	OCH_2c-Pr	$SO(CH_2)_2OMe$	Cl
2-347	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	Cl
2-348	OCH_2c-Pr	SMe	SO_2Me
2-349	OCH_2c-Pr	SOMe	SO_2Me
2-350	OCH_2c-Pr	SO_2Me	SO_2Me
2-351	OCH_2c-Pr	SEt	SO_2Me
2-352	OCH_2c-Pr	SOEt	SO_2Me
2-353	OCH_2c-Pr	SO_2Et	SO_2Me
2-354	OCH_2c-Pr	$S(CH_2)_2OMe$	SO_2Me
2-355	OCH_2c-Pr	$SO(CH_2)_2OMe$	SO_2Me
2-356	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	SO_2Me
2-357	SO_2Me	F	CF_3
2-358	SO_2Me	NH_2	CF_3

No	X	Y	Z
2-359	SO_2Me	NHEt	Cl
2-360	SMe	SEt	F
2-361	SMe	SMe	F

Table 3: Compounds of the general formula (I) according to the invention in which A is CY, B is CH and R is phenyl



No.	X	Y	Z
3-1	F	H	Cl
3-2	F	H	Br
3-3	F	H	SO_2Me
3-4	F	H	SO_2Et
3-5	F	H	CF_3
3-6	F	H	NO_2
3-7	Cl	H	F
3-8	Cl	H	Cl
3-9	Cl	H	Br
3-10	Cl	H	SMe
3-11	Cl	H	SOMe
3-12	Cl	H	SO_2Me
3-13	Cl	H	SO_2CH_2Cl
3-14	Cl	H	SEt
3-15	Cl	H	SO_2Et
3-16	Cl	H	CF_3
3-17	Cl	H	NO_2
3-18	Cl	H	pyrazol-1-yl
3-19	Cl	H	1H-1,2,4-triazol-1-yl
3-20	Br	H	Cl
3-21	Br	H	Br
3-22	Br	H	SO_2Me
3-23	Br	H	SO_2Et

No.	X	Y	Z
3-24	Br	H	CF_3
3-25	SO_2Me	H	Cl
3-26	SO_2Me	H	Br
3-27	SO_2Me	H	SMe
3-28	SO_2Me	H	SOMe
3-29	SO_2Me	H	SO_2Me
3-30	SO_2Me	H	SO_2Et
3-31	SO_2Me	H	CF_3
3-32	SO_2Et	H	Cl
3-33	SO_2Et	H	Br
3-34	SO_2Et	H	SMe
3-35	SO_2Et	H	SOMe
3-36	SO_2Et	H	SO_2Me
3-37	SO_2Et	H	CF_3
3-38	NO_2	H	F
3-39	NO_2	H	Cl
3-40	NO_2	H	Br
3-41	NO_2	H	I
3-42	NO_2	H	CN
3-43	NO_2	H	SO_2Me
3-44	NO_2	H	SO_2Et
3-45	NO_2	H	CF_3
3-46	Me	H	Cl
3-47	Me	H	Br
3-48	Me	H	SMe
3-49	Me	H	SO_2Me
3-50	Me	H	SO_2CH_2Cl
3-51	Me	H	SEt
3-52	Me	H	SO_2Et
3-53	Me	H	CF_3
3-54	CH_2SO_2Me	H	CF_3
3-55	Et	H	Cl
3-56	Et	H	Br
3-57	Et	H	SMe
3-58	Et	H	SO_2Me
3-59	Et	H	SO_2CH_2Cl
3-60	Et	H	SEt
3-61	Et	H	SO_2Et
3-62	Et	H	CF_3

No.	X	Y	Z
3-63	CF_3	H	Cl
3-64	CF_3	H	Br
3-65	CF_3	H	SO_2Me
3-66	CF_3	H	SO_2Et
3-67	CF_3	H	CF_3
3-68	NO_2	NH_2	F
3-69	NO_2	NHMe	F
3-70	NO_2	NMe_2	F
3-71	NO_2	Me	Cl
3-72	NO_2	NH_2	Cl
3-73	NO_2	NHMe	Cl
3-74	NO_2	NMe_2	Cl
3-75	NO_2	NH_2	Br
3-76	NO_2	NHMe	Br
3-77	NO_2	NMe_2	Br
3-78	NO_2	NH_2	CF_3
3-79	NO_2	NMe_2	CF_3
3-80	NO_2	NH_2	SO_2Me
3-81	NO_2	NH_2	SO_2Et
3-82	NO_2	NHMe	SO_2Me
3-83	NO_2	NMe_2	SO_2Me
3-84	NO_2	NMe_2	SO_2Et
3-85	NO_2	NH_2	1H-1,2,4-triazol-1-yl
3-86	NO_2	NHMe	1H-1,2,4-triazol-1-yl
3-87	NO_2	NMe_2	1H-1,2,4-triazol-1-yl
3-88	Me	SMe	H
3-89	Me	SOMe	H
3-90	Me	SO_2Me	H
3-91	Me	SEt	H
3-92	Me	SOEt	H
3-93	Me	SO_2Et	H
3-94	Me	$S(CH_2)_2OMe$	H
3-95	Me	$SO(CH_2)_2OMe$	H
3-96	Me	$SO_2(CH_2)_2OMe$	H
3-97	Me	F	F
3-98	Me	F	Cl
3-99	Me	SEt	F
3-100	Me	SOEt	F
3-101	Me	SO_2Et	F

No.	X	Y	Z
3-102	Me	Me	Cl
3-103	Me	F	Cl
3-104	Me	Cl	Cl
3-105	Me	NH_2	Cl
3-106	Me	NHMe	Cl
3-107	Me	NMe_2	Cl
3-108	Me	$O(CH_2)_2OMe$	Cl
3-109	Me	$O(CH_2)_3OMe$	Cl
3-110	Me	$O(CH_2)_4OMe$	Cl
3-111	Me	OCH_2CONMe_2	Cl
3-112	Me	$O(CH_2)_2$-$CONMe_2$	Cl
3-113	Me	$O(CH_2)_2$-NH(CO)NMe_2	Cl
3-114	Me	$O(CH_2)_2$-NH(CO)$NHCO_2Et$	Cl
3-115	Me	$O(CH_2)_2NHCO_2Me$	Cl
3-116	Me	OCH_2NHSO_2cPr	Cl
3-117	Me	$O(CH_2)$-5-2,4-di-methyl-2,4-dihydro-3H-1,2,4-triazol-3-on	Cl
3-118	Me	$O(CH_2)$-3,5-dime-thyl-1,2-oxazol-4-yl	Cl
3-119	Me	SMe	Cl
3-120	Me	SOMe	Cl
3-121	Me	SO_2Me	Cl
3-122	Me	SEt	Cl
3-123	Me	SOEt	Cl
3-124	Me	SO_2Et	Cl
3-125	Me	$S(CH_2)_2OMe$	Cl
3-126	Me	$SO(CH_2)_2OMe$	Cl
3-127	Me	$SO_2(CH_2)_2OMe$	Cl
3-128	Me	NH_2	Br
3-129	Me	NHMe	Br
3-130	Me	NMe_2	Br
3-131	Me	OCH_2CONMe_2	Br
3-132	Me	$O(CH_2)$-5-pyrrolidin-2-on	Br
3-133	Me	SMe	Br
3-134	Me	SOMe	Br
3-135	Me	SO_2Me	Br
3-136	Me	SEt	Br
3-137	Me	SOEt	Br
3-138	Me	SO_2Et	Br
3-139	Me	SMe	I

No.	X	Y	Z
3-140	Me	SOMe	I
3-141	Me	SO_2Me	I
3-142	Me	SEt	I
3-143	Me	SOEt	I
3-144	Me	SO_2Et	I
3-145	Me	Cl	CF_3
3-146	Me	SMe	CF_3
3-147	Me	SOMe	CF_3
3-148	Me	SO_2Me	CF_3
3-149	Me	SEt	CF_3
3-150	Me	SOEt	CF_3
3-151	Me	SO_2Et	CF_3
3-152	Me	$S(CH_2)_2OMe$	CF_3
3-153	Me	$SO(CH_2)_2OMe$	CF_3
3-154	Me	$SO_2(CH_2)_2OMe$	CF_3
3-155	Me	Me	SO_2Me
3-156	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
3-157	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
3-158	Me	5-cyanomethyl-4,5-dihydro-1,2-oxazol-3-yl	SO_2Me
3-159	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Et
3-160	Me	NH_2	SO_2Me
3-161	Me	NHMe	SO_2Me
3-162	Me	NMe_2	SO_2Me
3-163	Me	$NH(CH_2)_2OMe$	SO_2Me
3-164	Me	Pyrazol-1-yl	SO_2Me
3-165	Me	OH	SO_2Me
3-166	Me	OMe	SO_2Me
3-167	Me	OMe	SO_2Et
3-168	Me	OEt	SO_2Me
3-169	Me	OEt	SO_2Et
3-170	Me	OiPr	SO_2Me
3-171	Me	OiPr	SO_2Et
3-172	Me	$O(CH_2)_2OMe$	SO_2Me
3-173	Me	$O(CH_2)_2OMe$	SO_2Et
3-174	Me	$O(CH_2)_3OMe$	SO_2Me
3-175	Me	$O(CH_2)_3OMe$	SO_2Et
3-176	Me	$O(CH_2)_4OMe$	SO_2Me
3-177	Me	$O(CH_2)_4OMe$	SO_2Et

No.	X	Y	Z
3-178	Me	$O(CH_2)_2NHSO2Me$	SO_2Me
3-179	Me	$O(CH_2)_2NHSO2Me$	SO_2Et
3-180	Me	$OCH_2(CO)NMe_2$	SO_2Me
3-181	Me	$OCH_2(CO)NMe_2$	SO_2Et
3-182	Me	[1,4]dioxan-2-yl-methoxy	SO_2Me
3-183	Me	[1,4]dioxan-2-yl-methoxy	SO_2Et
3-184	Me	$O(CH_2)_2$-O(3,5-dimethoxypyrimidin-2-yl	SO_2Me
3-185	Me	Cl	SO_2Me
3-186	Me	SMe	SO_2Me
3-187	Me	SOMe	SO_2Me
3-188	Me	SO_2Me	SO_2Me
3-189	Me	SO_2Me	SO_2Et
3-190	Me	SEt	SO_2Me
3-191	Me	SOEt	SO_2Me
3-192	Me	SO_2Et	SO_2Me
3-193	Me	$S(CH_2)_2OMe$	SO_2Me
3-194	Me	$SO(CH_2)_2OMe$	SO_2Me
3-195	Me	$SO_2(CH_2)_2OMe$	SO2Me
3-196	CH_2SMe	OMe	SO_2Me
3-197	CH_2OMe	OMe	SO_2Me
3-198	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OEt$	SO_2Me
3-199	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OEt$	SO_2Me
3-200	$CH_2O(CH_2)_3OMe$	OMe	SO_2Me
3-201	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OMe$	SO_2Me
3-202	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OMe$	SO_2Me
3-203	Et	SMe	Cl
3-204	Et	SO_2Me	Cl
3-205	Et	SMe	CF_3
3-206	Et	SO_2Me	CF_3
3-207	Et	F	SO_2Me
3-208	Et	$NH(CH_2)_2OMe$	SO_2Me
3-209	iPr	SO_2Me	CF_3
3-210	cPr	SO_2Me	CF_3
3-211	CF_3	$O(CH_2)_2OMe$	F
3-212	CF_3	$O(CH_2)_3OMe$	F
3-213	CF_3	OCH_2CONMe_2	F
3-214	CF_3	[1,4]dioxan-2-yl-methoxy	F
3-215	CF_3	$O(CH_2)_2OMe$	Cl

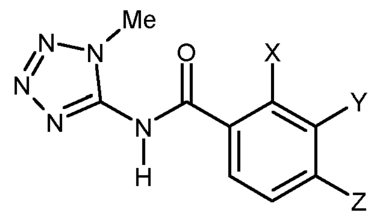
No.	X	Y	Z
3-216	CF_3	$O(CH_2)_3OMe$	Cl
3-217	CF_3	OCH_2CONMe_2	Cl
3-218	CF_3	[1,4]dioxan-2-yl-methoxy	Cl
3-219	CF_3	$O(CH_2)_2OMe$	Br
3-220	CF_3	$O(CH_2)_3OMe$	Br
3-221	CF_3	OCH_2CONMe_2	Br
3-222	CF_3	[1,4]dioxan-2-yl-methoxy	Br
3-223	CF_3	$O(CH_2)_2OMe$	I
3-224	CF_3	$O(CH_2)_3OMe$	I
3-225	CF_3	OCH_2CONMe_2	I
3-226	CF_3	[1,4]dioxan-2-yl-methoxy	I
3-227	CF_3	F	SO_2Me
3-228	CF_3	F	SO_2Et
3-229	CF_3	$O(CH_2)_2OMe$	SO_2Me
3-230	CF_3	$O(CH_2)_2OMe$	SO_2Et
3-231	CF_3	$O(CH_2)_3OMe$	SO_2Me
3-232	CF_3	$O(CH_2)_3OMe$	SO_2Et
3-233	CF_3	OCH_2CONMe_2	SO_2Me
3-234	CF_3	OCH_2CONMe_2	SO_2Et
3-235	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Me
3-236	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Et
3-237	F	SMe	CF_3
3-238	F	SOMe	CF_3
3-239	Cl	Me	Cl
3-240	Cl	OCH_2CHCH_2	Cl
3-241	Cl	OCH_2CHF_2	Cl
3-242	Cl	$O(CH_2)_2OMe$	Cl
3-243	Cl	$OCH_2(CO)NMe_2$	Cl
3-244	Cl	$O(CH_2)$-5-pyrrolidin-2-on	Cl
3-245	Cl	SMe	Cl
3-246	Cl	SOMe	Cl
3-247	Cl	SO_2Me	Cl
3-248	Cl	F	SMe
3-249	Cl	Cl	SO_2Me
3-250	Cl	COOMe	SO_2Me
3-251	Cl	$CONMe_2$	SO_2Me
3-252	Cl	CONMe(OMe)	SO_2Me
3-253	Cl	CH_2OMe	SO_2Me
3-254	Cl	CH_2OMe	SO_2Et

No.	X	Y	Z
3-255	Cl	CH_2OEt	SO_2Me
3-256	Cl	CH_2OEt	SO_2Et
3-257	Cl	$CH_2OCH_2CHF_2$	SO_2Me
3-258	Cl	$CH_2OCH_2CF_3$	SO_2Me
3-259	Cl	$CH_2OCH_2CF_3$	SO_2Et
3-260	Cl	$CH_2OCH_2CF_2CHF_2$	SO_2Me
3-261	Cl	CH_2OcPentyl	SO_2Me
3-262	Cl	$CH_2PO(OMe)_2$	SO_2Me
3-263	Cl	4,5-dihydro-1,2-oxazol-3 yl	SMe
3-264	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
3-265	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
3-266	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
3-267	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
3-268	Cl	5-(Methoxymethyl)-4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
3-269	Cl	5-(Methoxymethyl)-5-Methyl-4,5-dihy-dro-1,2-oxazol-3-yl	SO_2Et
3-270	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Me
3-271	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Et
3-272	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Me
3-273	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Et
3-274	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Me
3-275	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Et
3-276	Cl	OMe	SO_2Me
3-277	Cl	OMe	SO_2Et
3-278	Cl	OEt	SO_2Me
3-279	Cl	OEt	SO_2Et
3-280	Cl	OiPr	SO_2Me
3-281	Cl	OiPr	SO_2Et
3-282	Cl	$O(CH_2)_2OMe$	SO_2Me
3-283	Cl	$O(CH_2)_4OMe$	SO_2Me
3-284	Cl	$O(CH_2)_4OMe$	SO_2Et
3-285	Cl	$O(CH_2)_3OMe$	SO_2Me
3-286	Cl	$O(CH_2)_3OMe$	SO_2Et
3-287	Cl	$O(CH_2)_2OMe$	SO_2Me

No.	X	Y	Z
3-288	Cl	$O(CH_2)_2OMe$	SO_2Et
3-289	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Me
3-290	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Et
3-291	Cl	$OCH_2(CO)NMe_2$	SO_2Me
3-292	Cl	$OCH_2(CO)NMe_2$	SO_2Et
3-293	Cl	SMe	SO_2Me
3-294	Cl	SOMe	SO_2Me
3-295	Br	OMe	Br
3-296	Br	$O(CH_2)_2OMe$	Br
3-297	Br	$O(CH_2)_2OMe$	SO_2Me
3-298	Br	$O(CH_2)_2OMe$	SO_2Et
3-299	Br	$O(CH_2)_3OMe$	SO_2Me
3-300	Br	$O(CH_2)_3OMe$	SO_2Et
3-301	Br	$O(CH_2)_4OMe$	SO_2Me
3-302	Br	$O(CH_2)_4OMe$	SO_2Et
3-303	Br	[1,4]dioxan-2-yl-methoxy	SO_2Me
3-304	Br	[1,4]dioxan-2-yl-methoxy	SO_2Et
3-305	I	$O(CH_2)_2OMe$	SO_2Me
3-306	I	$O(CH_2)_2OMe$	SO_2Et
3-307	I	$O(CH_2)_3OMe$	SO_2Me
3-308	I	$O(CH_2)_3OMe$	SO_2Et
3-309	I	$O(CH_2)_4OMe$	SO_2Me
3-310	I	$O(CH_2)_4OMe$	SO_2Et
3-311	I	[1,4]dioxan-2-yl-methoxy	SO_2Me
3-312	I	[1,4]dioxan-2-yl-methoxy	SO_2Et
3-313	OMe	SMe	CF_3
3-314	OMe	SOMe	CF_3
3-315	OMe	SO_2Me	CF_3
3-316	OMe	SOEt	CF_3
3-317	OMe	SO_2Et	CF_3
3-318	OMe	$S(CH_2)_2OMe$	CF_3
3-319	OMe	$SO(CH_2)_2OMe$	CF_3
3-320	OMe	$SO_2(CH_2)_2OMe$	CF_3
3-321	OMe	SMe	Cl
3-322	OMe	SOMe	Cl
3-323	OMe	SO_2Me	Cl
3-324	OMe	SEt	Cl
3-325	OMe	SOEt	Cl
3-326	OMe	SO2Et	Cl

No.	X	Y	Z
3-327	OMe	$S(CH_2)_2OMe$	Cl
3-328	OMe	$SO(CH_2)_2OMe$	Cl
3-329	OMe	$SO_2(CH_2)_2OMe$	Cl
3-330	OCH_2c-Pr	SMe	CF_3
3-331	OCH_2c-Pr	SOMe	CF_3
3-332	OCH_2c-Pr	SO_2Me	CF_3
3-333	OCH_2c-Pr	SEt	CF_3
3-334	OCH_2c-Pr	SOEt	CF_3
3-335	OCH_2c-Pr	SO_2Et	CF_3
3-336	OCH_2c-Pr	$S(CH_2)_2OMe$	CF_3
3-337	OCH_2c-Pr	$SO(CH_2)_2OMe$	CF_3
3-338	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	CF_3
3-339	OCH_2c-Pr	SMe	Cl
3-340	OCH_2c-Pr	SOMe	Cl
3-341	OCH_2c-Pr	SO_2Me	Cl
3-342	OCH_2c-Pr	SEt	Cl
3-343	OCH_2c-Pr	SOEt	Cl
3-344	OCH_2c-Pr	SO_2Et	Cl
3-345	OCH_2c-Pr	$S(CH_2)_2OMe$	Cl
3-346	OCH_2c-Pr	$SO(CH_2)_2OMe$	Cl
3-347	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	Cl
3-348	OCH_2c-Pr	SMe	SO_2Me
3-349	OCH_2c-Pr	SOMe	SO_2Me
3-350	OCH_2c-Pr	SO_2Me	SO_2Me
3-351	OCH_2c-Pr	SEt	SO_2Me
3-352	OCH_2c-Pr	SOEt	SO_2Me
3-353	OCH_2c-Pr	SO_2Et	SO_2Me
3-354	OCH_2c-Pr	$S(CH_2)_2OMe$	SO_2Me
3-355	OCH_2c-Pr	$SO(CH_2)_2OMe$	SO_2Me
3-356	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	SO_2Me
3-357	SO_2Me	F	CF_3
3-358	SO_2Me	NH_2	CF_3
3-359	SO_2Me	NHEt	Cl
3-360	SMe	SEt	F
3-361	SMe	SMe	F

Table 4: Compounds of the general formula (I) according to the invention in which A is CY, B is N and R is methyl



No.	X	Y	Z
4-1	F	H	Cl
4-2	F	H	Br
4-3	F	H	SO_2Me
4-4	F	H	SO_2Et
4-5	F	H	CF_3
4-6	Cl	H	F
4-7	Cl	H	Cl
4-8	Cl	H	Br
4-9	Cl	H	SMe
4-10	Cl	H	SO_2Me
4-11	Cl	H	SO_2CH_2Cl
4-12	Cl	H	SEt
4-13	Cl	H	SO_2Et
4-14	Cl	H	CF_3
4-15	Br	H	Cl
4-16	Br	H	Br
4-17	Br	H	SO_2Me
4-18	Br	H	SO_2Et
4-19	Br	H	CF_3
4-20	SO_2Me	H	Cl
4-21	SO_2Me	H	Br
4-22	SO_2Me	H	SMe
4-23	SO_2Me	H	SOMe
4-24	SO_2Me	H	SO_2Me
4-25	SO_2Me	H	CF_3
4-26	SO_2Et	H	Cl
4-27	SO_2Et	H	Br
4-28	SO_2Et	H	SMe
4-29	SO_2Et	H	SOMe

No.	X	Y	Z
4-30	SO_2Et	H	SO_2Me
4-31	SO_2Et	H	CF_3
4-32	NO_2	H	F
4-33	NO_2	H	Cl
4-34	NO_2	H	Br
4-35	NO_2	H	I
4-36	NO_2	H	CN
4-37	NO_2	H	SO_2Me
4-38	NO_2	H	SO_2Et
4-39	NO_2	H	CF_3
4-40	Me	H	Cl
4-41	Me	H	Br
4-42	Me	H	SO_2Me
4-43	Me	H	SO_2CH_2Cl
4-44	Me	H	SO_2Et
4-45	Me	H	CF_3
4-46	CH_2SO_2Me	H	CF_3
4-47	Et	H	Cl
4-48	Et	H	Br
4-49	Et	H	SO_2Me
4-50	Et	H	SO_2CH_2Cl
4-51	Et	H	SEt
4-52	Et	H	SO_2Et
4-53	Et	H	CF_3
4-54	CF_3	H	Cl
4-55	CF_3	H	Br
4-56	CF_3	H	SO_2Me
4-57	CF_3	H	CF_3
4-58	NO_2	NH_2	F
4-59	NO_2	NHMe	F
4-60	NO_2	NMe_2	F
4-61	NO_2	Me	Cl
4-62	NO_2	NH_2	Cl
4-63	NO_2	NHMe	Cl
4-64	NO_2	NMe_2	Cl
4-65	NO_2	NH_2	Br
4-66	NO_2	NHMe	Br
4-67	NO_2	NMe_2	Br
4-68	NO_2	NH_2	CF_3

No.	X	Y	Z
4-69	NO_2	NMe_2	CF_3
4-70	NO_2	NH_2	SO_2Me
4-71	NO_2	NH_2	SO_2Et
4-72	NO_2	NHMe	SO_2Me
4-73	NO_2	NMe_2	SO_2Me
4-74	NO_2	NMe_2	SO_2Et
4-75	NO_2	NH_2	1H-1,2,4-triazol-1-yl
4-76	NO_2	NHMe	1H-1,2,4-triazol-1-yl
4-77	NO_2	NMe_2	1H-1,2,4-triazol-1-yl
4-78	Me	SMe	H
4-79	Me	SOMe	H
4-80	Me	SO_2Me	H
4-81	Me	SEt	H
4-82	Me	SOEt	H
4-83	Me	SO_2Et	H
4-84	Me	$S(CH_2)_2OMe$	H
4-85	Me	$SO(CH_2)_2OMe$	H
4-86	Me	$SO_2(CH_2)_2OMe$	H
4-87	Me	F	F
4-88	Me	SEt	F
4-89	Me	SOEt	F
4-90	Me	SO_2Et	F
4-91	Me	Me	Cl
4-92	Me	F	Cl
4-93	Me	Cl	Cl
4-94	Me	NH_2	Cl
4-95	Me	NHMe	Cl
4-96	Me	NMe_2	Cl
4-97	Me	$O(CH_2)_2OMe$	Cl
4-98	Me	$O(CH_2)_3OMe$	Cl
4-99	Me	$O(CH_2)_4OMe$	Cl
4-100	Me	OCH_2CONMe_2	Cl
4-101	Me	$O(CH_2)_2CONMe_2$	Cl
4-102	Me	$O(CH_2)_2$-NH(CO)NMe_2	Cl
4-103	Me	$O(CH_2)_2$NH(CO)NHCO_2Et	Cl
4-104	Me	$O(CH_2)_2NHCO_2Me$	Cl
4-105	Me	OCH_2NHSO_2cPr	Cl
4-106	Me	$O(CH_2)$-5-(2,4-dimethyl-2,4-dihydro)-3H-1,2,4-triazol-3-on	Cl

No.	X	Y	Z
4-107	Me	O(CH2)-3,5-dimethyl-1,2-oxazol-4-yl	Cl
4-108	Me	SMe	Cl
4-109	Me	SOMe	Cl
4-110	Me	SO_2Me	Cl
4-111	Me	SEt	Cl
4-112	Me	SOEt	Cl
4-113	Me	SO_2Et	Cl
4-114	Me	$S(CH_2)_2OMe$	Cl
4-115	Me	$SO(CH_2)_2OMe$	Cl
4-116	Me	$SO_2(CH_2)_2OMe$	Cl
4-117	Me	NH_2	Br
4-118	Me	NHMe	Br
4-119	Me	NMe_2	Br
4-120	Me	OCH_2CONEt_2	Br
4-121	Me	$O(CH_2)$-5-pyrrolidin-2-on	Br
4-122	Me	SMe	Br
4-123	Me	SOMe	Br
4-124	Me	SO_2Me	Br
4-125	Me	SEt	Br
4-126	Me	SOEt	Br
4-127	Me	SO_2Et	Br
4-128	Me	SMe	I
4-129	Me	SOMe	I
4-130	Me	SO_2Me	I
4-131	Me	SEt	I
4-132	Me	SOEt	I
4-133	Me	SO_2Et	I
4-134	Me	Cl	CF_3
4-135	Me	SMe	CF_3
4-136	Me	SOMe	CF_3
4-137	Me	SO_2Me	CF_3
4-138	Me	SEt	CF_3
4-139	Me	SOEt	CF_3
4-140	Me	SO_2Et	CF_3
4-141	Me	$S(CH_2)_2OMe$	CF_3
4-142	Me	$S(O)(CH_2)_2OMe$	CF_3
4-143	Me	$SO_2(CH_2)_2OMe$	CF_3
4-144	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me

No.	X	Y	Z
4-145	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
4-146	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Me
4-147	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Et
4-148	Me	NH_2	SO_2Me
4-149	Me	NHMe	SO_2Me
4-150	Me	NMe_2	SO_2Me
4-151	Me	$NH(CH_2)_2OMe$	SO_2Me
4-152	Me	Pyrazol-1-yl	SO_2Me
4-153	Me	OH	SO_2Me
4-154	Me	OMe	SO_2Me
4-155	Me	OMe	SO_2Et
4-156	Me	OEt	SO_2Me
4-157	Me	OEt	SO_2Et
4-158	Me	OiPr	SO_2Me
4-159	Me	OiPr	SO_2Et
4-160	Me	$O(CH_2)_2OMe$	SO_2Me
4-161	Me	$O(CH_2)_2OMe$	SO_2Et
4-162	Me	$O(CH_2)_3OMe$	SO_2Me
4-163	Me	$O(CH_2)_3OMe$	SO_2Et
4-164	Me	$O(CH_2)_4OMe$	SO_2Me
4-165	Me	$O(CH_2)_4OMe$	SO_2Et
4-166	Me	$O(CH_2)_2NHSO2Me$	SO_2Me
4-167	Me	$O(CH_2)_2NHSO2Me$	SO_2Et
4-168	Me	$OCH_2(CO)NMe_2$	SO_2Me
4-169	Me	$OCH_2(CO)NMe_2$	SO_2Et
4-170	Me	[1,4]dioxan-2-yl-methoxy	SO_2Me
4-171	Me	[1,4]dioxan-2-yl-methoxy	SO_2Et
4-172	Me	$O(CH_2)_2$-O(3,5-di-methoxypyrimidin-2-yl)	SO_2Me
4-173	Me	Cl	SO_2Me
4-174	Me	SMe	SO_2Me
4-175	Me	SOMe	SO_2Me
4-176	Me	SO_2Me	SO_2Me
4-177	Me	SO_2Me	SO_2Et
4-178	Me	SEt	SO_2Me
4-179	Me	SOEt	SO_2Me
4-180	Me	SO_2Et	SO_2Me
4-181	Me	$S(CH_2)_2OMe$	SO_2Me

No.	X	Y	Z
4-182	Me	$SO(CH_2)_2OMe$	SO_2Me
4-183	Me	$SO_2(CH_2)_2OMe$	SO_2Me
4-184	CH_2SMe	OMe	SO_2Me
4-185	CH_2OMe	OMe	SO_2Me
4-186	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OEt$	SO_2Me
4-187	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OEt$	SO_2Me
4-188	$CH_2O(CH_2)_3OMe$	OMe	SO_2Me
4-189	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OMe$	SO_2Me
4-190	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OMe$	SO_2Me
4-191	Et	SMe	Cl
4-192	Et	SO_2Me	Cl
4-193	Et	SMe	CF_3
4-194	Et	SO_2Me	CF_3
4-195	Et	F	SO_2Me
4-196	Et	$NH(CH_2)_2OMe$	SO_2Me
4-197	iPr	SMe	CF_3
4-198	iPr	SO_2Me	CF_3
4-199	cPr	SO_2Me	CF_3
4-200	CF_3	$O(CH_2)_2OMe$	F
4-201	CF_3	$O(CH_2)_3OMe$	F
4-202	CF_3	OCH_2CONMe_2	F
4-203	CF_3	[1,4]dioxan-2-yl-methoxy	F
4-204	CF_3	$O(CH_2)_2OMe$	Cl
4-205	CF_3	$O(CH_2)_3OMe$	Cl
4-206	CF_3	OCH_2CONMe_2	Cl
4-207	CF_3	[1,4]dioxan-2-yl-methoxy	Cl
4-208	CF_3	$O(CH_2)_2OMe$	Br
4-209	CF_3	$O(CH_2)_2OMe$	Br
4-210	CF_3	$O(CH_2)_3OMe$	Br
4-211	CF_3	OCH_2CONMe_2	Br
4-212	CF_3	[1,4]dioxan-2-yl-methoxy	Br
4-213	CF_3	$O(CH_2)_2OMe$	I
4-214	CF_3	$O(CH_2)_3OMe$	I
4-215	CF_3	OCH_2CONMe_2	I
4-216	CF_3	[1,4]dioxan-2-yl-methoxy	I
4-217	CF_3	F	SO_2Me
4-218	CF_3	F	SO_2Et
4-219	CF_3	$O(CH_2)_2OMe$	SO_2Me
4-220	CF_3	$O(CH_2)_2OMe$	SO_2Et

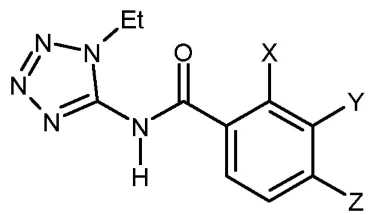
No.	X	Y	Z
4-221	CF_3	$O(CH_2)_3OMe$	SO_2Me
4-222	CF_3	$O(CH_2)_3OMe$	SO_2Et
4-223	CF_3	OCH_2CONMe_2	SO_2Me
4-224	CF_3	OCH_2CONMe_2	SO_2Et
4-225	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Me
4-226	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Et
4-227	F	SMe	CF_3
4-228	F	SOMe	CF_3
4-229	Cl	SMe	H
4-230	Cl	SOMe	H
4-231	Cl	SO_2Me	H
4-232	Cl	SEt	H
4-233	Cl	SOEt	H
4-234	Cl	SO_2Et	H
4-235	Cl	$S(CH_2)_2OMe$	H
4-236	Cl	$SO(CH_2)_2OMe$	H
4-237	Cl	$SO_2(CH_2)_2OMe$	H
4-238	Cl	Me	Cl
4-239	Cl	Cl	Cl
4-240	Cl	OCH_2CHCH_2	Cl
4-241	Cl	OCH_2CHF_2	Cl
4-242	Cl	$O(CH_2)_2OMe$	Cl
4-243	Cl	$OCH_2(CO)NMe_2$	Cl
4-244	Cl	$O(CH_2)$-5-pyrrolidin-2-on	Cl
4-245	Cl	SMe	Cl
4-246	Cl	SOMe	Cl
4-247	Cl	SO_2Me	Cl
4-248	Cl	F	SMe
4-249	Cl	Cl	SO_2Me
4-250	Cl	COOMe	SO_2Me
4-251	Cl	$CONMe_2$	SO_2Me
4-252	Cl	CONMe(OMe)	SO_2Me
4-253	Cl	CH_2OMe	SO_2Me
4-254	Cl	CH_2OMe	SO_2Et
4-255	Cl	CH_2OEt	SO_2Me
4-256	Cl	CH_2OEt	SO_2Et
4-257	Cl	CH_2OiPr	SO_2Me
4-258	Cl	$CH_2OcPentyl$	SO_2Me
4-259	Cl	$CH_2OCH_2CHF_2$	SO_2Me

