



[Environment Horticulture Program Research Summaries](#)

**IR-4 Ornamental Horticulture Program
Pseudomonas chlororaphis (SP2300, Zio) Crop Safety**

**Authors: Ely Vea and Cristi L. Palmer
Date: November 16, 2018**

**Acknowledgements
Susan Bierbrunner**

This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2015-34383-23710 with substantial cooperation and support from the State Agricultural Experiment Stations and USDA-ARS.

Table of Contents

Table of Contents	2
Table of Tables	3
Abstract	4
Introduction.....	5
Materials and Methods.....	5
Results and Summary	5
Phytotoxicity	5
Label Suggestions	8
Appendix 1: Contributing Researchers.....	9

Table of Tables

Table 1.	List of Pseudomonas chlororaphis (SP2300, Zio) treated crops with no or minimal transitory injury.	6
Table 2.	List of Pseudomonas chlororaphis (SP2300, Zio) treated crops with no injury at 1X but significant injury at 2X or 4X.	6
Table 3.	List of Pseudomonas chlororaphis treated (SP2300, Zio) crops with significant injury at 1X.	6
Table 4.	List of Pseudomonas chlororaphis treated (SP2300, Zio) crops where more information is needed.	6
Table 5	Detailed Summary of Crop Safety Testing with Pseudomonas chlororaphis (SP2300, Zio).	7

Abstract

Pseudomonas chlororaphis (SP2300, Zio) is a new fungicide being developed by AgBiome and SePro for the control of several important diseases including Rhizoctonia, Pythium, and Phytophthora. The IR-4 Project completed 18 crop safety trials on 14 ornamental horticulture plant species or genera during 2017. In these trials, all 14 species or genera exhibited minimal or no injury in the limited number of trials (one or two) for each crop; AgBiome and SePro can consider adding these to the label.

Introduction

Pseudomonas chlororaphis (SP2300, Zio) is a new biological fungicide being developed by AgBiome and SePro for the control of several important diseases including Rhizoctonia, Pythium, and Phytophthora. The IR-4 Project completed 18 crop safety trials on 14 ornamental horticulture plant species or genera during 2017.

Materials and Methods

Pseudomonas chlororaphis (SP2300, Zio) was applied as foliar treatment typically 3 times at approximately 14 days intervals. The application rates were 67, 100 and 200 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 protocol was used: 17-004. For more detailed materials and methods, including application rates for various products, please visit <http://ir4.rutgers.edu/ornamental/OrnamentalDrafts.cfm> to view and download this protocol.

Pseudomonas chlororaphis (SP2300, Zio) 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 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 *Pseudomonas chlororaphis*, and 4) more data is needed to make informed recommendations.

Phytotoxicity

Across all crops tested, *Pseudomonas chlororaphis* exhibited no or minimal negative impact on all plant species or genera. However none of these crops had the minimum number of 3 tests for definitive conclusion of crop safety. There are 14 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 *Pseudomonas chlororaphis* (SP2300, Zio) treated crops with no or minimal transitory injury.

None

Table 2. List of *Pseudomonas chlororaphis* (SP2300, Zio) treated crops with no injury at 1X but significant injury at 2X or 4X.

None

Table 3. List of *Pseudomonas chlororaphis* (SP2300, Zio) treated crops with significant injury at 1X.

None

Table 4. List of *Pseudomonas chlororaphis* (SP2300, Zio) treated crops where more information is needed.

*Antirrhinum majus*¹

Begonia sp.²

Calibrachoa sp.¹

*Euphorbia pulcherrima*²

Gerbera sp.¹

*Impatiens hawkeri*¹

*Impatiens walleriana*¹

*Pelargonium x hortorum*²

Petunia sp.¹

*Salvia splendens*¹

*Salvia sylvestris*¹

Tagetes sp.¹

Verbena sp.²

*Zinnia elegans*¹

¹ No injury in 1 trial

² No injury in 2 trials

Table 5 Detailed Summary of Crop Safety Testing with *Pseudomonas chlororaphis* (SP2300, Zio).

