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Amended

(CONVENTION Company.) Form 8

COMMONWEALTH OF AUSTRALIA

Patents Act 1952-1969

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

(1) Here insert (in full) Name of Company.

In support of the Convention Application made by(1) CHINOIN GYOGYSZER- ES VEGYESZETI TERMEKEK GYARA R.T.

(hereinafter referred to as the applicant) for a Patent

(2) Here insert title of Invention.

for an invention entitled:(2) FUNGICIDE COMPOSITIONS

(3) Here insert full Name and Address, of Company official authorized to make declaration.

We I,(3) ISTVAN HERMECZ and TAMAS SZUTS both of Budapest IV, To utca 1-5, H-1045, Hungary

do solemnly and sincerely declare as follows:

1. We ~~I am~~ are authorised by the applicant for the patent to make this declaration on its behalf.

2. The basic application as defined by Section 141 of the Act was made in(4) Hungary on the 9th day of March 19 87, by CHINOIN GYOGYSZER- ES VEGYESZETI TERMEKEK GYARA R.T.

(4) Here insert basic Country or Countries followed by date or dates and basic Applicant or Applicants.

~~XXXXXXXX XXXXXXXX XXXXXXXX~~

(5) Here insert (in full) Name and Address of Actual Inventor or Inventors.

3.(5) The persons named on the reverse hereof

~~is~~ are the actual inventors of the invention and the facts upon which the applicant is entitled to make the application are as follow:

The applicant is the assignee of the invention from the said actual inventors

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at Budapest, Hungary

this 15th day of June 19 90

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FUNGICIDE COMPOSITIONS

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AU 534187 62937/80 C07D 261/18, A01N 43/80

(57) Claim

1. A fungicide composition containing as active ingredient a mixture of:

A) one of the following fungicides:

methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-(2-furoyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-phenylacetyl-N-(2,6-xylyl)-D,L-alaninate;

±-alpha-2-chloro-N-2,6-xylylacetamido-gamma-butyrolactone;

(±)-alpha-/N-(3-chlorophenyl)cyclopropanecarboxamido/-gamma--butyrolactone;

2-methoxy-N-(2-oxo-1,3-oxazolidin-3-yl-2',6'-xylidide;

.../2

N-isoxazole-5-yl-N-(2,6-xylyl)-D,L-alanine-methylester;

N-/~2,6-dimethyl-phenyl(-2-methoxy-N-)tetrahydro-2-oxo--furanyl7-acetamide; and

B) a fungicide of the group of morpholines

2,6-dimethyl-4-tridecylmorpholine;

4-cyclododecyl-2,6-dimethylmorpholine;

(±)-cis-4-/3-(4-tert-butylphenyl)-2-methylpropyl/-2,6-dimethylmorpholine;

the mixture of N-alkyl (C_{12})-2,6-dimethylmorpholine and N-alkyl(C_{12})-2,5-dimethyl morpholine;

together with

C) one of the following fungicides

diethyl 4,4'/o-phenylene(bis)3-thioallophanate/;

dimethyl 4,4'-(o-phenylene(bis)3-thioallophanate/;

methyl-benzimidazole-2-yl-carbamate;

methyl 1-(butylcarbamoyl)benzimidazole-2-ylcarbamate;
2-(4-thiazolyl)-1H-benzimidazole,

or

D) one of the following dithiocarbamate or disulphide derivatives:

zinc ethylenebis(dithiocarbamate) (polymeric);

manganese ethylenebis(dithiocarbamate) (polymeric);

manganese ethylenebis(dithiocarbamate) (polymeric) complex with zinc salt;

zinc ammoniate ethylenebis /dithiocarbamate(-poly)ethylene-thiuram disulphide/;

polymeric zinc propylenebis (dithiocarbamate);

the mixture of zinc ammoniate ethylenebis(dithiocarbamate/-poly/-ethylenethiuram disulphide) and polymeric zinc propylenebis/di-

.../3

thiocarbamate/ in a ratio of 1:3, respectively;

wherein the weight ratio of the compounds A, B and D is 1-1:3-5:5-10 and the weight ratio of the compounds A, B and C is 1-1:3-5:1-6; together with a fungicidally acceptable inert carrier.

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(54) Title: FUNGICIDE COMPOSITIONS

(57) Abstract

The invention relates to synergistic combinations of known fungicide active ingredients and their application in plant protection.

FUNGICIDE COMPOSITIONS

Field of invention

The invention relates to synergistic combinations of known fungicide active ingredients and their application in plant protection.

Technical field

N-alkyl-morpholines are applied as fungicides in plant protection (DE-PS 1164152 and 1198125 and DD 140112).

A disadvantage of the known agents is that they have only a narrow spectrum of activity, preferentially for mildew fungi (Erysiphales) in cereals. By their phytotoxic side effects they can be used only in a restricted field of application.

The various acylamide derivatives (DD 116 979 and 118 510, DE-PS 2 515 091, 1 448 810 and 2 903 612, GB-PS 1 603 730 and EP 26 873), on the other hand, possess a good efficacy against fungi from the group of Oomycetes, but they are inactive against other plant pathogenic fungi of economical importance.

Furthermore, it is known that benzimidazole- and dithiocarbamate fungicides are applied in plant protection to control fungal diseases (GB-PS 1 193 461, 1 190 614 and 1 000 137). A disadvantage of the benzimidazole fungicides results from the quick appearance of resistance in the

target fungus population.

For simultaneous control of different species of fungi the use of a mixture of N-alkyl-morpholines with dithiocarbamates was recommended (DD 111 014).

It is also known that N-alkyl-morpholine derivatives in combination with methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)--D,L-alaninate (HU-PS T/33363) are beneficially used against fungal diseases.

Detailed description of the invention

The aim of the invention is, to enrich the prior art with fungicide compositions of better properties for the practical control of fungal diseases.