No.	X	Y	Z
4-260	Cl	$CH_2OCH_2CF_3$	SO_2Me
4-261	Cl	$CH_2OCH_2CF_3$	SO_2Et
4-262	Cl	$CH_2OCH_2CF_2CHF_2$	SO_2Me
4-263	Cl	$CH_2PO_3Me_2$	SO_2Me
4-264	Cl	4,5-dihydro-1,2-oxazol-3 y	SMe
4-265	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
4-266	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
4-267	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
4-268	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
4-269	Cl	CH_2O-tetrahydro-furan-3-yl	SO_2Me
4-270	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Et
4-271	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Me
4-272	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Et
4-273	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Me
4-274	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Et
4-275	Cl	pyrazol-1-yl	SO_2Me
4-276	Cl	OMe	SO_2Me
4-277	Cl	OMe	SO_2Et
4-278	Cl	OEt	SO_2Me
4-279	Cl	OEt	SO_2Et
4-280	Cl	OiPr	SO_2Me
4-281	Cl	OiPr	SO_2Et
4-282	Cl	$O(CH_2)_2OMe$	SO_2Me
4-283	Cl	$O(CH_2)_2OMe$	SO_2Et
4-284	Cl	$O(CH_2)_3OMe$	SO_2Me
4-285	Cl	$O(CH_2)_3OMe$	SO_2Et
4-286	Cl	$O(CH_2)_4OMe$	SO_2Me
4-287	Cl	$O(CH_2)_4OMe$	SO_2Et
4-288	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Me
4-289	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Et
4-290	Cl	$OCH_2(CO)NMe_2$	SO_2Me
4-291	Cl	$OCH_2(CO)NMe_2$	SO_2Et
4-292	Cl	SMe	SO_2Me
4-293	Cl	SOMe	SO_2Me
4-294	Br	OMe	Br

No.	X	Y	Z
4-295	Br	$O(CH_2)_2OMe$	Br
4-296	Br	$O(CH_2)_2OMe$	SO_2Me
4-297	Br	$O(CH_2)_2OMe$	SO_2Et
4-298	Br	$O(CH_2)_3OMe$	SO_2Me
4-299	Br	$O(CH_2)_3OMe$	SO_2Et
4-300	Br	$O(CH_2)_4OMe$	SO_2Me
4-301	Br	$O(CH_2)_4OMe$	SO_2Et
4-302	Br	[1,4]dioxan-2-yl-methoxy	SO_2Me
4-303	Br	[1,4]dioxan-2-yl-methoxy	SO_2Et
4-304	I	$O(CH_2)_2OMe$	SO_2Me
4-305	I	$O(CH_2)_2OMe$	SO_2Et
4-306	I	$O(CH_2)_3OMe$	SO_2Me
4-307	I	$O(CH_2)_3OMe$	SO_2Et
4-308	I	$O(CH_2)_4OMe$	SO_2Me
4-309	I	$O(CH_2)_4OMe$	SO_2Et
4-310	I	[1,4]dioxan-2-yl-methoxy	SO_2Me
4-311	I	[1,4]dioxan-2-yl-methoxy	SO_2Et
4-312	OMe	SMe	CF_3
4-313	OMe	SOMe	CF_3
4-314	OMe	SO_2Me	CF_3
4-315	OMe	SEt	CF_3
4-316	OMe	SOEt	CF_3
4-317	OMe	SO_2Et	CF_3
4-318	OMe	$S(CH_2)_2OMe$	CF_3
4-319	OMe	$SO(CH_2)_2OMe$	CF_3
4-320	OMe	$SO_2(CH_2)_2OMe$	CF_3
4-321	OMe	SMe	Cl
4-322	OMe	SOMe	Cl
4-323	OMe	SO_2Me	Cl
4-324	OMe	SEt	Cl
4-325	OMe	SOEt	Cl
4-326	OMe	SO_2Et	Cl
4-327	OMe	$S(CH_2)_2OMe$	Cl
4-328	OMe	$SO(CH_2)_2OMe$	Cl
4-329	OMe	$SO_2(CH_2)_2OMe$	Cl
4-330	OCH_2c-Pr	SMe	CF_3
4-331	OCH_2c-Pr	SOMe	CF_3
4-332	OCH_2c-Pr	SO_2Me	CF_3
4-333	OCH_2c-Pr	SEt	CF_3

No.	X	Y	Z
4-334	OCH_2c-Pr	SOEt	CF_3
4-335	OCH_2c-Pr	SO_2Et	CF_3
4-336	OCH_2c-Pr	$S(CH_2)_2OMe$	CF_3
4-337	OCH_2c-Pr	$SO(CH_2)_2OMe$	CF_3
4-338	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	CF_3
4-339	OCH_2c-Pr	SMe	Cl
4-340	OCH_2c-Pr	SOMe	Cl
4-341	OCH_2c-Pr	SO_2Me	Cl
4-342	OCH_2c-Pr	SEt	Cl
4-343	OCH_2c-Pr	SOEt	Cl
4-344	OCH_2c-Pr	SO_2Et	Cl
4-345	OCH_2c-Pr	$S(CH_2)_2OMe$	Cl
4-346	OCH_2c-Pr	$SO(CH_2)_2OMe$	Cl
4-347	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	Cl
4-348	OCH_2c-Pr	SMe	SO_2Me
4-349	OCH_2c-Pr	SOMe	SO_2Me
4-350	OCH_2c-Pr	SO_2Me	SO_2Me
4-351	OCH_2c-Pr	SEt	SO_2Me
4-352	OCH_2c-Pr	SOEt	SO_2Me
4-353	OCH_2c-Pr	SO_2Et	SO_2Me
4-354	OCH_2c-Pr	$S(CH_2)_2OMe$	SO_2Me
4-355	OCH_2c-Pr	$SO(CH_2)_2OMe$	SO_2Me
4-356	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	SO_2Me
4-357	SO_2Me	F	CF_3
4-358	SO_2Me	NH_2	CF_3
4-359	SO_2Me	NHEt	Cl
4-360	SMe	SEt	F
4-361	SMe	SMe	F

Table 5: Compounds of the general formula (I) according to the invention in which A is CY, B is N and R is ethyl



No.	X	Y	Z
5-1	F	H	Cl
5-2	F	H	Br
5-3	F	H	SO_2Me
5-4	F	H	SO_2Et
5-5	F	H	CF_3
5-6	F	H	NO_2
5-7	Cl	H	F
5-8	Cl	H	Cl
5-9	Cl	H	Br
5-10	Cl	H	SMe
5-11	Cl	H	SOMe
5-12	Cl	H	SO_2Me
5-13	Cl	H	SO_2CH_2Cl
5-14	Cl	H	SEt
5-15	Cl	H	SO_2Et
5-16	Cl	H	CF_3
5-17	Cl	H	NO_2
5-18	Cl	H	pyrazol-1-yl
5-19	Cl	H	1H-1,2,4-triazol-1-yl
5-20	Br	H	Cl
5-21	Br	H	Br
5-22	Br	H	SO_2Me
5-23	Br	H	SO_2Et
5-24	Br	H	CF_3
5-25	SO_2Me	H	Cl
5-26	SO_2Me	H	Br
5-27	SO_2Me	H	SMe
5-28	SO_2Me	H	SOMe
5-29	SO_2Me	H	SO_2Me
5-30	SO_2Me	H	SO_2Et

No.	X	Y	Z
5-31	SO_2Me	H	CF_3
5-32	SO_2Et	H	Cl
5-33	SO_2Et	H	Br
5-34	SO_2Et	H	SMe
5-35	SO_2Et	H	SOMe
5-36	SO_2Et	H	SO_2Me
5-37	SO_2Et	H	CF_3
5-38	NO_2	H	F
5-39	NO_2	H	Cl
5-40	NO_2	H	Br
5-41	NO_2	H	I
5-42	NO_2	H	CN
5-43	NO_2	H	SO_2Me
5-44	NO_2	H	SO_2Et
5-45	NO_2	H	CF_3
5-46	Me	H	Cl
5-47	Me	H	Br
5-48	Me	H	SMe
5-49	Me	H	SO_2Me
5-50	Me	H	SO_2CH_2Cl
5-51	Me	H	SEt
5-52	Me	H	SO_2Et
5-53	Me	H	CF_3
5-54	CH_2SO_2Me	H	CF_3
5-55	Et	H	Cl
5-56	Et	H	Br
5-57	Et	H	SMe
5-58	Et	H	SO_2Me
5-59	Et	H	SO_2CH_2Cl
5-60	Et	H	SEt
5-61	Et	H	SO_2Et
5-62	Et	H	CF_3
5-63	CF_3	H	Cl
5-64	CF_3	H	Br
5-65	CF_3	H	SO_2Me
5-66	CF_3	H	SO_2Et
5-67	CF_3	H	CF_3
5-68	NO_2	NH_2	F
5-69	NO_2	NHMe	F

No.	X	Y	Z
5-70	NO_2	NMe_2	F
5-71	NO_2	Me	Cl
5-72	NO_2	NH_2	Cl
5-73	NO_2	NHMe	Cl
5-74	NO_2	NMe_2	Cl
5-75	NO_2	NH_2	Br
5-76	NO_2	NHMe	Br
5-77	NO_2	NMe_2	Br
5-78	NO_2	NH_2	CF_3
5-79	NO_2	NMe_2	CF_3
5-80	NO_2	NH_2	SO_2Me
5-81	NO_2	NH_2	SO_2Et
5-82	NO_2	NHMe	SO_2Me
5-83	NO_2	NMe_2	SO_2Me
5-84	NO_2	NMe_2	SO_2Et
5-85	NO_2	NH_2	1H-1,2,4-triazol-1-yl
5-86	NO_2	NHMe	1H-1,2,4-triazol-1-yl
5-87	NO_2	NMe_2	1H-1,2,4-triazol-1-yl
5-88	Me	SMe	H
5-89	Me	SOMe	H
5-90	Me	SO_2Me	H
5-91	Me	SEt	H
5-92	Me	SOEt	H
5-93	Me	SO_2Et	H
5-94	Me	$S(CH_2)_2OMe$	H
5-95	Me	$SO(CH_2)_2OMe$	H
5-96	Me	$SO_2(CH_2)_2OMe$	H
5-97	Me	F	F
5-98	Me	F	Cl
5-99	Me	SEt	F
5-100	Me	SOEt	F
5-101	Me	SO_2Et	F
5-102	Me	Me	Cl
5-103	Me	F	Cl
5-104	Me	Cl	Cl
5-105	Me	NH_2	Cl
5-106	Me	NHMe	Cl
5-107	Me	NMe_2	Cl
5-108	Me	$O(CH_2)_2OMe$	Cl

No.	X	Y	Z
5-109	Me	$O(CH_2)_3OMe$	Cl
5-110	Me	$O(CH_2)_4OMe$	Cl
5-111	Me	OCH_2CONMe_2	Cl
5-112	Me	$O(CH_2)_2$-CO-NMe_2	Cl
5-113	Me	$O(CH_2)_2$-NH(CO)NMe_2	Cl
5-114	Me	$O(CH_2)_2$-NH(CO)$NHCO_2Et$	Cl
5-115	Me	$O(CH_2)_2$-$NHCO_2Me$	Cl
5-116	Me	O-CH_2-$NHSO_2cPr$	Cl
5-117	Me	$O(CH_2)$ -5-2,4-dimethyl-2,4-dihydro-3H-1,2,4-triazol-3-on	Cl
5-118	Me	$O(CH_2)$-3,5-dime-thyl-1,2-oxazol-4-yl	Cl
5-119	Me	SMe	Cl
5-120	Me	SOMe	Cl
5-121	Me	SO_2Me	Cl
5-122	Me	SEt	Cl
5-123	Me	SOEt	Cl
5-124	Me	SO_2Et	Cl
5-125	Me	$S(CH_2)_2OMe$	Cl
5-126	Me	$SO(CH_2)_2OMe$	Cl
5-127	Me	$SO_2(CH_2)_2OMe$	Cl
5-128	Me	NH_2	Br
5-129	Me	NHMe	Br
5-130	Me	NMe_2	Br
5-131	Me	$OCH_2(CO)NMe_2$	Br
5-132	Me	$O(CH_2)$-5-pyrrolidin-2-on	Br
5-133	Me	SMe	Br
5-134	Me	SOMe	Br
5-135	Me	SO_2Me	Br
5-136	Me	SEt	Br
5-137	Me	SOEt	Br
5-138	Me	SO_2Et	Br
5-139	Me	SMe	I
5-140	Me	SOMe	I
5-141	Me	SO_2Me	I
5-142	Me	SEt	I
5-143	Me	SOEt	I
5-144	Me	SO_2Et	I
5-145	Me	Cl	CF_3
5-146	Me	SMe	CF_3

No.	X	Y	Z
5-147	Me	SOMe	CF_3
5-148	Me	SO_2Me	CF_3
5-149	Me	SEt	CF_3
5-150	Me	SOEt	CF_3
5-151	Me	SO_2Et	CF_3
5-152	Me	$S(CH_2)_2OMe$	CF_3
5-153	Me	$SO(CH_2)_2OMe$	CF_3
5-154	Me	$SO_2(CH_2)_2OMe$	CF_3
5-155	Me	Me	SO_2Me
5-156	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
5-157	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
5-158	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Me
5-159	Me	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3-yl	SO_2Et
5-160	Me	NH_2	SO_2Me
5-161	Me	NHMe	SO_2Me
5-162	Me	NMe_2	SO_2Me
5-163	Me	$NH(CH_2)_2OMe$	SO_2Me
5-164	Me	pyrazol-1-yl	SO_2Me
5-165	Me	OH	SO_2Me
5-166	Me	OMe	SO_2Me
5-167	Me	OMe	SO_2Et
5-168	Me	OEt	SO_2Me
5-169	Me	OEt	SO_2Et
5-170	Me	OiPr	SO_2Me
5-171	Me	OiPr	SO_2Et
5-172	Me	$O(CH_2)_2OMe$	SO_2Me
5-173	Me	$O(CH_2)_2OMe$	SO_2Et
5-174	Me	$O(CH_2)_3OMe$	SO_2Me
5-175	Me	$O(CH_2)_3OMe$	SO_2Et
5-176	Me	$O(CH_2)_4OMe$	SO_2Me
5-177	Me	$O(CH_2)_4OMe$	SO_2Et
5-178	Me	$O(CH_2)_2NHSO2Me$	SO_2Me
5-179	Me	$O(CH_2)_2NHSO2Me$	SO_2Et
5-180	Me	$OCH_2(CO)NMe_2$	SO_2Me
5-181	Me	$OCH_2(CO)NMe_2$	SO_2Et
5-182	Me	[1,4]dioxan-2-yl-methoxy	SO_2Me
5-183	Me	[1,4]dioxan-2-yl-methoxy	SO_2Et

No.	X	Y	Z
5-184	Me	$O(CH_2)_2$-O(3,5-dimethoxypyrimidin-2-yl	SO_2Me
5-185	Me	Cl	SO_2Me
5-186	Me	SMe	SO_2Me
5-187	Me	SOMe	SO_2Me
5-188	Me	SO_2Me	SO_2Me
5-189	Me	SO_2Me	SO_2Et
5-190	Me	SEt	SO_2Me
5-191	Me	SOEt	SO_2Me
5-192	Me	SO_2Et	SO_2Me
5-193	Me	$S(CH_2)_2OMe$	SO_2Me
5-194	Me	$SO(CH_2)_2OMe$	SO_2Me
5-195	Me	$SO_2(CH_2)_2OMe$	SO2Me
5-196	CH_2SMe	OMe	SO_2Me
5-197	CH_2OMe	OMe	SO_2Me
5-198	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OEt$	SO_2Me
5-199	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OEt$	SO_2Me
5-200	$CH_2O(CH_2)_3OMe$	OMe	SO_2Me
5-201	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OMe$	SO_2Me
5-202	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OMe$	SO_2Me
5-203	Et	SMe	Cl
5-204	Et	SO_2Me	Cl
5-205	Et	SMe	CF_3
5-206	Et	SO_2Me	CF_3
5-207	Et	F	SO_2Me
5-208	Et	$NH(CH_2)_2OMe$	SO_2Me
5-209	iPr	SO_2Me	CF_3
5-210	cPr	SO_2Me	CF_3
5-211	CF_3	$O(CH_2)_2OMe$	F
5-212	CF_3	$O(CH_2)_3OMe$	F
5-213	CF_3	OCH_2CONMe_2	F
5-214	CF_3	[1,4]dioxan-2-yl-methoxy	F
5-215	CF_3	$O(CH_2)_2OMe$	Cl
5-216	CF_3	$O(CH_2)_3OMe$	Cl
5-217	CF_3	OCH_2CONMe_2	Cl
5-218	CF_3	[1,4]dioxan-2-yl-methoxy	Cl
5-219	CF_3	$O(CH_2)_2OMe$	Br
5-220	CF_3	$O(CH_2)_3OMe$	Br
5-221	CF_3	OCH_2CONMe_2	Br

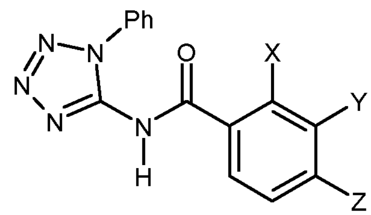
No.	X	Y	Z
5-222	CF_3	[1,4]dioxan-2-yl-methoxy	Br
5-223	CF_3	$O(CH_2)_2OMe$	I
5-224	CF_3	$O(CH_2)_3OMe$	I
5-225	CF_3	OCH_2CONMe_2	I
5-226	CF_3	[1,4]dioxan-2-yl-methoxy	I
5-227	CF_3	F	SO_2Me
5-228	CF_3	F	SO_2Et
5-229	CF_3	$O(CH_2)_2OMe$	SO_2Me
5-230	CF_3	$O(CH_2)_2OMe$	SO_2Et
5-231	CF_3	$O(CH_2)_3OMe$	SO_2Me
5-232	CF_3	$O(CH_2)_3OMe$	SO_2Et
5-233	CF_3	OCH_2CONMe_2	SO_2Me
5-234	CF_3	OCH_2CONMe_2	SO_2Et
5-235	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Me
5-236	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Et
5-237	F	SMe	CF_3
5-238	F	SOMe	CF_3
5-239	Cl	Me	Cl
5-240	Cl	OCH_2CHCH_2	Cl
5-241	Cl	OCH_2CHF_2	Cl
5-242	Cl	$O(CH_2)_2OMe$	Cl
5-243	Cl	$OCH_2(CO)NMe_2$	Cl
5-244	Cl	$O(CH_2)$-5-pyrrolidin-2-on	Cl
5-245	Cl	SMe	Cl
5-246	Cl	SOMe	Cl
5-247	Cl	SO_2Me	Cl
5-248	Cl	F	SMe
5-249	Cl	Cl	SO_2Me
5-250	Cl	COOMe	SO_2Me
5-251	Cl	$CONMe_2$	SO_2Me
5-252	Cl	CONMe(OMe)	SO_2Me
5-253	Cl	CH_2OMe	SO_2Me
5-254	Cl	CH_2OMe	SO_2Et
5-255	Cl	CH_2OEt	SO_2Me
5-256	Cl	CH_2OEt	SO_2Et
5-257	Cl	$CH_2OCH_2CHF_2$	SO_2Me
5-258	Cl	$CH_2OCH_2CF_3$	SO_2Me
5-259	Cl	$CH_2OCH_2CF_3$	SO_2Et
5-260	Cl	$CH_2OCH_2CF_2CHF_2$	SO_2Me

No.	X	Y	Z
5-261	Cl	CH_2OcPentyl	SO_2Me
5-262	Cl	$CH_2PO(OMe)_2$	SO_2Me
5-263	Cl	4,5-dihydro-1,2-oxazol-3 yl	SMe
5-264	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
5-265	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
5-266	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
5-267	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
5-268	Cl	5-(Methoxyme-thyl)-4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
5-269	Cl	5-(Methoxyme-thyl)-5-Methyl-4,5-dihy-dro-1,2-oxazol-3 yl	SO_2Et
5-270	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Me
5-271	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Et
5-272	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Me
5-273	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Et
5-274	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Me
5-275	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Et
5-276	Cl	OMe	SO_2Me
5-277	Cl	OMe	SO_2Et
5-278	Cl	OEt	SO_2Me
5-279	Cl	OEt	SO_2Et
5-280	Cl	OiPr	SO_2Me
5-281	Cl	OiPr	SO_2Et
5-282	Cl	$O(CH_2)_2OMe$	SO_2Me
5-283	Cl	$O(CH_2)_4OMe$	SO_2Me
5-284	Cl	$O(CH_2)_4OMe$	SO_2Et
5-285	Cl	$O(CH_2)_3OMe$	SO_2Me
5-286	Cl	$O(CH_2)_3OMe$	SO_2Et
5-287	Cl	$O(CH_2)_2OMe$	SO_2Me
5-288	Cl	$O(CH_2)_2OMe$	SO_2Et
5-289	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Me
5-290	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Et
5-291	Cl	$OCH_2(CO)NMe_2$	SO_2Me
5-292	Cl	$OCH_2(CO)NMe_2$	SO_2Et
5-293	Cl	SMe	SO_2Me

No.	X	Y	Z
5-294	Cl	SOMe	SO_2Me
5-295	Br	OMe	Br
5-296	Br	$O(CH_2)_2OMe$	Br
5-297	Br	$O(CH_2)_2OMe$	SO_2Me
5-298	Br	$O(CH_2)_2OMe$	SO_2Et
5-299	Br	$O(CH_2)_3OMe$	SO_2Me
5-300	Br	$O(CH_2)_3OMe$	SO_2Et
5-301	Br	$O(CH_2)_4OMe$	SO_2Me
5-302	Br	$O(CH_2)_4OMe$	SO_2Et
5-303	Br	[1,4]dioxan-2-yl-methoxy	SO_2Me
5-304	Br	[1,4]dioxan-2-yl-methoxy	SO_2Et
5-305	I	$O(CH_2)_2OMe$	SO_2Me
5-306	I	$O(CH_2)_2OMe$	SO_2Et
5-307	I	$O(CH_2)_3OMe$	SO_2Me
5-308	I	$O(CH_2)_3OMe$	SO_2Et
5-309	I	$O(CH_2)_4OMe$	SO_2Me
5-310	I	$O(CH_2)_4OMe$	SO_2Et
5-311	I	[1,4]dioxan-2-yl-methoxy	SO_2Me
5-312	I	[1,4]dioxan-2-yl-methoxy	SO_2Et
5-313	OMe	SMe	CF_3
5-314	OMe	SOMe	CF_3
5-315	OMe	SO_2Me	CF_3
5-316	OMe	SOEt	CF_3
5-317	OMe	SO_2Et	CF_3
5-318	OMe	$S(CH_2)_2OMe$	CF_3
5-319	OMe	$SO(CH_2)_2OMe$	CF_3
5-320	OMe	$SO_2(CH_2)_2OMe$	CF_3
5-321	OMe	SMe	Cl
5-322	OMe	SOMe	Cl
5-323	OMe	SO_2Me	Cl
5-324	OMe	SEt	Cl
5-325	OMe	SOEt	Cl
5-326	OMe	SO2Et	Cl
5-327	OMe	$S(CH_2)_2OMe$	Cl
5-328	OMe	$SO(CH_2)_2OMe$	Cl
5-329	OMe	$SO_2(CH_2)_2OMe$	Cl
5-330	OCH_2c-Pr	SMe	CF_3
5-331	OCH_2c-Pr	SOMe	CF_3
5-332	OCH_2c-Pr	SO_2Me	CF_3

No.	X	Y	Z
5-333	OCH_2c-Pr	SEt	CF_3
5-334	OCH_2c-Pr	SOEt	CF_3
5-335	OCH_2c-Pr	SO_2Et	CF_3
5-336	OCH_2c-Pr	$S(CH_2)_2OMe$	CF_3
5-337	OCH_2c-Pr	$SO(CH_2)_2OMe$	CF_3
5-338	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	CF_3
5-339	OCH_2c-Pr	SMe	Cl
5-340	OCH_2c-Pr	SOMe	Cl
5-341	OCH_2c-Pr	SO_2Me	Cl
5-342	OCH_2c-Pr	SEt	Cl
5-343	OCH_2c-Pr	SOEt	Cl
5-344	OCH_2c-Pr	SO_2Et	Cl
5-345	OCH_2c-Pr	$S(CH_2)_2OMe$	Cl
5-346	OCH_2c-Pr	$SO(CH_2)_2OMe$	Cl
5-347	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	Cl
5-348	OCH_2c-Pr	SMe	SO_2Me
5-349	OCH_2c-Pr	SOMe	SO_2Me
5-350	OCH_2c-Pr	SO_2Me	SO_2Me
5-351	OCH_2c-Pr	SEt	SO_2Me
5-352	OCH_2c-Pr	SOEt	SO_2Me
5-353	OCH_2c-Pr	SO_2Et	SO_2Me
5-354	OCH_2c-Pr	$S(CH_2)_2OMe$	SO_2Me
5-355	OCH_2c-Pr	$SO(CH_2)_2OMe$	SO_2Me
5-356	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	SO_2Me
5-357	SO_2Me	F	CF_3
5-358	SO_2Me	NH_2	CF_3
5-359	SO_2Me	NHEt	Cl
5-360	SMe	SEt	F
5-361	SMe	SMe	F

Table 6: Compounds of the general formula (I) according to the invention in which A is CY, B is N and R is phenyl



No.	X	Y	Z
6-1	F	H	Cl
6-2	F	H	Br
6-3	F	H	SO_2Me
6-4	F	H	SO_2Et
6-5	F	H	CF_3
6-6	F	H	NO_2
6-7	Cl	H	F
6-8	Cl	H	Cl
6-9	Cl	H	Br
6-10	Cl	H	SMe
6-11	Cl	H	SOMe
6-12	Cl	H	SO_2Me
6-13	Cl	H	SO_2CH_2Cl
6-14	Cl	H	SEt
6-15	Cl	H	SO_2Et
6-16	Cl	H	CF_3
6-17	Cl	H	NO_2
6-18	Cl	H	pyrazol-1-yl
6-19	Cl	H	1H-1,2,4-triazol-1-yl
6-20	Br	H	Cl
6-21	Br	H	Br
6-22	Br	H	SO_2Me
6-23	Br	H	SO_2Et
6-24	Br	H	CF_3
6-25	SO_2Me	H	Cl
6-26	SO_2Me	H	Br
6-27	SO_2Me	H	SMe
6-28	SO_2Me	H	SOMe
6-29	SO_2Me	H	SO_2Me
6-30	SO_2Me	H	SO_2Et

No.	X	Y	Z
6-31	SMe	H	CF_3
6-32	SO_2Me	H	CF_3
6-33	SO_2Et	H	Cl
6-34	SO_2Et	H	Br
6-35	SO_2Et	H	SMe
6-36	SO_2Et	H	SOMe
6-37	SO_2Et	H	SO_2Me
6-38	SO_2Et	H	CF_3
6-39	NO_2	H	F
6-40	NO_2	H	Cl
6-41	NO_2	H	Br
6-42	NO_2	H	I
6-43	NO_2	H	CN
6-44	NO_2	H	SO_2Me
6-45	NO_2	H	SO_2Et
6-46	NO_2	H	CF_3
6-47	Me	H	Cl
6-48	Me	H	Br
6-49	Me	H	SMe
6-50	Me	H	SO_2Me
6-51	Me	H	SO_2CH_2Cl
6-52	Me	H	SEt
6-53	Me	H	SO_2Et
6-54	Me	H	CF_3
6-55	CH_2SO_2Me	H	CF_3
6-56	Et	H	Cl
6-57	Et	H	Br
6-58	Et	H	SMe
6-59	Et	H	SO_2Me
6-60	Et	H	SO_2CH_2Cl
6-61	Et	H	SEt
6-62	Et	H	SO_2Et
6-63	Et	H	CF_3
6-64	CF_3	H	Cl
6-65	CF_3	H	Br
6-66	CF_3	H	SO_2Me
6-67	CF_3	H	SO_2Et
6-68	CF_3	H	CF_3
6-69	NO_2	NH_2	F

No.	X	Y	Z
6-70	NO_2	NHMe	F
6-71	NO_2	NMe_2	F
6-72	NO_2	Me	Cl
6-73	NO_2	NH_2	Cl
6-74	NO_2	NHMe	Cl
6-75	NO_2	NMe_2	Cl
6-76	NO_2	NH_2	Br
6-77	NO_2	NHMe	Br
6-78	NO_2	NMe_2	Br
6-79	NO_2	NH_2	CF_3
6-80	NO_2	NMe_2	CF_3
6-81	NO_2	NH_2	SO_2Me
6-82	NO_2	NH_2	SO_2Et
6-83	NO_2	NHMe	SO_2Me
6-84	NO_2	NMe_2	SO_2Me
6-85	NO_2	NMe_2	SO_2Et
6-86	NO_2	NH_2	1H-1,2,4-triazol-1-yl
6-87	NO_2	NHMe	1H-1,2,4-triazol-1-yl
6-88	NO_2	NMe_2	1H-1,2,4-triazol-1-yl
6-89	Me	SMe	H
6-90	Me	SOMe	H
6-91	Me	SO_2Me	H
6-92	Me	SEt	H
6-93	Me	SOEt	H
6-94	Me	SO_2Et	H
6-95	Me	$S(CH_2)_2OMe$	H
6-96	Me	$SO(CH_2)_2OMe$	H
6-97	Me	$SO_2(CH_2)_2OMe$	H
6-98	Me	F	F
6-99	Me	F	Cl
6-100	Me	SEt	F
6-101	Me	SOEt	F
6-102	Me	SO_2Et	F
6-103	Me	Me	Cl
6-104	Me	F	Cl
6-105	Me	Cl	Cl
6-106	Me	NH_2	Cl
6-107	Me	NHMe	Cl
6-108	Me	NMe_2	Cl

No.	X	Y	Z
6-109	Me	$O(CH_2)_2OMe$	Cl
6-110	Me	$O(CH_2)_3OMe$	Cl
6-111	Me	$O(CH_2)_4OMe$	Cl
6-112	Me	OCH_2CONMe_2	Cl
6-113	Me	$O(CH_2)_2$-CO-NMe_2	Cl
6-114	Me	$O(CH_2)_2$-NH(CO)NMe_2	Cl
6-115	Me	$O(CH_2)_2$-NH(CO)$NHCO_2Et$	Cl
6-116	Me	$O(CH_2)_2$-$NHCO_2Me$	Cl
6-117	Me	O-CH_2-$NHSO_2$cPr	Cl
6-118	Me	$O(CH_2)$ -5-2,4-dime-thyl-2,4-dihydro-3H-1,2,4-triazol-3-on	Cl
6-119	Me	$O(CH_2)$-3,5-dime-thyl-1,2-oxazol-4-yl	Cl
6-120	Me	SMe	Cl
6-121	Me	SOMe	Cl
6-122	Me	SO_2Me	Cl
6-123	Me	SEt	Cl
6-124	Me	SOEt	Cl
6-125	Me	SO_2Et	Cl
6-126	Me	$S(CH_2)_2OMe$	Cl
6-127	Me	$SO(CH_2)_2OMe$	Cl
6-128	Me	$SO_2(CH_2)_2OMe$	Cl
6-129	Me	NH_2	Br
6-130	Me	NHMe	Br
6-131	Me	NMe_2	Br
6-132	Me	$O(CH_2)$- (CO)NEt_2	Br
6-133	Me	$O(CH_2)$-5-pyrrolidin-2-on	Br
6-134	Me	SMe	Br
6-135	Me	SOMe	Br
6-136	Me	SO_2Me	Br
6-137	Me	SEt	Br
6-138	Me	SOEt	Br
6-139	Me	SO_2Et	Br
6-140	Me	SMe	I
6-141	Me	SOMe	I
6-142	Me	SO_2Me	I
6-143	Me	SEt	I
6-144	Me	SOEt	I
6-145	Me	SO_2Et	I
6-146	Me	Cl	CF_3

