

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



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Doctor

José Luis Salazar

Director de Nuevas Creaciones (C)

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

E. S. D.

Referencia: Expediente No. 10.095.278

Solicitud de Patente de Invención titulada: "Compuestos mesoionicos de pirimidinio para el control de plagas de invertebrados"

Solicitante: E.I. Du Pont de Nemours and Company

RESPUESTA AL AUTO NOTIFICADO POR FIJACIÓN EN LISTA NO. 447

DEL 27 DE NOVIEMBRE DE 2012, OFICIO NO. 21351 (EXAMEN DE FONDO)

ÁLVARO CORREA ORDÓÑEZ, mayor de edad y vecino de Bogotá D.C., identificado tal como aparece al pie de mi firma, en mi carácter de apoderado de la sociedad en referencia, doy respuesta al auto emanado por ese Despacho dentro del término legal:

1. Respuesta al examen de patentabilidad

1.1 Claridad de la solicitud

Modificación a una solicitud en trámite

Con el propósito de atender a las observaciones del examinador y de conformidad con el artículo 34 de la Decisión 486 que permite al solicitante modificar su solicitud en cualquier momento del trámite sin que se presente ampliación de su invención, me permito presentar un nuevo pliego reivindicatorio conformado por 10 reivindicaciones.

El examinador podrá notar que en la reivindicación 1 modificada las definiciones de casi todas las variables se han limitado significativamente.

Así mismo, se borró el término "opcionalmente"

Con relación a la siguiente observación del examinador:

"En las reivindicaciones 1-3, 8, 9-14 se menciona la expresión "o" que es disyuntiva, lo que quiere decir que es alternativo escoger uno u otro significado de los sustituyentes, por lo tanto, se estaría hablando de compuestos diferentes".

Al respecto, respetuosamente informamos a su Despacho que dicha observación no se entiende ya que la expresión "o" es un término que se usa y es necesario cuando se redactan las solicitudes de patentes. Sin embargo, con el nuevo pliego reivindicatorio se considera que se supera la anterior observación.

Con relación a la reivindicación 18, informamos a su Despacho que dicha reivindicación fue cancelada así como varias reivindicaciones dependientes.

1.2 Unidad de Invención

Con el nuevo pliego reivindicatorio se da por superada esta observación.

1.3 Argumentos en favor de la novedad y del nivel inventivo de la solicitud en estudio

1.3.1 Novedad

La novedad de una solicitud está legalmente definida en el Artículo 16 de la Decisión 486 así: *"una invención se considerará nueva, cuando no está comprendida en el estado de la técnica. El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso de la prioridad reconocida..."*

En virtud de la anterior definición, consideramos que el documento **D1 (US5089501)** no constituye documento del arte previo que afecte la novedad de la presente solicitud.

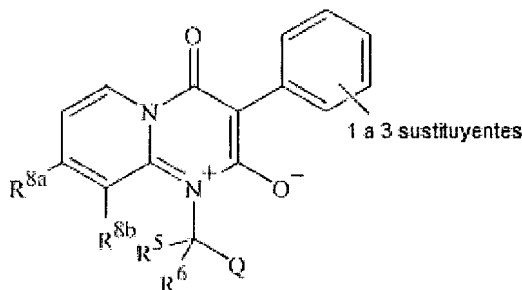
1.3.2 Nivel inventivo

El nivel inventivo de una solicitud se encuentra definido en el Artículo 18 de la Decisión 486 y se establece cuando *“si para una persona del oficio normalmente versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica”*.

Contrario a lo que plantea el Examinador, el documento **D2 (Bottcher, et al, Journal of organic chemistry)** del arte previo citado no afecta el nivel inventivo de las reivindicaciones 2 a 8 de la presente solicitud por cuanto no es posible derivar la presente invención a partir de las enseñanzas presentadas en dicho documento.

Para sustentar la novedad y el nivel inventivo de la solicitud en estudio, se presentan los siguientes argumentos:

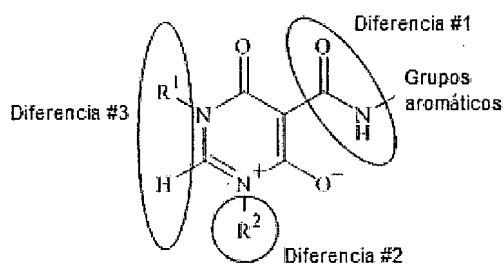
En primer lugar, como se mencionó anteriormente, se presenta un nuevo pliego reivindicatorio, el examinador podrá notar que el alcance de la reivindicación 1 se ha limitado a los compuestos de la estructura que se muestra a continuación:



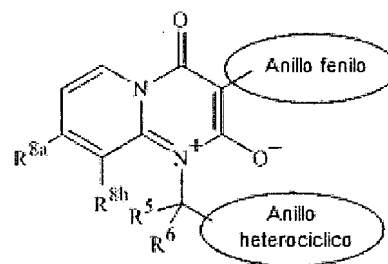
Compuestos de la fórmula 1 de la reivindicación 1 modificada

Estos compuestos no solamente son novedosos cuando se comparan con los compuestos del documento D1 (US 5,089,501) o con los compuestos de Botcher, JOC, 50(25), 5050-5055 (D2) sino que también son inventivos debido al gran número de diferencias estructurales que ahora presentan.

Por ejemplo, una comparación de los compuestos de la reivindicación 1 modificada con los compuestos de D1 muestra diferencias significantes prácticamente en cada parte de la molécula como se muestra a continuación:



Compuestos de US 5,089,501 (D1)



Compuestos de la fórmula 1 de la reivindicación 1 modificada

De forma similar, el compuesto trimetilo sustituido del documento D2 no presenta similitud con los compuestos de la fórmula I de la reivindicación 1 modificada.

Con respecto a lo que el examinador afirma con relación al problema técnico de la invención: "El problema técnico objetivo a resolver consiste en plantear una alternativa a los compuestos de fórmula I conocidos según D1 para que sea más eficiente su actividad como fungicida...". Negrilla fuera de texto.

(...) las personas de nivel medio versada en la materia derivara de manera obvia los compuestos descritos en la reivindicación 1 de la presente invención a partir de las enseñanzas del documento D1 toda vez que las diferencias se limitan a variaciones en uno de los sustituyentes, sin que ese hecho confiera una mayor acción fungicida". Negrilla fuera de texto.

Al respecto, le aclaramos al examinador que la presente solicitud de patente se relaciona con **compuestos insecticidas**, y no fungicidas.

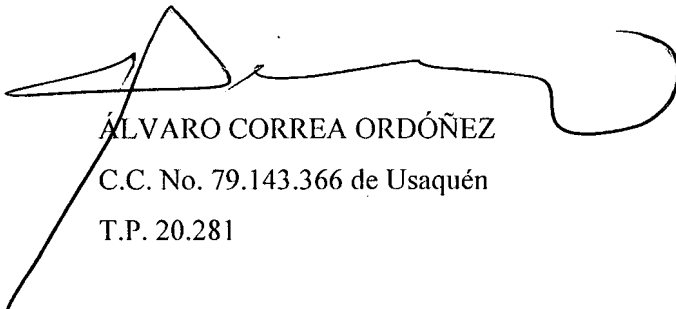
En este orden de ideas, tenemos que la invención propuesta por el solicitante cumple con los requisitos de patentabilidad y de esta manera es susceptible de ostentar el título de patente de invención.

