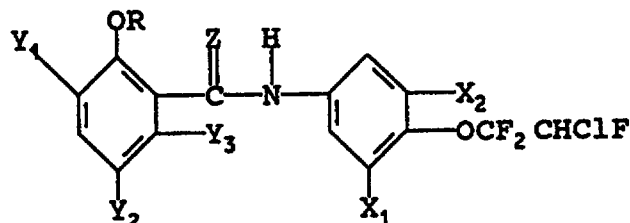


Description

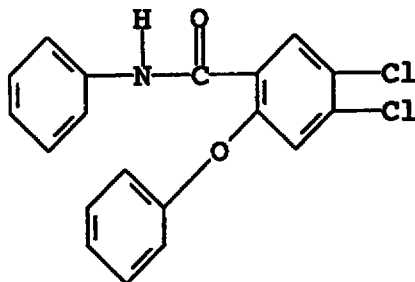
The present invention concerns certain substituted benzanilides and related benzylamides, their preparation, herbicidal compositions containing them, and their use in combating undesired plant growth.

US Patent Specification no. 3 719 707 discloses compounds of the general formula



in which X_1 is halogen and X_2 is hydrogen or halogen; Y_1 and Y_2 are halogen; Y_3 is hydrogen or hydroxyl, Z is oxygen or sulphur, and R is hydrogen or lower alkanoyl, as bacteriocides and anthelmintic agents.

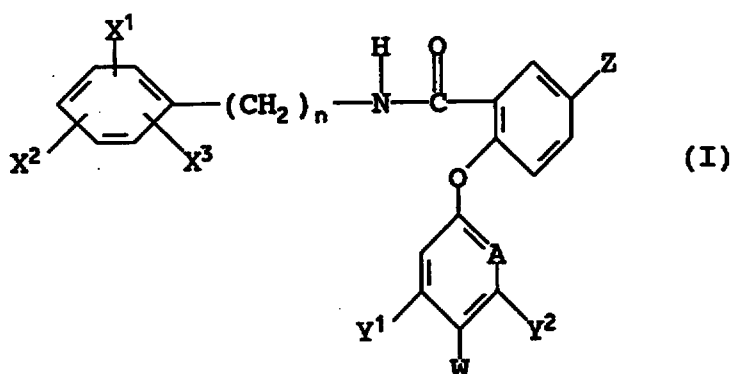
V.B. Angadi et al. in J. Karnatak Univ., 3, 63-64 (1958), reported in Chemical Abstracts 54, 3404i, discloses as useful in photographic materials, the compound



Other related compounds have also found use in photographic materials.

US-A-4208205 and DE-A-2720427 describe phenoxybenzamide derivatives having herbicidal activity and EP-A-0147477 describes pyridyloxybenzanilide derivatives having herbicidal activity.

According to the present invention, there is provided a compound of the general formula



wherein X^1 , X^2 and X^3 each independently represents a hydrogen or halogen atom or a C_{1-4} alkyl group; n is 0 or 1; Z represents a hydrogen or halogen atom, or an amino, C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} alkylthio or C_{1-4} alkoxy group or a phenoxy group optionally substituted by C_{1-4} haloalkyl; A represents CH or N ; Y^1 and Y^2 each independently represents a hydrogen or halogen atom, or a C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} alkoxy or C_{1-4} haloalkoxy group; and either W represents a hydrogen atom or, when A represents CH and at least one of Y^1 and Y^2 is other than hydrogen or when A represents N , W represents a hydrogen or

halogen atom; with the proviso that when A represents N, then each of Y¹ and Y² must represent a hydrogen atom.

An alkyl substituent group or alkyl moiety in a haloalkyl, alkylthio, alkoxy or haloalkoxy substituent group, may be linear or branched. A preferred alkyl group or moiety is methyl. A preferred haloalkyl group or moiety is trifluoromethyl.

Preferably X¹, X² and X³ each independently represents a hydrogen, fluorine or chlorine atom or a methyl group. In especially preferred compounds one or more of X¹, X² and X³ represents a hydrogen, fluorine or chlorine atom.

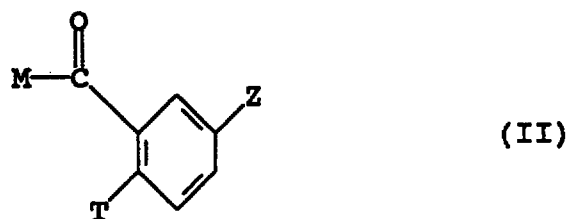
Z preferably represents a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy or 3-trifluoromethylphenoxy group. In especially preferred compounds, Z represents a hydrogen, fluorine or chlorine atom or a methyl group.

Preferably one of Y¹ and Y² represents a hydrogen, fluorine or chlorine atom, or a methyl, trifluoromethyl, methoxy or trifluoromethoxy group, and the other represents a hydrogen atom. In especially preferred compounds one of Y¹ and Y² represents a hydrogen or chlorine atom or a trifluoromethyl or trifluoromethoxy group, and the other represents a hydrogen atom.

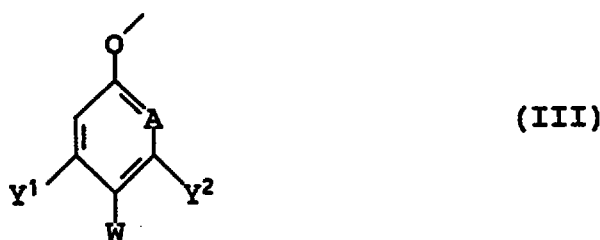
A represents CH or N. When A represents N, then each of Y¹ and Y² must represent a hydrogen atom to maintain herbicidal activity. In preferred compounds, however, A represents a CH group.

W suitably represents a hydrogen atom or, in certain compounds, i.e. those in which A is CH and at least one of Y¹ and Y² is other than hydrogen and especially those compounds in which A is N, W may alternatively represent a halogen atom, conveniently a fluorine or chlorine atom. In especially preferred compounds, W represents a hydrogen atom.

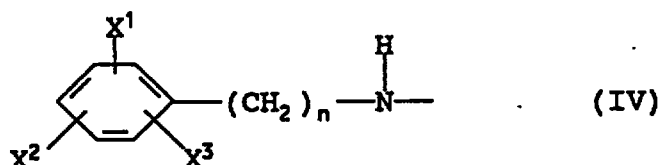
The present invention also provides a process for the preparation of a compound of formula I as defined above which comprises reacting, where necessary in the presence of a suitable base, a compound of the general formula



in which M represents a leaving group and T represents a group of the general formula



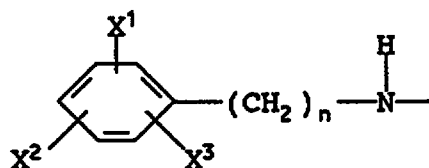
or M represents a group of the general formula



and T represents a leaving group, with a compound of the general formula

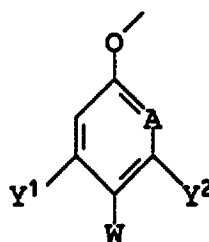
Q-L (V)

in which, when M represents a leaving group and T represents a group III then Q represents the group



and L represents a hydrogen atom,

or, when M represents a group IV and T represents a leaving group, then Q represents the group



25 and L represents a hydrogen atom or univalent cation, and X^1 , X^2 , X^3 , n , Z , A , Y^1 , Y^2 and W are as defined above.

A leaving group is any group that will, under the reaction conditions, cleave from the starting material thus promoting reaction at a specific site.

When present as a leaving group in a compound of formula II, M is conveniently a halogen atom, preferably a chlorine atom, when A in the group T is CH. When A in the group T is N, then M is suitably a hydroxy group.

When present as a leaving group in a compound of formula II, T is conveniently a halogen atom, suitably a fluorine or chlorine atom.

The reaction of a compound of formula II in which M represents a leaving group and T represents a group III with a phenyl- or benzyl-amine of formula V, is suitably carried out using conventional techniques for such reactions.

The presence of a base is required for this process variant; suitable bases include organic bases, for example tertiary amines, e.g. triethylamine and N-methylmorpholine.

The reaction of a compound of formula II in which M represents a group IV and T represents a leaving group, with a phenol or pyridinol of formula V or a reactive salt derivative thereof, i.e. where L is a cation, is especially suitable where Z is a strongly electron-withdrawing group, for example a trifluoromethyl group. Following the reaction, the resulting compound of the invention may be converted to other compounds of the invention, for example to those in which Z is amino, by conventional techniques, e.g. reduction.

In this reaction variant a base is required when the compound V is a phenol or pyridinol, to generate the reactive salt derivative, especially an alkali metal salt, of the phenol or pyridinol V in situ. Suitable bases include alkali metal hydrides, e.g. sodium or potassium hydride, alkali metal alkoxides, e.g. sodium ethoxide, or alkali metal hydroxides, e.g. sodium or potassium hydroxide.

If, however, the phenol or pyridinol is already in the form of a reactive salt derivative, i.e. if L is a cation, then it is no longer necessary to carry out the reaction in the presence of a base.

Both variants of the process of the invention are conveniently carried out in the presence of an organic solvent. Suitable solvents include polar organic solvents, e.g. dimethylformamide dimethylsulphoxide and tetrahydrofuran, and hydrocarbon solvents, e.g. toluene.

The reaction temperature for each process variant will be determined by the reaction materials used and the coupling technique selected. Generally, process of the present invention may be carried out at a temperature in the range of from -30°C to the reflux temperature of the reaction mixture. Where compounds of formula I are prepared in which A is CH, the reaction is conveniently carried out at a temperature in the range of from ambient (20°C) to the reflux temperature. For compounds in which A is N, the reaction is suitably carried out at a temperature in the range of from -20°C to 0°C , for example at

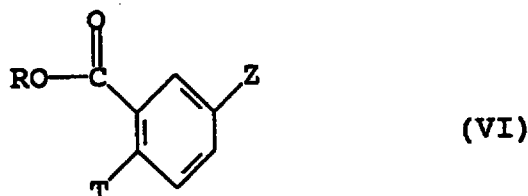
-15°C.

Preferably the molar ratio of compound V to compound II is in the range of from 1:1 to 1.2:1.

