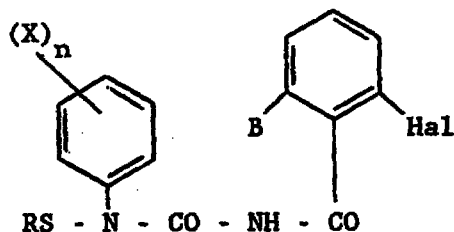


Description

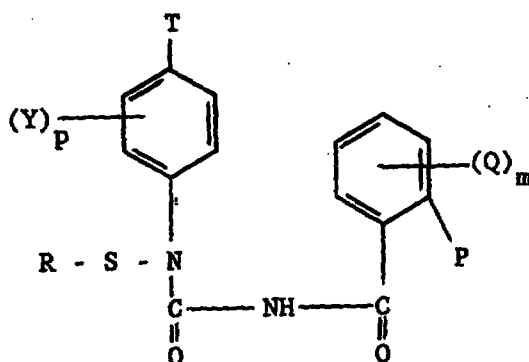
The present invention relates to benzoylurea compounds having pesticidal, especially insecticidal and acaricidal, activity.

GB-A-2118941 discloses benzoylphenyl urea derivatives of the formula

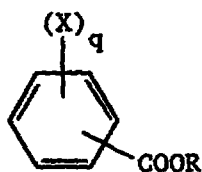


in which, in particular, X may be a phenoxy group substituted by one or more substituents selected from the group consisting of halogen atoms and nitro, cyano, haloalkyl and haloalkoxy groups; and R is a haloalkyl group or a phenyl group optionally-substituted by one or more substituents selected from the group consisting of halogen atoms and nitro and alkyl groups, which compounds have insecticidal and ovicidal activity.

EP-A-0103918 discloses benzoylurea compounds of formula

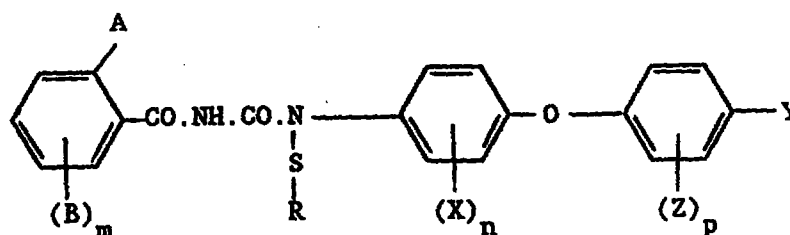


in which, in particular, R is a group of the formula



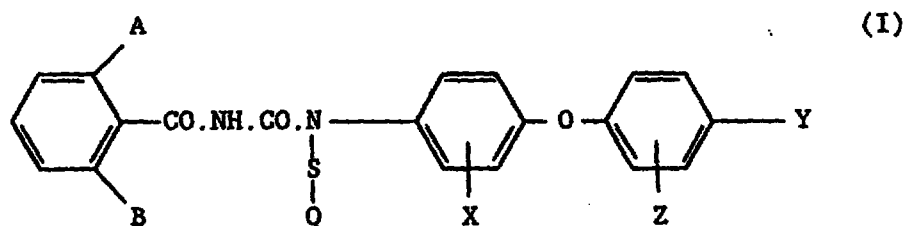
in which R represents an optionally-substituted alkyl, alkenyl, alkynyl, cycloalkyl or phenyl group, a hydrogen atom, one equivalent of an alkali metal or alkaline earth metal, or an ammonium or substituted ammonium group, each X independently represents a halogen atom, a cyano, nitro or carboxy group, or an optionally-substituted alkyl, alkoxy, alkylthio, cycloalkyl, cycloalkyloxy, cycloalkylthio, alkenyl, alkenylthio, alkylcarbonyl, alkoxycarbonyl, alkylsulphonyl, alkynyl, phenyl, phenoxy, phenylthio or amino group, and q is 0, 1, 2, 3 or 4; and T may represent a phenoxy group optionally-substituted by one or more substituents selected from halogen atoms and nitro, alkyl, haloalkyl and cyano groups, which compounds have pesticidal activity.

EP-A-0171853 discloses compounds of the general formula

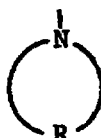


in which, in particular, R represents a group $-\text{CO}_2\text{R}^1$, $-\text{SO}_2\text{R}^1$ or $-\text{NR}^2\text{R}^3$, in which R^1 represents an optionally-substituted alkyl or aryl group; R^2 represents an optionally-substituted alkyl or aryl group; and R^3 represents an optionally-substituted alkyl or aryl group, or a group of formula $-\text{CO}_2\text{R}^4$, $-\text{SO}_2\text{R}^4$, $-\text{COR}^4$, $\text{CO.CO}_2\text{R}^4$, $-\text{CO.N}^5\text{R}^6$ or $-\text{SO}_2\text{NR}^5\text{R}^6$, in which R^4 represents an optionally-substituted alkyl or aryl group, and each of R^5 and R^6 independently represents an optionally-substituted alkyl or aryl group; or R^2 and R^3 together or R^5 and R^6 together represent an optionally-substituted alkylene group, the optional substituents for an alkylene group being selected from halogen atoms, and alkoxy, alkoxycarbonyl, haloalkoxycarbonyl, alkylcarbonyl, haloalkylcarbonyl, alkylsulphonyl and haloalkylsulphonyl groups, which compounds have pesticidal activity.

The invention provides a compound of the general formula



in which each of A and B independently represents a halogen atom; Q represents a group of general formula



in which R represents a C_3-8 alkylene group in which a $-\text{CH}_2-$ group is replaced by an oxygen atom or by a carbonyl group, or Q represents a group of general formula $-\text{CR}^2\text{R}^3\text{R}^4$ in which R^2 represents a C_1-4 alkyl group, R^3 represents a (up to C_6 alkoxy)carbonyl or a $(\text{C}_1-6$ alkyl)carbonyl group and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_1-4 alkyl group; X represents a halogen atom; Y represents a trifluoromethyl group; and Z represents a halogen atom.

Except where otherwise stated, throughout this Specification and claims, halogen atoms may be fluorine, chlorine, bromine or iodine atoms, with fluorine and chlorine being preferred.

R preferably has 4 or 5 atoms in the chain.

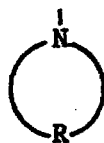
Preferably each of A and B independently represents a fluorine atom. Preferably X represents a fluorine atom; such a fluorine atom is preferably in the position ortho to the nitrogen linkage.

Preferably Z represents a chlorine atom; such a chlorine atom is preferably in the position ortho to the oxygen linkage.

When Q represents a group of general formula $-\text{CR}^2\text{R}^3\text{R}^4$, it is preferred that R^3 represents a (up to C_6 alkoxy)carbonyl or a $(\text{C}_1-6$ alkyl)carbonyl group, and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_1-4 alkyl group. Particularly preferred compounds are those wherein R^2 represents a methyl group; R^3 represents a methylcarbonyl, propylcarbonyl or ethoxycarbonyl group; and R^4 represents an ethoxycarbonyl

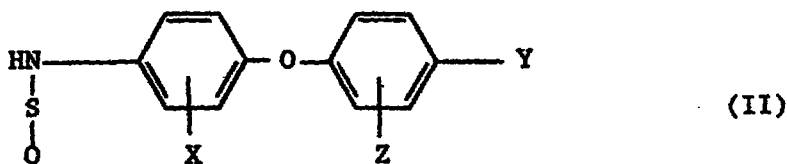
or methyl group.

