

STUDY TITLE

Flutriafol Minor Use Registrations Petition for Three Years Extension of Exclusive Use Data Protection Provided Under FIFRA Section 3(c)(1)(F)(ii)

DATA REQUIREMENTS

Not applicable

AUTHOR

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DATE

April 23, 2020

PERFORMING COMPANY

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STATEMENT OF CONFIDENTIALITY CLAIMS

No claim of confidentiality, on any basis whatsoever, is made for any information contained in this study. I acknowledge that the information not designated as within the scope of FIFRA section 10(d) (1)(A), (B) or (C) and which pertains to a registered or previously registered pesticide is not entitled to confidential treatment and may be released to the public, subject to the provisions regarding disclosure to multinational entities under FIFRA (10)g.

Signature: *Paula Bodey* Date: 23-April-2020

Paula Bodey
Senior Registration Manager
FMC Corporation

STATEMENT OF GOOD LABORATORY PRACTICE COMPLIANCE

This document is a petition for extending the exclusive use data protection period. It is not required to comply with 40 CFR Part 160.

Signature: Paula Bodey Date: 23-April-2020

Paula Bodey
Senior Registration Manager
FMC Corporation

Introduction

FMC hereby petitions EPA to extend the period of exclusive data use for Flutriafol fungicide by three years, by applying the provision listed under FIFRA Section 3(c)(1)(F)(ii).

FIFRA Section 3(c)(1)(F)(ii) states that:

The period of exclusive data use provided under clause (i) shall be extended 1 additional year for each 3 minor uses registered after the date of enactment of this clause and within 7 years of the commencement of the exclusive use period, up to a total of 3 additional years for all minor uses registered by the Administrator if the Administrator, in consultation with the Secretary of Agriculture, determines that, based on information provided by an applicant for registration or a registrant, that

- I. there are insufficient efficacious alternative registered pesticides available for the use;
- II. the alternatives to the minor use pesticide pose greater risks to the environment or human health;
- III. the minor use pesticide plays or will play a significant part in managing pest resistance;
- IV. the minor use pesticide plays or will play a significant part in an integrated pest management program.

Flutriafol Product Registrations

Cheminova Flutriafol Technical (EPA Reg. No. 4787-55) was first registered by the EPA on April 29, 2010. An additional technical registration, Cheminova Flutriafol Technical 98.3% (EPA Reg. No. 4787-61), was approved by EPA on October 26, 2011. Both technical registrations are held by Cheminova A/S (EPA Company No. 4787). Topguard Fungicide, containing flutriafol, was the formulated product registered with the initial technical registration on April 29, 2010. Three additional formulated products containing flutriafol were also registered in 2013, 2014 and 2015. The formulated product registrations were held by Cheminova Inc. (EPA Company No. 67760). In April 2015 FMC acquired both Cheminova Inc. and Cheminova A/S with the formulated product registrations transferred from Cheminova Inc. to FMC (EPA Company No. 279) in 2016. The two technical registrations remained under Cheminova A/S, which is a wholly owned subsidiary of FMC. Since the company acquisition, FMC has registered four additional formulated products. The registered formulated products are provided in the table below including the identification of any formulations which have minor crop uses on the approved label.

Product Name	EPA Reg. No.	Registration Date	Alternate Brand Names	Minor Crop(s) on Label
Topguard Fungicide	279-3577	4/29/2010	Topguard Fungicide Topguard Fungicide Specialty Crops	Yes Yes (multiple)
Flutriafol 250 g/L SC	279-3588	7/29/2013	Rhyme Fungicide	Yes (multiple)
Flutriafol 500 g/L SC	279-3594	1/30/2015	Topguard Terra Fungicide	No
Azoxystrobin 296 g/L + Flutriafol 218 g/L SC	279-3596	10/22/2014	Topguard EQ Fungicide	Yes (multiple)
F9654-1 Fungicide	279-3603	12/6/2018	Lucento Fungicide	Yes (popcorn)
Preemptor Fungicide	279-3620	2/15/2017		No
F6123-1 Fungicide	279-3633	11/20/2019	Rayora Fungicide	No (No Ag Uses)
F4278-3	279-9638	10/3/2019	Xyway 3D Fungicide	Yes (popcorn)

Minor Use Registrations

All minor crop uses were registered within the required seven years following the initial registration. Using the guidance provided by EPA, the total number of minor uses eligible to support the exclusive use data extension, should they meet one of the criteria, is twenty two (22).

Minor Crop / Crop Group	Date of Registration	Representative Crops*
Popcorn	4/29/2010	popcorn
Pome fruit crop group 11	8/8/2012	apple, pear (2)
Stone fruit crop group 12	8/8/2012	cherry (sweet or tart), peach, plum (3)
Cucurbit Vegetables crop group 9	8/20/2014	cucumber, muskmelon, and summer squash (3)
Fruiting vegetable crop group 8-10	8/20/2014	tomato, pepper (bell and non-bell)(2)
Tree nut crop group 14	8/20/2014	almond, pecan (2)
Strawberry	8/20/2014	strawberry
Leafy vegetables, except Brassica, crop group 4	1/30/2015	head lettuce, leaf lettuce, spinach, and celery (4)

Brassica leafy vegetables crop group 5 (with 3 representative crops:)	1/30/2015	broccoli or cauliflower, cabbage, and mustard greens (3)
Hops	11/19/2015	hops

*Per EPA guidance documents, the number of representative crops in a crop group is the maximum number of minor uses that may qualify for the exclusive data use extension for that crop group. If one of the representative crops is a major crop (>300,000 acres), another minor crop in that crop group may be used to substitute for the major representative crop.

Diseases Controlled (or Suppressed) on Minor Use Crops:

As the table in the Flutriafol Product Registrations section of the document summarizes, the primary registered end use products containing multiple minor crop uses are Topguard Fungicide, Topguard Fungicide Specialty Crops, Rhyme Fungicide, and Topguard EQ. Topguard Fungicide, Topguard Fungicide Specialty Crops, and Rhyme contain flutriafol as the sole active ingredient in the formulation, while Topguard EQ is a premix product containing flutriafol and azoxystrobin. The table below, which focuses on the formulations with flutriafol as the sole active ingredient, summarizes the broad spectrum of disease control (or suppression) across multiple crops.