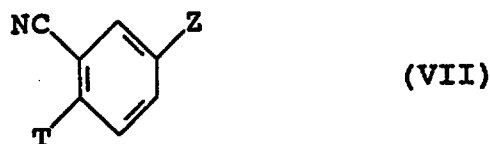
Where A is N, it is preferred to use the synthesis route in which an aryl phenyl ether II is reacted with a phenyl- or benzyl-amine V utilising a peptide coupling agent, for example isobutylchloroformate or dicyclohexylcarbodiimide.

The compounds of the present invention may be isolated and purified by conventional techniques.

Compounds of formula II in which M represents a leaving group and T represents a group III may be conveniently prepared by hydrolysing a compound of the general formula

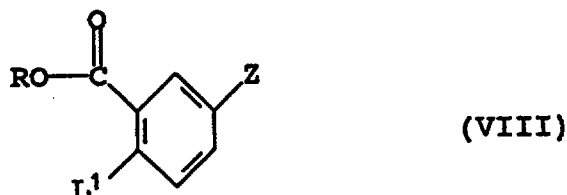


in which Z is as defined above and R represents an alkyl, preferably C₁-C₆ alkyl, group, to the corresponding carboxylic acid, in the presence of a base such as potassium hydroxide, or by hydrolysing a compound of the general formula



in which Z is as defined above, to the corresponding carboxylic acid, in the presence of a base such as potassium hydroxide, optionally followed in each case by reaction with a halogenating agent such as thionyl chloride, to form an acid halide of formula II, i.e. in which M is a halogen atom.

Compounds of formula VI may be prepared by reacting a compound of the general formula

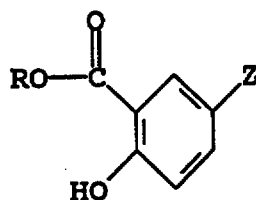


in which R and Z are as defined above and L¹ represents a leaving group, preferably a halogen, suitably a chlorine or bromine, atom, with a compound of the general formula

T-H (IX)

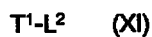
in which T is a group III, under Ullmann coupling conditions, for example using the sodium salt of compound IX in the presence of a copper (I) salt, e.g. cuprous chloride, and as co-solvents xylene and pyridine. This synthesis route is only suitable for compounds in which Z is other than halogen, and is, for example, an electron-donating group e.g. methoxy or methylthio.

Alternatively compounds of formula VI in which A is N may be prepared by reacting a compound of the general formula

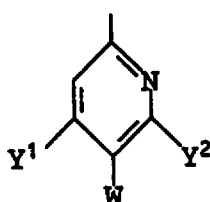


(X)

in which R¹ and Z are as defined above, with a compound of the general formula



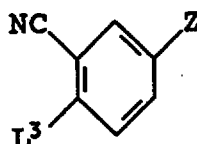
in which L² represents a leaving group, preferably a halogen, especially a chlorine, atom and T¹ represents a group of the general formula



(XII)

in which Y¹, Y² and W are as defined above, in the presence of a strong base such as sodium hydride, with a polar organic solvent such as dimethylformamide.

Compounds of formula VII may be prepared by reacting a compound of the general formula

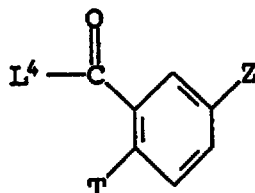


(XIII)

in which Z is as defined above and L³ represents a leaving group, preferably a halogen, especially a fluorine or chlorine, atom, with a compound of formula IX as defined above, in the presence of a base such as potassium hydroxide, using a polar organic solvent such as dimethylformamide.

Compounds of formula V, VIII, IX, X, XI and XIII are either known compounds or can be prepared using conventional techniques.

Compounds of formula II in which M represents a group IV and T represents a leaving group may be conveniently prepared by reacting a compound of the general formula



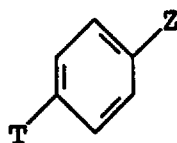
(XIV)

in which Z and T are as defined above and L⁴ represents a leaving group preferably a halogen, especially a chlorine, atom, with a compound of the general formula



in which M is as defined above, in the presence of a base such as triethylamine, and an organic solvent such as xylene or toluene.

Compounds of formula XIV may be prepared by reacting a compound of the general formula



(XVI)

in which Z is as defined above and T is a leaving group with a strong base such as an organolithium, e.g. butyl lithium, followed by aqueous work-up, followed thereafter by reaction with a halogenating agent such as thionyl chloride, in an organic solvent, e.g. toluene or xylene, under nitrogen.

Compounds of formulae XV and XVI are either known compounds or can be prepared by conventional techniques.

The compounds of general formula I have been found to have useful herbicidal activity. Accordingly, the present invention further provides a herbicidal composition which comprises a carrier and, as active ingredient, a compound of formula I as defined above. A method of making such a composition is also provided which comprises bringing a compound of formula I as defined above into association with at least one carrier.

A composition according to the present invention preferably contains in the range of from 0.5% to 95% by weight of active ingredient.

A carrier in a composition according to the invention is any material with which the active ingredient is formulated to facilitate application to the locus to be treated, which may for example be a plant, seed or soil, or to facilitate storage, transport or handling. A carrier may be a solid or a liquid, including a material which is normally gaseous but which has been compressed to form a liquid, and any of the carriers normally used in formulating herbicidal compositions may be used.

Suitable solid carriers include natural and synthetic clays and silicates, for example natural silicas such as diatomaceous earths; magnesium silicates, for example talcs; magnesium aluminium silicates, for example attapulgites and vermiculites; aluminium silicates, for example kaolinites, montmorillonites and micas; calcium carbonate; calcium sulphate; ammonium sulphate; synthetic hydrated silicon oxides and synthetic calcium or aluminium silicates; elements, for example carbon and sulphur; natural and synthetic resins, for example coumarone resins, polyvinyl chloride, and styrene polymers and copolymers; solid polychlorophenols; bitumen; waxes; and solid fertilisers, for example superphosphates.

Suitable liquid carriers include water; alcohols, for example isopropanol and glycols; ketones, for example acetone, methyl ethyl ketone, methyl isobutyl ketone and cyclohexanone; ethers; aromatic or aliphatic hydrocarbons, for example benzene, toluene and xylene; petroleum fractions, for example kerosine and light mineral oils; chlorinated hydrocarbons, for example carbon tetrachloride, perchloroethylene and trichloroethane. Mixtures of different liquids are often suitable.

Agricultural compositions are often formulated and transported in a concentrated form which is subsequently diluted by the user before application. The presence of small amounts of a carrier which is a surface-active agent facilitates this process of dilution. Thus preferably at least one carrier in a composition according to the invention is a surface-active agent. For example the composition may contain at least two carriers, at least one of which is a surface-active agent.

A surface-active agent may be an emulsifying agent, a dispersing agent or a wetting agent; it may be nonionic or ionic. Examples of suitable surface-active agents include the sodium or calcium salts of polyacrylic acids and lignin sulphonic acids; the condensation products of fatty acids or aliphatic amines or amides containing at least 12 carbon atoms in the molecule with ethylene oxide and/or propylene oxide; fatty acid esters of glycerol, sorbitol, sucrose or pentaerythritol; condensates of these with ethylene oxide and/or propylene oxide; condensation products of fatty alcohol or alkyl phenols, for example *p*-octylphenol or *p*-octylcresol, with ethylene oxide and/or propylene oxide; sulphates or sulphonates of these condensation products; alkali or alkaline earth metal salts, preferably sodium salts, of sulphuric or sulphonic acid esters containing at least 10 carbon atoms in the molecule, for example sodium lauryl sulphate, sodium secondary alkyl sulphates, sodium salts of sulphonated castor oil, and sodium alkylaryl sulphonates such as dodecylbenzene sulphonate; and polymers of ethylene oxide and copolymers of ethylene oxide and propylene oxide.

The compositions of the invention may for example be formulated as wettable powders, dusts, granules, solutions, emulsifiable concentrates, emulsions, suspension concentrates and aerosols. Wettable powders usually contain 25, 50 or 75% w of active ingredient and usually contain in addition to solid inert carrier, 3-10% w of a dispersing agent and, where necessary, 0-10% w of stabiliser(s) and/or other additives such as penetrants or stickers. Dusts are usually formulated as a dust concentrate having a similar composition to that of a wettable powder but without a dispersant, and are diluted in the field with further solid carrier to give a composition usually containing 1-10% w of active ingredient. Granules are usually prepared to have a size between 10 and 100 BS mesh (1.676 - 0.152 mm), and may be manufactured by agglomeration or impregnation techniques. Generally, granules will contain 1-75% w active ingredient and 0-10% w of additives such as stabilisers, surfactants, slow release modifiers and binding agents. The so-called "dry flowable powders" consist of relatively small granules having a relatively high concentration of active ingredient. Emulsifiable concentrates usually contain, in addition to a solvent and, when necessary, co-solvent, 10-50% w/v active ingredient, 2-20% w/v emulsifiers and 0-20% w/v of other additives such as stabilisers, penetrants and corrosion inhibitors. Suspension concentrates are usually compounded so as to obtain a stable, non-sedimenting flowable product and usually contain 10-75% w active ingredient, 0.5-15% w of dispersing agents, 0.1-10% w of suspending agents such as protective colloids and thixotropic agents, 0-10% w of other additives such as defoamers, corrosion inhibitors, stabilisers, penetrants and stickers, and water or an organic liquid in which the active ingredient is substantially insoluble; certain organic solids or inorganic salts may be present dissolved in the formulation to assist in preventing sedimentation or as anti-freeze agents for water.

Aqueous dispersions and emulsions, for example compositions obtained by diluting a wettable powder or a concentrate according to the invention with water, also lie within the scope of the invention. The said emulsions may be of the water-in-oil or of the oil-in-water type, and may have a thick 'mayonnaise'-like consistency.

The composition of the invention may also contain other active ingredients, for example compounds possessing insecticidal or fungicidal properties or other herbicides.

The present invention still further provides the use as a herbicide of a compound of the general formula I as defined above or a composition as defined above and a method of combating undesired plant growth at a locus with such a compound or composition. The locus may be, for example, the soil or plants in a crop area. The dosage of active ingredient may, for example, be in the range of from 0.01 to 10kg/ha, preferably from 0.01 to 5kg/ha.

The following Examples illustrate the invention.

