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IR-4 Ornamental Horticulture Program Prodiamine + Isoxaben Crop Safety

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Abstract

Prodiamine + Isoxaben (Gemini G) is a new herbicide combination being developed by Everris dba ICL Specialty Fertilizers for pre-emergent control of grasses and broadleaf weeds on ornamental horticulture crops. The IR-4 Project completed 24 crop safety trials on 15 ornamental horticulture plant species or genera in 2017. In these trials, one species (*Quercus virginiana*) exhibited no injury after over-the top applications in a minimum of 3 trials; this species can be added to a list of tolerant plants in the new label for this product. One species (*Phlox paniculata*) exhibited damage sufficient to recommend growers not utilize Gemini G as an over-the-top treatment for pre-emergent weed control.

Introduction

Prodiamine + Isoxaben (Gemini G) is a new herbicide combination being developed by Everris dba ICL Specialty Fertilizers for pre-emergent control of grasses and broadleaf weeds on ornamental crops. The IR-4 Project completed 24 crop safety trials on 15 ornamental horticulture plant species or genera in 2017.

Materials and Methods

Gemini G (Prodiamine + Isoxaben) was applied over-the-top twice at 6 weeks intervals. The application rates were 200, 400 and 800 lb product/A. A minimum of four plants per three blocks or ten plants per completely randomized design were required with many researchers exceeding this minimum. Phytotoxicity was recorded on a scale of 0 to 10 (0 = no phytotoxicity; 10 = complete kill) at 1, 2, and 4 weeks after initial application. To view the more detailed materials and methods in the protocol 17-010, please see <http://ir4.rutgers.edu/Ornamental/Ornamentals.cfm> to view and download protocol.

Gemini G was supplied to researchers (See list of researchers in Appendix 1) by Everris dba ICL Specialty Fertilizers.

Results and Summary

Phytotoxicity

Based on the type and nature of injury seen with pesticide applications, tested plant species were placed into four categories: 1) no significant phytotoxicity or growth differences from the untreated check or any injury was transitory, 2) no or minimal transitory injury seen at the 1X rate, but the 2X and/or 4X rates did cause significant phytotoxicity, 3) significant injury at the 1X rate sufficient to recommend growers not utilize Gemini G, and 4) more data are needed to make informed recommendations.

Gemini G exhibited no or minimal negative impact on one species with over-the-top applications (Table 1). Some minimal injury may be acceptable for growers, if applications are made several weeks to months in advance of crop sale particularly for woody ornamental crops. One species tested exhibited damage sufficient to recommend growers not utilize Gemini G as an over-the-top treatment for pre-emergent weed control (Table 3). For 13 genera / species, more information is needed either because only 1 or 2 trials were conducted or because consistent results were not achieved across research sites (Table 4).

Please see Table 5 for a list of individual trial summaries for Gemini G.

Table 1. List of Gemini G treated crops with no or minimal transitory injury.

Quercus virginiana

Table 2. List of Gemini G treated crops with no injury at 1X but significant injury at 2X or 4X.

None

Table 3. List of Gemini G treated crops with significant injury at 1X.

Phlox paniculata

Table 4. List of Gemini G treated crops where more information is needed.

*Acer rubrum*²

*Allamanda cathartica*¹

*Campanula portenschlagiana*¹

Digitalis sp.

Echinacea purpurea

Echinacea sp.¹

Euonymus alatus

Hemerocallis sp.

Hydrangea macrophylla

Hydrangea quercifolia

Nepeta x faassenii

Rosa sp.

Tagetes erecta

¹ No injury in 1 trial.

² No injury in 2 trials.

Table 5 Detailed Summary of Crop Safety Testing with Gemini G (Prodiamine + Isoxaben).

