

PATENT SPECIFICATION

(11) 1 438 311

1 438 311

- (21) Application No. 26865/73 (22) Filed 5 June 1973
 (31) Convention Application No. 8345/72
 (32) Filed 6 June 1972
 (31) Convention Application No. 4607/73
 (32) Filed 30 March 1973 in
 (33) Switzerland (CH)
 (44) Complete Specification published 3 June 1976
 (51) INT CL⁷ C07C 103/32; A01N 9/20
 (52) Index at acceptance



C2C 1173 200 220 225 227 22Y 281 30Y 313 314 31Y 322 323
 32Y 339 342 34Y 360 362 364 36Y 456 591 620 623
 624 62X 652 660 680 791 79Y KQ LE

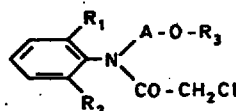
(54) CHLOROACETANILIDES FOR REGULATING PLANT GROWTH

(71) We, CIBA-GEIGY A.G., a Swiss body Corporate of Basle, Switzerland, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to N-substituted chloroacetanilides, their manufacture, herbicidal and plant growth regulating compositions which contain these new compounds as active ingredient, and the use of the new compounds as herbicides and plant growth regulants.

Herbicidally active haloacetanilides are already known from the literature. Reference is made to the following patent specifications as representing the prior art: French Patent Specifications Nos. 1,337,529, 1,419,116 and 2,028,991; Belgian Patent Specification No. 746,288; and U.S. Patent Specifications Nos. 2,863,752, 3,442,945 and 3,547,620.

According to the present invention there are provided compounds of the formula I



(I)

wherein R₁ represents an ethyl or isopropyl group, R₂ represents a methyl, ethyl, or isopropyl group, R₃ represents an alkyl group with 1 to 3 carbon atoms, an alkenyl group with 3 or 4 carbon atoms, or a cyclopropyl or cyclopropylmethyl group and A represents an unsubstituted ethylene group (—CH₂—CH₂—) or an ethylene group which is monosubstituted by ethyl or mono- or disubstituted by methyl, provided that when R₁ represents an ethyl group and R₂ and R₃ both represent methyl groups, A does not represent a mono-methyl-substituted ethylene group in which the methyl substituent is attached to the carbon atom adjacent the nitrogen atom.

Alkyl radicals R₃ are methyl, ethyl, n-propyl, and isopropyl. Possible alkenyl radicals for R₃ are the allyl, crotyl, methallyl radicals.

A particularly interesting group of compounds is that in which R₁ represents an ethyl or isopropyl group, R₂ represents a methyl or ethyl group, R₃ represents a methyl, ethyl, n-propyl or isopropyl group, and A represents an unsubstituted ethylene group.

Another group of compounds is that in which R₁ represents an ethyl or isopropyl group, R₂ represents a methyl or ethyl group, R₃ represents a methyl, ethyl, or n-propyl group and A represents an ethylene group which is mono or disubstituted by methyl, provided that when R₁ represents an ethyl group and R₂ and R₃ both represent methyl groups, A does not represent a mono-methyl-substituted ethylene group in which the methyl substituent is attached to the carbon atom adjacent the nitrogen atom.

A particularly pronounced selectivity between weeds and crops of cultivated plants, even at low rates of application, is possessed by those compounds of the formula I wherein R₁ represents an ethyl or isopropyl group, R₂ represents a methyl or ethyl group, R₃ represents a methyl or ethyl group, and A represents an ethylene group which is unsubstituted or monosubstituted with methyl, provided that when R₁ represents an ethyl group and R₂ and R₃ both represent methyl group, A does not represent a mono-

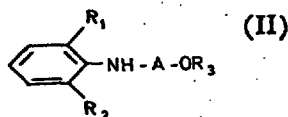
methyl-substituted ethylene group in which the methyl substituent is attached to the carbon atom adjacent the nitrogen atom.

Examples of such compounds are:

- 5 2-ethyl-6-methyl-N-(2'-methoxyethyl)-N-chloroacetanilide,
 2-ethyl-6-methyl-N-(2'-ethoxyethyl)-N-chloroacetanilide,
 2-ethyl-6-methyl-N-(2'-n-propoxyethyl)-N-chloroacetanilide,
 2-ethyl-6-methyl-N-(2'-isopropoxyethyl)-N-chloroacetanilide,
 2-ethyl-6-methyl-N-(2'-methoxypropyl)-N-chloroacetanilide,
 10 2,6-diethyl-N-(2'-methoxyethyl)-N-chloroacetanilide,
 2,6-diethyl-N-(2'-ethoxyethyl)-N-chloroacetanilide,
 2,6-diethyl-N-(2'-n-propoxyethyl)-N-chloroacetanilide,
 2,6-diethyl-N-(1'-methoxyprop-2'-yl)-N-chloroacetanilide,
 2-isopropyl-6-methyl-N-(2'-ethoxyethyl)-N-chloroacetanilide,
 15 2-isopropyl-6-ethyl-N-(2'-methoxyethyl)-N-chloroacetanilide,
 2-ethyl-6-methyl-N-(1'-ethoxyprop-2'-yl)-N-chloroacetanilide,
 2-isopropyl-6-methyl-N-(1'-methoxyprop-2'-yl)-N-chloroacetanilide,
 2-isopropyl-6-methyl-N-(1'-methoxypropyl)-N-chloroacetanilide,
 2,6-diethyl-N-(1'-ethoxyprop-2'-yl)-N-chloroacetanilide,
 20 2-ethyl-6-methyl-N-(2'-ethoxypropyl)-N-chloroacetanilide,
 and the compounds of the formula I
 2-ethyl-6-methyl-N-(2'-cyclopropylmethoxyethyl)-N-chloroacetanilide,
 2,6-diethyl-N-(2'-cyclopropylmethoxyethyl)-N-chloroacetanilide.

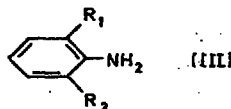
The compound wherein R_1 represents an ethyl group, R_2 and R_3 both represent methyl groups and A represents a mono-methyl-substituted ethylene group, in which the methyl substituent is attached to the carbon atom adjacent the nitrogen atom, viz. 2-ethyl-6-methyl-N-(1'-methoxyprop-2'-yl)-N-chloroacetanilide, is described and claimed in our copending application No. 4395/76 (Serial No. 1 438 312) divided out of this application.

30 The new chloroacetanilides of the formula I may be prepared by reacting an N-substituted aniline of the formula II



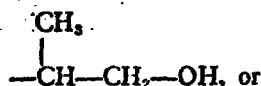
with a chloroacetylating agent, preferably an anhydride or halide of chloroacetic acid. In formula II, R_1 , R_2 , A and R_3 have the same meanings as given under formula I.

