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(54) Title: USE OF COMBINATION OF TEMBOTRIONE, ISOXADIFEN- ETHYL, TRIFLOXYSTROBIN AND PROTHIOCONAZOLE FOR IMPROVING CROP YIELD

(57) Abstract: Discloses methods for increasing crop or plant yield and reducing demage to corn caused by a weed or pest by applying: (a) tembotrione, (b) isoxadifen-ethyl, (c) trifloxystrobin, and (d) prothioconazole to a plant or crop separately or in a single application step.

USE OF COMBINATION OF TEMBOTRIONE , ISOXADIFEN- ETHYL , TRIFLOXYSTROBIN AND PROTHOICONAZOLE FOR IMPROVING CROP YIELD

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 61/611,762, filed on March 16, 2012, the contents of which are incorporated herein by reference in their entirety.

FIELD

[0002] Methods for increasing crop or plant yield by applying a fungicide and herbicide to a plant or crop are described herein. Methods of increasing corn yield by applying a composition disclosed herein in a single application step to a corn crop are also described herein. The disclosure also provides for compositions capable of increasing crop or plant yield.

BACKGROUND

[0003] With an increase of labor and raw material costs associated with growing crops, especially corn, there is a need to streamline the time consuming and costly fungicidal and herbicidal treatment of corn. Currently, many treatment regimens require the application of fungicidal agents to corn between the stages of corn tasseling and brown silk timing. As corn crops are relatively tall between the stages of corn tasseling and brown silk timing, fungicidal application at this growth stage requires aerial application, oftentimes by airplane. Generally, it is necessary to treat corn crops with one or more foliar applications of a fungicidal agent in order to effectively control diseases which may damage corn crops. These fungicidal applications are both costly and time consuming for farmers.

[0004] Herbicides are traditionally applied to corn in one of the following manners: prelant, preemergence, or postemergence to a corn crop. Farmers oftentimes choose to apply a herbicide at these growth stages because the corn crop is still young and weeds are relatively small.

[0005] There is a need to streamline the treatment of corn by applying both a fungicide and herbicide together in a single application in a manner that combats weeds and diseases while maintaining yield. In contrast to traditional application treatments, the current disclosure provides for a new technique of improving yield and managing weed

and disease pest infestation by applying a tankmix of herbicidal and fungicidal compositions to corn. Application of the disclosed herbicide/fungicide composition helps to control weeds and diseases in a single pass. By treating corn in a single application step, the methods described herein help to reduce labor needs and equipment wear, while preserving and enhancing yield potential.

SUMMARY

[0006] In an aspect, the disclosure provides for a method for increasing crop yield by applying a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to a crop.

[0007] In an aspect, the disclosure provides for a method for reducing damage to a crop caused by a weed or pest by applying a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to a crop.

[0008] In another aspect, the disclosure provides for a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole.

[0009] In an aspect, a composition described herein is applied to a foliar region of a crop. In yet another aspect, the crop is a corn crop.

[0010] In an aspect, a composition described herein is applied to a crop in an amount effective to increase crop yield. In yet another aspect, a composition described herein is applied to a crop in an amount effective to reduce damage to a crop caused by a weed or pest. In an aspect, a composition described herein is applied to a crop at about 0.5 fluid ounces/acre to about 6.0 fluid ounces/acre, at about 1.0 fluid ounces/acre to about 5.0 fluid ounces/acre, or at about 2.0 fluid ounces/acre to about 6.0 fluid ounces/acre.

[0011] In an aspect, the disclosure provides for a method of improving crop yield or reducing damage to a crop caused by a weed or pest by applying a composition described herein to a crop in a single application step. In an aspect, a composition described herein includes methylated seed oil, atrazine, or a combination thereof.

BRIEF DESCRIPTION OF THE FIGURES

[0012] FIG. 1 sets forth the phytotoxicity from a combination of STRATEGO YLD + LAUDIS as applied to corn at V5 timing.

[0013] FIG. 2 sets forth the yield from a combination of STRATEGO YLD + LAUDIS as applied to corn at V5 timing as measured in bushels/acre.

[0014] FIG. 3 sets forth the phytotoxicity from a combination of STRATEGO YLD + LAUDIS/CALLISTO as applied to corn at yield enhancing stage timing, corresponding to a corn growth stage ranging from V5-V7.

[0015] FIG. 4 sets forth the yield from a combination of STRATEGO YLD + LAUDIS/CALLISTO as applied to corn at yield enhancing stage timing, corresponding to a corn growth stage ranging from V5-V7.

DETAILED DESCRIPTION

[0016] In an aspect, the disclosure provides for a method of treating a crop, plant, or plant part with a composition described herein. In another aspect, the disclosure provides for a method of improving crop yield by the application of a composition described herein. In yet another aspect, the disclosure provides for a method of reducing phytotoxicity to a plant or crop by the application of a composition described herein. In another aspect, the disclosure provides for a method of reducing damage or infestation caused by weeds or pests by applying a composition described herein to a to a crop, plant, or plant part thereof. In an aspect, the crop to be treated is corn.

[0017] In an aspect, a composition described herein comprises, consists of, or consists essentially of tembotrione, isoxadifen-ethyl, trifloxystrobin, and prothioconazole. In an aspect, a composition comprising, consisting of, or consisting essentially of tembotrione, isoxadifen-ethyl, trifloxystrobin, and prothioconazole is applied to a plant or crop, such as corn, in a method described herein. In another aspect, a composition comprising, consisting of, or consisting essentially of tembotrione, isoxadifen-ethyl, trifloxystrobin, prothioconazole, and methylated seed oil is applied to a plant or crop, such as corn, in a method described herein. In yet another aspect, a composition comprising, consisting of, or consisting

essentially of tembotrione, isoxadifen-ethyl, trifloxystrobin, prothioconazole, and atrazine is applied to a plant or crop, such as corn, in a method described herein.

