



[Environmental Horticulture Program Research Summaries](#)

IR-4 Environmental Horticulture Program Pydiflumetofen Crop Safety

**Authors: Cristi L. Palmer and Ely Vea
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Susan Bierbrunner**

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Abstract

Pydiflumetofen is a new fungicide being developed by Syngenta for the control of leaf spots (*Septoria*, *Cercospora*, *Alternaria*, *Venturia*), powdery mildew, *Fusarium*, *Botrytis*, *Sclerotinia*, *Corynespora*, and other foliar diseases. The IR-4 Project completed 61 crop safety trials on 22 ornamental horticulture plant species or genera during 2015 to 2019. In these trials, all 22 species or genera exhibited minimal or no injury. Ten genera exhibited minimal or no injury in 3 trials and 12 species or genera exhibited minimal or no injury in the limited number of trials (one or two) for each crop. Syngenta may consider adding these to the label.

Introduction

Pydiflumetofen is a new fungicide being developed by Syngenta for the control of leaf spots (*Septoria*, *Cercospora*, *Alternaria*, *Venturia*), powdery mildew, *Fusarium*, *Botrytis*, *Sclerotinia*, *Corynespora*, and other foliar diseases. The IR-4 Project completed 61 crop safety trials on 22 environmental horticulture plant species or genera during 2015 to 2019.

Materials and Methods

Pydiflumetofen was applied as foliar treatment typically 3 times at approximately 14 days intervals; in a few trials, it was applied as a single drench treatment. The application rates were 13.7, 27.4 and 54.8 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: 15-003, 16-004, 16-005, 17-004 and 17-005. 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.

Pydiflumetofen was supplied to researchers (See list of researchers in Appendix 1) by Syngenta.

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 Pydiflumetofen, and 4) more data are needed to make informed recommendations.

Phytotoxicity

Across all crops tested, Pydiflumetofen exhibited no or minimal negative impact on all plant species or genera. Ten genera exhibited minimal or no injury from foliar applied product in 3 trials (Table 1) and 12 species or genera exhibited minimal or no injury in the limited number of trials (one or two) for each crop (Table 4).

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

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

Antirrhinum majus
Begonia sp.
Dianthus sp.
Euphorbia pulcherrima
Gerbera sp.
Impatiens walleriana
Pelargonium x hortorum
Petunia sp.
Salvia sp.
Viola x wittrockiana

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

None

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

None

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

<i>Alyssum montanum</i> ¹	<i>Impatiens hawkeri</i> ²
<i>Alyssum</i> sp. ¹	<i>Lupinus</i> sp. ²
<i>Calibrachoa</i> sp. ²	<i>Osteospermum</i> sp. ²
<i>Chamerops humilis</i> ¹	<i>Salvia greggi</i> ²
<i>Chrysanthemum/Dendranthema x morifolium</i> ¹	<i>Verbena x hybrida</i>
<i>Coreopsis</i> sp. ¹	<i>Verbena</i> sp. ¹

¹ No injury in 1 trial

² No injury in 2 trials

Table 5 Detailed Summary of Crop Safety Testing with Pydiflumetofen.

