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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 4 :
A01N 43/653, C07D 249/12
A01N 43/40, 43/50, 43/84
A61K 31/41, 31/44, 31/415
A61K 31/535, C07D 233/60
C07D 233/68, 233/84, 233/90
C07D 249/12, 295/08, 295/12
C07D 211/86

A1

(11) International Publication Number: **WO 89/ 05581**

(43) International Publication Date: 29 June 1989 (29.06.89)

(21) International Application Number: PCT/US88/04343

(22) International Filing Date: 7 December 1988 (07.12.88)

(31) Priority Application Number: 134,261

(32) Priority Date: 17 December 1987 (17.12.87)

(33) Priority Country: US

(71) Applicant: E.I. DU PONT DE NEMOURS AND COMPANY [US/US]; 1007 Market Street, Wilmington, DE 19898 (US).

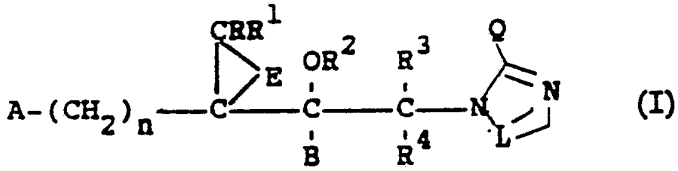
(72) Inventors: CUOMO, John ; 16 Hillcroft, Newark, DE 19711 (US). GREENBERG, Richard, Scot ; 41-10 Erli Road, Fairlawn, NJ 07410 (US). OLSON, Richard, Eric ; 600 Silverside Road, Wilmington, DE 19809 (US).

(74) Agent: BLACK, Robert, W.; Legal Department, Barley Mill Plaza P17/1172, E.I. du Pont de Nemours and Company, Wilmington, DE 19898 (US).

(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), HU, IT (European patent), JP, KR, LU (European patent), NL (European patent), NO, SE (European patent), SU.

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: ANTIFUNGAL CARBINOLS



(I)

(57) Abstract

Antifungal carbinols, particularly α-styryl carbinols, and the corresponding epoxy carbinols are provided. These carbinol compounds have formula (I) or a pharmaceutically or agriculturally suitable salt thereof, wherein E is a bond or an oxygen atom with the proviso that when E is oxygen; R, R^1 are not halogen; and L, A, B, Q, R^2, R^3, R^4 and n are as defined in the specification.

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TITLE

ANTIFUNGAL CARBINOLS

Cross-Reference

This application is a continuation-in-part of co-pending application Serial No. 042,541, filed April 29, 1987, which in turn is a continuation-in-part of application Serial No. 877,525, filed June 23, 1986.

Field of the Invention

This invention relates to antifungal carbinols, particularly α-styryl carbinols, and the corresponding epoxy carbinols, pharmaceutical and agricultural compositions containing them, processes for preparing them and methods of using them as antifungal agents in mammals and plants.

Background Including Prior Art

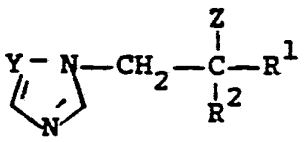
Systemic fungal infections are of increasing importance because of continued and expanded use of immunosuppressive therapies, antimicrobial therapies and indwelling catheters. Currently there are limited therapies available to treat such fungal infections. Amphotericin B remains the drug of choice because it has the widest spectrum of antifungal activity of any systemic antifungal drug, however its utility is limited by its toxicity. Because of the potential seriousness of its toxic effects, intravenous use of amphotericin B is primarily for patients with progressive, potentially fatal infections in which the patient is hospitalized during the course of therapy.

Thus, there is a continuing need to develop safer and more effective drugs which are useful for the treatment of fungal infections.

Plant pathogenic fungi and other disease incitants also cause extensive losses in crops annually. While there are commercially available materials used to control many plant diseases, further improvement in this art is needed if full food and fiber production is to be realized.

There are a large number of patent and literature references in the area of azole antifungal drugs and plant disease control agents. Most pertinent to the α-styryl carbinol compounds of this invention are the following references:

B. Sugavanam in U.S. Patent 4,507,140 issued March 26, 1985 discloses fungicidal or plant growth regulating β-styryl triazoles or imidazoles, amongst others of the formula:



where R^1 is CH=CH-X; -C≡C-X or $-CH_2-CH_2-X$;

X is substituted aryl, aralkyl, or heterocycle;

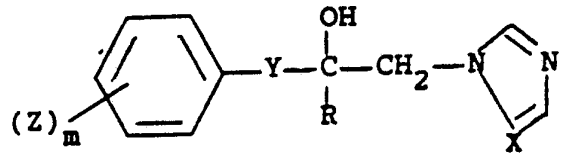
R^2 is alkyl, cycloalkyl, or optionally substituted aryl;

Z is OR^3;

R^3 is H, acetyl;

Y is -N- or -CH-.

German Patent 3,018,865, published May 16, 1980 discloses antimycotic agents of the formula:



where amongst others

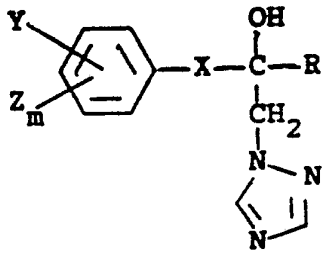
R is alkyl, optionally substituted cycloalkyl or optionally substituted phenyl radical;

X is N, or a CH group;

Y is $-OCH_2-$, $-CH_2CH_2-$ or CH=CH;

Z is halogen, alkyl, cycloalkyl, alkoxy, alkythio, etc.

German Patent 3,314,548-A, published April 21, 1983 discloses substituted 1-hydroxy-ethyl-triazole derivatives of the formula:



where amongst others

R is alkyl, cycloalkyl or phenyl optionally substituted;

X is $-OCH_2-$, $-SCH_2-$, $-(CH_2)_p$ or -CH=CH-;

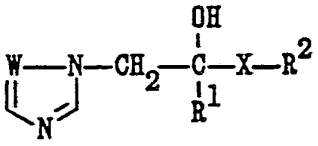
Z is halogen, alkyl, alkoxy, alkylthio, haloalkyl, haloalkoxy, or haloalkylthio;

m and p are 0, 1 and 2.

The compounds are antimycotics for treating dermatophytomycoses and systemic mycoses caused, e.g., by Candida sp., Aspergillus sp., Trichophyton sp.

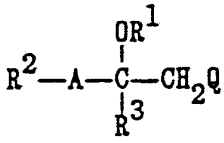
The above three references, which pertain to β-styryl azoles, are believed to be the most relevant. The β-styryl azole analog of one of the preferred compounds of the instant invention was prepared and found to be significantly less active.

European Patent Application 114,487 which published August 1, 1984 discloses azolylethanol derivatives of the formula:



Where amongst others R^1 and R^2 which may be the same or different are hydrogen, alkyl, cycloalkyl, alkenyl, heterocyclyl aryl, or aralkyl optionally substituted; W is N or CH; and X is C=O. The compounds have fungicidal activity and plant growth regulating activity.

European Patent 117,578-A, published February 23, 1984 discloses heterocyclic-hydroxy-alkyl alkyl ketone(s) and analogues of the formula:



where

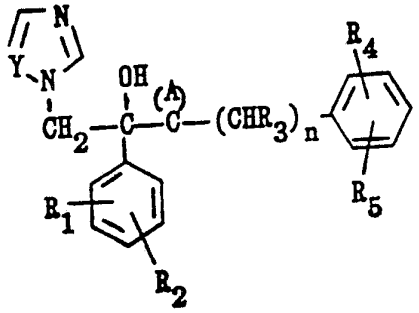
A is CO amongst others;

Q is imidazoyl or 1H- or 4H-1,2,4-triazol-1-yl;

R^1 is H, 1-5C alkyl, or 1-8C acyl;

R^2 and R^3 are 1-5C alkyl, 3-6C cycloalkyl, 2-6C alkenyl, benzyl (optionally substituted by 1-3 halogen), pyridyl, furyl, thienyl, or phenyl optionally substituted by 1-3 halogen, 1-3 alkyl, or 1-3C alkoxy.

Belgian Patent 900,594-A published September 22, 1983 discloses 1-phenyl-1-azolyl-hydroxyethyl cycloalkane derivatives of the formula:



where

R_1 and R_2 = H, halo, NO_2, lower alkyl, alkenyl, alkynyl, alkoxy or alkylthio (all optionally substituted by 1 or more halo), or optionally substituted phenyl or phenoxy;

R_3 = H or lower alkyl;

R_4 and R_5 = H or halo;

Y = CH or N;

A = 2-7C alkylene;

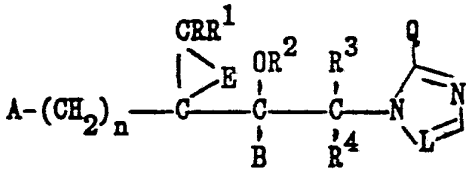
n = 0 or 1.

The compounds are useful as agricultural fungicides and antimycotics.

None of the cited references nor any known references suggest the novel antifungal compounds of this invention.

SUMMARY OF THE INVENTION

According to the present invention compounds are provided having the formula:



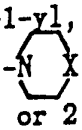
(I)

or a pharmaceutically or agriculturally suitable salt thereof wherein

E is a bond or an oxygen atom with the proviso that when E is oxygen; R, R^1 are not halogen;

A is perfluoroalkyl of 1-8 carbon atoms, $N(CH_3)_2$, OH, naphthyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and CF_3,  optionally substituted with 1 or 2 methyl groups, phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, and with no more than one group selected from:

haloalkoxy of 1-4 carbon atoms, CN, CO_2R_{14}, $CH=NOR_{14}$, $S(O)_mR^5$, R_6, 2-,3-, or 4-pyridyl or an N-oxide thereof, imidazol-1-yl, 1,2,4-triazol-1-yl, and  optionally substituted with 1 or 2 methyl groups,

or a heterocycle selected from imidazol-1-yl, 1,2,4-triazol-1-yl, 2-or 3-thienyl, and 2-,3-, or 4-pyridyl or an N-oxide thereof, optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, CF_3, alkoxy of 1-4 carbon atoms, haloalkoxy of 1-4 carbon atoms, and $S(O)_mR^5$;

B is alkyl of 1-8 carbon atoms, naphthyl, biphenyl,

R^6, perfluoroalkyl of 1-8 carbon atoms,

phenyl optionally substituted with 1-3 substituents each of which is independently selected from: halogen, alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, and with no more than one group selected from haloalkoxy of 1-4 carbon atoms, CN, CO_2R_{14}, $CH=NOR_{14}$, $S(O)_mR^5$, 2-,3-,4-pyridyl or an N oxide thereof,

benzyl optionally substituted on the phenyl ring with halogen or alkyl of 1-4 carbon atoms, or optionally α-substituted with 1 or 2 methyl groups, or

a heterocycle selected from 2-or 3-thienyl, and 2-,3-,or 4-pyridyl, said heterocycles being optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, haloalkoxy of 1-4 carbon atoms, CF_3, or $S(O)_mR^5$;

Q is H, halogen, $S(O)_mR^{11}$, $SCNHR^{12}$, CHO, $C\text{-}CH_3$, CO_2R^{13}, SCN, SSR^{12}, or SH or its corresponding disulfide, provided however that when Q is other than H, then n is 0, R, R^1, and R^4 are independently H or CH_3, R^3 is H, and A and B are each phenyl optionally substituted with from 1-3 substituents each of which is independently halogen, CH_3, CF_3, OCH_3, or $S(O)_mR^5$;

L is CH or N with the proviso that when L = CH then Q=H;

n is 0-4 with the proviso that when A is  , $N(CH_3)_2$, or OH, then n is other than 0;

m each occurrence is 0, 1 or 2;

X is C, NR^{10}, or O;

R and R^1 independently are H, alkyl of 1-4 carbon atoms, halogen, or phenyl, or taken together form cycloalkyl of 3-7 carbon atoms;

R^2 is H, allyl, propargyl, alkyl of 1-4 carbon atoms,

$-\overset{O}{\overset{\|}{C}}R^7$, $-\overset{O}{\overset{\|}{C}}-NR^8R^9$, $-\overset{O}{\overset{\|}{C}}OR^7$, or

haloalkyl of 1-4 carbon atoms;

R^3 and R^4 independently are H, F, or alkyl of 1-4 carbon atoms;

R^5 is alkyl of 1-4 carbon atoms;

R^6 is phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and CF_3;

R^7 is alkyl of 1-4 carbon atoms, phenyl, or benzyl;

R^8 and R^9 independently are H, alkyl of 1-4 carbon atoms, phenyl or benzyl;

R^{10} is H, alkyl of 1-4 carbon atoms, or acetyl;

R^{11} is alkyl of 1-4 carbon atoms, haloalkyl of 1-2 carbon atoms, CH_2CN, CH_2SCN, $CH(CH_3)CN$, $CH_2CO_2CH_3$, or $CH_2CO_2CH_2CH_3$;

R^{12} is alkyl of 1-4 carbon atoms, allyl, phenyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3, or benzyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3;

R^{13} is H, or alkyl of 1-4 carbon atoms; and
R^{14} is alkyl of 1-4 carbon atoms.

Also provided are pharmaceutical compositions comprising a suitable pharmaceutical carrier and a therapeutically effective amount of a compound of Formula (I) or its pharmaceutically suitable salt and methods of using the compounds of Formula (I) as antifungal agents.

This invention further provides agricultural compositions comprising a compound of Formula (I) or its agriculturally suitable salt together with an agriculturally acceptable diluent or carrier and a method of controlling fungal diseases in plants.

Certain compounds of this invention are useful as herbicides and plant growth regulants. This invention, therefore, also relates to the herbicidal composition of these compounds and their method of use as herbicides.

The herbicidal compounds are those of Formula (I) wherein:

E is a bond;

L is N;

A is perfluoroalkyl of 1-4 carbon atoms, naphthyl optionally substituted with a total of 1-2 substituents each of which is independently selected from halogen and CF_3, optionally substituted with 1 or 2 methyl groups, phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from:

halogen, alkyl of 1-3 carbon atoms, haloalkyl of 1-3 carbon atoms, alkoxy of 1-3 carbon atoms, and with no more than one group selected from:

haloalkoxy of 1-3 carbon atoms, CN, CO_2R^{14}, $CH{=}NOR^{14}$, R_6, 2-,3-,or 4-pyridyl, or an N-oxide thereof, imidazol-1-yl, 1,2,4-triazol-1-yl, and  optionally substituted with 1 or 2 methyl groups,

or a heterocycle selected from imidazol-1-yl, 1,2,4-triazol-1-yl, 2-or 3-thienyl, and 2-,3-, or 4-pyridyl, said heterocycles being optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-2 carbon atoms, and CF_3;

B is alkyl of 1-4 carbon atoms, naphthyl,

perfluoroalkyl of 1-4 carbon atoms, phenyl optionally substituted with 1-2 substituents each of which is independently selected from: halogen, alkyl of 1-3 carbon atoms, haloalkyl of 1-3 carbon atoms, alkoxy of 1-3 carbon atoms, and with no more than one group selected from haloalkoxy of 1-3 carbon atoms, and CN,

benzyl optionally substituted on the phenyl ring with halogen or alkyl of 1-3 carbon atoms, or optionally α-substituted with 1 or 2 methyl groups, or

a heterocycle selected from 2-or 3-thienyl, and 2-,3-,or 4-pyridyl, said heterocycles being optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-3 carbon atoms, or CF_3;

Q is H, halogen, $S(O)_mR^{11}$, $\overset{O}{\overset{\|}{S}}CNHR^{12}$, CHO, $\overset{O}{\overset{\|}{C}}-CH_3$, CO_2R^{13}, SCN, SSR^{12}, or SH or its corresponding disulfide, provided however that when Q is other than H, then n is 0, R, R^1, and R^4 are independently H or CH_3, R^3 is H, and A and B are each phenyl optionally substituted with from 1-3 substituents each of which is independently halogen, CH_3, CF_3, or OCH_3;

n is 0-2 with the proviso that when A is  , then n is other than 0;

m each occurrence is 0, 1 or 2;

X is C, NR^{10}, or O;

R and R^1 independently are H, alkyl of 1-2 carbon atoms, halogen, or phenyl, or taken together form cycloalkyl of 3-6 carbon atoms;

R^2 is H, allyl, propargyl, alkyl of 1-2 carbon atoms,

$-\overset{O}{\overset{\|}{C}}R^7$, $-\overset{O}{\overset{\|}{C}}-NR^8R^9$, $-\overset{O}{\overset{\|}{C}}OR^7$, or

haloalkyl of 1-4 carbon atoms;

R^3 and R^4 independently are H, F, or alkyl of 1-2 carbon atoms;

R^6 is phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and CF_3;

R^7 is alkyl of 1-2 carbon atoms, phenyl, or benzyl;

R^8 and R^9 independently are H, alkyl of 1-2 carbon atoms, phenyl or benzyl;

R^{10} is H, alkyl of 1-2 carbon atoms, or acetyl;

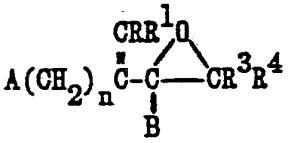
R^{11} is alkyl of 1-2 carbon atoms, haloalkyl of 1-2 carbon atoms, CH_2CN, CH_2SCN, $CH(CH_3)CN$, $CH_2CO_2CH_3$, or $CH_2CO_2CH_2CH_3$;

R^{12} is alkyl of 1-2 carbon atoms, allyl, phenyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3, or benzyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3; and

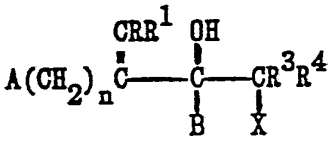
R^{13} is H, or alkyl of 1-2 carbon atoms.

Further provided are processes for the preparation of the aforesaid compounds, which processes are described hereinafter.

Additionally provided are novel intermediates having the formulas (II) and (IIa) shown below:



(II)



(IIa; where X is Br, Cl, I)

wherein A, B, R, R^1, R^3, R^4 and n are as defined above, except that R^3, R^4 are not F and not both alkyl.

PREFERRED EMBODIMENTS

Preferred compounds are the α-styryl compounds of formula (I) (E is a bond) where:

1) n = 0, or 1; and/or
2) R^3 and R^4 independently are H, CH_3, or F.

More preferred compounds are preferred compounds where:

1) A, and B independently are phenyl optionally substituted with from 1-3 substituents each of which is halogen, alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, or $S(O)_mR^5$; and/or

2) n = 0; and/or

3) R and R^1 independently are H, CH_3 or halogen; and/or

4) R^2 = H, alkyl of 1-4 carbon atoms, allyl, or propargyl; and/or

5) Q is H, I, SH.

Most preferred compounds are more preferred compounds where:

1) A and B independently are phenyl optionally substituted with from 1-3 halogen atoms, CH_3, OCH_3, CF_3, or SCH_3; and/or;

2) R, R^1, R^2, R^3, R^4 and Q are all H.

Specifically preferred because of their biological activity are the following compounds or salts thereof:

(a) 2-(4-Fluorophenyl)-3-phenyl-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(b) 2,3-Bis(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(c) 2-(2,4-Dichlorophenyl)-3-(4-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(d) 2-(4-Chlorophenyl)-3-(2-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(e) 2-(2,4-Dichlorophenyl)-3-(3-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(f) 2-(2-Chlorophenyl)-3-(2-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(g) 2-(2,4-Dichlorophenyl)-3-(3-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(h) 2-(4-Fluorophenyl)-3-(4-trifluoromethylphenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(i) 2-(2,4-Dichlorophenyl)-3-phenyl-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(j) 2-(3,4-Dichlorophenyl)-3-(4-fluorophenyl)-1-(1H-1,2-4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(k) 2-(4-Chlorophenyl)-3-(3-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(l) 2-(4-Fluorophenyl)-3-(2,4-difluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(m) 2-(2,4-Difluorophenyl)-3-(2-chlorophenyl)-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(n) 2-(2,4-Dichlorophenyl)-3-(2-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(o) 2-(2,4-Difluorophenyl)-3-phenyl)-1-(1H-imidazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(p) 2-(2,4-Difluorophenyl)-3-(4-fluorophenyl)-1-(1H-imidazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(q) 2-(2,4-Difluorophenyl)-3-(2-chlorophenyl)-1-(1H-imidazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(r) 2-(2,4-Difluorophenyl)-3-phenyl-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(s) 2-(2,4-Difluorophenyl)-3-(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(t) 2-(2-Fluorophenyl)-3-(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(u) 2-(2-Fluorophenyl)-3-(4-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(v) 2-(2,4-Difluorophenyl)-3-(4-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(w) 2-(2-Chlorophenyl)-3-(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

(x) 2-(4-Chlorophenyl)-3-phenyl-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof.

All of the compounds within the scope of this invention are active in either pharmaceutical or agricultural fungicidal assays. Thus, it should be recognized that there are compounds which are not always active in both assays as is shown with some compounds in the Examples. Of the above listed specifically preferred compounds, compounds (a)-(r) or their salts are preferred for pharmaceutical uses and compounds (r)-(x) or their salts are preferred for agricultural uses.

Detailed Description of the Invention

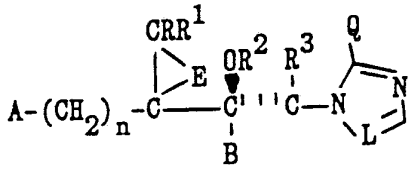
Synthesis

The novel compounds of Formula (I) can be prepared using the reactions and techniques described in this section. The reactions are usually performed in a solvent appropriate to the reagents and materials employed, and suitable for the transformation being effected. In some cases functional groups on the starting materials may need to be protected by standard protecting groups reported in the chemical literature which are well known to one skilled in the art.

In some cases, substituents on the starting materials may be incompatible with some of the reaction conditions required in some of the methods described. Such restrictions to the substituents which are compatible with the reaction conditions will be readily apparent to one skilled in the art and alternative methods described must then be used.

The compounds of the present invention can contain at least one chiral center and as such can exist as two individual isomers or as a racemic mixture of both. This invention relates to the (S) isomer, as well as to racemic mixtures containing both isomers.

For the purposes of this invention, the (S)-isomer of compounds of Formula (I) is intended to mean compounds of the configuration depicted:

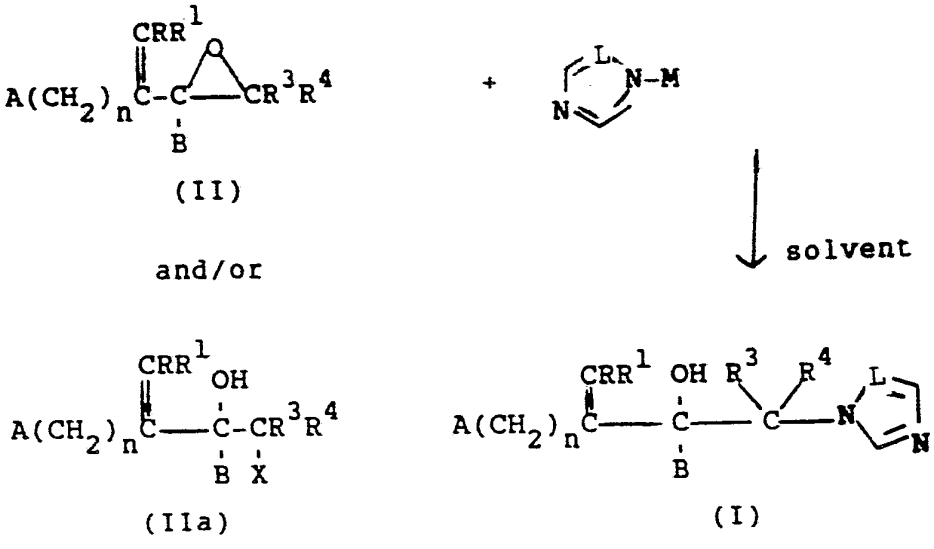


(Ia)

When a single chiral center is present the resolution can be performed by reacting the compound with a chiral strong acid (e.g. substituted camphor-sulfonic acids) in a suitable solvent (e.g. aceto-nitrile) or mixture of solvents (e.g. 3/1 ether-acetone). This reaction is carried out at a temperature between 25°C to 100°C, preferably at the reflux temperature of the solvent(s) employed. The reaction produces two diastereomeric adducts that can be separated by fractional crystallization. The adduct can then be cleaved in basic medium (e.g. sat. $NaHCO_3$, sat. Na_2CO_3) to give the resolved product.

The compounds of Formula I, where E is a bond, R^2 and Q are H and R^3, R^4 are not F and not both alkyl, can be prepared by contacting an oxirane of Formula (II) or a halohydrin of Formula (IIa), or a mixture of (II) or (IIa) with imidazole or triazole or a corresponding alkali metal salt (preferably the Na^+ or K^+ salt) in a suitable solvent (Scheme I).

Scheme 1



X = I, Br, Cl; M = H, alkali metal

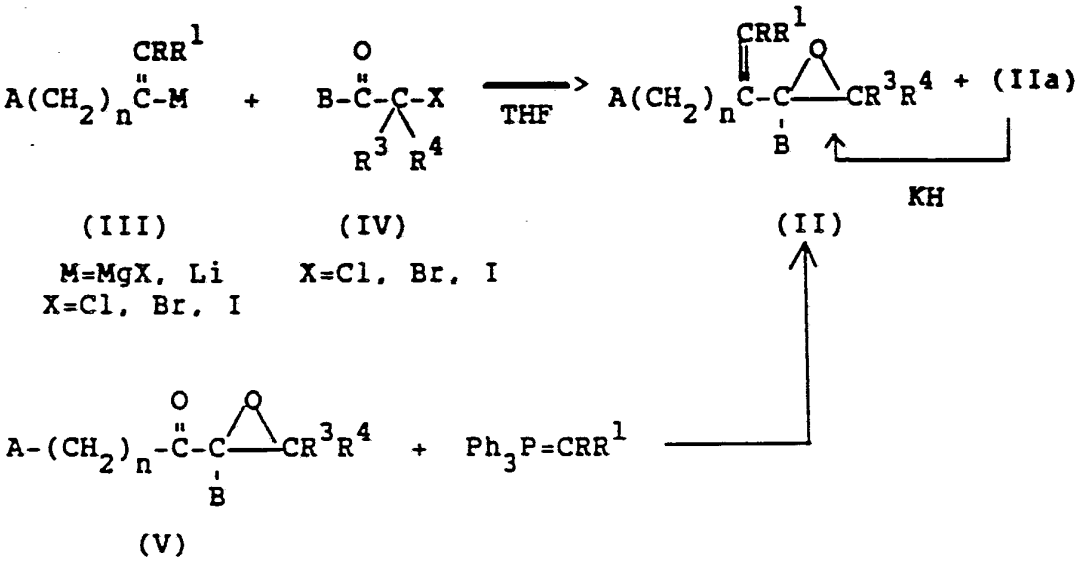
When imidazole or triazole is used, an acid acceptor, such as potassium carbonate, sodium methoxide or sodium hydride, is added to the reaction mixture. Suitable inert solvents include polar, aprotic solvents such as dimethylformamide (DMF), dimethylsulfoxide (DMSO) and ethereal solvents such as tetrahydrofuran (THF). Non-polar solvents, such as toluene, may be used if a phase transfer catalyst, such as tetrabutylammonium bromide, is added. The reaction is carried out at a temperature in the range of 10° to 150°C, preferably from 50° to 120°C, for a period of 0.25 to 24 hours. It is recognized that varying amounts of the 4H-1,2,4-triazol-4-yl isomers of Formula (I) may be formed when triazole is used in the above reaction. The isomers can be separated, if desired, using standard separation techniques, e.g., chromatography.

The 4H-1,2,4-triazol-4-yl isomers of Formula (I) can be converted to the compounds of Formula (I) by isomerization with base as described in EP 143384A2, or by heating with 2-100 mol % of oxiranes of Formula (II), halohydrins of Formula (IIa), reactive alkyl or benzyl bromides or iodides, such as benzyl bromide or methyl iodide, or commercial oxiranes such as styrene oxide, at temperatures of 100-200°C; preferably, in a polar aprotic solvent such as DMF, or a non-polar solvent such as one of the xylenes.

The oxiranes of Formula (II) can be prepared using one or both of the following methods; (Scheme 2). In the first, vinyl organometallic reagents, e.g., vinyl Grignard reagents, of Formula (III) are allowed

to react with haloketones of Formula (IV) in the presence of ethereal solvents, such as THF or diethyl ether, at a temperature ranging from -90° to 60°C, preferably -10° to 50°C, for 0.5 to 24 hours. Depending on the reaction conditions and the value of X in the haloketone starting material (IV), the product may be an oxirane (II), a halohydrin (IIa) or a mixture of (II) and (IIa). If desired, the halohydrins (IIa) may be converted to oxiranes (II) by treatment with base, e.g., potassium hydride (KH), in a solvent such as THF.

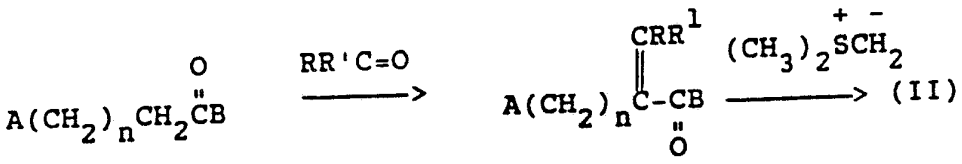
Scheme 2



In the second method, keto-oxiranes of formula (V) are olefinated with, for example, Wittig reagents, which provide epoxy-olefins of Formula (II).

Unsaturated ketones of Formula (VII) can be converted to expoxy-olefins (II) by treatment with dimethylsulfonium methylide. The enones (VII) can be prepared by treatment of ketones of Formula (VI) with carbonyl compounds and appropriate catalysts (Scheme 3).

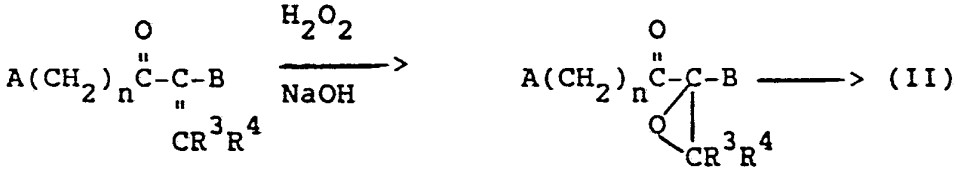
Scheme 3



(VI) (VII)

Unsaturated ketones of Formula (VIII) can be converted to epoxyketones (V) using basic hydrogen peroxide. Olefination of (V), as described above, provides epoxyolefins (II) (Scheme 4).

Scheme 4

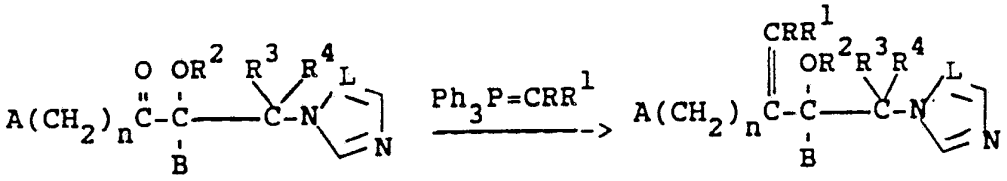


(VIII) (V)

The vinyl organometallics of Formula (III) are prepared using standard procedures from the corresponding chlorides, bromides or iodides. The haloolefins, the haloketones of Formula (IV), the keto-oxiranes of Formula (V) and the ketones of Formula (VI) are known, or can be prepared using methods known to one skilled in the art.

Compounds of Formula (I) can also be prepared by olefination of ketones (IX) with, for example, Wittig reagents (Scheme 5). Ketones of Formula (IX) where R^2, R^3 and R^4 = H are known (EP 117578A).

Scheme 5

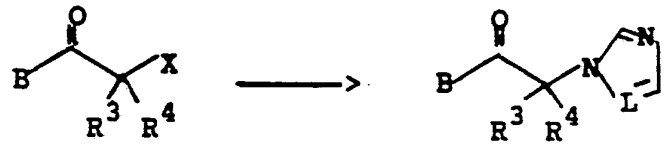


(IX) (I)

Compounds of general Formula (I) where R^3 and/or $R^4 \neq H$ can be made as shown in Scheme 6 by reacting ketones of general Formula (X) with the appropriate organometallic reagent (e.g. Grignard reagent, organolithium reagent). The ketones (X) are prepared by conventional methods from the corresponding α-haloketones (IV) (see e.g. EP 0044605, UK 2099818A, UK 146224, EP 1337718, and EP 0153803).

Scheme 6

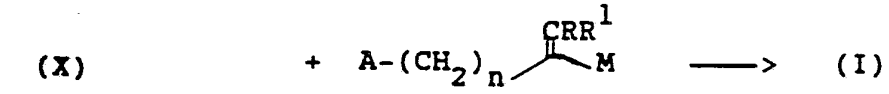
a)



(IV)
X=Br, Cl, I

(X)

b)



(III)
M=MgX, Li
X=Cl, Br, I

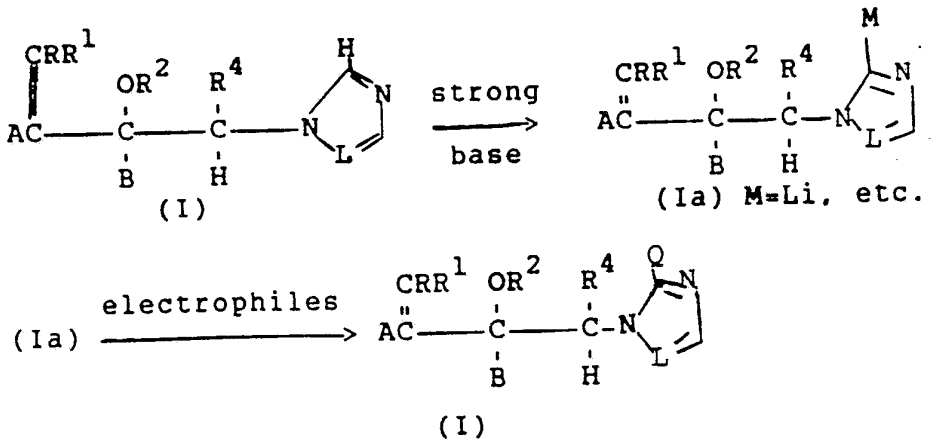
Compounds of Formula (I) where A=(heterocycle)-phenyl can be prepared from appropriately substituted precursors using the methods described above, or by using substitution reactions on (I) wherein A is halophenyl. For example, compounds of

Formula (I) where A is (pyridyl)phenyl can be prepared by treatment of (I), wherein A is bromophenyl or iodophenyl, with the appropriate pyridylstannanes in the presence of palladium catalysts (see Tetrahedron Letters, 27, 4407, 1986). Copper assisted displacement of halogen (Tetrahedron, 40, 1433, 1984) with heterocyclic nucleophiles provides compounds of Formula (I) where A is for example 1-imidazolylphenyl.

In some cases, it may be desirable to begin with compounds of Formula I, wherein A is aminophenyl, and construct the heterocyclic ring using $X(CH_2CH_2Cl)_2$ (see ES 8603-473-A).

The compounds of Formula (I) where Q ≠ H and L = N can be prepared as shown in Scheme 7. Metalation of (I), Q=H with strong base provides the 5-metalated triazoles (Ia) (See Heterocycles, 23, 1645-49, 1985). When R^2 is H, 2 equivalents of base are required. Typical conditions involve treatment of a solution of (I) in THF at -70° with n-butyllithium for 15-30 minutes. Where the metalated triazole (Ia) is less soluble than (I), the addition of co-solvents, such as dimethylpropyleneurea (DMPU) may be beneficial.

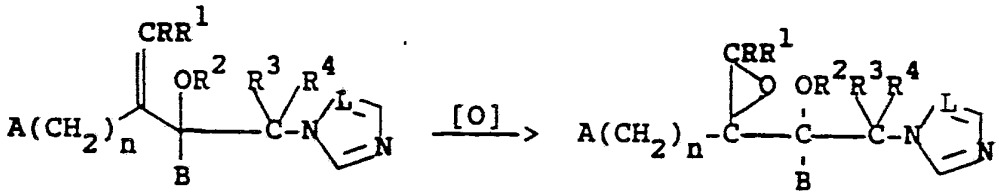
Scheme 7



The treatment of (Ia) with electrophiles gives a wide variety of (I) where Q ≠ H. Electrophiles of relevance to the present invention include halogenating agents, sulfur, disulfides, carbon dioxide, dimethylamides and sulfur dioxide followed by alkyl halides. Subsequent functionalization, using methods known to one skilled in the art, provide other compounds of Formula (I) wherein Q ≠ H. For example, the treatment of (I), where Q is SH with isocyanates or phthalimidosulfides provides thiocarbamates (I; $Q = SCNHR^{12}$) or disulfides (I; $Q = SSR^{12}$), respectively.

The compounds of general Formula (I) where E is oxygen can be prepared by oxidation of compounds of general Formula (I) where E is a bond provided that R, R^1 ≠ halogen using methods described in the literature (Scheme 8):

Scheme 8



Suitable reagents which can effect this oxidation, depending on the nature of the substituents, include peracids such as m-chloroperbenzoic acid;

hydroperoxides such as tert-butyl hydroperoxide in the presence of an appropriate catalyst such as vanadium acetonylacetonate; or hydrogen peroxide. Alternatively, the transformation can be effected by first forming the halohydrin with a hypohalous acid such as hypobromous acid and then reacting the intermediate halohydrin with a proton acceptor such as potassium tert-butoxide.

It will be noted by those skilled in the art that, depending on the nature of the compound to be oxidized, a mixture of diastereomers can be obtained. This can be controlled through selection of appropriate oxidation methods or, alternatively, the resulting mixture of diastereomers can be separated in a conventional manner (e.g. chromatography, fractional crystallization).

Compounds of Formula (I) where R^2 is H can be alkylated, acylated and carbamoylated, using standard procedures, to prepare functional derivatives of the alcohol moiety.

The compounds of this invention and their preparation can be understood further by the following examples, but should not constitute a limitation thereof. In these examples, unless otherwise indicated, all temperatures are in degrees centigrade and parts and percentages are by weight.

Nuclear magnetic resonance (nmr) spectra were obtained in $CDCl_3$ solution, unless otherwise noted. Abbreviations for nmr spectra are s=singlet, d=doublet, t=triplet, q=quartet, m=multiplet; peak positions are reported as parts per million downfield from tetramethylsilane.

Example 1

PART A: 2-(4-Fluorophenyl)-2-[1-(4-fluorophenyl)-ethenyl] oxirane

PROCESS 1: Grignard Addition to an α-Haloketone

To a 25° solution of Grignard reagent prepared from 6.0 g (0.030 mol) of 1-bromo-4'-fluorostyrene and 0.85 g (0.035 mol) of magnesium turnings in 60 mL of THF was added a solution of 5.2 g (0.030 mol) of 2-chloro-4'-fluoroacetophenone in 10 mL of THF. The solution was stirred for 2 hours at 25°. Saturated aqueous NH_4Cl (10 mL) was added, the aqueous layer was extracted with 1:1 Et_2O/hexane and the combined organic layers were washed with brine, dried over $MgSO_4$ and evaporated to give 10.2 g of an amber oil. Analysis by NMR ($CDCl_3$) indicated that the desired oxirane was the major product: δ 3.1, 3.3 (two d, epoxide protons; 5.5, 5.8 (two s, vinyl protons). The material was of sufficient purity to be used in the next step.

PROCESS 2: Olefination of 2-(4-Fluorophenyl)-2-(4-fluorobenzoyl)oxirane

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To a suspension of 4.3 g (0.012 mol) of methyltriphenylphosphonium bromide in 15 mL of THF cooled to -70° was added 8.4 mL (0.013 mol) of 1.55 M n-butyllithium over 3 min., keeping the temperature at less than -55°. The resulting yellow suspension was allowed to warm to 0° over 10 min, and was then treated with 2.6 g (0.010 mol) of 2-(4-fluorophenyl)-2-(4-fluorobenzoyl)oxirane in 5 mL of THF. The light-

brown suspension was stirred for 6 hours at 25°. Standard workup gave 3.4 g of crude product which was flash chromatographed (Et_2O) to give 1.7 g of the desired product, which was of sufficient purity to be used in the next step. NMR ($CDCl_3$) δ 3.1 (d): 3.3 (d); 5.5 (s); 5.8 (s).

PART B: 2,3-Bis (4-Fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol

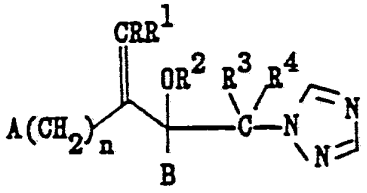
---

A mixture of 10.2 g (0.040 mol) of crude 2-(4-fluorophenyl)-2-[1-(4-fluorophenyl)ethenyl]oxirane and 7.0 g (0.065 mol) of potassium triazole in 60 mL of DMF was heated at 60° overnight, then cooled and poured into 100 mL of 1:1 Et_2O/hexanes. After washing the organic layer three times with H_2O and once with brine, a precipitate formed in the organic layer. Filtering gave 4.8 g of a brown solid which was recrystallized from 500 mL of cyclohexane to yield 2.5 g of a light-tan powder, mp 136-137°: NMR ($CDCl_3$) δ 1.7 (br s, 0H); 4.7 (q, 2H); 5.3 (s, 1H); 5.5 (s, 1H); 6.8-7.1 (m, 6H); 7.4 (m, 2H); 7.8 (s, 1H); 7.9 (s, 1H); IR (nujol) 3120 (br), 1900, 1600, 1505, 1220, 1139, 835 cm^{-1}.

The compounds shown in Table 1 were prepared or can be prepared by the method described hereinabove.

In the tables, Ph means phenyl and substituted aryl groups are abbreviated, e.g., 4-F-Ph is 4-fluorophenyl, 2,4-Cl_2-Ph is 2,4-dichlorophenyl and 2-thienyl is thiophen-2-yl.

Table 1



Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1	4-F-Ph	4-F-Ph	0	H	H	H	H	H	136-137 (HCl salt 182-184)
2	4-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	139-143
3	4-F-Ph	4-Cl-Ph	0	H	H	H	H	H	(oil)[a]
4	4-F-Ph	2,4-F_2-Ph	0	H	H	H	H	H	102-103.5
5	4-F-Ph	4-CF_3-Ph	0	H	H	H	H	H	
6	4-F-Ph	n-C_4H_9	0	H	H	H	H	H	72-73
7	4-F-Ph	n-C_4F_9	0	H	H	H	H	H	
8	2-F-Ph	Ph	0	H	H	H	H	H	
9	2-F-Ph	2-F-Ph	0	H	H	H	H	H	89-93
10	2-F-Ph	4-F-Ph	0	H	H	H	H	H	(oil)[b]
11	2-F-Ph	2,4-F_2-Ph	0	H	H	H	H	H	121-122
12	2-F-Ph	2-Cl-Ph	0	H	H	H	H	H	
13	2-F-Ph	4-Cl-Ph	0	H	H	H	H	H	116-117
14	2-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	115-116
15	3-F-Ph	4-F-Ph	0	H	H	H	H	H	106-109
16	3-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	145-147
17	3-F-Ph	4-Cl-Ph	0	H	H	H	H	H	101-102
18	3-F-Ph	2,4-F_2-Ph	0	H	H	H	H	H	92-93
19	3-F-Ph	4-CF_3-Ph	0	H	H	H	H	H	
20	3-F-Ph	n-C_4H_9	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R^1	R^2	R^3	R^4	R	M.P.°C	
21	3-F-Ph	n-C_4F_9	0	H	H	H	H	H		
22	3-F-Ph	Ph	0	H	H	H	H	H		
23	3-F-Ph	2-F-Ph	0	H	H	H	H	H	122-124	
24	3-F-Ph	2-Cl-Ph	0	H	H	H	H	H		
25	4-Cl-Ph	4-F-Ph	0	H	H	H	H	H	110-115	
26	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	89-91 (HCl salt 184-190)	
27	4-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	132-135	
28	4-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	124-125.5	
29	4-Cl-Ph	4-CF_3-Ph	0	H	H	H	H	H		
30	4-Cl-Ph	n-C_4H_9	0	H	H	H	H	H		
31	4-Cl-Ph	n-C_4F_9	0	H	H	H	H	H		
32	2-Cl-Ph	4-F-Ph	0	H	H	H	H	H	(oil)[c]	
33	2-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	150-152	(HCl salt 124-127)
34	2-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	153-154 (HCl salt 175-180)	HNO_3 salt 138-141 H_2SO_4 salt 180-182 H_3PO_4 salt 158-160
35	2-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	128-129 (HCl salt 156-161)	H_2SO_4 salt 184-187 HNO_3 salt 158-159 H_3PO_4 salt 141-143
36	2-Cl-Ph	4-CF_3-Ph	0	H	H	H	H	H		
37	2-Cl-Ph	n-C_4H_9	0	H	H	H	H	H		
38	2-Cl-Ph	n-C_4F_9	0	H	H	H	H	H		
39	3-Cl-Ph	4-F-Ph	0	H	H	H	H	H	95-96.5	
40	3-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	144-146	
41	3-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	112-115	

Table 1 (Continued)