2. Solicitudes concedidas en otros países para esta misma invención.

A manera informativa, pongo en conocimiento del Examinador que la oficina de patentes europea para ésta invención aceptó un pliego reivindicatorio con un alcance mayor al de las reivindicaciones que ahora se presentan en Colombia. Es decir, dicha oficina considero que la presente invención tiene novedad y altura inventiva. Anexo copia de dichas reivindicaciones para su información. Aún cuando entiendo que estas decisiones de ninguna manera obligan al Despacho para decidir de igual forma, considero que por tratarse de una pregunta fáctica la determinación de la existencia de novedad, nivel inventivo y aplicación industrial, las decisiones de otras oficinas de patentes constituyen un antecedente persuasivo en la materia.

En virtud de lo anterior, solicito que se acepten las razones expuestas en el presente documento y en consecuencia, se otorgue el privilegio de patente de invención para el invento que se tramita en este expediente.

Atentamente,



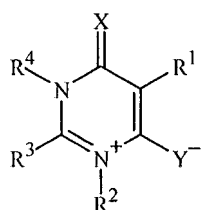
ÁLVARO CORREA ORDÓÑEZ
C.C. No. 79.143.366 de Usaquén
T.P. 20.281

Anexos: - Capítulo reivindicatorio modificado conformado por 10 reivindicaciones
 - Copia de las reivindicaciones aceptadas por la Oficina de patentes
 Europea para la solicitud EP 09 709 044.

BOGMGT/BOGDMS-#1396351-VI-P2010_000047-0720.DOC

REIVINDICACIONES

1. Un compuesto de Fórmula 1,



1

caracterizado porque

X es O;

Y es O;

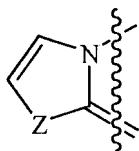
R¹ es fenilo sustituido con 1 a 3 sustituyentes independientemente seleccionados del grupo que consiste de halógeno, ciano, nitro, alquilo de C₁-C₄, alquenilo de C₂-C₄, alquinilo de C₂-C₄, haloalquilo de C₁-C₄, haloalquenilo de C₂-C₄, alquilcarbonilo de C₂-C₄, haloalquilcarbonilo de C₂-C₄, alcoxycarbonilo de C₂-C₄, haloalquilcarbonilo de C₂-C₄, alquilaminocarbonilo de C₂-C₄, dialquilaminocarbonilo de C₃-C₇, C(O)N-(-CH₂Z²CH₂-)-, alcoxi de C₁-C₄, haloalcoxi de C₁-C₄, alcoxialquilo de C₂-C₆, S(O)_nR¹², S(O)₂R¹³, alquilamino de C₁-C₄, dialquilamino de C₂-C₆, SF₅, Si(CH₃)₃, CHO, hidroxilo, OC(O)R¹⁹ y N(R²⁰)C(O)R¹⁹;

7

R^2 es CR^5R^6Q ; o

R^3 y R^4 se toman juntos con los átomos de nitrógeno y carbono de enlace contiguos para formar un anillo

5 **R-2**



R-2 ;

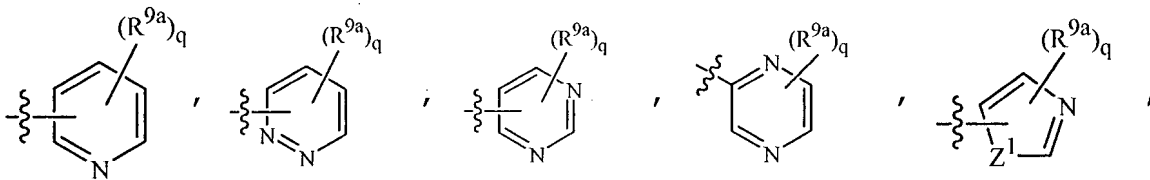
5

Z es $C(R^{8a})=C(R^{8b})$, siempre y cuando la porción de $C(R^{8a})=C(R^{8b})$ se oriente de manera que el átomo de carbono enlazado a R^{8b} se conecte como R^3 en la Fórmula 1;

10 R^5 es H, F, Cl, ciano o alquilo de C_1-C_4 ;

R^6 es H, F, Cl o CH_3 ;

Q es



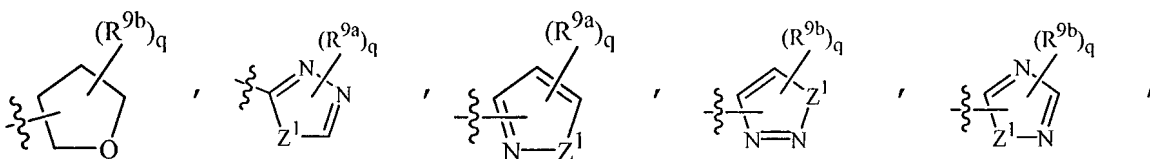
Q-1

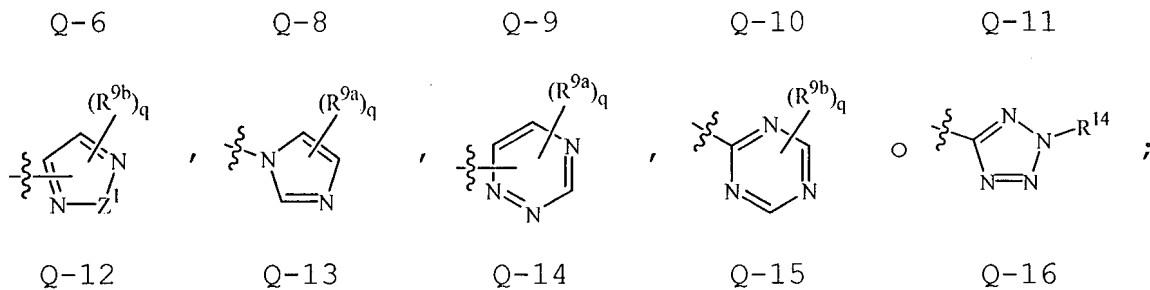
Q-2

Q-3

Q-4

Q-5





Z^1 es O, S o NR^{14} ;

R^{8a} es H o F;

R^{8b} es H, F, CF_2H o CF_3 ;

cada R^{9a} es independientemente H, halógeno, ciano, alquilo de C_1-C_4 , haloalquilo de C_1-C_4 , alcoxi de C_1-C_4 , haloalcoxi de C_1-C_4 , SF_5 , $S(O)_nR^{12}$, cicloalquilo C_3-C_6 o cicloalquiloalquilo de C_4-C_7 ;

cada R^{9b} es independientemente H, halógeno, ciano, alquilo de C_1-C_4 , haloalquilo de C_1-C_4 , alcoxi de C_1-C_4 o haloalcoxi de C_1-C_4 ;

cada R^{12} es independientemente alquilo de C_1-C_4 o haloalquilo de C_1-C_4 ;

cada R^{13} es independientemente alquilamino de C_1-C_4 , dialquilamino de C_2-C_6 o $-N-(-CH_2Z^2CH_2-)-$;