Examples of Q representing a group of general formula



are N-morpholinyl, N-piperidonyl and N-pyrrolidonyl.

The invention also provides a process for the preparation of a compound of the general formula I, which comprises reacting a compound of the general formula



with a compound of the general formula

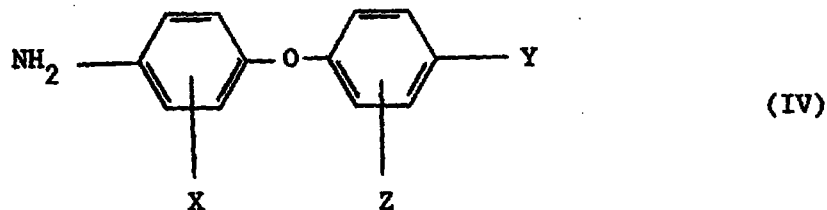


in which A, B, X, Y, Z and Q have the meanings given for the general formula I.

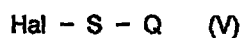
The reaction is suitably carried out in the presence of a solvent. Suitable solvents are aromatic solvents such as benzene, toluene, xylene, or chlorobenzene, hydrocarbons such as petroleum fractions, chlorinated hydrocarbons such as chloroform, methylene chloride or dichloroethane, and ethers such as diethyl ether, dibutyl ether, or dioxan. Mixtures of solvents are also suitable.

Preferably the reaction is carried out at a temperature from 0°C to 100°C, suitably ambient temperature. Preferably the molar ratio of isocyanate to amine is from 1:1 to 2:1. Preferably the reaction is carried out under anhydrous conditions.

The compounds of formula II are themselves novel and constitute a further aspect of the invention; they may be prepared by reacting a compound of the general formula



with a compound of the general formula



in which Hal represents a halogen atom.

The reaction between the compounds of formulae IV and V is preferably carried out in the presence of an inert solvent, for example a hydrocarbon or chlorinated hydrocarbon, and the reaction temperature is

preferably in the range of from 0 to 100°C, preferably 10 to 30°C. The reaction is suitably carried out in the presence of an inorganic or organic base. Preferably an amine such as triethylamine is used.

The compounds of formula IV may be prepared by reacting a compound of general formula



with a compound of the general formula



in which X, Y and Z have the meanings given for the compound of general formula IV.

The reaction between the compounds of formulae VI and VII is preferably carried out in the presence of an inert solvent, for example a polar aprotic solvent such as dimethylsulphoxide or dimethylformamide, in the presence of a base, for example an alkali metal hydroxide, alkoxide or carbonate, or an organic base.

25 The reaction temperature is suitably in the range of from 0 to 150°C, preferably 30 to 100°C.

Certain compounds of the general formula V are novel and constitute a further aspect of the invention. In this aspect the invention provides compounds of the general formula V in which Q represents a group of general formula $-CR^2R^3R^4$ in which R^2 represents a C_{1-4} alkyl group, R^3 represents a (up to C_6 alkoxy) - carbonyl or a (C_{1-6} alkyl)carbonyl group and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_{1-4} alkyl group.

30 The compounds of general formula V may be prepared by reacting a sulphenyl halide compound of general formula $S(Hal)_2$ with a compound of general formula $Q-H$. The reaction is preferably carried out in the presence of an inert solvent, for example a hydrocarbon or halogenated hydrocarbon, and may be carried out at a temperature from -10 to 100°C.

The compounds of the general formula I exhibit pesticidal, for example insecticidal and acaricidal, activity. Accordingly the invention also provides a pesticidal composition comprising a compound of the general formula I together with a carrier. The invention further provides a method of combating pests at a locus, which comprises applying to the locus a pesticidal compound or composition according to the invention.

40 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 pesticidal compositions may be used. Preferably compositions according to the invention contain 0.5 to 95% by weight of active ingredient.

45 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.

50 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 araliphatic 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.

55 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 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, sorbitan, 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 $\frac{1}{2}$ -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 $\frac{1}{2}$ -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 ingredients, for example other compounds possessing pesticidal, herbicidal, or fungicidal properties. The compounds of the invention are especially useful when applied in admixture with other insecticides, especially organophosphates and pyrethroids. Mixtures with the commercial products fenvalerate, permethrin, cypermethrin, deltamethrin and alphanethrin are especially useful.

The following Examples illustrate the invention. Example 1 illustrates the preparation of the intermediate of the general formula IV. Examples 2 and 5 illustrate the preparation of intermediates of the general formula V, and Examples 3 and 6, intermediates of the general formula II. Examples 4 and 7 to 11 illustrate the preparation of compounds of the general formula I.

Example 1

Preparation of 2-fluoro-4-[2-chloro-4-(trifluoromethyl)phenoxy]aniline

A solution of 2-fluoro-4-hydroxyaniline (7.1g) and potassium hydroxide (3.7g, 85% pure) in dimethylsulphoxide (25ml) was heated to 80°C and treated with a solution of 1,2-dichloro-4-(trifluoromethyl)benzene (10.9g) in dimethylsulphoxide (10ml). The mixture was stirred at 90-95°C for 20 hours, after which time it was diluted with a mixture of water and dichloromethane. The organic phase was dried over sodium sulphate and evaporated down to give 3.6g of the crude desired product as a brown oil.

Chromatography over silica gel using toluene/petroleum ether (4:1 ratio) gave 1.1g of the pure amine as a yellow oil.

Example 2

Preparation of (alpha - methyl - alpha - chlorosulphenyl) diethylmalonate

Sulphur dichloride (11.3g) in 1,2 dichloroethane (20ml) was added to diethyl methyl malonate (17.4g) in 1,2-dichloroethane, over 10 minutes, at ambient temperature. The solution was refluxed for 8 hours. Distillation yielded the title compound. (15.6g), b.p. 120 - 3° C/12mmHg.

Example 3

Preparation of diethyl 4-[4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl]-3-thia-4-azabutane-2,2-dicarboxylate

A solution of the compound prepared in Example 2 (5.3g), in diethyl ether (10ml), was added over 30 minutes to a solution of triethylamine (2.2g) and the compound prepared in Example 1 (6.1g), in diethyl ether (50ml). The solution was stirred at ambient temperature for 6 hours. Diethyl ether (150 ml) was added, the solution was washed with water and dried, and the diethyl ether was removed by evaporation. Column chromatography on silica using dichloromethane as eluant yielded 8g of the title compound as a clear, colourless oil.

Example 4

Preparation of diethyl 4-[4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl]-7-(2,6-difluorophenyl)-5,7-dioxo-3-thia-4,6-diazaheptane-2,2-dicarboxylate.

2,6-Difluorobenzoylisocyanate (3g) in a 1:1 (v/v) mixture of toluene and petroleum ether (10ml) was added to a solution of the compound produced by Example 3 (7.6g) in the same solvent (15ml), over 30 minutes at 15-20° C. The solution was stirred for 6 hours at ambient temperature and the solvent was removed by evaporation. Column chromatography on silica using a 1:1 (v/v) mixture of diethyl ether and petroleum ether yielded the title compound as a gum (9.5g).