35 It is also possible to prepare the compounds of the formula I by reacting an aniline of the formula III

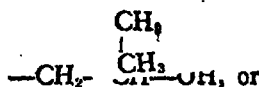


wherein R_1 and R_2 have the meanings given hereinbefore, with

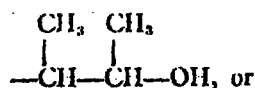
- (i) 2-haloethanol or ethylene oxide to introduce the hydroxyalkyl chain
 —CH₂—CH₂—OH, or
 40 (ii) 2-halopropanol to introduce the hydroxyalkyl chain



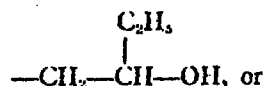
(iii) 1-halopropan-2-ol or propylene oxide to introduce the hydroxyalkyl chain



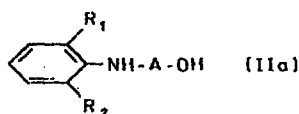
(iv) 3-halobutan-2-ol to introduce the hydroxyalkyl chain



(v) 1-halobutan-2-ol to introduce the hydroxyalkyl chain



(vi) a corresponding haloalkanol to introduce one of the further possible structural chains $-\text{A}-\text{OH}$, and then chloroacetylating the resulting compound of the formula IIa



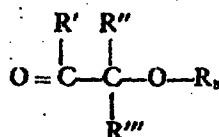
preferably with an anhydride or halide of chloroacetic acid, and finally the still free OH group is etherified in acid medium (e.g. HCl, H_2SO_4) under mild conditions and in conventional manner with an alcohol R_3-OH , in which the radical R_3 corresponds to the definition given under formula I.

The reactions can be carried out in the presence or absence of solvents or diluents which are inert towards the reactants. Examples of suitable solvents or diluents are: aliphatic, aromatic or halogenated hydrocarbons, such as benzene, toluene, xylene, petroleum ether, chlorobenzene, methylene chloride, ethylene chloride, chloroform; ethers and ethereal compounds, such as dialkyl ethers, dioxan, tetrahydrofuran; nitriles, such as acetonitrile; N,N-dialkylated amides, such as dimethyl formamide; also dimethyl sulphoxide, and also mixtures of these solvents.

As suitable chloroacetylating agents there are preferably used chloroacetic anhydride, and chloroacetic halides, such as chloroacetyl chloride. However, it is also possible to carry out the reaction with chloroacetic acid or its esters or amides. The reaction temperatures are generally between 0° and 200°C , preferably between 20° and 100°C . Often, especially if chloroacetyl halides are used, the chloroacetylation is carried out in the presence of an acid binding agent. Suitable acid binding agents are: tertiary amines, such as trialkylamines, e.g. triethylamine, pyridine and pyridine bases, or inorganic bases, such as the oxides and hydroxides, hydrogen carbonates and carbonates of alkali and alkaline earth metals. Furthermore, it is also possible to use the corresponding aniline of the formula II as acid binding agent, in which case it must be used in excess.

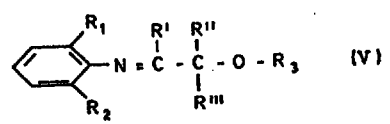
Compounds homologous to formula II and hydroxyalkyl derivatives homologous to formula IIa are known, e.g. from US Patent Specification Nos. 2,381,071, 2,759,943 as well as from J. Am. Soc. 84, 743 and Bull. Soc. Chim. France 1962, 303 and 1965, 2037. These starting materials, as well as those not yet described in the literature, which fall under the general formula II, can be manufactured easily by one of the following known methods, for example:

a) by condensation of the correspondingly alkylated aniline III with a carbonyl compound IV



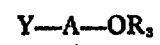
(IV)

in which the substituents R' , R'' , and R''' each represents hydrogen, methyl or ethyl, but together possess at most 2 carbon atoms, while R_3 has the meaning given for formula I, and simultaneous or subsequent catalytic hydrogenation of the resulting azomethine of the formula V



b) by reaction of the alkylaniline III with a compound of the formula VI

(VI)



5 wherein A and R₃ are defined as under formula I and Y represents a halogen atom or
another acid radical, in particular an arylsulphonic acid radical. Compounds of the
formula VI with benzenesulphonic acid radicals Y are described e.g. in Can. J. Chem.
33, 1207, and those with tosyloxy radicals (CH₃-C₆H₄-SO₃-) in British Patent
Specification No. 869,083.

10 There are, of course, a number of other processes for the manufacture of the
starting materials of the formula II from ortho-alkylated anilines.

15 The compounds of formula I are stable compounds and possess good selective
herbicidal properties. Accordingly the invention provides a method of selectively com-
bating undesirable plant growth at a locus which method comprises applying to the
locus a compound of formula I. The locus is suitably an area in which a useful crop
is to be grown. The compounds of formula I may thus be used against annual grasses
such as Echinochloa and related plants of the genera Setaria, and Digitaria, against
grasses such as Lolium species and against many dicotyledonous weeds such as Amaran-
thus, Sesbania, Chrysanthemum, Ipomoea, Sinapis, Galium, Pastinaca, without causing
20 damage to the cultivated plants in respect of which the use of the active substances is
intended, for example soya, alfalfa, peas, beans, lentils, various types of ground nuts,
such as peanuts, cotton, maize, coffee, tea, bananas, pineapples, sugar beet, sugar cane,
potatoes, paprika, tomatoes, spinach, onions, aubergines, sunflowers, tobacco, Brassica
species such as rape and cabbage, but also cereals, such as barley, oats, rye, wheat, or
dry rice or water rice.

25 The compounds of formula I may be applied either before or after the germination
of the cultivated plants and of the weeds and grasses (pre- and postemergence); pre-
emergence application is preferred. The rates of application are between 0.1 and 10 kg
of active substance per hectare. But in preemergent application the weeds are virtually
destroyed with a rate of application as low as 0.25 kg of active substance per hectare.

30 Normally up to 10 kg of active substance per hectare are used to prevent railway em-
bankments, factory grounds, roads etc. from becoming overgrown with weeds.

35 Furthermore the compounds of the formula I also display plant growth regulating
properties. Accordingly the invention also provides a method of retarding the growth
in height of grass in grasslands which method comprises applying to the grasslands a
compound of formula I. Consequently the growth rate of a grassland (consisting of the
genera Poa pratensis, Agrostis tenuis and Festuca rubra) treated in the spring shortly
after the first cutting may be reduced by half when active substances of the formula I
are used in amounts of 5 kg of active substance per hectare, an observation period of
60 days being used as basis.

40 The invention also provides a method of inhibiting the growth of tobacco side
shoots which method comprises applying to tobacco plants a compound of formula I.

The following Examples illustrate the invention, including the manufacture of
starting materials. The Table following Examples 1 and 2 lists further chloroacetanilides
of the formula I which were manufactured by one of the above-mentioned processes.

45 **Example 1.**

a) A solution of 135 g (1.0 mole) of 2-ethyl-6-methylaniline and 70 g (0.5 mole) of
1-bromo-propan-2-ol in 2 ml of absolute toluene is boiled under reflux for 20 hours.
The mixture is cooled, then diluted with ether, and shaken with 2 normal sodium
hydroxide solution. The organic phase is then isolated and washed neutral with water.

50 The solution is dried with Na₂SO₄, evaporated, and the residue is distilled in vacuo to
yield 2-ethyl-6-methyl-N-(2'-hydroxy-propyl)-aniline as fraction boiling at 99°-
104°C/0.5 Torr.

b) While stirring, a suspension of 49.2 g (0.255 mole) of the intermediate described
under a) and 27 g (0.255 mole) of sodium carbonate in 250 ml of absolute benzene
is treated dropwise at room temperature with a solution of 30.5 g (0.27 mole) of chloro-
acetyl chloride in 50 ml of absolute benzene. The reaction mixture is stirred for 2 hours

55

5

1,438,311

5

at room temperature, then treated with 300 ml of water. The organic phase is washed with water, dried, and evaporated under reduced pressure. The residue consists of practically pure 2-ethyl-6-methyl-N-(2'-hydroxy-propyl)-chloroacetanilide.