R^{14} es H, alquilo de C_1-C_4 , haloalquilo de C_1-C_4 , alcóxicarbonilo de C_2-C_5 , alquilaminocarbonilo de

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C_2-C_5 , dialquilaminocarbonilo de C_3-C_7 $C(O)N-(-CH_2Z^2CH_2-)-$, $S(O)_nR^{12}$ o $S(O)_2R^{13}$;

cada R^{19} es independientemente alquilo de C_1-C_4 ;

cada R^{20} es independientemente H o alquilo de C_1-C_4 ;

cada n es independientemente 0, 1 ó 2;

cada q es independientemente 0, 1 ó 2;

y

cada Z^2 es independientemente CH_2CH_2 , $CH_2CH_2CH_2$ o CH_2OCH_2 .

2. Un compuesto de conformidad con la reivindicación 1, caracterizado porque

R^1 es fenilo sustituido con 1 a 3 sustituyentes independientemente seleccionados del grupo que consiste de halógeno, ciano, alquilo de C_1-C_4 , haloalquilo de C_1-C_4 , alquilcarbonilo de C_2-C_4 , alcoxicarbonilo C_2-C_4 , alquilaminocarbonilo de C_2-C_4 , dialquilaminocarbonilo de C_3-C_7 , $C(O)N-(-CH_2Z^2CH_2-)-$, alcoxi de C_1-C_4 , haloalcoxi de C_1-C_4 , alcoxialquilo de C_2-C_6 , $S(O)_nR^{12}$, y $S(O)_2R^{13}$.

3. Un compuesto de conformidad con la reivindicación 2, caracterizado porque

R^5 es H; y

R^6 es H.

4. Un compuesto de conformidad con la reivindicación 2, caracterizado porque

R^{8a} es H; y

R^{8b} es H.

5. Un compuesto de conformidad con la reivindicación 1, caracterizado porque se selecciona del grupo que consiste de

sal interna de 1-[(6-cloro-3-piridinil)metil]-3-(2,4-difluorofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(6-cloro-3-piridinil)metil]-3-(4-fluorofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-(3-clorofenil)-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometil)fenil]-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometoxi)fenil]-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(4-fluorofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-
a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-fenil-4*H*-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2,4-difluorofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-
a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-(4-metoxifenil)-4-oxo-4*H*-pirido[1,2-
a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-(3-metoxifenil)-4-oxo-4*H*-pirido[1,2-
a]pirimidinio;

sal interna de 3-(4-fluorofenil)-1-[(6-fluoro-3-piridinil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-
a]pirimidinio;

sal interna de 3-(3-bromofenil)-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-
a]pirimidinio;

sal interna de 3-(3-bromofenil)-1-[(6-cloro-3-piridinil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-
a]pirimidinio;

sal interna de 1-[(6-cloro-3-piridinil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometoxi)fenil]-4*H*-
pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-[4-(trifluorometil)-2-piridinil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2-cianofenil)-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-[3-(6-cloro-3-piridinil)fenil]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(6-fluoro-3-piridinil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometoxi)fenil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-(5-cloro-2-fluorofenil)-1[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[2-cloro-5-(trifluorometoxi)fenil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-(4-fluorofenil)-2-hidroxi-1-[(1-metil-1H-pirazol-4-yl)metil]-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 2-hidroxi-1-[(1-metil-1H-pirazol-4-il)metil]-4-oxo-3-fenil-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(3,5-dimetoxifenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[2-fluoro-5-(trifluorometoxi)fenil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-(2-cloro-4-piridinil)-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2-fluoro-5-bromofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-3-(2,4,5-trifluorofenil)-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-[3-bromo-5-(trifluorometoxi)fenil]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-[3-bromo-5-(trifluorometil)fenil]-1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-[2-fluoro-5-(trifluorometil)fenil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-2-hidroxi-3-(2-metoxifenil)-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(2-cloro-5-tiazolil)metil]-3-(2-fluorofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[1-(6-cloro-3-piridinil)etil]-3-(4-fluorofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-(2,4-difluorofenil)-1-[(6-fluoro-3-piridinil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(6-cloro-3-piridinil)metil]-2-hidroxi-3-(3-metoxifenil)-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(6-cloro-3-piridinil)metil]-3-(2,3-difluorofenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(6-cloro-3-piridinil)metil]-3-(2-fluoro-3-metoxifenil)-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 3-(3,5-dimetoxifenil)-1-[(6-fluoro-3-piridinil)metil]-2-hidroxi-4-oxo-4*H*-pirido[1,2-*a*]pirimidinio;

sal interna de 1-[(6-fluoro-3-piridinil)metil]-2-hidroxi-4-oxo-3-[3-(trifluorometil)fenil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-(4-fluorofenil)-2-hidroxi-1-[(2-metil-5-tiazolil)metil]-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 2-hidroxi-4-oxo-3-fenil-1-[(5-tiazolil)metil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-(4-fluorofenil)-2-hidroxi-4-oxo-1-[(5-tiazolil)metil]-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-(2-fluorofenil)-1-[(6-fluoro-3-piridinil)metil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(6-cloro-3-piridinil)metil]-3-[2-cloro-5-(trifluorometil)fenil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 3-(2-fluoro-4-cianofenil)-1-[(6-fluoro-3-piridinil)metil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio;

sal interna de 1-[(6-fluoro-3-piridinil)metil]-3-[2-fluoro-5-(trifluorometil)fenil]-2-hidroxi-4-oxo-4H-pirido[1,2-a]pirimidinio.

6. Una composición que comprende un compuesto de la reivindicación 1 y al menos un agente o compuesto adicional biológicamente activo seleccionado del grupo que consiste de