<u>Analysis</u>	C	H	N
Calculated (%)	50.3	3.3	4.0
Found (%)	50.5	3.6	4.1

Example 5

Preparation of (4-morpholinyl)sulphenyl chloride

Pyridine (8.7g) dissolved in dichloromethane (25ml) was added, over 20 minutes at 5-10° C, to a solution of sulphur dichloride (11.3g) in dichloromethane (25ml). A solution of morpholine (8.7g) in dichloromethane (25ml) was added, over 20 minutes at 5-10° C. The solution was stirred for four hours and the temperature allowed to rise to ambient temperature. The solution was filtered and the solvent was evaporated off. Diethyl ether was added, the resulting suspension was filtered and the filtrate evaporated. Distillation of the residue yielded the title compound (8.2g), b.p. 60° C/0.5mmHg.

Example 6

Preparation of [4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl][(4-morpholinyl)thio]amine

The compound prepared in Example 5 (3.4g) was dissolved in diethyl ether (10 ml). The solution was added to a solution of triethylamine (2.2g) and the compound prepared in Example 1 (6.1g) in diethyl ether

(50ml) at 15–20 °C. The solution was stirred for 20 minutes, diethyl ether was added (20ml), the solution was washed with water, and dried. The solvent was removed by evaporation. Column chromatography on silica using 50:50 (v/v) diethyl ether–dichloromethane as eluant yielded the title compound as a brown oil (5g).

Example 7

Preparation of N-[[[4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl][(4-morpholinyl)thio]-amino]carbonyl]-2,6-difluorobenzamide

2,6-Difluorobenzoyl isocyanate (1.4g) in a 1:1 (v/v) mixture of toluene and petroleum ether (10ml) was added to a solution of the compound produced by Example 6 (3g) in the same solvent (15ml), at ambient temperature. The solution was stirred for two hours and placed in a freezer overnight (–5 to 0 °C). The solvent was removed by evaporation, and the residue was chromatographed twice on silica, firstly using dichloromethane as eluant and secondly using a 1:1 (v/v) mixture of diethyl ether and petroleum ether, to yield the title compound (2.5g), m.p. 77–80 °C.

<u>Analysis</u>	C	H	N
Calculated (%)	49.5	3.0	6.9
Found (%)	50.1	3.4	6.7

Example 8

N-[[[4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl] [(2-oxo-1-pyrrolidiny)thio]amino]-carbonyl]-2,6-difluorobenzamide.

The title compound was prepared in a similar manner to the compounds of Examples 4 and 7, m.p. 166–8 °C.

<u>Analysis</u>	C	H	N
Calculated (%)	49.7	2.7	7.0
Found (%)	49.6	2.7	7.2

Freshly prepared (2-oxo-1-pyrrolidiny)-sulphenyl chloride, a dark red oil, was used without further purification to prepare the further intermediate [4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl][(2-oxo-1-pyrrolidiny)thio]amine, which was a crystalline compound, (mp 125–126 °C).

Example 9

N-[[[4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl] [(2-oxo-1-piperidiny)thio]amino]-carbonyl]-2,6-difluorobenzamide.

The title compound was prepared in a similar manner to the compounds of Examples 4 and 7, m.p. 139–141 °C.

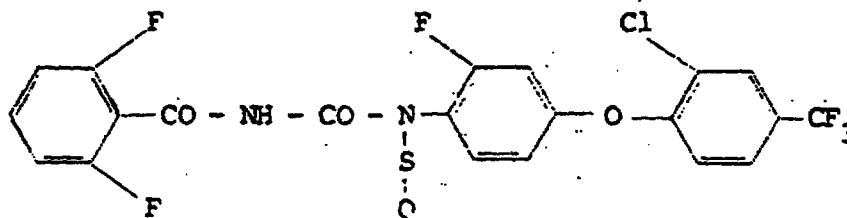
<u>Analysis</u>	C	H	N
Calculated (%)	50.5	2.9	6.8
Found (%)	50.6	3.0	6.9

Freshly prepared (2-oxo-1-piperidiny)-sulphenyl chloride was used, without further purification, in the preparation of [4-[2-chloro-4-(trifluoromethyl)phenoxy]-2-fluorophenyl][(2-oxo-1-piperidiny)-

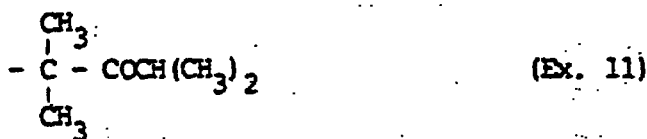
thio]amine, which was a crystalline compound (mp 128–130°C).

Examples 10 and 11

Following procedures similar to those described in Examples 1–4, but substituting the diethyl methyl malonate (Example 2) with (10) ethyl-2-methyl acetoacetate, or (11) diisopropyl ketone, there were obtained, respectively, compounds of the formula: –



wherein Q has the structure:



The compound of Example 10 was a pale brown oil,

<u>Analysis</u>	Calc.	C 50.7; H 3.2; N 4.2
	Found	C 50.3; H 3.7; N 3.9

The compound of Example 11 was a white solid, m.pt. 148–150°C

<u>Analysis</u>	Calc.	C 53.1; H 3.6; N 4.4
	Found	C 53.3; H 3.7; N 4.8

Example 12

Insecticidal Activity.

The insecticidal activity of the compounds of the invention was determined in the following tests, employing the insects *Spodoptera littoralis* (S.l.) and *Aedes aegypti* (A.a)

The test methods used for each species appear below. In each case the tests were conducted under normal conditions (23°C ± 2°C; fluctuating light and humidity).

In each test an LC₅₀ (the dosage of active material required to kill half of the test species) for the compound was calculated from the mortality figures and compared with the corresponding LC₅₀ for a standard insecticide, ethyl parathion, in the same tests. The results are expressed as toxicity indices thus:

$$\text{toxicity index} = \frac{\text{LC}_{50} (\text{parathion})}{\text{LC}_{50} (\text{test compound})} \times 100$$

and are set out in Table I below.

(i) *Spodoptera littoralis* (S.l.)

Solutions or suspensions of the compound were made up over a range of concentrations in 10% acetone/water containing .025% Triton X100 ("Triton" is a registered trade mark). These solutions were sprayed using a logarithmic spraying machine onto petri dishes containing a nutritious diet on which the *Spodoptera littoralis* larvae had been reared. When the spray deposit had dried each dish was infested with 10 2nd instar larvae. Mortality assessments were made 7 days after spraying.

(ii) *Aedes aegypti* (A.a.)

Several solutions of the test compound of varying concentration were prepared in acetone. 100 microlitre quantities were added to 100ml of tap water, the acetone being allowed to evaporate off. 10 early 4th instar larvae were placed in the test solution; after 48 hours the (surviving) larvae were fed with animal feed pellets, and the final percentage mortality assessed when all the larvae had either pupated and emerged as adults or died.

The results are given in Table I.

