

CASTELLANOS & CO LTDA

ABOGADOS

Calle 94 A No. 7 A-09

Bogotá, D.C. – COLOMBIA

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 06-101066-A-00008-0000

Fecha: 2012-08-03 14:29:39 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 379 FASENACIONALI
Act. 412 REPOSPRESRECU Folios: 39

Señor

SUPERINTENDENTE DE INDUSTRIA Y COMERCIO

Superintendencia de Industria y Comercio

Ministerio de Desarrollo Económico

E. S. D.

RECURSO DE REPOSICION

Ref: Expediente No. 06 101066A

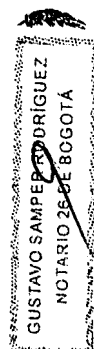
Solicitud de Patente de invención para: **“COMPOSICIONES Y MÉTODOS PARA EL CONTROL DE INFESTACIONES DE INSECTOS EN PLANTAS”**

Solicitante: **MONSANTO TECHNOLOGY LLC**

Yo, **MARGARITA CASTELLANOS ABONDANO**, mayor de edad, domiciliada e identificada como aparece al pié de mi firma, apoderada de la sociedad solicitante en el asunto de la referencia, atentamente acudo a su Despacho con el fin de interponer **RECURSO DE REPOSICIÓN** (art. 50 C.C.A.) para que se revoque en su totalidad la resolución No. **40740** de 28 de junio de 2012, notificada por edicto desfijado el 27 de julio de 2012.

1. LA RESOLUCION No. 40740

La Superintendencia de Industria y Comercio expidió la Resolución No. 40740 por la cual se niega la patente que fue solicitada el día 6 de octubre de 2006, para el invento denominado: **“COMPOSICIONES Y METODOS PARA EL CONTROL DE**



INFESTACIONES DE INSECTOS EN PLANTAS", y radicada bajo el expediente N° 06.101.066-A.

2. FUNDAMENTO DE LA RESOLUCION No. 40740

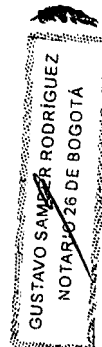
La Resolución 40740 establece en su artículo sexto que, el pliego reivindicatorio de la presente solicitud no cumple con el requisito de nivel inventivo y se mencionan los siguientes argumentos:

2.1 "La diferencia entre la materia reclamada en la solicitud y D1, está dada porque en la solicitud el ARNds se combina con un plaguicida tipo proteína de *Bacillus thuringiensis*, mientras que en D1 se considera que el ARNds del gen esencial de la plaga, se puede colocar en un vector y combinar con un marcador biocida o herbicida".

"El efecto que produce esa diferencia es que la expresión combinada del ARNds de un gen esencial del insecto y una proteína de *Bacillus thuringiensis*, disminuye la supervivencia del insecto plaga".

2.2 "Sin embargo, el documento D3 sugiere superar la resistencia a toxinas Bt por la combinación de toxinas Bt con otros compuestos para evitar la resistencia de la plaga e incrementar la protección del cultivo. D3 también sugiere la acumulación racional de toxinas en plantas de forma que los mecanismos de resistencia a las toxinas no se sobrelapen. La persona del oficio normalmente versada en la materia sabe que los mecanismos de acción usados con dsRNA dirigido a genes esenciales, tales como los divulgados en D1, no se sobrelapan con los mecanismos de resistencia a las toxinas Bt divulgadas en D3. De esta manera, D3 sugeriría la combinación de otros compuestos que afectan a los insectos plaga lo cual motivaba a la persona del oficio para combinar el método planteado en D3 con el método de inhibición de genes esenciales planteado en D1".

2.3 "Igualmente, frente a la reivindicación 4 de la solicitud, la cual reclama un método para mejorar el crecimiento de un cultivo usando la técnica de ARNds combinada con un plaguicida, esta Oficina determina que los documentos D1 y D3 afectan el nivel inventivo puesto que dicho método comprende las mismas etapas ya analizadas para la reivindicación 1. Por tanto, frente a la combinación de D1 y D3 la invención de la solicitud resulta obvia e incumple el artículo 18 de la D 486".



2.4 "El documento D2 también resuelve el problema de controlar plagas de insecto por inhibir la expresión de un gen esencial de estos por producir ARNds de este gen en plantas. Este documento se concentra en obtener el ARNds por introducir el mismo a través de vectores de expresión de diverso origen que inhiben la expresión de los genes en los insectos que se alimentan de las plantas transformadas".

"La diferencia entre la materia reclamada y D2 esta dada porque en la solicitud hay una inclusión de un plaguicida, que puede ser una proteína heteróloga insecticida, mientras que en D2 la infestación se controla por supresión en la expresión de genes esenciales del insecto y genes blanco de insecticidas. El efecto que produce la introducción de este plaguicida es asegurar que la plaga no puede infestar las plantas, generando una exposición a la toxina que la afecta".

2.5 "D3 sugería la combinación de otros compuestos que afectan a los insectos plaga lo cual motivaba a la persona del oficio para combinar el método planteado en D3 con el método de inhibición de genes esenciales y genes blanco de insecticida planteado en D2. Por tanto, frente a la combinación de D2 y D3 la invención de la solicitud resulta obvia e incumple el artículo 18 de la D486".

3. FUNDAMENTOS DEL RECURSO

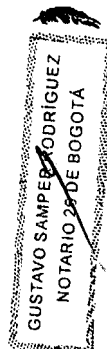
Presento a su Despacho las siguientes consideraciones que justifican la revocatoria de la Resolución N° 40740 del 28 de junio de 2012:

3.1 Violación del artículo 18 de la Decisión 486 de la Comisión de la Comunidad Andina:

De acuerdo con el artículo 18 de la Decisión 486:

"Artículo 18.- Se considerará que una invención tiene nivel inventivo, 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"

Así entonces, es claro que en la evaluación de nivel inventivo de la presente invención, los documentos citados D1, D2 y D3 **deberían** revelar sugerencias y enseñanzas claras para el técnico en la materia que lo lleven a obtenerla. Para este fin, el Señor Examinador



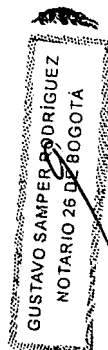
debe examinar si, de conformidad con dichos documentos (el estado de la técnica más cercano), una persona versada en la materia habría o no propuesto las características técnicas que distinguen la invención reivindicada y que permiten alcanzar los resultados obtenidos por dicha invención.

Asimismo, es importante resaltar que si bien el resultado y/o los medios reivindicados en la invención objeto de análisis pudieran ya haber sido conocidos (estado de la técnica), la invención no necesariamente carecerá de nivel inventivo. En efecto, se pone de presente que si al momento de efectuar el examen de nivel inventivo de una invención, los medios usados para la producción de dicho resultado son conocidos, este solo hecho no permitirá al examinador concluir que la invención carece de nivel inventivo y que por ende no puede ser objeto de patente de invención toda vez que el invento debe ser considerado como un todo (en su combinación) y no en cada uno de los elementos que lo conforman. Lo anterior, teniendo en cuenta que los resultados inesperados o el aporte tecnológico de la invención frente a lo ya conocido se puede presentar por la combinación específica de características ya conocidas en el estado de la técnica previo.

De conformidad con el anterior artículo, se expone a continuación las razones por las cuales la presente invención posee nivel inventivo frente a la combinación de las enseñanzas de los documentos D1-D3 y D2-D3:

El problema técnico planteado en la presente solicitud es la necesidad de suministrar un método libre de plaguicidas para controlar la infestación de plagas en plantas de cultivo. Este problema es precisamente el que soluciona la presente invención, toda vez que proporciona un evento transgénico, consistente en un método para controlar una infestación por insectos plaga en plantas de maíz que comprende expresar en una planta un ARNds que es transcripta a partir de unas secuencias determinadas de ADN preferiblemente de 19 a 21 nucleótidos y la selección de un plaguicida de una proteína insecticida de *Bacillus thuringiensis* que presenta actividad biológica contra el insecto plaga blanco.

Ahora bien, de acuerdo con el Señor Examinador el documento D1 divulga un método para inhibir una infestación por una plaga de insectos por medio de la expresión de un vector que produce ARNds direccionado hacia dicho insecto. Asimismo, el Examinador señala que el documento D2 divulga un método de control de la infestación por una plaga de insectos a través de la expresión de ARNds y que el documento D3 divulga un método para el control de una infestación por insectos usando una combinación de toxinas de *Bacillus thuringiensis* (Bt).

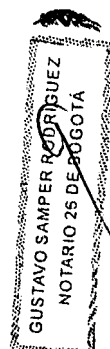


En el trámite de la presente solicitud se han presentado argumentos detallados y evidencias sobre los resultados sinérgicos inesperados obtenidos usando la presente invención y que en consecuencia, demuestran el nivel inventivo y la no obviedad de la invención. En particular, los documentos D1-D3 o D2-D3 por si solos o combinados, no enseñan ni sugieren la combinación de la expresión de una secuencia de ARNs y un plaguicida en una planta, tal como se reivindica en la presente invención y mucho menos permiten prever con absoluta certeza el resultado sinérgico que se obtendría con dicha combinación específica sin experimentación alguna teniendo en cuenta únicamente las enseñanzas reveladas en dichos documentos. Por lo tanto, no se entiende cómo una persona versada en el arte podría verse motivada a obtener el método acá reivindicado y las características técnicas específicas del mismo a partir de las enseñanzas generales de los documentos D1, D2 y D3.

