NexGen
Enhanced Technology

Snow Molds and Their Control

Phoenix
ENVIRONMENTAL CARE
The Science of Nature

Introducing Snow Molds……..

- Cold-tolerant fungi that grow at freezing or near freezing temperatures
  - *Snow cover maintains the surface close to freezing*
- All cool-season grasses affected
  - Bentgrass, annual bluegrass, and perennial rye are most severely affected
- Three key species of snow molds
  - Pink Snow Mold: *Microdochium nivale*
  - Gray Snow Mold: *Typhula incarnata*, *Typhula ishikariensis*
- Which species is most prevalent and causes most damage is related to the location, climate, and the duration of winter snow cover

Pink Snow Mold
Microdochium nivale

- Occurrence – widespread throughout the US Snowbelt
- September thru June
- Preferred Climate – Cool, wet, overcast conditions, Alternating snow and rain, slowly melting snow
- Pink Snow mold is usually the key snow mold problem in areas where snow cover lasts about 30 days
- Vulnerable Grasses: Annual Bluegrass, Creeping Bentgrass, Perennial Ryegrass, Fine Leaf Fescue, Colonial Bentgrass

Pink Snow Mold / Fusarium patch *Microdochium nivale*

- *Microdochium nivale* does not require continuous snow cover to incite disease
- Some pathologists distinguish between the disease associated with and without snow cover. Symptoms, patch size are somewhat different
  - "Pink Snow Mold" – occurs with snow cover. Patches may coalesce into large damaged areas under snow
  - "Fusarium patch", sometimes called "Microdochium patch" – occurs without snow cover