Minor Use Crops	Topguard Fungicide, Topguard Fungicide Specialty Crops or Topguard EQ Fungicide Labels	Rhyme Fungicide Label
Leafy vegetables, except Brassica, crop group 4		<p><u>Celery/Chinese Celery</u> Alternaria Leaf Spot (Alternaria sonci, A. spp.) Anthracnose (Colletotrichum dematium) Early Blight (Cercospora apii) Late Blight (Septoria apiicola) 2(ee) Fusarium Suppression</p> <p><u>Leafy Vegetables</u> Alternaria Leaf Spot (Alternaria sonchi, A. spp.) Anthracnose (Microdochium panattonianum, Colletotrichum dematium) Cercospora Leaf Spot (Cercospora spp.) Powdery mildew (Erysiphe cichoroacearum, leveillula taurica) Septoria Leaf Spot (Septoria spp.)</p>

Brassica leafy vegetables crop group 5		Black spot (<i>Alternaria</i> spp.) Cercospora Leaf Spot (<i>Cercospora</i> spp.) Powdery Mildew (<i>erysiphe polygoni</i>)
Cucurbit Vegetables crop group 9	Gummy Stem Blight (<i>Didymella bryoniae</i>) Powdery Mildew (<i>Sphaerotheca fuliginea</i> , <i>Erysiphe cichoracearum</i>) Target Spot (<i>Corynespora cassicola</i>) Charcoal Rot (<i>Macrophomina phaseolina</i>)	Gummy Stem Blight (<i>Didymella bryoniae</i>) Powdery Mildew (<i>Sphaerotheca fuliginea</i> , <i>Erysiphe cichoracearum</i>) Target Spot (<i>Corynespora cassicola</i>) Charcoal Rot (<i>Macrophomina phaseolina</i>) <u>2(ee) Drip Irrigation:</u> Anthracnose Gummy Stem Blight Powdery Mildew Target Spot Charcoal Rot Fusarium sp.
Fruiting vegetable crop group 8-10 <i>(removed tomato diseases)</i>	Anthracnose (<i>Collectotrichum coccedes</i> , <i>C. acutatum</i>) Cercospora Leaf Spot (<i>Cercospora capsici</i>) Powdery Mildew (<i>Leveillula taurica</i>) Charcoal Rot (<i>Macrophomina phaseolina</i>)	Anthracnose (<i>Collectotrichum coccedes</i> , <i>C. acutatum</i>) Cercospora Leaf Spot (<i>Cercospora capsici</i>) Powdery Mildew (<i>Leveillula taurica</i>) Charcoal Rot (<i>Macrophomina phaseolina</i>) <u>2(ee) Drip Irrigation:</u> Anthracnose Black Mold Early Blight Cercospora Lef Spot Powdery Mildew Target Spot Charcoal Rot Fusarium sp.

Hops	Powdery Mildew (<i>Podosphaera macularis</i> , <i>Sphaerotheca macularis</i>) 2(ee) Drip Irrigation: Powdery Mildew	Powdery Mildew (<i>Podosphaera macularis</i> , <i>Sphaerotheca macularis</i>)
Pome fruit crop group 11 (<i>removed apple diseases</i>)	Powdery Mildew (<i>Podosphaera leucotricha</i>) Quince Rust (<i>Gymnosporangium clavipes</i>) Cedar Apple Rust (<i>Gymnosporangium juniperi-virginianae</i>) Apple Scab (<i>Venturia inaequalis</i>) Pear scab (<i>venturia pirina</i>)	Powdery Mildew (<i>Podosphaera leucotricha</i>) Quince Rust (<i>Gymnosporangium clavipes</i>) Cedar Apple Rust (<i>Gymnosporangium juniperi-virginianae</i>) Brooks Fruit Spot (<i>Mycosphaerella pomi</i>) Flyspeck (<i>Zygophiala jamacaicensis</i> , formerly <i>Schizothyrium pomi</i>) Apple Scab (<i>Venturia inaequalis</i>) Sooty lotch (<i>Gleodes pomigena</i>) Bot Rot or White Rot (<i>Botryosphaeria dothidea</i>) Black Rot (<i>Botryosphaeria obtusa</i>) Bitter Rot (<i>Colletotrichum gloesporoides</i> , <i>C. acutatum</i>) Alternaria Blotch (<i>Alternaria mali</i>) Pear scab (<i>venturia pirina</i>)
Popcorn	Gray leaf spot Southern Corn Leaf Blight Northern Corn Leaf Blight Common Rust Eyespot Antracnose Leaf Blight Northern Corn Leaf Spot 2(ee) Tar Spot (Topguard EQ)	

Stone fruit crop group 12	Brown Rot Blossom Blight (Monilinia fructicola) Cherry Leaf Spot (Blumeriella jaapii) Fruit Brown Rot (Monilinia fructicola) Powdery Mildew (Podosphaera clandestina)	Rusty Spot (Podosphaera leucotricha) Brown Rot Blossom Blight (Monilinia spp.) Cherry Leaf Spot (Blumeriella jaapil) Fruit Brown Rot (Monilinia spp.) Powdery Mildew (Sphaerotheca pannosa) Shot Hole (Wilsonomyces carpophilus) <u>2(ee) Drip Irrigation:</u> Powdery Mildew
Strawberry		Powdery Mildew (Podosphaera aphanis) Charcoal Rot (Macrophomina phaseolina) <u>2(ee) Drip Irrigation:</u> Anthracnose Powdery Mildew Charcoal Rot
Tree nut crop group 14 (<i>removed almond and walnut diseases</i>)	Pecan scab (Fusicladium effusum) Powdery mildew (Microsphaera penicillata) Zonate leaf Spot (Cristulariella moricola) Alternaria Leaf Spot and Fruit Spot (Alternaria alternata) Anthracnose (Colletotrichum acutatum) Brown Rot Blossom Blight (Monilinia fructicola) Eastern Filbert Blight (Anisogramma anomale) Shot Hole (Wilsonomyces carpophilus)	Pecan scab (Fusicladium effusum) Powdery mildew (Microsphaera penicillata) Zonate leaf Spot (Cristulariella moricola) Alternaria Leaf Spot and Fruit Spot (Alternaria alternata) Anthracnose (Colletotrichum acutatum) Brown Rot Blossom Blight (Monilinia fructicola) Eastern Filbert Blight (Anisogramma anomale) Shot Hole (Wilsonomyces carpophilus) Leaf Rust (Tranzschelia discolor)

	Leaf Rust (<i>Tranzschelia discolor</i>) Downy Spot (<i>Mycosphaerella caryigena</i>)	Downy Spot (<i>Mycosphaerella caryigena</i>) <u>2(ee) - Trunk diseases:</u> <i>Botryosphaeria dothidea</i> <i>Cytospora sorbicola</i> <i>Neofusicoccum parvum</i> Phomopsis canker
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Flutriafol Mode of Action

Flutriafol is a systemic, demethylation inhibitor (DMI) fungicide that can be used as a curative or preventative treatment. Flutriafol inhibits the specific enzyme, C14-demethylase, a fungal cytochrome P450, which plays a role in sterol production. Sterols are needed for fungal membrane structure and function and are essential for the development of functional cell walls.

Flutriafol Efficacy Advantage on Key Diseases

Since Flutriafol was first registered, FMC has invested in the development of Flutriafol products to control the diseases that have insufficient effective alternatives. FMC's intensive research to address evolving diseases, such as charcoal rot and fusarium, provides minor crop growers with tools to efficiently produce minor crops. With the prohibitions on soil fumigants, such as methyl bromide, challenges to control devastating soilborne diseases have arisen leaving the growers with insufficient alternatives for disease control.

Flutriafol is unique among the slate of FRAC group 3 fungicides due to its high systemic mobility through plant leaves (foliar application), and especially through plant roots. Effective root uptake enables control of soilborne diseases of charcoal rot and fusarium, and importantly, Flutriafol has efficacy via drip irrigation to control foliar diseases such as powdery mildew on hops, stone fruit, strawberry, fruiting vegetables and cucurbits. FMC continues to invest in the development of appropriate use rates for minor crops so that growers can reduce dependence on manual labor and precisely apply flutriafol via drip irrigation to economically produce minor crops. With the growth of "buy local" initiatives, it is important to growers to have access to products that can solve disease problems while getting the most out of their investment in drip systems.

