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NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

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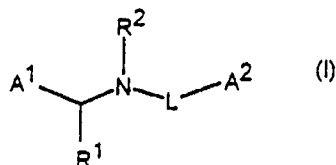
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(54) Title: 2-PYRIDYLMETHYLAMINE DERIVATIVES USEFUL AS FUNGICIDES			
(I)			
(57) Abstract			
Compounds of formula (I) and salts thereof as phytopathogenic fungicides wherein A ¹ is substituted 2-pyridyl; A ² is optionally substituted phenyl; L is -(C=O)-, -SO ₂ - or -(C-S)-; R ¹ is hydrogen, optionally substituted alkyl or acyl; and R ² is hydrogen or optionally substituted alkyl are useful phytopathogenic fungicides.			

2-PYRIDYLMETHYLAMINE DERIVATIVES USEFUL AS FUNGICIDES

This invention relates to compounds having fungicidal activity, their preparation, and intermediates for their preparation.

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In a first aspect the invention provides the use of compounds of formula I and salts thereof as phytopathogenic fungicides



wherein

10 A^1 is substituted 2-pyridyl; ✓

A^2 is optionally substituted phenyl; ✓

L is $-(C=O)-$, $-SO_2-$ or $-(C=S)-$;

R^1 is hydrogen, optionally substituted alkyl or acyl; and ✓

R^2 is hydrogen or optionally substituted alkyl. ✓

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The 2-pyridyl group (A^1) can have up to four substituents, preferably up to two, ✓ which may be the same or different to each other. Preferably, the substituents are on the 3 and/or 5 position of the 2-pyridyl group. ✓

20 Preferred substituents on the 2-pyridyl group (A^1) are halogen, hydroxy, cyano, nitro, SF_5 , trialkylsilyl, optionally substituted amino, acyl, or a group E, OE or SE,

where E is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, phenyl or heterocyclyl, ✓ each of which is optionally substituted, or a group $-C(E)=N-Q$, where Q is E, OE, SE or optionally substituted amino; or two adjacent substituents together with the

25 atoms to which they are attached form an optionally substituted ring which can contain up to 3 hetero atoms. Especially preferred substituents are alkoxy, alkyl, cyano, halogen, nitro, alkoxycarbonyl, alkylsulfinyl, alkylsulfonyl and trifluoromethyl, particularly chlorine and trifluoromethyl.

30 The phenyl group, A^2 , may have up to five substituents, preferably up to 3, especially up to two, which may be the same or different to each other. Preferred

substituents are the same as those defined for A¹ above. ✓ Particularly preferred substituents are alkoxy, alkyl, halogen, nitro or trifluoromethyl. ✓

Preferably the linking group L is -(C=O)-.

5

R¹ is preferably hydrogen. When it is not hydrogen, it is preferably alkyl, optionally substituted by phenyl, or alkoxycarbonyl.

Many of the compounds of formula I are novel. Therefore according to a second aspect, the invention provides compounds of formula I where A¹ is a 2-pyridyl group having substituents at the 3 and/or 5 position and no other position, R¹ and R² are hydrogen and A² and L are as defined above.

The invention also includes any of the compounds specifically exemplified hereinafter.

Any alkyl group present in the molecule is preferably of 1 to 10 carbon atoms, especially of 1 to 7 carbon atoms, and particularly of 1 to 5 carbon atoms.

Any alkenyl or alkynyl group present in the molecule is preferably of 2 to 7 carbon atoms, for example allyl, vinyl or propargyl.

Any cycloalkyl, cycloalkenyl or cycloalkynyl group present in the molecule is preferably of 3 to 7 carbon atoms, especially cyclopropyl, cyclopentyl, cyclohexyl or cyclohexenyl.

Substituents, when present on any alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl cycloalkynyl moiety may for example be halogen, cyano, optionally substituted alkoxy, optionally substituted alkylthio, mercapto, hydroxy, nitro, optionally substituted amino, acyl, acyloxy, acylthio, optionally substituted phenyl, optionally substituted heterocyclyl, optionally substituted phenylthio, optionally substituted phenoxy, optionally substituted heterocycloxy or optionally substituted heterocyclylthio.

Preferred substituents on any alkyl, alkenyl or alkynyl group are alkoxy, haloalkoxy or alkylthio, each containing 1 to 5 carbon atoms; halogen; or optionally substituted phenyl. An especially preferred group is trifluoromethyl.

- 5 Cycloalkyl, cycloalkenyl, cycloalkynyl groups may also be substituted by optionally substituted alkyl, alkynyl or alkenyl and *vice versa*.

Substituents when present on any phenyl or heterocyclyl group are preferably as defined above for substituents on A².

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- The term heterocyclyl includes both aromatic and non-aromatic heterocyclyl groups. Heterocyclyl groups are generally 5, 6 or 7-membered rings containing up to 4 hetero atoms selected from nitrogen, oxygen and sulfur. Examples of heterocyclyl groups are furyl, thienyl, pyrrolyl, pyrrolinyl, pyrrolidinyl, imidazolyl, dioxolanyl, oxazolyl, thiazolyl, imidazolyl, imidazolinyl, imidazolidinyl, pyrazolyl, pyrazolinyl, pyrazolidinyl, isoxazolyl, isothiazolyl, oxadiazolyl, triazolyl, thiadiazolyl, pyranyl, pyridyl, piperidinyl, dioxanyl, morpholino, dithianyl, thiomorpholino, pyridazinyl, pyrimidinyl, pyrazinyl, piperazinyl, triazinyl, thiazolinyl, benzimidazolyl, tetrazolyl, benzoxazolyl, imidazopyridinyl, 1,3-benzoxazinyl, 1,3-benzothiazinyl, oxazolopyridinyl, benzofuranyl, quinolinyl, quinazolinyl, quinoxalinyl, sulfolanyl, dihydroquinazolinyl, benzothiazolyl, phthalimido, benzofuranyl, azepinyl, oxazepinyl, thiazepinyl, diazepinyl and benzodiazepinyl.
- 15
- 20

