Environment Horticulture Program Research Summaries

# IR-4 Environmental Horticulture Program
# Mandestrobin Crop Safety

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**Acknowledgements**
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## Abstract

Mandestrobin is a new systemic and translaminar fungicide being developed by Valent for the control of Botrytis and other foliar diseases of environmental horticulture crops. The IR-4 Project completed 37 crop safety trials on 19 environmental horticulture plant species or genera during 2015 to 2021. Four crops exhibited no or minimal injury in at least 3 trials: *Antirrhinum majus*, *Begonia* sp., *Petunia* sp. and *Viola x wittrockiana*. There are 15 species or genera where less than 3 trials were conducted so there is not enough information available at this time. All trials for each of these crops showed no or minimal, transitory phytotoxicity.

## Introduction

Mandestrobin is a new systemic and translaminar fungicide being developed by Valent for the control of Botrytis and other foliar diseases of ornamental horticulture crops. The IR-4 Project completed 37 crop safety trials on 19 ornamental horticulture plant species or genera during 2015 to 2017.

## Materials and Methods

Mandestrobin was applied as foliar treatment typically 3 times at approximately 14 days intervals. The application rates were 7.5, 15 and 30 fl oz per 100 gal, plus a water treated control. A minimum of ten plants (replicate treatments) were required. Phytotoxicity was recorded on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill). Phytotoxicity was rated weekly up to 6 weeks after initial application. For IR-4 testing, the following protocols were used: 15-003, 16-004, 17-004, 18-006, 19-006, 20-011, and 21-011. For more detailed materials and methods, including application rates for various products, please visit https://www.ir4project.org/ehc/ehc-registration-support-research/env-hort-researcher-resources/#Protocols to view and download these protocols.

Mandestrobin was supplied to researchers (See list of researchers in Appendix 1) by Valent.

## Results and Summary

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 Mandestrobin, and 4) more data is needed to make informed recommendations.

### Phytotoxicity

Across all crops tested, Mandestrobin exhibited no or minimal negative impact on all plant species or genera. Four crops exhibited no or minimal injury in at least 3 trials: *Antirrhinum majus*, *Begonia* sp., *Petunia* sp. and *Viola x wittrockiana*. There are 15 species or genera where less than 3 trials were conducted so there is not enough information available at this time (Table 4). All trials for each of these crops showed no or minimal, transitory phytotoxicity.

Please see Table 5 for a summary of the individual trial results.

**Table 1. List of Mandestrobin treated crops with no or minimal transitory injury.**

*Antirrhinum majus*
*Begonia* sp.
*Petunia hybrida*
*Viola x wittrockiana*

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

None

**Table 3. List of Mandestrobin treated crops with significant injury at 1X.**

None

**Table 4. List of Mandestrobin treated crops where more information is needed.**

*Alyssum* sp. [1]
*Calibrachoa* sp. [1]
*Chamaerops humilis* [1]
*Chrysanthemum/Dendranthema x morifolium* [1]
*Coreopsis* sp. [2]
*Dianthus* sp. [2]
*Euphorbia pulcherrima* [2]
*Gerbera sp.* [2]
*Impatiens hawkeri* [1]
*Lupinus* sp. [1]
*Osteospermum sp.* [1]
*Pelargonium x hortorum* [2]
*Salvia* sp. [1]
*Verbena sp.* [1]
*Viola sp.* [1]

[1] No injury in 1 trial
[2] No injury in 2 trials

**Table 5 Detailed Summary of Crop Safety Testing with Mandestrobin.**

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 11/29/2021 are listed below.