Drip systems have an advantage to human health and the environment as the application is conducted via a closed system, which reduces direct exposure to the applicator and bystanders, and potential contact or off-site movement via physical drift. Selection pressure on pathogens is reduced since flutriafol is applied to the root zone for uptake at effective use rates versus foliar applications which rely on interception of foliar sprays at an effective concentration to provide disease control. Foliar applications are dependent on proper application and coverage to achieve the target rate which makes them more subject to error.

FMC has invested in not only the active ingredient chemistry, but in novel formulations and application technology to help the minor crop user economically solve pest problems. Specially formulated products have been developed for use in FMC's 3RIVE 3D system to precisely apply product in furrow which reduces applicator and bystander exposure. FMC registered one Flutriafol product in October 2019 to be used in the 3RIVE system, EPA Reg No. 279-9638, and an additional product to address the need for a fertilizer blend has been submitted to EPA, EPA Reg. No. 279-OALI. Both of these new products expand the utility of Flutriafol to the previously registered minor crop, popcorn.

Crop Specific Justification to meet one criteria to extend period of exclusive data use

The following table reflects the minor crops described in this petition and the criteria met to extend the period of exclusive data use.

	Minor Crop	Criteria Met
1	Strawberry	I, II, III, IV
2	Cucumber	I, II, III, IV
3	Summer squash	I, II, III, IV
4	Cantaloupe/Muskmelon	I, II, III, IV
5	Celery	I
6	Bell pepper	I, II, III, IV
7	Non-bell pepper	I, II, III, IV
8	Eggplant	I, II, III, IV
9	Mayhaw	I
10	Peach	I, II
11	Apricot	I, II
12	Nectarine	I, II
13	Popcorn	I
14	Hops	I, II

Strawberry

Pest: *Macrophomina phaseolina*, charcoal rot

Crops: Strawberry

Criteria Met:

(I): The ban of methyl bromide has led to a resurgence in the occurrence and severity of charcoal rot in strawberry. Current fumigant alternatives (i.e. chloropicrin, 1,3-dichloropropene, metam sodium, AITC products) do not have the vapor pressure to move through the bed shoulders and row middles like methyl bromide did and leave untreated areas that lead to late season infection and crop collapse once the roots reach the untreated areas.

The importance of charcoal rot in California was described in the January 18, 2019 Fruit Growers News (Kloosterman, 2019). Charcoal rot is a universal problem for strawberry breeding programs, according to disease resistance trials at the California Polytechnic State University Strawberry Center. Also known as the fungus *Macrophomina phaseolina*, charcoal rot is a growing problem in California, where the vast majority of U.S. strawberries are grown. Growers first started reporting trouble with it in 2005 in plots that were no longer fumigated with methyl bromide. Charcoal rot symptoms started to show in established plants that have begun to produce fruit. Older leaves wilt turn grayish green and begin to dry out. The entire plant can collapse and die, and in severe cases, large portions of a field can be affected, according to production guidelines of the California Strawberry Commission.

Charcoal rot in strawberries is the subject of a February 2018 technical paper published by University of Florida IFAS Extension titled “Charcoal Rot of Strawberries Caused by *Macrophomina phaseolina*” (Peres, 2018) The authors state charcoal rot is caused by *Macrophomina phaseolina* and has become more prevalent in Florida strawberry fields since methyl bromide was phased out. This disease was first observed in December 2001, when collapsed and dying strawberry plants from a commercial field were submitted to a diagnostic clinic. During the 2015–2016 season, 30% plant mortality due to charcoal rot was reported early in the season and reached more than 60% by the end of the season in some fields.

The authors continue to discuss that plant losses to charcoal rot can be reduced by chemigation or application of fungicides through the drip system. In chemigation experiments at UF/IFAS GCREC, Kenja, **Rhyme**[®], Topsin, and Velum Prime suppressed charcoal rot when drip applied. Of these, **Rhyme**[®] and Velum Prime are currently labeled for drip application to strawberry, and **only Rhyme**[®] has a specific label for charcoal rot.

Rhyme[®] is a valuable tool for growers to address charcoal rot in strawberries and there are few alternatives for growers.

Strawberry also meet criteria II, III, and IV as explained below:

(II): (A) Fumigants that are currently used are applied in gallons or hundreds of pounds of product per acre versus flutriafol which is applied at 7 fl oz/A. Fumigants require fumigant management plans and due to their toxicity have maximum use limits in certain CA geographies to limit air concentration. Fumigants are also limited by buffer zones which prohibit the use in certain fields in close proximity to sensitive areas and prohibit use around field perimeters. Instances of use of dimethyl disulfide in Florida and Georgia has resulted in public irritation and enhanced sensitivity of the public to pesticide applications in agriculture. This is likely one of the main contributors as to why this active is not available in CA. (B) Drip injection of flutriafol places the product in the

root zone of the crop where it is readily available for uptake. Agricultural handler/applicator/worker, environmental, and bystander exposure is minimal for drip injection applications due to the reduced handling and precise application of flutriafol where it is needed compared to foliar applications which may be impacted by drift and inversion layers which have greater potential to increase off target exposure to pesticides. (C) Drip injection also allows the application of flutriafol during environmental conditions when tractors cannot enter the field or wind conditions prohibit the application of foliar sprays.

(III): The ability to apply flutriafol through drip injection in-season is a major benefit to protecting the crop late season when heavy fruit loads and their resulting stress result in the appearance of disease and collapse of plants. The flutriafol active ingredient is unique in the Group 3 Mode of Action options for efficacy against charcoal root rot.

(IV): (A) As part of an IPM program, flutriafol can be used in conjunction with fumigants to extend the length of protection and provide systemic activity during the growing season thereby providing late season protection to extend the harvest window and maximize total yield production. The unique systemic activity of flutriafol makes it one of very few viable options for drip injection applications in the above commodities grown with or without plastic mulch and commonly produced with drip tape in the field. (B) Drip injection applications are providing broad spectrum control of other difficult pathogens such as gummy stem blight, anthracnose and powdery mildew. (C) Continued investment in the flutriafol active ingredient indicates that flutriafol is providing the same level of *Fusarium* sp. activity as some of the current fumigant standards.

Cucurbit Vegetables crop group 9

Crops: cucumber, muskmelon, pumpkin, summer squash, winter squash, and watermelon

Pest: *Macrophomina phaseolina*, charcoal rot/*Fusarium* sp

Note: all cucurbits are susceptible to charcoal rot, however only three minor crops can be counted to extend the exclusive use period.

Crop: Cucumber

Pest: Charcoal Rot/*Fusarium* sp.

Criteria Met: Cucumber

(I): The ban of methyl bromide has led to a resurgence in the occurrence and severity of charcoal rot and *Fusarium* sp. in cucurbit vegetables. Current fumigant alternatives (i.e. chloropicrin, 1,3-dichloropropene, metam sodium, AITC products) do not have the vapor pressure to move through the bed shoulders and row middles like methyl bromide did and leave untreated areas that lead to late season infection and crop collapse once the roots reach the untreated areas.