No.	X	Y	Z
6-147	Me	SMe	CF_3
6-148	Me	SOMe	CF_3
6-149	Me	SO_2Me	CF_3
6-150	Me	SEt	CF_3
6-151	Me	SOEt	CF_3
6-152	Me	SO_2Et	CF_3
6-153	Me	$S(CH_2)_2OMe$	CF_3
6-154	Me	$SO(CH_2)_2OMe$	CF_3
6-155	Me	$SO_2(CH_2)_2OMe$	CF_3
6-156	Me	Me	SO_2Me
6-157	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
6-158	Me	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
6-159	Me	5-cyanomethyl-4,5-dihydro-1,2-oxazol-3-yl	SO_2Me
6-160	Me	5-cyanomethyl-4,5-dihydro-1,2-oxazol-3-yl	SO_2Et
6-161	Me	NH_2	SO_2Me
6-162	Me	NHMe	SO_2Me
6-163	Me	NMe_2	SO_2Me
6-164	Me	$NH(CH_2)_2OMe$	SO_2Me
6-165	Me	pyrazol-1-yl	SO_2Me
6-166	Me	OH	SO_2Me
6-167	Me	OMe	SO_2Me
6-168	Me	OMe	SO_2Et
6-169	Me	OEt	SO_2Me
6-170	Me	OEt	SO_2Et
6-171	Me	OiPr	SO_2Me
6-172	Me	OiPr	SO_2Et
6-173	Me	$O(CH_2)_2OMe$	SO_2Me
6-174	Me	$O(CH_2)_2OMe$	SO_2Et
6-175	Me	$O(CH_2)_3OMe$	SO_2Me
6-176	Me	$O(CH_2)_3OMe$	SO_2Et
6-177	Me	$O(CH_2)_4OMe$	SO_2Me
6-178	Me	$O(CH_2)_4OMe$	SO_2Et
6-179	Me	$O(CH_2)_2NHSO2Me$	SO_2Me
6-180	Me	$O(CH_2)_2NHSO2Me$	SO_2Et
6-181	Me	$OCH_2(CO)NMe_2$	SO_2Me
6-182	Me	$OCH_2(CO)NMe_2$	SO_2Et
6-183	Me	[1,4]dioxan-2-yl-methoxy	SO_2Me
6-184	Me	[1,4]dioxan-2-yl-methoxy	SO_2Et

No.	X	Y	Z
6-185	Me	$O(CH_2)_2$-O(3,5-dimethoxypyrimidin-2-yl)	SO_2Me
6-186	Me	Cl	SO_2Me
6-187	Me	SMe	SO_2Me
6-188	Me	SOMe	SO_2Me
6-189	Me	SO_2Me	SO_2Me
6-190	Me	SO_2Me	SO_2Et
6-191	Me	SEt	SO_2Me
6-192	Me	SOEt	SO_2Me
6-193	Me	SO_2Et	SO_2Me
6-194	Me	$S(CH_2)_2OMe$	SO_2Me
6-195	Me	$SO(CH_2)_2OMe$	SO_2Me
6-196	Me	$SO_2(CH_2)_2OMe$	SO2Me
6-197	CH_2SMe	OMe	SO_2Me
6-198	CH_2OMe	OMe	SO_2Me
6-199	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OEt$	SO_2Me
6-200	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OEt$	SO_2Me
6-201	$CH_2O(CH_2)_3OMe$	OMe	SO_2Me
6-202	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_2OMe$	SO_2Me
6-203	$CH_2O(CH_2)_2OMe$	$NH(CH_2)_3OMe$	SO_2Me
6-204	Et	SMe	Cl
6-205	Et	SO_2Me	Cl
6-206	Et	SMe	CF_3
6-207	Et	SO_2Me	CF_3
6-208	Et	F	SO_2Me
6-209	Et	$NH(CH_2)_2OMe$	SO_2Me
6-210	iPr	SO_2Me	CF_3
6-211	cPr	SO_2Me	CF_3
6-212	CF_3	$O(CH_2)_2OMe$	F
6-213	CF_3	$O(CH_2)_3OMe$	F
6-214	CF_3	OCH_2CONMe_2	F
6-215	CF_3	[1,4]dioxan-2-yl-methoxy	F
6-216	CF_3	$O(CH_2)_2OMe$	Cl
6-217	CF_3	$O(CH_2)_3OMe$	Cl
6-218	CF_3	OCH_2CONMe_2	Cl
6-219	CF_3	[1,4]dioxan-2-yl-methoxy	Cl
6-220	CF_3	$O(CH_2)_2OMe$	Br
6-221	CF_3	$O(CH_2)_3OMe$	Br
6-222	CF_3	OCH_2CONMe_2	Br

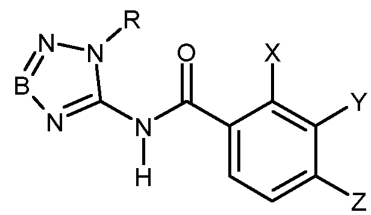
No.	X	Y	Z
6-223	CF_3	[1,4]dioxan-2-yl-methoxy	Br
6-224	CF_3	$O(CH_2)_2OMe$	I
6-225	CF_3	$O(CH_2)_3OMe$	I
6-226	CF_3	OCH_2CONMe_2	I
6-227	CF_3	[1,4]dioxan-2-yl-methoxy	I
6-228	CF_3	F	SO_2Me
6-229	CF_3	F	SO_2Et
6-230	CF_3	$O(CH_2)_2OMe$	SO_2Me
6-231	CF_3	$O(CH_2)_2OMe$	SO_2Et
6-232	CF_3	$O(CH_2)_3OMe$	SO_2Me
6-233	CF_3	$O(CH_2)_3OMe$	SO_2Et
6-234	CF_3	OCH_2CONMe_2	SO_2Me
6-235	CF_3	OCH_2CONMe_2	SO_2Et
6-236	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Me
6-237	CF_3	[1,4]dioxan-2-yl-methoxy	SO_2Et
6-238	F	SMe	CF_3
6-239	F	SOMe	CF_3
6-240	Cl	Me	Cl
6-241	Cl	OCH_2CHCH_2	Cl
6-242	Cl	OCH_2CHF_2	Cl
6-243	Cl	$O(CH_2)_2OMe$	Cl
6-244	Cl	$OCH_2(CO)NMe_2$	Cl
6-245	Cl	$O(CH_2)$-5-pyrrolidin-2-on	Cl
6-246	Cl	SMe	Cl
6-247	Cl	SOMe	Cl
6-248	Cl	SO_2Me	Cl
6-249	Cl	F	SMe
6-250	Cl	Cl	SO_2Me
6-251	Cl	COOMe	SO_2Me
6-252	Cl	$CONMe_2$	SO_2Me
6-253	Cl	CONMe(OMe)	SO_2Me
6-254	Cl	CH_2OMe	SO_2Me
6-255	Cl	CH_2OMe	SO_2Et
6-256	Cl	CH_2OEt	SO_2Me
6-257	Cl	CH_2OEt	SO_2Et
6-258	Cl	$CH_2OCH_2CHF_2$	SO_2Me
6-259	Cl	$CH_2OCH_2CF_3$	SO_2Me
6-260	Cl	$CH_2OCH_2CF_3$	SO_2Et
6-261	Cl	$CH_2OCH_2CF_2CHF_2$	SO_2Me

No.	X	Y	Z
6-262	Cl	CH_2OcPentyl	SO_2Me
6-263	Cl	$CH_2PO(OMe)_2$	SO_2Me
6-264	Cl	4,5-dihydro-1,2-oxazol-3 yl	SMe
6-265	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
6-266	Cl	4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
6-267	Cl	5-cyanomethyl-4,5-dihydro-1,2-oxazol-3 yl	SO_2Me
6-268	Cl	5-cyanomethyl- 4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
6-269	Cl	5-(Methoxymethyl)-4,5-dihydro-1,2-oxazol-3 yl	SO_2Et
6-270	Cl	5-(Methoxymethyl)-5-Methyl-4,5-dihy-dro-1,2-oxazol-3-yl	SO_2Et
6-271	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Me
6-272	Cl	CH_2O-tetrahydrofuran-3-yl	SO_2Et
6-273	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Me
6-274	Cl	CH_2OCH_2-tetrahydrofuran-2-yl	SO_2Et
6-275	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Me
6-276	Cl	CH_2OCH_2-tetrahydrofuran-3-yl	SO_2Et
6-277	Cl	OMe	SO_2Me
6-278	Cl	OMe	SO_2Et
6-279	Cl	OEt	SO_2Me
6-280	Cl	OEt	SO_2Et
6-281	Cl	OiPr	SO_2Me
6-282	Cl	OiPr	SO_2Et
6-283	Cl	$O(CH_2)_2OMe$	SO_2Me
6-284	Cl	$O(CH_2)_4OMe$	SO_2Me
6-285	Cl	$O(CH_2)_4OMe$	SO_2Et
6-286	Cl	$O(CH_2)_3OMe$	SO_2Me
6-287	Cl	$O(CH_2)_3OMe$	SO_2Et
6-288	Cl	$O(CH_2)_2OMe$	SO_2Me
6-289	Cl	$O(CH_2)_2OMe$	SO_2Et
6-290	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Me
6-291	Cl	[1,4]dioxan-2-yl-methoxy	SO_2Et
6-292	Cl	$OCH_2(CO)NMe_2$	SO_2Me
6-293	Cl	$OCH_2(CO)NMe_2$	SO_2Et
6-294	Cl	SMe	SO_2Me

No.	X	Y	Z
6-295	Cl	SOMe	SO_2Me
6-296	Br	OMe	Br
6-297	Br	$O(CH_2)_2OMe$	Br
6-298	Br	$O(CH_2)_2OMe$	SO_2Me
6-299	Br	$O(CH_2)_2OMe$	SO_2Et
6-300	Br	$O(CH_2)_3OMe$	SO_2Me
6-301	Br	$O(CH_2)_3OMe$	SO_2Et
6-302	Br	$O(CH_2)_4OMe$	SO_2Me
6-303	Br	$O(CH_2)_4OMe$	SO_2Et
6-304	Br	[1,4]dioxan-2-yl-methoxy	SO_2Me
6-305	Br	[1,4]dioxan-2-yl-methoxy	SO_2Et
6-306	I	$O(CH_2)_2OMe$	SO_2Me
6-307	I	$O(CH_2)_2OMe$	SO_2Et
6-308	I	$O(CH_2)_3OMe$	SO_2Me
6-309	I	$O(CH_2)_3OMe$	SO_2Et
6-310	I	$O(CH_2)_4OMe$	SO_2Me
6-311	I	$O(CH_2)_4OMe$	SO_2Et
6-312	I	[1,4]dioxan-2-yl-methoxy	SO_2Me
6-313	I	[1,4]dioxan-2-yl-methoxy	SO_2Et
6-314	OMe	SMe	CF_3
6-315	OMe	SOMe	CF_3
6-316	OMe	SO_2Me	CF_3
6-317	OMe	SOEt	CF_3
6-318	OMe	SO_2Et	CF_3
6-319	OMe	$S(CH_2)_2OMe$	CF_3
6-320	OMe	$SO(CH_2)_2OMe$	CF_3
6-321	OMe	$SO_2(CH_2)_2OMe$	CF_3
6-322	OMe	SMe	Cl
6-323	OMe	SOMe	Cl
6-324	OMe	SO_2Me	Cl
6-325	OMe	SEt	Cl
6-326	OMe	SOEt	Cl
6-327	OMe	SO2Et	Cl
6-328	OMe	$S(CH_2)_2OMe$	Cl
6-329	OMe	$SO(CH_2)_2OMe$	Cl
6-330	OMe	$SO_2(CH_2)_2OMe$	Cl
6-331	OCH_2c-Pr	SMe	CF_3
6-332	OCH_2c-Pr	SOMe	CF_3
6-333	OCH_2c-Pr	SO_2Me	CF_3

No.	X	Y	Z
6-334	OCH_2c-Pr	SEt	CF_3
6-335	OCH_2c-Pr	SOEt	CF_3
6-336	OCH_2c-Pr	SO_2Et	CF_3
6-337	OCH_2c-Pr	$S(CH_2)_2OMe$	CF_3
6-338	OCH_2c-Pr	$SO(CH_2)_2OMe$	CF_3
6-339	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	CF_3
6-340	OCH_2c-Pr	SMe	Cl
6-341	OCH_2c-Pr	SOMe	Cl
6-342	OCH_2c-Pr	SO_2Me	Cl
6-343	OCH_2c-Pr	SEt	Cl
6-344	OCH_2c-Pr	SOEt	Cl
6-345	OCH_2c-Pr	SO_2Et	Cl
6-346	OCH_2c-Pr	$S(CH_2)_2OMe$	Cl
6-347	OCH_2c-Pr	$SO(CH_2)_2OMe$	Cl
6-348	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	Cl
6-349	OCH_2c-Pr	SMe	SO_2Me
6-350	OCH_2c-Pr	SOMe	SO_2Me
6-351	OCH_2c-Pr	SO_2Me	SO_2Me
6-352	OCH_2c-Pr	SEt	SO_2Me
6-353	OCH_2c-Pr	SOEt	SO_2Me
6-354	OCH_2c-Pr	SO_2Et	SO_2Me
6-355	OCH_2c-Pr	$S(CH_2)_2OMe$	SO_2Me
6-356	OCH_2c-Pr	$SO(CH_2)_2OMe$	SO_2Me
6-357	OCH_2c-Pr	$SO_2(CH_2)_2OMe$	SO_2Me
6-358	SO_2Me	F	CF_3
6-359	SO_2Me	NH_2	CF_3
6-360	SO_2Me	NHEt	Cl
6-361	SMe	SEt	F
6-362	SMe	SMe	F

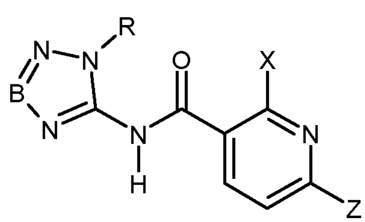
Table 7: Compounds of the general formula (I) according to the invention in which A is CY



No.	B	R	X	Y	Z
7-1	CH	nPr	Cl	H	SO_2Me
7-2	CH	iPr	Cl	H	SO_2Me
7-3	N	nPr	Cl	H	SO_2Me
7-4	N	iPr	Cl	H	SO_2Me
7-5	N	cPr	Cl	H	SO_2Me
7-6	N	Allyl	Cl	H	SO_2Me
7-7	N	CH_2OMe	Cl	H	SO_2Me
7-8	CH	nPr	NO_2	H	SO_2Me
7-9	CH	iPr	NO_2	H	SO_2Me
7-10	N	nPr	NO_2	H	SO_2Me
7-11	N	iPr	NO_2	H	SO_2Me
7-12	N	cPr	NO_2	H	SO_2Me
7-13	N	Allyl	NO_2	H	SO_2Me
7-14	N	CH_2OMe	NO_2	H	SO_2Me
7-15	CH	nPr	SO_2Me	H	CF_3
7-16	CH	iPr	SO_2Me	H	CF_3
7-17	N	nPr	SO_2Me	H	CF_3
7-18	N	iPr	SO_2Me	H	CF_3
7-19	N	cPr	SO_2Me	H	CF_3
7-20	N	Allyl	SO_2Me	H	CF_3
7-21	N	CH_2OMe	SO_2Me	H	CF_3
7-22	CH	nPr	Cl	$CH_2OCH_2CF_3$	SO_2Me
7-23	CH	iPr	Cl	$CH_2OCH_2CF_3$	SO_2Me
7-24	N	nPr	Cl	$CH_2OCH_2CF_3$	SO_2Me
7-25	N	iPr	Cl	$CH_2OCH_2CF_3$	SO_2Me
7-26	N	cPr	Cl	$CH_2OCH_2CF_3$	SO_2Me

No.	B	R	X	Y	Z
7-27	N	Allyl	Cl	$CH_2OCH_2CF_3$	SO_2Me
7-28	N	CH_2OMe	Cl	$CH_2OCH_2CF_3$	SO_2Me
7-29	CH	nPr	Me	SO_2Me	CF_3
7-30	CH	iPr	Me	SO_2Me	CF_3
7-31	CH	Pyrid-2-yl	Me	SO_2Me	CF_3
7-32	N	nPr	Me	SO_2Me	CF_3
7-33	N	iPr	Me	SO_2Me	CF_3
7-34	N	cPr	Me	SO_2Me	CF_3
7-35	N	Allyl	Me	SO_2Me	CF_3
7-36	N	CH_2OMe	Me	SO_2Me	CF_3
7-37	N	$CH_2(CO)Me$	Me	SO_2Me	CF_3
7-38	N	CH_2COOEt	Me	SO_2Me	CF_3
7-39	N	4-Cl-benzyl	Me	SO_2Me	CF_3
7-40	CH	nPr	Me	SO_2Me	SO_2Me
7-41	CH	iPr	Me	SO_2Me	SO_2Me
7-42	N	nPr	Me	SO_2Me	SO_2Me
7-43	N	iPr	Me	SO_2Me	SO_2Me
7-44	N	cPr	Me	SO_2Me	SO_2Me
7-45	N	CH_2OMe	Me	SO_2Me	SO_2Me
7-46	N	$CH_2(CO)Me$	Me	SO_2Me	SO_2Me
7-47	N	CH_2COOEt	Me	SO_2Me	SO_2Me
7-48	N	4-Cl-benzyl	Me	SO_2Me	SO_2Me

Table 8: Compounds of the general formula (I) according to the invention in which A is N



No.	B	R	X	Z
8-1	CH	Me	Cl	Cl
8-2	N	Me	Cl	Cl

No.	B	R	X	Z
8-3	CH	Me	Me	Cl
8-4	N	Me	Me	Cl
8-5	CH	Me	Cl	SMe
8-6	N	Me	Cl	SMe
8-7	CH	Me	Me	SO_2Me
8-8	N	Me	Me	SO_2Me
8-9	CH	Me	Cl	CF_3
8-10	N	Me	Cl	CF_3
8-11	CH	Ph	Cl	CF_3
8-12	N	Ph	Cl	CF_3
8-13	N	CH_2(CO)Me	Cl	CF3
8-14	N	Benzoyl	Cl	CF3
8-15	N	Allyl	Cl	CF3
8-16	N	4-Cl-benzyl	Cl	CF3
8-17	N	CH_2CO_2Et	Cl	CF3
8-18	CH	Me	Me	CF_3
8-19	N	Me	Me	CF_3
8-20	CH	Me	CH_2OMe	CF_3
8-21	N	Me	CH_2OMe	CF_3
8-22	CH	Me	$CH_2OC_2H_4OMe$	CF_3
8-23	N	Me	$CH_2OC_2H_4OMe$	CF_3

As already disclosed in European patent application “EP 10174893” (being filed in the name of Bayer CropScience AG at the EPO on September 01, 2010) and its corresponding international application PCT/EP 2011/064820, the compounds of the formula (I) and/or their salts to be used according to the invention, hereinbelow also referred to together as “compounds according to the invention”, have excellent herbicidal efficacy against a broad spectrum of economically important monocotyledonous and dicotyledonous annual harmful plants. The active compounds act efficiently even on perennial weeds which produce shoots from rhizomes, rootstocks and other perennial organs and which are difficult to control.

The present invention therefore relates to a method for controlling unwanted plants, in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, , PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, comprising the application of one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above to the plants (for example harmful plants such as monocotyledonous or dicotyledonous weeds or undesired crop plants), to the seed (for example grains, seeds or vegetative propagules such as tubers or shoot parts with buds) or to the area on which the plants grow (for example the area under cultivation). Specific examples may be mentioned of some representatives of the monocotyledonous and dicotyledonous weed flora which can be controlled by the compounds according to the invention, without the enumeration being restricted to certain species.

Monocotyledonous harmful plants of the genera: Aegilops, Agropyron, Agrostis, Alopecurus, Apera, Avena, Brachiaria, Bromus, Cenchrus, Commelina, Cynodon, Cyperus, Dactyloctenium, Digitaria, Echinochloa, Eleocharis, Eleusine, Eragrostis, Eriochloa, Festuca, Fimbristylis, Heteranthera, Imperata, Ischaemum, Leptochloa, Lolium, Monochoria, Panicum, Paspalum, Phalaris, Phleum, Poa, Rottboellia, Sagittaria, Scirpus, Setaria, Sorghum.

Dicotyledonous weeds of the genera: Abutilon, Amaranthus, Ambrosia, Anoda, Anthemis, Aphanes, Artemisia, Atriplex, Bellis, Bidens, Capsella, Carduus, Cassia, Centaurea, Chenopodium, Cirsium, Convolvulus, Datura, Desmodium, Emex, Erysimum, Euphorbia, Galeopsis, Galinsoga, Galium, Hibiscus, Ipomoea, Kochia, Lamium, Lepidium, Lindernia, Matricaria, Mentha, Mercurialis, Mullugo, Myosotis, Papaver, Pharbitis, Plantago, Polygonum, Portulaca, Ranunculus, Raphanus, Rorippa, Rotala, Rumex, Salsola, Senecio, Sesbania, Sida, Sinapis, Solanum, Sonchus, Sphenoclea, Stellaria, Taraxacum, Thlaspi, Trifolium, Urtica, Veronica, Viola, Xanthium.

Trangenic crop plants of economically important crops to which the N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above might be applied are, for example dicotyledonous crops of the genera Arachis, Beta, Brassica, Cucumis, Cucurbita, Helianthus, Daucus, Glycine, Gossypium, Ipomoea, Lactuca, Linum, Lycopersicon, Nicotiana, Phaseolus, Pisum, Solanum, Vicia, or monocotyledonous crops of the genera Allium, Ananas, Asparagus, Avena, Hordeum, Oryza, Panicum, Saccharum, Secale, Sorghum, Triticale, Triticum, Zea, in particular Zea and Triticum. This is why the present invention preferably relates to the method for controlling unwanted plants, in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3

encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, , PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, comprising the application of one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above to the plants (for example harmful plants such as monocotyledonous or dicotyledonous weeds or undesired crop plants), to the seed (for example grains, seeds or vegetative propagules such as tubers or shoot parts with buds) or to the area on which the plants grow (for example the area under cultivation) in dicotyledonous crops of the genera Arachis, Beta, Brassica, Cucumis, Cucurbita, Helianthus, Daucus, Glycine, Gossypium, Ipomoea, Lactuca, Linum, Lycopersicon, Nicotiana, Phaseolus, Pisum, Solanum, Vicia, or monocotyledonous crops of the genera Allium, Ananas, Asparagus, Avena, Hordeum, Oryza, Panicum, Saccharum, Secale, Sorghum, Triticale, Triticum, Zea, in particular Zea and Triticum.

It is preferred to use the N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts in economically important transgenic crops of useful plants and ornamentals, for example of cereals such as wheat, barley, rye, oats, sorghum/millet, rice, cassava and maize or else crops of sugar beet, sugar cane, cotton, soybean, oilseed rape, potato, tomato, peas and other vegetables, which crops contain one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

The invention also relates to the use, in a method for transforming plants, of a nucleic acid which encodes an HPPD as a marker gene or as a coding sequence which makes it possible to confer to the plant tolerance to herbicides which are HPPD inhibitors, and the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably

Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

In the commercial production of crops, it is desirable to eliminate under reliable pesticidial management unwanted plants (i.e.,"weeds") from a field of crop plants. An ideal treatment would be one which could be applied to an entire field but which would eliminate only the unwanted plants while leaving the crop plants unaffected. One such treatment system would involve the use of crop plants which are tolerant to an herbicide so that when the herbicide is sprayed on a field of herbicide-tolerant crop plants, the crop plants would continue to thrive while non-herbicide-tolerant weeds are killed or severely damaged. Ideally, such treatment systems would take advantage of varying herbicide properties so that weed control could provide the best possible combination of flexibility and economy. For example, individual herbicides have different longevities in the field, and some herbicides persist and are effective for a relatively long time after they are applied to a field while other herbicides are quickly broken down into other and/or non-active compounds. An ideal treatment system would allow the use of different herbicides so that growers could tailor the choice of herbicides for a particular situation.

While a number of herbicide-tolerant crop plants are presently commercially available, one issue that has arisen for many commercial herbicides and herbicide/crop combinations is that individual herbicides typically have incomplete spectrum of activity against common weed species. For most individual herbicides which have been in use for some time, populations of herbicide resistant weed species and biotypes have become more prevalent (see, e.g., Tranel and Wright (2002) *Weed Science* 50: 700-712; Owen and Zelaya *(2005) Pest Manag. Sci.* 61: 301-311). Transgenic plants which are resistant to more than one herbicide have been described (see, e.g., W02005/012515). However, improvements in every aspect of crop production, weed control options, extension of residual weed control, and improvement in crop yield are continuously in demand.

The above defined chimeric gene(s) encoding one or more HPPD protein(s) or mutants thereof being functional in transgenic plants in order to perform tolerance to HPPD inhibitor herbicides belonging to the class of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts is/are advantageously combined in plants with other genes which encode proteins or RNAs that confer useful agronomic properties to such plants. Among the genes which encode proteins or RNAs that confer useful agronomic properties on the transformed plants, mention can be made of the DNA sequences encoding proteins which confer tolerance to one or more herbicides that, according to their chemical structure, differ from HPPD inhibitor herbicides, and others which confer tolerance to certain insects, those which confer tolerance to certain diseases and or biotic and abiotic stresses, DNAs that encodes RNAs that provide nematode or insect control, etc..
Such genes are in particular described in published PCT Patent Applications WO 91/02071 and WO95/06128.

Among the DNA sequences encoding proteins which confer tolerance to certain herbicides on the transformed plant cells and plants, mention can be made of a bar or PAT gene or the *Streptomyces coelicolor* gene described in WO2009/152359 which confers tolerance to glufosinate herbicides, a gene encoding a suitable EPSPS which confers tolerance to herbicides having EPSPS as a target, such as glyphosate and its salts (US 4,535,060, US 4,769,061, US 5,094,945, US 4,940,835, US 5,188,642, US 4,971,908, US 5,145,783, US 5,310,667, US 5,312,910, US 5,627,061, US 5,633,435), or a gene encoding glyphosate oxydoreductase (US 5,463,175).

Among the DNA sequences encoding a suitable EPSPS which confer tolerance to the herbicides which have EPSPS as a target, mention will more particularly be made of the gene which encodes a plant EPSPS, in particular maize EPSPS, particularly a maize EPSPS which comprises two mutations, particularly a mutation at amino acid position 102 and a mutation at amino acid position 106 (WO 2004/074443), and which is described in Patent Application US 6566587, hereinafter named double mutant maize EPSPS or 2mEPSPS, or the gene which encodes an EPSPS isolated from Agrobacterium and which is described by SEQ ID No. 2 and SEQ ID No. 3 of US Patent 5,633,435, also named CP4.

Among the DNA sequences encoding a suitable EPSPS which confer tolerance to the herbicides which have EPSPS as a target, mention will more particularly be made of the gene which encodes an EPSPS GRG23 from Arthrobacter globiformis, but also the mutants GRG23 ACE1, GRG23 ACE2, or GRG23 ACE3, particularly the mutants or variants of GRG23 as described in WO2008/100353, such as GRG23(ace3)R173K of SEQ ID No. 29 in WO2008/100353.

In the case of the DNA sequences encoding EPSPS, and more particularly encoding the above genes, the sequence encoding these enzymes is advantageously preceded by a sequence encoding a transit peptide, in particular the “optimized transit peptide” described in US Patent 5,510,471 or 5,633,448.

In WO 2007/024782, plants being tolerant to glyphosate and at least one ALS (acetolactate synthase) inhibitor are disclosed. More specifically plants containing genes encoding a GAT (Glyphosate-N-Acetyltransferase) polypeptide and a polypeptide conferring resistance to ALS inhibitors are disclosed.
In US 6855533, transgenic tobacco plants containing mutated Arabidopsis ALS/AHAS genes were disclosed.
In US 6,153,401, plants containing genes encoding 2,4-D-monooxygenases conferring tolerance to 2,4-D (2,4-dichlorophenoxyacetic acid) by metabolisation are disclosed.

In US 2008/0119361 and US 2008/0120739, plants containing genes encoding Dicamba monooxygenases conferring tolerance to dicamba (3,6-dichloro-2-methoxybenzoic acid) by metabolisation are disclosed.

In WO2011/028833 and WO2011/028832 plants containing genes encoding mutagenized or recombinant Acetyl-coenzyme-A carboylase (ACCase) conferring tolerance to at least one herbicide is selected from the group consisting of alloxydim, butroxydim, clethodim, cloproxydim, cycloxydim, sethoxydim, tepraloxydim, tralkoxydim, chlorazifop, clodinafop, clofop, diclofop, fenoxaprop, fenoxaprop-P, fenthiaprop, fluazifop, fluazifop-P, haloxyfop, haloxyfop-P, isoxapyrifop, propaquizafop, quizalofop, quizalofop-P, trifop, and pinoxaden or agronomically acceptable salts or esters of any ofthese herbicides are disclosed.

All the above mentioned herbicide tolerance traits can be combined with those performing HPPD tolerance in plants concerning N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4,

(c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

Among the DNA sequences encoding proteins concerning properties of tolerance to insects, mention will more particularly be made of the Bt proteins widely described in the literature and well known to those skilled in the art. Mention will also be made of proteins extracted from bacteria such as *Photorhabdus* (WO 97/17432 & WO 98/08932).

Among such DNA sequences encoding proteins of interest which confer novel properties of tolerance to insects, mention will more particularly be made of the Bt Cry or VIP proteins widely described in the literature and well known to those skilled in the art. These include the Cry1F protein or hybrids derived from a Cry1F protein (e.g., the hybrid Cry1A-Cry1F proteins described in US 6,326,169; US 6,281,016; US 6,218,188, or toxic fragments thereof), the Cry1A-type proteins or toxic fragments thereof, preferably the Cry1Ac protein or hybrids derived from the Cry1Ac protein (e.g., the hybrid Cry1Ab-Cry1Ac protein described in US 5,880,275) or the Cry1Ab or Bt2 protein or insecticidal fragments thereof as described in EP451878, the Cry2Ae, Cry2Af or Cry2Ag proteins as described in WO02/057664 or toxic fragments thereof, the Cry1A.105 protein described in WO 2007/140256 (SEQ ID No. 7) or a toxic fragment thereof, the VIP3Aa19 protein of NCBI accession ABG20428, the VIP3Aa20 protein of NCBI accession ABG20429 (SEQ ID No. 2 in WO 2007/142840), the VIP3A proteins produced in the COT202 or COT203 cotton events (WO 2005/054479 and WO 2005/054480, respectively), the Cry proteins as described in WO01/47952, the VIP3Aa protein or a toxic fragment thereof as described in Estruch et al. (1996), Proc Natl Acad Sci U S A. 28;93(11):5389-94 and US 6,291,156, the insecticidal proteins from *Xenorhabdus* (as described in WO98/50427), *Serratia* (particularly from *S. entomophila*) or *Photorhabdus* species strains, such as Tc-proteins from Photorhabdus as described in WO98/08932 (e.g., Waterfield et al., 2001, Appl Environ Microbiol. 67(11):5017-24; Ffrench-Constant and Bowen, 2000, Cell Mol Life Sci.; 57(5):828-33). Also any variants or mutants of any one of these proteins differing in some (1-10, preferably 1-5) amino acids from any of the above sequences, particularly the sequence of their toxic fragment, or which are fused to a transit peptide, such as a plastid transit peptide, or another protein or peptide, is included herein.

The present invention also relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts in transgenic plants comprising a chimeric gene (or expression cassette) which comprises a coding sequence as well as heterologous regulatory elements, at the 5' and/or 3' position, at least at the 5' position, which are able to function in a host organism, in particular plant cells or plants, with the coding sequence containing at least one nucleic acid sequence which encodes an HPPD
(I) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7,

(d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) represents HPPD encoded by a mutated nucleic acid sequence of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

In another particular embodiment, the present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts in transgenic plant comprising a chimeric gene as previously described, wherein the chimeric gene contains in the 5' position of the nucleic acid sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) (I) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) encoded by a mutated nucleic acid sequence of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575., a nucleic acid sequence which encodes a plant transit peptide, with this sequence being arranged between the promoter region and the nucleic acid sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) (I) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) encoded by a mutated nucleic acid sequence of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, so as to permit expression of a transit peptide/HPPD fusion protein.

In a further particular embodiment, the present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants, plant parts, or plant seeds containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7 (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, , PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, or to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on soil where such plants, plant parts or seeds are to be grown or sown, either alone or in combination with one or more other known herbicides acting in a different matter to HPPD inhibitors.

In a further particular embodiment, the N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts herbicide can applied in combination either in mixture, simultaneously or successively with HPPD inhibitor herbicides selected from the group consisting of triketones (named triketone HPPD inhibitor), such as tembotrione, sulcotrione mesotrione, bicyclopyrone, tefuryltrione, particularly tembotrione, of the class diketone such as diketonitrile of the class of isoxazoles such as isoxaflutole or of the class of pyrazolinates (named pyrazolinate HPPD inhibitor), such as pyrasulfotole, pyrazolate, topramezone, benzofenap, even more specifically present invention relates to the application of tembotrione, mesotrione, diketonitrile, bicyclopyrone, tefuryltrione, benzofenap, pyrasulfotole, pyrazolate and sulcotrione to such HPPD inhibitor tolerant plants, plant parts or plant seeds containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13, (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 , or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

As a regulatory sequence which functions as a promoter in plant cells and plants, use may be made of any promoter sequence of a gene which is naturally expressed in plants, in particular a promoter which is expressed especially in the leaves of plants, such as for example “constitutive” promoters of bacterial, viral or plant origin, or “light-dependent” promoters, such as that of a plant ribulose-biscarboxylase/oxygenase (RuBisCO) small subunit gene, or any suitable known promoter-expressible which may be used. Among the promoters of plant origin, mention will be made of the histone promoters as described in EP 0 507 698 A1, the rice actin promoter (US 5,641,876), or a plant ubiquitin promoter (US 5,510,474). Among the promoters of a plant virus gene, mention will be made of that of the cauliflower mosaic virus (CaMV 19S or 35S, Sanders et al. (1987), Nucleic Acids Res. 15(4):1543-58.), the circovirus (AU 689 311) or the Cassava vein mosaic virus (CsVMV, US 7,053,205).

