



TM

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## Fusarium Patch

Product information,  
Integrated Pest Management Programme  
& Test Data

# Outline

## 1. CIVITAS Overview

- What is CIVITAS
- Product Information
- Where to Use
- How to Use
- Compatibility
- Disease Information

## 2. CIVITAS IPM Outline

## 3. APPENDIX

- Test Data
- CIVITAS Efficacy and Trial Photos



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# What is CIVITAS?

CIVITAS is the first commercially available fungicide for the golf industry that has been developed utilizing a unique mode of action called **Induced Systemic Resistance (ISR)**. It is a 'plant defense activator' that turns on the natural defenses of the plant to fight off fungus and reduces the need for traditional, toxic chemicals.

For more information, visit [www.civitasturf.com](http://www.civitasturf.com)



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# General Product Information

- **Chemical class:** synthetic isoparaffins
- **Mode of Action:** ISR (Induced systemic resistance). Induce plant natural defense system against diseases
- **Mobility:** systemic, topical
- **Risk of resistance:** low
- **Signal word:** Caution
- **FRAC group:** not listed
- **REI:** When spray has dried.
- **PPE:** long sleeved shirt and long pants/chemical-resistant gloves/shoes plus socks
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- **EPA Reg. No:** 69526-13



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# Where to use CIVITAS

Grass Types	Diseases	Insects
Ryegrass	Dollar spot	Sod webworm
Bentgrass	Brown patch	Annual bluegrass weevils
Poa	Anthracnose	Banks grass mites
Bluegrass	Spring leaf spot	Mealybugs
	Grey leaf spot	Mites
	Fusarium patch	Cutworm
	Powdery mildew	Fall armyworm
	Grey snow mold	
	Pink snow mold	



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# How to use CIVITAS

## 1. CIVITAS can be used alone or with other Fungicides in your current IPM program to enhance turf quality.

- See the APPENDIX for data demonstrating various application frequency and volume combinations

## 2. Use CIVITAS for Preventative and Curative Purposes

- **Preventative** applications for **low** to moderate disease pressure (early and late season)
    - Typical Rate: Apply CIVITAS alone at 14.5 oz/1000 sq.ft\* in 1 to 2 gallons of water/1000 sq.ft
  - **Curative** application at **high** disease pressure by tank mixing with half rate of fungicides:
  - For Example:
    - Typical Rate: 14.5 oz/1000 sq.ft\* Civitas + 0.5oz/1000 sq.ft propiconazole in 1 to 2 gallons of water/1000 sq.ft for the control of Dollar Spots
    - Typical Rate: 8 oz/1000 sq.ft\* Civitas + 2 oz/1000 sq. ft of thiophanate methyl with 1 to 1 gallons of water/1000 sq. ft for the control of Grey Leaf Spots
- \*NB. CIVITAS application rates do not include Harmonizer. This is added at a 16:1 ratio (Civitas:Harmonizer).

## 3. CIVITAS application rate, frequency and nomenclature












- FULL application of CIVITAS is 14.5oz/1000sq ft
  - HALF application of CIVITAS is 8 oz/1000sq ft
  - IPM frequencies tested are: 7, 14, 21 and 28 days\*. (d=days)
  - Frequency dependent on disease pressure and tank mix partner
- \*\*Do not exceed maximum Chlorothalonil amounts indicated in IPM Program
- Patent Pending Tank Mix



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# Tested CIVITAS Compatibility Bentgrass, POA and Ryegrass

<u>Active Ingredient</u>	<u>Compatible</u> (Bentgrass, Poa)	<u>Incompatible</u> (Ryegrass)	
Strobilurin, Fluoxastobin			
Thiophanate methyl			
Phosphite			
Chlorothalonil		<b>X*</b>	* On Ryegrass, the tank mix of CIVITAS and Chlorothalonil produced phytotoxicity during periods of high temperature.
Iprodione			
Boscalid			
Propiconazole			
Quintozene/PCNB		<b>X</b>	
Bacilus licheniformis			
Polyoxin D zinc salt (1:1)			
<u>Fertilizer Foliar</u>			
<u>Growth Regulator</u>			
TRINEXAPAC-ETHYL			



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# Disease Information

## Fusarium Patch

- Also known as Pink Snow Mold and Microdochium Patch
  - Affect all cool season turfgrass species
  - Caused by fungal pathogen, *Microdochium nivale*, that blights the leaves but is not reported to affect roots and crowns
- Symptoms
  - Short-mown turf: well defined circular patch clusters
  - Creeping bentgrass: streaks of off-colored turf (spring)
  - White-pink body of a fungus, composed of many threads of tissue maybe observed on infected leaf blades
  - Patches of dead, matted leaf blades
- Conditions
  - Active over broad temperature range and therefore infection may occur in fall and spring as well as the winter



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Richard Latin, Professor of Plant Pathology  
Perdue University  
<http://www.ces.purdue.edu/extmedia/botany.htm#5>

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# IPM – CIVITAS & Fusarium Patch