Charcoal rot is a serious threat to cucumber as discussed in a Purdue University publication “New disease Report – Charcoal Rot of Cucumber ” (Egel D. , 2018). Further supporting the need for control of the emerging charcoal rot crisis is documented in the APS article “First Report of *Macrophomina phaseolina* Causing Charcoal Rot of Cucumber in Indiana” (Egel D. W., 2020). This report is significant both in that it is the first report of charcoal rot of cucumber in Indiana and because it appears to be the first report on cucumber in the U.S. in over 50 years. *Macrophomina phaseolina* is the causal agent of charcoal rot on more than 500 plant species.

A 2ee for suppression of *Fusarium* sp. via chemigation in cucurbits allows cucurbit growers to address the emerging serious pest of *Fusarium*. The multi state 2ee “For Chemigation Use in Listed Crops” is included in the attachment.

Crop: Summer Squash

Pest: Charcoal Rot/*Fusarium* sp.

Criteria Met: Summer Squash

(I): The ban of methyl bromide has led to a resurgence in the occurrence and severity of charcoal rot in cucurbit vegetables. Current fumigant alternatives (i.e. chloropicrin, 1,3-dichloropropene, metam sodium, AITC products) do not have the vapor pressure to move through the bed shoulders and row middles like methyl bromide did and leave untreated areas that lead to late season infection and crop collapse once the roots reach the untreated areas.

In the article “Summer Squash Production in California” (Molinar, 1999), charcoal rot is identified as a problem for summer squash, and other cucurbits. The authors state that charcoal rot (*Macrophomina phaseoli*) is the causal organism, a soilborne fungus with a wide host range, is common in most soils in the Central Valley.

A 2ee for suppression of *Fusarium* sp. via chemigation in cucurbits allows cucurbit growers to address the emerging serious pest of *Fusarium*. The multi state 2ee “For Chemigation Use in Listed Crops” is included in the attachment.

Crop: Cantaloupe/Muskmelon
Pest: Charcoal Rot/Fusarium sp.

Criteria Met: Cantaloupe/Muskmelon

(I): The ban of methyl bromide has led to a resurgence in the occurrence and severity of charcoal rot in cucurbit vegetables. Current fumigant alternatives (i.e. chloropicrin, 1,3-dichloropropene, metam sodium, AITC products) do not have the vapor pressure to move through the bed shoulders and row middles like methyl bromide did and leave untreated areas that lead to late season infection and crop collapse once the roots reach the untreated areas.

As evidence that charcoal rot is a concerning disease in melon, the APS article titled “A Severe Outbreak of Charcoal Rot in Cantaloupe Melon Caused by *Macrophomina phaseolina* in Chile” (Etebarian, 2006) is included in this petition as a citation.

A 2ee for suppression of *Fusarium* sp. via chemigation in cucurbits allows cucurbit growers to address the emerging serious pest of *Fusarium*. The multi state 2ee “For Chemigation Use in Listed Crops” is included in the attachment.

Cucurbit vegetables, crop group 9 also meet criteria II, III, and IV as explained below:

(II): (A) Fumigants that are currently used are applied in gallons or hundreds of pounds of product per acre versus flutriafol which is applied at 7 fl oz/A. Fumigants require fumigant management plans and due to their toxicity have maximum use limits in certain CA geographies to limit air concentration. Fumigants are also limited by buffer zones which prohibit the use in certain fields in close proximity to sensitive areas and prohibit use around field perimeters. Instances of use of dimethyl disulfide in Florida and Georgia has resulted in public irritation and enhanced sensitivity of the public to pesticide applications in agriculture. This is likely one of the main contributors as to why this active is not available in CA. (B) Drip injection of flutriafol places the product in the root zone of the crop where it is readily available for uptake. Agricultural handler/applicator/worker, environmental, and bystander exposure is minimal for drip injection applications due to the reduced handling and precise application of flutriafol where it is needed compared to foliar applications which may be impacted by drift and inversion layers which have greater potential to increase off target exposure to pesticides. (C) Drip injection also allows the application of flutriafol during environmental conditions when tractors cannot enter the field or wind conditions prohibit the application of foliar sprays.

(III): The ability to apply flutriafol through drip injection in-season is a major benefit to protecting the crop late season when heavy fruit loads and their resulting stress result in the appearance of disease and collapse of plants. The flutriafol active ingredient is unique in the Group 3 Mode of Action options for efficacy against charcoal root rot.

(IV): (A) As part of an IPM program, flutriafol can be used in conjunction with fumigants to extend the length of protection and provide systemic activity during the growing season thereby providing late season protection to extend the harvest window and maximize total yield production. The unique systemic activity of flutriafol makes it one of very few viable options for drip injection applications in the above commodities grown with or without plastic mulch and commonly produced with drip tape in the field. (B) Drip injection applications are providing broad spectrum control of other difficult pathogens such as gummy stem blight, anthracnose and powdery mildew.

Leafy vegetables, except Brassica, crop group 4

Crop: Celery

Pest: Fusarium sp.

Criteria Met:

(I): The ban of methyl bromide has led to a resurgence in the occurrence and severity of charcoal rot and fusarium sp. in leafy vegetables. Current fumigant alternatives (i.e. chloropicrin, 1,3-dichloropropene, metam sodium, AITC products) do not have the vapor pressure to move through the bed shoulders and row middles like methyl bromide did and leave untreated areas that lead to late season infection and crop collapse once the roots reach the untreated areas.

As submitted to California Department of Pesticide Regulation, a 2ee for suppression of Fusarium sp. via chemigation in Celery allows CA celery growers to address the emerging serious pest of Fusarium. The CA 2ee "For suppression of Fusarium SP. Via Chemigation in Celery" is included in the attachment.

Fruiting vegetable crop group 8-10 (except tomato)

Pest: *Macrophomina phaseolina*, charcoal rot/Fusarium sp.

Crops: bell pepper, non-bell pepper, eggplant

Note: eggplant is substituted for tomato as a representative crop for purposes of this petition.

It is well known that charcoal rot is a disease that is a risk to all fruiting vegetables, as stated by Kansas State University plant pathologist Chris Little in a Farm Talk Newspaper article, "Charcoal rot the No. 1 yield-reducing disease in Kansas" (Rapp, 2018), "This fungus is able to cause charcoal rot in 500 different plant species that we know about."

Criteria Met:

(I): The ban of methyl bromide has led to a resurgence in the occurrence and severity of charcoal root rot in fruiting vegetables. Current fumigant alternatives (i.e. chloropicrin, 1,3-dichloropropene, metam sodium, AITC products) do not have the vapor pressure to move through the bed shoulders and row middles like methyl bromide did and leave untreated areas that lead to late season infection and crop collapse once the roots reach the untreated areas.

A 2ee for suppression of *Fusarium* sp. via chemigation in fruiting vegetable allows growers to address the emerging serious pest of *Fusarium*. The multi state 2ee “For Chemigation Use in Listed Crops” is included in the attachment.