5

c) A solution of 27 g (0.1 mole) of the product obtained under b) in 100 ml of absolute methanol is treated with 6 ml of concentrated sulphuric acid and the mixture is boiled under reflux for 20 hours. The reaction mixture is evaporated in vacuo, the residue partitioned between 100 ml of water and 200 ml of ether, and the ethereal solution is washed neutral with water, dried, and evaporated in vacuo, to yield pure 2-ethyl-6-methyl-N-(2'-methoxypropyl)-chloroacetanilide, n_D^{20} : 1.5299.

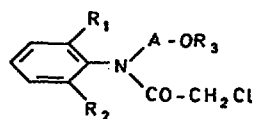
5

10

Analysis: calculated: C 63.5 H 7.8 N 4.9%
found: C 63.0 H 7.7 N 5.0%

10

The following Table 1 lists the compound obtained in Example 1 as well as further compounds of the formula



15

obtained by one of the above-mentioned processes. The temperatures are given in degrees centigrade.

15

TABLE I

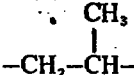
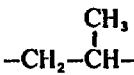
Compound No.	R ₁	R ₂	A	R ₃	Physical data or substance properties
1	C ₂ H ₅	CH ₃	-CH ₂ -CH ₂ -	CH ₃	n _D ²⁰ 1.5335
2	C ₂ H ₅	CH ₃	-CH ₂ -CH ₂ -	C ₂ H ₅	b.p. 120-122°/0.001 Torr
3	C ₂ H ₅	CH ₃	-CH ₂ -CH ₂ -	n-C ₃ H ₇	n _D ²⁰ 1.5221
4	C ₂ H ₅	CH ₃	-CH ₂ -CH ₂ -	i-C ₃ H ₇	n _D ²⁰ 1.5190
5	C ₂ H ₅	CH ₃	-CH ₂ -CH ₂ -	-CH ₂ -CH=CH ₂	n _D ²⁰ 1.5328
6	C ₂ H ₅	CH ₃	-CH ₂ -CH ₂ -		oil
7	C ₂ H ₅	CH ₃	-CH ₂ -CH ₂ -	-CH ₂ - 	n _D ²⁰ 1.5237
8	C ₂ H ₅	CH ₃	 -CH-	CH ₃	n _D ²⁰ 1.5299
9	C ₂ H ₅	C ₂ H ₅	-CH ₂ -CH ₂ -	CH ₃	n _D ²⁰ 1.5317
10	C ₂ H ₅	C ₂ H ₅	-CH ₂ -CH ₂ -	C ₂ H ₅	n _D ²⁰ 1.5247
11	C ₂ H ₅	C ₂ H ₅	-CH ₂ -CH ₂ -	n-C ₃ H ₇	n _D ²⁰ 1.5204
12	C ₂ H ₅	C ₂ H ₅	-CH ₂ -CH ₂ -	i-C ₃ H ₇	n _D ²⁰ 1.5181
13	C ₂ H ₅	C ₂ H ₅	-CH ₂ -CH ₂ -	-CH ₂ -CH=CH ₂	n _D ²⁰ 1.5319
14	C ₂ H ₅	C ₂ H ₅	-CH ₂ -CH ₂ -		semicrystalline
15	C ₂ H ₅	C ₂ H ₅	-CH ₂ -CH ₂ -	-CH ₂ - 	n _D ²⁰ 1.5296
16	C ₂ H ₅	C ₂ H ₅	 -CH ₂ -	CH ₃	n _D ²⁰ 1.5282
17	C ₂ H ₅	C ₂ H ₅	 -CH-	CH ₃	n _D ²⁰ 1.5293
18	i-C ₃ H ₇	CH ₃	-CH ₂ -CH ₂ -	CH ₃	n _D ²⁰ 1.5287

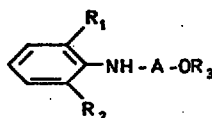
TABLE 1 (continued)

Compound No.	R ₁	R ₂	A	R ₃	Physical data or substance properties
19	i-C ₃ H ₇	CH ₃	-CH ₂ -CH ₂ -	C ₂ H ₅	n _D ²⁰ 1.5216
20	i-C ₃ H ₇	CH ₃	-CH ₂ -CH ₂ -	n-C ₃ H ₇	n _D ²⁰ 1.5185
21	i-C ₃ H ₇	CH ₃	-CH ₂ -CH ₂ -	i-C ₃ H ₇	n _D ²⁰ 1.5160
22	i-C ₃ H ₇	CH ₃	-CH ₂ -CH ₂ -	-CH ₂ -CH=CH ₂	n _D ²⁰ 1.5285
23	i-C ₃ H ₇	C ₂ H ₅	-CH ₂ -CH ₂ -	CH ₃	n _D ²⁰ 1.5258
24	i-C ₃ H ₇	C ₂ H ₅	-CH ₂ -CH ₂ -	C ₂ H ₅	n _D ²⁰ 1.5240
25	i-C ₃ H ₇	C ₂ H ₅	-CH ₂ -CH ₂ -	n-C ₃ H ₇	n _D ²⁰ 1.5182
26	i-C ₃ H ₇	C ₂ H ₅	-CH ₂ -CH ₂ -	i-C ₃ H ₇	n _D ²⁰ 1.5160
27	i-C ₃ H ₇	C ₂ H ₅	-CH ₂ -CH ₂ -	-CH ₂ -CH=CH ₂	n _D ²⁰ 1.5274
28	i-C ₃ H ₇	i-C ₃ H ₇	-CH ₂ -CH ₂ -	CH ₃	m.p. = 71-75°
29	i-C ₃ H ₇	i-C ₃ H ₇	-CH ₂ -CH ₂ -	C ₂ H ₅	m.p. = 55-57°
30	i-C ₃ H ₇	i-C ₃ H ₇	-CH ₂ -CH ₂ -	n-C ₃ H ₇	m.p. = 43-48°
31	i-C ₃ H ₇	i-C ₃ H ₇	-CH ₂ -CH ₂ -	i-C ₃ H ₇	oil
32	i-C ₃ H ₇	i-C ₃ H ₇	-CH ₂ -CH ₂ -	-CH ₂ -CH=CH ₂	oil
33	C ₂ H ₅	CH ₃	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}-\text{CH}_2- \end{array}$	C ₂ H ₅	b.p. 120-122°/0.001 Torr
34	C ₂ H ₅	CH ₃	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}-\text{CH}_2- \end{array}$	n-C ₃ H ₇	b.p. 128-133°/0.001 Torr
35	C ₂ H ₅	CH ₃	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}_2-\text{CH}- \end{array}$	n-C ₃ H ₇	b.p. 126-133°/0.001 Torr
36	i-C ₃ H ₇	CH ₃	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}-\text{CH}_2- \end{array}$	CH ₃	n _D ²⁰ 1.5263
37	i-C ₃ H ₇	CH ₃	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}_2-\text{CH}- \end{array}$	CH ₃	n _D ²⁰ 1.5256
38	i-C ₃ H ₇	C ₂ H ₅	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}-\text{CH}_2 \end{array}$	CH ₃	n _D ²⁰ 1.5223

TABLE 1 (continued)