Object of the invention is a fungicide composition containing in addition to the conventional carriers and auxiliaries, 5-95 by weight percents of an active ingredient mixture of the following components:

A) one of the following acylamide derivatives:

methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L--alaninate (Metalaxyl);

methyl N-(2-furoyl)-N-(2,6-xylyl)-D,L-alaninate (Furalaxyl);

methyl N-phenylacetyl-N-(2,6-xylyl)-D,L-alaninate (Benalaxyl);

±-alpha-2-chloro-N-(2,6-xylylacetamido)-gamma-butyrolactone (Ofurace);

(±)-alpha-[-N-(3-chlorophenyl)cyclopropanecarboxamido]-gamma-butyrolactone (Cyprofuram);

2-methoxy-N-(2-oxo-1,3-oxazolidin-3-yl)-2',6'-xylidide (Oxadixyl);

N-isoxazole-3-yl-N-(2,6-xylyl)-D,L-alanine-methyl-ester (LAB 149202F);

N-(2,6-dimethyl-phenyl)-2-methoxy-N-(tetrahydro-2-oxo-furanyl)-acetamide (RE 26745); and

B) one of the following morpholine derivatives:

2,6-dimethyl-4-tridecylmorpholine (Tridemorph);

4-cyclododecyl-2,6-dimethylmorpholine (Dodemorph);

(±)-cis-4-[3-(4-tert-butylphenyl)-2-methylpropyl]-2,6-dimethylmorpholine (Fenpropimorph);

the mixture of N-alkyl(C_{12})-2,6-dimethylmorpholine and N-alkyl(C_{12})-2,5-dimethyl morpholine (Aldimorph);

together with

C) one of the following fungicides

diethyl 4,4'(o-phenylene)bis(3-thioallophanate) (Thiophanata);

dimethyl 4,4'-[o-phenylene)bis[3-thioallophanate] (Thiophanate-methyl);

methyl-benzimidazole-2-yl-carbamate (Carbendazim) or (BCM);

methyl-1-(butylcarbamoyl)benzimidazole-2-ylcarbamate (Benomyl);

2-(4-thiazolyl)-1H-benzimidazole (Thiabendazole); or

D) one of the following dithiocarbamate or tetrasulphide derivatives:

zinc ethylenebis(dithiocarbamate) (polymeric) (Zineb);

manganese ethylenebis(dithiocarbamate) (polymeric) (Maneb);

manganese ethylenebis(dithiobarbamate) (polymeric) complex with zinc salt (Mancozeb);

zinc ammoniate ethylenebis(dithiocarbamate)-poly-(ethylene thiuram disulphide) (Metiram);

polymeric zinc propylenebis(dithiocarbamate) (Propineb);

the mixture of Metiram /zinc ammoniate ethylenebis(dithiocarbamate)-polyethylenethiuram disulphide/ and Propineb /polymeric zinc propylenebis(dithiocarbamate/ in a ratio of 1:3 respectively (Polycarbazin);

In the compositions of the invention, the ~~ratio~~ ratio of the active ingredients A, B and C is 1-1:3-5:1-6, advantageously 1:4:4, the ~~ratio~~ ratio of the compounds A, B and D is ~~1-1:3-5:5-10~~ 1-1:3-5:5-10 advantageously 1:4:10. The compositions according to the invention can be advantageously used to control diseases, which are caused by various species of fungi.

Surprisingly it was found that using the fungicide composition of the invention in the case of numerous species of fungi an increased activity may be observed, which is based on a synergistic rather than an additive action. This can be calculated e.g. according to the Colby's formula:

$$E = X + Y - \frac{X \cdot Y}{100}, \quad \text{wherein}$$

X is the efficiency of the components A + B and

Y is the efficiency of the components C + D.

Another method is the HORSFALL model where the toxic effects of various treatments are compared at the same concentration level, i.e. each component of the fungicide mixture is tested at the total amount of the mixture applied. and the criterion of synergism was as follows:

$$LSD_{5\%}^{comb} < \left| X_i \right| = CT_i - MRV_{max}, \quad \text{wherein}$$

$LSD_{5\%}^{comb}$ = the lowest standard deviation at P = 5% in the experiment.

CT_i = effect of the "i" variant of the treatment with the fungicidal mixture.

MRV_{max} = the maximum response value of the most toxic combination partner, if it was used alone at the total amount of the mixture concerned.

If X_i positive, synergism, if X_i negative, antagonism occurred.

In the SUN's model a Comparative Toxicity Index is used, which is calculated as follows:

$$Co.T.I. = \frac{1/ED_{50}^{mixt}}{\frac{a}{ED_{50}^{Y}} + \frac{b}{ED_{50}^{Z}}}, \quad \text{wherein}$$

ED_{50} = the efficiency of the known mixture Y,

ED^{B}_{50} = the efficiency of the active ingredient Z

a and b indicate the current mass parts of the partners Y and Z in the combination.

An additional advantage of the composition of the present invention lies in a reduced risk of formation of resistance, that means in the reduced occurence of fungal strains resistant to the above mentioned compounds under the selection pressure of the claimed fungicides. This is due to the different mode of action of the components, and to the abscence of positive cross resistance among the components.

Due to the above mentioned reasons, the compositions according to the invention can be used for the reduction of heterogenous fungal populations, which at the conventional application of the individual comoonents and/or their binary mixtures can not be controlled satisfactorily. Based on the systemic properties of some comoonents, phytopathogenic fungi such as Plasmopara halstedii (Peronosporales, Ooomycetes), Peronospora manshurica (Peronosporales, Oomycetes), Sclerospora graminicola (Peronosporales, Oomycetes), S.macrospora, Peronospora pisi (Peronosporales Oomycetes), Ustilago maydis (Ustilaginales, Basidiomycetes), Ustilago avenae (Ustilaginales, Bsidiomycetes), Fusarium oxysporum (Deuteromycetes), Verticillium spp. (Deuteromycetes), Rhizoctonia solani (Polyporales, Basidiomycetes), Stereum purpureum (Basidiomycetes) etc. can be controlled effectively and newly developed parts of the plant can also be protected.