- Amino groups may be substituted for example by one or two E or acyl groups, each of which may be the same or different, or two substituents together with the nitrogen to which they are attached can form a ring, preferably a 5 to 7-membered ring, which may be substituted and may contain other heteroatoms, for example morpholine, thiomorpholine, or piperidine. This ring can be substituted as for A.
- 25

- 30 The term acyl includes the residue of sulfur and phosphorus-containing acids as well as carboxylic acids. Examples of acyl groups are thus -COR^{5a}, -COOR^{5a}, -CXNR^{5a}R^{6a}, -CON(R^{5a})OR^{6a}, -COONR^{5a}R^{6a}, -CON(R^{5a})NR^{6a}R^{7a}, -COSR^{5a}, -CSSR^{5a}, -S(O)_yR^{5a}, -S(O)₂OR^{5a}, -S(O)_yNR^{5a}R^{6a}, -P(=X)(OR^{5a})(OR^{6a}), -CO-COOR^{5a}, where R^{5a}, R^{6a} and R^{7a}, which may be the same or different, are

hydrogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted cycloalkenyl, optionally substituted cycloalkynyl optionally substituted phenyl or optionally substituted heterocyclyl, or R^{5a} and R^{6a}, or R^{6a} and R^{7a}, together with the atom(s) to which they are attached can form a ring, γ is 1 or 2 and X is O or S.

When substituted, substituents on the phenyl and alkyl groups are as defined above.

10

In preferred compounds of the invention

A¹ is a mono- or disubstituted 2-pyridyl group, substituted by chlorine and/or trifluoromethyl at the 3 and/or 5 position, e.g. 2-(5-chloro-3-trifluoromethyl)pyridyl; X is -C(=O)-; and

15

R¹ is hydrogen or alkyl, e.g. methyl, and especially hydrogen; and R² is hydrogen, alkyl, (e.g. methyl), benzyl or alkoxycarbonyl, (e.g. ethoxycarbonyl) and especially hydrogen.

Particularly preferred substituents on the A² phenyl are halogen.

20

→ The compounds of the invention have activity as fungicides, especially against fungal diseases of plants, e.g. mildews and particularly cereal powdery mildew (*Erysiphe graminis*) and vine downy mildew (*Plasmopara viticola*), rice blast (*Pyricularia oryzae*), cereal eyespot (*Pseudocercospora herpotrichoides*), rice sheath blight (*Pellicularia sasakii*), grey mould (*Botrytis cinerea*), damping off (*Rhizoctonia solani*), wheat brown rust (*Puccinia recondita*), late tomato or potato blight (*Phytophthora infestans*), apple scab (*Venturia inaequalis*), glume blotch (*Leptosphaeria nodorum*). Other fungi against which the compounds may be active include other powdery mildews, other rusts, and general pathogens of Deuteromycete, Ascomycete, Phycomycete and Basidiomycete origin.

The invention thus also provides a method of combating fungi at a locus infested or liable to be infested therewith, which comprises applying to the locus a compound of formula I.

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→ [The invention also provides an agricultural composition comprising a compound of formula I in admixture with an agriculturally acceptable diluent or carrier.

The composition of the invention may of course include more than one compound
5 of the invention.

→ [In addition the composition can comprise one or more additional active ingredients, for example compounds known to possess plant-growth regulant, herbicidal, fungicidal, insecticidal or acaricidal properties. Alternatively the compound of the
10 invention can be used in sequence with the other active ingredient.

The diluent or carrier in the composition of the invention can be a solid or a liquid optionally in association with a surface-active agent, for example a dispersing agent, emulsifying agent or wetting agent. Suitable surface-active agents include
15 anionic compounds such as a carboxylate, for example a metal carboxylate of a long chain fatty acid; an N-acylsarcosinate; mono- or di-esters of phosphoric acid with fatty alcohol ethoxylates or salts of such esters; fatty alcohol sulfates such as sodium dodecyl sulfate, sodium octadecyl sulfate or sodium cetyl sulfate; ethoxylated fatty alcohol sulfates; ethoxylated alkylphenol sulfates; lignin
20 sulfonates; petroleum sulfonates; alkyl-aryl sulfonates such as alkyl-benzene sulfonates or lower alkylnaphthalene sulfonates, e.g. butyl-naphthalene sulfonate; salts of sulfonated naphthalene-formaldehyde condensates; salts of sulfonated phenol-formaldehyde condensates; or more complex sulfonates such as the amide sulfonates, e.g. the sulfonated condensation product of oleic acid and N-methyl
25 taurine or the dialkyl sulfosuccinates, e.g. the sodium sulfonate of dioctyl succinate. Nonionic agents include condensation products of fatty acid esters, fatty alcohols, fatty acid amides or fatty-alkyl- or alkenyl-substituted phenols with ethylene oxide, fatty esters of polyhydric alcohol ethers, e.g. sorbitan fatty acid esters, condensation products of such esters with ethylene oxide, e.g.
30 polyoxyethylene sorbitan fatty acid esters, block copolymers of ethylene oxide and propylene oxide, acetylenic glycols such as 2,4,7,9-tetramethyl-5-decyne-4,7-diol, or ethoxylated acetylenic glycols.

Examples of a cationic surface-active agent include, for instance, an aliphatic
35 mono-, di-, or polyamine as an acetate, naphthenate or oleate; an

oxygen-containing amine such as an amine oxide or polyoxyethylene alkylamine; an amide-linked amine prepared by the condensation of a carboxylic acid with a di- or polyamine; or a quaternary ammonium salt.

- 5 The compositions of the invention can take any form known in the art for the formulation of agrochemicals, for example, a solution, a dispersion, an aqueous emulsion, a dusting powder, a seed dressing, a fumigant, a smoke, a dispersible powder, an emulsifiable concentrate or granules. Moreover it can be in a suitable form for direct application or as a concentrate or primary composition which
- 10 requires dilution with a suitable quantity of water or other diluent before application.

- An emulsifiable concentrate comprises a compound of the invention dissolved in a water-immiscible solvent which is formed into an emulsion with water in the
- 15 presence of an emulsifying agent.

A dusting powder comprises a compound of the invention intimately mixed and ground with a solid pulverulent diluent, for example, kaolin.