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 10/22/2018 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
32908	Garden Snapdragon (<i>Antirrhinum majus</i>) 'Sonnet White'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves.
32897	Begonia (<i>Begonia</i> sp.)	Greenhouse	Gu	TX	2017	Foliar	Minor injury, with quick recovery, with 67, 100 and 200 oz per 100 gal; no growth reduction.
32897	Begonia (<i>Begonia</i> sp.) 'Megawatt Red'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves.
32901	Calibrachoa (<i>Calibrachoa</i> sp.) 'Cabaret Purple'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or growth reduction with 67, 100 and 200 oz per 100 gal applied 3 times biweekly.
32895	Poinsettia (<i>Euphorbia pulcherrima</i>) 'Prestige Red'	Greenhouse	Catlin	NY	2017	Foliar	No significant injury and no growth reduction with 67, 100 and 200 oz per 100 gal; spray residue levels unacceptable at sale with all rates.
32895	Poinsettia (<i>Euphorbia pulcherrima</i>) 'Whitestar'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves.
32904	Transvaal Daisy (<i>Gerbera</i> sp.) 'Jaguar Scarlet'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves.
32898	Impatiens, New Guinea (<i>Impatiens hawkeri</i>) 'Pure Beauty White'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or growth reduction with 67, 100 and 200 oz per 100 gal applied 3 times biweekly.
32899	Buzzy Lizzy; Impatiens, Common Garden (<i>Impatiens walleriana</i>) 'Blue Pearl'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or growth reduction with 67, 100 and 200 oz per 100 gal applied 3 times biweekly.
32903	Geranium, Zonal (<i>Pelargonium x hortorum</i>) 'Bullseye Scarlet'	Greenhouse	Gu	TX	2017	Foliar	Minor injury, with quick recovery, with 67, 100 and 200 oz per 100 gal; no growth reduction.
32903	Geranium, Zonal (<i>Pelargonium x hortorum</i>) 'Cherry Rose'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves.
32905	Petunia (<i>Petunia</i> sp.) 'Sky Blue'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves.
32906	Scarlet Sage (<i>Salvia splendens</i>) 'Vista Purple'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or growth reduction with 67, 100 and 200 oz per 100 gal applied 3 times biweekly.
32907	Woodland Sage (<i>Salvia x sylvestris</i>) 'May Night'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or growth reduction with 67, 100 and 200 oz per 100 gal applied 3 times biweekly.
32900	Marigold (<i>Tagetes</i> sp.) 'Taishan Orange'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves.
32909	Vervain (<i>Verbena</i> sp.) 'Imagination Violet'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves at 4X.
32909	Vervain (<i>Verbena</i> sp.) 'Tuscany Peach'	Greenhouse	Gu	TX	2017	Foliar	Minor injury, with quick recovery, with 67, 100 and 200 oz per 100 gal; no growth reduction.
32910	Zinnia, Elegant (<i>Zinnia elegans</i>) 'Dreamland Rose'	Greenhouse	Freiberger	NJ	2017	Foliar	No injury or stunting with 67, 100 and 200 oz per 100 gal applied 3 times; slight spray residue on leaves at 4X.

Label Suggestions

In this report, all plants exhibited no or minimal injury after foliar treatments of *Pseudomonas chlororaphis* (SP2300, Zio) at 67, 100 and 200 oz per 100 gal, suggesting that this active ingredient is safe to ornamental horticulture crops. Given the lack of phytotoxicity across so many different plant species and genera, it is suggested that all the 14 plants in Table 4 (listed below) that showed no injury be placed on the *Pseudomonas chlororaphis* label if SePro 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. *Pseudomonas chlororaphis* 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 *Pseudomonas chlororaphis* to that crop'.

Antirrhinum majus

Begonia sp.

Calibrachoa sp.

Euphorbia pulcherrima

Gerbera sp.

Impatiens hawkeri

Impatiens walleriana

Pelargonium x hortorum

Petunia sp.

Salvia splendens

Salvia sylvestris

Tagetes sp.

Verbena sp.

Zinnia elegans

Appendix 1: Contributing Researchers

Mr. Tom Freiberger

Rutgers University
Cream Ridge Experiment Station
283 Rt. 539
Cream Ridge, NJ 08514

Dr. Mengmeng Gu

Texas AgriLife Extension Service
Dept. of Horticulture Sciences
2134 TAMU
College Station TX 77843