As. 2932/PCT.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO DIVISION DE NUEVAS CREACIONES

V-

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Solicitud de Patente a nombre de
Novartis AG.

’ UJN [ENDENCIA DE INDUSTRIA V COMERCIO

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Yo, JIMENA ESCOBAR URIBE, identificada como aparece al pie de mi firma, domiciliada en Bogota, en la Carrera 11 No. 86-53, piso 6, obrando como apoderada
de la sociedad Novartis AG., con doxnicilio en Basilea, Suiza, solicitante de la patente de la referenda, pido a usted que se proceda a examinar si la invención, cuya patente se traniita en el expediente de la referencia, es patentable.

Adjunto al presente memorial el recibo No. 08 - 5,829 de 22 de enero de 2008, por la suma de $420.000.00, con lo cual quecla cubierta la tasa oficial correspondiente a
dicho estudio.

SeæorSuperintendente,

O. PMEWNICOBAR RIBE

C.C.39.779.452 de UsaquØn
T.P. 68.228

4,855,133

* a-Cyano-3’-phenoxybcnzyl c-isopropyl- chiorophe.

nylacetate (common name: Penvalerate) * 0(4-Bromo-2,5-dicldorophenyl) O,O-dimethylphos-phorothioate (common name: Bromophos) * S-Methyl N(methy1carbamoytoxy)thioacetimldate 5 (common name: Methomyl) * 0,0-Dunethyl 0-4-niethylthlo-m-toluylphcsphoro-
thloate (brand name: Baycid) (common time: Fenth-
ion)
* Dimethyl-(2,2,2-trlchloro-1-bydroxyethyl)pbosphon- 10

ate (common name: Trichiorfon) * 0-2,4-Dichlorophenyl O-ethyl-S-propyl-phos-
phorodithioatc (common name: Prothiophos)
Among these Insecticidal compounds, pyrethrold compounds are especially preferable. Of the corn- 15 pounds of this type, the most preferable are 5-benzyl.3. furylmethyl d-cls/trans-chrysanthemate, phenothiin and permethrin. These Insecticides are used singly, or at

least two ofthem are used in admixture. The proportion of the insecticide to be used is usually in the range of 20
about 0.1 to about 15 wt. % based on the entire weight of the present composition although not limited specifi-cally.
The fly attracting composition of the present inven-tion is prepared by admixing a suitable carrier with the 25 components and shaping or granulating the mixture into a suitable form having a mean grain size in the foregoing range. Examples of useful carriers are finely divided inorganic substances such as talc, kaolin, slide acid, active carbon, bentonite, silica, alumina, alumina-silica, 30 calcium carbonate, earthen or poroelaneous powder and kieselguhr, and organic substances such as pulp, fiber, wood powder, sugar powder, soybean flour, wheat flour, starch, resin and rubber.
Preferably, the fly attracting composition ofthe prea- 35 eat invention is prepared, for example, by mixing to-gether the pigment and the attracting compound serv-ing as an active component, along with a suitable insec-ticide when required, using a solvent and/or a binder solution, granulating the mixture to a specified grain 40 size, removing the solvent and drying the granular product. Examples of solvents useful for this method are alcohols such as methanol and ethanol, ketones such as acetone and methyl ethyl ketone, ethers such as tetra-bydrofuran and dioxane, and other substances such as 45 hexane, kerosene, paraffin, petroleum benzine, toluene, ethyl acetate and dichloroethane. Examples of useful binders are cellulose derivatives such as nitrocellulose,

hydroxypropylcellulose, acetylcellulose, acetylbutyryl- cellulose and methylcellulose, polyvinyl alcohol gum 50 arabic, sodium carboxymethylcellulose, casein, gelatin, aigluic acid. Such binder is adantageously usable usu-

ally in the form of about 1 to about 20% aqueous solu-tion.

Also usable as incorporated in the fly attracting corn-’ 55 position of the present invention when so required are various known additives such as synergist, antioxidant, decomposition preventing agent, bactericide, fungicide, accidental ingestion preventing agent, etc. Other known attractants are also usable conjointly. 60 Examples of useful synergists are N-(2-ethylhexyl).

bicyclo[2,2, l]-5-hepteae-2,3-dicarboxixnide, 6.(propyl- piperonyl)butyl carbityl ether, etc. Examples of useful antioxidants are butylbydroxyanisole, dibutylbydrox- ytoluene, tocopherol, ’-oryzanol, etc. Examples of 65 useful decomposition preventing agents are pbenyl- glycidyl ether, etc. These agents, all known, are used in

the usual manner and can be used in combination.

Examples of useful bacterioeides are salicylic acid, benzoic acid, sorbic acid, p-chloro-m.xylenol, 2-(4’-

thiazoyl)benzimidazole, etc. Examples of useful fungi- cides are a-bromo cinnamic aldedhyde, N-dhnethyl.N- phenyl-N’-(fluorodiohlorometbyl)thiosulfamide, etc.

Examples of useful accidental ingestion preventing agents are tincture of Capsicum annum, Japanese bitter wood, obloramphenlool, etc. The proportions of these agents to be used can be determined suitable. For exam-ple, accidental ingestion preventing agent can be used in an amount of about 0.1 to about 3 wt. % based on the preparation to be obtained.
Examples of attractants which can be incorporated into the present fly attracting composition are ingestion. inducing substances including protein- and/or carbohy-

drate-containing substances such as milk powder, egg powder, pupal powder, krill powder, meat extract,

albumin, globulin, amino acids (e.g. praline), malt ex-tract, caramel, vanillin, whey, cereal flours, yeast, glu-cose, sucrose, maltose, monosaccharides and disaccha-

rides, Examples ofother useful attractants are terpineol, farnesol, geraniol, acetic acid, isovaleric acid, trimethyl-
amine, indole, piperidine, phenylethanol, ammonium carbonate, skatole, formaldehyde, hexasnothylenetetra-mine, ammonium carbamate, papain, butyric acid, isovaleraldehyde, ethylamine, aliphatic monoesters of chlorinated alkene polyols, pariereatin. The amounts of these altrautants to be used can be determined suitably and are not limited specifically.
The preferred embodiments of the present invention include a bait composition having incorporating therein at least one pyretliroid insecticide selected from the group consisting of (5-benzyl-3-furyl)niethyl d-cis/- trasis-chrysanthemate (common name: allethrin), 3-phenoxybenzyl cis/trans-chrysanthernate (common name: phenothrin) and 3-phenoxybeuzyl cis/traus-3-(2,2-dicblorovinyl)-2,2-dlmethyl-cyclopropane carbax-ylate (common name: permethrin).
Generally, bait compositions comprise a food for flies impregnated with or incorporating an insecticide. To achieve a satisfactory result, the bait composition must meet the following requirements. First, the insecticidal component selected should be least repellent to flies. Second, there must be physical and/or chemical means for attracting flies to the bait. Third, the bait needs to be fully attractive to the taste so as to Induce the attracted fly to ingest the bait. Fourth, the bait must be taken in by the fly at a sufficient lethal dose before disgusting the fly in some way or producing toxic symptoms. These requirements are not Independent of, but are closely associated with, one another, when failing to *’ulllll any one ofthese requirements, the bait composition exhibits