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 1/30/2018 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
32929	Maple, Red (<i>Acer rubrum</i>)	Field Container	Marble	FL	2017	Over the top	No significant injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32929	Maple, Red (<i>Acer rubrum</i>)	Field Container	Senesac	NY	2017	Over the top	No injury with 200, 400 and 800 lb per acre applied twice.
32913	Allamanda (<i>Allamanda</i> sp.) A. cathartica 'Golden Butterfly'	Field Container	Marble	FL	2017	Over the top	No injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32925	Bellflower (<i>Campanula</i> sp.) C. portenschlagiana 'Birch Hybrid'	Field Container	Senesac	NY	2017	Over the top	No injury with 200, 400 and 800 lb per acre applied twice.
32924	Foxglove (<i>Digitalis</i> sp.) 'Dalmatian Purple'	Field Container	Senesac	NY	2017	Over the top	Moderate injury with 200 and 400, severe with 800 lb per acre applied twice
32923	Purple Coneflower (<i>Echinacea</i> sp.) 'Cheyenne Spirit'	Field Container	Derr	VA	2017	Over the top	No injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32923	Purple Coneflower (<i>Echinacea</i> sp.) E. purpurea 'Hot Summer'	Field Container	Marble	FL	2017	Over the top	No injury or growth reduction with 200 and 400, minor injury and significant growth reduction with 800 lb per acre, applied twice.
32922	Burning Bush (<i>Euonymus alatus</i>) 'Compacta'	Field Container	Senesac	NY	2017	Over the top	Minor injury with 200, 400 and 800 lb per acre applied twice.
32921	Daylily (<i>Hemerocallis</i> sp.) <i>Hemerocallis</i> x 'Monie' Starburst R Susie	Field Container	Nackley	OR	2017	Over the top	Minor to moderate injury increasing with rates (200, 400 and 800 lb per acre) applied twice; no growth reduction.
32921	Daylily (<i>Hemerocallis</i> sp.) 'Stella d'Oro'	Field Container	Derr	VA	2017	Over the top	No injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32911	Bigleaf Hydrangea (<i>Hydrangea macrophylla</i>)	Field Container	Nackley	OR	2017	Over the top	Minor to moderate injury increasing with rates (200, 400 and 800 lb per acre) after 2nd applic; no significant growth reduction.
32911	Bigleaf Hydrangea (<i>Hydrangea macrophylla</i>) 'Paraplu'	Field Container	Senesac	NY	2017	Over the top	Minor injury with 200, moderate with 400, and severe with 800 lb per acre applied twice.
32912	Hydrangea (<i>Hydrangea</i> sp.) H. macrophylla 'Dooley'	Field Container	Derr	VA	2017	Over the top	No injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32912	Hydrangea (<i>Hydrangea</i> sp.) H. macrophylla 'Nikko Blue'	Field Container	Gilliam	AL	2017	Over the top	No significant injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32912	Hydrangea (<i>Hydrangea</i> sp.) H. quercifolia	Field Container	Marble	FL	2017	Over the top	No injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32920	Nepeta (<i>Nepeta</i> x <i>faassenii</i>)	Field Container	Senesac	NY	2017	Over the top	Minor injury with 200 and 400, moderate with 800 lb per acre applied twice.
32918	Phlox, Fall (<i>Phlox paniculata</i>) 'Cotton Candy'	Field Container	Nackley	OR	2017	Over the top	Moderate to severe injury increasing with rates (200, 400 and 800 lb per acre) applied twice; moderate growth reduction with 4X.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
32928	Oak, Southern Live (<i>Quercus virginiana</i>)	Field Container	Gilliam	AL	2017	Over the top	No injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32928	Oak, Southern Live (<i>Quercus virginiana</i>)	Field Container	Marble	FL	2017	Over the top	No injury or growth reduction with 200, 400 and 800 lb per acre applied twice.
32928	Oak, Southern Live (<i>Quercus virginiana</i>)	Field Container	Senesac	NY	2017	Over the top	No injury with 200, 400 and 800 lb per acre applied twice.
32917	Rose (<i>Rosa</i> sp.) 'Baimir' Easy Elegance® Kashmir Rose'	Field Container	Nackley	OR	2017	Over the top	Minor injury with complete recovery with 200, 400 and 800 lb per acre applied twice; no significant growth reduction.
32917	Rose (<i>Rosa</i> sp.) Rosa x 'Horcoherent' (OSO Easy Peachy Cream)	Field Container	Senesac	NY	2017	Over the top	No injury with 200, 400 and 800 lb per acre applied twice.
32926	African Marigold (<i>Tagetes erecta</i>)	Field Container	Marble	FL	2017	Over the top	No to minor injury with 200, 400 and 800 lb per acre applied twice.
32926	African Marigold (<i>Tagetes erecta</i>) 'Taisha Gold'	Field Container	Senesac	NY	2017	Over the top	Moderate injury with 200 and 400, severe with 800 lb per acre applied twice.

Label Suggestions

We recommend that the following crop, which exhibited no injury in these experiments, be added to the future Gemini G label for broadcast applications.

Quercus virginiana

We also suggest that the one plant species exhibiting significant injury with over-the-top applications be added to list of sensitive ornamental species.

Phlox paniculata

Appendix 1: Contributing Researchers

Dr. Jeffrey Derr	Hampton Roads Ag. Exp. Station 1444 Diamond Springs Road, Virginia Beach, VA 23455
Dr. Charles Gilliam	Auburn University Department of Horticulture 101 Funchess Hall Auburn, AL 36849
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