Ex. No.	A	B	n	R^1	R^2	R^3	R^4	R	M.P.°C
42	3-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	115-116
43	3-Cl-Ph	4-CF_3-Ph	0	H	H	H	H	H	
44	3-Cl-Ph	n-C_4H_9	0	H	H	H	H	H	
45	3-Cl-Ph	n-C_4F_9	0	H	H	H	H	H	
46	3-Cl-Ph	Ph	0	H	H	H	H	H	
47	3-Cl-Ph	2-F-Ph	0	H	H	H	H	H	91-93
48	3-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	
49	Ph	4-F-Ph	0	H	H	H	H	H	125-126
50	Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	117-120
51	Ph	4-Cl-Ph	0	H	H	H	H	H	111
52	Ph	2,4-F_2-Ph	0	H	H	H	H	H	119.5-122 (HCl salt 152-154)
53	Ph	4-CF_3-Ph	0	H	H	H	H	H	
54	Ph	n-C_4H_9	0	H	H	H	H	H	
55	Ph	n-C_4F_9	0	H	H	H	H	H	
56	2-CF_3-Ph	Ph	0	H	H	H	H	H	(oil)[r]
57	2-CF_3-Ph	2-F-Ph	0	H	H	H	H	H	127.5-130
58	2-CF_3-Ph	2-Cl-Ph	0	H	H	H	H	H	152-156
59	3-CF_3-Ph	Ph	0	H	H	H	H	H	101-103
60	3-CF_3-Ph	2-F-Ph	0	H	H	H	H	H	(oil)[s]
61	3-CF_3-Ph	2-Cl-Ph	0	H	H	H	H	H	101-104
62	4-CF_3-Ph	Ph	0	H	H	H	H	H	
63	4-CF_3-Ph	2-F-Ph	0	H	H	H	H	H	
64	4-CF_3-Ph	2-Cl-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
65	4-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	152-154
66	4-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	(oil)[t]
67	4-CF_3-Ph	4-Cl-Ph	0	H	H	H	H	H	144-145
68	4-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
69	4-CF_3-Ph	4-CF_3-Ph	0	H	H	H	H	H	
70	4-CF_3-Ph	n-C_4H_9	0	H	H	H	H	H	
71	4-CF_3-Ph	n-C_4F_9	0	H	H	H	H	H	
72	2-Br-Ph	Ph	0	H	H	H	H	H	
73	2-Br-Ph	2-F-Ph	0	H	H	H	H	H	
74	2-Br-Ph	4-F-Ph	0	H	H	H	H	H	
75	2-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
76	2-Br-Ph	2-Cl-Ph	0	H	H	H	H	H	
77	2-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	
78	2-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
79	3-Br-Ph	Ph	0	H	H	H	H	H	
80	3-Br-Ph	2-F-Ph	0	H	H	H	H	H	
81	3-Br-Ph	2-Cl-Ph	0	H	H	H	H	H	
82	4-Br-Ph	Ph	0	H	H	H	H	H	
83	4-Br-Ph	2-F-Ph	0	H	H	H	H	H	
84	4-Br-Ph	2-Cl-Ph	0	H	H	H	H	H	123-126
85	4-Br-Ph	4-F-Ph	0	H	H	H	H	H	(oil)[d]
86	4-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
87	4-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	145-148
88	4-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	123-125
89	4-Br-Ph	4-CF_3-Ph	0	H	H	H	H	H	
90	4-Br-Ph	n-C_4H_9	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
91	4-Br-Ph	n-C_4F_9	0	H	H	H	H	H	
92	2,4-F_2-Ph	Ph	0	H	H	H	H	H	
93	2,4-F_2-Ph	2-F-Ph	0	H	H	H	H	H	106-108
94	2,4-F_2-Ph	4-F-Ph	0	H	H	H	H	H	100-103
95	2,4-F_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	116-120
96	2,4-F_2-Ph	2-Cl-Ph	0	H	H	H	H	H	
97	2,4-F_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
98	2,4-F_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
99	2,4-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	(oil)[e]
100	2,4-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	75-78
101	2,4-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	60-62
102	2,4-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	106-109
103	2,4-Cl_2-Ph	4-CF_3-Ph	0	H	H	H	H	H	
104	2,4-Cl_2-Ph	n-C_4H_9	0	H	H	H	H	H	
105	2,4-Cl_2-Ph	n-C_4F_9	0	H	H	H	H	H	
106	2,4-Cl_2-Ph	Ph	0	H	H	H	H	H	45-54
107	2,4-Cl_2-Ph	2-F-Ph	0	H	H	H	H	H	68-73
108	2,4-Cl_2-Ph	2-Cl-Ph	0	H	H	H	H	H	(oil)[u]
109	3,4-Cl_2-Ph	Ph	0	H	H	H	H	H	
110	3,4-Cl_2-Ph	2-F-Ph	0	H	H	H	H	H	
111	3,4-Cl_2-Ph	2-Cl-Ph	0	H	H	H	H	H	
112	4-t-Bu-Ph	Ph	0	H	H	H	H	H	
113	4-t-Bu-Ph	2-F-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
114	4-t-Bu-Ph	4-F-Ph	0	H	H	H	H	H	110-113
115	4-t-Bu-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
116	4-t-Bu-Ph	2-Cl-Ph	0	H	H	H	H	H	
117	4-t-Bu-Ph	4-Cl-Ph	0	H	H	H	H	H	(oil)[f]
118	4-t-Bu-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
119	2-CH_3S-Ph	Ph	0	H	H	H	H	H	
120	2-CH_3S-Ph	2-F-Ph	0	H	H	H	H	H	
121	2-CH_3S-Ph	4-F-Ph	0	H	H	H	H	H	
122	2-CH_3S-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
123	2-CH_3S-Ph	2-Cl-Ph	0	H	H	H	H	H	
124	2-CH_3S-Ph	4-Cl-Ph	0	H	H	H	H	H	
125	2-CH_3S-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
126	2-$CH_3S(0)$-Ph	Ph	0	H	H	H	H	H	
127	2-$CH_3S(0)$-Ph	2-F-Ph	0	H	H	H	H	H	
128	2-$CH_3S(0)$-Ph	4-F-Ph	0	H	H	H	H	H	
129	2-$CH_3S(0)$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
130	2-$CH_3S(0)$-Ph	2-Cl-Ph	0	H	H	H	H	H	
131	2-$CH_3S(0)$-Ph	4-Cl-Ph	0	H	H	H	H	H	
132	2-$CH_3S(0)$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
133	2-$CH_3S(0)_2$-Ph	Ph	0	H	H	H	H	H	
134	2-$CH_3S(0)_2$-Ph	2-F-Ph	0	H	H	H	H	H	
135	2-$CH_3S(0)_2$-Ph	4-F-Ph	0	H	H	H	H	H	
136	2-$CH_3S(0)_2$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
137	2-$CH_3S(O)_2$-Ph	2-Cl-Ph	0	H	H	H	H	H	
138	2-$CH_3S(O)_2$-Ph	4-Cl-Ph	0	H	H	H	H	H	
139	2-$CH_3S(O)_2$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
140	3-CH_3S-Ph	Ph	0	H	H	H	H	H	
141	3-CH_3S-Ph	2-F-Ph	0	H	H	H	H	H	
142	3-CH_3S-Ph	4-F-Ph	0	H	H	H	H	H	
143	3-CH_3S-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
144	3-CH_3S-Ph	2-Cl-Ph	0	H	H	H	H	H	
145	3-CH_3S-Ph	4-Cl-Ph	0	H	H	H	H	H	
146	3-CH_3S-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
147	3-$CH_3S(O)$-Ph	Ph	0	H	H	H	H	H	
148	3-$CH_3S(O)$-Ph	2-F-Ph	0	H	H	H	H	H	
149	3-$CH_3S(O)$-Ph	4-F-Ph	0	H	H	H	H	H	
150	3-$CH_3S(O)$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
151	3-$CH_3S(O)$-Ph	2-Cl-Ph	0	H	H	H	H	H	
152	3-$CH_3S(O)$-Ph	4-Cl-Ph	0	H	H	H	H	H	
153	3-$CH_3S(O)$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
154	3-$CH_3S(O)_2$-Ph	Ph	0	H	H	H	H	H	
155	3-$CH_3S(O)_2$-Ph	2-F-Ph	0	H	H	H	H	H	
156	3-$CH_3S(O)_2$-Ph	4-F-Ph	0	H	H	H	H	H	
157	3-$CH_3S(O)_2$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
158	3-$CH_3S(O)_2$-Ph	2-Cl-Ph	0	H	H	H	H	H	
159	3-$CH_3S(O)_2$-Ph	4-Cl-Ph	0	H	H	H	H	H	
160	3-$CH_3S(O)_2$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
161	4-CH_3S-Ph	Ph	0	H	H	H	H	H	
162	4-CH_3S-Ph	2-F-Ph	0	H	H	H	H	H	
163	4-CH_3S-Ph	4-F-Ph	0	H	H	H	H	H	140-142
164	4-CH_3S-Ph	2,4-F_2-Ph	0	H	H	H	H	H	81-83
165	4-CH_3S-Ph	2-Cl-Ph	0	H	H	H	H	H	
166	4-CH_3S-Ph	4-Cl-Ph	0	H	H	H	H	H	
167	4-CH_3S-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
168	4-$CH_3S(O)$-Ph	Ph	0	H	H	H	H	H	
169	4-$CH_3S(O)$-Ph	2-F-Ph	0	H	H	H	H	H	
170	4-$CH_3S(O)$-Ph	4-F-Ph	0	H	H	H	H	H	81-84
171	4-$CH_3S(O)$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	131-134
172	4-$CH_3S(O)$-Ph	2-Cl-Ph	0	H	H	H	H	H	
173	4-$CH_3S(O)$-Ph	4-Cl-Ph	0	H	H	H	H	H	
174	4-$CH_3S(O)$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
175	4-$CH_3S(O)_2$-Ph	Ph	0	H	H	H	H	H	
176	4-$CH_3S(O)_2$-Ph	2-F-Ph	0	H	H	H	H	H	
177	4-$CH_3S(O)_2$-Ph	4-F-Ph	0	H	H	H	H	H	135
178	4-$CH_3S(O)_2$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
179	4-$CH_3S(O)_2$-Ph	2-Cl-Ph	0	H	H	H	H	H	
180	4-$CH_3S(O)_2$-Ph	4-Cl-Ph	0	H	H	H	H	H	
181	4-$CH_3S(O)_2$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
182	3-n-BuS(O)-Ph	4-F-Ph	0	H	H	H	H	H	
183	3-n-BuS(O)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
184	3-n-BuS(O)-Ph	4-Cl-Ph	0	H	H	H	H	H	
185	3-n-BuS(O)-Ph	2-4-Cl_2-Ph	0	H	H	H	H	H	
186	2-CF_3O-Ph	Ph	0	H	H	H	H	H	
187	2-CF_3O-Ph	2-F-Ph	0	H	H	H	H	H	
188	2-CF_3O-Ph	4-F-Ph	0	H	H	H	H	H	
189	2-CF_3O-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
190	2-CF_3O-Ph	2-Cl-Ph	0	H	H	H	H	H	
191	2-CF_3O-Ph	4-Cl-Ph	0	H	H	H	H	H	
192	2-CF_3O-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
193	3-CF_3O-Ph	Ph	0	H	H	H	H	H	
194	3-CF_3O-Ph	2-F-Ph	0	H	H	H	H	H	
195	3-CF_3O-Ph	4-F-Ph	0	H	H	H	H	H	
196	3-CF_3O-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
197	3-CF_3O-Ph	2-Cl-Ph	0	H	H	H	H	H	
198	3-CF_3O-Ph	4-Cl-Ph	0	H	H	H	H	H	
199	3-CF_3O-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
200	4-CF_3O-Ph	Ph	0	H	H	H	H	H	
201	4-CF_3O-Ph	2-F-Ph	0	H	H	H	H	H	
202	4-CF_3O-Ph	4-F-Ph	0	H	H	H	H	H	
203	4-CF_3O-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
204	4-CF_3O-Ph	2-Cl-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
205	4-CF_3O-Ph	4-Cl-Ph	0	H	H	H	H	H	
206	4-CF_3O-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
207	4-F-1-naphthyl	2-F-Ph	0	H	H	H	H	H	
208	1-naphthyl	4-F-Ph	0	H	H	H	H	H	104-106
209	1-naphthyl	2,4-F_2-Ph	0	H	H	H	H	H	
210	1-naphthyl	2-Cl-Ph	0	H	H	H	H	H	
211	2-Cl-1-naphthyl	4-Cl-Ph	0	H	H	H	H	H	
212	1-naphthyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
213	2-naphthyl	2-F-Ph	0	H	H	H	H	H	
214	2-naphthyl	4-F-Ph	0	H	H	H	H	H	
215	2-naphthyl	2,4-F_2-Ph	0	H	H	H	H	H	
216	2-naphthyl	2-Cl	0	H	H	H	H	H	
217	1-Cl-2-naphthyl	4-Cl-Ph	0	H	H	H	H	H	
218	2-naphthyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
219	2-thienyl	Ph	0	H	H	H	H	H	
220	2-thienyl	2-F-Ph	0	H	H	H	H	H	
221	2-thienyl	4-F-Ph	0	H	H	H	H	H	
222	2-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
223	2-thienyl	2-Cl-Ph	0	H	H	H	H	H	
224	2-thienyl	4-Cl-Ph	0	H	H	H	H	H	
225	2-thienyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
226	3-thienyl	Ph	0	H	H	H	H	H	
227	3-thienyl	2-F-Ph	0	H	H	H	H	H	
228	3-thienyl	4-F-Ph	0	H	H	H	H	H	
229	3-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
230	3-thienyl	2-Cl-Ph	0	H	H	H	H	H	
231	3-thienyl	4-Cl-Ph	0	H	H	H	H	H	
232	3-thienyl	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
233	2-Cl-3-thienyl	Ph	0	H	H	H	H	H	
234	2-Cl-3-thienyl	2-F-Ph	0	H	H	H	H	H	
235	2-Cl-3-thienyl	2-Cl-Ph	0	H	H	H	H	H	
236	5-Cl-2-thienyl	Ph	0	H	H	H	H	H	
237	5-Cl-2-thienyl	2-F-Ph	0	H	H	H	H	H	
238	5-Cl-2-thienyl	2-Cl-Ph	0	H	H	H	H	H	
239	2,5-Cl_2-3-thienyl	Ph	0	H	H	H	H	H	
240	2,5-Cl_2-3-thienyl	2-F-Ph	0	H	H	H	H	H	
241	2,5-Cl_2-3-thienyl	4-F-Ph	0	H	H	H	H	H	
242	2,5-Cl_2-3-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
243	2,5-Cl_2-3-thienyl	2-Cl-Ph	0	H	H	H	H	H	
244	2,5-Cl_2-3-thienyl	4-Cl-Ph	0	H	H	H	H	H	
245	2,5-Cl_2-3-thienyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
246	5-bromo-2-thienyl	Ph	0	H	H	H	H	H	
247	5-bromo-2-thienyl	2-F-Ph	0	H	H	H	H	H	
248	5-bromo-2-thienyl	4-F-Ph	0	H	H	H	H	H	
249	5-bromo-2-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
250	5-bromo-2-thienyl	2-Cl-Ph	0	H	H	H	H	H	
251	5-bromo-2-thienyl	4-Cl-Ph	0	H	H	H	H	H	
252	5-bromo-2-thienyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
253	2-pyridyl	Ph	0	H	H	H	H	H	
254	2-pyridyl	2-F-Ph	0	H	H	H	H	H	
255	2-pyridyl	2-Cl-Ph	0	H	H	H	H	H	
256	3-pyridyl	Ph	0	H	H	H	H	H	
257	3-pyridyl	2-F-Ph	0	H	H	H	H	H	
258	3-pyridyl	2-Cl-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
259	4-pyridyl	Ph	0	H	H	H	H	H	
260	4-pyridyl	2-F-Ph	0	H	H	H	H	H	
261	4-pyridyl	2-Cl-Ph	0	H	H	H	H	H	
262	5-Cl-2-pyridyl	Ph	0	H	H	H	H	H	
263	5-Cl-2-pyridyl	2-F-Ph	0	H	H	H	H	H	
264	5-Cl-2-pyridyl	2-Cl-Ph	0	H	H	H	H	H	
265	2-Cl-3-pyridyl	Ph	0	H	H	H	H	H	
266	2-Cl-3-pyridyl	2-F-Ph	0	H	H	H	H	H	
267	2-Cl-3-pyridyl	4-F-Ph	0	H	H	H	H	H	
268	2-Cl-3-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	142-143
269	2-Cl-3-pyridyl	2-Cl-Ph	0	H	H	H	H	H	
270	2-Cl-3-pyridyl	4-Cl-Ph	0	H	H	H	H	H	140-145
271	2-Cl-3-pyridyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
272	3-Cl-2-pyridyl	Ph	0	H	H	H	H	H	
273	3-Cl-2-pyridyl	2-F-Ph	0	H	H	H	H	H	
274	3-Cl-2-pyridyl	4-F-Ph	0	H	H	H	H	H	
275	3-Cl-2-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
276	3-Cl-2-pyridyl	2-Cl-Ph	0	H	H	H	H	H	
277	3-Cl-2-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
278	3-Cl-2-pyridyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
279	6-Cl-3-pyridyl	Ph	0	H	H	H	H	H	
280	6-Cl-3-pyridyl	2-F-Ph	0	H	H	H	H	H	
281	6-Cl-3-pyridyl	4-F-Ph	0	H	H	H	H	H	
282	6-Cl-3-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
283	6-Cl-3-pyridyl	2-Cl-Ph	0	H	H	H	H	H	
284	6-Cl-3-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
285	6-Cl-3-pyridyl	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
286	Ph	4-F-Ph	0	H	CH_3	H	H	H	108-111
287	Ph	4-F-Ph	0	H	F	H	H	H	
288	Ph	4-F-Ph	0	H	Cl	H	H	H	
289	Ph	4-F-Ph	0	H	Br	H	H	H	
290	Ph	4-F-Ph	0	$-(CH_2)_2-$		H	H	H	
291	Ph	4-F-Ph	0	H	Ph	H	H	H	(oil)[g]
292	Ph	4-F-Ph	0	CH_3	CH_3	H	H	H	
293	Ph	4-F-Ph	0	F	F	H	H	H	
294	Ph	4-F-Ph	0	Cl	Cl	H	H	H	
295	4-F-Ph	4-F-Ph	0	H	CH_3	H	H	H	
296	4-F-Ph	4-F-Ph	0	H	F	H	H	H	
297	4-F-Ph	4-F-Ph	0	H	Cl	H	H	H	
298	4-F-Ph	4-F-Ph	0	H	Br	H	H	H	
299	4-F-Ph	4-F-Ph	0	$-(CH_2)_2-$		H	H	H	
300	4-F-Ph	4-F-Ph	0	CH_3	CH_3	H	H	H	
301	4-F-Ph	4-F-Ph	0	F	F	H	H	H	
302	4-F-Ph	4-F-Ph	0	Cl	Cl	H	H	H	
303	4-Cl-Ph	2,4-Cl_2-Ph	0	H	CH_3	H	H	H	
304	4-Cl-Ph	2,4-Cl_2-Ph	0	H	F	H	H	H	
305	4-Cl-Ph	2,4-Cl_2-Ph	0	H	Cl	H	H	H	
306	4-Cl-Ph	2,4-Cl_2-Ph	0	H	Br	H	H	H	
307	4-Cl-Ph	2,4-Cl_2-Ph	0	$-(CH_2)_2-$		H	H	H	
308	4-Cl-Ph	2,4-Cl_2-Ph	0	CH_3	CH_3	H	H	H	
309	4-Cl-Ph	2,4-Cl_2-Ph	0	F	F	H	H	H	
310	4-Cl-Ph	2,4-Cl_2-Ph	0	Cl	Cl	H	H	H	
311	2-Cl-Ph	4-Cl-Ph	0	H	CH_3	H	H	H	
312	2-Cl-Ph	4-Cl-Ph	0	H	F	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
313	2-Cl-Ph	4-Cl-Ph	0	H	Cl	H	H	H	
314	2-Cl-Ph	4-Cl-Ph	0	H	Br	H	H	H	
315	2-Cl-Ph	4-Cl-Ph	0	$-(CH_2)_2-$		H	H	H	
316	2-Cl-Ph	4-Cl-Ph	0	CH_3	CH_3	H	H	H	
317	2-Cl-Ph	4-Cl-Ph	0	F	F	H	H	H	
318	2-Cl-Ph	4-Cl-Ph	0	Cl	Cl	H	H	H	
319	4-F-Ph	4-F-Ph	0	H	C_2H_5	H	H	H	
320	4-F-Ph	4-F-Ph	0	H	$\underline{i}$-C_3H_7	H	H	H	
321	4-F-Ph	4-F-Ph	0	H	$\underline{n}$-C_4H_9	H	H	H	
322	4-F-Ph	4-F-Ph	0	H	Ph	H	H	H	
323	4-F-Ph	4-F-Ph	0	CH_3	$\underline{t}$-C_4H_9	H	H	H	
324	4-F-Ph	4-F-Ph	0	CH_3	Ph	H	H	H	
325	4-F-Ph	4-F-Ph	0	H	I	H	H	H	
326	4-F-Ph	4-F-Ph	0	CH_3	F	H	H	H	
327	4-F-Ph	4-F-Ph	0	CH_3	Cl	H	H	H	
328	4-F-Ph	4-F-Ph	0	Br	Br	H	H	H	
329	4-F-Ph	4-F-Ph	0	$-(CH_2)_3-$		H	H	H	
330	4-F-Ph	4-F-Ph	0	$-(CH_2)_4-$		H	H	H	
331	4-F-Ph	4-F-Ph	0	$-(CH_2)_5-$		H	H	H	
332	4-F-Ph	4-F-Ph	0	$-(CH_2)_6-$		H	H	H	
333	4-CH_3-Ph	4-F-Ph	0	H	CH_3	H	H	H	
334	4-F-Ph	4-F-Ph	1	H	CH_3	H	H	H	
335	4-Cl-Ph	4-F-Ph	4	H	CH_3	H	H	H	
336	$\underline{n}$-C_4F_9	4-F-Ph	0	H	CH_3	H	H	H	
337	$(CH_3)_2N$	4-F-Ph	1	H	CH_3	H	H	H	
338	5-Cl-thiophen-2-yl	4-F-Ph	0	H	CH_3	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
339	2-Cl-thiophen-3-yl	4-F-Ph	0	H	CH_3	H	H	H	
340	1-imidazoyl	4-F-Ph	0	H	CH_3	H	H	H	
341	1,2,4-triazol-1-yl	4-F-Ph	0	H	CH_3	H	H	H	
342	5-chloro-2-pyridyl	4-F-Ph	0	H	CH_3	H	H	H	
343	4-F-Ph	n-C_4H_9	0	H	CH_3	H	H	H	
344	4-F-Ph	t-C_4H_9	0	H	CH_3	H	H	H	
345	4-F-Ph	n-C_4F_9	0	H	CH_3	H	H	H	
346	4-CH_3-Ph	4-F-Ph	0	H	F	H	H	H	
347	4-F-Ph	4-F-Ph	1	H	F	H	H	H	
348	4-Cl-Ph	4-F-Ph	4	H	F	H	H	H	
349	n-C_4F_9	4-F-Ph	0	H	F	H	H	H	
350	$(CH_3)_2N$	4-F-Ph	1	H	F	H	H	H	
351	5-Cl-thiophen-2-yl	4-F-Ph	0	H	F	H	H	H	
352	2-Cl-thiophen-2-yl	4-F-Ph	0	H	F	H	H	H	
353	1-imidazoyl	4-F-Ph	0	H	F	H	H	H	
354	1,2,4-triazol-1-yl	4-F-Ph	0	H	F	H	H	H	
355	5-Cl-2-pyridyl	4-F-Ph	0	H	F	H	H	H	
356	4-F-Ph	n-C_4H_9	0	H	F	H	H	H	
357	4-F-Ph	t-C_4H_9	0	H	F	H	H	H	
358	4-F-Ph	n-C_4F_9	0	H	F	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
359	4-F-Ph	4-F-Ph	0	H	H	CH_3	H	H	(oil)[h]
360	4-F-Ph	4-F-Ph	0	H	H	$CH_2CH=CH_2$	H	H	(oil)[i]
361	4-F-Ph	4-F-Ph	0	H	H	$COCH_3$	H	H	(oil)[j]
362	4-F-Ph	4-F-Ph	0	H	H	CO_2CH_3	H	H	
363	4-F-Ph	4-F-Ph	0	H	H	$CONHCH_3$	H	H	164-167
364	4-F-Ph	4-F-Ph	0	H	H	CONH-nBu	H	H	
365	4-F-Ph	4-F-Ph	0	H	H	CONHPh	H	H	
366	4-F-Ph	4-F-Ph	0	H	H	CONH-(4-F-Ph)	H	H	
367	4-F-Ph	4-F-Ph	0	H	H	$CON(CH_3)_2$	H	H	
368	2-Cl-Ph	4-Cl-Ph	0	H	H	CH_3	H	H	
369	2-Cl-Ph	4-Cl-Ph	0	H	H	$CH_2CH=CH_2$	H	H	
370	2-Cl-Ph	4-Cl-Ph	0	H	H	$COCH_3$	H	H	
371	2-Cl-Ph	4-Cl-Ph	0	H	H	CO_2CH_3	H	H	
372	2-Cl-Ph	4-Cl-Ph	0	H	H	$CONHCH_3$	H	H	
373	2-Cl-Ph	4-Cl-Ph	0	H	H	CONH-nBu	H	H	
374	2-Cl-Ph	4-Cl-Ph	0	H	H	CONHPh	H	H	
375	2-Cl-Ph	4-Cl-Ph	0	H	H	CONH-(4-F-Ph)	H	H	
376	2-Cl-Ph	4-Cl-Ph	0	H	H	$CON(CH_3)_2$	H	H	
377	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	CH_3	H	H	
378	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	$CH_2CH=CH_2$	H	H	
379	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	$COCH_3$	H	H	
380	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	CO_2CH_3	H	H	
381	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	$CONHCH_3$	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
382	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	CONH-nBu	H	H	
383	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	CONHPh	H	H	
384	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	CONH(4-F-Ph)	H	H	
385	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	$CON(CH_3)_2$	H	H	
386	Ph	4-F-Ph	0	H	H	CH_3	H	H	
387	Ph	4-F-Ph	0	H	H	$CH_2CH=CH_2$	H	H	
388	Ph	4-F-Ph	0	H	H	$COCH_3$	H	H	
389	Ph	4-F-Ph	0	H	H	CO_2CH_3	H	H	
390	Ph	4-F-Ph	0	H	H	$CONHCH_3$	H	H	
391	Ph	4-F-Ph	0	H	H	CONH-nBu	H	H	
392	Ph	4-F-Ph	0	H	H	CONHPh	H	H	
393	Ph	4-F-Ph	0	H	H	CONH(4-F-Ph)	H	H	
394	Ph	4-F-Ph	0	H	H	$CON(CH_3)_2$	H	H	
395	4-F-Ph	4-F-Ph	0	H	H	C_2H_5	H	H	
396	4-F-Ph	4-F-Ph	0	H	H	i-C_3H_7	H	H	
397	4-F-Ph	4-F-Ph	0	H	H	n-C_4H_9	H	H	
398	4-F-Ph	4-F-Ph	0	H	H	COC_2H_5	H	H	
399	4-F-Ph	4-F-Ph	0	H	H	CO-tC_4H_9	H	H	
400	4-F-Ph	4-F-Ph	0	H	H	COPh	H	H	
401	4-F-Ph	4-F-Ph	0	H	H	$COCH_2Ph$	H	H	
402	4-F-Ph	4-F-Ph	0	H	H	$CONH_2$	H	H	
403	4-F-Ph	4-F-Ph	0	H	H	CONH-iC_3H_7	H	H	
404	4-F-Ph	4-F-Ph	0	H	H	$CONHCH_2Ph$	H	H	
405	4-F-Ph	4-F-Ph	0	H	H	$CON(CH_3)Ph$	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
406	4-F-Ph	4-F-Ph	0	H	H	CONH(4-Cl-Ph)	H	H	
407	4-F-Ph	4-F-Ph	0	H	H	CONH(4-CH_3-Ph)	H	H	
408	4-F-Ph	4-F-Ph	0	H	H	CONH(4-CH_3-Ph)	H	H	
409	4-F-Ph	4-F-Ph	0	H	H	CONH(3-CF_3-Ph)	H	H	
410	4-F-Ph	4-F-Ph	0	H	H	CONH(4-NO_2-Ph)	H	H	
411	4-F-Ph	4-F-Ph	0	H	H	CONH(2-CH_3-Ph)	H	H	
412	4-F-Ph	4-F-Ph	0	H	H	CONH(2,4-F_2-Ph)	H	H	
413	4-F-Ph	4-F-Ph	0	H	H	CONH(2,4-Cl_2-Ph)	H	H	
414	4-F-Ph	4-F-Ph	0	H	H	$CO_2C_2H_5$	H	H	
415	4-F-Ph	4-F-Ph	0	H	H	CO_2-nC_4H_9	H	H	
416	4-F-Ph	4-F-Ph	0	H	H	CO_2-tC_4H_9	H	H	
417	4-F-Ph	4-F-Ph	0	H	H	CO_2CH_2Ph	H	H	
418	4-F-Ph	4-F-Ph	0	H	H	CO_2Ph	H	H	
419	4-F-Ph	4-F-Ph	0	H	H	CF_2H	H	H	
420	4-F-Ph	4-F-Ph	0	H	H	CH_2CF_3	H	H	
421	4-F-Ph	4-F-Ph	0	H	H	$CH_2CH_2CH_2F$	H	H	
422	4-F-Ph	4-F-Ph	0	H	H	$CH_2CH_2CH_2CH_2Cl$	H	H	
423	Ph	2,4-F_2-Ph	0	H	H	CH_2-C≡CH	H	H	
424	Ph	4-Cl-Ph	0	H	H	CH_2-C≡CH	H	H	
425	4-F-Ph	2-F-Ph	0	H	H	CH_2-C≡CH	H	H	
426	4-F-Ph	4-F-Ph	0	H	H	CH_2-C≡CH	H	H	(HCl salt 184-187)
427	4-F-Ph	2,4-F_2-Ph	0	H	H	CH_2-C≡CH	H	H	
428	4-F-Ph	2-Cl-Ph	0	H	H	CH_2-C≡CH	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
429	2-Cl-Ph	2,4-F_2-Ph	0	H	H	CH_2-C≡CH	H	H	68-70
430	2-Cl-Ph	4-Cl-Ph	0	H	H	CH_2-C≡CH	H	H	108-111
431	4-Cl-Ph	2-F-Ph	0	H	H	CH_2-C≡CH	H	H	
432	4-Cl-Ph	2,4-F_2-Ph	0	H	H	CH_2-C≡CH	H	H	
433	4-F-Ph	4-F-Ph	1	H	H	H	H	H	
434	4-F-Ph	4-F-Ph	2	H	H	H	H	H	
435	4-F-Ph	4-F-Ph	3	H	H	H	H	H	
436	4-F-Ph	4-F-Ph	4	H	H	H	H	H	
437	2-Cl-Ph	4-Cl-Ph	1	H	H	H	H	H	
438	2-Cl-Ph	4-Cl-Ph	2	H	H	H	H	H	
439	2-Cl-Ph	4-Cl-Ph	3	H	H	H	H	H	
440	2-Cl-Ph	4-Cl-Ph	4	H	H	H	H	H	
441	4-Cl-Ph	2,4-Cl_2-Ph	1	H	H	H	H	H	
442	4-Cl-Ph	2,4-Cl_2-Ph	2	H	H	H	H	H	
443	4-Cl-Ph	2,4-Cl_2-Ph	3	H	H	H	H	H	
444	4-Cl-Ph	2,4-Cl_2-Ph	4	H	H	H	H	H	
445	Ph	4-F-Ph	1	H	H	H	H	H	
446	Ph	4-F-Ph	2	H	H	H	H	H	
447	OH	4-Cl-Ph	1	H	H	H	H	H	(oil)[k]
448	OH	Ph	1	H	H	H	H	H	94-100
449	OH	2,4-Cl_2-Ph	1	H	H	H	H	H	166-168
450	OH	4-F-Ph	1	H	H	H	H	H	115-116
451	OH	4-Br-Ph	1	H	H	H	H	H	(foam)[l]
452	OH	4-Ph-Ph	1	H	H	H	H	H	140-143
453	$(CH_3)_2N$	2,4-Cl_2-Ph	1	H	H	H	H	H	104-107
454	$(CH_3)_2N$	4-F-Ph	1	H	H	H	H	H	(oil)[m]

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
455	$(CH_3)_2N$	4-Br-Ph	1	H	H	H	H	H	(oil)[n]
456	$(CH_3)_2N$	4-Ph-Ph	1	H	H	H	H	H	(oil)°
457	1-imidazoyl	4-F-Ph	1	H	H	H	H	H	
458	1-imidazoyl	4-F-Ph	2	H	H	H	H	H	
459	1-imidazoyl	4-F-Ph	3	H	H	H	H	H	
460	1-imidazoyl	4-F-Ph	4	H	H	H	H	H	
461	1H-1,2,4-triazol-1-yl	4-F-Ph	1	H	H	H	H	H	
462	1H-1,2,4-triazol-1-yl	4-F-Ph	2	H	H	H	H	H	
463	1H-1,2,4-triazol-1-yl	4-F-Ph	3	H	H	H	H	H	
464	1H-1,2,4-triazol-1-yl	4-F-Ph	4	H	H	H	H	H	
465	1H-1,2,4-triazol-1-yl	$2,4-Cl_2$-Ph	1	H	H	H	H	H	
466	1H-1,2,4-triazol-1-yl	$2,4-Cl_2$-Ph	2	H	H	H	H	H	
467	1-imidazoyl	$2,4-Cl_2$-Ph	1	H	H	H	H	H	
468	1-piperidyl	Ph	1	H	H	H	H	H	
469	1-piperidyl	2-F-Ph	1	H	H	H	H	H	
470	1-piperidyl	4-F-Ph	1	H	H	H	H	H	
471	1-piperidyl	$2,4-F_2$-Ph	1	H	H	H	H	H	
472	1-piperidyl	2-Cl-Ph	1	H	H	H	H	H	
473	1-piperidyl	4-Cl-Ph	1	H	H	H	H	H	
474	1-piperidyl	$2,4-Cl_2$-Ph	1	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
475	2,6-$(CH_3)_2$-1-morpholinyl	Ph	1	H	H	H	H	H	
476	2,6-$(CH_3)_2$-1-morpholinyl	2-F-Ph	1	H	H	H	H	H	
477	2,6-$(CH_3)_2$-1-morpholinyl	4-F-Ph	1	H	H	H	H	H	97-99
478	2,6-$(CH_3)_2$-1-morpholinyl	2,4-F_2-Ph	1	H	H	H	H	H	
479	2,6-$(CH_3)_2$-1-morpholinyl	2-Cl-Ph	1	H	H	H	H	H	
480	2,6-$(CH_3)_2$-1-morpholinyl	4-Cl-Ph	1	H	H	H	H	H	
481	2,6-$(CH_3)_2$-1-morpholinyl	2,4-Cl_2-Ph	1	H	H	H	H	H	
482	4-CH_3-1-piperazinyl	Ph	1	H	H	H	H	H	
483	4-CH_3-1-piperazinyl	2-F-Ph	1	H	H	H	H	H	
484	4-CH_3-1-piperazinyl	4-F-Ph	1	H	H	H	H	H	
485	4-CH_3-1-piperazinyl	2,4-F_2-Ph	1	H	H	H	H	H	
486	4-CH_3-1-piperazinyl	2-Cl-Ph	1	H	H	H	H	H	
487	4-CH_3-1-piperazinyl	4-Cl-Ph	1	H	H	H	H	H	
488	4-CH_3-1-piperazinyl	2,4-Cl_2-Ph	1	H	H	H	H	H	
489	4-n-Bu-1-piperazinyl	Ph	1	H	H	H	H	H	
490	4-n-Bu-1-piperazinyl	2-F-Ph	1	H	H	H	H	H	
491	4-n-Bu-1-piperazinyl	4-F-Ph	1	H	H	H	H	H	
492	4-n-Bu-1-piperazinyl	2,4-F_2-Ph	1	H	H	H	H	H	
493	4-n-Bu-1-piperazinyl	2-Cl-Ph	1	H	H	H	H	H	
494	4-n-Bu-1-piperazinyl	4-Cl-Ph	1	H	H	H	H	H	
495	4-n-Bu-1-piperazinyl	2,4-Cl_2-Ph	1	H	H	H	H	H	
496	4-acetyl-1-piperazinyl	Ph	1	H	H	H	H	H	
497	4-acetyl-1-piperazinyl	2-F-Ph	1	H	H	H	H	H	
498	4-acetyl-1-piperazinyl	4-F-Ph	1	H	H	H	H	H	
499	4-acetyl-1-piperazinyl	2,4-F_2-Ph	1	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
500	4-acetyl-1-piperazinyl	2-Cl-Ph	1	H	H	H	H	H	
501	4-acetyl-1-piperazinyl	4-Cl-Ph	1	H	H	H	H	H	
502	4-acetyl-1-piperazinyl	2,4-Cl_2-Ph	1	H	H	H	H	H	
503	2-(2-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
504	2-(3-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
505	2-(4-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
506	3-(2-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
507	3-(3-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
508	3-(4-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
509	4-(2-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
510	4-(3-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
511	4-(4-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
512	2-(1H-1,2,4-triazol-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
513	3-(1H-1,2,4-triazol-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
514	4-(1H-1,2,4-triazol-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
515	2-(imidazol-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
516	3-(imidazol-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
517	4-(imidazol-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
518	2-(4-methylpiperazin-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
519	3-(4-methylpiperazin-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
520	4-(4-methylpiperazin-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
521	2-(4-acetylpiperazin-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
522	3-(4-acetylpiperazin-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
523	4-(4-acetylpiperazin-1-yl)-Ph	4-F-Ph	0	H	H	H	H	H	
524	2-(2-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
525	2-(3-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
526	2-(4-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
527	3-(2-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
528	3-(3-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	(Foam)[am]
529	3-(4-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
530	4-(2-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
531	4-(3-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	(Foam)[an]
532	4-(4-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
533	2-(1H-1,2,4-triazol-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
534	3-(1H-1,2,4-triazol-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
535	4-(1H-1,2,4-triazol-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
536	2-(imidazol-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
537	3-(imidazol-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
538	4-(imidazol-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
539	2-(4-methylpiperazin-2-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
540	3-(4-methylpiperazin-2-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
541	4-(4-methylpiperazin-2-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
542	2-(4-acetylpiperazin-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
543	3-(4-acetylpiperazin-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
544	4-(4-acetylpiperazin-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
545	2-Cl-3-(3-pyridyl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
546	2-(2-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
547	2-(3-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
548	2-(4-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
549	3-(2-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
550	3-(3-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
551	3-(4-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
552	4-(2-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
553	4-(3-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
554	4-(4-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
555	2-(1H-1,2,4-triazol-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
556	3-(1H-1,2,4-triazol-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
557	4-(1H-1,2,4-triazol-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
558	2-(imidazol-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
559	3-(imidazol-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
560	4-(imidazol-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
561	2-(4-methylpiperazin-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
562	3-(4-methylpiperazin-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
563	4-(4-methylpiperazin-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
564	2-(4-acetylpiperazin-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
565	3-(4-acetylpiperazin-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
566	4-(4-acetylpiperazin-1-yl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
567	2-Cl-3-(3-pyridyl)-Ph	4-Cl-Ph	0	H	H	H	H	H	
568	2-(2-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
569	2-(3-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
570	2-(4-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
571	3-(2-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
572	3-(3-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
573	3-(4-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
574	4-(2-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
575	4-(3-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
576	4-(4-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
577	2-(1H-1,2,4-triazol-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
578	3-(1H-1,2,4-triazol-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
579	4-(1H-1,2,4-triazol-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
580	2-(imidazol-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
581	3-(imidazol-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
582	4-(imidazol-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
583	2-(4-methylpiperazin-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
584	3-(4-methylpiperazin-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
585	4-(4-methylpiperazin-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
586	2-(4-acetylpiperazin-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
587	3-(4-acetylpiperazin-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
588	4-(4-acetylpiperazin-1-yl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
589	2-Cl-3-(3-pyridyl)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
590	3-(morpholin-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
591	3-(2,6-dimethyl-morpholin-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
592	4-(n-butyl-piperazin-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
593	4-(piperidin-1-yl)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
594	Ph	2-F-Ph	0	H	H	H	H	H	(oil)P (HCl salt 190-195)
595	Ph	3-F-Ph	0	H	H	H	H	H	
596	Ph	2-Cl-Ph	0	H	H	H	H	H	78-80
597	Ph	3-Cl-Ph	0	H	H	H	H	H	
598	Ph	4-Br-Ph	0	H	H	H	H	H	92-95

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
599	Ph	4-I-Ph	0	H	H	H	H	H	
600	Ph	3,4-F_2-Ph	0	H	H	H	H	H	
601	Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
602	Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
603	Ph	3,5-Cl_2-Ph	0	H	H	H	H	H	142-144
604	Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	
605	Ph	3-Cl-(4-F)-Ph	0	H	H	H	H	H	119-124 (dec.)
606	Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
607	Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
608	Ph	Ph	0	H	H	H	H	H	130-133
609	Ph	4-CH_3-Ph	0	H	H	H	H	H	
610	Ph	3-CH_3-Ph	0	H	H	H	H	H	
611	Ph	2-CH_3-Ph	0	H	H	H	H	H	160.5-163
612	Ph	2-CF_3-Ph	0	H	H	H	H	H	
613	Ph	3-CF_3-Ph	0	H	H	H	H	H	
614	Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
615	Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	
616	Ph	4-CH_3O-Ph	0	H	H	H	H	H	
617	Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
618	Ph	5-Cl-2-thienyl	0	H	H	H	H	H	88-90
619	Ph	s-C_4H_9	0	H	H	H	H	H	
620	2-Cl-Ph	2-F-Ph	0	H	H	H	H	H	118-119
621	2-Cl-Ph	3-F-Ph	0	H	H	H	H	H	
622	2-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	149-150

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
623	2-Cl-Ph	3-Cl-Ph	0	H	H	H	H	H	
624	2-Cl-Ph	4-Br-Ph	0	H	H	H	H	H	151-152
625	2-Cl-Ph	4-I-Ph	0	H	H	H	H	H	
626	2-Cl-Ph	3,4-F_2-Ph	0	H	H	H	H	H	
627	2-Cl-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	122-123.5
628	2-Cl-Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
629	2-Cl-Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	
630	2-Cl-Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
631	2-Cl-Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
632	2-Cl-Ph	Ph	0	H	H	H	H	H	
633	2-Cl-Ph	4-CH_3-Ph	0	H	H	H	H	H	
634	2-Cl-Ph	3-CH_3-Ph	0	H	H	H	H	H	
635	2-Cl-Ph	2-CH_3-Ph	0	H	H	H	H	H	
636	2-Cl-Ph	2-CF_3-Ph	0	H	H	H	H	H	
637	2-Cl-Ph	3-CF_3-Ph	0	H	H	H	H	H	
638	2-Cl-Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	
639	2-Cl-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
640	2-Cl-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
641	2-Cl-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	(oil)[v]
642	2-Cl-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
643	2-Cl-Ph	s-C_4H_9	0	H	H	H	H	H	
644	4-F-Ph	2-F-Ph	0	H	H	H	H	H	96-97
645	4-F-Ph	3-F-Ph	0	H	H	H	H	H	
646	4-F-Ph	2-Cl-Ph	0	H	H	H	H	H	116-119
647	4-F-Ph	3-Cl-Ph	0	H	H	H	H	H	
648	4-F-Ph	4-Br-Ph	0	H	H	H	H	H	114-116
649	4-F-Ph	4-I-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
650	4-F-Ph	3,4-F_2-Ph	0	H	H	H	H	H	
651	4-F-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	98-99
652	4-F-Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
653	4-F-Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	128-130
654	4-F-Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
655	4-F-Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
656	4-F-Ph	Ph	0	H	H	H	H	H	124-125
657	4-F-Ph	4-Ph-Ph	0	H	H	H	H	H	116-119
658	4-F-Ph	4-CH_3-Ph	0	H	H	H	H	H	145-147
659	4-F-Ph	2-CH_3-Ph	0	H	H	H	H	H	145-149
660	4-F-Ph	2-CF_3-Ph	0	H	H	H	H	H	
661	4-F-Ph	3-CF_3-Ph	0	H	H	H	H	H	121-122
662	4-F-Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	
663	4-F-Ph	4-CH_3O-Ph	0	H	H	H	H	H	112-114
664	4-F-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
665	4-F-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	114-115
666	4-F-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
667	4-F-Ph	i-C_3H_7	0	H	H	H	H	H	74-75
668	4-F-Ph	C_2H_5	0	H	H	H	H	H	(oil)[q]
669	4-Cl-Ph	2-F-Ph	0	H	H	H	H	H	130-131
670	4-Cl-Ph	3-F-Ph	0	H	H	H	H	H	
671	4-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	137-139
672	4-Cl-Ph	3-Cl-Ph	0	H	H	H	H	H	
673	4-Cl-Ph	4-Br-Ph	0	H	H	H	H	H	121-123
674	4-Cl-Ph	4-I-Ph	0	H	H	H	H	H	

Table 1 (Continued)

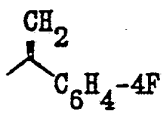
Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
675	4-Cl-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	107-198
676	4-Cl-Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
677	4-Cl-Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	
678	4-Cl-Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
679	4-Cl-Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
680	4-Cl-Ph	Ph	0	H	H	H	H	H	
681	4-Cl-Ph	4-CH_3-Ph	0	H	H	H	H	H	
682	4-Cl-Ph	3-CH_3-Ph	0	H	H	H	H	H	
683	4-Cl-Ph	2-CH_3-Ph	0	H	H	H	H	H	
684	4-Cl-Ph	2-CF_3-Ph	0	H	H	H	H	H	
685	4-Cl-Ph	3-CF_3-Ph	0	H	H	H	H	H	103-104
686	4-Cl-Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	
687	4-Cl-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
688	4-Cl-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
689	4-Cl-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	(oil)*
690	4-Cl-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
691	4-Cl-Ph	s-C_4H_9	0	H	H	H	H	H	
692	4-F-Ph		0	H	H	H	H	H	
693	4-F-Ph	t-butyl	0	H	H	H	H	H	
694	4-F-Ph	n-hexyl	0	H	H	H	H	H	
695	4-F-Ph	n-heptyl	0	H	H	H	H	H	
696	4-F-Ph	2,4-$(CH_3)_2$-Ph	0	H	H	H	H	H	148-149
697	4-F-Ph	-C_6F_{13}	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
698	4-F-Ph	$-C_8F_{17}$	0	H	H	H	H	H	
699	4-F-Ph	4-pyridyl	0	H	H	H	H	H	175-178
700	4-F-Ph	2-pyridyl	0	H	H	H	H	H	
701	4-F-Ph	2-thienyl	0	H	H	H	H	H	
702	4-F-Ph	4-n-Bu-Ph	0	H	H	H	H	H	
703	4-F-Ph	4-n-BuO-Ph	0	H	H	H	H	H	
704	4-F-Ph	5-CF_3-pyrid-2-yl	0	H	H	H	H	H	
705	4-F-Ph	5-$MeSO_2$-2-thienyl	0	H	H	H	H	H	
706	4-C_2H_5-Ph	4-F-Ph	0	H	H	H	H	H	
707	4-(n-BuO)-Ph	4-F-Ph	0	H	H	H	H	H	
708	2-CH_3SO_2-imidazol-1-yl	4-F-Ph	0	H	H	H	H	H	
709	5-CH_3-1,2,4-triazol-1-yl	4-F-Ph	0	H	H	H	H	H	
710	$-C_6F_{13}$	4-F-Ph	0	H	H	H	H	H	
711	$-C_8F_{17}$	4-F-Ph	0	H	H	H	H	H	
712	2-Cl-3-(3-pyridyl)-Ph	4-F-Ph	0	H	H	H	H	H	
713	2-CF_3-imidazol-1-yl	4-F-Ph	0	H	H	H	H	H	
714	4-(i-PrO)-Ph	4-F-Ph	0	H	H	H	H	H	
715	4-I-Ph	4-F-Ph	0	H	H	H	H	H	
716	3,4-F_2-Ph	4-F-Ph	0	H	H	H	H	H	
717	3,4-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
718	2,6-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
719	2-Cl-(4-F)-Ph	4-F-Ph	0	H	H	H	H	H	
720	2,4,6-Cl_3-Ph	4-F-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
721	4-CH_3-Ph	4-F-Ph	0	H	H	H	H	H	119-120
722	3-CH_3-Ph	4-F-Ph	0	H	H	H	H	H	
723	2-CH_3-Ph	4-F-Ph	0	H	H	H	H	H	181-184
724	2-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	110-112
725	3-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	106-108
726	4-CH_3O-Ph	4-F-Ph	0	H	H	H	H	H	109-111
727	2,3-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
728	3,5-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
729	2,5-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
730	3-Br-Ph	4-F-Ph	0	H	H	H	H	H	91-93
731	4-EtO-Ph	4-F-Ph	0	H	H	H	H	H	
732	2,4-$(CH_3)_2$-Ph	4-F-Ph	0	H	H	H	H	H	
733	2,4,6-$(CH_3)_3$-Ph	4-F-Ph	0	H	H	H	H	H	
734	4-Ph-Ph	4-F-Ph	0	H	H	H	H	H	
735	5-Cl-2-thienyl	4-F-Ph	0	H	H	H	H	H	
736	2-Cl-3-thienyl	4-F-Ph	0	H	H	H	H	H	
737	1-imidazoyl	4-F-Ph	0	H	H	H	H	H	
738	1H-1,2,4-triazoyl	4-F-Ph	0	H	H	H	H	H	
739	2-pyridyl	4-F-Ph	0	H	H	H	H	H	
740	5-Cl-pyrid-2-yl	4-F-Ph	0	H	H	H	H	H	
741	3-pyridyl	4-F-Ph	0	H	H	H	H	H	
742	4-pyridyl	4-F-Ph	0	H	H	H	H	H	
743	n-C_4F_9	4-F-Ph	0	H	H	H	H	H	
744	4-I-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
745	3,4-F_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
746	3,4-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
747	2,6-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
748	2-Cl-(4-F)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
749	2,4,6-Cl_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
750	4-CH_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
751	3-CH_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
752	2-CH_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
753	2-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	133-137
754	3-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	77-84
755	4-CH_3O-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
756	2,3-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
757	3,5-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
758	2,5-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
759	3-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	171-173
760	4-EtO-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
761	2,4-$(CH_3)_2$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
762	2,4,6-$(CH_3)_3$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
763	4-Ph-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
764	5-Cl-2-thienyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
765	2-Cl-3-thienyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
766	1-imidazoyl	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
767	1H-1,2,4-triazoyl-1-yl	2,4-Cl_2-Ph	0	H	H	H	H	H	
768	2-pyridyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
769	5-Cl-pyrid-2-yl	2,4-Cl_2-Ph	0	H	H	H	H	H	
770	3-pyridyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
771	4-pyridyl	2,4-Cl_2-Ph	0	H	H	H	H	H	
772	n-C_4F_9	2,4-Cl_2-Ph	0	H	H	H	H	H	
773	4-I-Ph	4-Cl-Ph	0	H	H	H	H	H	
774	3,4-F_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
775	3,4-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
776	2,6-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
777	2-Cl-(4-F)-Ph	4-Cl-Ph	0	H	H	H	H	H	
778	2,4,6-Cl_3-Ph	4-Cl-Ph	0	H	H	H	H	H	
779	4-CH_3-Ph	4-Cl-Ph	0	H	H	H	H	H	
780	3-CH_3-Ph	4-Cl-Ph	0	H	H	H	H	H	
781	2-CH_3-Ph	4-Cl-Ph	0	H	H	H	H	H	
782	2-CF_3-Ph	4-Cl-Ph	0	H	H	H	H	H	43-49
783	3-CF_3-Ph	4-Cl-Ph	0	H	H	H	H	H	109-112
784	4-CH_3O-Ph	4-Cl-Ph	0	H	H	H	H	H	111-113
785	2,3-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
786	3,5-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
787	2,5-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
788	3-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	119-121
789	4-EtO-Ph	4-Cl-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
790	2,4-$(CH_3)_2$-Ph	4-Cl-Ph	0	H	H	H	H	H	
791	2,4,6-$(CH_3)_3$-Ph	4-Cl-Ph	0	H	H	H	H	H	
792	4-Ph-Ph	4-Cl-Ph	0	H	H	H	H	H	
793	5-Cl-2-thienyl	4-Cl-Ph	0	H	H	H	H	H	
794	2-Cl-3-thienyl	4-Cl-Ph	0	H	H	H	H	H	
795	1-imidazoyl	4-Cl-Ph	0	H	H	H	H	H	
796	1H-1,2,4-triazoyl-1-yl	4-Cl-Ph	0	H	H	H	H	H	
797	2-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
798	5-Cl-pyrid-2-yl	4-Cl-Ph	0	H	H	H	H	H	
799	3-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
800	4-pyridyl	4-Cl-Ph	0	H	H	H	H	H	(oil)[af]
801	n-C_4F_9	4-Cl-Ph	0	H	H	H	H	H	
802	4-I-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
803	3,4-F_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
804	3,4-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
805	2,6-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
806	2-Cl-(4-F)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
807	2,4,6-Cl_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
808	4-CH_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	129-130.5
809	3-CH_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
810	2-CH_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
811	2-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	113-116
812	3-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	123-124
813	4-CH_3O-Ph	2,4-F_2-Ph	0	H	H	H	H	H	88-89