[0018] LAUDIS® (Bayer CropScience) is characterized as a postemergence herbicide. STRATEGO® YLD (Bayer CropScience) is characterized as a fungicide. In an aspect, a composition comprising, consisting of, or consisting essentially of LAUDIS + STRATEGO YLD is applied to a plant or crop, such as corn, in a method described herein. In another aspect, a composition comprising, consisting of, or consisting essentially of LAUDIS, STRATEGO YLD, and methylated seed oil ("MSO") is applied to a plant or crop, such as corn, in a method described herein. In yet another aspect, a composition comprising, consisting of, or consisting essentially of LAUDIS, STRATEGO YLD, methylated seed oil ("MSO"), and atrazine is applied to a plant or crop, such as corn, in a method described herein.

[0019] In an aspect, a composition described herein is applied to a crop, plant, or plant part thereof in a manner sufficient to convey the desired property. In another aspect, a composition described herein is applied to corn at V5, V6, V7, or V8 timing. In another aspect, a composition described herein is applied to corn at V5 through V7 timing, designated as yield enhancing stage or "YES" timing. "V5" refers to 5 leaf collar corn, "V6" refers to 6 leaf collar corn, "V7" refers to 7 leaf collar corn, and "V8" refers to 8 leaf collar corn.

[0020] In an aspect, a composition described herein is applied to a crop, plant, or plant part thereof in a single application step. In another aspect, a composition described herein is applied in multiple application steps to a crop, plant, or plant part thereof. In yet another aspect, a composition described herein is applied in one, two, three or more application steps to a crop, plant, or plant part thereof. In another aspect, a method described herein excludes multiple application steps. In yet another aspect, a method described herein excludes a preemergence and/or postemergence application step. In an aspect, a method disclosed herein does not include application at any of the "R" reproductive stages of corn growth. In another aspect, a method disclosed herein does not include an application at R1 (silking), R2 (blister), R3 (milk), R4 (dough), R5 (dent), or R6 (physiological maturity). In yet another aspect, a method disclosed herein does not include an application at VE (emergence), V1 (first leaf), V2 (second leaf), or V3 (third leaf), or Vn (where "n" is the respective the leaf number).

[0021] In an aspect, the methods described herein include a first sequential application of tembotrione and isoxadifen-ethyl followed by a second application of trifloxystrobin and prothioconazole. In another aspect, the methods described herein include

a first sequential application of trifloxystrobin and prothioconazole followed by a second application of tembotrione and isoxadifen-ethyl. In yet another aspect, tembotrione, isoxadifen-ethyl, trifloxystrobin, and prothioconazole are applied at the same time in by a tankmix in a single application step.

[0022] In an aspect, the methods described herein include a first sequential application of STRATEGO YLD followed by a second application of LAUDIS. In another aspect, the methods described herein include a first sequential application of LAUDIS followed by a second application of STRATEGO YLD. In yet another aspect, the combination of LAUDIS + STRATEGO YLD are applied at the same time in a tankmix in a single application step.

[0023] In an aspect, the disclosure provides for a method of reducing crop damage caused by, for example, weeds, such as broadleaf weeds, grass, wooly cupgrass, foxtail, crabgrass, and weeds resistant to glyphosate, Protox or PPO, ALS, and dicamba by applying a composition described herein. In another aspect, the disclosure provides for a method of reducing corn damage caused by, for example, weeds, such as broadleaf weeds, grass, wooly cupgrass, foxtail, crabgrass, and weeds resistant to glyphosate, PPO, ALS, and dicamba by applying a composition described herein in a single application step at V5, V6, V7, or yield enhancing stage timing. In yet another aspect, the disclosure provides for a method increasing yield and reducing corn damage caused by, for example, weeds, such as broadleaf weeds, grass, wooly cupgrass, foxtail, crabgrass, and weeds resistant to glyphosate, PPO, ALS, and dicamba by applying a tank mixture of a composition describe herein in a single application step at V5, V6, V7, or yield enhancing stage timing. In an aspect, broadleaf weeds can include, for example, ragweed, pigweed, lambsquarters, and waterhemp.

[0024] In another aspect, the compositions described herein can be used to treat Anthracnose Leaf Blight (*Colletotrichum graminicola*), Rusts (*Puccinia spp.*), Eye Spot (*Aureobasidium zeae*), Gray Leaf Spot (*Cerscospora zeae-maydis*), Northern Corn Leaf Blight (*Setosphaeria turcica*), Northern Corn Leaf Spot (*Cochliobolus carbonum*), and/or Southern Corn Leaf Blight (*Cochliobolus heterostrophus*).

[0025] In an aspect, the methods described herein exclude a soil application step. In another aspect, the methods described herein include a foliar application step and exclude a soil application step. In another aspect, the methods described herein exclude a direct soil application step and the only application of a composition described herein would be to the foliar region of a crop described herein. In an aspect, the exclusion of a soil application step refers to less than about 2%, less than about 5%, less than about 10%, less than about 20%, or

less than about 30% of the total percent applied of a composition described herein being applied to soil. In another aspect, a foliar application includes a trace amount of a composition described herein coming into contact with soil. In yet another aspect, any soil application is incidental to foliar treatment.