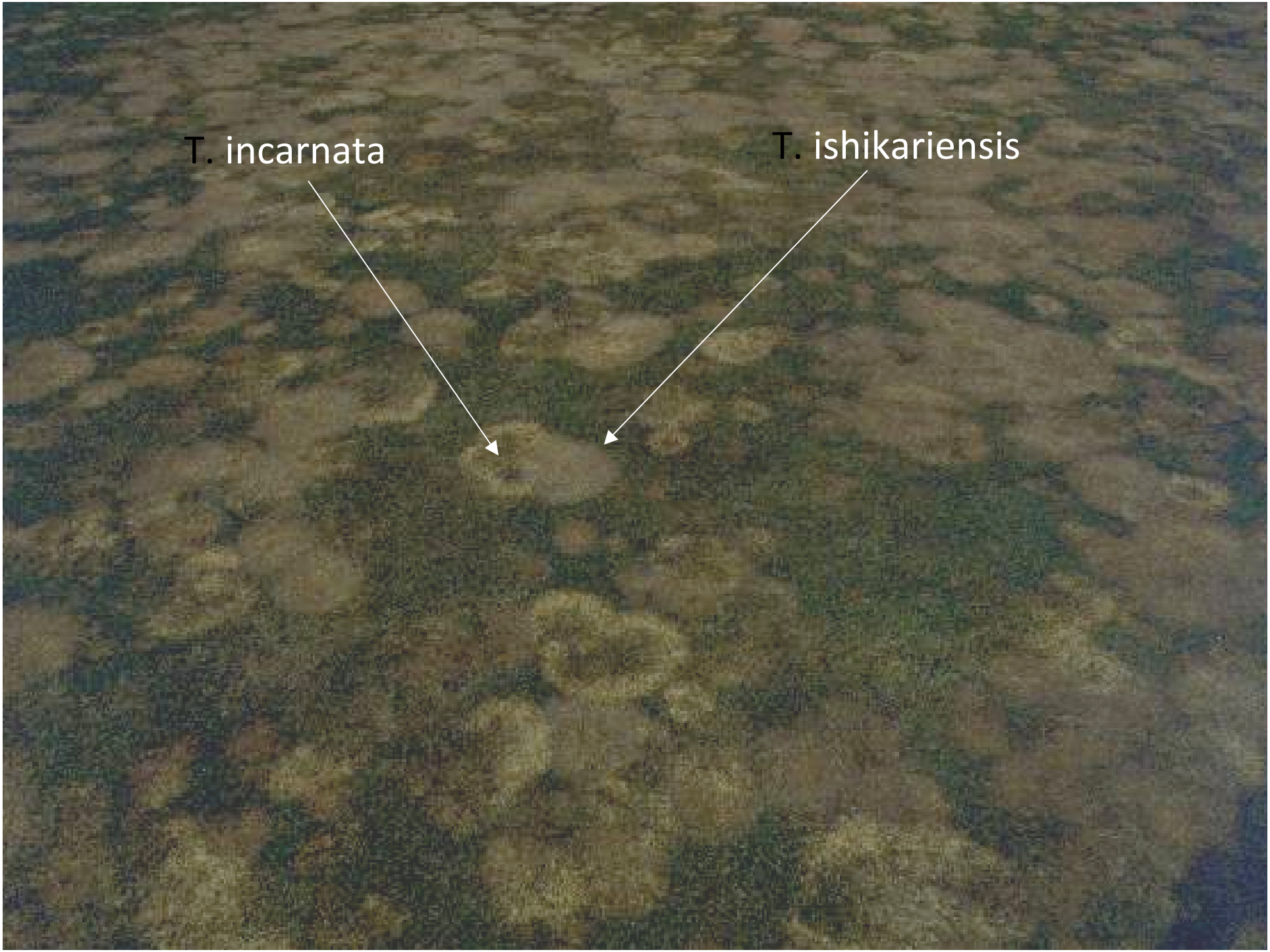
Pink Snow Mold

Pink Snow Mold

Gray Snow Mold / Typhula blight
Typhula incarnata & Typhula ishikariensis

- Found where snow cover persists for long periods
- *Typhula incarnata*
  - found throughout the US snow belt
  - *T. incarnata* prevalent where snow cover 60-90 days
- *Typhula ishikariensis*
  - found primarily in the upper Midwest and higher elevations in the West. Less common in the East
  - *T. ishikariensis* prevalent where snow cover > 100 d
  - Considered more damaging than *T. incarnata*
  - Often lumped with *T. incarnata* as “Gray” snow mold but sometimes referred to as “speckled” snow mold

Gray Snow Mold


T. incarnata
T. ishikariensis

Pink and Gray Snow Molds

- Both Pink and Gray SM may be active in the same location during the winter
- Pink often is more damaging to turf than Gray SM
  - ➢ Crowns more likely to be damaged, spring recovery slower
- Pink Snow mold may be:
  - Active earlier in fall than Gray SM
  - Active during a winter thaw
  - Active after snow melt – gray SM will not
- Pink SM may require several applications, but many chemical options work fairly well
- Controlling gray SM in regions with very long periods of snow cover is the most challenging problem, tank mixes of several chemistries usually work best

Snow Mold Strategies
Benefits of two fall applications

- Pre-Inoculum fungicide spray *"cleans up"* any residual Pink Snow Mold before final spray is applied . *Dr. J.M. Vargas*, MSU

- Secondary Benefit is the activity on residual diseases such as *Anthracnose, Summer Patch, Take All Patch and Dollar Spot.* This reduces disease pressure the following season.