- 20 A granular solid comprises a compound of the invention associated with similar diluents to those which may be employed in dusting powders, but the mixture is granulated by known methods. Alternatively it comprises the active ingredient absorbed or adsorbed on a pre-granular diluent, for example, Fuller's earth, attapulgite or limestone grit.

- 25 Wettable powders, granules or grains usually comprise the active ingredient in admixture with a suitable surfactant and an inert powder diluent such as china clay.

- 30 Another suitable concentrate is a flowable suspension concentrate which is formed by grinding the compound with water or other liquid, a wetting agent and a suspending agent.

- The concentration of the active ingredient in the composition of the present
- 35 invention, as applied to plants is preferably within the range of 0.0001 to 1.0 per

cent by weight, especially 0.0001 to 0.01 per cent by weight. In a primary composition, the amount of active ingredient can vary widely and can be, for example, from 5 to 95 per cent by weight of the composition.

5. In the method of the invention the compound is generally applied to seeds, plants or their habitat. Thus, the compound can be applied directly to the soil before, at or after drilling so that the presence of active compound in the soil can control the growth of fungi which may attack seeds. When the soil is treated directly the active compound can be applied in any manner which allows it to be intimately mixed with the soil such as by spraying, by broadcasting a solid form of granules, or by applying the active ingredient at the same time as drilling by inserting it in the same drill as the seeds. A suitable application rate is within the range of from 5 to 1000 g per hectare, more preferably from 10 to 500 g per hectare.
15. Alternatively the active compound can be applied directly to the plant by, for example, spraying or dusting either at the time when the fungus has begun to appear on the plant or before the appearance of fungus as a protective measure. In both such cases the preferred mode of application is by foliar spraying. It is generally important to obtain good control of fungi in the early stages of plant growth as this is the time when the plant can be most severely damaged. The spray or dust can conveniently contain a pre- or post-emergence herbicide if this is thought necessary. Sometimes, it is practicable to treat the roots of a plant before or during planting, for example, by dipping the roots in a suitable liquid or solid composition. When the active compound is applied directly to the plant a suitable rate of application is from 0.025 to 5 kg per hectare, preferably from 0.05 to 1 kg per hectare.
20. In addition, the compounds of the invention can be applied to plants or parts thereof which have been genetically modified to exhibit a trait such as fungal, insect, and/or herbicidal resistance.

The compounds of formula I may be obtained by reacting a compound of formula II, or its hydrochloride salt, with a compound of formula III according to Scheme 1, where X is a leaving group such as halogen. When L is $-(C=O)-$ or $-SO_2-$,



US006075047A

United States Patent [19]
Young et al.

[11] **Patent Number:** **6,075,047**
 [45] **Date of Patent:** **Jun. 13, 2000**

[54] **FUNGICIDAL COMPOSITIONS
 CONTAINING N-ACETONYLBENZAMIDES**

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[21] Appl. No.: **09/433,676**

[22] Filed: **Nov. 4, 1999**

Related U.S. Application Data

[62] Division of application No. 09/148,604, Sep. 4, 1998, Pat.
 No. 6,004,947

[60] Provisional application No. 60/072,725, Jan. 27, 1998.

[51] Int. Cl.⁷ **A01N 37/18; A01N 47/10**

[52] U.S. Cl. **514/479; 514/478; 514/617**

[58] Field of Search **514/617, 478,**
514/479

[56] **References Cited**

U.S. PATENT DOCUMENTS

5,304,572 4/1994 Michelotti et al. 514/514

5,677,333 10/1997 Loughner et al. 514/491

FOREIGN PATENT DOCUMENTS

WO 98/53684 12/1998 WIPO .

OTHER PUBLICATIONS

Tomlin; The Pesticide Manual Incorporating the Agrochemicals Handbook, 16th Ed. (1995) pp. 843-845.

Primary Examiner—Allen J. Robinson

Attorney, Agent, or Firm—Clark R. Carpenter

[57] **ABSTRACT**

The present invention relates to fungicidal compositions and their use as a method for controlling phytopathogenic fungi comprising the application of a selected fungicidally active N-acetonylbenzamide compound and a second fungicidally active compound selected from the group consisting of an inhibitor of respiration at cytochrome complex III, ziram, fluazinam, zarilamide, chlorothalonil, propamocarb, folpet, fosetyl-aluminum or a fungitoxic metabolite thereof, a triphenyltin type fungicide and a copper containing fungicide to plant seed, to plant foliage or to a plant growth medium. The compositions and method of use provide higher fungicidal activity than separate use of the same compounds.

5 Claims, No Drawings

FUNGICIDAL COMPOSITIONS CONTAINING N-ACETONYLBENZAMIDES

This is a divisional application of Ser. no. 09/148,604, filed Sep. 4, 1988, now U.S. Pat. No. 6,004,947, which claim for domestic priority 60/072725 filed Jan. 27, 1998.

The present invention relates to new fungicidal compositions and their use as a method for controlling phytopathogenic fungi on plants.

It is always desirable to improve products which can be used by growers in order to combat fungal diseases of crops, and in particular diseases caused by fungi in the class Oomycetes.

It is also always desirable to reduce the doses of chemical products spread into the environment to combat fungal attacks on crops, in particular by reducing the application doses of the products.

It is also always desirable to increase the number of antifungal products available to growers in order that they will find, among these products, the one which is best suited to the grower's specific use.

One objective of the invention is thus to provide novel fungicidal compositions which are useful against the problems outlined above.

Another objective of the invention is to propose novel fungicidal compositions which are useful in the preventive and curative treatment of diseases caused by fungi of the class Oomycetes.

Still another objective of the invention is to propose novel fungicidal compositions which are of improved efficacy against mildew and/or late blight caused by Oomycetes.

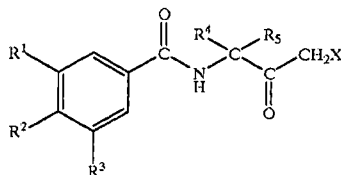
Yet another objective of the invention is to propose novel fungicidal compositions which are of improved efficacy against downy mildew in grapes and other crops and/or late blight in tomatoes and potatoes.

It has now been found that these objectives may be achieved, partly or totally, by means of the fungicidal compositions according to the present invention.