[0026] In an aspect, the methods and compositions described herein increase crop yield by about 1% to about 3%, about 1% to about 5%, about 1% to about 10%, about 2% to about 5%, about 3% to about 5%, about 5% to about 10%, about 15% to about 30%, about 20% to about 50%, or about 1% or more, about 2% or more, about 3% or more, about 5% or more, about 10% or more, about 20% or more, about 30% or more, or about 50% or more. In yet another aspect, the methods and compositions described herein increase crop yield by about 1%, about 2%, about 3%, about 5%, about 10%, about 20%, about 30%, or about 50%. In an aspect, the crop yield is increased compared to an untreated plant or crop. In yet another aspect, the crop yield is increased with an application of LAUDIS + STRATEGO YLD relative to STRATEGO YLD or LAUDIS alone.

[0027] The compositions described herein can be used in an amount effective to increase corn yield. In an aspect, a composition described herein is applied at about 0.5 fluid ounces/acre to about 6.0 fluid ounces/acre, about 1.0 fluid ounces/acre to about 4.0 fluid ounces/acre, about 2.0 fluid ounces/acre to about 4.0 fluid ounces/acre, or about 3.0 fluid ounces/acre to about 6.0 fluid ounces/acre. In another aspect, a composition described herein is applied at about 0.1, about 1.0, about 2.0, about 3.0, about 4.0, about 5.0, about 6.0, about 7.0, about 8.0, about 9.0, about 10.0 or more fluid ounces/acre. In yet another aspect, a composition described herein is applied at about 0.1, about 1.0, about 2.0, about 3.0, about 4.0, about 5.0, about 6.0, about 7.0, about 8.0, about 9.0, or about 10.0 fluid ounces/acre.

[0028] In an aspect, a composition described herein comprises, consists of, or consists essentially of about 30 – 50 g/l tembotrione, about 20 – 30 g/lisoxadifen-ethyl, about 300 – 400 g/l trifloxystrobin, and about 100 – 150 g/l prothioconazole. In another aspect, a composition described herein comprises, consists of, or consists essentially of about 44g/l tembotrione, about 22 g/lisoxadifen-ethyl, about 376 g/l trifloxystrobin, and about 126 g/l prothioconazole.

[0029] In an aspect, a first composition described herein is applied at about 1.0 fluid ounces/acre to about 5.0 fluid ounces/acre and a second composition described herein is applied at about 2.0 fluid ounces/acre to about 5.0 fluid ounces/acre. In another aspect, a first composition described herein is applied at about 1.5 fluid ounces/acre to about 3.0 fluid ounces/acre and a second composition described herein is applied at about 3.0 fluid

ounces/acre to about 4.0 fluid ounces/acre. In yet another aspect, a first composition described herein is applied at about 1.5 fluid ounces/acre to about 2.5 fluid ounces/acre and a second composition described herein is applied at about 3.0 fluid ounces/acre to about 4.0 fluid ounces/acre. In an aspect, a first composition comprises one, two, three or four compositions described herein. In an aspect, a second composition comprises one, two, three or four compositions described herein. In an aspect, the first composition includes tembotrione and isoxadifen-ethyl and the second composition includes trifloxystrobin, and prothioconazole.

[0030] In another aspect, a composition described herein is applied to a plant or crop described herein, such as corn, at about 10 to about 20, about 10 to about 30 days, about 10 to about 40 days, about 15 to about 25 days, about 20 to about 40 days, about 30 to about 50 days, or about 40 to about 50 days after planting. In another aspect, a composition described herein is applied to a plant or crop described herein at about 10, about 15, about 20, about 25, about 30, or about 50 or more days after planting. In yet another aspect, a composition described herein is applied to a plant or crop described herein at least 10, at least 15, at least 20, at least 25, at least 30, or at least 50 after planting.

[0031] In an aspect, the methods disclosed herein reduce damage caused by a weed or pest by about 10% to about 20%, about 10 % to about 30%, about 10% to about 40%, about 10% to about 90%, about 20% to about 80%, about 30% to about 70%, about 40% to about 60%, or about 5% or more, about 10% or more, about 20% or more, about 30% or more, about 40% or more, about 50% or more, about 60% or more, about 70% or more, about 80% or more, or about 90% or more, about 5% or less, about 10% or less, about 20% or less, about 30% or less, about 40% or less, about 50% or less, about 60% or less, about 70% or less, about 80% or less, or about 90%. In yet another aspect, the methods and compositions disclosed herein reduce damage caused by a weed or pest described herein by about 5%, about 10%, about 20%, about 30%, about 40%, about 50%, about 60% about 70%, about 80%, or about 90%. In another aspect, the above percentages are relative to an untreated plant.

[0032] In an aspect, binders, coating agents, wetting agents, or buffering agents can be added to a composition described herein. In another aspect, at least one agriculturally acceptable carrier can be added to the formulation such as water, solids or dry powders. The dry powders can be derived from a variety of materials such as wood barks, calcium carbonate, gypsum, vermiculite, talc, humus, activated charcoal, and various phosphorous compounds. In an aspect, a composition described herein can include a spray or tank mix

adjuvant. In another aspect, a composition described herein can include additional components, such as an insecticide, fungicide, herbicides, fertilizer, or foliar-applied fertilizers. In another aspect, compositions described herein can include methylated seed oil ("MSO"), for example MSO at 0.5% v/v to 1.0% v/v. In yet another aspect, compositions described herein can contain High Surfactant Oil Concentrates ("HSOC") or Crop Oil Concentration ("COC"). In another aspect, MSO is a tank mix adjuvant capable of being used with a composition described herein. In yet another aspect, compositions described herein may be used together with IGNITE®280 SL, DEFINE™SC, ACCENT®, OPTION®, STOUT™, STEADFAST®, or Glyphosate.