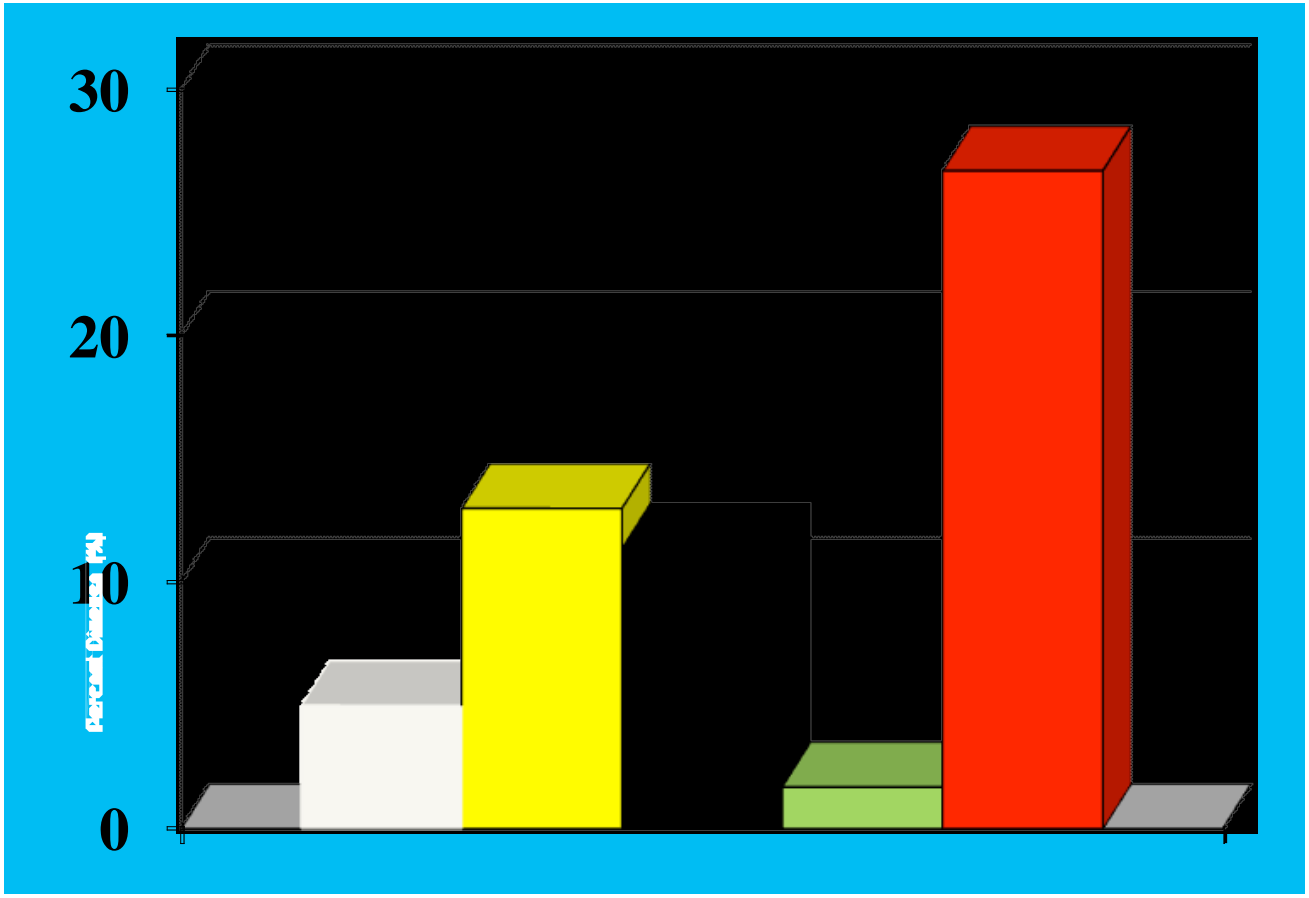
Controlling Snow Mold
Key considerations for using fungicides

- How long does snow typically persist in the area?
- Which type of snow mold is prevalent: pink, gray, both ?
- How severe has snow mold been in the past?

Pink Snow Mold % Disease Severity

Umass 2009 -2010 Snow Mold Trials

Berkshire Hills– Pittsfield MA



60-90 days of snow cover, with January break in cover

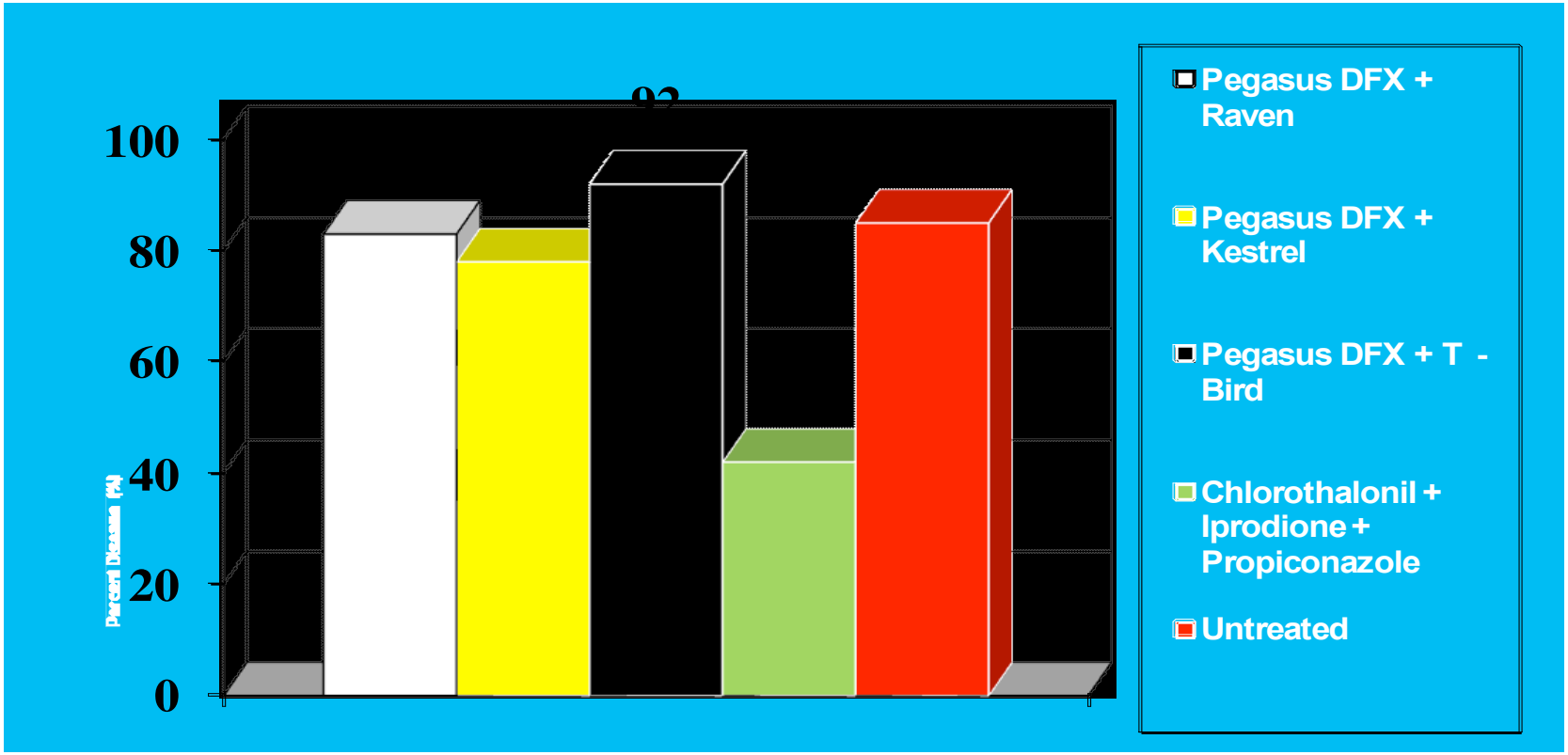
Single fall application, 2nd week in November