In a further particular embodiment, present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants, plant parts, or plant seeds comprising a promoter sequence specific for particular regions or tissues of plants can be used to express one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d)

Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, such as promoters specific for seeds (Datla, R. et al., 1997, Biotechnology Ann. Rev. 3, 269-296), especially the napin promoter (EP 255 378 A1), the phaseolin promoter, the glutenin promoter, the helianthinin promoter (WO 92/17580), the albumin promoter (WO 98/45460), the oleosin promoter (WO 98/45461), the SAT1 promoter or the SAT3 promoter (PCT/US98/06978).

Use may also be made of an inducible promoter advantageously chosen from the phenylalanine ammonia lyase (PAL), HMG-CoA reductase (HMG), chitinase, glucanase, proteinase inhibitor (PI), PR1 family gene, nopaline synthase (nos) and vspB promoters (US 5 670 349, Table 3), the HMG2 promoter (US 5 670 349), the apple beta-galactosidase (ABG1) promoter and the apple aminocyclopropane carboxylate synthase (ACC synthase) promoter (WO 98/45445).

The genes encoding hydroxyphenylpyruvate dioxygenase (HPPD) (I) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) represented by a mutated DNA sequence of HPPD encoding genes of the before defined organisms, preferably represented by mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 may also be used in combination with the promoter, of other regulatory sequences, which are located between the promoter and the coding sequence, such as transcription activators ("enhancers"), for instance the translation activator of the tobacco mosaic virus (TMV) described in Application WO 87/07644, or of the tobacco etch virus (TEV) described by Carrington & Freed 1990, J. Virol. 64: 1590-1597, for example, or introns such as the adh1 intron of maize or intron 1 of rice actin in order to perform a sufficient tolerance to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts.

In a further particular embodiment, the present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants, plant parts, or plant seeds containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably

Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 and also containing a CYP450 Maize monooxygenase (nsf1 gene) gene being under the control of an identical or different plant expressible promoter in order to confer tolerance to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts.

As a regulatory terminator or polyadenylation sequence, use may be made of any corresponding sequence of bacterial origin, such as for example the nos terminator of *Agrobacterium tumefaciens*, of viral origin, such as for example the CaMV 35S terminator, or of plant origin, such as for example a histone terminator as described in published Patent Application EP 0 633 317 A1.

It is to be understood that in order to obtain an optimized expression by a host adapted codon usage of the respective chimeric gene(s), one could adopt non-planta genes to the codon usage of the respective plant organism in which such chimeric genes will be inserted. Accordingly, in all of the described chimeric genes expressing HPPD of non-planta origin, the respective HPPD encocing DNA sequence can be replaced by an amended DNA sequence encoding the identical amino acid sequence, i.e. SEQ ID No. 3 can be replaced by SEQ ID No. 5., SEQ ID No. 6 can be replaced by SEQ ID No. 18, SEQ ID No. 8 can be replaced by SEQ ID No. 19, SEQ ID No. 10 can be replaced by SEQ ID No. 20, SEQ ID No. 12 can be replaced by SEQ ID No. 21, SEQ ID No. 14 can be replaced by SEQ ID No. 22, SEQ ID No. 16 can be replaced by SEQ ID No.23.

The term "gene", as used herein refers to a DNA coding region flanked by 5' and/or 3' regulatory sequences allowing a RNA to be transcribed which can be translated to a protein, typically comprising at least a promoter region. A "chimeric gene", when referring to an HPPD encoding DNA, refers to an HPPD encoding DNA sequence having 5' and/or 3' regulatory sequences different from the naturally occurring bacterial 5' and/or 3' regulatory sequences which drive the expression of the HPPD protein in its native host cell (also referred to as “heterologous promoter” or “heterologous regulatory sequences”).

The terms “DNA/protein comprising the sequence X” and "DNA/protein with the sequence comprising sequence X", as used herein, refer to a DNA or protein including or containing at least the sequence X in their nucleotide or amino acid sequence, so that other nucleotide or amino acid sequences can be included at the 5’ (or N-terminal) and/or 3’ (or C-terminal) end, e.g., a N-terminal transit or signal peptide. The term "comprising", as used herein, is open-ended language in the meaning of "including", meaning that other elements then those specifically recited can also be present. The term "consisting of", as used herein, is closed-ended language, i.e., only those elements specifically recited are present. The term “DNA encoding a protein comprising sequence X”, as used herein, refers to a DNA comprising a coding sequence which after transcription and translation results in a protein containing at least amino acid sequence X. A DNA encoding a protein need not be a naturally occurring DNA, and can be a semi-synthetic, fully synthetic or artificial DNA and can include introns and 5' and/or 3' flanking regions. The term "nucleotide sequence", as used herein, refers to the sequence of a DNA or RNA molecule, which can be in single- or double-stranded form.

HPPD proteins according to the invention may be equipped with a signal peptide according to procedures known in the art, see, e.g., published PCT patent application WO 96/10083, or they can be replaced by another peptide such as a chloroplast transit peptide (e.g., Van Den Broeck et al., 1985, Nature 313, 358, or a modified chloroplast transit peptide of US patent 5, 510,471) causing transport of the protein to the chloroplasts, by a secretory signal peptide or a peptide targeting the protein to other plastids, mitochondria, the ER, or another organelle, or it can be replaced by a methionine amino acid or by a methionine-alanine dipeptide. Signal sequences for targeting to intracellular organelles or for secretion outside the plant cell or to the cell wall are found in naturally targeted or secreted proteins, preferably those described by Klösgen et al. (1989, Mol. Gen. Genet. 217, 155-161), Klösgen and Weil (1991, Mol. Gen. Genet. 225, 297-304), Neuhaus & Rogers (1998, Plant Mol. Biol. 38, 127-144), Bih et al. (1999, J. Biol. Chem. 274, 22884-22894), Morris et al. (1999, Biochem. Biophys. Res. Commun. 255, 328-333), Hesse et al. (1989, EMBO J. 8 2453-2461), Tavladoraki et al. (1998, FEBS Lett. 426, 62-66), Terashima et al. (1999, Appl. Microbiol. Biotechnol. 52, 516-523), Park et al. (1997, J. Biol. Chem. 272, 6876-6881), Shcherban et al. (1995, Proc. Natl. Acad. Sci USA 92, 9245-9249), all of which are incorporated herein by reference, particularly the signal peptide sequences from targeted or secreted proteins of corn, cotton, soybean, or rice. A DNA sequence encoding such a plant signal peptide can be inserted in the chimeric gene encoding the HPPD protein for expression in plants.

The invention also encompasses variant HPPD enzymes which are amino acid sequences similar to the HPPD amino acid sequence of SEQ ID No. 2, SEQ ID No. ID No. 4, SEQ ID No. 7, SEQ ID No. 9, SEQ ID No. 11, SEQ ID No. 13, SEQ ID No. 15, and SEQ ID No. 17 wherein in each of the before one or more amino acids have been inserted, deleted or substituted. In the present context, variants of an amino acid sequence refer to those polypeptides, enzymes or proteins which have a similar catalytic activity as the amino acid sequences described herein, notwithstanding any amino acid substitutions, additions or deletions thereto. Preferably the variant amino acid sequence has a sequence identity of at least about 80%, or 85 or 90%, 95%, 97%, 98% or 99% with the amino acid sequence of SEQ ID No. 2, SEQ ID No. 4, SEQ ID No. 7, SEQ ID No. 9, SEQ ID No. 11, SEQ ID No. 13, SEQ ID No. 15, and SEQ ID No. 17, respectively . Also preferably, a polypeptide comprising the variant amino acid sequence has HPPD enzymatic activity. Methods to determine HPPD enzymatic activity are well known in the art and include assays as extensively described in WO 2009/144079 or in WO 2002/046387, or in PCT/EP2010/070561.

Substitutions encompass amino acid alterations in which an amino acid is replaced with a different naturally-occurring or a non-conventional amino acid residue. Such substitutions may be classified as "conservative', in which an amino acid residue contained in an HPPD protein of this invention is replaced with another naturally-occurring amino acid of similar character, for example Gly↔Ala, Val↔Ile↔Leu, Asp↔Glu, Lys↔Arg, Asn↔Gln or Phe↔Trp↔Tyr. Substitutions encompassed by the present invention may also be "non-conservative", in which an amino acid residue which is present in an HPPD protein of the invention is substituted with an amino acid with different properties, such as a naturally-occurring amino acid from a different group (e.g. substituting a charged or hydrophobic amino acid with alanine. Amino acid substitutions are typically of single residues, but may be of multiple residues, either clustered or dispersed. Amino acid deletions will usually be of the order of about 1-10 amino acid residues, while insertions may be of any length. Deletions and insertions may be made to the N-terminus, the C-terminus or be internal deletions or insertions. Generally, insertions within the amino acid sequence will be smaller than amino- or carboxy-terminal fusions and of the order of 1 to 4 amino acid residues. “Similar amino acids”, as used herein, refers to amino acids that have similar amino acid side chains, i.e. amino acids that have polar, non-polar or practically neutral side chains. “Non-similar amino acids”, as used herein, refers to amino acids that have different amino acid side chains, for example an amino acid with a polar side chain is non-similar to an amino acid with a non-polar side chain. Polar side chains usually tend to be present on the surface of a protein where they can interact with the aqueous environment found in cells (“hydrophilic” amino acids). On the other hand, “non-polar” amino acids tend to reside within the center of the protein where they can interact with similar non-polar neighbours (“hydrophobic” amino acids”). Examples of amino acids that have polar side chains are arginine, asparagine, aspartate, cysteine, glutamine, glutamate, histidine, lysine, serine, and threonine (all hydrophilic, except for cysteine which is hydrophobic). Examples of amino acids that have non-polar side chains are alanine, glycine, isoleucine, leucine, methionine, phenylalanine, proline, and tryptophan (all hydrophobic, except for glycine which is neutral).

Unless otherwise stated in the examples, all procedures for making and manipulating recombinant DNA are carried out by the standard procedures described in Sambrook et al., Molecular Cloning - A Laboratory Manual, Second Ed., Cold Spring Harbor Laboratory Press, NY (1989), and in Volumes 1 and 2 of Ausubel et al. (1994) Current Protocols in Molecular Biology, Current Protocols, USA. Standard materials and methods for plant molecular biology work are described in Plant Molecular Biology Labfax (1993) by R.R.D. Croy, jointly published by BIOS Scientific Publications Ltd (UK) and Blackwell Scientific Publications (UK). Procedures for PCR technology can be found in “PCR protocols: a guide to methods and applications”, Edited by M.A. Innis, D.H. Gelfand, J.J. Sninsky and T.J. White (Academic Press, Inc., 1990).

The terms “tolerance”, “tolerant” or “less sensitive” are interchangeable used and mean the relative levels of inherent tolerance of the HPPD screened according to a visible indicator phenotype of the strain or plant transformed with a nucleic acid comprising the gene coding for the respective HPPD protein in the presence of different concentrations of the various HPPD inhibitor herbicides. Dose responses and relative shifts in dose responses associated with these indicator phenotypes (formation of brown colour, growth inhibition, bleaching, herbicidal effect, etc) are

conveniently expressed in terms, for example, of GR50 (concentration for 50% reduction of growth) or MIC (minimum inhibitory concentration) values where increases in values correspond to increases in inherent tolerance of the expressed HPPD, in the normal manner based upon plant damage, meristematic bleaching symptoms etc. at a range of different concentrations of herbicides. These data can be expressed in terms of, for example, GR50 values derived from dose/response curves having "dose" plotted on the x-axis and "percentage kill", "herbicidal effect", "numbers of emerging green plants" etc. plotted on the y-axis where increased GR50 values correspond to increased levels of inherent tolerance of the expressed HPPD. Herbicides can suitably be applied pre-emergence or post emergence.
Likewise, tolerance level is screened via transgenesis, regeneration, breeding and spray testing of a test plant such as tobacco, or a crop plant such as soybean or cotton and according to these results, such plants are at least 2-4x more tolerant to HPPD inhibitor herbicides, like N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts than plants that do not contain any exogenous gene encoding an HPPD protein,
"Host organism" or “host” is understood as being any unicellular or multicellular heterologous organism into which the nucleic acid or chimeric gene according to the invention can be introduced for the purpose of producing HPPD. These organisms are, in particular, bacteria, for example *E. coli*, yeast, in particular of the genera *Saccharomyces* or *Kluyveromyces*, Pichia, fungi, in particular *Aspergillus*, a baculovirus or, preferably, plant cells and plants.

"Plant cell" is understood, according to the invention, as being any cell which is derived from or found in a plant and which is able to form or is part of undifferentiated tissues, such as calli, differentiated tissues such as embryos, parts of plants, plants or seeds. This includes protoplasts and pollen, cultivated plants cells or protoplasts grown in vitro, and plant cells that can regenerate into a complete plant.

"Plant" is understood, according to the invention, as being any differentiated multicellular organism which is capable of photosynthesis, in particular a monocotyledonous or dicotyledonous organism, more especially cultivated plants which are or are not intended for animal or human nutrition, such as maize or corn, wheat, *Brassica spp.* plants such as *Brassica napus* or *Brassica juncea*, soya spp, rice, sugarcane, beetroot, tobacco, cotton, vegetable plants such as cucumber, leek, carrot, tomato, lettuce, peppers, melon, watermelon, etc. Transgenic plants, as used herein, refer to plants comprising one or more foreign or heterologous gene(s) stably inserted in their genome.

In order perform tolerance to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts, any promoter sequence of a gene which is expressed naturally in plants, or any hybrid or combination of promoter elements of genes expressed naturally in plants, including *Agrobacterium* or plant virus promoters, or any promoter which is suitable for controlling the transcription of a herbicide tolerance gene in plants, can be used as the promoter sequence in the plants of the invention (named “plant-expressible promoter” herein). Examples of such suitable plant-expressible promoters are described above. In one embodiment of this invention, such plant-expressible promoters are operably-linked to a (I) DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) that is derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) a mutated DNA sequence of HPPD of the before defined organisms, preferably a mutated DNA sequence as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 and also containing .

According to the invention, it is also possible to use, in combination with the promoter regulatory sequence, other regulatory sequences which are located between the promoter and the coding sequence, such as intron sequences, or transcription activators (enhancers) in order to perform tolerace to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts. Examples of such suitable regulatory sequences are described above.

Any corresponding sequence of bacterial or viral origin, such as the nos terminator from *Agrobacterium tumefaciens*, or of plant origin, such as a histone terminator as described in application EP 0 633 317 A1, may be used as transcription termination (and polyadenylation) regulatory sequence.

In a further particular embodiment, the present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants, plant parts, or plant seeds containing a nucleic acid sequence which encodes a transit peptide is employed 5' (upstream) of the nucleic acid sequence encoding the exogenous chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 and also containing with this transit peptide sequence being arranged between the promoter region and the sequence encoding the exogenous HPPD so as to permit expression of a transit peptide-HPPD fusion protein. The transit peptide makes it possible to direct the HPPD into the plastids, more especially the chloroplasts, with the fusion protein being cleaved between the transit peptide and the HPPD protein when the latter enters the plastid. The transit peptide may be a single peptide, such as an EPSPS transit peptide (described in US patent 5,188,642) or a transit peptide of the plant ribulose bisphosphate carboxylase/ oxygenase small subunit (RuBisCO ssu), where appropriate, including a few amino acids of the N-terminal part of the mature RuBisCO ssu (EP 189 707 A1), or else may be a fusion of several transit peptides such as a transit peptide which comprises a first plant transit peptide which is fused to a part of the N-terminal sequence of a mature protein having a plastid location, with this part in turn being fused to a second plant transit peptide as described in patent EP 508 909 A1, and, more especially, the optimized transit peptide which comprises a transit peptide of the sunflower RuBisCO ssu fused to 22 amino acids of the N-terminal end of the maize RuBisCO ssu, in turn fused to the transit peptide of the maize RuBisCO ssu, as described, with its coding sequence, in patent EP 508 909 A1.

The present invention also relates to the transit peptide HPPD fusion protein and a nucleic acid or plant-expressible chimeric gene encoding such fusion protein, wherein the two elements of this fusion protein are as defined above.

In a further particular embodiment, the present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants, plant parts, or plant seeds obtained by cloning, transformation with a expression vector, which expression vector contains at least one chimeric gene encoding the hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561,

PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 . In addition to the above chimeric gene, this vector can contain an origin of replication. This vector can be a plasmid or plasmid portion, a cosmid, or a bacteriophage or a virus which has been transformed by introducing the chimeric gene according to the invention. Transformation vectors are well known to the skilled person and widely described in the literature. The transformation vector which can be used, in particular, for transforming plant cells or plants may be a virus, which can be employed for transforming plant cells or plants and which additionally contains its own replication and expression elements. The vector for transforming plant cells or plants is preferably a plasmid, such as a disarmed *Agrobacterium* Ti plasmid.

In a further particular embodiment, the present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants, plant parts, or plant seeds containing a chimeric gene which comprises a sequence encoding the hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a

DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, and the use of the plants or seeds in a field to grow a crop and harvest a plant product, e.g., soya spp, rice, wheat, barley or corn grains or cotton bolls, where in one embodiment said use involves the application of an N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts to such plants to control weeds.

In another particular embodiment, the present invention relates to the use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts on plants, plant parts, or plant seeds characterized in that it contains one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16

encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575. and in addition further contains a chimeric gene comprising a plant-expressible promoter as described above, operably-linked to a nucleic acid sequence encoding a PDH (prephenate dehydrogenase) enzyme (US 2005/0257283) in order to confer tolerance to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts. A plant comprising such two transgenes can be obtained by transforming a plant with one transgene, and then re-transforming this transgenic plant with the second transgene, or by transforming a plant with the two transgenes simultaneously (in the same or in 2 different transforming DNAs or vectors), or by crossing a plant comprising the first transgene with a plant comprising the second transgene, as is well known in the art.

One transformation method in order to obtain plants, plant parts or seeds being tolerant to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 comprises bombarding cells, protoplasts or tissues with solid or liquid particles to which DNA is attached, or containing DNA. Another transformation method comprises using, as mean for transfer into the plant, a chimeric gene which is inserted into an *Agrobacterium tumefaciens* Ti plasmid or an *Agrobacterium rhizogenes* Ri plasmid. Other methods may be used, such as microinjection or electroporation or otherwise direct gene transfer using PEG. The skilled person can select any appropriate method for transforming the host organism of choice, in particular the plant cell or the plant. As examples, the technology for soybean transformation has been extensively described in the examples 1 to 3 disclosed in EP 1186666 A1, incorporated herein by reference. For rice, Agrobacterium-mediated transformation (Hiei et al., 1994 Plant J 6:271-282, and Hiei et al., 1997 Plant Mol Biol. 35:205-21, incorporated herein by reference), electroporation (US 5,641,664 and US 5,679,558, incorporated herein by reference), or bombardment (Christou et al., 1991, Biotechnology 9:957 incorporated herein by reference) could be performed. A suitable technology for transformation of monocotyledonous plants, and particularly rice, is described in WO 92/09696, incorporated herein by reference. For cotton, Agrobacterium-mediated transformation (Gould J.H. and Magallanes-Cedeno M., 1998 Plant Molecular Biology reporter, 16:1-10 and Zapata C., 1999, Theoretical Applied Genetics, 98(2):1432-2242 incorporated herein by reference), polybrene and/or treatment-mediated transformation (Sawahel W.A., 2001, - Plant Molecular Biology reporter, 19:377a-377f, incorporated herein by reference) have been described.

Alternatively, N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts may be used on plants, plant parts, or plant seeds containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 which HPPD is expressed directly in the plastids, such as the chloroplasts, using transformation of the plastid, such as the chloroplast genome. A suitable method comprises the bombardment of plant cells or tissue by solid particles coated with the DNA or liquid particles comprising the DNA, and integration of the introduced gene by homologous recombination. Suitable vectors and selection systems are known to the person skilled in the art. An example of means and methods which can be used for such integration into the chloroplast genome of tobacco plants is given in WO 06/108830, the content of which is hereby incorporated by reference

The present invention also relates to a method for obtaining a plant tolerant to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts, characterized in that the plant is transformed with one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575.

Therefore, the present invention also relates to a method for obtaining a plant tolerant to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts by containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, characterized in that the plant contains one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No.

7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, which comprises a coding sequence as well as a heterologous regulatory element in the 5' and optionally in the 3' positions, which are able to function in a host organism, characterized in that the coding sequence comprises at least a nucleic acid sequence defining a gene encoding an HPPD of the invention as previously described in order to perform a sufficiently high level of tolerance to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts.

In one embodiment of this invention, the HPPD inhibitor in the above method is a N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts either alone or in combination with one or more HPPD inhibitor herbicides selected from the group consisting of triketone or pyrazolinate herbicide, preferably tembotrione, mesotrione, bicyclopyrone, tefuryltrione pyrasulfotole, pyrazolate, diketonitrile, benzofenap, or sulcotrione, particularly tembotrione.

The invention also relates to a method for selectively removing weeds or preventing the germination of weeds in a field to be planted with plants or to be sown with seeds, or in a plant crop, by application of a N-(tetrazol-4-yl)- or N-(triazol-3-

yl)arylcarboxamides as defined above or their salts to such field or plant crop, which method is characterized in that this N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts is applied to plants which have been transformed in accordance with one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, either before sowing the crop (hereinafter named pre-planting application), before emergence of the crop (hereinafter named pre-emergence application), or after emergence of the crop (hereinafter named post-emergence application).

The invention also relates to a method for controlling in an area or a field which contains transformed seeds as previously described in the present invention, which method comprises applying, to the said area of the field, a dose of an N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts which is toxic for the said weeds, without significantly affecting the seeds or plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 .

The present invention also relates to a method for cultivating the plants which have been transformed with one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, which method comprises planting seeds comprising a chimeric gene of before, in an area of a field which is appropriate for cultivating the said plants, and in applying, if weeds are present, a dose, which is toxic for the weeds, of one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts to the said area of the said field, without significantly affecting the said transformed seeds or the said transformed plants, and in then harvesting the cultivated plants or plant parts when they reach the desired stage of maturity and, where appropriate, in separating the seeds from the harvested plants.

In the above methods, the N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts can be applied in accordance with the invention, either before sowing the crop, before the crop emerges or after the crop emerges.

Within the meaning of the present invention, "herbicide" is understood as being a herbicidally active substance on its own or such a substance which is combined with an additive which alters its efficacy, such as, for example, an agent which increases its activity (a synergistic agent) or which limits its activity (a safener). It is of course to be understood that, for their application in practice, the above herbicides are combined, in a manner which is known per se, with the formulation adjuvants which are customarily employed in agricultural chemistry.

Thus, transgenic plants can be obtained which - in addition to the one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7 (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17or (II) comprising one or more mutated

DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 - have modified properties as the result of overexpression, suppression or inhibition of homologous (= natural) genes or gene sequences or expression of heterologous (= foreign) genes or gene sequences.

On the plants, plant cells or seeds containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11, or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, it is preferred to employ one or more of the N-(tetrazol-4-yl)-

or N-(triazol-3-yl)arylcarboxamides as defined above or their salts in combination with one or more further HPPD inhibitor herbicides belonging to the class of triketones, such as tembotrione, sulcotrione and mesotrione, or of the class of pyrazolinates, such as pyrasulfotole and topramezone, particularly selected from tembotrione, sulcotrione, topramezone, bicyclopyrone, tefuryltrione and mesotrione, more particularly tembotrione in transgenic crops which are also resistant to growth regulators such as, for example, 2,4-D or dicamba, or against herbicides which inhibit essential plant enzymes, for example acetolactate synthases (ALS), EPSP synthases, glutamine synthases (GS), Acetyl-coenzyme A carboxylase (ACCase), or against herbicides from the group of the sulfonylureas, imidazolinones, glyphosate, glufosinate, ACCase inhibitors and analogous active substances.

The invention therefore also relates to the use of herbicides applied to HPPD tolerant plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 for controlling harmful plants (i.e. weeds) which also extends to transgenic crop plants comprising a second or more herbicide resistance(s) beside the resistance against one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts.

N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts can be formulated in various ways, depending on the prevailing biological and/or physico-chemical parameters. Examples of possible formulations are: wettable powders (WP), water-soluble powders (SP), water-soluble concentrates, emulsifiable concentrates (EC), emulsions (EW), such as oil-in-water and water-in-oil emulsions, sprayable solutions, suspension concentrates (SC), oil- or water-based dispersions, oil-miscible solutions, capsule suspensions (CS), dusts (DP), seed-dressing products, granules for application by broadcasting and on the soil, granules (GR) in the form of microgranules, spray granules, coated granules and adsorption granules, water-dispersible granules (WG), water-soluble granules (SG), ULV formulations, microcapsules and waxes.

These individual types of formulation are known in principle and are described, for example, in: Winnacker-Küchler, "Chemische Technologie" [Chemical technology], volume 7, C. Hanser Verlag Munich, 4th Ed. 1986; Wade van Valkenburg, "Pesticide Formulations", Marcel Dekker, N.Y., 1973; K. Martens, "Spray Drying" Handbook, 3rd Ed. 1979, G. Goodwin Ltd. London.

The formulation auxiliaries required, such as inert materials, surfactants, solvents and further additives, are also known and are described, for example, in: Watkins, "Handbook of Insecticide Dust Diluents and Carriers", 2nd Ed., Darland Books, Caldwell N.J., H.v. Olphen, "Introduction to Clay Colloid Chemistry"; 2nd Ed., J. Wiley & Sons, N.Y.; C. Marsden, "Solvents Guide"; 2nd Ed., Interscience, N.Y. 1963; McCutcheon's "Detergents and Emulsifiers Annual", MC Publ. Corp., Ridgewood

N.J.; Sisley and Wood, "Encyclopedia of Surface Active Agents", Chem. Publ. Co. Inc., N.Y. 1964; Schönfeldt, "Grenzflächenaktive Äthylenoxidaddukte" [Interface-active ethylene oxide adducts], Wiss. Verlagsgesell., Stuttgart 1976; Winnacker-Küchler, "Chemische Technologie" [Chemical technology], volume 7, C. Hanser Verlag Munich, 4th Ed. 1986.

Based on these formulations, it is also possible to prepare combinations with other pesticidally active substances such as, for example, insecticides, acaricides, herbicides, fungicides, and with safeners, fertilizers and/or growth regulators, for example in the form of a ready mix or a tank mix.

Wettable powders are preparations which are uniformly dispersible in water and which, besides the active substance, also comprise ionic and/or nonionic surfactants (wetters, dispersers), for example polyoxyethylated alkylphenols, polyoxyethylated fatty alcohols, polyoxyethylated fatty amines, fatty alcohol polyglycol ether sulfates, alkanesulfonates, alkylbenzenesulfonates, sodium lignosulfonate, sodium 2,2'-dinaphthylmethane-6,6'-disulfonate, sodium dibutylnaphthalenesulfonate or else sodium oleoylmethyltaurinate, besides a diluent or inert substance. To prepare the wettable powders, the herbicidally active substances are ground finely, for example in customary apparatuses such as hammer mills, blower mills and air-jet mills, and mixed with the formulation auxiliaries, either simultaneously or subsequently.

Emulsifiable concentrates are prepared by dissolving the active substance in an organic solvent, for example butanol, cyclohexanone, dimethylformamide, xylene or else higher-boiling aromatics or hydrocarbons or mixtures of the organic solvents with addition of one or more ionic and/or nonionic surfactants (emulsifiers). Examples of emulsifiers which may be used are: calcium alkylarylsulfonates such as calcium dodecylbenzenesulfonate, or nonionic emulsifiers such as fatty acid polyglycol esters, alkylarylpolyglycol ethers, fatty alcohol polyglycol ethers, propylene oxide/ethylene oxide condensates, alkyl polyethers, sorbitan esters such as, for example, sorbitan fatty acid esters or polyoxyethylene sorbitan esters such as, for example, polyoxyethylene sorbitan fatty acid esters.

Dusts are obtained by grinding the active substance with finely divided solid materials such as, for example, talcum, natural clays such as kaolin, bentonite and pyrophyllite, or diatomaceous earth.

Suspension concentrates can be water- or oil-based. They can be prepared for example by wet-grinding by means of commercially available bead mills, if appropriate with addition of surfactants as already listed above for example in the case of the other formulation types.

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

Granules can be prepared either by spraying the active substance onto adsorptive, granulated inert material, or by applying active substance concentrates to the surface of carriers such as sand, kaolinites or granulated inert material with the aid of stickers, for example polyvinyl alcohol, sodium polyacrylate or else mineral oils. Suitable active substances can also be granulated in the manner which is customary for the production of fertilizer granules, if desired as a mixture with fertilizers.

Water-dispersible granules are generally prepared by customary methods such as spray drying, fluidized-bed granulation, disk granulation, mixing with high-speed stirrers, and extrusion without solid inert material.

To prepare disk granules, fluidized-bed granules, extruder granules and spray granules, see, for example, methods in "Spray-Drying Handbook" 3rd ed. 1979, G. Goodwin Ltd., London; J.E. Browning, "Agglomeration", Chemical and Engineering 1967, pages 147 et seq.; "Perry's Chemical Engineer's Handbook", 5th Ed., McGraw-Hill, New York 1973, p. 8-57.

For further details of the formulation of crop protection products see, for example, G.C. Klingman, "Weed Control as a Science", John Wiley and Sons, Inc., New York, 1961, pages 81-96 and J.D. Freyer, S.A. Evans, "Weed Control Handbook", 5th Ed., Blackwell Scientific Publications, Oxford, 1968, pages 101-103.

As a rule, the agrochemical preparations comprise from 0.1 to 99% by weight, in particular from 0.1 to 95% by weight, of compounds according to the invention.
In wettable powders, the active substance concentration is, for example, approximately 10 to 90% by weight, the remainder to 100% by weight being composed of customary formulation constituents. In the case of emulsifiable concentrates, the active substance concentration can amount to approximately 1 to 90, preferably 5 to 80% by weight. Formulations in the form of dusts comprise from 1 to 30% by weight of active substance, preferably in most cases from 5 to 20% by weight of active substance, and sprayable solutions comprise approximately from 0.05 to 80, preferably from 2 to 50% by weight of active substance. In the case of water-dispersible granules, the active substance content depends partly on whether the active compound is in liquid or solid form, and on the granulation auxiliaries, fillers and the like which are being used. In the case of the water-dispersible granules, for example, the active substance content is between 1 and 95% by weight, preferably between 10 and 80% by weight.

In addition, the active substance formulations mentioned comprise, if appropriate, the auxiliaries which are conventional in each case, such as stickers, wetters, dispersants, emulsifiers, penetrations, preservatives, antifreeze agents, solvents, fillers, carriers, colorants, antifoams, evaporation inhibitors, and pH and viscosity regulators.

Based on these formulations, it is also possible to prepare combinations of an HPPD inhibitor herbicide of the class of triketones, such as tembotrione, sulcotrione and mesotrione, or of the class of pyrazolinates, such as pyrasulfotole and topramezone, particularly selected from tembotrione, sulcotrione, topramezone, bicyclopyrone, tefuryltrione and mesotrione, more particularly tembotrione with other pesticidally active substances such as, for example, insecticides, acaricides, herbicides, fungicides, and with safeners, fertilizers and/or growth regulators, for example in the form of a ready mix or a tank mix to be applied to HPPD tolerant plants according to the invention.

Formulation examples

a) A dust is obtained by mixing 10 parts by weight of a compound of the formula (I) and/or a salt thereof and 90 parts by weight of talc as inert substance and comminuting the mixture in a hammer mill.

b) A wettable powder which is readily dispersible in water is obtained by mixing 25 parts by weight of a compound of the formula (I) and/or a salt thereof, 64 parts by weight of kaolin-containing quartz as inert substance, 10 parts by weight of potassium lignosulfonate and 1 part by weight of sodium oleoylmethyltaurinate as wetting agent and dispersant, and grinding the mixture in a pinned-disk mill.

c) A readily water-dispersible dispersion concentrate is obtained by mixing 20 parts by weight of a compound of the formula (I) and/or a salt thereof with 6 parts by weight of alkylphenol polyglycol ether (®Triton X 207), 3 parts by weight of isotridecanol polyglycol ether (8 EO) and 71 parts by weight of paraffinic mineral oil (boiling range for example about 255 to above 277°C) and grinding the mixture in a ball mill to a fineness of below 5 microns.

d) An emulsifiable concentrate is obtained from 15 parts by weight of a compound of the formula (I) and/or a salt thereof, 75 parts by weight of cyclohexanone as solvent and 10 parts by weight of oxethylated nonylphenol as emulsifier.