abamectina, acefato, acequinocil, acetamiprid, acrinatrina,
 amidoflumet, amitraz, avermectina, azadiractina, azinfos-metil,
 bifentrina, bifenazato, bistrifluron, borato, 3-bromo-1-(3-cloro-
 2-piridinil)-N-[4-ciano-2-metil-6-[(metilamino)carbonil]fenil]-
 1H-pirazol-5-carboxamida (ciantraniliprol), buprofezina,
 cadusafos, carbarilo, carbofurano, cartap, carzol,
 clorantraniliprol, clorfenapir, clorfluazuron, clorpirifos,
 clorpirifos-metil, cromafenozida, clofentezina, clotianidina,
 ciflumetofeno, ciflutrina, beta-ciflutrina, cihalotrina, gamma-
 cihalotrina, lambda-cihalotrina, cipermetrina, alfa-cipermetrina,
 zeta-cipermetrina, ciromazina, deltametrina, diafentiuron,
 diazinon, dieldrina, diflubenzurón, dimeflutrina, dimehipo,
 dimetoato, dinotefuran, diofenolan, emamectina, ensodulfán,
 esfenvalerato, etiprol, etofenprox, etoxazol, óxido de
 fenbutatina, fenotiocarb, fenoxicarb, fenpropatrina,
 fenvaleriato, fipronil, flonicamid, flubendiamida, flucitrinato,
 flufenerim, flufenoxuron, fluvalinato, tau-fluvalinato, fonofós,
 formetanato, fostiazato, halofenozida, hexaflumuron, hexitiazox,
 hidrametilnon, imidacloprid, indoxacarb, jabones insecticidas,
 isofenfos, lufenuron, malatión, metaflumizona, metaldehído,
 metamidofos, metidation, metiodicarb, metomilo, metopreno,
 metoxiclor, metoflutrina, monocrotofós, metoxifenoazida,
 nitenpiram, nitiazina, novaluron, noviflumuron, oxamilo,
 parationa, parationa-metil, permetrina, forato, fosalona, fosmet,
 fosfamidón, pirimicarb, profenofos, proflutrina, propargita,
 protrifenbute, pimetrozina, pirafluprol, piretrina, piridaben,

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piridalil, pirifluquinazon, piriprol, piriproxifeno, rotenona, rianodina, espinetoram, espinosad, espirodiclofen, espiromesifen, espirotetramat, sulprofos, sulfoxaflor, tebufenozide, tebufenpirad, teflubenzuron, teflutrina, terbufos, tetraclorvinfos, tetrametrina, tiacloprid, tiametoxam, tiodicarb, tiosultap-sodio, tolfenpirad, tralometrina, triazamato, triclorfon, triflumuron, *Bacillus thuringiensis* delta-endotoxinas, bacterias entomopatógenicas, virus entomopatógenicos y hongos entomopatógenicos.

7. Un método para controlar una plaga de invertebrados; el método comprende poner en contacto la plaga de invertebrados o su hábitat con una cantidad biológicamente eficaz de un compuesto de conformidad con la reivindicación 1.

8. El método de acuerdo con la reivindicación 7, caracterizado además porque el hábitat es una planta.

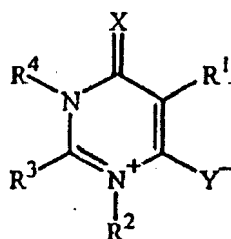
9. El método de acuerdo con la reivindicación 7, caracterizado además porque el hábitat es una semilla.

10. Una semilla tratada caracterizada porque comprende un compuesto de la reivindicación 1 en una cantidad de aproximadamente 0,0001 a 1 % por peso de la semilla antes del tratamiento.

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CLAIMS

1. A compound of Formula 1,



1

wherein

X is O or S;

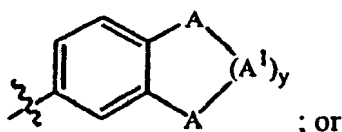
Y is O or S;

R¹ is H, halogen, C₁-C₆ alkyl, C₁-C₆ haloalkyl, C₂-C₆ alkenyl, C₂-C₆ haloalkenyl, C₂-C₆ alkynyl, C₂-C₆ haloalkynyl, CR²⁴=C(R²⁴)R¹⁰ or C≡CR¹⁰; or

R¹ is C₃-C₇ cycloalkyl, C₄-C₈ cycloalkylalkyl or C₅-C₇ cycloalkenyl, each optionally substituted with 1 to 4 substituents independently selected from the group consisting of halogen, C₁-C₂ alkyl, C₁-C₂ alkoxy, 1 cyclopropyl, 1 CF₃ and 1 OCF₃; or

R¹ is phenyl, naphthalenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ haloalkenyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxy, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, SF₅, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹; or

R¹ is



; or

R¹ is C(X¹)R¹⁸, C(=NOR²³)R¹⁸, C(O)NR¹⁶R^{18a}, C(=NNR^{20a}R²³)R¹⁸, C(=NNR^{20a}C(O)R²³)R¹⁸, C(=NNR^{20a}C(O)OR^{23a})R¹⁸ or C(=NNR^{20a}C(O)NR^{20a}R²³)R¹⁸; or

R¹ is an 8- to 10-membered heteroaromatic bicyclic ring system optionally substituted on carbon ring members with up to 3 substituents independently selected from

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the group consisting of halogen, cyano, nitro, SF₅, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹, and optionally further substituted on nitrogen ring members with methyl; or

R¹ is phenyl or a 5- or 6-membered heteroaromatic ring, each substituted with GQ¹, each optionally substituted with 1 Q² and each optionally substituted with 1 or 2 substituents independently selected from the group consisting of halogen, cyano, nitro, SF₅, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹; or

R¹ is phenyl or a 5- or 6-membered heteroaromatic ring, each substituted with LQ¹ and optionally substituted with 1 or 2 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino and C₂-C₆ dialkylamino;

each A is independently C(R¹⁶)₂, O, S(O)_n or NR¹⁵;

each A¹ is independently C(R¹⁷)₂;

X¹ is O or S;

G is a direct bond, O, S(O)_n, NH, N(CH₃), CH₂, CH₂O, OCH₂, C(O), C(O)O, OC(O), C(O)NH or NHC(O);

L is a phenyl or 5- or 6-membered heteroaromatic ring optionally substituted with 1 or 2 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino and C₂-C₆ dialkylamino;

Q¹ is phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of

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halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, SF₅, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹;

Q² is phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 or 2 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino and C₂-C₆ dialkylamino;

R² is CR⁵R⁶Q;

R³ is H, C₁-C₆ alkyl, C₁-C₆ haloalkyl, C₂-C₆ alkenyl, C₂-C₆ haloalkenyl, C₂-C₆ alkynyl, C₂-C₆ haloalkynyl or C≡CR¹⁰; or

R³ is C₃-C₆ cycloalkyl or C₄-C₇ cycloalkylalkyl, each optionally substituted with 1 to 4 substituents independently selected from the group consisting of halogen, C₁-C₂ alkyl, 1 cyclopropyl and 1 CF₃; or

R³ is phenyl, naphthalenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 or 2 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino and C₂-C₆ dialkylamino;

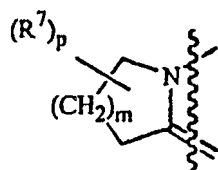
R⁴ is C₁-C₆ alkyl, C₁-C₆ haloalkyl, C₂-C₆ alkenyl, C₂-C₆ haloalkenyl, C₂-C₆ alkynyl, C₂-C₆ haloalkynyl or C≡CR¹⁰; or

R⁴ is C₃-C₆ cycloalkyl or C₄-C₇ cycloalkylalkyl, each optionally substituted with 1 to 4 substituents independently selected from the group consisting of halogen, C₁-C₂ alkyl, 1 cyclopropyl and 1 CF₃; or

R⁴ is phenyl, naphthalenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 or 2 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxycarbonyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino and C₂-C₆ dialkylamino; or

