968,665

PATENT SPECIFICATION

NO DRAWINGS

968,665

Date of Application and filing Complete Specification: Aug. 15, 1960.
No. 17419/64.
Application made in United States of America (No. 833,704) on Aug. 14, 1959.
Two Applications made in United States of America (Nos. 12957 and 12959) on March 7, 1960.
(Patent of Addition to No. 968,661 dated Aug. 15, 1960.)
(Divided out of No. 968,661).
Complete Specification Published: Sept. 2, 1964.
© Crown Copyright 1964.

Index at acceptance:—C2 C(1E6K1, 1E6K4, 1E6K6, 3A14B3A, 3A14B5, 3A14B8C, 3A14B8D); A5 E(1C2, 1C3B1, 1C3B3, 1C4A2, 1C4A3, 1C4A4, 1C4B2, 1C4B3, 1C4B4, 1C5A, 1C5D, 1C7A, 1C7B, 1C12, 1C14B, 1C14C, 1C15)

International Classification:—C 07 d (A 01 n)

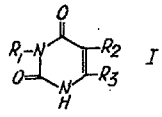
COMPLETE SPECIFICATION

3-Substituted Uracils

We, E. I. DU PONT DE NEMOURS AND COMPANY, a Corporation organised and existing under the laws of the State of Delaware, United States of America, of Wilmington 98, Delaware, United States of America, 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:—

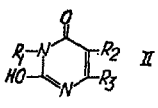
This invention relates to 3-substituted uracils and is an improvement in or modification of the invention described in our Application No. 28,141/60 (Serial No. 968,661).

Our Application No. 28,141/60 discloses that certain 3-substituted uracils of defined formula have herbicidal activity. The present invention is concerned with a particular group of 3-substituted uracils within the broad disclosure of Application No. 28,141/60, namely compounds of the general formula:



I

or the corresponding isomeric formula:



II

wherein R_1 represents a phenyl or benzyl group; R_2 represents a bromine or chlorine atom or a methyl or ethyl group; and R_3 represents a methyl or ethyl group; and the sodium, potassium and lithium salts thereof.

It will be noted that the definition above refers to the isomeric enol form of the uracil, as well as the usual keto form. It is thought that there is a tautomeric equilibrium between the two forms. However, for the sake of convenience the keto form is generally referred to herein.

One preferred group of compounds is that in which R_2 represents a bromine or chlorine atom. Particularly preferred compounds are:

3-phenyl-5-chloro-6-methyluracil
3-benzyl-5-chloro-6-methyluracil
3-benzyl-5-bromo-6-ethyluracil
3-phenyl-5-bromo-6-methyluracil

and the sodium, potassium and lithium salts thereof.

In one aspect the invention provides herbicidal compositions comprising at least one 3-substituted uracil which is a compound of general formula I or II as defined above or a sodium, potassium or lithium salt thereof, associated with a compatible diluent or surface active agent, or both. The term "herbicidal composition" is used herein to include both compositions which are ready for use as herbicides and concentrates which require dilution before use as herbicides. The compositions may contain for example 0.5 to 95% by weight of the 3-substituted uracil.

The diluent may be a liquid other than an oil, especially water, or an oil, or a solid carrier. The term "oil" is used herein to denote a liquid which is immiscible with water and soluble in ether, and which has a boiling point of at least 125°C. Two or more different types of diluent may be pre-

[*Price 4s. 6d.*]

sent, as for example in compositions obtained by dispersing a wettable powder in a liquid diluent. Liquid compositions may be in the form of solutions or dispersions.

Examples of oil carriers are aliphatic and aromatic hydrocarbons, for example, hydrocarbons of petroleum origin. Dispersions in oils may be prepared by milling the active material, usually with dispersing agents and suspending agents, with the oil in mills such as pebble mills. The amount of the herbicide in the dispersion may be from 10% or less to 48 and 50% of the oil dispersion. Preferably, the particles in such dispersions range from about 1 to 50 microns, although the majority are preferably in the range of from about 5 to 20 microns in average diameters. In general, the oils used include aliphatic and aromatic hydrocarbons and mixtures thereof, particularly those derived from petroleum and having a boiling point in the range from about 125 to 400°C. A hydrocarbon oil having a boiling point lower than 125°C should not be used because when sprayed from a nozzle, such a hydrocarbon tends to volatilize undesirably. Furthermore, low-boiling hydrocarbons present a serious fire hazard.