En efecto, debido a la diferencia entre la materia reclamada en la solicitud y D1, que consiste en que en la solicitud el ARNs se combina con un plaguicida tipo proteína de *Bacillus thuringiensis* mientras que en D1 se considera que el ARNs del gen esencial de la plaga se puede colocar en un vector y combinar con un marcador biocida o herbicida, se observa que se disminuye la supervivencia del insecto plaga lo cual representa una mejora en los resultados y un avance en comparación con las enseñanzas del documento D1. Adicionalmente, se pone de presente que en la solicitud hay una inclusión de un plaguicida, que puede ser una proteína heteróloga insecticida, mientras que en D2 la infestación se controla por supresión en la expresión de genes esenciales del insecto y genes blanco de insecticidas, lo cual permite asegurar que la plaga no puede infestar las plantas, generando una exposición a la toxina que la afecta.

Con respecto a las enseñanzas de los documentos D1 y D3, vale la pena resaltar que a partir de la combinación de las enseñanzas de dichos documentos no se obtienen las características técnicas esenciales del método acá reivindicado toda vez que tal combinación no divulga la expresión de un plaguicida junto con un ARNs. De hecho, se aclara a su Despacho que aunque en la Resolución 40740 se indica que el documento D3 sugiere el apilamiento de toxinas en una planta con el fin de que el mecanismo de resistencia a las toxinas no se superponga, deseamos aclarar que contrario a lo que afirma el Señor Examinador, en el documento D3 (ver pág. 4, líneas 24-28) se divulga lo siguiente:

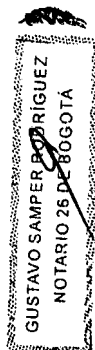
“Los insectos pueden llegar a presentar resistencia cruzada a numerosas toxinas Bt después de su exposición a una sola toxina. La identificación de



mecanismos de resistencia a las toxinas Bt puede proporcionar un método de apilamiento racional de toxinas en plantas de manera tal que no se superpongan los mecanismos de resistencia a las toxinas".

A partir del párrafo arriba mencionado y las enseñanzas del pliego descriptivo de D3, resulta claro que los inventores de dicho documento solamente pretendían que dicho apilamiento se refiriera a toxinas y más específicamente a toxinas Bt. En particular, la referencia se relaciona en general a las toxinas Bt y la resistencia a las mismas. De modo que, una persona versada en la materia comprendería entonces que los "otros compuestos" divulgados que se combinarán con las toxinas Bt serán otras **toxinas convencionales**, inclusive otras toxinas Bt. El especialista no podría derivar de ninguna manera, a partir de D3, que el "otro compuesto" podría ser un ARNds para suprimir un gen esencial en la plaga blanco. Por este motivo, una persona versada en la materia no se vería motivada a combinar las toxinas Bt de D3 con un mecanismo drásticamente diferente direccionado contra diferentes insectos, como es el caso del mecanismo que comprende las moléculas de ARNds de D1. Lo anterior es aún más evidente, si se tiene en cuenta que el documento D3 no enseña ni sugiere combinar el método allí reivindicado con el método de inhibición de genes esenciales planteado en D1 o con métodos similares al mismo.

Con respecto a la combinación de los documentos D2 y D3, deseamos resaltar que D3 no sugiere la combinación de una toxina Bt con un elemento distinto de una toxina convencional, tal como si lo hace la presente solicitud de patente en la cual se hace referencia a la expresión de un ARNds **en una planta**. De otro lado, el documento D2 se refiere en general a métodos para conferir resistencia en plantas a una plaga de insectos mediante la expresión de un ARNds que presenta una identidad de secuencia sustancial con un gen endógeno de un **insecto contenido en un baculovirus**. Sin embargo, dicho documento no enseña o sugiere la expresión de dicho ARNds en una planta tal como si lo hace la presente solicitud. En consecuencia, una persona versada en la materia no se vería motivada a expresar un ARNds direccionado contra un insecto en una célula vegetal en lugar de un baculovirus, a partir de las enseñanzas reveladas en D2. De modo que, al combinar las enseñanzas de los documentos D2 y D3 citados por su Despacho, es claro que dichos documentos por si solos o combinados no enseñan ni sugieren como un todo las características técnicas esenciales de la presente invención y por lo tanto, la objeción formulada por nivel inventivo se debe tener por superada.



Adicionalmente, se aclara a su Despacho que las reivindicaciones de la presente invención son específicas para controlar una infestación por insectos, donde el insecto blanco es una plaga de Coleópteros. En contraste, ninguna de las referencias citadas divulga un ARNds dirigido contra genes en plagas de Coleópteros. Por ejemplo, D3 no divulga el uso de un ARNds contra ningún insecto y, aunque D1 describe en términos generales el uso de ARNds contra nematodos e insectos, la única divulgación específica con respecto a insectos involucra insectos chupadores de savia, con un solo ejemplo dirigido contra *Manduca sexta*, un Lepidóptero. De manera similar, los ejemplos de D2 están dirigidos a *Drosophila* y *Manduca* pero no hay ninguna divulgación respecto del direccionamiento de ARNds contra plagas de Coleópteros. De modo que, en ninguna de las referencias citadas se revelan ejemplos sobre la identificación o el uso de ARNds direccionados contra genes de insectos Coleópteros.

De lo anterior, es claro que los documentos D1, D2 y D3 citados por su Despacho, no incluyen enseñanzas que motiven a una persona versada en la materia a identificar un ARNds de insectos Coleópteros para conferir resistencia a una infestación por dichos insectos y prever con absoluta certeza la obtención de resultados mejorados sin realizar experimentación alguna. La identificación y el uso de ARNds direccionados a un gen esencial de un orden o grupo de insectos, tales como nematodos, insectos chupadores de savia o insectos *Lepidópteros*, no había sido previamente enseñado o sugerido en el arte previo a partir del cual no se identifica el uso de los ARNds direccionados contra un gen esencial en otro orden o grupo de insectos, tales como insectos Coleópteros, como se reivindica en la presente invención. Dicha identificación no sólo requiere de investigación y experimentación para identificar un gen esencial apropiado para tal direccionamiento, sino también de un análisis genético profundo y múltiples ensayos para identificar y evaluar moléculas de ARNds potencialmente exitosas. Aún más, una vez identificadas tales moléculas de ARNds es necesario realizar ensayos adicionales para evaluar tales moléculas de ARNds en plantas transgénicas y su eficacia para inhibir una infestación por medio de la mortalidad de la plaga blanco. La magnitud de la experimentación necesaria queda demostrada por los extensos experimentos descritos en los Ejemplos de la presente Solicitud.

Además, vale destacar que ninguna de las referencias citadas divulga o sugiere las secuencias específicas que se describen en las reivindicaciones de la presente solicitud de patente y adicionalmente, si bien los métodos para determinar secuencias homólogas pueden ser conocidos por los especialistas en el arte, la identificación, el análisis y la evaluación de secuencias funcionales en base a homólogos de otras

especies no son tareas de rutina. Por ejemplo, como se describió previamente, es necesario efectuar un análisis profundo así como múltiples ensayos y experimentaciones funcionales para identificar secuencias que inhibirán eficazmente una infestación por insectos por medio del direccionamiento de un ARNds. Por consiguiente, las secuencias específicas descritas proporcionan un nivel inventivo en vista de dicha experimentación necesaria para identificar y evaluar cada secuencia.

Entonces, ninguno de los documentos D1, D2 o D3 ofrece una divulgación o motivación para que un especialista en el arte combine las dos modalidades de control de plagas en plantas, es decir, una secuencia de ARNds y un gen convencional que codifica una proteína de una toxina, con el fin de obtener la invención acá reivindicada. Sin un análisis retrospectivo, un especialista no hubiera podido predecir si dicha combinación sería eficaz en el control de una infestación por una plaga.

Con el fin de corroborar el efecto inesperado del método acá reivindicado, deseamos dirigir la atención del Señor Examinador al Ejemplo 4 y el Ejemplo 5 de la presente Solicitud en los cuales se demuestra que la combinación de ARNds direccionado contra un gen de una plaga y un plaguicida, tal como una proteína Cry, es sorprendentemente eficaz para inducir mortalidad de plagas de insectos, tal como el gusano de la raíz de maíz (CRW). Estos resultados demuestran la eficacia sorprendente y sinérgica de la combinación del ARNds y el plaguicida en el control de plagas de insectos. El efecto sinérgico de la invención reivindicada está fundamentado además por los datos proporcionados durante el trámite de la solicitud que demuestran la protección contra daños ocasionados por la alimentación del CRW en plantas que comprenden las combinaciones de la inserción de un gen Bt (Cry3Bb) y dos eventos de ARNds distintos en comparación con una planta control. En particular, los datos provistos muestran el efecto sinérgico logrado con la expresión combinada de un ARNds y un plaguicida.