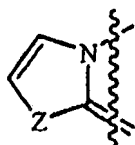
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R^3 and R^4 are taken together with the contiguous linking nitrogen and carbon atoms to form an optionally substituted ring R-1



R-1

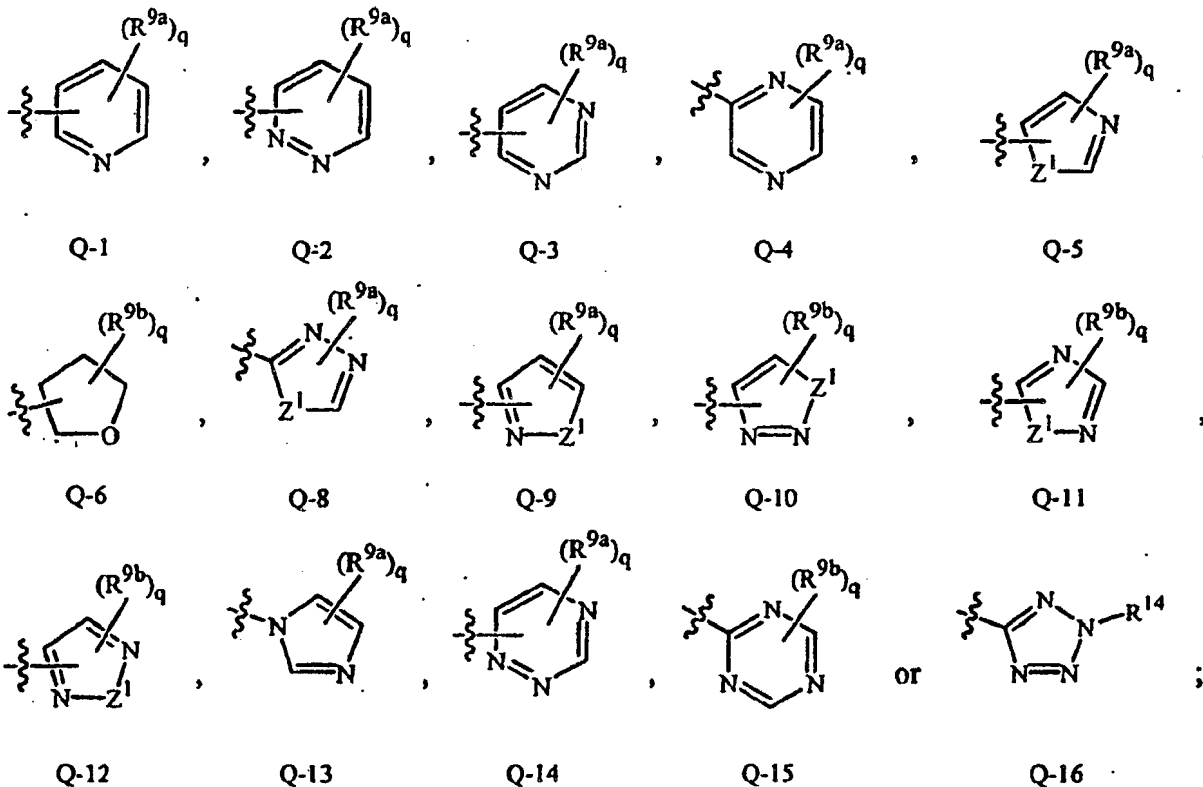
or ring R-2



R-2

Z is $C(R^{8a})=C(R^{8b})$, S, O or NCH_3 , provided that the $C(R^{8a})=C(R^{8b})$ moiety is oriented so the carbon atom bonded to R^{8b} is connected as R^3 in Formula 1;
each R^5 is independently H, F, Cl, cyano or C_1 - C_4 alkyl;
each R^6 is independently H, F, Cl or CH_3 ;

Q is



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Z^1 is O, S or NR^{14} ;

each R^7 is independently H, halogen, cyano, CF_3 , C_1-C_3 alkyl or C_3-C_6 cycloalkyl;

R^{8a} is H or F;

R^{8b} is H, F, CF_2H or CF_3 ;

5 each R^{9a} is independently H, halogen, cyano, nitro, C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_2-C_4 alkenyl, C_2-C_4 haloalkenyl, C_2-C_4 alkynyl, C_2-C_4 haloalkynyl, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_2-C_4 alkylcarbonyl, C_2-C_4 haloalkylcarbonyl, C_2-C_4 alkoxycarbonyl, C_2-C_4 haloalkoxycarbonyl, $C(O)NH_2$, C_2-C_4 alkylaminocarbonyl, C_3-C_7 dialkylaminocarbonyl, $C(O)N-(CH_2Z^2CH_2)-$, C_2-C_4 haloalkylaminocarbonyl, C_3-C_7 halodialkylaminocarbonyl, SF_5 , $S(O)_nR^{12}$ or $S(O)_2R^{13}$; or C_3-C_6 cycloalkyl or C_4-C_7 cycloalkylalkyl, each optionally substituted with 1 to 4 substituents selected from the group consisting of
10 halogen, C_1-C_2 alkyl, 1 cyclopropyl and 1 CF_3 ; or phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 or 2 substituents
15 independently selected from the group consisting of halogen, cyano, nitro, C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_1-C_4 haloalkyl, C_2-C_4 alkylcarbonyl, C_2-C_4 haloalkylcarbonyl, C_2-C_4 alkoxycarbonyl, C_2-C_4 alkylaminocarbonyl, C_3-C_7 dialkylaminocarbonyl, $C(O)N-(CH_2Z^2CH_2)-$, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_2-C_6 alkoxyalkyl, $S(O)_nR^{12}$, $S(O)_2R^{13}$, C_1-C_4 alkylamino and C_2-C_6 dialkylamino;

20 each R^{9b} is independently H, halogen, cyano, C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_1-C_4 alkoxy or C_1-C_4 haloalkoxy; or phenyl or pyridinyl, each optionally substituted with 1 or 2 substituents independently selected from the group consisting of
25 halogen, cyano, C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, $S(O)_nR^{12}$ and $S(O)_2R^{13}$;

each R^{10} is independently $Si(R^{11})_3$; or phenyl or pyridinyl, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of
30 halogen, cyano, nitro, SF_5 , C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_1-C_4 haloalkyl, C_2-C_4 alkylcarbonyl, C_2-C_4 haloalkylcarbonyl, C_2-C_4 alkoxycarbonyl, C_2-C_4 alkylaminocarbonyl, C_3-C_7 dialkylaminocarbonyl, $C(O)N-(CH_2Z^2CH_2)-$, C_2-C_6 alkoxyalkyl, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, $S(O)_nR^{12}$, $S(O)_2R^{13}$, C_1-C_4 alkylamino and C_2-C_6 dialkylamino;

each R^{11} is independently C_1-C_4 alkyl;

each R^{12} is independently C_1-C_4 alkyl or C_1-C_4 haloalkyl;

35 each R^{13} is independently C_1-C_4 alkylamino, C_2-C_6 dialkylamino or $-N-(CH_2Z^2CH_2)-$;

R^{14} is H, C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_2-C_5 alkoxycarbonyl, C_2-C_5 alkylaminocarbonyl, C_3-C_7 dialkylaminocarbonyl, $C(O)N-(CH_2Z^2CH_2)-$.