a seriously reduced effect and produces no satisfactory result.
The insecticidal components of bait compositions presently known are limited only to some of organic phosphorus or carbamate insecticides, and pyrethroid insecticides are not used commonly. Pyrethroid insecti-cides generally are known to quickly act on adults of

flies (hereinafter referred to merely as "flies") to pro- duce an outstanding knockdown effect because the
Insecticide enters the body of the fly through the skin or stoma and quickly acts on the nervous system. Accord-ingly, the application of insecticides of this type is lim-ited only to the stomatal respiratory tract and the cuta-neous contact tract. Utilizing the above characteristics, pyrethroid insecticides are used not only for flies but also for mosquitos, cockroaches, etc., in the form of

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preparations such as mosquito-repellent insence (stoma- plate, ball, polygonal body or the like ofsynthetic resin,
tel tract), mosquito-repellent electric mat (same), aero- wood or metal.

sd (stomatal tract and cutaneous contact tract), furm- Like common fly controlling or destroying agents, Sant or vaporizable composition (same), etc. However, the fly attracting composition of the present invention, they have not been used in the form of Insecticidal bait 5 when prepared with the insecticide, etc, incorporated compositions for the oral tract. therein, is usable by placement, spreading or adhering in
An attempt to use pyrethroid insecticides for the oral fly occurring areas such as agricultural crop growing tract to control insects Is reported, for example, by L fields, orchards, greenhouses, vinyl houses, cattle sheds, Kelding in Danish Pest Infection Laboratory Annual
"Paint 10 poultry houses, grain storehouses, kitchens, dwelling Report, 1978, -on-Baits" Laboratory Tests, but houses, etc. When not containing the insecticide or the the report says the baits incorporating pyrethroid mace- like, the present composition Is usable In these places in ticides failed to achieve a satisfactory result. The re-

ported result appears reasonable in view ofthe prevail- combination with other known suitable insecticidal
Ing scientific information that the pyrethroid insecti- preparation or the like. The amount of the composition
cides are not ingestible by insects. Further recently, it

to be used can be determined suitably in accordance

has been reported that 2,2-dhnethyl-3-(J3j3- with the method and place of application. For example,
dichlorovinyl)-’cyclopropaneoarboxylic acid cz-cyano- when to be applied by spreading, the present fly attract-
3-phenoxy-4-fluorobenzene, a kind of pyrethroid mace- ing composition is used in such an amount that at least
ticide, is effective for baits for flies (see Unexamined 20

1 mg, preferably about 3 to about 10 mg, of the active
Japanese Patent Publication SNO 59-78111). However, compound will be present per square meter of the area
the report says that the above-mentioned compound concerned.
alone is effective and that the other pyrethroid insecti- Examples of flies attractable by the present attractant
cidcs are not suited to baits, Thus, it is presently gener- composition are those of the family Muscidac such as
ally believed in the art that the pyrethroid insecticides
25

Musca domestica, Muscina stabulans, Stonwxys ca/citrans

have insect-repellent activity but are less effective when and Ophyra leucostoma: Fannllnae: the family C4111- taken in orally. phorldae such as Calliphora lata 4/drichina grahamL

Nevertheless, our research has demonstrated that Phoenicia sericata, Phoenicia cuprina, Lucille caesar,
when the fly attracting composition of the present in- Lucille lilustris, Chrysomyla megacephala and Phormia

ventlon has incorporated therein at least one of the reglsa. the family Sarcophagidac such as Sarcophaga foregoing three pyrethroid compounds and is used as a peregrina and Parasorcophaga slmilis the family Droso-
bait composition, the pyrethroid compound exhibits a philldae such as Drosophila raelanogczster and Drosophila powerful Insecticidal effect on flies although taken in virllln’ the family Plophllldoe such as Piophila casei the

orally and further that the composition efficiently at- family Scatophagidac such as Scatophaga stercoraria: the

tracts flies without arousing any aversion and induces 35 family Dromyridae such as Stenodryomyza formosa: the the attracted flies to positively take In a lethal dosage of family Phorldae such as Megaselic scalaris: etc. the bait with great tenacity, consequently achieving a

high controlling efficiency. EXAMPLE

Attractants for inducing flies to ingest the present bait Sck The present invention will be described in greater composition are incorporated into the composition. The 40detail with reference to the following examples. attractants already exemplified are usable as such attrac-

tants. The ingestion-inducing attractant is a substance
which itselfis eatable by flies. Useful carriers are prefer- i. Sugar powder 60 g
ably edible substances such as sugar powder, soybean 2. Pigment 0.8
flour, wheat flour, starch; etc. The ingestion-1naulng 45 3. cis-9-’’rlcosene 15 rag
attractant and/or the edible substance serving as a car-- (1.5 nil as I wt. 95 acetone solution)
4. Mixture of methanol and acetone 100 ml tier are used In an amount ofit least 70 wt.
basd-6n 4.) in equal amounts the 4k S. Binder 7 ml
The above-mentioned pyrethroid insecticidal corn- 4’s (20 wt. 95 aqueous solution of gum arable)
pounds are usable singly, or at least two of them can be So
used in combination, the amount, thereof being 0.1 to 15
wt. %, preferably 0.3 to 10 wt. %, based on the compo-

The above components I to 5 were mixed together

sition. It is especially preferable to use allethrin. with stirring, the solvent was evaporated offby a rotary
evaporator (50° C.) and the mixture was screened with The sex pheromone is used in an amount of about 0.01
about 15 wt, %, preferably about 0,02 to about 4 Wt. a 2-mm-mesh sieve. The oversize portion was also
based on the composition. Although the pyrethroid crushed to particle. With addition of an aqueous solu-
insecticidal compound and the sex pheromone areus- tion of binder by tlx gpwe was
able in a ratio which is not limited particularly but is about it
in mean size, under The grantar mixture was selectable from a wide range, the former to latter ratio pressure.
(by weight) is usually about 10.001-1, preferably about 6o allowed to stand at room temperature for at least 12
110.005-0.5. hours and dried to obtain a granular preparition. In this
The same additives as already mentioned are usable way, fly attracting compositions la to Im were ob-
for preparing the bait composition. The components tB.ifled.
can be made Into a granular preparation in the same The cis-9-tricosenc concentration of these prepara-
manner as already described. 65 tloii specimens was 0.025 wt. %.
The attractant composition ofthe present invention is The preparation specimens obtained were checked
usable in the original granular form, or as adhered to a for hue according to JIS Z 8721, Table 1 shows the
suitable substrate, such as paper, fabric, and film, sheet, results.