Table I
Insecticidal Activity

<u>Compound of Example No.</u>	<u>Toxicity Index</u>	
	<u>S.l.</u>	<u>A.a.</u>
4	4200	1400
7	4500	290
8	2800	2100
9	3800	680
10	9500	540
11	4400	120

Example 13

Acaricidal Activity.

Leaf discs were infested with 30-60 larvae of the mite *Tetranychus urticae* and sprayed with varying dosages of solutions of the test compound made up as in test (i) of Example 12 above. When dry, the discs were maintained at constant temperature for 12 days, after which mortality assessments were made, and the LC₅₀ values calculated, that is, the dosage of active material required to kill half of the test species. The results are given in table II below.

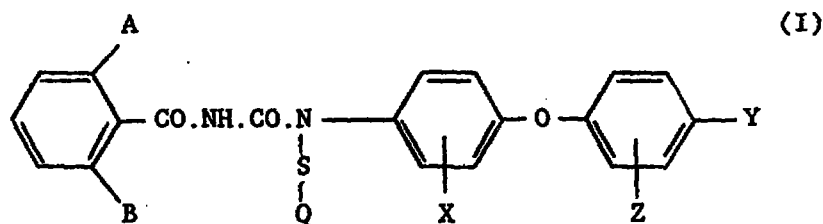
Table II
Acaricidal Activity

Compound of Example No.	LC ₅₀ (% active ingredient in spray)
4	0.00049
7	0.00015
8	0.00037
9	0.00024
10	0.00017
11	0.00013

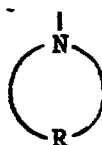
Claims

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

1. A compound of the general formula



in which each of A and B independently represents a halogen atom; Q represents a group of general formula



in which R represents a C₃₋₈ alkylene group in which a -CH₂- group is replaced by an oxygen atom or by a carbonyl group, or Q represents a group of general formula -CR²R³R⁴ in which R² represents a C₁₋₄ alkyl group, R³ represents a (up to C₆alkoxy)carbonyl or a (C₁₋₆alkyl)carbonyl group and R⁴ represents a (up to C₆alkoxy)carbonyl or a C₁₋₄alkyl group; X represents a halogen atom; Y represents a trifluoromethyl group; and Z represents a halogen atom.

2. A compound as claimed in claim 1, in which each of A and B represents a fluorine atom; X represents a fluorine atom; and Z represents a chlorine atom.
3. A compound as claimed in claim 2, in which X represents a fluorine atom located ortho to the nitrogen linkage; and Z represents a chlorine atom located ortho to the oxygen linkage.

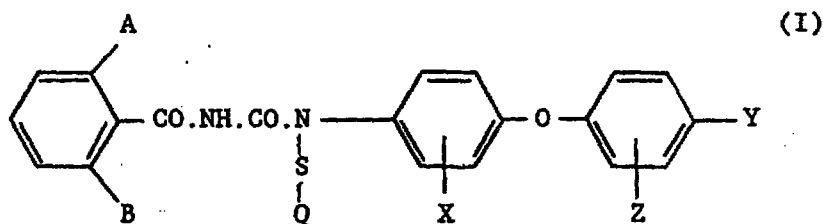
Table II
Acaricidal Activity

Compound of Example No.	LC ₅₀ (% active ingredient in spray)
4	0.00049
7	0.00015
8	0.00037
9	0.00024
10	0.00017
11	0.00013

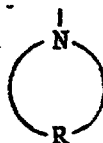
Claims

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

1. A compound of the general formula



in which each of A and B independently represents a halogen atom; Q represents a group of general formula

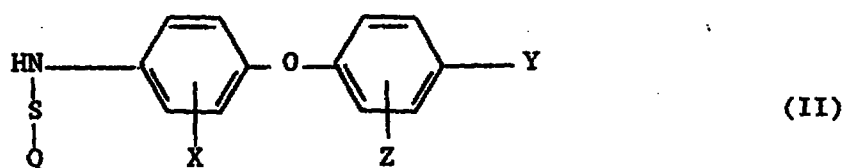


in which R represents a C₃₋₈ alkylene group in which a -CH₂- group is replaced by an oxygen atom or by a carbonyl group, or Q represents a group of general formula -CR²R³R⁴ in which R² represents a C₁₋₄ alkyl group, R³ represents a (up to C₆ alkoxy)carbonyl or a (C₁₋₆ alkyl)carbonyl group and R⁴ represents a (up to C₆ alkoxy)carbonyl or a C₁₋₄ alkyl group; X represents a halogen atom; Y represents a trifluoromethyl group; and Z represents a halogen atom.

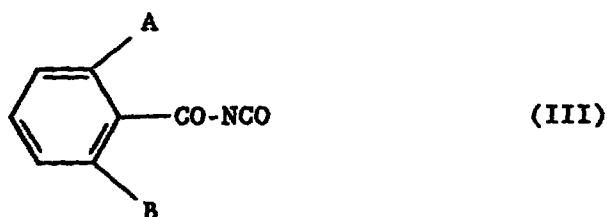
2. A compound as claimed in claim 1, in which each of A and B represents a fluorine atom; X represents a fluorine atom; and Z represents a chlorine atom.
3. A compound as claimed in claim 2, in which X represents a fluorine atom located ortho to the nitrogen linkage; and Z represents a chlorine atom located ortho to the oxygen linkage.



4. A compound as claimed in claim 3, in which Q represents an N-morpholinyl, N-piperidonyl or N-pyrrolidonyl group, or a group of general formula $-CR^2R^3R^4$ in which R^2 represents a C_1-4 alkyl group, R^3 represents a (up to C_6 alkoxy)carbonyl or a (C_1-6 alkyl)carbonyl group, and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_1-4 alkyl group.
5. A compound as claimed in claim 4, in which R^2 represents a methyl group; R^3 represents a methylcarbonyl, propylcarbonyl or ethoxycarbonyl group; and R^4 represents an ethoxycarbonyl or methyl group.
6. A pesticidal composition comprising a compound as claimed in any one of claims 1 to 5, together with a carrier.
7. A method of combating pests at a locus, which comprises applying to the locus a compound as claimed in any one of claims 1 to 5 or a composition as claimed in claim 6.
8. A process for the preparation of a compound as claimed in claim 1, which comprises reacting a compound of the general formula

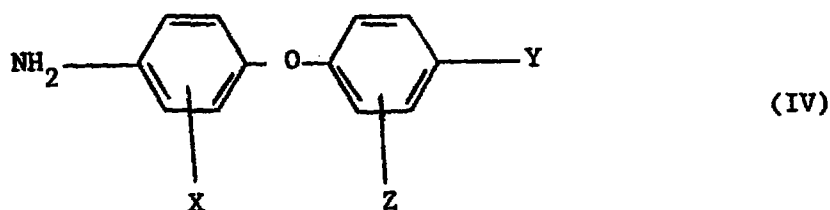


with a compound of the general formula



in which A, B, X, Y, Z and Q have the meanings given in claim 1.

