



[Environment Horticulture Program Research Summaries](#)

IR-4 Environmental Horticulture Program Pydiflumetofen + Difenconazole Crop Safety

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**Acknowledgements
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Abstract

Postiva (pydiflumetofen + difenoconazole) is a new fungicide registered by Syngenta for the control of foliar diseases of environmental horticulture crops. The IR-4 Project completed 43 crop safety trials on 18 environmental horticulture plant species or genera during 2019 to 2022. In addition, crop safety data were collected during efficacy experiments. Across all crops tested, Pydiflumetofen + difenoconazole generally exhibited no or minimal negative impact. Seven crops were not injured after drench or foliar applications; while *Begonia semperflorens* did not display visible chlorosis or necrosis, but plants at the 4x rate were significantly shorter in one trial. For three crops, more information will be needed to determine response because outcomes have been variable from no impact to significant injury, six crops have been screened in less than three trials.

Introduction

Postiva (pydiflumetofen + difenoconazole) is a new fungicide registered by Syngenta for the control of foliar diseases of environmental horticulture crops. The IR-4 Project completed 43 crop safety trials on 18 environmental horticulture plant species or genera during 2019 to 2022. Crop safety data collected during efficacy experiments are also included.

Materials and Methods

Pydiflumetofen + difenoconazole was applied as a foliar treatment typically 3 times at approximately 14 days intervals or as a single drench treatment. The application rates were 14, 28 and 56 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: 19-006, 19-007, 20-011, 20-012, 21-011, 21-012, 22-014, and 22-015. 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.

Postiva 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 + difenoconazole, and 4) more data is needed to make informed recommendations.

Phytotoxicity

Across all crops tested, Pydiflumetofen + difenoconazole generally exhibited no or minimal negative impact. Seven crops were not injured after drench or foliar applications (Table 1). One crop, *Begonia semperflorens*, did not display visible chlorosis or necrosis, but plants at the 4x rate were significantly shorter in one trial. For three crops, more information will be needed to determine response because outcomes have been variable from no impact to significant injury (Table 3), while six crops have been screened in less than three trials (Table 4).

Please see Table 5 for a comparison of responses across application methods and Table 6 for a summary of individual trial results.

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

Begonia semperflorens (See Gu, moderate stunting)
Calibrachoa sp.
Celosia sp.
Chrysanthemum/Dendranthema sp.

Hydrangea sp.
Pelargonium x hortorum
Tagetes patula
Viola x wittrockiana

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

None

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

None

Table 3. List of Pydiflumetofen + Difenconazole treated crops where more information is needed.

Impatiens hawkeri
Impatiens walleriana

Petunia hybrida (See Gu)

Table 4. List of Pydiflumetofen + Difenconazole treated crops with less than 3 trials.

Catharanthus roseus
Myrtus communis
Paeonia sp.

Rosa sp.¹
Syringa sp.
*Tagetes erecta*¹

¹ No injury in 2 trials

Table 5. Average Crop Safety Rating after Foliar, Drench or Sprench Applications of Pydiflumetofen + Difenconazole