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TABLE I

Preparation Hue of
No. Pigment preparation
la Tartrazine No. 4 6 Y
lb Uranine K (202.1) 2 Y
IQ Naphthol Yellow S 3 Y
Id Pluoreaccine 1 YR
to Qeutoline Yellow SS 10 YR
If Past Yellow 30 7 YR

Ig Ureuiue K (202.2) 2 Y
III Ucazidine Yellow 0 5 YR.
Ii Metand Yellow 5 Y
li Ham Yellow 3 Y
1k YellowNo.5 9 R
11 Sunset Yellow F 1 YR
Im Yellow No. 4 1.5 5.

EXAMPLE 2

Ply attracting granular compositions 2a to 2m having an insecticide concentration of 1 wt. % were prepared in the same manner as in Example 1 with the exception of additionally using as another insecticidal component 600 mg of Methomyl (S-methyl N.(methylcar-ba3noyloxy)thioaeti1rcarban1ate Insecticide, prod-uct of E.I. du Pont de Nemours & Co.),
Each of the preparation...spepimens obtained was found to have the same hue as the corresponding one of the specimens la to lm (see Table 1) of Example 1. The preparations obtained in Example 2 were tested for attracting effect by the following methods.

Test I

The preparations were placed, each in an amount of 60 g, into glass dishes (15.5 cm in diameter) Individually, which were then arranged on the floor of a test room along a circle, as spaced apart from one, another at a distance of about 30 cm. Houseflies (Marco domestico) were released into the test room. Upon the lapse of a predetermined period oftime, the number of dead flies within each dish was checked.

The fly attracting effect of each preparation was evaluated in terms of the ratio (%) of the number of dead flies in the dish containing the preparation to the total number of dead flies In the test room (Le. the total of the numbers of dead tiles in all dishes).

Test U

The fly attracting effect of the preparations was eval-

uated in the same manner as in Test I with the exception of placing the preparations, 10 g each, into plastics cups

individually and arranging the cups on the floor of a glass chamber (1.45 mx 1.4 as) placed outdoors, as spaced apart from one another at a distance of about 20
cm.

The test results are given in Table 2 (Test I) and Table 3 crest II).
TABLE 2

Preparation No. Ply attracting effect (56)
2a 1.
2b 3
2c 2
2d 28
20 3
21 4
2g 4
211 4
21 3
21 3
2k 30

10

TABLE 2-continued

Preparation No. Ply attracting effect (56)
21 11
3m 3
Control 1
25 3
2
25 1
3d 16

2e 10 4

21 5
2g 5
25 3
21 3
S
2k 28

15 21 21
3m 3
Control

20 EXAMPLE

Ply attracting-Insecticidal compositions were pre-pared in the same manner as in Example 2 except that 008 wt. % or 1.3 wt. % of Sunset Yellow P was used.

The preparations obtained were tested for fly attracting 25 effect in the same manner as in Example 2, Test I. Table

4 shows the result.

TABLE 4

Preparation _Piasnenc Ply attracting
30 No. Name Conon. (Wa %) Hue effect (56) -
3a Sunset 0.08 - - 1 Y 12
Yellow P
3b 111.3 1Y 16

35 EXAMPLE 4

Pigment (Fluorescelne) I g
Titseetluitle (Permetluin) I g
40 cis-9-Trlcosene 25 mg
Extender (sugar powder) 100 g

The specified amounts of the pigment, cis--tricosene (used as I ml of hexane solution) and sugar powder 45 were mixed together with stirring, and the solid mixture obtained was crushed, thoroughly kneaded with addi-tion of20% aqueous solution of gum arabic by spraying, granulated under pressure and dried at room tempera-
ture.
so The insecticide as dissolved in acetone was then sprayed to the mixture obtained in an amount of 15 ml per g of the mixture. The mixture was thoroughly stirred, and the solvent was removed therefrom by a rotary evaporator (50° C.) to obtain a fly attracting 55 composition ofthe Invention. This composition will be referred to as "invention 4a".

COMPARATIVE EXAMPLE 1

A comparative fly attracting composition, having the 60 same hue and the same mean grain size as the composi-tion ofExample 4, was prepared in the same manner as in Example 4 except that cis-9-tricosene was not used. This composition will be referred to as "comparative 41,".

65 COMPARATIVE EXAMPLE 2
The components used in Example 4 were mixed to-gether with stirring, then pulverized and dried to obtain

4,855,133 11 - a comparative fly attracting composition in the form of

a powder. This composition will be referred to as "com-parative 4c".

Attracting-insecticidal test

The attractant specimens prepared above were tested
for attracting-insecticidal activity on flies by placing the specimens, 20 g each, into large dishes, 15 cm in inside diameter, individually, arranging the dishes on the floor of a test room (4X 3

2.6 as) arid releasing about 140 to
150 flies into the room. The number ofdead flies In each dish was counted one to two hours after the start of the test. The activity is evaluated in terms of the average obtained by repeating the above test four times for each specimen.
Table 5 below shows the result.

TABLES

Attracting-insecticidal
Test No, Specimen activity (number at’ tiles)
Invention 4a 69.1

2 Comparative 4b 9.1
3 Comparative 4c 2.9

With reference to Table 5, comparison between in-ventton 4a and comparative 4c, having the same compo-sition, reveals that invention 4a is exceedingly superior in the. activity owing to the feature of the preparation that It is given the specified grain size by granulation. in this effect, the preparation of the Invention is also ex-ceedingly superior to comparative 4b which is free from cis-9-tricosene. Thus, the test result indicates that the outstanding attracting effect is attributable to the use of cis-9-trloosene and also to the specified grain size.

EXAMPLE 5

Insecticide (Methomyl, S-methyl 2 g N-(methylaarbamoyloxy)thioace;imidate

cis-9-Tri;osene 30 mg Sugar powder 100 g Antioxidant (BHT, 2,"i- 2 g bucylmethyIphenyl)

12
attracting composition of the invention. This composi-tion will be referred to as "invention 5a".
The composition has a hue of 1YR. and was eventu-ally 1.5 mm in mean grain size.

COMPARATIVE EXAMPLE 3

A comparative fly attracting composition having the same hue and mean grain size as above was prepared in the same manner as in Example 5 except that no cis-9-10 tricosene was used. The composition will be referred to as "comparative Sb".