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$S(O)_nR^{12}$ or $S(O)_2R^{13}$; or phenyl or pyridinyl, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of halogen, cyano, C_1-C_4 alkyl, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, $S(O)_nR^{12}$ and $S(O)_2R^{13}$;

5 each R^{15} is independently C_1-C_4 alkyl;

each R^{16} is independently H or C_1-C_4 alkyl;

each R^{17} is independently H, F or CH_3 ;

10 R^{18} is H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_6 cycloalkyl, C_1-C_6 alkoxy, C_1-C_6 alkylamino or C_2-C_7 dialkylamino; or phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of halogen, C_1-C_4 alkyl, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, $S(O)_nR^{12}$ and $S(O)_2R^{13}$;

15 R^{18a} is phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of halogen, C_1-C_4 alkyl, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, $S(O)_nR^{12}$ and $S(O)_2R^{13}$;

each R^{19} is independently C_1-C_4 alkyl;

each R^{20} is independently H or C_1-C_4 alkyl;

each R^{20a} is independently C_1-C_4 alkyl;

20 each R^{21} is independently H or C_1-C_4 alkyl;

R^{23} is H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_3-C_6 alkenyl, C_3-C_6 haloalkenyl, C_3-C_6 alkynyl, C_3-C_6 haloalkynyl or $CH_2CO_2R^{21}$; or

25 R^{23} is C_3-C_6 cycloalkyl or C_4-C_7 cycloalkylalkyl, each optionally substituted with 1 to 4 substituents independently selected from the group consisting of halogen, C_1-C_2 alkyl, 1 cyclopropyl and 1 CF_3 ; or

30 R^{23} is phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of halogen, cyano, nitro, C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_1-C_4 haloalkyl, C_2-C_4 alkylcarbonyl, C_2-C_4 haloalkylcarbonyl, C_2-C_4 alkoxycarbonyl, C_2-C_4 alkylaminocarbonyl, C_3-C_7 dialkylaminocarbonyl, $C(O)N-(CH_2Z^2CH_2)-$, C_1-C_4 alkoxy, C_1-C_4 haloalkoxy, C_2-C_6 alkoxyalkyl, $S(O)_nR^{12}$, $S(O)_2R^{13}$, C_1-C_4 alkylamino and C_2-C_6 dialkylamino;

R^{23a} is C_1-C_6 alkyl, C_2-C_6 haloalkyl, C_3-C_6 alkenyl or C_3-C_6 cycloalkyl;

each R^{24} is independently H, F or CH_3 ;

35 m is 0, 1, 2 or 3;

each n is independently 0, 1 or 2;

p is 0, 1, 2, 3 or 4;

each q is independently 0, 1 or 2;

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y is 1 or 2; and

each Z² is independently CH₂CH₂, CH₂CH₂CH₂ or CH₂OCH₂.

2. A compound of Claim 1 wherein

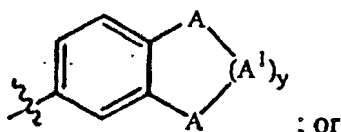
X is O;

Y is O;

R¹ is H or halogen; or

R¹ is phenyl or a 6-membered heteroaromatic ring, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ haloalkenyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxy, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, SF₅, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹; or

R¹ is



R¹ is C(X¹)R¹⁸ or C(=NOR²³)R¹⁸; or

R¹ is an 8- to 10-membered heteroaromatic bicyclic ring system optionally substituted on carbon ring members with up to 3 substituents independently selected from the group consisting of halogen, cyano, nitro, SF₅, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxy, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹, and optionally substituted on nitrogen ring members with methyl; or

R¹ is phenyl or a 5- or 6-membered heteroaromatic ring, each substituted with GQ¹, each optionally substituted with 1 Q² and each optionally substituted with 1 or 2 substituents independently selected from the group consisting of halogen, cyano, nitro, SF₅, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxy, C₂-C₄ alkoxyalkyl, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂), C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹;

G is a direct bond;

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Q¹ is phenyl or a 5- or 6-membered heteroaromatic ring, each optionally substituted with 1 to 3 substituents independently selected from the group consisting of halogen, cyano, nitro, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl, C₂-C₄ alkoxy, C₂-C₄ alkylaminocarbonyl, C₃-C₇ dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂)-, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆ dialkylamino, SF₅, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹;

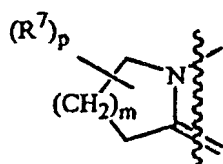
R³ is H, C₁-C₆ alkyl, C₁-C₆ haloalkyl, C₂-C₆ alkenyl, C₂-C₆ haloalkenyl, C₂-C₆ alkynyl, C₂-C₆ haloalkynyl or C≡CR¹⁰; or

R³ is C₃-C₆ cycloalkyl or C₄-C₇ cycloalkylalkyl, each optionally substituted with 1 to 4 substituents independently selected from the group consisting of halogen, C₁-C₂ alkyl, 1 cyclopropyl and 1 CF₃;

R⁴ is C₁-C₆ alkyl, C₁-C₆ haloalkyl, C₂-C₆ alkenyl, C₂-C₆ haloalkenyl, C₂-C₆ alkynyl, C₂-C₆ haloalkynyl or C≡CR¹⁰; or

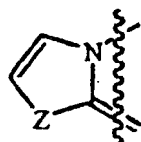
R⁴ is C₃-C₆ cycloalkyl or C₄-C₇ cycloalkylalkyl, each optionally substituted with 1 to 4 substituents independently selected from the group consisting of halogen, C₁-C₂ alkyl, 1 cyclopropyl and 1 CF₃; or

R³ and R⁴ are taken together with the contiguous linking nitrogen and carbon atoms to form an optionally substituted ring R-1



R-1

or ring R-2



R-2

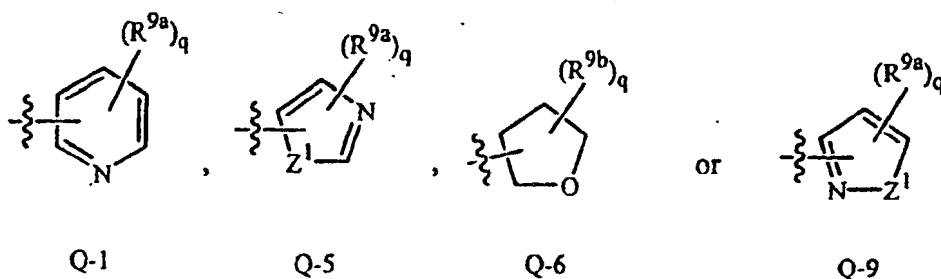
Z is C(R^{8a})=C(R^{8b}) or S, provided that the C(R^{8a})=C(R^{8b}) moiety is oriented so the carbon atom bonded to R^{8b} is connected as R³ in Formula 1;

each R⁵ is independently H, F, Cl, cyano or C₁-C₄ alkyl;

each R⁶ is independently H, F, Cl or CH₃; and

Q is

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3. A compound of Claim 2 wherein
 R^3 is C_1-C_6 alkyl or C_1-C_6 haloalkyl; and
 R^4 is C_1-C_6 alkyl or C_1-C_6 haloalkyl.

