Environment Horticulture Program Research Summaries

IR-4 Environmental Horticulture Program
SP2700 Crop Safety

Authors: Allison Ballantyne, Ely Vea and Cristi Palmer
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Acknowledgements
Susan Bierbrunner

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Table of Contents

Table of Tables

Abstract

SP2700 is a new fungicide being developed by SePro for the control of diseases on environmental horticulture crops such as *Alternaria, Cylindrocladium*, *Fusarium, Rhizoctonia,* and *Thielaviopsis.* The IR-4 Project completed 41 crop safety trials on 14 environmental horticulture plant species or genera from 2018 through 2021. SP2700 was applied either and a foliar spray or as a drench into soilless media. In these trials, six genera or species exhibited minimal or no injury after foliar applications in a minimum of three trials for each crop; these can be added to a list of tolerant plants in the new label for this active ingredient. The remaining eight other species or genera treated with foliar sprays exhibited minimal or no injury in the limited number of trials (one or two) for each crop.
When SP2700 was applied as a drench application, two plant species or genera exhibited moderate to severe negative impacts. The remaining six species or genera treated with drenches exhibited minimal or no injury in the limited number of trials (one or two) for each crop.

Introduction

SP2700 is a new fungicide being developed by SePro for the control of diseases on ornamentals such as *Alternaria, Cylindrocladium*, *Fusarium, Rhizoctonia,* and *Thielaviopsis.* The IR-4 Project completed 41 crop safety trials on 14 ornamental horticulture plant species or genera from 2018 through 2021.

Materials and Methods

SP2700 was applied as foliar treatment three times, at approximately 14 days intervals. This product was also applied once as a drench treatment. The application rates were at 11, 22 and 44 fl oz per 100 gal, plus a water treated control. A minimum of ten plants (replicate treatments) were required. Phytotoxicity was planned to be 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: 18-006, 18-007, 19-006 and 19-007, 20-211, 20-012, 21-011 and 21-012. 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.

SP2700 was supplied to researchers (See list of researchers in Appendix 1) by SePro.

Results and Summary

Based on the type and nature of injury seen with pesticide applications, tested plant species were placed into three 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 SP2700, and 4) more data are needed to make informed recommendations. These categories were represented separately for foliar and drench applications.

Phytotoxicity

As a foliar application, across all crops tested, SP2700 exhibited no or minimal negative impact on all plant species or genera. Six of these crops had the minimum number of three tests for definitive conclusion of crop safety (Table 1). As a foliar application, no crop displayed significant injury with SP2700 (Tables 2 and 3). There are eight species or genera where less than three trials were conducted so there is not enough information available at this time (Table 4). As a foliar application, all trials for each of these crops showed no or minimal, transitory phytotoxicity.

As a drench application, SP2700 exhibited moderate to severe negative impacts on two plant species or genera. None of these crops had the minimum number of three tests for definitive conclusion of crop safety (Table 5). As a drench application, two crops displayed significant injury with SP2700 (Table 7). There are six species or genera where less than three trials were conducted so there is not enough information available at this time (Table 8).

Please see Table 9 for a summary of the individual trial results.

Table 1. List of SP2700 treated crops (foliar) with no or minimal transitory injury.

Chrysanthemum sp.
Hydrangea sp.
Impatiens walleriana
Pelargonium x hortorum
Petunia sp.
Tagetes sp

Table 2. List of SP2700 treated crops (foliar) with no injury at 1X but significant injury at 2X or 4X.

None

Table 3. List of SP2700 treated crops (foliar) with significant injury at 1X.

None

Table 4. List of SP2700 treated crops (foliar) where more information is needed.

Begonia sp. [2]
Dracaena sp. [2]
Fuschia sp. [1]
Impatiens hawkeri [2]
Leucanthemum x superbum [1]
Rosa sp. [2]
Verbena sp. [1]
Viola sp. [2]

Table 5. List of SP2700 treated crops (drench) with no or minimal transitory injury.

None

Table 6. List of SP2700 treated crops (drench) with no injury at 1X but significant injury at 2X or 4X.

None

Table 7. List of SP2700 treated crops (drench) with significant injury at 1X.

Impatiens hawkeri
Pelargonium x hortorum

Table 8. List of SP2700 treated crops (drench) where more information is needed.

Begonia sp. [1]
Chrysanthemum sp. [2]
Dracaena sp. [1]
Impatiens walleriana [1]
Verbena sp [1]
Leucanthemum x superbum [1]

