



[Environment Horticulture Program Research Summaries](#)

IR-4 Environmental Horticulture Program Cyflumetofen Crop Safety

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Date: March 7, 2019**

**Acknowledgements
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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 and 2017-34383-27100 with substantial cooperation and support from the State Agricultural Experiment Stations and USDA-ARS.

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Abstract

Sultan (cyflumetofen) was registered for use on greenhouse environmental horticulture crops as foliar spray in the United States on May 9, 2014 to manage mites. The label does not contain a list of crops tested for tolerance. During 2014 to 2018, the IR-4 Project conducted 92 trials on 25 environmental horticulture plant species or genera examining phytotoxicity related to Sultan applications. Sixteen species or genera exhibited no injury in a minimum of 3 trials, and eight species or genera exhibited no or minimal injury in the limited number of trials (one or two) for each crop. BASF can consider adding these to the label. Only one crop (*Impatiens walleriana*) exhibited significant injury or growth reduction during these experiments.

Introduction

Sultan (cyflumetofen) was registered for use on greenhouse environmental horticulture crops as foliar spray in the United States on May 9, 2014 to manage mites. The label does not contain a list of crops tested for tolerance. During 2014 to 2018, the IR-4 Project conducted 92 trials on 25 environmental horticulture plant species or genera examining phytotoxicity related to Sultan applications.

Materials and Methods

Sultan was tested as foliar treatment typically three times at approximately 14 days interval or as a single drench application. The foliar application rates were typically 13.7, 27.4, and 54.8 fl oz per 100 gal, plus a water treated control; a non ionic surfactant was co-applied by most researchers. A minimum of three plants (replicate treatments) were required with most researchers exceeding this minimum. Phytotoxicity was recorded on a scale of 0 to 10 (0 = no phytotoxicity; 10 = complete kill) one to four times from 1 to 6 weeks after initial application. For IR-4 testing, the following protocols were used: 14-008, 15-008, 16-008, 17-008 and 18-011. 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.

Sultan was supplied to researchers (See list of researchers in Appendix 1) by BASF.

Results and Summary

Phytotoxicity

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

Of the 25 species or genera tested, Sultan exhibited no or minimal negative impact on 24 plant species or genera. Sixteen of these had the minimum number of 3 tests for definitive conclusion of crop safety (Table 1). Only one crop (*Impatiens walleriana*) exhibited significant injury or growth reduction during these experiments (Table 2). There are 8 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 (Table 4).

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

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

<i>Alyssum</i> spp.	<i>Gerbera</i> spp.
<i>Angelonia angustifolia</i>	<i>Hedera</i> spp.
<i>Antirrhinum majus</i>	<i>Hibiscus</i> spp.
<i>Calibrachoa</i> spp.	<i>Hydrangea</i> spp.
<i>Chrysanthemum/Dendranthema x morifolium</i>	<i>Impatiens hawkeri</i>
<i>Dahlia</i> spp.	<i>Lobularia maritima</i>
<i>Dracaena</i> spp.	<i>Salvia splendens</i>
<i>Fuschia</i> spp.	<i>Viola</i> spp.

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

Impatiens walleriana

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

None

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

<i>Coreopsis auriculata</i> . ¹	<i>Heucherella x Tiarella</i> ¹
<i>Coreopsis</i> sp. ¹	<i>Pelargonium</i> spp. ¹
<i>Dianthus</i> sp. ¹	<i>Rosa</i> sp. ¹
<i>Geranium</i> sp. ¹	
<i>Heucherella</i> sp. ¹	

¹For these plants, the one or two trials presented here indicate no phytotoxicity or slight, transient injury, but these findings need to be confirmed.

Table 5 Detailed Summary of Crop Safety Testing with Sultan (cyflumetofen).

