



(51) International Patent Classification:

A01N 43/28 (2006.01) **A01N 43/70** (2006.01)
A01N 37/18 (2006.01) **A01N 43/76** (2006.01)
A01N 37/22 (2006.01) **A01N 43/80** (2006.01)
A01N 39/02 (2006.01) **A01N 43/824** (2006.01)
A01N 39/04 (2006.01) **A01N 43/88** (2006.01)
A01N 41/10 (2006.01) **A01N 43/90** (2006.01)
A01N 43/08 (2006.01) **A01N 47/12** (2006.01)
A01N 43/12 (2006.01) **A01N 47/16** (2006.01)
A01N 43/20 (2006.01) **A01N 47/28** (2006.01)
A01N 43/54 (2006.01) **A01N 47/36** (2006.01)
A01N 43/56 (2006.01) **A01N 47/38** (2006.01)
A01N 43/653 (2006.01) **A01P 13/00** (2006.01)

(21) International Application Number:

PCT/JP2013/064559

(22) International Filing Date:

21 May 2013 (21.05.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2012-116274 22 May 2012 (22.05.2012) JP

(71) Applicant: **ISHIHARA SANGYO KAISHA, LTD.**
 [JP/JP]; 3-15, Edobori 1-chome, Nishi-ku, Osaka-shi,
 Osaka, 5500002 (JP).

(72) Inventor: **SUGANUMA, Taketo**; c/o Ishihara Sangyo
 Kaisha, Ltd. Chuo Kenkyusho, 3-1, Nishi-shibukawa 2-
 chome, Kusatsu-shi, Shiga, 5250025 (JP).

(74) Agents: **SEMYO, Kenji** et al.; 4th Floor, SIA Kanda
 Square, 17, Kanda-konyacho, Chiyoda-ku, Tokyo,
 1010035 (JP).

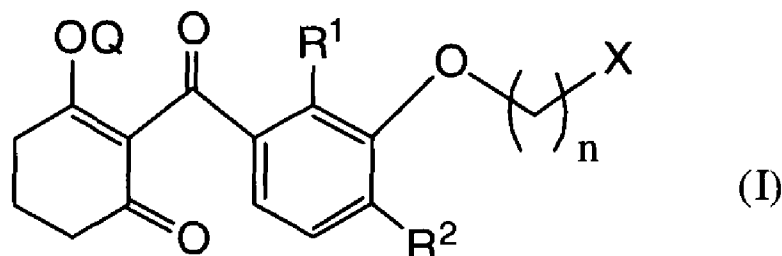
(81) Designated States (*unless otherwise indicated, for every
 kind of national protection available*): AE, AG, AL, AM,
 AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
 BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
 DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
 HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
 KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
 ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
 NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,
 RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
 TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
 ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every
 kind of regional protection available*): ARIPO (BW, GH,
 GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
 UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
 TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
 EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
 MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
 TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
 ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: HERBICIDAL COMPOSITION



(57) Abstract: To provide a herbicidal composition having a broad herbicidal spectrum, having high activity and having a long-lasting effect, whereby the dose of the herbicidally active ingredients can be reduced. By combining a compound represented by the following formula (I) with another herbicidal compound, it is possible to provide a herbicidal composition having a broad herbicidal spectrum, having high activity and having a long-lasting effect. A herbicidal composition comprising a herbicidal compound represented by the formula (I) or its salt; wherein X, R¹, R², Q and n are as disclosed in the specification, and another herbicidal compound, and a method for controlling weeds or inhibiting their growth by means of the herbicidal composition.

DESCRIPTION

TITLE OF INVENTION: HERBICIDAL COMPOSITION

5 TECHNICAL FIELD

The present invention relates to a herbicidal composition comprising a compound represented by the formula (I) given hereinafter and another herbicidal compound.

BACKGROUND ART

10 Patent Document 1 discloses a certain triketone compound, and it is disclosed that the compound can be used as mixed or combined with other agricultural chemicals, fertilizers, phytotoxicity-reducing agents, etc.

However, it is not known specifically that a herbicidal composition comprising a compound represented by the formula (I) given hereinafter and another herbicidal
15 compound described hereinafter, exhibits synergistic herbicidal effects.

PRIOR ART DOCUMENT

PATENT DOCUMENT

Patent Document 1: JP-A-2006-16389

20

DISCLOSURE OF INVENTION

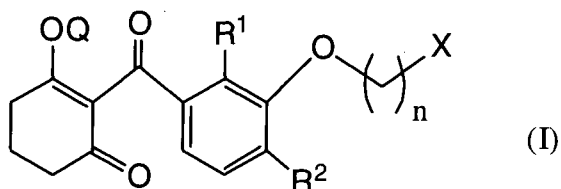
TECHNICAL PROBLEM

At present, many herbicidal compositions have been developed and used, but there are a variety of types of weeds to be controlled, and their development lasts for a
25 long period of time. Thus, a herbicidal composition having a broad herbicidal spectrum, having high activity and having a long-lasting effect has been desired.

SOLUTION TO PROBLEM

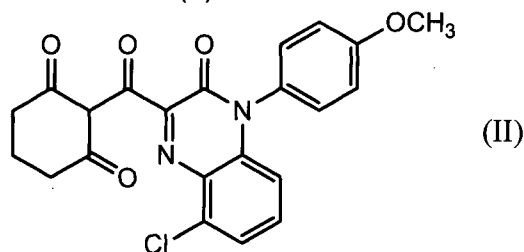
By combining a compound represented by the following formula (I) and another
30 herbicidal compound, it is possible to provide a herbicidal composition having a broad herbicidal spectrum, having high activity and having a long-lasting effect.

That is, the present invention relates to a herbicidal composition comprising (A) a compound represented by the formula (I) or its salt:

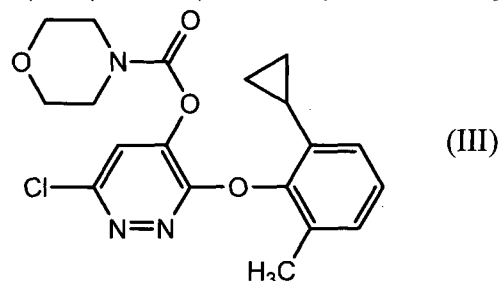


35 wherein X is a 5- or 6-membered saturated heterocyclic group containing one or two hetero atoms of at least one type selected from the group consisting of an oxygen atom and a sulfur atom (said heterocyclic group may be substituted by alkyl), or dialkoxymethyl, R¹ is halogen, R² is alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio, haloalkylthio, alkylsulfinyl, haloalkylsulfinyl, alkylsulfonyl, haloalkylsulfonyl,
40 dialkylaminosulfonyl, di(haloalkyl)aminosulfonyl, nitro or cyano, Q is a hydrogen atom or benzoyl, and n is 1 or 2, and (B) at least one compound selected from the group consisting of (B1) 2,4-D, or its salt or ester, (B2) MCP, or its salt or ester, (B3) MCPB, or its salt or ester, (B4) clomeprop, (B5) simetryn, (B6) dimethametryn, (B7) bentazone, (B8) oxadiazon, (B9) oxadiargyl, (B10) pentoxazone, (B11) pyraclonil, (B12)

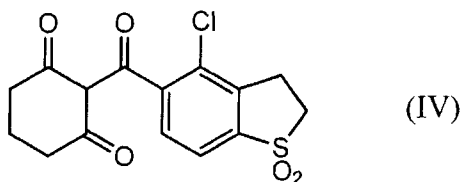
carfentrazone-ethyl, (B13) pyrazolynate, (B14) pyrazoxyfen, (B15) benzofenap, (B16) benzobicyclon, (B17) mesotrione, (B18) tefuryltrione, (B19) a compound represented by the formula (II):



5 (B20) a compound represented by the formula (III):



(B21) cyhalofop-butyl, (B22) metamifop, (B23) bensulfuron-methyl, (B24) pyrazosulfuron-ethyl, (B25) imazosulfuron, (B26) azimsulfuron, (B27) cyclosulfamuron, (B28) ethoxysulfuron, (B29) halosulfuron-methyl, (B30) flucetosulfuron, (B31) propyrisulfuron, (B32) metazosulfuron, (B33) penoxsulam (B34) pyriminobac-methyl, (B35) bispyribac-sodium, (B36) pyrimisulfan, (B37) triafamone, (B38) pyriftalid, (B39) butamifos, (B40) daimuron, (B41) cumyluron, (B42) bromobutide, (B43) molinate, (B44) esprocarb, (B45) pyributicarb, (B46) butachlor, (B47) pretilachlor, (B48) thenylchlor, (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone, (B57) fenoxasulfone, (B58) quinclamine, (B59) quinclorac, (B60) thiobencarb, (B61) clomazone, (B62) pendimethalin and (B63) a compound represented by the formula (IV):



20 Further, the present invention relates to a method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of the above herbicidal composition to weeds or to a place where they grow. Further, the present invention relates to a method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of the compound A and a
25 herbicidally effective amount of the compound B to weeds or to a place where they grow.

ADVANTAGEOUS EFFECTS OF INVENTION

30 According to the present invention, it is possible to provide a herbicidal composition having a broad herbicidal spectrum, having high activity and having a long-lasting effect.

DESCRIPTION OF EMBODIMENTS

The compound of the above formula (I) or its salt is a known compound disclosed in JP-A-2006-16389.

In the formula (I), the 5- or 6-membered saturated heterocyclic group containing one or more hetero atoms of at least one type selected from the group consisting of an oxygen atom and a sulfur atom, for X, may, for example, be tetrahydrofuran-2-yl, tetrahydrofuran-3-yl, dioxolan-2-yl, dioxolan-4-yl, tetrahydropyran-2-yl, 1,4-dioxan-2-yl, 1,3-dioxan-2-yl, 1,3-dioxan-4-yl, tetrahydrothiophen-2-yl, tetrahydrothiopyran-2-yl, 1,3-dithian-2-yl, 1,4-dithian-2-yl, 1,4-thioxan-2-yl or 1,4-thioxan-3-yl. Further, such a heterocyclic group may be substituted by alkyl. Such alkyl has from 1 to 6 carbon atoms and may be linear or branched.

In the formula (I), the alkyl or alkyl moiety for X or R² may be a C₁₋₆ linear or branched one, such as methyl, ethyl, propyl, isopropyl, butyl, tert-butyl, pentyl or hexyl.

In the formula (I), the halogen or halogen as a substituent for R¹ or R² may be an atom of fluorine, chlorine, bromine or iodine. The number of halogen atoms as substituents may be 1, or 2 or more, and in the case of 2 or more, the respective halogen atoms may be the same or different. Further, the substitution position of halogen may be any position.

The salt of the compound of the formula (I) may be any salt so long as it is agriculturally acceptable, and it may, for example, be an alkali metal salt such as a sodium salt, a potassium salt or a lithium salt; an alkaline earth metal salt such as a magnesium salt, a calcium salt or a barium salt; or an ammonium salt such as a NH₄⁺ salt, a dimethylamine salt or a triethylamine salt.

Now, the compound B will be described. The compound B is represented by a common name or a chemical structural formula.

(B1) 2,4-D, or its salt or ester, (B2) MCP, or its salt or ester, (B3) MCPB, or its salt or ester, and (B4) clomeprop, are phenoxy acetic acid type compounds. Such phenoxy acetic acid type compounds and (B59) quinclorac are classified into a plant hormone active (auxin active) disturbing herbicide. Specific examples of the above (B1) include 2,4-D, 2,4-D sodium, 2,4-D dimethylammonium, 2,4-D diethylammonium, 2,4-D diethanolammonium, 2,4-D lithium, 2,4-D ethyl, 2,4-D isopropyl, 2,4-D butyl, 2,4-D isooctyl, etc. Specific examples of the above (B2) include MCP (or MCPA), MCP sodium, MCP potassium, MCP calcium, MCP lithium, MCP dimethylammonium, MCP benzyl triethanol ammonium, MCP ethyl, MCP butyl, MCP isooctyl, MCP allyl, etc. Specific examples of the above (B3) include MCPB, MCPB sodium, MCPB ethyl, etc.