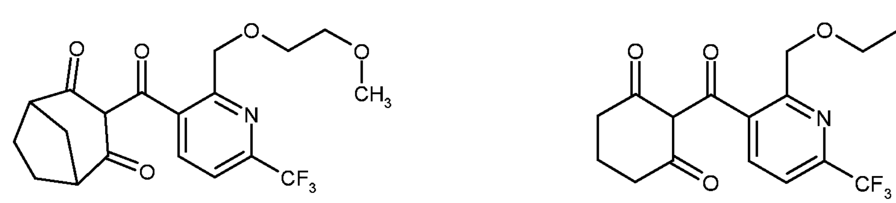
e) Water-dispersible granules are obtained by mixing
75 parts by weight of a compound of the formula (I) and/or a salt thereof,
10 parts by weight of calcium lignosulfonate,

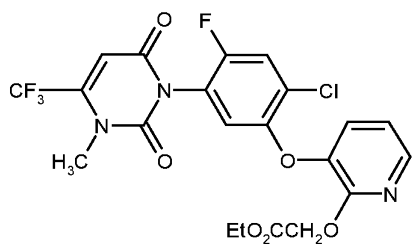
5 parts by weight of sodium lauryl sulfate,
3 parts by weight of polyvinyl alcohol and
7 parts by weight of kaolin,
grinding the mixture in a pinned-disk mill, and granulating the powder in a fluidized bed by spraying on water as granulating liquid.

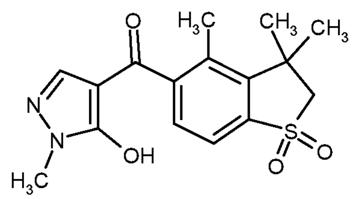
f) Water-dispersible granules are also obtained by homogenizing and precomminuting, in a colloid mill,
25 parts by weight of a compound of the formula (I) and/or a salt thereof,
5 parts by weight of sodium 2,2'-dinaphthylmethane-6,6'-disulfonate,
2 parts by weight of sodium oleoylmethyltaurinate,
1 part by weight of polyvinyl alcohol,
17 parts by weight of calcium carbonate and
50 parts by weight of water,
subsequently grinding the mixture in a bead mill and atomizing and drying the resulting suspension in a spray tower by means of a single-substance nozzle.

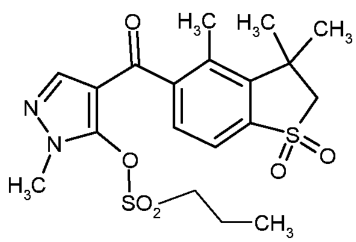
A further apect of present invention is the use of one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts to HPPD tolerant plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 in combination with further HPPD inhibitor herbicide belonging to the class of triketones, such as tembotrione, sulcotrione and mesotrione, or belonging to the class of pyrazolinates, such as pyrasulfotole and topramezone, particularly selected from tembotrione, sulcotrione, topramezone, bicyclopyrone, tefuryltrione and mesotrione, more particularly tembotrione in mixed formulations or in the tank mix, and/or with further known active substances which are based on the inhibition of, for example, acetolactate synthase, acetyl-CoA carboxylase, cellulose synthase, enolpyruvylshikimate-3-phosphate synthase, glutamine synthetase, p-hydroxyphenylpyruvate dioxygenase, phytoene desaturase, photosystem I, photosystem II, protoporphyrinogen oxidase, as are described in, for example, Weed Research 26 (1986) 441-445 or "The Pesticide Manual", 14th edition, The British Crop Protection Council and the Royal Soc. of Chemistry, 2003 and the literature cited therein. Known herbicides or plant growth regulators which can be combined with the compounds according to the invention are, for example, the following active substances (the compounds are either designated by the common name according to the International Organization for Standardization (ISO) or by a chemical name, if appropriate together with the code number) and always comprise all use forms such as acids, salts, esters and isomers such as stereoisomers and optical isomers. In this context, one and in some cases also several use forms are mentioned by way of example:

acetochlor, acibenzolar, acibenzolar-S-methyl, acifluorfen, acifluorfen-sodium, aclonifen, alachlor, allidochlor, alloxydim, alloxydim-sodium, ametryne, amicarbazone, amidochlor, amidosulfuron, aminocyclopyrachlor, aminopyralid, amitrole, ammonium sulfamate, ancymidol, anilofos, asulam, atrazine, azafenidin, azimsulfuron, aziprotryne, BAH-043, BAS-140H, BAS-693H, BAS-714H, BAS-762H, BAS-776H, BAS-800H, beflubutamid, benazolin, benazolin-ethyl, bencarbazone, benfluralin, benfuresate, bensulide, bensulfuron-methyl, bentazone, benzfendizone, benzobicyclon, benzofenap, benzofluor, benzoylprop, bifenox, bilanafos, bilanafos-sodium, bispyribac, bispyribac-sodium, bromacil, bromobutide, bromofenoxim, bromoxynil, bromuron, buminafos, busoxinone, butachlor, butafenacil, butamifos, butenachlor, butralin, butroxydim, butylate, cafenstrole, carbetamide, carfentrazone, carfentrazone-ethyl, chlomethoxyfen, chloramben, chlorazifop, chlorazifop-butyl, chlorbromuron, chlorbufam, chlorfenac, chlorfenac-sodium, chlorfenprop, chlorflurenol, chlorflurenol-methyl, chloridazon, chlorimuron, chlorimuron-ethyl, chlormequat-chloride, chlornitrofen, chlorophthalim, chlorthal-dimethyl, chlorotoluron, chlorsulfuron, cinidon, cinidon-ethyl, cinmethylin, cinosulfuron, clethodim, clodinafop clodinafop-propargyl, clofencet, clomazone, clomeprop, cloprop, clopyralid, cloransulam, cloransulam-methyl, cumyluron, cyanamide, cyanazine, cyclanilide, cycloate, cyclosulfamuron, cycloxydim, cycluron, cyhalofop, cyhalofop-butyl, cyperquat, cyprazine, cyprazole, 2,4-D, 2,4-DB, daimuron/dymron, dalapon, daminozide, dazomet, n-decanol, desmedipham, desmetryn, detosyl-pyrazolate (DTP), di-allate, dicamba, dichlobenil, dichlorprop, dichlorprop-P, diclofop, diclofop-methyl, diclofop-P-methyl, diclosulam, diethatyl, diethatyl-ethyl, difenoxuron, difenzoquat, diflufenican, diflufenzopyr, diflufenzopyr-sodium, dimefuron, dikegulac-sodium, dimefuron, dimepiperate, dimethachlor, dimethametryn, dimethenamid, dimethenamid-P, dimethipin, dimetrasulfuron, dinitramine, dinoseb, dinoterb, diphenamid, dipropetryn, diquat, diquat-dibromide, dithiopyr, diuron, DNOC, eglinazine-ethyl, endothal, EPTC, esprocarb, ethalfluralin, ethametsulfuron-methyl, ethephon, ethidimuron, ethiozin, ethofumesate, ethoxyfen, ethoxyfen-ethyl, ethoxysulfuron, etobenzanid, F-5331, i.e. N-[2-chloro-4-fluoro-5-[4-(3-fluoro-propyl)-4,5-dihydro-5-oxo-1H-tetrazol-1-yl]-phenyl]ethanesulfonamide, fenoprop, fenoxaprop, fenoxaprop-P, fenoxaprop-ethyl, fenoxaprop-P-ethyl, fentrazamide, fenuron, flamprop, flamprop-M-isopropyl, flamprop-M-methyl, flazasulfuron, florasulam, fluazifop, fluazifop-P, fluazifop-butyl, fluazifop-P-butyl, fluazolate, flucarbazone, flucarbazone-sodium, flucetosulfuron, fluchloralin, flufenacet (thiafluamide), flufenpyr, flufenpyr-ethyl, flumetralin, flumetsulam, flumiclorac, flumiclorac-pentyl, flumioxazin, flumipropyn, fluometuron, fluorodifen, fluoroglycofen, fluoroglycofen-ethyl, flupoxam, flupropacil, flupropanate, flupyrsulfuron, flupyrsulfuron-methyl-sodium, flurenol, flurenol-butyl, fluridone, flurochloridone, fluroxypyr, fluroxypyr-meptyl, flurprimidol, flurtamone, fluthiacet, fluthiacet-methyl, fluthiamide, fomesafen, foramsulfuron, forchlorfenuron, fosamine, furyloxyfen, gibberellic acid, glufosinate, L-glufosinate, L-glufosinate-ammonium, glufosinate-ammonium, glyphosate, glyphosate-isopropylammonium, H-9201, halosafen, halosulfuron, halosulfuron-methyl, haloxyfop, haloxyfop-P, haloxyfop-ethoxyethyl, haloxyfop-P-ethoxyethyl, haloxyfop-methyl, haloxyfop-P-methyl, hexazinone, HNPC-9908, HOK-201, HW-02, imazamethabenz, imazamethabenz-methyl, imazamox, imazapic, imazapyr, imazaquin, imazethapyr, imazosulfuron, inabenfide, indanofan, indoleacetic acid (IAA), 4-indol-3-ylbutyric acid (IBA), iodosulfuron, iodosulfuron-methyl-sodium, ioxynil, isocarbamid, isopropalin, isoproturon, isouron, isoxaben, isoxachlortole, isoxaflutole, isoxapyrifop, KUH-043, KUH-071, karbutilate, ketospiradox, lactofen, lenacil, linuron, maleic hydrazide, MCPA, MCPB, MCPB-methyl, -ethyl and -sodium, mecoprop, mecoprop-sodium, mecoprop-butotyl, mecoprop-P-butotyl, mecoprop-P-dimethylammonium, mecoprop-P-2-ethylhexyl, mecoprop-P-potassium, mefenacet, mefluidide, mepiquat-chloride, mesosulfuron, mesosulfuron-methyl, methabenzthiazuron, metam, metamifop, metamitron, metazachlor, methazole, methoxyphenone, methyldymron, 1-methylcyclopropene, methyl isothiocyanate, metobenzuron, metobenzuron, metobromuron, metolachlor, S-metolachlor, metosulam, metoxuron, metribuzin, metsulfuron, metsulfuron-methyl, molinate, monalide, monocarbamide, monocarbamide dihydrogen sulfate, monolinuron, monosulfuron, monuron, MT 128, MT-5950, i.e. N-[3-chloro-4-(1-methylethyl)-phenyl]-2-methylpentanamide, NGGC-011, naproanilide, napropamide, naptalam, NC-310, i.e. 4-(2,4-dichlorobenzoyl)-1-methyl-5-benzyloxypyrazole, neburon, nicosulfuron, nipyraclofen, nitralin, nitrofen, nitrophenolat-sodium (isomer mixture), nitrofluorfen, nonanoic acid, norflurazon, orbencarb, orthosulfamuron, oryzalin, oxadiargyl, oxadiazon, oxasulfuron, oxaziclomefone, oxyfluorfen, paclobutrazole, paraquat, paraquat dichloride, pelargonic acid (nonanoic acid), pendimethalin, pendralin, penoxsulam, pentanochlor, pentoxazone, perfluidone, pethoxamid, phenisopham, phenmedipham, phenmedipham-ethyl, picloram, picolinafen, pinoxaden, piperophos, pirifenop, pirifenop-butyl, pretilachlor, primisulfuron, primisulfuron-methyl, probenazole, profluazol, procyazine, prodiamine, prifluraline, profoxydim, prohexadione, prohexadione-calcium, prohydrojasmone, prometon, prometryn, propachlor, propanil, propaquizafop, propazine, propham, propisochlor, propoxycarbazone, propoxycarbazone-sodium, propyzamide, prosulfalin, prosulfocarb, prosulfuron, prynachlor, pyraclonil, pyraflufen, pyraflufen-ethyl, pyrazolynate (pyrazolate), pyrazosulfuron-ethyl, pyrazoxyfen, pyribambenz, pyribambenz-isopropyl, pyribenzoxim, pyributicarb, pyridafol, pyridate, pyriftalid, pyriminobac, pyriminobac-methyl, pyrimisulfan, pyrithiobac, pyrithiobac-sodium, pyroxasulfone, pyroxsulam, quinclorac, quinmerac, quinoclamine, quizalofop, quizalofop-ethyl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, rimsulfuron, saflufenacil, secbumeton, sethoxydim, siduron, simazine, simetryn, SN-106279, sulf-allate (CDEC), sulfentrazone, sulfometuron, sulfometuron-methyl, sulfosate (glyphosate-trimesium), sulfosulfuron, SYN-523, SYP-249, SYP-298, SYP-300, tebutam, tebuthiuron, tecnazene, tepraloxydim, terbacil, terbucarb, terbuchlor, terbumeton, terbuthylazine, terbutryne, TH-547, thenylchlor, thiafluamide, thiazafluron, thiazopyr, thidiazimin, thidiazuron, thiencarbazone, thiencarbazone-methyl, thifensulfuron, thifensulfuron-methyl, thiobencarb, tiocarbazil, tralkoxydim, tri-allate, triasulfuron, triaziflam, triazofenamide, tribenuron, tribenuron-methyl, trichloroacetic acid (TCA), triclopyr, tridiphane, trietazine, trifloxysulfuron, trifloxysulfuron-sodium, trifluralin, triflusulfuron, triflusulfuron-methyl, trimeturon, trinexapac, trinexapac-ethyl, tritosulfuron, tsitodef, uniconazole, uniconazole-P, vernolate, ZJ-0166, ZJ-0270, ZJ-0543, ZJ-0862 and the following compounds









The application rate required of an N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts to be applied to areas where HPPD tolerant plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by

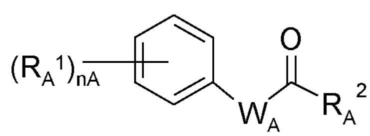
SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 are growing varies as a function of the external conditions such as temperature, humidity, the nature of the herbicide used and the like. It can vary within wide limits, for example between 0.001 and 1.0 kg/ha and more of active substance, but it is preferably between 0.005 and 750 g/ha.

In case of combined applications of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts herbicides that differ from N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts to the HPPD tolerant plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a

DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575, these mixtures may cause crop injury, based on the presence herbicides different to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts. In order to reduce/eliminate such crop injuries, appropriate safeners may be added. These safeners, which are employed in antidotically active amounts, reduce the phytotoxic side effects of herbicides/pesticides used, for example in economically important crops, such as cereals (wheat, barley, rye, corn, rice, millet), alfalfa, sugar beet, sugarcane, oilseed rape, cotton and soya spp., preferably corn, cotton, sugarbeet, or soya spp.

The safeners are preferably selected from the group consisting of:

A) compounds of the formula (S-I)



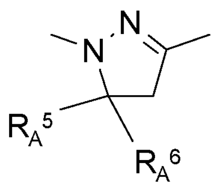
(S-I)

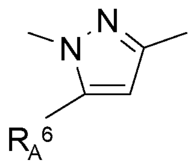
where the symbols and indices have the following meanings:

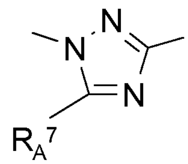
n_A is a natural number from 0 to 5, preferably from 0 to 3;

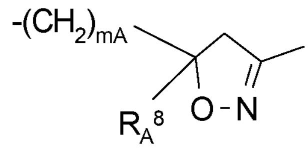
$R_A{}^1$ is halogen, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, nitro or (C_1-C_4)-haloalkyl;

W_A is an unsubstituted or substituted divalent heterocyclic radical from the group consisting of partially unsaturated or aromatic five-membered heterocycles having 1 to 3 hetero ring atoms of the type N or O, where at least one nitrogen atom and at most one oxygen atom is present in the ring, preferably a radical from the group consisting of $(W_A{}^1)$ to $(W_A{}^4)$,


(W_A^1)


(W_A^2)


(W_A^3)


(W_A^4)

m_A is 0 or 1;

R_A^2 is OR_A^3, SR_A^3 or $NR_A^3R_A^4$ or a saturated or unsaturated 3- to 7-membered heterocycle having at least one nitrogen atom and up to 3 heteroatoms, preferably from the group consisting of O and S, which is attached via the nitrogen atom to the carbonyl group in (S-I) and which is unsubstituted or substituted by radicals from the group consisting of $(C_1\text{-}C_4)$-alkyl, $(C_1\text{-}C_4)$-alkoxy and optionally substituted phenyl, preferably a radical of the formula OR_A^3, NHR_A^4 or $N(CH_3)_2$, in particular of the formula OR_A^3;

R_A^3 is hydrogen or an unsubstituted or substituted aliphatic hydrocarbon radical having preferably a total of 1 to 18 carbon atoms;

R_A^4 is hydrogen, $(C_1\text{-}C_6)$-alkyl, $(C_1\text{-}C_6)$-alkoxy or substituted or unsubstituted phenyl;

R_A^5 is H, $(C_1\text{-}C_8)$-alkyl, $(C_1\text{-}C_8)$-haloalkyl), $(C_1\text{-}C_4)$-alkoxy-$(C_1\text{-}C_8)$-alkyl, cyano or $COOR_A^9$ where R_A^9 is hydrogen, $(C_1\text{-}C_8)$-alkyl, $(C_1\text{-}C_8)$-haloalkyl, $(C_1\text{-}C_4)$-alkoxy-$(C_1\text{-}C_4)$-alkyl, $(C_1\text{-}C_6)$-hydroxyalkyl, $(C_3\text{-}C_{12})$-cycloalkyl or tri-$(C_1\text{-}C_4)$-alkylsilyl;

R_A^6, R_A^7, R_A^8 are identical or different and are hydrogen, $(C_1\text{-}C_8)$-alkyl, $(C_1\text{-}C_8)$-haloalkyl, $(C_3\text{-}C_{12})$-cycloalkyl or substituted or unsubstituted phenyl;

preferably:

a) compounds of the type of the dichlorophenylpyrazoline-3-carboxylic acid, preferably compounds such as ethyl 1-(2,4-dichlorophenyl)-5-(ethoxycarbonyl)-5-methyl-2-pyrazoline-3-carboxylate (S1-1) ("mefenpyr-diethyl", see Pestic. Man.), and related compounds, as described in WO 91/07874;

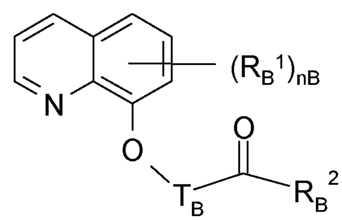
b) derivatives of dichlorophenylpyrazolecarboxylic acid, preferably compounds such as ethyl 1-(2,4-dichlorophenyl)-5-methylpyrazole-3-carboxylate (S1-2), ethyl

1-(2,4-dichlorophenyl)-5-isopropylpyrazole-3-carboxylate (S1-3), ethyl 1-(2,4-dichlorophenyl)-5-(1,1-dimethylethyl)pyrazole-3-carboxylate (S1-4), ethyl 1-(2,4-dichlorophenyl)-5-phenylpyrazole-3-carboxylate (S1-5) and related compounds, as described in EP-A-333 131 and EP-A-269 806;

c) compounds of the type of the triazolecarboxylic acids, preferably compounds such as fenchlorazole(-ethyl ester), i.e. ethyl 1-(2,4-dichlorophenyl)-5-trichloro-methyl-(1H)-1,2,4-triazole-3-carboxylate (S1-6), and related compounds, as described in EP-A-174 562 and EP-A-346 620;

d) compounds of the type of the 5-benzyl- or 5-phenyl-2-isoxazoline-3-carboxylic acid or the 5,5-diphenyl-2-isoxazoline-3-carboxylic acid, preferably compounds such as ethyl 5-(2,4-dichlorobenzyl)-2-isoxazoline-3-carboxylate (S1-7) or ethyl 5-phenyl-2-isoxazoline-3-carboxylate (S1-8) and related compounds, as described in WO 91/08202, or ethyl 5,5-diphenyl-2-isoxazolinecarboxylate (S1-9) ("isoxadifen-ethyl") or n-propyl 5,5-diphenyl-2-isoxazolinecarboxylate (S1-10) or ethyl 5-(4-fluorophenyl)-5-phenyl-2-isoxazoline-3-carboxylate (S1-11), as described in the patent application WO-A-95/07897.

B) Quinoline derivatives of the formula (S-II)



(S-II)

where the symbols and indices have the following meanings:

$R_B{}^1$ is halogen, $(C_1\text{-}C_4)$-alkyl, $(C_1\text{-}C_4)$-alkoxy, nitro or $(C_1\text{-}C_4)$-haloalkyl;

n_B is a natural number from 0 to 5, preferably from 0 to 3;

$R_B{}^2$ $OR_B{}^3$, $SR_B{}^3$ or $NR_B{}^3R_B{}^4$ or a saturated or unsaturated 3- to 7-membered heterocycle having at least one nitrogen atom and up to 3 heteroatoms, preferably from the group consisting of O and S, which is attached via the nitrogen atom to the carbonyl group in (S-II) and is unsubstituted or substituted by radicals from the group consisting of $(C_1\text{-}C_4)$-alkyl, $(C_1\text{-}C_4)$-alkoxy or optionally substituted phenyl, preferably a radical of the formula OR_B^3, NHR_B^4 or $N(CH_3)_2$, in particular of the formula OR_B^3;

R_B^3 is hydrogen or an unsubstituted or substituted aliphatic hydrocarbon radical having preferably a total of 1 to 18 carbon atoms;

R_B^4 is hydrogen, (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy or substituted or unsubstituted phenyl;

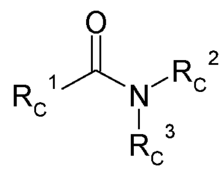
T_B is a (C_1- or C_2)-alkanediyl chain which is unsubstituted or substituted by one or two (C_1-C_4)-alkyl radicals or by [(C_1-C_3)-alkoxy]carbonyl;

preferably:

a) compounds of the type of the 8-quinolinoxyacetic acid (S2), preferably 1-methylhexyl (5-chloro-8-quinolinoxy)acetate (common name "cloquintocet-mexyl" (S2-1) (see Pestic. Man.),
1,3-dimethylbut-1-yl (5-chloro-8-quinolinoxy)acetate (S2-2),
4-allyloxybutyl (5-chloro-8-quinolinoxy)acetate (S2-3),
1-allyloxyprop-2-yl (5-chloro-8-quinolinoxy)acetate- (S2-4),
ethyl (5-chloro-8-quinolinoxy)acetate (S2-5),
methyl (5-chloro-8-quinolinoxy)acetate (S2-6),
allyl (5-chloro-8-quinolinoxy)acetate (S2-7),
2-(2-propylideneiminoxy)-1-ethyl (5-chloro-8-quinolinoxy)acetate (S2-8), 2-oxoprop-1-yl (5-chloro-8-quinolinoxy)acetate (S2-9) and related compounds, as described in EP-A-86 750, EP-A-94 349 and EP-A-191 736 or EP-A-0 492 366, and also their hydrates and salts, as described in WO-A-2002/034048.

b) Compounds of the type of the (5-chloro-8-quinolinoxy)malonic acid, preferably compounds such as diethyl (5-chloro-8-quinolinoxy)malonate, diallyl (5-chloro-8-quinolinoxy)malonate, methyl ethyl (5-chloro-8-quinolinoxy)malonate and related compounds, as described in EP-A-0 582 198.

C) Compounds of the formula (S-III)



(S-III)

where the symbols and indices have the following meanings:

R_C^1 is (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-haloalkenyl, (C_3-C_7)-cycloalkyl, preferably dichloromethyl;

R_C^2, R_C^3 are identical or different and are hydrogen, (C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl, (C_1-C_4)-haloalkyl, (C_2-C_4)-haloalkenyl, (C_1-C_4)-alkylcarbamoyl-(C_1-C_4)-alkyl, (C_2-C_4)-alkenylcarbamoyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, dioxolanyl-(C_1-C_4)-alkyl, thiazolyl, furyl, furylalkyl, thienyl, piperidyl, substituted or unsubstituted phenyl, or R_C^2 and R_C^3 together form a substituted or unsubstituted heterocyclic ring,

preferably an oxazolidine, thiazolidine, piperidine, morpholine, hexahydropyrimidine or benzoxazine ring;

preferably:

Active compounds of the type of the dichloroacetamides which are frequently used as pre-emergence safener (soil-acting safeners), such as, for example,

"dichlormid" (see Pestic.Man.) (= N,N-diallyl-2,2-dichloroacetamide),

"R-29148" (= 3-dichloroacetyl-2,2,5-trimethyl-1,3-oxazolidine from Stauffer),

"R-28725" (= 3-dichloroacetyl-2,2,-dimethyl-1,3-oxazolidine from Stauffer),

"benoxacor" (see Pestic. Man.) (= 4-dichloroacetyl-3,4-dihydro-3-methyl-2H-1,4-benzoxazine),

"PPG-1292" (= N-allyl-N-[(1,3-dioxolan-2-yl)methyl]dichloroacetamide from PPG Industries),

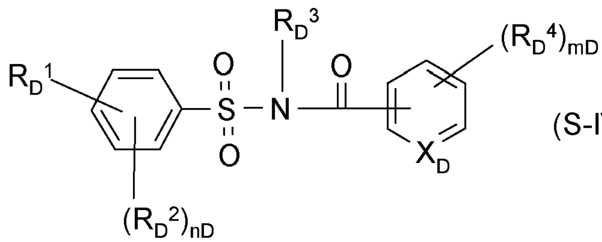
"DKA-24" (= N-allyl-N-[(allylaminocarbonyl)methyl]dichloroacetamide from Sagro-Chem),

"AD-67" or "MON 4660" (= 3-dichloroacetyl-1-oxa-3-aza-spiro[4,5]decane from Nitrokemia or Monsanto),

"TI-35" (= 1-dichloroacetylazepane from TRI-Chemical RT)

"diclonon" (dicyclonone) or "BAS145138" or "LAB145138" (= 3-dichloroacetyl-2,5,5-trimethyl-1,3-diazabicyclo[4.3.0]nonane from BASF) and "furilazole" or "MON 13900" (see Pestic. Man.) (= (RS)-3-dichloroacetyl-5-(2-furyl)-2,2-dimethyloxazolidine).

D) N-Acylsulfonamides of the formula (S-IV) and their salts



(S-IV)

in which

X_D is CH or N;

R_D^1 is CO-$NR_D^5R_D^6$ or NHCO-R_D^7;

R_D^2 is halogen, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, nitro, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkoxycarbonyl or (C_1-C_4)-alkylcarbonyl;

R_D^3 is hydrogen, (C_1-C_4)-alkyl, (C_2-C_4)-alkenyl or (C_2-C_4)-alkynyl;

R_D^4 is halogen, nitro, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_3-C_6)-cycloalkyl, phenyl, (C_1-C_4)-alkoxy, cyano, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkoxycarbonyl or (C_1-C_4)-alkylcarbonyl;

R_D^5 is hydrogen, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_5-C_6)-cycloalkenyl, phenyl or 3- to 6-membered heterocyclyl containing v_D heteroatoms from the group consisting of nitrogen, oxygen and sulfur, where the seven last-mentioned radicals are substituted by v_D substituents from the group consisting of halogen, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_2)-alkylsulfinyl, (C_1-C_2)-alkylsulfonyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxycarbonyl, (C_1-C_4)-alkylcarbonyl and phenyl and, in the case of cyclic radicals, also (C_1-C_4)-alkyl and (C_1-C_4)-haloalkyl;

R_D^6 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl or (C_2-C_6)-alkynyl, where the three last-mentioned radicals are substituted by v_D radicals from the group consisting of halogen, hydroxy, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy and (C_1-C_4)-alkylthio, or

R_D^5 and R_D^6 together with the nitrogen atom carrying them form a pyrrolidinyl or piperidinyl radical;

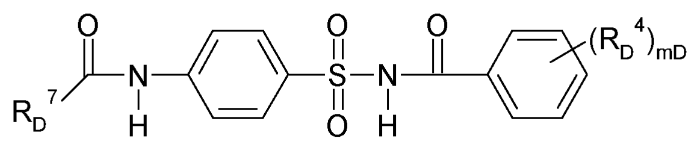
R_D^7 is hydrogen, $(C_1$-$C_4)$-alkylamino, di-$(C_1$-$C_4)$-alkylamino, $(C_1$-$C_6)$-alkyl, $(C_3$-$C_6)$-cycloalkyl, where the 2 last-mentioned radicals are substituted by v_D substituents from the group consisting of halogen, $(C_1$-$C_4)$-alkoxy, halogen-$(C_1$-$C_6)$-alkoxy and $(C_1$-$C_4)$-alkylthio and, in the case of cyclic radicals, also $(C_1$-$C_4)$-alkyl and $(C_1$-$C_4)$-haloalkyl;

n_D is 0, 1 or 2;

m_D is 1 or 2;

v_D is 0, 1, 2 or 3;

from among these, preference is given to compounds of the type of the N-acylsulfonamides, for example of the formula (S-V) below, which are known, for example, from WO 97/45016



(S-V)

in which

R_D^7 is $(C_1$-$C_6)$-alkyl, $(C_3$-$C_6)$-cycloalkyl, where the 2 last-mentioned radicals are substituted by v_D substituents from the group consisting of halogen, $(C_1$-$C_4)$-alkoxy, halogen-$(C_1$-$C_6)$-alkoxy and $(C_1$-$C_4)$-alkylthio and, in the case of cyclic radicals, also $(C_1$-$C_4)$-alkyl and $(C_1$-$C_4)$-haloalkyl;

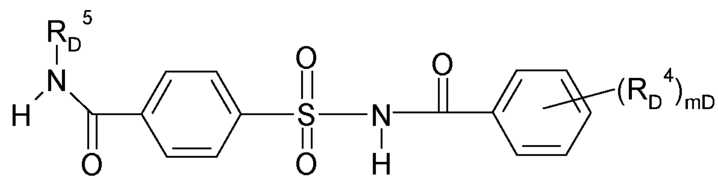
R_D^4 is halogen, $(C_1$-$C_4)$-alkyl, $(C_1$-$C_4)$-alkoxy, CF_3;

m_D is 1 or 2;

v_D is 0, 1, 2 or 3;

and also

acylsulfamoylbenzamides, for example of the formula (S-VI) below, which are known, for example, from WO 99/16744,



(S-VI)

for example those in which

R_D^5 = cyclopropyl and (R_D^4) = 2-OMe ("cyprosulfamide", S3-1),

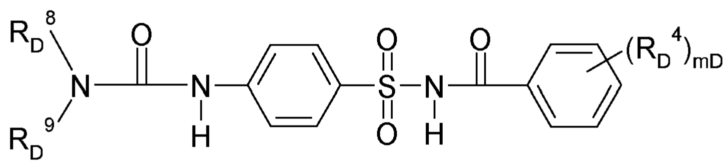
R_D^5 = cyclopropyl and (R_D^4) = 5-Cl-2-OMe (S3-2),

R_D^5 = ethyl and (R_D^4) = 2-OMe (S3-3),

R_D^5 = isopropyl and (R_D^4) = 5-Cl-2-OMe (S3-4) and

R_D^5 = isopropyl and (R_D^4) = 2-OMe (S3-5);

and also compounds of the type of the N-acylsulfamoylphenylureas of the formula (S-VII), which are known, for example, from EP-A-365484



(S-VII)

in which

R_D^8 and R_D^9 independently of one another are hydrogen, (C_1-C_8)-alkyl, (C_3-C_8)-cycloalkyl, (C_3-C_6)-alkenyl, (C_3-C_6)-alkynyl,

R_D^4 is halogen, (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, CF_3

m_D is 1 or 2;

from among these in particular

1-[4-(N-2-methoxybenzoylsulfamoyl)phenyl]-3-methylurea,

1-[4-(N-2-methoxybenzoylsulfamoyl)phenyl]-3,3-dimethylurea,

1-[4-(N-4,5-dimethylbenzoylsulfamoyl)phenyl]-3-methylurea,

1-[4-(N-naphthoylsulfamoyl)phenyl]-3,3-dimethylurea,

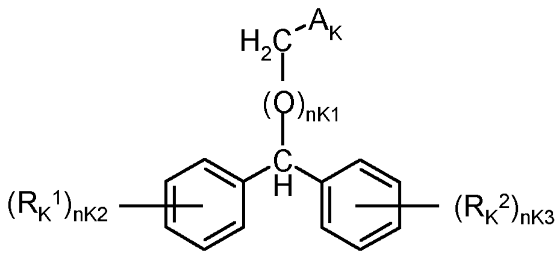
G) active compounds from the class of the hydroxyaromatics and aromatic-aliphatic carboxylic acid derivatives, for example ethyl 3,4,5-triacetoxybenzoate, 3,5-dimethoxy-4-hydroxybenzoic acid, 3,5-

dihydroxybenzoic acid, 4-hydroxysalicylic acid, 4-fluorosalicyclic acid, 1,2-dihydro-2-oxo-6-trifluoromethylpyridine-3-carboxamide, 2-hydroxycinnamic acid, 2,4-dichlorocinnamic acid, as described in WO 2004084631, WO 2005015994, WO 2006007981, WO 2005016001;