4. A compound of Claim 2 wherein
 R^3 and R^4 are taken together with the contiguous linking nitrogen and carbon atoms to
form an optionally substituted ring R-2; and
 Z is $CH=CH$ or $CH=CF$, provided that the $CH=CF$ moiety is oriented so the carbon
atom bonded to F is connected as R^3 in Formula 1.

5. A compound of Claim 2 wherein
 R^3 and R^4 are taken together with the contiguous linking nitrogen and carbon atoms to
form an optionally substituted ring R-2; and
 Z is S.

6. A compound of any one of Claims 3 through 5 wherein
 R^1 is phenyl or pyridinyl, each optionally substituted with 1 to 3 substituents
independently selected from the group consisting of halogen, cyano, nitro, C_1-C_4
alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_1-C_4 haloalkyl, C_2-C_4 haloalkenyl,
 C_2-C_4 alkylcarbonyl, C_2-C_4 haloalkylcarbonyl, C_2-C_4 alkoxy carbonyl, C_2-C_4
alkylaminocarbonyl, C_3-C_7 dialkylaminocarbonyl, $C(O)N-(CH_2Z^2CH_2)-$, C_1-C_4
alkoxy, C_1-C_4 haloalkoxy, C_2-C_6 alkoxyalkyl, $S(O)_nR^{12}$, $S(O)_2R^{13}$, C_1-C_4
alkylamino, C_2-C_6 dialkylamino, SF_5 , $Si(CH_3)_3$, CHO, hydroxy, $OC(O)R^{19}$ and
 $N(R^{20})C(O)R^{19}$.

7. A compound of any one of Claims 3 through 5 wherein
 R^1 is phenyl or pyridinyl, each substituted with GQ^1 and further optionally substituted
with 1 or 2 substituents independently selected from the group consisting of
halogen, cyano, nitro, SF_5 , C_1-C_4 alkyl, C_2-C_4 alkenyl, C_2-C_4 alkynyl, C_1-C_4

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haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ haloalkylcarbonyl,
 C₂-C₄ alkoxy, C₂-C₄ alkylaminocarbonyl, C₃-C₇
 dialkylaminocarbonyl, C(O)N-(CH₂Z²CH₂)-, C₁-C₄ alkoxy, C₁-C₄
 haloalkoxy, C₂-C₆ alkoxyalkyl, S(O)_nR¹², S(O)₂R¹³, C₁-C₄ alkylamino, C₂-C₆
 dialkylamino, Si(CH₃)₃, CHO, hydroxy, OC(O)R¹⁹ and N(R²⁰)C(O)R¹⁹.

8. A compound of any one of Claim 3 to 5 wherein

Q is Q-1, Q-5, Q-6 or Q-9;

R⁵ is H or methyl;

R⁶ is H;

each R^{9a} is independently H, halogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄
 alkoxy, C₁-C₄ haloalkoxy, SF₅ or S(O)_nR¹²; or C₃-C₆ cycloalkyl or C₄-C₇
 cycloalkylalkyl, each optionally substituted with 1 to 4 substituents selected from
 the group consisting of halogen, C₁-C₂ alkyl, 1 cyclopropyl and 1 CF₃; and

each R^{9b} is independently H, halogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄
 alkoxy or C₁-C₄ haloalkoxy.

9. A compound of Claim 1 that is selected from the group consisting of

1-[(6-chloro-3-pyridinyl)methyl]-3-(2,4-difluorophenyl)-2-hydroxy-4-oxo-
 4H-pyrido[1,2-a]pyrimidinium inner salt;

1-[(6-chloro-3-pyridinyl)methyl]-3-(4-fluorophenyl)-2-hydroxy-4-oxo-4H-
 pyrido[1,2-a]pyrimidinium inner salt;

3-(3-chlorophenyl)-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4H-
 pyrido[1,2-a]pyrimidinium inner salt;

1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-[3-
 (trifluoromethyl)phenyl]-4H-pyrido[1,2-a]pyrimidinium inner salt;

1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-[3-
 (trifluoromethoxy)phenyl]-4H-pyrido[1,2-a]pyrimidinium inner salt;

1-[(2-chloro-5-thiazolyl)methyl]-3-(4-fluorophenyl)-2-hydroxy-4-oxo-4H-
 pyrido[1,2-a]pyrimidinium inner salt;

1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-phenyl-4H-pyrido[1,2-
 a]pyrimidinium inner salt;

1-[(2-chloro-5-thiazolyl)methyl]-3-(2,4-difluorophenyl)-2-hydroxy-4-oxo-
 4H-pyrido[1,2-a]pyrimidinium inner salt;

1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-(4-methoxyphenyl)-4-oxo-4H-
 pyrido[1,2-a]pyrimidinium inner salt;

1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-(3-methoxyphenyl)-4-oxo-4H-

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pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-fluoro-3-pyridinyl)methyl]-3-(4-fluorophenyl)-2-hydroxy-4-oxo-4*H*-
 pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(3-bromophenyl)-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4*H*-
 pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(3-bromophenyl)-1-[(6-chloro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-4*H*-
 pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-chloro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-3-[3-
 (trifluoromethoxy)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-[4-(trifluoromethyl)-2-
 pyridinyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-(2-cyanophenyl)-2-hydroxy-4-oxo-4*H*-
 pyrido[1,2-*a*]pyrimidinium inner salt;
 8-[(6-chloro-3-pyridinyl)methyl]-7-hydroxy-5-oxo-6-phenyl-5*H*-thiazolo[3,2-
a]pyrimidinium inner salt;
 8-[(6-chloro-3-pyridinyl)methyl]-6-(4-fluorophenyl)-7-hydroxy-5-oxo-5*H*-
 thiazolo[3,2-*a*]pyrimidinium inner salt;
 8-[(6-chloro-3-pyridinyl)methyl]-7-hydroxy-5-oxo-6-[3-
 (trifluoromethoxy)phenyl]-5*H*-thiazolo[3,2-*a*]pyrimidinium inner salt;
 8-[(2-chloro-5-thiazolyl)methyl]-7-hydroxy-5-oxo-6-phenyl-5*H*-thiazolo[3,2-
a]pyrimidinium inner salt;
 8-[(2-chloro-5-thiazolyl)methyl]-6-(4-fluorophenyl)-7-hydroxy-5-oxo-5*H*-
 thiazolo[3,2-*a*]pyrimidinium inner salt;
 8-[(2-chloro-5-thiazolyl)methyl]-7-hydroxy-5-oxo-6-[3-
 (trifluoromethoxy)phenyl]-5*H*-thiazolo[3,2-*a*]pyrimidinium inner salt;
 3-[3-(6-chloro-3-pyridinyl)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-
 hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-fluoro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-3-[3-
 (trifluoromethoxy)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(5-chloro-2-fluorophenyl)-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-
 oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-[2-chloro-5-(trifluoromethoxy)phenyl]-2-
 hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(4-fluorophenyl)-2-hydroxy-1-[(1-methyl-1*H*-pyrazol-4-yl)methyl]-4-oxo-
 4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 2-hydroxy-1-[(1-methyl-1*H*-pyrazol-4-yl)methyl]-4-oxo-3-phenyl-4*H*-
 pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-(3,5-dimethoxyphenyl)-2-hydroxy-4-oxo-