(B5) simetryn and (B6) dimethametryn are triazine type compounds. (B7) bentazone is a pyrimidine type compound. Such triazine type compounds and pyrimidine type compound, are classified into a photosynthesis-inhibiting herbicide.

(B8) oxadiazon, (B9) oxadiargyl, (B10) pentoxazone, (B11) pyraclostrobin and (B12) carfentrazone-ethyl are heterocyclic compounds. Such heterocyclic compounds are classified into a protoporphyrinogen oxidase-inhibiting herbicide.

(B13) pyrazolynate, (B14) pyrazoxyfen and (B15) benzofenap are pyrazole type compounds. (B16) benzobicyclon, (B17) mesotrione, (B18) tefuryltrione, (B19) a compound of the formula (II) and (B63) a compound of the formula (IV) are triketone-type compounds. Such pyrazole type compounds and triketone-type compounds as well as (B20) a compound of the above formula (III) and (B61) clomazone are classified into a 4-hydroxyphenyl pyruvic acid-inhibiting herbicide.

(B21) cyhalofop-butyl and (B22) metamifop are aryloxyphenoxy propionic acid-

type compounds. Such aryloxyphenoxy propionic acid-type compounds are classified into an acetyl CoA carboxylase-inhibiting herbicide.

(B23) bensulfuron-methyl, (B24) pyrazosulfuron-ethyl, (B25) imazosulfuron, (B26) azimsulfuron, (B27) cyclosulfamuron, (B28) ethoxysulfuron, (B29) halosulfuron-methyl, (B30) flucetosulfuron, (B31) propyrisulfuron and (B32) metazosulfuron are sulfonylurea type compounds. (B33) penoxsulam is a sulfone amide-type compound. (B34) pyriminobac-methyl and (B35) bispyribac-sodium are pyrimidinylsalicylic acid-type compounds. (B36) pyrimisulfan and (B37) triafamone are sulfone anilide-type compounds. Such sulfonylurea-type compounds, sulfoneamide-type compounds, pyrimidinylsalicylic acid-type compounds and sulfone anilide-type compounds, as well as (B38) pyrithalid, are classified into an acetolactate synthetase-inhibiting herbicide.

(B39) butamifos is an organic phosphorus compound. (B40) daimuron, (B41) cumyluron and (B42) bromobutide are cumylamine-type compounds. (B62) pendimethalin is a dinitroaniline-type compound. Such organic phosphorus compound, cumylamine-type compounds and dinitroaniline-type compound are classified into a cell mitoses-inhibiting herbicide.

(B43) molinate, (B44) esprocarb, (B45) pyributicarb and (B60) thiobencarb are thiocarbamate-type compounds. (B46) butachlor, (B47) pretilachlor and (B48) thenylchlor are chloroacetamide-type compounds. Such thiocarbamate-type compounds and chloroacetamide-type compounds as well as (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone and (B57) fenoxasulfone are classified into a lipid biosynthesis-inhibiting herbicide.

(B58) quinclamine is a naphthoquinone type compound.

The mixing ratio of compound A and compound B cannot generally be defined, as it is required to be suitably adjusted depending upon the type of the formulation, the weather conditions, and the type and the growth stage of weeds to be controlled. However, compound B is, for example, from 0.0005 to 500 parts by weight, preferably from 0.002 to 100 parts by weight, more preferably from 0.005 to 100 parts by weight, to 1 part by weight of compound A. However, depending upon the above-mentioned various conditions, it is possible to select the mixing ratio outside of such ranges.

Now, the mixing ratio of compound A and compound B will be exemplified for the above-mentioned every type of compound B. The weight ratio of each type of compound B to 1 part by weight of compound A is as follows. However, as mentioned above, such a mixing ratio cannot generally be defined, as it is required to be suitably adjusted depending upon various conditions, and it is also possible to select a mixing ratio outside of such a range. Further, it should be understood that the present invention is by no means restricted by such descriptions.

In a case where compound B is a phenoxy acetic acid type compound, its ratio is from 0.01 to 100 parts by weight, preferably from 0.1 to 11 parts by weight, further preferably from 0.2 to 10 parts by weight.

In a case where compound B is (B59) quinclorac, its ratio is from 0.01 to 100 parts by weight, preferably from 0.1 to 10 parts by weight, further preferably from 0.2 to 10 parts by weight.

In a case where compound B is a triazine type compound, its ratio is from 0.002 to 100 parts by weight, preferably from 0.02 to 10 parts by weight, further preferably from 0.05 to 10 parts by weight.

In a case where compound B is a pyrimidine type compound, its ratio is from 0.2

to 500 parts by weight, preferably from 1.6 to 80 parts by weight, further preferably from 4 to 70 parts by weight.

5 In a case where compound B is a heterocyclic compound, its ratio is from 0.002 to 100 parts by weight, preferably from 0.02 to 16 parts by weight, further preferably from 0.05 to 15 parts by weight.

In a case where compound B is a pyrazole type compound, its ratio is from 0.02 to 500 parts by weight, preferably from 0.4 to 70 parts by weight, further preferably from 1 to 60 parts by weight.

10 In a case where compound B is a triketone type compound, its ratio is from 0.01 to 50 parts by weight, preferably from 0.04 to 7 parts by weight, further preferably from 0.1 to 7 parts by weight.

In a case where compound B is (B20) a compound of the above formula (III), its ratio is from 0.005 to 300 parts by weight, preferably from 0.02 to 30 parts by weight, further preferably from 0.05 to 25 parts by weight.

15 In a case where compound B is (B61) clomazone, its ratio is from 0.01 to 100 parts by weight, preferably from 0.1 to 16 parts by weight, further preferably from 0.2 to 15 parts by weight.

20 In a case where compound B is an aryloxyphenoxypropionic acid type compound, its ratio is from 0.01 to 50 parts by weight, preferably from 0.04 to 7 parts by weight, further preferably from 0.1 to 6 parts by weight.

In a case where compound B is a sulfonylurea compound, its ratio is from 0.0005 to 30 parts by weight, preferably from 0.002 to 3 parts by weight, further preferably from 0.005 to 2.5 parts by weight.

25 In a case where compound B is a sulfonamide type compound, its ratio is from 0.002 to 20 parts by weight, preferably from 0.01 to 2 parts by weight, further preferably from 0.02 to 2 parts by weight.

In a case where compound B is a pyrimidinylsalicylic acid type compound, its ratio is from 0.001 to 30 parts by weight, preferably from 0.004 to 3 parts by weight, further preferably from 0.01 to 2.5 parts by weight.

30 In a case where compound B is a sulfonanilide type compound, its ratio is from 0.002 to 15 parts by weight, preferably from 0.02 to 1.6 parts by weight, further preferably from 0.05 to 1.5 parts by weight.

35 In a case where compound B is (B38) pyriftalid, its ratio is from 0.002 to 50 parts by weight, preferably from 0.02 to 6 parts by weight, further preferably from 0.1 to 5 parts by weight.

In a case where compound B is an organic phosphorus-type compound, its ratio is from 0.2 to 300 parts by weight, preferably from 0.8 to 50 parts by weight, further preferably from 2 to 40 parts by weight.

40 In a case where compound B is a cumylamine type compound, its ratio is from 0.02 to 300 parts by weight, preferably from 0.4 to 40 parts by weight, further preferably from 1 to 30 parts by weight.

In a case where compound B is a dinitroaniline type compound, its ratio is from 0.1 to 150 parts by weight, preferably from 0.4 to 24 parts by weight, further preferably from 0.2 to 24 parts by weight.

45 In a case where compound B is a thiocarbamate type compound, its ratio is from 0.02 to 500 parts by weight, preferably from 0.2 to 100 parts by weight, further preferably from 0.5 to 100 parts by weight.

In a case where compound B is a chloroacetamide type compound, its ratio is

from 0.02 to 300 parts by weight, preferably from 0.1 to 40 parts by weight, further preferably from 0.3 to 35 parts by weight.

In a case where compound B is (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone or (B57) fenoxasulfone, its ratio is from 0.002 to 300 parts by weight, preferably from 0.01 to 40 parts by weight, further preferably from 0.02 to 30 parts by weight.

In a case where compound B is (B58) quinoclamine, its ratio is from 0.2 to 500 parts by weight, preferably from 1.2 to 60 parts by weight, further preferably from 3 to 50 parts by weight.

The amounts of application of compound A and compound B cannot generally be defined, as they are required to be suitably adjusted depending upon e.g. the mixing ratio of compound A and compound B, the type of the formulation, the weather conditions, and the type and growth stage of weeds to be controlled. However, per 1 are, for example, compound A can be suitably selected within a range of from 0.1 to 10 g, preferably from 0.5 to 5 g, and compound B can be suitably selected within a range of from 0.005 to 50 g, preferably from 0.01 to 50 g, and they may be suitably combined. However, depending upon the above-mentioned various conditions, it is possible to select the amounts of application outside of these ranges.

Now, the amount of application of compound B per 1 are will be exemplified for the above-mentioned every type of compound B. However, as mentioned above, the amount of application cannot generally be defined, as it is required to be suitably adjusted depending upon various conditions, and it is also possible to select the amount of application outside of such a range. Further, it should be understood that the present invention is by no means limited by such descriptions.

In a case where compound B is a phenoxy acetic acid type compound, it is from 0.1 to 10 g, preferably from 0.5 to 5.5 g.

In a case where compound B is (B59) quinclorac, it is from 0.1 to 10 g, preferably from 0.5 to 5 g.

In a case where compound B is a triazine type compound, it is from 0.02 to 10 g, preferably from 0.1 to 5 g.

In a case where compound B is a pyrimidine type compound, it is from 2 to 50 g, preferably from 8 to 40 g.

In a case where compound B is a heterocyclic compound, it is from 0.02 to 10 g, preferably from 0.1 to 8 g.

In a case where compound B is a pyrazole type compound, it is from 0.2 to 50 g, preferably from 2 to 35 g.

In a case where compound B is a triketone type compound, it is from 0.1 to 5 g, preferably from 0.2 to 3.5 g.

In a case where compound B is (B20) a compound of the above formula (III), it is from 0.05 to 30 g, preferably from 0.1 to 15 g.

In a case where compound B is (B61) clomazone, it is from 0.1 to 10 g, preferably from 0.5 to 8 g.

In a case where compound B is an aryloxyphenoxypropionic acid type compound, it is from 0.1 to 5 g, preferably from 0.2 to 3.5 g.

In a case where compound B is a sulfonylurea compound, it is from 0.005 to 3 g, preferably from 0.01 to 1.5 g.

In a case where compound B is a sulfonamide type compound, it is from 0.02 to 2

g, preferably from 0.05 to 1 g.

In a case where compound B is a pyrimidinylsalicylic acid type compound, it is from 0.01 to 3 g, preferably from 0.02 to 1.5 g.

5 In a case where compound B is a sulfonanilide type compound, it is from 0.02 to 1.5 g, preferably from 0.1 to 0.8 g.

In a case where compound B is (B38) pyrithalid, it is from 0.02 to 5 g, preferably from 0.1 to 3 g.

In a case where compound B is an organic phosphorus-type compound, it is from 2 to 30 g, preferably from 4 to 25 g.

10 In a case where compound B is a cumylamine type compound, it is from 0.2 to 30 g, preferably from 2 to 20 g.

In a case where compound B is a dinitroaniline type compound, it is from 1 to 15 g, preferably from 2 to 12 g.

15 In a case where compound B is a thiocarbamate type compound, it is from 0.2 to 50 g, preferably from 1 to 50 g.

In a case where compound B is a chloroacetamide type compound, it is from 0.2 to 30 g, preferably from 0.5 to 20 g.

20 In a case where compound B is (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone or (B57) fenoxasulfone, it is from 0.02 to 30 g, preferably from 0.05 to 20 g.

In a case where compound B is (B58) quinoclamine, it is from 2 to 50 g, preferably from 6 to 30 g.