H) active compounds from the class of the 1,2-dihydroquinoxalin-2-ones, for example
1-methyl-3-(2-thienyl)-1,2-dihydroquinoxalin-2-one, 1-methyl-3-(2-thienyl)-1,2-dihydroquinoxaline-2-thione, 1-(2-aminoethyl)-3-(2-thienyl)-1,2-dihydroquinoxalin-2-one hydrochloride, 1-(2-methylsulfonylaminoethyl)-3-(2-thienyl)-1,2-dihydro-quinoxalin-2-one, as described in WO 2005112630,

I) active compounds which, in addition to a herbicidal action against harmful plants, also have safener action on crop plants such as rice, such as, for example,
"dimepiperate" or "MY-93" (see Pestic. Man.) (=S-1-methyl-1-phenylethyl piperidine-1-thiocarboxylate), which is known as safener for rice against damage by the herbicide molinate,
"daimuron" or "SK 23" (see Pestic. Man.) (= 1-(1-methyl-1-phenylethyl)-3-p-tolyl-urea), which is known as safener for rice against damage by the herbicide imazosulfuron,
"cumyluron" = "JC-940" (= 3-(2-chlorophenylmethyl)-1-(1-methyl-1-phenyl-ethyl)urea, see JP-A-60087254), which is known as safener for rice against damage by a number of herbicides,
"methoxyphenone" or "NK 049" (= 3,3'-dimethyl-4-methoxybenzophenone), which is known as safener for rice against damage by a number of herbicides,
"CSB" (= 1-bromo-4-(chloromethylsulfonyl)benzene) (CAS Reg. No. 54091-06-4 from Kumiai), which is known as safener against damage by a number of herbicides in rice,

K) compounds of the formula (S-IX),
as described in WO-A-1998/38856



(S-IX)

in which the symbols and indices have the following meanings:

R_K^1, R_K^2 independently of one another are halogen, $(C_1\text{-}C_4)$-alkyl, $(C_1\text{-}C_4)$-alkoxy, $(C_1\text{-}C_4)$-haloalkyl, $(C_1\text{-}C_4)$-alkylamino, di-$(C_1\text{-}C_4)$-alkylamino, nitro;

A_K is $COOR_K^3$ or $COOR_K^4$

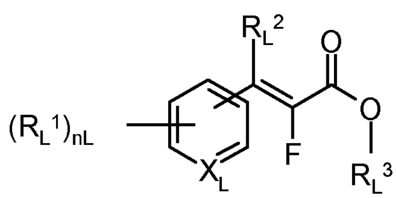
R_K^3, R_K^4 independently of one another are hydrogen, $(C_1\text{-}C_4)$-alkyl, $(C_2\text{-}C_6)$-alkenyl, $(C_2\text{-}C_4)$-alkynyl, cyanoalkyl, $(C_1\text{-}C_4)$-haloalkyl, phenyl, nitrophenyl, benzyl, halobenzyl, pyridinylalkyl or alkylammonium,

n_K^1 is 0 or 1,

n_K^2, n_K^3 independently of one another are 0, 1 or 2

preferably: methyl (diphenylmethoxy)acetate (CAS Reg. No.: 41858-19-9),

L) compounds of the formula (S-X),
as described in WO A-98/27049



(S-X)

in which the symbols and indices have the following meanings:

X_L is CH or N,

n_L is, in the case that X=N, an integer from 0 to 4 and,
in the case that X=CH, an integer from 0 to 5,

R_L^1 is halogen, $(C_1\text{-}C_4)$-alkyl, $(C_1\text{-}C_4)$-haloalkyl, $(C_1\text{-}C_4)$-alkoxy, $(C_1\text{-}C_4)$-haloalkoxy, nitro, $(C_1\text{-}C_4)$-alkylthio, $(C_1\text{-}C_4)$-alkylsulfonyl, $(C_1\text{-}C_4)$-alkoxycarbonyl, optionally substituted phenyl, optionally substituted phenoxy,

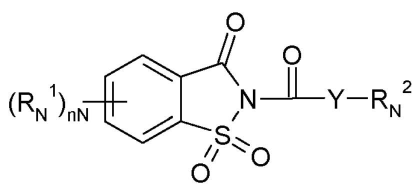
R_L^2 is hydrogen or $(C_1\text{-}C_4)$-alkyl,

R_L^3 is hydrogen, (C_1-C_8)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl or aryl, where each of the carbon-containing radicals mentioned above is unsubstituted or substituted by one or more, preferably by up to three, identical or different radicals from the group consisting of halogen and alkoxy; or salts thereof,

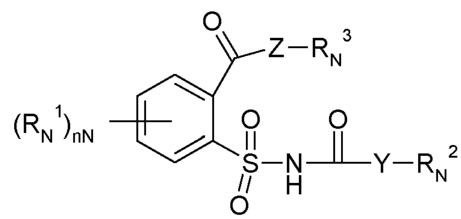
M) active compounds from the class of the 3-(5-tetrazolylcarbonyl)-2-quinolones, for example

1,2-dihydro-4-hydroxy-1-ethyl-3-(5-tetrazolylcarbonyl)-2-quinolone (CAS Reg. No.: 219479-18-2), 1,2-dihydro-4-hydroxy-1-methyl-3-(5-tetrazolylcarbonyl)-2-quinolone (CAS Reg. No.: 95855-00-8), as described in WO-A-1999000020,

N) compounds of the formula (S-XI) or (S-XII), as described in WO-A-2007023719 and WO-A-2007023764



(S-XI)



(S-XII)

in which

R_N^1 is halogen, (C_1-C_4)-alkyl, methoxy, nitro, cyano, CF_3, OCF_3

Y, Z independently of one another are O or S,

n_N is an integer from 0 to 4,

R_N^2 is (C_1-C_{16})-alkyl, (C_2-C_6)-alkenyl, (C_3-C_6)-cycloalkyl, aryl, benzyl, halobenzyl,

R_N^3 is hydrogen, (C_1-C_6)alkyl,

O) one or more compounds from the group consisting of:

1,8-naphthalic anhydride,

O,O-diethyl S-2-ethylthioethyl phosphorodithioate (disulfoton),

4-chlorophenyl methylcarbamate (mephenate),

O,O-diethyl O-phenyl phosphorothioate (dietholate),

4-carboxy-3,4-dihydro-2H-1-benzopyran-4-acetic acid (CL-304415, CAS Reg. No.: 31541-57-8),

2-propenyl 1-oxa-4-azaspiro[4.5]decane-4-carbodithioate (MG-838, CAS Reg. No.: 133993-74-5),
methyl [(3-oxo-1H-2-benzothiopyran-4(3H)-ylidene)methoxy]acetate (from WO-A-98/13361; CAS Reg. No.: 205121-04-6),
cyanomethoxyimino(phenyl)acetonitrile (cyometrinil),
1,3-dioxolan-2-ylmethoxyimino(phenyl)acetonitrile (oxabetrinil),
4'-chloro-2,2,2-trifluoroacetophenone O-1,3-dioxolan-2-ylmethyloxime (fluxofenim),
4,6-dichloro-2-phenylpyrimidine (fenclorim),
benzyl 2-chloro-4-trifluoromethyl-1,3-thiazole-5-carboxylate (flurazole),
2-dichloromethyl-2-methyl-1,3-dioxolane (MG-191),

including the stereoisomers, and the salts customary in agriculture.

A mixture N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above or their salts to be applied in connection with other known active compounds, such as fungicides, insecticides, acaricides, nematicides, bird repellents, plant nutrients and soil structure improvers to transgenic plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 is likewise possible.

Some of the safeners are already known as herbicides and accordingly, in addition to the herbicidal action against harmful plants, also act by protecting the crop plants. The weight ratios of herbicide (mixture) to safener generally depend on the herbicide application rate and the effectiveness of the safener in question and may vary within wide limits, for example in the range from 200:1 to 1:200, preferably from 100:1 to 1:100, in particular from 20:1 to 1:20. The safeners may be formulated analogously to the compounds of the formula (I) or their mixtures with other herbicides/pesticides and be provided and used as a finished formulation or as a tank mix with the herbicides.

The required application rate of the N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above to areas where such transgenic plants containing one or more chimeric gene(s) (I) comprising a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms, consisting of (a) Avena, preferably Avena sativa, more preferably comprising a DNA sequence identical to SEQ ID No. 1 encoding HPPD defined by SEQ ID No. 2, (b) Pseudomonas, preferably Pseudomonas fluorescens, more preferably comprising a DNA sequence identical to SEQ ID No. 3 encoding HPPD defined by SEQ ID No. 4, (c) Synechococcoideae, preferably Synechococcus sp., more preferably comprising a DNA sequence identical to SEQ ID No. 6, encoding HPPD defined by SEQ ID No. 7, (d) Blepharismidae, preferably Blepharisma japonicum, more preferably comprising a DNA sequence identical to SEQ ID No. 8 encoding HPPD defined by SEQ ID No. 9, (e) Rhodococcus, preferably

Rhodococcus sp. (strain RHA1), isolate ro03041 more preferably comprising a DNA sequence identical to SEQ ID No. 10 encoding HPPD defined by SEQ ID No. 11 or Rhodococcus sp. (strain RHA1), isolate ro02040, more preferably comprising a DNA sequence identical to SEQ ID No.12 encoding HPPD defined by SEQ ID No. 13 , (f) Picrophilaceae, preferably Picrophilus torridus, more preferably comprising a DNA sequence identical to SEQ ID No. 14 encoding HPPD defined by SEQ ID No. 15, (g) Kordia, preferably Kordia algicida, more preferably comprising a DNA sequence identical to SEQ ID No. 16 encoding HPPD defined by SEQ ID No. 17 or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, preferably mutants as described in WO 2010/085705, US6,245,968, WO 2009/144079, PCT/EP2010/070561, PCT/EP2010/070567, PCT/EP2010/070578, PCT/EP2010/070570, or PCT/EP2010/070575 varies depending, inter alia, on external conditions such as temperature, humidity and the type of herbicide used. It can vary within wide limits, for example between 0.001 and 10 000 g/ha or more of active substance; however, it is preferably between 0.5 and 5000 g/ha, particularly preferably between 0.5 and 1000 g/ha and very particularly preferably between 0.5 and 500 g/ha.

SEQUENCES LISTING

SEQ ID No. 1:	Nucleic acid sequence encoding *Avena sativa* HPPD optimized for the expression in E. coli cells
SEQ ID No. 2:	Protein encoded by SEQ ID No. 1
SEQ ID No. 3:	Nucleic acid sequence encoding *Pseudomonas fluorescens* HPPD mutated at position 336; mutation Gly => Trp
SEQ ID No. 4:	Protein encoded by SEQ ID No. 3
SEQ ID No. 5:	Nucleic acid sequence encoding *Pseudomonas fluorescens* HPPD mutated at at position 336; mutation Gly => Trp; optimized for the expression in soybean and cotton
SEQ ID No. 6:	Nucleic acid sequence encoding *Synechococcus sp. HPPD*
SEQ ID No. 7:	Protein encoded by SEQ ID No. 6
SEQ ID No. 8:	Nucleic acid sequence encoding Blepharisma japonicum *HPPD*

SEQ ID No. 9:	Protein encoded by SEQ ID No. 8
SEQ ID No. 10:	Nucleic acid sequence encoding Rhodococcus sp. (strain RHA1), isolate ro03041 HPPD
SEQ ID No. 11:	Protein encoded by SEQ ID No. 10
SEQ ID No. 12:	Nucleic acid sequence encoding Rhodococcus sp. (strain RHA1), isolate ro02040 HPPD
SEQ ID No. 13:	Protein encoded by SEQ ID No. 12
SEQ ID No. 14:	Nucleic acid sequence encoding Picrophilus torridus *HPPD*
SEQ ID No. 15:	Protein encoded by SEQ ID No. 14
SEQ ID No. 16:	Nucleic acid sequence encoding Kordia algicida *HPPD*
SEQ ID No. 17:	Protein encoded by SEQ ID No. 16
SEQ ID No. 18:	Nucleic acid sequence encoding Synechococcus sp. HPPD optimized for the expression in soybean and cotton
SEQ ID No. 19:	Nucleic acid sequence encoding Blepharisma japonicum HPPD optimized for the expression in soybean and cotton
SEQ ID No. 20:	Nucleic acid sequence encoding Rhodococcus sp. (strain RHA1), isolate ro0341 HPPD optimized for the expression in soybean and cotton
SEQ ID No. 21:	Nucleic acid sequence encoding Rhodococcus sp. (strain RHA1), isolate ro0240 HPPD optimized for the expression in soybean and cotton
SEQ ID No. 22:	Nucleic acid sequence encoding Picropphilus torridus HPPD optimized for the expression in soybean and cotton
SEQ ID No. 23:	Nucleic acid sequence encoding Kordia algicida HPPD optimized for the expression in soybean and cotton

I. Cloning of specific genes coding for HPPDs from various organisms

A. Cloning of Avena HPPD (according WO02/46387)

A1- Cloning for expression in E. coli cells

cDNA coding for Avena sativa HPPD (AvHPPD; SEQ ID No. 1) was ordered at GeneArt (Regensburg, Germany) using the codon usage optimized for the expression of the gene in Escherichia coli cells. Upstream to the start codon ATG, was added the sequence corresponding to the recognition site of the restriction enzyme BamHI, and downstream to the stop codon was added the sequence stretch corresponding to the recognition site of the enzyme HindIII. The synthesized fragment was cloned using the restriction enzymes BamHI and HindIII in the previously opened vector pET32a (Novagen, Darmstadt, Germany), in order to obtain a fusion with the HisTag present in the vector at the N-Terminal extremity from the AvHPPD protein (SEQ ID No. 2). The resulting vector was named pET32a-AvHPPDe.

The protein was produced in E.coli and isolated following the standard protocol (as described for example in WO2009/144097).

A2- Cloning of the AvHPPD gene in the pBin19 binary vector for expression in tobacco plants

The cDNA corresponding to the gene coding for AvHPPD protein was cut out from the plasmid pET32a-AvHPPDe using the restriction enzymes NcoI and NotI. The overhang sequence resulting from the NotI restriction was filled up, and the consequent fragment was then cloned in the vector pRT100-OTPc (see for example Töpfer (1987), Nucleic Acids Res. 15: 5890, and PCT/EP2010/070561) previously restricted with the enzymes NcoI and SmaI. In this vector, the sequence coding for the AvHPPD was located downstream to the sequence corresponding to an optimized transit peptide responsible for the translocation of the protein to the chloroplast, itself downstream of the sequence corresponding to the CaMV 35S promoter (see for example WO2009/144097). The nucleotide sequence corresponding to the expression cassette CaMV35S-OTPc-AvHPPDe-35S was restricted using the enzyme SbfI and further cloned into the previously opened vector pBin19 with the same enzyme. The resulting plasmid was named pBin19-CaMV35S-OTPc-AvHPPDe-35S, and was used to transform Agrobacterium tumefaciens strain ATHV (see for example PCT/EP2010/070561).

B Cloning of PfHPPD-G336W

B1- Cloning of PfHPPD-G336W for the expression in E. coli cells

The gene coding for the mutant HPPD G336W (SEQ ID No. 3) (US 6,245,968) from Pseudomonas fluorescens in the plasmid pKK233-2 (Clontech) (US 6245968) was used as template for a PCR to add to the sequence at it 5' extremity the sequence corresponding to the recognition site of the enzyme NcoI and at its 3' extremity the sequence corresponding to the recognition site of the enzyme XbaI. (see WO 2009/144079). The cloning was made in order to obtain a His tag fusion protein at the N-terminal extremity of the Pseudomonas HPPD G336W (SEQ ID No. 4) named "pSE420(RI)NX-PfG336W".

B2- Cloning of PfHPPD-G336W for the expression in tobacco plants pFCO117

A binary vector for tobacco or soybean transformation is, for example, constructed with the CaMV35 promoter driving the expression of the gene PfHPPD-G336W (SEQID No 5), with a codon usage optimized for the expression in dicotyledoneous plants and at its 5'extremity was added a sequence coding for an OTP, and further upstream a sequence TEV (Tobacco etch virus) to improve the stability of the mRNA in plants followed by the CaMV35S terminator. Additionally, the transformation vector also contains a PAT gene cassette in which the gene is driven by a CaVM35S promoter and followed by a CaMV35S terminator for glufosinate based selection during the transformation process and a 2mEPSPS gene cassette in which the gene is driven by an histone promoter from Arabidopsis to confer tolerance to the herbicide glyphosate to the transformed plants. The binary vector was called pFCO117.

C. – Cloning ofHPPD obtained from Blepharisma and Kordia for expression in E.coli or in tobacco plants

These clonings were done as described in PCT/EP2010/070567 (Blepharisma japonicum, FMP37, Example 1,named "pSE420(RI)NX-FMP37") and

PCT/EP2010/070575 (Kordia algicida, FMP27, Example 1, named "pSE420(RI)NX-FMP27").

D- Production of HPPD protein in E coli, purification via His-Tag

The *Arabidopsis thaliana* AtHPPD coding sequence (1335 bp; Genebank AF047834; WO 96/38567) was initially cloned into the expression vector pQE-30 (QIAGEN, Hilden, Germany) in between the restriction sites of BamHI and HindIII. The obtained vector was called "pQE30-AtHPPD" (see WO 2009/144079).

The plasmid possesses the trp-lac (trc) promoter and the *lac*I[q] gene that provides the *lac* repressor in every *E. coli* host strain. The *lac* repressor binds to the *lac* operator (*lac*O) and restricts expression of the target gene; this inhibition can be alleviated by induction with Isopropyl β-D-1-thiogalactopyranoside (IPTG).

All above defined E. coli expression vectors were used to transform *Escherichia coli* BL21 cells (Merck, Darmstadt, Germany).

For the AtHPPD (*Arabidopsis thaliana* HPPD) that was used as reference see WO 2009/144079.

Expression of HPPD was carried out in *E. coli* K-12 BL21 containing pQE30-*AtHPPD*, pET32a-AvHPPDe, pSE420(RI)NX-PfG336W , pSE420(RI)NX-FMP27 or pSE420(RI)NX-FMP37. Cells were allowed to grow until OD reached 0.5, then expression was initiated from the trp-lac (trc) promoter by induction with 1 mM IPTG which binds to the *lac* repressor and causes its dissociation from the *lac* operon.
Expression was carried out over 15 h at 28 °C.
To prepare the pre-starter culture, 2 mL of TB medium (100 $\mu g*mL^{-1}$ carbenicillin) were inoculated with 50 µL of an *E. coli* K-12 BL21 glycerol stock. The pre-starter culture was incubated at 37 °C with shaking at 140 rpm for 15 h. 200µl of the pre-starter culture was used to initiate the starter culture (5mL TB supplement with 100 $\mu g*L^{-1}$), which was incubated 3 h at 37°C.
To prepare the main culture, 400 mL of TB medium (100 $\mu g*mL^{-1}$ carbenicillin) were inoculated with 4 mL of the starter culture. This starter culture was incubated at

37 °C with shaking at 140 rpm until OD_{600} 0.5 was reached. Then recombinant protein expression was induced with 400 µl of 1M IPTG solution. The cells were allowed to grow for an additional hour under these conditions, then the temperature was lowered to 28°C and the culture was shaken at 140 rpm for 15 h. Cells were harvested by centrifugation at 6000 x g for 15 min at 4 °C. Then cell pellets were stored at -80 °C.

Isolation and purification of His_6-AtHPPD, His_6-AvHPPD, His_6-PfHPPD-G336W, His_6-FMP27 and His_6-FMP37 in native form

Lysis of cells

Cells were lysed using Lysozyme, an enzyme that cleaves the 1,4-β-linkages between N-acetylmuramic acid and N-acetyl-D-glucosamine residues in peptidoglycan which forms the bacterial cell wall. Cell membranes were then disrupted by the internal pressure of the bacterial cell. In addition, the lysis buffer contained Benzonase® Nuclease, an endonuclease that hydrolyzes all forms of DNA and RNA without damaging proteins and thereby largely reduces viscosity of the cell lysate. Lysis under native conditions was carried out on ice.
For purification of His_6-tagged proteins the QIA*express*® Ni-NTA Fast Start Kit was used following the user manual instruction.

Purification of His_6-tagged proteins by immobilized metal ion affinity chromatography (IMAC)

The cleared cell lysate (10 mL) obtained after centrifugation of the lysis reaction was loaded onto a Ni-NTA Fast Start Column from the QIA*express*® Ni-NTA Fast Start Kit (Qiagen, Hilden, Germany) and purification was carried out according to the instruction manual. The His_6-tagged protein was eluted with 2.5 mL of elution buffer.

Desalting of HPPD solutions by gel filtration

HPPD solutions eluted from a Ni-NTA Fast Start Column with 2.5 mL of elution buffer were applied to a Sephadex G-25 PD-10 column (GE Healthcare, Freiburg, Germany) following the user manual instruction. After the whole sample had entered the gel bed, elution was performed with 3.5 mL of storage buffer.

The HPPD solutions eluted from the desalting column were frozen at -80 °C in 1 mL aliquots.

Determination of HPPD protein concentration using the Bradford protein assay

Protein concentration was determined using the standard Bradford assay (Bradford, (1976), Anal Biochem 72: 248-254).

Determination of purity of HPPD solutions using SDS-PAGE

The integrity of the eluted protein was checked by SDS-PAGE protein gel electrophoresis using the gel NuPAGE® Novex 4-12 % Bis-Tris Gels (Invitrogen, Karlsruhe, Germany), approximately 10 µg of protein were loaded. 10 µL of Laemmli Sample Buffer was added to 1-10 µL of protein solution and the mixture was incubated at 90 °C for 10 min. After short centrifugation step, the whole mixture was loaded into a slot of an SDS gel previously fixed in a XCell *SureLock*™ Novex Mini-Cell gel chamber filled with NuPAGE® MOPS SDS Running Buffer (diluted from the 20 x-solution with ddH_2O). A voltage of 150 was then applied to the gel chamber for 1 h. For staining of protein bands, the gel was immersed in Coomassie Brilliant Blue R-250 Staining Solution. For destaining of the polyacrylamide gel, it was immersed in Coomassie Brilliant Blue R-250 Destaining Solution until protein bands appear blue on a white gel.

Evaluation of tolerance to HPPD inhibitors of HPPD enzymes

The HPPD activity was checked by the standard spectrophotmetric assay (method extensively described in WO 2009/144079)

E- Evaluation of tolerance to HPPD inhibitor herbicide

Determination of HPPD activity in presence of several HPPD inhibitors

Level of tolerance of HPPD proteins obtained from different organisms was determined according to the procedure as described in PCT/EP2010/070575.

On the below Table E1, it can be clearly seen, that the HPPDs obtained from Kordia algicida (FMP27), Blepharisma japonicum (FMP37), Avena sativa (AvHPPD), and from the mutated HPPD-G336W from Pseudomonas fluorescens showed superior level of tolerance to all tested HPPD inhibitors than the Arabidopsis thaliana HPPD (AtHPPD) at all tested HPPD inhibitor concentrations under identical experimental conditions.

Table E1: Determination of percentage of inhibition in presence of $5.0x10^{-6}$M of Compound “4-137” compared to the activity measured in absence of Compound No. “4-137” with HPPD originated from *Arabidopsis thaliana (AtHPPD)*, mutated Pseudomonas fluorescens PfHPPD-G336W, Avena sativa (AvHPPD), FMP27 (derived from Kordia algicida) and FMP37 (derived from Blepharisma japonicum).

Table E1 Compound „4-137“

Proteins	Inhibition %
AtHPPD	100
PfHPPD-G336W	92
AvHPPD	93
FMP27	90
FMP37	82

These data show that the HPPD derived from Kordia algicida, Blepharisma japonicum, from Avena sativa, and the mutant HPPD-G336W of Pseudomonas fluorescens are less sensitive to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides compared to the inhibition observed with the HPPD derived from *Arabidopsis thaliana*, as shown for Compound “4-137”

F- Evaluation of tolerance to HPPD inhibitors of tobacco plants expressing tolerant HPPD enzymes

Genes coding for the selected HPPD were obtained from a member of the group of organisms consisting of Avena sativa, Pseudomonas fluorescens mutant G336W ,

Blepharisma japonicum and Kordia algicida and cloned into the binary vector pBin19 allowing the integration of DNA into the tobacco genome, under the control of the CaMV35S promoter. For the cloning procedures, see A2 above for Avena sativa, see B2 above for Pseudomonas fluorescens, mutant G336W, see PCT/EP2010/070567 (published as WO 2011/076882, Example 5; for Blepharisma japonicum (FMP37) and see PCT/EP2010/070575, Example 5 for Kordia algicida (FMP27).
Between the sequence corresponding to the promoter and the sequence coding for the HPPD a DNA sequence coding for a transit peptide to the chloroplast was inserted , in order to add at the N-terminal extremity of the protein a target signal to allow the localization of the HPPD protein into the plant chloroplast.
Seeds harvested from T0 transformants will be put on standard soil for germination. Three weeks later plantlets (T1) will be transferred to single pots and grown under standard cultivation conditions (PCT/EP2010/070575, published as WO 2011/076889). Two weeks later, plants were sprayed with several N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above. For example, one week after application of compounds “5-148”, “4-137”, “4-253”, “4-278”, and “4-25” the symptoms due to the application of the herbicides were evaluated and the transgenic plants showed good tolerance as demonstrated in below Tables F1 to F5, respectively.

Tables F1 to F5: Evaluation of the symptoms observed due to the application of the herbicides on transgenic tobacco plants, expressing the mutant Pseudomonas fluorescens HPPD G336W, the Avena HPPD (AvHPPD), the HPPD from Kordia algicida FMP27 or the HPPD from Blepharisma japonicum (FMP37), compared to non-tranformed tobacco plants (“wt”).
The herbicides (with “g AI/ha” meaning “g active ingredient/ha”) were applied on 8 to 10 plants originated from 1 to 3 independent transgenic events per transgene.
The symptoms were evaluated and classified as following :
3 = Very strong damage
2 = Strong damage
1 = Light and transient damage

0 = No damage

Table F1

The compound “5-148”; (WP20 formulation) was mixed with 2 l/ha oilseed rape methyl ester and 1 kg/ha ammonium sulfate, then applied on the transgenic plants using a standard herbicide sprayer at a rate of 25 g AI /ha.

HPPD		Damage			
	Line	0	1	2	3
Wt		0	0	0	10
PfHPPD-G336W	646	0	3	2	4
AvHPPD	656	2	1	3	4
	659	3	1	0	6
	699	1	1	1	7
FMP27	733	3	1	4	2
	734	4	2	0	4
	735	0	4	4	2
FMP37	749	2	3	2	3
	754	2	1	5	2
	795	1	0	6	3

Table F2

The compound “4-137”; 25 g/ha (WP20 formulation) was mixed with 2 l/ha oilseed rape methyl ester and 1 kg/ha ammonium sulfate, then applied on the transgenic plants using a standard herbicide sprayer at a rate of 25g AI/ha.

HPPD		Damage			
	Line	0	1	2	3
Wt		0	0	0	10
PfHPPD-G336W	646	5	2	0	3
AvHPPD	656	3	1	1	5
	659	3	3	0	4
	699	1	2	0	7
FMP27	733	4	0	1	5
	734	5	2	0	3
	735	3	0	4	3
FMP37	749	8	2	0	0
	754	0	1	1	8
	795	2	0	2	6

Table F3

The compound “4-253”; 50 g/ha (WP20 formulation) was mixed with 2 l/ha oilseed rape methyl ester and 1 kg/ha ammonium sulfate, then applied on the transgenic plants using a standard herbicide sprayer at a rates of 50g AI/ha.

HPPD		Damage			
	Line	0	1	2	3
Wt		0	0	0	10
PfHPPD-G336W	646	9	0	0	1
AvHPPD	659	3	0	0	7
FMP27	733	4	4	2	0
	734	6	1	2	1
	735	2	5	0	3
FMP37	749	7	2	0	1
	754	6	2	1	1
	795	3	4	0	3

Table F4

The compound “4-278”; 50 g/ha (WP20 formulation) was mixed with 2 l/ha oilseed rape methyl ester and 1 kg/ha ammnium sulfate, then applied on the transgenic plants using a standard herbicides sprayer at a rate of 50g AI/ha.

HPPD		Damage			
	Line	0	1	2	3
Wt		0	0	0	10
PfHPPD-G336W	646	6	3	0	1
AvHPPD	659	9	0	0	1
FMP27	733	6	4	0	0
	734	6	3	0	1
	735	6	2	0	2
FMP37	749	5	4	0	1
	754	5	4	0	1
	795	4	3	0	3

Table F5

The compound “4-25”; 50 g/ha (WP20 formulation) was mixed with 2 l/ha oilseed rape methyl ester and 1 kg/ha ammnium sulfate, then applied on the transgenic plants using a standard herbicides sprayer at a rate of 50 g AI/ha.

HPPD		Damage			
	Line	0	1	2	3
Wt		0	0	0	10
PfHPPD-G336W	646	10	0	0	0
AvHPPD	659	6	1	0	3
FMP27	733	9	1	0	0
	734	6	3	0	1
	735	5	3	0	0
FMP37	749	8	0	0	2
	754	3	5	1	1
	795	7	0	1	2

These data show that tobacco plants of all the tested independent lines expressing the HPPD derived from Kordia algicida, Blepharisma japonicum, from Avena sativa and the mutant “G336W” of Pseudomonas fluorescens HPPD are less sensitive at agronomically relevant dose to N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides than wild type (wt) plants as shown for Compounds “5-148”,“4-137”, “4-253”, “4-278”, and “4-25” .

G- Evaluation of tolerance to HPPD inhibitors of soybean plants expressing tolerant HPPD enzymes, Pseudomonas fluorescens “G336W” mutant, FMP 27, and FMP 37

Genes coding for the selected HPPD were obtained from a member of the group of organisms consisting of Blepharisma japonicum and Kordia algicida and cloned into an appropritate binary vector allowing the integration of DNA into the soybean genome, under the control of the CaMV35S promoter. For the respective cloning procedures, see WO2011076882 (PCT/EP2010/070567), Example 9; for Blepharisma japonicum (FMP37) and WO2011076889 (PCT/EP2010/070575), Example 9 for Kordia algicida (FMP27).

Between the sequence corresponding to the promoter and the sequence coding for the HPPD a DNA sequence coding for a transit peptide to the chloroplast was inserted, in order to add at the N-terminal extremity of the protein a target signal to allow the localization of the HPPD protein into the plant chloroplast. By using the vectors “pFCO112“ (Blepharisma japonicum, WO2011076882), pFCO116 (Korida algicida, WO2011076889), and pFCO117” (see Example B2, above), soybean transformation was achieved as described in Example 10 of WO2011076882 (PCT/EP2010/070567) for Blepharisma japonicum (FMP37) and WO2011076889 (PCT/EP2010/070575) for Kordia algicida (FMP27). Seeds from T0 events showing tolerance to tembotrione were harvested.

T1 Soybean seeds were transferred to single pots and grown under standard cultivation conditions, see WO2011076882.

Two weeks later, plants will be sprayed with several N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above. For example, one week after application of compounds “5-148”, “4-137”, “4-253”, “4-278”, and “4-25” the symptoms due to the application of the herbicides will be evaluated and the transgenic plants will show superior tolerance compared to the wild-type soybean plants.

H- Evaluation of tolerance to HPPD inhibitors of cotton plants expressing tolerant HPPD enzymes FMP 27 and FMP 37

Genes coding for the selected HPPD were obtained from a member of the group of organisms consisting of Blepharisma japonicum and Kordia algicida and cloned into an appropritate binary vector allowing the integration of DNA into the cotton genome, under the control of the CaMV35S promoter. For the respective cloning procedures, see WO2011076882 (PCT/EP2010/070567), Example 11; for Blepharisma japonicum (FMP37) and WO2011076889 (PCT/EP2010/070575), Example 11 for Kordia algicida (FMP27).

Between the sequence corresponding to the promoter and the sequence coding for the HPPD a DNA sequence coding for a transit peptide to the chloroplast was inserted, in order to add at the N-terminal extremity of the protein a target signal to

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allow the localization of the HPPD protein into the plant chloroplast. Cotton transformation was achieved as described in Example 12 of WO2011076882 (PCT/EP2010/070567) for Blepharisma japonicum (FMP37) and WO2011076889 (PCT/EP2010/070575) for Kordia algicida (FMP27). Seeds from T0 events showing tolerance to tembotrione were harvested.

T1 Cotton seeds were transferred to single pots and grown under standard cultivation conditions, see WO2011076882 (PCT/EP2010/070567) for Blepharisma japonicum (FMP37) and WO2011076889 (PCT/EP2010/070575) for Kordia algicida (FMP27).

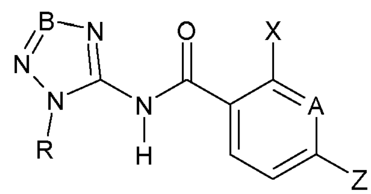
At least 4 weeks later, plants will be sprayed with several N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides as defined above. For example, one week after application of compounds “5-148”, “4-137”, “4-253”, “4-278”, and “4-25” the symptoms due to the application of the herbicides will be evaluated and the transgenic plants will show superior tolerance compared to the wild-type cotton plants.

In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary implication, the word “comprise” or variations such as “comprises” or “comprising” is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the invention.