Así entonces, es claro que los documentos citados no proporcionan a la persona versada en la materia información sobre cómo la combinación del ARNds y el plaguicida debe ser realizada con el fin de obtener un efecto sorprendente y sinérgico, sino que adicionalmente dichas propiedades inesperadas han sido demostradas durante el trámite de la presente solicitud.

En virtud de las diferencias esenciales entre los métodos enseñados en las anterioridades citadas y el método de conformidad con la presente invención, existe un claro salto tecnológico, a saber: un método que permite la obtención del efecto mejorado

mencionado al combinar un ARNds y un plaguicida de conformidad con lo recitado en la reivindicación 1 de la presente solicitud.

Así entonces, respecto a los resultados y pruebas presentadas durante el trámite de la presente solicitud, es claro que los mismos demuestran la eficacia **sorprendente** y **sinérgica** de la combinación del ARNds y el plaguicida en el control de plagas de insectos.

De tal manera que, debido a que en los documentos D1, D2 y D3 citados no existe ninguna indicación sobre la combinación específica de un ARNds y un plaguicida de acuerdo con lo recitado en la reivindicación 1 de la presente invención con el fin de presentar un efecto mejorado en el control de plagas de insectos, tal como lo hace la presente solicitud, la materia divulgada en la presente solicitud se debe tener como inventiva frente a dichos documentos, ya que tal y como lo señala el Manual Andino de Patentes un compuesto tiene nivel inventivo cuando:

“- presenta un efecto inesperado, (es el caso más frecuente sobre todo si el compuesto es similar a otros del estado de la técnica. El efecto inesperado puede ser completamente diferente de los descritos para los compuestos similarmente conocidos, o bien ser igual pero con una mejora en los resultados)”¹.

3.2 Conclusión.

Así entonces, teniendo en cuenta que las enseñanzas de las anterioridades D1, D2 y D3 citadas por su Despacho no llevan a un técnico versado en la materia a obtener el método acá reivindicado toda vez que no enseñan ni sugieren por si solos o combinados como un todo las características técnicas esenciales del mismo, es claro que a partir de dichos documentos no era posible para un técnico medio obtener de manera obvia y/o evidente el método acá reivindicado. Lo anterior si se tiene en cuenta que para el estudio de nivel inventivo el Examinador no puede adoptar la posición de un inventor y que además no puede partir de la solución dada sino simplemente de lo que expresamente revelen el o los documentos más cercanos del estado del arte, que en el presente caso son D1, D2 y D3.

¹ IEPI, BID. “MANUAL PARA EL EXAMEN DE SOLICITUDES DE PATENTES DE INVENCION EN LAS OFICINAS DE PROPIEDAD INDUSTRIAL DE LOS PAÍSES DE LA COMUNIDAD ANDINA”. Quito, Ecuador 2004. Página 82.

3.3 Concesión de una solicitud foránea.

Finalmente, si bien la concesión de una solicitud de patente en otros países, equivalente a la solicitud Colombiana, no obliga a su Despacho a otorgar el privilegio de patente para la misma invención, es importante resaltar que lo anterior constituye un antecedente favorable para el estudio de patentabilidad y por lo tanto, respetuosamente solicitamos tener en cuenta los países u oficinas de patentes en los cuales ha sido otorgada la invención equivalente a la solicitud de patente Colombiana bajo estudio: Australia, México e India, de las cuales presentamos copia de los pliegos reivindicatorios concedidos.

3.4. Por lo tanto, queda así demostrado en forma definitiva, que la Resolución acá impugnada fue expedida con violación del artículo 18 de la Decisión 486 y que en consecuencia, la misma debe ser revocada y en su lugar se debe otorgar la solicitud de patente para la invención **“COMPOSICIONES Y METODOS PARA EL CONTROL DE INFESTACIONES DE INSECTOS EN PLANTAS”** a favor de **MONSANTO TECHNOLOGY LLC** por cumplir con los requisitos de patentabilidad.

4. FUNDAMENTO DE DERECHO

Fundamento el presente recurso en las siguientes normas:

- Artículo 18 de la Decisión 486 de la Comisión de la Comunidad Andina.

5. PETICIÓN

Solicito a su despacho que con fundamento en los hechos y normas citadas:

1. Se revoque la resolución No. **40740** del 28 de junio de 2012 en cuanto a la negación del privilegio de patente de invención.
2. Que como consecuencia de la revocación, se otorgue el privilegio de patente a la invención titulada **“COMPOSICIONES Y METODOS PARA EL CONTROL DE INFESTACIONES DE INSECTOS EN PLANTAS”**.

6. PRUEBAS

Solicito que se tengan como tales, los documentos contenidos en el Expediente No. **06.101.066-A** de la referencia, en el que se presentó la solicitud de privilegio de patente para la invención titulada "**COMPOSICIONES Y METODOS PARA EL CONTROL DE INFESTACIONES DE INSECTOS EN PLANTAS**" a nombre de la sociedad **MONSANTO TECHNOLOGY LLC**.

7. ANEXOS

Pliegos reivindicatorios de las patentes concedidas en Australia, México e India.

8. NOMBRE Y DIRECCION DEL RECURRENTE

MONSANTO TECHNOLOGY LLC

800 North Lindbergh Boulevard, St. Louis, Missouri 63167,
Estados Unidos de America

9. NOTIFICACIONES

Las recibiré en la Secretaría de su Despacho y en mí oficina en la **Calle 94 A No. 7 A-09**, teléfono 7560770.

Del Señor Superintendente, Atentamente,


Margarita Castelhanos Abondano

T.P.A. No. **70819** del C. Sup. de la Judicatura.

C.C. No. **39.779.654** de Usaquén

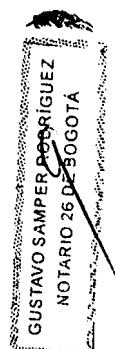
Calle 94 A No. 7 A-09

Teléfono: 7560770 - 7550158

Bogotá, D.C.

P1533/Recurso

03 AGO. 2012



PRESENTACIÓN PERSONAL DE ABOGADO

El anterior memorial fué presentado personalmente por

Maria Margarita Castellanos Abandano

quien se identificó con la C. de C. No. 39779654

de Usaquén

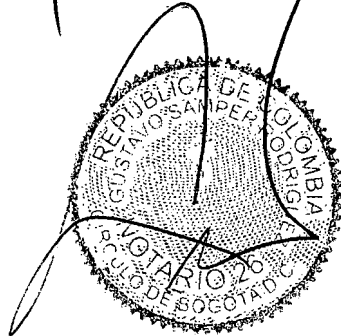
Tarjeta Profesional No. 70819 CSJ

Bogotá, D.C. - 3 AGO. 2012

El Notario Veintiséis

Gustavo Samper Rodríguez

Margarita Castellanos Abandano



247 AU
ISSUED
~~Accepted~~
Claims

The claims defining the invention are as follows:

1. A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a ribonucleic acid that functions upon ingestion by the pest to inhibit the expression of a target sequence within said pest, wherein said ribonucleic acid consists of a ribonucleotide sequence that is or is complementary to said target sequence, wherein said ribonucleotide sequence is transcribed from a DNA sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.
2. An isolated ribonucleic acid that functions when provided in a diet to a coleopteran pest to control coleopteran pest infestation by inhibiting the expression of a target sequence in said pest, said ribonucleic acid comprising a ribonucleotide sequence transcribed from a DNA sequence that is from about 80 to about 100% identical to a nucleotide sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.
3. A method for inhibiting expression of a target nucleotide sequence in a coleopteran plant pest comprising providing in the diet of said pest an agent that, upon ingestion by said pest, inhibits the expression of a nucleotide sequence in said pest, said agent comprising a ribonucleic acid expressed from a DNA sequence that is from about 80 to about 100% identical to a nucleotide coding sequence present in said pest, said nucleotide coding sequence being selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.
4. A polynucleotide composition for use in a plant cell comprising an expression cassette comprising a plant functional promoter operably linked to a nucleotide sequence element comprising from about 50 to about 5000 contiguous nucleotides exhibiting from about 80 to about 100% sequence identity to a nucleotide coding sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, wherein ingestion of plants expressing said nucleotide coding sequence by a coleopteran plant pest inhibits an essential biological function in said pest.