[0033] Components of compositions described herein can be converted into the customary formulations, such as solutions, emulsions, wettable powders, suspensions, suspension concentrate, powders, dusts, pastes, soluble powders, granules, suspoemulsion concentrates, natural and synthetic materials impregnated with active compound, and ultrafine encapsulations in polymeric materials. These formulations are produced in the known manner, for example by mixing the active compound with extenders, liquid solvents and/or solid carriers, optionally with the use of surfactants, emulsifiers and/or dispersants and/or foam formers. Suitable extenders are, for example, water, polar and unpolar organic chemical liquids, for example from the classes of the aromatic and nonaromatic hydrocarbons (such as paraffins, alkylbenzenes, alkylnaphthalenes, chlorobenzenes), of the alcohols and polyols (which can optionally also be substituted, etherified and/or esterified), of the ketones (such as acetone, cyclohexanone), esters (including fats and oils) and (poly)ethers, of the unsubstituted and substituted amines, amides, lactams (such as N-alkylpyrrolidones) and lactones, the sulphones and sulphoxides (such as dimethyl sulphoxide).

[0034] In the case of the use of water as an extender, organic solvents can, for example, also be used as cosolvents. Liquid solvents which are suitable include: aromatics, such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics or chlorinated aliphatic hydrocarbons, such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons, such as cyclohexane or paraffins, for example mineral oil fractions, mineral oils and vegetable oils, alcohols, such as butanol or glycol as well as their ethers and esters, ketones, such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents, such as dimethylformamide and dimethyl sulphoxide, and water.

[0035] Solid carriers which are suitable are for example, ammonium salts and ground natural minerals, such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and ground synthetic minerals, such as highly-disperse silica, alumina

and silicates; suitable solid carriers for granules are: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, and synthetic granules of inorganic and organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; suitable emulsifiers and/or foam formers are: for example non-ionic and anionic emulsifiers, such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates as well as protein hydrolysates; suitable dispersants are: for example lignin-sulphite waste liquors and methylcellulose.

[0036] Adhesives such as carboxymethylcellulose and natural and synthetic polymers in the form of powders, granules or latices, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, and natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids, can be used in the formulations. Other additives can be mineral and vegetable oils. Colorants may be added such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyestuffs, such as alizarin dyestuffs, azo dyestuffs and metal phthalocyanine dyestuffs, and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

[0037] All corn and corn plant parts can be treated in accordance with the invention. Corn plants can be plants which can be obtained by traditional breeding and optimization methods or by biotechnological and recombinant methods, or combinations of these methods, including the transgenic plants and including the plant varieties which are capable or not capable of being protected by Plant Breeders' Rights. Plant parts are understood as meaning all aerial and subterranean parts and organs of the plants.

[0038] In one embodiment, plant species and plant varieties which are found in the wild or which are obtained by traditional biological breeding methods, such as hybridization or protoplast fusion, and parts of these species and varieties are treated. In a further preferred embodiment, transgenic plants and plant varieties which were obtained by recombinant methods, if appropriate in combination with traditional methods (genetically modified organisms) and their parts are treated.

[0039] Plants which can be treated by the methods described herein include, for example, corn or soybeans. Examples of corn capable of being used in the methods described herein include, for instance, sweet corn (for example, *zea mays* convar. *saccharata* var. *Rugosa*), silver queen corn, golden bantam, early sunglow, indian corn, sugar corn, pole corn, field corn, dent corn, flint corn, flour corn, blue corn (for example, *Zea mays amylacea*), pop corn, and waxy corn. In another aspect, plants or crops which can be used in

conjunction with the disclosed methods include any plant or crop not damaged by the active agents described herein.

[0040] The plants and their parts may be treated with the described compositions by applying the compositions directly to the plants or plant parts. In another embodiment, the plant and plant parts may be treated indirectly, for example by treating the environment or habitat in which the plant parts are exposed to. Conventional treatment methods may be used to treat the environment or habitat including dipping, spraying, fumigating, chemigating, fogging, scattering, brushing on, shanking or injecting. In an aspect, a composition described herein is applied to corn leaf, ear shoot, or tassel.

[0041] In another aspect, the disclosure provides for a kit comprising, consisting essentially of, or consisting of any of the compositions disclosed herein. In an aspect, the kit includes any of the combination of compositions described in Examples 1 – 5 or Figures 1 – 4. In another aspect, the kit provides for the compositions described in Examples 1 – 5 and Figures 1 – 4 applied in a manner that is consistent with the methodology of these examples and figures. In another aspect, the kit provides instructions or guidance regarding the use of the compositions or methods described herein.

[0042] In an aspect, the kit includes instructions describing the methodology described herein. In another aspect, the kit includes instructions describing the methodology set forth in any of Examples 1 – 5 and Figures 1 – 4. In an aspect, the instructions are included with the kit, separate from the kit, in the kit, or are included on the kit packaging.

[0043] The following examples serve to illustrate certain aspects of the disclosure and are not intended to limit the disclosure.

EXAMPLES

Example 1

[0044] Example 1 shows the influence of STRATEGO YLD and LAUDIS on corn yield at the V5-V7 Developmental Stages.

[0045] STRATEGO YLD and a tank mixture of LAUDIS + STRATEGO YLD (both products applied with recommended adjuvant systems) were applied in a single application to early- to mid-post (V5-V7) emergence corn plants. These trials were maintained in a weed-free state throughout the growing season. Yields for these two treatments were compared to a weed free untreated area.

[0046] Yields from the LAUDIS + STRATEGO YLD tank mixture were improved an average of 3.2%, as compared to a STRATEGO YLD solo treatment.

[0047] Tables 1 and 2 demonstrate the increased yield observed in the treated corn plants. Table 3 illustrates the 3.2% average increase in yield observed in the LAUDIS + STRATEGO YLD combination treatments as compared to the STRATEGO YLD solo treatment. The datasets include only those trials which were kept in a weed free state, if treatments showed differential levels of weed control, the test was not included in the dataset.