Compound No.	R ₁	R ₂	A	R ₃	Physical data or substance properties
39	i-C ₃ H ₇	C ₂ H ₅	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}_2-\text{CH}- \end{array}$	CH ₃	n _D ²⁰ 1.5231
40	C ₂ H ₅	C ₂ H ₅	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}-\text{CH}_2- \end{array}$	C ₂ H ₅	oil
41	C ₂ H ₅	C ₂ H ₅	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}-\text{CH}_2- \end{array}$	n-C ₃ H ₇	oil
42	C ₂ H ₅	C ₂ H ₅	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}_2-\text{CH}- \end{array}$	n-C ₃ H ₇	semicrystalline
43	C ₂ H ₅	CH ₃	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}_2-\text{CH}- \end{array}$	C ₂ H ₅	n _D ²⁰ 1.5236
44	C ₂ H ₅	C ₂ H ₅	$\begin{array}{c} \text{CH}_3 \\ \\ -\text{CH}_2-\text{CH}- \end{array}$	C ₂ H ₅	n _D ²⁰ 1.5205

The respective starting materials which correspond to each of these active substances have the formula II



5 wherein the radicals R₁, R₂, A and R₃ have the same meanings as given for the formula I. 5

Some of these starting materials are listed in the following table.

2-ethyl-6-methyl-N-(2'-methoxyethyl)-aniline	b.p. 78 – 82°/0.3 Torr
2,6-diethyl-N-(2'-methoxyethyl)-aniline	b.p. 61 – 63°/0.03 Torr
2,6-diethyl-N-(1'-methoxyprop-2'-yl)-aniline	b.p. 71 – 74°/0.1 Torr

Example 2.

10 Combating of Echinochloa species and other monocotyledonous weeds in various cultures of useful plants (preemergence method) 10

One day after the test plants have been sown in seed dishes, dilute aqueous suspensions of the active substances are sprayed in such concentrations on the surface of the soil as to correspond to rates of application of 2 kg, 1 kg and 0.5 kg per hectare. 15
The seed dishes are kept at 22° and 25°C and about 70% relative humidity. The test is evaluated after 28 days according to the following rating: 15

9 = plants undamaged (as control test)

1 = plants destroyed

8—2 = intermediate stages of damage

— = not tested

5 Haloacetanilides known from US Patent Specification No. 3,547,620 were used as comparative compounds: 5

Compound A: 2-methyl-6-ethyl-N-(ethoxymethyl)-chloroacetanilide

Compound B: 2,6-diethyl-N-(methoxymethyl)-chloroacetanilide
(commercial product).

TABLE 2

Compound No.	rate of application	Echinochloa	Setaria	Digitaria	Rottboellia	Cyperus	Alopecurus	Lolium	alfalfa	sugar beet	cotton	soya	barley	wheat	maize
5	2	1	1	1	1	1	1	1	8	9	8	8	7	—	7
	1	1	1	1	1	1	1	1	9	9	8	9	8	8	8
	0.5	1	1	1	3	2	2	3	9	9	9	9	9	9	9
12	2	1	1	1	—	1	2	2	7	9	8	9	8	7	9
	1	1	1	1	—	1	2	3	8	9	9	9	9	8	9
	0.5	1	1	1	—	1	3	3	9	9	9	9	9	9	9
18	2	1	1	1	1	1	1	1	8	—	9	9	7	—	7
	1	1	1	1	1	1	1	1	9	8	9	9	8	—	8
	0.5	1	1	1	1	1	3	1	9	8	9	9	9	—	9
8	2	1	1	1	1	1	1	1	7	8	9	9	8	—	9
	1	1	1	1	2	1	2	1	7	9	9	9	9	8	9
	0.5	2	1	1	4	2	3	1	9	9	9	9	9	9	9
43	2	1	1	1	—	1	1	1	8	8	7	9	7	—	8
	1	1	1	1	—	1	2	1	8	9	8	9	8	8	9
	0.5	1	1	1	—	1	6	1	9	9	9	9	9	9	9
44	2	1	1	1	1	1	—	2	7	9	8	9	7	7	9
	1	1	1	1	2	1	—	2	8	9	9	9	9	9	9
	0.5	1	2	2	4	3	—	4	8	9	9	9	9	9	9
16	2	1	1	1	—	1	1	1	8	9	9	9	7	8	9
	1	1	1	1	—	2	2	1	8	9	9	9	8	9	9
	0.5	1	1	1	—	—	—	2	9	9	9	9	9	9	9
10	2	1	1	1	—	1	1	1	8	9	9	8	7	7	9
	1	1	1	1	—	1	1	1	9	9	9	9	8	8	9
	0.5	1	1	1	—	1	1	1	9	9	9	9	9	9	9

TABLE 2 (Continuation)

Compound No.	rate of application	Echinochloa	Setaria	Digitaria	Rottboellia	Cyperus	Alopecurus	Lolium	alfalfa	sugar beet	cotton	soya	barley	wheat	maize
4	2	1	1	1	2	1	1	1	8	9	9	8	7	9	7
	1	1	1	1	3	1	1	2	8	9	9	9	8	9	9
	0.5	1	1	1	5	1	2	3	9	9	9	9	9	9	9
3	2	1	1	1	—	1	1	1	8	9	7	7	—	—	8
	1	1	1	1	—	1	1	1	9	9	9	9	9	—	9
	0.5	1	1	1	—	3	1	2	9	9	9	9	9	—	9
11	2	1	1	1	—	1	1	1	8	9	9	9	8	9	9
	1	1	1	1	—	1	1	2	9	9	9	9	9	9	9
	0.5	1	1	1	—	—	2	3	9	9	9	9	9	9	9
19	2	1	1	1	1	1	1	1	7	8	9	9	7	—	9
	1	1	1	1	1	1	1	1	9	9	9	9	9	—	9
	0.5	1	1	1	1	1	4	2	9	9	9	9	9	—	9
23	2	1	1	1	1	1	2	1	9	8	9	9	8	—	9
	1	1	1	1	2	1	2	2	9	9	9	9	8	8	9
	0.5	1	1	1	4	1	5	2	9	9	9	9	9	9	9
A	2	1	1	1	3	1	1	1	6	4	6	8	2	3	6
	1	1	1	1	3	1	3	1	7	5	9	8	3	3	8
	0.5	1	1	1	4	—	4	1	8	6	9	9	6	7	9
B	2	1	1	1	4	—	2	2	8	5	9	8	4	3	9
	1	1	1	1	5	2	3	2	9	6	9	9	8	4	9
	0.5	1	2	1	7	—	4	4	9	7	9	9	9	9	9

It is evident that the active substances according to the present invention possess a more distinctly pronounced herbicidal selectivity than the comparative compounds A and B. Primarily, compounds of the formula I are better tolerated by cultures of useful plants.

Example 3.

Broad action against mono- and dicotyledonous weeds in selected cultures of useful plants (preemergence method)

Immediately after the test plants have been sown in seed dishes, the active sub-

5

stances are applied to the surface of the soil as an aqueous suspension (obtained from a 25% wettable powder) so as to correspond to rates of application of 4 kg, 2 kg, 1 kg and 0.5 kg per hectare. The seed dishes are then kept at 22° to 23°C and 70% relative humidity. After 28 days the test is evaluated according to the rating given in Example 2. The haloacetanilides A and B cited in Example 2 were used as comparative compounds.