U.S. Pat. Nos. 5,304,572 and 5,677,333 disclose applying mixtures of the N-acetonylbenzamides disclosed therein with other fungicidal compounds. It has now been discovered that application of the N-acetonylbenzamides disclosed in these patents in combination with selected other fungicidal compounds provides unexpectedly high fungicidal activity and is effective in controlling phytopathogenic fungi at lower N-acetonylbenzamide dosage rates than those disclosed in the U.S. Pat. No. 5,304,572 patent. Although U.S. Pat. No. 5,677,333 discloses the use of N-acetonylbenzamides in combination with ethylene bisdithiocarbamates, cymoxanil and dimethomorph to provide unexpectedly high fungicidal activity, the synergistic combinations of this invention are not disclosed or suggested in that patent.

In a first embodiment of this invention, there is provided a composition comprising

(a) a fungicidally effective amount of a first fungicidally active compound having the formula (I)



or an agronomically acceptable salt thereof

wherein

R¹ and R³ are each independently halo or (C₁-C₄)alkyl, R² is (C₁-C₄)alkyl, (C₂-C₄)alkenyl, (C₂-C₆)alkynyl, (C₁-C₄)alkoxy or cyano,

R⁴ and R⁵ are each independently a hydrogen atom or (C₁-C₄)alkyl, provided that at least one of R⁴ and R⁵ is (C₂-C₄)alkyl and

X is halo, thiocyno or isothiocyano;

(b) a fungicidally effective amount of a second fungicidally active compound selected from the group consisting of

(i) an inhibitor of respiration at cytochrome complex III, such as a methoxyacrylate type fungicide, for example, azoxystrobin and kresoxim-methyl,

(ii) ziram

(iii) fluazinam

(iv) zarilamide

(v) chlorothalonil

(vi) propamocarb ✓

(vii) folpet

(viii) fosetyl-aluminum or a fungitoxic metabolite thereof such as phosphorus acid,

(ix) a triphenyltin type fungicide such as fentin hydroxide and fentin acetate and

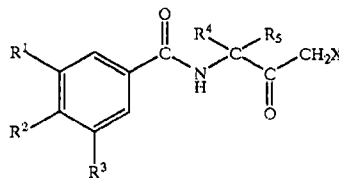
(x) a copper containing fungicide such as copper(I) sulfate, copper(II) sulfate, copper(II) sulfate pentahydrate, copper(I) oxide and Bordeaux mixture; and

(c) an agronomically acceptable carrier.

In a second embodiment of this invention, there is provided a method for controlling phytopathogenic fungi on a plant comprising the application of

(a) a fungicidally effective amount of a first fungicidally active compound having the formula (I)

(I)



or an agronomically acceptable salt thereof wherein

R¹ and R³ are each independently halo or (C₁-C₄)alkyl, R² is (C₁-C₄)alkyl, (C₂-C₄)alkenyl, (C₂-C₆)alkynyl, (C₁-C₄)alkoxy or cyano,

R⁴ and R⁵ are each independently a hydrogen atom or (C₁-C₄)alkyl, provided that at least one of R⁴ and R⁵ is (C₂-C₄)alkyl and

X is halo, thiocyno or isothiocyano;

(b) a fungicidally effective amount of a second fungicidally active compound selected from the group consisting of

(i) an inhibitor of respiration at cytochrome complex III, such as a methoxyacrylate type fungicide, for example, azoxystrobin and kresoxim-methyl,

(ii) ziram

(iii) fluazinam

(iv) zarilamide

(v) chlorothalonil

(vi) propamocarb ✓

(vii) folpet

- (viii) fosetyl-aluminum or a fungitoxic metabolite thereof such as phosphorus acid,
- (ix) a triphenyltin type fungicide such as fentin hydroxide and fentin acetate and
- (x) a copper containing fungicide such as copper(I) sulfate, copper(II) sulfate, copper(II) sulfate pentahydrate, copper(I) oxide and Bordeaux mixture; and

(c) an agronomically acceptable carrier to the plant seed, to the plant foliage or to the growth medium for the plant.

When R⁴ and R⁵ are different, optical enantiomers of the compounds of the present invention are possible due to the presence of an asymmetric carbon atom linking R⁴ and R⁵. It is known that many biologically active compounds have optical enantiomers, one of which is more active than the other. Similarly, for compounds used in the method of the present invention, the biological activity of one enantiomer may exceed that of the other enantiomer, as described in EP 0 816 330 A1, Jan. 7, 1998.

"(C₁-C₄)alkyl" means a straight or branched alkyl group having one to four carbon atoms per group and includes methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, sec-butyl and tert-butyl.

"(C₂-C₄)alkenyl" means a straight or branched alkenyl group having two to four carbon atoms per group and includes, for example, ethenyl, 2-propenyl, 2-butenyl, 1-methylethenyl, 2-methyl-2-propenyl and the like.

"(C₂-C₆)alkynyl" means a straight or branched alkynyl group having from two to six carbons per group and includes, for example, ethynyl, 2-propynyl, 2-butylnyl and the like.

"Halo" means chloro, fluoro, bromo and iodo.

"(C₁-C₄)alkoxy" means a straight or branched alkoxy group having one to four carbon atoms per group and includes, for example, ethoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy and tert-butoxy.

"Cyano" means a group having the structural formula -CN.

"Thiocyano" means a group having the structural formula -SCN.

"Isothiocyano" means a group having the structural formula -NCS.

Agronomically acceptable salts include, for example, metal salts such as sodium, potassium, calcium and magnesium salts, ammonium salts such as isopropyl ammonium salts and trialkylsulfonium salts such as triethylsulfonium salts.

The first fungicidally active compound may be a single compound of formula (I) or, alternatively, may be a mixture of compounds of formula (I). Suitable compounds of formula (I) include, but are not limited to,

- N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide,
- N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-ethylbenzamide,
- N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-ethoxybenzamide,
- N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methoxybenzamide,
- N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-cyanobenzamide, and
- N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dibromo-4-methylbenzamide.

In a preferred embodiment, the first fungicidally active compound is

N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide,

N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dibromo-4-cyanobenzamide or a mixture thereof.

More preferably, the first fungicidally active compound is N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide.