Table 1

Test #	1	2	3	4	5	6
Location (State)	IN	OH	IL	IL	MN	MI
Corn Growth Stage at Application (V5-V7)	6	5	5	5	6	6
Yield (bushels/acre)						
Weed Free Check	200.1	128.9	228.6	209	117.2	144.9
STRATEGO YLD (2-4 oz)	188.9	134.7	227.5	227.8	127.4	150.3
LAUDIS + STRATEGO YLD (3oz + 2-4 oz)	186.1	138.9	241.5	215.4	135.3	159
% Yield Improvement	-1.5	3.1	6.2	-5.4	6.2	5.8

Table 2

Test #	1	2	3	4	5	6	7	8
Location (State)	SD	SD	SD	IN	OH	IL	IL	MN
Corn Growth Stage at Application (V5-V7)	5	7	5	5	5	5	5	5
Yield (bushels/acre)								
Weed Free Check	101.9	144	158.9	87.7	94.5	181.1	145.3	208.5
STRATEGO YLD (2-4 oz)	111.5	149.7	157.2	82.3	110.6	180.9	167.9	196.8
LAUDIS + STRATEGO YLD (3oz + 2-4 oz)	114.7	141.2	156.9	91.2	109.6	194.7	179.7	214.5
% Yield Improvement	2.9	-5.6	-0.02	10.8	-0.9	7.6	7	9

Table 3

	Average Yield
Yield (bushels/acre)	
Weed Free Check	153.6
STRATEGO YLD (2-4 oz)	158.1
LAUDIS + STRATEGO YLD (3oz + 2-4 oz)	162.8
% Yield Improvement	**3.20%**

Example 2

[0048] Example 2 shows the influence of STRATEGO YLD + LAUDIS on phytotoxicity of corn plants at the V5 developmental stage.

[0049] Field experiments were conducted to measure the phytotoxic effects on corn plants resulting from treatment with a combination of the fungicide STRATEGO YLD and herbicide LAUDIS. Phytotoxicity ratings were evaluated by visual observation. Some symptoms factored into phytotoxicity ratings include a combination of, for example, chlorosis, stunted growth, leaf necrosis, and other commonly known indicators of phytotoxicity.

[0050] Corn plants at the V5 stage of development were treated with combinations of the active ingredients STRATEGO YLD and LAUDIS. These treatments were applied as a single application, utilizing a tank mixture of the ingredients.

[0051] Figure 1 demonstrates the phytotoxic impact that the tested combination has upon the treated corn plants. The individual results from each field trial are indicated by the various data points depicted in the Figure 1. The treatments in Figure 1 contained 0.5 lbs/acre of atrazine. As set forth in Figure 1, the average phytotoxicity rating for each treatment yields data demonstrating the following:

(1) STRATEGO YLD + crop oil concentrate ("COC") - average phytotoxicity of 1.4%;

(2) LAUDIS + MSO - average phytotoxicity of 0.7%;

(3) STRATEGO YLD + LAUDIS + MSO - average phytotoxicity of 5.0%;

(4) STRATEGO YLD + LAUDIS + MSO + CoRoN - average phytotoxicity of 0.9%; and

(5) STRATEGO YLD + LAUDIS + MSO at a 2x application rate - average phytotoxicity of 3.00%.

Example 3

[0052] Example 3 shows the influence of STRATEGO YLD + LAUDIS on Yield of Corn Plants at the V5 Developmental Stage.

[0053] Field experiments were conducted to measure the effect on corn plant yields resulting from treatment with a combination of the fungicide STRATEGO YLD and herbicide LAUDIS.

[0054] Corn plants at the V5 stage of development were treated with combinations of the active ingredients STRATEGO YLD and LAUDIS. These treatments were applied as a single application, utilizing a tank mixture of the ingredients.

[0055] Figure 2 demonstrates the increased yield potential observed in the treated corn plants. The individual results from each field trial are indicated by the various data points depicted in Figure 2. The treatments in Figure 2 contained 0.5 lbs/acre of atrazine. As described in Figure 2, corn plants treated with STRATEGO YLD + LAUDIS + MSO have an average yield of 170.13 Bu/A. This average yield is higher than the 168.14 Bu/A and 166.83 Bu/A observed in corn plants treated with only STRATEGO YLD or LAUDIS respectively. The data also demonstrates yields of 172.14 Bu/A in corn plants treated with STRATEGO YLD + LAUDIS + MSO + CoRoN (Controlled-Release Nitrogen, Helena Chemical Company). This yield is also higher than that observed in corn plants treated with only the single active ingredients.

Example 4

[0056] Example 4 shows the influence of STRATEGO YLD + LAUDIS/CALLISTO (Callisto®, Syngenta) on Phytotoxicity of Corn Plants at the yield enhancing stage.

[0057] Field experiments were conducted to measure the phytotoxic effects on corn plants resulting from treatment with combinations of: the fungicide STRATEGO YLD, the herbicide LAUDIS, and the herbicide CALLISTO.

[0058] Corn plants were treated with the combinations of active ingredients at yield enhancing stage ("YES timing"), which corresponds to a corn growth stage ranging from V5-V7. These treatments were applied as a single application, utilizing a tank mixture of the ingredients. phytotoxicity ratings were obtained by visual observations conducted during each experiment. Symptoms analyzed during visual observations included: chlorosis, stunted growth, leaf necrosis, and other commonly known indicators

of phytotoxicity. These observations were then combined into an overall phytotoxicity rating.