25 The herbicidal composition of the present invention may be applied to weeds or may be applied to a place where they grow. Further, it may be applied at any time either before or after the emergence of the weeds. Further, the herbicidal composition of the present invention may take various application forms such as soil application, foliar application, irrigation application, and submerged application, and it can be applied to agricultural fields such as upland fields, orchards and paddy fields, and non-
30 cropland such as ridges of fields, fallow fields, play grounds, golf courses, vacant lands, forests, factory sites, railway sides and roadsides. The herbicidal composition of the present invention is suitably applied to paddy fields.

35 The herbicidal composition of the present invention can control a wide range of undesired plants such as annual weeds and perennial weeds. Specifically, it can control various noxious weeds including, for example, gramineae such as barnyardgrass (Echinochloa crus-galli L., Echinochloa oryzicola vasing.), crabgrass (Digitaria sanguinalis L., Digitaria ischaemum Muhl. , Digitaria adscendens Henr. , Digitaria microbachne Henr. , Digitaria horizontalis Willd.), greenfoxtail (Setaria viridis L.), giant foxtail (Setaria faberi Herrm.), yellow foxtail
40 (Setaria lutescens Hubb.), goosegrass (Eleusine indica L.), wild oat (Avena fatua L.), johnsongrass (Sorghum halepense L.), quackgrass (Agropyron repens L.), alexandergrass (Brachiaria plantaginea), guineagrass(Panicummaximum Jacq.), paragrass (Panicum purpurascens), sprangletop (Leptochloa chinensis), red sprangletop (Leptochloa panicea), annual bluegrass (Poa annua L.), black grass
45 (Alopecurus myosuroides Huds.), cholorado bluestem (Agropyron tsukushiense (Honda) Ohwi), broadleaf signalgrass(Brachiaria platyphylla Nash), southern sandbur (Cenchrus echinatus L.), italian ryegrass (Lolium multiflorum Lam.) or bermudagrass (Cynodon dactylon Pers.); cyperaceae such as rice flatsedge (Cyperus iria L.), purple

nutsedge (Cyperus rotundus L.), yellow nutsedge (Cyperus esculentus L.), Japanese bulrush (Scirpus juncoides), flatsedge (Cyperus serotinus), small-flower umbrellaplant (Cyperus difformis), slender spikerush (Eleocharis acicularis), Eleocharis kuroguwai or Scirpus planiculmis Fr. Schm.; alismataceae such as Japanese ribbon waparo (Sagittaria pygmaea), arrow-head (Sagittaria trifolia L.) or narrowleaf waterplantain (Alisma canaliculatum); pontederiaceae such as monochoria (Monochoria vaginalis) or monochoria species (Monochoria korsakowii); Scrophulariaceae such as false pimpernel (Lindernia pyxidaria); plantaginaceae such as abunome (Dopatrium junceum); lythraceae such as toothcup (Rotala india) or red stem (Ammanniamultiflora); elatinaceae such as long stem waterwort (Elatine triandra SCHK.); malvaceae such as velvetleaf (Abutilon theophrasti MEDIC.) or prickly sida (Sida spinosa L.); compositae such as common cocklebur (Xanthium strumarium L.), common ragweed (Ambrosia elatior L.), thistle (Breea setosa (BIEB.) KITAM.), hairy galinsoga (Galinsoga ciliata Blake), wild chamomile (Matricaria chamomilla L.) or henbit (Lamium amplexicaule L.); solanaceae such as black nightshade (Solanumnigrum L.) or jimsonweed (Daturastramonium); amaranthaceae such as slender amaranth (Amaranthus viridis L.) or redroot pigweed (Amaranthus retroflexus L.); polygonaceae such as pale smartweed (Polygonumlapathifolium L.), ladythumb (Polygonumpersicaria L.), wild buckwheat (Polygonumconvolvulus L.) or knotweed (Polygonumaviculare L.); cruciferae such as flexuous bittercress (Cardamine flexuosa WITH.), shepherd's-purse (Capsella bursa-pastoris Medik.) or indian mustard (Brassica juncea Czern.); convolvulaceae such as tall morningglory (Ipomoeapurpurea L.), field bindweed (Convolvulusarvensis L.) or ivyleaf morningglory (Ipomoeahederacea Jacq.); Amaran thaceae such as common lambsquarters (Chenopodium album L.) or mexican burningbush (Kochia scoparia Schrad.); Portulacaceae such as common purslane (Portulacaoleracea L.); fabaceae such as sicklepod (Cassia obtusifolia L.); caryophyllaceae such as common chickweed (Stellariamedia L.); rubiaceae such as catchweed (Galium spurium L.); euphorbiaceae such as threeseeded copperleaf (Acalyphaaustralis L.); Commelinaceae such as common dayflower (Commelina communis L.). Therefore, it is effectively used in the case of controlling noxious weeds selectively or non-selectively in cultivation of e.g. useful plants such as corn (Zea mays L.), soybean (Glycine max Merr.), cotton (Gossypium spp.), wheat (Triticum spp.), rice (Oryza sativa L.), barley (Hordeum Vulgare L.), rye (Secalecereale L.), oat (Avena sativa L.), sorgho (Sorghum bicolor Moench), rape (Brassica napus L.), sunflower (Helianthus annuus L.), suger beet (Beta Vulgaris L.), suger cane (Saccharum officinarum L.), japanese lawnggrass (Zoysia japonica stend), peanut (Arachis hypogaea L.), flax (Linum usitatissimum L.), tobacco (Nicotiana tabacum L.) or coffee (Coffea spp.).

The herbicidal composition of the present invention may be used in combination with the following known herbicidal compounds (such as common names), whereby there may be a case where the range of types of weeds to be controlled, the time for the application, the herbicidal activities, etc. may be improved to a more desirable direction. Even when not specifically mentioned here, in a case where such compounds have salts, alkyl esters, hydrates, different crystal forms, various structural isomers, etc., they are, of course, all included.

(1) Those which are believed to exhibit herbicidal effects by disturbing hormone activities of plants, such as a phenoxy type such as 2,4-D, 2,4-D-butotyl, 2,4-D-butyl, 2,4-D-dimethylammonium, 2,4-D-diolamine, 2,4-D-ethyl, 2,4-D-2-ethylhexyl, 2,4-D-isobutyl, 2,4-D-isooctyl, 2,4-D-isopropyl, 2,4-D-isopropylammonium, 2,4-D-sodium, 2,4-

D-isopropanolammonium, 2,4-D-trolamine, 2,4-DB, 2,4-DB-butyl, 2,4-DB-dimethylammonium, 2,4-DB-isooctyl, 2,4-DB-potassium, 2,4-DB-sodium, dichlorprop, dichlorprop-butotyl, dichlorprop-dimethylammonium, dichlorprop-isooctyl, dichlorprop-potassium, dichlorprop-P, dichlorprop-P-dimethylammonium, dichlorprop-P-potassium, 5 dichlorprop-P-sodium, MCPA, MCPA-butotyl, MCPA-dimethylammonium, MCPA-2-ethylhexyl, MCPA-potassium, MCPA-sodium, MCPA-thioethyl, MCPB, MCPB-ethyl, MCPB-sodium, mecoprop, mecoprop-butotyl, mecoprop-sodium, mecoprop-P, mecoprop-P-butotyl, mecoprop-P-dimethylammonium, mecoprop-P-2-ethylhexyl, mecoprop-P-potassium, naproanilide or clomeprop; an aromatic carboxylic acid type 10 such as 2,3,6-TBA, dicamba, dicamba-butotyl, dicamba-diglycolamine, dicamba-dimethylammonium, dicamba-diolamine, dicamba-isopropylammonium, dicamba-potassium, dicamba-sodium, dichlobenil, picloram, picloram-dimethylammonium, picloram-isooctyl, picloram-potassium, picloram-triisopropanolammonium, picloram-triisopropylammonium, picloram-trolamine, triclopyr, triclopyr-butotyl, triclopyr-15 triethylammonium, clopyralid, clopyralid-olamine, clopyralid-potassium, clopyralid-triisopropanolammonium or aminopyralid; and others such as naptalam, naptalam-sodium, benazolin, benazolin-ethyl, quinclorac, quinmerac, diflufenzopyr, diflufenzopyr-sodium, fluroxypyr, fluroxypyr-2-butoxy-1-methylethyl, fluroxypyr-meptyl, chlorflurenol, chlorflurenol-methyl, aminocyclopyrachlor, aminocyclopyrachlor-methyl or 20 aminocyclopyrachlor-potassium.

(2) Those which are believed to exhibit herbicidal effects by inhibiting photosynthesis of plants, such as a urea type such as chlorotoluron, diuron, fluometuron, linuron, isoproturon, metobenzuron, tebuthiuron, dimefuron, isouron, karbutilate, 25 methabenzthiazuron, metoxuron, monolinuron, neburon, siduron, terbumeton, trietazine or metobromuron; a triazine type such as simazine, atrazine, atratone, simetryn, prometryn, dimethametryn, hexazinone, metribuzin, terbuthylazine, cyanazine, ametryn, cybutryne, triaziflam, indaziflam, terbutryn, propazine, metamitron or prometon; a uracil type such as bromacil, bromacyl-lithium, lenacil or terbacil; an anilide type such as propanil or cypromid; a carbamate type such as swep, desmedipham or 30 phenmedipham; a hydroxybenzonitrile type such as bromoxynil, bromoxynil-octanoate, bromoxynil-heptanoate, ioxynil, ioxynil-octanoate, ioxynil-potassium or ioxynil-sodium; and others such as pyridate, bentazone, bentazone-sodium, amicarbazone, methazole or pentanochlor.

(3) Quaternary ammonium salt type such as paraquat or diquat, which is 35 believed to be converted to free radicals by itself to form active oxygen in the plant body and shows rapid herbicidal efficacy.

(4) Those which are believed to exhibit herbicidal effects by inhibiting chlorophyll biosynthesis of plants and abnormally accumulating a photosensitizing peroxide substance in the plant body, such as a diphenylether type such as nitrofen, 40 chlomethoxyfen, bifenox, acifluorfen, acifluorfen-sodium, fomesafen, fomesafen-sodium, oxyfluorfen, lactofen, aclonifen, ethoxyfen-ethyl (HC-252), fluoroglycofen-ethyl or fluoroglycofen; a cyclic imide type such as chlorphthalim, flumioxazin, flumiclorac, flumiclorac-pentyl, cinidon-ethyl, fluthiacet or fluthiacet-methyl; and others such as 45 oxadiargyl, oxadiazon, sulfentrazone, carfentrazone-ethyl, thidiazimin, pentoxazone, azafenidin, isopropazole, pyraflufen-ethyl, benzfendizone, butafenacil, saflufenacil, flupoxam, fluazolate, profluzol, pyracilonil, flufenpyr-ethyl, bencarbazone or ethyl[3-(2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-trifluoromethyl-3,6-dihydro-2H-pyrimidin-1-yl)phenoxy)pyridin-2-yloxy]acetate (SYN-523).

(5) Those which are believed to exhibit herbicidal effects characterized by bleaching activities by inhibiting chromogenesis of plants such as carotenoids, such as a pyridazinone type such as norflurazon, chloridazon or metflurazon; a pyrazole type such as pyrazolynate, pyrazoxyfen, benzofenap, topramezone or pyrasulfotole; and others such as amitrole, fluridone, flurtamone, diflufenican, methoxyphenone, clomazone, sulcotrione, mesotrione, tembotrione, tefuryltrione (AVH-301), bicyclopyrone, isoxaflutole, difenzoquat, difenzoquat-metilsulfate, isoxachlortole, benzobicyclon, picolinafen, beflubutamid, SW-065, KUH-110, compounds disclosed in the Claims of WO2005118530, compounds disclosed in the Claims of WO2008065907 or compounds disclosed in the Claims of WO2009142318.