Treatment 4 (green) equivalent to Pegasus + Raven + Kestrel

Gray Snow Mold % Disease Severity

Umass 2009 -2010 Snow Mold Trials

T. incarnata Glens Falls, Queensbury NY



Two and three-way fungicide tank mixed failed with > 90 days of continuous snow cover

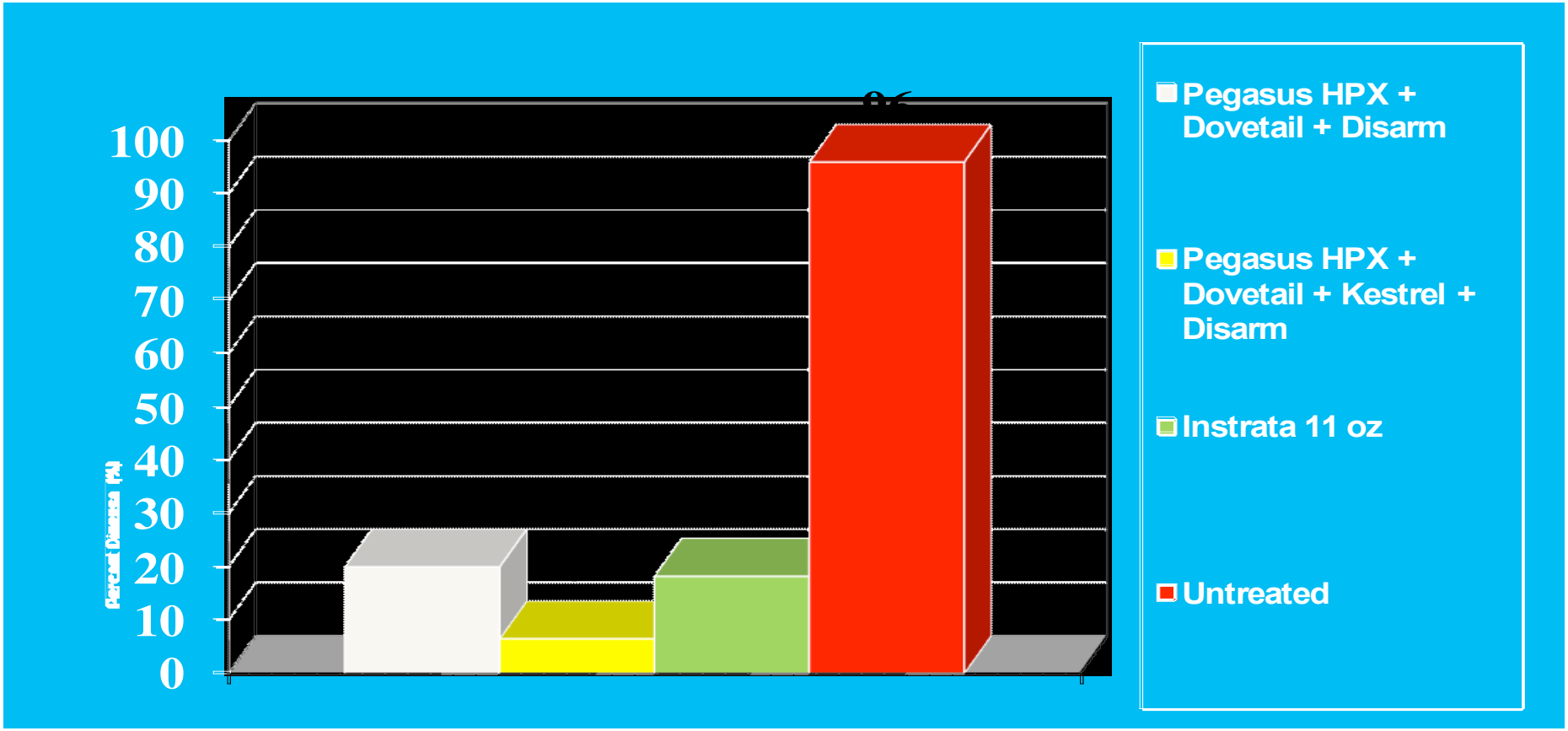
Single application, 2nd week in November