[0059] Figure 3 demonstrates the phytotoxic impact that the tested combinations have upon the treated corn plants. The individual results from each field trial are indicated by the various data points depicted in the Figure 3. As described in Figure 3, the average phytotoxicity rating for each treatment yields data demonstrating the following:

(1) STRATEGO YLD - average phytotoxicity of 0.6%;

(2) LAUDIS - average phytotoxicity of 0.8%;

(3) STRATEGO YLD + LAUDIS - average phytotoxicity of 2.00%;

(4) CALLISTO - average phytotoxicity of 1.5%;

(5) STRATEGO YLD + CALLISTO - average phytotoxicity of 1.9%; and

(6) STRATEGO YLD + LAUDIS + CoRoN - average phytotoxicity of 1.8%.

Example 5

[0060] Example 5 shows the influence of STRATEGO YLD + LAUDIS/CALLISTO on yield of corn plants at yield enhancing stage (YES) timing.

[0061] Field experiments were conducted to measure the effect on corn plant yields resulting from treatment with a combination of the fungicide STRATEGO YLD and herbicides LAUDIS and CALLISTO.

[0062] Corn plants were treated with the combinations of active ingredients at yield enhancing stage (YES) timing, which corresponds to a corn growth stage ranging from V5-V7. These treatments were applied as a single application, utilizing a tank mixture of the ingredients.

[0063] Figure 4 demonstrates the increased yield observed in the treated corn plants. The individual results from each field trial are indicated by the various data points depicted in the Figure 4. As described in Figure 4, corn plants treated with STRATEGO YLD + LAUDIS have an average yield of 160.2 Bu/A. This average yield is higher than the 156.98 Bu/A observed in corn plants treated with only STRATEGO YLD. The data also demonstrates yields of 157.2 Bu/A, in corn plants treated with STRATEGO YLD + CALLISTO. This average yield is higher than the 154.51 Bu/A observed in corn plants treated with only CALLISTO.

The Claims:

Claim 1. A method for increasing crop yield, comprising applying a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to a crop.

Claim 2. The method of claim 1, wherein said composition is applied to a foliar region of said crop.

Claim 3. The method of claim 1, wherein said crop is corn.

Claim 4. The method of claim 1, wherein said composition is applied in a single application step.

Claim 5. The method of claim 1, wherein said composition comprises methylated seed oil.

Claim 6. The method of claim 1, wherein said composition comprises atrazine.

Claim 7. The method of claim 1, wherein said composition is applied to corn in an amount effective to increase corn yield.

Claim 8. The method of claim 1, wherein said composition is applied to corn at about 0.5 fluid ounces/acre to about 6.0 fluid ounces/acre.

Claim 9. The method of claim 8, wherein said composition is applied to corn at about 1.0 fluid ounces/acre to about 5.0 fluid ounces/acre.

Claim 10. The method of claim 1, wherein said composition is applied to corn at about 2.0 fluid ounces/acre to about 6.0 fluid ounces/acre in a single application step.

Claim 11. A method for reducing damage to corn caused by a weed or pest, comprising applying a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to corn.

Claim 12. The method of claim 11, wherein said composition is applied to a foliar region of said corn.

Claim 13. The method of claim 11, wherein said composition is applied in a single application step.

Claim 14. The method of claim 11, wherein said composition comprises methylated seed oil.

Claim 15. The method of claim 11, wherein said composition comprises atrazine.

Claim 16. The method of claim 11, wherein said composition is applied to corn in an amount effective to reduce damage to corn caused by a weed or pest.

Claim 17. The method of claim 11, wherein said composition is applied to corn at about 0.5 fluid ounces/acre to about 6.0 fluid ounces/acre.

Claim 18. The method of claim 11, wherein said composition is applied to corn at about 2.0 fluid ounces/acre to about 6.0 fluid ounces/acre in a single application step.

Claim 19. The method of claim 11, wherein said weed is selected from the group consisting of a broadleaf weed, grass, wooly cupgrass, foxtail, and crabgrass.

Claim 20. A composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole.

AMENDED CLAIMS
received by the International Bureau on 29 July 2013

Claim 1. A method for increasing crop yield, comprising applying a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to a crop.

Claim 2. The method of claim 1, wherein said composition is applied to a foliar region of said crop.

Claim 3. The method of claim 1, wherein said crop is corn.

Claim 4. The method of any of claims 1 - 3, wherein said composition is applied in a single application step.

Claim 5. The method of any of claims 1 - 4, wherein said composition comprises methylated seed oil.

Claim 6. The method of any of claims 1 - 5, wherein said composition comprises atrazine.

Claim 7. The method of any of claims 1 - 6, wherein said composition is applied to corn in an amount effective to increase corn yield.

Claim 8. The method of any of claims 1 - 7, wherein said composition is applied to corn at about 0.5 fluid ounces/acre to about 6.0 fluid ounces/acre.

Claim 9. The method of claim 8, wherein said composition is applied to corn at about 1.0 fluid ounces/acre to about 5.0 fluid ounces/acre.

Claim 10. The method of any of claims 1 - 7, wherein said composition is applied to corn at about 2.0 fluid ounces/acre to about 6.0 fluid ounces/acre in a single application step.

Claim 11. A method for reducing damage to corn caused by a weed or pest, comprising applying a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to corn.

Claim 12. The method of claim 11, wherein said composition is applied to a foliar region of said corn.

Claim 13. The method of any of claims 11 - 12, wherein said composition is applied in a single application step.

Claim 14. The method of any of claims 11 - 13, wherein said composition comprises methylated seed oil.

Claim 15. The method of any of claims 11 - 14, wherein said composition comprises atrazine.

Claim 16. The method of any of claims 11 - 15, wherein said composition is applied to corn in an amount effective to reduce damage to corn caused by a weed or pest.