With an optimal combination of the active ingredients according to the invention the following groups of phytopathogenic fungi can be controlled: powdery mildews, for examole Erysiphe spp. (Erysiphales, Ascomycetes), Aspergillus spp. (Eurotiales, Ascomycetes), Penicillium spp. (Eurotiales, Ascomycetes), Phoma betae (Dothiales, Ascomycetes), Ph. macdonaldii, Didymella applanata (Dothiales, Ascomycetes), Fusarium graminearum (Hypocreales, Ascomycetes), Nectria cinnabarina (Hypocreales, Ascomycetes), Venturia inaequalis (Dothiales, Ascomycetes), Khuskia oryzae (Sphaeriales, Ascomycetes), Colletotrichum atramantarium (Sphaeriales, Ascomycetes), Coll. dematium, Diaporthe phaseolorum (Sphaeriales, Ascomycetes), Phomopsis mali (Sphaeriales, Ascomycetes), Ceratocystic ulmi (Sphaeriales, Ascomycetes), Botrytis spp. (Helotiales, Ascomycetes), Sclerotinia sclerotiorum (Helotiales, Ascomycetes), Ustilago spp. (Ustilaginales, Basidiomycetes) Verticillium sppl. Rhizoctonia solani (Polyporales, Basidiomycetes), St. purpureum, Tr. versicolor, Sphaeropsis malorum, Pythium spp. (Peronosporales, Oomycetes), Phytophthora spp. (Peronosporales, Oomycetes), Albugo candida, (Peronosporales, Oomycetes), Bremia lactucae (Peronosporales, Oomycetes), Peronospora destructor (Peronosporales, Oomycetes), Plasmopara viticola (Peronosporales, Oomycetes), Pseudoperonospora cubensis (Peronosporales, Oomycetes), Peronospora spp. (Peronosporales, Oomycetes), Alternaria spp. (Deuteromycetes), Fusarium oxysporum and other Fusarium spp. (Deuteromycetes), Verticillium spp. (Deuteromycetes). They are also useful against Gram-positive and Gram-negative bacteria

(Corynebacterium michiganense, C. nebraskense, C. flaccum-faciens and Xanthomonas malvacearem, X. phaseoli, X. trans-lucens pv. oryzae); and human related Bacillus, Staphylococcus and Streptomyces spp., too.

The compositions according to the invention can be formulated in a conventional way, e.g. to wettable powders, granulates or microcapsules, emulsion concentrates or flowables (WP, EC, FW, G, SD). For this purpose the active ingredients are dissolved in conventional liquid carriers, if desired, in the presence of surface active auxiliaries, dispergated respectively or admixed with solid carriers, or formulated according to other known processes.

The compositions of the invention are of 5 to 95 weight percents, advantageously 5 to 50 weight percents of the active ingredients. The compositions can be used in a conventional way, e.g. by spraying, dusting, submerging for dispersion or seed dressing.

The applied quantities depend on the aim of application and generally amount to 0.3 to 5 kg active ingredient/ha. The composition of the invention may be used for the treatment of sugar beet (Beta vulgaris), sunflower, soya, potato, tomato, corn, wheet, cucumber, vine, tobacco, broom-corn, millet, horse-bean (Vicia faba), cotton, citrus spp. apple, sugar-cane, avocado, mango (Mungos mungo), lettuce, onion, tulip, hyacinth, gladiolus (sword-lily), pea, bean, peanut, medic (Medicago), clover, batata (Xanthosoma spp.) plants susceptible to pathogenic fungal infections.

The composition according to the invention and their action are illustrated by the following examples.

Examole 1

In 508 g of water 21.2 g of Tensilin FN 80, 7.6 g of Tensiofix CG 21, 7.6 g of Tensiofix B 7425 are dissolved. To the solution under slow stirring 47.5 g of ethyleneglycol and under vigorous stirring 156 g of Carbendazim and 38 g of LAB 149202 are added. After homogenization the suspension will be transferred in an atritor of 1.5 liter content which contains siliquartzite pearls of 1 mm diameter. The atritor is operated for 30 minutes at 1440 RPM and later at 30 RPM. To the suspension the following solution is added: 156 g of Tridemorph, 4 g of Triton X-15, 31.2 g of Triton X-114. After stirring the suspension 16.8 g of paraffin oil and 1.8 g of Emulsogen M are added. After stirring the glass pearls (quartzite pearls) are separated by a soreen. The floating capacity of the suspension concentrate amounts according to the CIPAC method to 95%.

Examole 2

In a powder homogenizer of 3 l capacity 200 g of Wessalon S are introduced. To 261 g of Tridemorph 6.6 g of Triton X-15, 52.8 g of Triton X-114 and 6.6 g of Triton X-45 are added. By slow stirring a homogeneous solution is prepared. This solution is added to Wesselon S while slow stirring. After further stirring 250 g of Carbendazim and 88 g of LAB 149202 are added. After 5 minutes of homogeniza-

tion 50 g of Atlox 5320 and 75 g of Atlox 4862 are added and after further 5 minutes the mixture will be completed by the addition of 10 g of Aerosil. The powder mixture will be granulated in 2 parts in a laboratory granulator with water (to 500 g of the powder mixture 66 ml of water are added). The granulate formed is dried in a drying oven at 60 ^{o}C till constant weight. The particle size of the granulate amounts to 95% between 0.1 and 0.6 mm. The floating capacity of the product obtained amounts according to CIPAC to 84%.

Example 3

In a homogenizer of 3 l content 150 g of Zeolex 414 are filled as a carrier. In a separate vessel 266 g of Tridemorph, 6.8 g of Triton X-15, 6.8 g of Triton X-45 and 54.2 g of Triton X-114 are mixed by stirring slowly. A homogeneous solution is obtained, which is transferred while uniform stirring in the homogenizer. After homogenizing 266 g of Carbendazim and 66.6 g of Benalaxyl are introduced. The mixture is homogenized, thereafter under continuous stirring 88.6 g of saccharose, 30 g of a wetting agent IS (Hoechst) and 65 g of sodium lignine-sulphonate are added.

The powder mixture is ground in an air jet mill to particles of 10 µm size. The floating capacity of the powder mixture obtained amounts according to CIPAC to 87%, the wetting time is 18 sec.

Examole 4

In an atritor of 1.5 l content 60.54 g of water and 6.55 g of ethylene glycol are mixed. To the solution 2.21 g of Tensiofix B 7425, 1.7 g of Tensilin FN 80, 12.5 g of Carbendazim and 3.1 g of Benalaxyl are added. The atritor is filled with siliquartzite glass pearls of 2 mm diameter and the mixing mechanism of the atritor is operated for 30 minutes with an RPS of 800. After this period the following solution is added to the suspension: 9.4 g of Tridemorph, 0.23 g of Triton X-15, 0.23 g of Triton X-45 and 1.84 g of Triton X-114 (preliminary homogenized).

After stirring to the mixture 1.35 g of paraffin oil and 0.15 g of Emulsogen M are added. The siliquartzite glass pearls are filtered from the suspension. Applying a stirrer with a big shearing moment 0.2 g Tensiofix 821 are added to the solution.

The floating capacity of the suspension is according to CIPAC 97% (Particle size under 5 um in 98%).

Example 5

To 605.4 g of water 65 g of ethylene glycol, 22.2 g Tensiofix CG-21 and 17 g Tensilin FN-80 are added.