Fruiting vegetables, crop group 8-10 also meet criteria II, III, and IV as explained below:

(II): (A) Fumigants that are currently used are applied in gallons or hundreds of pounds of product per acre versus flutriafol which is applied at 7 fl oz/A. Fumigants require fumigant management plans and due to their toxicity have maximum use limits in certain CA geographies to limit air concentration. Fumigants are also limited by buffer zones which prohibit the use in certain fields in close proximity to sensitive areas and prohibit use around field perimeters. Instances of use of dimethyl disulfide in Florida and Georgia has resulted in public irritation and enhanced sensitivity of the public to pesticide applications in agriculture. This is likely one of the main contributors as to why this active is not available in CA. (B) Drip injection of flutriafol places the product in the root zone of the crop where it is readily available for uptake. Agricultural handler/applicator/worker, environmental, and bystander exposure is minimal for drip injection applications due to the reduced handling and precise application of flutriafol where it is needed compared to foliar applications which may be impacted by drift and inversion layers which have greater potential to increase off target exposure to pesticides. (C) Drip injection also allows the application of flutriafol during environmental conditions when tractors cannot enter the field or wind conditions prohibit the application of foliar sprays.

(III): The ability to apply flutriafol through drip injection in-season is a major benefit to protecting the crop late season when heavy fruit loads and their resulting stress result in the appearance of disease and collapse of plants. The flutriafol active ingredient is unique in the Group 3 Mode of Action options for efficacy against charcoal root rot.

(IV): (A) As part of an IPM program, flutriafol can be used in conjunction with fumigants to extend the length of protection and provide systemic activity during the growing season thereby providing late season protection to extend the harvest window and maximize total yield production. The unique systemic activity of flutriafol makes it one of very few viable options for drip injection applications in the above commodities grown with or without plastic mulch and commonly produced with drip tape in the field. (B) Drip injection applications are providing broad spectrum control of other difficult pathogens such as gummy stem blight, anthracnose and powdery mildew. (C) Continued investment in the flutriafol active ingredient indicates that flutriafol is providing the same level of *Fusarium* sp. activity as some of the current fumigant standards.

Pome fruit crop group 11 (except apple)**Pest:** Quince Rust**Crops:** Mayhaw

Criteria Met:

(I): The mayhaw tree is the official state fruit tree in Louisiana, according to The LSU Ag Center 2016 Plant Disease Management guide_(LSU Ag Center, 2016). Flutriafol is one of only five fungicides identified by LSU to be used to suppress quince rust. Note that Topguard Specialty Crop controls quince rust, making it important to mayhaw growers as an efficacious product. Growers of mayhaw need an option to use Flutriafol as there are insufficient efficacious alternatives.

Stone fruit crop group 12**Pest:** Rusty Spot**Crops:** Peach

Criteria Met:

(I): In peach, Rhyme fungicide is the only Group 3 fungicide claiming control of rusty spot of peach caused by the apple powdery mildew fungus, *Podosphaera leucotricha*. Rusty spot directly affects the fruit of peach during its susceptible early season and can render the fruit unmarketable if not protected.

Pest: Powdery Mildew**Crops:** Peach, Apricot, Nectarine

Criteria Met:

(I): Flutriafol is unique among the slate of FRAC group 3 fungicides due to its high systemic mobility through plant leaves (foliar application), and especially through plant roots. Effective root uptake enables control of soilborne diseases of charcoal rot and fusarium, and most importantly, Flutriafol has efficacy via drip irrigation to control powdery mildew on stone fruit. FMC continues to invest in the development of appropriate use rates for minor crops so that growers can reduce dependence on manual labor and precisely apply flutriafol via drip irrigation to economically produce minor crops. It is of value to growers to have access to products that can solve disease problems while getting the most out of their investment in drip systems.

(II): Drip systems have an advantage to human health and the environment as the application is conducted via a closed system which reduces direct exposure to the applicator and bystanders and potential contact or off site movement via physical drift. Selection pressure on pathogens is reduced since flutriafol is applied to the root zone for uptake at effective use rates versus foliar applications rely on interception of foliar sprays at an effective concentration to provide disease control. Foliar applications are dependent on proper application and coverage to achieve the target rate which makes them more subject to error.

Directions in a 2ee to control Powdery Mildew in Stone Fruit (including peach, apricot, and nectarine) for RHYME Fungicide in CALIFORNIA is included in the attachment.

Popcorn

Pest: Tar Spot

Crops: Popcorn

Criteria Met:

(I) Tar Spot is a new disease in the US, as cited in a 2016 study titled “First Report of Tar Spot on Corn Caused by *Phyllachora maydis* in the United States (Ruhl, 2016). Additionally, a 2018 publication titled “First Report of Tar Spot in Corn (*Zea mays*) Caused by *Phyllachora maydis* in Florida, Iowa, Michigan, and Wisconsin (McCoy, 2018). FMC was able to show efficacy and provide a solution to popcorn growers. Since Flutriafol is able to be used on popcorn for this disease when no other alternatives are available to combat this new disease, its use meets criteria 1 in this petition.

Directions in a 2ee to control Tar Spot in popcorn for TOPGUARD EQ Fungicide in NY, and in multiple states, is included in the attachment.

Hops

Pest: Powdery Mildew

Crops: Hops

Criteria Met:

(I): Flutriafol is unique among the slate of FRAC group 3 fungicides due to its high systemic mobility through plant leaves (foliar application), and especially through plant roots. Effective root uptake enables control via drip irrigation of powdery mildew on hops. FMC continues to invest in the development of appropriate use rates for minor crops so that growers can reduce dependence on manual labor and precisely apply flutriafol via drip irrigation to economically produce minor crops. It is of value to growers to have access to products that can solve disease problems while getting the most out of their investment in drip systems.

(II): Drip systems have an advantage to human health and the environment as the application is conducted via a closed system which reduces direct exposure to the applicator and bystanders and potential contact or off site movement via physical drift. Selection pressure on pathogens is reduced since flutriafol is applied to the root zone for uptake at effective use rates versus foliar applications rely on interception of foliar sprays at an effective concentration to provide disease control. Foliar applications are dependent on proper application and coverage to achieve the target rate which makes them more subject to error.

Directions in a 2ee to control Powdery Mildew via drip irrigation for Topguard Fungicide Specialty Crops on hops, grapes, and stone fruit in Washington, Oregon, and Idaho is included in the attachment.

Conclusion

This petition demonstrates that the registration of Flutriafol on nine or more minor crops meets the criteria for granting a 3 year extension of the exclusive data use period. Flutriafol controls important diseases for which effective control products are not available. Flutriafol takes the place of control measures such as fumigants that pose a greater risk to humans and to the environment. Flutriafol containing products, such as Rhyme Fungicide, have been shown to be highly effective against a list of important, well-understood diseases, as well as diseases emerging as more problematic since the banned use of fumigants, such as charcoal rot and fusarium. Flutriafol's efficacy when used via drip is proven in many applications and is an exciting prospect for the future of disease control in even more minor crops. Flutriafol's preventative and curative efficacy helps the grower produce crops more efficiently, with less negative environmental impact.

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ATTACHMENTS



FIFRA 2(ee) Recommendation
EPA Reg. No. 279-3588
FOR DISTRIBUTION AND USE IN ARKANSAS, CONNECTICUT, DELAWARE, FLORIDA, GEORGIA, KENTUCKY, ILLINOIS, INDIANA, MAINE, OHIO, MARYLAND, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, SOUTH CAROLINA, MASSACHUSETTS, MICHIGAN, NORTH CAROLINA, PENNSYLVANIA, RHODE ISLAND, TENNESSEE, VERMONT, VIRGINIA, WEST VIRGINIA
THIS RECOMMENDATION, WHICH CONTAINS ADDITIONAL DIRECTIONS FOR USE, IS MADE AS PERMITTED UNDER FIFRA SECTION 2(ee) AND HAS NOT BEEN SUBMITTED TO OR APPROVED BY THE US EPA.