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 2/28/2019 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31723	Madwort (Alyssum sp.)	Field Container	Reding	OH	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + NIS applied 3 times; all plants marketable.
31723	Madwort (Alyssum sp.) A. maritima 'Wonderlanf'	Field Container	Davis	MI	2014	Foliar	No injury with 13.76, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.
31723	Madwort (Alyssum sp.) A. maritimum 'Wonderland'	Field Container	Davis	MI	2015	Foliar	No significant injury with 13.7, 27.4 and 54.8 fl oz per acre + Capsil applied 3 times.
31723	Madwort (Alyssum sp.) A. saxatilis 'Goldkugel'	Field Container	DeFrancesco	OR	2014	Foliar	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per acre + NIS.
31723	Madwort (Alyssum sp.) Alyssum saxatile 'Summit'	Field Container	Freiberger	NJ	2014	Foliar	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31723	Madwort (Alyssum sp.) 'Easter Bonnet', 'Deep Pink'	Field Container	Wade	SC	2014	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; all plants marketable.
31731	Narrowleaf Angelonia (Angelonia angustifolia) 'Serena Blue'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31731	Narrowleaf Angelonia (Angelonia angustifolia) 'Serenita Purple'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31731	Narrowleaf Angelonia (Angelonia angustifolia) 'Serenita Raspberry'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31722	Garden Snapdragon (Antirrhinum majus) 'Mini Chimes'	Greenhouse	Davis	MI	2014	Foliar	No injury with 13.76, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.
31722	Garden Snapdragon (Antirrhinum majus) 'Orange Candy Show'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31722	Garden Snapdragon (Antirrhinum majus) 'Red Rocket'	Greenhouse	DeFrancesco	OR	2014	Foliar	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per acre + NIS.
31724	Calibrachoa (Calibrachoa sp.)	Greenhouse	Davis	MI	2015	Foliar	No significant injury with 13.7, 27.4 and 54.8 fl oz per acre + Capsil applied 3 times.
31724	Calibrachoa (Calibrachoa sp.) Kabloom Pink Deep	Greenhouse	Gilrein	NY	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
31724	Calibrachoa (Calibrachoa sp.) 'Kabloom White'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31724	Calibrachoa (Calibrachoa sp.) Kabloom Yellow	Greenhouse	Gilrein	NY	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
31724	Calibrachoa (Calibrachoa sp.) 'Superbells Apricot Punch'	Greenhouse	Cloyd	KS	2016	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31728	Hardy Mum (Chrysanthemum/Dendranthema x morifolium)	Field Container	Reding	OH	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + NIS applied 3 times; all plants marketable.
31728	Hardy Mum (Chrysanthemum/Dendranthema x morifolium) 'Outrageous Orange'	Field Container	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31728	Hardy Mum (Chrysanthemum/Dendranthema x morifolium) 'Sparkle White'	Field Container	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31732	Tickseed (Coreopsis sp.) C. auriculata	Field Container	Uber	CA	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31732	Tickseed (Coreopsis sp.) 'Early Sunrise'	Field Container	Wade	SC	2014	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; all plants marketable.
32264	Dahlia (Dahlia sp.)	Field Container	Uber	CA	2017	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times biweekly.
31718	Dahlia (Dahlia sp.) D hybrida 'Grandahlia Deep Red'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31718	Dahlia (Dahlia sp.) D hybrida 'Grandahlia Pink'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31718	Dahlia (Dahlia sp.) D hybrida 'Grandahlia White'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31718	Dahlia (Dahlia sp.) D hybrida 'Grandahlia White/Orange'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31718	Dahlia (Dahlia sp.) D hybrida 'Grandahlia Yellow'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31718	Dahlia (Dahlia sp.) D. hortensis 'Figaro'	Greenhouse	Davis	MI	2014	Foliar	No injury with 13.76, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.
32264	Dahlia (Dahlia sp.) D. hortensis 'Figaro'	Field Container	Davis	MI	2015	Foliar	No significant injury with 13.7, 27.4 and 54.8 fl oz per acre + Capsil applied 3 times.