9. A compound of the general formula II as defined in claim 8.
10. A process for the preparation of a compound as claimed in claim 9, which comprises reacting a compound of the general formula



with a compound of the general formula



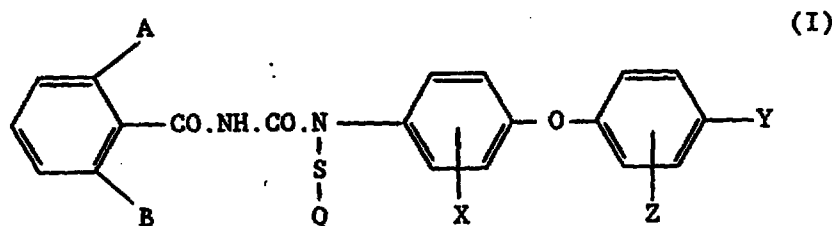
in which Hal represents a halogen atom, and the other substituents have the meanings given in claim 1.



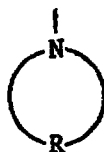
11. A compound of the general formula V, according to claim 10, in which Q represents a group of general formula $-CR^2R^3R^4$ in which R^2 represents a C_{1-4} alkyl group, R^3 represents a (up to C_6 alkoxy)carbonyl or a $(C_{1-6}$ alkyl)carbonyl group and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_{1-4} alkyl group.
12. A process for the preparation of a compound as claimed in claim 11, in which a sulphenyl halide compound of general formula $S(Hal)_2$ is reacted with a compound of the general formula Q-H.

Claims for the following Contracting State : AT

1. A pesticidal composition comprising a compound of the general formula



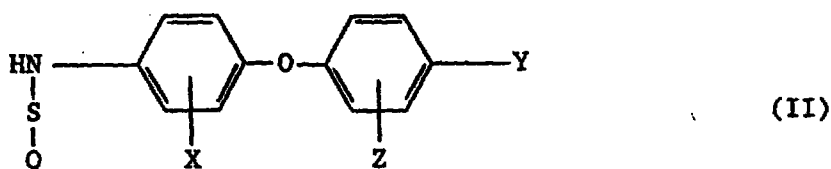
in which each of A and B independently represents a halogen atom; Q represents a group of general formula



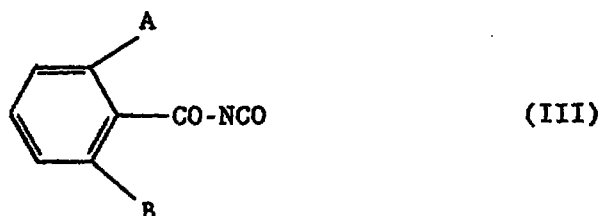
in which R represents a C_{3-8} alkylene group in which a $-CH_2-$ group is replaced by an oxygen atom or by a carbonyl group, or Q represents a group of general formula $-CR^2R^3R^4$ in which R^2 represents a C_{1-4} alkyl group, R^3 represents a (up to C_6 alkoxy)carbonyl or a $(C_{1-6}$ alkyl)carbonyl group and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_{1-4} alkyl group; X represents a halogen atom; Y represents a trifluoromethyl group; and Z represents a halogen atom, together with a carrier.

2. A composition as claimed in claim 1, in which each of A and B represents a fluorine atom; X represents a fluorine atom; and Z represents a chlorine atom.
3. A composition as claimed in claim 2, in which X represents a fluorine atom located ortho to the nitrogen linkage; and Z represents a chlorine atom located ortho to the oxygen linkage.
4. A composition as claimed in claim 3, in which Q represents an N-morpholinyl, N-piperidonyl or N-pyrrolidonyl group, or a group of general formula $-CR^2R^3R^4$ in which R^2 represents a C_{1-4} alkyl group, R^3 represents a (up to C_6 alkoxy)carbonyl or a $(C_{1-6}$ alkyl)carbonyl group, and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_{1-4} alkyl group.
5. A composition as claimed in claim 4, in which R^2 represents a methyl group; R^3 represents a methylcarbonyl, propylcarbonyl or ethoxycarbonyl group; and R^4 represents an ethoxycarbonyl or methyl group.
6. A method of combating pests at a locus, which comprises applying to the locus a composition as claimed in any one of claims 1 to 5.
7. A process for the preparation of a compound as defined in claim 1, which comprises reacting a compound of the general formula



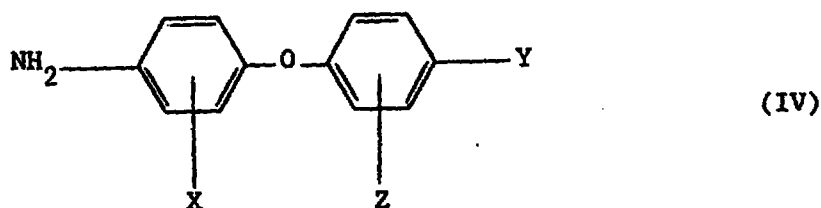


with a compound of the general formula



in which A, B, X, Y, Z and Q have the meanings given in claim 1.

8. A process for the preparation of a compound of the general formula II as defined in claim 7, which comprises reacting a compound of the general formula



with a compound of the general formula



in which Hal represents a halogen atom, and the other substituents have the meanings given in claim 1.

9. A process for the preparation of a compound of the general formula V



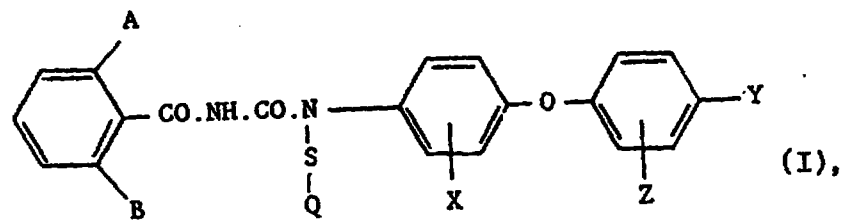
in which Hal represents a halogen atom and Q represents a group of general formula $-\text{CR}^2\text{R}^3\text{R}^4$ in which R^2 represents a C_1-4 alkyl group, R^3 represents a (up to C_6 alkoxy)carbonyl or a $(\text{C}_1-6 \text{ alkyl})-\text{carbonyl}$ group and R^4 represents a (up to C_6 alkoxy)carbonyl or a C_1-4 alkyl group, in which process a sulphenyl halide compound of general formula $\text{S}(\text{Hal})_2$ is reacted with a compound of the general formula $\text{Q}-\text{H}$.



Patentansprüche

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

1. Verbindung mit der allgemeinen Formel



worin jeder der Reste A und B unabhängig voneinander ein Halogenatom darstellt; Q eine Gruppe der allgemeinen Formel



bezeichnet, worin R eine C_3-8 Alkylengruppe darstellt, worin eine $-CH_2-$ Gruppe durch ein Sauerstoffatom oder durch eine Carbonylgruppe ersetzt ist, oder Q eine Gruppe der allgemeinen Formel $-CR^2R^3R^4$ bedeutet, worin R^2 eine C_1-4 Alkylgruppe darstellt, R^3 eine (bis zu C_6 -Alkoxy)-carbonylgruppe oder eine (C_1-6 Alkyl)carbonylgruppe darstellt und R^4 eine (bis zu C_6 Alkoxy)-carbonylgruppe oder eine C_1-4 Alkylgruppe bezeichnet; X ein Halogenatom darstellt; Y eine Trifluormethylgruppe bedeutet; und Z ein Halogenatom bedeutet.

2. Verbindung nach Anspruch 1, worin jeder der Reste A und B ein Fluoratom bedeutet; X ein Fluoratom darstellt; und Z ein Chloratom bedeutet.