5

TABLE 3 (active substances according to the invention)

Compound No.	rate of application	dicotyledonous weeds					monocotyledonous weeds							useful plants					
		Pastinaca	Sinapis	Chrysanthemum	Amaranthus	Sesbania	Echinochloa	Setaria	Digitaria	Rottboellia	Cyperus	Alopecurus	Lolium	Avena	alfalfa	sugar beet	cotton	soya	barley
1	4	1	1	1	1	2	1	1	1	1	1	1	1	1	7	1	6	8	1
	2	1	1	2	1	3	1	1	1	2	1	1	1	1	8	1	8	8	1
	1	4	3	2	1	3	1	1	1	6	1	1	1	1	9	1	9	9	8
	0.5	5	4	3	1	4	1	1	1	6	1	2	1	1	9	1	9	9	8
2	4	1	1	1	1	2	1	1	1	1	1	1	1	1	7	1	8	6	1
	2	1	2	1	1	3	1	1	1	2	1	1	1	1	8	1	9	9	1
	1	2	3	2	1	6	1	1	1	3	1	1	1	2	9	1	9	9	9
	0.5	5	5	3	1	8	1	1	2	7	1	2	2	4	9	1	9	9	9
9	4	1	1	1	1	2	1	1	1	2	1	1	1	1	7	1	8	9	1
	2	2	2	3	1	3	1	1	1	2	1	1	1	1	9	1	9	9	1
	1	7	5	3	1	5	1	1	1	3	1	1	2	2	9	8	9	9	8
	0.5	9	8	4	1	8	1	1	2	5	1	2	2	2	9	8	9	9	8

TABLE 3 (Comparative substances according to US Patent Specification No. 3,547,620)

Compound	rate of application	dicotyledonous weeds						monocotyledonous weeds						useful plants						
A	4	Pastinaca	Galium	Ipomoea	Sinapis	Chrysanthemum	Amaranthus	Sesbania	Echinochloa	Setaria	Digitaria	Rottboellia	Cyperus	Alopercurus	Lolium	alfalfas	sugar beet	cotton	soya	barley
	2	1	4	6	2	2	1	—	1	1	1	2	1	1	1	5	2	6	6	1
	1	3	9	7	5	2	1	—	1	1	1	3	1	1	1	6	4	6	8	2
	0.5	4	9	7	5	2	1	—	1	1	1	3	1	3	1	7	5	9	8	3
B	4	9	9	7	6	2	1	—	1	1	1	4	—	4	1	8	6	9	9	6
	2	3	5	6	6	2	1	7	1	1	1	3	1	1	1	7	3	8	8	3
	1	3	7	8	7	3	1	7	1	1	1	4	—	2	2	8	5	9	8	4
	0.5	9	9	9	8	4	1	9	1	1	1	5	2	3	2	9	6	9	9	8
		9	9	9	9	6	2	9	1	2	1	7	—	4	4	9	7	9	9	9

5

While the comparative substances A and B are suitable for combating monocotyledonous weeds, they do give evidence of certain weaknesses in their activity (Avena and Alopecurus). They are unsuitable for combating dicotyledonous weeds because only Chrysanthemum and Amaranthus are damaged when low rates of application are used. In comparison thereto, the compounds according to the invention have uniformly good action against all varieties of undesirable grasses. Moreover, they also combat broadleaf weeds and thereby fulfil the requirement made of selective herbicides that they should protect cultures of useful plants by exhibiting the broadest possible activity spectrum against weeds.

5

10

Example 4.

10

Activity against undesirable grasses in low rates of application (preemergence method)

15

Plastic tubs 30 cm deep and measuring 30 cm x 50 cm along the edges are filled with medium heavy arable soil. The respective seed is sown on the surface of the soil and then covered with about 2 cm of soil and moistened. The dilute active substance suspension is applied within 24 hours. Concentrations are used which correspond to a rate of application of 1 kg, 0.5 kg, 0.25 kg and 0.125 kg of active substance per hectare. The tubs are kept at 22—25°C and about 70% relative humidity. As comparative compounds there were used the compound B of Example 2 and compound D = 2,6-diethyl-N-(butoxyethyl)-chloroacetanilide, which is cited as comparative compound in US Patent Specification No. 3,547,620. Evaluation is carried out after 20 days. The result is given in Table 4 as the damage to the test plants expressed in percentages, with the range of more severe damage being more differentiated than that of medium or slight damage. On the other hand the range of slighter damage is more strongly differentiated in useful plants.

15

20

20

TABLE 4

Compound No.	rate of application	Digitaria sang.	Lolium perenne	Bromus tect.	Sorghum alnum	Echinochloa c.g.	Setaria italica	soya	cotton	maize	sugar beet
10	1	—	100	—	100	100	100	0	0	0	—
	0.5	—	100	—	100	100	100	0	0	0	—
	0.25	—	95	—	90	100	98	0	0	0	—
	0.125	—	90	—	60	98	95	0	0	0	—
19	1	100	100	100	100	100	100	0	0	—	2
	0.5	100	100	98	100	100	100	0	0	—	0
	0.25	98	98	95	98	100	98	0	0	—	0
	0.125	95	—	—	95	100	95	0	0	—	0
23	1	100	100	100	100	100	100	0	0	0	0
	0.5	100	98	98	98	100	100	0	0	0	0
	0.25	98	98	95	95	100	100	0	0	0	0
	0.125	95	85	85	85	95	95	0	0	0	0
1	1	100	100	100	100	100	100	—	2	10	—
	0.5	100	100	100	100	100	100	—	0	2	—
	0.25	100	95	90	95	100	100	—	0	0	—
	0.125	98	85	85	85	98	100	—	0	0	—
9	1	100	100	100	100	100	100	0	0	—	—
	0.5	100	100	100	100	100	100	0	0	—	—
	0.25	100	100	98	95	100	100	0	0	—	—
	0.125	95	100	60	60	98	100	0	0	—	—
B	1	98	100	95	90	100	100	0	0	5	40
	0.5	85	98	90	85	95	100	0	0	0	25
	0.25	60	98	60	75	90	98	0	0	0	2
	0.125	0-35	75	0-35	0-35	85	95	0	0	0	0

TABLE 4 (Continuation)

Compound No.	rate of application	Digitaria sang.	Lolium perenne	Bromus tect.	Sorghum alnum	Echinochloa c.g.	Setaria italica	soya	cotton	maize	sugar beet
D	1	85	75	0-35	75	98	98	0	0	0	0
	0.5	35	60	0-35	60	98	85	0	0	0	0
	0.25	0-35	0-35	0-35	0-35	75	35	0	0	0	0
	0.125	0-35	0-35	0-35	0-35	35	0-35	0	0	0	0

Comparative compound B is able to combat effectively the monocotyledonous weeds only at a rate of application of 1 kg AS/ha or more, whereas comparative compound D has a thoroughly inadequate activity and cannot be considered for this use.

In contrast, the compounds of the formula I act with complete effectiveness against monocotyledonous weeds in rates of application down to 0.25 kg per hectare and partly to 0.125 kg per hectare. This test shows that chloroacetanilides of the present invention largely meet the present day requirement for the quantitative reduction of herbicides in cultures of useful plants.

Example 5.

Herbicidal activity against naturally occurring weeds

For field tests in western France (Maine-et-Loire) maize was sown at intervals of 60 cm in ploughed and harrowed fields. The field was then divided up into plots of 4 m² each, with an expectation of about 60-75 plants per plot.