Suitable compounds which function as the second fungicidally active compound include, but are not limited to, azoxystrobin, kresoxim-methyl, ziram, fluazinam, zarilamide, chlorothalonil, propamocarb, folpet, fosetyl-aluminum, phosphorus acid, fentin hydroxide, fentin acetate, copper(I) sulfate, copper(II) sulfate, copper(II) sulfate pentahydrate, copper(I) oxide and Bordeaux mixture.

In a preferred embodiment, the second fungicidally active compound is selected from the group consisting of fluazinam, propamocarb, folpet, fosetyl-aluminum, phosphorus acid and copper(II) sulfate pentahydrate.

The method of the present invention may optionally further comprise application of other compounds having biological activity, for example, additional fungicidally active compounds or compounds having herbicidal activity or insecticidal activity, to the plant seed, to the plant foliage or to the growth medium for the plant.

The method of the present invention is useful for the control of phytopathogenic fungi on crops and the first and second fungicidally active compounds may be applied as a soil fungicide, as a seed protectant, as a foliar fungicide or as a combination thereof. In a preferred embodiment, the first and second fungicidally active compounds are applied to a plant growth medium, to the plant seed or to plant foliage at dosage rates of from 2 parts by weight (pbw) to 90 pbw, more preferably from 5 pbw to 75 pbw, of the first fungicidally active compound per 100 pbw of the combined amount of first and second fungicidally active compounds and from 10 pbw to 98 pbw, more preferably from 25 pbw to 95 pbw, of the second fungicidally active compound per 100 pbw of the combined amount of first and second fungicidally active compounds.

As a soil fungicide, the first and second fungicidally active compositions can be incorporated in the soil or applied to the surface of the soil at a dosage rate of about 0.25 kg to 5 kg of the first fungicidally active compound and from 0.25 kg to 5 kg of the second fungicidally active compound per hectare.

As a seed protectant, the first and second fungicidally active compounds are coated on seed at a dosage rate of about 0.5 kilograms (kg) to 5 kg of the first fungicidally active compound and from 0.5 kg to 5 kg of the second fungicidally active compound per 100 kg seed.

As a foliar fungicide, the first and second fungicidally active compounds are applied to plant foliage at a dosage rate of from 0.01 kg per hectare to 5 kg per hectare of the first fungicidally active compound, and a dosage rate of from 0.01 kg per hectare to about 5 kg per hectare of the second fungicidally active compound. In a preferred embodiment, the first fungicidally active compound is applied to plant foliage at a dosage rate of from 0.05 kg per hectare to about 0.5 kg per hectare. In a preferred embodiment, the second fungicidally active compound is applied to plant foliage at a dosage rate of 0.05 kg per hectare to 5.0 kg per hectare. The first and second fungicidally active compounds can be applied to plant foliage as fungicidal sprays by methods commonly employed, such as conventional high-gallonage hydraulic sprays, low-gallonage sprays, air-blast, aerial

sprays and dusts. While the dilution and rate of application will depend upon the type of equipment employed, the method and frequency of application desired and diseases to be controlled, the effective amount is typically from about 0.1 kg to about 5.0 kg, preferably 0.2 kg to 5.0 kg, of both the first and second active compounds per hectare.

The first and second fungicidally active compounds may be applied simultaneously or sequentially.

In a preferred embodiment, the first and second fungicidally active compounds are simultaneously applied to plant growth medium, the plant seed, plant foliage or a combination thereof as a composition comprising a mixture of the first fungicidally active compound and second fungicidally active compound. In the preferred embodiments, the mixture includes from 2 pbw to 90 pbw of a first fungicidally active compound and from 10 pbw to 98 pbw of a second fungicidally active compound per 100 pbw of the mixture.

In an alternative embodiment, the first and second fungicidally active compounds are applied sequentially to the plant seed, plant foliage or plant growth medium, with application of the second-applied compound following application of the first-applied compound by up to 72 hours. The compounds may be applied in either order: either the first fungicidally active compound followed by the second fungicidally active compound or, alternatively, as application of the second fungicidally active compound followed by the first fungicidally active compound.

The method of the present invention is useful in controlling certain phytopathogenic fungi, particularly fungi of the class Oomycetes, and provides high fungicidal activity and relatively low phytotoxicity. The method of the present invention is particularly effective in controlling Oomycete fungi of the genera *Phytophthora*, *Plasmopara*, *Peronospora*, *Albugo* and *Pseudoperonospora*, and even more particularly against the organisms of those genera that cause diseases such as late blight in tomatoes and potatoes and downy mildew in grapes and other crops, including for example, *Phytophthora infestans*, *Plasmopara viticola* and *Pseudoperonospora cubensis*.

For each of the above disclosed purposes, the first and second fungicidally active compounds can be used in the technical or pure form as prepared, as solutions or as formulations. The compounds are usually taken up in a carrier or are formulated so as to render them suitable for subsequent use as fungicides. For example, the compounds can be formulated as wettable powders, dry powders, emulsifiable concentrates, dusts, granular formulations, aerosols, or flowable emulsion concentrates. In such formulations, the compounds are extended with a liquid or solid carrier and, when dried, suitable surfactants are incorporated. It is usually desirable, particularly in the case of foliar spray formulations, to include adjuvants, such as wetting agents, spreading agents, dispersing agents, stickers, adhesives and the like in accordance with agricultural practices. Such adjuvants commonly used in the art can be found in McCutcheon's "Emulsifiers and Detergents", McCutcheon's "Emulsifiers and Detergents/Functional Materials" and McCutcheon's "Functional Materials" all published annually by McCutcheon Division of MC Publishing Company (New Jersey).

In general, the compositions utilized in this invention can be dissolved in appropriate solvents such as acetone, methanol, ethanol, dimethylformamide or dimethyl sulfoxide and such solutions extended with water. The concentrations of the combined first and second active compounds in the solution can vary from 1% to 90% with a preferred range being 5% to 50%.