32264	Dahlia (Dahlia sp.) 'Dahlietta Patty'	Field Container	Gilrein	NY	2017	Foliar	No injury nor effect on plant growth and quality with 13.6, 27.4 and 54.8 fl oz per 100 gal.
32264	Dahlia (Dahlia sp.) 'Dahlietta White'	Field Container	Gilrein	NY	2017	Foliar	No injury nor effect on plant growth and quality with 13.6, 27.4 and 54.8 fl oz per 100 gal.
31718	Dahlia (Dahlia sp.) 'Fresco Mix'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
33170	Pink (Dianthus sp.) Jolt Pink	Field Container	Cloyd	KS	2016	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal.
33170	Pink (Dianthus sp.)	Field Container	Uber	CA	2018	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + Capsil applied twice biweekly.
31738	Dracaena (Dracaena sp.) Cordylene australis	Greenhouse	Gilrein	NY	2015	Foliar	No injury or reduction in plant growth and quality with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31738	Dracaena (Dracaena sp.) D. indivisa	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31738	Dracaena (Dracaena sp.) D. marginata	Greenhouse	Uber	CA	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.
31738	Dracaena (Dracaena sp.) 'Spikes'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31730	Fuschia; Ladies-Eardrops (Fuschia sp.) F. magellanica 'Lena'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31730	Fuschia; Ladies-Eardrops (Fuschia sp.) F. magellanica 'Swingtime'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31730	Fuschia; Ladies-Eardrops (Fuschia sp.) F. x hybrida 'Neon White'	Greenhouse	Gilrein	NY	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times; improved plant quality.
31730	Fuschia; Ladies-Eardrops (Fuschia sp.) F. x hybrida 'Southgate'	Greenhouse	Gilrein	NY	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times; improved plant quality.
31730	Fuschia; Ladies-Eardrops (Fuschia sp.) 'Marinka'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury and more vigorous plants with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31730	Fuschia; Ladies-Eardrops (Fuschia sp.) New Wind Chimes Dark Eyes	Greenhouse	Cloyd	KS	2015	Foliar	No injury with 10, 13.7, and 15 fl oz per 100 gal.
31730	Fuschia; Ladies-Eardrops (Fuschia sp.) New Wind Chimes Dark Eyes	Greenhouse	Cloyd	KS	2016	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal.
31721	Transvaal Daisy (Gerbera sp.)	Greenhouse	Cloyd	KS	2015	Foliar	No injury with 10, 13.7, and 15 fl oz per 100 gal.
31721	Transvaal Daisy (Gerbera sp.) 'Mega Orange'	Greenhouse	Uber	CA	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times biweekly.
31721	Transvaal Daisy (Gerbera sp.) 'Mega Rev Mix'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31721	Transvaal Daisy (Gerbera sp.) 'Revolution Rose Bright Eye'	Greenhouse	Gilrein	NY	2017	Foliar	No injury nor effect on plant growth and quality with 13.6, 27.4 and 54.8 fl oz per 100 gal.
31721	Transvaal Daisy (Gerbera sp.) 'Revolution Yellow Light Eye'	Greenhouse	Gilrein	NY	2017	Foliar	No injury nor effect on plant growth and quality with 13.6, 27.4 and 54.8 fl oz per 100 gal.
31736	Ivy (Hedera sp.) 'English Ivy-Green'	Field Container	Wade	SC	2014	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; all plants marketable.
31736	Ivy (Hedera sp.) H. canariensis	Field Container	Uber	CA	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31736	Ivy (Hedera sp.) H. helix	Field Container	Davis	MI	2015	Foliar	No significant injury with 13.7, 27.4 and 54.8 fl oz per acre + Capsil applied 3 times.
31736	Ivy (Hedera sp.) H. helix	Field Container	Fraelich	GA	2016	Foliar	No injury or difference in plant growth and marketability with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31735	Foamy Bells (Heucherella sp.) 'Brass Lantern'	Field Container	Gilrein	NY	2017	Foliar	No injury nor effect on plant growth and quality with 13.6, 27.4 and 54.8 fl oz per 100 gal.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31735	Foamy Bells (Heucherella sp.) Heucherella x Tiarella 'Pink Fizz'	Field Container	Davis	MI	2015	Foliar	No significant injury with 13.7, 27.4 and 54.8 fl oz per acre + Capsil applied 3 times.
31733	Rosemallow (Hibiscus sp.) 'Disco Belle Mix'	Field Container	Wade	SC	2014	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; all plants marketable.
31733	Rosemallow (Hibiscus sp.) H. syriacus 'Azurri Blue Satin'	Field Container	Reding	OH	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + NIS applied 3 times; all plants marketable.