| PR# | Crop | Production Site | Researcher | State | Year | Application Type | Results |
|---|---|---|---|---|---|---|---|
| 32422 | Madwort (Alyssum sp.) 'Clear Crystal Lavender' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 33061 | Madwort (Alyssum sp.) A. montanum | Shadehouse/Lath House | Klett | CO | 2017 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32392 | Garden Snapdragon (Antirrhinum majus) 'Rocket Mix' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32392 | Garden Snapdragon (Antirrhinum majus) | Greenhouse | Grunwald | OR | 2017 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32392 | Garden Snapdragon (Antirrhinum majus) | Greenhouse | Vafaie | TX | 2018 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32389 | Begonia (Begonia sp.) 'Dragon Wing Red' | Greenhouse | Freiberger | NJ | 2019 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32389 | Begonia (Begonia sp.) | Greenhouse | Grunwald | OR | 2017 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32389 | Begonia (Begonia sp.) B. semperflorens 'Bada Bing' | Greenhouse | Hausbeck | MI | 2016 | Foliar | No leaf injury, slight to moderate flower bleaching, with 7.5, 15 and 30 fl oz per 100 gal applied 3 times; no growth reduction. |
| 33059 | Begonia (Begonia sp.) 'Summerwings Rose' | Shadehouse/Lath House | Klett | CO | 2017 | Foliar | No injury or significant growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32394 | Calibrachoa (Calibrachoa sp.) 'Blue Legend' | Greenhouse | Freiberger | NJ | 2019 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 33060 | Calibrachoa (Calibrachoa sp.) Minifamous Double Amethest | Shadehouse/Lath House | Klett | CO | 2017 | Foliar | No injury or significant growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 33073 | Palm, Mediterranean Fan; Dwarf Fan Palm (Chamaerops humilis) | Field Container | Palmateer (UF) | FL | 2016 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32396 | Hardy Mum (Chrysanthemum/Dendranthema x morifolium) 'Snow Lady' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32419 | Tickseed (Coreopsis sp.) 'Early Sunrise Yellow' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32419 | Tickseed (Coreopsis sp.) C. verticillata “Moonbeam” | Greenhouse | Fraelich | GA | 2021 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times biweekly. All plants marketable. |
| 32423 | Pink (Dianthus sp.) 'Bouquet Rose Magic' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32423 | Pink (Dianthus sp.) D. gratianopolitanus. “Firewitch” | Greenhouse | Fraelich | GA | 2021 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times biweekly. All plants marketable. |

| PR# | Crop | Production Site | Researcher | State | Year | Application Type | Results |
|---|---|---|---|---|---|---|---|
| 33062 | Pink (Dianthus sp.) Dianthus SCENT FIRST POT Coral Reef | Shadehouse/Lath House | Klett | CO | 2017 | Foliar | No injury with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32385 | Poinsettia (Euphorbia pulcherrima) 'Prestige Red' | Greenhouse | Catlin | NY | 2017 | Foliar | Minor injury and no growth reduction with 7.5, 15 and 30 fl oz per 100 gal; moderate to high spray residue levels unacceptable at sale with all rates. |
| 32385 | Poinsettia (Euphorbia pulcherrima) 'Jubilee Red' | Greenhouse | Freiberger | NJ | 2016 | Foliar | No injury, growth reduction or delayed blooming with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32393 | Transvaal Daisy (Gerbera sp.) 'EZdazy Mix' | Greenhouse | Beckerman | IN | 2018 | Foliar | No injury or significant growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32393 | Transvaal Daisy (Gerbera sp.) | Greenhouse | Grunwald | OR | 2017 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32386 | Impatiens, New Guinea (Impatiens hawkeri) 'Harmony Deep Red' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No significant injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32424 | Lupine (Lupinus sp.) 'Gallery Mix' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32395 | Daisybush (Osteospermum sp.) M. ecklonis 'Margarita Rioja Red' | Greenhouse | Beckerman | IN | 2018 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32390 | Geranium, Zonal (Pelargonium x hortorum) 'Maverick Violet' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32390 | Geranium, Zonal (Pelargonium x hortorum) 'Super Moon Red' | Greenhouse | Klett | CO | 2018 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32391 | Petunia (Petunia sp.) 'Dream Rose Picotee' | Greenhouse | Freiberger | NJ | 2018 | Foliar | No injury to leaves, some injury to blooming flowers, with complete recovery, with 7.5, 15 and 30 fl oz per 100 gal applied 3 times biweekly. |
| 32391 | Petunia (Petunia sp.) 'Sweetunia Johnny Flame' | Greenhouse | Ong | TX | 2017 | Foliar | No significant injury or stunting with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32391 | Petunia (Petunia sp.) Petunia x hybrida 'Dreams Midnight' | Greenhouse | Uber | CA | 2017 | Foliar | No injury with 7.5 fl oz, minor injury with 15 and 30 fl oz per acre applied 3 times biweekly; no growth reduction. |
| 32421 | Sage (Salvia sp.) 'New Dimension Blue' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32397 | Vervain (Verbena sp.) | Greenhouse | Grunwald | OR | 2017 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32388 | Violet (Viola sp.) V. cornuta 'Penny™ Denim Jump ' | Greenhouse | Klett | CO | 2018 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |
| 32420 | Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Matrix True Blue' | Greenhouse | Beckerman | IN | 2020 | Foliar | Minor injury with 7.5 and 15, moderate with 30 fl oz per 100 gal applied 3 times biweekly; no growth reduction. |
| 32420 | Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Delta Orange Blotch' | Greenhouse | Bodine (NER) | NJ | 2015 | Foliar | No injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times. |