For the preparation of emulsifiable concentrates, the compositions used in the invention can be dissolved in suitable organic solvents or a mixture of solvents, together with an emulsifying agent which permits dispersion of the first and second active compounds in water. The concentration of the combined first and second active compounds in emulsifiable concentrates is usually 10% to 90% and in flowable emulsion concentrate, this can be as high as 75%. Wettable powders suitable for spraying, can be prepared by admixing the composition with a finely divided solid, such as clays, inorganic silicates and carbonates, and silicas and incorporating wetting agents, sticking agents, and/or dispersing agents in such mixtures. The concentration of the combined first and second active compounds in such formulations is usually in the range of 20% to 98%, preferably 40% to 75%.

Dusts are prepared by mixing the composition of the present invention, or salts and complexes thereof, with finely divided inert solids which can be organic or inorganic in nature. Inert materials useful for this purpose include botanical flours, silicas, silicates, carbonates and clays. One convenient method of preparing a dust is to dilute a wettable powder with a finely divided carrier. Dust concentrations containing 20% to 80% of the combined first and second active compounds are commonly made and are subsequently diluted to 1% to 10% use concentration.

The method of the present invention, wherein an N-acetylbenzamide and a selected second fungicidally active compound are applied to plant seed, plant foliage or to a plant growth medium, unexpectedly provides higher fungicidal activity than the same compounds used separately.

The results provided by the mixtures were compared with the predicted results that were calculated using the formula set forth by S. R. Colby in *Weeds* 1967, 15, 20-22 ("Colby's Formula") from the results obtained using each of the compounds individually. The predicted results are also provided in the following Examples. These examples, tables and experimental procedures are provided for guidance to the practitioner and are not meant to limit the scope of the invention which is defined by the claims.

EXAMPLE 1

Test to Control *Phytophthora capsici* Using N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide (Compound A) and Phosphorus Acid (Compound C)

A dilution series of Compound A was prepared in dimethylsulfoxide (DMSO) and a dilution series of Compound C was prepared in sterile water. Aliquots of each were added to 25 ml of molten potato dextrose agar at 50° C. to give the appropriate concentrations shown in the table below. Immediately after adding the compound(s), the molten agar was poured into 9-cm diameter petri plates and allowed to harden. The final concentration of DMSO in all plates was 0.25%. Control plates contained DMSO but neither compound. Plates were inoculated in the center with 1 μ l of a suspension of *Phytophthora capsici* (ATCC 15399, obtainable from the American Type Culture Collection, Rockville, Md., U.S.A.) zoospores containing 5×10^5 zoospores per milliliter. Three replicate plates were used for each treatment. Fungal colony diameters were measured after growth for 7 days at 25° C., and two measurements were taken from each plate. Inhibition of growth was calculated by comparing growth in the treatments with compound A and/or C with growth in the controls. Degree of inhibition (Observed) is expressed as a percentage in Table 1 below. The predicted %

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inhibition in treatments containing both A and C was calculated using the Colby Formula.

TABLE 1

Control of <i>Phytophthora capsici</i>			
Compound A Concentration ppm	Compound C Concentration ppm	% Inhibition (Observed)	% Inhibition (Predicted)
0	70	48.3	
0	100	72.1	
0.2	0	34.1	
0.3	0	52.8	
0.2	70	75.4	65.9
0.3	70	77.3	75.6
0.2	100	88.1	81.6
0.3	100	91.1	86.8

EXAMPLE 2

Test to Control *Phytophthora capsici* Using N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide (Compound A) and CuSO₄·5H₂O (Compound D)

The test protocol followed was the same as described in Example 1 and the results reported in Table 2.

TABLE 2

Control of <i>Phytophthora capsici</i>			
Compound A Concentration ppm	Compound D Concentration ppm	% Inhibition (Observed)	% Inhibition (Predicted)
0	100	15.3	
0	200	47.0	
0	300	59.2	
0.1	0	21.6	
0.2	0	31.0	
0.3	0	44.0	
0.1	100	49.4	33.8
0.2	100	60.9	41.8
0.3	100	68.3	52.7
0.1	200	84.7	58.4
0.2	200	98.6	63.4
0.3	200	100	70.3
0.1	300	100	68.0
0.2	300	100	71.8
0.3	300	100	77.2

EXAMPLE 3

N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide (Compound A)+
Fosetyl-aluminum (Compound E) Combination
Study

Two trials were conducted with the combination of fosetyl-aluminum and N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide to evaluate the potential benefits of combinations of the two products.

The first trial was conducted to determine the appropriate rates for use in a combination of the two products.

Ratios where synergism was observed are 1:2.25, 1:4.5, 1:9, 1:18 and 1:36.

EXAMPLE 3a

N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide+Fosetyl-aluminum
Combination Study—Preliminary Application Rate
Study

Two to three week old Bush Champion cucumbers and 2 week old Patio tomatoes were sprayed with the fungicidal

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compounds as protectant sprays. The plants were inoculated with cucumber downy mildew (CDM), *Pseudoperonospora cubensis*, and tomato late blight (TLB), *Phytophthora infestans*, one day after spraying.

N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide was extremely effective against the tomato late blight fungus in this test. N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide alone at all rates tested gave 95% control or better. Since excellent results were observed with N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide at the rates tested, no synergism could be detected.

Cucumber downy mildew control with N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide ranged from 63 to 82%. There was a suggestion of synergism at some rates. The data suggested that the N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide rates should be lowered and the trial repeated.

Using the Colby equation, $E = X + Y - XY/100$, results suggest that ratios or 1:2.25 to 1:4.5 were potentially synergistic. The results of the calculations are recorded in CDM calc. column as shown in Table 3a.