Applying a stirrer with a big shearing moment continuously 125 g of Carbendazim and 31 g of Metalaxyl are added to the solution. At a maximum RPS of the stirrer (12000/minute) the suspension is homogenized. The suspension is poured into a laboratory atritor of 1500 ml and the atritor is filled with ceramic pearls of 1 mm diameter.

The stirrer of the atritor is operated with a maximum RPS (1440/minute) for 30 minutes. Thereafter into the atritor a solution of 94 g of Tridemorph, 2.3 g of Triton X-13, 2.3 g of Triton X-45 and 18.4 g of Triton X-114 is introduced and stirring is continued for further 5 minutes. From the suspension the glass pearls are removed by a screen. Applying a stirrer with a big shearing moment to the suspension a previously similarly suspended mixture consisting of 13.5 g of paraffin oil, 1.5 g of Emulsogen M and 2 g of Tensiofix 821 is added and is homogenized for 5 minutes. The floating capacity of the suspension obtained amounts according to CIPAC 92%. The average particle size lies under 5 /um (97%).

Examole 6

In a laboratory powder homogenizer of 5 l content 300 g of Wessalon are introduced. To 266 g of Tridemorph under slow stirring 4 g of Triton X-15, 4 g of Triton X-45 and 25 g of Triton X-114 are added. Under stirring the Tridemorph solution is slowly poured into the powder homogenizer. Thereafter while further stirring a mixture of 266 g of Carbendazim 66 g of Metalaxyl, 30 g of the wetting agent IS and 39 g of sodium lignine sulphate are added. After 2 minutes of post homogenization the powder mixture is ground in a laboratory air jet mill to particles under 10 /um particle size. The floating capacity of the powder mixture amounts according to CIPAC to 86%, the wetting time is 23 sec.

Examole 7

In a powder homogenizer of 3.1 capacity 549.5 g of Wessalon S are introduced. To 131 g of Tridemorph 3.3 g of Triton X-15, 26.4 g of Triton X-114 and 3.3 g of Triton X-45 are added. By slow stirring a homogeneous solution is prepared. This solution is added to Wessalon S while slow stirring. After further stirring 175 g of Carbendazim and 44 g of LAB 149202 are added. After 5 minutes of homogenization 25 g of Atlox 5320 and 37.5 g of Atlox 4862 are added and after further 5 minutes the mixture will be completed by the addition of 10 g of Aerosil. The powder mixture will be granulated in 2 parts in a laboratory granulator with water (to 500 g of the powder mixture 66 ml of water are added). The granulate formed is dried in a drying oven at 60 ^{o}C till constant weight. The particle size of the granulate amounts to 95% between 0.1 and 0.6 mm. The floating capacity of the product obtained amounts according to CIPAC to 84%.

Examole 8

In a homogenizer of 3 l content 575 g of Zeolex 414 are filled as a carrier. In a spearate vessel 133 g of Tridemorph, 314 g of Triton X-15, 3.4 g of Triton X-45 and 27.1 g of Triton X-114 are mixed by stirring slowly. A homogeneous solution is obtained, which is transferred while uniform stirring in the homogenizer. After homogenizing 133 g of Carbendazim and 33.3 g of Benalaxyl are introduced. The mixture is homogenized. thereafter under continuous stirring

44.3 g of saccharose, 15 g of a wetting agent IS (Hoechst) and 32.5 g of sodium lignine-sulphonate are added. Later the mixture is stirred for further 3 minutes.

The powder mixture is ground in an air jet mill to particles of 10 /um size. The floating capacity of the powder mixture obtained amounts according to CIPAC to 87%, the wetting time is 18 sec.

Example 9

In a laboratory powder homogenizer of 3 l content 648 g of Wessalon are introduced. To 133 g of Tridemorph under slow stirring 2 g of Triton X-15, 2 g of Triton X-45 and 12.5 g of Triton X-114 are added. Under stirring the Tridemorph-solution is slowly poured into the powder homogenizer. Thereafter while further stirring a mixture of 133 g of Carbendazim, and 33 g of Metalaxyl, 15 g of the wetting agent IS and 19.5 g of sodium lignine sulphonate are added. After 2 minutes of post homogenization the powder mixture is ground in a laboratory air jet mill to particles under 10 /um size. The floating capacity of the powder mixture amounts according to CIPAC to 86%, the wetting time is 23 sec.

Auxiliaries and filling materials used

a) Surface-active materials (wetting agents and emulsifying agents)

Tensilin FN 80 (Kutrilin): alkyl-aryl-polyglycolether;

Triton X-15, X-45 and X-114 (Rohm and Haas): octyl-phenol--polyglycolether;

Tensiofix CG 21, B 7425 (Tensia): alkyl-aralkyl-sulphonate and phosphate, esters and non-ionic surface-active material mixtures respectively;

Emulsogen M (Hoechst): fatty alcohol-polyglycolether;

Atlox 5320 (Atlas ICI): non-ionic surface-active material;

wetting agent IS (Hoechst): Dialkyl-sulpho-succinate.

b) Dispersing agents:

Sodium-lignine-sulphonate;

Atlox 4862: Alkyl-aryl-sulphonate-formaldehyde-condensate.

c) Anti-freezing agents:

Ethylene glycol

d) Filling and carrier materials:

Wessalon S (Degussa): synthetic silicic acid;

Aerosil 300 (Degussa): silicic acid with great specific surface;

Saccharose;

Zeolex 414 (Zeofin): sodium-aluminium-silicate;

Paraffin oil.

e) Sedimentation inhibitor

Tensiofix 821 (Tenzia): synthetic polysaccharide.

Example 10

Efficiency against downy mildew of sunflower

Sunflower germlings with the root initials, 1-5 mm in length, were inoculated with zoospore suspension (2.5×10^5 spore/ml) of the downy mildew fungus (Plasmopara halstedii (Farl.) Berlese et de Toni, Peronosporales, Oomycetes).

Twenty four hours after inoculation the germlings were immersed into the aqueous solutions / emulsions / suspensions of the chemicals to be tested for 18 hrs. The germlings were then planted into sterile soil and grown in greenhouse until the evaluation of the effectivity of treatments. All measures not descripted in detail here, and the assessments were made as described by OROS and VIRÁNYI (1987): Ann. appl. Biol. 110:53-63.

The efficiency of treatments was characterized by ED_{50} (mg/l) value and the significance of synergistic effect was tested according to SUN (1950).