Crop	Application Method		
	Foliar	Drench	Sprenc
<i>Begonia semperflorens</i>	1.0 (1 - 1) n2	2.0 (1 - 3) n2	
<i>Calibrachoa sp.</i>	1.0 (1 - 1) n1	1.0 (1 - 1) n3	
<i>Catharanthus roseus</i>		1.0 (1 - 1) n1	
<i>Celosia sp.</i>	1.5 (1 - 2) n2	1.0 (1 - 1) n1	
<i>Chrysanthemum/Dendranthema sp.</i>	1.0 (1 - 1) n2	1.0 (1 - 1) n1	
<i>Hydrangea sp.</i>	1.0 (1 - 1) n3	1.0 (1 - 1) n1	
<i>Impatiens hawkeri</i>	2.0 (1 - 4) n3	2.5 (1 - 4) n2	
<i>Impatiens walleriana</i>	1.7 (1 - 3) n3	1.0 (1 - 1) n2	
<i>Myrtus communis</i>		1.0 (1 - 1) n1	
<i>Paeonia sp.</i>	1.0 (1 - 1) n1		
<i>Pelargonium x hortorum</i>	1.3 (1 - 2) n3	1.0 (1 - 1) n2	
<i>Petunia x hybrida</i>	1.0 (1 - 1) n1	2.0 (1 - 3) n2	1.0 (1 - 1) n1
<i>Rosa sp.</i>	1.0 (1 - 1) n2		
<i>Syngonium podophyllum</i>	1.0 (1 - 1) n1		
<i>Syringa sp.</i>	1.0 (1 - 1) n1		
<i>Tagetes erecta</i>	1.0 (1 - 1) n1	1.0 (1 - 1) n1	
<i>Tagetes patula</i>	1.5 (1 - 2) n2	1.5 (1 - 2) n2	
<i>Viola X wittrockiana</i>	1.0 (1 - 1) n2	1.0 (1 - 1) n1	

Table 6. Detailed Summary of Crop Safety Testing with Pydiflumetofen + Difenconazole.

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 8/18/2023 are listed below. Efficacy results are included where crop safety data were collected.

PR#	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
34207	Botrytis Gray Mold (<i>Botrytis cinerea</i>)	Peony (<i>Paeonia</i> sp.) 'Allan Rogers'	Field In-Ground	Santamaria	OR	2021	Foliar	Great reduction in floral and foliar disease reduction at 28 oz per 100 gal. No injury or stunting observed.
34020	Botrytis Gray Mold (<i>Botrytis cinerea</i>)	Geranium, Zonal (<i>Pelargonium x hortorum</i>) 'Rocky Mountain Red'	Greenhouse	Hausbeck	MI	2022	Foliar	No significant means separation in percentage leaves symptomatic or disease severity. No injury observed with 28 fl oz per 100 gal applied 0 and 7 days after inoculation.
35120	<i>Thielaviopsis</i> Root Rot (<i>Chalara elegans</i>)	Calibrachoa (<i>Calibrachoa</i> sp.) 'Superbells Lemon Slice'	Greenhouse	Catlin	NY	2020	Drench	Some reduction of disease based on visual assessment for healthy roots after single drench application of 14 or 21 fl oz per 100 gal. No phytotoxicity observed.
34587	<i>Thielaviopsis</i> Root Rot (<i>Chalara elegans</i>)	Periwinkle, Madagascar (<i>Catharanthus roseus</i>) 'Cora XDR Mix'	Greenhouse	Beckerman	IN	2020	Drench	Poor efficacy on a severe disease pressure with 14 and 21 fl oz per 100 gal applied once pre-inoculation.
33894	<i>Cylindrocladium</i> Root Rot (<i>Cylindrocladium</i> sp.)	Myrtle (<i>Myrtus communis</i>)	Greenhouse	Chase	AZ	2019	Drench	Mediocre control of a low disease infection with 28 fl oz per 100 gal applied once.
35357	<i>Myrothecium roridum</i> (<i>Myrothecium roridum</i>)	American Evergreen (<i>Syngonium podophyllum</i>) 'Show Biz'	Greenhouse	Norman	FL	2022	Foliar	No leaf spots found with either 14 fl oz/100 gal or 21 fl oz/100 gal
33891	Phytotoxicity (Phytotoxicity)	Clubed Begonia (<i>Begonia semperflorens</i>) 'Dragon Wing Red'	Greenhouse	Freiberger	NJ	2019	Drench	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal.
33891	Phytotoxicity (Phytotoxicity)	Clubed Begonia (<i>Begonia semperflorens</i>) 'Dragon Wing Red'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
33891	Phytotoxicity (Phytotoxicity)	Clubed Begonia (<i>Begonia semperflorens</i>) 'Bada Bing Scarlet'	Greenhouse	Gu	TX	2021	Drench	No injury with 14, 28 and 56 fl oz per 100 gal; moderate growth reduction.
33891	Phytotoxicity (Phytotoxicity)	Clubed Begonia (<i>Begonia semperflorens</i>) 'Top Hat Scarlet'	Greenhouse	Koski	CO	2021	Foliar	No injury or growth reduction when using 14, 28, and 56 fl oz per 100 gallon rates, applied three times at 14 day intervals.