This recommendation for Rhyme™ fungicide is valid until March 1, 2025, or until withdrawn, canceled or suspended.

Use of this product according to this bulletin has not been reviewed or endorsed by the Office of the Indiana State Chemist

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING. ALL APPLICABLE DIRECTIONS, RESTRICTIONS AND PRECAUTIONS ON THE EPA REGISTERED LABEL MUST BE FOLLOWED.
THESE USE DIRECTIONS MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.

FOR CHEMIGATION USE IN LISTED CROPS

Directions for Use					
When applied as directed through drip irrigation or micro sprinklers, Rhyme fungicide will provide control of listed foliar diseases or suppression of listed soilborne diseases.					
Crop	Pest	Rate (fl oz/A)	PHI	Retreatment Interval (Days)	Restrictions
Vegetables, Cucurbit Group 9 (See label for list of crops)	Anthracnose (<i>Colletotrichum</i> sp.) Gummy Stem Blight (<i>Didymella bryoniae</i>) Powdery Mildew (<i>Sphaerotheca fuliginea</i> , <i>Erysiphe cichoracearum</i>) Target Spot (<i>Corynespora cassiicola</i>) Soilborne diseases: Charcoal Rot (<i>Macrophomina phaseolina</i>) Fusarium sp. (<i>Fusarium oxysporum</i>)	7	0	14	<ul style="list-style-type: none"> Do not apply more than 7.0 fl. oz. (0.114 lb. ai) product/A/ application. Do not apply more than 28 fl. oz. of product/A/year. Do not make more than 4 applications/ year. Do not apply more than 0.455 lb. ai of flutriafol or flutriafol containing products/ A/year.
Use Directions: Apply preventively or when conditions are favorable for disease development. Repeat as necessary if conditions remain favorable for disease development and to provide extended foliar protection. Best results for both foliar and soilborne pathogens have been obtained when Rhyme fungicide is applied preventively, as early as 14 days after transplanting, to provide protection of the roots from soilborne pathogens and to ensure time for movement of flutriafol into the foliage for protection against foliar pathogens. Once fruit are present, foliar applications are needed for fruit protection.					

Crop	Pest	Rate (fl oz/A)	PHI	Retreatment Interval (Days)	Restrictions
<p>Vegetables, Fruiting Group 8-10 (See label for list of crops)</p> <p>Tomatoes (See label for list of crops)</p>	<p>Anthracnose (<i>Colletotrichum coccodes</i>, <i>C.acutatum</i>)</p> <p>Black Mold (<i>Alternaria alternata</i>)</p> <p>Early Blight (<i>Alternaria solani</i>)</p> <p>Cercospora Leaf Spot (<i>Cercospora capsici</i>)</p> <p>Powdery Mildew (<i>Leveillula taurica</i>, <i>Oidium neolycopersici</i>)</p> <p>Target Spot (<i>Corynespora cassicola</i>)</p> <p>Soilborne diseases:</p> <p>Charcoal Rot (<i>Macrophomina phaseolina</i>)</p> <p>Fusarium sp. (<i>Fusarium oxysporum</i>)</p>	7	0	14	<ul style="list-style-type: none"> Do not apply more than 7.0 fl. oz. (0.114 lb ai) product/A/ application. Do not apply more than 28 fl. oz. of product/A/year. Do not make more than 4 applications/ year. Do not apply more than 0.455 lb. ai of flutriafol or flutriafol containing products/A/year.

Use Directions:

Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development. Best results for both foliar and soilborne pathogens have been obtained when Rhyme fungicide is applied preventively, shortly after transplanting, to provide protection of the roots from soilborne pathogens and to ensure time for movement of flutriafol into the foliage for protection against foliar pathogens. Once fruit are present, foliar applications are needed for fruit protection.

Crop	Pest	Rate (fl. oz./A)	PHI (days)	Retreatment Interval (Days)	Restrictions
<p>Grapes (fresh, juice, table, wine, raisin)</p>	<p>Powdery Mildew (<i>Uncinula necator</i>)</p>	5	14	14	<ul style="list-style-type: none"> Do not apply more than 5.0 fl. oz. (0.11 lb ai) product/A/ application. Do not apply more than 30 fl. oz. of product/A/year. Do not apply more than 0.488 lb. ai of flutriafol or flutriafol containing products/A/year.

Use Directions:

Apply preventively or when conditions are favorable for disease development. Repeat as necessary if conditions remain favorable for disease development and to provide extended foliar protection. Best results have been obtained when Rhyme fungicide is applied

preventively, as early as bud break, to ensure time for movement of flutriafol into the foliage. Once fruit are present, foliar applications are needed for fruit protection.

Crop	Pest	Rate (fl. oz./A)	PHI (days)	Retreatment Interval (Days)	Restrictions
Strawberry	Powdery Mildew <i>(Podosphaera aphanis)</i> Anthracnose <i>(Colletotrichum acutatum)</i> Soilborne diseases: Charcoal Rot <i>(Macrophomina phaseolina)</i>	7	7	14	<ul style="list-style-type: none"> Do not apply more than 7.0 fl. oz. (0.114 lb. ai) product/A/ application. Do not apply more than 28 fl. oz. of product/A/year. Do not make more apply more than 4 applications/year. Do not apply more than 0.455 lb. ai of flutriafol or flutriafol containing products/A/year.

Use Directions:

Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development. Best results for both foliar and soilborne pathogens have been obtained when Rhyme fungicide is applied preventively, shortly after transplanting, to provide protection of the roots from soilborne pathogens and to ensure time for movement of flutriafol into the foliage for protection against foliar pathogens. Once fruit are present, foliar applications are needed for fruit protection.

Table 1. Rhyme fungicide rate conversion chart for drip (trickle) chemigation soil application.

fl. oz./A	Fluid ounces Rhyme fungicide/1000 row feet based on planted row spacing												
	30" rows	34" rows	36" rows	38" rows	40" rows	44" rows	48" rows	60" rows	66" rows	72" rows	80" rows	84" rows	120" rows
5	0.29	0.33	0.34	0.36	0.38	0.42	0.46	0.57	0.63	0.69	0.77	0.80	1.15
7	0.40	0.46	0.48	0.51	0.54	0.59	0.64	0.80	0.88	0.96	1.07	1.12	1.61

R-4394 041320



FIFRA 2(ee) Recommendation
EPA Reg. No. 279-3588
FOR DISTRIBUTION AND USE IN TEXAS
THIS RECOMMENDATION, WHICH CONTAINS ADDITIONAL DIRECTIONS FOR USE, IS MADE AS PERMITTED UNDER FIFRA SECTION 2(ee) AND HAS NOT BEEN SUBMITTED TO OR APPROVED BY THE US EPA.

This recommendation for Rhyme™ fungicide is valid until March 1, 2025, or until withdrawn, canceled or suspended.

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING. ALL APPLICABLE DIRECTIONS, RESTRICTIONS AND PRECAUTIONS ON THE EPA REGISTERED LABEL MUST BE FOLLOWED.
THESE USE DIRECTIONS MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.