5. A plant cell comprising the polynucleotide composition of Claim 4, or a plant regenerated from the plant cell, or a progeny plant produced from the regenerated plant, wherein said progeny plant comprises said polynucleotide composition, or a seed produced from the progeny plant, wherein said seed comprises said polynucleotide composition.
6. An insect control agent comprising a ribonucleotide sequence produced from the expression of a DNA sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, wherein said ribonucleotide sequence functions when ingested by a coleopteran pest to inhibit the expression of a nucleotide sequence substantially complementary to said DNA sequence.
7. A method for protecting a plant from coleopteran insect infestation comprising providing in the diet of said insect one or more cells of said plant expressing an RNA molecule from a DNA sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, wherein ingestion of said one or more cells by said insect results in the inhibition of a biological function in said insect.
8. The method of claim 7 wherein said plant cells expressing said RNA comprise a pesticidal agent selected from the group consisting of a patatin, a *Bacillus thuringiensis* insecticidal protein, a *Xenorhabdus* insecticidal protein, a *Photorhabdus* insecticidal protein, a *Bacillus laterosporous* insecticidal protein, and a *Bacillus sphearicus* insecticidal protein, preferably said *Bacillus thuringiensis* insecticidal protein is selected from the group consisting of a Cry1, a Cry3, a TIC851, a CryET70, a Cry22, a binary insecticidal protein CryET33 and CryET34, a binary insecticidal protein CryET80 and CryET76, a binary insecticidal protein TIC100 and TIC101, and a binary insecticidal protein PS149B1.
9. A method for inhibiting the expression of a target gene product in one or more cells of a coleopteran insect pest comprising providing to said one or more cells a gene suppressive amount of an RNA molecule in the diet of said insect, wherein said gene suppressive RNA molecule is produced from a DNA sequence selected from the group

consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, said ingestion of said gene suppressive RNA resulting in a decrease in the level of said target gene product in said insect pest cell.

10. The method of claim 8 wherein

(i) said DNA sequence is selected from the group consisting of SEQ ID NO:4, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, preferably said DNA sequence is selected from the group consisting of 19-21 contiguous nucleotides as set forth in SEQ ID NO:17 and SEQ ID NO:31; or

(ii) said target gene encodes a protein, the predicted function of which is selected from the group of functions consisting of muscle formation, juvenile hormone formation, juvenile hormone regulation, ion regulation and transport, digestive enzyme synthesis, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, development and differentiation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, cell division, energy metabolism, respiration, and apoptosis; or

(iii) said coleopteran insect is a *Diabrotica* spp., preferably is selected from the group consisting of *Diabrotica virgifera*, *Diabrotica barberi*, and *Diabrotica undecimpunctata*.

11. An expression cassette comprising a DNA sequence selected from the group consisting of 19-21 contiguous nucleotides as set forth in SEQ ID NO:17 and SEQ ID NO:31.

12. A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a first ribonucleotide sequence that

functions upon ingestion by the pest to inhibit a biological function within said pest, wherein said ribonucleotide sequence exhibits

(i) from about 85 to about 100% nucleotide sequence identity to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence; or

(ii) from about 95 to about 100% nucleotide sequence identity along at least from about 14 to about 25 contiguous nucleotides to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence, and

wherein said coding sequence derived from said pest is selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complements thereof.

13. A nucleotide sequence encoding an RNA molecule that, when provided in a pest inhibitory amount in the diet of a pest, inhibits the pest from feeding on the diet containing the RNA molecule, wherein said nucleotide sequence is selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, and SEQ ID NO:169 through SEQ ID NO:174 and the complements thereof.

14. The nucleotide sequence of claim 13, wherein

(i) said diet is selected from the group consisting of an artificial diet, a plant cell, a plurality of plant cells, a plant tissue, a plant root, a plant seed, and a plant grown from a plant seed, wherein said diet comprises a pest inhibitory amount of said RNA molecule; or

(ii) said sequence comprises at least about 19 contiguous nucleotides as set forth in SEQ ID NO:97, preferably said about 19 contiguous nucleotides being selected from nucleotide position 58 through about nucleotide 1010 as set forth in SEQ ID NO:97.

15. A method for protecting a plant from coleopteran insect infestation comprising

a) providing in the diet of the insect a plant cell expressing an RNA transcribed from a DNA sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, wherein said RNA suppresses a gene in the insect that performs a function essential for insect survival, said function being selected from the group consisting

of reduction in feeding by the pest, reduction in viability of the pest, pest cell apoptosis, inhibition of differentiation and development of the pest or any pest cell, absence of or reduced capacity or desire for sexual reproduction by the pest, muscle formation, muscle twitching, muscle contraction, juvenile hormone formation, juvenile hormone regulation, ion regulation and transport, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, larval stage transition, pupation, emergence from pupation, cell division, energy metabolism, respiration, and any component of a eukaryotic cells' cytoskeletal structure; and

b) growing a plant comprising said plant cells.

16. A method for improving the yield of a crop produced from a crop plant subjected to coleopteran insect pest infestation, said method comprising the steps of

a) growing said crop plant using seed comprising one or more RNA molecules that suppress one or more target genes in an insect pest that has ingested a portion of said crop plant in its diet, wherein said one or more target genes perform at least one essential function in insect physiology and metabolism, said essential function being selected from the group consisting of feeding by the pest, viability of the pest, pest cell apoptosis, differentiation and development of the pest or any pest cell, sexual reproduction by the pest, muscle formation, muscle twitching, muscle contraction, juvenile hormone formation and/or reduction, juvenile hormone regulation, ion regulation and transport, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, larval stage transition, pupation, emergence from pupation, cell division, energy metabolism, respiration, cytoskeletal structure synthesis and maintenance, nucleotide metabolism, nitrogen metabolism, water use, water retention, and sensory perception; and

b) observing an improvement in the percent yield of said crop plant.

17. The method of claim 16 wherein the one or more RNA molecules is transcribed from a DNA sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.

18. A commodity or commodity product produced from the seed produced from a transgenic plant, wherein said transgenic plant expresses an RNA from one or more contiguous nucleotide sequences selected from the group consisting of SEQ ID NO:1 to SEQ ID NO:143, SEQ ID NO:169 to SEQ ID NO:174, and the complements thereof, and wherein said one or more nucleotide sequences are detectable within the commodity or commodity product.

19. A contiguous nucleotide sequence at least about 21 nucleotides in length, selected from the group consisting of SEQ ID NO:1-143, and 169-174 expressed as an RNA sequence and provided in the diet of a coleopteran insect pest, wherein ingestion of a coleopteran insect pest inhibitory amount of said RNA inhibits the pest from further feeding on said diet.

20. A plant cell transformed with a contiguous nucleotide sequence at least about 21 nucleotides in length, selected from the group consisting of SEQ ID NO:1-143, and 169-174, wherein said nucleotide sequence is expressed in the plant cell as an RNA segment provided in the diet of an insect pest, wherein (a) ingestion of said RNA by the insect pest results in the suppression of a gene encoding a protein expressed from said gene, and (b) ingestion of a coleopteran insect pest inhibitory amount of said RNA inhibits the pest from further feeding on said diet.

21. A method for selecting a nucleotide sequence for expression of an RNA for use in inhibiting the expression of a gene in a coleopteran insect pest cell comprising the steps of

- (a) isolating a mRNA from a plant pest;
- (b) producing an RNA from all or a part of a cDNA sequence derived from the mRNA;
- (c) providing the RNA in the diet of the insect pest;
- (d) selecting an RNA that inhibits expression of said gene in said insect pest; and

(e) selecting a nucleotide sequence that hybridizes to said RNA from the group consisting of SEQ ID NO:1-143; 169 - 174, or the complement thereof.

22. A method for controlling a coleopteran insect pest comprising providing in the diet of the insect pest two or more insecticidal agents toxic to the same insect species, wherein a first insecticidal agent comprises an RNA molecule expressed from a DNA sequence, wherein said RNA molecule inhibits a biological function within said pest when ingested by said pest, wherein a portion of said DNA sequence consisting of at least about 21 contiguous nucleotides exhibits from about 85% to about 100% nucleotide sequence identity to a coding sequence derived from said pest, and wherein a second insecticidal agent is provided along with the first insecticidal agent in the diet, wherein said second insecticidal agent is different from the first.

23. The method of claim 22 wherein said pest is a corn rootworm and said coding sequence derived from said pest is selected from the group consisting of SEQ ID NO:1 - 143, and 169 - 174.

24. The method of claim 1 or 9 wherein

(i) said coleopteran pest is selected from the group consisting of a *Leptinotarsa* spp pest, a *Tribolium* spp pest, a *Anthonomus* spp pest, a *Cyclocephala* spp pest, and a *Polyphaga* spp pest, preferably *Leptinotarsa* spp pest is a corn rootworm pest selected from the group consisting of *Diabrotica virgifera virgifera* (Western Corn Rootworm, WCR), *Diabrotica barberi* (Northern Corn Rootworm, NCR), *Diabrotica virgifera zea* (Mexican Corn Rootworm, MCR), *Diabrotica balteata* (Brazilian Corn Rootworm (BZR), *Diabrotica viridula* (Brazilian Corn Rootworm (BZR), *Diabrotica spectlosi* (Brazilian Corn Rootworm (BZR)), and *Diabrotica undecimpunctata howardii* (Southern Corn Rootworm, SCR); or

(ii) said DNA sequence is selected from the group consisting of SEQ ID NO:4, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:80, SEQ ID NO:81,

SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.