Table 1

Eradicant Effect of Benomyl, Tridemorph, LAB 149202F and of their mixtures against downy mildew of sunflower

Active agent [x] combination, resp.	mass proportion of the active agents	ED_{50}	Co.f.1
1. LAB 149202F	-	19.08	
2. Tridemorph	-	500	
3. Benomyl	-	500	
4. 2+3	1:1	500	
5. 1+2	1:4	16.86	
6. 1+2+3	1:4:4	6.55	1.70

x = The active agents and their mixtures, respectively, were applied in a suitable mass proportion in the form of wettable powder (WP) of the following compsition: 40% of the active agent, or mixtures thereof respectively; Emulsogen E-40, TWEEN 20, TWEEN 80, TWEEN 40, silicagel, Hyflosupercell, dextran, Polyethylene glycol 20 000 and cyclohexanon, 4.0; 0.5; 0.5; 1.0; 10.0; 10.0; 22.0; 8.8; and 4.0 per cent respectively

Example 11

Seed dressing against damping off fungi (Pythium, Fusarium in peas)

Seeds of the peas (Pisum sativum cv Gloriosa) were surface sterilized with 0.1% sublimate prior to dressing and treated thereafter with active agents formulated as 25 WP. To improve the adhesion at the dressing process, a TWEEN 80 solution was added. The dressed seeds were sown into an infested soil. 14 days after emergence both qualitative and quantitative evaluation of fungicidal efficacy were carried out.

The efficiency was calculated as follows:

$$\text{Efficiency } \% = 100 - \frac{A \times 100}{B}$$, wherein

A = Infection rate (%) of the treated plants,

B = Infection rate (%) of the control plants.

Table 2

Seed dressing against fungi causing damping off

Active agent	Concentration mg/L a.i.		Efficiency %
1. Carbendazim	2.0		9
2. Metalaxyl +Aldimorph	0.25 1.0	1.25	85
3. Metalaxyl +Aldimorph +Carbendazim	0.125 0.5 0.5	1.25	92

Table 3

Seed dressing against fungi causing damping off

Active agent	Concentration mg/L a.i.		Efficiency %
1. Propineb	1.50		0
2. Metalaxyl + Tridemorph	0.25 1.0	1.25	63
3. Metalaxyl + Tridemorph + Propineb	0.125 0.5 0.7	1.325	91

Table 4

Seed dressing against fungi causing damping off

Active agent	Concentration mg/L a.i.		Efficiency %
1. Benomyl	2.50		28
2. LAB 149202F +Aldimorph	0.5 2.0	2.5	67
3. LAB 149202F +Aldimorph +Benomyl	0.5 1.0 1.0	2.5	82

The used 25 WP had the following composition

25 weight% active ingredient or ingredients, respectively;

5 weight% Ca-lignin-sulphonate

5 weight% Tween 80

17 weight% Silicic acid

45 weight% kaolin

Example 12

Protective effect against Phytophthora infestans on tomatoes

Solanum lycopersicum - plants, cv. "Tamina" at four-leaf stage were drop-wet sprayed with the combinations in 25 WP form. The inoculation of the plants with a zoospore-suspension was carried out after the fungicide was dried up. After the inoculation the plants were kept for one day in a humid chamber at 16 °C to 18 °C and for five further days in the greenhouse at 20 °C. Thereafter the typical leaf-lesions appeared and their extension was a measure for the intensity of infection.

Table 5

Protective effect against Phytophthora infestans on tomatoes

Active agent	Concentration mg/L. a.i.		Efficiency %
1. Metalaxyl Aldimorph	6 24	30	61
2. Zineb	30		18
3. Metalaxyl Aldimorph Zineb	2 8 20	30	84

Table 6

Protective effect against Phytoohthora infestans on tomatoes

Active agent	Concentration mg/L a.i.		Efficiency %
1. Propineb	30		27
2. Metalaxyl + Tridemorph	6.0 24	30	62
3. Metalaxyl + Tridemorph + Propineo	2.0 8.0 20.0	30	88

Table 7

Protective effect against Phytoohthora infestans on tomatoes

Active agent	Concentration mg/L a.i.		Efficiency %
1. Maneb	10		40
2. Mancozeb	10		25
3. Oxadixyl + Tridemorph	2 8	10	47
4. Oxadixyl + Mancozeb	2 8	10	45
5. Oxadixyl + Maneb	2 8	10	65
6. Oxadixyl + Tridemorph + Maneb	1 4 4	9	78
7. Oxadixyl + Tridemorph + Mancozeb	1 4 4	9	65

Table 8

Protective effect against Phytophthora infestans on tomatoes

Active agent	Concentration mg/L		Efficiency %
1. Metiram	5.0		20
2. LAB 147202F + Tridemorph	1.0 4.0	5.0	54
3. LAB 147202F - Metiram	0.8 5.0	5.8	28
4. LAB 147202F + Tridemorph + Metiram	0.5 2.0 3.0	5.5	68

Examole 13

Effect on the growth of Phytophthora parasitica

The acetonic solution of the fungicides to be tested was in a suitable amount admixed to the agar mediums and 4 hours after pouring out the plates the Petri dishes were inoculated with 3-3 mycelium cuts; after an inoculation period of 72 hours the diameter of the cultures was measured. The growth inhibition was expressed - referred to the untreated control - according to the following equation:

$$100 - \left(100 \times \frac{X_{ij} - 7}{X_{ikontr.} - 7} \right) = \text{inhibition in \%, wherein}$$

X_{ij} = population diameter measured on j-compounds (or combination thereof) containing medium plate of the given species (i)

X ikontr.= population diameter measured on xenobiotica not containing medium plate of the given species i.

The data were analysed by means of variance analysis and the results are summarized in Table 9.

Table 9

Effect of combinations of Tridemorph - Carbendazim - + an acylamide derivative on the growth (colony diameters) of Phytophthora parasitica f.sp. nicotianae var tomato

Active agent or combination	Concentration mg/L		Inhibition %
1. Metalaxyl	2.6		50
2. Tridemorph + Carbendazim + RE 26745	1.0 1.0 0.25	2.25	81.6
3. Tridemorph + Carbendazim + Ofurace	1.0 1.0 0.25	2.25	73.6

Examole 14

Control of a mixed mildew infection on cucumber leaves

The both powdery and downy mildew pathogens when associated in a leaf disease complex on cucumber can severely damage the leaf surface causing a serious yield loss.