(6) Those which exhibit strong herbicidal effects specifically to gramineous plants, such as an aryloxyphenoxypropionic acid type such as diclofop-methyl, diclofop, pyriphenop-sodium, fluazifop-butyl, fluazifop, fluazifop-P, fluazifop-P-butyl, haloxyfop-methyl, haloxyfop, haloxyfop-etotyl, haloxyfop-P, haloxyfop-P-methyl, quizalofop-ethyl, quizalofop-P, quizalofop-P-ethyl, quizalofop-P-tefuryl, cyhalofop-butyl, fenoxaprop-ethyl, fenoxaprop-P, fenoxaprop-P-ethyl, metamifop-propyl, metamifop, clodinafop-propargyl, clodinafop or propaquizafop; a cyclohexanedione type such as alloxydim-sodium, alloxydim, clethodim, sethoxydim, tralkoxydim, butroxydim, tepraloxym, profoxydim or cycloxydim; and others such as flamprop-M-methyl, flamprop-M or flamprop-M-isopropyl.

(7) Those which are believed to exhibit herbicidal effects by inhibiting an amino acid biosynthesis of plants, such as a sulfonylurea type such as chlorimuron-ethyl, chlorimuron, sulfometuron-methyl, sulfometuron, primisulfuron-methyl, primisulfuron, bensulfuron-methyl, bensulfuron, chlorsulfuron, metsulfuron-methyl, metsulfuron, cinosulfuron, pyrazosulfuron-ethyl, pyrazosulfuron, azimsulfuron, rimsulfuron, nicosulfuron, flazasulfuron, imazosulfuron, cyclosulfamuron, prosulfuron, flupyrsulfuron-methyl-sodium, flupyrsulfuron, triflusulfuron-methyl, triflusulfuron, halosulfuron-methyl, halosulfuron, thifensulfuron-methyl, thifensulfuron, ethoxysulfuron, oxasulfuron, ethametsulfuron, ethametsulfuron-methyl, iodosulfuron, iodosulfuron-methyl-sodium, sulfosulfuron, triasulfuron, tribenuron-methyl, tribenuron, tritosulfuron, foramsulfuron, trifloxysulfuron, trifloxysulfuron-sodium, mesosulfuron-methyl, mesosulfuron, orthosulfamuron, flucetosulfuron, amidosulfuron, propyrisulfuron (TH-547), metazosulfuron, iofensulfuron, or compounds disclosed in the claims of EP0645386; a triazolopyrimidinesulfonamide type such as flumetsulam, metosulam, diclosulam, cloransulam-methyl, florasulam, penoxsulam or pyroxsulam; an imidazolinone type such as imazapyr, imazapyr-isopropylammonium, imazethapyr, imazethapyr-ammonium, imazaquin, imazaquin-ammonium, imazamox, imazamox-ammonium, imazamethabenz, imazamethabenz-methyl or imazapic; a pyrimidinylsalicylic acid type such as pyriothiac-sodium, bispyribac-sodium, pyriminobac-methyl, pyribenzoxim, pyriftalid or pyrimisulfan; a sulfonylaminocarbonyltriazolinone type such as flucarbazone, flucarbazone-sodium, propoxycarbazine-sodium, propoxycarbazine or thienecarbazine; and others such as glyphosate, glyphosate-sodium, glyphosate-potassium, glyphosate-ammonium, glyphosate-diammonium, glyphosate-isopropylammonium, glyphosate-trimesium, glyphosate-sesquisodium, glufosinate, glufosinate-ammonium, glufosinate-P, glufosinate-P-ammonium, glufosinate-P-sodium, bilanafos, bilanafos-sodium, cinmethylin or triafamone.

(8) Those which are believed to exhibit herbicidal effects by inhibiting cell mitoses of plants, such as a dinitroaniline type such as trifluralin, oryzalin, nitralin, pendimethalin, ethalfluralin, benfluralin, prodiamine, butralin or dinitramine; an amide

type such as bensulide, napropamide, propyzamide or pronamide; an organic phosphorus type such as amiprofos-methyl, butamifos, anilofos or piperophos; a phenyl carbamate type such as propham, chlorpropham, barban or carbetamide; a cumylamine type such as daimuron, cumyluron, bromobutide or methylaldymron; and others such as asulam, asulam-sodium, dithiopyr, thiazopyr, chlorthal-dimethyl, chlorthal or diphenamid.

(9) Those which are believed to exhibit herbicidal effects by inhibiting protein biosynthesis or lipid biosynthesis of plants, such as a chloroacetamide type such as alachlor, metazachlor, butachlor, pretilachlor, metolachlor, thenylchlor, pethoxamid, acetochlor, propachlor, dimethenamid, dimethenamid-P, propisochlor or dimethachlor; a thiocarbamate type such as molinate, dimepiperate, pyributicarb, EPTC, butylate, vernolate, pebulate, cycloate, prosulfocarb, esprocarb, thiobencarb, diallate, tri-allate or orbencarb; and others such as etobenzanid, mefenacet, flufenacet, tridiphane, cafenstrole, fentrazamide, oxaziclomefone, indanofan, benfuresate, pyroxasulfone, fenoxasulfone, dalapon, dalapon-sodium, TCA-sodium or trichloroacetic acid.

(10) MSMA, DSMA, CMA, endothall, endothall-dipotassium, endothall-sodium, endothall-mono(N,N-dimethylalkylammonium), ethofumesate, sodium chlorate, pelargonic acid (nonanoic acid), fosamine, fosamine-ammonium, pinoxaden, ipfencarbazone (HOK-201), aclolecin, ammonium sulfamate, borax, chloroacetic acid, sodium chloroacetate, cyanamide, methylarsonic acid, dimethylarsinic acid, sodium dimethylarsinate, dinoterb, dinoterb-ammonium, dinoterb-diolamine, dinoterb-acetate, DNOC, ferrous sulfate, flupropanate, flupropanate-sodium, isoxaben, mefluidide, mefluidide-diolamine, metam, metam-ammonium, metam-potassium, metam-sodium, methyl isothiocyanate, pentachlorophenol, sodium pentachlorophenoxide, pentachlorophenol laurate, quinclamine, sulfuric acid, urea sulfate, methiozolin (MRC-01), etc.

(11) Those which are believed to exhibit herbicidal effects by being parasitic on plants, such as Xanthomonas campestris, Epicoccossirus nematosorus, Epicoccossirus nematosperus, Exserohilum monoseras or Drechsreia monoceras.

The herbicidal composition of the present invention may be prepared by mixing compound A and compound B, as active ingredients, with various agricultural additives in accordance with conventional formulation methods for agricultural chemicals, and applied in various formulations such as dusts, granules, water dispersible granules, wettable powders, tablets, pills, capsules (including a formulation packaged by a water soluble film), water-based suspensions, oil-based suspensions, microemulsions, suspoemulsions, water soluble powders, emulsifiable concentrates, soluble concentrates or pastes. It may be formed into any formulation which is commonly used in this field, so long as the object of the present invention is thereby met.

At the time of the formulation, compound A and compound B may be mixed together for the formulation, or they may be separately formulated and may be mixed at the time of application.

The additives to be used for the formulation include, for example, a solid carrier such as kaolinite, sericite, diatomaceous earth, slaked lime, calcium carbonate, talc, white carbon, kaoline, bentonite, clay, sodium carbonate, sodium bicarbonate, mirabilite, zeolite or starch; a solvent such as water, toluene, xylene, solvent naphtha, dioxane, dimethylsulfoxide, N,N-dimethylformamide, dimethylacetamide, N-methyl-2-pyrrolidone or an alcohol; an anionic surfactant such as a salt of fatty acid, a benzoate, a polycarboxylate, a salt of alkylsulfuric acid ester, an alkyl sulfate, an alkylaryl sulfate, an alkyl diglycol ether sulfate, a salt of alcohol sulfuric acid ester, an alkyl sulfonate, an

alkylaryl sulfonate, an aryl sulfonate, a lignin sulfonate, an alkyldiphenylether disulfonate, a polystyrene sulfonate, a salt of alkylphosphoric acid ester, an alkylaryl phosphate, a styrylaryl phosphate, a salt of polyoxyethylene alkyl ether sulfuric acid ester, a polyoxyethylene alkylaryl ether sulfate, a salt of polyoxyethylene alkylaryl ether sulfuric acid ester, a polyoxyethylene alkyl ether phosphate, a salt of polyoxyethylene alkylaryl phosphoric acid ester, a salt of polyoxyethylene aryl ether phosphoric acid ester, a naphthalene sulfonic acid condensed with formaldehyde or a salt of alkylnaphthalene sulfonic acid condensed with formaldehyde; a nonionic surfactant such as a sorbitan fatty acid ester, a glycerin fatty acid ester, a fatty acid polyglyceride, a fatty acid alcohol polyglycol ether, acetylene glycol, acetylene alcohol, an oxyalkylene block polymer, a polyoxyethylene alkyl ether, a polyoxyethylene alkylaryl ether, a polyoxyethylene styrylaryl ether, a polyoxyethylene glycol alkyl ether, polyethylene glycol, a polyoxyethylene fatty acid ester, a polyoxyethylene sorbitan fatty acid ester, a polyoxyethylene glycerin fatty acid ester, a polyoxyethylene hydrogenated castor oil or a polyoxypropylene fatty acid ester; and a vegetable oil or mineral oil such as olive oil, kapok oil, castor oil, palm oil, camellia oil, coconut oil, sesame oil, corn oil, rice bran oil, peanut oil, cottonseed oil, soybean oil, rapeseed oil, linseed oil, tung oil or liquid paraffins. These additives may suitably be selected for use alone or in combination as a mixture of two or more of them, so long as the object of the present invention is met. Further, additives other than the above-mentioned may be suitably selected for use among those known in this field. For example, various additives commonly used, such as a filler, a thickener, an anti-settling agent, an anti-freezing agent, a dispersion stabilizer, a safener, an anti-mold agent, a bubble agent, a disintegrator and a binder, may be used. The mix ratio by weight of the active ingredient to such various additives may be from 0.001:99.999 to 95:5, preferably from 0.005:99.995 to 90:10.

As a method of applying the herbicidal composition of the present invention, a proper method can be selected for use among various methods depending upon various conditions such as the application site, the type of the formulation, and the type and the growth stage of the plants to be controlled, and for example, the following methods may be mentioned.

1. Compound A and compound B are mixed and formulated together, and the formulation is applied as it is.
2. Compound A and compound B are mixed and formulated together, and the formulation is diluted to a predetermined concentration with e.g. water, and as the case requires, a spreader (such as a surfactant, a vegetable oil or a mineral oil) is added for application.
3. Compound A and compound B are formulated separately, and the formulations are applied as they are.
4. Compound A and compound B are formulated separately, and the formulations are diluted to predetermined concentrations with e.g. water as the case requires, and as the case requires, a spreader (such as a surfactant, a vegetable oil or a mineral oil) is added for application.
5. Compound A and compound B are formulated separately, and the formulations are mixed at the time of dilution to a predetermined concentration with e.g. water, and as the case requires, a spreader (such as a surfactant, a vegetable oil or a mineral oil) is added for application.

Preferred embodiments of the present invention will be described below, but the present invention is by no means restricted thereto. Hereinafter, the herbicidal

composition containing compound A and compound B will be referred to as "the above herbicidal composition".

(1) The above herbicidal composition wherein compound A is a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is methylsulfonyl, Q is a hydrogen atom, and n is 2 (hereinafter referred to simply as compound A1).

(2) The above herbicidal composition wherein compound A is a sodium salt of the compound as defined in the above (1) (hereinafter referred to simply as compound A2).

(3) The above herbicidal composition wherein compound B is at least one phenoxy acetic acid type compound selected from the group consisting of (B1) 2,4-D, or its salt or ester, (B2) MCP, or its salt or ester, (B3) MCPB, or its salt or ester, and (B4) clomeprop.

(4) The above herbicidal composition wherein compound B is a plant hormone active (auxin active) disturbing herbicide selected from the phenoxy acetic acid type compounds as defined in the above (3) and (B59) quinclorac.

(5) The above herbicidal composition wherein compound B is at least one triazine type compound selected from the group consisting of (B5) simetryn and (B6) dimethametryn.

(6) The above herbicidal composition wherein compound B is a pyrimidine type compound such as (B7) bentazone.