Compositions containing the uracils in association with a solid diluent may be in the form of powdered solids, granules or pellets. Powdered or dust compositions may be prepared by mixing the active material with finely divided inert solid carriers, preferably talcs, natural clays, pyrophyllite, diatomaceous earth, synthetic fine silica, calcium silicate and flours such as walnut shell, wheat, redwood, soya bean, and cottonseeds, and including also magnesium and calcium carbonates, calcium phosphates, calcium silicate, sulphur and lime, either in powder or granular form.

Granule or pellet compositions may be prepared my mixing the active material in finely divided form with a clay (with or without a water-soluble binder), moistening the mixture with 15—20% water, extruding the mass under pressure through an orifice, and either cutting the extruded material to size before drying to yield pellets, or first drying and then granulating to yield granules. Alternatively granules, but usually not pellets, may be made by spraying active material in solution or suspension upon the surface of a preformed granule of clay, vermiculite, or other suitable granular material. When the active material is soluble in the spray medium so that it can penetrate into the pores of the granular carrier, no binding agent is needed. When it is insoluble and in suspension form, a binder is needed to cause the active material to adhere to the surface. The binder may be soluble such as goulac or dextrin, or colloidally soluble such as swollen starch, glue or polyvinyl alcohol. The final step in either case is to remove the liquid medium, whether solvent or carrier.

The compositions of the invention will usually contain a surface-active agent, in the case of concentrates the amount suitably being sufficient to render the concentrate, e.g. wettable powder, readily dispersible in water or in oil.

The term "surface-active agent" is used herein to include wetting agents, dispersing agents, suspending agents and emulsifying agents. Suitable surface-active agents are listed in, for example, United States Patent Specifications 2,426,417, ~~fication~~ No. 492,742, "Soap and Chemical Specialties," *31*, No. 7, pages 50—61, No. 8, pages 48—61, No. 9, pages 52—67, and No. 10, pages 38—67 (1955), McCutcheon in "Soap and Chemical Specialties," December, 1957; January, February, March, 1958, and Bulletin E—607 of the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture. In general, less than 10% by weight of surface-active agent need be present in herbicidal compositions according to the invention, and the amount of surface-active agent may be 1% by weight or even less.

The herbicidal compositions of this invention may contain two or more of the substituted uracils. They may also be formulated to contain at least one other herbicide in addition to the substituted uracils, for example one of the 3-substituted uracils disclosed in our Application Nos. 28,141/60, 32,469/60, 17,417/64, 17,418/64 and 17,420/64 (Serial Nos. 968,661, 968,662, 968,664, 968,666 and 968,663) and/or one of the following known herbicides:—

2,3,6-trichlorobenzoic acid and salts thereof
2,3,5,6-tetrachlorobenzoic acid and salts thereof
2-chloro-*N*,*N*-diallylacetamide
N,*N*-dipropylthiocarbamic acid, ethyl ester
2,2,-dichloropropionic acid and salts thereof

methylarsonic acid and salts thereof
borates
chlorates
ammonium sulphamate
2,4-dichlorophenoxyacetic acid

2,4,5-trichlorophenoxyacetic acid
N-phenylcarbamic acid, isopropyl ester
N-(*m*-chlorophenyl)carbamic acid, isopropyl ester
trichloroacetic acid
maleic hydrazide

1,1-dimethyl-3-(3,4-dichlorophenyl)urea
1,1-dimethyl-3-(*p*-chlorophenyl)urea
1,1-dimethyl-3-phenylurea

1 - n - butyl - 1 - methyl - 3 - (3,4 - dichlorophenyl)urea
1 - methoxy - 1 - methyl - 3 - (3,4 - dichlorophenyl)urea
1 - methoxy - 1 - methyl - 3 - (*p*-chlorophenyl)urea
1,1,3 - trimethyl - 3 - (3,4 - dichlorophenyl)urea
2 - chloro - 4,6 - bis - (ethylamino) - *s* - triazine
2 - chloro - 4 - ethylamino - 6 - isopropylamino - *s* - triazine
2 - chloro - 4,6 - bis - (methoxypropylamino) - *s* - triazine
2 - methoxy - 4,6 - bis - (isopropylamino)-*s*-triazine
2,4 - bis - (isopropylamino) - 6 - methoxy-*s*-triazine
dinitro-sec.-butylphenol
2,3,6-trichlorophenylacetic acid
5,6 - dihydro - (4A,6A) - dipyrido - (1,2—A,2',1'—C) pyrazinium dibromide
2,6-dichlorobenzonitrile.