3. Verbindung nach Anspruch 2, worin X ein in orth-Stellung zur Stickstoffverknüpfung angeordnetes Fluoratom darstellt; und Z ein in ortho-Stellung zur Sauerstoff-Verknüpfung angeordnetes Chloratom bedeutet.

4. Verbindung nach Anspruch 3, worin Q eine N-Morpholinylgruppe, N-Piperidonylgruppe oder N-Pyrrolidonylgruppe oder eine Gruppe der allgemeinen Formel $-CR^2R^3R^4$ bedeutet, worin R^2 eine C_1-4 Alkylgruppe bezeichnet, R^3 eine (bis zu C_6 Alkoxy)carbonylgruppe oder eine (C_1-6 Alkyl)-carbonylgruppe darstellt und R^4 eine (bis zu C_6 Alkoxy)carbonylgruppe oder eine C_1-4 Alkylgruppe bedeutet.

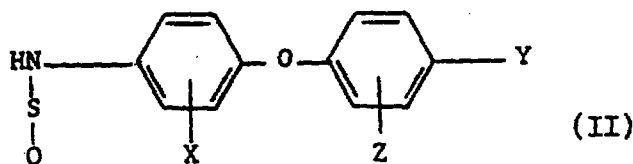
5. Verbindung nach Anspruch 4, worin R^2 eine Methylgruppe darstellt; R^3 eine Methylcarbonyl-, Propylcarbonyl- oder Ethoxycarbonylgruppe darstellt; und R^4 eine Ethoxycarbonyl- oder Methylgruppe bedeutet.

6. Pestizide Zusammensetzung, umfassend eine Verbindung nach einem der Ansprüche 1 bis 5 zusammen mit einem Träger.

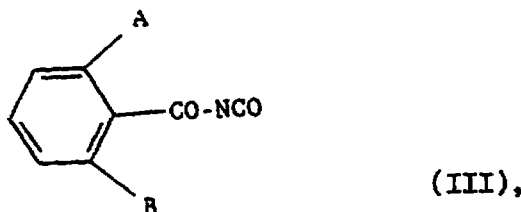
7. Verfahren zur Bekämpfung von Unkräutern an einem Ort, welches ein Aufbringen einer Verbindung nach einem der Ansprüche 1 bis 5 oder einer Zusammensetzung nach Anspruch 6 auf den Ort umfaßt.

8. Verfahren zur Herstellung einer Verbindung nach Anspruch 1, welches ein Umsetzen einer Verbindung der allgemeinen Formel





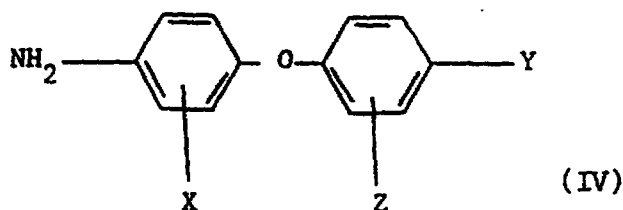
mit einer Verbindung der allgemeinen Formel



worin A, B, X, Y, Z und Q die in Anspruch 1 angegebenen Bedeutungen aufweisen, umfaßt.

9. Verbindung der allgemeinen Formel II, wie in Anspruch 8 definiert.

10. Verfahren zur Herstellung einer Verbindung nach Anspruch 9, welches ein Umsetzen einer Verbindung der allgemeinen Formel



mit einer Verbindung der allgemeinen Formel



worin Hal ein Halogenatom bedeutet und die anderen Substituenten die in Anspruch 1 angegebenen Bedeutungen besitzen, umfaßt.

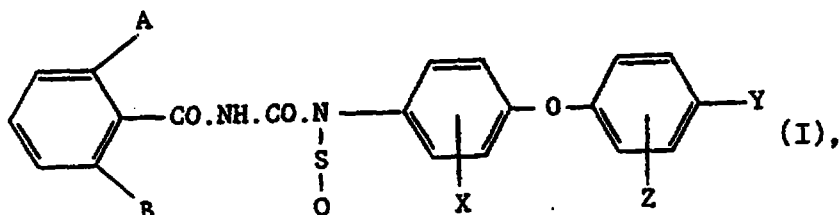
11. Verbindung der allgemeinen Formel V nach Anspruch 10, worin Q eine Gruppe der allgemeinen Formel $-CR^2R^3R^4$ darstellt, worin R^2 eine C_1-4 Alkylgruppe bedeutet, R^3 eine (bis zu C_6 Alkoxy)carbonylgruppe oder eine (C_1-6 Alkoxy)carbonylgruppe darstellt und R^4 eine (bis zu C_6 Alkoxy)carbonylgruppe oder eine C_1-4 Alkylgruppe bedeutet.

12. Verfahren zur Herstellung einer Verbindung nach Anspruch 11, worin eine Sulfonylhalogenidverbindung der allgemeinen Formel $S(Hal)_2$ mit einer Verbindung der allgemeinen Formel $Q-H$ umgesetzt wird.

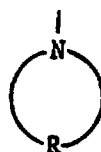


Patentansprüche für folgenden Vertragsstaat : AT

1. Pestizide Zusammensetzung, umfassend eine Verbindung der allgemeinen Formel

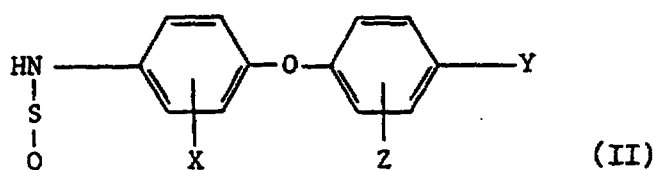


worin jeder der Reste A und B unabhängig voneinander ein Halogenatom darstellt; Q eine Gruppe der allgemeinen Formel

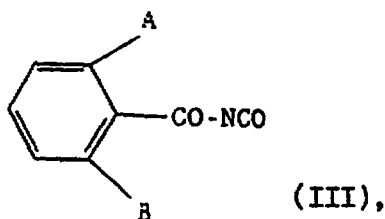


bezeichnet, worin R eine C_3-8 Alkylengruppe darstellt, worin eine $-CH_2-$ Gruppe durch ein Sauerstoffatom oder durch eine Carbonylgruppe ersetzt ist, oder Q eine Gruppe der allgemeinen Formel $-CR^2R^3R^4$ bedeutet, worin R^2 eine C_1-4 Alkylgruppe darstellt, R^3 eine (bis zu C_6 - Alkoxy) - carbonylgruppe oder eine (C_1-5 Alkyl) carbonylgruppe darstellt und R^4 eine (bis zu C_6 Alkoxy) - carbonylgruppe oder eine C_1-4 Alkylgruppe bezeichnet; X ein Halogenatom darstellt; Y eine Trifluormethylgruppe bedeutet; und Z ein Halogenatom bedeutet, zusammen mit einem Träger.