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

Claims

1. The use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides of the formula (I) or their salts



(I),

for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) comprising (I) a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, (b) Pseudomonas, (c) Synechococcoideae, (d) Blepharismidae, (e) Rhodococcus, (f) Picrophilaceae, (g) Kordia, or (II) comprising one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms

in which

A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, formyl, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $C(O)NR^1OR^1$, OR^1, $OCOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-

OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, NR_1R_2, $P(O)(OR^5)_2$, $CH_2P(O)(OR^5)_2$, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy and/or halo-(C_1-C_6)-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups,

Y is hydrogen, nitro, halogen, cyano, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$,$OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $CO(NOR^1)R^1$, $NR^1SO_2R^2$, NR^1COR^1, OR^1, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$ (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-CN, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, $N(R^1)_2$, $P(O)(OR^5)_2$, $CH_2P(O)(OR^5)_2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, thiocyanato, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $OCOOR^1$, NR^1COOR^1, $C(O)N(R^1)_2$, $NR^1C(O)N(R^1)_2$, $OC(O)N(R^1)_2$, $C(O)NR^1OR^1$,

OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, $N(R^1)_2$, $P(O)(OR^5)_2$, heteroaryl, heterocyclyl or phenyl, the last three radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy or halo-(C_1-C_6)-alkoxy, and where heterocyclyl carries 0 to 2 oxo groups, or Z may else be hydrogen, (C_1-C_6)-alkyl or (C_1-C_6)-alkoxy if Y is the radical $S(O)_nR^2$,

R is (C_1–C_6)-alkyl, (C_3–C_7)-cycloalkyl, halo-(C_1–C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_2-C_6)-alkynyl, CH_2R^6, heteroaryl, heterocyclyl or phenyl, the last three radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy and (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl,

R^1 is hydrogen, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, (C_3-C_6)-halocycloalkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl, (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 21 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, thiocyanato, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, $SCOR^4$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $COSR^4$, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, (C_3-C_6)-halocycloalkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl, (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 21 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, thiocyanato, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, $SCOR^4$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $COSR^4$, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^3 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl or (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl,

R^4 is (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl or (C_2-C_6)-alkynyl,

R^5 is methyl or ethyl,

R^6 is acetoxy, acetamido, N-methylacetamido, benzoyloxy, benzamido, N-methylbenzamido, methoxycarbonyl, ethoxycarbonyl, benzoyl, methylcarbonyl, piperidinylcarbonyl, morpholinylcarbonyl, trifluoromethylcarbonyl, aminocarbonyl, methylaminocarbonyl, dimethylaminocarbonyl, (C_1-C_6)-alkoxy or (C_3-C_6)-cycloalkyl or is heteroaryl, heterocyclyl or phenyl substituted in each case by s radicals from the group consisting of methyl, ethyl, methoxy, trifluoromethyl, and halogen,

n is 0, 1 or 2,

s is 0, 1, 2 or 3.

2. The use according to claim 1, where, in formula (I)

A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, OR^1, $OCOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1 or (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy and/or halo-(C_1-C_6)-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups,

Y is hydrogen, nitro, halogen, cyano, thiocyanato, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkenyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, OR^1, $COOR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2\ N(R^1)_2$, $N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n-(C_1-C_6)$-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, thiocyanato, halo-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, halo-(C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, halo-(C_3-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, halo-(C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, COR^1, $COOR^1$, $C(O)N(R^1)_2$, $C(O)NR^1OR^1$, OSO_2R^2, $S(O)_nR^2$, SO_2OR^1, $SO_2N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$OCOR^1$, (C_1-C_6)-alkyl-OSO_2R^2, (C_1-C_6)-alkyl-CO_2R^1, (C_1-C_6)-alkyl-SO_2OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$ or 1,2,4-triazol-1-yl, or Z may else be hydrogen, (C_1-C_6)-alkyl or (C_1-C_6)-alkoxy if Y is the radical $S(O)_nR^2$,

R is $(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkyl, halo-$(C_1–C_6)$-alkyl, $(C_3–C_7)$-cycloalkylmethyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, acetylmethyl, methoxymethyl, or phenyl or benzyl each substituted by s radicals from the group consisting of methyl, methoxy, trifluoromethyl and halogen,

R^1 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl or (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 16 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, NR^3COR^3, $NR^3SO_2R^4$,

CO_2R^3, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl or (C_1-C_6)-alkyl-NR^3-heterocyclyl, these radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, $NR^3SO_2R^4$, COR^3, $OCOR^3$, NR^3COR^3, CO_2R^3, $CON(R^3)_2$ and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^3 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl or (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl,

R^4 is (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl or (C_2-C_6)-alkynyl,

n is 0, 1 or 2,

s is 0, 1, 2 or 3.

3. The use according to claim 1, where, in formula (I)

A is N or CY,

B is N or CH,

X is nitro, halogen, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, OR^1, $S(O)_nR^2$, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-heteroaryl or (C_1-C_6)-alkyl-heterocyclyl, the two last-mentioned radicals being substituted in each case by s halogen, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy and/or halo-(C_1-C_6)-alkoxy radicals, and where heterocyclyl carries 0 to 2 oxo groups,

Y is hydrogen, nitro, halogen, cyano, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, OR^1, $S(O)_nR^2$, $SO_2N(R^1)_2$, $N(R^1)_2$, $NR^1SO_2R^2$, NR^1COR^1, (C_1-C_6)-alkyl-$S(O)_nR^2$, (C_1-C_6)-alkyl-OR^1, (C_1-C_6)-alkyl-$CON(R^1)_2$, (C_1-C_6)-alkyl-$SO_2N(R^1)_2$, (C_1-C_6)-alkyl-NR^1COR^1, (C_1-C_6)-alkyl-$NR^1SO_2R^2$, (C_1-C_6)-alkyl-phenyl, (C_1-C_6)-alkyl-heteroaryl, (C_1-C_6)-alkyl-heterocyclyl, phenyl, heteroaryl or heterocyclyl, the last 6 radicals being substituted in each case by s radicals from the group consisting of halogen, nitro, cyano, (C_1-C_6)-alkyl, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_n$-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, halo-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_4)-alkyl, and cyanomethyl, and where heterocyclyl carries 0 to 2 oxo groups,

Z is halogen, cyano, halo-(C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, $S(O)_nR^2$ or 1,2,4-triazol-1-yl, or Z may else be hydrogen, methyl, methoxy or ethoxy if Y is the radical $S(O)_nR^2$,

R is (C_1–C_6)-alkyl, (C_3–C_7)-cycloalkyl, halo-(C_1–C_6)-alkyl, (C_3–C_7)-cycloalkylmethyl, methoxycarbonylmethyl, ethoxycarbonylmethyl, acetylmethyl or methoxymethyl, or is phenyl substituted by s radicals from the group consisting of methyl, methoxy, trifluoromethyl, and halogen;

R^1 is hydrogen, (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkyl-O-(C_1-C_6)-alkyl, phenyl, phenyl-(C_1-C_6)-alkyl, heteroaryl, (C_1-C_6)-alkyl-heteroaryl, heterocyclyl, (C_1-C_6)-alkyl-heterocyclyl, (C_1-C_6)-alkyl-O-heteroaryl, (C_1-C_6)-alkyl-O-heterocyclyl, (C_1-C_6)-alkyl-NR^3-heteroaryl or (C_1-C_6)-alkyl-NR^3-heterocyclyl, the 16 last-mentioned radicals being substituted by s radicals from the group consisting of cyano, halogen, nitro, OR^3, $S(O)_nR^4$, $N(R^3)_2$, NR^3OR^3, COR^3, $OCOR^3$, NR^3COR^3, $NR^3SO_2R^4$, CO_2R^3, $CON(R^3)_2$, and (C_1-C_4)-alkoxy-(C_2-C_6)-alkoxycarbonyl, and where heterocyclyl carries 0 to 2 oxo groups,

R^2 is (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl or (C_3-C_6)-cycloalkyl-(C_1-C_6)-alkyl, these three aforementioned radicals being substituted in each case by s radicals from the group consisting of halogen and OR^3,

R^3 is hydrogen or (C_1-C_6)-alkyl,

R^4 is (C_1-C_6)-alkyl,

n is 0, 1 or 2,

s is 0, 1, 2 or 3.

4. A method for controlling unwanted plants comprising the application of one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides according to claim 1 in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides by containing one or more chimeric gene(s) comprising (I) a DNA sequence encoding hydroxyphenylpyruvate dioxygenase (HPPD) derived from a member of a group of organisms consisting of (a) Avena, (b) Pseudomonas, (c) Synechococcoideae, (d) Blepharismidae, (e) Rhodococcus, (f) Picrophilaceae, (g) Kordia, or comprising (II) one or more mutated DNA sequences of HPPD encoding genes of the before defined organisms, and in which the application is performed to (a) the unwanted plants, (b) to the seeds of unwanted plants, and/or (c) to the area on which the plants grow.

5. A method according to claim 4, in which the transgenic crop plant belongs to the group of dicotyledonous crops consisting of Arachis, Beta, Brassica, Cucumis, Cucurbita, Helianthus, Daucus, Glycine, Gossypium, Ipomoea, Lactuca, Linum, Lycopersicon, Nicotiana, Phaseolus, Pisum, Solanum, and Vicia, or to the group of monocotyledonous crops consisting of Allium, Ananas, Asparagus, Avena, Hordeum, Oryza, Panicum, Saccharum, Secale, Sorghum, Triticale, Triticum, Zea.

6. A method according to claim 4 or 5 in which one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides according to claim 1 is/are applied in combination with one or more HPPD inhibitor herbicides selected from the group consisting of triketone or pyrazolinate herbicide in mixed formulations or in the tank mix, and/or with further known active substances which are based on the inhibition of acetolactate synthase, acetyl-CoA carboxylase, cellulose synthase, enolpyruvylshikimate-3-phosphate synthase, glutamine synthetase, p-hydroxyphenylpyruvate dioxygenase, phytoene desaturase, photosystem I, photosystem II, protoporphyrinogen oxidase, or act as growth regulators.

7. A method according to claim 6, in which one or more N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides is/are applied in combination with one or more HPPD inhibitor herbicides selected from the group consisiting of tembotrione, mesotrione, bicyclopyrone, tefuryltrione pyrasulfotole, pyrazolate, diketonitrile, benzofenap, or sulcotrione.

SEQUENCE LISTING

<110> Bayer CropScience AG

<120> Use of N-(tetrazol-4-yl)- or N-(triazol-3-yl)arylcarboxamides or their salts for controlling unwanted plants in areas of transgenic crop plants being tolerant to HPPD inhibitor herbicides

<130> BCS 11-1013

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His Ala Ser Leu Leu Leu Arg Ser Gly Ala Leu Ala Phe Leu Phe Thr
                85   90   95

Ala Pro Tyr Ala Pro Pro Pro Gln Glu Ala Ala Thr Ala Ala Ala Thr
            100   105   110

Ala Ser Ile Pro Ser Phe Ser Ala Asp Ala Ala Arg Thr Phe Ala Ala
        115   120   125

Ala His Gly Leu Ala Val Arg Ser Val Gly Val Arg Val Ala Asp Ala
    130   135   140

Ala Glu Ala Phe Arg Val Ser Val Ala Gly Gly Ala Arg Pro Ala Phe
145   150   155   160

Ala Pro Ala Asp Leu Gly His Gly Phe Gly Leu Ala Glu Val Glu Leu
                165   170   175

Tyr Gly Asp Val Val Leu Arg Phe Val Ser Tyr Pro Asp Glu Thr Asp
            180   185   190

Leu Pro Phe Leu Pro Gly Phe Glu Arg Val Ser Ser Pro Gly Ala Val
        195   200   205

Asp Tyr Gly Leu Thr Arg Phe Asp His Val Val Gly Asn Val Pro Glu
    210   215   220

Met Ala Pro Val Ile Asp Tyr Met Lys Gly Phe Leu Gly Phe His Glu
225 230 235 240

Phe Ala Glu Phe Thr Ala Glu Asp Val Gly Thr Thr Glu Ser Gly Leu
245 250 255

Asn Ser Val Val Leu Ala Asn Asn Ser Glu Ala Val Leu Leu Pro Leu
260 265 270

Asn Glu Pro Val His Gly Thr Lys Arg Arg Ser Gln Ile Gln Thr Tyr
275 280 285

Leu Glu Tyr His Gly Gly Pro Gly Val Gln His Ile Ala Leu Ala Ser
290 295 300

Asn Asp Val Leu Arg Thr Leu Arg Glu Met Arg Ala Arg Thr Pro Met
305 310 315 320

Gly Gly Phe Glu Phe Met Ala Pro Pro Gln Ala Lys Tyr Tyr Glu Gly
325 330 335

Val Arg Arg Ile Ala Gly Asp Val Leu Ser Glu Glu Gln Ile Lys Glu
340 345 350

Cys Gln Glu Leu Gly Val Leu Val Asp Arg Asp Asp Gln Gly Val Leu
355 360 365

Leu Gln Ile Phe Thr Lys Pro Val Gly Asp Arg Pro Thr Phe Phe Leu
370 375 380

Glu Met Ile Gln Arg Ile Gly Cys Met Glu Lys Asp Glu Val Gly Gln
385 390 395 400

Glu Tyr Gln Lys Gly Gly Cys Gly Gly Phe Gly Lys Gly Asn Phe Ser
405 410 415

Glu Leu Phe Lys Ser Ile Glu Asp Tyr Glu Lys Ser Leu Glu Val Lys
420 425 430

Gln Ser Val Val Ala Gln Lys Ser
435 440

<210> 3
<211> 1077
<212> DNA
<213> Pseudomonas fluorescens

<220>
<221> misc_feature
<222> (1006)..(1008)
<223> GGT codon is replaced by codon TGG

<400> 3

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tcgccgacgc cgggtaccct ggagccgatc ttcgagatca tgggcttcac caaagtcgcg     120

acccaccgtt ccaagaacgt gcacctgtac cgccagggcg agatcaacct gatcctcaac     180

aacgagccca acagcatcgc ctcctacttt gcggccgaac acggcccgtc ggtgtgcggc     240

atggcgttcc gcgtgaagga ctcgcaaaag gcctacaacc gcgccctgga actcggcgcc     300

cagccgatcc atattgacac cgggccgatg gaattgaacc tgccggcgat caagggcatc     360

ggcggcgcgc cgttgtacct gatcgaccgt ttcggcgaag gcagctcgat ctacgacatc     420

gacttcgtgt acctcgaagg tgtggagcgc aatccggtcg gtgcaggtct caaagtcatc     480

gaccacctga cccacaacgt ctatcgcggc cgcatggtct actgggccaa cttctacgag     540

aaattgttca acttccgtga agcgcgttac ttcgatatca agggcgagta caccggcctg     600

acttccaagg ccatgagtgc gccggacggc atgatccgca tcccgctgaa cgaagagtcg     660

tccaagggcg cggggcagat cgaagagttc ctgatgcagt tcaacggcga aggcatccag     720

cacgtggcgt tcctcaccga cgacctggtc aagacctggg acgcgttgaa gaaaatcggc     780

atgcgcttca tgaccgcgcc gccagacact tattacgaaa tgctcgaagg ccgcctgcct     840

gaccacggcg agccggtgga tcaactgcag gcacgcggta tcctgctgga cggatcttcc     900

gtggaaggcg acaaacgcct gctgctgcag atcttctcgg aaaccctgat gggcccggtg     960

ttcttcgaat tcatccagcg caagggcgac gatgggtttg gcgagtggaa cttcaaggcg    1020

ctgttcgagt ccatcgaacg tgaccaggtg cgtcgtggtg tattgaccgc cgattaa       1077
```

<210> 4
<211> 358
<212> PRT
<213> Pseudomonas fluorescens

<220>
<221> MISC_FEATURE
<222> (336)..(336)
<223> Gly replaced by Trp

<400> 4

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Met Ala Asp Leu Tyr Glu Asn Pro Met Gly Leu Met Gly Phe Glu Phe
1               5                   10                  15

Ile Glu Phe Ala Ser Pro Thr Pro Gly Thr Leu Glu Pro Ile Phe Glu
            20                  25                  30

Ile Met Gly Phe Thr Lys Val Ala Thr His Arg Ser Lys Asn Val His
        35                  40                  45

Leu Tyr Arg Gln Gly Glu Ile Asn Leu Ile Leu Asn Asn Glu Pro Asn
    50                  55                  60

Ser Ile Ala Ser Tyr Phe Ala Ala Glu His Gly Pro Ser Val Cys Gly
65                  70                  75                  80
```

```
Met Ala Phe Arg Val Lys Asp Ser Gln Lys Ala Tyr Asn Arg Ala Leu
                85                  90                  95

Glu Leu Gly Ala Gln Pro Ile His Ile Asp Thr Gly Pro Met Glu Leu
            100                 105                 110

Asn Leu Pro Ala Ile Lys Gly Ile Gly Gly Ala Pro Leu Tyr Leu Ile
        115                 120                 125

Asp Arg Phe Gly Glu Gly Ser Ser Ile Tyr Asp Ile Asp Phe Val Tyr
    130                 135                 140

Leu Glu Gly Val Glu Arg Asn Pro Val Gly Ala Gly Leu Lys Val Ile
145                 150                 155                 160

Asp His Leu Thr His Asn Val Tyr Arg Gly Arg Met Val Tyr Trp Ala
                165                 170                 175

Asn Phe Tyr Glu Lys Leu Phe Asn Phe Arg Glu Ala Arg Tyr Phe Asp
            180                 185                 190

Ile Lys Gly Glu Tyr Thr Gly Leu Thr Ser Lys Ala Met Ser Ala Pro
        195                 200                 205

Asp Gly Met Ile Arg Ile Pro Leu Asn Glu Glu Ser Ser Lys Gly Ala
    210                 215                 220

Gly Gln Ile Glu Glu Phe Leu Met Gln Phe Asn Gly Glu Gly Ile Gln
225                 230                 235                 240

His Val Ala Phe Leu Thr Asp Asp Leu Val Lys Thr Trp Asp Ala Leu
                245                 250                 255

Lys Lys Ile Gly Met Arg Phe Met Thr Ala Pro Pro Asp Thr Tyr Tyr
            260                 265                 270

Glu Met Leu Glu Gly Arg Leu Pro Asp His Gly Glu Pro Val Asp Gln
        275                 280                 285

Leu Gln Ala Arg Gly Ile Leu Leu Asp Gly Ser Ser Val Glu Gly Asp
    290                 295                 300

Lys Arg Leu Leu Leu Gln Ile Phe Ser Glu Thr Leu Met Gly Pro Val
305                 310                 315                 320

Phe Phe Glu Phe Ile Gln Arg Lys Gly Asp Asp Gly Phe Gly Glu Trp
                325                 330                 335

Asn Phe Lys Ala Leu Phe Glu Ser Ile Glu Arg Asp Gln Val Arg Arg
            340                 345                 350
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Gly Val Leu Thr Ala Asp
        355

<210> 5
<211> 1077
<212> DNA
<213> Artificial Sequence

<220>
<223> Nucleic acid sequence encoding Pseudomonas fluorescens HPPD mutated at the position 336 (Gly to Trp) optimized for the expression in soybean and cotton

<220>
<221> misc_feature
<222> (1006)..(1008)
<223> GGT codon is replaced by codon TGG

<400> 5
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tctcctaccc ctggtactct tgaacctatt ttcgagatca tgggcttcac taaggttgca   120

actcacaggt ctaagaacgt tcacctttac aggcagggtg agatcaacct tatccttaac   180

aacgagccta actccattgc ttcttatttc gctgctgagc atggtccatc tgtttgcggt   240

atggctttca gagttaagga ttctcagaag gcttacaaca gggctcttga acttggtgct   300

cagcctattc atattgatac cggacctatg gaactcaacc ttcctgctat taagggtatt   360

ggtggtgctc ctctttacct tattgataga ttcggtgagg gctcctccat ctacgatatt   420

gatttcgttt accttgaggg cgttgagaga aaccctgttg gtgctggtct taaggttatc   480

gatcacctta cccacaacgt ttacagaggt aggatggttt actgggctaa cttctacgag   540

aagttgttca acttcagaga ggctcgttac ttcgatatta agggcgagta cactggtctt   600

acctctaagg ctatgtctgc tcctgatggt atgatcagga ttcctcttaa cgaagagtcc   660

tctaagggtg ctggtcaaat tgaagagttc ctcatgcaat tcaacggtga gggtattcag   720

catgttgctt tcttgaccga tgaccttgtt aagacttggg acgctcttaa gaaaatcggc   780

atgcgtttca tgactgctcc tccagatact tactacgaaa tgcttgaggg taggcttcct   840

gatcatggtg aacctgttga tcaacttcag gctaggggta ttcttcttga tggttcttct   900

gttgagggcg ataagaggct tttgcttcag attttctccg agactcttat gggtcctgtg   960

ttcttcgagt tcattcagag aaagggtgat gatggtttcg gtgaatggaa cttcaaggct   1020

cttttcgagt ccattgagag ggatcaagtt agaaggggtg ttcttaccgc tgattaa   1077

<210> 6
<211> 1053
<212> DNA
<213> Synechococcus sp.

<400> 6
atgaacccgt ccattcgaat tgtccaaggg atccaccacc tgcacttcta cctttgggat   60

```
ctgccccgtt ggcgggaaca cttttgtcgg gtttggggct tccgggtggc aagcgacgcc     120

ggcaacaccc tggagctgga gcagggatcc ctgcgcttgc gcctgtctca gccggcacgg     180

gcgggggacg aggtggaccg ccatttgcag cggcatgggc cgggggtggt ggatgtggcc     240

ttggcggtgg gagagcagga gctaccggcc ttggcggagc tgttgcgggg ccgaggcgcc     300

caactggcgt ggatcccggc agcagcggcg ctctgcctcc acacccccta cgggatccgg     360

cattctctga tccctggccc cttggatgcc gcccctgccg aagcgggcct gttttcccac     420

tgggatcacg tggtgttgaa cgtggagcag ggatccctgc aggcggcagc cgactggtat     480

gggcgggtgc tgggctggcg gcggctgtac cgctacagca tcggcaccgc cacctccggc     540

ctggaaagcg tggtggtggg ggatccggaa gcggggatcc aatgggccat caacgagccc     600

acctgtgccg cttcccagat tcaggagttt ttgcatgccc atggcggccc gggcattcag     660

cacgcggcgc tgcacagctc agacattgtt gccagcctgc gccggttgcg gcaggggga      720

gtggactttt tgcaagtggc gccgcagtac tacaccagcc tggaaaggga gctggggttg     780

gcgctccgtt ctgcccttgg gcaggccatc tcctggcaag acctggtgga gcagcagatc     840

cttctggatg ctaccctgcc cgcttctgat ggccaggatc gccccccttct gctgcagacc    900

tttacccagc ccctctttgg tcggcccacc tttttctttg aagtcattca acggctaggc     960

ggggccacgg gctttggcga ggccaatttt caggctttgt tcgaggccct ggaacggcaa    1020

cagcgacagc gacaccaggc gctgacccct tag                                1053
```

```
<210>  7
<211>  350
<212>  PRT
<213>  Synechococcus sp.

<400>  7

Met Asn Pro Ser Ile Arg Ile Val Gln Gly Ile His His Leu His Phe
1               5                   10                  15

Tyr Leu Trp Asp Leu Pro Arg Trp Arg Glu His Phe Cys Arg Val Trp
            20                  25                  30

Gly Phe Arg Val Ala Ser Asp Ala Gly Asn Thr Leu Glu Leu Glu Gln
        35                  40                  45

Gly Ser Leu Arg Leu Arg Leu Ser Gln Pro Ala Arg Ala Gly Asp Glu
    50                  55                  60

Val Asp Arg His Leu Gln Arg His Gly Pro Gly Val Val Asp Val Ala
65                  70                  75                  80

Leu Ala Val Gly Glu Gln Glu Leu Pro Ala Leu Ala Glu Leu Leu Arg
                85                  90                  95

Gly Arg Gly Ala Gln Leu Ala Trp Ile Pro Ala Ala Ala Ala Leu Cys
            100                 105                 110
```

```
Leu His Thr Pro Tyr Gly Ile Arg His Ser Leu Ile Pro Gly Pro Leu
        115                 120                 125

Asp Ala Ala Pro Ala Glu Ala Gly Leu Phe Ser His Trp Asp His Val
    130                 135                 140

Val Leu Asn Val Glu Gln Gly Ser Leu Gln Ala Ala Ala Asp Trp Tyr
145                 150                 155                 160

Gly Arg Val Leu Gly Trp Arg Arg Leu Tyr Arg Tyr Ser Ile Gly Thr
                165                 170                 175

Ala Thr Ser Gly Leu Glu Ser Val Val Val Gly Asp Pro Glu Ala Gly
            180                 185                 190

Ile Gln Trp Ala Ile Asn Glu Pro Thr Cys Ala Ala Ser Gln Ile Gln
        195                 200                 205

Glu Phe Leu His Ala His Gly Gly Pro Gly Ile Gln His Ala Ala Leu
    210                 215                 220

His Ser Ser Asp Ile Val Ala Ser Leu Arg Arg Leu Arg Gln Gly Gly
225                 230                 235                 240

Val Asp Phe Leu Gln Val Ala Pro Gln Tyr Tyr Thr Ser Leu Glu Arg
                245                 250                 255

Glu Leu Gly Leu Ala Leu Arg Ser Ala Leu Gly Gln Ala Ile Ser Trp
            260                 265                 270

Gln Asp Leu Val Glu Gln Gln Ile Leu Leu Asp Ala Thr Leu Pro Ala
        275                 280                 285

Ser Asp Gly Gln Asp Arg Pro Leu Leu Leu Gln Thr Phe Thr Gln Pro
    290                 295                 300

Leu Phe Gly Arg Pro Thr Phe Phe Phe Glu Val Ile Gln Arg Leu Gly
305                 310                 315                 320

Gly Ala Thr Gly Phe Gly Glu Ala Asn Phe Gln Ala Leu Phe Glu Ala
                325                 330                 335

Leu Glu Arg Gln Gln Arg Gln Arg His Gln Ala Leu Thr Pro
            340                 345                 350


<210>  8
<211>  1149
<212>  DNA
<213>  Blepharisma japonicum

<400>  8
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cacgttcgtt tttacgtctc caactcagag caagccgctt cgttctacac atctcgcttt 120

gggttttctc cggttgccta tgaaggattg gaaacaggaa accaaaaatt ctgtaccaat 180

gtcgtccgaa gcaaccatgt agtcatcgct tttacctcag ctctcactcc tgaagacaat 240

gaagtgaacc gtcacgttgg caagcatagt gatggagttc aagacattgc ctttagtgta 300

agtgacgcaa gagggatgta tgagaaagcg atagctaaag gctgtaaaag cttccgtgag 360

ccacaggttt tacaagatca atttggatct gttataatag cgtctctcca gacttatgga 420

gacactgttc acacattagt ccaaaatgtc gactatacag gacccttttt gcctggcttc 480

agagcaatca caaaagatga tccattaaac tctgcctttc ctcaggtaaa ttatgacatt 540

attgatcatg ttgtaggaaa tcagcctggt ggcgatatga ctcctacagt agaatggtat 600

gagaaatatc tagaatttca tcgatattgg tctgctgatg agtctgtaat ccataccgat 660

tattcagcat taaggtctgt tgtggttgct gattgggatg aagtgatcaa aatgcctatt 720

aatgagcctg ctgatggact tagaaaaagt caaatccaag aatatgtcga atattatggt 780

ggagcaggcg tacaacatat tgccttaaaa gtcaatgata ttatttcagt aataagcacc 840

ttaagggcta gaggtgtgga attcttagaa gttcctccta aatattatga tagcttaaga 900

aaaagacttg cgcattctgc ggtacaaatt gaagaagact taaaaagaat tgaagacctt 960

catattttgg ttgactttga cgaccgtggg tatttacttc agattttcac aaaaccagta 1020

gaagacagac ctactctgtt ttatgaaatt attcaaagac ataataacaa tggattcgga 1080

attggaaatt ttaaagccct atttgaatca ttggaacaag agcaagaaag aagaggtaat 1140

ttgatctaa 1149

<210> 9
<211> 382
<212> PRT
<213> Blepharisma japonicum

<400> 9

Met Thr Tyr Tyr Asp Lys Gln Glu Thr Arg Pro Asp Leu Gly Glu Phe
1 5 10 15

Tyr Gly Phe His His Val Arg Phe Tyr Val Ser Asn Ser Glu Gln Ala
20 25 30

Ala Ser Phe Tyr Thr Ser Arg Phe Gly Phe Ser Pro Val Ala Tyr Glu
35 40 45

Gly Leu Glu Thr Gly Asn Gln Lys Phe Cys Thr Asn Val Val Arg Ser
50 55 60

Asn His Val Val Ile Ala Phe Thr Ser Ala Leu Thr Pro Glu Asp Asn
65 70 75 80

```
Glu Val Asn Arg His Val Gly Lys His Ser Asp Gly Val Gln Asp Ile
                85                  90                  95

Ala Phe Ser Val Ser Asp Ala Arg Gly Met Tyr Glu Lys Ala Ile Ala
            100                 105                 110

Lys Gly Cys Lys Ser Phe Arg Glu Pro Gln Val Leu Gln Asp Gln Phe
        115                 120                 125

Gly Ser Val Ile Ile Ala Ser Leu Gln Thr Tyr Gly Asp Thr Val His
    130                 135                 140

Thr Leu Val Gln Asn Val Asp Tyr Thr Gly Pro Phe Leu Pro Gly Phe
145                 150                 155                 160

Arg Ala Ile Thr Lys Asp Asp Pro Leu Asn Ser Ala Phe Pro Gln Val
                165                 170                 175

Asn Tyr Asp Ile Ile Asp His Val Val Gly Asn Gln Pro Gly Gly Asp
            180                 185                 190

Met Thr Pro Thr Val Glu Trp Tyr Glu Lys Tyr Leu Glu Phe His Arg
        195                 200                 205

Tyr Trp Ser Ala Asp Glu Ser Val Ile His Thr Asp Tyr Ser Ala Leu
    210                 215                 220

Arg Ser Val Val Val Ala Asp Trp Asp Glu Val Ile Lys Met Pro Ile
225                 230                 235                 240

Asn Glu Pro Ala Asp Gly Leu Arg Lys Ser Gln Ile Gln Glu Tyr Val
                245                 250                 255

Glu Tyr Tyr Gly Gly Ala Gly Val Gln His Ile Ala Leu Lys Val Asn
            260                 265                 270

Asp Ile Ile Ser Val Ile Ser Thr Leu Arg Ala Arg Gly Val Glu Phe
        275                 280                 285

Leu Glu Val Pro Pro Lys Tyr Tyr Asp Ser Leu Arg Lys Arg Leu Ala
    290                 295                 300

His Ser Ala Val Gln Ile Glu Glu Asp Leu Lys Arg Ile Glu Asp Leu
305                 310                 315                 320

His Ile Leu Val Asp Phe Asp Asp Arg Gly Tyr Leu Leu Gln Ile Phe
                325                 330                 335

Thr Lys Pro Val Glu Asp Arg Pro Thr Leu Phe Tyr Glu Ile Ile Gln
            340                 345                 350
```

Arg His Asn Asn Asn Gly Phe Gly Ile Gly Asn Phe Lys Ala Leu Phe
355 360 365

Glu Ser Leu Glu Gln Glu Gln Glu Arg Arg Gly Asn Leu Ile
370 375 380

<210> 10
<211> 1206
<212> DNA
<213> Rhodococcus sp.

<400> 10
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ctcgagcagt tggtcgggct cgtcgagtac gacggcaccc gcgacccgtt cccggtcagc 120

ggctgggatg ccgtcgtctg ggtggtcggc aacgccaccc agaccgccca ctacttccag 180

tccgcgttcg ggatgaccct cgtcgcctac tccggaccca ccaccggcaa ccgcgaccac 240

cacagcttcg tcctcgaatc cggggccgtc cgcttcgtca tcaaaggcgc cgtgaacccg 300

gacagccccc tgatcgacca ccaccgcacc cacggcgacg gcgtcgtcga catcgccctc 360

gccgtccccg acgtcgacaa gtgcatcgcc cacgcccgcg cccagggcgc caccgtcctc 420

gacgaacccc acgacgtgac cgacgaccac ggcaccgtcc gcctcgccgc gatcgccacc 480

tacggcgaca cccgccacac cctcgtcgac cgcagccact acaccggccc ctacctgccc 540

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caggccctcg accacgtcgt cggcaacgtc gaactcggca agatggacca ctgggtcgac 660

ttctacaacc gggtcatggg ctttacgaac atggccgagt tcgtcggcga ggacatcgcc 720

accgactact ccgcgctgat gagcaaggtc gtctccaacg gcaaccaccg ggtcaagttc 780

cccctcaacg aacccgccct cgccaagaaa cgctcgcaga tcgacgaata cctcgacttc 840

taccgcggcc ccggcgccca gcacctggcc ctggccacca atgacatcct caccgccgtc 900

gaccagctga ccgccgaggg cgtcgagttc ctggccaccc ccgactccta ctacgaggac 960

cccgaactgc gggcccggat cggcaacgtc cgcgccccca tcgccgaact gcagaaacgc 1020

ggcatcctcg tcgaccgcga cgaagacggc tacctgctgc agatcttcac caaacccctc 1080

gtcgaccggc ccaccgtgtt cttcgaactc atcgaacgcc acggctccct cggcttcggc 1140

atcggcaact tcaaagccct cttcgaggcc atcgaacgcg aacaagccgc ccgcggaaac 1200

ttctga 1206

<210> 11
<211> 401
<212> PRT
<213> Rhodococcus sp.