Example 1

Preparation of 2-(3-trifluoromethylphenoxy)-5-fluorobenzoic acid-2',4'-difluoroanilide ($X^1 = 2-F$; $X^2 = 4-F$; $X^3 = H$; $n = 0$; $Z = F$; $A = CH$; $Y^1 = CF_3$; $Y^2 = H$; $W = H$)

(i) Preparation of 2-(3-trifluoromethylphenoxy)-5-fluorobenzonitrile

To a solution of 3-trifluoromethylphenol (29g, 0.18mol) dissolved in dimethylformamide (100ml) was added finely-powdered potassium hydroxide (15g, 0.19mol). The reaction mixture was heated to approximately 60 °C, with stirring, for one hour after which time 2,5-difluorobenzonitrile (25g, 0.19mol) was added and the temperature increased to 110 °C. After approximately half an hour, the reaction mixture was allowed to cool and excess dimethylformamide was removed in vacuo before 500ml of a 50:50 mixture of water and trichloromethane was added. The organic layer was separated, washed and dried and the residue purified by chromatography using a silica column with trichloromethane as eluant, followed by distillation and recrystallisation to yield the title compound as a solid.

Melting point: 51 °C.

Analysis (%) Calc.	C: 59.8;	H: 2.5;	N: 5.0
Found	C: 59.8;	H: 2.7;	N: 5.2

(ii) Preparation of 2-(3-trifluoromethylphenoxy)-5-benzoic acid

2-(3-Trifluoromethylphenoxy)-5-fluorobenzonitrile obtained in (i) above (12g, 0.04mol) was added to ethylene glycol (15ml) and to this solution was added potassium hydroxide (10g, 0.125mol) dissolved in water (10ml). The reaction mixture was refluxed for approximately four hours, cooled, and water (150ml) added. The mixture was then extracted with diethyl ether (100ml) and the aqueous layer acidified before further extraction with trichloromethane (3 x 150ml). The organic layer was separated, washed, dried and chromatographed on a silica column using 3:2 (v/v) trichloromethane : ethyl acetate as eluant to give the title compound as a colourless solid (10g, mol, 74% yield).

Melting point: 106 °C.

Analysis (%) Calc.	C: 56.0;	H: 2.7
Found	C: 55.9;	H: 2.7

(iii) Preparation of 2-(3-trifluoromethylphenoxy)-5-fluorobenzoic acid-2',4'-difluoroanilide

To a solution of 2-(3-trifluoromethylphenoxy)-5-benzoic acid obtained in (ii) above (6g, 0.02mol) in toluene (60ml) was added thionyl chloride (6ml). The reaction mixture was refluxed for one hour and solvent subsequently removed to leave a residue. The residue was then redissolved in toluene (25ml) and the resulting solution added to a mixture of 2,4-difluoroaniline (2.6g, 0.02mol) and triethylamine (3g, 0.03mol) in toluene (25ml) and the reaction allowed to proceed at ambient temperature (~20 °C). Once all reaction had ended, the reaction mixture was filtered and the filtrate chromatographed on a silica column using trichloromethane as eluant to give 2-(3-trifluoromethylphenoxy)-5-fluorobenzoic acid-2',4'-difluoroanilide as a colourless solid (6.2g, 0.015mol, 76% yield).

Melting point: 98 °C.

Analysis (%) Calc.	C: 58.4;	H: 2.7;	N: 3.4
Found	C: 58.9;	H: 2.8;	N: 3.7

Example 2

Preparation of 2-(3-trifluoromethylphenoxy)-5-trifluoromethyl-benzoic acid-2',4'-difluoroanilide (X¹ = 2-F; X² = 4-F; X³ = H; n = 0; Z = CF₃; A = CH; Y¹ = CF₃; Y² = H; W = H)

(i) Preparation of 3-carboxy,4-fluorobenzotrifluoride

To a solution of 4-fluorobenzotrifluoride (75ml) in tetrahydrofuran (570ml) under a nitrogen atmosphere and at a temperature of approximately -60 °C was added butyl lithium (25N, 200ml) over a period of one hour. The reaction mixture was stirred at from -70 to -60 °C for four hours and then was poured over an excess of dry ice. After fifteen minutes the excess dry ice was evaporated and the solvent removed to leave a residue. The residue was taken up in water (500ml) and sodium hydroxide (1N, 30ml) prior to washing with ethyl acetate (2x300ml). The aqueous phase was acidified with concentrated hydrochloric acid and extracted with ethyl acetate (2x300ml). Finally, the combined organic extracts were washed with water (500ml), dried and then evaporated to yield a crude residue which, upon recrystallisation from toluene/hexane, gave the title compound as a solid (77g, 0.37mol, 81% yield).

Melting point: 100 °C.

Analysis (%) Calc.	C: 46.2;	H: 1.9
Found	C: 46.1;	H: 1.7

(ii) Preparation of 2-fluoro-5-trifluoromethylbenzoic acid-2',4'-difluoroanilide

- 3-Carboxy,4-fluorobenzotrifluoride obtained in (i) above (10g, 0.05mol) was dissolved in toluene (100ml) and excess thionyl chloride (10ml) added dropwise whilst stirring under a nitrogen atmosphere. After one hour, the solvent was removed to leave a residue which was subsequently redissolved in toluene (50ml) and added to a mixture of 2,4-difluoroaniline (6.2g, 0.05mol) and triethylamine (7g, 0.07mol) in toluene (50ml). The reaction mixture was filtered to obtain a precipitate-free filtrate from which solvent was subsequently removed to yield a residue. Purification of the residue on a silica column using trichloromethane as eluant gave the title compound as a colourless solid (10.6g, 0.03mol, 69% yield).
- Melting point: 126 °C.

Analysis (%) Calc.	C: 52.7;	H: 2.2;	N: 4.4
Found	C: 53.3;	H: 2.2;	N: 4.7

(iii) Preparation of 2-(3-trifluoromethylphenoxy)-5-trifluoromethylbenzoic acid-2',4'-difluoroanilide

- To a suspension of oil-free sodium hydride (0.7g, 0.03mol) in dry tetrahydrofuran (50ml) was added 3-trifluoromethylphenol (3.6g, 0.022mol) in small portions and 2-fluoro-5-trifluoromethylbenzoic acid-2',4'-difluoroanilide obtained in (ii) above (7g, 0.022mol) in a single portion. Reflux of the reaction mixture for one hour was followed by removal of solvent and partitioning of the remaining residue between trichloromethane and water (500ml, 50:50 v/v). The organic layer was separated, washed, then dried and finally purified on a silica column using trichloromethane as eluant to give the title compound as a colourless solid (6.8g, 0.015mol, 67% yield).
- Melting point: 105 °C.

Analysis (%) Calc.	C: 54.7;	H: 2.4;	N: 3.0
Found	C: 55.6;	H: 2.6;	N: 3.0

Example 3

- Preparation of 2-(3-trifluoromethylphenoxy)-5-methoxybenzoic acid-2',4'-difluoroanilide ($X^1 = 2-F$; $X^2 = 4-F$; $X^3 = H$; $n = 0$; $Z = OCH_3$; $A = CH$; $Y^1 = CF_3$; $Y^2 = H$; $W = H$)

(i) Preparation of methyl-2-(3-trifluoromethylphenoxy)-5-methoxy benzoate

- Sodium (5.4g, 0.23mol) in methanol (90ml) was added to a solution of 3-trifluoromethylphenol (36g, 0.22mol) in xylene (200ml) and the xylene then removed. Fresh xylene (200ml) was added and subsequently evaporated *in vacuo*. Further fresh xylene (200ml) was added followed by cuprous chloride (6g, 0.06mol) and pyridine (100ml). 2-Bromo-5-methoxy benzoic acid methyl ester (50g, 0.20mol) in xylene (50ml) was then added and the resulting mixture refluxed overnight before pouring into water (1000 ml), acidifying with dilute hydrochloric acid and extracting with diethyl ether (2 x 500 ml). The organic layer was separated and chromatographed on a silica column using a 50:50 (v/v) mixture of trichloromethane and hexane as eluant to give the title compound as a colourless oil (55.2g, 0.17mol, 83% yield).
- Boiling point: 140 °C at approximately 1 mmHg.

Analysis (%) Calc.	C: 58.9;	H: 4.0
Found	C: 58.6;	H: 4.1

(ii) Preparation of 2-(3-trifluoromethylphenoxy)-5-methoxybenzoic acid

Methyl-2-(3-trifluoromethylphenoxy)-5-methoxybenzoate obtained in (i) above (10g; 0.03mol) was dissolved in methanol (20ml) and 10% aqueous solution potassium hydroxide (50ml) added. The reaction

mixture was refluxed until homogeneous (30 minutes), acidified with 2N hydrochloric acid, and water added (300ml). The resulting mixture was extracted with trichloromethane (2 x 150ml) and the combined extracts chromatographed on a silica column using a 80:20 (v/v) mixture of trichloromethane and ethyl acetate as eluant to give a colourless solid. Recrystallisation of the solid from toluene/hexane gave the title compound as colourless crystals (7.5g, 0.024mol, 78% yield). Melting point: 124 °C.

Analysis (%) Calc.	C: 57.7;	H: 3.5
Found	C: 57.6;	H: 3.9

(iii) Preparation of 2-(3-trifluoromethylphenoxy)-5-methoxybenzoic acid-2',4'-difluoroanilide

To a solution of 2-(3-trifluoromethylphenoxy)-5-methoxybenzoic acid obtained in (ii) above (6g; 0.02mol) in toluene (60ml) was added thionyl chloride (6ml). The reaction mixture was refluxed for one hour and the solvent subsequently removed to leave a residue. The residue was then redissolved in toluene (25ml) and the resulting solution added to a mixture of 2,4-difluoroaniline (2.6g, 0.02mol) and triethylamine (3g; 0.03mol), and the reaction allowed to proceed at ambient temperature (approximately 20 °C). Once all reaction had ended, the reaction mixture was filtered and the filtrate chromatographed on a silica column using trichloromethane as eluant to give a colourless solid. Recrystallisation of the solid from hexane/ethyl acetate yielded the title compound as colourless crystals (6.5g, 0.015mol, 80% yield). Melting point: 112 °C

Analysis (%) Calc.	C: 59.6;	H: 3.3;	N: 3.3
Found	C: 59.9;	H: 3.5;	N: 3.7

Example 4

Preparation of 2-(5-chloro-2-pyridyloxy)benzoic acid-2',4'-difluoroanilide ($X^1 = 2-F$; $X^2 = 4-F$; $X^3 = H$; $n = 0$; $Z = H$; $A = N$; $Y^1 = H$; $Y^2 = H$; $W = Cl$)

(i) Preparation of ethyl-2-(5-chloro-2-pyridyloxy)benzoate

Ethyl salicylate (30g, 0.18mol) was added dropwise with stirring to a suspension of oil-free sodium hydride (5g, 0.21mol) in dry dimethylformamide (100ml) under a nitrogen atmosphere. After one hour, 2,5-dichloropyridine (26g, 0.17mol) was added and the reaction mixture refluxed for 48 hours. The dimethylformamide was then removed *in vacuo* and 11 of a 50:50 (v/v) mixture of water and trichloromethane added to the remaining residue. The organic layer was separated, washed, dried and, finally, chromatographed on a silica column using trichloromethane and hexane (3:1, v/v) as eluant to give the title compound as a colourless oil (32.1g, 0.115mol, 64% yield). Boiling point: 150 °C at approximately 1 mmHg.