25. A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a first ribonucleotide sequence that functions upon ingestion by the pest to inhibit a biological function within said pest, wherein said ribonucleotide sequence exhibits from about 95 to about 100% nucleotide sequence identity along at least from about 14 to about 25 contiguous nucleotides to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence, and wherein said coding sequence derived from said pest is selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complements thereof.

26. The method of claim 25, wherein

- (i) said diet is selected from the group consisting of an artificial diet, a plant cell, a plurality of plant cells, a plant tissue, a plant root, a plant seed, and a plant grown from a plant seed, wherein said diet comprises a pest inhibitory amount of said RNA molecule; or
- (ii) said nucleotide sequence comprises at least about 19 contiguous nucleotides as set forth in SEQ ID NO:97, preferably about 19 contiguous nucleotides are selected from nucleotide position 58 through about nucleotide 1010 as set forth in SEQ ID NO:97.

I/We Claim:

1. A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a ribonucleic acid that functions upon ingestion by the pest to inhibit the expression of a target sequence within said pest, wherein said ribonucleic acid consists of a ribonucleotide sequence that is or is complementary to said target sequence, wherein said ribonucleotide sequence is transcribed from a DNA sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof.
2. An isolated ribonucleic acid that functions when provided in a diet to a coleopteran pest to control coleopteran pest infestation by inhibiting the expression of a target sequence in said pest, said ribonucleic acid comprising a ribonucleotide sequence transcribed from a DNA sequence that is from 80 to 100% identical to a nucleotide sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO:174, and the complement thereof.
3. A method for inhibiting expression of a target nucleotide sequence in a coleopteran plant pest comprising providing in the diet of said pest an agent that, upon ingestion by said pest, inhibits the expression of a nucleotide sequence in said pest, said agent comprising a ribonucleic acid expressed from a DNA sequence that is from 80 to 100% identical to a nucleotide coding sequence present in said pest, said nucleotide coding sequence being selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.
4. A polynucleotide composition for use in a plant cell comprising an expression cassette comprising a plant functional promoter operably linked to a nucleotide sequence element comprising from 50 to 5000 contiguous nucleotides exhibiting from 80 to 100% sequence identity to a nucleotide coding sequence selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, wherein ingestion of said polynucleotide composition by a coleopteran plant pest inhibits an essential biological function in said pest.

5. An insect control agent comprising a ribonucleotide sequence produced from the expression of a DNA sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, wherein said ribonucleotide sequence functions when ingested by a coleopteran pest to inhibit the expression of a nucleotide sequence substantially complementary to said DNA sequence.

6. A method for protecting a plant from coleopteran insect infestation comprising providing in the diet of said insect one or more cells of said plant expressing an RNA molecule from a DNA sequence selected from the group consisting of, SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, wherein ingestion of said one or more cells by said insect results in the inhibition of a biological function in said insect.

7. The method of claim 6 wherein said plant cells expressing said RNA comprise a pesticidal agent selected from the group consisting of a patatin, a *Bacillus thuringiensis* insecticidal protein, a *Xenorhabdus* insecticidal protein, a *Photorhabdus* insecticidal protein, a *Bacillus laterosporous* insecticidal protein, and a *Bacillus sphearicus* insecticidal protein, preferably said *Bacillus thuringiensis* insecticidal protein is selected from the group consisting of a Cry1, a Cry3, a TIC851, a CryET70, a Cry22, a binary insecticidal protein CryET33 and CryET34, a binary insecticidal protein CryET80 and CryET76, a binary insecticidal protein TIC100 and TIC101, and a binary insecticidal protein PS149B1.

8. A method for inhibiting the expression of a target gene product in one or more cells of a coleopteran insect pest comprising providing to said one or more cells a gene suppressive amount of an RNA molecule in the diet of said insect, wherein said gene suppressive RNA molecule is produced from a DNA sequence selected from the group consisting of , SEQ ID NO:1 through SEQ ID NO:143,SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, said ingestion of said gene suppressive RNA resulting in a decrease in the level of said target gene product in said insect pest cell.

9. The method of claim 7, wherein

(i) said DNA sequence is selected from the group consisting of SEQ ID NO:4, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:35, SEQ ID NO:36, SEQ ID

NO:39, SEQ ID NO:40, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof, preferably said DNA sequence is selected from the group consisting of 19-21 contiguous nucleotides as set forth in SEQ ID NO:17 and SEQ ID NO:31; or

(ii) said target gene encodes a protein, the predicted function of which is selected from the group of functions consisting of muscle formation, juvenile hormone formation, juvenile hormone regulation, ion regulation and transport, digestive enzyme synthesis, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, development and differentiation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, cell division, energy metabolism, respiration, and apoptosis; or

(iii) said coleopteran insect is a *Diabrotica* spp., preferably is selected from the group consisting of *Diabrotica virgifera*, *Diabrotica barberi*, and *Diabrotica undecimpunctata*.

10. An expression cassette comprising a DNA sequence selected from the group consisting of 19-21 contiguous nucleotides as set forth in SEQ ID NO:17 and SEQ ID NO:31.

11. A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a first ribonucleotide sequence that functions upon ingestion by the pest to inhibit a biological function within said pest, wherein said ribonucleotide sequence exhibits

(i) from 85 to 100% nucleotide sequence identity to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence; or

(ii) from 95 to 100% nucleotide sequence identity along at least from 14 to 25 contiguous nucleotides to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence, and wherein said coding sequence derived from said pest is selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complements thereof.

12. A nucleotide sequence encoding an RNA molecule that, when provided in a pest inhibitory amount in the diet of a pest, inhibits the pest from feeding on the diet containing the RNA molecule, wherein said nucleotide sequence is selected from the group consisting of, SEQ ID NO: 1 through SEQ ID NO: 143, and SEQ ID NO: 169 through SEQ ID NO: 174 and the complements thereof.

13. The nucleotide sequence of claim 12, wherein

(i) said diet is selected from the group consisting of an artificial diet, a plant cell, a plurality of plant cells, a plant tissue, a plant root, a plant seed, and a plant grown from a plant seed, wherein said diet comprises a pest inhibitory amount of said RNA molecule; or

(ii) said sequence comprises at least 19 contiguous nucleotides as set forth in SEQ ID NO:97, preferably said 19 contiguous nucleotides being selected from nucleotide position 58 through nucleotide 1010 as set forth in SEQ ID NO:97.

14. A commodity or commodity product produced from the seed produced from a transgenic plant, wherein said transgenic plant expresses an RNA from one or more contiguous nucleotide sequences selected from the group consisting of SEQ ID NO: 1 to SEQ ID NO: 143, SEQ ID NO: 169 to SEQ ID NO: 174, and the complements thereof, and wherein said one or more nucleotide sequences are detectable within the commodity or commodity product.

15. A contiguous nucleotide sequence at least 21 nucleotides in length, selected from the group consisting of SEQ ID NO: 1-143, and 169-174 expressed as an RNA sequence and provided in the diet of a coleopteran insect pest, wherein ingestion of a coleopteran insect pest inhibitory amount of said RNA inhibits the pest from further feeding on said diet.

16. A method for selecting a nucleotide sequence for expression of a RNA for use in inhibiting the expression of a gene in a coleopteran insect pest cell comprising the steps of (a) isolating a mRNA from a plant pest;

(b) producing an RNA from all or a part of a cDNA sequence derived from the mRNA;

(c) providing the RNA in the diet of the insect pest;

(d) selecting an RNA that inhibits expression said gene in said insect pest; and

(e) selecting a nucleotide sequence that hybridizes to said RNA from the group consisting of SEQ ID NO:1-143, 169 – 174, or the complement thereof.

17. A method for controlling a coleopteran insect pest comprising providing in the diet of the insect pest two or more insecticidal agents toxic to the same insect species, wherein a first insecticidal agent comprises an RNA molecule expressed from a DNA sequence, wherein said RNA molecule inhibits a biological function within said pest when ingested by said pest, wherein a portion of said DNA sequence consisting of at least 21 contiguous nucleotides exhibits from 85% to 100% nucleotide sequence identity to a coding sequence derived from said pest, and wherein a second insecticidal agent is provided along with the first insecticidal agent in the diet, wherein said second insecticidal agent is different from the first.

18. The method of claim 17, wherein said pest is a corn rootworm and said coding sequence derived from said pest is selected from the group consisting of SEQ ID NO: 1-143, and 169-174.

19. A method for inhibiting expression of a target nucleotide sequence in a coleopteran plant pest comprising providing in the diet of said pest an agent that, upon ingestion by said pest, inhibits the expression of a nucleotide sequence in said pest, said agent comprising a ribonucleic acid expressed from a DNA sequence that is from 80 to 100% identical to a nucleotide coding sequence present in said pest, said nucleotide coding sequence being selected from the group consisting of SEQ ID NO:1 through SEQ ID NO:143, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.