Optionally the compositions may contain conventional additives e.g. adhesives such as gelatin, and blood albumin; resins, for example rosin and alkyd resins, may also be used in certain compositions to increase retention or tenacity of deposits following application.

In a further aspect the invention provides a method of controlling the growth of weeds at a locus which comprises applying to the locus a herbicidally effective quantity of at least one 3-substituted uracil which is a compound of general formula I or II as hereinbefore defined or a sodium, potassium or lithium salt thereof. The amount of active compound used will depend on the weeds to be controlled, the formulation used, the mode of application, the climate, season of the year, rainfall and other variables, and because of this it is not possible to state generally a particular rate of application which will be suitable for all situations.

The 3-substituted uracils have herbicidal activity. Some of them are especially useful in controlling the growth of weeds on uncultivated areas. Thus in suitable circumstances some of the uracils can be used as soil sterilants and/or in soil-foliage applications; for the latter use rates of at least 2 lb. per acre are generally required, while for tough weeds, rates of 10 to 25 or 35 lb. per acre, or even more, e.g. up to 80 lb. per acre, may be required. In suitable cases the 3-substituted uracils can be used to obtain selective control of weeds in the presence of crops. For such use pre-emergence application is usually preferred, in which case rates as low as 0.5 pounds per acre often are effective though up to 2, 3, 4, or 5 pounds per acre or more may be needed in some instances. The uracils can also be used in some cases for post-emergence application.

A particularly valuable method for the preparation of the sodium and potassium salts is the novel process which is described in detail and claimed in our Application No. 28,141/60 (Serial No. 968,661), which comprises (A) heating a urea of the formula:

$$R_1.NH.C(=O).NH_2$$

with a β-keto ester of the formula:

$$R^1O.C(=O).CH(R_2).C(=O).R_3$$

(wherein R^1 represents an alkyl group of 1 to 6 carbon atoms and R_1, R_2 and R_3 are as hereinbefore defined) in the presence of an acidic compound and under substantially anhydrous reaction conditions, to produce a 3-(3-substituted ureido)-2,3-unsaturated ester of the formula:

$$R_1.NH.C(=O).NH.C(R_3)=C(R_2).C(=O).OR^1$$

and (B) heating the said ester under substantially anhydrous conditions in the presence of a strong base of the appropriate metal. The corresponding uracil can be produced from the metal salt by treatment with an acid.

The 3-substituted uracils can also be prepared by the adaptation of methods known for the preparation of related compounds. For example salts may be prepared by dissolving the free uracil in an aqueous or non-aqueous solution of at least an equimolar amount of a base or basic salt containing the desired cation. For example, a sodium salt may be prepared by dissolving the uracil in water containing an equimolar amount of sodium hydroxide. The salt may then be isolated from the solution by removal of the water.

The invention is illustrated by the following Examples, in which parts and percentages are by weight except where otherwise noted.

EXAMPLE 1

Preparation of 3-phenyl-5-chloro-6-methyl-uracil

8.0 parts of chlorine are added to a stirred solution of 20.2 parts of 3-phenyl-6-methyl-uracil in about 100 parts of glacial acetic acid. The temperature is maintained below

30°C. during this addition. The solution is stirred ½ hour longer at room temperature, then poured into ice water, whereupon a solid separates. This solid is collected by filtration and washed well with water to give 3-pehnyl-5-chloro-6-methyluracil, which can be purified by ~~recrystallization~~ recrystallisation.

The following compounds are prepared as in Example 1, using the starting reagents set out in the following table instead of 3-phenyl-6-methyluracil.

Ex. No.	Uracil Starting Reagent	Parts by Weight	Uracil Product
2	3-phenyl-6-ethyluracil	21.6	3-phenyl-5-chloro-6-ethyluracil
3	3-benzyl-6-methyluracil	21.6	3-benzyl-5-chloro-6-methyluracil

EXAMPLE 4

Preparation of 5-bromo-3-phenyl-6-methyluracil

Seventeen parts of bromine are added over a 20-minute period to a stirred solution of 20.2 parts of 3-phenyl-6-methyluracil in about 100 ml. of glacial acetic acid. The temperature is maintained below 30°C. during this addition. The solution is stirred at room temperature for an additional 1½ hours, then poured into a mixture of ice and water, with stirring. The white solid which separates is collected by filtration, washed well with water, and dried in a vacuum oven to give 5-bromo-3-phenyl-6-methyluracil, which can be purified by recrystallisation.