(7) The above herbicidal composition wherein compound B is a photosynthesis-inhibiting herbicide selected from the triazine type compound as defined in the above (5) and the pyrimidine type compound as defined in the above (6).

(8) The above herbicidal composition wherein compound B is at least one heterocyclic compound selected from the group consisting of (B8) oxadiazon, (B9) oxadiargyl, (B10) pentoxazone, (B11) pyraclonil and (B12) carfentrazone-ethyl.

(9) The above herbicidal composition wherein compound B is a protoporphyrinogen oxidase-inhibiting herbicide selected from heterocyclic compounds defined in the above (8).

(10) The above herbicidal composition wherein compound B is at least one pyrazole type compound selected from the group consisting of (B13) pyrazolynate, (B14) pyrazoxyfen and (B15) benzofenap.

(11) The above herbicidal composition wherein compound B is at least one triketone type compound selected from the group consisting of (B16) benzobicyclon, (B17) mesotrione, (B18) tefuryltrione, (B19) a compound of the above formula (II) and (B63) a compound of the above formula (IV).

(12) The above herbicidal composition wherein compound B is a 4-hydroxyphenyl pyruvic acid-inhibiting herbicide selected from the pyrazole type compound as defined in the above (10), the triketone type compound as defined in the above (11), (B20) the compound of the above formula (III) and (B61) clomazone.

(13) The above herbicidal composition wherein compound B is at least one aryloxyphenoxypropionic acid type compound selected from the group consisting of (B21) cyhalofop-butyl and (B22) metamifop.

(14) The above herbicidal composition wherein compound B is an acetyl CoA carboxylase-inhibiting herbicide selected from aryloxyphenoxypropionic acid-type compounds as defined in the above (13).

(15) The above herbicidal composition wherein compound B is at least one sulfonylurea type compound selected from the group consisting of (B23) bensulfuron-

methyl, (B24) pyrazosulfuron-ethyl, (B25) imazosulfuron, (B26) azimsulfuron, (B27) cyclosulfamuron, (B28) ethoxysulfuron, (B29) halosulfuron-methyl, (B30) flucetosulfuron, (B31) propyrisulfuron and (B32) metazosulfuron.

5 (16) The above herbicidal composition wherein compound B is a sulfonamide type compound such as (B33) penoxsulam.

(17) The above herbicidal composition wherein compound B is at least one pyrimidinylsalicylic acid-type compound selected from the group consisting of (B34) pyriminobac-methyl and (B35) bispyribac-sodium.

10 (18) The above herbicidal composition wherein compound B is at least one sulfonanilide type compound selected from the group consisting of (B36) pyrimisulfan and (B37) triafamone.

(19) The above herbicidal composition wherein compound B is an acetolactate synthetase-inhibiting herbicide selected from the sulfonylurea type compound as defined in the above (15), the sulfonamide type compound as defined in the above (16),
15 the pyrimidinylsalicylic acid type compound as defined in the above (17), the sulfonanilide type compound as defined in the above (18), and (B38) pyritalid.

(20) The above herbicidal composition wherein compound B is an organic phosphorus-type compound such as (B39) butamifos.

20 (21) The above herbicidal composition wherein compound B is at least one cumylamine type compound selected from the group consisting of (B40) daimuron, (B41) cumyluron and (B42) bromobutide.

(22) The above herbicidal composition wherein compound B is a cell mitoses-inhibiting herbicide selected from the organic phosphorus type compound as defined in the above (20), the cumylamine type compound as defined in the above (21) and (B62) pendimethalin.
25

(23) The above herbicidal composition wherein compound B is at least one thiocarbamate type compound selected from the group consisting of (B43) molinate, (B44) esprocarb, (B45) pyributicarb and (B60) thiobencarb.

30 (24) The above herbicidal composition wherein compound B is at least one chloroacetamide type compound selected from the group consisting of (B46) butachlor, (B47) pretilachlor and (B48) thenylchlor.

(25) The above herbicidal composition wherein compound B is a lipid biosynthesis-inhibiting herbicide selected from the thiocarbamate compound as defined in the above (23), the chloroacetamide compound as defined in the above (24), (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone and (B57) fenoxasulfone.
35

(26) The above herbicidal composition wherein compound B is (B58) quinoclamine.

40 (27) Each herbicidal composition comprising compound A1 and each of compound B as defined in any one of the above (3) to (26).

(28) Each herbicidal composition comprising compound A2 and each of compound B as defined in any one of the above (3) to (26).

45 (29) A method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of the herbicidal composition as defined in any one of the above (1) to (28) to the weeds or to a place where they grow.

(30) A method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of compound A1 and a herbicidally effective

amount of compound B to the weeds or to a place where they grow.

(31) A method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of compound A2 and a herbicidally effective amount of compound B to the weeds or to a place where they grow.

5 (32) A method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of compound A1 and a herbicidally effective amount of each compound B as defined in any one of the above (3) to (26) to the weeds or to a place where they grow.

10 (33) A method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of compound A2 and a herbicidally effective amount of each compound B as defined in any one of the above (3) to (26) to the weeds or to a place where they grow.

(34) The above herbicidal composition which contains compound A2 and (B12) carfentrazone-ethyl.

15 (35) The above herbicidal composition which contains compound A2 and (B30) flucetosulfuron.

EXAMPLES

20 Now, the present invention will be described in further detail with reference to Examples. However, it should be understood that the present invention is by no means restricted to such specific Examples. In Examples, compound A2 is as defined above and its chemical name is sodium 2-(3-(2-(1,3-dioxolan-2-yl)ethoxy)-2-chloro-4-(methylsulfonyl)benzoyl)-3-oxo-1-cyclohexenolate.

TEST EXAMPLE 1

25 Paddy soil was put into a 1/10,000 are pot to simulate a paddy field, and tubers of Scirpus planiculmis Fr. Schm. were planted and left to stand under an irrigated condition with a water depth of 3.5 cm. When Scirpus planiculmis Fr. Schm. reached a predetermined size, compound A and compound B were, respectively, applied in predetermined amounts. After expiration of a predetermined period, the state of
30 growth of Scirpus planiculmis Fr. Schm. was visually observed and investigated. As a measured value, the growth inhibition rate (%) evaluated in accordance with the following evaluation standard, and as a calculated value, the growth inhibition rate (%) calculated by the Colby's formula (WEED, vol.15, pages 20 to 22, 1967) are, respectively, shown in Tables 1-1 to 1-40.

35 Growth inhibition rate (%) = 0% (equivalent to the non-treated area) to 100% (complete kill)

TABLE 1-1 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	55	-
	10.5	55	-
	5.25	48	-
MCP sodium salt	40	45	-
	20	20	-
	10	25	-
Compound A2+ MCP sodium salt	21+40	85	75
	21+20	82	64
	21+10	78	66
	10.5+40	81	75
	10.5+20	83	64
	10.5+10	84	66
	5.25+40	90	71
	5.25+20	83	58
	5.25+10	75	61

TABLE 1-2 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	55	-
	10.5	55	-
	5.25	48	-
MCPB	12	30	-
	6	18	-
Compound A2+ MCPB	21+12	88	69
	21+6	73	63
	10.5+12	88	69
	10.5+6	78	63
	5.25+12	68	64
	5.25+6	75	57

TABLE 1-3 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	55	-
	10.5	55	-
	5.25	48	-
2,4-D amine salt	50	10	-
	25	5	-
	12.5	20	-
Compound A2+ 2,4-D amine salt	21+50	63	60
	21+25	68	57
	21+12.5	71	64
	10.5+50	82	60
	10.5+25	71	57
	10.5+12.5	70	64
	5.25+50	75	53
	5.25+25	70	51
	5.25+12.5	73	58

TABLE 1-4 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	55	-
	10.5	55	-
	5.25	48	-
Simetryn	45	0	-
	22.5	8	-
	11.25	5	-
Compound A2+ simetryn	21+45	85	55
	21+22.5	68	59
	21+11.25	80	57
	10.5+45	71	55
	10.5+22.5	76	59
	10.5+11.25	70	57
	5.25+45	63	48
	5.25+22.5	63	52
	5.25+11.25	84	51

TABLE 1-5 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 11th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	50	-
	10.5	47	-
	5.25	25	-
Bentazone	350	0	-
	175	0	-
	87.5	0	-
Compound A2+ bentazone	21+350	63	50
	21+175	61	50
	21+87.5	61	50
	10.5+350	65	47
	10.5+175	66	47
	10.5+87.5	58	47
	5.25+350	70	25
	5.25+175	61	25
	5.25+87.5	63	25

TABLE 1-6 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	55	-
	10.5	55	-
	5.25	48	-
Oxadiargyl	2.5	78	-
	1.25	60	-
Compound A2+ oxadiargyl	21+2.5	97	90
	21+1.25	97	82
	10.5+2.5	99	90
	10.5+1.25	97	82
	5.25+2.5	95	89
	5.25+1.25	92	79

TABLE 1-7 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	56	-
	10.5	55	-
	5.25	43	-
Pentoxazone	22.5	86	-
	11.25	60	-
Compound A2+ pentoxazone	21+22.5	98	94
	21+11.25	95	82
	10.5+22.5	98	94
	10.5+11.25	91	82
	5.25+22.5	97	92
	5.25+11.25	94	77

TABLE 1-8 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	53	-
	10.5	48	-
Pyraclozil	20	88	-
	10	67	-
Compound A2+ pyraclozil	21+20	98	94
	21+10	88	85
	10.5+20	98	94
	10.5+10	93	83

TABLE 1-9 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 7th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	49	-
	10.5	44	-
	5.25	20	-
Pyraclozil	2.5	60	-
	1.25	46	-
Compound A2+ pyraclozil	21+2.5	85	80
	21+1.25	79	73
	10.5+2.5	81	78
	10.5+1.25	87	70
	5.25+2.5	90	68
	5.25+1.25	85	57

TABLE 1-10 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	53	-
	10.5	48	-
	5.25	54	-
Carfentrazone-ethyl	4.5	63	-
	2.25	60	-
Compound A2+ carfentrazone-ethyl	21+4.5	96	83
	21+2.25	95	81
	10.5+4.5	96	81
	10.5+2.25	95	79
	5.25+4.5	98	83
	5.25+2.25	94	82

TABLE 1-11 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	54	-
	10.5	54	-
	5.25	48	-
	2.625	6	-
	1.3125	0	-
Carfentrazone-ethyl	4.5	65	-
Compound A2+ carfentrazone-ethyl	21+4.5	98	84
	10.5+4.5	99	84
	5.25+4.5	99	82
	2.625+4.5	98	67
	1.3125+4.5	79	65

TABLE 1-12 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10.5	74	-
Pyrazoxyfen	200	10	-
	100	0	-
	50	0	-
Compound A2+ pyrazoxyfen	10.5+200	93	77
	10.5+100	87	74
	10.5+50	91	74

TABLE 1-13 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	54	-
	10.5	54	-
	5.25	48	-
Benzofenap	100	0	-
	50	0	-
	25	0	-
Compound A2+ benzofenap	21+100	66	54
	21+50	74	54
	21+25	60	54
	10.5+100	64	54
	10.5+50	63	54
	10.5+25	72	54
	5.25+100	66	48
	5.25+50	54	48
	5.25+25	61	48

TABLE 1-14 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10.5	74	-
	5.25	61	-
Tefuryltrione	30	65	-
	15	60	-
	7.5	43	-
Compound A2+ tefuryltrione	10.5+30	95	91
	10.5+15	98	90
	10.5+7.5	90	85
compound A+ pyrazoxyfen (Tank-Mix)	5.25+30	94	86
	5.25+15	95	84
	5.25+7.5	93	78

TABLE 1-15 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	74	-
	10.5	75	-
	5.25	48	-
Pyriminobac-methyl	3	0	-
Compound A2+ pyriminobac-methyl	21+3	86	74
	10.5+3	81	75
	5.25+3	58	48