Series of leaf treatments were carried out when first symptoms occurred caused by powdery mildews (Sohaerotheca fulginea and Erysiohe cichoracearum, Erysiphales, Ascomycetes) and Downy mildew (Pseudoperonospora cubensis, Peronosporales, Oomycetes).

The disease development was checked after days from the treatment by counting the number of visible pustules on the leaves. The inhibition of disease rate was calculated and expressed in percent of the untreated control.

Results.

Table 10

Active agents or combinations	ratio	Concentration Mg/L	Inhibition of disease rate (%)
1. Benalaxyl		10	32
2. Tridemorph		10	55
3. Benomyl		10	26
4. 1+2	(9:11)	10	61
5. 1+3	(9:10)	10	21
6. 2+3	(11:10)	10	16
7. 1+2+3	(9:10:11)	10	72

Examole 15

Seed-dressing experiments with maize

The infection rate of maize seed lot by Fusarium species used for laboratory purposes amounted to 29.5%, but total contamination has reached 100% so it was unsuitable

for sowing.

After the treatment the infection rate of 4 x 100 seed pieces was evaluated following an incubation on Papavizas-medium. The effect of combination (CHBA 6-11) was compared with the standard mixture Kolfugo Extra (20% Carbendazim) + Quinolate V-4-X (2.0 l/t + 1.0 kg/t, respectively) commonly used in Hungary. The results are presented in Table 11.

Table 11

Treatment	Dose g/kg	Agent mg/100 g seed	Infection rate of seed %
CHBA 6	2.0	312+312+76	0.25
CHBA 7	2.0	262+350+88	0.75
CHBA 8	2.3	306+306+76	0.00
CHBA 9	2.8	263+350+87	0.25
CHBA 10	2.3	306+306+76	0.50
CHBA 11	2.8	263+350+87	1.0
Kolfugo Extra-	2.0	400	
Quinolate V-4-X	1.0	500+150	1.0
Surface sterilized	-	-	29,5
Control	-	-	100,0

Table 12

Preparation	Active agent	rate of active agent	act. agent content g/1000 g	formulation act. agent content
CHBA 6	Tridemorph+ +BCM+LAB 149202	4:4:1	156+156+38	350
CHBA 7	-"-	3:4:1	131+175+44	353
CHBA 8	-"- + + Benalaxyl	4:4:1	133+133+33	300
CHBA 9	-"- -"-	3:4:1	94+125+31	250
CHBA 10	-"- - + Metalaxyl	4:4:1	133+133+33	300
CHBA 11	-"- -"-	3:4:1	94+125+31	250

Apron 35 SP Metalaxyl

Kolfugo 25 FW BCM

Kolfugo extra BCM

Quinolate V-4-X Carboxin + Cu-oxyquinolate

Examole 16

Seed-dressing experiments with sovabean (Acternaria, Fusarium, Aspergillus)

The efficiency of the individual treatments was evaluated first in the laboratory by determining the composition of pathogens (the contamination rate of 2 x 100 seeds of soyabean). In a field experiment, the yield of soyabean treated with different fungicides was measured, and expressed in kg/plot (2 m^2).

The results obtained are contained in Table 13.

Table 13

TREATMENT Fungicide	Dose of formulation g/kg seed	Dose of active ingredient mg/kg seed	No. of seeds infected	YIELD kg/2m^2 (mean of 4 replicates)	YIELD K %
CIBA 6 (IKL)	2.0	312+312+76	5.5	2.15	108.6
CIBA 7 (IKL)	2.0	262+350+88	1.5	2.18	110.1
CIBA 8 (IKB)	2.3	306+306+76	2.5	2.30	116.2
CIBA 9 (IKB)	2.8	263+350+87	1.0	2.45	123.8
CIBA 10 (IKM)	2.3	306+306+76	1.0	2.05	103.5
CIBA 11 (IKM)	2.8	263+350+87	3.5	2.18	110.1
Apron 35 SD	2.0	700	16	2.03	102.5
Kolfugo 25 FW	2.8	700	11	2.07	104.5
Control	-	-	76.5	1.98	100.0

Example 17

Possibility of control population of pathogenic fungi associated with the root rot complex of seedlings

Plant at seeding stage are endangered by a number of soil- and seed-borne seedling- and foot diseases caused by fungi of various taxonomic position (usually named pathogene "associated with the root rot complex" of plants - of G. DIXON (1981): Vegetable Crop Diseases, The Macmillan Press Ltd, London).

It is possible to eliminate certain pathogenic species with an efficient fungicide preparate. However, the species non-sensitive to a given compound can build up in an explosive way. The use of broad-spectral fungicides may circumvent this problem. Such compounds, however, are often harmful pollutants of the environment. The accumulation of toxic materials (e.g. mercury, tin, aluminium or carcinogenic metabolite, such as ETU) can not be exluded and one must renounce their use. Against the highly efficient and selective fungicide preparations that are harmless to nature and mankind (e.g. Carbendazim, Metalaxyl), the target organisms (plant parasites) become quickly resistant. The resistance is due to genetic reasons. In the population of the pathogens there appear individuals that carry genes responsible for the reduction of fungicide sensitivity. Individuals carrying such genes that had been treated with the given fungicide will increase in number dramatically, moreover, in the soil fungi of various taxonomic position are associated with the

root rot complex that makes a necessity to use a broad--spectrum fungicide. The use of especially selected and optimalized mixtures is necessary due to the requirement of treatment as highly selective as possible and at the same time combating the formation of established resistant populations to the given fungicides. In Table 14 a model experiment is shown, which proves that in the case of a fungal population consisting of individuals of different fungicide sensitivity and associated with root rot complex, by the appropriate combination of synergistically interacting fungicides a successful control can be achieved. Beside the fact, that the pathogenes associated with root rot complex can be controlled with certainty, a synergistic fungicide combination will reduce costs and decrease pesticide pressure to nature simply due to its increased efficacy to the target organisms.

Furthermore there occurs an economic synergism too, by the reduced amount of chemicals applied for having the same effect, by the reduced costs of application, and the by insurance increased of yield due to decreasing the probability of resistance.

Performance of experiments

By means of somatic hybridization (Molnar et. al., (1985): Exp. Mycol. 9:326-333.), and by means of mass selection of spontaneous mutants (Oros (1987): Tag.-Ber. Akad. LdW. DDR., Berlin 253, S 177-183), respectively, Fusarium oxysporum and Phytophthora parasitica strains/clones of extremely different fungicide sensitivity were prepared for

the experiments. The efficacy of the fungicides was determined in conventional agar plates by measuring the radial mycelium growth after 48 hours.