Treatment 4 (green) equivalent to Pegasus + Raven + Kestrel

Gray Snow Mold % Disease Severity

UColo 2008 -2009 Snow Mold Trials

Vail, CO



Two fall applications

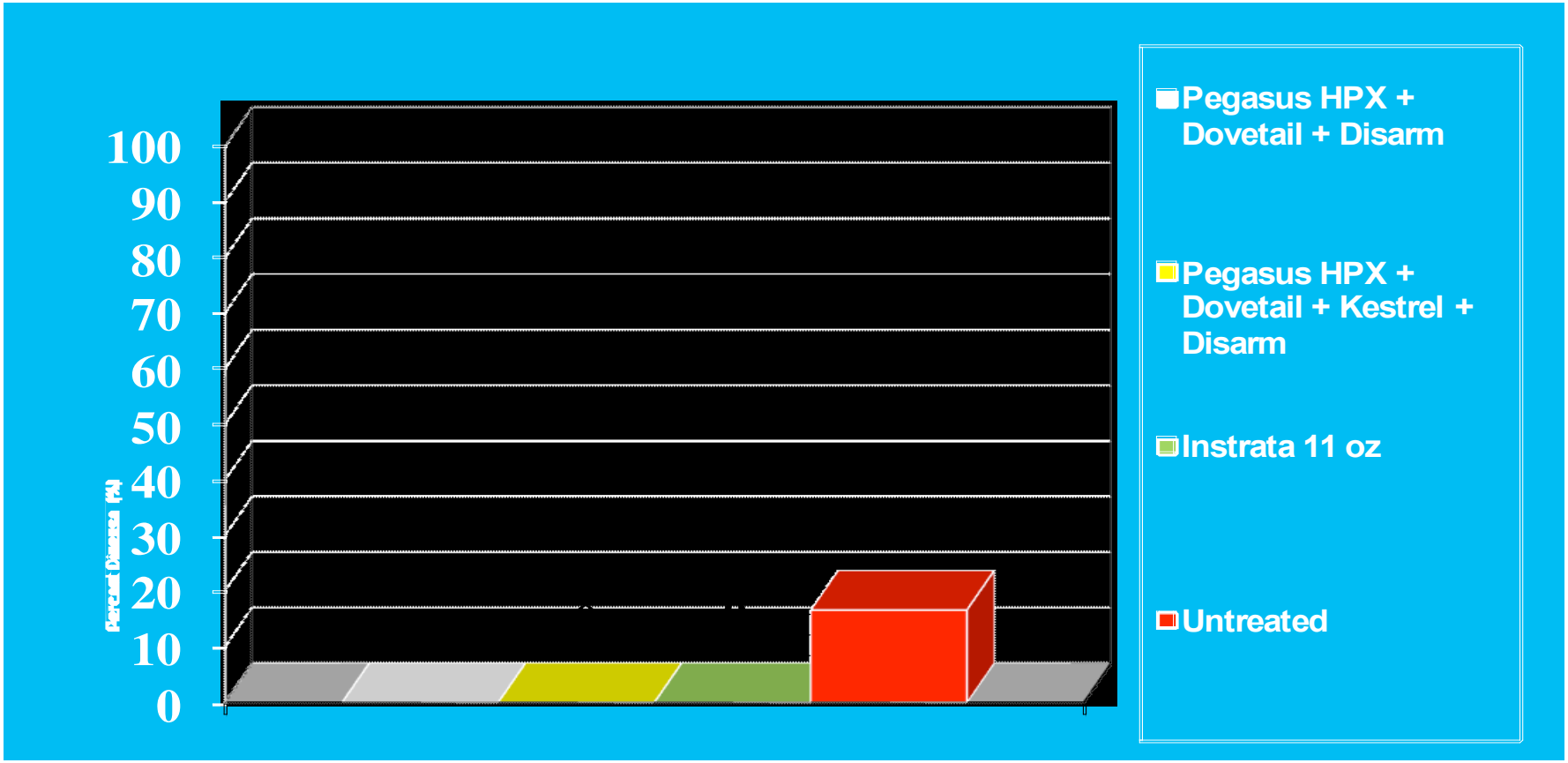
4, 5 way tank mixes perform well under extreme conditions