One day after the sowing the plots were treated with the active substance concentration intended for them and obtained by dilution from an emulsion concentrate. Active substances A and B from Example 2 were used as comparative compounds. The evaluation after 35 days referred to the state of the cultivated plants and to the grasses which had emerged naturally. Damage to the plants is expressed in Table 5 in the differentiated percentages of Example 4.

It is evident that the compounds according to the invention of the formula I are superior in their activity against weeds to the known compounds A and B.

TABLE 5

Compound No.	Rate of application	Echinochloa crus galli	Digitaria	Maize
1	4	100	100	0
	2	100	100	0
	1	100	100	0
	0.5	100	100	0
9	4	100	100	5
	2	100	100	5
	1	100	100	2
	0.5	100	100	0
16	4	100	100	0
	2	100	100	0
	1	100	100	0
	0.5	100	100	0
A	4	100	100	2
	2	100	100	0
	1	95	95	0
	0.5	60	60	0
B	4	100	100	0
	2	95	100	0
	1	85	95	0
	0.5	60	<60	0

Example 6.

Combating of weeds in rice

In earthenware dishes filled with garden soil are sown on the one hand rice (*Oryza oryzoides*) and on the other hand weeds. The active substance solution was prepared from a 25% wettable powder and applied to the surface of the soil immediately after the sowing (amount of the solution: 100 ml/m²). The dishes were kept in a greenhouse at 24—27°C and 70% relative humidity. Evaluation took place 28 days later according to the rating given in Example 2.

TABLE 6

Compound	Rate of application	Cyperus esculentus	Setaria italica	Echinochloa c.g.	Rice
11	2	1	1	1	6
	1	1	1	1	8
	0.5	1	1	1	9

Example 7.

Growth inhibition in grasses (postemergence method)

Seeds of the grasses *Lolium perenne*, *Poa pratensis*, *Festuca ovina*, and *Dactylis glomerata* were sown in plastic dishes filled with an earth/turf/sand mixture. After 3 weeks the germinated grasses were cut back to a height of 4 cm above the soil and 2 days later sprayed with aqueous spray broths of active substances of the formula I. The amount of active substance corresponded to a rate of application of 5 kg of active substance per hectare. Fourteen days after application the growth of the grasses was evaluated according to the following linear rating:

1 = strong inhibition (no growth from the time of application)
9 = no inhibition (growth as untreated control)
The following results were obtained:

Compound No.	<i>Lolium perenne</i>	<i>Poa pratensis</i>	<i>Festuca ovina</i>	<i>Dactylis glomerata</i>
1	1	1	1	2
9	2	1	1	3
2	1	1	1	2
10	2	2	2	2
3	4	2	2	4
11	4	3	2	4
19	2	2	2	4
23	2	2	2	3
Control	9	9	9	9

Example 8.

Sucker-control in tobacco plants

Tobacco plants were reared in a greenhouse and topped at the onset of blossoming. One day later they were sprayed with aqueous spray broths of active substances 2, 3, 10, 11 or 19. The concentration of the active substances was 0.66% and 1.32% of active substance.

Whereas healthy side-shoots developed from the leaf axil buds of the untreated plants, the growth of side-shoots was strongly inhibited in the treated tobacco plants.

The invention further provides a herbicidal or plant growth regulant composition which comprises, as active ingredient, a compound of formula I together with one or more solid extenders or liquid diluents. The composition may for example be in a solid form containing a solid extender and optionally a surface active agent or in liquid form comprising a liquid diluent and a surface active agent.

The compositions according to the invention may be manufactured in known manner e.g. by intimately mixing and/or grinding active substances of the formula I with the suitable extenders, optionally with the addition of dispersants or solvents which are inert towards the active substances. The active substances may take and be used in the following forms:

Solid forms:

dusts, tracking agents, granules, coated granules, impregnated granules and homogeneous granules.

Liquid forms:

- active substances which are dispersible in water: wettable powders, pastes, emulsions;
- solutions.

To manufacture solid forms (dusts, tracking agents) the active substances are mixed with solid extenders. Suitable extenders are, for example, kaolin, talcum, bolus, loess, chalk, limestone, ground limestone, attaclay, dolomite, diatomaceous earth, precipitated silica, alkaline earth silicates, sodium and potassium aluminium silicates (feldspar and mica), calcium and magnesium sulphates, magnesium oxide, ground synthetic materials, fertilisers, for example ammonium sulphate, ammonium phosphate, ammonium nitrate, urea, ground vegetable products, such as corn meal, bark dust, sawdust, nutshell meal, cellulose powder, residues of plant extractions, activated charcoal etc. These substances can either be used singly or in admixture with one another.

The particle size of the extenders for dusts is advantageously up to 0.1 mm, for tracking agents from about 0.075 to 0.2 mm, and for granules 0.2 mm or larger.

The solid forms contain the active substances in concentrations from 0.1% to 80%.

To these mixtures can also be added additives which stabilize the active substance and/or non-ionic, anionic and cationic surface active substances, which for example improve the adhesion of the active ingredients on plants or parts of plants (adhesives and agglutinants) and/or ensure a better wettability (wetting agents) and dispersibility (dispersing agents). Examples of suitable adhesives are the following: olein/chalk mixture, cellulose, derivatives (methyl cellulose, carboxymethyl cellulose), hydroxyethyl glycol ethers of monoalkyl and dialkyl phenols having 5 to 15 ethylene oxide radicals per molecule and 8 to 9 carbon atoms in the alkyl radical, lignin sulphonic acids, their alkali metal and alkaline earth metal salts, polyethylene glycol ethers (Carbowaxes — Carbowax is a registered Trade Mark), fatty alcohol polyethylene glycol ether having 5 to 20 ethylene oxide radicals per molecule and 8 to 18 carbon atoms in the fatty alcohol moiety, condensation products of urea and formaldehyde, and also latex products. Preferred dispersions (suspensions and emulsions) are manufactured by mixing or grinding the active substance with extenders accompanied by the addition of dispersing agents and solvents, in the process of which there result firstly dispersible active substance concentrations, such as wettable powders and emulsifiable concentrates.

The water-dispersible concentrates of the active substance i.e. wettable powders, pastes and emulsifiable concentrates, are agents which can be diluted with water to any concentration desired. They consist of active substance, extender, optionally additives which stabilize the active substance, surface-active substances and anti-foam agents and, optionally, solvents. The active substance concentrations in these agents are from 5—80%.

Wettable powders and pastes are obtained by mixing and grinding the active substances with dispersing agents and pulverulent extenders in suitable apparatus until homogeneity is attained. Extenders are, for example, those mentioned for the solid forms of application. In some cases it is advantageous to use mixtures of different extenders. As dispersing agents there can be used, for example, condensation products of sulphonated naphthalene and sulphonated naphthalene derivatives with formaldehyde, condensation products of naphthalene or naphthalene sulphonic acids with phenol and formaldehyde, as well as alkali metal, ammonium and alkaline earth metal salts of lignin sulphonic acid, in addition, alkylaryl sulphonates, alkali and alkaline earth metal salts of dibutyl naphthalene sulphonic acid, fatty alcohol sulphates such as salts of sulphated hexadecanols, heptadecanols, octadecanols, and salts of sulphated fatty alcohol glycol ethers, the sodium salt of oleoyl ethionate, the sodium salt of oleoyl methyl tauride, ditertiary acetylene glycols, dialkyl dilauryl ammonium chloride and fatty acid alkali and alkaline earth metal salts.