Attracting-insecticidal test

The composition specimens obtained in these exam- 15 pies were tested in the same manner as in Example 4
using 20 g of each specimen. Table 6 below shows the result. The activity is evaluated in terms of the average obtained by repeating the test procedure five times for each specimen.
20 TABLE 6

Attracting-Insecticidal
Test No, Specimen activity (number of flies)

I Invention $a - 43.3 - 2 Comparative 6b 10.4

EXAMPLES 6-11

In the same manner as in Example 4, attracting coin-
30 positions of the invention having different grain sizes were prepared using the components listed in Table 7. The symbols used in Table 7 for some of the compo-nents represent the following.
Pigments
35 A-I. Sunset Yellow
A-2: Yellow No. 2
A-3: Fluoresceine
Insecticides
B-I: Permethrin

40 B-2: Cbrysron.Forte (compound name: 5-benzyl-3- furylmethyl d-cis/trans-chrysanthemate)

B-3: Phenothrin

TABLE 7

cis-9. Sugar
Tricosene insecticide jjginent powder Grain
La. Amount Amount Amount Amount size

No. (part) Name (parts) Name (parts) (parts) (mm) lice
6 0.025 5-1 1.0 A-i 1.0 97.975 1.5 1 YR
7 0.025 5-2 1.0 A-2 1.0 97.975 1.5 9 5.
8 0.025 B-3 1.0 A-3 1.0 97.975 1.5 1 YR
9 0.025 5.1 3.0 A-I 3.0 93.975 3.0 1 YR
10 0.025 0-2 3.0 A-1 3.0 93.975 3.0 1 YR
11 0.02$ 0-3 3.0 A-1 3.0 93.975 3.0 1 YR

Fluorescelne 1 g 53

The sugar powder and cis-9.tricosene (used as I ml of hexane solution) were mixed together with stirring to obtain a solid mixture, which was then crushed, thor-oughly kneaded with addition of 200/c aqueous solution of gum arabic by spraying, granulated to a mean grain size of 2 mm under pressure and dried at room tempera-
ture.
The above insecticide as dissolved in acetone was

subsequently sprayed to the granular mixture in an amount of 15 ml per 50 g of the mixture. The mixture was thoroughly stirred, and the solvent was removed therefrom by a rotary evaporator (50’ C.) to obtain a fly

60

The composition specimens ofthe invention prepared
in these examples were tested for attracting-insecticidal activity on flies in the same manner as In Example 4. The result achieved by each of the specimens was com-parable to those already attained by the compositions of the invention.

EXAMPLES 12-17

Granular attracting-insecticidal compositions having
a mean grain size of 2 mm and the same hue as the 65 composition of Example 4 according to the invention were prepared in the same manner as in Example 4 with the exception of using the sex pheromones listed in Table 8 below in place of cis-9-trlcosene.

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TABLE 8

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Example No. Sex pheromone
12 9-Tricosene

13 10-Methyl-9-trlcoscne
14 cis-2-Methyl-8.docosene
15 65.9-Docosana
16 cis.S-Docosena
17 cis-10-Trlcosene

The compositions obtained were tested in the same manner as in Example 4. Consequently, each of the composition was found to exhibit the same attracting effect as achieved by the composition of the invention In Example 4.

EXAMPLE 18

14

TEST EXAMPLE

Two g of each of the bait compositions obtained in Examples 18, 21 and 22 was placed into a plastics cup (KP-430) containing 100 male adults of flies. The knockdown was checked with the lapse of time. Table 9 shows the result.

TABLE 9

10 1nock4own
Example - 5 Minutes later 24 Hours later

18 100 100 - 21 100 100
22 100 100

15

A 0.6 g quantity of (5-benzyl-3-f’uryl)methyl d-cis/- trans-chrysanthemate (hereinafter referred to as "corn20 pound A"), 1.04 g of Yellow No. 5, 0.1 g of cls-9-trlco-sane, 60 g of sugar powder and 20 g of pupal powder were mixed together with stirring. The solvent was removed from the mixture using a rotary evaporator
(50’ C.). The mixture was screened with a 2-mm-mesh 25 sieve, and the oversize portion was further pulverized to particles. The combined powder thus obtained was fully kneaded with addition of 1.2 nil of Amycol H (aqueous binder solution) by spraying and granulated to 30 a mean grain size of2 mm under pressure. The granular mixture was dried at 40’ C. for 4 hours to obtain a bait composition according to the invention.

EXAMPLE 19 35

A bait composition of the invention was prepared in the same manner as In Example 18 except that 40 g of pupal powder was used.

EXAMPLE 20 40

A bait composition of the invention was prepared in the same manner as in Example 18 with the exception of using 10 of wheat flour and 30 g of glucose in place of sugar powder and 5 g of a meat extract in place ofpupal 45 powder.

EXAMPLE 21

A bait composition of the invention was prepared in the same manner as in Example 18 with the exception of 50 using Permethrin in place of compound A.

EXAMPLE 22

A bait composition of the invention was prepared in 55 the same manner as in Example 18 except that Phenoth-
na was used in place of compound A.

60

65

We claim:
1. A By attracting composition comprising:
(a) as a fly attracting compound, about 0.01 to about 15% by weight, based on the weight of the compo-sition, of at least one sex pheromone selected from
the group consisting of 9-tricosene, cis-9.tricosene, 10-methyl-9-tricosene, cis-2-methyl-8.docosene, cis-9-docosene, cis-8-docosene and cia. lO-trico-sane;

(b) a colorant to impart a yellowish red color in the range of 2.5R. to 2.5YR. in hue to the composition; and

(o) a carrier; the composition being in granular form having a mean grain size of about 0,5 to about 5
mm.

2. A composition as defined in claim 1 wherein the sex pheromone is cis-9-trieosene.
3. A composition as defined in claim 1 wherein the hue is In the range of 7.5R to 2.5YR.
4. A composition as defined in claim 1 wherein the mean grain size is in the range of about ito about 3 mm. S. A composition as defined in claim 1 which further comprises about 0.1 to about 15% by weight based on the weight of the composition of an insecticidal com-pound.
6. A composition as defined in claim 5 wherein the insecticidal compound is a pyrethroid compound.
1. A composition as defined in claim 6 wherein the insecticidal compound Is at least one compound se-lected from the group consisting of. 5-benzyl-3-furyl-methyl d-ois/trans.chrysanthernate, 3-phenoxybenzyl cis/trana-chrysanthemate and 3-phenoxybenzyl oisf-trans-3-(2,2-dlchlorovinyl)-2,2-dimethyloyclo-propanecarboxylats.
S. A composition as defined in claim 7 wherein the insecticidal compound is 5-benzyl-3-furylznethyl d-cis/- trans-chrysanthemate.
9. A composition as defined in claim 7 or $ which further comprises about 70% by weight or more, based on the weight ofthe composition of an ingestion-induc-ing attractant and/or an edible substance as a carrier.

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U 20010046986A1

(19) United States.

(12) Patent Application. Publication (10) Pub. No.: US 2001/0046986 Al
Mum etal.

(4). Pub. Date: Nov.29,2001

(54) METHOD FOR CONTROLLING. FLIES (52) U.S. Cl........