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
814	2,3-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
815	3,5-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	173-175
816	2,5-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
817	3-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	103-107
818	4-EtO-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
819	2,4-$(CH_3)_2$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
820	2,4,6-$(CH_3)_3$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
821	4-Ph-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
822	5-Cl-2-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
823	2-Cl-3-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
824	1-imidazoyl	2,4-F_2-Ph	0	H	H	H	H	H	
825	1H-1,2,4-triazoyl-1-yl	2,4-F_2-Ph	0	H	H	H	H	H	
826	2-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
827	5-Cl-pyrid-2-yl	2,4-F_2-Ph	0	H	H	H	H	H	
828	3-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
829	4-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
830	n-C_4F_9	2,4-F_2-Ph	0	H	H	H	H	H	
831	2-F-Ph	4-Br-Ph	0	H	H	H	H	H	
832	3-F-Ph	4-Br-Ph	0	H	H	H	H	H	
833	3-Cl-Ph	4-Br-Ph	0	H	H	H	H	H	
834	4-Br-Ph	4-Br-Ph	0	H	H	H	H	H	
835	2,4-F_2-Ph	4-Br-Ph	0	H	H	H	H	H	
836	2,4-Cl_2-Ph	4-Br-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
837	2-CF_3-Ph	4-Br-Ph	0	H	H	H	H	H	
838	3-CF_3-Ph	4-Br-Ph	0	H	H	H	H	H	
839	4-CF_3-Ph	4-Br-Ph	0	H	H	H	H	H	
840	2-F-Ph	4-I-Ph	0	H	H	H	H	H	
841	3-F-Ph	4-I-Ph	0	H	H	H	H	H	
842	3-Cl-Ph	4-I-Ph	0	H	H	H	H	H	
843	4-Br-Ph	4-I-Ph	0	H	H	H	H	H	
844	2,4-F_2-Ph	4-I-Ph	0	H	H	H	H	H	
845	2,4-Cl_2-Ph	4-I-Ph	0	H	H	H	H	H	
846	2-CF_3-Ph	4-I-Ph	0	H	H	H	H	H	
847	3-CF_3-Ph	4-I-Ph	0	H	H	H	H	H	
848	4-CF_3-Ph	4-I-Ph	0	H	H	H	H	H	
849	2-F-Ph	2-CH_3-Ph	0	H	H	H	H	H	
850	3-F-Ph	2-CH_3-Ph	0	H	H	H	H	H	
851	3-Cl-Ph	2-CH_3-Ph	0	H	H	H	H	H	
852	4-Br-Ph	2-CH_3-Ph	0	H	H	H	H	H	
853	2,4-F_2-Ph	2-CH_3-Ph	0	H	H	H	H	H	
854	2,4-Cl_2-Ph	2-CH_3-Ph	0	H	H	H	H	H	
855	2-CF_3-Ph	2-CH_3-Ph	0	H	H	H	H	H	
856	3-CF_3-Ph	2-CH_3-Ph	0	H	H	H	H	H	
857	4-CF_3-Ph	2-CH_3-Ph	0	H	H	H	H	H	
858	4-(4-F-Ph)-Ph	4-F-Ph	0	H	H	H	H	H	
859	4-(2-Cl-Ph)-Ph	4-Cl-Ph	0	H	H	H	H	H	
860	3-(3-CF_3-Ph)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
861	3-(2,4-F_2-Ph)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
862	2,4-F_2-Ph	4-CH_3-Ph	0	H	H	H	H	H	
863	4-CH_3-Ph	4-CH_3-Ph	0	H	H	H	H	H	178-181.5
864	2-CF_3-Ph	4-CH_3-Ph	0	H	H	H	H	H	
865	3-CF_3-Ph	4-CH_3-Ph	0	H	H	H	H	H	
866	4-CF_3-Ph	4-CH_3-Ph	0	H	H	H	H	H	
867	2-F-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
868	3-F-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
869	3-Cl-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
870	4-Br-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
871	2,4-F_2-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
872	2,4-Cl_2-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
873	2-CF_3-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
874	3-CF_3-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
875	4-CF_3-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
876	Ph	2-CH_3O-Ph	0	H	H	H	H	H	
877	2-F-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
878	3-F-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
879	4-F-Ph	2-CH_3O-Ph	0	H	H	H	H	H	56-70 (138-139.5 •$H_2C_2O_4$)
880	2,4-F_2-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
881	2-Cl-Ph	2-CH_3O-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
882	3-Cl-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
883	4-Cl-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
884	2,4-Cl_2-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
885	4-Br-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
886	2-CF_3-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
887	3-CF_3-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
888	4-CF_3-Ph	2-CH_3O-Ph	0	H	H	H	H	H	
889	Ph	4-CF_3O-Ph	0	H	H	H	H	H	
890	2-F-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
891	3-F-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
892	4-F-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
893	2,4-F_2-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
894	2-Cl-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
895	3-Cl-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
896	4-Cl-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
897	2,4-Cl_2-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
898	4-Br-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
899	2-CF_3-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
900	3-CF_3-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
901	4-CF_3-Ph	4-CF_3O-Ph	0	H	H	H	H	H	
902	2-F-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
903	3-F-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
904	2,4-F_2-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
905	3-Cl-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	110-111
906	2,4-Cl_2-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
907	4-Br-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
908	2-CF_3-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
909	3-CF_3-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
910	4-CF_3-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
911	Ph	2,5-F_2-Ph	0	H	H	H	H	H	
912	2-F-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
913	3-F-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
914	4-F-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
915	2,4-F_2-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
916	2-Cl-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
917	3-Cl-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
918	4-Cl-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
919	2,4-Cl_2-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
920	4-Br-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
921	2-CF_3-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
922	3-CF_3-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
923	4-CF_3-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
924	Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
925	2-F-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
926	3-F-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
927	4-F-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
928	2,4-F_2-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
929	2-Cl-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
930	3-Cl-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
931	4-Cl-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
932	2,4-Cl_2-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
933	4-Br-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
934	2-CF_3-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
935	3-CF_3-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
936	4-CF_3-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
937	Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
938	2-F-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
939	3-F-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
940	4-F-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
941	2,4-F_2-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
942	2-Cl-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
943	3-Cl-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
944	4-Cl-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
945	2,4-Cl_2-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
946	4-Br-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
947	2-CF_3-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
948	3-CF_3-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	
949	4-CF_3-Ph	2,4,6-F_3-Ph	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
950	Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
951	2-F-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
952	3-F-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
953	4-F-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
954	2,4-F_2-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
955	2-Cl-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
956	3-Cl-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
957	4-Cl-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
958	2,4-Cl_2-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
959	4-Br-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
960	2-CF_3-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
961	3-CF_3-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
962	4-CF_3-Ph	2,4,5-F_3-Ph	0	H	H	H	H	H	
963	2-F-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
964	3-F-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
965	2,4-F_2-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
966	3-Cl-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
967	2,4-Cl_2-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
968	4-Br-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
969	2-CF_3-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
970	3-CF_3-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
971	4-CF_3-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	
972	Ph	4-F-1-naphthyl	0	H	H	H	H	H	
973	2-F-Ph	1-naphthyl	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
974	3-F-Ph	1-naphthyl	0	H	H	H	H	H	
975	4-F-Ph	1-naphthyl	0	H	H	H	H	H	
976	2,4-F_2-Ph	1-naphthyl	0	H	H	H	H	H	
977	2-Cl-Ph	1-naphthyl	0	H	H	H	H	H	
978	3-Cl-Ph	1-naphthyl	0	H	H	H	H	H	
979	4-Cl-Ph	1-naphthyl	0	H	H	H	H	H	
980	2,4-Cl_2-Ph	1-naphthyl	0	H	H	H	H	H	
981	4-Br-Ph	1-naphthyl	0	H	H	H	H	H	
982	2-CF_3-Ph	1-naphthyl	0	H	H	H	H	H	
983	3-CF_3-Ph	1-naphthyl	0	H	H	H	H	H	
984	4-CF_3-Ph	1-naphthyl	0	H	H	H	H	H	
985	Ph	6-Cl-2-naphthyl	0	H	H	H	H	H	
986	2-F-Ph	2-naphthyl	0	H	H	H	H	H	
987	3-F-Ph	2-naphthyl	0	H	H	H	H	H	
988	4-F-Ph	2-naphthyl	0	H	H	H	H	H	
989	2,4-F_2-Ph	2-naphthyl	0	H	H	H	H	H	
990	2-Cl-Ph	2-naphthyl	0	H	H	H	H	H	
991	3-Cl-Ph	2-naphthyl	0	H	H	H	H	H	
992	4-Cl-Ph	2-naphthyl	0	H	H	H	H	H	
993	2,4,-Cl_2-Ph	2-naphthyl	0	H	H	H	H	H	
994	4-Br-Ph	2-naphthyl	0	H	H	H	H	H	
995	2-CF_3-Ph	2-naphthyl	0	H	H	H	H	H	
996	3-CF_3-Ph	2-naphthyl	0	H	H	H	H	H	
997	4-CF_3-Ph	2-naphthyl	0	H	H	H	H	H	
998	Ph	$PhCH_2$-	0	H	H	H	H	H	
999	2-F-Ph	$PhCH_2$-	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1000	3-F-Ph	$PhCH_2$-	0	H	H	H	H	H	
1001	4-F-Ph	$PhCH_2$-	0	H	H	H	H	H	
1002	2,4-F_2-Ph	$PhCH_2$-	0	H	H	H	H	H	
1003	2-Cl-Ph	$PhCH_2$-	0	H	H	H	H	H	
1004	3-Cl-Ph	$PhCH_2$-	0	H	H	H	H	H	
1005	4-Cl-Ph	$PhCH_2$-	0	H	H	H	H	H	
1006	2,4-Cl_2-Ph	$PhCH_2$-	0	H	H	H	H	H	
1007	4-Br-Ph	$PhCH_2$-	0	H	H	H	H	H	
1008	2-CF_3-Ph	$PhCH_2$-	0	H	H	H	H	H	
1009	3-CF_3-Ph	$PhCH_2$-	0	H	H	H	H	H	
1010	4-CF_3-Ph	$PhCH_2$-	0	H	H	H	H	H	
1011	Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1012	2-F-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1013	3-F-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1014	4-F-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1015	2,4-F_2-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1016	2-Cl-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1017	3-Cl-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1018	4-Cl-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1019	2,4-Cl_2-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1020	4-Br-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	
1021	2-CF_3-Ph	$PhCH(CH_3)$	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1022	3-CF_3-Ph	PhCH(CH_3)	0	H	H	H	H	H	
1023	4-CF_3-Ph	PhCH(CH_3)	0	H	H	H	H	H	
1024	Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1025	2-F-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1026	3-F-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1027	4-F-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1028	2,4-F_2-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1029	2-Cl-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1030	3-Cl-PH	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1031	4-Cl-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1032	2,4-Cl_2-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1033	4-Br-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1034	2-CF_3-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1035	3-CF_3-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1036	4-CF_3-Ph	PhC(CH_3)$_2$-	0	H	H	H	H	H	
1037	Ph	4-Cl-PhC(CH_3)$_2$-	0	H	H	H	H	H	
1038	2-F-Ph	4-Cl-PhC(CH_3)$_2$-	0	H	H	H	H	H	
1039	3-F-Ph	4-Cl-PhC(CH_3)$_2$-	0	H	H	H	H	H	
1040	4-F-Ph	4-Cl-PhC(CH_3)$_2$-	0	H	H	H	H	H	(oil)[x]
1041	2,4-F_2-Ph	4-Cl-PhC(CH_3)$_2$-	0	H	H	H	H	H	
1042	2-Cl-Ph	4-Cl-PhC(CH_3)$_2$-	0	H	H	H	H	H	
1043	3-Cl-Ph	4-Cl-PhC(CH_3)$_2$-	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1044	4-Cl-Ph	4-Cl-PhC$(CH_3)_2$-	0	H	H	H	H	H	
1045	2,4-Cl_2-Ph	4-Cl-PhC$(CH_3)_2$-	0	H	H	H	H	H	
1046	4-Br-Ph	4-Cl-PhC$(CH_3)_2$-	0	H	H	H	H	H	
1047	2-CF_3-Ph	4-Cl-PhC$(CH_3)_2$-	0	H	H	H	H	H	
1048	3-CF_3-Ph	4-Cl-PhC$(CH_3)_2$-	0	H	H	H	H	H	
1049	4-CF_3-Ph	4-Cl-PhC$(CH_3)_2$-	0	H	H	H	H	H	
1050	Ph	2-thienyl	0	H	H	H	H	H	127-129
1051	2-F-Ph	2-thienyl	0	H	H	H	H	H	
1052	3-F-Ph	2-thienyl	0	H	H	H	H	H	
1053	4-F-Ph	2-thienyl	0	H	H	H	H	H	125-134
1054	2,4-F_2-Ph	2-thienyl	0	H	H	H	H	H	
1055	2-Cl-Ph	2-thienyl	0	H	H	H	H	H	
1056	3-Cl-Ph	2-thienyl	0	H	H	H	H	H	110
1057	4-Cl-Ph	2-thienyl	0	H	H	H	H	H	141-143
1058	2,4-Cl_2-Ph	2-thienyl	0	H	H	H	H	H	(oil)[y]
1059	4-Br-Ph	2-thienyl	0	H	H	H	H	H	
1060	2-CF_3-Ph	2-thienyl	0	H	H	H	H	H	
1061	3-CF_3-Ph	2-thienyl	0	H	H	H	H	H	
1062	4-CF_3-Ph	2-thienyl	0	H	H	H	H	H	
1063	Ph	3-thienyl	0	H	H	H	H	H	
1064	2-F-Ph	3-thienyl	0	H	H	H	H	H	
1065	3-F-Ph	3-thienyl	0	H	H	H	H	H	
1066	4-F-Ph	3-thienyl	0	H	H	H	H	H	
1067	2,4-F_2-Ph	3-thienyl	0	H	H	H	H	H	
1068	2-Cl-Ph	3-thienyl	0	H	H	H	H	H	
1069	3-Cl-Ph	3-thienyl	0	H	H	H	H	H	
1070	4-Cl-Ph	3-thienyl	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1071	2,4-Cl_2-Ph	3-thienyl	0	H	H	H	H	H	
1072	4-Br-Ph	3-thienyl	0	H	H	H	H	H	
1073	2-CF_3-Ph	3-thienyl	0	H	H	H	H	H	
1074	3-CF_3-Ph	3-thienyl	0	H	H	H	H	H	
1075	4-CF_3-Ph	3-thienyl	0	H	H	H	H	H	
1076	2-F-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1077	3-F-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1078	2,4-F_2-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1079	3-Cl-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1080	2,4-Cl_2-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1081	4-Br-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1082	2-CF_3-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1083	3-CF_3-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1084	4-CF_3-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1085	2-F-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1086	3-F-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1087	2,4-F_2-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1088	3-Cl-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	111-112
1089	2,4-Cl_2-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	103-106
1090	4-Br-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1091	2-CF_3-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1092	3-CF_3-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	(oil)[z]
1093	4-CF_3-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1094	Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	(oil)[aa]

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1095	2-F-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1096	3-F-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1097	4-F-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	60-62
1098	2,4-F_2-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1099	2-Cl-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	(oil)[ab]
1100	3-Cl-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	54-57
1101	4-Cl-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	(oil)[ac]
1102	2,4-Cl_2-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	(oil)[ad]
1103	4-Br-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1104	2-CF_3-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1105	3-CF_3-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	(oil)[ae]
1106	4-CF_3-Ph	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1107	Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1108	2-F-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1109	3-F-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1110	4-F-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1111	2,4-F_2-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1112	2-Cl-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1113	3-Cl-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1114	4-Cl-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1115	2,4-Cl_2-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1116	4-Br-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1117	2-CF_3-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1118	3-CF_3-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1119	4-CF_3-Ph	5-bromo-2-thienyl	0	H	H	H	H	H	
1120	Ph	2-pyridyl	0	H	H	H	H	H	
1121	2-F-Ph	2-pyridyl	0	H	H	H	H	H	
1122	3-F-Ph	2-pyridyl	0	H	H	H	H	H	
1123	2,4-F_2-Ph	2-pyridyl	0	H	H	H	H	H	
1124	2-Cl-Ph	2-pyridyl	0	H	H	H	H	H	
1125	3-Cl-Ph	2-pyridyl	0	H	H	H	H	H	
1126	4-Cl-Ph	2-pyridyl	0	H	H	H	H	H	
1127	2,4-Cl_2-Ph	2-pyridyl	0	H	H	H	H	H	
1128	4-Br-Ph	2-pyridyl	0	H	H	H	H	H	
1129	2-CF_3-Ph	2-pyridyl	0	H	H	H	H	H	
1130	3-CF_3-Ph	2-pyridyl	0	H	H	H	H	H	
1131	4-CF_3-Ph	2-pyridyl	0	H	H	H	H	H	
1132	Ph	3-pyridyl	0	H	H	H	H	H	
1133	2-F-Ph	3-pyridyl	0	H	H	H	H	H	
1134	3-F-Ph	3-pyridyl	0	H	H	H	H	H	
1135	4-F-Ph	3-pyridyl	0	H	H	H	H	H	
1136	2,4-F_2-Ph	3-pyridyl	0	H	H	H	H	H	
1137	2-Cl-Ph	3-pyridyl	0	H	H	H	H	H	
1138	3-Cl-Ph	3-pyridyl	0	H	H	H	H	H	
1139	4-Cl-Ph	3-pyridyl	0	H	H	H	H	H	
1140	2,4-Cl_2-Ph	3-pyridyl	0	H	H	H	H	H	
1141	4-Br-Ph	3-pyridyl	0	H	H	H	H	H	
1142	2-CF_3-Ph	3-pyridyl	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1143	3-CF_3-Ph	3-pyridyl	0	H	H	H	H	H	
1144	4-CF_3-Ph	3-pyridyl	0	H	H	H	H	H	
1145	Ph	4-pyridyl	0	H	H	H	H	H	
1146	2-F-Ph	4-pyridyl	0	H	H	H	H	H	
1147	3-F-Ph	4-pyridyl	0	H	H	H	H	H	
1148	2,4-F_2-Ph	4-pyridyl	0	H	H	H	H	H	
1149	2-Cl-Ph	4-pyridyl	0	H	H	H	H	H	
1150	3-Cl-Ph	4-pyridyl	0	H	H	H	H	H	
1151	4-Cl-Ph	4-pyridyl	0	H	H	H	H	H	
1152	2,4-Cl_2-Ph	4-pyridyl	0	H	H	H	H	H	
1153	4-Br-Ph	4-pyridyl	0	H	H	H	H	H	
1154	2-CF_3-Ph	4-pyridyl	0	H	H	H	H	H	
1155	3-CF_3-Ph	4-pyridyl	0	H	H	H	H	H	
1156	4-CF_3-Ph	4-pyridyl	0	H	H	H	H	H	
1157	Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1158	2-F-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1159	3-F-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1160	4-F-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1161	2,4-F_2-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1162	2-Cl-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1163	3-Cl-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1164	4-Cl-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1165	2,4-Cl_2-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1166	4-Br-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1167	2-CF_3-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1168	3-CF_3-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1169	4-CF_3-Ph	2-Cl-3-pyridyl	0	H	H	H	H	H	
1170	Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1171	2-F-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1172	3-F-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1173	4-F-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1174	2,4-F_2-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1175	2-Cl-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1176	3-Cl-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1177	4-Cl-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1178	2,4-Cl_2-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1179	4-Br-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1180	2-CF_3-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1181	3-CF_3-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1182	4-CF_3-Ph	3-Cl-2-pyridyl	0	H	H	H	H	H	
1183	2-F-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1184	3-F-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1185	2,4-F -Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1186	3-Cl-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1187	2,4-Cl_2-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1188	4-Br-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1189	2-CF_3-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1190	3-CF_3-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1191	4-CF_3-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1192	Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1193	2-F-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1194	3-F-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1195	4-F-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1196	2,4-F_2-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1197	2-Cl-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1198	3-Cl-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1199	4-Cl-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1200	2,4-Cl_2-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1201	4-Br-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1202	2-CF_3-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1203	3-CF_3-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1204	4-CF_3-Ph	6-Cl-3-pyridyl	0	H	H	H	H	H	
1205	2-thienyl	2-thienyl	0	H	H	H	H	H	
1206	3-thienyl	2-thienyl	0	H	H	H	H	H	
1207	2-Cl-3-thienyl	2-thienyl	0	H	H	H	H	H	
1208	5-Cl-2-thienyl	2-thienyl	0	H	H	H	H	H	
1209	2,5-Cl_2-3-thienyl	2-thienyl	0	H	H	H	H	H	
1210	2-thienyl	3-thienyl	0	H	H	H	H	H	
1211	3-thienyl	3-thienyl	0	H	H	H	H	H	
1212	2-Cl-3-thienyl	3-thienyl	0	H	H	H	H	H	
1213	5-Cl-2-thienyl	3-thienyl	0	H	H	H	H	H	
1214	2,5-Cl_2-3-thienyl	3-thienyl	0	H	H	H	H	H	
1215	2-thienyl	2-Cl-3-thienyl	0	H	H	H	H	H	
1216	3-thienyl	2-Cl-3-thienyl	0	H	H	H	H	H	
1217	2-Cl-3-thienyl	2-Cl-3-thienyl	0	H	H	H	H	H	
1218	5-Cl-2-thienyl	2-Cl-3-thienyl	0	H	H	H	H	H	
1219	2,5-Cl_2-3-thienyl	2-Cl-3-thienyl	0	H	H	H	H	H	
1220	2-thienyl	5-Cl-3-thienyl	0	H	H	H	H	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1221	3-thienyl	5-Cl-3-thienyl	0	H	H	H	H	H	
1222	2-Cl-3-thienyl	5-Cl-3-thienyl	0	H	H	H	H	H	
1223	5-Cl-2-thienyl	5-Cl-3-thienyl	0	H	H	H	H	H	
1224	2,5-Cl_2-3-thienyl	5-Cl-3-thienyl	0	H	H	H	H	H	
1225	2-thienyl	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1226	3-thienyl	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1227	2-Cl-3-thienyl	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1228	5-Cl-2-thienyl	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1229	2,5-Cl_2-3-thienyl	2,5-Cl_2-3-thienyl	0	H	H	H	H	H	
1230	thienyl	5-F-2-thienyl	0	H	H	H	H	H	
1231	3-pyridyl	5-Cl-2-pyridyl	0	H	H	H	H	H	
1232	5-Cl-2-pyridyl	5-Cl-2-pyridyl	0	H	H	H	H	H	
1233	4-pyridyl	5-Cl-2-pyridyl	0	H	H	H	H	H	
1234	2-Cl-3-pyridyl	5-Cl-2-pyridyl	0	H	H	H	H	H	
1235	2-pyridyl	5-Cl-2-pyridyl	0	H	H	H	H	H	
1236	4-F-Ph	4-F-Ph	0	H	H	H	C_2H_5	H	
1237	4-F-Ph	4-F-Ph	0	H	H	H	n-C_3H_7	H	
1238	4-F-Ph	4-F-Ph	0	H	H	H	n-C_4H_9	H	
1239	4-F-Ph	4-F-Ph	0	H	H	H	i-C_3H_7	H	
1240	4-F-Ph	4-F-Ph	0	H	H	H	s-C_4H_9	H	
1241	2-Cl-Ph	4-Cl-Ph	0	H	H	H	C_2H_5	H	
1242	2-Cl-Ph	4-Cl-Ph	0	H	H	H	n-C_3H_7	H	
1243	2-Cl-Ph	4-Cl-Ph	0	H	H	H	n-C_4H_9	H	
1244	2-Cl-Ph	4-Cl-Ph	0	H	H	H	i-C_3H_7	H	
1245	2-Cl-Ph	4-Cl-Ph	0	H	H	H	s-C_4H_9	H	
1246	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	C_2H_5	H	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1247	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	n-C_3H_7	H	
1248	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	n-C_4H_9	H	
1249	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	i-C_3H_7	H	
1250	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	s-C_4H_9	H	
1251	Ph	4-F-Ph	0	H	H	H	C_2H_5	H	
1252	Ph	4-F-Ph	0	H	H	H	n-C_3H_7	H	
1253	Ph	4-F-Ph	0	H	H	H	n-C_4H_9	H	
1254	Ph	4-F-Ph	0	H	H	H	i-C_3H_7	H	
1255	Ph	4-F-Ph	0	H	H	H	s-C_4H_9	H	
1256	4-F-Ph	4-F-Ph	0	H	H	H	CH_3	H	
1257	4-F-Ph	4-F-Ph	0	H	H	H	CH_3	CH_3	
1258	4-F-Ph	4-F-Ph	0	H	H	H	F	H	166-167
1259	4-F-Ph	4-F-Ph	0	H	H	H	F	CH_3	
1260	4-F-Ph	4-F-Ph	0	H	H	H	F	F	145-147
1261	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	CH_3	H	
1262	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	CH_3	CH_3	
1263	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	F	H	
1264	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	F	CH_3	
1265	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	F	F	
1266	2-Cl-Ph	4-Cl-Ph	0	H	H	H	CH_3	H	
1267	2-Cl-Ph	4-Cl-Ph	0	H	H	H	CH_3	CH_3	
1268	2-Cl-Ph	4-Cl-Ph	0	H	H	H	F	H	
1269	2-Cl-Ph	4-Cl-Ph	0	H	H	H	F	CH_3	
1270	2-Cl-Ph	4-Cl-Ph	0	H	H	H	F	F	

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1271	Ph	4-F-Ph	0	H	H	H	CH_3	H	
1272	Ph	4-F-Ph	0	H	H	H	CH_3	CH_3	
1273	Ph	4-F-Ph	0	H	H	H	F	H	
1274	Ph	4-F-Ph	0	H	H	H	F	CH_3	
1275	Ph	4-F-Ph	0	H	H	H	F	F	
1997	Ph	4-t-Bu-Ph	0	H	H	H	H	H	112-114
1998	4-F-Ph	2,6-F_2-Ph	0	H	H	H	H	H	110-116
1999	4-F-Ph	3-CH_3-4-Cl-Ph	0	H	H	H	H	H	127.5-129
2000	4-F-Ph	4-t-Bu-Ph	0	H	H	H	H	H	105-107
2001	4-F-Ph	4-CN-Ph	0	H	H	H	H	H	137-139
2002	4-F-Ph	-CF_3	0	H	H	H	H	H	(oil)[ag]
2003	2-CF_3-Ph	3-CF_3-Ph	0	H	H	H	H	H	(oil)[ah]
2004	4-CH_3-Ph	2-F-Ph	0	H	H	H	H	H	115-118
2005	4-CH_3-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	111-116
2006	Ph	2,4-F_2-Ph	0	H	H	CH_3	H	H	67-72
2007	Ph	4-Cl-Ph	0	H	H	CH_3	H	H	110.5-111
2008	4-F-Ph	2-F-Ph	0	H	H	CH_3	H	H	67-72
2009	4-F-Ph	2,4-F_2-Ph	0	H	H	CH_3	H	H	(oil)[ai]
2010	2-Cl-3-pyridyl, N-oxide	4-Cl-Ph	0	H	H	H	H	H	(HCl salt)[aj]
2011	4-Cl-3-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	(oil)[ak]
2012	4-Cl-3-pyridyl	4-Cl-Ph	0	H	H	H	H	H	172-174
2013	4-Cl-3-pyridyl	2,4-Cl_2-Ph	0	H	H	H	H	H	(oil)[al]
2014	4-CH_3S-3-1 pyridyl	4-Cl-Ph	0	H	H	H	H	H	138-140

Table 1 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
2015	2-Cl-4-pyridyl	4-Cl-Ph	0	H	H	H	H	H	(2HCl salt 170-175)
2016	2-CH_3-Ph	2-Cl-4-F-Ph	0	H	H	H	H	H	

a NMR: ($CDCl_3$) δ 4.70 (q, J=14Hz, 2H), 4.90 (s, 1H), 5.40 (s, 1H), 5.55 (s, 1H), 6.8-7.0 (m, 4H), 7.2-7.4 (m, 4H), 7.8 (bs, 2H).

b NMR: ($CDCl_3$) δ 4.8 (q, 2H), 5.2 (s, 1H), 5.3 (s,1H), 5.6 (s, 1H), 6.9-7.6 (m, 8H), 7.8 (s, 1H), 8.1 (s, 1H).

c NMR: ($CDCl_3$) δ 4.70 (q, J=13Hz, 2H), 4.85 (s, 1H), 5.35 (s, 1H), 5.55 (s, 1H), 6.85-7.4 (m, 8H), 7.7 (s, H), 7.9 (s, 1H).

d NMR: ($CDCl_3$) δ 4.60 (q, J=12Hz, 2H), 5.0 (s, 1H), 5.40 (s, 1H), 5.55 (s, 1H), 6.8 (1/2 of ABq, J=10Hz, 2H), 7.00 (m, 2H), 7.3 (1/2 of ABq, J=10Hz, 2H), 7.45 (m, 2H), 7.80 (s, 1H), 7.85 (s, 1H).

e NMR: ($CDCl_3$) δ 4.6, 4.8 (ABq, J=14Hz, 2H), 4.9 (br s, 3H), 5.3 (s, 1H), 5.6 (s, 1H), 6.8 (d, 1H), 7.0 (m, 3H), 7.4 (m, 3H), 7.8 (s, 1H), 7.9 (s, 1H).

f NMR: ($CDCl_3$) δ 1.3 (s, 9H), 4.7 (q, 2H), 4.6 (s, 1H), 5.0 (s, 1H), 5.4 (s, 1H), 6.8-7.4 (9H), 7.8 (s, 1H).

g NMR: ($CDCl_3$) δ 4.7, 4.8 (ABq, J=12Hz, 2H), 6.7-7.5 (m, 14H), 7.9 (s, 1H), 8.0 (s, 1H).

h NMR: ($CDCl_3$) δ 3.45 (s, 3H), 4.75 (ABq, J=18Hz, 14Hz, 2H), 4.6 (m, 2H), 6.8-7.0 (m, 4H), 7.05-7.25 (m, 4H), 8.0 (s, 1H), 8.25 (s, 1H).

i NMR: ($CDCl_3$) δ 4.0 (dd, 14, 4Hz, 1H), 4.3 (dd, 14, 4Hz, 1H), 4.6 (d, 13Hz, 1H), 4.9 (d, 13Hz, 1H), 5.1 (d, 1H), 5.3 (d, 1H), 5.55 (s, 1H), 5.60 (s, 1H), 5.85 (m, 1H), 6.8-7.0 (m, 4H), 7.05-7.2 (m, 4H), 8.05 (s, 1H), 8.25 (s, 1H).

j NMR: ($CDCl_3$) δ 1.90 (s, 3H), 4.80 (1/2 of ABq, J=14Hz, 1H), 5.65 (1/2 of ABq, J=14Hz, 1H), 5.55 (s, 1H), 5.60 (s, 1H), 6.75-7.0 (m, 4H), 7.0-7.2 (t, 2H), 7.25-7.4 (m, 2H), 7.35 (s, 1H), 7.85 (s, 1H).

k NMR: ($CDCl_3$) δ 4.03, 4.11 (ABq, J=11Hz, 2H), 4.25 (s, 1H, OH), 4.39 (s, 1H, OH), 4.54, 4.81 (ABq, J=14Hz, 2H), 5.31, 5.33 (2 sharp s, 1H each), 7.25-7.40 (m, 4H), 7.71 (s, 1H), 8.03 (s, 1H).

l NMR: ($CDCl_3$) δ 2.03 (s, 1H, OH), 4.0-4.2 (m, 2H), 4.57, 4.85 (ABq, J=15Hz, 2H), 5.3-5.35 (m, 2H), 5.7-5.9 (broad s, 1H, OH), 7.3-7.6 (m, 4H), 7.75 (s, 1H), 8.11 (s, 1H).

m NMR: ($CDCl_3$) δ 2.10 (s, 6H), 2.52, 3.03 (ABq, J=12Hz, 2H), 4.41, 4.78 (ABq, J=15 Hz, 2H), 5.19 (s, 1H), 5.50 (s, 1H), 6.9-7.2 (m, 2H), 7.4-7.6 (m, 2H), 7.80 (s, 1H), 8.36 (s, 1H).

n NMR: ($CDCl_3$) δ 2.11 (s, 6H), 2.61, 3.11 (ABq, J=12Hz, 2H), 4.50, 4.90 (ABq, J=13Hz, 2H), 5.13 (s, 1H), 5.50 (s, 1H), 7.50 (s, 4H), 7.86 (s, 1H), 8.14 (s, 1H).

o NMR: ($CDCl_3$) δ 2.13 (s, 3H), 2.19 (s, 3H), 2.5-3.1 (m, 2H), 4.44, 4.85 (ABq, J=14Hz, 2H), 5.0-5.5 (m, 2H), 7.3-7.8 (m, 9H), 7.97 (s, 1H), 8.32 (s, 1H, OH), 8.50 (s, 1H).

p NMR: ($CDCl_3$) δ 4.6 (d, 1/2 of ABq, 1H), 4.9 (d, 1/2 of ABq, 1H), 5.0 (s, 1H), 5.3 (two s, 2H), 6.9-7.6 (m, 9H), 7.8 (two s, 2H).

q NMR: ($CDCl_3$) δ 1.0 (t, 3H), 1.2 (s, 1H), 1.6 (m, 2H), 4.2 (ABq, 2H), 5.1 (s, 1H), 5.4 (s, 1H), 6.9-7.1 (m, 4H), 7.9 (s, 1H), 8.0 (s, 1H).

r NMR: ($CDCl_3$) δ 4.6 (AB, 2H), 4.6 (d, 1H), 5.3 (s, 1H), 5.5 (s, 1H), 7.2 (m, 1H), 7.6 (m, 7H), 7.7 (m, 1H), 7.7 (s, 1H), 7.8 (s, 1H).

s NMR: ($CDCl_3$) δ 4.6 (1/2 of AB, J=13, 1H), 5.0 (1/2 of AB, J=13, 1H), 5.2 (s, 1H), 5.3 (s, 1H), 5.4 (s, 1H), 7.0 (m, 2H), 7.2 (m, 1H), 7.4 (m, 5H), 7.8 (s, 1H), 7.82 (s, 1H).

t NMR: ($CDCl_3$) δ 4.6 (1/2 of ABq, 1H), 5.3 (s), 5.4 (1/2 of ABq + s + br, 4H total), 7.1 (m, 1H), 7.3 (m, 1H), 7.5 (m, 5H), 7.8 (s, 2H).

u NMR: ($CDCl_3$) δ 4.4 (1/2 of AB, 1H), 5.7 (1/2 of AB, 1H), 5.1 (s, 1H), 5.3 (s, 1H), 5.4 (s, 1H), 7.2 (m, 3H), 7.3 (m, 2H), 7.4 (d, 1H), 7.6 (m, 1H), 7.7 (s, 1H), 7.9 (s, 1H).

v NMR: ($CDCl_3$) δ 4.4 (s, 2H), 4.8 (s, 1H) 5.1 (s, 1H), 5.5 (s, 1H), 6.3 (d, 1H) 6.5 (d, 1H) 6.8-7.2 (m, 4H), 7.6 (s, 1H), 7.7 (s, 1H).

w NMR: ($CDCl_3$) δ 4.7 (dd, 2H), 5.4 (s, 1H), 5.6 (s, 1H), 6.7 (d, 1H), 7.0 (d, 1H), 7.2 (m), 8.0 (s, 1H), 8.2 (s, 1H).

x NMR: ($CDCl_3$) δ 1.6 (two s, 6H total), 4.3 (1/2 of ABq, 1H), 4.6 (1/2 of ABq, 1H), 5.0 (d, 1H), 5.2 (d, 1H), 5.3 (s, 1H), 6.7-7.6 (m, 8H), 7.9 (s, 1H), 8.1 (s, 1H).

y NMR: ($CDCl_3$) δ 4.7 (s, 2H), 5.3 (s, 1H), 5.8 (s, 1H), 6.9 (m, 3H), 7.1 (m, 1H), 7.2 (m, 1H), 7.4 (s, 1H), 7.9 (s, 1H), 8.1 (s, 1H).

z NMR: ($CDCl_3$) δ 4.6 (dd, 2H), 5.2 (s, 1H), 5.4 (s, 1H), 5.6 (s, 1H), 6.7 (d, 1H), 6.8 (d, 1H), 7.4-7.6 (m, 4H), 7.9 (s, 1H), 7.9 (s, 1H).

aa NMR: ($CDCl_3$) δ 4.6 (d, 1H), 5.0 (d, 1H), 5.2 (s, 1H), 5.34 (s, 1H), 5.4 (s, 1H), 6.8 (s, 1H), 7.2 (m, 5H), 7.9 (s, 2H).

ab NMR: ($CDCl_3$) δ 4.4 (d, 1H), 5.3 (d, 1H), 5.3 (s, 1H), 5.6 (s, 1H), 6.8 (s, 1H), 7.2-7.4 (m, 4H), 7.8 (s, 1H), 8.1 (s, 1H).

ac NMR: ($CDCl_3$) δ 4.6 (d, 1H), 5.1 (d, 1H), 5.3 (s, 1H), 5.35 (s, 1H), 5.45 (s, 1H), 6.8 (s, 1H), 7.2 (m, 4H), 7.9 (s, 1H), 8.1 (s, 1H).

ad NMR: ($CDCl_3$) δ 4.6 (d, 1H), 5.3 (d, 1H), 5.3 (s, 1H), 5.6 (s, 1H), 6.8 (s, 1H), 7.2 (m, 2H), 7.4 (s, 1H), 7.9 (s, 1H), 8.1 (s, 1H).

af NMR: ($CDCl_3$) δ 4.7 (bs, 1H), 4.9 (bs, 1H), 5.33 (2s, 2H), 6.75 (d, 2H), 7.12 (m, 4H), 7.45 (s, 1H), 7.83 (s, 1H), 8.00 (s, 1H), 8.33 (d, 2H).

ag NMR: ($CDCl_3$) δ 4.6 (s, 2H), 5.4 (s, 1H), 5.5 (s, 1H), 5.8 (s, 1H), 6.8-7.0 (m, 3H), 7.3-7.4 (m, 1H), 8.0, 8.1 (two s, 2H).

ah NMR: ($CDCl_3$) δ 4.6 (ABq, 2H), 5.2 (s, OH), 5.3 (s, 1H), 5.4 (s, 1H), 7.1-7.7 (m, 8H), 7.7 (s, 1H), 7.8 (s, 1H).

ai NMR: ($CDCl_3$) δ 3.6 (s, 3H), 4.7-5.0 (ABq, 2H), 5.4 (s, 1H), 5.7 (s, 1H), 6.6-7.2 (m), 7.7 (s, 1H), 7.8 (s, 1H).

aj NMR: (free base, $CDCl_3$) δ 4.77 (s, 2H), 5.27 (s, 1H), 5.33 (s, 1H), 5.73 (s, 1H), 6.72 (d, 1H), 7.00 (t, 1H), 7.32 (ABq, 4H), 7.77 (s, 1H), 8.13 (s, 1H), 8.18 (d, 1H).

ak NMR: ($CDCl_3$) δ 4.63 (d, 1H), 5.03 (d, 1H), 5.30 (s, 1H), 5.42 (s, 1H), 5.50 (s, 1H), 6.75 (m, 2H), 7.23 (d, 1H), 7.43 (q, 1H), 7.67 (dd, 1H), 7.83 (s, 1H), 7.88 (s, 1H), 8.28 (d, 1H).

al NMR: ($CDCl_3$) δ 4.67 (d, 1H), 5.40 (s, 1H), 5.46 (s, 1H), 5.45 (d, 2H), 7.00-7.27 (m, 3H), 7.43 (d, 1H), 7.67-7.83 (m, 3H), 8.33 (d, 1H).

am NMR: ($CDCl_3$) δ 4.7 (1/2 of ABq, 1H), 5.0 (1/2 of ABq, 1H), 5.3 (s, 2H), 6.0 (s, 1H), 6.8 (m, 2H), 7.3-7.6 (m, 6H), 7.7 (s, 1H), 7.8 (d, 1H), 8.0 (s, 1H), 8.6 (d, 1H), 8.7 (s, 1H).

an NMR: ($CDCl_3$) δ 4.6 (1/2 of ABq, 1H), 5.0 (1/2 of ABq, 1H), 5.2-5.3 (three s, 3H), 6.8 (m, 2H), 7.5 (m, 6H), 7.8 (m, 3H), 8.6 (d, 1H), 8.8 (s, 1H).

Examples 1276 and 1276a: Preparation of the (S)-enantiomer of Example 49

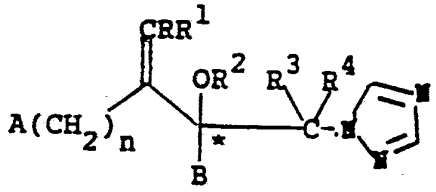
The compound of Example 49 (1.5 g) and 1.5 g of ℓ-α-bromocamphor-π-sulfonic acid was dissolved in 75 ml of acetonitrile and refluxed for 2 hours. The solution was allowed to cool to ambient temperature and stand for 14 hours. Filtration of the resulting solids followed by recrystallization from an additional portion of acetonitrile, yielded 1.28 g of white solid, mp 216-217°; $[\alpha]_D^{25}$ = -104° (C = 1; DMSO).

The acetonitrile can be evaporated to yield the adduct having a (+)- rotation (Example 1276a). This compound can be recrystallized from an ether/acetone mixture to yield a solid, that on treatment with aqueous $NaHCO_3$ yields material identical by NMR to that of Example 49.

The solid was suspended in 50 ml of saturated $NaHCO_3$ solution and stirred vigorously until the evolution of gas ceased (1-2 hours). The mixture was extracted twice with 50 ml of $CHCl_3$. The organic layers were combined, washed with brine, dried over Na_2SO_4 and the solvent removed in vacuo. This yielded 750 mg of a white solid (Example 1276) having an 'H NMR identical to that of the compound of Example 49, mp = 82-83°; $[\alpha]_D^{25}$ = -62° (C = 1; $CHCl_3$).

These compounds and other compounds which were resolved as described above are shown in Table 2.

Table 2



Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C	$[\alpha]_D^{25}$
1276			0	H	H	H	H	H	82-83	-62°
1276a(1)			0	H	H	H	H	H	83-84	+60°
1277(2)			0	H	H	H	H	H	60-61 (HCl salt 181-184)	-67°
1277a(1),(2)			0	H	H	H	H	H	60-62	+66°

* denotes chiral center

(1) = substitute d-α-bromocamphor-π-sulfonic acid

(2) = use a 3 parts ether - 1 part acetone mixture as solvent.

Example 1278

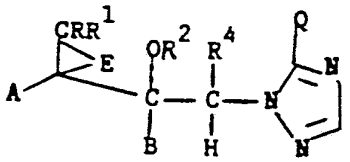
Preparation of 2-(4-fluorophenyl)-3-phenyl-1-(5-mercapto-1H-1,2,4-triazol-1-yl)-3-buten-1-ol

To a solution of 1.24 g (0.004 mol) of 2-(4-fluorophenyl)-3-phenyl-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol in 15 mL of THF at -70° was added 5.2 mL (0.008 mol) of a 1.55 M solution of n-butyllithium in hexanes over 5 minutes. After 30 minutes, 0.13 g (0.004 mol) of sulfur was added and the reaction mixture was allowed to

warm to room temperature over 1 h, then quenched with 8 mL of 1N HCl. After pouring into saturated NH_4Cl, the mixture was extracted with 2 x ether and the combined organic layers were washed with brine, dried over Na_2SO_4 and evaporated. The crude product was purified by flash chromatography using 2:13:85 methanol/ether/methylene chloride to give 0.85 g of the title compound, m.p. 54-58°: NMR ($CDCl_3$) δ 4.7 (ABq, 2H), 5.0 (s, 1H, OH), 5.3 (s, 1H, vinyl), 5.5 (s, 1H, vinyl), 7.0 (m, 4H), 7.2 (m, 3H), 7.5 (m, 2H), 7.7 (s, 1H, triazole proton), 12.5 (brs, 1H, SH); IR (methylene chloride) 3500-3000 (br), 1590, 1500, 1465, 1230, 1162, 1109, 825 cm^{-1}; MS: highest m/e 341.

The compounds shown in Table 3 were prepared or can be prepared by the methods described above.