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 2/20/2020 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
33048	Madwort (<i>Alyssum</i> sp.) <i>A. montanum</i>	Shadehouse/Lath House	Klett	CO	2017	Foliar	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32428	Madwort (<i>Alyssum</i> sp.) 'Clear Crystal Lavender'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	No significant injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32437	Garden Snapdragon (<i>Antirrhinum majus</i>)	Greenhouse	Grunwald	OR	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32437	Garden Snapdragon (<i>Antirrhinum majus</i>)	Greenhouse	Vafaie	TX	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32437	Garden Snapdragon (<i>Antirrhinum majus</i>) 'Montego Purple'	Greenhouse	Hausbeck	MI	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; all treated plants marketable.
32437	Garden Snapdragon (<i>Antirrhinum majus</i>) 'Rocket Mix'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32440	Begonia (<i>Begonia</i> sp.)	Greenhouse	Grunwald	OR	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32440	Begonia (<i>Begonia</i> sp.) <i>B. semperflorens</i> 'Bada Bing'	Greenhouse	Hausbeck	MI	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32440	Begonia (<i>Begonia</i> sp.) 'Dragon Wing Red'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
33047	Begonia (<i>Begonia</i> sp.) 'Summerwings Rose'	Shadehouse/Lath House	Klett	CO	2017	Drench	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal; moderate growth reduction at 4X.
33047	Begonia (<i>Begonia</i> sp.) 'Summerwings Rose'	Shadehouse/Lath House	Klett	CO	2017	Foliar	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32436	Calibrachoa (<i>Calibrachoa</i> sp.) 'Minifamous Neo Pink'	Greenhouse	Hausbeck	MI	2018	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal; all treated plants marketable.
32436	Calibrachoa (<i>Calibrachoa</i> sp.) 'Kabloom Deep Blue'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
33064	Palm, Mediterranean Fan; Dwarf Fan Palm (<i>Chamaerops humilis</i>)	Field Container	Palmateer (UF)	FL	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32434	Hardy Mum (<i>Chrysanthemum/Dendranthema x morifolium</i>) 'Dark Roanole'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32431	Tickseed (<i>Coreopsis</i> sp.) 'Early Sunrise Yellow'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32427	Pink (<i>Dianthus</i> sp.) 'Bouquet Rose Magic'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32427	Pink (<i>Dianthus</i> sp.) <i>D. plumarius</i> 'Jolt Pink'	Greenhouse	Hausbeck	MI	2019	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
33050	Pink (Dianthus sp.) Dianthus SCENT FIRST POT Coral Reef	Shadehouse/Lath House	Klett	CO	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32444	Poinsettia (Euphorbia pulcherrima) 'Prestige Red'	Greenhouse	Catlin	NY	2017	Foliar	No significant injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal; moderate to high spray residue levels unacceptable at sale with 2X and 4X.
32444	Poinsettia (Euphorbia pulcherrima) 'Whitestar'	Greenhouse	Freiberger	NJ	2016	Drench	No injury, growth reduction or delayed blooming with 13.7, 27.4 and 54.8 fl oz per 100 gal.
32444	Poinsettia (Euphorbia pulcherrima) 'Whitestar'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury, growth reduction or delayed blooming with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32432	Transvaal Daisy (Gerbera sp.)	Greenhouse	Grunwald	OR	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32432	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Majorette Pink Halo'	Greenhouse	Meadows	NC	2018	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
32432	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Majorette Pink Halo'	Greenhouse	Meadows	NC	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32432	Transvaal Daisy (Gerbera sp.) 'Garvenia Sweet Honey'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32443	Impatiens, New Guinea (Impatiens hawkeri) 'Divine'	Greenhouse	Baysal-Gurel	TN	2018	Drench	No injury with 13.7, minor with 27.4 and severe with 54.8 fl oz per 100 gal applied 3 times; moderate and severe growth reduction with 2X and 4X.
32443	Impatiens, New Guinea (Impatiens hawkeri) 'Super Sonic Purple'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times; slight leaf yellowing at end of trial.
32442	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Accent Premium Rose'	Greenhouse	Baysal-Gurel	TN	2018	Drench	No injury, growth or flower reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
33051	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Balsam Mix'	Shadehouse/Lath House	Uber	CA	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly.
32442	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Impreza Red'	Greenhouse	Madeiras	MA	2017	Foliar	No injury with 13.7 and 27.4, minor with 54.8, fl oz per 100 gal applied 3 times; minor height reduction with 2X and 4X.
33051	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Sup Elf Lipstick'	Shadehouse/Lath House	Klett	CO	2017	Drench	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal; moderate growth reduction at 4X.
32442	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Super XP Pink'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32426	Lupine (Lupinus sp.)	Greenhouse	Grunwald	OR	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32426	Lupine (Lupinus sp.) 'Gallery Blue'	Greenhouse	Freiberger	NJ	2016	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
32435	Daisybush (<i>Osteospermum</i> sp.) 'Asti Purple'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32435	Daisybush (<i>Osteospermum</i> sp.) 'Asti Purple'	Greenhouse	Meadows	NC	2017	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
32439	Geranium, Zonal (<i>Pelargonium x hortorum</i>) P. zonale 'Patriot Cranberry'	Greenhouse	Hausbeck	MI	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; all treated plants marketable.
32439	Geranium, Zonal (<i>Pelargonium x hortorum</i>) 'Super Moon Red'	Greenhouse	Klett	CO	2018	Drench	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
32439	Geranium, Zonal (<i>Pelargonium x hortorum</i>) 'Super Moon Red'	Greenhouse	Klett	CO	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32439	Geranium, Zonal (<i>Pelargonium x hortorum</i>) 'Zonal Tango Orange'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32438	Petunia (<i>Petunia</i> sp.)	Greenhouse	Beckerman	IN	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32438	Petunia (<i>Petunia</i> sp.) 'Dreams White'	Greenhouse	Madeiras	MA	2017	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
33049	Petunia (<i>Petunia</i> sp.) Petunia hybrid Cascadias Chaplin	Shadehouse/Lath House	Klett	CO	2017	Foliar	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32438	Petunia (<i>Petunia</i> sp.) Petunia x hybrida 'Carpet velvet'	Greenhouse	Hand	OH	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 per 100 gal applied 3 times. Patchy coloration of flower with 2X and 4X.
32438	Petunia (<i>Petunia</i> sp.) 'Tritunia Blue'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	Slight injury only after 3rd application, with complete recovery, with 13.7, 27.4 and 54.8 fl oz per 100 gal; no growth reduction.
32429	Sage (<i>Salvia</i> sp.)	Greenhouse	Grunwald	OR	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32429	Sage (<i>Salvia</i> sp.) 'Evolution White'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32429	Sage (<i>Salvia</i> sp.) S. greggi "Furman Red"	Greenhouse	Ong	TX	2017	Drench	Minor injury with 13.7, 27.4 and 54.8 fl oz per 100 gal; no significant stunting.
33052	Sage (<i>Salvia</i> sp.) S. greggi 'Raspberry'	Shadehouse/Lath House	Klett	CO	2017	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
33052	Sage (<i>Salvia</i> sp.) S. splendens 'Vista Purple'	Shadehouse/Lath House	Hausbeck	MI	2019	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; slight growth increase with 2X and 4X. All treated plants marketable.
32433	Vervain (<i>Verbena</i> sp.) 'Lanai Vintage Vodka'	Greenhouse	Freiberger	NJ	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
33053	Vervain (<i>Verbena</i> sp.) V. x hybrida 'Lanai Magenta'	Shadehouse/Lath House	Klett	CO	2017	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
32441	Violet (<i>Viola</i> sp.) V. cornuta 'Penny™ Denim Jump'	Greenhouse	Klett	CO	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
32430	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Colossus Yellow'	Greenhouse	Freiberger	NJ	2016	Drench	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
32430	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Cool Wave Blue Skies'	Greenhouse	Hand	OH	2018	Drench	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied once.
32430	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Delta Orange Blotch'	Greenhouse	Bodine (NER)	NJ	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32430	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Matrix'	Greenhouse	Madeiras	MA	2017	Drench	Pansies suffered from heat stress and a severe aphid infestation. No injury with 13.7 and 27.4, moderate with 54.8, fl oz per 100 gal; no growth reduction.
32430	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Matrix'	Greenhouse	Madeiras	MA	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
32430	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Spring Matrix Blue Blotch'	Greenhouse	Freiberger	NJ	2019	Drench	No injury with 17.2, 27.4 and 54.8 fl oz per 100 gal applied once; all plants grew and flowered normally.
32430	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Spring Matrix Blue Blotch'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury with 27.4, 54.8 and 111.2 fl oz per 100 gal applied 3 times biweekly; all plants grew and flowered normally.