Analysis (%) Calc.	C: 60.5;	H: 4.3;	N: 5.1
Found	C: 60.5;	H: 4.4;	N: 5.1

(ii) Preparation of 2-(5-chloro-2-pyridyloxy)benzoic acid

To a solution of ethyl-2-(5-chloro-2-pyridyloxy)benzoate obtained in (i) above (30g, 0.11mol) dissolved in ethanol (50ml) was added a 10% aqueous solution of potassium hydroxide (120ml). The reaction mixture was refluxed with stirring for thirty minutes until it was homogeneous. The reaction mixture was then acidified (to pH 2-3) with aqueous hydrochloric acid and extracted with trichloromethane (500ml). The organic layer was separated, dried and subsequently chromatographed on a silica column using a 50:50 v/v mixture of trichloromethane and ethyl acetate as eluant to give the title compound as a colourless solid (19.7g, 0.08mol, 73% yield). Melting point: 159 °C.

Analysis (%) Calc.	C: 57.7;	H: 3.2;	N: 5.6
Found	C: 57.7;	H: 3.2;	N: 5.7

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(iii) Preparation of 2-(5-chloro-2-pyridyloxy)benzoic acid-2',4'-difluoroanilide

2-(5-chloro-2-pyridyloxy)benzoic acid obtained in (ii) above (1.5g, 0.006mol) was dissolved in dry tetrahydrofuran (20ml), cooled to -15°C and then treated sequentially with N-methylmorpholine (1ml) and isobutylchloroformate (1ml). The resulting mixture was stirred at approximately -15°C for one minute before 2,4-difluoroaniline (0.8g, 0.006mol) was added. The mixture was stirred for a further thirty minutes at the same temperature after which time a 10% v/v aqueous solution of citric acid (50ml) was added. Extraction with ethyl acetate (3x50ml) followed; the organic extracts were combined, dried and then chromatographed on a silica column to give the title compound as a colourless solid (1.2g, 0.0033mol, 54% yield).

15 Melting point: 138°C.

Analysis (%) Calc.	C: 59.9;	H: 3.1;	N: 7.8
Found	C: 60.2;	H: 3.1;	N: 7.5

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Examples 5 to 41

By processes analogous to those described in Examples 1 to 4 above, further compounds according to the invention were prepared as detailed in Table I below. In Table I, the compounds are identified by reference to formula I. Melting/boiling point data and elemental analysis data for the compounds of Examples 5 to 41 are given in Table IA below.

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Table 1

Example No.	X ¹	X ²	X ³	n	Z	A	Y ¹	Y ²	W
5	H	H	H	0	H	CH	H	H	H
6	2-F	4-F	H	0	H	CH	H	H	H
7	H	H	H	0	H	CH	CF ₃	H	H
8	2-F	4-F	H	0	H	CH	CF ₃	H	H
9	2-CH ₃	4-CH ₃	H	0	F	CH	CF ₃	H	H
10	H	H	H	0	F	CH	CF ₃	H	H
11	2-F	H	H	0	F	CH	CF ₃	H	H
12	4-F	H	H	0	F	CH	CF ₃	H	H
13	2-F	5-F	H	0	F	CH	CF ₃	H	H
14	2-F	4-F	5-F	0	F	CH	CF ₃	H	H
15	2-F	4-Cl	H	0	F	CH	CF ₃	H	H
16	2-F	4-F	H	0	F	CH	CF ₃	H	Cl
17	2-F	4-F	H	0	H	CH	CH ₃	CH ₃	H
18	2-F	4-F	H	0	H	CH	Cl	H	H
19	2-F	4-F	H	0	F	CH	Cl	H	H

Table 1 (continued)

Example No.	X ¹	X ²	X ³	n	Z	A	Y ¹	Y ²	W
20	2-F	4-F	H	0	F	CH	Cl	H	F
21	2-F	4-F	H	0	F	CH	F	H	H
22	2-F	4-F	H	0	F	CH	OCH ₃	H	H
23	2-F	4-F	H	0	F	CH	OCF ₃	H	H
24	H	H	H	0	F	CH	H	H	H
25	2-F	4-F	H	0	Cl	CH	CF ₃	H	H
26	2-F	4-F	H	0	NH ₂	CH	CF ₃	H	H
27	2-F	4-F	H	0	3-trifluoromethyl -phenoxy	CH	CF ₃	H	H
28	H	H	H	1	H	CH	CF ₃	H	H
29	H	H	H	1	Cl	CH	CF ₃	H	H
30	H	H	H	1	F	CH	CF ₃	H	H
31	2-CH ₃	H	H	1	F	CH	CF ₃	H	H
32	3-F	4-F	H	0	F	CH	CF ₃	H	H
33	3-F	H	H	0	F	CH	CF ₃	H	H

Table 1 (continued)

Example No.	X ¹	X ²	X ³	n	Z	A	Y ¹	Y ²	W
34	4-Cl	H	H	0	F	CH	CF ₃	H	H
35	2-F	4-F	5-F	0	F	CH	OCF ₃	H	H
36	4-F	H	H	0	F	CH	OCF ₃	H	H
37	2-F	4-F	H	0	CH ₃	CH	CF ₃	H	H
38	2-F	4-F	H	0	SCH ₃	CH	OCF ₃	H	H
39	2-F	4-F	H	0	CH ₃	CH	OCF ₃	H	H
40	4-F	H	H	0	CH ₃	CH	OCF ₃	H	H
41	2-F	4-F	H	0	Br	CH	CF ₃	H	H

Table IA

Example No.	Melting point (°C)	Analysis (%)					
		C		H		N	
		Calc.	Found	Calc.	Found	Calc.	Found
5	98	78.9	78.9	5.2	5.2	4.8	5.0
6	89	70.2	70.5	4.0	4.0	4.3	4.3
7	74	67.2	66.8	3.9	3.9	3.9	4.4
8	99	61.1	61.1	3.0	3.0	3.6	3.6
9	112	65.5	64.9	4.2	4.6	3.5	4.1
10	126	64.0	63.9	3.5	3.5	3.7	4.0
11	119	61.1	60.9	3.0	3.3	3.6	3.9
12	119	61.1	61.2	3.0	3.2	3.6	3.6
13	142	58.4	58.0	2.7	3.3	3.4	3.6
14	114	55.9	56.1	2.3	2.6	3.3	3.6
15	105	56.1	56.5	2.6	2.8	3.3	4.0
16	128	53.9	53.7	2.2	2.3	3.1	3.4
17	94	71.4	71.6	4.8	4.9	4.0	4.0

Table IA (continued)

Example No.	Melting point (°C)	C		H		N	
		Calc.	Found	Calc.	Found	Calc.	Found
18	101	63.4	63.5	3.3	3.5	3.9	4.3
19	87	60.4	60.6	2.9	3.0	3.7	3.7
20	134	57.7	57.8	2.5	2.8	3.5	3.7
21	104	63.2	63.2	3.0	3.2	3.9	3.9
22	112	64.3	64.3	3.8	3.8	3.8	3.9
23	95	56.2	56.7	2.6	2.8	3.3	3.9
24	117	74.3	74.0	4.6	4.7	4.6	5.0
25	114	56.1	56.0	2.6	2.6	3.3	3.5
26	128	58.8	58.4	3.2	3.2	6.9	7.1
27	oil (boiling point: 200°C/1 mmHg)	58.6	58.6	2.7	2.7	2.5	2.5
28	oil (boiling point: 230°C/4 mmHg)	67.9	67.9	4.3	4.3	3.8	4.1

Table IA (continued)

Example No.	Melting point (°C)	C		H		N	
		Calc.	Found	Calc.	Found	Calc.	Found
29	oil (boiling point: 190°C/1 mmHg)	62.1	62.3	3.7	3.7	3.5	3.8
30	98	64.8	65.0	3.9	4.0	3.6	3.8
31	101	65.5	65.1	4.2	4.3	3.5	3.6
32	109	58.4	58.2	2.7	3.1	3.4	3.4
33	120	61.1	61.3	3.1	3.2	3.6	3.4
34	115	58.7	58.9	2.9	3.0	3.4	3.8
35	113	53.9	53.9	2.2	2.5	3.1	3.0
36	102	58.7	58.8	2.9	3.2	3.4	3.4
37	68	61.9	61.8	3.4	3.3	3.4	3.5
38	87	55.4	55.1	3.1	2.7	3.1	3.1
39	80	59.6	59.3	3.3	3.1	3.3	3.7
40	126	62.2	62.4	3.7	3.9	3.5	3.8
41	103	50.8	50.6	2.3	2.5	3.0	2.9

Example 42Herbicidal Activity

5 To evaluate their herbicidal activity, compounds according to the invention were tested using as representative range of plants: maize, Zea mays (Mz); rice, Oryza sativa (R); barnyard grass, Echinochloa crusgalli (BG); oat, Avena sativa (O); linseed, Linum usitatissimum (L); mustard, Sinapsis alba (M); sugar beet, Beta vulgaris (SB) and soya bean, Glycine max (S).

10 The tests fall into two categories, pre-emergence and post-emergence. The pre-emergence tests involved spraying a liquid formulation of the compound onto the soil in which the seeds of the plant species mentioned above had recently been sown. The post-emergence tests involved two types of test, viz., soil drench and foliar spray tests. In the soil drench tests the soil in which the seedling plants of the above species were growing was drenched with a liquid formulation containing a compound of the invention, and in the foliar spray tests the seedling plants were sprayed with such a formulation.