20. The method of claim 1 or 8, wherein

(i) said coleopteran pest is selected from the group consisting of a *Leptinotarsa* spp pest, a *Tribolium* spp pest, a *Anthonomus* spp pest, a *Cyclocephala* spp pest, and a *Polyphaga* spp pest. preferably *Leptinotarsa* spp pest is a corn rootworm pest selected from the group consisting of *Diabrotica virgifera virgifera* (Western Corn Rootworm, WCR), *Diabrotica barberi* (Northern Corn Rootworm, NCR), *Diabrotica virgifera zea* (Mexican Corn Rootworm, MCR), *Diabrotica balteata* (Brazilian Corn Rootworm (BZR), *Diabrotica viridula* (Brazilian Corn Rootworm (BZR), *Diabrotica speciosa* (Brazilian Corn Rootworm (BZR)), and *Diabrotica undecimpunctata howardii* (Southern Corn Rootworm, SCR); or

(ii) said DNA sequence is selected from the group consisting of SEQ ID NO:4, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:169 through SEQ ID NO:174, and the complement thereof.

Dated this 28th day of September 2006

Malathi

MALATHI LAKSHMIKUMARAN
Agent for the Applicant

To
The Controller of Patents
The Patent Office at Chennai

Claims allowed in the Mexican Patent Application PA/a/2006/011694

1.- A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a ribonucleic acid that functions upon ingestion by the pest to inhibit the expression of a target sequence within said pest, wherein said ribonucleic acid consists of a ribonucleotide sequence that is or is complementary to said target sequence, wherein said ribonucleotide sequence is transcribed from a DNA sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof.

2.- An isolated ribonucleic acid that functions when provided in a diet to a coleopteran pest to control coleopteran pest infestation by inhibiting the expression of a target sequence in said pest, said ribonucleic acid comprising a ribonucleotide sequence transcribed from a DNA sequence that is from about 80 to about 100% identical to a nucleotide sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof.

3.- A method for inhibiting expression of a target nucleotide sequence in a coleopteran plant pest comprising providing in the diet of said pest an agent that, upon ingestion by said pest, inhibits the expression of a nucleotide sequence in said pest, said agent comprising a ribonucleic acid expressed from a DNA sequence that is from about 80 to about 100% identical to a nucleotide coding sequence present in said pest, said nucleotide coding sequence being selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof.

4.- A polynucleotide composition for use in a plant cell comprising an expression cassette comprising a plant functional promoter operably linked to a nucleotide sequence element comprising from about 50 to about 5000 contiguous nucleotides exhibiting from about 80 to about 100% sequence identity to a nucleotide coding sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, wherein ingestion of said polynucleotide composition by a coleopteran plant pest inhibits an essential biological function in said pest.

5.- A plant cell comprising the polynucleotide composition of claim 4, a plant regenerated from the plant cell, a progeny plant produced from the regenerated plant, wherein

said progeny plant comprises said polynucleotide composition, and a seed produced from the progeny plant, wherein said seed comprises said polynucleotide composition.

6.- An insect control agent comprising a ribonucleotide sequence produced from the expression of a DNA sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, wherein said ribonucleotide sequence functions when ingested by a coleopteran pest to inhibit the expression of a nucleotide sequence substantially complementary to said DNA sequence.

7.- A method for protecting a plant from coleopteran insect infestation comprising providing in the diet of said insect one or more cells of said plant expressing an RNA molecule from a DNA sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, wherein ingestion of said one or more cells by said insect results in the inhibition of a biological function in said insect.

8.- The method of claim 7, wherein said plant cells expressing said RNA comprise a pesticidal agent selected from the group consisting of a patatin, a *Bacillus thuringiensis* insecticidal protein, a *Xenorhabdus* insecticidal protein, a *Photorhabdus* insecticidal protein, a *Bacillus laterosporous* insecticidal protein, and a *Bacillus sphearicus* insecticidal protein, preferably said *Bacillus thuringiensis* insecticidal protein is selected from the group consisting of a Cry1, a Cry3, a TIC851, a CryET70, a Cry22, a binary insecticidal protein CryET33 and CryET34, a binary insecticidal protein CryET80 and CryET76, a binary insecticidal protein TIC100 and TIC101, and a binary insecticidal protein PS149B1.

9.- A method for inhibiting the expression of a target gene product in one or more cells of a coleopteran insect pest comprising providing to said one or more cells a gene suppressive RNA molecule in the diet of said insect, wherein said gene suppressive RNA molecule is produced from a DNA sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, said ingestion of said gene suppressive RNA molecule resulting in a decrease in the level of said target gene product in said insect pest cell.

10.- The method of claim 8 wherein (i) said DNA sequence is selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 31, SEQ ID NO: 32, SEQ ID NO: 35, SEQ ID NO: 36, SEQ ID NO: 39, SEQ ID NO: 40, SEQ ID NO: 43,

SEQ ID NO: 44, SEQ ID NO: 47, SEQ ID NO: 48, SEQ ID NO: 52, SEQ ID NO: 53, SEQ ID NO: 56, SEQ ID NO: 57, SEQ ID NO: 60, SEQ ID NO: 61, SEQ ID NO: 64, SEQ ID NO: 65, SEQ ID NO: 68, SEQ ID NO: 69, SEQ ID NO: 72, SEQ ID NO: 73, SEQ ID NO: 76, SEQ ID NO: 77, SEQ ID NO: 80, SEQ ID NO: 81, SEQ ID NO: 84, SEQ ID NO: 85, SEQ ID NO: 88, SEQ ID NO: 89, SEQ ID NO: 92, SEQ ID NO: 93, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, preferably said DNA sequence is selected from the group consisting of 19-21 contiguous nucleotides as set forth in SEQ ID NO: 17 and SEQ ID NO: 31; or (ii) said target gene encodes a protein, the predicted function of which is selected from the group of functions consisting of muscle formation, juvenile hormone formation, juvenile hormone regulation, ion regulation and transport, digestive enzyme synthesis, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, development and differentiation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, cell division, energy metabolism, respiration, and apoptosis; or (iii) said coleopteran insect is a *Diabrotica* spp., preferably is selected from the group consisting of *Diabrotica virgifera*, *Diabrotica barberi*, and *Diabrotica undecimpunctata*.

11.- An expression cassette comprising a DNA sequence selected from the group consisting of 19-21 contiguous nucleotides as set forth in SEQ ID NO: 17 and SEQ ID NO: 31.

12.- A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a first ribonucleotide sequence that functions upon ingestion by the pest to inhibit a biological function within said pest, wherein said ribonucleotide sequence exhibits (i) from about 85 to about 100% nucleotide sequence identity to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence; or (ii) from about 95 to about 100% nucleotide sequence identity along from 14 to about 25 contiguous nucleotides to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence, and wherein said coding sequence derived from said pest is selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complements thereof.

13.- A nucleotide sequence encoding an RNA molecule that, when provided in the diet of a pest, inhibits the pest from feeding on the diet containing the RNA molecule, wherein said nucleotide sequence is selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, and SEQ ID NO: 169 through SEQ ID NO: 174 and the complements thereof.

14.- The nucleotide sequence of claim 13, wherein (i) said diet is selected from the group consisting of an artificial diet, a plant cell, a plurality of plant cells, a plant tissue, a plant root, a plant seed, and a plant grown from a plant seed, wherein said diet comprises said RNA molecule; or (ii) said sequence comprises 19 contiguous nucleotides as set forth in SEQ ID NO: 97, preferably the 19 contiguous nucleotides being selected from nucleotide position 58 to nucleotide 1010 as set forth in SEQ ID NO: 97.

15.- A method for protecting a plant from coleopteran insect infestation comprising a) providing in the diet of the insect a plant cell expressing an RNA that suppresses a gene in the insect and performs a function essential for insect survival, said function being selected from the group consisting of reduction in feeding by the pest, reduction in viability of the pest, pest cell apoptosis, inhibition of differentiation and development of the pest or any pest cell, absence of or reduced capacity or desire for sexual reproduction by the pest, muscle formation, muscle twitching, muscle contraction, juvenile hormone formation, juvenile hormone regulation, ion regulation and transport, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, larval stage transition, pupation, emergence from pupation, cell division, energy metabolism, respiration, and any component of a eukaryotic cells' cytoskeletal structure; and b) growing a plant comprising said plant cells.

16.- A method for improving the yield of a crop produced from a crop plant subjected to coleopteran insect pest infestation, said method comprising the steps of a) growing said crop plant using seed comprising one or more RNA molecules that suppress one or more target genes in an insect pest that has ingested a portion of said crop plant in its diet, wherein said one or more target genes perform at least one essential function in insect physiology and metabolism, said essential function being selected from the group consisting of feeding by the pest, viability of the pest, pest cell apoptosis, differentiation and development of the pest or any

pest cell, sexual reproduction by the pest, muscle formation, muscle twitching, muscle contraction, juvenile hormone formation and/or reduction, juvenile hormone regulation, ion regulation and transport, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, larval stage transition, pupation, emergence from pupation, cell division, energy metabolism, respiration, cytoskeletal structure synthesis and maintenance, nucleotide metabolism, nitrogen metabolism, water use, water retention, and sensory perception; and b) observing an improvement in the percent yield of said crop plant.