PR#	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
33893	Phytotoxicity (Phytotoxicity)	Calibrachoa (Calibrachoa sp.) 'Noa Blue Legend'	Greenhouse	Freiberger	NJ	2019	Drench	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal.
33893	Phytotoxicity (Phytotoxicity)	Calibrachoa (Calibrachoa sp.) 'Blue Legend'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
33893	Phytotoxicity (Phytotoxicity)	Calibrachoa (Calibrachoa sp.) 'Chameleon Pink Passion'	Greenhouse	Gu	TX	2021	Drench	No injury with 14, 28 and 56 fl oz per 100 gal; no growth reduction.
33887	Phytotoxicity (Phytotoxicity)	Cockscomb, Wool Flower (Celosia sp.) 'Kosmo Purple Red'	Greenhouse	Bodine	NJ	2021	Drench	No injury with 14, 28, and 56 fl oz per 100 gal
33887	Phytotoxicity (Phytotoxicity)	Cockscomb, Wool Flower (Celosia sp.) 'Kosmo Purple Red'	Greenhouse	Bodine	NJ	2021	Foliar	No to slight injury with 14, 28, and 56 fl oz per 100 gal
33887	Phytotoxicity (Phytotoxicity)	Cockscomb, Wool Flower (Celosia sp.) 'Castle Scarlet'	Greenhouse	Catlin	NY	2020	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times. May be unacceptable spray residue at 4X.
34131	Phytotoxicity (Phytotoxicity)	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Gold Rush Yellow'	Field Container	Catlin	NY	2020	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
34131	Phytotoxicity (Phytotoxicity)	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Rhinos Orange'	Field Container	Klett	CO	2020	Drench	No injury or growth reduction, and no effect on flower production or bloom time, with 14, 28 and 56 fl oz per 100 gal applied once.
34131	Phytotoxicity (Phytotoxicity)	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Rhinos Orange'	Field Container	Klett	CO	2020	Foliar	No injury or growth reduction, and no effect on flower production or bloom time, with 14, 28 and 56 fl oz per 100 gal applied 3 times biweekly.
34133	Phytotoxicity (Phytotoxicity)	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Baysal-Gurel	TN	2020	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times biweekly.
34133	Phytotoxicity (Phytotoxicity)	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Fraelich	GA	2020	Drench	No injury or significant growth reduction with 14, 28 and 56 fl oz per 100 gal; all treated plants marketable.
34133	Phytotoxicity (Phytotoxicity)	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Fraelich	GA	2020	Foliar	No injury or significant growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times; all treated plants marketable.
34133	Phytotoxicity (Phytotoxicity)	Hydrangea (Hydrangea sp.) 'Wee-White' & 'Mini-Mauvette'	Field Container	Hausbeck	MI	2020	Foliar	No injury or adverse effects on crop growth and flower development with 14, 28 and 56 fl oz per 100 gal applied twice biweekly.
33885	Phytotoxicity (Phytotoxicity)	Impatiens, New Guinea (Impatiens hawkeri) 'Divine Pink'	Greenhouse	Catlin	NY	2020	Foliar	No injury with 14, 28 and 56 fl oz per 100 gal after 2nd application, moderate