15 The soil used in the tests was a prepared horticultural loam.

The formulations used in the tests were prepared from solutions of the test compounds in acetone containing 0.4% by weight of an alkylphenol/ethylene oxide condensate available under the trade mark TRITON X-155. These acetone solutions were diluted with water and the resulting formulations applied at dosage levels corresponding to 5 kg or 1 kg of active material per hectare in a volume equivalent to 600
20 litres per hectare in the soil spray and foliar spray test, and at a dosage of level equivalent to 10 kilograms of active material per hectare in a volume equivalent to approximately 3,000 litres per hectare in the soil drench tests.

In the pre-emergence tests untreated sown soil and in the post-emergence tests untreated soil bearing seedling plants were used as controls.

25 The herbicidal effects of the test compounds were assessed visually twelve days after spraying the foliage and the soil, and thirteen days after drenching the soil and were recorded on a 0-9 scale. A rating 0 indicates growth as untreated control, a rating 9 indicates death. An increase of 1 unit on the linear scale approximates to a 10% increase in the level of effect.

30 The results of the tests are set out in Table II below, in which the compounds are identified by reference to the preceding Examples. Absence of a numeral in the Table indicates a zero rating; an asterisk indicates that no result was obtained.

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Table II

Compound of		Soil drench 10/kg/ha				Dosage		Foliar spray				Pre-emergence													
Ex. No.	Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
1	4	1	4	4	2	2	4		5	6	4	8	6	7	9	9	8	5	3	9	7	4	9	9	3
									1	4	3	7	5	6	9	9	8	3	2	9	6	2	8	8	2
2									5	1		2	1	2	7	3	2						2	2	
									1	1		1		2	7	3	2						2		
3									5	4		3	1	*	*	*	*						2	1	
									1	1		2	1	4	8	4	4						2		
4									5	2		5	1	4	8	5	4					2	5	2	
									1	1		3		3	8	4	4						3		
5									5	4		5	3	5	9	9	4					1		3	
									1	2		4	1	4	9	9	3					1		2	

Table II (continued)

Compound of																									
Ex. No.	Soil drench 10/kg/ha						Dosage		Foliar spray						Pre-emergence										
	Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
6									5	4		7	2	6	9	8	5								
									1	2		3	1	3	9	8	3								
7	2				1	2	3		5	4	1	8	4	6	9	9	5	1		4			7	7	
									1	2		6	2	5	9	9	5			2			4	5	
8	2		5	2	2				5	4	3	8	6	7	8	6	6	3		8	3	1	6	*	2
									1	4	2	7	4	6	7	5	5	2		8	2		5	*	
9																									
10	3	2	3	2		3	2		5	4	1	6	4	4	7	8	4		5			3	3		
									1	3	1	4	2	4	7	7	3		4			3	3		
10	3	2	3	2		3	2		5	3	1	7	3	5	9	9	5		5	1	1	7	7		
									1	3	1	6	2	3	9	9	4		5			5	5		

Table II (continued)

Compound of Ex. No.	Soil drench 10/kg/ha						Dosage kg/ha						Foliar spray						Pre-emergence					
	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
11	2	1	1	1	1	2	1	5	4	2	8	5	6	9	9	5	1		6	2	2	7	7	4
							1	1	3	1	8	4	6	9	9	4			6	1	1	6	5	1
12	4	2	4	3	2	4	4	5	4	3	6	5	7	9	9	8	2	1	5	*	*	7	6	2
							1	1	3	2	5	3	6	9	9	7			4	4	2	7	6	
13								5	4	1	8	3	5	8	8	6			6			5	5	
								1	3		4	2	5	8	7	6			6			4	5	
14	3	2	4	1	2	2	2	5	3	2	8	6	5	8	9	4	3	1	7	5	3	8	8	
								1	2	1	7	4	5	8	9	4	1	1	7	4	3	8	7	
15	3		4	5	2	5	2	2	5	4	1	8	4	6	9	9	7		6	4	2	8	7	
								1	4	1	8	4	6	9	9	7			6	3		6	6	

Table II (continued)

Compound of																									
Ex. No.	Soil drench 10/kg/ha						Dosage		Foliar spray						Pre-emergence										
	Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
16	1				2	3	2	2	5	3		6	3	5	9	8	5	1		4	1	2	4	3	
									1	2		4	2	4	9	8	3			3			3	1	
17					2	2			5	3		3	3	3	*	*	*								
									1	1		2	1	3	4	5	4								
18			1	2	5	1	2		5	4	1	7	3	6	8	8	4			1			3		
									1	2		5	3	5	8	8	3						1		
19	3	1	4	3	1	2	2		5	3	2	7	3	6	9	9	6			4	1		4	2	
									1	2	1	6	2	5	9	8	4			3	1		3	1	
20	1		3				1		5	3		6	3	5	8	8	5			3			3	3	
									1	2		2	1	3	8	5	3			1			2	1	

Table II (continued)

Compound of																									
Ex. No.	Soil drench 10/kg/ha						Dosage		Foliar spray						Pre-emergence										
	Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
21	1		1		1	1			5	3		6	3	5	8	6	4			4			4	2	
									1	2		4	2	4	8	6	4			2			2	1	
22			1	1	2		1		5	4	1	6	3	4	8	8	5						2		
									1	3		4	2	3	7	8	4						1		
23	4	3	6	4	2	3	2		5	5	4	8	7	6	9	9	6	4	3	8	6	3	9	9	
									1	4	4	8	6	6	9	9	6	2	1	8	5	3	9	9	
24	1	*	3		1	1			5	2		*	1	*	8	8	*			3			4	2	
									1	1		5	1	4	8	8	4			2			3	1	
25					2	2			5	5	2	6	4	6	9	9	6	1		5	3	2	5	6	
									1	4	1	5	3	6	8	8	6			4	3	1	5	5	

Table II (continued)

Compound of																				
Ex. No.	Soil drench 10/kg/ha						Dosage		Foliar spray						Pre-emergence					
	Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S			
26	5	1	2	3	3	1	4	2	4	2	4	2	1	1	2	3	1			
	1			2	1				2	1										
27	5	2	4	2	4	8	7	4	4	2	4	2	1	1	2	3	5			
	1	2	3	2	4	7	5	3	1	1	1	1	1	1	2	2	4			
28	5	4	6	3	4	8	6	4	2	1	1	2	4	5						
	1	2	1	2	2	5	5	3	1	1	1	2								
29	2	2	1	2	2	1	5	4	8	4	6	9	9	5	2	1	4	3	2	
							1	2	4	2	6	9	7	4			3	1		
30	1	3	1	3	1		5	6	1	7	4	4	8	8	5	4	1	1	7	4
							1	3	1	5	3	3	8	8	4	1		4	2	

Table II (continued)

Compound of																									
Ex. No.	Soil drench 10/kg/ha						Dosage			Foliar spray				Pre-emergence											
	Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
31			4	3	1	4	4		5	5	3	7	6	5	8	9	7	2		7	3	3	8	8	2
									1	3	1	6	3	4	8	9	7			6	2	2	8	5	1
32			1	1	3	4	2	3	2	5	3	2	8	4	5	9	9	6	1		6	2	2	8	7
									1	2	1	5	3	4	9	9	5			5	2	1	7	5	
33			1	3	1	2	2		5	4	1	7	4	5	9	9	6			4		1	6	6	
									1	4		7	3	5	9	9	5			3		1	6	5	
34			3	5	1	2	2	1	5	4		8	4	5	9	9	5			4	1	3	6	7	
									1	2		7	3	5	9	9	5			3		1	6	6	
35			2	2	3	5	2	4	2	5	4	2	8	6	5	9	9	4	4	2	7	5	3	7	8
									1	3	1	7	4	4	9	9	4	2	2	7	5	2	7	7	

Table II (continued)

Compound of		Soil drench 10/kg/ha						Dosage		Foliar spray						Pre-emergence										
Ex. No.		Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
36		3	4	5	6	3	4			5	5	4	8	7	7	9	9	7	1	1	5	4	3	5	6	
										1	4	2	7	6	7	9	9	7	1		4	1	1	5	5	
37		2		3	2	2	3	2		5	6	5	8	6	6	8	8	7	2		8	3		8	6	
										1	5	1	7	4	5	8	8	7			4	1		6	4	
38										5	1		1	2	*	*	*	*								
										1	1		1	1	2	4	2	2								
39		3	2	4	4	1	2	2		5	6	4	8	6	7	9	9	8	*	*	*	*	*	*	*	*
										1	5	3	8	5	7	9	9	8	2		6			3	2	
40										5	5	1	6	4	2	8	6	3								
										1	4	1	*	*	*	*	*	*								

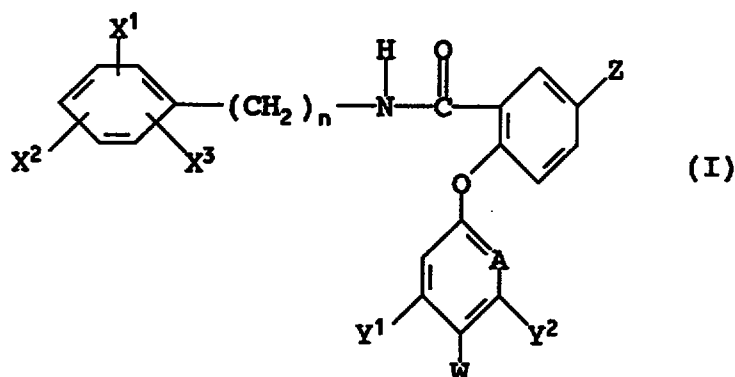
Table II (continued)

Compound		Soil drench 10/kg/ha				Dosage		Foliar spray				Pre-emergence													
Ex. No.	Mz	R	BG	O	L	M	SB	S	kg/ha	Mz	R	BG	O	L	M	SB	S	Mz	R	BG	O	L	M	SB	S
41				1	3				5	4	3	4	4	6	9	7	4					6	4		
									1	3	2	2	2	4	9	6	3					4	2		

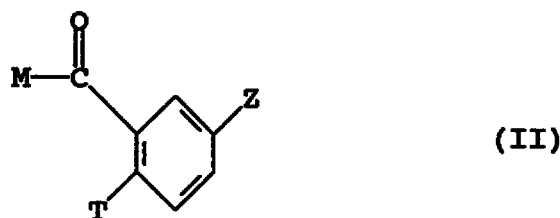
Claims

Claims for the following Contracting States : AT, BE, CH, DE, DK, FR, GB, GR, IT, LU, LI, NL, SE