Table 3*



Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1278	Ph	4-F-Ph	H	H	H	H	SH	54-58
1279	Ph	Ph	H	H	H	H	SH	
1280	Ph	2-F-Ph	H	H	H	H	SH	
1281	Ph	2-Cl-Ph	H	H	H	H	SH	
1282	Ph	4-Cl-Ph	H	H	H	H	SH	
1283	Ph	2,4-F_2-Ph	H	H	H	H	SH	
1284	Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1285	2-F-Ph	Ph	H	H	H	H	SH	
1286	2-F-Ph	2-F-Ph	H	H	H	H	SH	
1287	2-F-Ph	4-F-Ph	H	H	H	H	SH	
1288	2-F-Ph	2-Cl-Ph	H	H	H	H	SH	
1289	2-F-Ph	4-Cl-Ph	H	H	H	H	SH	
1290	2-F-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1291	2-F-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1292	3-F-Ph	Ph	H	H	H	H	SH	
1293	3-F-Ph	2-F-Ph	H	H	H	H	SH	
1294	3-F-Ph	4-F-Ph	H	H	H	H	SH	
1295	3-F-Ph	2-Cl-Ph	H	H	H	H	SH	
1296	3-F-Ph	4-Cl-Ph	H	H	H	H	SH	
1297	3-F-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1298	3-F-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1299	4-F-Ph	Ph	H	H	H	H	SH	
1300	4-F-Ph	2-F-Ph	H	H	H	H	SH	144.5-148
1301	4-F-Ph	4-F-Ph	H	H	H	H	SH	
1302	4-F-Ph	2-Cl-Ph	H	H	H	H	SH	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1303	4-F-Ph	4-Cl-Ph	H	H	H	H	SH	
1304	4-F-Ph	2,4-F_2-Ph	H	H	H	H	SH	(foam)[a]
1305	4-F-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1306	2-Cl-Ph	Ph	H	H	H	H	SH	
1307	2-Cl-Ph	2-F-Ph	H	H	H	H	SH	
1308	2-Cl-Ph	4-F-Ph	H	H	H	H	SH	
1309	2-Cl-Ph	2-Cl-Ph	H	H	H	H	SH	
1310	2-Cl-Ph	4-Cl-Ph	H	H	H	H	SH	
1311	2-Cl-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1312	2-Cl-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1313	3-Cl-Ph	Ph	H	H	H	H	SH	
1314	3-Cl-Ph	2-F-Ph	H	H	H	H	SH	
1315	3-Cl-Ph	4-F-Ph	H	H	H	H	SH	
1316	3-Cl-Ph	2-Cl-Ph	H	H	H	H	SH	
1317	3-Cl-Ph	4-Cl-Ph	H	H	H	H	SH	
1318	3-Cl-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1319	3-Cl-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1320	4-Cl-Ph	Ph	H	H	H	H	SH	
1321	4-Cl-Ph	2-F-Ph	H	H	H	H	SH	
1322	4-Cl-Ph	4-F-Ph	H	H	H	H	SH	
1323	4-Cl-Ph	2-Cl-Ph	H	H	H	H	SH	
1324	4-Cl-Ph	4-Cl-Ph	H	H	H	H	SH	
1325	4-Cl-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1326	4-Cl-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1327	2-CF_3-Ph	Ph	H	H	H	H	SH	
1328	2-CF_3-Ph	2-F-Ph	H	H	H	H	SH	
1329	2-CF_3-Ph	4-F-Ph	H	H	H	H	SH	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1330	2-CF_3-Ph	2-Cl-Ph	H	H	H	H	SH	
1331	2-CF_3-Ph	4-Cl-Ph	H	H	H	H	SH	
1332	2-CF_3-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1333	2-CF_3-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1334	4-CF_3-Ph	Ph	H	H	H	H	SH	
1335	4-CF_3-Ph	2-F-Ph	H	H	H	H	SH	
1336	4-CF_3-Ph	4-F-Ph	H	H	H	H	SH	
1337	4-CF_3-Ph	2-Cl-Ph	H	H	H	H	SH	
1338	4-CF_3-Ph	4-Cl-Ph	H	H	H	H	SH	
1339	4-CF_3-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1340	4-CF_3-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1341	2,4-F_2-Ph	Ph	H	H	H	H	SH	
1342	2,4-F_2-Ph	2-F-Ph	H	H	H	H	SH	
1343	2,4-F_2-Ph	4-F-Ph	H	H	H	H	SH	
1344	2,4-F_2-Ph	2-Cl-Ph	H	H	H	H	SH	
1345	2,4-F_2-Ph	4-Cl-Ph	H	H	H	H	SH	
1346	2,4-F_2-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1347	2,4-F_2-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1348	2,4-Cl_2-Ph	Ph	H	H	H	H	SH	
1349	2,4-Cl_2-Ph	2-F-Ph	H	H	H	H	SH	
1350	2,4-Cl_2-Ph	4-F-Ph	H	H	H	H	SH	
1351	2,4-Cl_2-Ph	2-Cl-Ph	H	H	H	H	SH	
1352	2,4-Cl_2-Ph	4-Cl-Ph	H	H	H	H	SH	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1353	2,4-Cl_2-Ph	2,4-F_2-Ph	H	H	H	H	SH	
1354	2,4-Cl_2-Ph	2,4-Cl_2-Ph	H	H	H	H	SH	
1355	Ph	Ph	H	H	H	H	I	
1356	Ph	2-F-Ph	H	H	H	H	I	
1357	Ph	4-F-Ph	H	H	H	H	I	
1358	Ph	2-Cl-Ph	H	H	H	H	I	
1359	Ph	4-Cl-Ph	H	H	H	H	I	
1360	Ph	2,4-F_2-Ph	H	H	H	H	I	
1361	Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1362	2-F-Ph	Ph	H	H	H	H	I	
1363	2-F-Ph	2-F-Ph	H	H	H	H	I	
1364	2-F-Ph	4-F-Ph	H	H	H	H	I	
1365	2-F-Ph	2-Cl-Ph	H	H	H	H	I	
1366	2-F-Ph	4-Cl-Ph	H	H	H	H	I	
1367	2-F-Ph	2,4-F_2-Ph	H	H	H	H	I	
1368	2-F-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1369	3-F-Ph	Ph	H	H	H	H	I	
1370	3-F-Ph	2-F-Ph	H	H	H	H	I	
1371	3-F-Ph	4-F-Ph	H	H	H	H	I	
1372	3-F-Ph	2-Cl-Ph	H	H	H	H	I	
1373	3-F-Ph	4-Cl-Ph	H	H	H	H	I	
1374	3-F-Ph	2,4-F_2-Ph	H	H	H	H	I	
1375	3-F-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1376	4-F-Ph	Ph	H	H	H	H	I	
1377	4-F-Ph	2-F-Ph	H	H	H	H	I	96-97.5
1378	4-F-Ph	4-F-Ph	H	H	H	H	I	
1379	4-F-Ph	2-Cl-Ph	H	H	H	H	I	
1380	4-F-Ph	4-Cl-Ph	H	H	H	H	I	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1381	4-F-Ph	2,4-F_2-Ph	H	H	H	H	I	(foam)[b]
1382	4-F-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1383	2-Cl-Ph	Ph	H	H	H	H	I	
1384	2-Cl-Ph	2-F-Ph	H	H	H	H	I	
1385	2-Cl-Ph	4-F-Ph	H	H	H	H	I	
1386	2-Cl-Ph	2-Cl-Ph	H	H	H	H	I	
1387	2-Cl-Ph	4-Cl-Ph	H	H	H	H	I	
1388	2-Cl-Ph	2,4-F_2-Ph	H	H	H	H	I	
1389	2-Cl-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1390	3-Cl-Ph	Ph	H	H	H	H	I	
1391	3-Cl-Ph	2-F-Ph	H	H	H	H	I	
1392	3-Cl-Ph	4-F-Ph	H	H	H	H	I	
1393	3-Cl-Ph	2-Cl-Ph	H	H	H	H	I	
1394	3-Cl-Ph	4-Cl-Ph	H	H	H	H	I	
1395	3-Cl-Ph	2,4-F_2-Ph	H	H	H	H	I	
1396	3-Cl-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1397	4-Cl-Ph	Ph	H	H	H	H	I	
1398	4-Cl-Ph	2-F-Ph	H	H	H	H	I	
1399	4-Cl-Ph	4-F-Ph	H	H	H	H	I	
1400	4-Cl-Ph	2-Cl-Ph	H	H	H	H	I	
1401	4-Cl-Ph	4-Cl-Ph	H	H	H	H	I	
1402	4-Cl-Ph	2,4-F_2-Ph	H	H	H	H	I	
1403	4-Cl-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1404	2-CF_3-Ph	Ph	H	H	H	H	I	
1405	2-CF_3-Ph	2-F-Ph	H	H	H	H	I	
1406	2-CF_3-Ph	4-F-Ph	H	H	H	H	I	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1407	2-CF_3-Ph	2-Cl-Ph	H	H	H	H	I	
1408	2-CF_3-Ph	4-Cl-Ph	H	H	H	H	I	
1409	2-CF_3-Ph	2,4-F_2-Ph	H	H	H	H	I	
1410	2-CF_3-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1411	4-CF_3-Ph	Ph	H	H	H	H	I	
1412	4-CF_3-Ph	2-F-Ph	H	H	H	H	I	
1413	4-CF_3-Ph	4-F-Ph	H	H	H	H	I	
1414	4-CF_3-Ph	2-Cl-Ph	H	H	H	H	I	
1415	4-CF_3-Ph	4-Cl-Ph	H	H	H	H	I	
1416	4-CF_3-Ph	2,4-F_2-Ph	H	H	H	H	I	
1417	4-CF_3-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1418	2,4-F_2-Ph	Ph	H	H	H	H	I	
1419	2,4-F_2-Ph	2-F-Ph	H	H	H	H	I	
1420	2,4-F_2-Ph	4-F-Ph	H	H	H	H	I	
1421	2,4-F_2-Ph	2-Cl-Ph	H	H	H	H	I	
1422	2,4-F_2-Ph	4-Cl-Ph	H	H	H	H	I	
1423	2,4-F_2-Ph	2,4-F_2-Ph	H	H	H	H	I	
1424	2,4-F_2-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1425	2,4-Cl_2-Ph	Ph	H	H	H	H	I	
1426	2,4-Cl_2-Ph	2-F-Ph	H	H	H	H	I	
1427	2,4-Cl_2-Ph	4-F-Ph	H	H	H	H	I	
1428	2,4-Cl_2-Ph	2-Cl-Ph	H	H	H	H	I	
1429	2,4-Cl_2-Ph	4-Cl-Ph	H	H	H	H	I	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1430	2,4-Cl_2-Ph	2,4-F_2-Ph	H	H	H	H	I	
1431	2,4-Cl_2-Ph	2,4-Cl_2-Ph	H	H	H	H	I	
1432	Ph	2,4-F_2-Ph	H	H	H	H	-SS-	
1433	4-F-Ph	2-F-Ph	H	H	H	H	-SS-	
1434	4-F-Ph	2,4-F_2-Ph	H	H	H	H	-SS-	
1435	Ph	2,4-F_2-Ph	H	H	H	H	$-SSCH_3$	
1436	4-F-Ph	2-F-Ph	H	H	H	H	$-SSCH_3$	
1437	4-F-Ph	2,4-F_2-Ph	H	H	H	H	$-SSCH_3$	
1438	Ph	2,4-F_2-Ph	H	H	H	H	$SCNHMe$ (O)	
1439	4-F-Ph	2-F-Ph	H	H	H	H	$SCNHMe$ (O)	
1440	4-F-Ph	2,4-F_2-Ph	H	H	H	H	$SCNHMe$ (O)	
1441	Ph	2,4-F_2-Ph	H	H	H	H	$SCNH$-n-Bu (O)	
1442	4-F-Ph	2-F-Ph	H	H	H	H	$SCNH$-n-Bu (O)	
1443	4-F-Ph	2,4-F_2-Ph	H	H	H	H	$SCNH$-n-Bu (O)	
1444	Ph	2,4-F_2-Ph	H	H	H	H	Cl	
1445	4-F-Ph	2-F-Ph	H	H	H	H	Cl	
1446	4-F-Ph	2,4-F_2-Ph	H	H	H	H	Cl	
1447	Ph	2,4-F_2-Ph	H	H	H	H	CHO	
1448	4-F-Ph	2-F-Ph	H	H	H	H	CHO	
1449	4-F-Ph	2,4-F_2-Ph	H	H	H	H	CHO	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1450	Ph	2,4-F_2-Ph	H	H	H	H	SCH_2CN	
1451	4-F-Ph	2-F-Ph	H	H	H	H	SCH_2CN	oil[c]
1452	4-F-Ph	2,4-F_2-Ph	H	H	H	H	SCH_2CN	
1453	Ph	2,4-F_2-Ph	H	H	H	H	SCH_2SCN	
1454	4-F-Ph	2-F-Ph	H	H	H	H	SCH_2SCN	
1455	4-F-Ph	2,4-F_2-Ph	H	H	H	H	SCH_2SCN	
1456	Ph	2,4-F_2-Ph	H	H	H	H	$SCCl_3$	
1457	4-F-Ph	2-F-Ph	H	H	H	H	$SCCl_3$	
1458	4-F-Ph	2,4-F_2-Ph	H	H	H	H	$SCCl_3$	
1459	Ph	4-F-Ph	H	H	H	H	S-n-Bu	semi-solid[d]
1460	4-F-Ph	2-F-Ph	H	H	H	H	F	
1461	4-F-Ph	2-F-Ph	H	H	H	H	Br	
1462	4-F-Ph	2-F-Ph	H	H	H	H	$S(O)CH_3$	
1463	4-F-Ph	2-F-Ph	H	H	H	H	$S(O)_2CH_3$	
1464	4-F-Ph	2-F-Ph	H	H	H	H	$S(O)_2$-n-Pr	
1465	4-F-Ph	2-F-Ph	H	H	H	H	-S(O)-t-Bu	
1466	4-F-Ph	2-F-Ph	H	H	H	H	SCF_2H	
1467	4-F-Ph	2-F-Ph	H	H	H	H	SCF_2CF_2H	
1468*	4-F-Ph	2-F-Ph	H	H	H	H	$S(O)CH_2CN$	(oil)[e]

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1469*	4-F-Ph	2-F-Ph	H	H	H	H	SCH_2CN	(oil)[f]
1470	4-F-Ph	2-F-Ph	H	H	H	H	SCH_2SCN	
1471	4-F-Ph	2-F-Ph	H	H	H	H	$S(O)-CH(CH_3)CN$	
1472	4-F-Ph	2-F-Ph	H	H	H	H	$SCH_2CO_2CH_3$	
1473	4-F-Ph	2-F-Ph	H	H	H	H	SCNH-allyl	
1474	4-F-Ph	2-F-Ph	H	H	H	H	SCNH-i-Pr	
1475	4-F-Ph	2-F-Ph	H	H	H	H	SCNHPh	
1476	4-F-Ph	2-F-Ph	H	H	H	H	SCNH-(4-Cl-Ph)	
1477	4-F-Ph	2-F-Ph	H	H	H	H	$SCNHCH_2Ph$	
1478	4-F-Ph	2-F-Ph	H	H	H	H	$SCNHCH_2$-(4-CH_3O-Ph)	
1479	4-F-Ph	2-F-Ph	H	H	H	H	CCH_3	

Table 3 (continued)

Ex. No.	A	B	R	R^1	R^2	R^4	Q	M.P.°C
1480	4-F-Ph	2-F-Ph	H	H	H	H	C(=O)OH	
1481	4-F-Ph	2-F-Ph	H	H	H	H	C(=O)CH_3	
1482	4-F-Ph	2-F-Ph	H	H	H	H	C(=O)-i-Pr	
1483	4-F-Ph	2-F-Ph	H	H	H	H	SCN	
1484	4-F-Ph	2-F-Ph	H	H	H	H	$SSCH_2Ph$	
1485	4-F-Ph	2-F-Ph	H	H	H	H	SS-allyl	
1486	4-F-Ph	2-F-Ph	H	H	H	H	SSPh	

*All compounds in this table are compounds in which E is a bond except 1468 and 1469 in which E is an oxygen atom.

a NMR: ($CDCl_3$) δ 4.9 (s, 2H); 5.1 (s, 1H); 5.2 (s, 1H); 5.3 (s, 1H); 6.7 (m, 2H); 6.9 (m, 2H); 7.2 (m, 2H); 7.5 (m, 1H); 7.6 (s, 1H); 12.2 (brs, 1H).

b NMR: ($CDCl_3$) δ 4.7 (ABq, 2H); 5.3 (s, 2H); 5.8 (s, 1H); 6.7 (m, 2H); 6.9 (m, 2H); 7.3 (m, 2H); 7.5 (m, 1H); 7.8 (s, 1H).

c NMR: ($CDCl_3$) δ 3.8 (ABq, 2H); 4.7 (ABq, 2H); 5.2 (s, 1H); 5.3 (two s, 2H); 6.9-7.2 (m, 4H); 7.2-7.4 (m, 3H); 7.5 (m, 1H); 7.8 (s, 1H).

d NMR: ($CDCl_3$) δ 0.92 (t, 3H); 1.4-1.7 (m, 4H); 3.1 (t, 2H); 4.5 (ABq, 2H); 5.4 (two s, 2H); 5.8 (s, 1H); 7.0 (m, 4H); 7.2 (m, 3H); 7.5 (m, 2H); 7.8 (s, 1H).

e NMR: ($CDCl_3$) δ 2.7-3.5 (m, 2H); 4.3 (s, 1H); 4.4 (m, 2H); 5.2 (m, 2H); 6.8-7.4 (m, 8H); 7.9 (m, 1H).

f NMR: ($CDCl_3$) δ 2.7-3.4 (m, 2H); 4.2 (d, 1H); 4.5 (ABq, 2H); 5.3 (m, 2H); 6.8-7.4 (m, 8H); 7.9 (d, 1H).

Example 1487

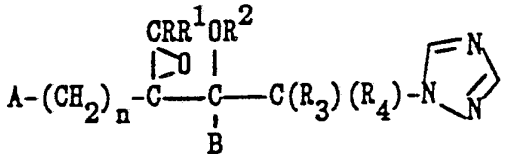
Preparation of 2,3-bis(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3,4-epoxy-2-butanol

2,3-Bis(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-butene-2-ol (1.0 g) was dissolved in 50 ml of anhydrous benzene and stirred under nitrogen. To this solution was added .012 g of vanadium acetonylacetonate. The solution was then refluxed and tert-butyl hydroperoxide (0.44 g dissolved in 5 ml of anhydrous benzene) was added dropwise over 10 minutes. The reaction was refluxed for one additional hour and then cooled to ambient temperature. The benzene was removed in vacuo and the residue chromatographed on silica gel (2% MeOH/CH_2Cl_2). This yielded a total of 650 mg of diastereomeric products in a 3:1 ratio. Further chromatography resulted in the separation of the diastereomers. The major isomer was a waxy white solid. NMR ($CDCl_3$/TMS) δ 2.60 (d, J=6Hz, 1H); 3.48 (d, J=6Hz, 1H); 4.70 (q, J=7Hz, 2H); 5.25 (s, 1H); 6.8-7.3 (m, 8H); 7.55 (s, 1H); 7.90 (s, 1H).

The minor isomer was an amorphous white solid. NMR ($CDCl_3$/TMS) δ 2.55 (d, J=6H, 1H); 2.75 (d, J=6Hz, 1H); 4.80, (q, J=7Hz); 5.0 (s, 1H); 6.85 - 7.10 (m, 4H); 7.15-7.45 (m, 4H); 7.80 (s, 1H); 8.05 (s, 1H).

The epoxides shown in Table 4 were prepared or can be prepared by the method described in Example 1487.

Table 4



Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1487	4-F-Ph	4-F-Ph	0	H	H	H	H	H	53-55
1488	4-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1489	4-F-Ph	4-Cl-Ph	0	H	H	H	H	H	
1490	4-F-Ph	2,4-F_2-Ph	0	H	H	H	H	H	(semi-solid)[a]
1491	4-F-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1492	4-F-Ph	2-F-Ph	0	H	H	H	H	H	(110-119)
1493	4-F-Ph	2-Cl-Ph	0	H	H	H	H	H	
1494	4-F-Ph	n-C_4F_9	0	H	H	H	H	H	
1495	3-F-Ph	4-F-Ph	0	H	H	H	H	H	
1496	3-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1497	3-F-Ph	4-Cl-Ph	0	H	H	H	H	H	
1498	3-F-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1499	3-F-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1500	3-F-Ph	2-F-Ph	0	H	H	H	H	H	
1501	3-F-Ph	2-Cl-Ph	0	H	H	H	H	H	
1502	3-F-Ph	n-C_4F_9	0	H	H	H	H	H	
1503	4-Cl-Ph	4-F-Ph	0	H	H	H	H	H	
1504	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1505	4-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	
1506	4-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	

Table 4 (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1507	4-Cl-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1508	4-Cl-Ph	2-F-Ph	0	H	H	H	H	H	
1509	4-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	
1510	4-Cl-Ph	n-C_4F_9	0	H	H	H	H	H	
1511	2-Cl-Ph	4-F-Ph	0	H	H	H	H	H	
1512	2-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1513	2-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	149-150 Low R_f isomer 141-143 High R_f isomer
1514	2-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	138-140 Isomer A 152-156 Isomer B
1515	2-Cl-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1516	2-Cl-Ph	2-F-Ph	0	H	H	H	H	H	
1517	2-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	
1518	2-Cl-Ph	n-C_4F_9	0	H	H	H	H	H	
1519	3-Cl-Ph	4-F-Ph	0	H	H	H	H	H	
1520	3-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1521	3-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	
1522	3-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1523	3-Cl-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1524	3-Cl-Ph	2-F-Ph	0	H	H	H	H	H	
1525	3-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	
1526	3-Cl-Ph	n-C_4F_9	0	H	H	H	H	H	
1527	Ph	4-F-Ph	0	H	H	H	H	H	88-94
1528	Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1529	Ph	4-Cl-Ph	0	H	H	H	H	H	156-158
1530	Ph	2,4-F_2-Ph	0	H	H	H	H	H	87-90 Low R_f isomer 148-150 High R_f isomer
1531	Ph	4-CF_3-Ph	0	H	H	H	H	H	
1532	Ph	2-F-Ph	0	H	H	H	H	H	

Table 4 (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1533	Ph	2-Cl-Ph	0	H	H	H	H	H	
1534	Ph	n-C_4F_9	0	H	H	H	H	H	
1535	4-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	
1536	4-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1537	4-CF_3-Ph	4-Cl-Ph	0	H	H	H	H	H	
1538	4-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1539	4-CF_3-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1540	4-CF_3-Ph	2-F-Ph	0	H	H	H	H	H	
1541	4-CF_3-Ph	2-Cl-Ph	0	H	H	H	H	H	
1542	4-CF_3-Ph	n-C_4F_9	0	H	H	H	H	H	
1543	4-Br-Ph	4-F-Ph	0	H	H	H	H	H	
1544	4-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1545	4-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	
1546	4-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1547	4-Br-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1548	4-Br-Ph	2-F-Ph	0	H	H	H	H	H	
1549	4-Br-Ph	2-Cl-Ph	0	H	H	H	H	H	
1550	4-Br-Ph	n-C_4F_9	0	H	H	H	H	H	
1551	2,4-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
1552	2,4-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1553	2,4-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
1554	2,4-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1555	2,4-Cl_2-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1556	2,4-Cl_2-Ph	2-F-Ph	0	H	H	H	H	H	
1557	2,4-Cl_2-Ph	2-Cl-Ph	0	H	H	H	H	H	
1558	2,4-Cl_2-Ph	n-C_4F_9	0	H	H	H	H	H	

Table 4 (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1559	2-F-Ph	4-F-Ph	0	H	H	H	H	H	
1560	2-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1561	2-F-Ph	4-Cl-Ph	0	H	H	H	H	H	
1562	2-F-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1563	2-F-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1564	2-F-Ph	2-F-Ph	0	H	H	H	H	H	
1565	2-F-Ph	2-Cl-Ph	0	H	H	H	H	H	
1566	2-F-Ph	n-C_4F_9	0	H	H	H	H	H	
1567	2,4-F_2-Ph	4-F-Ph	0	H	H	H	H	H	
1568	2,4-F_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1569	2,4-F_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
1570	2,4-F_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1571	2,4-F_2-Ph	4-CF_3-Ph	0	H	H	H	H	H	
1572	2,4-F_2-Ph	2-F-Ph	0	H	H	H	H	H	
1573	2,4-F_2-Ph	2-Cl-Ph	0	H	H	H	H	H	
1574	2,4-F_2-Ph	n-C_4F_9	0	H	H	H	H	H	
1575	Ph	4-F-Ph	0	H	CH_3	H	H	H	
1576	Ph	4-F-Ph	0	-$(CH_2)_2$-		H	H	H	
1577	Ph	4-F-Ph	0	CH_3	CH_3	H	H	H	
1578	4-F-Ph	4-F-Ph	0	H	CH_3	H	H	H	
1579	4-F-Ph	4-F-Ph	0	-$(CH_2)_2$-		H	H	H	
1580	4-F-Ph	4-F-Ph	0	CH_3	CH_3	H	H	H	
1581	4-Cl-Ph	2,4-Cl_2-Ph	0	H	CH_3	H	H	H	

Table 4 (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1582	4-Cl-Ph	2,4-Cl_2-Ph	0	$-(CH_2)_2-$		H	H	H	
1583	4-Cl-Ph	2,4-Cl_2-Ph	0	CH_3	CH_3	H	H	H	
1584	2-Cl-Ph	4-Cl-Ph	0	H	CH_3	H	H	H	
1585	2-Cl-Ph	4-Cl-Ph	0	$-(CH_2)_2-$		H	H	H	
1586	2-Cl-Ph	4-Cl-Ph	0	CH_3	CH_3	H	H	H	
1587	4-F-Ph	4-F-Ph	0	H	C_2H_5	H	H	H	
1588	4-F-Ph	4-F-Ph	0	H	i-C_3H_7	H	H	H	
1589	4-F-Ph	4-F-Ph	0	H	n-C_4H_9	H	H	H	
1590	4-F-Ph	4-F-Ph	0	H	Ph	H	H	H	
1591	4-F-Ph	4-F-Ph	0	H	t-C_4H_9	H	H	H	
1592	4-F-Ph	4-F-Ph	0	H	Ph	H	H	H	
1593	4-F-Ph	4-F-Ph	0	CH_3	t-C_4H_9	H	H	H	
1594	4-F-Ph	4-F-Ph	0	CH_3	Ph	H	H	H	
1595	4-F-Ph	4-F-Ph	0	$-(CH_2)_3-$		H	H	H	
1596	4-F-Ph	4-F-Ph	0	$-(CH_2)_4-$		H	H	H	
1597	4-F-Ph	4-F-Ph	0	$-(CH_2)_5-$		H	H	H	
1598	4-F-Ph	4-F-Ph	0	$-(CH_2)_6-$		H	H	H	
1599	4-CH_3-Ph	4-F-Ph	0	H	CH_3	H	H	H	
1600	4-F-Ph	4-F-Ph	1	H	CH_3	H	H	H	
1601	4-Cl-Ph	4-F-Ph	4	H	CH_3	H	H	H	
1602	n-C_4F_9	4-F-Ph	0	H	CH_3	H	H	H	
1603	$(CH_3)_2N$	4-F-Ph	1	H	CH_3	H	H	H	

Table 4 (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1604	5-Cl-2-thienyl	4-F-Ph	0	H	CH_3	H	H	H	
1605	2-Cl-3-thienyl	4-F-Ph	0	H	CH_3	H	H	H	
1606	1-imidazoyl	4-F-Ph	0	H	CH_3	H	H	H	
1607	4-F-Ph	4-F-Ph	0	H	H	CH_3	H	H	
1608	4-F-Ph	4-F-Ph	0	H	H	$CH_2CH=CH_2$	H	H	
1609	4-F-Ph	4-F-Ph	0	H	H	$COCH_3$	H	H	
1610	4-F-Ph	4-F-Ph	0	H	H	CO_2CH_3	H	H	
1611	4-CF_3O-Ph	4-F-Ph	0	H	H	H	H	H	
1612	2-Cl-Ph	4-Cl-Ph	0	H	H	CH_3	H	H	
1613	2-Cl-Ph	4-Cl-Ph	0	H	H	$CH_2CH=CH_2$	H	H	
1614	2-Cl-Ph	4-Cl-Ph	0	H	H	$COCH_3$	H	H	
1615	2-Cl-Ph	4-Cl-Ph	0	H	H	CO_2CH_3	H	H	
1616	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	CH_3	H	H	
1617	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	$CH_2CH=CH_2$	H	H	
1618	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	$COCH_3$	H	H	
1619	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	CO_2CH_3	H	H	
1620	Ph	4-F-Ph	0	H	H	CH_3	H	H	
1621	Ph	4-F-Ph	0	H	H	$CH_2CH=CH_2$	H	H	
1622	Ph	4-F-Ph	0	H	H	$COCH_3$	H	H	
1623	Ph	4-F-Ph	0	H	H	CO_2CH_3	H	H	
1624	OH	2,4-Cl_2-Ph	2	H	H	H	H	H	
1625	OH	2,4-Cl_2-Ph	3	H	H	H	H	H	
1626	OH	2,4-Cl_2-Ph	4	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1627	1-imidazoyl	2,4-Cl_2-Ph	1	H	H	H	H	H	
1628	1-imidazoyl	2,4-Cl_2-Ph	2	H	H	H	H	H	
1629	1-imidazoyl	4-F-Ph	3	H	H	H	H	H	
1630	1-imidazoyl	4-F-Ph	4	H	H	H	H	H	
1631	1H-1,2,4-triazoyl-1-yl	4-F-Ph	1	H	H	H	H	H	
1632	1H-1,2,4-triazoyl-1-yl	4-F-Ph	2	H	H	H	H	H	
1633	1H-1,2,4-triazoyl-1-yl	4-F-Ph	3	H	H	H	H	H	
1634	1H-1,2,4-triazoyl-1-yl	4-F-Ph	4	H	H	H	H	H	
1635	1H-1,2,4-triazoyl-1-yl	2,4-Cl_2-Ph	1	H	H	H	H	H	
1636	Ph	2,5-F_2-Ph	0	H	H	H	H	H	
1637	Ph	3-F-Ph	0	H	H	H	H	H	
1638	Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
1639	Ph	3-Cl-Ph	0	H	H	H	H	H	
1640	Ph	4-Br-Ph	0	H	H	H	H	H	
1641	Ph	4-I-Ph	0	H	H	H	H	H	
1642	Ph	3,4-F_2-Ph	0	H	H	H	H	H	
1643	Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
1644	Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
1645	Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	
1646	Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
1647	Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
1648	Ph	Ph	0	H	H	H	H	H	
1649	Ph	4-CH_3-Ph	0	H	H	H	H	H	
1650	Ph	3-CH_3-Ph	0	H	H	H	H	H	
1651	Ph	2-CH_3-Ph	0	H	H	H	H	H	
1652	Ph	2-CF_3-Ph	0	H	H	H	H	H	
1653	Ph	3-CF_3-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1654	Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	
1655	Ph	4-CH_3O-Ph	0	H	H	H	H	H	
1656	Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1657	Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1658	Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1659	Ph	s-C_4H_9	0	H	H	H	H	H	
1660	2-Cl-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
1661	2-Cl-Ph	3-F-Ph	0	H	H	H	H	H	
1662	2-Cl-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
1663	2-Cl-Ph	3-Cl-Ph	0	H	H	H	H	H	
1664	2-Cl-Ph	4-Br-Ph	0	H	H	H	H	H	
1665	2-Cl-Ph	4-I-Ph	0	H	H	H	H	H	
1666	2-Cl-Ph	3,4-F_2-Ph	0	H	H	H	H	H	
1667	2-Cl-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
1668	2-Cl-Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
1669	2-Cl-Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	
1670	2-Cl-Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
1671	2-Cl-Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
1672	2-Cl-Ph	Ph	0	H	H	H	H	H	
1673	2-Cl-Ph	4-CH_3-Ph	0	H	H	H	H	H	
1674	2-Cl-Ph	3-CH_3-Ph	0	H	H	H	H	H	
1675	2-Cl-Ph	2-CH_3-Ph	0	H	H	H	H	H	
1676	2-Cl-Ph	2-CF_3-Ph	0	H	H	H	H	H	
1677	2-Cl-Ph	3-CF_3-Ph	0	H	H	H	H	H	
1678	2-Cl-Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	
1679	2-Cl-Ph	4-CH_3O-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1680	2-Cl-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1681	2-Cl-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1682	2-Cl-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1683	3-Cl-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
1684	3-Cl-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
1685	4-F-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
1686	4-F-Ph	3-F-Ph	0	H	H	H	H	H	
1687	4-F-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
1688	4-F-Ph	3-Cl-Ph	0	H	H	H	H	H	
1689	4-F-Ph	4-Br-Ph	0	H	H	H	H	H	
1690	4-F-Ph	4-I-Ph	0	H	H	H	H	H	
1691	4-F-Ph	3,4-F_2-Ph	0	H	H	H	H	H	
1692	4-F-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
1693	4-F-Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
1694	4-F-Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	
1695	4-F-Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
1696	4-F-Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
1697	4-F-Ph	Ph	0	H	H	H	H	H	
1698	4-F-Ph	4-CH_3-Ph	0	H	H	H	H	H	
1699	4-F-Ph	3-CH_3-Ph	0	H	H	H	H	H	
1700	4-F-Ph	2-CH_3-Ph	0	H	H	H	H	H	
1701	4-F-Ph	2-CF_3-Ph	0	H	H	H	H	H	
1702	4-F-Ph	3-CF_3-Ph	0	H	H	H	H	H	
1703	4-F-Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1704	4-F-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
1705	4-F-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	
1706	4-F-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1707	4-F-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1708	3-F-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
1709	3-F-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
1710	4-Cl-Ph	2,5-F_2-Ph	0	H	H	H	H	H	
1711	4-Cl-Ph	3-F-Ph	0	H	H	H	H	H	
1712	4-Cl-Ph	2,5-Cl_2-Ph	0	H	H	H	H	H	
1713	4-Cl-Ph	3-Cl-Ph	0	H	H	H	H	H	
1714	4-Cl-Ph	4-Br-Ph	0	H	H	H	H	H	
1715	4-Cl-Ph	4-I-Ph	0	H	H	H	H	H	
1716	4-Cl-Ph	3,4-F_2-Ph	0	H	H	H	H	H	
1717	4-Cl-Ph	3,4-Cl_2-Ph	0	H	H	H	H	H	
1718	4-Cl-Ph	2,6-Cl_2-Ph	0	H	H	H	H	H	
1719	4-Cl-Ph	2-Cl-(4-F)-Ph	0	H	H	H	H	H	
1720	4-Cl-Ph	2,4,6-Cl_3-Ph	0	H	H	H	H	H	
1721	4-Cl-Ph	2-F-(4-Cl)-Ph	0	H	H	H	H	H	
1722	4-Cl-Ph	Ph	0	H	H	H	H	H	
1723	4-Cl-Ph	4-CH_3-Ph	0	H	H	H	H	H	
1724	4-Cl-Ph	3-CH_3-Ph	0	H	H	H	H	H	
1725	4-Cl-Ph	2-CH_3-Ph	0	H	H	H	H	H	
1726	4-Cl-Ph	2-CF_3-Ph	0	H	H	H	H	H	
1727	4-Cl-Ph	3-CF_3-Ph	0	H	H	H	H	H	
1728	4-Cl-Ph	2-F-(4-CF_3)-Ph	0	H	H	H	H	H	
1729	4-Cl-Ph	4-CH_3O-Ph	0	H	H	H	H	H	
1730	4-Cl-Ph	5-Cl-2-pyridyl	0	H	H	H	H	H	

Table 4 (Continued)

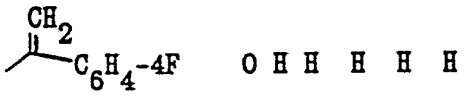
Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1731	4-Cl-Ph	5-Cl-2-thienyl	0	H	H	H	H	H	
1732	4-Cl-Ph	2-Cl-3-thienyl	0	H	H	H	H	H	
1733	4-Cl-Ph		0	H	H	H	H	H	
1734	4-Cl-Ph	t-butyl	0	H	H	H	H	H	
1735	4-Cl-Ph	n-hexyl	0	H	H	H	H	H	
1736	4-Cl-Ph	n-heptyl	0	H	H	H	H	H	
1737	4-Cl-Ph	n-octyl	0	H	H	H	H	H	
1738	4-Cl-Ph	$-C_6F_{13}$	0	H	H	H	H	H	
1739	4-Cl-Ph	$-C_8F_{17}$	0	H	H	H	H	H	
1740	4-Cl-Ph	4-pyridyl	0	H	H	H	H	H	
1741	4-Cl-Ph	2-pyridyl	0	H	H	H	H	H	
1742	4-Cl-Ph	2-thienyl	0	H	H	H	H	H	
1743	4-Cl-Ph	4-n-Bu-Ph	0	H	H	H	H	H	
1744	4-Cl-Ph	4-n-BuO-Ph	0	H	H	H	H	H	
1745	4-Cl-Ph	$5\text{-}CF_3\text{-}2$-pyridyl	0	H	H	H	H	H	
1746	4-Cl-Ph	$5\text{-}CH_3SO_2\text{-}2$-thienyl	0	H	H	H	H	H	
1747	$4\text{-}C_2H_5$-Ph	4-F-Ph	0	H	H	H	H	H	
1748	4-(n-BuO)-Ph	4-F-Ph	0	H	H	H	H	H	
1749	$2\text{-}CH_3SO_2$-imidazol-1-yl	4-F-PH	0	H	H	H	H	H	
1750	$5\text{-}CH_3S$-1,2,4-triazol-1-yl	4-F-Ph	0	H	H	H	H	H	
1751	$-C_6F_{13}$	4-F-Ph	0	H	H	H	H	H	
1752	$-C_8F_{17}$	4-F-Ph	0	H	H	H	H	H	
1753	$3\text{-}CH_3O$-Ph	4-F-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1754	2-CF_3-imidazol-1-yl	4-F-Ph	0	H	H	H	H	H	
1755	4-(i-C_3H_7O)-Ph	4-F-Ph	0	H	H	H	H	H	
1756	4-I-Ph	4-F-Ph	0	H	H	H	H	H	
1757	3,4-F_2-Ph	4-F-Ph	0	H	H	H	H	H	
1758	3,4-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
1759	2,6-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
1760	2-Cl-(4-F)-Ph	4-F-Ph	0	H	H	H	H	H	
1761	2,4,6-Cl_3-Ph	4-F-Ph	0	H	H	H	H	H	
1762	4-CH_3-Ph	4-F-Ph	0	H	H	H	H	H	
1763	3-CH_3-Ph	4-F-Ph	0	H	H	H	H	H	
1764	2-CH_3-Ph	4-F-Ph	0	H	H	H	H	H	
1765	2-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	
1766	3-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	
1767	4-CH_3O-Ph	4-F-Ph	0	H	H	H	H	H	
1768	2,3-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
1769	3,5-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
1770	2,5-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
1771	3-Br-Ph	4-F-Ph	0	H	H	H	H	H	
1772	4-C_2H_5O-Ph	4-F-Ph	0	H	H	H	H	H	
1773	2,4-$(CH_3)_2$-Ph	4-F-Ph	0	H	H	H	H	H	
1774	2,4,6-$(CH_3)_3$-Ph	4-F-Ph	0	H	H	H	H	H	
1775	4-Ph-Ph	4-F-Ph	0	H	H	H	H	H	
1776	5-Cl-2-thienyl	4-F-Ph	0	H	H	H	H	H	
1777	2-Cl-3-thienyl	4-F-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1778	1-imidazoyl	4-F-Ph	0	H	H	H	H	H	
1779	1H-1,2,4-triazoyl-1-yl	4-F-Ph	0	H	H	H	H	H	
1780	2-pyridyl	4-F-Ph	0	H	H	H	H	H	
1781	5-Cl-2-pyridyl	4-F-Ph	0	H	H	H	H	H	
1782	3-pyridyl	4-F-Ph	0	H	H	H	H	H	
1783	4-pyridyl	4-F-Ph	0	H	H	H	H	H	
1784	n-C_4F_9	4-F-Ph	0	H	H	H	H	H	
1785	4-I-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1786	3,4-F_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1787	3,4-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1788	2,6-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1789	2-Cl-(4-F)-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1790	2,4,6-Cl_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1791	4-CH_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1792	3-CH_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1793	2-CH_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1794	2-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1795	3-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1796	4-CH_3O-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1797	2,3-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1798	3,5-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1799	2,5-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1800	3-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1801	4-C_2H_5O-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1802	2,4-$(CH_3)_2$-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1803	2,4,6-$(CH_3)_3$-Ph	2,4-Cl_2-Ph	O	H	H	H	H	H	
1804	4-Ph-Ph	2,4-Cl_2-Ph	O	H	H	H	H	H	
1805	5-Cl-2-thienyl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1806	2-Cl-3-thienyl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1807	1-imidazoyl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1808	1H-1,2,4-triazoyl-1-yl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1809	2-pyridyl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1810	5-Cl-2-pyridyl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1811	3-pyridyl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1812	4-pyridyl	2,4-Cl_2-Ph	O	H	H	H	H	H	
1813	n-C_4F_9	2,4-Cl_2-Ph	O	H	H	H	H	H	
1814	4-I-Ph	4-Cl-Ph	O	H	H	H	H	H	
1815	3,4-F_2-Ph	4-Cl-Ph	O	H	H	H	H	H	
1816	3,4-Cl_2-Ph	4-Cl-Ph	O	H	H	H	H	H	
1817	2,6-Cl_2-Ph	4-Cl-Ph	O	H	H	H	H	H	
1818	2-Cl-(4-F)-Ph	4-Cl-Ph	O	H	H	H	H	H	
1819	2,4,6-Cl_3-Ph	4-Cl-Ph	O	H	H	H	H	H	
1820	4-CH_3-Ph	4-Cl-Ph	O	H	H	H	H	H	
1821	3-CH_3-Ph	4-Cl-Ph	O	H	H	H	H	H	
1822	2-CH_3-Ph	4-Cl-Ph	O	H	H	H	H	H	
1823	2-CF_3-Ph	4-Cl-Ph	O	H	H	H	H	H	
1824	3-CF_3-Ph	4-Cl-Ph	O	H	H	H	H	H	
1825	4-CH_3O-Ph	4-Cl-Ph	O	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1826	2,3-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
1827	3,5-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
1828	2,5-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
1829	3-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	
1830	4-EtO-Ph	4-Cl-Ph	0	H	H	H	H	H	
1831	2,4-$(CH_3)_2$-Ph	4-Cl-Ph	0	H	H	H	H	H	
1832	2,4,6-$(CH_3)_3$-Ph	4-Cl-Ph	0	H	H	H	H	H	
1833	4-Ph-Ph	4-Cl-Ph	0	H	H	H	H	H	
1834	5-Cl-2-thienyl	4-Cl-Ph	0	H	H	H	H	H	
1835	2-Cl-3-thienyl	4-Cl-Ph	0	H	H	H	H	H	
1836	1-imidazoyl	4-Cl-Ph	0	H	H	H	H	H	
1837	1H-1,2,4-triazoyl-1-yl	4-Cl-Ph	0	H	H	H	H	H	
1838	2-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
1839	5-Cl-2-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
1840	3-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
1841	4-pyridyl	4-Cl-Ph	0	H	H	H	H	H	
1842	n-C_4F_9	4-Cl-Ph	0	H	H	H	H	H	
1843	4-I-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1844	3,4-F_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1845	3,4-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1846	2,6-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1847	2-Cl-(4-F)-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1848	2,4,6-Cl_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1849	4-CH_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1850	3-CH_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1851	2-CH_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1852	2-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1853	3-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1854	4-CH_3O-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1855	2,3-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1856	3,5-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1857	2,5-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1858	3-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1859	4-C_2H_5O-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1860	2,4-$(CH_3)_2$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1861	2,4,6-$(CH_3)_3$-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1862	4-Ph-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1863	5-Cl-2-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
1864	2-Cl-3-thienyl	2,4-F_2-Ph	0	H	H	H	H	H	
1865	1-imidazoyl	2,4-F_2-Ph	0	H	H	H	H	H	
1866	1H-1,2,4-triazoyl-1-yl	2,4-F_2-Ph	0	H	H	H	H	H	
1867	2-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
1868	5-Cl-2-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
1869	3-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
1870	4-pyridyl	2,4-F_2-Ph	0	H	H	H	H	H	
1871	n-C_4F_9	2,4-F_2-Ph	0	H	H	H	H	H	

Table 4 (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1872	4-F-Ph	4-F-Ph	0	H	H	H	CH_3	H	
1873	4-F-Ph	4-F-Ph	0	H	H	H	CH_3	CH_3	
1874	4-F-Ph	4-F-Ph	0	H	H	H	F	H	
1875	4-F-Ph	4-F-Ph	0	H	H	H	F	CH_3	
1876	4-F-Ph	4-F-Ph	0	H	H	H	F	F	
1877	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	CH_3	H	
1878	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	CH_3	CH_3	
1879	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	F	H	
1880	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	F	CH_3	
1881	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	F	F	
1882	2-Cl-Ph	4-Cl-Ph	0	H	H	H	CH_3	H	
1883	2-Cl-Ph	4-Cl-Ph	0	H	H	H	CH_3	CH_3	
1884	2-Cl-Ph	4-Cl-Ph	0	H	H	H	F	H	
1885	2-Cl-Ph	4-Cl-Ph	0	H	H	H	F	CH_3	
1886	2-Cl-Ph	4-Cl-Ph	0	H	H	H	F	F	
1887	Ph	4-F-Ph	0	H	H	H	CH_3	H	
1888	Ph	4-F-Ph	0	H	H	H	CH_3	CH_3	
1889	Ph	4-F-Ph	0	H	H	H	F	H	
1890	Ph	4-F-Ph	0	H	H	H	F	CH_3	
1891	Ph	4-F-Ph	0	H	H	H	F	F	

a NMR: ($CDCl_3$) δ 2.7 (m, 2H), 4.4 (1/2 of ABq, J=12, 1H), 4.9 (1/2 of ABq, J=12, 1H), 5.0 (br s, 1H, OH), 6.7 (m, 2H), 7.0 (m, 2H), 7.4 (m, 3H), 7.8 (s, 1H), 8.0 (s, 1H).

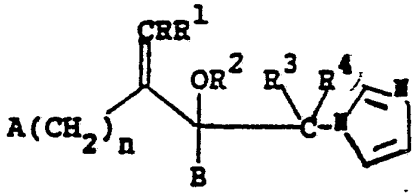
Example 1930

2-(2,4-Difluorophenyl)-3-(2-chlorophenyl)-1-(1H-1,2,4-imidazol-1-yl)-3-buten-2-ol

A mixture of 10.2 g (0.035 mol) of 2-(2,4-difluorophenyl)-2-[1-(2-chlorophenyl)ethenyl]oxirane; 6.20 g (0.091 mol) of imidazole and 12.44 g (0.091 mol) of potassium carbonate in 100 mL of DMSO was heated overnight at 100°, then cooled and poured into 800 mL of H_2O. The aqueous mixture was extracted with 4x500 mL Et_2O, and the organic extracts were washed with water (2x) and brine, dried over $MgSO_4$ and evaporated to give 7.8 g of a yellow-brown solid. Flash chromatography and trituration with Et_2O gave 4.0 g of a white powder, mp 139-142°: NMR: ($CDCl_3$) δ 3.9 (br, OH), 4.2 (1/2 of ABq, 1H), 4.7 (1/2 of ABq, 1H, CH_2-imidazole), 5.3 (s, 1H, vinyl), 5.5 (s, 1H, vinyl), 6.7 (m, 4H), 7.0-7.5 (m, 6H); IR (nujol) 3400-2600 (br), 1614, 1512, 1501, 1111, 1075, 852, 819, 768, 743, 623 cm^{-1}.

The compounds shown in Table 4A were prepared or can be prepared by the methods described above.

Table 4A



Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1892	Ph	Ph	0	H	H	H	H		
1893	Ph	2-F-Ph	0	H	H	H	H		
1894	Ph	4-F-Ph	0	H	H	H	H		(oil)[a]
1895	Ph	2,4-F_2-Ph	0	H	H	H	H		157-158
1896	Ph	2-Cl-Ph	0	H	H	H	H		
1897	Ph	4-Cl-Ph	0	H	H	H	H		
1898	Ph	2,4-Cl_2-Ph	0	H	H	H	H		
1899	2-F-Ph	Ph	0	H	H	H	H		
1900	2-F-Ph	2-F-Ph	0	H	H	H	H		
1901	2-F-Ph	4-F-Ph	0	H	H	H	H		
1902	2-F-Ph	2,4-F_2-Ph	0	H	H	H	H		
1903	2-F-Ph	2-Cl-Ph	0	H	H	H	H		
1904	2-F-Ph	4-Cl-Ph	0	H	H	H	H		
1905	2-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H		
1906	3-F-Ph	Ph	0	H	H	H	H		
1907	3-F-Ph	2-F-Ph	0	H	H	H	H		
1908	3-F-Ph	4-F-Ph	0	H	H	H	H		
1909	3-F-Ph	2,4-F_2-Ph	0	H	H	H	H		
1910	3-F-Ph	2-Cl-Ph	0	H	H	H	H		
1911	3-F-Ph	4-Cl-Ph	0	H	H	H	H		
1912	3-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H		

Table 4A (Continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1913	4-F-Ph	Ph	0	H	H	H	H		
1914	4-F-Ph	2-F-Ph	0	H	H	H	H		159-160
1915	4-F-Ph	4-F-Ph	0	H	H	H	H		175-177
1916	4-F-Ph	2,4-F_2-Ph	0	H	H	H	H		194-197
1917	4-F-Ph	2-Cl-Ph	0	H	H	H	H		
1918	4-F-Ph	4-Cl-Ph	0	H	H	H	H		
1919	4-F-Ph	2,4-Cl_2-Ph	0	H	H	H	H		200-215 (60% pure)
1920	2,4-F_2-Ph	Ph	0	H	H	H	H		
1921	2,4-F_2-Ph	2-F-Ph	0	H	H	H	H		
1922	2,4-F_2-Ph	4-F-Ph	0	H	H	H	H		
1923	2,4-F_2-Ph	2,4-F_2-Ph	0	H	H	H	H		
1924	2,4-F_2-Ph	2-Cl-Ph	0	H	H	H	H		
1925	2,4-F_2-Ph	4-Cl-Ph	0	H	H	H	H		
1926	2,4-F_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H		
1927	2-Cl-Ph	Ph	0	H	H	H	H		
1928	2-Cl-Ph	2-F-Ph	0	H	H	H	H		
1929	2-Cl-Ph	4-F-Ph	0	H	H	H	H		
1930	2-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H		139-142 (HCl salt 215-217)
1931	2-Cl-Ph	2-Cl-Ph	0	H	H	H	H		
1932	2-Cl-Ph	4-Cl-Ph	0	H	H	H	H		160-162 (HCl salt 170-173)
1933	2-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H		

Table 4A (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1934	3-Cl-Ph	Ph	0	H	H	H	H	H	
1935	3-Cl-Ph	2-F-Ph	0	H	H	H	H	H	
1936	3-Cl-Ph	4-F-Ph	0	H	H	H	H	H	
1937	3-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1938	3-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	
1939	3-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	
1940	3-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1941	4-Cl-Ph	Ph	0	H	H	H	H	H	
1942	4-Cl-Ph	2-F-Ph	0	H	H	H	H	H	
1943	4-Cl-Ph	4-F-Ph	0	H	H	H	H	H	
1944	4-Cl-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1945	4-Cl-Ph	2-Cl-Ph	0	H	H	H	H	H	
1946	4-Cl-Ph	4-Cl-Ph	0	H	H	H	H	H	179-181
1947	4-Cl-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1948	2,4-Cl_2-Ph	Ph	0	H	H	H	H	H	
1949	2,4-Cl_2-Ph	2-F-Ph	0	H	H	H	H	H	
1950	2,4-Cl_2-Ph	4-F-Ph	0	H	H	H	H	H	
1951	2,4-Cl_2-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1952	2,4-Cl_2-Ph	2-Cl-Ph	0	H	H	H	H	H	
1953	2,4-Cl_2-Ph	4-Cl-Ph	0	H	H	H	H	H	
1954	2,4-Cl_2-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 4A (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1955	2-Br-Ph	Ph	0	H	H	H	H	H	
1956	2-Br-Ph	2-F-Ph	0	H	H	H	H	H	
1957	2-Br-Ph	4-F-Ph	0	H	H	H	H	H	
1958	2-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1959	2-Br-Ph	2-Cl-Ph	0	H	H	H	H	H	
1960	2-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	
1961	2-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1962	3-Br-Ph	Ph	0	H	H	H	H	H	
1963	3-Br-Ph	2-F-Ph	0	H	H	H	H	H	
1964	3-Br-Ph	4-F-Ph	0	H	H	H	H	H	
1965	3-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1966	3-Br-Ph	2-Cl-Ph	0	H	H	H	H	H	
1967	3-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	
1968	3-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1969	4-Br-Ph	Ph	0	H	H	H	H	H	
1970	4-Br-Ph	2-F-Ph	0	H	H	H	H	H	
1971	4-Br-Ph	4-F-Ph	0	H	H	H	H	H	
1972	4-Br-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1973	4-Br-Ph	2-Cl-Ph	0	H	H	H	H	H	
1974	4-Br-Ph	4-Cl-Ph	0	H	H	H	H	H	
1975	4-Br-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

Table 4A (continued)

Ex. No.	A	B	n	R	R^1	R^2	R^3	R^4	M.P.°C
1976	2-CF_3-Ph	Ph	0	H	H	H	H	H	177-179
1977	2-CF_3-Ph	2-F-Ph	0	H	H	H	H	H	185-187
1978	2-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	170-172
1979	2-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1980	2-CF_3-Ph	2-Cl-Ph	0	H	H	H	H	H	
1981	2-CF_3-Ph	4-Cl-Ph	0	H	H	H	H	H	159-161
1982	2-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1983	3-CF_3-Ph	Ph	0	H	H	H	H	H	
1984	3-CF_3-Ph	2-F-Ph	0	H	H	H	H	H	
1985	3-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	
1986	3-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1987	3-CF_3-Ph	2-Cl-Ph	0	H	H	H	H	H	
1988	3-CF_3-Ph	4-Cl-Ph	0	H	H	H	H	H	
1989	3-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	
1990	4-CF_3-Ph	Ph	0	H	H	H	H	H	
1991	4-CF_3-Ph	2-F-Ph	0	H	H	H	H	H	
1992	4-CF_3-Ph	4-F-Ph	0	H	H	H	H	H	
1993	4-CF_3-Ph	2,4-F_2-Ph	0	H	H	H	H	H	
1994	4-CF_3-Ph	2-Cl-Ph	0	H	H	H	H	H	
1995	4-CF_3-Ph	4-Cl-Ph	0	H	H	H	H	H	
1996	4-CF_3-Ph	2,4-Cl_2-Ph	0	H	H	H	H	H	

a NMR: ($CDCl_3$) δ 4.5 (ABq, 2H), 4.8 (br s, 1H), 5.5 (two s, 2H), 6.7 (s, 1H), 6.9 (s, 1H), 7.0-7.6 (m, 10H)

Pharmaceutical Utility

In vitro activity (Table 5) is expressed in terms of the minimal inhibitory concentration (MIC) of the test compound which inhibits the growth of yeasts and fungi.

The target organisms, Candida albicans ATCC 11651 and Aspergillus fumigatus ATCC 28214 are standardized, [V. Bezjak, J. Clinical Micro., 21 509-512 (1984)] to a concentration of 10^7 organisms/ml and maintained at -70° until use. Test compounds are solubilized in dimethyl sulfoxide (DMSO) and diluted in Eagle's Minimum Essential Medium (EMEM) broth to achieve a final concentration of 200 μg/ml. Stock solutions of standard antifungal agents are stored at -70° and diluted in EMEM as required.

The in vitro assay utilizes a microtiter broth dilution technique [L. Polonelli and G. Morace, Mycopathologia, 86, 21-28 (1984)] and C. Hughes, et. al. Antimicrob. Ag. and Chemo., 25, 560-562(1984)]. Test compounds are serially diluted in EMEM to give graded concentrations ranging from 100 to 0.4 μg/ml. The appropriate wells are inoculated with the required organism (C. albicans at 1 x 10^4 organisms/ml and A. fumigatus at 5 x 10^5 organisms/ml) and the assay incubated at 30° for 24 hours. The extent of fungal growth is determined at an optical density equal to 540 nm using a scanning spectrophotometer (Flow® MCC) and MIC values, representing the minimal concentration of a compound which inhibited growth, are determined, [V. Grenta, et al. Antimicrob. Ag. and Chemo., 22, 151-153 (1982)].