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

Table 9. Detailed Summary of Crop Safety Testing with SP2700

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 3/10/2022 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
33192	Fuschia; Ladies-Eardrops (Fuschia sp.) 'Dollar Princess'	Greenhouse	Freiberger	NJ	2018	Foliar	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly.
33207	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Baysal-Gurel	TN	2018	Foliar	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times.
33207	Hydrangea (Hydrangea sp.) H. macrophylla	Field Container	Uber	CA	2018	Foliar	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly.
33207	Hydrangea (Hydrangea sp.) 'Nikko Blue'	Field Container	Wade	SC	2018	Foliar	No injury with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; all plants marketable.
33201	Impatiens, New Guinea (Impatiens hawkeri) 'Sonic Pink'	Greenhouse	Freiberger	NJ	2018	Foliar	No injury or growth reduction with 11, minor with 22 and 44, fl oz per 100 gal applied 3 times biweekly; plants flowered normally.
33200	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Impreza Cherry Splash'	Greenhouse	Catlin	NY	2018	Foliar	Virtually no injury with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; minor growth reduction at 4X.
33200	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Dazzler Orange'	Greenhouse	Freiberger	NJ	2018	Foliar	No injury or growth reduction with 11, minor with 22 and 44, fl oz per 100 gal applied 3 times biweekly.
33200	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Dazzler Red'	Greenhouse	Vafaie	TX	2019	Foliar	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times.
33895	Daisy, Shasta (Leucanthemum x superbum) 'Snow Lady'	Greenhouse	Freiberger	NJ	2019	Drench	No injury with 11, 22 and 44 fl oz per 100 gal; all plants grew and flowered normally.
33895	Daisy, Shasta (Leucanthemum x superbum) 'Snow Lady'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; all plants grew and flowered normally.
33208	Geranium, Zonal (Pelargonium x hortorum) 'Ringo 2000 Deep Red'	Greenhouse	Freiberger	NJ	2018	Foliar	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; plants flowered normally.
33208	Geranium, Zonal (Pelargonium x hortorum) ‘Dynamite Dark Red’	Greenhouse	Grunwald	OR	2018	Foliar	No injury, growth or flowering reduction when applied at 11, 22 and 44 fl oz per 100 gal rates
33208	Geranium, Zonal (Pelargonium x hortorum) 'Patriot Bright Red'	Greenhouse	Ong	TX	2019	Drench	Moderate to severe injury increasing with rates (11, 22 and 44 oz per 100 gal) applied once.
33208	Geranium, Zonal (Pelargonium x hortorum) 'Patriot Bright Red'	Greenhouse	Ong	TX	2019	Foliar	No significant injury with 11, minor with complete recovery, with 22 and 44 oz per 100 gal applied 3 times biweekly; no significant growth reduction at all rates.
33196	Petunia (Petunia sp.) 'Pretty Flora Midnight'	Greenhouse	Catlin	NY	2018	Foliar	No injury with 11 and 22, minor with 44 fl oz per 100 gal applied 3 times biweekly; no growth reduction.
33196	Petunia (Petunia sp.) 'Cascadias Rim Chianti'	Greenhouse	Freiberger	NJ	2018	Foliar	No injury with 11, minor with 22 and 44 fl oz per 100 gal applied 3 times biweekly; no growth reduction.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
33196	Petunia (Petunia sp.) ‘Wave Deep Blue’	Greenhouse	Grunwald	OR	2018	Foliar	No injury, growth or flowering reduction when applied at 11, 22 and 44 fl oz per 100 gal rates
33196	Petunia (Petunia sp.) P. x hybrida 'Carpet Velvet'	Greenhouse	Hand	OH	2018	Foliar	No injury or significant growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times.
33198	Rose (Rosa sp.) 'Iceberg White'	Field Container	Uber	CA	2018	Foliar	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly.
33198	Rose (Rosa sp.) 'Old Blush'	Field Container	Wade	SC	2018	Foliar	No injury with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; all plants marketable.
33194	Marigold (Tagetes sp.) 'Inca II Orange'	Greenhouse	Catlin	NY	2018	Foliar	No injury with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; minor growth reduction at 4X.
33194	Marigold (Tagetes sp.) 'Boy Orange'	Greenhouse	Freiberger	NJ	2018	Foliar	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; plants flowered normally.
33194	Marigold (Tagetes sp.) ‘Bonanza Orange’	Greenhouse	Grunwald	OR	2018	Foliar	No injury, growth or flowering reduction when applied at 11, 22 and 44 fl oz per 100 gal rates
33197	Vervain (Verbena sp.) ‘Obsession Burgandy’	Greenhouse	Grunwald	OR	2018	Foliar	No injury, growth or flowering reduction when applied at 11, 22 and 44 fl oz per 100 gal rates
33175	Violet (Viola sp.) ‘Pennylane mix’	Greenhouse	Grunwald	OR	2018	Foliar	No injury, growth or flowering reduction when applied at 11, 22 and 44 fl oz per 100 gal rates
33205	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Cool Wave Purple'	Greenhouse	Freiberger	NJ	2018	Foliar	No significant injury or growth reduction with 11, 22 and 44 fl oz per 100 gal applied 3 times biweekly; plants flowered normally.
34021	Clubed Begonia (Begonia semperflorens) 'Ambassador White'	Greenhouse	Bodine	NJ	2020	Drench	Minor injury with 11 and 22, moderate with 44 oz per 100 gal.
34021	Clubed Begonia (Begonia semperflorens) 'Ambassador White'	Greenhouse	Bodine	NJ	2020	Foliar	Minor injury on sprayed foliage with 11, 22 and 44 oz per 100 gal applied 3 times biweekly; no injury on new growth.
34021	Clubed Begonia (Begonia semperflorens)	Greenhouse	Vafaie	TX	2021	Foliar	No injury or growth reduction with 11, 22 and 44 oz per 100 gal.
34022	Daisy/Chrysanthemum (Chrysanthemum sp.) “Sheffield Pink”	Greenhouse	Fraelich	GA	2021	Drench	No injury or growth reduction with 11, 22 and 44 fl oz per 100 gal.
34022	Daisy/Chrysanthemum (Chrysanthemum sp.) “Sheffield Pink”	Greenhouse	Fraelich	GA	2021	Foliar	No injury or growth reduction with 11, 22 and 44 oz per 100 gal applied 3 times biweekly. All plants marketable.
34022	Daisy/Chrysanthemum (Chrysanthemum sp.) 'Snowbound'	Greenhouse	Grunwald	OR	2021	Drench	No injury, growth or flowering reduction when applied at 11, 22 and 44 fl oz per 100 gal rates
34022	Daisy/Chrysanthemum (Chrysanthemum sp.) ‘Snowland’	Greenhouse	Grunwald	OR	2021	Foliar	No injury, growth or flowering reduction when applied at 11, 22 and 44 fl oz per 100 gal rates
34023	Dracaena (Dracaena sp.) 'Spikes'	Greenhouse	Bodine	NJ	2020	Drench	No injury or growth reduction with 11, 22 and 44 oz per 100 gal.
34023	Dracaena (Dracaena sp.) 'Spikes'	Greenhouse	Bodine	NJ	2020	Foliar	No injury or growth reduction with 11, 22 and 44 oz per 100 gal applied 3 times biweekly.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
34023	Dracaena (Dracaena sp.) 'Spike'	Greenhouse	Hausbeck	MI	2021	Foliar	No injury, growth or flowering reduction when applied 3x biweekly at 11, 22 and 44 fl oz per 100 gal rates.
34025	Impatiens, New Guinea (Impatiens hawkeri) 'Deep Rose'	Greenhouse	Bodine	NJ	2020	Drench	Minor injury with 11, moderate and severe with 22 and 44 oz per 100 gal.
34025	Impatiens, New Guinea (Impatiens hawkeri) 'Deep Rose'	Greenhouse	Bodine	NJ	2020	Foliar	No injury or growth reduction with 11, 22 and 44 oz per 100 gal applied 3 times biweekly.
34026	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Beacon White'	Greenhouse	Bodine	NJ	2020	Drench	Minor initial injury with complete recovery with 11, 22 and 44 oz per 100 gal; no growth reduction.
34026	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Beacon White'	Greenhouse	Bodine	NJ	2020	Foliar	No injury or growth reduction with 11, 22 and 44 oz per 100 gal applied 3 times biweekly.
34028	Vervain (Verbena sp.)	Greenhouse	Grunwald	OR	2020	Drench	No injury, growth or flowering reduction when applied at 11, 22 and 44 oz per 100 gal rates