Fungicide effect was characterized by the % of inhibition of radial growth of colonies.

As the survival of the population in the presence of a harmful factor is always determined by the most resistant part of this population, the Most Potent Treatment (MPT) was used for comparing efficacies in the experiment.

Table 14

Control of mixed populations consisting of Fusarium oxysporum and Phytophthora parasitica individuals of different fungicide sensitivity in the case of their simultaneous occurrence on tomatoes.

Active agents, combinations, resp.	ratio	Inhibition of fungal species[a] F. oxysproum	P. parasitice[b] var. nicotianae	(ED_{50} mg/L) I_i/I_{MPT}[c]
Carbendazim		42.7	125	12.5
Tridemorph		86.6	518	51.8
Metalaxyl		500	4.2	50
1+2	(1:1)	8.1	105	10.5
1+3	(4:1)	57.2	16.9	5.7
2+3	(4:1)	117	9.05	11.7
1+2+3	(4:4:1)	8.9	10.07	1.0

a = A population consisting of resistant and sensitive strains to benomyl. Ratio 1:1

b = A population consisting of resistant and sensitive strains to metalaxyl. Ratio 1:1.

c = I_i/I_{MPT} = the factor, which shows how manyfold the concentration of the preparate should be increased to have the same effect as it was obtained at the application of the most potent one (No. 7).

I_i = ED_{50} value (mg/L) of the "i" treatment, and

I_{MPT} = the ED_{50} value (mg/L) of the most potent treatment (MPT).

What we claim is:

1. A fungicide composition containing as active ingredient a mixture of:

A) one of the following fungicides:

methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-(2-furoyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-phenylacetyl-N-(2,6-xylyl)-D,L-alaninate;

±-alpha-2-chloro-N-2,6-xylylacetamido-gamma-butyrolactone;

(±)-alpha-/N-(3-chlorophenyl)cyclopropanecarboxamido/-gamma--butyrolactone;

2-methoxy-N-(2-oxo-1,3-oxazolidin-3-yl-2'6'-xylidide;

N-isoxazole-5-yl-N-(2,6-xylyl)-D,L-alanine-methylester;

N-/2,6-dimethyl-phenyl(-2-methoxy-N-)tetrahydro-2-oxo--furanyl/-acetamide; and

B) a fungicide of the group of morpholines

2,6-dimethyl-4-tridecylmorpholine;

4-cyclododecyl-2,6-dimethylmorpholine;

(±)-cis-4-/3-(4-tert-butylphenyl)-2-methylpropyl/-2,6-dimethylmorpholine;

the mixture of N-alkyl (C_{12})-2,6-dimethylmorpholine and N-alkyl(C_{12})-2,5-dimethyl morpholine;

together with

C) one of the following fungicides

diethyl 4,4'/o-phenylene(bis)3-thioallophanate/;

dimethyl 4,4'-(o-phenylene(bis)3-thioallophanate/;

methyl-benzimidazole-2-yl-carbamate;

methyl 1-(butylcarbamoyl)benzimidazole-2-ylcarbamate;

2-(4-thiazolyl)-1H-benzimidazole,

or

D) one of the following dithiocarbamate or disulphide derivatives:

zinc ethylenebis(dithiocarbamate) (polymeric);

manganese ethylenebis(dithiocarbamate) (polymeric);

manganese ethylenebis(dithiocarbamate) (polymeric) complex with zinc salt;

zinc ammoniate ethylenebis /dithiocarbamate(-poly)ethylene-thiuram disulphide/;

polymeric zinc propylenebis (dithiocarbamate);

the mixture of zinc ammoniate ethylenebis(dithiocarbamate/-poly/-ethylenethiuram disulphide) and polymeric zinc propylenebis/dithiocarbamate/ in a ratio of 1:3, respectively;

wherein the weight ratio of the compounds A, B and D is 1-1:3-5:5-10 and the weight ratio of the compounds A, B and C is 1-1:3-5:1-6; together with a fungicidally acceptable inert carrier.

2. A fungicide composition containing as active ingredient one of the following mixtures:

A) one of the following fungicides:

methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-(2-furoyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-phenylacetyl-N-(2,6-xylyl)-D,L-alaninate;

±-alpha-2-chloro-N-2,6-xylylacetamido-gamma-butyrolactone;

(±)-alpha-/N-/3-chlorophenyl/cyclopropanecarboxamido/--gamma-butyrolactone;

2-methoxy-N-/2-oxo-1,3-oxazolidin-3-yl-2',6'-xylidide;

N-isoxazole-5-yl-N-(2,6-xylyl)-D,L-alanine-methylester;

N-/2,6-dimethyl-phenyl(-2-methoxy-N-)tetrahydro-2-oxo--furanyl/-acetamide; and

B) a fungicide of the group of morpholines

2,6-dimethyl-4-tridecylmorpholine;

or

the mixture of N-alkyl (C_{12})-2,6-dimethylmorpholine and N-alkyl(C_{12})-2,5-dimethyl morpholine;

together with

C) one of the following fungicides

methyl-benzimidazole-2-yl-carbamate; or

methyl 1-(butylcarbamoyl)benzimidazol-2-ylcarbamate;

wherein in each of the mixtures the weight ratio of the compounds A, B and C is 1:4:4, together with a fungicidally acceptable inert carrier.

3. A fungicide composition containing as active ingredient

A) one of the following fungicides:

methyl N-phenylacetyl-N-2,6-xylyl-D,L-alaninate;

or

±-alpha-2-chloro-N-2,6-xylylacetamido-gamma-butyrolactone;

or

2-methoxy-N-(2-oxo-1,3-oxazolidin-3-yl)-2',6'-xylidide

and

B) 2,6-dimethyl-4-tirdecylmorpholine;

together with

C) methyl-benzimidazole-2-yl-carbamate;

wherein in each of the mixtures the weight ratio of the compounds A, B and C is 1:4:4, together with a fungicidally acceptable inert carrier.