TABLE 1-16 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	55	-
	10.5	55	-
	5.25	48	-
Cumyluron	120	48	-
	60	23	-
	30	28	-
Compound A2+ cumyluron	21+120	96	77
	21+60	83	65
	21+30	79	68
	10.5+120	99	77
	10.5+60	85	65
	10.5+30	76	68
	5.25+120	82	73
	5.25+60	95	60
	5.25+30	97	63

TABLE 1-17 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 7th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	38	-
	10.5	40	-
	5.25	25	-
Bromobutide	90	10	-
	45	15	-
	22.5	3	-
Compound A2+ bromobutide	21+90	74	44
	21+45	78	47
	21+22.5	76	40
	10.5+90	78	46
	10.5+45	73	49
	10.5+22.5	72	42
	5.25+90	74	33
	5.25+45	72	36
	5.25+22.5	63	27

TABLE 1-18 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 11th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	50	-
	10.5	47	-
	5.25	25	-
Esprocarb	150	5	-
	75	0	-
	37.5	0	-
Compound A2+ esprocarb	21+150	73	53
	21+75	60	50
	21+37.5	70	50
	10.5+150	64	50
	10.5+75	66	47
	10.5+37.5	68	47
	5.25+150	57	29
	5.25+75	63	25
	5.25+37.5	59	25

TABLE 1-19 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	56	-
	10.5	55	-
	5.25	43	-
Pretilachlor	60	71	-
	30	45	-
	15	48	-
Compound A2+ pretilachlor	21+60	94	87
	21+30	92	76
	21+15	83	77
	10.5+60	99	87
	10.5+30	96	75
	10.5+15	96	77
	5.25+60	98	84
	5.25+30	96	69
	5.25+15	86	70

TABLE 1-20 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	56	-
	10.5	55	-
	5.25	43	-
Butachlor	160	84	-
	80	63	-
	40	60	-
Compound A2+ butachlor	21+160	99	93
	21+80	99	84
	21+40	99	82
	10.5+160	99	93
	10.5+80	99	83
	10.5+40	95	82
	5.25+160	99	91
	5.25+80	99	79
	5.25+40	96	77

TABLE 1-21 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 13th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	58	-
	10.5	55	-
	5.25	54	-
Cafenstrole	30	80	-
	15	58	-
	7.5	53	-
Compound A2+ cafenstrole	21+30	99	92
	21+15	98	82
	21+7.5	91	80
	10.5+30	99	91
	10.5+15	97	81
	10.5+7.5	91	79
	5.25+30	99	91
	5.25+15	98	81
	5.25+7.5	82	78

TABLE 1-22 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 13th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	58	-
	10.5	55	-
	5.25	54	-
Indanofan	15	71	-
	7.5	78	-
	3.75	40	-
Compound A2+ indanofan	21+15	98	88
	21+7.5	96	91
	21+3.75	96	75
	10.5+15	99	87
	10.5+7.5	99	90
	10.5+3.75	98	73
	5.25+15	98	87
	5.25+7.5	99	90
	5.25+3.75	93	72

TABLE 1-23 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 13th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	58	-
	10.5	55	-
	5.25	54	-
Fentrazamide	15	55	-
	7.5	68	-
Compound A2+ fentrazamide	21+15	98	81
	21+7.5	98	87
	10.5+15	99	80
	10.5+7.5	97	86
	5.25+15	99	79
	5.25+7.5	99	85

TABLE 1-24 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 13th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	58	-
	10.5	55	-
	5.25	54	-
Ipfencarbazone	30	71	-
	15	53	-
	7.5	40	-
Compound A2+ ipfencarbazone	21+30	98	88
	21+15	91	80
	21+7.5	82	75
	10.5+30	91	87
	10.5+15	97	79
	10.5+7.5	85	73
	5.25+30	99	87
	5.25+15	95	78
	5.25+7.5	83	72

TABLE 1-25 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 13th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	58	-
	10.5	55	-
	5.25	54	-
Fenoxasulfone	20	33	-
	10	39	-
	5	28	-
Compound A2+ fenoxasulfone	21+20	95	72
	21+10	77	74
	21+5	85	70
	10.5+20	92	70
	10.5+10	84	73
	10.5+5	74	68
	5.25+20	91	69
	5.25+10	93	72
	5.25+5	93	67

TABLE 1-26 (*Scirpus planiculmis* Fr. Schm.: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	55	-
	10.5	55	-
	5.25	48	-
Benfuresate	60	78	-
	30	10	-
	15	18	-
Compound A2+ benfuresate	21+60	95	90
	21+30	80	60
	21+15	72	63
	10.5+60	93	90
	10.5+30	85	60
	10.5+15	78	63
	5.25+60	93	89
	5.25+30	90	53
	5.25+15	88	57

TABLE 1-27 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 7th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	40	-
	10.5	39	-
	5.25	30	-
Pyrazoxyfen	200	23	-
	150	28	-
Compound A2+ pyrazoxyfen	21+200	80	54
	21+150	64	57
	10.5+200	60	53
	10.5+150	61	56
	5.25+200	61	46
	5.25+150	69	50

TABLE 1-28 (*Scirpus planiculmis* Fr. Schm. :5 cm, investigation date: 7th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	40	-
	10.5	39	-
	5.25	30	-
Compound of the above formula (III)	50	10	-
	25	13	-
	12.5	13	-
Compound A2+ compound of the above formula (III)	21+50	75	46
	21+25	65	48
	21+12.5	71	48
	10.5+50	78	45
	10.5+25	66	47
	10.5+12.5	73	47
	5.25+50	78	37
	5.25+25	71	39
	5.25+12.5	70	39

TABLE 1-29 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 7th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	48	-
	10	47	-
Compound of the above formula (III)	15	5	-
	10	3	-
	5	0	-
	2.5	0	-
	1.25	0	-
Compound A2+ Compound of the above formula (III)	20+15	60	51
	20+10	63	50
	20+5	61	48
	20+2.5	60	48
	20+1.25	65	48
	10+15	64	50
	10+10	61	49
	10+5	66	47
	10+2.5	64	47
	10+1.25	63	47

TABLE 1-30 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 7th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	48	-
	10	47	-
	5	40	-
Quinclorac	40	3	-
	20	0	-
	10	0	-
Compound A2+ Quinclorac	20+40	63	50
	20+20	68	48
	20+10	60	48
	10+40	65	49
	10+20	65	47
	10+10	61	47
	5+40	51	42
	5+20	51	40
	5+10	62	40

TABLE 1-31 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	50	-
	10	49	-
	5	40	-
Pyrazolynate	300	2	-
	200	5	-
	150	0	-
Compound A2+ Pyrazolynate	20+300	72	51
	20+200	63	53
	20+150	70	50
	10+300	75	50
	10+200	71	52
	10+150	59	49
	5+300	56	41
	5+200	61	43
	5+150	50	40

TABLE 1-32 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	50	-
	10	49	-
	5	40	-
Thiobencarb	200	54	-
	100	5	-
Compound A2+ Thiobencarb	20+200	88	77
	20+100	80	53
	10+200	87	77
	10+100	70	52
	5+200	92	72
	5+100	73	43

TABLE 1-33 (*Scirpus planiculmis* Fr. Schm: 5cm, investigation date: 16th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	65	-
	10	59	-
	5	24	-
Thiobencarb	400	55	-
Compound A2+ Thiobencarb	20+400	97	84
	10+400	100	82
	5+400	85	66

TABLE 1-34 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	50	-
	10	49	-
	5	40	-
Clomazone	60	3	-
	30	0	-
	15	0	-
	7.5	0	-
Compound A2+ Clomazone	20+60	58	52
	20+30	60	50
	20+15	66	50
	20+7.5	63	50
	10+60	60	51
	10+30	63	49
	10+15	78	49
	10+7.5	61	49
	5+60	55	42
	5+30	55	40
	5+15	60	40
	5+7.5	56	40

TABLE 1-35 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	61	-
	10	48	-
	5	23	-
Oxadiazon	15	78	-
	7.5	33	-
Compound A2+ Oxadiazon	20+15	99	91
	20+7.5	80	74
	10+15	99	89
	10+7.5	68	65
	5+15	95	83
	5+7.5	72	48

TABLE 1-36 (*Scirpus planiculmis* Fr. Schm: 5cm, investigation date: 16th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10	65	-
	5	59	-
Oxadiazon	60	49	-
	30	63	-
	15	40	-
	7.5	10	-
Compound A2+ Oxadiazon	10+60	99	82
	10+30	96	87
	10+15	89	79
	10+7.5	99	69
	5+60	96	79
	5+30	96	85
	5+15	84	75
	5+7.5	71	63

TABLE 1-37 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	50	-
	10	49	-
	5	40	-
Bispyribac-sodium	1	61	-
	0.5	8	-
Compound A2+ Bispyribac-sodium	20+1	85	81
	20+0.5	73	54
	10+1	84	80
	10+0.5	66	53
	5+1	94	77
	5+0.5	52	45

TABLE 1-38 (*Scirpus planiculmis* Fr. Schm: 5cm, investigation date: 6th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	45	-
	10	44	-
	5	24	-
	2.5	10	-
Bispyribac-sodium	4	58	-
	2	44	-
Compound A2+ Bispyribac-sodium	20+4	95	77
	20+2	89	69
	10+4	95	77
	10+2	92	69
	5+4	93	68
	5+2	81	57
	2.5+4	94	62
	2.5+2	85	50

TABLE 1-39 (*Scirpus planiculmis* Fr. Schm: initial stage of emergence, investigation date: 10th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	52	-
	10	50	-
	5	39	-
Pendimethalin	100	0	-
	50	0	-
	25	0	-
Compound A2+ Pendimethalin	20+100	75	52
	20+50	80	52
	20+25	70	52
	10+100	77	50
	10+50	77	50
	10+25	78	50
	5+100	78	39
	5+50	77	39
	5+25	76	39

TABLE 1-40 (*Scirpus planiculmis* Fr. Schm: 5cm, investigation date: 6th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	5	24	-
Compound of the above formula (II)	30	43	-
	15	40	-
	7.5	36	-
	3.75	13	-
Compound A2+ Compound of the above formula (II)	5+30	66	57
	5+15	69	54
	5+7.5	65	51
	5+3.75	68	34

TEST EXAMPLE 2

- 5 Paddy soil was put into a 1/10,000 are pot to simulate a paddy field, and seeds of barnyardgrass (*Echinochloa oryzicola* vasing.) were sown, and left to stand under an irrigated condition with a water depth of 3.5 cm. When *Echinochloa oryzicola* vasing. reached a predetermined size, compound A and compound B were, respectively, applied in predetermined amounts. After expiration of a predetermined period, the
- 10 state of growth of *Echinochloa oryzicola* vasing. was visually observed and investigated. The growth inhibition rates (%) evaluated in the same manner as in Test Example 1 are

shown in Tables 2-1 to 2-9.

