BASF Ornamentals Updates

Kathie E. Kalmowitz, PhD,
Turf and Ornamentals Market Develop. Spec.

Renee J. Keese, PhD,
Turf and Ornamental Biology Leader

IR-4 Meeting, October 7-8, 2009
BASF Ornamental Portfolio

Herbicides
- Pendulum
- FreeHand
- Tower
- Basagran
- Segment

Fungicides
1. Cygnus
2. Insignia
3. Pageant
4. Stature SC
5. Iprodione Pro
6. Trinity*
7. BAS 651

* New request for plant safety or pathogen efficacy trial consideration

2009 IR-4 Meeting
BASF Purchase of Whitmire Microgen

- BASF purchases company Dec. 2008
- St. Louis Headquarters remains
- Adds ‘total released’ TR Technology plus oils to products mix for Ornamentals
- Adds 4 sales people – 1 specialist in St. Louis and 3 sales in field
Fungicide Group No.:  7 + 11
Active Ingredients:  Boscalid + Pyraclostrobin
Use Sites:  All ornamental uses including, commercial and retail nursery and greenhouses, landscape maintenance and interiorscapes.
REI:  12 hr
Rates by Diseases

Pageant use rate is dependent upon the target diseases and or conditions favorable to disease

Best Used As Preventative

- Use rate is 4-18 oz./100 gallons for foliar and crown pathogens
- Drench rate is 12-18 for soilborne diseases
- Use rate for dip treatments for ornamental bulbs is 23-35 oz./100 gallons
- Do not exceed 7.3 lbs. (118 oz.) per use site per year

2009 IR-4 Meeting
Pageant Needs

Post Harvest Spray Applications and Uses (potential for use for *Botrytis*, *Alternaria*, *Fusarium*, *Rhizoctonia*, *Penicillium* and *Rhizopus*)

- **Storage Rots**
  Dip bare roots prior to cold storage

- **Blight and Wilts**
  Dip cuttings prior to planting

- **Corm and Bulb Rots**
  Dip corms or bulbs prior to storage

- **Sprays to stems or vegetative parts** prior to propagating, potting, bare-root, or as plant parts brought in from field
Introducing Stature SC

new liquid formulation technology
Stature SC

Fungicides: Group No.40

Diseases Controlled: Phytophthora, Downy Mildew

Chemical Class: Cinnamic Acid Derivative

Active Ingredient: Dimethomorph

Trade Names: Stature 500 SC (Stature DM 50 WP will be discontinued)

Use Sites: Greenhouse, Field and Container Nurseries, Shadehouses, Lathhouses, including conifer seedling nurseries

REI: 12 hr

2009 IR-4 Meeting
More evaluations on differences in activity to foliar, crown and root Phytophthora spp.

Uses for downy mildew in program rotations

Need for Interiorscape and landscape ornamental uses
Initium®
(BAS 650F)

An innovative fungicide of a new chemical class for the control of oomycetes
Reliable & highly active against oomycete diseases with excellent selectivity

Innovative complex III inhibitor of a new chemical class and a new tool in resistance management

Very favorable regulatory profile

Premium preventive action

World-wide registrations and import tolerances
### Proposed Uses of **Initium®**

<table>
<thead>
<tr>
<th><strong>Application Rates</strong></th>
<th>200 – 300 g/ha in combination with other fungicides of a different mode of action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spray Interval</strong></td>
<td>7 - 14 days</td>
</tr>
<tr>
<td><strong>Fungi Controlled</strong></td>
<td>Downy mildew &amp; Phytophthora diseases</td>
</tr>
<tr>
<td><strong>Crops</strong></td>
<td>Ornamentals*&lt;br&gt;Grapes, Solanaceae crops (potatoes, tomatoes &amp; others)&lt;br&gt;icy &amp; fruiting vegetables, bulb vegetables, brassicas, hops,</td>
</tr>
</tbody>
</table>

2009 IR-4 Meeting
### Initium® Spectrum Of Activity

<table>
<thead>
<tr>
<th>Plant Group</th>
<th>Pathogen(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes</td>
<td><em>Phytophthora infestans</em></td>
</tr>
<tr>
<td>Tomatoes</td>
<td><em>Phytophthora infestans</em></td>
</tr>
<tr>
<td>Grapes</td>
<td><em>Plasmopara viticola</em></td>
</tr>
<tr>
<td>Vegetables</td>
<td><em>Peronospora spp.</em></td>
</tr>
<tr>
<td>Vegetables</td>
<td><em>Phytophthora spp.</em></td>
</tr>
<tr>
<td>Cucurbits</td>
<td><em>Pseudoperonospora cubensis</em></td>
</tr>
<tr>
<td>Lettuce</td>
<td><em>Bremia lactucae</em></td>
</tr>
<tr>
<td>Hops</td>
<td><em>Pseudoperonospora humuli</em></td>
</tr>
<tr>
<td>Ornamental Plants</td>
<td><em>Phytophthora spp.</em></td>
</tr>
<tr>
<td></td>
<td><em>Plasmopara, Peronospora spp.</em></td>
</tr>
</tbody>
</table>