Vail averages 150 days continuous snow cover

Gray Snow Mold % Disease Severity

UColo 2008 -2009 Snow Mold Trials

Sonnenalp, CO



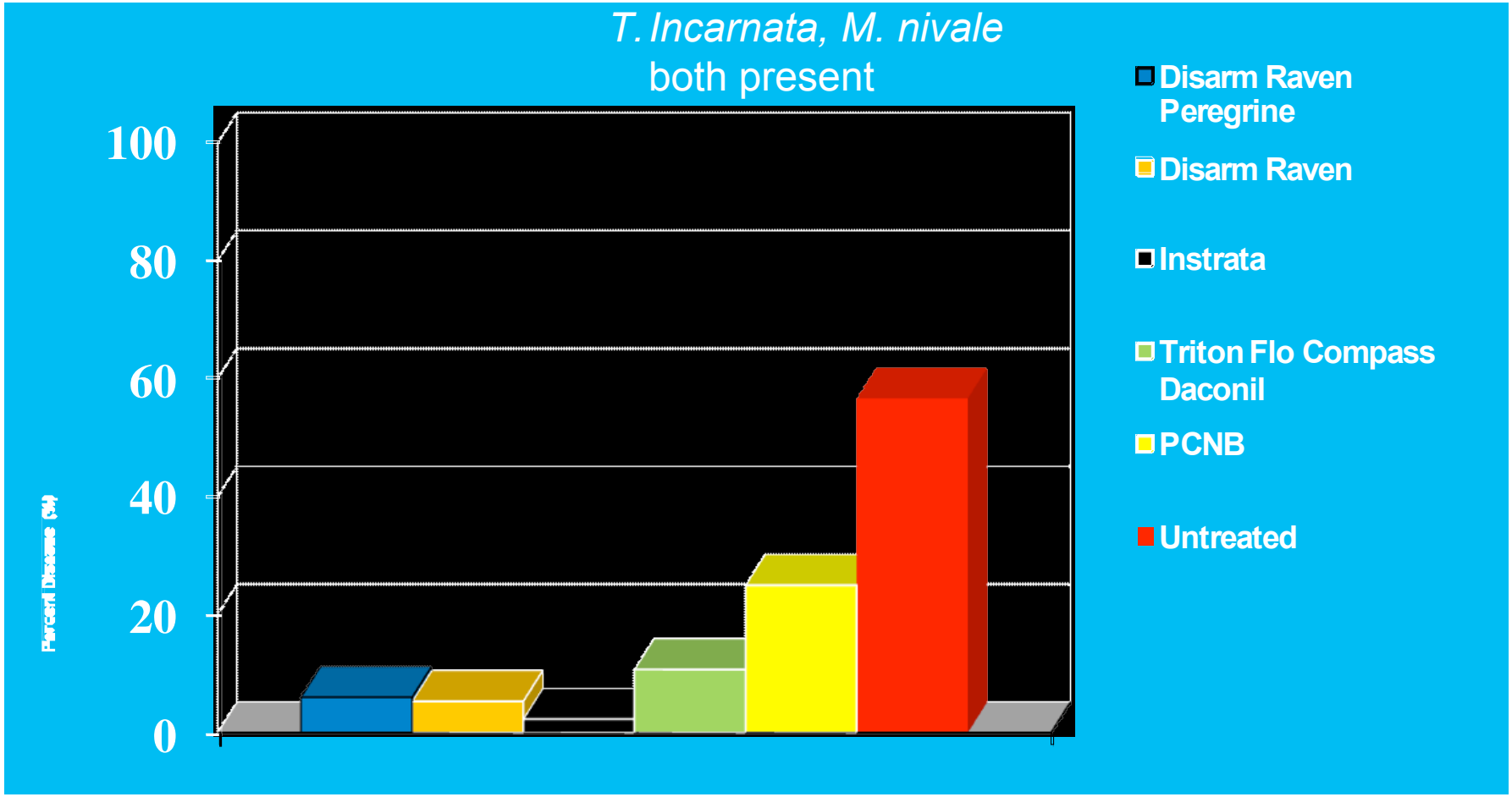
Two fall applications