TABLE 2-1 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 14th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	77	-
Pyrazoxyfen	300	30	-
	150	18	-
	75	10	-
Compound A2+ pyrazoxyfen	21+300	88	84
	21+150	92	81
	21+75	89	79

TABLE 2-2 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 19th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	92	-
	10.5	84	-
	5.25	81	-
Tefuryltrione	7.5	30	-
Compound A2+ tefuryltrione	21+7.5	97	94
	10.5+7.5	95	89
	5.25+7.5	96	87

TABLE 2-3 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 20th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	2.625	0	-
Pyrimisulfan	1	87	-
	0.5	65	-
	0.25	50	-
Compound A2+ pyrimisulfan	2.625+1	92	87
	2.625+0.5	73	65
	2.625+0.25	55	50

TABLE 2-4 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 20th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10.5	48	-
	5.25	13	-
Benzobicyclon	20	47	-
	10	23	-
	5	0	-
	2.5	0	-
Compound A2+ benzobicyclon	10.5+20	79	72
	10.5+10	68	60
	10.5+5	70	48
	10.5+2.5	65	48
	5.25+20	63	54
	5.25+10	52	33
	5.25+5	47	13
	5.25+2.5	20	13

TABLE 2-5 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 20th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	5.25	23	-
Mesotrione	9	53	-
	4.5	33	-
	2.25	3	-
Compound A2+ mesotrione	5.25+9	81	64
	5.25+4.5	58	48
	5.25+2.25	40	25

TABLE 2-6 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 11th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	40	-
Compound of the above formula (II)	30	8	-
	15	3	-
	7.5	0	-
Compound A2+ Compound of the above formula (II)	20+30	60	45
	20+15	58	42
	20+7.5	55	40

TABLE 2-7 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 11th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	40	-
	10	17	-
	5	10	-
Compound of the above formula (IV)	20	62	-
	10	48	-
	5	15	-
	2.5	10	-
Compound A2+ Compound of the above formula (IV)	20+20	82	77
	20+10	72	69
	20+5	72	49
	20+2.5	68	46
	10+20	82	69
	10+10	72	57
	10+5	67	30
	10+2.5	57	25
	5+20	79	66
	5+10	62	53
	5+5	43	24
	5+2.5	37	19

TABLE 2-8 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 15th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	20	37	-
	10	12	-
Cyhalofop-butyl	27	43	-
	18	3	-
	9	0	-
Compound A2+ Cyhalofop-butyl	20+27	83	64
	20+18	78	39
	20+9	58	37
	10+27	53	50
	10+18	40	15
	10+9	40	12

TABLE 2-9 (*Echinochloa oryzicola* vasing.: 3-leaf stage, investigation date: 15th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	5	0	-
pyriftalid	15	88	-
	7.5	75	-
Compound A2+ pyriftalid	5+15	92	88
	5+7.5	83	75

TEST EXAMPLE 3

- 5 Paddy soil was put into a 1/10,000 are pot to simulate a paddy field, and tubers of arrow-head (*Sagittaria trifolia* L.) (sulfonyl urea resistant) were planted and left to stand under an irrigated condition with a water depth of 3.5 cm. When arrow-head (*Sagittaria trifolia* L.) reached a predetermined size, compound A and compound B were, respectively, applied in predetermined amounts. After expiration of a predetermined
- 10 period, the state of growth of arrow-head (*Sagittaria trifolia* L.) was visually observed and investigated. The growth inhibition rates (%) evaluated in the same manner as in the above Test Example 1 are shown in Tables 3-1 to 3-3.

TABLE 3-1 (arrow-head (*Sagittaria trifolia* L.):initial stage of emergence, investigation date: 28th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	81	-
	10.5	57	-
Flucetosulfuron	5	3	-
	2.5	3	-
	1.25	0	-
Compound A2+ flucetosulfuron	21+5	95	82
	21+2.5	88	82
	21+1.25	87	81
compound A+ pyrazoxyfen (Tank-Mix)	10.5+5	83	58
	10.5+2.5	77	58
	10.5+1.25	76	57

TABLE 3-2 (arrow-head (*Sagittaria trifolia* L.):initial stage of emergence, investigation date: 28th day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	21	81	-
	10.5	57	-
Halosulfuron-methyl	9	3	-
	4.5	0	-
	2.25	0	-
Compound A2+ halosulfuron-methyl	21+9	90	82
	21+4.5	86	81
	21+2.25	92	81
compound A+ pyrazoxyfen (Tank-Mix)	10.5+9	85	58
	10.5+4.5	91	57
	10.5+2.25	86	57

TABLE 3-3 (arrow-head (*Sagittaria trifolia* L.): initial stage of emergence, investigation date: 42nd day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	5.25	0	-
Propyrisulfuron	9	92	-
	4.5	58	-
	2.25	10	-
Compound A2+ propyrisulfuron	5.25+9	96	92
	5.25+4.5	70	58
	5.25+2.25	50	10

TEST EXAMPLE 4

5 Paddy soil was put into a 1/10,000 are pot to simulate a paddy field, and tubers of arrow-head (*Sagittaria trifolia* L.) (sulfonyl urea sensitive) were planted and left to stand under an irrigated condition with a water depth of 3.5 cm. When arrow-head (*Sagittaria trifolia* L.) reached a predetermined size, compound A and compound B were, respectively, applied in predetermined amounts. After expiration of a predetermined period, the state of growth of arrow-head (*Sagittaria trifolia* L.) was visually observed and investigated. The growth inhibition rates (%) evaluated in the same manner as in the above Test Example 1 are shown in Tables 4-1 to 4-3.

TABLE 4-1 (arrow-head (*Sagittaria trifolia* L.): initial stage of emergence, investigation date: 53rd day after application of herbicide)

Compound	Amount of active ingredient (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	5	0	-
	2.5	0	-
	1.25	0	-
Imazosulfuron	0.5	63	-
Compound A2+ imazosulfuron	5+0.5	90	63
	2.5+0.5	82	63
	1.25+0.5	87	63

TABLE 4-2 (arrow-head (*Sagittaria trifolia* L.): pre-emergence, investigation date: 39th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10	0	-
	5	0	-
	2.5	0	-
Bensulfuron-methyl	1	17	-
	0.5	0	-
	0.25	0	-
Compound A2+ Bensulfuron-methyl	10+1	74	17
	10+0.5	61	0
	10+0.25	63	0
	5+1	65	17
	5+0.5	35	0
	5+0.25	43	0
	2.5+1	72	17
	2.5+0.5	48	0
	2.5+0.25	30	0

TABLE 4-3 (arrow-head (*Sagittaria trifolia* L.): pre-emergence, investigation date: 39th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10	0	-
	5	0	-
	2.5	0	-
Azimsulfuron	0.25	83	-
	0.125	20	-
Compound A2+ Azimsulfuron	10+0.25	93	83
	10+0.125	70	20
	5+0.25	96	83
	5+0.125	84	20
	2.5+0.25	98	83
	2.5+0.125	60	20

TEST EXAMPLE 5

- 5 Paddy soil was put into a 1/10,000 are pot to simulate a paddy field, and seeds of Japanese bulrush (*Scirpus juncoides*) (sulfonylurea sensitive and resistant present as mixed) were sown, and left to stand under an irrigated condition with a water depth of 3.5 cm. When Japanese bulrush (*Scirpus juncoides*) reached a predetermined size, compound A and compound B were, respectively, applied in predetermined amounts.

On the day after the application, in order to simulate overflowing by raining, paddy water was once removed to a water depth of about 1 cm and then increased again to a water depth of 3.5 cm. After expiration of a predetermined period, the state of growth of Japanese bulrush (Scirpus juncooides) was visually observed and investigated. The growth inhibition rates (%) evaluated in the same manner as in the above Test Example 1 are shown in Tables 5-1 to 5-3.

TABLE 5-1 (Japanese bulrush (Scirpus juncooides: 2-leaf stage, investigation date: 17th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10	50	-
	5	45	-
	2.5	25	-
Azimsulfuron	1	18	-
	0.5	20	-
	0.25	13	-
Compound A2+ Azimsulfuron	10+1	65	59
	10+0.5	72	60
	10+0.25	63	57
	5+1	67	55
	5+0.5	65	56
	5+0.25	58	52
	2.5+1	43	39
	2.5+0.5	53	40
	2.5+0.25	50	35

TABLE 5-2 (Japanese bulrush (Scirpus juncooides: 2-leaf stage, investigation date: 17th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10	50	-
	5	45	-
Pyrazosulfuron-ethyl	1	23	-
	0.5	20	-
	0.25	23	-
Compound A2+ Pyrazosulfuron-ethyl	10+1	75	62
	10+0.5	68	60
	10+0.25	80	62
	5+1	65	58
	5+0.5	73	56
	5+0.25	73	58

TABLE 5-3 (Japanese bulrush (*Scirpus juncoides*: 2-leaf stage, investigation date: 17th day after application of herbicide)

Compound	Amount of active ingredient (g/10a) (g/10a)	Growth inhibition rate (%)	
		Measured value	Calculated value
Compound A2	10	50	-
	5	45	-
	2.5	25	-
Penoxsulam	2	27	-
	1	23	-
Compound A2+ Penoxsulam	10+2	68	64
	10+1	72	62
	5+2	67	60
	5+1	60	58
	2.5+2	65	45
	2.5+1	58	42

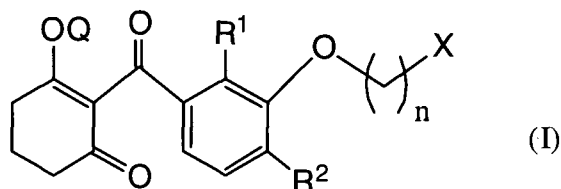
INDUSTRIAL APPLICABILITY

According to the present invention, it is possible to provide a herbicidal composition having a broad herbicidal spectrum, having high activity and having a long-lasting effect.

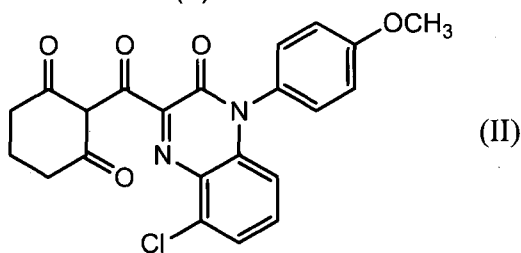
The entire disclosure of Japanese Patent Application No. 2012-116274 filed on May 22, 2012 including specification, claims and abstract is incorporated herein by reference in its entirety.

CLAIMS

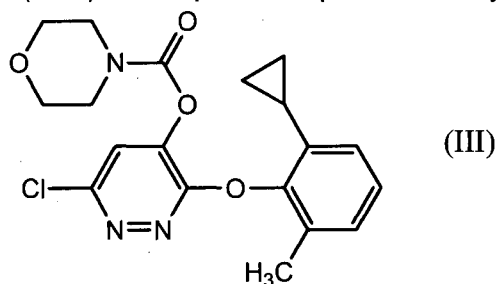
1. A herbicidal composition comprising (A) a compound represented by the formula (I) or its salt:



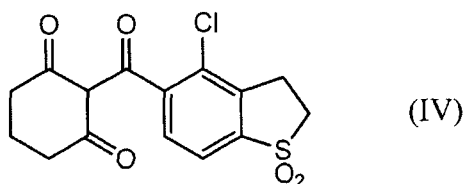
- 5 wherein X is a 5- or 6-membered saturated heterocyclic group containing one or two hetero atoms of at least one type selected from the group consisting of an oxygen atom and a sulfur atom (said heterocyclic group may be substituted by alkyl), or dialkoxymethyl, R¹ is halogen, R² is alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio, haloalkylthio, alkylsulfinyl, haloalkylsulfinyl, alkylsulfonyl, haloalkylsulfonyl, dialkylaminosulfonyl, di(haloalkyl)aminosulfonyl, nitro or cyano, Q is a hydrogen atom or benzoyl, and n is 1 or 2, and (B) at least one compound selected from the group consisting of (B1) 2,4-D, or its salt or ester, (B2) MCP, or its salt or ester, (B3) MCPB, or its salt or ester, (B4) clomeprop, (B5) simetryn, (B6) dimethametryn, (B7) bentazone, (B8) oxadiazon, (B9) oxadiargyl, (B10) pentoxazone, (B11) pyraclonil, (B12) carfentrazone-ethyl, (B13) pyrazolynate, (B14) pyrazoxyfen, (B15) benzofenap, (B16) benzobicyclon, (B17) mesotrione, (B18) tefuryltrione, (B19) a compound represented by the formula (II):



(B20) a compound represented by the formula (III):



- 20 (B21) cyhalofop-butyl, (B22) metamifop, (B23) bensulfuron-methyl, (B24) pyrazosulfuron-ethyl, (B25) imazosulfuron, (B26) azimsulfuron, (B27) cyclosulfamuron, (B28) ethoxysulfuron, (B29) halosulfuron-methyl, (B30) flucetosulfuron, (B31) propyrisulfuron, (B32) metazosulfuron, (B33) penoxsulam, (B34) pyriminobac-methyl, (B35) bispyribac-sodium, (B36) pyrimisulfan, (B37) triafamone, (B38) pyriftalid, (B39) butamifos, (B40) daimuron, (B41) cumyluron, (B42) bromobutide, (B43) molinate, (B44) esprocarb, (B45) pyributicarb, (B46) butachlor, (B47) pretilachlor, (B48) thenylchlor, (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone, (B57) fenoxasulfone, (B58) quinoclamine, (B59) quinclorac, (B60) thiobencarb, (B61) clomazone, (B62) pendimethalin and (B63) a compound represented by the formula (IV):
- 30



2. The herbicidal composition according to Claim 1, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into a protoporphyrinogen oxidase-inhibiting herbicide selected from the group consisting of (B8) oxadiazon, (B9) oxadiargyl, (B10) pentoxazone, (B11) pyraclonil and (B12) carfentrazone-ethyl.