The in vivo activity of test compounds is based on the percent (%) survival of infected animals receiving test or standard agent compared to that in an infected untreated group (Table 6). The in vivo assays are chronic systemic infections lethal to mice within 7 days post infection, [J. Barnes, et al. Lab Investigation, 49 460-467 (1963), and T. Rogers and E. Balish, Infection and Immunity, 14 33-38 (1976)].

Candida albicans ATCC 11651, from a frozen stock culture (10^9 organisms/ml) maintained at -70°, is diluted in saline to 1 x 10^7 organisms/ml and 0.2 ml inoculated intravenously (caudal vein) into 20.0 gm CF-1 female mice (Charles River).

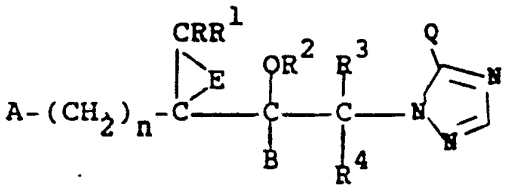
Test compounds are routinely solubilized in 0.25% (w/v) methylcellulose (Methocel®) but for those compounds difficult to solubilize 10% (w/v) Emulophor® (EL620 GAF Corp.) is used. The standard antifungal agents, amphotericin B (Fungizone®) in water and ketoconazole (Nizoral®) in Methocel®, are administered at 1.0 mg/kg/day and 150 mg/kg/day, respectively.

In a primary assay, mice (10 per group) are infected with C. albicans, and receive test compounds at 50 or 150 mg/kg/day via the subcutaneous route. Animals are dosed with the test compound at 1 and 6 hour post-infection and then once daily for the next three days. Survival of mice in each group is recorded for 21 days.

Compounds which protect $\geq$70% of the infected animals for 14 days at a dose 150 mg/kg/day or less are viewed as active.

Table 5

In Vitro Antifungal Results



Example Number	MIC values (μg/ml) C. albicans	A. fumigatus
1	≤0.01	6.3
1 HCl salt	0.05	12.5
2	≤0.4	1.6
3	≤0.4	50
4	0.03	0.8
6	1.6	25
10	1.6	25
15	0.1	50
16	0.03	6.3
17	0.03	12.5
25	1.6	25
26	≤0.4	12.5
26 HCl salt	0.03	0.4
27	≤0.4	12.5
28	0.03	1.6
32	≤0.4	1.6
33	0.03	0.03
34	0.03	3.2
34 HCl salt	0.03	1.6
35	0.03	0.1
35 HCl salt	0.03	≤0.2
39	0.4	25
40	0.4	3.2

Table 5 (Continued)

Example Number	MIC values (μg/ml) C. albicans	A. fumigatus
41	0.4	50
42	0.03	6.3
47	0.03	1.6
49	0.03	12.5
50	0.1	0.8
51	0.03	3.2
52	0.03	0.4
52 HCl salt	0.03	0.4
65	0.2	100
67	0.03	100
85	≤0.4	12.5
94	0.4	50
99	0.05	6.3
100	0.03	3.2
101	0.03	12.5
114	0.4	50
117	0.4	100
163	0.03	12.5
164	0.03	1.6
170	1.6	100
177	3.2	>100
208	1.6	50
286	0.4	25
291	0.2	100
359	0.4	50
360	0.8	100
361	0.8	25
363	100	100
447	3.2	N.T.
449	≤0.4	N.T.

Table 5 (Continued)

Example Number	MIC values (μg/ml) C. albicans	A. fumigatus
450	>100	N.T.
451	12.5	N.T.
452	>100	N.T.
453	1.6	>100
454	100	>100
455	25	N.T.
477	>100	N.T.
594	0.8	0.8
594 HCl salt	0.03	0.4
596	0.05	0.4
603	0.1	>100
605	0.2	100
608	0.4	6.3
620	0.03	0.05
622	0.03	0.1
627	0.03	25
644	0.03	0.4
646	0.03	0.4
651	0.8	100
656	≤0.4	12.5
657	0.4	100
661	1.6	100
667	6.3	25
668	0.4	50
669	0.03	0.8
671	0.03	0.2
675	0.1	25
685	0.8	100
699	50	100
721	0.4	12.5

Table 5 (Continued)

Example Number	MIC values (μg/ml) C. albicans	A. fumigatus
724	0.4	0.4
726	0.8	6.3
815	0.03	>100
905	0.04	100
1258	1.6	>100
1260	0.8	>100
1276	0.03	1.6
1276a	3.2	100
1277	0.03	6.3
1277 HCl salt	0.03	3.2
1277a	6.3	100
1278	≤0.4	>100
1300	≤0.4	6.3
1377	1.6	100
1451	>100	>100
1459	>100	>100
1487	0.4	6.3
1527	0.4	6.3
Standards*		
Amphotericin B	0.33±0.2	1.4±0.5
Nystatin	1.3 ±0	3.0±1.0
5-Fluorocytosine	0.14±0.1	5.7±4.0
Ketoconazole	≤0.1	11.0±5.0
Miconazole	≤0.1	1.3±0

*MIC values of the standard drugs are the mean of five determinations

± Standard deviation

TABLE 6

In Vivo Antifungal Results

% Survival (150 mg/kg per day)
Primary Assay

Ex. No.	Days 7	14	21
1	100	100	80
2	100	100	80
3	100	100	60
4	100	50	N.T.
6	50	10	0
10	20	10	0
15	100	90	60
16	100	100	100
17	100	90	70
25	100	100	50
26	100	100	100
26 salt	100	90	80
27	100	100	100
28	100	90	N.T.
32	100	90	50
33	100	100	100
34	100	100	100
34 salt	100	100	100
35	100	100	90
35 salt	100	100	70
39	100	80	N.T.
40	100	100	N.T.
41	100	100	N.T.
42	80	80	50
47	90	80	30
49	100	90	60
50	100	90	50
51	100	100	80
52	100	100	90
52 salt	100	100	90
55	100	70	50
65	100	70	50
67	100	100	100
85	100	80	70
94	100	40	10
99	100	100	40
100	100	50	30
101	100	90	60
114	70	10	10
117	60	0	0
163	90	60	40

TABLE 6 (continued)

In Vivo Antifungal Results

% Survival (150 mg/kg per day)
Primary Assay

Ex. No.	Days 7	14	21
164	100	80	70
208	0	0	0
286	100	50	20
359	100	80	80
360	100	60	40
361	100	100	90
363	10	0	0
453	60	40	30
594	70	10	0
596	70	60	40
603	10	0	0
608	100	70	20
620	100	100	90
622	100	100	100
627	0	0	0
644	80	70	50
646	100	100	70
651	100	50	20
656	100	90	40
657	0	0	0
661	50	20	0
667	10	0	0
668	70	10	0
669	100	100	100
671	100	100	60
675	100	60	0
685	30	10	0
721	100	30	30
724	100	90	40
725	90	90	40
726	100	80	10
905	80	50	20
1276	100	70	50
1276a	0	0	0
1277	100	100	90
1277a	80	0	0
1278	0	0	0
1487	100	100	70
1527	100	70	20

Standards			
Amphotericin B	100	100	100
Ketoconazole	100	80	50

N.T.: Not Tested

DOSAGE FORMS

The antimycotic agents of this invention can be administered by any means that effects contact of the active ingredient with the agent's site of action in the body. The compounds can be administered by any conventional means available for use in conjunction with pharmaceuticals, either as individual therapeutic agents or in a combination of therapeutic agents. They can be administered alone, but are generally administered with a pharmaceutical carrier selected on the basis of the chosen route of administration and standard pharmaceutical practice.

The dosage administered will, of course, vary depending on the use and known factors such as the pharmacodynamic characteristics of the particular agent, and its mode and route of administration: age, health, and weight of the recipient; nature and extent of symptoms, kind of concurrent treatment, frequency of treatment, and the effect desired.

Dosage forms (compositions) suitable for administration contain from about 200 milligram to about 2000 milligrams of active ingredient per unit. In these pharmaceutical compositions, the active ingredient will ordinarily be present in an amount of about 0.5-95% by weight based on the total weight of the composition. For use in the treatment of said diseases, a daily dose of active ingredient can be about 10 to 50 milligrams per kilogram of body weight.

The composition of the invention may be in a conventional pharmaceutical form suitable for oral administration, for example a tablet, a capsule, an emulsion or an aqueous or oily solution or suspension, or suitable for topical application, for example a cream, ointment or gel. It can also be administered parenterally in sterile liquid dosage forms.

Gelatin capsules contain the active ingredient and powdered carriers, such as lactose, starch, cellulose derivatives, magnesium stearate, stearic acid and the like. Similar diluents can be used to make compressed tablets. Both tablets and capsules can be manufactured as sustained release products to provide for continuous release of medication over a period of hours. Compressed tablets can be sugar coated or film coated to mask any unpleasant taste and protect the tablet from the atmosphere, or enteric coated for selective disintegration in the gastrointestinal tract.

The pharmaceutical compositions which are ointments, creams and gels can, for example, contain the usual diluents, e.g. animal and vegetable fats, waxes, paraffins, starch, tragacanth, cellulose derivatives, polyethylene glycols, silicones, bentonites, silicic acid, talc and zinc oxide or mixtures of these substances.

In general, water, a suitable oil, saline, aqueous dextrose (glucose), and related sugar solutions and glycols such as propylene glycol or polyethylene glycols are suitable carriers for parenteral solutions. Solutions for parenteral administration preferably contain a water soluble salt of the active ingredient, suitable stabilizing agents, and if necessary, buffer substances. Antioxidizing agents such as sodium bisulfite, sodium sulfite, or ascorbic acid, either alone or combined, are suitable stabilizing agents.

All the pharmaceutical compositions according to the invention can also contain coloring and flavoring to increase patient acceptance.

Also used are citric acid and its salts and sodium EDTA. In addition, parenteral solutions can contain

preservatives, such as benzalkonium chloride, methyl or propyl-paraben, and chlorobutanol.

Suitable pharmaceutical carriers are described in Remington's Pharmaceutical Sciences, A. Osol, a standard reference text in this field.

Useful pharmaceutical dosage forms for administration of the compounds of this invention can be illustrated as follows:

Capsules

A large number of unit capsules are prepared by filling standard two-piece hard gelatin capsules each with 100 milligrams of powdered active ingredient, 150 milligrams of lactose, 50 milligrams of cellulose, and 6 milligrams magnesium stearate.

Soft Gelatin Capsules

A mixture of active ingredient in a digestable oil such as soybean oil, cottonseed oil or olive oil is prepared and injected by means of a positive displacement pump into gelatin to form soft gelatin capsules containing 100 milligrams of the active ingredient. The capsules are washed and dried.

Tablets

A large number of tablets are prepared by conventional procedures so that the dosage unit is 100 milligrams of active ingredient, 0.2 milligrams of colloidal silicon dioxide, 5 milligrams of magnesium stearate, 275 milligrams of microcrystalline cellulose, 11 milligrams of starch and 98.8 milligrams of lactose. Appropriate coatings may be applied to increase palatability or delay absorption.

Injectable

A parenteral composition suitable for administration by injection is prepared by stirring 1.5% by weight of active ingredient in 10% by volume propylene glycol. The solution is made to volume with water for injection and sterilized.

Suspension

An aqueous suspension is prepared for oral administration so that each 5 milliliters contain 100 milligrams of finely divided active ingredient, 100 milligrams of sodium carboxymethyl cellulose, 5 milligrams of sodium benzoate, 1.0 grams of sorbitol solution, U.S.P., and 0.025 milliliters of vanillin.

Cream

A cream for topical application is prepared by incorporating 100 milligrams of the finely pulverized active ingredient in 5 grams of a cream base which comprises 40% white petrolatum, 3% microcrystalline wax, 10% lanolin, 5% Span®20, 0.3% Tween®20 and 41.7% water.

Agricultural Formulations

The compounds of this invention when used for agricultural purposes will generally be used in formulation with a liquid or solid diluent or with an organic solvent. Useful formulations of the compounds of Formula I can be prepared in conventional ways. They include dusts, granules, pellets, solutions, emulsions, wettable powders, emulsifiable concentrates and the like. Many of these may be applied directly. Sprayable formulations can be extended in suitable media and used at spray volumes of from about one to several hundred liters per hectare. High strength compositions are primarily used as intermediates for further formulation. The formulations, broadly, contain about 1% to 99% by weight of active ingredient(s) and at least one of a) about 0.1% to 35% surfactant(s) and b) about 5% to 99% solid or liquid inert diluent(s). More specifically, they will contain these ingredients in the following approximate proportions:

	Percent by Weight		
	Active Ingredient	Diluent(s)	Surfactant(s)
Wettable Powders	20-90	0-74	1-10
Oil Suspensions, Emulsions, Solutions, (including Emulsifiable Concentrates)	5-50	40-95	0-35
Aqueous Suspensions	10-50	40-84	1-20
Dusts	1-25	70-99	0-5
Granules and Pellets	1-95	5-99	0-15
High Strength Compositions	90-99	0-10	0-2

Lower or higher levels of active ingredient can, of course, be present depending on the intended use and the physical properties of the compound. Higher ratios of surfactant to active ingredient are sometimes

desirable, and are achieved by incorporation into the formulation or by tank mixing.

Typical solid diluents are described in Watkins, et al., "Handbook of Insecticide Dust Diluents and Carriers", 2nd Ed., Dorland Books, Caldwell, New Jersey. The more absorptive diluents are preferred for the wettable powders and the denser ones for dusts. Typical liquid diluents and solvents are described in Marsden, "Solvents Guide," 2nd Ed., Interscience, New York, 1950. Solubility under 0.1% is preferred for suspension concentrates; solution concentrates are preferably stable against phase separation at 0°C. "McCutcheon's Detergents and Emulsifiers Annual", MC Publishing Corp., Ridgewood, New Jersey, as well as Sisely and Wood, "Encyclopedia of Surface Active Agents", Chemical Publ. Co., Inc., New York, 1964, list surfactants and recommended uses. All formulations can contain minor amounts of additives to reduce foam, caking, corrosion, microbiological growth, etc. Preferably, ingredients should be approved by the U.S. Environmental Protection Agency for the use intended.

The methods of making such compositions are well known. Solutions are prepared by simply mixing the ingredients. Fine solid compositions are made by blending and, usually, grinding as in a hammer or fluid energy mill. Suspensions are prepared by wet milling (see, for example, Littler, U.S. Patent 3,060,084). Granules and pellets may be made by spraying the active material upon preformed granular carriers or by agglomeration techniques. See J. E. Browning, "Agglomeration", Chemical Engineering, Dec. 4, 1967, pp. 147ff. and "Perry's Chemical Engineer's Handbook", 4th Edn., McGraw-Hill, N.Y., 1963, pp. 8-59ff.

For further information regarding the art of formulation, see for example:

H. M. Loux, U.S. Patent 3,235,361, Feb. 15, 1966, Col. 6, Line 16 through Col. 7, Line 19 and Examples 10 through 41.

R. W. Luckenbaugh, U.S. Patent 3,309,192, March 14, 1967, Col. 5, Line 43 through Col. 7, Line 62 and Examples 8, 12, 15, 39, 41, 52, 53, 58, 132, 138-140, 162-164, 166, 167, 169-192.

H. Gysin and E. Knusli, U.S. Patent 2,891,855, June 23, 1959, Col. 3, Line 66 through Col. 5, Line 17 and Examples 1-4.

G. C. Klingman, "Weed Control as a Science", John Wiley and Sons, Inc., New York, 1961, pp. 81-96.

J. D. Fryer and S. A. Evans, "Weed Control Handbook", 5th Edn. Blackwell Scientific Publications, Oxford, 1968, pp. 101-103.

Examples of useful formulations of compounds of the present invention are as follows.

Wettable Powder

2-(2,4-difluorophenyl)-3-(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-1-ol; and the (S) enantiomer thereof	80%
sodium alkylnaphthalenesulfonate	2%
sodium ligninsulfonate	2%
synthetic amorphous silica	3%
kaolinite	13%

The ingredients are blended, hammer-milled, re-blended and packaged.

Granule

wettable powder of above example	15%
gypsum	69%
potassium sulfate	16%

The ingredients are blended in a rotating or fluid bed mixer and water sprayed on to accomplish granulation. When most of the material has reached the

desired range of 1.0 to 0.42 mm. (U.S.S. No. 18 to 40 sieves), the granules are removed, dried, and screened. Oversize material is crushed to produce additional material in the desired range.

High Strength Concentrate

2-(2-fluorophenyl)-3-(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof	98.5%
silica aerogel	0.5%
synthetic amorphous fine silica	1.0%

The ingredients are blended and ground in a hammer-mill to produce a high strength concentrate essentially all passing a U.S.S. No. 50 sieve (0.3 mm openings). This material may then be formulated in a variety of ways.

Aqueous Suspension

2-(2,4-difluorophenyl)-3-phenyl-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof	25%
hydrated attapulgite	3%
crude calcium ligninsulfonate	10%
sodium dihydrogen phosphate	0.5%
water	61.5%

The ingredients are ground together in a ball, sand, or roller mill until the solid particles have been reduced to diameters under 10 microns.

Solution

2-(2,4-difluorophenyl)-3-(4-chlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof	30%
dimethylformamide	70%

The ingredients are combined and stirred to produce a solution, which can be used for low volume applications.

Emulsifiable Concentrate

2-(2,4-difluorophenyl)-3-(4-fluorophenyl)-1-(1H-1,2,4-triazol-1-yl)-3-buten-2-ol; and the (S) enantiomer thereof	15%
blend of calcium sulfonates and nonionic surfactants	25%
xylene	60%

The ingredients are combined and stirred until the active is dissolved. A fine screen filter is included in packaging operation to insure the absence of any extraneous undissolved material in the product.

Utility

The compounds of this invention are useful as plant disease control agents. They are effective in controlling a broad spectrum of plant diseases, particularly foliar pathogens of ornamental, vegetable, field, cereal and fruit crops, such as Puccinia recondita, Erysiphe cichoracearum, Erysiphe graminis, Venturia inaequalis, Cercospora arachidicola, and Monilinia fructicola, Rhizoctonia solani, Pyricularia oryzae, Botrytis cinerea, Pseudocercosporella herpotrichlorides, and Cercosporidium personatum. They also control seed pathogens.

Disease control is ordinarily accomplished by applying an effective amount of the compound either pre- or post-infection to the portion of the plant to be protected, such as the roots, stems, foliage, fruit, seeds, tubers or bulbs, or to the media (soil or sand) in which the plants to be protected are growing. The compound may also be applied to the seed from which the plants to be protected are to be grown.

Rates of application for these compounds can be influenced by many factors of the environment and should be determined under actual use conditions. Foliage can normally be protected when treated at a rate of from less than 1 g/ha to 5000 g/ha of active ingredient. Plants growing in soil treated at a concentration from 0.1 to about 20 kg/ha can be protected from disease. Seed and seedlings can normally be protected when seed is treated at a rate of from 0.06 to about 3 grams per kilogram of seed.

The compounds of this invention can be mixed with fungicides, bactericides, acaricides, nematicides, insecticides, or other biologically active compounds in order to achieve desired results with a minimum

expenditure of time, effort and material. Amounts of these biologically active materials added for each part by weight of the composition of this invention may vary from 0.05 to 25 parts by weight. Suitable agents of this type are well-known to those skilled in the art. Some are listed below:

Fungicides

methyl 2-benzimidazolecarbamate (carbendazim)
tetramethylthiuram disulfide (thiuram)
n-dodecylguanidine acetate (dodine)
manganese ethylenebisdithiocarbamate (maneb)
1,4-dichloro-2,5-dimethoxybenzene (chloroneb)methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate (benomyl)
2-cyano-N-ethylcarbamoyl-2-methoxyiminoacetamide (cymoxanil)
N-trichloromethylthiotetrahydrophthalamide (captan)
N-trichloromethylthiophthalimide (folpet)
dimethyl 4,4'-(o-phenylene)bis(3-thioallophanate)-(thiophanate-methyl)
2-(thiazol-4-yl)benzimidazole (thiabendazole)
aluminum tris(O-ethyl phosphonate)(phosethyl aluminum)
tetrachloroisophthalonitrile (chlorothalonil)
2,6-dichloro-4-nitroaniline (dichloran)
N-(2,6-dimethylphenyl)-N-(methoxyacetyl)alanine methyl ester (metalaxyl)
cis-N-[1,1,2,2-tetrachloroethyl)thio]cyclohex-4-ene-1,2-dicarbioximide (captafol)
3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidine carboxamide (iprodione)
3-(3,5-dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione (vinclozolin)
kasugamycin
O-ethyl-S,S-diphenylphosphorodithioate(edifenphos)
4-(3-(4-(1,1-dimethyl-ethyl)phenyl)-2-methyl)propyl-2,6-dimethylmorpholine (Fenpropimorph)
4-(3-4(1,1-dimethyl-ethyl)phenyl)-2-methyl)propylpiperidine (Fenpropidine)

Bactericides

tribasic copper sulfate

streptomycin sulfate

oxytetracycline

Acaricides

senecioic acid, ester with 2-sec-butyl-4,6-dinitrophenol (binapacryl)

6-methyl-1,3-dithiolo[2,3-B]quinonolin-2-one (oxythioquinox)

2,2,2-trichloro-1,1-bis(4-chlorophenyl)ethanol-(dicofol)

bis(pentachloro-2,4-cyclopentadien-1-yl)(dienochlor)

tricyclohexyltin hydroxide (cyhexatin)

hexakis(2-methyl-2-phenylpropyl)distannoxane (fenbutin oxide)

Nematicides

2-[diethoxyphosphinylimino]-1,3-diethietane (fosthietan)

S-methyl-1-(dimethylcarbamoyl)-N-(methylcarbamoyloxy)-thioformimidate(oxamyl)

S-methyl-1-carbamoyl-N-(methylcarbamoyloxy)thioformimidate

N-isopropylphosphoramidic acid, O-ethyl-O'-[4-(methylthio)-m-tolyl]diester (fenamiphos)

Insecticides

3-hydroxy-N-methylcrotonamide(dimethylphosphate)ester (monocrotophos)

methylcarbamic acid, ester with 2,3-dihydro-2,2-dimethyl-7-benzofuranol (carbofuran)

O-[2,4,5-trichloro-α-(chloromethyl)benzyl]phosphoric acid, O',O'-dimethyl ester (tetrachlorvinphos)

2-mercaptosuccinic acid, diethyl ester, S-ester with thionophosphoric acid, dimethyl ester (malathion)

phosphorothioic acid, O,O-dimethyl, O-p-nitrophenyl ester (methyl parathion)

methylcarbamic acid, ester with α-naphthol (carbaryl)

methyl N-[[(methylamino)carbonyl]oxy]ethanimidothioate (methomyl)

N'-(4-chloro-o-tolyl)-N,N-dimethylformamidine (chlordimeform)

O,O-diethyl-O-(2-isopropyl-4-methyl-6-pyrimidyl)-phosphorothioate (diazinon)

octachlorocamphene (toxaphene)

O-ethyl O-p-nitrophenyl phenylphosphonothioate (EPN)

cyano(3-phenoxyphenyl)-methyl 4-chloro-α-(1-methylethyl)benzeneacetate (fenvalerate)

(3-phenoxyphenyl)methyl (±)-cis,trans-3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate (permethrin)

dimethyl N,N'-[thiobis(N-methylimmo)carbonyloxy]]-bis[ethanimidothioate] (thiodicarb)

phosphorothiolothionic acid, O-ethyl-O-[4-(methylthio)phenyl]-S-n-propyl ester (sulprofos)

α-cyano-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylate (cypermethrin)

cyano(3-phenoxyphenyl)methyl 4-(difluoromethoxy)-α-(methylethyl)benzeneacetate (flucythrinate)

O,O-diethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate (chlorpyrifos)

O,O-dimethyl-S-[(4-oxo-1,2,3-benzotriazin-3-(4H)-yl)-methyl]phosphorodithioate (azinphos-methyl)

5,6-dimethyl-2-dimethylamino-4-pyrimidinyl dimethyl carbamate (pirimicarb)

S-(N-formyl-N-methylcarbamoylmethyl)-O,O-dimethyl phosphorodithioate (formothion)

S-2-(ethylthioethyl)-O,O-dimethyl phosphiorothioate (demeton-S-methyl)

α-cyano-3-phenoxybenzyl cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylate (deltamethrin)

cyano(3-phenoxyphenyl)methyl ester of N-(2-chloro-4-trifluoromethylphenyl)alanine (fluvalinate)

Test results indicate that the compounds of the present invention are also active preemergent or postemergent herbicides or plant growth regulants. Some of them have utility for broad-spectrum pre- and/or postemergence weed control in areas where complete control of all vegetation is desired, such as around industrial storage areas, parking lots, drive-in theaters, around billboards, highway and railroad structures. Other compounds have utility for selective weed control in crops such as rice, wheat, barley, corn, soybeans, sugarbeets and cotton. Some of the compounds are useful as selective herbicides for rice. They may be used either in direct seeded or transplanted rice. Alternatively, the subject compounds are useful to modify plant growth.

The rates of application for the compounds of the invention are determined by a number of factors, including their use as plant growth modifiers or as herbicides, the crop species involved, the types of weeds to be controlled, weather and climate, formulations selected, mode of application, amount of foliage present, etc. In general terms, the subject compounds should be applied at levels of around 0.050 to 20 kg/ha, the lower rates being suggested for use on lighter soils and/or those having a low organic matter content, for plant growth modification or for situations where only short-term persistence is required, such as a herbicide for fallow land.

The compounds of the invention may be used in combination with any other commercial herbicide, non-limiting examples of which are those below:

Common Name	Chemical Name
acifluorfen	5-[2-chloro-4-(trifluoromethyl)-phenoxy]-2-nitrobenzoic acid
acrolein	acrolein
alachlor	2-chloro-2',6'-diethyl-N-(methoxymethyl)-acetanilide
ametryn	2-(ethylamino)-4-(isopropylamino)-6-methylthio)-s-triazine
amitrole	3-amino-s-triazole
AMS	ammonium sulfamate
asulam	methyl sulfanilylcarbamate
atrazine	2-chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine
barban	4-chloro-2-butynyl m-chlorocarbanilate
benefin	N-butyl-N-ethyl-α,α,α-trifluoro-2,6-dinitro-p-toluidine
bensulide	O,O-diisopropyl phosphorodithioate S-ester with N-(2-mercaptoethyl)-benzenesulfonamide
bentazon	3-isopropyl-1H-2,1,3-benzothiadiazin-4(3H)-one 2,2-dioxide
benzipram	3,5-dimethyl-N-(1-methylethyl)-N-(phenylmethyl)benzamide
benzoylprop	N-benzoyl-N-(3,4-dichlorophenyl)-DL-alaine
bifenox	methyl 5-(2,4-dichlorophenoxy)-2-nitrobenzoate
bromacil	5-bromo-3-sec-butyl-6-methyluracil

Common Name	Chemical Name
bromoxynil	3,5-dibromo-4-hydroxybenzonitrile
butachlor	N-(butoxymethyl)-2-chloro-2',6'-diethylacetanilide
butam	2,2-dimethyl-N-(1-methylethyl)-N-(phenylmethyl)propanamide
buthidazole	3-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-4-hydroxy-1-methyl-2-imidazolidinone
butralin	4-(1,1-dimethylethyl)-N-(1-methylpropyl)-2,6-dinitrobenzenamine
butylate	S-ethyl-diisobutylthiocarbamate
cacodylic acid	hydroxydimethylarsine oxide
carbetamide	D-N-ethyllactamide carbanilate (ester)
CDAA	N-N-diallyl-2-chloroacetamide
CDEC	2-chloroallyl diethyldithiocarbamate
chlorbromuron	3-(4-bromo-3-chlorophenyl)-1-methoxy-1-methylurea
chloroxuron	3-[p-(p-chlorophenoxy)phenyl]-1,1-dimethylurea
chlorpropham	isoproyl m-chlorocarbanilate
chlorsulfuron	2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino-carbonyl]benzene-sulfonamide
chlortoluron	N'-(3-chloro-4-methylphenyl-N',N'-dimehylurea
cisanilide	cis-2,5-dimethyl-N-phenyl-1-pyrrolidine-carboxamide
CMA	calcium methanearsonate
cyanazine	2-[[4-chloro-6-(ethylamino)-s-triazin-2-yl]amino]-2-methylpropionitrile
cycloate	S-ethyl N-ethylthiocyclohexane-carbamate

Common Name	Chemical Name
cycluron	3-cyclooctyl-1,1-dimethylurea
cyperquat	1-methyl-4-phenylpyridinium
cyprazine	2-chloro-4-(cyclopropylamino)-6-(isopropylamino)-s-triazine
cyprazole	N-[5-(2-chloro-1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl] cyclopropanecarboxamide
cypromid	3',4'-dichlorocyclopropanecarboxanilide
dalapon	2,2-dichloropropionic acid
dazomet	tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione
DCPA	dimethyl tetrachloroterephthalate
desmetryn	2-(isopropylamino)-4-(methylamino)-6-methylthio)-s-triazine
diallate	S-(2,3-dichloroallyl)diisopropyl-thiocarbamate
dicamba	3,6-dichloro-o-anisic acid
dichlobenil	2,6-dichlorobenzonitrile
dichlorprop	2-(2,4-dichlorophenoxy)propionic acid
diclofop	2-[4-(2,4-dichlorophenoxy)phenoxyl]-propanoic acid
diethatyl	N-(chloroacetyl)-N-(2,6-diethylphenyl)-glycine
difenzoquat	1,2-dimethyl-3,5-diphenyl-1H-pyrazolium
dinitramine	N^4,N^4-diethyl-α,α,α-trifluoro-3,5-dinitrotoluene-2,4-diamine
dinoseb	2-sec-butyl-4,6-dinitrophenol
diphenamide	N,N-dimethyl-2,2-diphenylacetamide
dipropetryn	2-(ethylthio)-4,6-bis(isopropyl-amino)-s-triazine

Common Name	Chemical Name
diquat	6,7-dihydrodipyrido[1,2-α:2',1'-c]-pyrazinediium ion
diuron	3-(3,4-dichlorophenyl)-1,1-dimethylurea
DSMA	disodium methanearsonate
endothall	7-oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
erbon	2-(2,4,5-trichlorophenoxy)ethyl 2.2-dichloropropionate
ethafluralin	N-ethyl-N-(2-methyl-2-propenyl)-2,6-dinitro-4-(trifluoromethyl)-benzenamine
ethofumesate	(±)-2-ethoxy-2,3-dihydro-3,3-dimethyl-5-benzofuranyl methanesulfonate
fenac	(2,3,6-trichlorophenyl)acetic acid
fenoxaprop	ethyl 2-(4-(6-chloro-2-benzoxazolyl-oxy)phenoxy)propanoate
fenuron	1,1-dimethyl-3-phenylurea
fenuron TCA	1,2-dimethyl-3-phenylurea mono(trichloroacetate)
flamprop	N-benzoyl-N-(3-chloro-4-fluorophenyl)-DL-aniline
fluchloralin	N-(2-chloroethyl)-2,6-dinitro-N-propyl-4-(trifluoromethyl)aniline
fluometuron	1,1-dimethyl-3-(α,α,α-trifluoro-m-tolyl)-urea
fluorodifen	p-nitrophenyl α,α,α-trifluoro-2-nitro-p-tolyl ether
fluridone	1-methyl-3-phenyl-5-[3-(trifluoro-methyl)phenyl]-4-(1H)-pyridinone
fomesafen	5-(2-chloro-4-trifluoromethyl-phenoxy)-N-methylsulfonyl-2-nitrobenzamide

Common Name	Chemical Name
fosamine	ethyl hydrogen (aminocarbonyl)-phosphonate
glyphosate	N-(phosphonomehyl)glycine
hexaflurate	potasium hexafluoroarsenate
hexazinone	3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H, 3H)-dione
imazaquin	2-(4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl)-3-quinolinecarboxylic acid
ioxynil	4-hydroxy-3,5-diiodobenzonitrile
isopropalin	2,6-dinitro-N,N-dipropylcumidine
karbutilate	tert-butylcarbamic acid ester with 3-(m-hydroxyphenyl)-1,1-dimethylurea
lactofen	1'-(carboethoxy)ethyl-5-(2-chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoate
lenacil	3-cyclohexyl-6,7-dihydro-1H-cyclopentapyrimidine-2,4(3H,5H)-dione
linuron	3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea
MAA	methanearsonic acid
MAMA	monoammonium methanearsonate
MCPA	[(4-chloro-o-tolyl)oxy]acetic acid
MCPB	4-[(4-chloro-o-tolyl)oxy]butyric acid
mecoprop	2-[(4-chloro-o-tolyl)oxy]propionic acid
mefluidide	N-[(2,4-dimethyl-5-[[(trifluoromethyl)-sulfonyl]amino]phenyl]acetamide

Common Name	Chemical Name
methalpropalin	N-(2-methyl-2-propenyl)-2.6-dinitro-N-propyl-4-(trifluoromethyl)-benzenamide
methabenzthiazuron	1,3-dimethyl-3-(2-benzothiazolyl) urea
metham	sodium methyldithiocarbamate
methazole	2-(3,4-dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione
methoxuron	N'-(3-chloro-4-methoxyphenyl)N,N-dimethylurea
metolachlor	2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl)-acetamide
metribuzin	4-amino-6-tert-butyl-3-(methylthio)-as-triazine-5(4H)-one
metsulfuron methyl	2-[[(4-methoxy-6-methyl-1,3,5-triazine-2-yl)aminocarbonyl]amino-sulfonyl]benzoic acid, methyl ester
molinate	S-ethyl hexahydro-1H-azepine-1-carbothioate
monolinuron	3-(p-chlorophenyl)-1-methoxy-1-methylurea
monuron	3-(p-chlorophenyl)-1,1-dimethylurea
monuron TCA	3-(p-chlorophenyl)-1,1-dimethylurea mono(trichloroacetate)
MSMA	monosodium methanearsonate
napropamide	2-(α-naphthoxy)-N,N-diethylpropionamide
naptalam	N-1-naphthylphthalamic acid
neburon	1-butyl-3-(3,4-dichlorophenyl)-1-methylurea
nitralin	4-(methylsulfonyl)-2,6-dinitro-N,N-dipropylaniline

Common Name	Chemical Name
nitrofen	2,4-dichlorophenyl p-nitrophenyl ether
nitrofluorofen	2-chloro-1-(4-nitrophenoxy)-4-(trifluoromethyl)benzene
norea	3-(hexahydro-4.7-methanoindan-5-yl)-1.1-dimethylurea
norflurazon	4-chloro-5-(methylamino)-2-(α,α,α-trifluoro-m-tolyl)-3(2H)-pyridazinone
oryzalin	3,4-dinito-N,N-dipropylsulfanilamide
oxadiazon	2-tert-butyl-4-(2,4-dichloro-5-isopropoxyphenyl)Δ^2-1,3,4-oxadiazolin-5-one
oxyfluorfen	2-chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl)benzene
paraquat	1,1'-dimethyl-4,4'-bipyridinium ion
PBA	chlorinated benzoic acid
pendimethalin	N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine
perfluidone	1,1,1-trifluoro-N-[2-methyl-4-(phenylsulfonyl)phenyl]methanesulfonamide
picloram	4-amino-3,5,6-trichloropicolinic acid
procyazine	2-[[4-chloro-6-(cyclopropylamino)-1,3,5-triazine-2-yl]amino]-2-methylpropanenitrile
profluralin	N-(cyclopropylmethyl)-α,α,α-trifluoro-2,6-dinitro-N-propyl-p-toluidine
prometon	2,4-bis(isopropylamino)-6-methoxy-s-triazine
prometryn	2,4-bis(isopropylamino)-6-(methylthio)-s-triazine

Common Name	Chemical Name
pronamide	3,5-dichloro N-(1,1-dimethyl-2-propyn-yl)enzamide
propachlor	2-chloro-N-isopropylacetanilide
propanil	3',4'-dichloroprionalide
propazine	2-chloro-4,6-bis(isopropylamino)-s-triazine
propham	isopropyl carbanilate
prosulfalin	N-[[4-(dipropylamino)-3,5-dinitrophenyl]sulfonyl]-S,S-dimethylsulfilimine
prynachlor	2-chloro-N-(1-methyl-2-propynyl)acetanilide
quinofop ethyl	2-[4-(6-chloroquinoxalin-2-yloxy)-phenoxypropanoic acid, ethyl ester
secbumeton	N-ethyl-6-methoxy-N'(1-methylpropyl)-1,3,5-triazine-2,4-diamine
sethoxydim	2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexene-1-one
siduron	1-(2-methylcyclohexyl)-3-phenylurea
simazine	2-chloro-4,6-bis(ethylamino)-s-triazine
simetryn	2,4-bis(ethylamino)-6-(methylthio)-s-triazine
supriox	2-[1-(2,5-dimethylphenyl)-ethylsulfonyl]-pyridine-N-oxide
TCA	trichloroacetic acid
tebuthiuron	N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea
terbacil	3-tert-butyl-5-chloro-6-methyluracil
terbuchlor	N-(butoxymethyl)-2-chloro-N-[2-(1.1-dimethylethyl)-6-methylphenyl]-aceamide
terbuthylazine	2-(tert-butylamino)-4-chloro-6-(ethylamino)-s-triazine

Common Name	Chemical Name
terbutol	2,6-di-tert-butyl-p-tolyl methylcarbamate
terbutryn	2-(tert-butylamino)-4-(ethylamino)-6-(methylthio)-s-triazine
tetrafluron	N,N-dimethyl-N'-[3-(1,1,2,2-tetrafluoroethoxy)phenyl]urea
thiobencarb	S-[(4-chlorophenyl)methyl] diethylcarbamothioate
triallate	S-(2,3,3-trichloroallyl)-diisopropylthiocarbamate
trifluralin	α,α,α-tifluoro-2,6-dinitro-N,N-propyl-p-toluidine
trimeturon	1-(p-chlorophenyl)-2,3,3-trimethylpseudourea
vernolate	S-propyl dipropylthiocarbamae ethyl 5-[2-chloro-4-(trifluoromethyl)-phenoxy]-2-nitrobenzoic acid
2,3,6-TBA	2,3,6-trichlorobenzoic acid
2,4-D	(2,4-dichlorophenoxy)acetic acid
2,4-DB	4-(2,4-dichlorophenoxy)butyric acid
2,4-DEP	tris[2-(2,4-dichlorophenoxy)ethyl] phosphite

Trade Name or Code Number	Chemical Name
"Cinch"	exo-1-methyl-4-(1-methylethyl)-2-[2-methylphenyl)methoxy]7-oxabicyclo[2.2.1]heptane
AC 263,499	2-[4,5-dihydro-4-methyl-4-(1-methyl-ethyl)-5-oxo-1H-imidazol-2-yl]-5-ethyl-3-pyridinecarboxylic acid
Harmony™	3-[[(4-methoxy-6-methyl-1,3-5-triazin-2-yl)aminocarbonyl]amino-sulfonyl]-2-thiophenecarboxylic acid, methyl eser

Trade Name or Code Number	Chemical Name
PPG-1013	5-(2-chloro-4-(trifluoromethyl)-phenoxy)propanoic aicd, methyl ester
FMC 57020	2-(2'-chlorophenyl)methyl-4,4-dimethyl-3-isoxazolidinone
AC 222,293	6-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-m-toluic acid,methyl ester and 6-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl-p-toluic acid, methyl ester

The herbicidal properties of the subject compounds were discovered in a number of greenhouse tests. The test procedures and results follow.

This invention is further illustrated by the following examples.

Example A

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on apple seedings. The following day plants were inoculated with a spore suspension of Venturia inaequalis, the causal agent of apple scab, and incubated in a saturated humidity chamber at 20°C for 24 hours and then in a growth chamber at 22°C for 11 days, when disease ratings were made.

Example B

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on peanut seedlings. The following day plants were inoculated with a spore suspension of Cercosporidium personatum, the causal agent of Peanut Late Leafspot, and incubated in a saturated humidity chamber at 22°C for 24 hours, then in a high humidity chamber at 27°C for 7 days, and then in a growth chamber at 29°C for 7 days, when disease ratings were made.

Example C

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on broad bean

seedlings. The following day plants were inoculated with a spore suspension of Botrytis cinerea, the causal agent of bean grey mold, and incubated in a saturated humidity chamber at 20°C for 24 hours when disease ratings were made.

Example D

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on wheat seedlings. The following day plants were inoculated with a spore dust of Erysiphe graminis f. sp. tritici, the causal agent of wheat powdery mildew, and incubated in a growth chamber at 20°C for 6 days, when disease ratings were made.

Example E

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on rice seedlings. The following day plants were inoculated with a spore suspension of Pyricularia oryzae, the causal agent of rice blast, and incubated in a saturated humidity chamber at 27°C for 24 hours and then in a growth chamber at 29°C for 4 days, when disease ratings were made.

Example F

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on rice seedlings. The following day plants were inoculated with a spore suspension of Rhizoctonia solani, the causal agent of rice sheath blight, and incubated in a saturated humidity chamber at 27°C for 48 hours and then in a growth chamber at 29°C for 4 days, when disease ratings were made.

Example G

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on wheat seedlings. The following day plants were inoculated with a spore suspension of Puccinia recondita, the causal agent of wheat leaf rust, and incubated in a saturated humidity chamber at 20°C for 24 hours and then in a growth chamber at 20°C for 8 days, when disease ratings were made.

Example H

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on tomato seedlings. The following day plants were inoculated

with a spore suspension of Phytophthora infestans, the causal agent of tomato late blight, and incubated in a saturated humidity chamber at 20°C for 24 hours and then in a growth chamber at 20°C for 5 days, when disease ratings were made.

Example I

The test compounds were dissolved in acetone in an amount equal to 6% of the final volume and then suspended at a concentration of 100 or 20 ppm in purified water containing 250 ppm of the surfactant TREM 014 (polyhydric alcohol esters). This suspension was sprayed to the point of run-off on grape seedlings. The following day plants were inoculated with a spore suspension of Plasmorpara viticola, the causal agent of grade downy mildew, and incubated in a saturated humidity chamber at 20°C for 24 hours, then in a growth chamber at 20°C for 7 days and then held in a saturated humidity chamber at 20°C for 24 hours, when disease ratings were made.

Example J

The test compounds were dissolved in acetone so that 1 ml of solution yielded a concentration of 0.5 kilogram/hectare when added to cucumber seeds and soil in pots. Seeds and soil were then inoculated with a mixture of sand, cereal and mycelium of the fungus Pythium aphanadermatum, causal agent of cucumber damping off, and incubated in a growth chamber at 30°C for 14 days. Disease ratings were then made.

Example K

The test compounds were dissolved in acetone so that 1 ml of solution yielded a concentration of 0.5

kilogram/hectare when added to cotton seeds and soil in pots. Seeds and soil were then inoculated with a mixture of sand, cereal and mycelium of the fungus Rhizoctonia solani, causal agent of cotton blight, and incubated in a growth chamber at 30°C for 14 days. Disease ratings were then made.

Example L

The test compounds were dissolved in acetone so that 1 ml of solution yielded a concentration of 0.5 kilogram/hectare when added to cucumber seeds and soil in pots. Seeds and soil were then inoculated with a mixture of sand, cereal and mycelium of the fungus Fusarium oxysporum f. sp. cucumerinum, causal agent of cucumber wilt, and incubated in a growth chamber at 30°C for 14 days. Disease ratings were then made.

Example M

The test compounds were dissolved in acetone so that 1 ml of solution yielded a concentration of 0.5 kilogram/hectare when added to lima bean seeds and soil in pots. Seeds and soil were then inoculated with a mixture of sand, cereal and mycelium of the fungus Sclerotium rolfsii, causal agent of southern blight, and incubated in a growth chamber at 30°C for 14 days. Disease ratings were then made.

Results for Examples A-M are given in Table 7. In this table, a rating of 100 indicates 100% disease control and a rating of 0 indicates no disease control relative to the controls. A - entry indicates that no test was performed with the specified compound. A P entry indicates that disease control was not measured due to phytoxicity.

Table 7

Ex. No.	Rate (PPM)	Ex. A	Ex. B	Ex. C	Ex. D	Ex. E	Ex. F	Ex. G	Ex. H	Ex. I	Rate (kg/ha)	Ex. J	Ex. K	Ex. L	Ex. M
1	100	62	100	81	98	90	97	100	0	12	5	0	P	0	P
2	100	62	100	93	98	95	100	100	0	99	5	0	P	0	P
3	100	100	100	93	93	5	93	100	0	0	5	0	0	P	P
4	100	100	100	88	100	96	100	100	0	81	5	0	0	P	0
6	100	0	82	84	98	0	0	96	23	0	5	0	0	P	0
10	100	0	76	52	63	0	17	64	0	0	5	0	0	0	0
15	100	100	100	99	100	1	93	100	26	0	5	0	P	0	P
16	100	-	-	46	-	0	0	-	0	23	5	0	0	P	0
	20	74	99	27	67	0	0	100	-	-					
17	100	-	-	89	-	0	81	-	0	42	5	0	0	P	0
	20	80	100	57	95	0	0	100	-	-					
25	100	100	100	96	91	31	48	97	0	0	5	0	P	P	35
26	100	100	100	96	86	31	61	97	23	86	5	0	25	25	35
27	100	62	100	88	98	95	100	100	24	84	5	0	0	0	0
28	100	89	100	88	98	81	100	100	0	6	5	0	0	0	0
32	100	100	100	98	95	97	33	100	0	98	5	0	0	P	P
33	100	-	-	56	-	0	60	-	0	24	5	0	0	0	0
	20	47	99	37	89	0	29	100	-	-					
34	100	69	100	94	60	86	16	66	0	0	5	0	0	0	0
35	100	100	100	96	100	0	100	96	0	26	5	0	0	0	0
39	100	89	97	96	98	7	100	100	0	81	5	0	0	0	0
40	100	19	100	80	91	7	61	96	0	0	5	0	0	0	0
41	100	100	100	96	98	7	97	100	0	100	5	0	0	0	0
42	100	-	-	100	100	31	41	-	0	23	5	-	-	-	-
	20	29	100	38	98	15	0	100	-	-					
47	100	-	-	89	-	31	47	-	0	25	5	-	-	-	-
	20	93	100	26	98	15	0	100	-	-					
49	100	89	100	62	100	76	96	100	0	0	5	0	P	0	P
50	100	100	100	98	95	86	93	100	0	46	5	0	P	0	P
51	100	100	100	96	100	0	100	100	0	0	5	P	P	P	P
52	100	100	100	95	94	93	81	100	0	0	5	0	P	0	0

Table 7 (Continued)

Ex. No.	Rate (PPM)	Ex. A	Ex. B	Ex. C	Ex. D	Ex. E	Ex. F	Ex. G	Ex. H	Ex. I	Rate (kg/ha)	Ex. J	Ex. K	Ex. L	Ex. M
65	100	34	96	94	85	30	62	100	0	0	5	0	0	0	0
67	100	-	-	75	-	0	68	-	2	1	5	0	0	0	0
	20	58	99	60	85	0	35	89	-	-					
94	100	86	61	96	98	78	36	100	0	0	5	0	0	P	P
99	100	100	100	89	83	98	61	100	0	83	5	0	0	P	P
100	100	100	100	96	83	95	80	100	0	83	5	P	0	P	0
101	100	100	100	94	83	0	80	100	0	100	5	0	0	P	0
163	100	-	-	95	-	5	0	-	0	0	5	-	-	-	-
	20	0	81	58	23	5	0	99	-	-					
164	100	-	-	84	-	15	0	-	8	0	5	-	-	-	-
	20	82	100	57	88	5	0	100	-	-					
170	100	-	-	20	-	10	0	-	0	0	5	-	-	-	-
	20	19	69	32	95	0	0	100	-	-					
177	100	-	-	26	-	10	0	-	0	0	5	-	-	-	-
	20	82	26	50	46	0	0	100	-	-					
208	100	84	37	83	76	4	61	97	0	74	5	0	0	0	0
291	100	-	-	81	-	1	0	-	24	78	5	-	-	-	-
	20	32	26	6	83	1	0	73	-	-					
359	100	72	100	83	95	88	62	100	0	0	5	0	0	0	0
360	100	88	100	71	86	74	49	93	0	0	5	0	0	0	0
361	100	-	-	46	-	1	0	-	27	9	5	-	-	-	-
	20	43	26	29	33	1	0	100	-	-					
363	100	0	49	92	28	0	0	38	0	0	5	0	0	0	0
447	100	-	0	24	46	46	0	30	0	24	5	0	0	0	0
448	100	-	0	54	-	0	42	16	0	0	5	-	-	-	-
449	100	71	0	24	0	76	13	30	0	51	5	0	0	0	0
450	100	-	0	54	11	46	34	30	0	51	5	0	0	0	0
451	100	16	100	72	0	0	0	0	0	0	5	0	0	0	0
452	100	36	0	54	46	0	67	30	0	0	5	0	0	0	0
453	100	55	32	75	94	0	0	100	0	0	5	0	0	0	0

Table 7 (Continued)

Ex. No.	Rate (PPM)	Ex. A	Ex. B	Ex. C	Ex. D	Ex. E	Ex. F	Ex. G	Ex. H	Ex. I	Rate (kg/ha)	Ex. J	Ex. K	Ex. L	Ex. M
454	100	0	0	0	22	0	0	0	0	0	5	-	-	-	-
455	100	64	65	0	12	0	0	43	0	0	5	0	0	0	0
456	100	82	0	58	53	98	0	96	9	0	5	0	0	0	0
477	100	95	100	76	100	48	48	100	0	0	5	P	P	P	P
594	100	86	100	93	77	2	-	100	0	79	5	0	60	100	50
596	100	-	-	89	-	0	0	-	0	25	5	-	-	-	-
	20	91	95	35	94	0	0	100	-	-					
603	100	44	97	91	69	0	-	95	0	0	5	0	0	0	0
605	100	70	99	32	81	0	-	100	0	0	5	0	0	0	0
608	100	87	100	98	98	4	81	100	0	0	5	0	0	P	P
618	100	100	100	98	89	0	-	100	0	0	5	0	80	80	P
620	100	100	100	96	98	51	100	100	0	0	5	0	0	P	0
622	100	100	100	84	99	0	100	100	0	26	5	0	0	P	0
627	100	-	-	38	-	0	14	-	0	61	5	-	-	-	-
	20	31	70	19	81	0	0	99	-	-					
644	100	100	100	94	100	100	100	100	23	0	5	0	0	P	P
646	100	100	100	95	98	97	61	100	0	99	5	100	0	0	0
651	100	-	-	42	-	0	62	-	0	46	5	0	0	0	0
	20	67	0	7	67	0	0	100	-	-					
656	100	93	100	88	97	0	50	100	0	20	5	0	P	P	P
657	100	62	100	81	98	49	97	100	24	37	5	0	0	0	0
661	100	-	-	56	-	0	70	-	5	85	5	-	-	-	-
	20	81	79	61	62	0	10	100	-	-					
663	100	42	100	95	99	57	36	100	0	39	5	-	-	-	-
667	100	-	-	4	-	0	0	-	0	10	5	0	0	0	0
	20	13	14	7	39	0	0	0	-	-					
668	100	-	-	76	-	1	0	-	22	31	5	-	-	-	-
	20	65	17	31	31	1	0	100	-	-					
669	100	100	100	90	100	96	100	100	0	0	5	0	0	P	0
671	100	100	100	92	94	84	100	100	0	84	5	0	P	P	0

Table 7 (Continued)

Ex. No.	Rate (PPM)	Ex. A	Ex. B	Ex. C	Ex. D	Ex. E	Ex. F	Ex. G	Ex. H	Ex. I	Rate (kg/ha)	Ex. J	Ex. K	Ex. L	Ex. M
675	100	-	-	30	-	0	62	-	0	69	5	-	-	-	-
	20	40	0	42	44	0	0	16	-	-					
685	100	-	-	0	-	0	29	-	-	-	5	-	-	-	-
	20	57	66	28	67	-	15	100	-	-					
721	100	73	89	95	94	18	100	100	0	0	5	P	P	P	P
724	100	100	100	95	100	63	100	100	0	0	5	0	P	P	P
726	100	-	-	-	-	0	0	-	0	38	5	0	20	0	0
	20	75	0	23	81	0	0	100	-	-					
815	100	40	98	0	62	2	-	97	0	65	5	0	0	0	0
905	100	-	-	19	-	0	37	-	0	87	5	0	0	0	0
	20	7	0	15	47	0	0	16	-	-					
1276	100	100	-	96	100	1	97	100	0	0	5	0	P	0	P
	20	93	100	86	100	1	52	100	-	-					
1276a	100	-	-	53	-	1	0	-	16	22	5	-	-	-	-
	20	42	26	33	88	1	0	100	-	-					
1277	100	9	65	0	0	0	0	39	0	25	5	0	0	0	0
1277a	100	-	-	36	-	1	52	-	8	31	5	-	-	-	-
	20	58	74	24	95	1	0	100	-	-					
1278	100	100	100	87	85	17	36	100	0	16	5	0	0	0	0
1300	100	100	100	93	92	58	81	100	0	0	5	0	0	0	0
1304	100	100	100	97	100	78	88	100	0	18	5	0	0	0	0
1377	100	100	100	96	92	58	100	100	0	44	5	0	P	0	P
1381	100	100	100	97	98	51	73	100	0	78	5	0	50	0	0
1451	100	86	84	48	77	2	-	93	0	79	5	0	0	0	0
1459	100	72	70	65	31	17	0	65	0	74	5	0	0	0	0
1468	100	40	0	0	77	2	-	93	0	46	5	0	60	0	0
1469	100	68	84	81	77	2	-	100	24	89	5	0	80	70	0
1527	100	0	100	93	100	-	35	100	0	0	5	0	P	0	P

Test A

Seeds of crabgrass (Digitaria spp.), barnyardgrass (Echinochloa crusgalli), giant foxtail (Setaria faberii), wild oats (Avena fatua), cheatgrass (Bromus secalinus), velvetleaf (Abutilon theophrasti), morningglory (Ipomoea spp.), cocklebur (Xanthium pensylvanicum), sorghum, corn, soybean, sugarbeet, cotton, rice, wheat, barley and purple nutsedge (Cyperus rotundus) tubers were planted and treated preemergence with the test chemicals dissolved in a non-phytotoxic solvent. At the same time, these crop and weed species were treated with a soil/foliage application. At the time of treatment, the plants ranged in height from 2 to 18 cm. Treated plants and controls were maintained in a greenhouse for sixteen days, after which all species were compared to controls and visually rated for response to treatment. The ratings, summarized in Table A, are based on a numerical scale extending from 0 = no injury, to 10 = complete kill. The accompanying descriptive symbols have the following meanings:

C = chlorosis/necrosis;
B = burn;
D = defoliation;
E = emergence inhibition;
G = growth retardation;
H = formative effect;
U = unusual pigmentation;
X = axillary simulation;
S = albinism; and
Y = abscised buds or flowers.