Claim 17. The method of any of claims 11 - 15, wherein said composition is applied to corn at about 0.5 fluid ounces/acre to about 6.0 fluid ounces/acre.

Claim 18. The method of any of claims 11 - 15, wherein said composition is applied to corn at about 2.0 fluid ounces/acre to about 6.0 fluid ounces/acre in a single application step.

Claim 19. The method of any of claims 11 - 18, wherein said weed is selected from the group consisting of a broadleaf weed, grass, wooly cupgrass, foxtail, and crabgrass.

Claim 20. A composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole.

Claim 21. The use of a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to increase crop yield.

Claim 22. The use of claim 21, wherein said composition is applied to a crop at an application rate of about 2.0 fluid ounces/acre to about 6.0 fluid ounces/acre, preferably in a single application step.

Claim 23. The use of a composition comprising

(a) tembotrione,

(b) isoxadifen-ethyl,

(c) trifloxystrobin, and

(d) prothioconazole

to reduce damage to corn caused by a weed and/or pest.

Claim 24. The use of claim 23, wherein said composition is applied to corn at an application rate of about 2.0 fluid ounces/acre to about 6.0 fluid ounces/acre, preferably in a single application step.

FIG. 1

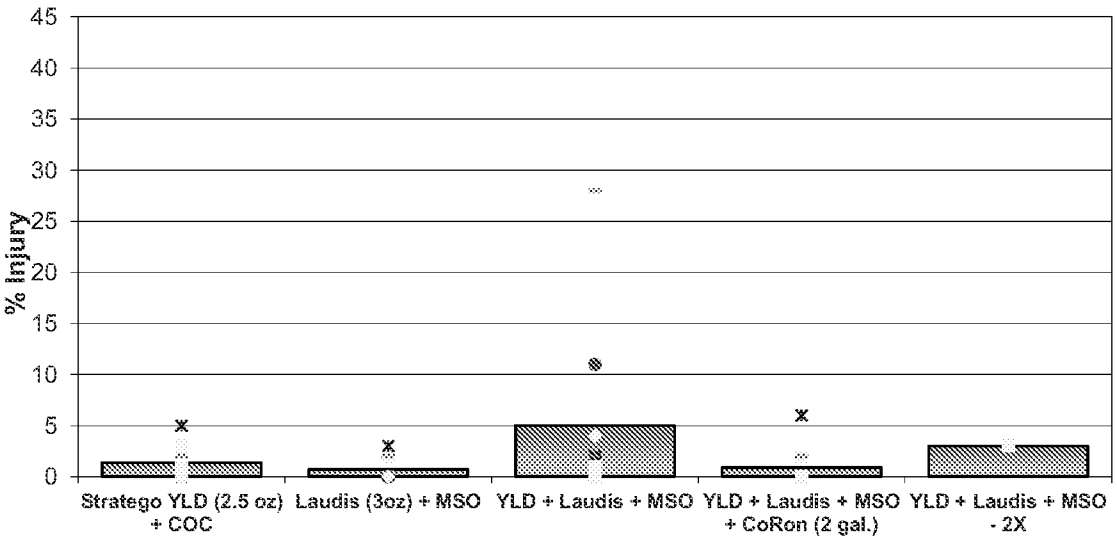

45
40
35
30
25
20
15
10
5
0
% injury
Stratego YLD (2.5 oz) + COC
Laudis (3oz) + MSO
YLD + Laudis + MSO
YLD + Laudis + MSO + CoRon (2 gal.)
YLD + Laudis + MSO - 2X

FIG. 2

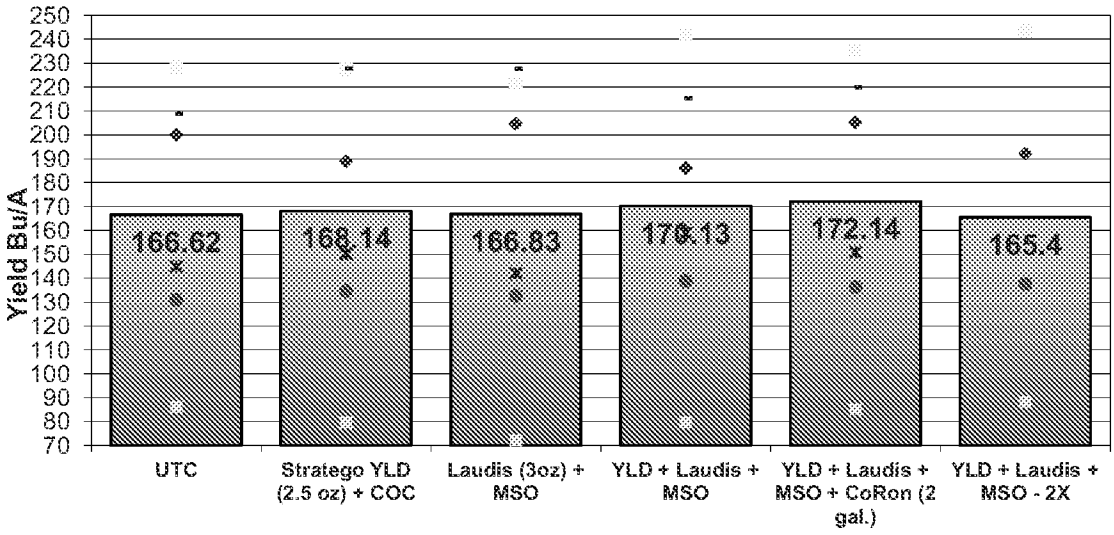

Yield Bu/A
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
166.62
168.14
166.83
170.13
172.14
165.4
UTC
Stratego YLD (2.5 oz) + COC
Laudis (3oz) + MSO
YLD + Laudis + MSO
YLD + Laudis + MSO + CoRon (2 gal.)
YLD + Laudis + MSO - 2X