Suitable anti-foam agents are silicones. The active substance is so mixed, ground sieved and strained with the additives mentioned above that, in wettable powders, the solid particle size of from 0.02 to 0.4 mm. and in pastes, of 0.03 mm. is not exceeded. To produce emulsifiable concentrates and pastes, dispersing agents such as those given in the previous paragraphs, organic solvents and water are used. Examples of suitable solvents are the following: alcohols, benzene, xylenes, toluene, dimethyl sulphoxide, N,N-dialkylated amides, N-oxides of amines (whereas N-oxides of trialkylamines are preferred), and mineral oil fractions boiling between 120 and 350°C. The solvents must be practically odorless, not phytotoxic, inert to the active substances and not readily inflammable.

Furthermore, the agents according to the invention can be applied in the form of solutions. For this purpose the active substance or several active substances of general formula I are dissolved in suitable organic solvents, mixtures of solvents or in water. Aliphatic and aromatic hydrocarbons, chlorinated derivatives thereof, alkyl naphthalenes and mineral oils singly or in admixture, can be used as organic solvents. The solutions contain the active substance in a concentration range from 1% to 20%.

In addition to the compound of formula I the compositions can contain other biologically active substances or agents. Thus in order to broaden the activity spectrum the compositions may contain, for example, pesticides e.g. insecticides, fungicides, bactericides, fungistatics, bacteriostatics, nematocides or further herbicides, in addition to the cited active substances of the formula I. The agents according to the invention may also contain plant fertilisers and trace elements.

The active substances of the formula I can, for example, be formulated as follows. The parts denote parts by weight.

Wettable powder
The following constituents are used to manufacture a) a 50% and b) a 10% wettable powder:

- a) 50 parts of N-(2'-methoxyethyl)-2-methyl-6-ethyl-chloroacetanilide,
5 parts of sodium dibutylnaphthalene sulphonate,
3 parts of naphthalenesulphonic acid/phenolsulphonic acid/formaldehyde condensate (3:2:1),
20 parts of kaolin,
22 parts of Champagne chalk;
- b) 10 parts of N-(2'-methoxyethyl)-2,6-diethyl-chloroacetanilide,
3 parts of a mixture of the sodium salts of saturated fatty alcohol sulphates,
5 parts of naphthalenesulphonic acid/formaldehyde condensate,
82 parts of kaolin.

The indicated active substance is applied to the corresponding extender (kaolin and chalk) and then these are mixed and ground, to yield wettable powders of excellent wettability and having an excellent capacity for forming suspensions. By diluting these wettable powders with the 10-fold amount of water it is possible to obtain suspensions of any desired concentration.

Paste

The following substances are used to manufacture a 45% paste:

- 45 parts of N-(2'-cyclopropoxyethyl)-2,6-diethylchloroacetanilide,
5 parts of sodium aluminium silicate,
14 parts of cetyl polyglycol ether with 8 mols of ethylene oxide,
1 part of oleyl polyglycol ether with 5 mols of ethylene oxide,
2 parts of spindle oil,
10 parts of polyethylene glycol,
23 parts of water.

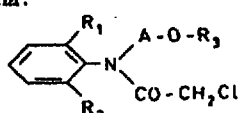
The active substance is intimately mixed with the addition in appropriate devices and ground. A paste is obtained from which, by diluting it with water, is possible to manufacture suspensions of every desired concentration of active substance.

Emulsion Concentrate
To manufacture a 25% emulsion concentrate

- 25 parts of N-(2'-ethoxyethyl)-2-methyl-6-ethyl-chloroacetanilide,
5 parts of a mixture of nonylphenolpolyoxy-ethoxy-ethylene and calcium dodecyl-
enesulphonate,
35 parts of 3,5,5-trimethyl-2-cyclohexan-1-one,
35 parts of dimethyl formamide,

are mixed together. This concentrate can be diluted with water to give emulsions in desired concentrations. Such emulsions are suitable for combating weeds in cultures of crop plants.

WHAT WE CLAIM IS:—
1. A compound of the formula:



wherein:

In addition to the compound of formula I the compositions can contain other biologically active substances or agents. Thus in order to broaden the activity spectrum the compositions may contain, for example, pesticides e.g. insecticides, fungicides, bactericides, fungistatics, bacteriostatics, nematocides or further herbicides, in addition to the cited active substances of the formula I. The agents according to the invention may also contain plant fertilisers and trace elements.

The active substances of the formula I can, for example, be formulated as follows. The parts denote parts by weight.

Wettable powder

The following constituents are used to manufacture a) a 50% and b) a 10% wettable powder:

- | | | |
|----|--|----|
| 5 | a) 50 parts of N-(2'-methoxyethyl)-2-methyl-6-ethyl-chloroacetanilide, | 5 |
| | 5 parts of sodium dibutyl-naphthalene sulphonate, | |
| | 3 parts of naphthalenesulphonic acid/phenolsulphonic acid/formaldehyde condensate (3:2:1), | |
| 15 | 20 parts of kaolin, | 15 |
| | 22 parts of Champagne chalk; | |
| | b) 10 parts of N-(2'-methoxyethyl)-2,6-diethyl-chloroacetanilide, | |
| | 3 parts of a mixture of the sodium salts of saturated fatty alcohol sulphates, | |
| 20 | 5 parts of naphthalenesulphonic acid/formaldehyde condensate, | 20 |
| | 82 parts of kaolin. | |

The indicated active substance is applied to the corresponding extender (kaolin and chalk) and then these are mixed and ground, to yield wettable powders of excellent wettability and having an excellent capacity for forming suspensions. By diluting these wettable powders with the 10-fold amount of water it is possible to obtain suspensions of any desired concentration.

Paste

The following substances are used to manufacture a 45% paste:

- | | | |
|----|--|----|
| 30 | 45 parts of N-(2'-cyclopropoxyethyl)-2,6-diethylchloroacetanilide, | 30 |
| | 5 parts of sodium aluminium silicate, | |
| | 14 parts of cetyl polyglycol ether with 8 mols of ethylene oxide, | |
| | 1 part of oleyl polyglycol ether with 5 mols of ethylene oxide, | |
| | 2 parts of spindle oil, | |
| 35 | 10 parts of polyethylene glycol, | 35 |
| | 23 parts of water. | |

The active substance is intimately mixed with the addition in appropriate devices and ground. A paste is obtained from which, by diluting it with water, is possible to manufacture suspensions of every desired concentration of active substance.

Emulsion Concentrate

To manufacture a 25% emulsion concentrate

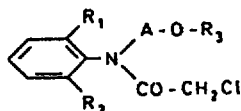
- | | | |
|----|---|----|
| 40 | 25 parts of N-(2'-ethoxyethyl)-2-methyl-6-ethyl-chloroacetanilide, | 40 |
| | 5 parts of a mixture of nonylphenolpolyoxy-ethoxy-ethylene and calcium dodecyl-
enesulphonate, | |
| 45 | 35 parts of 3,5,5-trimethyl-2-cyclohexan-1-one, | 45 |
| | 35 parts of dimethyl formamide, | |

are mixed together. This concentrate can be diluted with water to give emulsions in desired concentrations. Such emulsions are suitable for combating weeds in cultures of crop plants.