FOR CHEMIGATION USE IN LISTED CROPS

Directions for Use					
When applied as directed through drip irrigation or micro sprinklers, Rhyme fungicide will provide control of listed foliar diseases or suppression of listed soilborne diseases.					
Crop	Pest	Rate (fl oz/A)	PHI	Retreatment Interval (Days)	Restrictions
Vegetables, Cucurbit Group 9 (See label for list of crops)	Anthracnose (<i>Colletotrichum</i> sp.) Gummy Stem Blight (<i>Didymella bryoniae</i>) Powdery Mildew (<i>Sphaerotheca fuliginea</i> , <i>Erysiphe cichoracearum</i>) Target Spot (<i>Corynespora cassiicola</i>) Soilborne diseases: Charcoal Rot (<i>Macrophomina phaseolina</i>) Fusarium sp. (<i>Fusarium oxysporum</i>)	7	0	14	<ul style="list-style-type: none"> Do not apply more than 7.0 fl. oz. (0.114 lb. ai) product/A/ application. Do not apply more than 28 fl. oz. of product/A/year. Do not make more than 4 applications/ year. Do not apply more than 0.455 lb. ai of flutriafol or flutriafol containing products/ A/year.
Use Directions:					
Apply preventively or when conditions are favorable for disease development. Repeat as necessary if conditions remain favorable for disease development and to provide extended foliar protection. Best results for both foliar and soilborne pathogens have been obtained when Rhyme fungicide is applied preventively, as early as 14 days after transplanting, to provide protection of the roots from soilborne pathogens and to ensure time for movement of flutriafol into the foliage for protection against foliar pathogens. Once fruit are present, foliar applications are needed for fruit protection.					

Crop	Pest	Rate (fl oz/A)	PHI	Retreatment Interval (Days)	Restrictions
<p>Vegetables, Fruiting Group 8-10 (See label for list of crops)</p> <p>Tomatoes (See label for list of crops)</p>	<p>Anthracnose (<i>Colletotrichum coccodes</i>, <i>C.acutatum</i>)</p> <p>Black Mold (<i>Alternaria alternata</i>)</p> <p>Early Blight (<i>Alternaria solani</i>)</p> <p>Cercospora Leaf Spot (<i>Cercospora capsici</i>)</p> <p>Powdery Mildew (<i>Leveillula taurica</i>, <i>Oidium neolycopersici</i>)</p> <p>Target Spot (<i>Corynespora cassicola</i>)</p> <p>Soilborne diseases:</p> <p>Charcoal Rot (<i>Macrophomina phaseolina</i>)</p> <p>Fusarium sp. (<i>Fusarium oxysporum</i>)</p>	7	0	14	<ul style="list-style-type: none"> Do not apply more than 7.0 fl. oz. (0.114 lb ai) product/A/ application. Do not apply more than 28 fl. oz. of product/A/year. Do not make more than 4 applications/ year. Do not apply more than 0.455 lb. ai of flutriafol or flutriafol containing products/A/year.

Use Directions:

Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development. Best results for both foliar and soilborne pathogens have been obtained when Rhyme fungicide is applied preventively, shortly after transplanting, to provide protection of the roots from soilborne pathogens and to ensure time for movement of flutriafol into the foliage for protection against foliar pathogens. Once fruit are present, foliar applications are needed for fruit protection.

Crop	Pest	Rate (fl. oz./A)	PHI (days)	Retreatment Interval (Days)	Restrictions
<p>Grapes (fresh, juice, table, wine, raisin)</p>	<p>Powdery Mildew (<i>Uncinula necator</i>)</p>	5	14	14	<ul style="list-style-type: none"> Do not apply more than 5.0 fl. oz. (0.11 lb ai) product/A/ application. Do not apply more than 30 fl. oz. of product/A/year. Do not apply more than 0.488 lb. ai of flutriafol or flutriafol containing products/A/year.

Use Directions:

Apply preventively or when conditions are favorable for disease development. Repeat as necessary if conditions remain favorable for disease development and to provide extended foliar protection. Best results have been obtained when Rhyme fungicide is applied

preventively, as early as bud break, to ensure time for movement of flutriafol into the foliage. Once fruit are present, foliar applications are needed for fruit protection.

Crop	Pest	Rate (fl. oz./A)	PHI (days)	Retreatment Interval (Days)	Restrictions
Strawberry	Powdery Mildew <i>(Podosphaera aphanis)</i> Anthracnose <i>(Colletotrichum acutatum)</i> Soilborne diseases: Charcoal Rot <i>(Macrophomina phaseolina)</i>	7	7	14	<ul style="list-style-type: none"> Do not apply more than 7.0 fl. oz. (0.114 lb. ai) product/A/ application. Do not apply more than 28 fl. oz. of product/A/year. Do not make more apply more than 4 applications/year. Do not apply more than 0.455 lb. ai of flutriafol or flutriafol containing products/A/year.

Use Directions:

Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development. Best results for both foliar and soilborne pathogens have been obtained when Rhyme fungicide is applied preventively, shortly after transplanting, to provide protection of the roots from soilborne pathogens and to ensure time for movement of flutriafol into the foliage for protection against foliar pathogens. Once fruit are present, foliar applications are needed for fruit protection.

Table 1. Rhyme fungicide rate conversion chart for drip (trickle) chemigation soil application.

fl. oz./A	Fluid ounces Rhyme fungicide/1000 row feet based on planted row spacing												
	30" rows	34" rows	36" rows	38" rows	40" rows	44" rows	48" rows	60" rows	66" rows	72" rows	80" rows	84" rows	120" rows
5	0.29	0.33	0.34	0.36	0.38	0.42	0.46	0.57	0.63	0.69	0.77	0.80	1.15
7	0.40	0.46	0.48	0.51	0.54	0.59	0.64	0.80	0.88	0.96	1.07	1.12	1.61

R-4395 041320

THIS RECOMMENDATION IS MADE AS PERMITTED UNDER FIFRA SECTION 2(ee) AND HAS NOT BEEN SUBMITTED TO OR APPROVED BY THE EPA



EPA Reg. No. 279-3588

2(ee) Recommendation
FOR DISTRIBUTION AND USE ONLY IN CALIFORNIA
THIS PRODUCT BULLETIN CONTAINS NEW OR ADDITIONAL DIRECTIONS FOR USE WHICH ARE RECOMMENDED BY FMC CORPORATION UNDER FIFRA SECTION 2(ee)
IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH IT LABELING

DIRECTIONS FOR USE: GRAPES, STONE FRUIT, STRAWBERRY, TOMATOES, AND VEGETABLES (Cucurbits Group 9)

When applied as directed through drip irrigation and micro sprinklers, Rhyme fungicide will provide control of powdery mildew on the foliage of grapes, strawberry, stone fruit, tomatoes and cucurbits (Group 9).