EXAMPLE 5

By following the procedure of Example 4 but replacing the 3-phenyl-6-methyluracil by 23.0 parts of 3-benzyl-6-ethyl uracil, 3-benzyl-5-bromo-6-ethyluracil is prepared.

EXAMPLE 6

Preparation of 3-benzyl-5,6-dimethyluracil

A mixture of 30.0 parts of benzylurea, 28.8 parts of ethyl 2-methyl-3-ketobutyrate, about 0.5 part of 85% orthophosphoric acid, and about 200 parts of benzene was heated at reflux. Water was collected in a Dean Stark trap. After 24 hours, 2.5 parts of water had been collected and there appeared to be no more separating. The solution was decanted and evaporated to a mixture of viscous oil and solid, which was taken up in 200 parts of ethanol containing 10.6 parts of sodium methoxide and heated at reflux for 10 minutes. Most of the ethanol was removed under reduced pressure and the residue was taken up in just sufficient water to dissolve it. Concentrated hydrochloric acid was added to lower the pH to 4 and the resulting white solid was collected by filtration. This was recrystallized to give pure 3-benzyl-5,6-dimethyluracil.

EXAMPLE 7

3-phenyl-5,6-dimethyluracil was prepared by following the procedure of Example 6, but replacing the benzylurea by 27.2 parts of phenylurea.

EXAMPLE 8

Preparation of 3-benzyl-5,6-diethyluracil with no isolation of intermediates

A mixture containing 30 parts of benzylurea, 34.2 parts of ethyl 2-methyl-3-ketobutyrate, about 2.0 parts of phosphoric acid, about 100 parts of dioxane, and about 90 parts of benzene is stirred and heated at reflux temperature. The water given off by the reaction is continuously distilled and trapped out of the distillate as the lower layer. The resulting solution is base hydrolyzed *in situ* by adding a solution containing about 14 parts by weight of sodium methoxide and about 40 parts by weight of methanol. The solution is refluxed for 10 minutes and then about 200 parts by weight of water are added. On shaking, the sodium salt of the desired uracil product dissolves in the water. The aqueous solution is separated from the organic layer and acidified. 3-Benzyl-5,6-diethyluracil is separated by filtration and dried.

A representative list of the 3-substituted uracils is:—

3-benzyl-5,6-dimethyluracil, sodium salt
3-phenyl-5,6-dimethyluracil, sodium salt
3-benzyl-5-bromo-6-methyluracil

EXAMPLE 9

Granules

3-benzyl-5-chloro-6-methyluracil	40%
Anhydrous sodium sulphate	10%
Non-Swelling sub-bentonite clay	50%

The components are blended and micropulverized, then moistened with water and granulated. The granules are then dried and screened.

The granules are applied conveniently by hand for "spot treatment" of undesirable bunch grasses, such as crabgrass and quackgrass, growing in agricultural areas. An application of 20 pounds of active ingredient per acre gives good control.

EXAMPLE 10
Wettable powder

3-benzyl-5-chloro-6-methyluracil	80%
Sodium lauryl sulphate	0.6%
Partially desulphonated sodium lignin sulphonate	1.0%
Calcined, non-swelling montmorillonoid type clay (Pikes Peak clay)	18.4%

The wettable powder is prepared by blending the components and then micropulverizing them until substantially all the particles are below 50 microns in size.

This formulation is used at 20 pounds of active ingredient per acre in 100 gallons water for weed control around oil tank installations and on railroad ballast. Excellent control of quack grass, crab grass, goose grass, Johnson grass, bitterweed, ox-eye daisy, mare's-tail, maple oak, and willow brush is obtained.

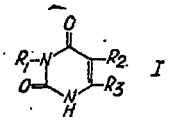
At 30 pounds of active ingredient per acre as a spot treatment, excellent control of such deep-rooted weeds as bindweed and Canada thistle is obtained.

3-Phenyl-5-bromo-6-methyl uracil, 3-benzyl-5-bromo-6-methyluracil and 3-phenyl-5,6-dimethyl uracil and its potassium salt are known compounds and therefore do not *per se* form part of the present invention, nor do compositions consisting of (i.e. containing no other ingredients) one of these uracils and water, ethanol or ether, or two or more of these diluents. This subject matter is not claimed here. The other 3-substituted uracils of formula I or II above and their lithium, sodium and potassium salts are believed to be new compounds and as such form part of the present invention.