1. A compound of the general formula

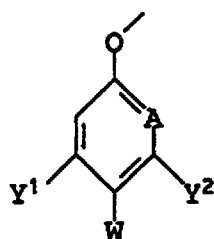


- wherein X^1 , X^2 and X^3 each independently represents a hydrogen or halogen atom or a C_{1-4} alkyl group; n is 0 or 1; Z represents a hydrogen or halogen atom, or an amino, C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} alkylthio or C_{1-4} alkoxy group or a phenoxy group optionally substituted by C_{1-4} haloalkyl; A represents CH or N; Y^1 and Y^2 each independently represents a hydrogen or halogen atom, or a C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} alkoxy or C_{1-4} haloalkoxy group; and W represents a hydrogen atom or, when A represents CH and at least one of Y^1 and Y^2 is other than a hydrogen atom or when A represents N, W represents a hydrogen or halogen atom; with the proviso that when A represents N, then each of Y^1 and Y^2 represents a hydrogen atom.
2. A compound according to claim 1, wherein X^1 , X^2 and X^3 each independently represents a hydrogen, fluorine or chlorine atom or a methyl group.
3. A compound according to claim 1 or 2, wherein Z represents a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy or 3-trifluoromethylphenoxy group.
4. A compound according to any one of the preceding claims, wherein one of Y^1 and Y^2 represents a hydrogen, fluorine or chlorine atom, or a methyl, trifluoromethyl, methoxy or trifluoromethoxy group, and the other represents a hydrogen atom.
5. A process for the preparation of a compound of formula I as defined in claim 1, which comprises reacting, when necessary in the presence of a suitable base, a compound of the general formula



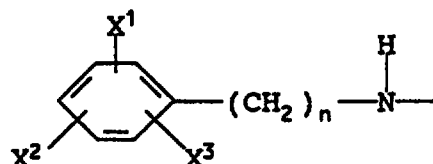
in which M represents a leaving group and T represents a group of the general formula





(III)

or M represents a group of the general formula

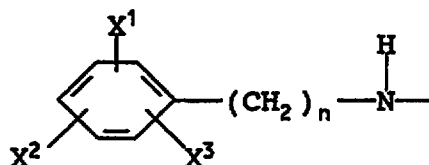


(IV)

and T represents a leaving group, with a compound of the general formula

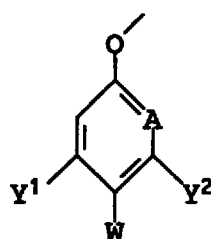
Q-L (V)

in which, when M represents a leaving group and T represents a group III then Q represents the group



and L represents a hydrogen atom,

or, when M represents a group IV and T represents a leaving group, then Q represents the group



and L represents a hydrogen atom or a univalent cation, and X¹, X², X³, n, Z, A, Y¹, Y² and W are as defined in claim 1.

6. A herbicidal composition which comprises a carrier and, as active ingredient, a compound of formula I as claimed in any one of claims 1 to 4.
7. A composition according to claim 6, which comprises at least two carriers, at least one of which is a surface-active agent.
8. A method of combating undesired plant growth at a locus, which comprises treating the locus with a compound of formula I as claimed in any one of claims 1 to 4, or with a composition as claimed in

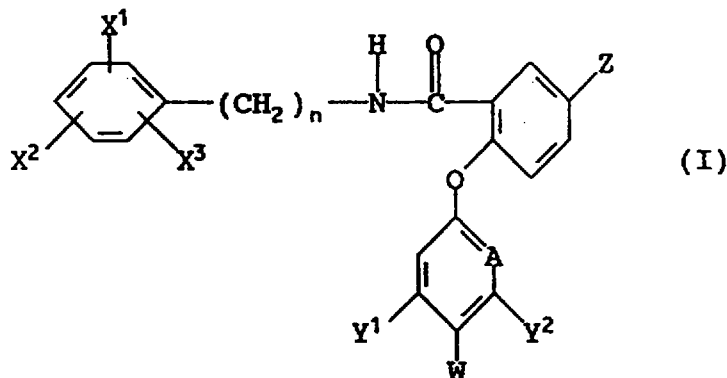


claim 6 or claim 7.

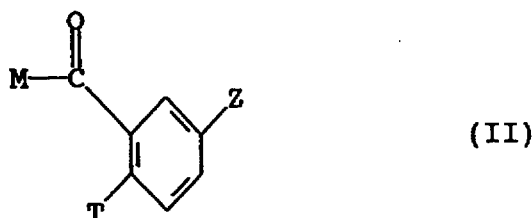
9. The use as a herbicide of a compound of formula I as claimed in any one of claims 1 to 4, or a composition as claimed in claim 6 or claim 7.

Claims for the following Contracting State : ES

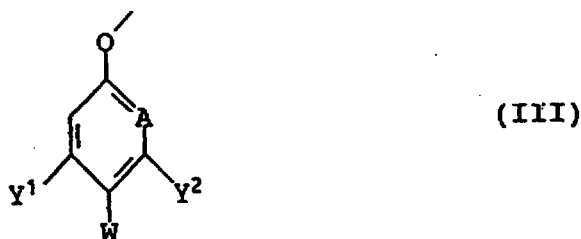
1. A process for the preparation of a compound of the general formula



wherein X^1 , X^2 and X^3 each independently represents a hydrogen or halogen atom or a C_{1-4} alkyl group; n is 0 or 1; Z represents a hydrogen or halogen atom, or an amino, C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} alkylthio or C_{1-4} alkoxy group or a phenoxy group optionally substituted by C_{1-4} haloalkyl; A represents CH or N; Y^1 and Y^2 each independently represents a hydrogen or halogen atom, or a C_{1-4} alkyl, C_{1-4} haloalkyl, C_{1-4} alkoxy or C_{1-4} haloalkoxy group; and W represents a hydrogen atom or, when A represents CH and at least one of Y^1 and Y^2 is other than a hydrogen atom or when A represents N, W represents a hydrogen or halogen atom; with the proviso that when A represents N, then each of Y^1 and Y^2 represents a hydrogen atom, which process comprises reacting, when necessary in the presence of a suitable base, a compound of the general formula

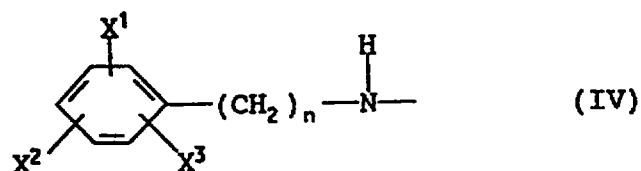


in which M represents a leaving group and T represents a group of the general formula



or M represents a group of the general formula

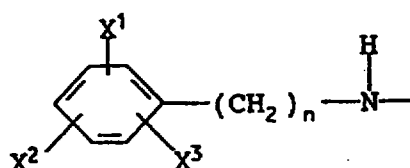




10 and T represents a leaving group, with a compound of the general formula

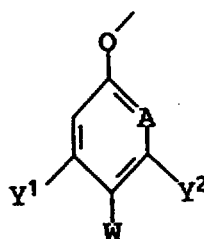
Q-L (V)

15 in which, when M represents a leaving group and T represents a group III then Q represents the group



25 and L represents a hydrogen atom,

or, when M represents a group IV and T represents a leaving group, then Q represents the group



35 and L represents a hydrogen atom or a univalent cation.

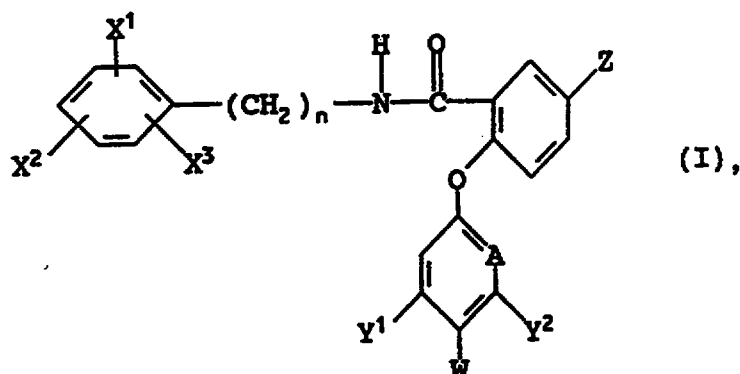
- 40
2. A process according to claim 1, wherein X¹, X² and X³ each independently represents a hydrogen, fluorine or chlorine atom or a methyl group.
 3. A process according to claim 1 or 2, wherein Z represents a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy or 3-trifluoromethylphenoxy group.
 - 45 4. A process according to any one of the preceding claims, wherein one of Y¹ and Y² represents a hydrogen, fluorine or chlorine atom, or a methyl, trifluoromethyl, methoxy or trifluoromethoxy group, and the other represents a hydrogen atom.
- 50
- 55



Patentansprüche

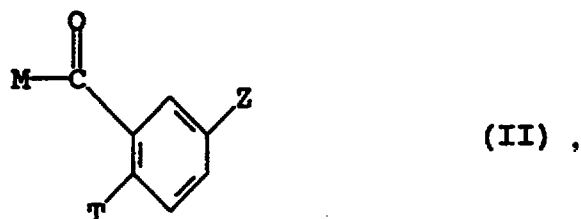
Patentansprüche für folgende Vertragsstaaten : AT, BE, CH, DE, DK, FR, GB, GR, IT, LU, LI, NL, SE

1. Eine Verbindung mit der allgemeinen Formel



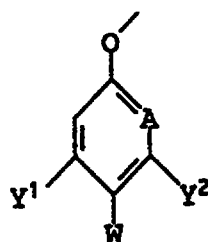
worin X^1 , X^2 und X^3 jeweils unabhängig ein Wasserstoff- oder Halogenatom oder eine C_{1-4} -Alkylgruppe darstellen; n den Wert 0 oder 1 hat; Z ein Wasserstoff- oder Halogenatom oder eine Amino-, C_{1-4} -Alkyl-, C_{1-4} -Halogenalkyl-, C_{1-4} -Alkylthio- oder C_{1-4} -Alkoxygruppe oder eine gegebenenfalls durch C_{1-4} -Halogenalkyl substituierte Phenoxygruppe bedeutet; A für CH oder N steht; Y^1 und Y^2 jeweils unabhängig ein Wasserstoff- oder Halogenatom oder eine C_{1-4} -Alkyl-, C_{1-4} -Halogenalkyl-, C_{1-4} -Alkoxy- oder C_{1-4} -Halogenalkoxygruppe darstellen; und W ein Wasserstoffatom bedeutet, oder, falls A für CH steht und wenigstens einer der Reste von Y^1 und Y^2 eine andere Bedeutung als ein Wasserstoffatom aufweist, oder, wenn A für N steht, W ein Wasserstoff- oder Halogenatom bedeutet; mit der Maßgabe, daß dann, wenn A für N steht, jeder der Reste Y^1 und Y^2 ein Wasserstoffatom bedeutet.