Sonnenalp 90-120 days continuous snow cover

Gray/Pink Snow Mold % Disease

Umass 2008 -2009 Snow Mold Trials

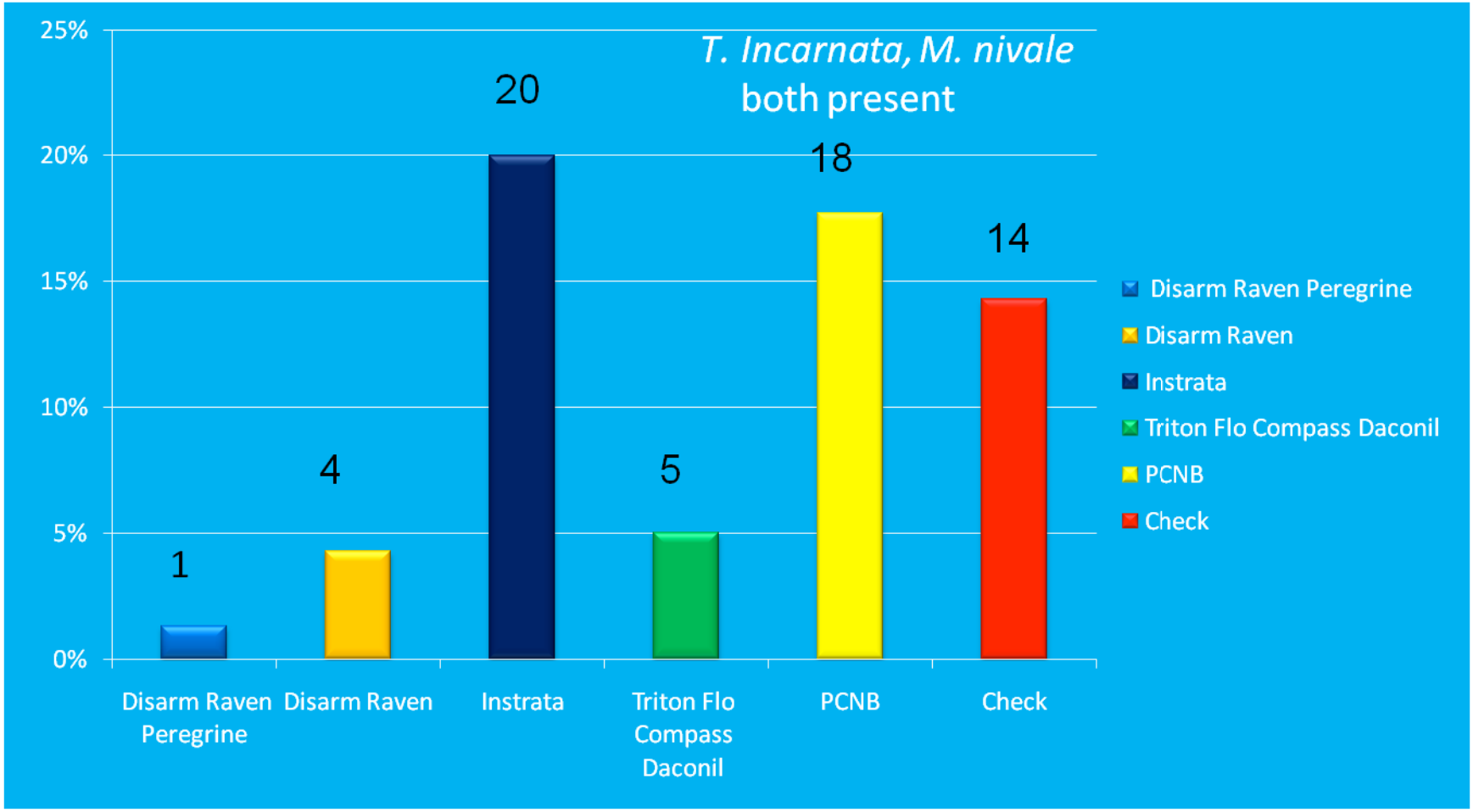
Ekwanok GC – Manchester, Vt.