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4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-[2-fluoro-5-(trifluoromethoxy)phenyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(2-chloro-4-pyridinyl)-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-(2-fluoro-5-bromophenyl)-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-(2,4,5-trifluorophenyl)-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-[3-bromo-5-(trifluoromethoxy)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-[3-bromo-5-(trifluoromethyl)phenyl]-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-[2-fluoro-5-(trifluoromethyl)phenyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-3-(2-methoxyphenyl)-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-(2-fluorophenyl)-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 8-[(6-chloro-3-pyridinyl)methyl]-6-(2-fluorophenyl)-7-hydroxy-5-oxo-5*H*-thiazolo[3,2-*a*]pyrimidinium inner salt;
 3-[(6-chloro-3-pyridinyl)methyl]-5-(4-fluorophenyl)-3,6-dihydro-4-hydroxy-1,2-dimethyl-6-oxopyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-[3-(6-fluoro-3-pyridinyl)-5-(trifluoromethyl)phenyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[1-(6-chloro-3-pyridinyl)ethyl]-3-(4-fluorophenyl)-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(2-chloro-5-thiazolyl)methyl]-3-(ethoxycarbonyl)-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-benzoyl-1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(2,4-difluorophenyl)-1-[(6-fluoro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-chloro-3-pyridinyl)methyl]-2-hydroxy-3-(3-methoxyphenyl)-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-chloro-3-pyridinyl)methyl]-3-(2,3-difluorophenyl)-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;

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1-[(6-chloro-3-pyridinyl)methyl]-3-(2-fluoro-3-methoxyphenyl)-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(3,5-dimethoxyphenyl)-1-[(6-fluoro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-fluoro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-3-[3-(trifluoromethyl)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(4-fluorophenyl)-2-hydroxy-1-[(2-methyl-5-thiazolyl)methyl]-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 2-hydroxy-4-oxo-3-phenyl-1-[(5-thiazolyl)methyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(4-fluorophenyl)-2-hydroxy-4-oxo-1-[(5-thiazolyl)methyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(2-fluorophenyl)-1-[(6-fluoro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-chloro-3-pyridinyl)methyl]-3-[2-chloro-5-(trifluoromethyl)phenyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 3-(2-fluoro-4-cyanophenyl)-1-[(6-fluoro-3-pyridinyl)methyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt;
 1-[(6-fluoro-3-pyridinyl)methyl]-3-[2-fluoro-5-(trifluoromethyl)phenyl]-2-hydroxy-4-oxo-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt; and
 1-[(2-chloro-5-thiazolyl)methyl]-2-hydroxy-4-oxo-3-[3-(6-trifluoromethyl-3-pyridinyl)phenyl]-4*H*-pyrido[1,2-*a*]pyrimidinium inner salt.

10. A composition comprising a compound of any of Claims 1 to 9 and at least one additional component selected from the group consisting of surfactants, solid diluents and liquid diluents, said composition optionally further comprising at least one additional
 5 biologically active compound or agent.

11. The composition of Claim 10 wherein the at least one additional biologically active compound or agent is selected from the group consisting of abamectin, acephate, acequinocyl, acetamiprid, acrinathrin, amidoflume, amitraz, avermectin, azadirachtin, azinphos-methyl, bifenthrin, bifenazate, bistrifluron, borate, 3-bromo-1-(3-chloro-2-
 10 pyridinyl)-*N*-[4-cyano-2-methyl-6-[(methylamino)carbonyl]phenyl]-1*H*-pyrazole-5-carboxamide (cyantraniliprole), buprofezin, cadusafos, carbaryl, carbofuran, cartap, carzol, chlorantraniliprole, chlorfenapyr, chlorfluazuron, chlorpyrifos, chlorpyrifos-methyl, chromafenozide, clofentezin, clothianidin, cyflumetofen, cyfluthrin, beta-cyfluthrin, cyhalothrin, gamma-cyhalothrin, lambda-cyhalothrin, cypermethrin, alpha-cypermethrin,
 15 zeta-cypermethrin, cyromazine, deltamethrin, diafenthiuron, diazinon, dieldrin, diflubenzuron, dimefluthrin, dimehypo, dimethoate, dinotefuran, diofenolan, emamectin,

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endosulfan, esfenvalerate, ethiprole, etofenprox, etoxazole, fenbutatin oxide, fenothiocarb, fenoxycarb, fenpropathrin, fenvalerate, fipronil, flonicamid, flubendiamide, flucythrinate, flufenerim, flufenoxuron, fluvalinate, tau-fluvalinate, fonophos, formetanate, fosthiazate, halofenozide, hexaflumuron, hexythiazox, hydramethylnon, imidacloprid, indoxacarb, insecticidal soaps, isofenphos, lufenuron, malathion, metaflumizone, metaldehyde, methamidophos, methidathion, methiodicarb, methomyl, methoprene, methoxychlor, metofluthrin, monocrotophos, methoxyfenozide, nitenpyram, nithiazine, novaluron, noviflumuron, oxamyl, parathion, parathion-methyl, permethrin, phorate, phosalone, phosmet, phosphamidon, pirimicarb, profenofos, profluthrin, propargite, protrifenbute, pymetrozine, pyrafluprole, pyrethrin, pyridaben, pyridalyl, pyrifluquinazon, pyriprole, pyriproxyfen, rotenone, ryanodine, spinetoram, spinosad, spirotetramat, sulprofos, sulfoxaflor, tebufenozide, tebufenpyrad, teflubenzuron, tefluthrin, terbufos, tetrachlorvinphos, tetramethrin, thiacloprid, thiamethoxam, thiodicarb, thiosultap-sodium, tolfenpyrad, tralomethrin, triazamate, trichlorfon, triflumuron, *Bacillus thuringiensis* delta-endotoxins, entomopathogenic bacteria, entomopathogenic viruses and entomopathogenic fungi.

12. A composition for protecting an animal from an invertebrate parasitic pest comprising a parasitically effective amount of a compound of any of Claims 1 to 9 and at least one carrier.

13. A non-therapeutic method for controlling an invertebrate pest comprising contacting the invertebrate pest or its environment with a biologically effective amount of a compound of any of Claims 1 to 9.

14. A treated seed comprising a compound of any of Claims 1 to 9 in an amount of from about 0.0001 to 1 % by weight of the seed before treatment.