17.- A commodity or commodity product produced from the seed produced from a transgenic plant, wherein said transgenic plant expresses an RNA from one or more contiguous nucleotide sequences selected from the group consisting of SEQ ID NO: 1 to SEQ ID NO: 143, SEQ ID NO: 169 to SEQ ID NO: 174, and the complements thereof, and wherein said one or more nucleotide sequences are detectable within the commodity or commodity product.

18.- A contiguous nucleotide sequence of 21 nucleotides in length, selected from the group consisting of SEQ ID NO: 1-143, and 169-174 expressed as an RNA sequence and provided in the diet of a coleopteran insect pest, wherein ingestion of said RNA inhibits the pest from further feeding on said diet.

19.- A plant cell transformed with a contiguous nucleotide sequence of 21 nucleotides in length, selected from the group consisting of SEQ ID NO: 1-143, and 169-174, wherein said nucleotide sequence is expressed in the plant cell as an RNA segment provided in the diet of an insect pest, wherein (a) ingestion of said RNA by the insect pest results in the suppression of a gene encoding a protein expressed from said gene, and (b) ingestion of said RNA inhibits the pest from further feeding on said diet.

20.- A method for selecting a nucleotide sequence for expression of an RNA for use in inhibiting the expression of a gene in a coleopteran insect pest cell comprising the steps of (a) isolating a mRNA from a plant pest; (b) producing an RNA from all or a part of a cDNA sequence derived from the mRNA; (c) providing the RNA in the diet of the insect pest; (d) selecting an RNA that inhibits expression said gene in said insect pest; and (e) selecting a

nucleotide sequence that hybridizes to said RNA from the group consisting of SEQ ID NO: 1-143, 169-174, or the complement thereof.

21.- A method for controlling a coleopteran insect pest comprising providing in the diet of the insect pest two or more insecticidal agents toxic to the same insect species, wherein a first insecticidal agent comprises an RNA molecule expressed from a DNA sequence, wherein said RNA molecule inhibits a biological function within said pest when ingested by said pest, wherein a portion of said DNA sequence consisting of 21 contiguous nucleotides exhibits from about 85% to about 100% nucleotide sequence identity to a coding sequence derived from said pest, and wherein a second insecticidal agent is provided along with the first insecticidal agent in the diet, wherein said second insecticidal agent is different from the first.

22.- The method of claim 21 wherein said pest is a corn rootworm and said coding sequence derived from said pest is selected from the group consisting of SEQ ID NO: 1-143, and 169-174.

23.- A method for inhibiting expression of a target nucleotide sequence in a coleopteran plant pest comprising providing in the diet of said pest an agent that, upon ingestion by said pest, inhibits the expression of a nucleotide sequence in said pest, said agent comprising a ribonucleic acid expressed from a DNA sequence that is from about 80 to about 100% identical to a nucleotide coding sequence present in said pest, said nucleotide coding sequence being selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof.

24.- A polynucleotide composition for use in a plant cell comprising an expression cassette comprising a plant functional promoter operably linked to a nucleotide sequence element comprising from about 50 to about 5000 contiguous nucleotides exhibiting from about 80 to about 100% sequence identity to a nucleotide coding sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 140:169 through SEQ ID NO: 174, and the complement thereof, wherein ingestion of said polynucleotide composition by a coleopteran plant pest inhibits an essential biological function in said pest.

25.- A plant cell comprising the polynucleotide composition of claim 24, a plant regenerated from the plant cell, a progeny plant produced from the regenerated plant, wherein said progeny plant comprises said polynucleotide composition, and a seed produced from the progeny plant, wherein said seed comprises said polynucleotide composition.

26.- A method for inhibiting the expression of a target gene product in one or more cells of a coleopteran insect pest comprising providing to said one or more cells a gene suppressive RNA molecule in the diet of said insect, wherein said gene suppressive RNA molecule is produced from a DNA sequence selected from the group consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof, said ingestion of said gene suppressive RNA resulting in a decrease in the level of said target gene product in said insect pest cell.

27.- The method of claim 1 or 26, wherein (i) said coleopteran pest is selected from the group consisting of a *Leptinotarsa* spp pest, a *Tribolium* spp pest, a *Anthonomus* spp pest, a *Cyclocephala* spp pest, and a *Polyphaga* spp pest, preferably *Leptinotarsa* spp pest is a corn rootworm pest selected from the group consisting of *Diabrotica virgifera virgifera* (Western Corn Rootworm, WCR), *Diabrotica barberi* (Northern Corn Rootworm, NCR), *Diabrotica virgifera zea* (Mexican Corn Rootworm, MCR), *Diabrotica balteata* (Brazilian Corn Rootworm (BZR), *Diabrotica viridula* (Brazilian Corn Rootworm (BZR), *Diabrotica speciosa* (Brazilian Corn Rootworm (BZR)), and *Diabrotica undecimpunctata howardii* (Southern Corn Rootworm, SCR); or (ii) said DNA sequence is selected from the group consisting of SEQ ID NO: 4, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 31, SEQ ID NO: 32, SEQ ID NO: 35, SEQ ID NO: 36, SEQ ID NO: 39, SEQ ID NO: 40, SEQ ID NO: 43, SEQ ID NO: 44, SEQ ID NO: 47, SEQ ID NO: 48, SEQ ID NO: 52, SEQ ID NO: 53, SEQ ID NO: 56, SEQ ID NO: 57, SEQ ID NO: 60, SEQ ID NO: 61, SEQ ID NO: 64, SEQ ID NO: 65, SEQ ID NO: 68, SEQ ID NO: 69, SEQ ID NO: 72, SEQ ID NO: 73, SEQ ID NO: 76, SEQ ID NO: 77, SEQ ID NO: 80, SEQ ID NO: 81, SEQ ID NO: 84, SEQ ID NO: 85, SEQ ID NO: 88, SEQ ID NO: 89, SEQ ID NO: 92, SEQ ID NO: 93, SEQ ID NO: 169 through SEQ ID NO: 174, and the complement thereof.

28.- A method for controlling coleopteran pest infestation comprising providing in the diet of a coleopteran pest an agent comprising a first ribonucleotide sequence that functions upon ingestion by the pest to inhibit a biological function within said pest, wherein said ribonucleotide sequence exhibits from about 95 to about 100% nucleotide sequence identity along from 14 to about 25 contiguous nucleotides to a coding sequence derived from said pest and is hybridized to a second ribonucleotide sequence that is complementary to said first ribonucleotide sequence, and wherein said coding sequence derived from said pest is selected from the group

consisting of SEQ ID NO: 1 through SEQ ID NO: 143, SEQ ID NO: 169 through SEQ ID NO: 174, and the complements thereof.

29.- The method of claim 28, wherein (i) said diet is selected from the group consisting of an artificial diet, a plant cell, a plurality of plant cells, a plant tissue, a plant root, a plant seed, and a plant grown from a plant seed, wherein said diet comprises said RNA molecule; or said nucleotide sequence comprises 19 contiguous nucleotides as set forth in SEQ ID NO: 97, preferably about 19 contiguous nucleotides are selected from nucleotide position 58 to nucleotide 1010 as set forth in SEQ ID NO: 97.

217MXD1 granted

Mexican Patent Application No.: MX/A/2007/010788

Your reference: MONS:247MXD1

Our reference: P07/1508F

Claims Pending:

1. A stacked transgenic event for reducing or eliminating plant pest infestation, comprising a dsRNA for suppression of an essential gene in a target pest and a pesticide exhibiting biological activity against said target pest.
2. The stacked transgenic event of claim 1, wherein said event is a plant selected from the group consisting of alfalfa, aneth, apple, apricot, artichoke, arugula, asparagus, avocado, banana, barley, beans, beet, blackberry, blueberry, broccoli, brussel sprouts, cabbage, canola, cantaloupe, carrot, cassava, cauliflower, celery, cherry, cilantro, citrus, clementine, coffee, corn, cotton, cucumber, Douglas fir, eggplant, endive, escarole, eucalyptus, fennel, figs, gourd, grape, grapefruit, honey dew, jicama, kiwifruit, lettuce, leeks, lemon, lime, Loblolly pine, mango, melon, mushroom, nut, oat, okra, onion, orange, an ornamental plant, papaya, parsley, pea, peach, peanut, pear, pepper, persimmon, pine, pineapple, plantain, plum, pomegranate, poplar, potato, pumpkin, quince, radiata pine, radicchio, radish, raspberry, rice, rye, sorghum, Southern pine, soybean, spinach, squash, strawberry, sugarbeet, sugarcane, sunflower, sweet potato, sweetgum, tangerine, tea, tobacco, tomato, turf, a vine, watermelon, wheat, yams, and zucchini plants.
3. The stacked transgenic event of claim 1, wherein said essential gene is a target gene encoding a protein, the predicted function of which is selected from the group of functions consisting of muscle formation, juvenile hormone formation, juvenile hormone regulation, ion regulation and transport, digestive enzyme synthesis, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, development and differentiation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, cell division, energy metabolism, respiration, and apoptosis.
4. The stacked transgenic event of claim 1, wherein said pesticide is an agent selected from the group consisting of a patatin, a *Bacillus thuringiensis* insecticidal protein, a *Xenorhabdus* insecticidal protein, a *Photorhabdus* insecticidal protein, a *Bacillus laterosporous* insecticidal protein, and a *Bacillus sphearicus* insecticidal protein.
5. The stacked transgenic event of claim 4, wherein said *Bacillus thuringiensis* insecticidal protein is selected from the group consisting of a CryI, a Cry3, a TIC85I, a CryET70, a Cry22, a binary insecticidal protein CryET33 and CryET34, a binary insecticidal protein CryET80 and CryET76, a binary insecticidal protein TIC100 and TIC101, and a binary insecticidal protein PS149BI.