314/211.03; 514/212,08; 514/241;

514/269; 514m65;.514/351; (76) Inventors:

Hiroyuki Mlura,.!4ish o..shi (JP); 5.14/595:

Atsuo Akayaina, Tita..sbj (JI) (57) ABSTRACT
Correspondence Address:
W,LINI)

PONACK, LLP There is provided a method for controlling flies, that livein
or come flying to livestock pens or poultry hOUSeS, by using .20331K STREET
:"SUITE a compound or salt thereof with an amnity for a ncotith 800
,i. WASHINGTON, "a acetylcholine receptor of insects. Since having a very high

activity against flies, the compound or salt thereof helps

21 I No.: O9/84J 820 quickly and eMciently to control flies that live in or come
-. flying to livestock pens or poultry houses. Also,since having
(1)L jJ U, Apr. 24 *VVL

an excellent control. effect on flies that are resistant to
conventional chocals rnt including a organo-phosphoricpes.
(30)

Foreign Application Priority ticide and a pyrethroid, compound or salt, thereof helps
to prevent propagation, caused by flies, of various diseases

Apr. 26, 2000 (11’)....................................... 131562/2000 to livestock, poultry and humans, and reduce. discomfort of
workers engaged in the livestock and poultry farming and a
. . . . Publication Classification

community. Still, It is possible with the present invention to
.. keep livestock pens, or poultry houses in a hygienic condi-
(51).. mt. CL.........,.....;..... AO1N 43/54;.AOIN 47/28;

tion, which may greatly contribute to the develnpment:ofthe
AO1N 43/78livcstok and ’poultry farming.

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METHOD FOR CONTROLLING FLIES

HELD OF THE INVENTION

[0001] The present invention relates to a method for
controlling flies, that live in or come flying to livestock pens (including barns, etc.,) or poultry houses such as chicken houses, by using one or more compounds or salts thereof having an affinity for a nicotinic acetylcholine receptor (hereinafter, sometimes abbreviated to as "NACR") of insects. The present invention also relates to a composition for controlling flies that live in or come flying to livestock pens or poultry houses comprising the compounds or salts thereof.

[0002] The compounds having an affinity for NACR used
herein include insecticidal compounds with an agonist activ-ity or antagonist activity for NACR (hereinafter, sometimes abbreviated to as ’NACRA type insecticidal compounds"),

DISCLOSURE OF THE PRIOR ART

[00031 Examples of conventional agents for controlling
flies in livestock pens or poultry houses include organo-phosphoric pesticides, synthetic pyrethroids, IGR (chitin-biosynthesis inhibitor), JHM (materials for juvenile hor-mone) and the like. However, repeated use of these limited chemicals results in various problems including the occur-rence of flies having resistance to the chemicals and delayed effect of, in particular, IGR and JHM on the flies. Thus, this is not a satisfactory situation. Also, synthetic pyrethroids are known to have a repellent activity. Therefor, even though flies are apparently reduced after chemical treatment, in fact they move to the surroundings of livestock pens or poultry houses. In some cases, it may make a community uncom-fortsble.

[0004] On the other hand, examples of the NACRA type
insecticidal compounds include compounds described in EP-A 135956, EP-A 136636, EP-A 154178, EP-A 163855, EP-A 189972, EP-A 192060, EP-A 212600, EP-A 235725, EP-A 254859, EP-A 259738, EP-A 302389, EP-A 302833, EP-A 303570, EP-A 306696, EP-A 315826, EP-A 364844, EP-A 375907, EP-A 383091, EP-A 386565, EP-A 425978, EP-A 428941, EP-A 455000, EP-A 464830, EP-A 471372, EP-A 580553; DE-A 3639877, DE-A 3712307; JP-A 63-287764, JP-A 63-307857, JP-A 2-171, JP-A 2-207083, JP-A 3-128361, JP-A 3-157308, JP-A 3-169861, JP-A 3-218370, JP-A 3-220176, JP-A 3-246283, JP-A 3-255072, JP-A 3-279359, JP-A 4-9371, JP-A 4-154741, JP-A 5-271207, JP-A 6-183918, JP-A 7-179448, JP-A 7-278094; U.S. Pat. No. 4,918,086, U.S. Pat, No. 4,948,798, U.S. Pat. No. 5,034,404, U.S. Pat, No, 5,034,524, U.S. Pat. No. 5,039,686; WO 91/4965, WO 91/17659; FR-A 2611114; Brazil Patent Application No. 8803621 and the like. These NACRA type insecticidal compounds are sometimes referred to as neonicotinoid compounds, nitromethylenc compounds, cbloronieotiuyl compounds and thianicotinyl compounds. Some of these compounds are marketed or under development.

[0005] Some of these patent publications disclose that the
compounds have the effect on agricultural insect pests and insanitary insects (e.g., JP-A 3-157308), However, none of them refer to control of flies in livestock pens or poultry houses.

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[0006] Moreover, a method for directly treating host ani-
mals with these NACRAtype compounds for extermination of fleas in mainly dogs and cats are described in, for example, JP-A 8-92091 and JP-A 2000-63271, However, no description is given with respect to control of flies that live in or come flying to livestock pens or poultry houses.

[0007] Examples of the flies in livestock pens or poultry
houses include flies such as Hypoderma bovis whose larva parasitizing the skin, or stinging and biting Stomoxys that directly inflict pain on livestock, and flies such as Musca domestics, Muscina stahulaus and Fannia canicularis that produce indirect detrimental effects on livestock. Such indi-rect detrimental effects include malodor caused by evolution of ammonia resulting from softening of feces by the larva and propagation of various diseases by the imagoes to livestock, poultry or humans. Examples of the diseases propagated by adult flies include Newcastle disease and influenza in chickens, infectious gastroenteritis and cholera in pigs, mastitis and epizootic stomatitis in cows, dysentery, cholera and alimentary intoxication (e.g., alimentary intoxi-cation caused by Salmonella, pathogenic Eseherichia coli 0-157 and the like) in humans. Also, flies are considered to be filthy insect pests. Therefor, when flies come flying to houses surrounding livestock pens or poultry houses, troubles with a community may occur as a problem. Thus, it is essential for livestock farmers to achieve control of these flies.

OBJECTS OF THE INVENTION

[0008] However, according to the present situation involv-
ing the above -described problem of the development of resistance, it is desired that a new type of agents having high activities for controlling files are developed.

[0009] The main object of the present invention is to
provide a method for controlling flies, that live in or come flying to livestock pens or poultry houses,

[0010] This objective as well as other objectives and
advantages of the present invention will become apparent to those skilled in the art from the following description.

SUMMARY OF THE INVENTION

[0011]. Under the above circumstances, the present inven-tors have studied intensively for searching a new type of an agent for controlling flies that live in or come flying to livestock pens or poultry houses, As a result, surprisingly, the present inventors have found that an NACRA type insecticidal compound has very high activity against these flies. As a result of the present inventors’ further study, the present invention has been completed.