PR#	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
								to severe increasing with rates after 3rd application; no to minor growth reduction. Unacceptable spray residue at 4X.
33885	Phytotoxicity (Phytotoxicity)	Impatiens, New Guinea (Impatiens hawkeri) 'Harmony Violet'	Greenhouse	Freiberger	NJ	2019	Drench	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal.
33885	Phytotoxicity (Phytotoxicity)	Impatiens, New Guinea (Impatiens hawkeri) 'Harmony Violet'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
33885	Phytotoxicity (Phytotoxicity)	Impatiens, New Guinea (Impatiens hawkeri) 'Harmony Deep Magenta'	Greenhouse	Gu	TX	2021	Drench	No significant injury with 14, moderate with 28 and 56 fl oz per 100 gal; moderate to severe growth reduction.
33885	Phytotoxicity (Phytotoxicity)	Impatiens, New Guinea (Impatiens hawkeri) 'Magnum Hot Pink'	Greenhouse	Koski	CO	2021	Foliar	No injury when using 14, 28, and 56 fl oz per 100 gallon rates, applied three times at 14 day intervals; slight growth reduction seen only at highest rate.
33886	Phytotoxicity (Phytotoxicity)	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Super Elfin Bright Orange'	Greenhouse	Freiberger	NJ	2019	Drench	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal.
33886	Phytotoxicity (Phytotoxicity)	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Super Elfin Bright Orange'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
33886	Phytotoxicity (Phytotoxicity)	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Beacon Orange'	Greenhouse	Hand	OH	2020	Foliar	Minor transient injury (water soaked leaf spots) and moderate stunting was observed increasing with rate (14, 28 54 fl oz per 100 gal).
33889	Phytotoxicity (Phytotoxicity)	Geranium, Zonal (Pelargonium x hortorum) 'Patriot White Imp.'	Greenhouse	Freiberger	NJ	2019	Drench	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal.
33889	Phytotoxicity (Phytotoxicity)	Geranium, Zonal (Pelargonium x hortorum) 'Patriot White Imp.'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
33889	Phytotoxicity (Phytotoxicity)	Geranium, Zonal (Pelargonium x hortorum) 'Americana Coral'	Greenhouse	Gu	TX	2021	Drench	No injury with 14, 28 and 56 fl oz per 100 gal; no significant growth reduction.
33889	Phytotoxicity (Phytotoxicity)	Geranium, Zonal (Pelargonium x hortorum) 'Caliente Coral Salmon'	Greenhouse	Hand	OH	2020	Foliar	No injury with 14, 28 and 54 fl oz per 100 gal but a significant decrease in plant width was observed increasing with rate.
33884	Phytotoxicity (Phytotoxicity)	Petunia (Petunia x hybrida) 'Dream Rose Picotee'	Greenhouse	Freiberger	NJ	2019	Drench	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal.