Label Suggestions

In this report, six species and genera exhibited no or minimal injury after foliar treatments of SP2700 at 11, 22 and 44 fl oz per 100 gal. If tested crops will be listed on the label, these can be included in a future label:

Chrysanthemum sp.
Hydrangea sp.
Impatiens walleriana
Pelargonium x hortorum
Petunia sp.
Tagetes sp.

Given the lack of phytotoxicity across so many different plant species and genera, it is suggested that a general statement can be placed on the label such as 'foliar applications have not been demonstrated to cause damage on various environmental horticulture plant species according to labeled use instructions. SP2700 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 SP2700 to that crop.'

In this report, two species and genera exhibited moderate to severe injury after a single drench treatment of SP2700 at 11, 22 and 44 fl oz per 100 gal. It is recommended these crops be listed in a section of the label cautioning against use with drench applications:

Impatiens hawkeri
Pelargonium x hortorum

Appendix 1: Contributing Researchers

Dr. Fulya Baysal-Gurel	Tennessee State University McMinnville, TN 37110
Mr. Dave Bodine	USDA-ARS Cream Ridge Experiment Station Cream Ridge, NJ 08514
Dr. Nora J. Catlin	Cornell Cooperative Extension 423 Griffing Avenue Riverhead, NY
Mr. Tom Freiberger (*retired*)	Rutgers University Cream Ridge Experiment Station 283 Rt. 539 Cream Ridge, NJ 08514
Dr. Francisca Hand	Ohio State University Department of Plant Pathology 475C Kottman Hall Columbus, OH 43210
Dr. Mary Hausbeck	Michigan State University Plant Pathology Department 140 Plant Biology Lab East Lansing, MI 48824
Dr. Kevin Ong	Texas AgriLife Extension Service 1500 Research Pkwy College Station, TX 77845
Mr. Buzz Uber	Crop Inspection Service 31130 Hilltop Drive Valley Center, CA92082
Mr. Erfan Vafaie (*past affiliate*)	Texas AgriLife Extension Service Overton, TX 75684
Mr. Paul Wade	USDA-ARS US Vegetable Laboratory 2700 Savannah Highway Charleston SC 29414