<400> 11

Met Thr Ile Glu Gln Thr Leu Thr Asp Lys Glu Arg Leu Ala Gly Leu
1 5 10 15

```
Asp Leu Gly Gln Leu Glu Gln Leu Val Gly Leu Val Glu Tyr Asp Gly
            20                  25                  30

Thr Arg Asp Pro Phe Pro Val Ser Gly Trp Asp Ala Val Val Trp Val
        35                  40                  45

Val Gly Asn Ala Thr Gln Thr Ala His Tyr Phe Gln Ser Ala Phe Gly
    50                  55                  60

Met Thr Leu Val Ala Tyr Ser Gly Pro Thr Thr Gly Asn Arg Asp His
65                  70                  75                  80

His Ser Phe Val Leu Glu Ser Gly Ala Val Arg Phe Val Ile Lys Gly
                85                  90                  95

Ala Val Asn Pro Asp Ser Pro Leu Ile Asp His His Arg Thr His Gly
            100                 105                 110

Asp Gly Val Val Asp Ile Ala Leu Ala Val Pro Asp Val Asp Lys Cys
        115                 120                 125

Ile Ala His Ala Arg Ala Gln Gly Ala Thr Val Leu Asp Glu Pro His
    130                 135                 140

Asp Val Thr Asp Asp His Gly Thr Val Arg Leu Ala Ala Ile Ala Thr
145                 150                 155                 160

Tyr Gly Asp Thr Arg His Thr Leu Val Asp Arg Ser His Tyr Thr Gly
                165                 170                 175

Pro Tyr Leu Pro Gly Tyr Thr Ala Arg Thr Ser Gly His Thr Lys Arg
            180                 185                 190

Asp Gly Ala Pro Lys Arg Leu Phe Gln Ala Leu Asp His Val Val Gly
        195                 200                 205

Asn Val Glu Leu Gly Lys Met Asp His Trp Val Asp Phe Tyr Asn Arg
    210                 215                 220

Val Met Gly Phe Thr Asn Met Ala Glu Phe Val Gly Glu Asp Ile Ala
225                 230                 235                 240

Thr Asp Tyr Ser Ala Leu Met Ser Lys Val Val Ser Asn Gly Asn His
                245                 250                 255

Arg Val Lys Phe Pro Leu Asn Glu Pro Ala Leu Ala Lys Lys Arg Ser
            260                 265                 270

Gln Ile Asp Glu Tyr Leu Asp Phe Tyr Arg Gly Pro Gly Ala Gln His
        275                 280                 285
```

Leu Ala Leu Ala Thr Asn Asp Ile Leu Thr Ala Val Asp Gln Leu Thr
    290   295   300

Ala Glu Gly Val Glu Phe Leu Ala Thr Pro Asp Ser Tyr Tyr Glu Asp
305   310   315   320

Pro Glu Leu Arg Ala Arg Ile Gly Asn Val Arg Ala Pro Ile Ala Glu
                325   330   335

Leu Gln Lys Arg Gly Ile Leu Val Asp Arg Asp Glu Asp Gly Tyr Leu
            340   345   350

Leu Gln Ile Phe Thr Lys Pro Leu Val Asp Arg Pro Thr Val Phe Phe
        355   360   365

Glu Leu Ile Glu Arg His Gly Ser Leu Gly Phe Gly Ile Gly Asn Phe
    370   375   380

Lys Ala Leu Phe Glu Ala Ile Glu Arg Glu Gln Ala Ala Arg Gly Asn
385   390   395   400

Phe

<210> 12
<211> 1209
<212> DNA
<213> Rhodococcus sp.

<400> 12
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gagctccggc agttggtcgg gctcgtcgaa cacgacgacg cgtcggatcc gtttcccgtg   120

gtcgcgatgg atgccgtggt gttcgtgtgc ggcaacgcga cgcagagcac gcagtacttc   180

gtctccacgt ggggcatgac cctcgtcgcc tacgccgggc cggagaccgg tcagcgctcg   240

cacaagtcct tcgtcctcga gtcggggtcg gcacggttcg tgctgcacgg cgccgtcgat   300

ccgaagagcc cgctcgcgga ccatcaccgg gcgcacggcg acggcgtggt ggacctggcg   360

atggaagttc tcgacgtcga ccgctgcatc gcgcatgcac gctcgcaggg ggccaccatt   420

ctcgaggagc cgcgcgacgt cacggatcag ttcggcaccg tgcggctcgc ggcgatcgcc   480

acgtacggca gcacccggca caccatcgtc gaccgaagcc gatacgacgg cccctacctc   540

cccggattcg tcgcgcgctc cagcggtttc gcggcgcgac cgggtaaacc cccgcgattg   600

ttccaggcgc tcgaccacgc cgtcggcaac gtcgagatgg gccggatgga tcactgggtc   660

cggttctaca accgcgtcat gggcttcacg aacatggccg aattcgtcgg cgacgacatc   720

gccacggagt actcggcgct gatgtcgaag gtcgtggcga acggcaatca ccgggtgaag   780

ttcccgctca acgaacccgc ggtgggaaag aagaagtcgc agatcgacga atatctcgag   840

ttctacggtg agccgggctg ccagcatctg gccctcgcga ccggagacat cctcgcgacg   900 gtggacgcgt tgcgggccga gggtgtcgaa ttcctgaaca cacccgacgc gtactacgag 960

gacccacagc tgcgcgcccg gatcggcagg gtgcgggtgc cggtggagga actgcagaag 1020

cgcggaatcc tcgtcgaccg cgacgaggac ggatacctcc tgcagatctt caccaaaccg 1080

ctcggcgacc ggccgaccgt gttcttcgag gtgatcgaac ggcacggttc gctcgggttc 1140

ggggcgggta acttccaggc cctgttcgaa tccatcgagc gtgagcaggc ggcgcgcggc 1200

aatctgtga 1209

<210> 13
<211> 402
<212> PRT
<213> Rhodococcus sp.

<400> 13

Met Thr Thr Ala Asp Ile Arg Leu Thr Pro Arg Glu Val Ala Ala His
1 5 10 15

Leu Glu Thr Asp Glu Leu Arg Gln Leu Val Gly Leu Val Glu His Asp
20 25 30

Asp Ala Ser Asp Pro Phe Pro Val Val Ala Met Asp Ala Val Val Phe
35 40 45

Val Cys Gly Asn Ala Thr Gln Ser Thr Gln Tyr Phe Val Ser Thr Trp
50 55 60

Gly Met Thr Leu Val Ala Tyr Ala Gly Pro Glu Thr Gly Gln Arg Ser
65 70 75 80

His Lys Ser Phe Val Leu Glu Ser Gly Ser Ala Arg Phe Val Leu His
85 90 95

Gly Ala Val Asp Pro Lys Ser Pro Leu Ala Asp His His Arg Ala His
100 105 110

Gly Asp Gly Val Val Asp Leu Ala Met Glu Val Leu Asp Val Asp Arg
115 120 125

Cys Ile Ala His Ala Arg Ser Gln Gly Ala Thr Ile Leu Glu Glu Pro
130 135 140

Arg Asp Val Thr Asp Gln Phe Gly Thr Val Arg Leu Ala Ala Ile Ala
145 150 155 160

Thr Tyr Gly Ser Thr Arg His Thr Ile Val Asp Arg Ser Arg Tyr Asp
165 170 175

Gly Pro Tyr Leu Pro Gly Phe Val Ala Arg Ser Ser Gly Phe Ala Ala
180 185 190

```
Arg Pro Gly Lys Pro Pro Arg Leu Phe Gln Ala Leu Asp His Ala Val
        195                 200                 205

Gly Asn Val Glu Met Gly Arg Met Asp His Trp Val Arg Phe Tyr Asn
    210                 215                 220

Arg Val Met Gly Phe Thr Asn Met Ala Glu Phe Val Gly Asp Asp Ile
225                 230                 235                 240

Ala Thr Glu Tyr Ser Ala Leu Met Ser Lys Val Val Ala Asn Gly Asn
                245                 250                 255

His Arg Val Lys Phe Pro Leu Asn Glu Pro Ala Val Gly Lys Lys Lys
            260                 265                 270

Ser Gln Ile Asp Glu Tyr Leu Glu Phe Tyr Gly Glu Pro Gly Cys Gln
        275                 280                 285

His Leu Ala Leu Ala Thr Gly Asp Ile Leu Ala Thr Val Asp Ala Leu
    290                 295                 300

Arg Ala Glu Gly Val Glu Phe Leu Asn Thr Pro Asp Ala Tyr Tyr Glu
305                 310                 315                 320

Asp Pro Gln Leu Arg Ala Arg Ile Gly Arg Val Arg Val Pro Val Glu
                325                 330                 335

Glu Leu Gln Lys Arg Gly Ile Leu Val Asp Arg Asp Glu Asp Gly Tyr
            340                 345                 350

Leu Leu Gln Ile Phe Thr Lys Pro Leu Gly Asp Arg Pro Thr Val Phe
        355                 360                 365

Phe Glu Val Ile Glu Arg His Gly Ser Leu Gly Phe Gly Ala Gly Asn
    370                 375                 380

Phe Gln Ala Leu Phe Glu Ser Ile Glu Arg Glu Gln Ala Ala Arg Gly
385                 390                 395                 400

Asn Leu


<210>  14
<211>  1107
<212>  DNA
<213>  Picrophilus torridus

<400>  14
atgtatggca aaaatttaat ctcagaacta agggaaaagg agatctttaa acgattacat      60

cacgtggaat tttacgttag cagtgccaaa acatggtcat atttcatgaa caggggtctt     120

ggatttaaaa cagtggcata tgccggtcca gaaaccggga taagggacaa gatatcctat     180
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gttatgtccc agggcactgc aaggatatct tttacatcat caatgaatga tgatagctat 240

atatcgaatc atgttaaaaa acacggggat ggcgtaaagg atatagcact tgaggtcgat 300

gatctggacg aggcaaaaag cctgatagaa aagtatggaa caaaggtttc aaaaataaat 360

gaaataaagg atggaaatgg aaagataaga actgcagaga taaaaacgta cggtgaaacc 420

gttcatacat taatagaaac cggggattac aatggcgtat tcatgcccgg ttatgaggaa 480

tctgaaataa attcaaaaaa cactgggata aaaaagatcg atcatatagt tggaaatgtc 540

tatgagggcg agatggatag ctgggttaat ttttacatag aaaaacttgg ctttgagcat 600

ttaataacct ttgatgataa agatataaga actgattaca gcgcattaag atcaaaggtt 660

gtaaaataca atgacgatat cgtatttcca ataaatgagc ctgcaaaggg cttaagaaaa 720

tcacagatag aggaatatct tgactattac aggtctgagg gcgttcagca catagcactg 780

ttaactgatg atataataaa aactgtatcc atgatggagg aaaacggcat agaattttta 840

aaaacaccag gatcatacta tgaatcccta tcatcaagga taggctcaat agacgaggat 900

ttaaatgaaa tagagaaaca taacatactt gtggatcgtg atgagaacgg atacctatta 960

cagatcttca caaagcctgt tactgacagg ccaacgttct tctttgaggt catacagaga 1020

aagggtgcaa ggtcattcgg caacggtaac tttaaggcac tttttgaggc gatagaaagg 1080

gagcaggcaa agagaggaaa cctatga 1107

<210> 15
<211> 368
<212> PRT
<213> Picrophilus torridus

<400> 15

Met Tyr Gly Lys Asn Leu Ile Ser Glu Leu Arg Glu Lys Glu Ile Phe
1 5 10 15

Lys Arg Leu His His Val Glu Phe Tyr Val Ser Ser Ala Lys Thr Trp
20 25 30

Ser Tyr Phe Met Asn Arg Gly Leu Gly Phe Lys Thr Val Ala Tyr Ala
35 40 45

Gly Pro Glu Thr Gly Ile Arg Asp Lys Ile Ser Tyr Val Met Ser Gln
50 55 60

Gly Thr Ala Arg Ile Ser Phe Thr Ser Ser Met Asn Asp Asp Ser Tyr
65 70 75 80

Ile Ser Asn His Val Lys Lys His Gly Asp Gly Val Lys Asp Ile Ala
85 90 95

Leu Glu Val Asp Asp Leu Asp Glu Ala Lys Ser Leu Ile Glu Lys Tyr
100 105 110

Gly Thr Lys Val Ser Lys Ile Asn Glu Ile Lys Asp Gly Asn Gly Lys
        115   120   125

Ile Arg Thr Ala Glu Ile Lys Thr Tyr Gly Glu Thr Val His Thr Leu
    130   135   140

Ile Glu Thr Gly Asp Tyr Asn Gly Val Phe Met Pro Gly Tyr Glu Glu
145   150   155   160

Ser Glu Ile Asn Ser Lys Asn Thr Gly Ile Lys Lys Ile Asp His Ile
                165   170   175

Val Gly Asn Val Tyr Glu Gly Glu Met Asp Ser Trp Val Asn Phe Tyr
            180   185   190

Ile Glu Lys Leu Gly Phe Glu His Leu Ile Thr Phe Asp Asp Lys Asp
        195   200   205

Ile Arg Thr Asp Tyr Ser Ala Leu Arg Ser Lys Val Val Lys Tyr Asn
    210   215   220

Asp Asp Ile Val Phe Pro Ile Asn Glu Pro Ala Lys Gly Leu Arg Lys
225   230   235   240

Ser Gln Ile Glu Glu Tyr Leu Asp Tyr Tyr Arg Ser Glu Gly Val Gln
                245   250   255

His Ile Ala Leu Leu Thr Asp Asp Ile Ile Lys Thr Val Ser Met Met
            260   265   270

Glu Glu Asn Gly Ile Glu Phe Leu Lys Thr Pro Gly Ser Tyr Tyr Glu
        275   280   285

Ser Leu Ser Ser Arg Ile Gly Ser Ile Asp Glu Asp Leu Asn Glu Ile
    290   295   300

Glu Lys His Asn Ile Leu Val Asp Arg Asp Glu Asn Gly Tyr Leu Leu
305   310   315   320

Gln Ile Phe Thr Lys Pro Val Thr Asp Arg Pro Thr Phe Phe Phe Glu
                325   330   335

Val Ile Gln Arg Lys Gly Ala Arg Ser Phe Gly Asn Gly Asn Phe Lys
            340   345   350

Ala Leu Phe Glu Ala Ile Glu Arg Glu Gln Ala Lys Arg Gly Asn Leu
        355   360   365

<210> 16
<211> 1164
<212> DNA
<213> Kordia algicida

<400> 16
atggcagcag aaataaaaaa cttaaaagat ttacaaaata cagaatacgg actcaaaaaa   60

ttatttgacg aagcagaaga ctttcttcca cttttaggaa cagactacgt agaattatac   120

gtcgggaacg ccaaacaatc ggcacatttc tacaaaacgg cttttggttt tcaatcagaa   180

gcttacgcag gattggaaac aggattaacc gacagagttt catacgtatt aaaacaagat   240

aaaattcgct tggtcttaac aacaccatta ggaaaaggtg gcgaaatcaa tgagcatatc   300

gatttacacg gcgatggcgt aaaagtagta gcactttggg tagaagatgc tacaaaagcc   360

tttgaagaaa cgaccaaaag aggcgcaaaa ccgtacatgg aaccaacaaa agaagaagat   420

gaaaacggat atgtaattcg ctcaggaatc tatacgtacg gagaaacggt tcatgttttt   480

gtagaacgta aaaactataa cggagtcttt ttaccaggat atcaaagatg ggaatctcac   540

tacaatccgg agccagttgg cttaaaattc atcgatcaca tggtaggaaa tgtaggttgg   600

ggagaaatga aagaatggtg tgaattctac gcgaaagtaa tgggatttgc gcaaattatc   660

tcctttacag atgatgatat ttctaccgat tttactgcgt tgatgagtaa agtaatgagt   720

aatggaaatg gtagaatcaa atttccaatc aatgaacccg cagaaggaaa aaagaaatcg   780

caaattgaag aatatctaga cttttacaat ggttcaggag tacaacatat tgcggttgct   840

acagacaata ttattgatac ggtttcgcaa atgcgcgaac gtggagtaga attcttatac   900

gttccagata catattatga tgacttgtta gaacgtgttg gcgacatcga tgaagatgta   960

gaagaactca aaaaacacgg aatcttaatt gatcgtgatg aagaaggata cttattgcag   1020

ttatttacca aaaccattgt agacagacca acaatgttct ttgaagtcat tcagcgtaaa   1080

ggcgcacaat catttggagt aggaaacttt aaagctttat ttgaagcgat agaaagagaa   1140

caagctgctc gcggaacatt gtaa   1164

<210> 17
<211> 387
<212> PRT
<213> Kordia algicida

<400> 17

Met Ala Ala Glu Ile Lys Asn Leu Lys Asp Leu Gln Asn Thr Glu Tyr
1   5   10   15

Gly Leu Lys Lys Leu Phe Asp Glu Ala Glu Asp Phe Leu Pro Leu Leu
            20   25   30

Gly Thr Asp Tyr Val Glu Leu Tyr Val Gly Asn Ala Lys Gln Ser Ala
        35   40   45

His Phe Tyr Lys Thr Ala Phe Gly Phe Gln Ser Glu Ala Tyr Ala Gly
    50   55   60

Leu Glu Thr Gly Leu Thr Asp Arg Val Ser Tyr Val Leu Lys Gln Asp
65   70   75   80

Lys Ile Arg Leu Val Leu Thr Thr Pro Leu Gly Lys Gly Gly Glu Ile
85 90 95

Asn Glu His Ile Asp Leu His Gly Asp Gly Val Lys Val Val Ala Leu
100 105 110

Trp Val Glu Asp Ala Thr Lys Ala Phe Glu Glu Thr Thr Lys Arg Gly
115 120 125

Ala Lys Pro Tyr Met Glu Pro Thr Lys Glu Glu Asp Glu Asn Gly Tyr
130 135 140

Val Ile Arg Ser Gly Ile Tyr Thr Tyr Gly Glu Thr Val His Val Phe
145 150 155 160

Val Glu Arg Lys Asn Tyr Asn Gly Val Phe Leu Pro Gly Tyr Gln Arg
165 170 175

Trp Glu Ser His Tyr Asn Pro Glu Pro Val Gly Leu Lys Phe Ile Asp
180 185 190

His Met Val Gly Asn Val Gly Trp Gly Glu Met Lys Glu Trp Cys Glu
195 200 205

Phe Tyr Ala Lys Val Met Gly Phe Ala Gln Ile Ile Ser Phe Thr Asp
210 215 220

Asp Asp Ile Ser Thr Asp Phe Thr Ala Leu Met Ser Lys Val Met Ser
225 230 235 240

Asn Gly Asn Gly Arg Ile Lys Phe Pro Ile Asn Glu Pro Ala Glu Gly
245 250 255

Lys Lys Lys Ser Gln Ile Glu Glu Tyr Leu Asp Phe Tyr Asn Gly Ser
260 265 270

Gly Val Gln His Ile Ala Val Ala Thr Asp Asn Ile Ile Asp Thr Val
275 280 285

Ser Gln Met Arg Glu Arg Gly Val Glu Phe Leu Tyr Val Pro Asp Thr
290 295 300

Tyr Tyr Asp Asp Leu Leu Glu Arg Val Gly Asp Ile Asp Glu Asp Val
305 310 315 320

Glu Glu Leu Lys Lys His Gly Ile Leu Ile Asp Arg Asp Glu Glu Gly
325 330 335

Tyr Leu Leu Gln Leu Phe Thr Lys Thr Ile Val Asp Arg Pro Thr Met
340 345 350

Phe Phe Glu Val Ile Gln Arg Lys Gly Ala Gln Ser Phe Gly Val Gly
        355   360   365

Asn Phe Lys Ala Leu Phe Glu Ala Ile Glu Arg Glu Gln Ala Ala Arg
    370   375   380

Gly Thr Leu
385

<210> 18
<211> 1056
<212> DNA
<213> Artificial sequence

<220>
<223> Nucleic acid sequence encoding Synechococcus sp. HPPD optimized for the expression in soybean and cotton

<400> 18
atggctaacc catccattag gatcgttcag ggaatccatc accttcactt ctacctttgg 60

gatcttccaa ggtggagaga gcatttctgt agagtttggg gattcagagt tgcttctgat 120

gctggaaaca ctcttgaact tgagcaagga tctcttaggc ttaggctttc tcaaccagct 180

agagctggtg atgaagttga taggcatctt caaagacatg gaccaggtgt tgttgatgtt 240

gctcttgctg ttggagaaca agaacttcca gctcttgctg aacttcttag aggaaggggt 300

gctcaacttg cttggattcc agctgctgct gctctttgcc ttcatactcc atacggaatt 360

aggcactccc ttattccagg accacttgat gctgctccag ctgaggctgg actttttct 420

cattgggatc acgttgttct taatgtggag cagggatctc ttcaagctgc tgctgattgg 480

tatggaagag ttcttggatg gcgtagactt taccgttact ccatcggaac tgctacttca 540

ggacttgagt ctgttgttgt tggagatcca gaggctggca ttcaatgggc tatcaacgaa 600

cctacttgcg ctgcttctca gattcaagag ttccttcatg ctcatggtgg accaggtatt 660

caacatgctg ctctccactc ttcagatatt gtggcttctc ttagaaggct taggcaaggt 720

ggagttgatt tccttcaagt ggctccacag tactatactt ctcttgagag agagcttgga 780

cttgctctta gatctgctct tggacaggct atttcttggc aggatcttgt tgagcagcag 840

attcttcttg atgctactct tccagcttct gatggacaag ataggccact tttgctccaa 900

actttcactc aaccactttt cggaaggcca acattcttct tcgaagtgat tcaaagactt 960

ggaggtgcta ctggatttgg agaggctaat ttccaagctc ttttcgaggc tcttgaaagg 1020

caacaaaggc aaaggcatca agctcttact ccatga 1056

<210> 19
<211> 1152
<212> DNA
<213> Artificial sequence

<220>
<223> Nucleic acid sequence encoding Blepharisma japonicum HPPD

optimized for the expression in soybean and cotton

<400> 19
atggctactt actacgataa gcaagagact agaccagatc ttggagagtt ctacggattc 60

caccatgtta ggttctacgt gtctaattct gagcaagctg cttctttcta cacttcccgt 120

ttcggatttt ctccagttgc ttacgaagga cttgagactg gaaatcagaa gttctgcact 180

aacgttgtta ggtctaacca cgtggtgatt gcttttactt ctgctctcac tccagaggat 240

aatgaggtta acaggcatgt tggaaagcac tctgatggtg ttcaggatat tgctttctct 300

gtgtctgatg ctagaggaat gtacgagaag gctattgcta agggatgcaa gtctttcaga 360

gagccacaag ttcttcaaga tcagttcgga tcagtgatta ttgcttccct tcagacttac 420

ggtgatactg ttcacactct cgttcagaac gttgattaca ctggaccatt ccttccaggt 480

ttcagggcta tcactaagga tgatccactt aactctgctt tcccacaggt gaactacgat 540

atcattgatc acgttgtggg aaatcagcca ggtggagata tgactccaac tgttgagtgg 600

tacgagaagt accttgagtt tcacaggtat tggagtgctg atgagtctgt gatccacact 660

gattactctg ctcttagatc tgttgttgtg gctgattggg atgaggttat caagatgcct 720

attaacgaac cagctgatgg acttaggaag tcccagattc aagagtacgt tgagtattat 780

ggtggagctg gtgttcaaca cattgctctc aaggtgaacg atatcatttc cgtgatttcc 840

actcttagag ctagaggagt tgagtttctt gaagtcccac caaagtacta cgattctctc 900

agaaagaggc ttgctcattc tgctgttcag atcgaagagg atcttaaacg tattgaggac 960

cttcacatcc tcgtggattt tgatgatagg ggataccttc tccagatttt cactaagcca 1020

gttgaggata ggccaacttt gttctacgag atcatccaaa ggcataacaa caacggattc 1080

ggaatcggaa atttcaaggc tcttttcgag tctcttgagc aagaacaaga gagaagggga 1140

aacctcatct ga 1152

<210> 20
<211> 1209
<212> DNA
<213> Artificial sequence

<220>
<223> Nucleic acid sequence encoding Rhodococcus sp. (strain RHA1), isolate ro03041 HPPD optimized for the expression in soybean and cotton

<400> 20
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caacttgagc agcttgttgg acttgttgag tacgatggaa ctagggaccc atttccagtt 120

tctggatggg atgctgttgt ttgggttgtg ggaaatgcta ctcaaactgc tcactacttc 180

caatctgctt tcggaatgac tcttgtggct tactctggac caactactgg aaatagggat 240

caccactctt tcgttcttga atctggtgct gtgagattcg ttattaaggg tgctgtgaac 300

ccagattctc cacttattga tcaccatagg actcatggtg atggtgttgt ggatattgct 360

cttgctgttc cagatgtgga taagtgcatt gctcatgcta gggctcaagg tgctactgtt 420 cttgatgagc cacacgatgt tactgatgat cacggaactg ttaggcttgc tgctattgct 480

acttacggtg atacaaggca cactcttgtt gataggtcac actacactgg accatatctt 540

ccaggataca ctgctagaac ttccggacac actaagaggg atggtgctcc aaagagactt 600

ttccaggctc ttgatcacgt tgttggaaac gttgagcttg gaaagatgga tcactgggtg 660

gacttctaca atagggtgat gggattcact aatatggctg agtttgtggg agaagatatc 720

gctactgatt actctgctct catgtctaag gttgtgtcta atggaaacca cagggtgaag 780

ttcccactta atgaaccagc tctcgctaaa aaaaggtcac agatcgatga gtacctcgat 840

ttttatcgtg gaccaggtgc tcaacatctt gctctcgcta ctaacgatat tctcactgct 900

gtggatcaac ttactgctga gggtgttgag tttcttgcta ctccagattc ctattacgag 960

gacccagaac ttagagctag gatcggaaat gttagggctc caatcgctga acttcagaag 1020

aggggaatac tcgttgatag agatgaggat ggataccttc tccagatctt cactaagcca 1080

ttggttgata ggccaactgt ttcttcgag cttattgaga ggcatggatc tcttggattc 1140

ggaatcggaa acttcaaggc tcttttcgag gctattgaga gagaacaagc tgctagggga 1200

aatttctga 1209

<210> 21
<211> 1212
<212> DNA
<213> Artificial sequence

<220>
<223> Nucleotide sequence encoding Rhodococcus sp. (strain RHA1), isolate ro02040 HPPD optimized optimized for the expression in soybean and cotton

<400> 21
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gatgagctta ggcaacttgt tggacttgtt gagcacgatg atgcttcaga tccattccca 120

gttgttgcta tggatgctgt tgtttttgtt tgcggaaacg ctactcaatc tactcagtac 180

ttcgtgtcta cttggggaat gactcttgtt gcttatgctg gaccagaaac tggacagaga 240

tctcacaagt ctttcgtgct tgaatctgga tctgctagat tcgttcttca cggtgctgtt 300

gatccaaagt ctccacttgc tgatcatcat agggctcatg gtgatggtgt tgtggatctt 360

gctatggaag tgcttgatgt ggatagatgc attgctcatg ctagatctca gggtgctact 420

attcttgaag aacctcgtga tgtgactgat cagtttggaa ctgttaggct tgctgctatt 480

gctacttacg gctccactag gcacactatt gtggataggt ccagatatga tggaccatac 540

cttccaggat ttgttgctag gtcatctgga tttgctgcta gaccaggaaa gccaccaaga 600

cttttccaag ctcttgatca cgctgttgga aatgttgaaa tgggaaggat ggatcattgg 660

gtgaggttct acaatagggt gatgggattc actaatatgg ctgagttcgt gggtgatgat 720

attgctactg agtactctgc tcttatgtct aaggttgtgg ctaatggaaa tcacagggtg 780

aagttcccac ttaatgaacc agctgtggga aagaagaagt cccagatcga cgagtacctt 840 gagttttacg gtgaaccagg atgtcaacat cttgctctcg ctactggtga tattcttgct 900

actgtggatg ctcttagagc tgaaggtgtt gagttcctca atactccaga tgcttactac 960

gaggacccac aacttagagc taggattgga agagttaggg ttccagttga ggaacttcag 1020

aagaggggaa tactcgttga tagagatgag gatggatacc ttctccagat cttcactaag 1080

ccacttggag ataggccaac tgttttcttc gaagtgattg agaggcatgg atctcttgga 1140

tttggagcag gaaacttcca ggcacttttc gagtctattg agagagaaca agctgctagg 1200

ggaaatcttt ga 1212

<210> 22
<211> 1110
<212> DNA
<213> Artificial sequence

<220>
<223> Nucleic acid sequence encoding Picrophilus torridus HPPD
optimized for the expression in soybean and cotton

<400> 22
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catcacgttg agttctacgt ttcttccgct aagacttggt cctacttcat gaatagggga 120

ctcggattca agactgttgc ttatgctgga ccagaaactg gaatcaggga taagatctcc 180

tacgttatgt ctcaaggtac tgctaggatt tctttcactt cctccatgaa cgatgattcc 240

tacatttcca accacgttaa gaaacacggt gatggtgtta aggatatcgc tctcgaagtg 300

gatgatcttg atgaggctaa gtctctcatt gagaagtacg gaactaaggt gtccaagatc 360

aacgagatca aggatggaaa cggaaagatt aggactgctg agatcaagac ttacggtgaa 420

actgtgcaca ctcttatcga gactggtgat tacaacggtg ttttcatgcc aggatacgaa 480

gagtctgaga tcaactccaa gaacactggt atcaaaaaaa tcgatcacat tgtgggaaat 540

gtttacgagg gtgaaatgga ttcttgggtg aacttctaca ttgagaagtt gggattcgag 600

caccttatca ctttcgatga taaggatatc aggactgatt actctgctct taggtctaag 660

gtggtgaagt acaacgatga tatcgtgttc cctattaacg aaccagctaa gggacttagg 720

aagtcccaaa tcgaagagta cctcgattat taccgttctg agggtgttca acacattgct 780

ttgctcacag acgatatcat caagactgtg tccatgatgg aagagaacgg aattgagttc 840

cttaagactc caggatctta ctacgagtct ttgtcctcta ggattggatc tatcgatgag 900

gatctcaacg aaatcgagaa gcacaacatt cttgtggata gggatgagaa cggatacctt 960

ctccagattt tcactaagcc agtgactgat aggccaacat tcttcttcga agtgatccaa 1020

agaaagggtg ctagatcttt cggaaacgga aacttcaagg ctcttttcga ggctattgag 1080

agagaacaag ctaagagggg aaacctttga 1110

<210> 23
<211> 1167
<212> DNA

<213> Artificial sequence

<220>
<223> Nucleic acid sequence encoding Kordia algicida HPPD optimized for the expression in soybean and cotton

<400> 23
atggctgctg ctgagattaa gaacctcaag gatctccaga atactgagta cggactcaag   60

aaactttttg atgaggctga ggatttcctt ccacttctcg gaactgatta cgttgagctt   120

tatgtgggaa acgcaaagca atctgctcac ttctacaaga ctgctttcgg atttcaatct   180

gaggcttacg ctggacttga aactggactt actgataggg tttcctacgt gcttaagcag   240

gataagatta ggcttgtgct cactactcca cttggaaagg gtggagagat taacgagcac   300

attgatcttc atggtgatgg tgttaaggtt gtggctcttt gggttgaaga tgctactaag   360

gctttcgaag agactactaa gagaggtgca aagccttata tggaacctac aaaagaagag   420

gacgagaacg gatacgtgat tagatccgga atctacactt acggtgagac tgttcacgtt   480

ttcgtggaga ggaagaacta caacggagtc tttcttcctg gataccaacg atgggagtct   540

cattacaatc cagagccagt gggacttaag ttcatcgatc acatggtggg taatgttgga   600

tggggagaga tgaaggaatg gtgcgagttt tacgctaagg ttatgggatt cgctcagatc   660

atttccttca ctgatgatga tatctccact gatttcactg ctcttatgtc caaggtgatg   720

tctaatggaa acggaaggat caagttccct attaacgaac cagctgaggg aaagaagaag   780

tcccagatcg aagagtacct cgatttctac aacggatctg gtgttcagca tattgctgtg   840

gcaactgata acatcatcga tactgtgtct caaatgagag aaaggggagt ggagtttctt   900

tacgtcccag atacttacta cgatgatctc cttgagagag tgggagatat tgacgaggat   960

gtggaggaac ttaagaagca cggaatcctc attgatagag atgaagaggg ataccttctc   1020

cagcttttca ctaagactat cgtggatagg ccaactatgt tcttcgaagt gatccaaaga   1080

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gaacaagctg ctagaggaac tctttga   1167

2