| PR# | Crop | Production Site | Researcher | State | Year | Application Type | Results |
|---|---|---|---|---|---|---|---|
| 32420 | Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Spring Matrix DP Orange' | Greenhouse | Freiberger | NJ | 2019 | Foliar | No injury with 7.5, 15 and 30 fl oz per 100 gal applied 3 times biweekly; all plants grew and flowered normally. |
| 32420 | Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Matrix Yellow' | Greenhouse | Vafaie | TX | 2020 | Foliar | No significant injury or growth reduction with 7.5, 15 and 30 fl oz per 100 gal applied 3 times biweekly. |

## Label Suggestions

In this report, all plants exhibited no or minimal injury after foliar treatments of Mandestrobin at 7.5, 15 and 30 fl oz per 100 gal, suggesting that this active ingredient is safe to environmental horticulture crops. Given the lack of phytotoxicity across so many different plant species and genera, it is suggested that all 19 plants in Table 1 and Table 4 that showed no injury be placed on the Mandestrobin label if Valent has similar results on these crops. Or a general statement can be placed on the label such as ‘has not been demonstrated to cause damage on various ornamental plant species according to labeled use instructions. Mandestrobin may be used on a wide number of crops but must be tested on a limited portion of the crop prior to applying to the whole crop if the grower has no previous experience applying Mandestrobin to that crop’.

## Appendix 1: Contributing Researchers


| | |
|---|---|
| Dr. Janna L. Beckerman | Purdue University<br>Dept. of Botany and Plant Pathology<br>West Lafayette, IN 47907 |
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| Mr. Tom Freiberger | Rutgers University<br>Cream Ridge Experiment Station<br>283 Rt. 539<br>Cream Ridge, NJ 08514 |
| Dr. Mary Hausbeck<br>Mr. Blair Harlan | Michigan State University<br>Dept. of Plant Pathology<br>140 Plant Pathology Building<br>East Lansing, MI 48824<br>517-355-4534 |
| Dr. Jim Klett | Colorado State University<br>Department of Horticulture and Landscape Architecture<br>Fort Collins, CO 80423 |
| Dr. Nik Grunwald | Horticultural Crops Research Lab<br>USDA-ARS<br>3420 NW Orchard Ave.<br>Corvallis, OR 97330 |
| Dr. Kevin Ong | Texas A&M AgriLife Extension<br>L.F. Peterson Building<br>College Station, TX 77843<br>979-845-8032 |
| Dr. Aaron Palmateer<br>(*past affiliate*) | University of Florida<br>Tropical Research & Education Center<br>18905 SW 280 Street<br>Homestead, FL 33031 |
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