TABLE A

	CMPD	52
RATE=KG/HA	0.1	0.4
POSTEMERGENCE		
COKER COTTON	2H	2H
CULT MORNINGLRY	2C,4H	3C,6H
COCKLEBUR	0	2C
PURPLE NUTSEDGE	0	-
LARGE CRABGRASS	0	3C,6G
BARNYARDGRASS	0	0
WILD OATS	0	2C,4G
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	1C
RICE DRY SEEDED	0	1C
G522 SORGHUM	0	0
USH11 SUGARBEET	0	4G
VELVETLEAF	3G	2C,5G
GIANT FOXTAIL	0	2C,5G
KLAGES BARLEY	0	0
DOWNY BROME	0	0

	CMPD	52
RATE=KG/HA	0.1	0.4
PREEMERGENCE		
COKER COTTON	-	2G
CULT MORNINGLRY	0	8H
COCKLEBUR	2G	2C,2G
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	2C,7H	4C,9H
BARNYARDGRASS	0	9C
WILD OATS	0	0
ERA WHEAT	0	8G
G4646 CORN	0	0
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	8G
USH11 SUGARBEET	0	5H
VELVETLEAF	0	4C,8H
GIANT FOXTAIL	3C,9H	9H
KLAGES BARLEY	0	0
DOWNY BROME	2G	3C,8G

	CMPD	52 (salt)
RATE=KG/HA	0.4	
POSTEMERGENCE		
COKER COTTON	0	
CULT MORNINGLRY	0	
COCKLEBUR	0	
LARGE CRABGRASS	0	
BARNYARDGRASS	0	
WILD OATS	0	
ERA WHEAT	0	
G4646 CORN	0	
WILLMS SOYBEANS	0	
RICE DRY SEEDED	0	
G522 SORGHUM	0	
CHEAT GRASS	0	
USH11 SUGARBEET	0	
VELVETLEAF	0	
GIANT FOXTAIL	0	
KLAGES BARLEY	0	

	CMPD	52
RATE=KG/HA	0.4	
PREEMERGENCE		
COKER COTTON	0	
CULT MORNINGLRY	0	
COCKLEBUR	0	
PURPLE NUTSEDGE	0	
LARGE CRABGRASS	0	
BARNYARDGRASS	5G	
WILD OATS	0	
ERA WHEAT	0	
G4646 CORN	0	
WILLMS SOYBEANS	0	
RICE DRY SEEDED	0	
G522 SORGHUM	0	
CHEAT GRASS	0	
USH11 SUGARBEET	0	
VELVETLEAF	0	
GIANT FOXTAIL	0	
KLAGES BARLEY	0	

TABLE A (CONTINUED)

	CMPD 56
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	7P,9G
CULT MORNINGLRY	4C,9G
COCKLEBUR	3H,8G
PURPLE NUTSEDGE	0
LARGE CRABGRASS	4G
BARNYARDGRASS	5G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	3C,8G
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	5H,5I
VELVETLEAF	7G
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 56
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	5G
CULT MORNINGLRY	4C,9G
COCKLEBUR	2G
PURPLE NUTSEDGE	5G
LARGE CRABGRASS	4C,9G
BARNYARDGRASS	7C,9H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	7G
RICE DRY SEEDED	0
G522 SORGHUM	7G
CHEAT GRASS	5G
USH11 SUGARBEET	6G
VELVETLEAF	4C,9G
GIANT FOXTAIL	9H
KLAGES BARLEY	0

	CMPD 56 (salt)
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	4H
CULT MORNINGLRY	3C,7G
COCKLEBUR	2C
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	1C
RICE DRY SEEDED	0
G522 SORGHUM	0
USH11 SUGARBEET	2H
VELVETLEAF	2G
GIANT FOXTAIL	0
KLAGES BARLEY	0
DOWNY BROME	0

	CMPD 56
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
USH11 SUGARBEET	3H
VELVETLEAF	0
GIANT FOXTAIL	4C,9G
KLAGES BARLEY	0
DOWNY BROME	0

TABLE A (CONTINUED)

	CMPD 57
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	10P,9G
CULT MORNINGLRY	5C,9G
COCKLEBUR	1H
PURPLE NUTSEDGE	5G
LARGE CRABGRASS	9C
BARNYARDGRASS	7H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	4C,9G
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	4H,5I
VELVETLEAF	4C,9G
GIANT FOXTAIL	9G
KLAGES BARLEY	0

	CMPD 58
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	10P,9G
CULT MORNINGLRY	2C,3G
COCKLEBUR	2C,8H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	2C,8H
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	4C,9G
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	3H,7G
VELVETLEAF	2C,8G
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 57
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	7G
CULT MORNINGLRY	4C,9G
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	4C,9G
BARNYARDGRASS	9C
WILD OATS	0
ERA WHEAT	2G
G4646 CORN	2G
WILLMS SOYBEANS	3C,9G
RICE DRY SEEDED	0
G522 SORGHUM	8G
CHEAT GRASS	9G
USH11 SUGARBEET	7H
VELVETLEAF	5C,9G
GIANT FOXTAIL	9H
KLAGES BARLEY	2G

	CMPD 58
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	8G
CULT MORNINGLRY	8G
COCKLEBUR	3G
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9G
BARNYARDGRASS	4C,9H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	3G
WILLMS SOYBEANS	4G
RICE DRY SEEDED	0
G522 SORGHUM	7G
CHEAT GRASS	3G
USH11 SUGARBEET	9G
VELVETLEAF	5G
GIANT FOXTAIL	3C,9G
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 59		CMPD 61
RATE=KG/HA	0.4	RATE=KG/HA	0.4
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	0	COKER COTTON	2H
CULT MORNINGLRY	3C,5H	CULT MORNINGLRY	3C,[illegible]
COCKLEBUR	0	COCKLEBUR	1C
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	0	LARGE CRABGRASS	0
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	0	G4646 CORN	0
WILLMS SOYBEANS	1C,1H	WILLMS SOYBEANS	3H
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
USH11 SUGARBEET	4H	USH11 SUGARBEET	3H
VELVETLEAF	0	VELVETLEAF	3C,5G
GIANT FOXTAIL	0	GIANT FOXTAIL	0
KLAGES BARLEY	0	KLAGES BARLEY	0
DOWNY BROME	0	DOWNY BROME	0

	CMPD 59		CMPD 61
RATE=KG/HA	0.4	RATE=KG/HA	0.4
PREEMERGENCE		PREEMERGENCE	
COKER COTTON	0	COKER COTTON	0
CULT MORNINGLRY	0	CULT MORNINGLRY	0
COCKLEBUR	0	COCKLEBUR	0
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	0	LARGE CRABGRASS	0
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	0	G4646 CORN	0
WILLMS SOYBEANS	0	WILLMS SOYBEANS	0
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
USH11 SUGARBEET	0	USH11 SUGARBEET	0
VELVETLEAF	0	VELVETLEAF	0
GIANT FOXTAIL	0	GIANT FOXTAIL	7G
KLAGES BARLEY	0	KLAGES BARLEY	0
DOWNY BROME	0	DOWNY BROME	0

TABLE A (CONTINUED)

	CMPD 66	CMPD 67
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	10P,9G	10P,9G
CULT MORNINGLRY	5C,9G	2C,2G
COCKLEBUR	2C,5H	2C,5G
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	0	4G
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	3C,4H	1C,4H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	8H,5I	7H,5I
VELVETLEAF	3G	2C,5G
GIANT FOXTAIL	0	0
KLAGES BARLEY	0	0

	CMPD 66	CMPD 67
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	0	0
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	2C,9G	7G
BARNYARDGRASS	0	3G
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	1H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	3G
USH11 SUGARBEET	5G	7G
VELVETLEAF	2G	0
GIANT FOXTAIL	3G	5G
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 99		CMPD 101
RATE=KG/HA	0.4	RATE=KG/HA	0.4
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	5H	COKER COTTON	9G,10P
CULT MORNINGLRY	2C,4H	CULT MORNINGLRY	5C,9H
COCKLEBUR	4C,7H	COCKLEBUR	3C,6H
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	9G	LARGE CRABGRASS	7G
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	0	G4646 CORN	0
WILLMS SOYBEANS	3C,5H	WILLMS SOYBEANS	2C,4H
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
CHEAT GRASS	0	CHEAT GRASS	0
USH11 SUGARBEET	7H	USH11 SUGARBEET	6H
VELVETLEAF	8G	VELVETLEAF	9H
GIANT FOXTAIL	0	GIANT FOXTAIL	0
KLAGES BARLEY	0	KLAGES BARLEY	0

	CMPD 99		CMPD 101
RATE=KG/HA	0.4	RATE=KG/HA	0.4
PREEMERGENCE		PREEMERGENCE	
COKER COTTON	0	COKER COTTON	0
CULT MORNINGLRY	8H	CULT MORNINGLRY	2C,9H
COCKLEBUR	0	COCKLEBUR	0
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	2C,9G	LARGE CRABGRASS	2G
BARNYARDGRASS	2G	BARNYARDGRASS	2G
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	0	G4646 CORN	0
WILLMS SOYBEANS	0	WILLMS SOYBEANS	0
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
CHEAT GRASS	0	CHEAT GRASS	0
USH11 SUGARBEET	3H	USH11 SUGARBEET	0
VELVETLEAF	0	VELVETLEAF	0
GIANT FOXTAIL	2C,9H	GIANT FOXTAIL	7G
KLAGES BARLEY	0	KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 106
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	4G
CULT MORNINGLRY	2C,8G
COCKLEBUR	2C,2H
PURPLE NUTSEDGE	5G
LARGE CRABGRASS	2G
BARNYARDGRASS	5H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	2C,5G
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	5G
VELVETLEAF	3C,7G
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 106
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	4C,9H
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	2G
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	3H
VELVETLEAF	0
GIANT FOXTAIL	3C,9G
KLAGES BARLEY	3G

	CMPD 107
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	10P,8G
CULT MORNINGLRY	5C,9G
COCKLEBUR	3C,5G
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	7H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	5C,9G
RICE DRY SEEDED	2C,5G
G522 SORGHUM	0
USH11 SUGARBEET	0
VELVETLEAF	3C,6G
GIANT FOXTAIL	0
KLAGES BARLEY	0
DOWNY BROME	0

	CMPD 107
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	3G
CULT MORNINGLRY	5C,9G
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	5C,9G
BARNYARDGRASS	9H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	2H
USH11 SUGARBEET	3H
VELVETLEAF	5G
GIANT FOXTAIL	3C,9G
KLAGES BARLEY	0
DOWNY BROME	0

TABLE A (CONTINUED)

	CMPD 108	CMPD 208
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	6H	0
CULT MORNINGLRY	3C,6G	2C,5H
COCKLEBUR	2C,2H	2C
PURPLE NUTSEDGE	0	5G
LARGE CRABGRASS	0	0
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	2C,7G	2C,2H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS		0
USH11 SUGARBEET	3C,6G	6H
VELVETLEAF	2C,5G	8G
GIANT FOXTAIL	0	0
KLAGES BARLEY	0	0
DOWNY BROME	0	

	CMPD 108	CMPD 208
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	3H	0
COCKLEBUR	0	0
PURPLE NUTSEDGE	10E	0
LARGE CRABGRASS	9G	0
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS		0
USH11 SUGARBEET	0	2H
VELVETLEAF	0	0
GIANT FOXTAIL	8H	0
KLAGES BARLEY	0	0
DOWNY BROME	0	

TABLE A (CONTINUED)

	CMPD 594
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	4G
CULT MORNINGLRY	6G
COCKLEBUR	2C
LARGE CRABGRASS	2G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	2B,3H
RICE DRY SEEDED	3G
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	0
VELVETLEAF	2C
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 594
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9G
BARNYARDGRASS	4C,8H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	2G
USH11 SUGARBEET	2G
VELVETLEAF	4G
GIANT FOXTAIL	9G
KLAGES BARLEY	0

	CMPD 594
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	3G
CULT MORNINGLRY	2C,2H
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	2G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	2G
WILLMS SOYBEANS	2C,3H
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	3G
VELVETLEAF	0
GIANT FOXTAIL	2G
KLAGES BARLEY	0

	CMPD 594
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	3G
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	2U,9G
BARNYARDGRASS	2C,8G
WILD OATS	3G
ERA WHEAT	0
G4646 CORN	2G
WILLMS SOYBEANS	0
RICE DRY SEEDED	4G
G522 SORGHUM	3G
CHEAT GRASS	3G
USH11 SUGARBEET	4G
VELVETLEAF	5G
GIANT FOXTAIL	3C,9G
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 596		CMPD 598
RATE=KG/HA	0.4	RATE=KG/HA	0.4
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	0	COKER COTTON	8G
CULT MORNINGLORY	2C	CULT MORNINGLORY	0
COCKLEBUR	1C	COCKLEBUR	2C
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	3G
LARGE CRABGRASS	0	LARGE CRABGRASS	2G
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	2G
ERA WHEAT	0	ERA WHEAT	3G
G4646 CORN	0	G4646 CORN	0
WILLMS SOYBEANS	2C	WILLMS SOYBEANS	2C,2H
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
CHEAT GRASS	0	CHEAT GRASS	0
USH11 SUGARBEET	1H	USH11 SUGARBEET	4G,5I
VELVETLEAF	1C	VELVETLEAF	0
GIANT FOXTAIL	0	GIANT FOXTAIL	3G
KLAGES BARLEY	0	KLAGES BARLEY	0

	CMPD 596		CMPD 598
RATE=KG/HA	0.4	RATE=KG/HA	0.4
PREEMERGENCE		PREEMERGENCE	
COKER COTTON	3G	COKER COTTON	0
CULT MORNINGLORY	0	CULT MORNINGLORY	0
COCKLEBUR	2G	COCKLEBUR	2G
PURPLE NUTSEDGE	10E	PURPLE NUTSEDGE	0
LARGE CRABGRASS	9H	LARGE CRABGRASS	3C,9G
BARNYARDGRASS	3C,7H	BARNYARDGRASS	2G
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	2G	G4646 CORN	0
WILLMS SOYBEANS	0	WILLMS SOYBEANS	0
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	2C,9H	G522 SORGHUM	0
CHEAT GRASS	0	CHEAT GRASS	0
USH11 SUGARBEET	3G	USH11 SUGARBEET	7H
VELVETLEAF	2G	VELVETLEAF	5G
GIANT FOXTAIL	9H	GIANT FOXTAIL	9G
KLAGES BARLEY	0	KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 603		CMPD 605
RATE=KG/HA	0.4	RATE=KG/HA	0.4
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	0	COKER COTTON	0
CULT MORNINGLRY	3B	CULT MORNINGLRY	2B
COCKLEBUR	1B	COCKLEBUR	1B
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	0	LARGE CRABGRASS	0
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	0	G4646 CORN	0
WILLMS SOYBEANS	0	WILLMS SOYBEANS	1C
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
CHEAT GRASS	0	CHEAT GRASS	0
USH11 SUGARBEET	0	USH11 SUGARBEET	0
VELVETLEAF	1B	VELVETLEAF	0
GIANT FOXTAIL	0	GIANT FOXTAIL	0
KLAGES BARLEY	0	KLAGES BARLEY	0
	CMPD 603		CMPD 605
RATE=KG/HA	0.4	RATE=KG/HA	0.4
PREEMERGENCE		PREEMERGENCE	
COKER COTTON	0	COKER COTTON	0
CULT MORNINGLRY	0	CULT MORNINGLRY	0
COCKLEBUR	0	PURPLE NUTSEDGE	0
PURPLE NUTSEDGE	0	LARGE CRABGRASS	3G
LARGE CRABGRASS	0	BARNYARDGRASS	0
BARNYARDGRASS	0	WILD OATS	0
WILD OATS	0	ERA WHEAT	0
ERA WHEAT	0	G4646 CORN	0
G4646 CORN	0	WILLMS SOYBEANS	0
WILLMS SOYBEANS	0	RICE DRY SEEDED	0
RICE DRY SEEDED	0	G522 SORGHUM	0
G522 SORGHUM	0	CHEAT GRASS	0
CHEAT GRASS	0	USH11 SUGARBEET	0
USH11 SUGARBEET	0	VELVETLEAF	0
VELVETLEAF	0	GIANT FOXTAIL	0
GIANT FOXTAIL	0	KLAGES BARLEY	0
KLAGES BARLEY	0		

TABLE A (CONTINUED)

	CMPD 611	CMPD 618
RATE=KG/HA	0.4	2
POSTEMERGENCE		
COKER COTTON	7G	&P,9G
CULT MORNINGLRY	0	0
COCKLEBUR	1H	1H
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	5G	8G
BARNYARDGRASS	2C	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	2C,4H	2C,4G
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	0	5H
VELVETLEAF	0	2C,7G
GIANT FOXTAIL	0	8G
KLAGES BARLEY	0	0

	CMPD 611	CMPD 618
RATE=KG/HA	0.4	2
PREEMERGENCE		
COKER COTTON	0	4G
CULT MORNINGLRY	0	2H
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	&E
LARGE CRABGRASS	8G	8H
BARNYARDGRASS	2C,6G	5C,9H
WILD OATS	0	0
ERA WHEAT	0	3G
G4646 CORN	0	3G
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	2G
G522 SORGHUM	0	0
CHEAT GRASS	0	2G
USH11 SUGARBEET	0	7G
VELVETLEAF	0	5G
GIANT FOXTAIL	3C,8G	9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 620		CMPD 624
RATE=KG/HA	0.4	2	0.4
POSTEMERGENCE			
COKER COTTON	3H	10P,9G	2H,9G
CULT MORNINGLRY	2C,5G	3C,8G	2C,3H
COCKLEBUR	2C,2H	3C,9G	2C,5H
PURPLE NUTSEDGE	0	5G	0
LARGE CRABGRASS	9G	2C,9G	9C
BARNYARDGRASS	2H	3C,9H	6H
WILD OATS	0	0	0
ERA WHEAT	0	0	2G
G4646 CORN	3C,3H	3C,7H	0
WILLMS SOYBEANS	3C,8G	4C,9G	3C,8H
RICE DRY SEEDED	2C,4G	2C,8G	0
G522 SORGHUM	2C	2C,3H	0
CHEAT GRASS	0	8G	0
USH11 SUGARBEET	3H	8H	7H,5I
VELVETLEAF	3C,5H	2C,9G	1C
GIANT FOXTAIL	2C,7H	9G	2C,9G
KLAGES BARLEY	0	0	0

	CMPD 620		CMPD 624
RATE=KG/HA	0.4	2	0.4
PREEMERGENCE			
COKER COTTON	9G	9G	0
CULT MORNINGLRY	2C,8G	9G	2G
COCKLEBUR	3C,7G	2H	2G
PURPLE NUTSEDGE	5G	0	0
LARGE CRABGRASS	9H	9H	9H
BARNYARDGRASS	2C,5H	7C,9H	8H
WILD OATS	0	0	0
ERA WHEAT	0	0	0
G4646 CORN	0	1H	0
WILLMS SOYBEANS	7G	8G	0
RICE DRY SEEDED	3G	2G	2G
G522 SORGHUM	9G	9G	0
CHEAT GRASS	0	2G	0
USH11 SUGARBEET	8H	9H	8H
VELVETLEAF	6G	9H	8G
GIANT FOXTAIL	9H	9H	9H
KLAGES BARLEY	0	0	0

TABLE A (CONTINUED)

	CMPD 627		CMPD 644
RATE=KG/HA	0.4	RATE=KG/HA	2
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	1C	CULT MORNINGLRY	6C,9G
CULT MORNINGLRY	2C,6G	COCKLEBUR	5C,8H
COCKLEBUR	2C	PURPLE NUTSEDGE	8G,5X
PURPLE NUTSEDGE	0	LARGE CRABGRASS	3C,9G
LARGE CRABGRASS	0	BARNYARDGRASS	5C,9H
BARNYARDGRASS	0	WILD OATS	3C,6G
WILD OATS	0	ERA WHEAT	4C,8G
ERA WHEAT	0	G4646 CORN	3C,6H
G4646 CORN	0	WILLMS SOYBEANS	9C
WILLMS SOYBEANS	1H	RICE DRY SEEDED	3C,8G
RICE DRY SEEDED	0	G522 SORGHUM	3C,9H
G522 SORGHUM	0	CHEAT GRASS	2C,8G
CHEAT GRASS	0	USH11 SUGARBEET	5G,5I
USH11 SUGARBEET	2H	VELVETLEAF	9G
VELVETLEAF	0	GIANT FOXTAIL	3C,9G
GIANT FOXTAIL	0	KLAGES BARLEY	2C,9G
KLAGES BARLEY	0		

	CMPD 627	RATE=KG/HA	
RATE=KG/HA	0.4	PREEMERGENCE	
PREEMERGENCE		COKER COTTON	9G
COKER COTTON	0	CULT MORNINGLRY	9G
CULT MORNINGLRY	0	COCKLEBUR	3C,7G
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	10[illegible]
LARGE CRABGRASS	0	LARGE CRABGRASS	9H
BARNYARDGRASS	0	BARNYARDGRASS	9C
WILD OATS	0	WILD OATS	4C,8G
ERA WHEAT	0	ERA WHEAT	9G
G4646 CORN	0	G4646 CORN	2C,8H
WILLMS SOYBEANS	0	WILLMS SOYBEANS	8G
RICE DRY SEEDED	0	RICE DRY SEEDED	6G
G522 SORGHUM	0	G522 SORGHUM	3C,9G
CHEAT GRASS	0	CHEAT GRASS	7G
USH11 SUGARBEET	0	USH11 SUGARBEET	9G
VELVETLEAF	0	VELVETLEAF	6C,9G
GIANT FOXTAIL	0	GIANT FOXTAIL	9H
KLAGES BARLEY	0	KLAGES BARLEY	3G

TABLE A (CONTINUED)

	CMPD 644			CMPD 646
RATE=KG/HA	0.1	0.4	RATE=KG/HA	0.4
POSTEMERGENCE			POSTEMERGENCE	
COKER COTTON	5G	2C,7G	COKER COTTON	9G,10P
CULT MORNINGLRY	3C,3G	3C,5G	CULT MORNINGLRY	3C,8G
COCKLEBUR	0	2C	COCKLEBUR	2C
PURPLE NUTSEDGE	0	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	0	0	LARGE CRABGRASS	6G
BARNYARDGRASS	0	0	BARNYARDGRASS	0
WILD OATS	0	0	WILD OATS	0
ERA WHEAT	0	0	ERA WHEAT	0
G4646 CORN	0	0	G4646 CORN	0
WILLMS SOYBEANS	2C,2H	2C,5H	WILLMS SOYBEANS	5C,8H
RICE DRY SEEDED	0	1C	RICE DRY SEEDED	0
G522 SORGHUM	0	0	G522 SORGHUM	0
USH11 SUGARBEET	2G	7G	CHEAT GRASS	0
VELVETLEAF	3G	2C,6G	USH11 SUGARBEET	4H
GIANT FOXTAIL	0	2C,3G	VELVETLEAF	2C,3G
KLAGES BARLEY	0	0	GIANT FOXTAIL	0
DOWNY BROME	0	0	KLAGES BARLEY	0

	CMPD 644			CMPD 646
RATE=KG/HA	0.1	0.4	RATE=KG/HA	0.4
PREEMERGENCE			PREEMERGENCE	
COKER COTTON	0	0	COKER COTTON	0
CULT MORNINGLRY	0	2C	CULT MORNINGLRY	0
COCKLEBUR	0	0	COCKLEBUR	0
PURPLE NUTSEDGE	10E	10E	PURPLE NUTSEDGE	0
LARGE CRABGRASS	3C,7H	5C,9H	LARGE CRABGRASS	9G
BARNYARDGRASS	0	5C,9H	BARNYARDGRASS	0
WILD OATS	0	2C,5G	WILD OATS	0
ERA WHEAT	0	0	ERA WHEAT	0
G4646 CORN	0	0	G4646 CORN	0
WILLMS SOYBEANS	0	0	WILLMS SOYBEANS	3H
RICE DRY SEEDED	0	0	RICE DRY SEEDED	0
G522 SORGHUM	0	4G	G522 SORGHUM	0
USH11 SUGARBEET	0	6H	CHEAT GRASS	0
VELVETLEAF	0	2C	USH11 SUGARBEET	5H
GIANT FOXTAIL	3C,9H	5C,9H	VELVETLEAF	2G
KLAGES BARLEY	0	0	GIANT FOXTAIL	9H
DOWNY BROME	0	3C,5G	KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 648		CMPD 651
RATE=KG/HA	0.4	RATE=KG/HA	0.4
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	9P,9G	COKER COTTON	0
CULT MORNINGLRY	1C	CULT MORNINGLRY	2C
COCKLEBUR	2C	COCKLEBUR	1C
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	0	LARGE CRABGRASS	0
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	0	G4646 CORN	2G
WILLMS SOYBEANS	2C	WILLMS SOYBEANS	1C
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
CHEAT GRASS	0	CHEAT GRASS	0
USH11 SUGARBEET	4G,5I	USH11 SUGARBEET	1H
VELVETLEAF	2C,5G	VELVETLEAF	0
GIANT FOXTAIL	0	GIANT FOXTAIL	0
KLAGES BARLEY	0	KLAGES BARLEY	0

	CMPD 648		CMPD 651
RATE=KG/HA	0.4	RATE=KG/HA	0.4
PREEMERGENCE		PREEMERGENCE	
COKER COTTON	0	COKER COTTON	0
CULT MORNINGLRY	0	CULT MORNINGLRY	0
COCKLEBUR	0	COCKLEBUR	0
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	3C,8G	LARGE CRABGRASS	0
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	2G	G4646 CORN	0
WILLMS SOYBEANS	0	WILLMS SOYBEANS	0
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
CHEAT GRASS	2G	CHEAT GRASS	0
USH11 SUGARBEET	7H	USH11 SUGARBEET	0
VELVETLEAF	4G	VELVETLEAF	0
GIANT FOXTAIL	2C,9G	GIANT FOXTAIL	0
KLAGES BARLEY	3G	KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 653	CMPD 656
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	10P,9G	7G
CULT MORNINGLRY	2C	2C,3H
COCKLEBUR	2C,5G	2C
LARGE CRABGRASS	5C,9G	PURPLE NUTSEDGE 2G
BARNYARDGRASS	0	2G
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	2G	0
WILLMS SOYBEANS	3C,7G	2C
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	2C,7H	4H
VELVETLEAF	1C	0
GIANT FOXTAIL	2C,7H	0
KLAGES BARLEY	0	

	CMPD 653	CMPD 656
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	5G	0
CULT MORNINGLRY	2C,5G	0
COCKLEBUR	2H	0
PURPLE NUTSEDGE	0	2G
LARGE CRABGRASS	9C	5C,9H
BARNYARDGRASS	3C,9G	0
WILD OATS	0	0
ERA WHEAT	2G	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	0
G522 SORGHUM	7G	0
CHEAT GRASS	8G	0
USH11 SUGARBEET	8H	2H
VELVETLEAF	5C,9G	0
GIANT FOXTAIL	5C,9H	4C,9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 658	CMPD 659
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	0	3C,6G
COCKLEBUR	0	2C
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	0	0
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	3C
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	0	0
VELVETLEAF	8G	2C,5G
GIANT FOXTAIL	0	0
KLAGES BARLEY	0	0

	CMPD 658	CMPD 659
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	3G
CULT MORNINGLRY	0	1C
COCKLEBUR	2G	0
PURPLE NUTSEDGE	6G	10E
LARGE CRABGRASS	9H	3C,9G
BARNYARDGRASS	5G	2C,5G
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	4G	0
WILLMS SOYBEANS	2G	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	0	0
VELVETLEAF	0	7G
GIANT FOXTAIL	7H	3C,9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 661
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	1C,3H
CULT MORNINGLRY	1C
COCKLEBUR	1C
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	1H
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	4H
VELVETLEAF	1C
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 669
RATE=KG/HA	2
POSTEMERGENCE	
COKER COTTON	3C,7H
CULT MORNINGLRY	6C,9G
COCKLEBUR	3C,7G
PURPLE NUTSEDGE	4G
LARGE CRABGRASS	2G
BARNYARDGRASS	5C,9G
WILD OATS	2C,4G
ERA WHEAT	2G
G4646 CORN	0
WILLMS SOYBEANS	5C,9G
RICE DRY SEEDED	0
G522 SORGHUM	2G
CHEAT GRASS	3G
USH11 SUGARBEET	5G,5I
VELVETLEAF	6G
GIANT FOXTAIL	2G
KLAGES BARLEY	2G

	CMPD 661
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	5G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	5G
VELVETLEAF	0
GIANT FOXTAIL	3G
KLAGES BARLEY	0

	CMPD 669
RATE=KG/HA	2
PREEMERGENCE	
COKER COTTON	8G
CULT MORNINGLRY	5C,9H
PURPLE NUTSEDGE	3G
LARGE CRABGRASS	9H
BARNYARDGRASS	9C
WILD OATS	2C
ERA WHEAT	0
G4646 CORN	2C,5H
WILLMS SOYBEANS	8G
RICE DRY SEEDED	0
G522 SORGHUM	9G
CHEAT GRASS	0
USH11 SUGARBEET	8G
VELVETLEAF	4C,8G
GIANT FOXTAIL	9H
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 673
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	10P,9G
CULT MORNINGLRY	2C,1H
COCKLEBUR	2C,3H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	3C,3G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	1C,1H
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	8H,5I
VELVETLEAF	1C
GIANT FOXTAIL	9H
KLAGES BARLEY	0

	CMPD 675
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	1C
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	1C
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	1C
VELVETLEAF	0
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 673
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9H
BARNYARDGRASS	4H
WILD OATS	0
ERA WHEAT	2G
G4646 CORN	2G
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	3G
USH11 SUGARBEET	6H
VELVETLEAF	0
GIANT FOXTAIL	2C,8G
KLAGES BARLEY	2G

	CMPD 675
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	0
VELVETLEAF	0
GIANT FOXTAIL	0
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 721	CMPD 724
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	5G	6G
CULT MORNINGLRY	3C,6H	3C,5H
COCKLEBUR	2C	3C,4H
PURPLE NUTSEDGE	0	2C,8H
LARGE CRABGRASS	0	9G
BARNYARDGRASS	0	2C,3H
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	2C	4C,8H
RICE DRY SEEDED	0	5G
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	3H	7H
VELVETLEAF	6G	9H
GIANT FOXTAIL	0	9G
KLAGES BARLEY	0	0

	CMPD 721	CMPD 724
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	3H	2C,8H
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	7G	2C,9H
BARNYARDGRASS	0	5C,9H
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	2C,3H	5H
VELVETLEAF	2G	9G
GIANT FOXTAIL	7G	3C,9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 724	CMPD 726
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	10P,9G	4H
CULT MORNINGLRY	5C,9G	3C,7G
COCKLEBUR	3C,9H	1C,2H
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	5G	0
BARNYARDGRASS	7G	0
WILD OATS	0	0
ERA WHEAT	2G	0
G4646 CORN	0	2G
WILLMS SOYBEANS	3C,9G	2H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	3H	3H
VELVETLEAF	3C,9G	0
GIANT FOXTAIL	9G	5G
KLAGES BARLEY	0	0

	CMPD 724	CMPD 726
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	8G	0
CULT MORNINGLRY	9C	0
COCKLEBUR	0	2G
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	4C,9H	7G
BARNYARDGRASS	5C,9H	3C,6G
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	2G
WILLMS SOYBEANS	6G	0
RICE DRY SEEDED	0	0
G522 SORGHUM	6G	0
CHEAT GRASS	8G	0
USH11 SUGARBEET	8G	2H
VELVETLEAF	4C,9G	0
GIANT FOXTAIL	9H	2C,9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 753	CMPD 754
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	10P,9G	2H
CULT MORNINGLRY	4C,9G	5C,9G
COCKLEBUR	2C,6G	2C,3H
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	4C,9G	0
BARNYARDGRASS	5H	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	9C	2C,3H
RICE DRY SEEDED	0	0
G522 SORGHUM	2G	0
CHEAT GRASS	0	0
USH11 SUGARBEET	8H	7G
VELVETLEAF	3C,8G	3G
GIANT FOXTAIL	2C,9G	0
KLAGES BARLEY	0	0
DOWNY BROME		0

	CMPD 753	CMPD 754
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	3G	0
CULT MORNINGLRY	9G	0
COCKLEBUR	3H	0
PURPLE NUTSEDGE	9G	0
LARGE CRABGRASS	9G	8G
BARNYARDGRASS	8G	2H
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	3G	0
RICE DRY SEEDED	0	0
G522 SORGHUM	5G	0
CHEAT GRASS	0	0
USH11 SUGARBEET	8H	3G
VELVETLEAF	4G	0
GIANT FOXTAIL	3C,9G	7G
KLAGES BARLEY	0	0
DOWNY BROME		0

TABLE A (CONTINUED)

	CMPD 782	CMPD 784
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	10P,9G	10P,9G
CULT MORNINGLRY	5C,9G	3H
COCKLEBUR	8G	2H
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	5C,9G	6H
BARNYARDGRASS	7H	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	8G	2C,5H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	7H,5I	7H
VELVETLEAF	8G	2H
GIANT FOXTAIL	7G	2G
KLAGES BARLEY	0	0

	CMPD 782	CMPD 784
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	3C,9H	1H
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	5G
LARGE CRABGRASS	3C,9G	9H
BARNYARDGRASS	2C,9H	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	3G	0
RICE DRY SEEDED	0	0
G522 SORGHUM	6G	2G
CHEAT GRASS	0	0
USH11 SUGARBEET	9G	5G
VELVETLEAF	2C,8G	4G
GIANT FOXTAIL	9H	3G
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 810	CMPD 811
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	0	10P,9G
CULT MORNINGLRY	2C,5G	5C,9G
COCKLEBUR	8G	3H,8G
LARGE CRABGRASS	5G	9C
BARNYARDGRASS	2G	3C,9G
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	5G	3C,9G
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	4G	6H,5I
VELVETLEAF	8G	4C,9G
GIANT FOXTAIL	2G	9G
KLAGES BARLEY	0	0

	CMPD 810	CMPD 811
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	9G
CULT MORNINGLRY	0	9C
COCKLEBUR	2G	0
PURPLE NUTSEDGE	0	10E
LARGE CRABGRASS	9H	5C,9H
BARNYARDGRASS	4C,9H	7C,9H
WILD OATS	2G	0
ERA WHEAT	2G	0
G4646 CORN	0	2G
WILLMS SOYBEANS	0	7G
RICE DRY SEEDED	0	0
G522 SORGHUM	0	8G
CHEAT GRASS	3G	5G
USH11 SUGARBEET	9G	8G
VELVETLEAF	3G	2C,9G
GIANT FOXTAIL	9H	9H
KLAGES BARLEY	0	2G

TABLE A (CONTINUED)

	CMPD 815			CMPD 863
RATE=KG/HA	0.4	2	RATE=KG/HA	0.4
POSTEMERGENCE			POSTEMERGENCE	
COKER COTTON	9G,10P	2B	COKER COTTON	2C,6G
CULT MORNINGLRY	3C,9H	0	CULT MORNINGLRY	1C,2G
COCKLEBUR	2C,4H	0	COCKLEBUR	2C
PURPLE NUTSEDGE	0	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	0	1B	LARGE CRABGRASS	0
BARNYARDGRASS	0	1B	BARNYARDGRASS	0
WILD OATS	0	0	WILD OATS	0
ERA WHEAT	0	0	ERA WHEAT	0
G4646 CORN	0	1B	G4646 CORN	0
WILLMS SOYBEANS	0	2B	WILLMS SOYBEANS	2C
RICE DRY SEEDED	0	0	RICE DRY SEEDED	0
G522 SORGHUM	0	0	G522 SORGHUM	0
CHEAT GRASS	0	0	CHEAT GRASS	0
USH11 SUGARBEET	0	1B	USH11 SUGARBEET	0
VELVETLEAF	0	2B	VELVETLEAF	2C
GIANT FOXTAIL	0	1B	GIANT FOXTAIL	0
KLAGES BARLEY	0	0	KLAGES BARLEY	0

	CMPD 815			CMPD 863
RATE=KG/HA	0.4	2	RATE=KG/HA	0.4
PREEMERGENCE			PREEMERGENCE	
COKER COTTON	0	0	COKER COTTON	5G
CULT MORNINGLRY	0	0	CULT MORNINGLRY	0
PURPLE NUTSEDGE	0	0	COCKLEBUR	2G
LARGE CRABGRASS	9G	0	PURPLE NUTSEDGE	4G
BARNYARDGRASS	0	0	LARGE CRABGRASS	4G
WILD OATS	0	0	BARNYARDGRASS	3G
ERA WHEAT	0	0	WILD OATS	2G
G4646 CORN	0	0	ERA WHEAT	0
WILLMS SOYBEANS	0	0	G4646 CORN	0
RICE DRY SEEDED	0	0	WILLMS SOYBEANS	0
G522 SORGHUM	0	0	RICE DRY SEEDED	0
CHEAT GRASS	0	0	G522 SORGHUM	0
USH11 SUGARBEET	0	0	CHEAT GRASS	2G
VELVETLEAF	3G	0	USH11 SUGARBEET	0
GIANT FOXTAIL	2G	0	VELVETLEAF	0
KLAGES BARLEY	0	0	GIANT FOXTAIL	8G
			KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 879	CMPD 905
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	1C,2H	2C
COCKLEBUR	1C	0
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	3G	0
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	2H,5G	0
RICE DRY SEEDED	2G	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	3G	0
VELVETLEAF	2G	0
GIANT FOXTAIL	0	0
KLAGES BARLEY	0	0

	CMPD 879	CMPD 905
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	0	0
COCKLEBUR	0	0
PURPLE NUTSEDGE	8G	0
LARGE CRABGRASS	9H	0
BARNYARDGRASS	4C,8H	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	2G	0
WILLMS SOYBEANS	2G	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	2G	0
USH11 SUGARBEET	5H	0
VELVETLEAF	4G	0
GIANT FOXTAIL	9H	0
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 1276	CMPD 1276 (salt)
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	4H	9G,10P
CULT MORNINGLRY	2C,4H	2C,3G
COCKLEBUR	2C	3C
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	0	0
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	2C,6H	3C
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	2H	0
VELVETLEAF	8G	2C,4G
GIANT FOXTAIL	0	0
KLAGES BARLEY	0	0

	CMPD 1276	CMPD 1276
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	0	1C,3G
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	8G
LARGE CRABGRASS	4C,9H	7G
BARNYARDGRASS	4C,8H	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	2G
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	2H	7G
VELVETLEAF	0	4G
GIANT FOXTAIL	4C,9H	2C,9G
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 1276A	CMPD 1277
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	7G	3H,6G
CULT MORNINGLRY	1C	2C,3G
COCKLEBUR	1C	2C,7G
LARGE CRABGRASS	0	PURPLE NUTSEDGE 0
BARNYARDGRASS	0	LARGE CRABGRASS 4G
WILD OATS	0	BARNYARDGRASS 1C
ERA WHEAT	0	WILD OATS 0
G4646 CORN	0	ERA WHEAT 0
WILLMS SOYBEANS	2H,6G	G4646 CORN 0
RICE DRY SEEDED	0	WILLMS SOYBEANS 1C,1H
G522 SORGHUM	2G	RICE DRY SEEDED 0
CHEAT GRASS	0	G522 SORGHUM 0
USH11 SUGARBEET	3H	CHEAT GRASS 0
VELVETLEAF	2C	USH11 SUGARBEET 1H
GIANT FOXTAIL	0	VELVETLEAF 0
KLAGES BARLEY	0	GIANT FOXTAIL 3G
		KLAGES BARLEY 0

	CMPD 1276A	CMPD 1277
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	0	0
COCKLEBUR	0	0
PURPLE NUTSEDGE	10E	0
LARGE CRABGRASS	0	5C,9G
BARNYARDGRASS	0	3C,8H
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	2G
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	6G	7H
VELVETLEAF	8G	3G
GIANT FOXTAIL	0	3C,9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 1278	CMPD 1279
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	0	10P,9G
CULT MORNINGLRY	1C	5C,9G
COCKLEBUR	1C	5H
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	4G	3C,5G
BARNYARDGRASS	0	2G
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	3C,5G
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	1H	7H,5I
VELVETLEAF	0	3C,7G
GIANT FOXTAIL	0	0
KLAGES BARLEY	0	0

	CMPD 1278	CMPD 1279
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	0	0
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	0	7G
BARNYARDGRASS	0	2G
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	0	3H
VELVETLEAF	0	5G
GIANT FOXTAIL	2G	8G
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 1280
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	7G
CULT MORNINGLRY	2H
COCKLEBUR	4H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9H
BARNYARDGRASS	5H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	5C,9G
RICE DRY SEEDED	0
G522 SORGHUM	2G
CHEAT GRASS	0
USH11 SUGARBEET	8H
VELVETLEAF	7H
GIANT FOXTAIL	9H
KLAGES BARLEY	0

	CMPD 1377	
RATE=KG/HA	0.4	2
POSTEMERGENCE		
COKER COTTON	9G,10P	9G,10P
CULT MORNINGLRY	2C,6H	4C,9H
COCKLEBUR	2C,3H	4C,9H
PURPLE NUTSEDGE	-	4G
LARGE CRABGRASS	0	4C,9G
BARNYARDGRASS	2G	5C,9H
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	3C,5H	3C,6H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	2G
USH11 SUGARBEET	6H,5I	7H,5I
VELVETLEAF	2C,3H	3C,7H
GIANT FOXTAIL	0	3C,9H
KLAGES BARLEY	0	0

	CMPD 1280
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	2G
CULT MORNINGLRY	2H
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9H
BARNYARDGRASS	3G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	5G
VELVETLEAF	5G
GIANT FOXTAIL	9H
KLAGES BARLEY	0

	CMPD 1377	
RATE=KG/HA	0.4	2
PREEMERGENCE		
COKER COTTON	0	7G
CULT MORNINGLRY	2C	2C,3G
COCKLEBUR	0	2G
PURPLE NUTSEDGE	0	9G
LARGE CRABGRASS	4C,8H	5C,9H
BARNYARDGRASS	2G	10C
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	0	5G
RICE DRY SEEDED	0	0
G522 SORGHUM	0	2C,6G
CHEAT GRASS	0	0
USH11 SUGARBEET	2C,6H	8G,5I
VELVETLEAF	3G	7G
GIANT FOXTAIL	3C,9H	4C,9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 1381	
RATE=KG/HA	0.4	2
POSTEMERGENCE		
COKER COTTON	3G	10P,9G
CULT MORNINGLRY	3C,5G	2C,8H
COCKLEBUR	2C	2C,7H
PURPLE NUTSEDGE	0	2C,5G
LARGE CRABGRASS	2G	4C,9G
BARNYARDGRASS	2H	9H
WILD OATS	0	2G
ERA WHEAT	0	2G
G4646 CORN	0	3G
WILLMS SOYBEANS	2C,4G	2C,8G
RICE DRY SEEDED	0	8G
G522 SORGHUM	0	9H
CHEAT GRASS	-	2G
USH11 SUGARBEET	5G	9H
VELVETLEAF	0	9G
GIANT FOXTAIL	0	9G
KLAGES BARLEY	0	2G
DOWNY BROME	0	-

	CMPD 1304	
RATE=KG/HA	0.4	2
POSTEMERGENCE		
COKER COTTON	5H	10P,9G
CULT MORNINGLRY	3C,7G	2C,7G
COCKLEBUR	2C,4G	8H
PURPLE NUTSEDGE	0	8G
LARGE CRABGRASS	3C,7G	3C,9G
BARNYARDGRASS	5H	9H
WILD OATS	0	2G
ERA WHEAT	0	4G
G4646 CORN	0	3G
WILLMS SOYBEANS	2C,5G	2C,6G
RICE DRY SEEDED	0	7G
G522 SORGHUM	0	7G
CHEAT GRASS	-	5G
USH11 SUGARBEET	2H	7H,5I
VELVETLEAF	0	9G
GIANT FOXTAIL	0	9H
KLAGES BARLEY	0	3G
DOWNY BROME	0	-

	CMPD 1381	
RATE=KG/HA	0.4	2
PREEMERGENCE		
COKER COTTON	0	8G
CULT MORNINGLRY	0	7H
COCKLEBUR	0	3G
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	5C,9G	3C,9G
BARNYARDGRASS	3H	5C,9H
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	3G
WILLMS SOYBEANS	0	9G
RICE DRY SEEDED	0	4G
G522 SORGHUM	0	7G
CHEAT GRASS	-	0
USH11 SUGARBEET	2H	8H
VELVETLEAF	3G	8G
GIANT FOXTAIL	4C,9H	9H
KLAGES BARLEY	0	0
DOWNY BROME	0	-

	CMPD 1304	
RATE=KG/HA	0.4	2
PREEMERGENCE		
COKER COTTON	0	7G
CULT MORNINGLRY	0	7G
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	3G
LARGE CRABGRASS	4C,9H	4C,9G
BARNYARDGRASS	0	5C,9H
WILD OATS	0	2G
ERA WHEAT	0	0
G4646 CORN	0	5G
WILLMS SOYBEANS	0	7G
RICE DRY SEEDED	0	0
G522 SORGHUM	3G	9G
CHEAT GRASS	-	6G
USH11 SUGARBEET	0	8H
VELVETLEAF	5G	7G
GIANT FOXTAIL	3C,9H	9H
KLAGES BARLEY	0	0
DOWNY BROME	0	-