Subject to the foregoing disclaimer,

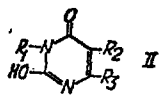
WHAT WE CLAIM IS:—

1. As a new compound a 3-substituted uracil which is a compound of the general formula



I

or the corresponding isomeric formula



II

wherein R_1 represents a phenyl or benzyl group
R_2 represents a bromine or chlorine atom or a methyl or ethyl group; and
R_3 represents a methyl or ethyl group.

2. As a new compound, a 3-substituted uracil which is a sodium, potassium or lithium salt of a compound of general formula I or II as defined in Claim 1.

3. As a new compound, a 3-substituted uracil according to Claim 1 or 2 wherein R_2 represents a bromine or chlorine atom.

4. As a new compound, 3-phenyl-5-chloro-6-methyl uracil or a sodium, potassium or lithium salt thereof.

5. As a new compound, 3-benzyl-5-chloro-6-methyl uracil or a sodium, potassium or lithium salt thereof.

6. As a new compound, 3-benzyl-5-bromo-6-ethyl uracil or a sodium, potassium or lithium salt thereof.

7. As a new compound, the sodium, potassium or lithium salt of 3-phenyl-5-bromo-6-methyl uracil.

8. As a new compound, a 3-substituted uracil according to Claim 1 or 2 wherein R_2 represents a methyl or ethyl group.

9. A herbicidal composition comprising at least one 3-substituted uracil which is a compound of general formula I or II as defined in Claim 1 or a sodium, potassium or lithium salt thereof, associated with a compatible diluent.

10. A herbicidal composition according to Claim 9 wherein the diluent is at least in part a liquid other than an oil.

11. A herbicidal composition according to Claim 10 wherein the diluent is water.

12. A herbicidal composition according to any one of Claims 9 to 11 wherein the diluent is at least in part an oil.

13. A herbicidal composition according to any one of Claims 9 to 12 wherein the diluent is at least in part a solid.

14. A herbicidal composition according to any one of Claims 9 to 13 which contains a surface active agent.

15. A herbicidal composition comprising at least one 3-substituted uracil which is a compound of general formula I or II as defined in Claim 1 or a sodium, potassium or lithium salt thereof, in association with a surface active agent.

16. A herbicidal composition according to Claim 14 or 15 which contains 1 to 10% by weight of the surface active agent.

17. A herbicidal composition according to any one of Claims 9 to 16 which contains, in addition to the 3-substituted uracil, another compound having herbicidal properties.

18. A herbicidal composition according to

EXAMPLE 10
Wettable powder

3-benzyl-5-chloro-6-methyluracil	80%
Sodium lauryl sulphate	0.6%
Partially desulphonated sodium lignin sulphonate	1.0%
Calcined, non-swelling montmorillonoid type clay (Pikes Peak clay)	18.4%

The wettable powder is prepared by blending the components and then micropulverizing them until substantially all the particles are below 50 microns in size.

This formulation is used at 20 pounds of active ingredient per acre in 100 gallons water for weed control around oil tank installations and on railroad ballast. Excellent control of quack grass, crab grass, goose grass, Johnson grass, bitterweed, ox-eye daisy, mare's-tail, maple oak, and willow brush is obtained.

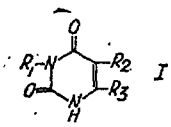
At 30 pounds of active ingredient per acre as a spot treatment, excellent control of such deep-rooted weeds as bindweed and Canada thistle is obtained.

3-Phenyl-5-bromo-6-methyl uracil, 3-benzyl-5-bromo-6-methyluracil and 3-phenyl-5,6-dimethyl uracil and its potassium salt are known compounds and therefore do not *per se* form part of the present invention, nor do compositions consisting of (i.e. containing no other ingredients) one of these uracils and water, ethanol or ether, or two or more of these diluents. This subject matter is not claimed here. The other 3-substituted uracils of formula I or II above and their lithium, sodium and potassium salts are believed to be new compounds and as such form part of the present invention.

Subject to the foregoing disclaimer,

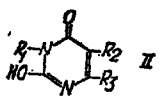
WHAT WE CLAIM IS:—

1. As a new compound a 3-substituted uracil which is a compound of the general formula



I

or the corresponding isomeric formula



II

wherein R_1 represents a phenyl or benzyl group
R_2 represents a bromine or chlorine atom or a methyl or ethyl group; and
R_3 represents a methyl or ethyl group.

2. As a new compound, a 3-substituted uracil which is a sodium, potassium or lithium salt of a compound of general formula I or II as defined in Claim 1.

3. As a new compound, a 3-substituted uracil according to Claim 1 or 2 wherein R_2 represents a bromine or chlorine atom.