2. Verbindung nach Anspruch 1, worin X^1 , X^2 und X^3 jeweils unabhängig ein Wasserstoff-, Fluor- oder Chloratom oder eine Methylgruppe bedeuten.
3. Verbindung nach Anspruch 1 oder 2, worin Z ein Wasserstoff-, Fluor-, Chlor- oder Bromatom oder eine Methyl-, Trifluormethyl-, Methoxy- oder 3-Trifluormethylphenoxygruppe darstellt.
4. Verbindung nach einem der vorstehenden Ansprüche, worin einer der Reste Y^1 und Y^2 ein Wasserstoff-, Fluor- oder Chloratom oder eine Methyl-, Trifluormethyl-, Methoxy- oder Trifluormethoxygruppe bedeutet und der andere Rest ein Wasserstoffatom darstellt.
5. Verfahren zur Herstellung einer Verbindung der Formel I, wie in Anspruch 1 definiert, welches ein Umsetzen, erforderlichenfalls in Anwesenheit einer geeigneten Base, einer Verbindung der allgemeinen Formel



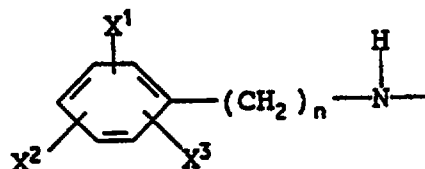
worin M eine Leaving-Gruppe bedeutet und T für eine Gruppe der allgemeinen Formel





(III)

steht, oder M eine Gruppe der allgemeinen Formel

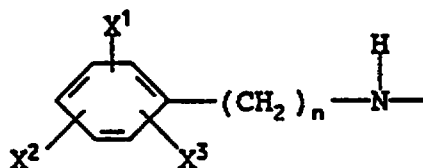


(IV)

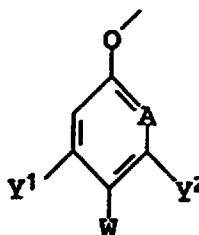
bedeutet und T eine Leaving-Gruppe darstellt, mit einer Verbindung der allgemeinen Formel

Q-L (V)

umfaßt, worin, falls M eine Leaving-Gruppe darstellt und T für eine Gruppe der Formel III steht, Q die Gruppe



darstellt und L ein Wasserstoffatom bedeutet, oder, falls M eine Gruppe der Formel IV bedeutet und T eine Leaving-Gruppe darstellt, Q die Gruppe



darstellt und L ein Wasserstoffatom oder ein einwertiges Kation bedeutet, und worin X¹, X², X³, n, Z, A, Y¹, Y² und W wie in Anspruch 1 definiert sind.

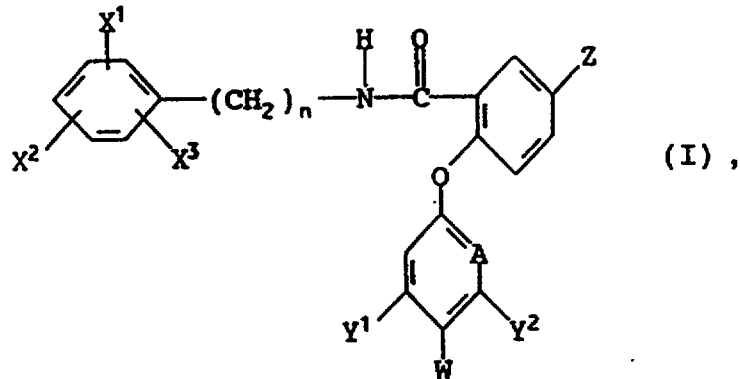
6. Herbizide Zusammensetzung, welche einen Träger und als wirksamen Bestandteil eine Verbindung der Formel I nach einem der Ansprüche 1 bis 4 umfaßt.
7. Zusammensetzung nach Anspruch 6, welche wenigstens zwei Träger umfaßt, von denen wenigstens einer ein oberflächenaktives Mittel ist.
8. Verfahren zur Bekämpfung von unerwünschtem Pflanzenwuchs an einem Ort, welches ein Behandeln des Ortes mit einer Verbindung der Formel I, wie in einem der Ansprüche 1 bis 4 beansprucht, oder mit einer Zusammensetzung, wie in Anspruch 6 oder Anspruch 7 beansprucht, umfaßt.



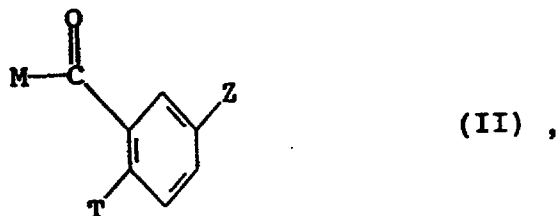
9. Verwendung einer Verbindung der Formel I, wie in einem der Ansprüche 1 bis 4 beansprucht, oder einer Zusammensetzung, wie in Anspruch 6 oder Anspruch 7 beansprucht, als ein Herbizid.

Patentansprüche für folgenden Vertragsstaat : ES

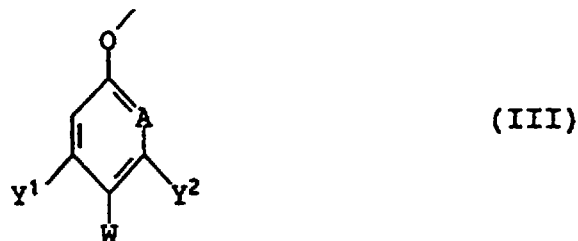
1. Verfahren zur Herstellung einer Verbindung mit der allgemeinen Formel



worin X^1 , X^2 und X^3 jeweils unabhängig ein Wasserstoff- oder Halogenatom oder eine C_1-4 -Alkylgruppe darstellen; n den Wert 0 oder 1 hat; Z ein Wasserstoff- oder Halogenatom oder eine Amino-, C_1-4 -Alkyl-, C_1-4 -Halogenalkyl-, C_1-4 -Alkylthio- oder C_1-4 -Alkoxygruppe oder eine gegebenenfalls durch C_1-4 -Halogenalkyl substituierte Phenoxygruppe bedeutet; A für CH oder N steht; Y^1 und Y^2 jeweils unabhängig ein Wasserstoff- oder Halogenatom oder eine C_1-4 -Alkyl-, C_1-4 -Halogenalkyl-, C_1-4 -Alkoxy- oder C_1-4 -Halogenalkoxygruppe darstellen; und W ein Wasserstoffatom bedeutet, oder, falls A für CH steht und wenigstens einer der Reste von Y^1 und Y^2 eine andere Bedeutung als ein Wasserstoffatom aufweist, oder, wenn A für N steht, W ein Wasserstoff- oder Halogenatom bedeutet; mit der Maßgabe, daß dann, wenn A für N steht, jeder der Reste Y^1 und Y^2 ein Wasserstoffatom bedeutet, welches Verfahren ein Umsetzen, erforderlichenfalls in Anwesenheit einer geeigneten Base, einer Verbindung der allgemeinen Formel

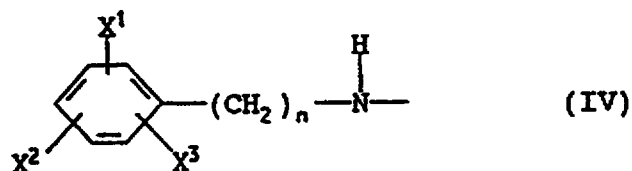


worin M eine Leaving-Gruppe bedeutet und T für eine Gruppe der allgemeinen Formel



steht, oder M eine Gruppe der allgemeinen Formel

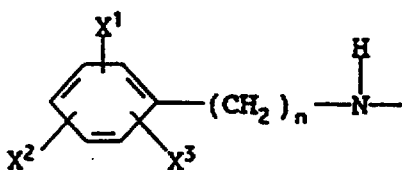




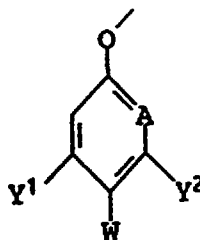
bedeutet und T eine Leaving-Gruppe darstellt, mit einer Verbindung der allgemeinen Formel

Q-L (V)

umfaßt, worin, falls M eine Leaving-Gruppe darstellt und T für eine Gruppe der Formel III steht, Q die Gruppe



darstellt und L ein Wasserstoffatom bedeutet, oder, falls M eine Gruppe der Formel IV bedeutet und T eine Leaving-Gruppe darstellt, Q die Gruppe



darstellt und L ein Wasserstoffatom oder ein einwertiges Kation bedeutet.

2. Verfahren nach Anspruch 1, worin X¹, X² und X³ jeweils unabhängig ein Wasserstoff-, Fluor- oder Chloratom oder eine Methylgruppe bedeuten.

3. Verfahren nach Anspruch 1 oder 2, worin Z ein Wasserstoff-, Fluor-, Chlor- oder Bromatom oder eine Methyl-, Trifluormethyl-, Methoxy- oder 3-Trifluormethylphenoxygruppe bedeutet.

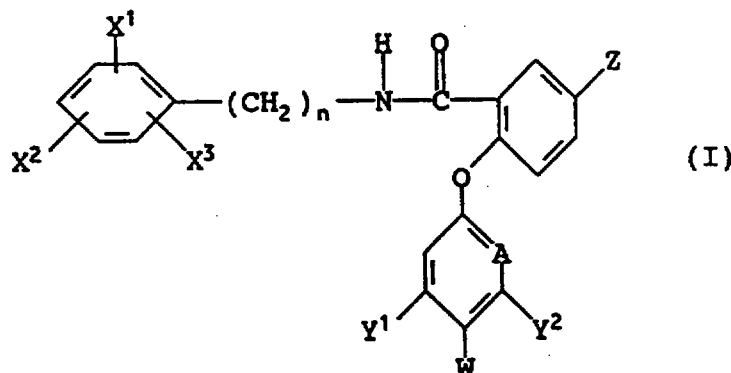
4. Verfahren nach einem der vorstehenden Ansprüche, worin einer der Reste Y¹ und Y² ein Wasserstoff-, Fluor- oder Chloratom oder eine Methyl-, Trifluormethyl-, Methoxy- oder Trifluormethoxygruppe darstellt und der andere Rest ein Wasserstoffatom bedeutet.