TABLE A (CONTINUED)

	CMPD 1
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	3H
CULT MORNINGLRY	1C,1H
COCKLEBUR	1C,3G
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	2G
WILLMS SOYBEANS	2C,3H
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	8G
VELVETLEAF	0
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 1
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	5G
LARGE CRABGRASS	4C,9G
BARNYARDGRASS	1C
WILD OATS	0
ERA WHEAT	2G
G4646 CORN	0
WILLMS SOYBEANS	2G
RICE DRY SEEDED	3G
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	4H
VELVETLEAF	5G
GIANT FOXTAIL	3C,9H
KLAGES BARLEY	0

	CMPD 4
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	3C,9H
CULT MORNINGLRY	4C,8H
COCKLEBUR	3C,8H
PURPLE NUTSEDGE	5G
LARGE CRABGRASS	9G
BARNYARDGRASS	2C,8H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	2G
WILLMS SOYBEANS	4C,8G
RICE DRY SEEDED	5G
G522 SORGHUM	5G
CHEAT GRASS	5G
USH11 SUGARBEET	6H
VELVETLEAF	2C,8H
GIANT FOXTAIL	9G
KLAGES BARLEY	0

	CMPD 4
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	8G
CULT MORNINGLRY	9H
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9C
BARNYARDGRASS	10C
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	9H
CHEAT GRASS	0
USH11 SUGARBEET	8H
VELVETLEAF	7H
GIANT FOXTAIL	3C,9H
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 9	
RATE=KG/HA	0.1	0.4
POSTEMERGENCE		
COKER COTTON	3H	3H
CULT MORNINGLRY	3C,4H	3C,6G
COCKLEBUR	0	3C,6G
PURPLE NUTSEDGE	0	9G
LARGE CRABGRASS	0	3G
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	1C,1H	2C,4H
RICE DRY SEEDED	0	1C
G522 SORGHUM	0	0
USH11 SUGARBEET	3G	3G
VELVETLEAF	-	4G
GIANT FOXTAIL	0	2C,2G
KLAGES BARLEY	0	0
DOWNY BROME	0	0

	CMPD 9	
RATE=KG/HA	0.1	0.4
PREEMERGENCE		
COKER COTTON	0	5H
CULT MORNINGLRY	0	1C
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	8G
LARGE CRABGRASS	3C,7H	4C,9H
BARNYARDGRASS	4C,6H	9C
WILD OATS	0	0
ERA WHEAT	0	2G
G4646 CORN	0	2C,2H
WILLMS SOYBEANS	0	3C,7H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	2C,9G
USH11 SUGARBEET	3H	6H
VELVETLEAF	0	5C,9H
GIANT FOXTAIL	4C,9H	4C,9H
KLAGES BARLEY	0	0
DOWNY BROME	0	2C,7G

	CMPD 11
RATE=KG/HA	2
POSTEMERGENCE	
COKER COTTON	10P,9G
CULT MORNINGLRY	4C,9G
COCKLEBUR	3C,9G
PURPLE NUTSEDGE	7G
LARGE CRABGRASS	9C
BARNYARDGRASS	5C,9G
WILD OATS	7G
ERA WHEAT	8G
G4646 CORN	7H
WILLMS SOYBEANS	4C,9G
RICE DRY SEEDED	3C,7G
G522 SORGHUM	3C,8H
CHEAT GRASS	7G
USH11 SUGARBEET	9H,5I
VELVETLEAF	3C,9G
GIANT FOXTAIL	9G
KLAGES BARLEY	5G

	CMPD 11
RATE=KG/HA	2
PREEMERGENCE	
COKER COTTON	9G
CULT MORNINGLRY	9G
COCKLEBUR	2C,8G
PURPLE NUTSEDGE	10E
LARGE CRABGRASS	9H
BARNYARDGRASS	5C,9H
WILD OATS	8G
ERA WHEAT	2C,9G
G4646 CORN	3C,8H
WILLMS SOYBEANS	9G
RICE DRY SEEDED	0
G522 SORGHUM	9H
CHEAT GRASS	3C,8G
USH11 SUGARBEET	9H
VELVETLEAF	9G
GIANT FOXTAIL	9H
KLAGES BARLEY	4G

TABLE A (CONTINUED)

	CMPD 13
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	6H
CULT MORNINGLRY	4C,8G
COCKLEBUR	3C,3H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	3C,5G
RICE DRY SEEDED	0
G522 SORGHUM	2G
USH11 SUGARBEET	7G
VELVETLEAF	2C
GIANT FOXTAIL	3G
KLAGES BARLEY	0
DOWNY BROME	0

	CMPD 15
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	7G
CULT MORNINGLRY	2C,4H
COCKLEBUR	2C
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	3G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	3C,5H
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	5H
VELVETLEAF	6G
GIANT FOXTAIL	0
KLAGES BARLEY	0

	CMPD 13
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	5C,9G
BARNYARDGRASS	3C,7G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	3G
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	2H
USH11 SUGARBEET	7H
VELVETLEAF	9C
GIANT FOXTAIL	2C,9G
KLAGES BARLEY	0
DOWNY BROME	4G

	CMPD 15
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	9G
LARGE CRABGRASS	3C,9H
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	0
VELVETLEAF	6G
GIANT FOXTAIL	0
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 16
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	8G
CULT MORNINGLRY	4C,9G
COCKLEBUR	2C,6G
PURPLE NUTSEDGE	0
LARGE CRABGRASS	8G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	2C,2H
RICE DRY SEEDED	2C
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	2G
VELVETLEAF	6G
GIANT FOXTAIL	7G
KLAGES BARLEY	0

	CMPD 16
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	5G
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	10E
LARGE CRABGRASS	8G
BARNYARDGRASS	5G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	2G
WILLMS SOYBEANS	0
RICE DRY SEEDED	2G
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	6G
VELVETLEAF	5G
GIANT FOXTAIL	9H
KLAGES BARLEY	0

	CMPD 17
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	3H
CULT MORNINGLRY	3C,4G
COCKLEBUR	2C,5G
PURPLE NUTSEDGE	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	1C,2H
RICE DRY SEEDED	1C
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	7H
VELVETLEAF	0
GIANT FOXTAIL	3G
KLAGES BARLEY	0

	CMPD 17
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	10E
LARGE CRABGRASS	9G
BARNYARDGRASS	3G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	0
VELVETLEAF	2G
GIANT FOXTAIL	6G
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 18
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	7G,5I
CULT MORNINGLRY	2C
COCKLEBUR	2C,3G
PURPLE NUTSEDGE	0
LARGE CRABGRASS	3C,7G
BARNYARDGRASS	9H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	3C,5G
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	3G,5I
VELVETLEAF	2C,5G
GIANT FOXTAIL	5G
KLAGES BARLEY	0

	CMPD 18
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	1H
COCKLEBUR	0
PURPLE NUTSEDGE	7G
LARGE CRABGRASS	10H
BARNYARDGRASS	5C,9H
WILD OATS	0
ERA WHEAT	7G
G4646 CORN	2G
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	9G
CHEAT GRASS	8G
USH11 SUGARBEET	7H
VELVETLEAF	7G
GIANT FOXTAIL	9H
KLAGES BARLEY	0

	CMPD 23
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	2H
CULT MORNINGLRY	2C,3H
COCKLEBUR	1C,1H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	3G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	1C,1H
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	4H
VELVETLEAF	0
GIANT FOXTAIL	2G
KLAGES BARLEY	0

	CMPD 23
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	0
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	9H
BARNYARDGRASS	3C,6G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	4G
USH11 SUGARBEET	3H
VELVETLEAF	3G
GIANT FOXTAIL	5C,9H
KLAGES BARLEY	0

TABLE A (CONTINUED)

	CMPD 33
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	10P,9G
CULT MORNINGLRY	2C,5G
COCKLEBUR	3C,4H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	5C,9G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	2G
WILLMS SOYBEANS	4C,9G
RICE DRY SEEDED	0
G522 SORGHUM	0
CHEAT GRASS	0
USH11 SUGARBEET	8H,5I
VELVETLEAF	3C,8G
GIANT FOXTAIL	9G
KLAGES BARLEY	0

	CMPD 34
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	10P,8G
CULT MORNINGLRY	3C,10P
COCKLEBUR	2C,2H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	3G
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	4C,9G
RICE DRY SEEDED	2G
G522 SORGHUM	0
USH11 SUGARBEET	7H
VELVETLEAF	5C,8G
GIANT FOXTAIL	0
KLAGES BARLEY	0
DOWNY BROME	3G

	CMPD 33
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	8G
CULT MORNINGLRY	7G
COCKLEBUR	2G
PURPLE NUTSEDGE	0
LARGE CRABGRASS	8G
BARNYARDGRASS	2C,8H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	4G
RICE DRY SEEDED	2G
G522 SORGHUM	5G
CHEAT GRASS	0
USH11 SUGARBEET	7G
VELVETLEAF	2G
GIANT FOXTAIL	9H
KLAGES BARLEY	0

	CMPD 34
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	6G
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	3C,9G
BARNYARDGRASS	5G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	1H
USH11 SUGARBEET	5H
VELVETLEAF	7G
GIANT FOXTAIL	3C,9H
KLAGES BARLEY	0
DOWNY BROME	0

TABLE A (CONTINUED)

	CMPD 34
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	8P,8G
CULT MORNINGLRY	5C,9G
COCKLEBUR	2C,2H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	0
BARNYARDGRASS	0
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	2C,3H
RICE DRY SEEDED	0
G522 SORGHUM	0
USH11 SUGARBEET	3G
VELVETLEAF	3C,8G
GIANT FOXTAIL	0
KLAGES BARLEY	0
DOWNY BROME	0

	CMPD 34
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	8G
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	4C,9G
BARNYARDGRASS	5H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
USH11 SUGARBEET	2H
VELVETLEAF	5G
GIANT FOXTAIL	3C,9H
KLAGES BARLEY	0
DOWNY BROME	0

	CMPD 34
RATE=KG/HA	0.4
POSTEMERGENCE	
COKER COTTON	4G
CULT MORNINGLRY	0
COCKLEBUR	2C,3H
PURPLE NUTSEDGE	0
LARGE CRABGRASS	5G
BARNYARDGRASS	5H
WILD OATS	0
ERA WHEAT	0
G4646 CORN	0
WILLMS SOYBEANS	4C,7G
RICE DRY SEEDED	0
G522 SORGHUM	0
USH11 SUGARBEET	6G
VELVETLEAF	5C,9G
GIANT FOXTAIL	0
KLAGES BARLEY	0
DOWNY BROME	0

	CMPD 34
RATE=KG/HA	0.4
PREEMERGENCE	
COKER COTTON	0
CULT MORNINGLRY	2C,8G
COCKLEBUR	0
PURPLE NUTSEDGE	0
LARGE CRABGRASS	4C,9G
BARNYARDGRASS	3C,8G
WILD OATS	0
ERA WHEAT	0
G4646 CORN	2G
WILLMS SOYBEANS	0
RICE DRY SEEDED	0
G522 SORGHUM	0
USH11 SUGARBEET	4H
VELVETLEAF	5C,8G
GIANT FOXTAIL	3C,9G
KLAGES BARLEY	0
DOWNY BROME	3G

TABLE A (CONTINUED)

	CMPD	35
RATE=KG/HA	0.4	2
POSTEMERGENCE		
COKER COTTON	10P,9G	10P,9G
CULT MORNINGLRY	10P,9G	4C,9G
COCKLEBUR	2C,5G	3C,8G
PURPLE NUTSEDGE	2G	8G
LARGE CRABGRASS	2C,9G	3C,9G
BARNYARDGRASS	2C,8H	4C,9H
WILD OATS	0	1C
ERA WHEAT	0	0
G4646 CORN	1C,3H	3C,7H
WILLMS SOYBEANS	10P,9G	3C,9G
RICE DRY SEEDED	1C	3C,9G
G522 SORGHUM	0	3C,9H
CHEAT GRASS	0	5G
USH11 SUGARBEET	5H	2C,8H
VELVETLEAF	4C,8G	4C,9G
GIANT FOXTAIL	8H	9G
KLAGES BARLEY	0	1C

	CMPD	35
RATE=KG/HA	0.4	2
PREEMERGENCE		
COKER COTTON	6G	8H
CULT MORNINGLRY	8H	9H
COCKLEBUR	1H	2H
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	9H	10E
BARNYARDGRASS	6C,9H	7C,9H
WILD OATS	0	7G
ERA WHEAT	0	8G
G4646 CORN	0	2C,3H
WILLMS SOYBEANS	2G	7G
RICE DRY SEEDED	0	1C
G522 SORGHUM	7G	9H
CHEAT GRASS	0	8G
USH11 SUGARBEET	5H	9H
VELVETLEAF	8H	9H
GIANT FOXTAIL	9H	9H
KLAGES BARLEY	0	0

	CMPD	35 (salt)
RATE=KG/HA	2	
POSTEMERGENCE		
COKER COTTON	10P,9G	
CULT MORNINGLRY	5C,9G	
COCKLEBUR	4C,9H	
PURPLE NUTSEDGE	8G	
LARGE CRABGRASS	3C,9G	
BARNYARDGRASS	5C,9G	
WILD OATS	0	
ERA WHEAT	0	
G4646 CORN	3C,7H	
WILLMS SOYBEANS	4C,9G	
RICE DRY SEEDED	4G	
G522 SORGHUM	7G	
CHEAT GRASS	4G	
USH11 SUGARBEET	3H,7G	
VELVETLEAF	7C,9G	
GIANT FOXTAIL	3C,9G	
KLAGES BARLEY	6G	

	CMPD	35
RATE=KG/HA	2	
PREEMERGENCE		
COKER COTTON	9G	
CULT MORNINGLRY	3C,9H	
COCKLEBUR	0	
PURPLE NUTSEDGE	3G	
LARGE CRABGRASS	10H	
BARNYARDGRASS	9H	
WILD OATS	8G	
ERA WHEAT	5G	
G4646 CORN	3G	
WILLMS SOYBEANS	2C,9G	
RICE DRY SEEDED	0	
G522 SORGHUM	2C,9G	
CHEAT GRASS	8G	
USH11 SUGARBEET	9G	
VELVETLEAF	9G	
GIANT FOXTAIL	9H	
KLAGES BARLEY	0	

TABLE A (CONTINUED)

	CMPD 35 (salt)		CMPD 35 (salt)
RATE=KG/HA	0.4	RATE=KG/HA	0.4
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	3H	COKER COTTON	0
CULT MORNINGLRY	3C,8G	CULT MORNINGLRY	0
COCKLEBUR	2C,1H	COCKLEBUR	0
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	0
LARGE CRABGRASS	0	LARGE CRABGRASS	0
BARNYARDGRASS	0	BARNYARDGRASS	0
WILD OATS	0	WILD OATS	0
ERA WHEAT	0	ERA WHEAT	0
G4646 CORN	2H	G4646 CORN	0
WILLMS SOYBEANS	3C,9G	WILLMS SOYBEANS	2G
RICE DRY SEEDED	0	RICE DRY SEEDED	0
G522 SORGHUM	0	G522 SORGHUM	0
USH11 SUGARBEET	7G	USH11 SUGARBEET	2G
VELVETLEAF	3C,5G	VELVETLEAF	0
GIANT FOXTAIL	2G	GIANT FOXTAIL	0
KLAGES BARLEY	0	KLAGES BARLEY	0
DOWNY BROME	0	DOWNY BROME	0

	CMPD 35		CMPD 35
RATE=KG/HA	0.4	RATE=KG/HA	0.4
PREEMERGENCE		PREEMERGENCE	
CULT MORNINGLRY	8G	COKER COTTON	0
COCKLEBUR	0	CULT MORNINGLRY	0
PURPLE NUTSEDGE	0	COCKLEBUR	0
LARGE CRABGRASS	3C,9G	PURPLE NUTSEDGE	0
BARNYARDGRASS	7H	LARGE CRABGRASS	0
WILD OATS	0	BARNYARDGRASS	0
ERA WHEAT	0	WILD OATS	0
G4646 CORN	0	ERA WHEAT	0
WILLMS SOYBEANS	0	G4646 CORN	0
RICE DRY SEEDED	0	WILLMS SOYBEANS	0
G522 SORGHUM	0	RICE DRY SEEDED	0
USH11 SUGARBEET	3H	G522 SORGHUM	0
VELVETLEAF	5C,9G	USH11 SUGARBEET	0
GIANT FOXTAIL	9H	VELVETLEAF	0
KLAGES BARLEY	0	GIANT FOXTAIL	0
DOWNY BROME	0	KLAGES BARLEY	0
		DOWNY BROME	0

TABLE A (CONTINUED)

	CMPD 35 (salt)	CMPD 39
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	9P,8G	8G,10P
CULT MORNINGLRY	2C,2H	2C
COCKLEBUR	2C,2H	2C
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	0	
BARNYARDGRASS	5H	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	2G	0
WILLMS SOYBEANS	9G,5I	2C
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	4H	4H
VELVETLEAF	3C,8H	4H
GIANT FOXTAIL	0	0
KLAGES BARLEY	0	0
	CMPD 35	CMPD 39
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	8G	0
CULT MORNINGLRY	6G	0
COCKLEBUR	0	0
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	3C,9G	6G
BARNYARDGRASS	3C,9G	2G
WILD OATS	2G	0
ERA WHEAT	0	0
G4646 CORN	0	0
WILLMS SOYBEANS	9G	0
RICE DRY SEEDED	4G	0
G522 SORGHUM	5G	0
CHEAT GRASS	5G	0
USH11 SUGARBEET	5H	2H
VELVETLEAF	7G	0
GIANT FOXTAIL	3C,9G	6G
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 42	CMPD 47
RATE=KG/HA	0.4	0.4
POSTEMERGENCE		
COKER COTTON	1C	10P,8G
CULT MORNINGLRY	2C	1C
COCKLEBUR	3C	1C
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	0	0
BARNYARDGRASS	0	0
WILD OATS	0	0
ERA WHEAT	0	0
G4646 CORN	0	2G
WILLMS SOYBEANS	1H	2C,2H
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	3H	0
VELVETLEAF	5C	0
GIANT FOXTAIL	2G	0
KLAGES BARLEY	0	0

	CMPD 42	CMPD 47
RATE=KG/HA	0.4	0.4
PREEMERGENCE		
COKER COTTON	0	0
CULT MORNINGLRY	0	0
PURPLE NUTSEDGE	0	0
LARGE CRABGRASS	2C,9G	9G
BARNYARDGRASS	0	1H
WILD OATS	2G	0
ERA WHEAT	0	0
G4646 CORN	0	3G
WILLMS SOYBEANS	0	0
RICE DRY SEEDED	0	0
G522 SORGHUM	0	0
CHEAT GRASS	0	0
USH11 SUGARBEET	5H	4H
VELVETLEAF	0	0
GIANT FOXTAIL	3C,9G	3C,9H
KLAGES BARLEY	0	0

TABLE A (CONTINUED)

	CMPD 51		CMPD 52
RATE=KG/HA	2	RATE=KG/HA	2
POSTEMERGENCE		POSTEMERGENCE	
COKER COTTON	1C,6H	COKER COTTON	3H,8G
CULT MORNINGLORY	5G	CULT MORNINGLOR	5C,9G
COCKLEBUR	2C,7H	COCKLEBUR	3C,9H
PURPLE NUTSEDGE	0	LARGE CRABGRASS	3C,9G
LARGE CRABGRASS	2C,9G	BARNYARDGRASS	5C,9G
BARNYARDGRASS	2C,7G	WILD OATS	2C,4G
WILD OATS	2C,2G	ERA WHEAT	2C,6G
ERA WHEAT	2C,3G	G4646 CORN	2C,6G
G4646 CORN	2C,6H	WILLMS SOYBEANS	4C,9G
WILLMS SOYBEANS	3C,7H	RICE DRY SEEDED	2C,6G
RICE DRY SEEDED	2C,5G	G522 SORGHUM	9H
G522 SORGHUM	0	CHEAT GRASS	2C,6G
CHEAT GRASS	5G	USH11 SUGARBEET	3H,7G
USH11 SUGARBEET	7G	VELVETLEAF	7C,9G
VELVETLEAF	4G	GIANT FOXTAIL	1C,9G
GIANT FOXTAIL	2C,7G	KLAGES BARLEY	6G
KLAGES BARLEY	0		

	CMPD 51		CMPD 52
RATE=KG/HA	2	RATE=KG/HA	2
PREEMERGENCE		PREEMERGENCE	
COKER COTTON	5G	COKER COTTON	9G
CULT MORNINGLORY	9H	CULT MORNINGLORY	5C,9Z
COCKLEBUR	1C,2G	COCKLEBUR	3C,8G
PURPLE NUTSEDGE	0	PURPLE NUTSEDGE	5G
LARGE CRABGRASS	10H	LARGE CRABGRASS	9H
BARNYARDGRASS	3C,9H	BARNYARDGRASS	9H
WILD OATS	2G	WILD OATS	2C,8G
ERA WHEAT	0	ERA WHEAT	4C,9G
G4646 CORN	0	G4646 CORN	3C,6G
WILLMS SOYBEANS	0	WILLMS SOYBEANS	9G,5I
RICE DRY SEEDED	0	RICE DRY SEEDED	8G
G522 SORGHUM	2C,9G	G522 SORGHUM	9G
CHEAT GRASS	3G	CHEAT GRASS	9G
USH11 SUGARBEET	9H	USH11 SUGARBEET	9G
VELVETLEAF	9H	VELVETLEAF	9G
GIANT FOXTAIL	3C,9H	GIANT FOXTAIL	10H
KLAGES BARLEY	0	KLAGES BARLEY	7G

Test B

Postemergence

Three round pans (25 cm diameter by 12.5 cm deep) were filled with Sassafras sandy loam soil. One pan was planted with nutsedge (Cyperus rotundus) tubers, crabgrass (Digitaria sanguinalis), sicklepod (Cassia obtusifolia), jimsonweed (Datura stramonium), velvetleaf (Abutilon theophrasti), lambsquarters (Chenopodium album), rice (Oryza sativa), and teaweed (Sida spinosa). the second pot was planted with green foxtail (Setaria viridis), cocklebur (Xanthium pensylvanicum), morningglory (Ipomoea hederacea), cotton (Gossypium hirsutum), johnsongrass (Sorghum halepense), barnyardgrass (Echinochloa crusgalli), corn (Zea mays), soybean (Glycine max), and giant foxtail (Setaria faberi). The third pot was planted with wheat (Triticum aestivum), barley (Hordeum vulgare), wild buckwheat (Polygonum convolvulus L.), cheatgrass (Bromus secalinus L.), sugarbeet (Beta vulgaris), wild oat (Avena fatua L.), common chickweed (Stellaria media), blackgrass (Alopecurus myosuroides), and rape (Brassica napus). The plants were grown for approximately fourteen days, then sprayed postemergence with the chemicals dissolved in a nonphytotoxic solvent.

Premergence

Three round pans (25 cm diameter by 12.5 cm deep) were filled with Sassafras sandy loam soil. One pan was planted with nutsedge tubers, crabgrass, sicklepod,jimsonweed, velvetleaf, lambsquarters, rice and teaweed. The second pot was planted with green foxtail, cocklebur, morningglory cotton, johnsongrass, barnyardgrass, corn, soybean, and giant foxtail. he third pot was planted with wheat, barley, wild

buckwheat, cheatgrass, sugarbeet, wild oat, viola, blackgrass, and rape. The thee pans were sprayed preemergence with the chemicals dissolved in a nonphytotoxic solvent.

Treated plants and controls were maintained in the greenhouse for approximately 24 days, then all rated plants were compared to controls and visually rated for plant response.

Response ratings are based on a scale of 0 to 100 where 0 = no effect, and 100 = complete control. A dash (-) response means no test.

Response ratings are contained in Table B.

TABLE B

	CMPD	51	
RATE=G/HA	0250	0125	0062
POST			
GIANT FOXTAIL	-	0	0
VELVETLEAF	30	0	0
USH11 SUGARBEET	-	30	0
LARGE CRABGRASS	0	0	0
PRICKLY SIDA	30	0	0
JIMSONWEED	0	0	0
RICE DRY SEEDED	0	0	0
COCKLEBUR	30	0	0
COKER COTTON	20	0	0
WILLMS SOYBEANS	-	0	0
BARNYARDGRASS	0	0	0
WILD OATS	-	0	0
IVY MORNINGLORY	30	0	0
ERA WHEAT	-	0	0
SICKLEPOD	0	0	0
JOHNSONGRASS	0	0	0
PURPLE NUTSEDGE	0	0	0
G4646 CORN	-	0	0
WILD BUCKWHEAT	-	0	0
BLACKGRASS	-	0	0
ALTEX RAPE	-	0	0
KLAGES BARLEY	-	0	0
GREEN FOXTAIL	30	0	0
CHEAT GRASS	-	0	0
FIELD VIOLET	-	0	0
LAMBSQUARTER	70	60	50

TABLE B

	CMPD 51				
RATE=G/HA	1000	0500	0250	0125	0062
PRE					
GIANT FOXTAIL	100	100	90	60	30
VELVETLEAF	80	50	30	0	0
USH11 SUGARBEET	80	70	60	50	30
LARGE CRABGRASS	100	90	70	50	30
PRICKLY SIDA	90	80	70	50	30
JIMSONWEED	80	60	40	30	0
RICE DRY SEEDED	0	0	0	0	0
COCKLEBUR	50	30	0	0	0
COKER COTTON	0	0	0	0	0
WILLMS SOYBEANS	0	0	0	0	0
BARNYARDGRASS	100	80	50	30	0
WILD OATS	0	0	0	0	0
IVY MORNINGLORY	0	0	0	0	0
ERA WHEAT	0	0	0	0	0
SICKLEPOD	60	30	0	0	0
JOHNSONGRASS	90	70	50	30	0
PURPLE NUTSEDGE	0	0	0	0	0
G4646 CORN	0	0	0	0	0
WILD BUCKWHEAT	60	30	0	0	0
BLACKGRASS	60	30	0	0	0
ALTEX RAPE	70	60	50	30	0
KLAGES BARLEY	0	0	0	0	0
GREEN FOXTAIL	100	100	90	70	50
CHEAT GRASS	0	0	0	0	0
FIELD VIOLET	90	70	50	30	0
LAMBSQUARTER	100	100	90	80	70

TABLE B

CMPD 669

RATE=G/HA	2000	1000	0500	0250
POST				
GIANT FOXTAIL	-	50	30	0
VELVETLEAF	80	50	30	0
USH11 SUGARBEET	-	80	70	50
LARGE CRABGRASS	80	70	50	30
PRICKLY SIDA	90	70	50	30
JIMSONWEED	60	40	20	0
RICE DRY SEEDED	0	0	0	0
COCKLEBUR	60	30	0	0
COKER COTTON	70	50	30	0
WILLMS SOYBEANS	-	40	0	0
BARNYARDGRASS	70	50	30	0
WILD OATS	-	0	0	0
IVY MORNINGLORY	100	70	50	30
ERA WHEAT	-	0	0	0
SICKLEPOD	80	30	0	0
JOHNSONGRASS	30	0	0	0
PURPLE NUTSEDGE	30	0	0	0
G4646 CORN	-	0	0	0
WILD BUCKWHEAT	-	70	60	50
BLACKGRASS	-	50	30	0
ALTEX RAPE	-	50	30	0
KLAGES BARLEY	-	0	0	0
GREEN FOXTAIL	80	50	30	0
CHEAT GRASS	-	0	0	0
FIELD VIOLET	-	0	0	0
LAMBSQUARTER	90	80	70	60

TABLE B

	CMPD 669			
RATE=G/HA	2000	1000	0500	0250
PRE				
GIANT FOXTAIL	100	100	100	100
VELVETLEAF	50	30	0	0
USH11 SUGARBEET	70	50	30	0
LARGE CRABGRASS	100	100	90	80
PRICKLY SIDA	90	70	50	30
JIMSONWEED	70	50	40	30
RICE DRY SEEDED	0	0	0	0
COCKLEBUR	40	20	0	0
COKER COTTON	0	0	0	0
WILLMS SOYBEANS	0	0	0	0
BARNYARDGRASS	100	100	50	30
WILD OATS	0	0	0	0
IVY MORNINGLORY	40	0	0	0
ERA WHEAT	0	0	0	0
SICKLEPOD	30	0	0	0
JOHNSONGRASS	90	80	50	30
PURPLE NUTSEDGE	0	0	0	0
G4646 CORN	0	0	0	0
WILD BUCKWHEAT	70	50	30	0
BLACKGRASS	70	50	30	0
ALTEX RAPE	70	50	30	0
KLAGES BARLEY	0	0	0	0
GREEN FOXTAIL	100	100	100	100
CHEAT GRASS	30	0	0	0
FIELD VIOLET	80	30	0	0
LAMBSQUARTER	100	90	70	50

TABLE B

	CMPD	35
RATE=G/HA	0500	0250
POST		
GIANT FOXTAIL	100	90
VELVETLEAF	100	70
USH11 SUGARBEET	70	50
LARGE CRABGRASS	100	50
PRICKLY SIDA	100	90
JIMSONWEED	60	20
RICE DRY SEEDED	30	10
COCKLEBUR	30	-
COKER COTTON	90	70
WILLMS SOYBEANS	80	60
BARNYARDGRASS	100	80
WILD OATS	50	0
IVY MORNINGLORY	20	0
ERA WHEAT	10	0
SICKLEPOD	50	30
JOHNSONGRASS	100	100
PURPLE NUTSEDGE	80	-
G4646 CORN	0	0
WILD BUCKWHEAT	-	0
BLACKGRASS	90	60
ALTEX RAPE	80	60
KLAGES BARLEY	0	0
GREEN FOXTAIL	100	90
LAMBSQUARTER	100	80
CHICKWEED SPP.	80	20
DOWNY BROME	40	20

TABLE B

	CMPD	35
RATE=G/HA	0500	0125
PRE		
GIANT FOXTAIL	100	100
VELVETLEAF	100	90
USH11 SUGARBEET	90	20
LARGE CRABGRASS	100	100
PRICKLY SIDA	100	100
JIMSONWEED	70	50
RICE DRY SEEDED	10	0
COCKLEBUR	20	0
COKER COTTON	100	20
WILLMS SOYBEANS	10	0
BARNYARDGRASS	100	60
WILD OATS	40	20
IVY MORNINGLORY	0	0
ERA WHEAT	20	0
SICKLEPOD	50	0
JOHNSONGRASS	100	50
PURPLE NUTSEDGE	50	0
G4646 CORN	40	10
WILD BUCKWHEAT	100	30
BLACKGRASS	100	80
ALTEX RAPE	80	40
KLAGES BARLEY	0	0
GREEN FOXTAIL	100	100
LAMBSQUARTER	100	90
CHICKWEED SPP.	40	-
DOWNY BROME	80	40

TABLE B

	CMPD 35			
RATE=G/HA	2000	1000	0250	0062
POST				
GIANT FOXTAIL	-	80	70	30
VELVETLEAF	100	90	70	50
USH11 SUGARBEET	-	70	60	50
LARGE CRABGRASS	100	100	90	30
PRICKLY SIDA	100	90	70	50
JIMSONWEED	90	70	50	0
RICE DRY SEEDED	60	30	0	0
COCKLEBUR	90	70	50	30
COKER COTTON	50	40	30	20
WILLMS SOYBEANS	-	80	60	20
BARNYARDGRASS	80	60	30	0
WILD OATS	-	30	0	0
IVY MORNINGLORY	70	60	50	30
ERA WHEAT	-	0	0	0
SICKLEPOD	90	70	50	30
JOHNSONGRASS	90	70	50	30
PURPLE NUTSEDGE	30	0	0	0
G4646 CORN	-	40	0	0
WILD BUCKWHEAT	-	70	50	30
BLACKGRASS	-	50	30	0
ALTEX RAPE	-	80	50	30
KLAGES BARLEY	-	0	0	0
GREEN FOXTAIL	90	80	60	30
CHEAT GRASS	-	0	0	0
FIELD VIOLET	-	0	0	0
LAMBSQUARTER	100	100	70	50

TABLE B

	CMPD 35			
RATE=G/HA PRE	2000	1000	0250	0062
GIANT FOXTAIL	100	100	100	90
VELVETLEAF	90	80	70	60
USH11 SUGARBEET	60	40	30	0
LARGE CRABGRASS	100	100	100	100
PRICKLY SIDA	90	80	70	60
JIMSONWEED	100	90	80	60
RICE DRY SEEDED	0	0	0	0
COCKLEBUR	50	40	30	0
COKER COTTON	80	70	60	30
WILLMS SOYBEANS	90	80	30	0
BARNYARDGRASS	100	100	100	60
WILD OATS	0	0	0	0
IVY MORNINGLORY	80	60	40	0
ERA WHEAT	0	0	0	0
SICKLEPOD	90	70	30	0
JOHNSONGRASS	100	100	90	70
PURPLE NUTSEDGE	0	0	0	0
G4646 CORN	60	40	20	0
WILD BUCKWHEAT	80	70	50	30
BLACKGRASS	90	80	60	30
ALTEX RAPE	90	70	50	30
KLAGES BARLEY	0	0	0	0
GREEN FOXTAIL	100	100	100	100
CHEAT GRASS	60	30	0	0
FIELD VIOLET	80	70	50	30
LAMBSQUARTER	100	100	90	80

TABLE B

	CMPD. 52			
RATE=G/HA	2000	1000	0250	0062
POST				
GIANT FOXTAIL	-	70	50	30
VELVETLEAF	90	70	50	30
USH11 SUGARBEET	-	70	50	30
LARGE CRABGRASS	100	90	90	50
PRICKLY SIDA	90	80	70	50
JIMSONWEED	90	70	50	30
RICE DRY SEEDED	60	40	0	0
COCKLEBUR	90	60	30	0
COKER COTTON	50	40	30	0
WILLMS SOYBEANS	-	30	0	0
BARNYARDGRASS	90	60	30	0
WILD OATS	-	30	0	0
IVY MORNINGLORY	90	70	50	30
ERA WHEAT	-	50	30	0
SICKLEPOD	70	40	30	0
JOHNSONGRASS	90	70	50	0
PURPLE NUTSEDGE	50	30	0	0
G4646 CORN	-	40	0	0
WILD BUCKWHEAT	-	70	50	30
BLACKGRASS	-	70	50	30
ALTEX RAPE	-	50	30	0
KLAGES BARLEY	-	30	0	0
GREEN FOXTAIL	90	70	50	30
CHEAT GRASS	-	50	30	0
FIELD VIOLET	-	50	30	0
LAMBSQUARTER	90	80	70	50

TABLE B

	CMPD 52			
RATE=G/HA	2000	1000	0250	0062
PRE				
GIANT FOXTAIL	100	100	90	60
VELVETLEAF	90	70	50	30
USH11 SUGARBEET	80	50	30	0
LARGE CRABGRASS	100	100	100	80
PRICKLY SIDA	90	80	80	70
JIMSONWEED	100	100	70	50
RICE DRY SEEDED	50	30	0	0
COCKLEBUR	100	100	50	30
COKER COTTON	80	60	20	0
WILLMS SOYBEANS	80	60	0	0
BARNYARDGRASS	100	100	80	30
WILD OATS	30	20	0	0
IVY MORNINGLORY	80	60	40	0
ERA WHEAT	50	30	0	0
SICKLEPOD	90	60	30	0
JOHNSONGRASS	100	90	80	50
PURPLE NUTSEDGE	70	30	0	0
G4646 CORN	60	30	0	0
WILD BUCKWHEAT	80	50	30	0
BLACKGRASS	90	70	50	30
ALTEX RAPE	70	40	20	0
KLAGES BARLEY	30	20	0	0
GREEN FOXTAIL	100	100	90	70
CHEAT GRASS	70	50	30	0
FIELD VIOLET	100	90	30	0
LAMBSQUARTER	100	100	90	80

TABLE B

	CMPD	18
RATE=G/HA	0500	0250
POST		
GIANT FOXTAIL	30	0
VELVETLEAF	80	50
USH11 SUGARBEET	60	50
LARGE CRABGRASS	30	20
PRICKLY SIDA	70	50
JIMSONWEED	40	0
RICE DRY SEEDED	40	30
COCKLEBUR	40	20
COKER COTTON	60	40
WILLMS SOYBEANS	30	30
BARNYARDGRASS	10	10
WILD OATS	30	0
IVY MORNINGLORY	30	20
ERA WHEAT	0	0
SICKLEPOD	40	20
JOHNSONGRASS	40	0
PURPLE NUTSEDGE	30	0
G4646 CORN	0	0
WILD BUCKWHEAT	40	-
BLACKGRASS	40	0
ALTEX RAPE	100	80
KLAGES BARLEY	10	0
GREEN FOXTAIL	40	0
CHEAT GRASS	30	10
LAMBSQUARTER	100	50
CHICKWEED SPP.	50	0

TABLE B

	CMPD 18			
RATE=G/HA PRE	0500	0250	0125	0062
GIANT FOXTAIL	100	100	90	30
VELVETLEAF	70	20	-	-
USH11 SUGARBEET	50	30	20	-
LARGE CRABGRASS	100	100	100	50
PRICKLY SIDA	90	90	80	50
JIMSONWEED	70	20	0	0
RICE DRY SEEDED	10	0	0	0
COCKLEBUR	20	0	0	0
COKER COTTON	10	0	0	-
WILLMS SOYBEANS	10	0	0	0
BARNYARDGRASS	100	60	20	0
WILD OATS	30	0	-	-
IVY MORNINGLORY	40	30	30	0
ERA WHEAT	10	0	0	0
SICKLEPOD	100	50	30	0
JOHNSONGRASS	90	60	30	0
G4646 CORN	10	10	10	0
WILD BUCKWHEAT	50	30	30	0
BLACKGRASS	90	80	80	30
ALTEX RAPE	30	20	20	-
KLAGES BARLEY	30	30	20	10
GREEN FOXTAIL	100	100	100	30
CHEAT GRASS	40	20	20	20
LAMBSQUARTER	100	90	80	60
CHICKWEED SPP.	50	20	-	-

TABLE B

	CMPD 35
RATE=G/HA	0250
POST	
GIANT FOXTAIL	80
VELVETLEAF	70
USH11 SUGARBEET	60
LARGE CRABGRASS	80
PRICKLY SIDA	80
JIMSONWEED	50
RICE DRY SEEDED	0
COCKLEBUR	30
COKER COTTON	90
WILLMS SOYBEANS	30
BARNYARDGRASS	90
WILD OATS	0
IVY MORNINGLORY	70
ERA WHEAT	0
SICKLEPOD	20
JOHNSONGRASS	90
PURPLE NUTSEDGE	0
G4646 CORN	0
WILD BUCKWHEAT	50
BLACKGRASS	40
ALTEX RAPE	50
KLAGES BARLEY	0
GREEN FOXTAIL	80
LAMBSQUARTER	60
CHICKWEED SPP.	0
DOWNY BROME	0

TABLE B

	CMPD 35		
RATE=G/HA	0250	0125	0062
PRE			
GIANT FOXTAIL	100	100	100
VELVETLEAF	-	90	30
USH11 SUGARBEET	50	20	0
LARGE CRABGRASS	100	100	60
PRICKLY SIDA	-	70	60
JIMSONWEED	0	0	0
RICE DRY SEEDED	30	10	0
COCKLEBUR	0	-	0
COKER COTTON	50	20	0
WILLMS SOYBEANS	40	10	0
BARNYARDGRASS	80	30	10
WILD OATS	10	0	0
IVY MORNINGLORY	50	40	40
ERA WHEAT	0	-	0
SICKLEPOD	90	40	30
JOHNSONGRASS	70	10	0
PURPLE NUTSEDGE	0	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	40	0	-
BLACKGRASS	50	-	10
ALTEX RAPE	40	40	30
KLAGES BARLEY	10	0	0
GREEN FOXTAIL	100	100	70
LAMBSQUARTER	100	70	60
CHICKWEED SPP.	40	30	0
DOWNY BROME	30	10	0

TABLE B

	CMPD 33		
RATE=G/HA	0500	0250	0125
POST			
GIANT FOXTAIL	30	0	0
VELVETLEAF	90	70	60
USH11 SUGARBEET	90	80	70
LARGE CRABGRASS	70	60	50
PRICKLY SIDA	70	60	50
JIMSONWEED	90	70	50
RICE DRY SEEDED	0	0	0
COCKLEBUR	30	20	0
COKER COTTON	30	30	30
WILLMS SOYBEANS	60	50	40
BARNYARDGRASS	0	0	0
WILD OATS	30	0	0
IVY MORNINGLORY	80	70	50
ERA WHEAT	0	0	0
SICKLEPOD	50	30	20
JOHNSONGRASS	0	0	0
PURPLE NUTSEDGE	0	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	60	30	0
BLACKGRASS	30	0	0
ALTEX RAPE	70	50	30
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	30	0	0
CHEAT GRASS	0	0	0
FIELD VIOLET	90	60	30
LAMBSQUARTER	80	70	50

TABLE B

	CMPD 33		
RATE=G/HA	0500	0250	0125
PRE			
GIANT FOXTAIL	100	90	80
VELVETLEAF	90	80	70
USH11 SUGARBEET	80	50	30
LARGE CRABGRASS	90	70	50
PRICKLY SIDA	60	30	0
JIMSONWEED	70	50	30
RICE DRY SEEDED	0	0	0
COCKLEBUR	30	0	0
COKER COTTON	30	0	0
WILLMS SOYBEANS	0	0	0
BARNYARDGRASS	100	90	80
WILD OATS	0	0	0
IVY MORNINGLORY	60	40	20
ERA WHEAT	0	0	0
SICKLEPOD	50	30	0
JOHNSONGRASS	50	30	0
PURPLE NUTSEDGE	0	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	0	0	0
BLACKGRASS	30	0	0
ALTEX RAPE	90	80	70
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	100	90	80
CHEAT GRASS	0	0	0
FIELD VIOLET	70	50	30
LAMBSQUARTER	100	100	100

TABLE B

	CMPD 35			
RATE=G/HA	0500	0250	0125	0062
POST				
GIANT FOXTAIL	0	0	0	-
VELVETLEAF	90	70	50	30
USH11 SUGARBEET	50	30	0	-
LARGE CRABGRASS	70	60	50	30
PRICKLY SIDA	90	60	30	0
JIMSONWEED	30	20	0	0
RICE DRY SEEDED	0	0	0	0
COCKLEBUR	30	0	0	0
COKER COTTON	60	40	30	0
WILLMS SOYBEANS	60	40	30	-
BARNYARDGRASS	0	0	0	0
WILD OATS	0	0	0	-
IVY MORNINGLORY	50	30	0	0
ERA WHEAT	0	0	0	-
SICKLEPOD	50	30	0	0
JOHNSONGRASS	50	30	0	0
PURPLE NUTSEDGE	60	30	0	0
G4646 CORN	0	0	0	-
WILD BUCKWHEAT	80	50	30	-
BLACKGRASS	50	30	0	-
ALTEX RAPE	30	0	0	-
KLAGES BARLEY	0	0	0	-
GREEN FOXTAIL	50	30	0	0
CHEAT GRASS	0	0	0	-
LAMBSQUARTER	50	30	0	0
CHICKWEED SPP.	60	30	0	-

TABLE B

	CMPD 35			
RATE=G/HA	0500	0250	0125	0062
PRE				
GIANT FOXTAIL	100	100	100	90
VELVETLEAF	90	80	60	50
USH11 SUGARBEET	70	50	40	0
LARGE CRABGRASS	100	100	100	100
PRICKLY SIDA	70	60	60	50
JIMSONWEED	40	40	20	0
RICE DRY SEEDED	10	10	0	0
COCKLEBUR	30	30	0	0
COKER COTTON	60	10	0	0
WILLMS SOYBEANS	10	10	0	0
BARNYARDGRASS	100	90	40	30
WILD OATS	40	30	20	0
IVY MORNINGLORY	20	0	0	0
ERA WHEAT	20	20	10	0
SICKLEPOD	30	20	0	0
JOHNSONGRASS	90	80	40	40
PURPLE NUTSEDGE	100	20	0	0
G4646 CORN	0	0	0	0
WILD BUCKWHEAT	50	30	0	0
BLACKGRASS	60	40	40	30
ALTEX RAPE	80	80	70	30
KLAGES BARLEY	20	0	0	0
GREEN FOXTAIL	100	100	100	60
CHEAT GRASS	40	30	0	0
LAMBSQUARTER	100	90	80	80
CHICKWEED SPP.	30	0	0	0

TABLE B

CMPD 1381

RATE=G/HA	0250	0125	0062
POST			
GIANT FOXTAIL	60	30	0
VELVETLEAF	0	0	0
USH11 SUGARBEET	70	50	30
LARGE CRABGRASS	0	0	0
PRICKLY SIDA	0	0	0
JIMSONWEED	60	50	30
RICE DRY SEEDED	0	0	0
COCKLEBUR	50	30	0
COKER COTTON	50	30	0
WILLMS SOYBEANS	30	0	0
BARNYARDGRASS	0	0	0
WILD OATS	0	0	0
IVY MORNINGLORY	50	30	0
ERA WHEAT	0	0	0
SICKLEPOD	30	0	0
JOHNSONGRASS	30	0	0
PURPLE NUTSEDGE	30	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	50	30	0
BLACKGRASS	70	50	30
ALTEX RAPE	30	0	0
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	30	0	0
CHEAT GRASS	0	0	0
LAMBSQUARTER	0	0	0
CHICKWEED SPP.	0	0	0

TABLE B

CMPD 1381

RATE=G/HA	0250	0125	0062
PRE			
GIANT FOXTAIL	100	100	90
VELVETLEAF	0	0	0
USH11 SUGARBEET	90	70	50
LARGE CRABGRASS	100	100	100
PRICKLY SIDA	30	0	0
JIMSONWEED	50	30	0
RICE DRY SEEDED	0	0	0
COCKLEBUR	50	30	0
COKER COTTON	30	30	30
WILLMS SOYBEANS	0	0	0
BARNYARDGRASS	80	50	30
WILD OATS	50	30	0
IVY MORNINGLORY	60	30	0
ERA WHEAT	30	0	0
SICKLEPOD	0	0	0
JOHNSONGRASS	70	30	0
PURPLE NUTSEDGE	30	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	0	0	0
BLACKGRASS	50	40	30
ALTEX RAPE	70	50	30
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	100	100	80
CHEAT GRASS	30	0	0
LAMBSQUARTER	70	50	30
CHICKWEED SPP.	70	50	30

TABLE B

CMPD 1304

RATE=G/HA	0250	0125	0062
POST			
GIANT FOXTAIL	0	0	0
VELVETLEAF	100	70	30
USH11 SUGARBEET	30	0	0
LARGE CRABGRASS	0	0	0
PRICKLY SIDA	50	30	0
JIMSONWEED	60	30	0
RICE DRY SEEDED	0	0	0
COCKLEBUR	50	30	0
COKER COTTON	50	30	0
WILLMS SOYBEANS	30	0	0
BARNYARDGRASS	0	0	0
WILD OATS	0	0	0
IVY MORNINGLORY	30	0	0
ERA WHEAT	0	0	0
SICKLEPOD	50	30	0
JOHNSONGRASS	0	0	0
PURPLE NUTSEDGE	70	50	30
G4646 CORN	0	0	0
WILD BUCKWHEAT	60	30	0
BLACKGRASS	30	0	0
ALTEX RAPE	0	0	0
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	0	0	0
LAMBSQUARTER	80	50	0
CHICKWEED SPP.	60	30	0
DOWNY BROME	0	0	0

TABLE B

CMPD 1304

RATE=G/HA	0250	0125	0062
PRE			
GIANT FOXTAIL	100	100	70
VELVETLEAF	30	0	0
USH11 SUGARBEET	50	30	0
LARGE CRABGRASS	100	90	80
PRICKLY SIDA	70	50	30
JIMSONWEED	30	0	0
RICE DRY SEEDED	0	0	0
COCKLEBUR	50	30	0
COKER COTTON	0	0	0
WILLMS SOYBEANS	0	0	0
BARNYARDGRASS	70	30	0
WILD OATS	50	30	0
IVY MORNINGLORY	0	0	0
ERA WHEAT	30	0	0
SICKLEPOD	0	0	0
JOHNSONGRASS	40	0	0
PURPLE NUTSEDGE	0	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	70	50	30
BLACKGRASS	50	30	0
ALTEX RAPE	0	0	0
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	100	100	70
LAMBSQUARTER	50	30	0
CHICKWEED SPP.	0	0	0
DOWNY BROME	0	0	0

TABLE B

	CMPD 810			
RATE=G/HA	0500	0250	0125	0062
POST				
GIANT FOXTAIL	80	20	0	0
VELVETLEAF	60	30	20	0
USH11 SUGARBEET	20	20	0	-
LARGE CRABGRASS	40	20	0	0
PRICKLY SIDA	30	20	0	0
JIMSONWEED	30	20	0	0
RICE DRY SEEDED	30	0	0	0
COCKLEBUR	30	20	0	0
COKER COTTON	30	20	10	10
WILLMS SOYBEANS	80	30	0	0
BARNYARDGRASS	30	20	0	0
WILD OATS	30	20	0	-
IVY MORNINGLORY	0	0	0	0
ERA WHEAT	20	0	0	0
SICKLEPOD	20	0	0	0
JOHNSONGRASS	20	0	0	0
PURPLE NUTSEDGE	0	0	0	0
G4646 CORN	30	20	0	0
WILD BUCKWHEAT	60	20	0	-
BLACKGRASS	80	30	20	-
ALTEX RAPE	80	30	20	-
KLAGES BARLEY	30	20	0	-
GREEN FOXTAIL	30	20	0	0
CHEAT GRASS	0	0	0	-
LAMBSQUARTER	80	70	30	0
CHICKWEED SPP.	80	20	0	-