TABLE 3a

Control of CDM and TLB				
Treatment	kg ai/ha	CDM obs. % Control	CDM calc. % Control	TBL obs. % Control
None		0		0
Cmpd. E	0.112	28		30.9
Cmpd. E	0.225	35		14.3
Cmpd. E	0.45	54		57.1
Cmpd. E	0.9	77		54.8
Cmpd. A	0.0125	63		97.1
Cmpd. A + Cmpd. E	0.0125 + 0.112	55	73.4	94.8
Cmpd. A + Cmpd. E	0.0125 + 0.225	70	75.9	90
Cmpd. A + Cmpd. E	0.0125 + 0.45	69	83	93.8
Cmpd. A + Cmpd. E	0.0125 + 0.9	81	81	92.3
Cmpd. A	0.025	70		96.7
Cmpd. A + Cmpd. E	0.025 + 0.112	60	78.4	97.6
Cmpd. A + Cmpd. E	0.025 + 0.225	71	80.5	97.1
Cmpd. A + Cmpd. E	0.025 + 0.45	81	86.2	92.9
Cmpd. A + Cmpd. E	0.025 + 0.9	85.8	93.1	95.2
Cmpd. A	0.05	82		96.7
Cmpd. A + Cmpd. E	0.05 + 0.112	61	87	95.7
Cmpd. A + Cmpd. E	0.05 + 0.225	76	88.6	96.7
Cmpd. A + Cmpd. E	0.05 + 0.45	89	91.7	96.1
Cmpd. A + Cmpd. E	0.05 + 0.9	87.8	95.9	96.7
Cmpd. A	0.1	72		97.1
Cmpd. A + Cmpd. E	0.1 + 0.112	71	79.8	98.6
Cmpd. A + Cmpd. E	0.1 + 0.225	87	81.8	97.6
Cmpd. A + Cmpd. E	0.1 + 0.45	89.6	87.1	99
Cmpd. A + Cmpd. E	0.1 + 0.9	93.6	93.6	96.7

EXAMPLE 3b

N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide+Fosetyl-aluminum
Combination Study—Second Application Rate
Study

As a result of the initial test, a second test was conducted against CDM with lower rates of N-[3'-(1'-chloro-3'-methyl-2'-oxopentyl)]-3,5-dichloro-4-methylbenzamide. Results with the adjusted rates confirmed the previous test with the higher doses and indicated synergism at additional rates. There was very strong synergism with some rates. Ratios were from 1:2.25 to 1:36. The results are reported in Table

3b. Specific ratios where synergism was observed were 1:2.25, 1:4.5, 1:9, 1:18 and 1:36.

TABLE 3b

Control of CDM			
Treatment	kg ai/ha	CDM obs. % Control	CDM calc. % Control
None		0	
Cmpd. E	0.225	14	
Cmpd. E	0.45	33	
Cmpd. E	0.9	41	
Cmpd. A	0.006	22	
Cmpd. A + Cmpd. E	0.006 + 0.225	26	32.9
Cmpd. A + Cmpd. E	0.006 + 0.45	49	47.7
Cmpd. A + Cmpd. E	0.006 + 0.9	54	54
Cmpd. A	0.025	14	
Cmpd. A + Cmpd. E	0.025 + 0.225	45	26
Cmpd. A + Cmpd. E	0.025 + 0.45	51	42.4
Cmpd. A + Cmpd. E	0.025 + 0.9	57	49.3
Cmpd. A	0.1	22	
Cmpd. A + Cmpd. E	0.1 + 0.225	47	32.9
Cmpd. A + Cmpd. E	0.1 + 0.45	48	47.7
Cmpd. A + Cmpd. E	0.1 + 0.9	60	54

EXAMPLE 4

N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide (Compound A)+
Propamocarb (Compound F) Tests Against TLB
and CDM

Cucumber downy mildew and tomato late blight were effectively controlled with different combinations of N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide and propamocarb.

Three week old Patio variety tomato and Busch Champion cucumber plants were sprayed with the fungicide rates listed in Tables 4a and 4b. One day following application, the plants were inoculated with spore $30-40 \times 10^6$ spores/ml suspensions of the respective diseases. The plants were incubated in mist cabinets for twenty-four hours and then placed in control temperature chambers for the duration of the experiment.

Visual assessments of disease infection was conducted and the transformed to percent control values. The data in Tables 4a and 4b suggest strong levels of synergism with the combinations. Ratios of N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide to propamocarb ranged from 1:1 to 1:42. Synergism was seen at the ratios: 1:42, 1:21, 1:10.5, 1:5, 1:2.5 and 1:1.

TABLE 4a

Tomato Late Blight Control			
Treatment	Kg ai/ha	% Control Observed	% Control Calculated
Cmpd. F	0.063	0	
	0.125	3	
	0.25	17	
Cmpd. A	0.006	23	
	0.012	20	
	0.025	36	
Cmpd. A + Cmpd. F	0.006 + 0.063	31	23
	0.006 + 0.125	37	27
	0.006 + 0.25	60	36
Cmpd. A + Cmpd. F	0.012 + 0.063	42	20
	0.012 + 0.125	34	22
	0.012 + 0.25	47	34

TABLE 4a-continued

Tomato Late Blight Control			
Treatment	Kg ai/ha	% Control Observed	% Control Calculated
Cmpd. A + Cmpd. F	0.025 + 0.063	37	36
	0.025 + 0.125	50	38
	0.025 + 0.125	54	47

TABLE 4b

Cucumber Downy Mildew Control			
Treatment	Kg ai/ha	% Control Observed	% Control Calculated
Cmpd. F	0.063	9	
	0.125	0	
	0.25	27	
Cmpd. A	0.006	56	
	0.012	33	
	0.025	45	
Cmpd. A + Cmpd. F	0.006 + 0.063	66	60
	0.006 + 0.125	67	56
	0.006 + 0.25	67	55
Cmpd. A + Cmpd. F	0.012 + 0.063	57	39
	0.012 + 0.125	47	33
	0.012 + 0.25	42	51
Cmpd. A + Cmpd. F	0.025 + 0.063	77	50
	0.025 + 0.125	82	45
	0.025 + 0.25	86	60

EXAMPLE 5a

N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide (Compound A)+Folpet (Compound G) Tests Against CDM

The results in the accompanying Table 5a are for N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide and folpet. The test was conducted as using the standard protocol (Example 3a) for cucumber downy mildew. Treatments were evaluated as a 3-day residual application.

Synergism was observed at the following ratios of N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide to folpet for CDM disease: 1:4.5, 1:9 and 1:18. The results are reported in Table 5a.