4. As a new compound, 3-phenyl-5-chloro-6-methyl uracil or a sodium, potassium or lithium salt thereof.

5. As a new compound, 3-benzyl-5-chloro-6-methyl uracil or a sodium, potassium or lithium salt thereof.

6. As a new compound, 3-benzyl-5-bromo-6-ethyl uracil or a sodium, potassium or lithium salt thereof.

7. As a new compound, the sodium, potassium or lithium salt of 3-phenyl-5-bromo-6-methyl uracil.

8. As a new compound, a 3-substituted uracil according to Claim 1 or 2 wherein R_2 represents a methyl or ethyl group.

9. A herbicidal composition comprising at least one 3-substituted uracil which is a compound of general formula I or II as defined in Claim 1 or a sodium, potassium or lithium salt thereof, associated with a compatible diluent.

10. A herbicidal composition according to Claim 9 wherein the diluent is at least in part a liquid other than an oil.

11. A herbicidal composition according to Claim 10 wherein the diluent is water.

12. A herbicidal composition according to any one of Claims 9 to 11 wherein the diluent is at least in part an oil.

13. A herbicidal composition according to any one of Claims 9 to 12 wherein the diluent is at least in part a solid.

14. A herbicidal composition according to any one of Claims 9 to 13 which contains a surface active agent.

15. A herbicidal composition comprising at least one 3-substituted uracil which is a compound of general formula I or II as defined in Claim 1 or a sodium, potassium or lithium salt thereof, in association with a surface active agent.

16. A herbicidal composition according to Claim 14 or 15 which contains 1 to 10% by weight of the surface active agent.

17. A herbicidal composition according to any one of Claims 9 to 16 which contains, in addition to the 3-substituted uracil, another compound having herbicidal properties.

18. A herbicidal composition according to

Claim 17 wherein the other compound is one of the known herbicides specifically hereinbefore named.

19. A herbicidal composition according to any one of Claims 9 to 18 in the form of a concentrate which requires dilution before use as a herbicide.

20. A herbicidal composition according to any one of Claims 9 to 19 wherein the 3-substituted uracil is as claimed in Claim 3.

21. A herbicidal composition according to any one of Claims 9 to 19 wherein the 3-substituted uracil as as claimed in Claim 4.

22. A herbicidal composition according to any one of Claims 9 to 19 wherein the 3-substituted uracil is as claimed in Claim 5.

23. A herbicidal composition according to any one of Claims 9 to 19 wherein the 3-substituted uracil is as claimed in Claim 6.

24. A herbicidal composition according to any one of Claims 9 to 19 wherein the 3-substituted uracil is as claimed in Claim 7.

25. A herbicidal composition according to any one of claims 9 to 19 wherein the 3-substituted uracil is as claimed in Claim 8.

26. A herbicidal composition according to any one of claims 9 to 19 where the 3-substituted uracil is 3-phenyl-5-bromo-6-methyl uracil.

27. A herbicidal composition according to any one of claims 9 to 19 wherein the 3-substituted uracil is one of the compounds specifically hereinbefore named.

28. A herbicidal composition according to Claim 9 substantially as described in Example 9 or 10.

29. A herbicidal composition according to Claim 9 substantially as hereinbefore described.

30. A method of controlling the growth of weeds at a locus which comprises applying to the locus a herbicidally effective quantity of at least one 3-substituted uracil which is a compound of general formula I or II as defined in Claim 1 or a sodium, potassium or lithium salt thereof.

31. A method according to Claim 30 wherein the 3-substituted uracil is 3-phenyl-5-bromo-6-methyl uracil.

32. A method according to Claim 30 or 31 wherein the 3-substituted uracil is applied in the form of a herbicidal composition as claimed in any one of Claims 9 to 29, where appropriate after dilution.

33. A method of controlling the growth of weeds according to Claim 30 wherein the growth of the weeds specified in either Example 9 or Example 10 is controlled by the application of the 3-substituted uracil specified in that Example.

34. A method according to Claim 33 wherein the 3-substituted uracil is applied at the rate specified in the Example.

35. A method of controlling the growth of weeds according to Claim 30 substantially as hereinbefore described.

J. A. KEMP & CO.,
Chartered Patent Agents,
14, South Square, Gray's Inn,
London, W.C.1.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press (Leamington) Ltd.—1964. Published by The Patent Office, 25 Southampton Buildings, London. W.C.2, from which copies may be obtained.

* C L M S *