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Governor's Environmental and
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 **A S T I A**
2008 Cleantech Innovator Award



Natural Products

For Pest Management

 **MarroneTM**
Bio Innovations

Early Stage Herbicides Currently in Development

Russell Blair
Marketing Manager
Marrone Bio Innovations
Davis, CA

MBI-005

Streptomycete



Product Description

- New, selective herbicide for use in rice and possibly other cereal crops.
- Streptomycete - Marine Streptomycete acquired by MBI as part of the DuPont/Instituto Biomar microbial collection.
- Active Ingredient - Produces phytotoxic secondary metabolites such as thaxtomin A (4-(nitroindol-3-yl-containing 2,5-dioxopiperazine) that inhibits cellulose biosynthesis in plants.
- Product Development - MBI is developing the microbe into a commercial bioherbicide through fermentation and formulation optimization.

MBI-005

Streptomycete



Efficacy Against Common Rice Weeds (California)

Common Name	Scientific Name	Control
Arrowhead, California	<i>Sagittaria montevidensis</i>	Good
Barnyardgrass	<i>Echinochloa crus-galli</i>	Poor
Bulrush, Ricefield	<i>Scirpus mucronatus</i>	Fair
Bulrush, River	<i>Scirpus fluviatilis</i>	Fair
Ducksalad	<i>Heteranthera limosa</i>	Fair
Redstems	<i>Ammania spp.</i>	Good
Sedge, Smallflower	<i>Cyperus difformis</i>	Excellent
Sprangletop, Bearded	<i>Leptochloa fascicularis</i>	Poor
Watergrass, Early	<i>Echinochloa oryzoides</i>	Poor
Watergrass, Late	<i>Echinochloa phyllopogon</i>	Poor

- Efficacy against grass weeds can be improved in tank mixes and/or rotations with grass herbicides.

MBI-005

Streptomycete



Conclusions

- Broadleaf & Sedge - MBI-005 has good efficacy against broadleaf weeds and excellent efficacy against sedge.
- Grass - Efficacy against grass weeds can be improved using tank mixes and/or rotations with grass herbicides at lower than label rates.
- Resistance - MBI-005 inhibits cellulose biosynthesis (no known herbicide resistance for this mode of action among weed populations yet).
- Phytotoxicity - MBI-005 has no phytotoxicity on rice.



Product Description

- GreenMatch is a “knockdown” or “burndown”, non-selective herbicide.
- Organic Use - NOP compliant, OMRI listed, WSDA approved.
- Active Ingredient - d-limonene, which occurs naturally in citrus and other fruits.
- Mode of Action - GreenMatch has a unique mode of action that removes the waxy cuticle from the leaves, causing necrosis of the leaves or fast wilting.

GreenMatch
Burndown Herbicide

Marrone
Bio Innovations



Before
Untreated Control



After
14 Days After Treatment
14% Dilution, 60 GPA



Conclusions

- GreenMatch shows excellent control of a wide variety of broadleaf and grassy weeds.
- Rate - Use a 14% solution in 60 GPA.
- Coverage - For best results, complete coverage is important.
- Surfactant - Use of an organic surfactant is recommended.
- Weed Size - Treat weeds 6 inches or smaller for best results.



Thank you !

Contact:

Timothy Johnson
Product Development Manager
14 Baldtop Heights
Danville, PA 17821
Phone: 570-441-8775
Email: 'tjohnson@marronebio.com'