2009 IR-4 Meeting
A New Choice In Resistance Management

Initium® displays no cross-resistance to fungicide classes of

- phenylamides (e.g. metalaxyl)
- Qo inhibitors (e.g. strobilurins)
- carboxylic acid amides (e.g. dimethomorph)
- benzimidazoles, SDH inhibitors, triazoles and imidazoles

As a pro-active measure, Initium will be marketed only as ready mixes in combination with other fungicidal active ingredients of a different mode of action. The partners will complement the activity spectrum and deliver built-in resistance management for Initium and vice versa.

– a new tool for resistance management
Initium® – Summary
The mode-of-action

- New proprietary chemical class: pyrimidylamines
- Initium® inhibits respiration at complex III
- Exact binding site at complex III is not yet known
- No cross-resistance to important oomycete fungicide classes detected, including complex III Qo inhibitors
- Cross-resistance to Qil fungicides cannot be excluded

Initium® fungicide is the innovative complex III inhibitor of a new chemical class

2009 IR-4 Meeting
First registration expected in 2010.

Annex II **Initium** registration dossier submitted for review in Europe in September 2008. MRL dossier submitted as an application for EU MRLs for all European uses developed up to now.

World-wide registration campaign for **Initium** products in progress.
BASF Herbicides

BASAGRAN T / O
2009 Dimethenamid-P Focus

FreeHand™ 1.75GR and Tower® 6 lb EC Formulations

- Continued tolerance testing with IR-4 and BASF protocols to get more plants on both labels. Submit Tower to CA

- To determine if Tower applications for Over-the-Top can be allowed for container and field nursery production

- To determine if greater tolerance is exhibited for landscape uses over-the-top applications than to potted transplants

- Tolerance on ornamental grasses with either product

- Tolerance when used in cell trays

- Other uses of Tower in production

2009 IR-4 Meeting
Plant Tolerance Additional Species Identified

- **FreeHand perennial safety by species**
- **Tower over-the-top minimal watch-outs on woodys**
- **Grasses remain very sensitive-landscape better**
- **Annual bedding plants safety by species – Begonia not safe**

All Photo Set-up: (IR-4 2008, B. Trader, Miss. St., MS)
Untrt, FreeHand 1x, 2x, 4x: 4 WAT2

2009 IR-4 Meeting
Plant Tolerance
Cell Size/ Timing of Applications

- Nurseries moving to ‘reduced steps in production’
- Cell trays continue to be source of weed propagule transfer
- Situation: Potting to 1 gal from 16 to 280 cell tray sizes
- Results: Trays larger than 72 too injurious; applications into propagation trays more research needed
Additional Weed Species/Uses

- Work to determine use with both formulations and actives on invasives
- Work with Tower on gravel in and around greenhouse
- Use in field production of bulb-like crops – gladiolus, caladiums, callas, others

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Lb/A</th>
<th>56 DAT1</th>
<th>56 DAT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMTA-P + Pendi</td>
<td>200</td>
<td>76.7 ab</td>
<td>95.0 a</td>
</tr>
<tr>
<td>Triflu. + Ixosaben</td>
<td>200</td>
<td>100 a</td>
<td>84.4 ab</td>
</tr>
<tr>
<td>Oxy. + Pendi.</td>
<td>100</td>
<td>100 a</td>
<td>88.5 ab</td>
</tr>
</tbody>
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Data provided by Dr. Robert Stamps, Univ. of Florida, Apopka

2009 IR-4 Meeting
In Summary: Dimethenamid-P 2009

- BASF combined with IR-4 approximately 30 more woody species will be added to FreeHand label for 2010.
- FreeHand on perennials: label to list approx. 10 more species
- FreeHand uses on annuals will need more trials. May be differences in landscape and in container production.
- Tower label to allow Over-The-Top container and field applications
- Tower additional woody species approx. 10-20 (trials in 2009)
- Not enough information on perennials at this time. Priority could be for safety in landscape

Both labels will identify plants where no safety was observed= risk high

2009 IR-4 Meeting
Basagran® T/O herbicide

- IR-4 has worked with this active ingredient for 30 years
- The ornamental and turf uses are sold by BASF Turf and Ornamentals
- IR-4 has identified 27 additional species that can be registered for Over-the-Top applications with possible single application restriction to some.
- To get label into EPA this fall for uses sometime in 2010 as supplemental.
- Basagran T/O not registered in CA.

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