[0012] That is, according to the present invention, there is
provided;

[0013] (1) A method for controlling flies, that Jive in or
come flying to livestock pens or poultry houses, comprising using a compound or salt thereof having an affinity for a nicotinic acetylcholine receptor of insects;

[0014] (2) The method for controlling flies according to
the above (1), wherein the compound or the salt thereof is a compound of the formula I, 11 or III,

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ACU2--L1,Ra

(H

A__Cr2_IC)_R3

III

[0015] wherein A represents 6-chloro-3-pyridyl, 2-chloro-
5-thiazolyl, tetrahydrofuran-3-yl, 5-rnethyltetrahydrofuran-3.yl, 3-pyridyl, 6.bromo-3-pyridyl, 3-cyanophenyl, 2-me-thyl-5-thiazolyl, 2-pbenyl-5-thiazolyl or 2-bromo-5-thiazolyl; R represents hydrogen atom, methyl, ethyl, propyl, propenyl, propynyl, formyl, acetyl or methoxycar-bonyl; R represents methyl, ethyl, amino, methylamino, N,N-dirnethylamino, ethylamino, N,N-diethylamino, N-me-tbyl-N-ethylamino, 1-pyrrolidinyl. N-methylformamide, N-rnethylacetamide or N-methyl-N-(methoxycarbony-l)arnino; R3 represents a hydrogen atom, methyl, ethyl, propyl, propenyl, propynyl, formyl, acetyl or methoxycar-honyl; X represents nitromethylene, nitroimino, cyanoimino or trifluoroacetylimino; Y represents a group represented by N (R4) (R4 is as defined with respect to R) or sulfur atom; Z represents a group represented by N (R) (R5 is as defined with respect to R) or oxygen atom; and n is an integer of 2 or 3, or a salt thereof;

[0016] (3) The method for controlling flies according to
the above (1), wherein the compound is one or more compounds selected from the group consisting of clothiani-din (common name), nitenpyram (common name), imida-cloprid (common name), thiacloprid (common name), acetamiprid (common name), thiamethoxam (common tiamc) and dinotefuran (common name);

[0017] (4) The method for controlling flies according to
the above (1), wherein the compound is chlothianidine (trade name);

[0018] (5) The method for controlling flies according to
the above (1), wherein the compound or salt thereof having an affinity for a nicotinic acetylcholine receptor of insects is sprinkled or sprayed in livestock pens or poultry houses;

[0019] (6)The method for controlling flies according to
the above (1), wherein the compound or salt thereof with an affinity for a nicotinic acetylcholine receptor of insects is applied to the inside of livestock pens or poultry houses;

[0020] (7) The method for controlling flies according to
the above (1), wherein a poisoned bait containing the compound or salt thereof with an affinity for a nicotinic acetylcholine receptor of insects is placed in livestock pens or poultry houses;

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[0021] (8) A composition for controlling flies, that live in
or come flying to livestock pens or poultry houses, corn-prising a compound or salt thereof having an affinity for a nicotinic acetylcholine receptor of insects;

[0022] (9) The composition for controlling flies according
to the above (8), wherein the compound or the salt thereof is a compound of the formula I, II or III shown in the above
(2) or a salt thereof;

[0023] (10) Use of a compound or salt thereof having an
ailnity for a nicotinic acetylcholine receptor of insects for manufacturing a composition for controlling flies that live in or come flying to livestock pens or poultry houses; and

[0024] (11) Use according to the above (10), wherein the
compound or the salt thereof is a compound of the formula I. II or III as shown in the above (2) or a salt thereof.

DETAILED DESCRIPTION OF THE
INVENTION

[0025] Examples of the compounds having an affinity for
NACR include the compounds described in the above patent publications. They can be produced according to the meth-ods described in the above patent publications, or their modifications.

[0026] Among NACRA type insecticidal compounds,
preferably, an insecticidal compound having an agonist activity for NACR are used.

[0027] It is preferred to use a compound of the formula I.
II or ill:

A_CH2_L(R2

(CH2)n

AcaratrrY

UT

ACF12N.., N

[002$] wherein the symbols are as defined above, or a salt thereof.

[0029] It is more preferred to use clothianidin [(E)-1 -(2.
chloro-1,3-thiazol-5-ylmethyl)-3-mcthyl-2-nitroguanidine], nitenpyram [(E)-N-(6-chloro-3-pyridylmethyl)-N-ethyl-N-methyl-2-nitrovinylidenediamine]. irnidacloprid - [1-(6-chloro-3-pyridylmethyl)-2-nitroiminoimidazolidirie], thia-cloprid [3-(6-ehloro-3-pyridylmnethyl)-2-cyanoimino-1,3-thiazolidin], acetamiprid [(E)-N’-((-chloro-3-pyridylmethyl) -N-cyano-N-metbylacetoamidine], thiamethoxam [3-(2.chloro-1,3-thiazol-5-ylmethyl)-5-me-

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thyl.4.nitroimino-1,3,5-perhydroxadiazine], and dinotefli-ran [1.methyl-2-nro-3-(3-tetrabydrofurylniethyl)guani-dine). The structural formulae thereof are as follows.,

H
chiothiankline

49 CHNO2

CL-0CRrJ

nitenpirame

I-’
CI_O_CH2N

imidacloprid

r C-0__ctiN1,S
thtalopid

NCN

acouniiprid

C

02
thlsmclosane

fT
dinotefuran

[0030] Among the above, chiothianidine (trade name) is the most preferred.

[0031] These compounds having an affinity for NACR sometimes react with acidic substances or basis substances, to form salts These salts may be agricultural chemicals acceptable salts. More specifically, examples of the basic substances include alkali metals such as sodium, potassium, lithium, etc.; alkaline earth metals such as calcium, magne-sium, etc.; inorganic bases such as ammonia, etc.; and

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organic bases such as pyridine, collidine, triethylamine, triethanolamine, etc.; and the like. Examples of the acidic substances include inorganic acid such as hydrochloric acid, hydrohrórnic acid, hydrofodic acid, phosphoric acid, sulfuric acid, perchioric acid,etc.; and organic acid salts such as formic acid, acetic acid, tartaric acid, malic acid, citric acid, oxalic acid, succinic acid, benzoic acid, picric acid, moth-anesulfonic acid, p-toluenesulpbonic acid, etc.

(0032] These compounds orsaltsthereof having an affinity for NACR have low toxicity against mammals including livestock and humans and low fish toxicity, and thus are excellent eco-friendly fly-controlling agents.

(0033] l"lies targeted for control by the present invention in livestock pens or poultry houses refer to all fifes that live in or come flying to livestock pens or poultry houses. Examples of the flies include those of Museidae such as Musca domestics, Fan.nia cankularis, Muscfrza stabula.ns, Stomoxys calcitrtrns, etc.; Calliphoridac such as Callipizora iota, Callophora vicina., Aldrkhina grahami, Lucille illus-trLc, etc.; and Sarcophagidae such as Boeticherisca pereg-rina, etc. The most troublesome flies in the livestock farming are flies of Museidac mentioned above.