6. The stacked transgenic event of claim 1, wherein said target pest is an agricultural pest selected from the group consisting of insects, mites, fungi, yeasts, molds, bacteria, nematodes, weeds, and parasitic and saprophytic plants.
7. The stacked transgenic event of claim 6, wherein said agricultural pest is selected from the group consisting of an insect pest and a nematode pest.
8. The stacked transgenic event of claim 6, wherein said agricultural pest is an insect pest selected from the group consisting of a Lepidopteran pest, a Coleopteran pest, a Hemipteran pest, and a Dipteran pest.
9. The stacked transgenic event of claim 8, wherein said Coleopteran pest is selected from the group consisting of a *Diabrotica* species, a Colorado Potato Beetle (CPB, *Leptinotarsa decemlineata*), and a Red Flour Beetle (RFB, *Tribolium castaneum*); said Lepidopteran pest is selected from the group consisting of European Corn Borer (ECB, *Ostrinia nubilalis*), Black Cutworm (BCW, *Agrotis ipsilon*), Corn Earworm (CEW, *Helicoverpa zea*), Fall Armyworm (FAW, *Spodoptera frugiperda*), Cotton Ball Weevil (BWV, *Anthonomus grandis*), silkworms (*Bombyx mori* and *Manduca sexta*); and said Hemipteran pest is a lygus bug.
10. The stacked transgenic event of claim 9, wherein said *Diabrotica* species is selected from the group consisting of *Diabrotica virgifera*, *Diabrotica barberi*, and *Diabrotica undecimpunctata*.
11. The stacked transgenic event of claim 1, wherein said event is provided in the diet of said target pest in a pest inhibitory amount and inhibits the pest from feeding on said diet.
12. The stacked transgenic event of claim 11, wherein said diet is selected from the group consisting of a plant cell, a plurality of plant cells, a plant tissue, a plant root, a plant seed, and a plant grown from a plant seed, wherein said diet comprises a pest inhibitory amount of said dsRNA and said pesticide.
13. The stacked transgenic event of claim 2, wherein said reduced or eliminated pest infestation improves the yield of a crop produced from said event.
14. A crop harvested from a field comprising the stacked transgenic event of claim 2, wherein said crop comprises said dsRNA and said pesticide.
15. Seed produced from the stacked transgenic event of claim 13, wherein said seed comprises a detectable amount of a gene encoding said dsRNA.
16. A commodity or commodity product produced from the crop of claim 14, wherein said commodity or commodity produce comprises a detectable amount of a gene encoding said dsRNA.

17. The stacked transgenic event of claim 2, wherein said dsRNA is in the cells of said plant and said pesticide comprises a seed treatment.
18. The stacked transgenic event of claim 17, wherein the cells of said plant comprise said dsRNA and said pesticide.

JHR/rgo*

07104762.5-2403
Monsanto Technology LLC

JH/km
November 17, 2011

Claims

1. A transgenic plant having more than one transgene for reducing or eliminating plant pest infestation, or a plant cell thereof, wherein said plant or said plant cell comprises a dsRNA for suppression of an essential gene in a target pest and a gene encoding a *Bacillus thuringiensis* insecticidal protein exhibiting biological activity against said target pest.
2. The transgenic plant of claim 1, wherein said plant is selected from alfalfa, aneth, apple, apricot, artichoke, arugula, asparagus, avocado, banana, barley, beans, beet, blackberry, blueberry, broccoli, brussel sprouts, cabbage, canola, cantaloupe, carrot, cassava, cauliflower, celery, cherry, cilantro, citrus, clementine, coffee, corn, cotton, cucumber, Douglas fir, eggplant, endive, escarole, eucalyptus, fennel, figs, gourd, grape, grapefruit, honey dew, jicama, kiwifruit, lettuce, leeks, lemon, lime, Loblolly pine, mango, melon, mushroom, nut, oat, okra, onion, orange, an ornamental plant, papaya, parsley, pea, peach, peanut, pear, pepper, persimmon, pine, pineapple, plantain, plum, pomegranate, poplar, potato, pumpkin, quince, radiata pine, radicchio, radish, raspberry, rice, rye, sorghum, Southern pine, soybean, spinach, squash, strawberry, sugarbeet, sugarcane, sunflower, sweet potato, sweetgum, tangerine, tea, tobacco, tomato, turf, a vine, watermelon, wheat, yams, and zucchini plants.
3. The transgenic plant of claim 1, wherein said essential gene is a target gene encoding a protein, the predicted function of which is selected from muscle formation, juvenile hormone formation, juvenile hormone regulation, ion regulation and transport, digestive enzyme synthesis, maintenance of cell membrane potential, amino acid biosynthesis, amino acid degradation, sperm formation, pheromone synthesis, pheromone sensing, antennae formation, wing formation, leg formation, development and differentiation, egg formation, larval maturation, digestive enzyme formation, haemolymph synthesis, haemolymph maintenance, neurotransmission, cell division, energy metabolism, respiration, and apoptosis.
4. The transgenic plant of claim 1, wherein said *Bacillus thuringiensis* insecticidal protein is selected from a Cry1, a Cry3, a TIC851, a CryET70, a Cry22, a binary insecticidal protein CryET33 and CryET34, a binary insecticidal protein CryET80

and CryET76, a binary insecticidal protein TIC100 and TIC101, and a binary insecticidal protein PS149B1.

5. The transgenic plant of claim 1, wherein said target pest is an agricultural pest selected from insects, mites, fungi, yeasts, molds, bacteria, nematodes, weeds, and parasitic and saprophytic plants.

6. The transgenic plant of claim 5, wherein said agricultural pest is selected from an insect pest and a nematode pest.

7. The transgenic plant of claim 5, wherein said agricultural pest is an insect pest selected from a Lepidopteran pest, a Coleopteran pest, a Hemipteran pest, and a Dipteran pest.

8. The transgenic plant of claim 7, wherein said Coleopteran pest is selected from a *Diabrotica* species, a Colorado Potato Beetle (CPB, *Leptinotarsa decemlineata*), and a Red Flour Beetle (RFB, *Tribolium castaneum*); said Lepidopteran pest is selected from the group consisting of European Corn Borer (ECB, *Ostrinia nubilalis*), Black Cutworm (BCW, *Agrotis ipsilon*), Corn Earworm (CEW, *Helicoverpa zea*), Fall Armyworm (FAW, *Spodoptera frugiperda*), Cotton Boll Weevil (BWV, *Anthonomus grandis*), silkworms (*Bombyx mori*) and *Manduca sexta*; and said Hemipteran pest is a lygus bug.

9. The transgenic plant of claim 8, wherein said *Diabrotica* species is selected from *Diabrotica virgifera*, *Diabrotica barberi*, and *Diabrotica undecimpunctata*.

10. Use of cells of the transgenic plant of claim 1, which comprises a dsRNA for suppression of an essential gene in a target pest and a gene encoding a *Bacillus thuringiensis* insecticidal protein exhibiting biological activity against said target pest, in the diet of a target pest in a pest inhibitory amount.

11. The use of claim 10, wherein said cells are selected from a plant cell, a plurality of plant cells, a plant tissue, a plant root, a plant seed, and a plant grown from a plant seed, wherein said diet comprises a pest inhibitory amount of said dsRNA and said *Bacillus thuringiensis* insecticidal protein.

12. The use of claim 10, wherein said reduced or eliminated pest infestation improves the yield of a crop produced from said event.

13. A crop harvested from a field comprising the transgenic plant of claim 2, wherein said crop comprises said dsRNA and said *Bacillus thuringiensis* insecticidal protein.

14. Seed produced from the transgenic plant of claim 10, wherein said seed comprises a detectable amount of a gene encoding said dsRNA and said *Bacillus thuringiensis* insecticidal protein.

15. A commodity or commodity product selected from meals, oils, crushed or whole grains or seeds of a plant, or any food product comprising any meal, oil, or crushed or whole grain of recombinant plant or seed of the crop of claim 13, wherein said commodity or commodity product comprises a detectable amount of a gene encoding said dsRNA and said *Bacillus thuringiensis* insecticidal protein.

16. The seed of claim 14, wherein said dsRNA is in the cells of said seed and said seed comprises a seed treatment.