50

WHAT WE CLAIM IS:—

1. A compound of the formula:



wherein:



R_1 represents an ethyl or isopropyl group;

R_2 represents a methyl, ethyl or isopropyl group;

R_3 represents a C_1-C_3 alkyl, C_2 or C_4 alkenyl, cyclopropyl or cyclopropylmethyl group; and

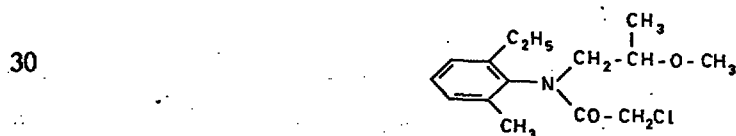
5 A represents an unsubstituted or mono-ethyl or mono- or di-methyl substituted ethylene group, provided that when R_1 represents an ethyl group and R_2 and R_3 both represent methyl groups, A does not represent a mono-methyl-substituted ethylene group in which the methyl substituent is attached to the carbon atom adjacent the nitrogen atom.

10 2. A compound of the formula of claim 1 wherein R_1 represents an ethyl or isopropyl group; R_2 represents a methyl or ethyl group R_3 represents a methyl, ethyl, n-propyl or isopropyl group; and A represents an unsubstituted ethylene group.

15 3. A compound of the formula of claim 1 wherein R_1 represents an ethyl or isopropyl group; R_2 represents a methyl or ethyl group; R_3 represents a methyl, ethyl or n-propyl group; and A represents a mono- or di-methyl substituted ethylene group, provided that when R_1 represents an ethyl group and R_2 and R_3 both represent methyl groups, A does not represent a mono-methyl-substituted ethylene group in which the methyl substituent is attached to the carbon atom adjacent the nitrogen atom.

20 4. A compound of the formula of claim 1 wherein R_1 represents an ethyl or isopropyl group, R_2 represents a methyl or ethyl group; R_3 represents a methyl or ethyl group; and A represents an unsubstituted or mono-methyl substituted ethylene group, provided that when R_1 represents an ethyl group and R_2 and R_3 both represent methyl groups, A does not represent a mono-methyl-substituted ethylene group in which the methyl substituent is attached to the carbon atom adjacent the nitrogen atom.

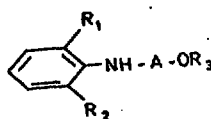
25 5. 2-Ethyl-6-methyl-N-(2'-methoxyethyl)-N-chloroacetanilide.
6. 2-Ethyl-6-methyl-N-(2'-ethoxyethyl)-N-chloroacetanilide.
7. 2-Ethyl-6-methyl-N-(2'-n-propoxyethyl)-N-chloroacetanilide.
8. 2-Ethyl-6-methyl-N-(2'-isopropoxyethyl)-N-chloroacetanilide.
9. 2-Ethyl-6-methyl-N-(2'-methoxypropyl)-N-chloroacetanilide of the formula



10. 2,6-Diethyl-N-(2'-methoxyethyl)-N-chloroacetanilide.
11. 2,6-Diethyl-N-(2'-ethoxyethyl)-N-chloroacetanilide.
12. 2,6-Diethyl-N-(2'-n-propoxyethyl)-N-chloroacetanilide.
13. 2,6-Diethyl-N-(1'-methoxyprop-2'-yl)-N-chloroacetanilide.
14. 2-Isopropyl-6-methyl-N-(2'-ethoxyethyl)-N-chloroacetanilide.
15. 2-Isopropyl-6-ethyl-N-(2'-methoxyethyl)-N-chloroacetanilide.
16. 2-Ethyl-6-methyl-N-(1'-ethoxyprop-2'-yl)-N-chloroacetanilide.
17. 2-Isopropyl-6-methyl-N-(1'-methoxyprop-2'-yl)-N-chloroacetanilide.
18. 2-Isopropyl-6-methyl-N-(2'-methoxypropyl)-N-chloroacetanilide.
19. 2,6-Diethyl-N-(1'-ethoxyprop-2'-yl)-N-chloroacetanilide.
20. 2-Ethyl-6-methyl-N-(2'-ethoxypropyl)-N-chloroacetanilide.
21. 2-Ethyl-6-methyl-N-(2'-cyclopropylmethoxyethyl)-N-chloroacetanilide.
22. 2,6-Diethyl-N-(2'-cyclopropylmethoxyethyl)-N-chloroacetanilide.
23. A process for the preparation of a compound of the formula:



which process comprises reacting a compound of the formula:



wherein R₁, R₂, R₃ and A are as defined in claim 1, with a chloroacetylating agent.

24. A process according to claim 23 wherein the chloroacetylating agent is a halide or anhydride of chloroacetic acid.

25. A process for the preparation of a compound as claimed in claim 1 substantially as hereinbefore described.

26. A compound according to claim 1 prepared by a process claimed in any of claims 23 to 25.

27. A herbicidal or plant growth regulant composition which comprises, as active ingredient, a compound as claimed in any one of claims 1, 5 to 15, 21 and 22 together with one or more solid extenders or liquid diluents.

28. A composition according to claim 27 which is in solid form and comprises the active ingredient together with a solid extender and optionally a surface active agent.

29. A composition according to claim 27 which is in liquid form and comprises the active ingredient together with a liquid diluent and a surface active agent.

30. A composition according to any one of claims 27 to 29 which also comprises one or more pesticidally active substances known *per se*.

31. A herbicidal or plant growth regulant composition which comprises, as active ingredient, a compound as claimed in any one of claims 2 to 4 and 16 to 20 together with one or more solid extenders or liquid diluents.

32. A composition according to claim 31 which is in solid form and comprises the active ingredient together with a solid extender and optionally a surface active agent.

33. A composition according to claim 31 which is in liquid form and comprises the active ingredient together with a liquid diluent and a surface active agent.

34. A composition according to any one of claims 31 to 33 which also comprises one or more pesticidally active substances known *per se*.

35. A method of selectively combating undesirable plant growth at a locus which method comprises applying to the locus a compound as claimed in any one of claims 1, 5 to 15, 21 and 22.

36. A method according to claim 35 wherein the locus is an area in which a useful crop is to be grown.

37. A method according to claim 36 wherein the crop is maize.

38. A method according to claim 36 wherein the crop is soya.

39. A method according to claim 36 wherein the crop is cotton, sunflowers, sugar beet, potatoes, peas or beans.

40. A method according to claim 36 wherein there is used a compound as claimed in claim 12 and the locus is a rice culture.

41. A method of retarding the growth in height of grass in grasslands which method comprises applying to the grasslands a compound as claimed in any one of claims 1, 5 to 15 and 21 to 22.

42. A method of selectively combating undesirable plant growth at a locus which method comprises applying to the locus a compound as claimed in any one of claims 2 to 4 and 16 to 20.

43. A method according to claim 42 wherein the locus is an area in which a useful crop is to be grown.

44. A method according to claim 43 wherein the crop is maize.

45. A method according to claim 43 wherein the crop is soya.

46. A method according to claim 43 wherein the crop is cotton, sunflowers, sugar beet, potatoes, peas or beans.

47. A method of retarding the growth in height of grass in grasslands which method comprises applying to the grasslands, a compound as claimed in any one of claims 2 to 4 and 16 to 20.

48. A method of inhibiting the growth of tobacco side shoots which method comprises applying to tobacco plants a compound as claimed in any one of claims 1 to 22.

Agents for the Applicants,
GALLAFENT & CO.,
Chartered Patent Agents,
8 Staple Inn,
London WC1V 7QH.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1976.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from
which copies may be obtained.



* C L M S *