4. A fungicide composition containing as active ingredient

A) one of the following fungicides:

methyl N-phenylacetyl-N-2,6-xylyl-D,L-alaninate,

or

±-alpha-2-chloro-N-2,6-xylylacetamido-gamma-butyrolactone;

or

2-methoxy-N-(2-oxo-1,3-oxazolidin-3-yl)-2',6'-xylidide;

and

B) the mixture of N-alkyl(C_{12})-2,6-dimethyl-morpholine and N-alkyl(C_{12})-2,5-dimethyl morpholine;

together with

C) methyl-benzimidazole-2-yl-carbamate;

wherein in each of the mixtures the weight ratio of the compounds A, B and C is 1:4:4, together with a fungicidally acceptable inert carrier.

5. A fungicide composition containing as active ingredient

A) methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L--alaninate;

and

B) a fungicide of the group of morpholines 2,6-dimethyl-4-tridecylmorpholine; or the mixture of N-alkyl(C_{12})-2,6-dimethylmorpholine and N-alkyl(C_{12})-2,5-dimethyl morpholine;

together with

C) methyl-benzimidazole-2-yl-carbamate;

wherein in each of the mixtures the weight ratio of the compounds A, B and C 1:4:4, together with a fungicidally acceptable inert carrier.

6. A fungicide composition containing as active ingredient a mixture of:

A) one of the following fungicides:

methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-(2-furoyl)-N-(2,6-xylyl)-D,L-alaninate;

methyl N-phenylacetyl-N-(2,6-xylyl)-D,L-alaninate;

±-alpha-2-chloro-N-2,6-xylylacetamido-gamma-butyrolactone;

(±)-alpha-/N-/3-chlorophenyl/cyclopropanecarboxamido/-

-gamma-butyrolactone;

2-methoxy-N-/2-oxo-1,3-oxazolidin-3-yl-2',6'.-xylidide;

N-isoxazole-5-yl-N-(2,6-xylyl)-D,L-alanine-methylester;

N-(2,6-dimethyl-phenyl)-2-methoxy-N-(tetrahydro-2-oxo-

-furanyl)acetamide; and

B) 2,6-dimethyl-4-tridecylmorpholine;

together with

D) one of the following dithiocarbamate or disulphide derivatives:

manganese ethylenebis(dithiocarbamate) (polymeric);

or

manganese ethylenebis(dithiocarbamate) (polymeric) complex with zinc salt; or

polymeric zinc propylenebis(dithiocarbamate or

zinc ammoniate ethylenebis/dithiocarbamate(-poly)ethylene

thiuram disulphide)

wherein in each of the mixtures the weight ratio of the compounds A, B and D is ~~1:3-5:10~~ 1:3-5:10 together with a fungicidally acceptable inert carrier.

7. A fungicide composition containing as active ingredient a mixture of:

A) methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L--alaninate;

and

B) 2,6-dimethyl-4-tridecylmorpholine;

together with

D) polymeric zinc propylenebis(dithiocarbamate)

wherein the weight ratio of the compounds A, B and D is 1:4:5-6, togetner with a fungicidally acceptable inert carrier.

8. A fungicide composition containing as active ingredient a mixture of

A) methyl N-(2-methoxyacetyl)-N-(2,6-xylyl)-D,L--alaninate

and

B) 2,6-dimethyl-4-tridecylmorpholine

together with

D) zinc ethylenebis(dithiocarbamate) (polymeric)

wherein the weight ratio of the compounds A, B and D is 1:4:10, together with a fungicidally acceptable inert carrier.

9. A fungicid composition containing as active ingredient a mixture of:

A) 2-methoxy-N-/2-oxo-1.3-oxazolidin-3-yl-2'.6'--xylidide;

and

B) a fungicide of the group of morpholines:

2,6-dimethyl-4-tridecylmorpholine;

or

the mixture of N-alkyl(C_{12})-2,6-dimethylmorpholine and N-alkyl(C_{12})-2,5-dimethyl morpholine;

together with

D) one of the following dithiocarbamate of di-sulphide derivatives:

manganese ethylenebis(dithiocarbamate) (polymeric), or

manganese ethylenebis(dithiocarbamate) (polymeric) complex with zinc salt; or

polymeric zinc propylenebis(dithiocarbamate)

wherein in each of the mixtures the weight ratio of the compounds A, B and D is 1:4:5-10, together with a fungicidally acceptable inert carrier.

10. A fungicidal method of treatment, which comprises the step of administering to a plant susceptible to pathogenic fungal infection, a fungicidally effective amount of the composition defined in claim 1.

11. A fungicidal method of treatment, which comprises the step of administering to cultivated plants susceptible to pathogenic fungal infection a fungicidally effective amount of the composition defined in claim 1.

INTERNATIONAL SEARCH REPORT

International Application No PCT/HU 88/00013

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]: A 01 N 37/22,43/06,43/80,43/84,47/34,47/36,55/02

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
Int.Cl.[4]	A 01 N 37/22,43/06,43/80,43/84,47/34,47/36,55/02

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

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
A	WERNER PERKOW "Wirksubstanzen der Pflanzenschutz und Schädlingsbekämpfungsmittel", 1971/1979, VERLAG PAUL PAREY, Berlin und Hamburg, see pages "Metalaxyl and Furalaxyl"	(1-11)
A	DE, A1, 2 903 612 (MONTEDISON S.P.A.) 09 August 1979 (09.08.79), see claims.	(1-11)
A	DE, A1, 2 515 091 (CIBA-GEIGY AG) 23 October 1975 (23.10.75), see claims.	(1-9)
A	EP, B1, 0 026 873 (BASF AKTIENGESELLSCHAFT) 06 October 1982 (06.10.82), see claims.	(1-9)
A	H.MARTIN AND C.R.WORTHING "Pesticide Manual", fifth edition, January 1977, BRITISH CROP PROTECTION COUNCIL, see pages 227,525.	(1-9)
A	WERNER PERKOW "Wirksubstanzen der Pflanzenschutz- und Schädlingsbekämpfungsmittel", 1971/1979, VERLAG PAUL PAREY, Berlin und Hamburg, see pages "Aldimorph and Fenpropemorph"	(1-9)

* Special categories of cited documents: [14]

"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	Date of Mailing of this International Search Report
17 May 1988 (17.05.88)	24 May 1988 (24.05.88)
International Searching Authority	**Signature of Authorized Officer**
AUSTRIAN PATENT OFFICE	Pippan

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
A	H.MARTIN AND C.R.WORTHING "Pesticide Manual", fifth edition, January 1977, BRITISH CROP PROTECTION COUNCIL, see pages 33,78,510,511.	(1-5)
	See pages 328,329,444,541,542.	(1,6,7,8,9)