TABLE B

	CMPD 810			
RATE=G/HA	0500	0250	0125	0062
PRE				
VELVETLEAF	50	40	20	0
USH11 SUGARBEET	40	30	30	20
LARGE CRABGRASS	100	90	90	20
PRICKLY SIDA	60	50	30	20
JIMSONWEED	50	40	30	30
RICE DRY SEEDED	0	0	0	0
COCKLEBUR	30	20	0	0
COKER COTTON	0	0	0	0
WILLMS SOYBEANS	20	0	0	0
BARNYARDGRASS	100	90	70	40
WILD OATS	20	0	0	0
IVY MORNINGLORY	30	20	0	0
ERA WHEAT	20	0	0	0
SICKLEPOD	0	0	0	0
JOHNSONGRASS	50	40	30	20
PURPLE NUTSEDGE	0	0	0	0
G4646 CORN	30	20	0	0
WILD BUCKWHEAT	30	0	0	0
BLACKGRASS	70	30	20	0
ALTEX RAPE	30	20	0	0
KLAGES BARLEY	30	0	0	0
GREEN FOXTAIL	100	100	100	90
CHEAT GRASS	40	30	20	0
LAMBSQUARTER	90	80	50	40
CHICKWEED SPP.	30	0	0	0

TABLE B

	CMPD	9	
RATE=G/HA	0500	0250	0125
POST			
GIANT FOXTAIL	80	50	30
VELVETLEAF	70	40	-
USH11 SUGARBEET	90	50	40
LARGE CRABGRASS	30	20	0
PRICKLY SIDA	70	60	30
JIMSONWEED	50	30	30
RICE DRY SEEDED	30	0	0
COCKLEBUR	40	40	30
COKER COTTON	80	60	30
WILLMS SOYBEANS	30	20	0
BARNYARDGRASS	100	90	30
WILD OATS	30	20	10
IVY MORNINGLORY	50	-	0
ERA WHEAT	0	0	0
SICKLEPOD	70	60	60
JOHNSONGRASS	50	30	0
PURPLE NUTSEDGE	-	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	60	40	30
BLACKGRASS	70	10	0
ALTEX RAPE	60	40	0
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	100	70	30
LAMBSQUARTER	-	90	50
CHICKWEED SPP.	70	70	30
DOWNY BROME	0	0	0

TABLE B

	CMPD 9			
RATE=G/HA	0500	0250	0125	0062
PRE				
GIANT FOXTAIL	100	100	100	40
VELVETLEAF	100	70	40	20
USH11 SUGARBEET	90	70	60	40
LARGE CRABGRASS	100	100	100	100
PRICKLY SIDA	90	50	10	0
JIMSONWEED	80	50	30	30
RICE DRY SEEDED	0	0	0	0
COCKLEBUR	30	0	0	0
COKER COTTON	30	10	-	0
WILLMS SOYBEANS	10	0	0	0
BARNYARDGRASS	100	100	30	0
WILD OATS	0	0	0	0
IVY MORNINGLORY	20	0	0	0
ERA WHEAT	0	0	0	0
SICKLEPOD	50	20	0	0
JOHNSONGRASS	100	90	50	40
PURPLE NUTSEDGE	0	0	0	0
G4646 CORN	10	0	0	0
WILD BUCKWHEAT	80	50	30	0
BLACKGRASS	90	50	20	0
ALTEX RAPE	90	70	50	30
KLAGES BARLEY	0	0	0	0
GREEN FOXTAIL	100	100	100	40
LAMBSQUARTER	100	100	90	80
CHICKWEED SPP.	40	10	0	0
DOWNY BROME	40	20	0	0

TABLE B

	CMPD 107		
RATE=G/HA	0500	0250	0125
POST			
GIANT FOXTAIL	60	20	0
VELVETLEAF	80	80	70
USH11 SUGARBEET	90	90	80
LARGE CRABGRASS	30	30	-
PRICKLY SIDA	100	90	80
JIMSONWEED	90	50	30
RICE DRY SEEDED	10	0	0
COCKLEBUR	50	40	20
COKER COTTON	90	70	60
WILLMS SOYBEANS	-	60	0
BARNYARDGRASS	100	80	70
WILD OATS	20	20	-
IVY MORNINGLORY	100	90	60
ERA WHEAT	0	0	0
SICKLEPOD	90	40	20
JOHNSONGRASS	0	0	0
PURPLE NUTSEDGE	70	70	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	90	70	70
BLACKGRASS	70	40	0
ALTEX RAPE	70	60	60
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	80	40	30
LAMBSQUARTER	80	80	60
CHICKWEED SPP.	80	50	40
DOWNY BROME	0	0	0

TABLE B

CMPD 107

RATE=G/HA PRE	0500	0250	0125	0062
GIANT FOXTAIL	100	100	90	70
VELVETLEAF	80	40	30	20
USH11 SUGARBEET	90	80	60	10
LARGE CRABGRASS	100	100	100	100
PRICKLY SIDA	80	80	70	0
JIMSONWEED	50	40	20	0
RICE DRY SEEDED	0	0	0	0
COCKLEBUR	10	0	0	0
COKER COTTON	10	0	0	0
WILLMS SOYBEANS	0	0	0	0
BARNYARDGRASS	100	90	40	0
WILD OATS	30	0	0	0
IVY MORNINGLORY	50	30	0	0
ERA WHEAT	0	0	0	0
SICKLEPOD	80	40	-	0
JOHNSONGRASS	100	90	40	20
PURPLE NUTSEDGE	30	-	0	0
G4646 CORN	10	0	0	0
WILD BUCKWHEAT	70	60	50	20
BLACKGRASS	70	50	30	10
ALTEX RAPE	70	60	60	40
KLAGES BARLEY	0	0	0	0
GREEN FOXTAIL	100	100	100	90
LAMBSQUARTER	100	90	90	80
CHICKWEED SPP.	70	40	0	0
DOWNY BROME	0	0	0	0

TABLE B

	CMPD	13
RATE=G/HA	0250	0125
POST		
GIANT FOXTAIL	20	0
VELVETLEAF	70	60
USH11 SUGARBEET	80	40
LARGE CRABGRASS	0	0
PRICKLY SIDA	60	40
JIMSONWEED	40	30
RICE DRY SEEDED	0	0
COCKLEBUR	30	0
COKER COTTON	90	80
WILLMS SOYBEANS	40	0
BARNYARDGRASS	20	0
WILD OATS	30	0
IVY MORNINGLORY	70	40
ERA WHEAT	10	0
SICKLEPOD	40	20
JOHNSONGRASS	0	0
PURPLE NUTSEDGE	0	0
G4646 CORN	0	0
WILD BUCKWHEAT	50	30
BLACKGRASS	80	30
ALTEX RAPE	30	0
KLAGES BARLEY	0	0
GREEN FOXTAIL	40	0
LAMBSQUARTER	50	-
CHICKWEED SPP.	50	0
DOWNY BROME	0	0

TABLE B

	CMPD 13		
RATE=G/HA	0250	0125	0062
PRE			
GIANT FOXTAIL	100	90	40
VELVETLEAF	40	20	0
USH11 SUGARBEET	90	80	50
LARGE CRABGRASS	100	100	100
PRICKLY SIDA	90	60	40
JIMSONWEED	50	30	0
RICE DRY SEEDED	0	0	0
COCKLEBUR	20	0	0
COKER COTTON	0	0	0
WILLMS SOYBEANS	0	0	0
BARNYARDGRASS	90	40	0
WILD OATS	0	0	0
IVY MORNINGLORY	0	0	0
ERA WHEAT	20	0	0
SICKLEPOD	30	0	0
JOHNSONGRASS	60	50	30
PURPLE NUTSEDGE	0	0	0
G4646 CORN	0	0	0
WILD BUCKWHEAT	80	40	30
BLACKGRASS	40	30	10
ALTEX RAPE	70	60	50
KLAGES BARLEY	0	0	0
GREEN FOXTAIL	100	50	20
LAMBSQUARTER	100	90	80
CHICKWEED SPP.	30	0	0
DOWNY BROME	20	0	0

Test C

Sixteen cm diameter Airlite plastic pots were partially filled with Tama silt loam soil and the soil saturated with water. Japonica and Indica rice seedlings a the 2.0 to 2.5 leaf stage were transplanted into 1/3 of the pots. Into another third of the pots were transplanted seedling or sprouted tubers of water plantain (Alisma trivale), Scripus (Scirpus paludosus), Cyperus (Cyperus esculentus), and arrowhead (Sagittaria spp.). The remaining pots were planted with barnyardgrass (Echinochloa crusgalli) seeds and sprouted tubes of water chestnut (Eleocharis spp.). These weeds all represent major rice weeds or genera of weeds important in rice. Three to four days after planting, the water level was raised to 3 cm (about 1200 ml/pot) and maintained a this level throughout the test. Chemical treatments were applied directly to the paddy water, within 24 hours of raising the water, after being formulated in a nonphytotoxic solvent. The pots were maintained in the greenhouse. Rates of application and plant response ratings made 21 days after treatment are summarized in Table C.

TABLE C

	CMPD	669			
RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	100	90	98	98	90
WATERCHESTNUT	0	0	0	0	0
ARROWHEAD	0	0	0	0	0
SCIRPUS	30	0	0	0	0
YELLOW NUTSEDGE	80	60	0	0	0
WATER PLAINTAIN	0	0	0	0	0
RICE JAP EFF	0	0	0	0	0
RICE INDICA EFF	0	0	0	0	0

	CMPD	35			
RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	95	100	80	100	70
WATERCHESTNUT	0	0	60	40	60
ARROWHEAD	95	50	40	0	0
SCIRPUS	50	0	0	0	0
YELLOW NUTSEDGE	100	95	60	0	0
WATER PLAINTAIN	60	40	40	0	0
RICE JAP EFF	20	0	0	0	0
RICE INDICA EFF	20	0	0	0	0

	CMPD	35		
RATE=G/HA	2000	0500	0125	0032
RICE JAP TOL	50	50	20	0
RICE INDICA TOL	60	55	55	0

TABLE C

	CMPD 18				
RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	60	40	0	0	0
WATERCHESTNUT	50	40	0	0	0
ARROWHEAD	35	20	0	0	0
SCIRPUS	0	0	0	0	0
WATER PLAINTAIN	40	20	0	0	0
RICE JAP EFF	70	50	0	0	0
RICE INDICA EFF	50	30	0	0	0

	CMPD 50				
RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	70	70	60	0	0
WATERCHESTNUT	0	0	0	0	0
ARROWHEAD	50	30	0	0	0
SCIRPUS	0	0	0	0	0
YELLOW NUTSEDGE	50	30	0	0	0
WATER PLAINTAIN	0	0	0	0	0
RICE JAP EFF	70	60	30	0	0
RICE INDICA EFF	80	70	30	40	0

	CMPD 33				
RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	95	70	80	10	0
WATERCHESTNUT	0	0	0	0	0
ARROWHEAD	0	0	0	0	0
SCIRPUS	0	0	0	0	0
YELLOW NUTSEDGE	40	0	0	0	0
WATER PLAINTAIN	0	0	0	0	0
RICE JAP EFF	60	30	0	0	0
RICE INDICA EFF	70	30	0	0	0

TABLE C

CMPD 1381

RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	100	100	60	55	55
WATERCHESTNUT	0	0	0	0	0
ARROWHEAD	0	0	0	0	0
SCIRPUS	30	0	0	0	0
YELLOW NUTSEDGE	50	40	0	0	0
WATER PLAINTAIN	0	0	0	0	0
RICE JAP EFF	60	40	20	0	0
RICE INDICA EFF	60	40	20	0	0

CMPD 1304

RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	100	98	100	100	85
WATERCHESTNUT	50	0	0	0	0
ARROWHEAD	30	0	0	0	0
SCIRPUS	80	70	65	0	0
YELLOW NUTSEDGE	0	0	0	0	0
WATER PLAINTAIN	65	0	0	0	0
RICE JAP EFF	40	0	0	0	0
RICE INDICA EFF	40	0	0	0	0

CMPD 107

RATE=G/HA	1000	0500	0250	0125	0064
BARNYARDGRASS	80	90	40	0	0
WATERCHESTNUT	30	60	40	0	0
ARROWHEAD	70	95	0	0	0
SCIRPUS	80	80	60	0	0
YELLOW NUTSEDGE	95	30	50	0	0
WATER PLAINTAIN	80	60	0	0	0
RICE JAP EFF	50	40	30	0	0
RICE INDICA EFF	50	40	30	0	0

Test D

the Corn and Sorghum Herbicide Test included the following species in both the preemergence and postemergence evaluations:

	SPECIES	
Category	Common Name	Scientific Name
Crops	Corn	Zea mays
	Soybean	Glycine max
	Sorghum	Sorghum bicolor
Grasses	Green foxtail	Setaria viridis
	Giant foxtail	Setaria faberii
	Johnsongrass	Sorghum halepense
	Barnyardgrass	Echinochloa crus-galli
	Fall panicum	Panicum dichotomiflorum
	Crabgrass	Digitaria sanguinalis
	Nutsedge	Cyperus rotundus
Broadleaves	Cocklebur	Xanthium pensylvanicum
	Morningglory	Ipomoea hederacea
	Velvetleaf	Abutilon theophrasti
	Jimsonweed	Datura stramonium
	Lambsquarters	Chenopodium album
	Pigweed	Amaranthus retroflexus
	Smartweed	Polygonum persicaris

Postemergence

Postemergence plantings were grown in Sassafras sandy loam soil. Corn and soybeans were grown in separate 25 cm diameter containers. Sorghum and the seven grass weed species were grown in two 18 cm diameter containers, 4 species per container. The seven broadleaf weed species were also grown in two 18 cm diameter containers, 4 species in one container, 3 species in the second container. One additional planting of corn in an 18 cm diameter container was made. One additional planting of corn in an 18 cm diameter container was made. The soil surface of this additional container of corn was covered with the absorbent, perlite, before spray treatment so that test chemicals would enter the plant only via the foliage.

The plants were grown 10-21 days, dependent upon the species and then sprayed postemergence with the test chemicals dissolved in a nonpytotoxic solvent.

Postemergence

Preemergence plantings were grown in fertilized Tama silt loam soil. These plantings are identical to those described in the postemergence section, with the exception of the corn planting having perlite covering the soil surface. These plantings were made the day of or the day before spraying the test chemicals dissolved in a nonphytotoxic solvent.

Evaluation

Treated plants and controls were maintained in the greenhouse for 2 to 4 weeks. Visual planting response ratings were made on a percentage scale of 0 to 100 in comparison with a control where 0 = no injury, and 100 = death.

The results are shown in Table D.

TABLE D

	CMPD 50			
RATE GM/HA	0500	0250	0125	0064
PREEMERGENCE				
G4646 CORN	0	0	0	0
WILLMS SOYBEANS	20	0	0	0
GREEN FOXTAIL	85	50	30	0
GIANT FOXTAIL	85	75	65	20
FALL PANICUM	95	60	35	20
LARGE CRABGRASS	100	100	75	40
BARNYARDGRASS	45	20	0	0
JOHNSONGRASS	95	90	70	35
G522 SORGHUM	0	0	0	0
PURPLE NUTSEDGE	30	0	0	0
VELVETLEAF	65	40	25	0
COCKLEBUR	25	0	0	0
LADY SMARTWEED	40	20	0	0
LAMBSQUARTER	90	75	35	0
REDROOT PIGWEED	100	85	40	0
IVY MORNINGLORY	65	40	30	0
JIMSONWEED	70	50	25	0

	CMPD 50	
RATE GM/HA	0500	0250
POSTEMERGENCE		
G4646 CORN	20	0
WILLMS SOYBEANS	65	35
GREEN FOXTAIL	0	0
GIANT FOXTAIL	0	0
FALL PANICUM	35	20
LARGE CRABGRASS	100	70
BARNYARDGRASS	0	0
JOHNSONGRASS	40	20
G522 SORGHUM	0	0
PURPLE NUTSEDGE	0	0
VELVETLEAF	25	0
COCKLEBUR	40	25
LADY SMARTWEED	40	30
LAMBSQUARTER	80	65
REDROOT PIGWEED	95	65
IVY MORNINGLORY	60	20
JIMSONWEED	45	20
PERLITE CORN	0	0

TABLE D

	CMPD 33		
RATE GM/HA	1000	0500	0250
PREEMERGENCE			
G4646 CORN	0	0	0
WILLMS SOYBEANS	0	0	0
GREEN FOXTAIL	0	0	0
GIANT FOXTAIL	0	0	0
FALL PANICUM	0	0	0
LARGE CRABGRASS	0	0	0
BARNYARDGRASS	0	0	0
JOHNSONGRASS	0	0	0
G522 SORGHUM	0	0	0
PURPLE NUTSEDGE	0	0	0
VELVETLEAF	0	0	0
COCKLEBUR	0	0	0
LADY SMARTWEED	0	0	0
LAMBSQUARTER	0	0	0
REDROOT PIGWEED	0	0	0
IVY MORNINGLORY	0	0	0
JIMSONWEED	0	0	0

	CMPD 33		
RATE GM/HA	1000	0500	0250
POSTEMERGENCE			
G4646 CORN	0	0	0
WILLMS SOYBEANS	0	0	0
GREEN FOXTAIL	0	0	0
GIANT FOXTAIL	0	0	0
FALL PANICUM	0	0	0
LARGE CRABGRASS	0	0	0
BARNYARDGRASS	0	0	0
JOHNSONGRASS	0	0	0
G522 SORGHUM	0	0	0
PURPLE NUTSEDGE	0	0	0
VELVETLEAF	0	0	0
COCKLEBUR	0	0	0
LADY SMARTWEED	0	0	0
LAMBSQUARTER	0	0	0
REDROOT PIGWEED	0	0	0
IVY MORNINGLORY	0	0	0
JIMSONWEED	0	0	0
PERLITE CORN	0	0	0

TABLE D

	CMPD 35			
RATE GM/HA	0500	0250	0125	0064
PREEMERGENCE				
G4646 CORN	0	0	0	0
WILLMS SOYBEANS	0	0	0	0
GREEN FOXTAIL	100	80	70	30
GIANT FOXTAIL	100	80	50	0
FALL PANICUM	100	80	50	0
LARGE CRABGRASS	100	95	70	50
BARNYARDGRASS	100	40	60	0
JOHNSONGRASS	100	100	30	30
G522 SORGHUM	0	0	0	0
PURPLE NUTSEDGE	50	0	0	-
VELVETLEAF	100	100	70	60
COCKLEBUR	20	0	0	0
LADY SMARTWEED	100	50	30	0
LAMBSQUARTER	80	60	30	30
REDROOT PIGWEED	98	50	0	0
IVY MORNINGLORY	30	0	0	0
JIMSONWEED	30	80	0	0

	CMPD 35	
RATE GM/HA	0500	0250
POSTEMERGENCE		
G4646 CORN	0	0
WILLMS SOYBEANS	30	10
GREEN FOXTAIL	40	0
GIANT FOXTAIL	60	0
LARGE CRABGRASS	30	30
BARNYARDGRASS	60	40
JOHNSONGRASS	50	0
G522 SORGHUM	50	0
PURPLE NUTSEDGE	0	0
VELVETLEAF	90	60
COCKLEBUR	30	0
LADY SMARTWEED	50	50
LAMBSQUARTER	20	0
REDROOT PIGWEED	70	30
IVY MORNINGLORY	30	20
JIMSONWEED	20	20
PERLITE CORN	0	0

TABLE E

	CMPD 51			
RATE GM/HA	0500	0250	0125	0064
POSTEMERGENCE				
PARK WHEAT	0	0	0	0
BONANZA BARLEY	0	0	0	0
BLACK NIGHTSHAD	60	40	0	0
CMN CHICKWEED	0	0	0	0
LAMBSQUARTER	40	20	0	0
CTCHWD BEDSTRAW	50	0	0	0
KOCHIA	0	0	0	0
SNTLS CHAMOMILE	60	40	20	0
REDROOT PIGWEED	90	60	50	30
PERSN SPEEDWELL	40	20	0	0
WILD BUCKWHEAT	0	0	0	0
MUSTARD SPP.	30	30	30	0
WILD RADISH	60	30	30	0
ANN. BLUEGRASS	50	20	0	0
ITALN. RYEGRASS	0	20	20	0
BLACKGRASS	0	0	0	0
GREEN FOXTAIL	0	0	0	0
WILD OATS	0	0	0	0
JET RAPE	20	0	0	0

	CMPD 51
RATE GM/HA	0500
PREEMERGENCE	
PARK WHEAT	0
BONANZA BARLEY	30
BLACK NIGHTSHAD	100
CMN CHICKWEED	0
LAMBSQUARTER	100
CTCHWD BEDSTRAW	0
KOCHIA	70
SNTLS CHAMOMILE	100
REDROOT PIGWEED	70
PERSN SPEEDWELL	20
WILD BUCKWHEAT	0
MUSTARD SPP.	0
WILD RADISH	0
ANN. BLUEGRASS	20
ITALN. RYEGRASS	0
BLACKGRASS	0
GREEN FOXTAIL	100
WILD OATS	20
JET RAPE	0

Test E

Seeds of the following crops and weeds are sown into 15 cm pots containing Sassafras sandy loam soil: wheat (Triticum aestivum cv. Park), barley (Hordeum vulgare cv. Bonanza), sugarbeet (Beta vulgaris cv. USH-11), rapeseed (Brassica napus cv. Jet Neuf), black nightshade (Solanum nigrum), chickweed (Stellaria media), lambsquarter (Chenopodium album), Galium aparine, knotweed (Polygonum aviculare), Kochia scoparia, Matricaria indora, redroot pigweed (Amaranthus retroflexus), smartweed (Polygonum persicaria), speedwell (Veronica persica), wild buckwheat (Polygonum convolvulus), wild mustard (Brassica spp.), wild radish (Raphanus raphanistrum), annual bluegrass (PO annua), annual ryegrass (Lolium multiflorum), blackgrass (Alopercurus mysuroides), green foxtail (Setaria viridis), and wild oats (Avena fatua). Compounds are formulated in a nonphytotoxic solvent and applied to the plants as a foliar spray or applied to the soil surface. Plants are treated at two stages: preemergence, or postemergence when the sugarbeets are at the 2-3 true leaf stage. Plants are grown in a temperature-controlled greenhouse for the duration of the test.

Weed control and crop injury are evaluated visually at 3-4 weeks after compound application, using a scale of 0 to 100%, where 0 = no injury and 100 = complete death of the plant. All plants are rated with respect to untreated plants (checks) grown in the greenhouse under identical conditions to the treated plants.

The results are shown in Table E.

TABLE E

	CMPD 644			
RATE GM/HA	0500	0250	0125	0064
POSTEMERGENCE				
PARK WHEAT	40	30	20	0
BONANZA BARLEY	40	20	20	0
BLACK NIGHTSHAD	20	10	0	0
CMN CHICKWEED	0	0	0	0
LAMBSQUARTER	40	20	0	0
CTCHWD BEDSTRAW	30	30	30	0
KOCHIA	70	50	0	0
SNTLS CHAMOMILE	90	50	50	20
REDROOT PIGWEED	60	50	50	50
LADY SMARTWEED	100	100	100	0
PERSN SPEEDWELL	80	40	20	0
WILD BUCKWHEAT	0	0	0	0
MUSTARD SPP.	50	50	20	20
WILD RADISH	80	50	30	20
ANN. BLUEGRASS	80	50	50	20
ITALN. RYEGRASS	40	50	20	0
BLACKGRASS	50	30	0	0
GREEN FOXTAIL	50	50	30	30
WILD OATS	20	20	0	0
JET RAPE	30	0	0	0

	CMPD 644
RATE GM/HA	0500
PREEMERGENCE	
PARK WHEAT	30
BONANZA BARLEY	50
BLACK NIGHTSHAD	0
CMN CHICKWEED	20
LAMBSQUARTER	85
CTCHWD BEDSTRAW	0
KOCHIA	100
SNTLS CHAMOMILE	100
REDROOT PIGWEED	80
PERSN SPEEDWELL	50
WILD BUCKWHEAT	30
MUSTARD SPP.	0
WILD RADISH	0
ANN. BLUEGRASS	80
ITALN. RYEGRASS	0
BLACKGRASS	20
GREEN FOXTAIL	100
WILD OATS	20
JET RAPE	20

TABLE E

	CMPD 52			
RATE GM/HA	0500	0250	0125	0064
POSTEMERGENCE				
PARK WHEAT	50	40	30	30
BONANZA BARLEY	40	20	20	0
BLACK NIGHTSHAD	70	10	0	0
CMN CHICKWEED	0	0	0	0
LAMBSQUARTER	10	0	0	0
CTCHWD BEDSTRAW	100	70	80	20
KOCHIA	70	0	0	0
SNTLS CHAMOMILE	85	50	50	20
REDROOT PIGWEED	90	90	50	0
PERSN SPEEDWELL	90	60	30	40
WILD BUCKWHEAT	30	0	0	0
MUSTARD SPP.	50	20	0	0
WILD RADISH	80	50	10	10
ANN. BLUEGRASS	70	60	40	30
ITALN. RYEGRASS	80	50	20	0
BLACKGRASS	60	20	0	0
GREEN FOXTAIL	75	40	0	0
WILD OATS	30	20	0	0
JET RAPE	40	20	0	0

	CMPD 52
RATE GM/HA	0250
PREEMERGENCE	
PARK WHEAT	70
BONANZA BARLEY	70
BLACK NIGHTSHAD	100
CMN CHICKWEED	0
LAMBSQUARTER	100
CTCHWD BEDSTRAW	100
KOCHIA	0
SNTLS CHAMOMILE	100
REDROOT PIGWEED	100
PERSN SPEEDWELL	100
WILD BUCKWHEAT	20
MUSTARD SPP.	50
WILD RADISH	50
ANN. BLUEGRASS	100
ITALN. RYEGRASS	70
BLACKGRASS	20
GREEN FOXTAIL	100
WILD OATS	70
JET RAPE	20

TABLE E

	CMPD 4			
RATE GM/HA	0500	0250	0125	0064
POSTEMERGENCE				
PARK WHEAT	50	30	10	0
BONANZA BARLEY	60	40	30	20
BLACK NIGHTSHAD	90	70	30	10
CMN CHICKWEED	0	0	0	0
LAMBSQUARTER	70	20	20	0
CTCHWD BEDSTRAW	100	80	20	20
KOCHIA	90	70	30	0
SNTLS CHAMOMILE	85	70	50	30
REDROOT PIGWEED	90	90	40	20
PERSN SPEEDWELL	100	100	70	20
WILD BUCKWHEAT	70	40	0	0
MUSTARD SPP.	80	40	40	20
WILD RADISH	90	80	60	20
ANN. BLUEGRASS	60	40	20	0
ITALN. RYEGRASS	80	30	0	0
BLACKGRASS	50	20	20	0
GREEN FOXTAIL	80	20	20	0
WILD OATS	30	0	0	0
JET RAPE	30	20	20	0

	CMPD 4
RATE GM/HA	0500
PREEMERGENCE	
PARK WHEAT	80
BONANZA BARLEY	80
BLACK NIGHTSHAD	100
CMN CHICKWEED	0
LAMBSQUARTER	100
CTCHWD BEDSTRAW	100
KOCHIA	100
SNTLS CHAMOMILE	100
REDROOT PIGWEED	100
LADY SMARTWEED	100
PERSN SPEEDWELL	90
WILD BUCKWHEAT	40
MUSTARD SPP.	50
WILD RADISH	50
ANN. BLUEGRASS	100
ITALN. RYEGRASS	70
BLACKGRASS	90
GREEN FOXTAIL	100
WILD OATS	90
JET RAPE	40

TABLE E

	CMPD 107
RATE GM/HA	0250
PREEMERGENCE	
PARK WHEAT	30
BONANZA BARLEY	30
BLACK NIGHTSHAD	80
CMN CHICKWEED	0
LAMBSQUARTER	90
CTCHWD BEDSTRAW	0
KOCHIA	70
SNTLS CHAMOMILE	70
REDROOT PIGWEED	100
PERSN SPEEDWELL	100
WILD BUCKWHEAT	0
MUSTARD SPP.	20
WILD RADISH	60
ANN. BLUEGRASS	20
ITALN. RYEGRASS	0
BLACKGRASS	20
GREEN FOXTAIL	100
WILD OATS	0
JET RAPE	30

Test F

Weed species were planted 3 or 4 per 15-cm diameter pot in Sassafras sandy loam (pH 6.8; 1% OM). Cotton was planted separately in the same sized pot. Postemergence plantings were made 12-16 days prior to treating so plants were in the 2- to 3-leaf stage (5-12 cm tall). Preemergence plantings were made the day before treating. Compounds were sprayed in a suitable non-phytotoxic solvent at 374 l/ha, then after 3 weeks of growth in a greenhouse, plant responses were visually rated on a percent scale where 0 = no injury and 100 = plant death. The following species were included:

Common Name	Latin Name	Planting Depth (cm)
Cotton (Coker 315)	Gossypium hirsutum	2
Barnyardgrass	Echinochloa crus-galli	1
Bermudagrass	Cynodon dactylon	1
Broadleaf signalgrass	Brachiaria platyphylla	1
Crabgrass	Digitaria sanguinalis	1
Fall panicum	Panicum dichotomiflorum	1
Goosegrass	Eleusine indica	1
Johnsongrass	Sorghum halepense	1
Nutsedge	Cyperus rotundus	3
Cocklebur	Xanthium pensylvanicum	3
Ivy leaf morningglory	Ipomoea hederacea	3
Lambsquarters	Chenopodium album	1
Pigweed	Amaranthus retroflexus	1
Prickly sida	Sida spinosa	1
Purslane	Portulaca oleracea	1
Sicklepod	Cassia obtusifolia	3
Smartweed	Polygonum persicaria	1
Velvetleaf	Abutilon theophrasti	3
Ground cherry	Physalis heterophylla	1

The results are shown in Table F.

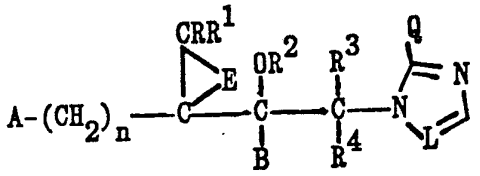
TABLE F

CMPD 4

RATE GM/HA	0500	0250	0125	0064	0032
PREEMERGENCE					
COKER COTTON	0	0	0	0	0
REDROOT PIGWEED	100	100	60	70	50
LAMBSQUARTER	70	60	20	20	0
VELVETLEAF	30	0	0	0	0
PRICKLY SIDA	90	100	0	0	0
SICKLEPOD	0	0	0	0	0
COCKLEBUR	0	0	0	0	0
CMN PURSLANE	80	30	30	20	0
IVY MORNINGLORY	0	0	0	0	0
GOOSEGRASS	100	100	100	80	80
BERMUDAGRASS	100	100	95	20	0
BARNYARDGRASS	95	0	0	0	0
JOHNSONGRASS	50	50	20	0	0
FALL PANICUM	100	100	90	90	90
LARGE CRABGRASS	100	100	100	20	0
BRDLF SGNLGRASS	30	0	0	0	0
PURPLE NUTSEDGE	0	0	0	0	0
LADY SMARTWEED	20	20	0	0	0
GROUND CHERRY	0	0	0	0	0

WHAT IS CLAIMED IS:

1. A compound having the formula:



(I)

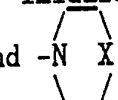
or a pharmaceutically or agriculturally suitable salt thereof

wherein

E is a bond or an oxygen atom with the proviso that when E is oxygen; R, R^1 are not halogen;

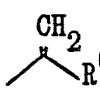
A is perfluoroalkyl of 1-8 carbon atoms, $N(CH_3)_2$, OH, naphthyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and CF_3,  optionally substituted with 1 or 2 methyl groups, phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, and with no more than one group selected from:

haloalkoxy of 1-4 carbon atoms, CN, CO_2R^{14}, $CH=NOR^{14}$, $S(O)_mR^5$, R^6, 2-,3-, or 4-pyridyl or an N-oxide thereof, imidazol-1-yl, 1,2,4-triazol-1-yl, and  optionally substituted with 1 or 2 methyl groups,

or a heterocycle selected from imidazol-1-yl, 1,2,4-triazol-1-yl, 2-or 3-thienyl, and 2-,3-,or 4-pyridyl or an N-oxide thereof optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, haloalkoxy of 1-4 carbon atoms, CF_3, and $S(O)_mR^5$;

B is alkyl of 1-8 carbon atoms, naphthyl, biphenyl,  , perfluoroalkyl of 1-8 carbon atoms, phenyl optionally substituted with 1-3 substituents each of which is independently selected from: halogen, alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, alkoxy of 1-4 carbon atoms, and with no more than one group selected from haloalkoxy of 1-4 carbon atoms, CN, CO_2R^{14}, $CH{=}NOR^{14}$, $S(O)_mR^5$, 2-, 3-, 4-pyridyl or an N oxide thereof,

benzyl optionally substituted on the phenyl ring with halogen or alkyl of 1-4 carbon atoms, or optionally α-substituted with 1 or 2 methyl groups, or

a heterocycle selected from 2-or 3-thienyl, and 2-,3-,or 4-pyridyl optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, haloalkoxy of 1-4 carbon atoms, CF_3 or $S(O)_mR^5$;

Q is H, halogen, $S(O)_mR^{11}$, $SCNHR^{12}$, CHO, $C{-}CH_3$, CO_2R^{13}, SCN, SSR^{12}, or SH or its corresponding disulfide, provided however that when Q is other than H, then n is 0, R,R^1, and R^4 are independently H or CH_3, R^3 is H, and A and B are each phenyl optionally substituted with from 1-3

substituents each of which is independently halogen, CH_3, CF_3, OCH_3 or $S(O)_mR^5$;

L is CH or N with the proviso that when L=CH then Q=H;

n is 0-4 with the proviso that when A is  , $N(CH_3)_2$, or OH, then n is other than 0;

m each occurrence is 0, 1 or 2;

X is C, NR^{10}, or O;

R and R^1 independently are H, alkyl of 1-4 carbon atoms, halogen, or phenyl, or taken together form cycloalkyl of 3-7 carbon atoms;

R^2 is H, allyl, propargyl, alkyl of 1-4 carbon atoms,

$-\overset{O}{\overset{\|}{C}}R^7$, $-\overset{O}{\overset{\|}{C}}-NR^8R^9$, $-\overset{O}{\overset{\|}{C}}OR^7$, or

haloalkyl of 1-4 carbon atoms;

R^3 and R^4 independently are H, F, or alkyl of 1-4 carbon atoms;

R^5 is alkyl of 1-4 carbon atoms;

R^6 is phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and CF_3;

R^7 is alkyl of 1-4 carbon atoms, phenyl, or benzyl;

R^8 and R^9 independently are H, alkyl of 1-4 carbon atoms, phenyl or benzyl;

R^{10} is H, alkyl of 1-4 carbon atoms, or acetyl;

R^{11} is alkyl of 1-4 carbon atoms, haloalkyl of 1-4 carbon atoms, CH_2CN, CH_2SCN, $CH(CH_3)CN$, $CH_2CO_2CH_3$, or $CH_2CO_2CH_2CH_3$;

R^{12} is alkyl of 1-4 carbon atoms, allyl, phenyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3, or benzyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3;

R^{13} is H, or alkyl of 1-4 carbon atoms; and

R^{14} is alkyl of 1-4 carbon atoms,

provided, however, that when L is N then either

(1) A must be phenyl substituted with CN, CO_2R^{14}, or $CH=NOR^{14}$; or a heterocycle selected from imidazol-1-yl, 1,2,4-triazol-1-yl, 2- or 3-thienyl, and 2-, 3-, or 4-pyridyl substituted with N-oxide or one or two substituents each of which is selcted from alkoxy of 1-4 carbon atoms and haloalkoxy of 1-4 carbon atoms; or

(2) B must be phenyl substituted with CN, CO_2R^{14}, $CH=NOR^{14}$, 2-, 3-, 4-pyridyl or an N oxide thereof; or a heterocycle selected from 2- or 3-thienyl, and 2-, 3-, or 4-pyridyl substituted with haloalkoxy of 1-4 carbon atoms.

2. A compound of Claim 1 wherein L is N.

3. A compound of Claim 2 wherein E is a bond.

4. A compound of Claim 2 wherein n is 0 or 1.

5. A compound of Claim 2 wherein R^3 and R^4 are each independently H, CH_3 or F.

6. A compound of Claim 2 wherein E is a bond, n is 0 or 1, and R^3 and R^4 are each independently H, CH_3 or F.

7. A compound of Claim 6 wherein one of A or B is phenyl optionally substituted with from 1-3 substituents each of which is halogen, alkoxy of 1-4 carbon atoms, alkyl of 1-4 carbon atoms, $S(O)_mR^5$ or haloalkyl of 1-4 carbon atoms.

8. A compound of Claim 6 wherein R and R^1 independently are H, CH_3 or halogen.

9. A compound of Claim 6 wherein n is 0.

10. A compound of Claim 6 wherein R^2 is H, alkyl of 1-4 carbon atoms, allyl or propargyl.

11. A compound of Claim 6 wherein Q is H, I or SH.

12. A compound of Claim 6 wherein R and R^1 independently are H, CH_3 or halogen; R^2 is H, alkyl of 1-4 carbon atoms, allyl or propargyl; n is 0; Q is H, I or SH; and one of A or B independently is phenyl optionally substituted with from 1-3 substituents each of which is halogen, alkoxy of 1-4 carbon atoms, alkyl of 1-4 carbon atoms, $S(O_m)R^5$, or haloalkyl of 1-4 carbon atoms.

13. A compound of Claim 12 wherein R, R^1, R^2, R^3, R^4 and Q are all H.

14. A compound of Claim 12 wherein one of A or B is phenyl optionally substituted with 1-3 halogen atoms, CH_3, OCH_3, CF_3 or SCH_3.

15. A compound of Claim 12 wherein R, R^1, R^2, R^3, R^4 and Q are all H; and one of A or B independently are phenyl optionally substituted with 1-3 halogen atoms, CH_3, OCH_3, CF_3 or SCH_3.

16. A pharmaceutical composition comprising a suitable pharmaceutical carrier and a therapeutically effective amount of a compound of any of Claims 1-15.

17. A method of treating a fungal infection in a mammal comprising administering to the mammal an antifungal amount of a compound of any of Claim 1-15.

18. An agricultural composition for controlling a plant fungus disease which comprises an effective amount of a compound of any of Claims 1-15 and at least one of the following: surfactant, solid or liquid inert diluent.

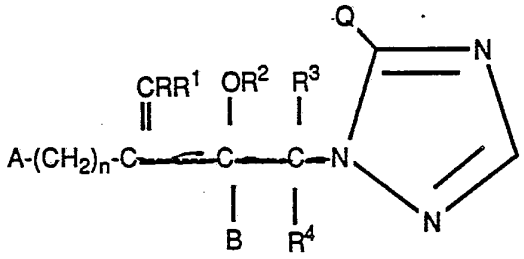
19. A method of controlling fungus disease in a plant comprising applying to the locus of infestation to be protected an effective amount of a compound of any of Claims 1-15.

20. A herbicidal composition for controlling undesirable vegetation which comprises an effective herbicidal amount of a compound of any of Claims 1-15

and at least one of the following: surfactant, solid or liquid inert diluent.

21. A method for controlling undesirable vegetation which comprising applying to the locus to be protected a herbicidally effective amount of a compound of any of Claims 1-15.

22. A herbicidal composition for controlling undesirable vegetation which comprises at least one of the following: surfactant, solid or liquid inert diluent and an effective herbicidal amount of a compound having the formula:



wherein

A is perfluoroalkyl of 1-4 carbon atoms, naphthyl optionally substituted with a total of 1-2 substituents each of which is independently selected from halogen and CF_3, -N X optionally substituted with 1 or 2 methyl groups, phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from:

halogen, alkyl of 1-3 carbon atoms, haloalkyl of 1-3 carbon atoms, alkoxy of 1-3 carbon atoms, and with no more than one group selected from:

haloalkoxy of 1-3 carbon atoms, CN, CO_2R^{14}, $CH=NOR^{14}$, R_6, 2-,3-,or 4-pyridyl, or an N-oxide thereof, imidazol-1-yl, 1,2,4-triazol-1-yl,

and -  optionally substituted with 1 or 2 methyl groups,

or a heterocycle selected from imidazol-1-yl, 1,2,4-triazol-1-yl, 2-or 3-thienyl, and 2-,3-, or 4-pyridyl, said heterocycles being optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-2 carbon atoms, and CF_3;

B is alkyl of 1-4 carbon atoms, naphthyl, perfluoroalkyl of 1-4 carbon atoms, phenyl optionally substituted with 1-2 substituents each of which is independently selected from: halogen, alkyl of 1-3 carbon atoms, haloalkyl of 1-3 carbon atoms, alkoxy of 1-3 carbon atoms, and with no more than one group selected from haloalkoxy of 1-3 carbon atoms, and CN,

benzyl optionally substituted on the phenyl ring with halogen or alkyl of 1-3 carbon atoms, or optionally α-substituted with 1 or 2 methyl groups, or

a heterocycle selected from 2-or 3-thienyl, and 2-,3-,or 4-pyridyl, said heterocycles being optionally substituted with one or two substituents each of which is independently selected from:

halogen, alkyl of 1-4 carbon atoms, or CF_3;

Q is H, halogen, $S(O)_mR^{11}$, $SCNHR^{12}$, CHO, $C\text{-}CH_3$, CO_2R^{13}, SCN, SSR^{12}, or SH or its corresponding disulfide, provided however that when Q is other than H, then n is 0, R, R^1, and R^4 are independently H or CH_3, R^3 is H, and A and B are each phenyl optionally substituted with from 1-3 substituents each of which is independently halogen, CH_3, CF_3, or OCH_3;

n is 0-2 with the proviso that when A is  , or OH, then n is other than 0;

m each occurrence is 0, 1 or 2;

X is C, NR^{10}, or O;

R and R^1 independently are H, alkyl of 1-2 carbon atoms, halogen, or phenyl, or taken together form cycloalkyl of 3-6 carbon atoms;

R^2 is H, allyl, propargyl, alkyl of 1-2 carbon atoms, $-CR^7$, $-C\text{-}NR^8R^9$, $-COR^7$, or haloalkyl of 1-4 carbon atoms;

R^3 and R^4 independently are H, F, or alkyl of 1-2 carbon atoms;

R^6 is phenyl optionally substituted with a total of 1-3 substituents each of which is independently selected from halogen and CF_3;

R^7 is alkyl of 1-2 carbon atoms, phenyl, or benzyl;

R^8 and R^9 independently are H, alkyl of 1-2 carbon atoms, phenyl or benzyl;

R^{10} is H, alkyl of 1-2 carbon atoms, or acetyl;

R^{11} is alkyl of 1-2 carbon atoms, haloalkyl of 1-2 carbon atoms, CH_2CN, CH_2SCN, $CH(CH_3)CN$, $CH_2CO_2CH_3$, or $CH_2CO_2CH_2CH_3$;

R^{12} is alkyl of 1-2 carbon atoms, allyl, phenyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3, or benzyl optionally substituted with 1-2 substituents each of which is independently halogen, CH_3, or OCH_3;

R^{13} is H, or alkyl of 1-2 carbon atoms; and

R^{14} is alkyl of 1-4 carbon atoms.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US88/04343

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC(4): A01N 43/653; C07D 249/12 A01N 43/40, See Attachment sheet 5

U.S.Cl.: 514/383;514/384;548/262,263,264,265, See Attachment sheet 5

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
U.S.	71/88,92 514/383,384,340,235.8,236.2,340 548/262,263,264,265,336,337,341; 544/132; 546/276

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

STN Online Structure Search

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
Y	US, A, 4,507,140 (SUGAVANAM) 26 May 1985 (26.05.85). See the entire document.	1-22
Y	US, A, 4,634,466 (NOON ET AL) 6 January 1987 (06.01.87). See the entire document.	1-22
Y	US, A, 4,652,579 (HOLMWOOD ET AL) 24 March 1987 (24.03.87). See the entire document.	1-19
Y	EP, A, 040,345 (HOLMWOOD ET AL) 25 November 1981 (25.11.81). See the entire document.	1-22
Y	DE, A, 3,314,548 (HOLMWOOD ET AL) 25 October 1984 (25.10.84). See pages 1-2.	1-19
Y	US, A, 4,655,820 (WORTHINGTON ET AL) 7 April 1987 07.04.87). See the entire document.	1-22

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search

27 FEBRUARY 1989 (27.02.89)

Date of Mailing of this International Search Report

15 MAY 1989

International Searching Authority

ISA/US

Signature of Authorized Officer

PATRICIA L. MORRIS

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

Y	US, A, 4,086,351 (BALASUBRAMANYAN ET AL) 25 April 1978 (25.04.78). See the entire document.	1-19
Y	US, A, 4,315,764 (REISER ET AL) 16 February 1982 (16.02.82). See columns 1-2.	1-22
Y	US, A, 4,530,922 (MOBERG ET AL) 23 July 1985 (23.07.85). See column 3, lines 31-68 and column 4, lines 1-56.	1-19

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers . because they relate to subject matter [12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers . because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

3. ☐ Claim numbers_____, because they are dependent claims not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☒ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [2]

This International Searching Authority found multiple inventions in this international application as follows:

The instances in claims 1-15 wherein L is nitrogen (triazole):

(See Attachment sheets 1 thru 4)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims: 1-22

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
Y	GB, A, 2,146,987 (EGGER) 1 May 1985 (01.05.85). See page 1, lines 8-42.	1-19
Y	US, A, 4,427,673 (KRAMER ET AL) 24 January 1984 (24.01.84). See column 1, lines 20-44.	1-19
Y	US, A, 4,464,381 (JANSSEN ET AL) 7 August 1984 (07.08.84). See column 1, lines 14-31.	1-19
P,Y	US, A, 4,780,471 (MAEDA ET AL) 25 October 1988 (25.10.88). See the entire document.	1-22
P,Y	US, A, 4,786,312 (SCHMIERER ET AL) 22 November 1988 (22.11.88). See columns 1-2.	1-19
Y	US, A, 4,701,207 (ROGERS ET AL) 20 October 1987 (20.10.87). See column 1, lines 13-49 and column 2, lines 2-4.	1-22

1. A is not a heterocycle and B is not a heterocycle classified in 548/262, 263, 265.

2. A is morpholine and B is not a heterocycle classified in 544/132.

3. A is morpholine and B is pyridine classified in 544/124.

4. A is morpholine and B is thiophene classified in 544/146.

5. A is piperazine and B is not a heterocycle classified in 544/366.

6. A is piperazine and B is pyridine classified in 544/360.

7. A is piperazine and B is thiophene classified in 544/379.

8. A is piperidine and B is not a heterocycle classified in 546/210.

9. A is piperidine and B is pyridine classified in 546/193, 194.

10. A is piperidine and B is thiophene classified in 546/212.

11. A is imidazole and B is not a heterocycle classified in 548/341.

12. A is imidazole and B is pyridine classified in 548/336.

13. A is imidazole and B is thiophene classified in 548/336.

14. A is triazole and B is not a heterocycle classified in 548/262, 263, 265.

15. A is triazole and B is pyridine classified in 546/276.

16. A is triazole and B is thiophene classified in 546/276.

17. A is thiophene and B is not a heterocycle classified in 549/62.

18. A is thiophene and B is pyridine classified in 549/59 and 546/284.

19. A is thiophene and B is thiophene classified in 549/59.

20. A is pyridine and B is not a heterocycle classified in 546/275.

21. A is pyridine and B is a pyridine classified in 546/256.

22. A is pyridine and B is thiophene classified in 546/284.

Or in claims 1-15 wherein L is carbon (imidazole)

23. A is not a heterocycle and B is not a heterocycle classified in 548/337, 341.

24. A is morpholine and B is not a heterocycle classified in 544/139.

25. A is morpholine and B is pyridine classified in 544/124.

26. A is morpholine and B is thiophene classified in 544/146.

27. A is piperazine and B is not a heterocycle classified in 544/366.

28. A is piperazine and B is pyridine classified in 544/360.

29. A is piperazine and B is thiophene classified in 544/379.

30. A is piperidine and B is not a heterocycle classified in 546/210.

31. A is piperidine and B is pyridine classified in 546/193, 194.

32. A is piperidine and B is thiophene classified in 546/212.

33. A is imidazole and B is not a heterocycle classified in 548/337.

34. A is imidazole and B is pyridine classified in 548/336.

35. A is imidazole and B is thiophene classified in 548/336.

36. A is triazole and B is not a heterocycle classified in 548/262, 263, 265.

37. A is triazole and B is pyridine classified in 546/276.

38. A is triazole and B is thiophene classified in 548/262, 263, 265.

39. A is thiophene and B is not a heterocycle classified in 549/62.

40. A is thiophene and B is pyridine classified in 549/59 and 546/284.

41. A is thiophene and B is thiophene classified in 549/59.

42. A is pyridine and B is not a heterocycle classified in 546/275.

43. A is pyridine and B is a pyridine classified in 546/256.

44. A is pyridine and B is thiophene classified in 546/284.

Applicants are entitled to one use under PCT Rule 13.2. The above-mentioned groups would include a search on fungicidal use (claims 16-19) classified

variously in Class 514. If applicants desire the herbicidal use (claims 20-22) to be searched in addition to the fungicidal use, then payment of an additional $140.00 would be required. Hence, claims 16-22 will be searched to the extent of the elected use and elected compounds above.

The inventions as set forth above are independent and distinct, each from the other because each can support a separate patent, each requires an independent search and a reference for one would not render the others prima facie obvious, absent ancillary art. The various inventions are thus lacking unity.

IPC(4): A01N 43/50; 43/84; A61K 31/41; 31/44; 31/415;
31/535; C07D 233/60; 233/68; 233/84; 233/90;
249/12; 295/08; 295/12; 211/86

U.S.Cl.: 336, 337, 341, 514/235.8, 236.2; 544/132;
546/276; 71/88, 92; 514/340