PR#	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
33884	Phytotoxicity (Phytotoxicity)	Petunia (Petunia x hybrida) 'Dream Rose Picotee'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
33884	Phytotoxicity (Phytotoxicity)	Petunia (Petunia x hybrida) 'Easy Wave Blue'	Greenhouse	Gu	TX	2021	Drench	No significant injury with 14 and 28, moderate with 56 fl oz per 100 gal; no growth reduction.
34130	Phytotoxicity (Phytotoxicity)	Rose (Rosa sp.)	Field Container	Baysal-Gurel	TN	2020	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times biweekly.
34130	Phytotoxicity (Phytotoxicity)	Rose (Rosa sp.) 'Red Drift' & 'Pink Drift'	Field Container	Hausbeck	MI	2020	Foliar	No injury or adverse effects on crop growth and flower development with 14, 28 and 56 fl oz per 100 gal applied twice biweekly.
34128	Phytotoxicity (Phytotoxicity)	Marigold, African (Tagetes erecta) 'Garden Joy Orange'	Greenhouse	Weiland	OR	2021	Drench	No injury with 14, 28, and 56 fl oz per 100 gal, but there was a nonsignificant trend towards less growth in width with increasing rate.
34128	Phytotoxicity (Phytotoxicity)	Marigold, African (Tagetes erecta) 'Garden Joy Orange'	Greenhouse	Weiland	OR	2021	Foliar	No injury or impact on growth with 14, 28, and 56 fl oz per 100 gal.
34129	Phytotoxicity (Phytotoxicity)	Marigold, French (Tagetes patula) 'Durango Bolero'	Greenhouse	Bodine	NJ	2021	Drench	Slight injury with 14, 28, and 56 fl oz per 100 gal
34129	Phytotoxicity (Phytotoxicity)	Marigold, French (Tagetes patula) 'Durango Bolero'	Greenhouse	Bodine	NJ	2021	Foliar	Slight injury with 14, 28, and 56 fl oz per 100 gal
34129	Phytotoxicity (Phytotoxicity)	Marigold, French (Tagetes patula) 'Bonanza Gold'	Greenhouse	Weiland	OR	2021	Drench	No injury or impact on growth with 14, 28, and 56 fl oz per 100 gal.
34129	Phytotoxicity (Phytotoxicity)	Marigold, French (Tagetes patula) 'Bonanza Gold'	Greenhouse	Weiland	OR	2021	Foliar	No injury or impact on growth with 14, 28, and 56 fl oz per 100 gal.
33883	Phytotoxicity (Phytotoxicity)	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Matrix Purple'	Greenhouse	Catlin	NY	2020	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times. Unacceptable spray residue at 4X.
33883	Phytotoxicity (Phytotoxicity)	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Delta Pure Yellow'	Greenhouse	Freiberger	NJ	2019	Drench	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal.
33883	Phytotoxicity (Phytotoxicity)	Pansy, Large Flowering; Wittrock's Violet (Viola X wittrockiana) 'Delta Pure Yellow'	Greenhouse	Freiberger	NJ	2019	Foliar	No injury or growth reduction with 14, 28 and 56 fl oz per 100 gal applied 3 times.
34415	Pseudomonas Syringae Blight (Pseudomonas syringae)	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Beacon Salmon'	Greenhouse	Norman	FL	2020	Foliar	No efficacy against a high disease pressure with 10 and 14 fl oz per 100 gal applied once. No phytotoxicity.

PR#	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
35341	Pseudomonas Syringae Blight (Pseudomonas syringae)	Lilac (Syringa sp.) S. reticulata	Field Container	Baysal-Gurel	TN	2022	Foliar	Great efficacy against bacterial blight observed at 10 fl oz per 100 gal; No Phytotoxicity occurred.
34551	Rhizoctonia solani (Rhizoctonia solani)	Impatiens, Common Garden; Buzzy Lizzy (Impatiens walleriana) 'Dazzler Lilac Splash'	Greenhouse	Hand	OH	2021	Drench	Excellent efficacy with no to some disease incidence and severity with 14 and 21 fl oz per 100 gal. No injury observed.
34578	Rhizoctonia solani (Rhizoctonia solani)	Petunia (Petunia x hybrida)	Greenhouse	Beckerman	IN	2020	Sprench	Mediocre efficacy on a moderate disease pressure at 14 and 21 fl oz per 100 gal applied twice; no visible phytotoxicity.

Label Suggestions

In this report, seven plants exhibited no or minimal injury after drench or foliar treatments of Pydiflumetofen + Difenconazole at 14, 28 and 56 fl oz per 100 gal.

Calibrachoa sp.

Celosia sp.

Chrysanthemum/Dendranthema sp.

Hydrangea sp.

Pelargonium x hortorum

Tagetes patula

Viola x wittrockiana

For *Impatiens hawkeri*, *Impatiens walleriana*, and *Petunia hybrida*, variable responses across trials were observed, so additional research may be needed to clarify outcomes and whether it may be prudent to provide further guidance to growers..

Appendix 1: Contributing Researchers

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