TABLE 5a

Cucumber Downy Mildew Control				
Treatment	Kg ai/ha	Number of Infection Sites	% Control Observed	% Control Calculated
Cmpd. G	0.113	16	28.8	
	0.225	22.2	0	
	0.45	19.2	8.5	
Cmpd. A	0.025	5.4	74.1	
	0.05	3.2	84.8	
	0.1	0.4	98.1	
Cmpd. A +	0.025 + 0.225	3.6	82.9	74.3
Cmpd. G	0.025 + 0.45	2.2	89.5	76.5
Cmpd. A +	0.05 + 0.225	2.2	89.5	84.8
Cmpd. G	0.05 + 0.45	2.2	89.5	84.8

EXAMPLE 5b

N-[3'-(1'-chloro-3'-methyl-2'-oxopentane)]-3,5-dichloro-4-methylbenzamide (Compound A)+Folpet (Compound G) Tests Against PLB

Three to four week old potato seedlings were sprayed with a series of doses of folpet and N-[3'-(1'-chloro-3'-

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methyl-2'-oxopentam)]-3,5-dichloro-4-methylbenzamide. Individual treatments and combination treatments were compared for biological efficacy against *Phytophthora infestans* on potatoes (PLB). Fungicide solutions were sprayed and inoculated one day after the application. Inoculation was completed with a spore suspension of $30-40 \times 10^4$ spores/ml. The plants were placed in a misting cabinet for 24 hours. Following the infection period, plants were placed in a constant temperature chamber for the duration.

One day following application, the plants were inoculated with spore suspensions of the respective diseases. The plants were inoculated in mist cabinets for twenty-four hours and then placed in control temperature chambers for the duration of the experiment.

Disease pressure was very high in this test as is evidenced by the exceptionally low level of control expressed by the individual treatment. However, the combinations were more active than either of the fungicides used alone.

N-[3-(1'-chloro-3'-methyl-2'-oxopentam)]-3,5-dichloro-4-methylbenzamide and folpet at ratios of 1:2.25, 1:4.5 and 1:9 exhibited synergism in this test. The results are reported in Table 5b.

TABLE 5b

Potato Late Blight Control				
Treatment	Kg ai/ha	% Control Observed	% Control Calculated	
Cmpd. G	0.225	0		
	0.45	3.5		
Cmpd. A	0.05	12		
	0.10	16		
Cmpd. A + Cmpd. G	0.05 + 0.225	32	12	
	0.05 + 0.45	20	15	
Cmpd. A + Cmpd. G	0.10 + 0.225	21	16	
	0.10 + 0.45	39	19	

EXAMPLE 6a

N-[3-(1'-chloro-3'-methyl-2'-oxopentam)]-3,5-dichloro-4-methylbenzamide (Compound A)+
Fluazinam (Compound H) Test Against TLB

The results in the accompanying Table 6a are for N-[3-(1'-chloro-3'-methyl-2'-oxopentam)]-3,5-dichloro-4-methylbenzamide and fluazinam against TLB. The test was conducted as using the standard protocol (Example 3a) for tomato late blight. Treatments were applied as one day protectant applications.

Synergism was observed at the 1:5 ratio of N-[3-(1'-chloro-3'-methyl-2'-oxopentam)]-3,5-dichloro-4-methylbenzamide to fluazinam. The results are reported in Table 6a.

TABLE 6a

Tomato Late Blight Control				
Treatment	Kg ai/ha	% Infection	% Control Observed	% Control Calculated
Cmpd. H	0.125	64	20	
Cmpd. A	0.025	13.2	84	
Cmpd. A + Cmpd. H	0.025 + 0.125	6.2	92	87.6

EXAMPLE 6b

N-[3-(1'-chloro-3'-methyl-2'-oxopentam)]-3,5-dichloro-4-methylbenzamide (Compound A)+
Fluazinam (Compound H) Test Against GDM

An example of synergism was observed with fluazinam in a test against grape downy mildew, *Plasmopara viticola*.

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Tissue culture produced from Delaware grapes were sprayed with the fungicides. Inoculation with grape downy mildew (GDM) spores having a concentration of 40,000 spores/ml was conducted 1 day after the application. Plants were placed in a mist chamber for 24 hrs and then moved to a control temperature chamber for the remainder of the test period. The results are reported in Table 6b.

TABLE 6b

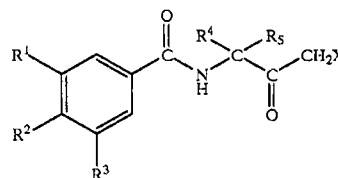
Grape Downy Mildew Control			
Treatment	Kg ai/ha	% Control Observed	% Control Calculated
Cmpd. H	0.006	52	
Cmpd. A	0.006	22	
Cmpd. A + Cmpd. H	0.006 + 0.006	76	63

It is to be understood that changes and variations in this invention may be made without departing from the spirit and scope of this invention as defined by the appended claims.

What is claimed is:

1. A fungicidal composition comprising synergistic fungicidally effective amounts of

(a) a first fungicidally active compound having the formula



or an agronomically acceptable salt thereof
wherein

R¹ and R³ are each chloro,
R² is methyl,
R⁴ is methyl,
R⁵ is ethyl, and
X is chloro;

(b) the second fungicidally active compound; and
(c) an agronomically acceptable carrier.

2. A method for controlling phytopathogenic fungi on a plant comprising the application of a synergistic fungicidally effective amount of the composition of claim 1 to the plant seed, to the plant foliage or to the growth medium for the plant.

3. The method of claim 2 wherein the phytopathogenic fungi belong to the class Oomycetes and are of the genera *Phytophthora*, *Plasmopara*, *Peronospora*, *Albugo* or *Pseudoperonospora*.

4. The method of claim 2 wherein the plant is a potato plant, a tomato plant, a grape plant or a cucumber plant.

5. The method of claim 2 wherein the amounts of the first and second fungicidally active compounds applied comprise from 2 parts by weight to 90 parts by weight of the first fungicidally active compound and from 10 parts by weight to 98 parts by weight of the second fungicidally active compound per 100 parts by weight of the combined amount of the first and second fungicidally active compounds.

* * * * *

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,075,047
DATED : June 13, 2000
INVENTOR(S) : David Hamilton Young et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 12,

Line 46, should read

-- (b) the second fungicidally active compound propamocarb; and -- ✓
rather than

“(b) the second fungicidally active company; and”

Signed and Sealed this

Twentieth Day of May, 2003



JAMES E. ROGAN
Director of the United States Patent and Trademark Office