<i>Crop</i>	<i>Pest</i>	<i>Rate (fl. oz/A)</i>	<i>Application Directions</i>	<i>Retreatment Interval (Days)</i>
Grapes (fresh, table, wine, raisin)	Powdery Mildew (<i>Uncinula necator</i>)	5	Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development.	14
Strawberry	Powdery Mildew (<i>Podosphaera aphanis</i>)	7	Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development.	7
Stone Fruit (See label list of stone fruit)	Powdery Mildew (<i>Podosphaera clandestina</i>)	7	Start applications at petal fall. Repeat as necessary if conditions are favorable for disease development.	7

<p>Tomatoes (See label for list of tomatoes)</p>	<p>Powdery Mildew (<i>Leveillula taurica</i>)</p>	<p>7</p>	<p>Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development.</p>	<p>7</p>
<p>Vegetables, Cucurbit Group 9 (See label for list of crops)</p>	<p>Powdery Mildew (<i>Sphaerotheca fuliginea</i>, <i>Erysiphe cichoracearum</i>)</p>	<p>7</p>	<p>Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development.</p>	<p>7</p>
<p>ALL APPLICABLE DIRECTIONS, RESTRICTIONS, AND PRECAUTIONS ON THE EPA REGISTERED RHYME FUNGICIDE LABEL (EPA REG. NO. 279-3588) MUST BE FOLLOWED. THIS RECOMMENDATION SHOULD BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.</p>				



FIFRA 2(ee) Recommendation
EPA Reg. No. 279-3588
FOR DISTRIBUTION AND USE ONLY IN CALIFORNIA
THIS RECOMMENDATION, WHICH CONTAINS ADDITIONAL DIRECTIONS FOR USE, IS MADE AS PERMITTED UNDER FIFRA SECTION 2(ee) AND HAS NOT BEEN SUBMITTED TO OR APPROVED BY THE US EPA.

This recommendation for Rhyme™ fungicide is valid until December 31, 2023, or until withdrawn, canceled or suspended.

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING. ALL APPLICABLE DIRECTIONS, RESTRICTIONS AND PRECAUTIONS ON THE EPA REGISTERED LABEL MUST BE FOLLOWED.
THESE USE DIRECTIONS MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.

FOR SUPPRESSION OF FUSARIUM SP. VIA CHEMIGATION IN CELERY

Directions for Use
Rhyme fungicide will provide suppression of listed diseases.
Product is to be applied through drip irrigation. Recommend initial application at transplanting. For spring and fall planting, a second application is required, approximately 30 days later. For fall planting, additional applications may be required at 14 day intervals, for a maximum of 4 applications per season.

Crop	Pest	Rate (fl oz/A)	PHI	Retreatment Interval (Days)	Restrictions
Celery	Fusarium Yellows /Fusarium Wilt (Suppression only) (<i>Fusarium oxysporum f.sp apii</i>)	5-7	Do not apply within 7 days of harvest	14	<ul style="list-style-type: none"> Do not apply more than 7.0 fl. oz. (0.114 lb ai) product/A/ application. Do not apply more than 28 fl. oz. of product/A/year. Do not make more than 4 applications/ year. Do not apply more than 0.455 lb. ai of flutriafol or flutriafol containing products/A/year.

R-4442 040920



FMC Corporation
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Philadelphia, PA 19104

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FIFRA 2(ee) Recommendation
EPA Reg. No. 279-3596
FOR DISTRIBUTION AND USE ONLY IN: Arkansas, Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Idaho, Iowa, Nebraska, New Hampshire, New Jersey, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, Utah, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming
THIS RECOMMENDATION, WHICH CONTAINS ADDITIONAL DIRECTIONS FOR USE, IS MADE AS PERMITTED UNDER FIFRA SECTION 2(ee) AND HAS NOT BEEN SUBMITTED TO OR APPROVED BY THE US EPA.

This recommendation for TopGuard® EQ Fungicide is valid until May 25, 2025, or until withdrawn, canceled or suspended.

Use of this product according to this bulletin has not been reviewed or endorsed by the Office of the Indiana State Chemist

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING. ALL APPLICABLE DIRECTIONS, RESTRICTIONS AND PRECAUTIONS ON THE EPA REGISTERED LABEL MUST BE FOLLOWED.
THESE USE DIRECTIONS MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.

For Tar Spot Management in Corn (Field, Corn Grown For Seed, Sweet Corn and Popcorn)

Directions For Use
Apply when disease first appears and repeat application on a 7-10 day interval. Use the high use rate when disease pressure is high and conditions are favorable for disease development.

CROP	PEST	RATE OF APPLICATION
Corn (Field, Corn Grown for Seed, Popcorn and Sweet Corn)	Tar Spot (<i>Phyllachora maydis</i>)	5.0 - 7.0 fl. oz./A
<p>RESTRICTIONS:</p> <ul style="list-style-type: none"> • Apply no later than R4 (early dough stage). • Do not exceed 7 fl. oz/A for a single application. • Do not apply more than 2 applications of product per growing season. • Do not apply more than 14 fl. oz./A of product per acre per year. • Do not apply more than 0.228 lb. ai of flutriafol/A per year. • Do not apply more than 2.0 lb. ai of azoxystrobin per acre per year. • An adjuvant may be used with TOPGUARD EQ fungicide prior to the V8 corn growth stage and after the VT corn growth stage. <p>Restricted Entry Interval (REI): The REI for detasseling field corn and popcorn grown for seed is 5 days. The REI for sweet corn is 3 days. The REI for all other activities is 12 hours.</p> <p>Preharvest Interval: Do not apply within 7 days of harvest.</p>		

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2929 Walnut St.
Philadelphia, PA 19104
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FIFRA 2(ee) Recommendation

EPA Reg. No. 279-3596

**FOR DISTRIBUTION AND USE ONLY IN:
New York**

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TOPGUARD[®]

 FUNGICIDE SPECIALTY CROPS

EPA Reg. No. 279-3557

2(ee) Recommendation

FOR DISTRIBUTION AND USE
 ONLY IN
 WASHINGTON, OREGON, & IDAHO

THIS PRODUCT BULLETIN CONTAINS NEW OR
 ADDITIONAL DIRECTIONS FOR USE WHICH ARE
 RECOMMENDED BY FMC CORPORATION UNDER
 FIFRA SECTION 2(ee)

**IT IS A VIOLATION OF FEDERAL LAW TO USE THIS
 PRODUCT IN A MANNER INCONSISTENT WITH IT
 LABELING**

DIRECTIONS FOR USE: HOPS, GRAPES AND STONE FRUIT

When applied as directed through drip irrigation and micro sprinklers, Topguard Fungicide Specialty Crops will provide control of powdery mildew on the foliage of hops, grapes and stone fruit.

Crop	Pest	Rate (fl. oz/A)	Application Directions	Retreatment Interval (Days)
Hops	Powdery Mildew (<i>Podosphaera macularis</i> , <i>Sphaerotheca macularis</i>)	14	Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development.	14
Grapes (fresh, table, wine, raisin)	Powdery Mildew (<i>Uncinula necator</i>)	10	Apply preventatively or when conditions are favorable for disease development. Repeat as necessary if conditions are favorable for disease development.	14
Stone Fruit (See label for list of stone fruit)	Powdery Mildew (<i>Podosphaera clandestina</i>)	14	Start applications at petal fall. Repeat as necessary if conditions are favorable for disease development.	7

ALL APPLICABLE DIRECTIONS, RESTRICTIONS, AND PRECAUTIONS ON THE TOPGUARD FUNGICIDE SPECIALTY CROPS LABEL (EPA REG. NO. 279-3557) MUST BE FOLLOWED. THIS RECOMMENDATION SHOULD BE IN THE POSSESSION OF THE USER AT THE TIME OF PESTICIDE APPLICATION.



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