2. Zusammensetzung nach Anspruch 1, worin jeder der Reste A und B ein Fluoratom bedeutet; X ein Fluoratom darstellt; und Z ein Chloratom bedeutet.
3. Zusammensetzung nach Anspruch 2, worin X ein in orth - Stellung zur Stickstoffverknüpfung angeordnetes Fluoratom darstellt; und Z ein in ortho - Stellung zur Sauerstoff - Verknüpfung angeordnetes Chloratom bedeutet.
4. Zusammensetzung nach Anspruch 3, worin Q eine N - Morpholinylgruppe, N - Piperidonylgruppe oder N - Pyrrolidonylgruppe oder eine Gruppe der allgemeinen Formel $-CR^2R^3R^4$ bedeutet, worin R^2 eine C_1-4 Alkylgruppe bezeichnet, R^3 eine (bis zu C_6 Alkoxy) carbonylgruppe oder eine (C_1-5 Alkyl) - carbonylgruppe darstellt und R^4 eine (bis zu C_6 Alkoxy) carbonylgruppe oder eine C_1-4 Alkylgruppe bedeutet.
5. Zusammensetzung nach Anspruch 4, worin R^2 eine Methylgruppe darstellt; R^3 eine Methylcarbonyl -, Propylcarbonyl - oder Ethoxycarbonylgruppe darstellt; und R^4 eine Ethoxycarbonyl - oder Methylgruppe bedeutet.
6. Verfahren zur Bekämpfung von Schädlingen an einem Ort, welches ein Aufbringen einer Zusammensetzung nach einem der Ansprüche 1 bis 5 auf den Ort umfaßt.
7. Verfahren zur Herstellung einer Verbindung, wie in Anspruch 1 definiert, welches ein Umsetzen einer Verbindung der allgemeinen Formel

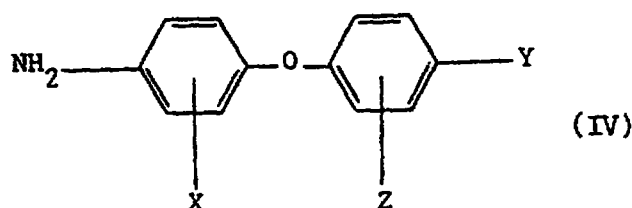


mit einer Verbindung der allgemeinen Formel



worin A, B, X, Y, Z und Q die in Anspruch 1 angegebenen Bedeutungen aufweisen, umfaßt.

8. Verfahren zur Herstellung einer Verbindung der allgemeinen Formel II, wie in Anspruch 7 definiert, welches ein Umsetzen einer Verbindung der allgemeinen Formel



mit einer Verbindung der allgemeinen Formel



worin Hal ein Halogenatom bedeutet und die anderen Substituenten die in Anspruch 1 angegebenen Bedeutungen besitzen, umfaßt.

9. Verfahren zur Herstellung einer Verbindung der allgemeinen Formel V

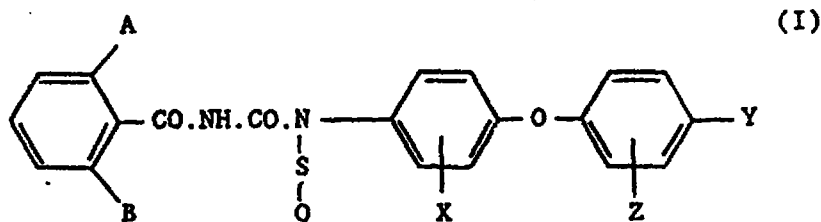


worin Hal ein Halogenatom darstellt und Q eine Gruppe der allgemeinen Formel $-\text{CR}^2\text{R}^3\text{R}^4$ bedeutet, worin R^2 eine C_1 -4 Alkylgruppe darstellt, R^3 eine (bis zu C_6 Alkoxy)carbonylgruppe oder eine (C_1 -6 Alkyl)carbonylgruppe darstellt und R^4 eine (bis zu C_6 Alkoxy)carbonylgruppe oder eine C_1 -4 Alkylgruppe bedeutet, in welchem Verfahren eine Sulfonylhalogenidverbindung der allgemeinen Formel $\text{S} - (\text{Hal})_2$ mit einer Verbindung der allgemeinen Formel $\text{Q} - \text{H}$ umgesetzt wird.

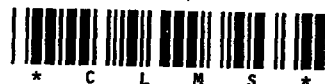
Revendications

Revendication pour les Etats contractants suivants : BE, CH, DE, FR, GB, IT, LI, LU, NL, SE

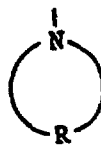
1. Un composé de formule générale



dans laquelle chacun des A et B représente indépendamment un atome d'halogène ; Q représente un

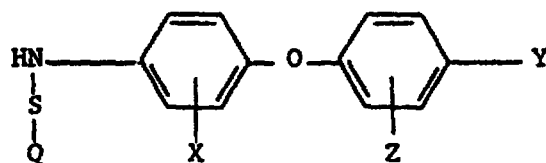


groupe de formule générale



dans laquelle R représente un groupe alcyène en C₃ à C₅, dans lequel un groupe -CH₂- est remplacé par un atome d'oxygène ou par un groupe carbonyle ou bien Q représente un groupe de formule générale -CR²R³R⁴ dans laquelle R² représente un groupe alkyle en C₁ à C₄, R³ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe (alkyl en C₁ à C₆) carbonyle et R⁴ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe alkyle en C₁ à C₄; X représente un atome d'halogène; Y représente un groupe trifluorométhyle; et Z représente un atome d'halogène.

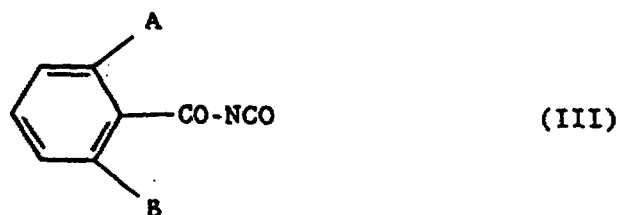
2. Un composé tel que revendiqué dans la revendication 1, dans lequel chacun des A et B représente un atome de fluor; X représente un atome de fluor; et Z représente un atome de chlore.
3. Un composé tel que revendiqué dans la revendication 2, dans lequel X représente un atome de fluor en position ortho par rapport à la liaison azote; et Z représente un atome de chlore en position ortho par rapport à la liaison oxygène.
4. Un composé tel que revendiqué dans la revendication 3, dans lequel Q représente un groupe N-morpholinyle, N-pipéridonyle ou N-pyrrolidonyle, ou bien un groupe de formule générale -CR²R³R⁴ dans lequel R² représente un groupe alkyle en C₁ à C₄, R³ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe (alkyle en C₁ à C₆) carbonyle et R⁴ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe alkyle en C₁ à C₄.
5. Un composé tel que revendiqué dans la revendication 4, dans lequel R² représente un groupe méthyle; R³ représente un groupe méthylcarbonyle, propylcarbonyle ou éthoxycarbonyle; et R⁴ représente un groupe éthoxycarbonyle ou méthyle.
6. Une composition pesticide comprenant un composé tel que revendiqué dans l'une quelconque des revendications 1 à 5, conjointement avec un support.
7. Une méthode pour combattre les pestes en un endroit, qui consiste à appliquer en cet endroit un composé tel que revendiqué dans l'une quelconque des revendications 1 à 5 ou une composition telle que revendiquée dans la revendication 6.
8. Un procédé pour la préparation d'un composé tel que revendiqué dans la revendication 1, qui consiste à faire réagir un composé de formule générale



(II)

avec un composé de formule générale

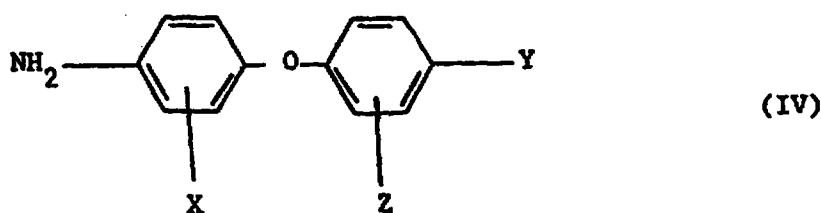




10 dans laquelle A, B, X, Y, Z et Q ont les significations spécifiées dans la revendication 1.