[0034) These flies targeted for control include every stage of generation, i.e., eggs, larvae, pupas and imagoes. Particu-larly, the compound or a salt thereof used in the present invention exhibits a high activity against larvae and ima-goes, That is, the preferred embodiment of the present invention include a method for controlling larvae and ima-goes of flies that live in livestock pens or poultry houses, or imagoes of flies that come flying thereto.

[0035] The compounds or salts thereof having an affinity
for NACR described above exhibits a strong insecticidal activity against Diptera in general, enabling simultaneous control of mosquitoes and gnats of Netuatocera, and horse-flies of l3rachycera.

[0036] ’l’picaI examples of livestock pens or poultry
houses to which the compounds or salts thereof having an affinity for NACR described above are used, include a cow house, a pig pen and a poultry farm. Examples thereof also include places for bleeding other livestock and pets (e.g., horses, sheep, goats, camels, buffalo, donkeys, rabbits, deer, reindeer, minks, dogs and cats) and poultry (e.g., ducks, turkeys and quails). Further, "the livestock pens or poultry houses" of the present.invention includes sites for accumu-lating feces and urine, garbage, spilt food and the like discharged from these facilities, which may be located indoor or outdoor around livestock pens or poultry houses.

[0037] For using the compounds or salts thereof having an
affinity for NACR described above for controlling flies in livestock pens or poultry houses, they can be formulated in the form of conventional agrochemical formulations. That is, one or more (preferably, one or more but three or loss) of the compounds or salts thereof having an affinity for NACR as active components are dissolved or dispersed in an appropriate liquid carrier, or mixed or absorbed with an appropriate solid carrier to prepare emulsion, solution, microemulsion, flowable preparation, oily preparation, water soluble powder, wettable powder, granular wettable powder, powder, granule;: microgranule, smoking agent, tablet, microcapsule, spray, EW, ointment, poisoned bait, and the like. ’

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[0038] 11 necessary, to these preparations may be added
emulsifier, suspension, spreader, penetrant, humecant, muci-lage, stabilizer and the like. They are prepared by a per se known method, -

[0039] Examples of the liquid carrier (solvent) to be used
include water, alcohols (e.g., methyl alcohol, ethyl alcohol, n-propyl alcohol, isopropyl alcohol, ethylene glycol, etc.), ketones (e.g., acetone, methyl ethyl ketone, etc.), ethers (e.g., dioxane, tetrahydrofliran, ethylene glycol monometbyl ether, diethylene glycol monomethyl ether, propylene glycol monotncthyl ether, etc.), aliphatic hydrocarbons (e.g., kero-sene, lamp oil, fuel oil, machine oil, etc.), aromatic hydro-carbons (e.g., benzene, toluene, xylene, solvent naphtha, meihylnapbthalene, etc.), halogenated hydrocarbons (e.g., diehioromethane, chloroform, carbon tetrachloride, etc.), acid amides (e.g., N,N-dimethylformamide, N,N-dimethy-lacetamide, etc.), esters (e.g., ethyl acetate, butyl acetate, glycerol fatty acid ester, etc.), nitrites (e.g., acetonitrile, propionitrile, etc.) and the like. One or more of these carriers (preferably, one or more, but three or less) may be mixed at a suitable ratio according to particular used,

[0040] Examples of the solid carriers (diluent, extender)
include vegetable powder (e.g., soy flour, tobacco powder, wheat flour, wood flour, etc.), mineral powder (e.g., clay such as kaolin, bentonite, acid clay, etc.; talc such as talc powder, pyrophyllite powder, etc.; silica such as diatom earth, mica powder, etc.; and the like), alumina, sulfur powder, activated carbon and the like. One or more of these carrier (preferably, one or more, but three of less) may be mixed at a suitable ratio according to particular use.

[0041] Examples of ointment bases include polyethylene
glycol; pectin, polyol ester of higher fatty acid such as glyceryl inonostearate ester, etc.; cellulose derivative such as methyl cellulose, etc.; sodium alginate; bentonite; higher alcohol; polyol such as glycerin, etc.; vaseline; white vase-line; liquid parafln; lard; various vegetable oils; lanolin; anhydrous lanolin; hardened oil; resin and the like. These may be used alone or in combination thereof(preferably, one or more, but three or less). If necessary, various surfactants can be appropriately added.

[0042] Examples of the surfactants to be used as emulsi-
fier, spreader, penetrant, dispersant or the like include non-ionic and anionic surfactants such as soaps, polyoxyethylene aikvlaryl ethers [e.g., Noigen (trade name) and E’A 142 (trade name) manufactured by Daiicbi Kogyo Seiyaku Co., Ltd.; Nonal (trade name) manufactured by Toho Chemical], aU<ylsulfatcs [e.g., Emal 10 (trade name) and Emal 40 (trade name) manufactured by Kau Corporation], aikylsulfonates [e.g. Neogen (trade name) and Neogen T (trade name) manufactured by Daiiclti Kogyn Seiyaku Co., Ltd.; Neopellex (trade name) manufactured by Kan corporation], polyethylene glycol ethers [e.g., Nonipol 85 (trade name), Nonipol 100 (trade name) and Nonipol 160 (trade name) manufactured by Sanyo Chemical Industries, Ltd.], polyby-dric alcohol esters [e.g., Tween 20 (trade name) and Tween 80 (trade name) manufactured by Kao Corporation] and the like. They may be used whenever they are needed. Further, the compounds or salts thereof having an affinity for NACR may be used in combination with one or more other insec-ticides (e.g., pyrethroid insecticides, organophosphorus insecticides, carbamate insecticides, phenylpyrazole insec-ticides, phenylpyrrole insecticides, benzoylurea insecticides,

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dibenzoylhydrazine insecticides, Nereistoxin insecticides, juvenile hormone substances, natural insecticides, and the like), miticides (acaricides), nematocides, fungicides (e.g., copper fungicides, organochlorine fungicides, organosulfur fungicides, phenolic fungicides, benzimidazole fungicides, EBI, melanin-biosynthesis inhibitors and acrylate fungi-cides), synergists, attractants (e.g., sugar, vinegar, molasses, milk powder, etc.), repellents, pigments, and the like accord-ing to particular use.

[0043] Normally, the compounds or salts thereof having
an affinity for NACR are formulated in an amount of about 0.01 to 95% by weight, preferably about 0.1 to 80% by weight based on the total weight of the composition for controlling flies of the present invention, More specifically, when the composition to be used is in the form of emulsion, solution, wettable powder, granular wettable powder or the like, suitably, the compounds or salts can he formulated in an amount of about 1 to 80% by weight, preferably about 1 to 20% by weight based on the total weight of the compo-sition. When the composition to he used is in the form of oily solution, powder or the like, suitably, the compounds or salts can be formulated in an amount of about 0.1 to 50% by weight, preferably about 0.1 to 20% by weight based on the total weight of the composition. When the composition to he used in the form of granule or the like, suitable, the com-pounds or salts can be formulated in an amount about 5 to 50% by weight, preferably about ito 2001b by weight based on the total weight of the composition.