3. The herbicidal composition according to Claim 1, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into a 4-hydroxyphenyl pyruvic acid-inhibiting herbicide selected from the group consisting of (B13) pyrazolynate, (B14) pyrazoxyfen, (B15) benzofenap, (B16) benzobicyclon, (B17) mesotrione, (B18) tefuryltrione, (B19) a compound of the above formula (II), (B20) a compound of the above formula (III), (B61) clomazone and (B63) a compound of the above formula (IV).

4. The herbicidal composition according to Claim 1, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into an acetyl CoA carboxylase-inhibiting herbicide selected from the group consisting of (B21) cyhalofop-butyl and (B22) metamifop.

5. The herbicidal composition according to Claim 1, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into an acetolactate synthetase-inhibiting herbicide selected from the group consisting of (B23) bensulfuron-methyl, (B24) pyrazosulfuron-ethyl, (B25) imazosulfuron, (B26) azimsulfuron, (B27) cyclosulfamuron, (B28) ethoxysulfuron, (B29) halosulfuron-methyl, (B30) flucetosulfuron, (B31) propyrisulfuron, (B32) metazosulfuron, (B33) penoxsulam, (B34) pyriminobac-methyl, (B35) bispyribac-sodium, (B36) pyrimisulfan, (B37) triafamone and (B38) pyriftalid.

6. The herbicidal composition according to Claim 1, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

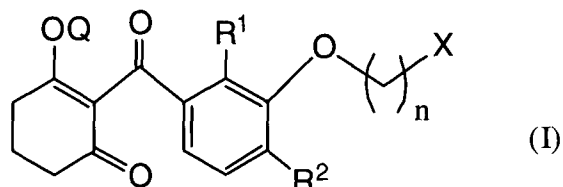
(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into a lipid biosynthesis-inhibiting herbicide selected from the group consisting of (B43) molinate, (B44) esprocarb, (B45) pyributicarb, (B60) thiobencarb, (B46) butachlor, (B47) pretilachlor, (B48) thenylchlor, (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone and

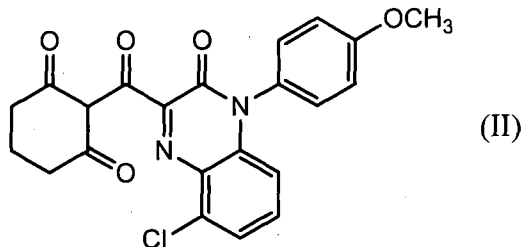
(B57) fenoxasulfone.

7. The herbicidal composition according to any one of Claims 1 to 6, wherein the mixing ratio of (A) and (B) is such that (B) is from 0.0005 to 500 parts by weight to 1 part by weight of (A).

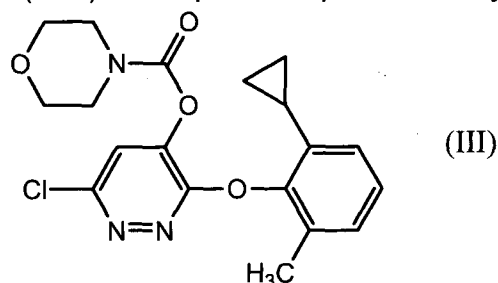
- 5 8. A method for controlling weeds or inhibiting their growth, which comprises applying a herbicidally effective amount of (A) a compound represented by the formula (I) or its salt:



- 10 wherein X is a 5- or 6-membered saturated heterocyclic group containing one or two hetero atoms of at least one type selected from the group consisting of an oxygen atom and a sulfur atom (said heterocyclic group may be substituted by alkyl), or dialkoxymethyl, R¹ is halogen, R² is alkyl, haloalkyl, alkoxy, haloalkoxy, alkylthio, haloalkylthio, alkylsulfinyl, haloalkylsulfinyl, alkylsulfonyl, haloalkylsulfonyl, dialkylaminosulfonyl, di(haloalkyl)aminosulfonyl, nitro or cyano, Q is a hydrogen atom or benzoyl, and n is 1 or 2, and a herbicidally effective amount of (B) at least one
15 compound selected from the group consisting of (B1) 2,4-D, or its salt or ester, (B2) MCP, or its salt or ester, (B3) MCPB, or its salt or ester, (B4) clomeprop, (B5) simetryn, (B6) dimethametryn, (B7) bentazone, (B8) oxadiazon, (B9) oxadiargyl, (B10) pentoxazone, (B11) pyraclonil, (B12) carfentrazone-ethyl, (B13) pyrazolynate, (B14) pyrazoxyfen, (B15) benzofenap, (B16) benzobicyclon, (B17) mesotrione, (B18) tefuryltrione, (B19) a compound represented by the formula (II):

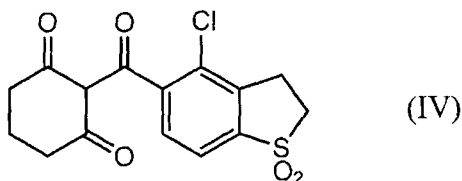


(B20) a compound represented by the formula (III):



- 25 (B21) cyhalofop-butyl, (B22) metamifop, (B23) bensulfuron-methyl, (B24) pyrazosulfuron-ethyl, (B25) imazosulfuron, (B26) azimsulfuron, (B27) cyclosulfamuron, (B28) ethoxysulfuron, (B29) halosulfuron-methyl, (B30) flucetosulfuron, (B31) propyrisulfuron, (B32) metazosulfuron, (B33) penoxsulam, (B34) pyriminobac-methyl, (B35) bispyribac-sodium, (B36) pyrimisulfan, (B37) triafamone, (B38) pyriftalid, (B39) butamifos, (B40) daimuron, (B41) cumyluron, (B42) bromobutide, (B43) molinate, (B44) esprocarb, (B45) pyributicarb, (B46) butachlor, (B47) pretilachlor, (B48) thenylchlor, (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53)
- 30

oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone, (B57) fenoxasulfone, (B58) quinoclamine, (B59) quinclorac, (B60) thiobencarb, (B61) clomazone, (B62) pendimethalin and (B63) a compound represented by the formula (IV):



to the weeds or to a place where they grow.

9. The method according to Claim 8, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into a protoporphyrinogen oxidase-inhibiting herbicide selected from the group consisting of (B8) oxadiazon, (B9) oxadiargyl, (B10) pentoxazone, (B11) pyraclonil and (B12) carfentrazone-ethyl.

10. The method according to Claim 8, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into a 4-hydroxyphenyl pyruvic acid-inhibiting herbicide selected from the group consisting of (B13) pyrazolynate, (B14) pyrazoxyfen, (B15) benzofenap, (B16) benzobicyclon, (B17) mesotrione, (B18) tefuryltrione, (B19) a compound of the above formula (II), (B20) a compound of the above formula (III), (B61) clomazone and (B63) a compound of the above formula (IV).

11. The method according to Claim 8, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into an acetyl CoA carboxylase-inhibiting herbicide selected from the group consisting of (B21) cyhalofop-butyl and (B22) metamifop.

12. The method according to Claim 8, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into an acetolactate synthetase-inhibiting herbicide selected from the group consisting of (B23) bensulfuron-methyl, (B24) pyrazosulfuron-ethyl, (B25) imazosulfuron, (B26) azimsulfuron, (B27) cyclosulfamuron, (B28) ethoxysulfuron, (B29) halosulfuron-methyl, (B30) flucetosulfuron, (B31) propyrisulfuron, (B32) metazosulfuron, (B33) penoxsulam, (B34) pyriminobac-methyl, (B35) bispyribac-sodium, (B36) pyrimisulfan, (B37) triafamone and (B38) pyriftalid

13. The method according to Claim 8, wherein the compound of (A) and the compound of (B) are the following compounds, respectively:

(A) a compound of the formula (I) wherein X is 1,3-dioxolan-2-yl, R¹ is a chlorine atom, R² is a methylsulfonyl, Q is a hydrogen atom, and n is 2, or its sodium salt,

(B) at least one compound classified into a lipid biosynthesis-inhibiting herbicide selected from the group consisting of (B43) molinate, (B44) esprocarb, (B45) pyributicarb, (B60) thiobencarb, (B46) butachlor, (B47) pretilachlor, (B48) thenylchlor, (B49) mefenacet, (B50) cafenstrole, (B51) indanofan, (B52) fentrazamide, (B53) oxaziclomefone, (B54) etobenzanid, (B55) benfuresate, (B56) ipfencarbazone and (B57) fenoxasulfone.

14. The method according to any one of Claims 8 to 13, wherein (A) is applied in an amount of from 0.1 to 10 g/are, and (B) is applied in an amount of from 0.005 to 50 g/are.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/064559

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. See extra sheet

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2013
 Registered utility model specifications of Japan 1996-2013
 Published registered utility model applications of Japan 1994-2013

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CAplus/REGISTRY (STN)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 2006-016389 A (ISHIHARA SANGYO KAISHA, LTD.) 2006.01.19, claim 1, 7-8, paragraph [0014], [0068]-[0084], [0101], compound 1-8 in Table 1 & CN 1960967 A & KR 10-2012-0123735 A & WO 2005/118530 A1	1, 4-8, 11-14 2-3, 9-10
A	WO 1998/034480 A1 (NOVARTIS-ERFINDUNGEN VERWALTUNGSGESELLSCHAFT MBH) 1998.08.13, claim 1, Table 1-2, B1-B3 & AU 6620498 A	1-14
A	US 2005/0192182 A1 (BAYER CROPSCIENCE) 2005.09.01, claim 13, Table 1, A, B1-B7 & DE 10142333 A & WO 2003/020033 A1	1-14

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:

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

"E" earlier application or patent 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 when the document is taken alone

"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

Date of the actual completion of the international search

19.06.2013

Date of mailing of the international search report

02.07.2013

Name and mailing address of the ISA/JP

Japan Patent Office

3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan

Authorized officer

Teruki AMANO

Telephone No. +81-3-3581-1101 Ext. 3443

4H

5084

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/064559

CLASSIFICATION OF SUBJECT MATTER

A01N43/28 (2006.01) i, A01N37/18 (2006.01) i, A01N37/22 (2006.01) i,
A01N39/02 (2006.01) i, A01N39/04 (2006.01) i, A01N41/10 (2006.01) i,
A01N43/08 (2006.01) i, A01N43/12 (2006.01) i, A01N43/20 (2006.01) i,
A01N43/54 (2006.01) i, A01N43/56 (2006.01) i, A01N43/653 (2006.01) i,
A01N43/70 (2006.01) i, A01N43/76 (2006.01) i, A01N43/80 (2006.01) i,
A01N43/824 (2006.01) i, A01N43/88 (2006.01) i, A01N43/90 (2006.01) i,
A01N47/12 (2006.01) i, A01N47/16 (2006.01) i, A01N47/28 (2006.01) i,
A01N47/36 (2006.01) i, A01N47/38 (2006.01) i, A01P13/00 (2006.01) i

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/064559

Minimum documentation searched

A01N43/28, A01N37/18, A01N37/22, A01N39/02, A01N39/04, A01N41/10, A01N43/08, A01N43/12, A01N43/20, A01N43/54, A01N43/56, A01N43/653, A01N43/70, A01N43/76, A01N43/80, A01N43/824, A01N43/88, A01N43/90, A01N47/12, A01N47/16, A01N47/28, A01N47/36, A01N47/38, A01P13/00