9. Un composé de formule générale II tel que défini dans la revendication 8.

10. Un procédé pour la préparation d'un composé tel que revendiqué dans la revendication 9, qui consiste à faire réagir un composé de formule générale



25 avec un composé de formule générale



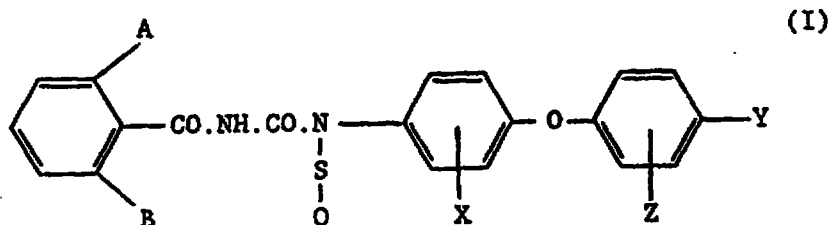
30 dans laquelle Hal représente un atome d'halogène, et les autres substituants ont les significations spécifiées dans la revendication 1.

11. Un composé de formule générale V, selon la revendication 10, dans laquelle Q représente un groupe de formule générale $-\text{CR}^2\text{R}^3\text{R}^4$ dans laquelle R^2 représente un groupe alkyle en C_1 à C_4 , R^3 représente un groupe (alkoxy jusqu'à C_6) carbonyle ou un groupe (alkyl en C_1 à C_6) carbonyle et R^4 représente un groupe (alkoxy jusqu'à C_6) carbonyle ou un groupe alkyle en C_1 à C_4 .

12. Un procédé pour la préparation d'un composé tel que revendiqué dans la revendication 11, dans lequel un composé type halogénure de sulfényle de formule générale $(\text{S}(\text{Hal}))_2$ est mis en réaction avec un composé de formule générale $\text{Q}-\text{H}$.

Revendications pour l'Etat contractant suivant : AT

1. Une composition pesticide comportant un composé de formule générale



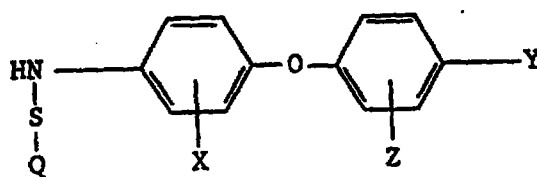
55 dans laquelle chacun des A et B représente indépendamment un atome d'halogène ; Q représente un groupe de formule générale





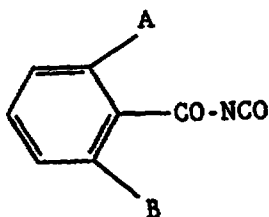
dans laquelle R représente un groupe alcylène en C₃ à C₅, dans lequel un groupe -CH₂- est remplacé par un atome d'oxygène ou par un groupe carbonyle ou bien Q représente un groupe de formule générale -CR²R³R⁴ dans laquelle R² représente un groupe alkyle en C₁ à C₄, R³ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe (alkyle en C₁ à C₆) carbonyle et R⁴ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe alkyle en C₁ à C₄; X représente un atome d'halogène; Y représente un groupe trifluorométhyle; et Z représente un atome d'halogène.

2. Une composition telle que revendiquée dans la revendication 1, dans laquelle chacun des A et B représente un atome de fluor; X représente un atome de fluor; et Z représente un atome de chlore.
3. Une composition telle que revendiquée dans la revendication 2, dans laquelle X représente un atome de fluor en position ortho par rapport à la liaison azote; et Z représente un atome de chlore en position ortho par rapport à la liaison oxygène.
4. Une composition pesticide telle que revendiquée dans la revendication 3, dans laquelle Q représente un groupe N-morpholinyne, N-pipéridonyne ou N-pyrrolidonyne, ou bien un groupe de formule générale -CR²R³R⁴ dans lequel R² représente un groupe alkyle en C₁ à C₄, R³ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe (alkyle en C₁ à C₆) carbonyle et R⁴ représente un groupe (alkoxy jusqu'à C₆) carbonyle ou un groupe alkyle en C₁ à C₄.
5. Une composition telle que revendiquée dans la revendication 4, dans laquelle R² représente un groupe méthyle; R³ représente un groupe méthylcarbonyle, propylcarbonyle ou éthoxycarbonyle; et R⁴ représente un groupe éthoxycarbonyle ou méthyle.
6. Une méthode pour combattre les pestes en un endroit, qui consiste à appliquer en cet endroit une composition telle que revendiquée dans l'une quelconque des revendications 1 à 5.
7. Un procédé pour la préparation d'un composé tel que défini dans la revendication 1, qui consiste à faire réagir un composé de formule générale



(II)

avec un composé de formule générale

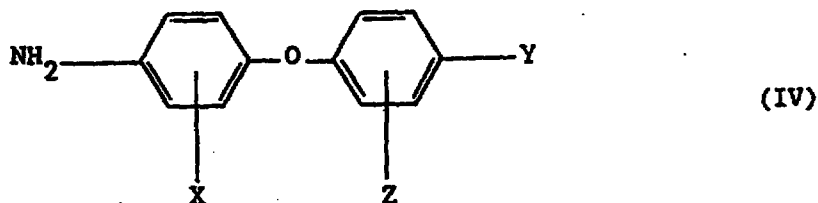


(III)

dans laquelle A, B, X, Y, Z et Q ont les significations spécifiées dans la revendication 1.



8. Un procédé pour la préparation d'un composé de formule générale II tel que défini dans la revendication 7, qui consiste à faire réagir un composé de formule générale



avec un composé de formule générale



dans laquelle Hal représente un atome d'halogène, et les autres substituants ont les significations spécifiées dans la revendication 1.

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



dans laquelle Hal représente un atome d'halogène et Q représente un groupe de formule générale $-\text{CR}^2\text{R}^3\text{R}^4$ dans laquelle R^2 représente un groupe alkyl en C_1 à C_4 , R^3 représente un groupe (alkoxy jusqu'à C_6) carbonyle ou un groupe (alkyl en C_1 à C_6) carbonyle et R^4 représente un groupe (alkoxy jusqu'à C_6) carbonyle ou un groupe alkyle en C_1 à C_4 , procédé dans lequel un composé du type halogénure de sulfényle de formule générale $(\text{S}(\text{Hal}))_2$ est mis à réagir avec un composé de formule générale $\text{Q}-\text{H}$.