[0044] Normally, other active components to he combined
in the composition for controlling flies of the present inven-tion (e.g., insecticides, acaricides (miticides) and/or fungi-cides) may be used in an amount ranging from about 0.01 to 80% by weight, preferably about 1 to 20% by weight based on the total weight of the composition.

[0045] The content of additives other than the above active
components varies depending on a particular kind or content of the active component, a particular form of the composi-tion and the like. Normally, they are formulated in an amount of about 0.001 to 99.9% by weight, preferably about 1 to 99% by weight based on the total weight of the composition. More specifically, normally, it is preferred to add about ito 209o’ by weight, preferably about ito 15% by weight of a surfactants, about 1 to 20% by weight of a fluidization aid, and about 1 to 90% by weight, preferably about I to 70% by weight of a carrier based on the total weight of the composition, respectively. Still more specifi-cally, for producing a solution, normally, it is preferred to about 1 to 20% by weight, preferably about 1 to 10% by weight of a surfactant and about 20 to 90% by weight of water based on the total weight of the composition. Upon use, the emulsion, wettable powder (e.g., granular wettable powder) or the like may be diluted with water and the like to a suitable concentration (e.g., about 100 to 5,000-fold) before sprinkling or spraying.

[0046] Representative examples of insecticides, miticides
(acaricides) and fungicides, which may be used by mixing or combining with the compounds or salts thereof having an affinity -for NACR in the method for controlling flies of the present invention, are as follows: EPN, acephate, isoxathion, isofeophos, isoproearb, etrixnfos, oxydeprofos, quinalphos, cadusafos, chiorethoxyfos, chiorpyrifos, chlorpyrifos-me-thyl, chlorofenvinphos, salithion, cyanophos, disulfoton,

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Preparation Example 1

Preparation of 50% chtothlantdine granular wettable powder

CIQLIiAaWW 50 parts,
Alkeuyinultató 10 parts and
Radiolire 0200 (trade narne) were added 100 parts
(total)

f0052) The above materials were thoroughly mixed, added with 25 parts of tap water, and kneaded in a mortar. Then, the resultant kneaded materials were granulated into col-urnn-shaped granules by a pellet mill (Kikusui Seisakusbo Ltd., RG-5W) using a screen with a diameter of 0.8 mm. The resultant granules were dried at 60° C. for 1 hour to obtain clothianidin 50% granular wettable powder.

EXAMPLE 1

[0053] Preparation ofliquid composition for application to liv.cstock pen and poultry house Ten grams of clothianidin 5001r granular wettable powder and 10 g of sugar were mixed. To the mixture was added water and the total volume was adjusted to 100 ml.

EXAMPLE 2

[0054) Preparation of liquid compositiOn for poisoned bait /

[0055] TO 100 g of a 1:5:10 mixture ofsugar, vinegar and milk powder (feed for weaning baby pigs). and 10 g of clothianidin 501016 granular wettable powder was added water and the mixture was adjusted to the total volume of 500 ml to obtain a liquid composition.

Test Example. 1

[0056]. Insecticidal test by oral administration to Musca domestica

[0057) A clothianidin solution in alcohol was diluted with 5% granulated sugar solution to prepare a 50 ppm liquid composition of clothianidin.

[0058) Female Musca domestica imagoes (ten flies) of a sensitive strain kept without water for 3-4 hours were anesthetized and lightly fixed to a pressure sensitive adhe-sive sheet which was cut into strips. After the test insects came out from the anesthetic, 1 iLof the liquid composition (containing 0.05 ig of clothianidin) was released from an injection needle attached to a micro dropper so that the test insects inhaled the composition. After 24 hours, it was confirmed that all flies were dead.

What is claimed is:

1. A method for controlling flies, that live in or come flying to livestock pens or poultry houses, comprising using a compound or salt thereof having an affinity for a nicotinic acetylcholine receptor of Insects.
2. The method for controlling flies according to claim 1, wherein the compound or the salt thereof is a compound of the formula.!, IT: or III:

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A_CR_k.1,..,R2

A,..Ci12.t!1Y

M
Z

) ACV12l(NRS

wherein A represents 6-chloro.3.pyridyl, 2-chloro-5-thiaz-olyl, tetrabydrofuran-3-yl, 5-metbyltetrahydrofuran-3-yl, 3-pyridyl, 6-brorno3-pyridyl, 3-cyanophenyl, 2-methyl-5. thiazolyl,,2-phenyl-5-thiazolyl or 2-bromo-5-thiazolyl; R represents hydrogen atom, methyl, ethyl, propyl, propenyl, propynyl, formyl, acetyl or methoxycarbonyl. R2 represents. methyl, ethyl, amino, methylamino, N,N-dimethylamino, ethylamino, NN-diothylarnino, N-methyl-N-etbylarnino, 1-pyrrOlidinyl, N-methylformamide, N-metbylacetainide or N-methyl-N-(metboxycarbonyl)amino; R3 represents a hydrogen atom, methyl, ethyl, pmpyl, propenyl, propynyl, formyl, acetyl or methoxycarbonyl; X represents nitrorneth-ylene, nitroitnino, cyaiioimino or trMuoroacetylimino; Y represents a group represented by N (P.4) (R4 is as defined with respect to 111) or sulfur atom; Z represents a group represented by N (W’) (R5 is as defined with respect to.R) or oxygen atom; and n is an integer of 2 or 3, or a salt thereof.

3. The method for controlling flies according to claim 1, wherein the compound is one or more compounds selected from the group consisting of clothianidin (common name), nitenpyram (common name) mndacloprid (common name) thiacloprid (common name), acetamiprid (common name), thiamethoxam (common name) and dinotefuran (common name).
4. The method for controlling flies according to claim I, wherein the compound is clothianidin (common name).
5. The method for controlling flies aocordingto claim 1, wherein the compound or salt thereof having an affinity for a nicotinic acetylcholine receptor of insects is sprinkled or sprayed in livestock pens or poultry houses,
6. The method for controlling flies according to claim 1, wherein the compound or salt thereof with an affinity for a nicotinic acetylcholine receptor of insects is applied to the inside of livestock pens or poultry houses
7. The method for controlling flies according to claim 1, wheem a poisoned bait containing the compound or salt thereof with an affinity for a nicotinic acetylcholine receptor. of insects is placed in livestock pens or.poultry houses.
S. Acomposition for controlling flies, that live in or come

flying to livestock pens or poultry houses, comprising a compound or salt thereof having an affinity for a nicotinic
acetylcholinØ receptor of insects.