<b>Fusarium Patch (Bent/POA)</b>				
<b><u>Preventative</u></b>		<b><u>Product</u></b>	<b><u>oz / 1000</u></b>	<b><u>Frequency, days</u></b>
Normal disease pressure (for early and late season)	CIVITAS		14.5	14
<b><u>Curative</u></b>		<b><u>Tank Mix</u></b>	<b><u>oz / 1000</u></b>	<b><u>Frequency, days</u></b>
Tank Mix	Propiconazole		0.5	21 days
	CIVITAS		14.5	



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# Fusarium Patch Test Data – University of Guelph

## University of Guelph

2008

Penncross Bentgrass (30% Poa annua)

1 Gal / 1000

Fusarium Patch %	Application		01-Oct	08-Oct	15-Oct	22-Oct	05-Nov	12-Nov	19-Nov	26-Nov
	oz/1000	Interval								
Control (Inoculated)	-	-	10.8	27.5	56.3	4.8	5.5	9.3	11.3	15.8
Civitas	17.4	14	1.3	4.5	0	0	1.3	1.8	2	4.3
Civitas + Propiconazole	17.4									
Tank mix	0.5	21	0	0.8	0	0	1.3	4	5	5.5
Propiconazole	1	21	0.8	1.3	1.3	0.3	2.5	4.3	11.3	8.8

Test conducted by Dr. Thomas Hsiang, University of Guelph

21-day IPM recommendation

14-day IPM recommendation

\*\*Do not exceed maximum Chlorothalonil amounts indicated in IPM Program



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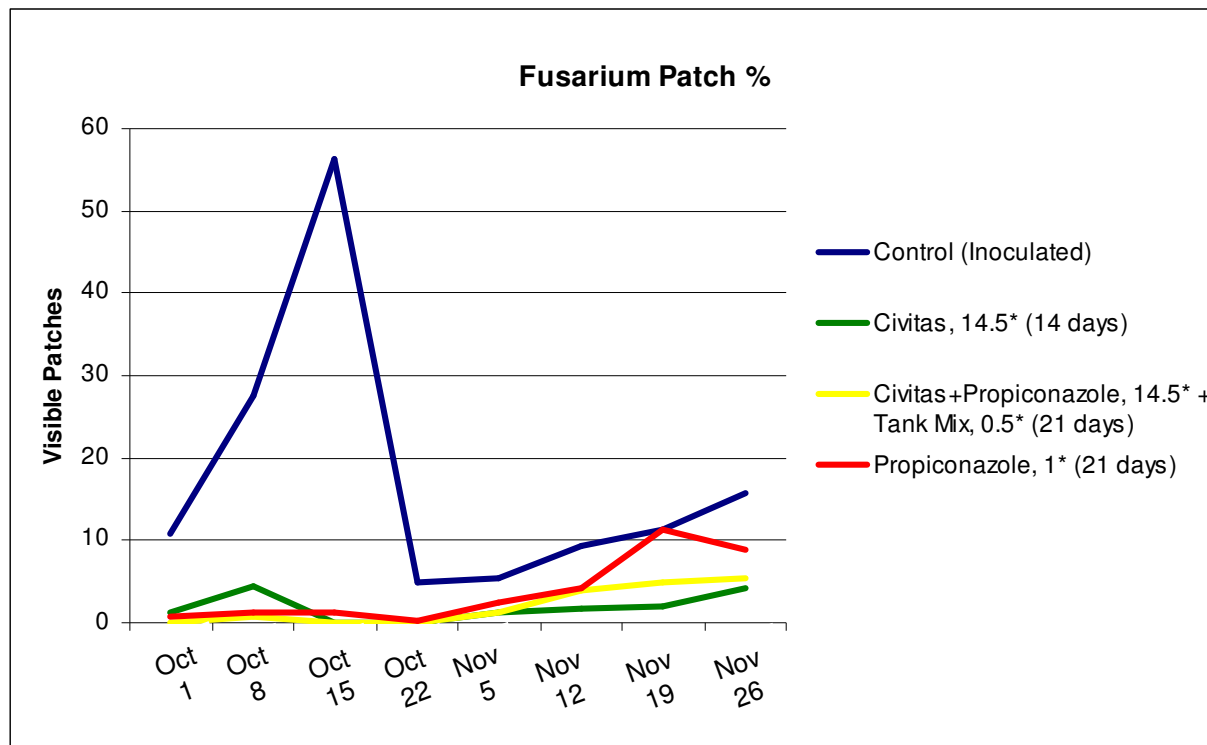
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# Fusarium Patch Test Results – University of Guelph

CIVITAS provides outstanding protection from Fusarium Patch

*On Average, CIVITAS results in almost 50% less Fusarium Patch Disease than Propiconazole.  
For **low** disease pressure, apply CIVITAS full rate every 14 days.  
For **high** disease pressure, apply CIVITAS and tank mix every 21 days.*



**Notes:**

Penncross Bentgrass (30%  
Poa annua)

University of Guelph, 2008

1 Gal/1000

\* oz/1000 sq. ft



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