Revendications

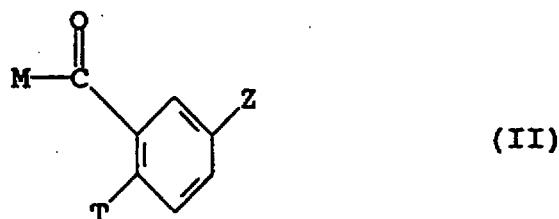
Revendications pour les Etats contractants suivants : AT, BE, CH, DE, DK, FR, GB, GR, IT, LU, LI, NL, SE

1. Un composé de la formule générale



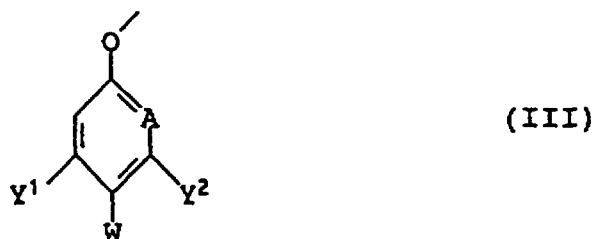
dans laquelle X^1 , X^2 et X^3 représentent chacun indépendamment un atome d'hydrogène ou d'halogène ou un groupe alcoyle en C_{1-4} ; n est 0 ou 1 ; Z représente un atome d'hydrogène ou d'halogène ou un groupe amino, C_{1-4} alcoyle, C_{1-4} haloalcoyle, C_{1-4} alcoylthio ou C_{1-4} alcoxy ou un groupe phénoxy éventuellement substitué par un groupe C_{1-4} haloalcoyle ; A représente CH ou N ; Y^1 et Y^2 représentent chacun indépendamment un atome d'hydrogène ou d'halogène ou un groupe C_{1-4} alcoyle, C_{1-4} haloalcoyle, C_{1-4} alcoxy ou C_{1-4} haloalcoxy ; et W représente un atome d'hydrogène ou, quand A représente CH et au moins un de Y^1 et Y^2 est autre qu'un atome d'hydrogène ou quand A représente N, W représente un atome d'hydrogène ou d'halogène ; avec la condition que quand A représente N, alors chacun de Y^1 et Y^2 représente un atome d'hydrogène.

2. Un composé selon la revendication 1, dans lequel X^1 , X^2 et X^3 représentent chacun indépendamment un atome d'hydrogène, de fluor ou de chlore ou un groupe méthyle.
3. Un composé selon la revendication 1 ou 2, dans lequel Z représente un atome d'hydrogène, de fluor, de chlore ou de brome ou un groupe méthyle, trifluorométhyle, méthoxy ou 3-trifluorométhylphénoxy.
4. Un composé selon l'une quelconque des revendications précédentes, dans lequel un de Y^1 et Y^2 représente un atome d'hydrogène, de fluor ou de chlore ou un groupe méthyle, trifluorométhyle, méthoxy ou trifluorométhoxy et l'autre représente un atome d'hydrogène.
5. Un procédé pour la préparation d'un composé de formule I tel que défini dans la revendication 1, qui comprend la réaction, quand c'est nécessaire en présence d'une base appropriée, d'un composé de la formule générale

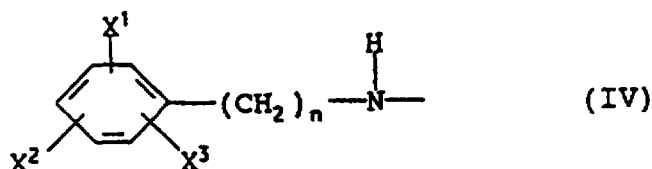


dans laquelle M représente un groupe qui part et T représente un groupe de la formule générale





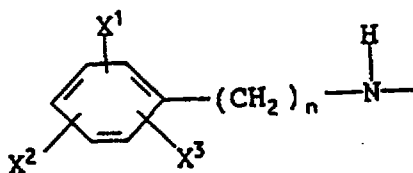
10 ou M représente un groupe de la formule générale



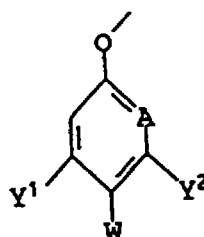
20 et T représente un groupe qui part, avec un composé de la formule générale

Q-L (V)

25 dans laquelle, quand M représente un groupe qui part et T représente un groupe III, alors Q représente le groupe



35 et L représente un atome d'hydrogène, ou, quand M représente un groupe IV et T représente un groupe qui part, alors Q représente le groupe



50 et L représente un atome d'hydrogène ou un cation univalent, et X1, X2, X3, n, Z, A, Y1 Y2 et W sont tels que définis dans la revendication 1.

6. Une composition herbicide qui comprend un véhicule et, comme ingrédient actif, un composé de formule 1 tel que revendiqué dans l'une quelconque des revendications 1 à 4.

7. Une composition selon la revendication 6, qui comprend au moins deux véhicules, dont au moins un est un agent tensio-actif.

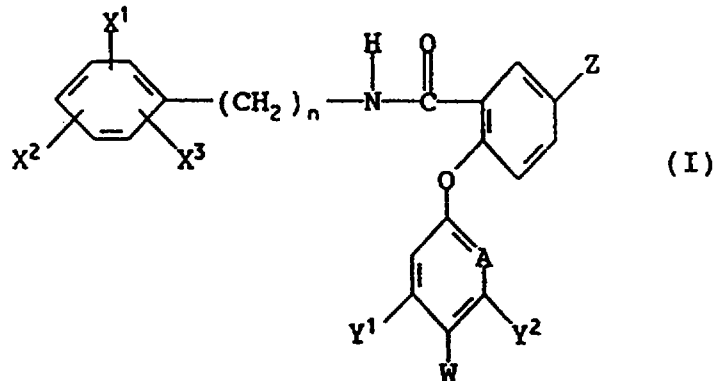


8. Une méthode de lutte contre la croissance de plantes indésirables en un lieu, qui comprend le traitement du lieu avec un composé de formule I tel que revendiqué dans l'une quelconque des revendications 1 à 4, ou avec une composition telle que revendiquée dans la revendication 6 ou la revendication 7.

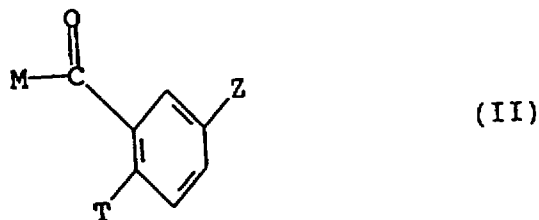
9. L'utilisation comme herbicide d'un composé de formule I tel que revendiqué dans l'une quelconque des revendications 1 à 4 ou d'une composition telle que revendiquée dans la revendication 6 ou la revendication 7.

10 Revendications pour l'Etat contractant suivant : ES

1. Un procédé pour la préparation d'un composé de la formule générale

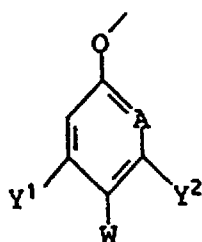


dans laquelle X^1 , X^2 et X^3 représentent chacun indépendamment un atome d'hydrogène ou d'halogène ou un groupe alcoyle en C_{1-4} ; n est 0 ou 1 ; Z représente un atome d'hydrogène ou d'halogène ou un groupe amino, C_{1-4} alcoyle, C_{1-4} haloalcoyle, C_{1-4} alcoylthio ou C_{1-4} alcoxy ou un groupe phénoxy éventuellement substitué par un groupe C_{1-4} haloalcoyle ; A représente CH ou N ; Y^1 et Y^2 représentent chacun indépendamment un atome d'hydrogène ou d'halogène ou un groupe C_{1-4} alcoyle, C_{1-4} haloalcoyle, C_{1-4} alcoxy ou C_{1-4} haloalcoxy ; et W représente un atome d'hydrogène ou, quand A représente CH et au moins un de Y^1 et Y^2 est autre qu'un atome d'hydrogène ou quand A représente N, W représente un atome d'hydrogène ou d'halogène ; avec la condition que quand A représente N, alors chacun de Y^1 et Y^2 représente un atome d'hydrogène, lequel procédé comprend la réaction, quand c'est nécessaire en présence d'une base appropriée, d'un composé de la formule générale



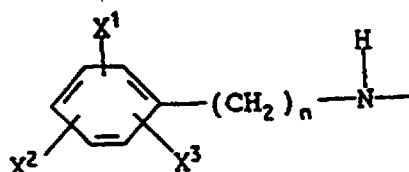
dans laquelle M représente un groupe qui part et T représente un groupe de la formule générale





(III)

ou M représente un groupe de la formule générale

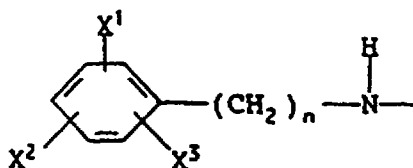


(IV)

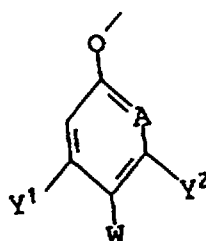
et T représente un groupe qui part, avec un composé de la formule générale

Q-L (V)

dans laquelle, quand M représente un groupe qui part et T représente un groupe III, alors Q représente le groupe



et L représente un atome d'hydrogène, ou, quand M représente un groupe IV et T représente un groupe qui part, alors Q représente le groupe



et L représente un atome d'hydrogène ou un cation univalent.

2. Un procédé selon la revendication 1, dans lequel X¹, X² et X³ représentent chacun indépendamment un atome d'hydrogène, de fluor ou de chlore ou un groupe méthyle.
3. Un procédé selon la revendication 1 ou 2, dans lequel Z représente un atome d'hydrogène, de fluor, de chlore ou de brome ou un groupe méthyle, trifluorométhyle, méthoxy ou 3-trifluorométhylphénoxy.
4. Un procédé selon l'une quelconque des revendications précédentes, dans lequel un de Y¹ et Y² représente un atome d'hydrogène, de fluor ou de chlore ou un groupe méthyle, trifluorométhyle,



méthoxy ou trifluorométhoxy et l'autre représente un atome d'hydrogène.

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