Label Suggestions

In this report, all plants exhibited no or minimal injury after foliar treatments of Pydiflumetofen at 13.7, 27.4 and 54.8 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 the 22 plants in Table 1 and Table 4 (listed below) that showed no injury be placed on the Pydiflumetofen label if Syngenta 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. Pydiflumetofen 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 Pydiflumetofen to that crop'.

Alyssum montanum

Alyssum sp.

Antirrhinum majus

Begonia sp.

Calibrachoa sp.

Chrysanthemum/Dendranthema x morifolium

Coreopsis sp.

Dianthus sp.

Euphorbia pulcherrima

Gerbera sp.

Impatiens hawkeri

Impatiens walleriana

Lupinus sp.

Osteospermum sp.

Pelargonium x hortorum

Petunia sp.

Salvia greggi

Salvia sp.

Verbena x hybrida

Verbena sp.

Viola sp.

Viola x wittrockiana

Appendix 1: Contributing Researchers

Dr. Fulya Baysal-Gurel	Tennessee State University McMinnville, TN 37110
Dr. Janna Beckerman	Purdue University Lilly Hall Rm 1-321 West Lafayette, IN 47907
Mr. Dave Bodine Mr. Tom Freiberger	Rutgers University Cream Ridge Experiment Station 283 Rt. 539 Cream Ridge, NJ 08514
Dr. Nora J. Catlin	Cornell Cooperative Extension 423 Griffing Avenue Riverhead, NY 11901
Dr. Nik Grunwald	Horticultural Crops Research Lab USDA-ARS 3420 NW Orchard Ave. Corvallis, OR 97330
Dr. Francesca Hand	Ohio State University Department of Plant Pathology 475C Kottman Hall Columbus, OH 43210
Dr. Mary Hausbeck Mr. Blair Harlan	Michigan State University Dept. of Plant Pathology 140 Plant Pathology Building East Lansing, MI 48824
Dr. Jim Klett Ms. Ronda Koski	Colorado State University Department of Horticulture and Landscape Architecture Fort Collins, CO 80423
Dr. Angela Madeiras	University of Massachusetts Extension Plant Diagnostic Lab French Hall 230 Stockbridge Road Amherst MA 01003
Dr. Inga Meadows	North Carolina State University Mountain Horticultural Crops Research 455 Research Drive Mills River NC 28759 828-684-3562

Dr. Kevin Ong	Texas A&M AgriLife Extension L.F. Peterson Building College Station, TX 77843 979-845-8032
Dr. Aaron Palmateer <i>(past affiliate)</i>	University of Florida Tropical Research & Education Center 18905 SW 280 Street Homestead, FL 33031
Mr. Buzz Uber	Crop Inspection Service 31130 Hilltop Drive Valley Center, CA 92082
Mr. Erfan Vafaie	Texas Agrilife Extension Service Overton, TX 75684