Gray/ Pink Snow Mold % Disease

UMass 2008 – 2009 Snow Mold Trials

Berkshire Hills CC – Pittsfield, Ma.



Take-home message:

- Disease severity increases the longer that snow cover persists !
- 2, 3 way tank mixes may offer sufficient control where :
  - Pink Snow mold is the key problem
  - Gray SM is prevalent, but snow cover less persistent

➢ 4,5 way tank mixes preferred where snow cover ~ 3 months or more

Phoenix Fungicides

Phoenix Product	Phoenix Formulations	Active Ingredients	Competitive Products
Dovetail	liquid	Iprodione + Thiophanate-methyl	Chipco 26GT + Cleary 3336
Kestrel	1.3, 1.3 MEX	Propiconazole	Banner Maxx 1.3ME
Pegasus	82.5DF, 6L, DFX, HPX	Chlorothalonil	Daconil 82.5 WDG, Daconil WS 6F
Peregrine	WDG	Chlorothalonil + Thiophanate-methyl	Spectro 90WDG Consyst
Raven	2F	Iprodione	Chipco 26GT 2SC
Siskin	1.67SC	Myclobutanil	Eagle 20EW
T-Bird	4.5L, WDG	Thiophanate-methyl	Cleary 3336

Phoenix Environmental Care
Pink Snow Mold Spray Cost Analysis
2-Way Tank Mixes

Product	Active Ingredient	Rate/ 1000 sq. ft.	Rate / Acre
Pegasus HPX	Chlorothalonil	5 ½ fl oz.	240 oz.
Kestrel MEX	Propiconazole	4.0 fl oz.	175 oz.

Product	Active Ingredient	Rate/ 1000 sq. ft.	Rate / Acre
Pegasus HPX	Chlorothalonil	5 ½ fl oz.	240 oz.
Raven	Iprodione	4.0 fl oz.	175 oz.

Product	Active Ingredient	Rate/ 1000 sq. ft.	Rate / Acre
Peregrine	Chlorothalonil Thiophanate-Methyl	8 oz.	352 oz.

Phoenix Environmental Care
Pink Snow Mold Spray Cost Analysis
3-Way Tank Mixes

Product	Active Ingredient	Rate/ 1000 sq. ft.	Rate / Acre
Pegasus HPX	Chlorothalonil	5 ½ fl oz.	240 oz.
Kestrel MEX	Propiconazole	4.0 fl oz.	175 oz.
Raven	Iprodione	4.0 fl oz.	175 oz.
Product	**Active Ingredient**	**Rate/ 1000 sq. ft.**	**Rate / Acre**
Pegasus HPX	Chlorothalonil	5 ½ fl oz.	240 oz.
Dovetail	Thiophanate-methyl Iprodione	4.0 oz.	175 oz.

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Phoenix Environmental Care
Snow Mold Spray Cost Analysis
4-Way Tank Mix Program

Product	Active Ingredient	Rate/ 1000 sq. ft.	Rate / Acre
Peregrine	Chlorothalonil + Thiophanate-M	4 fl oz	175 oz.
Kestrel MEX	Propiconazole	2 fl oz	87 oz.
	Split application 14-21 days later:		
Pegasus HPX	Chlorothalonil	3 fl oz	131 oz.
Kestrel MEX	Propiconazole	2 fl oz.	87oz.
Raven	Iprodione	4 fl oz	175

Phoenix Environmental Care
Snow Mold Spray Cost Analysis
5-Way Tank Mix

Product	Active Ingredient	Rate/ 1000 sq. ft.	Rate / Acre
Pegasus HPX	Chlorothalonil	3.6 fl oz	157 oz.
Kestrel MEX	Propiconazole	3 fl oz	131 oz.
Dovetail	Iprodione + Thiophanate-M	4 fl oz	175 oz.
Disarm 480SC	Fluoxastrobin	0.36 fl oz	16

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