FIG. 3

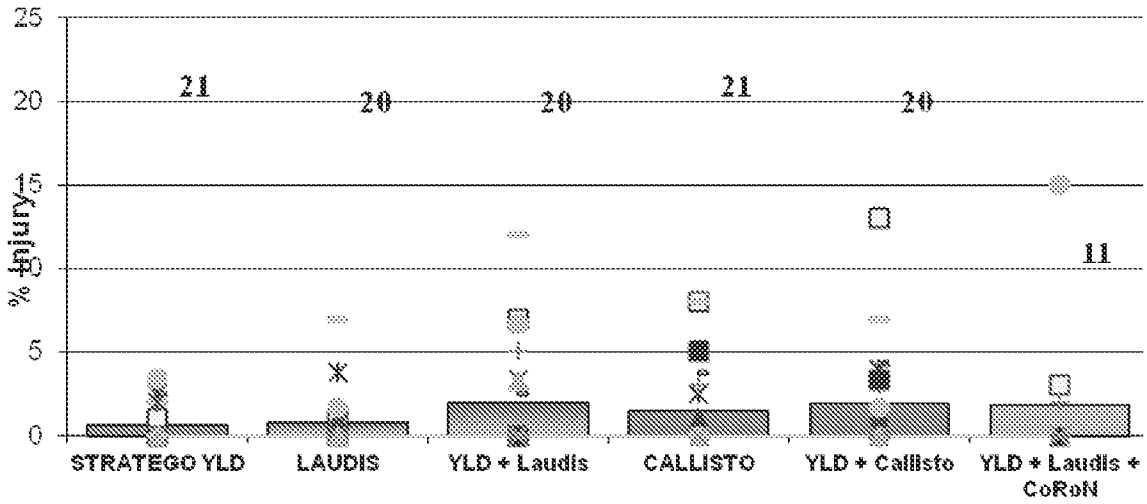
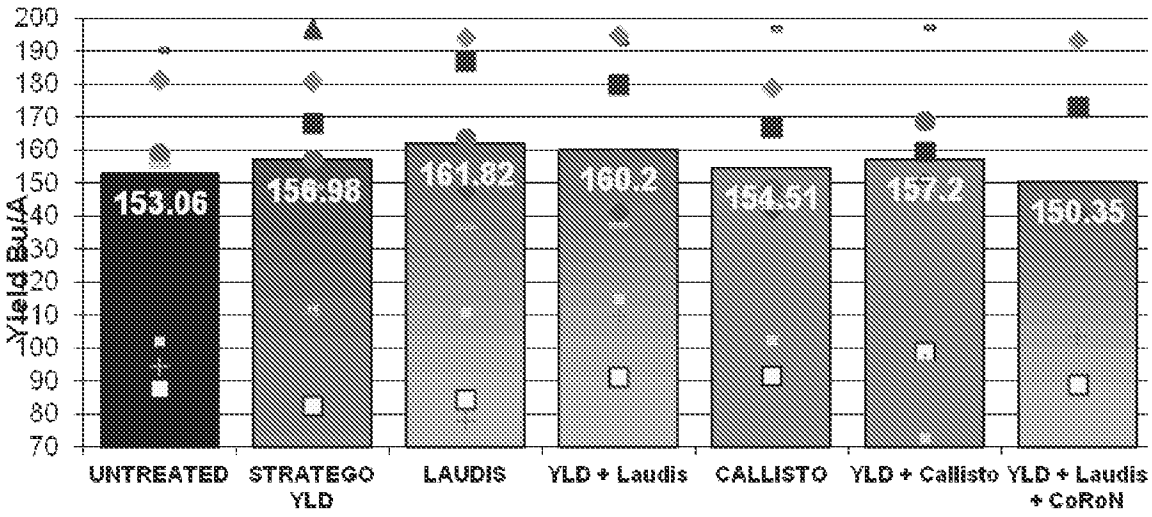

25
20
15
10
5
0
% injury
21
20
20
21
20
11
STRATEGO YLD
LAUDIS
YLD + Laudis
CALLISTO
YLD + Callisto
YLD + Laudis + CoRoN

FIG. 4


Yield Bu/A
200
190
180
170
160
150
140
130
120
110
100
90
80
70
153.06
156.98
161.82
160.2
154.51
157.2
150.35
UNTREATED
STRATEGO YLD
LAUDIS
YLD + Laudis
CALLISTO
YLD + Callisto
YLD + Laudis + CoRoN

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/030360

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01N43/653 A01N43/80 A01N41/10 A01N37/50 A01P3/00 A01P13/00
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01N

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	"Herbicide-fungicide mix combines convenience, yield protection", Stratego YLD - Product news, 13 July 2011 (2011-07-13), pages 1-1, XP055063054, Retrieved from the Internet: URL:http://www.bayercropscience.us/products/fungicides/stratego-yld/product-news?storyId=f35acc95-9be2-4f9d-9ac3-57c6c4af1327 [retrieved on 2013-05-15] page 1 ----- -/--	1-20

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 May 2013	27/05/2013

Name and mailing address of the ISA/	Authorized officer
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1

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/030360

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	"Laudis(TM) Supplemental Label", bayercropscience/products/herbicides/laudis/labels-msds, 20 April 2009 (2009-04-20), pages 1-3, XP055063062, Retrieved from the Internet: URL:http://www.agrian.com/pdfs/Laudis_Herbicide_Supplemental_Label.pdf [retrieved on 2013-05-15] pages 1-3	1-20

1

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