31733	Rosemallow (Hibiscus sp.) 'White Wing'	Field Container	Uber	CA	2015	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31734	Hydrangea (Hydrangea sp.) 'Glowing Embers'	Field Container	Persad	OH	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + Capsil applied twice.
31734	Hydrangea (Hydrangea sp.) H. macrophylla 'Robert'	Field Container	DeFrancesco	OR	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per acre + NIS.
31734	Hydrangea (Hydrangea sp.) H. paniculata 'Fire Light'	Field Container	Reding	OH	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + NIS applied 3 times; all plants marketable.
31734	Hydrangea (Hydrangea sp.) 'Mac. Nikko Blue'	Field Container	Wade	SC	2014	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times biweekly; all plants marketable.
31719	Impatiens, New Guinea (Impatiens hawkeri)	Greenhouse	Davis	MI	2015	Foliar	No significant injury with 13.7, 27.4 and 54.8 fl oz per acre + Capsil applied 3 times.
31719	Impatiens, New Guinea (Impatiens hawkeri) 'Divine Cherry'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31719	Impatiens, New Guinea (Impatiens hawkeri) 'Divine Orange'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31719	Impatiens, New Guinea (Impatiens hawkeri) 'Sun Harmony Deep Pink'	Greenhouse	Cloyd	KS	2015	Foliar	No injury with 10, 13.7, and 15 fl oz per 100 gal.
31719	Impatiens, New Guinea (Impatiens hawkeri) 'Sun Harmony Deep Pink'	Greenhouse	Cloyd	KS	2016	Foliar	No injury with 13.7, 27.4 and 54.8 fl oz per 100 gal.
31720	Impatiens; Touch-me-not (Impatiens sp.) 'Dark Salmon Glow'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury and more vigorous plants with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31720	Impatiens; Touch-me-not (Impatiens sp.) 'Harmony Red Fire'	Greenhouse	Freiberger	NJ	2014	Foliar	Virtually no injury and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31720	Impatiens; Touch-me-not (Impatiens sp.) I. walleriana 'Dazzler Tutti Frutti Mix'	Greenhouse	Vafaie	TX	2015	Foliar	Slight to moderate injury increasing with rates (13.7, 27.4 and 54.8 fl oz per 100 gal) + Preference after 2nd applic., with virtually complete recovery 2 weeks after 3rd applic.; moderate stunting.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31720	Impatiens; Touch-me-not (Impatiens sp.) I. walleriana 'Super Elfin Lipstick '	Greenhouse	Vafaie	TX	2015	Foliar	Moderate injury with 13.7, 27.4 and 54.8 fl oz per 100 gal + Preference after 2nd applic., with virtually complete recovery 2 weeks after 3rd applic. for 1X and 2X; no growth reduction.
32634	Buzzy Lizzy; Impatiens, Common Garden (Impatiens walleriana) 'Super Elfin'	Field Container	Davis	MI	2015	Foliar	No significant injury with 13.7, 27.4 and 54.8 fl oz per acre + Capsil applied 3 times.
31737	Sweet Alyssum (Lobularia maritima)	Field Container	Uber	CA	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.
31737	Sweet Alyssum (Lobularia maritima) Clear Crystal White	Field Container	Gilrein	NY	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
31737	Sweet Alyssum (Lobularia maritima) Easter Bonnet Rose Deep	Field Container	Gilrein	NY	2016	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal.
31717	Geranium (Pelargonium sp.) 'Pink Elite'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or significant growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31717	Geranium (Pelargonium sp.) 'Pinto Premium White to Rose'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury, growth reduction or delay in blooming with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31729	Rose (Rosa sp.) 'First Impression'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31729	Rose (Rosa sp.) 'Powerhouse'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.6, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31725	Scarlet Sage (Salvia splendens)	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31725	Scarlet Sage (Salvia splendens) 'Lighthouse Red'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31725	Scarlet Sage (Salvia splendens) S. splendens 'Sally'	Greenhouse	Davis	MI	2014	Foliar	No injury with 13.76, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.
31725	Scarlet Sage (Salvia splendens) 'Vista Purple'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31726	Violet (Viola sp.) 'Frizzy Lemonberry'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31726	Violet (Viola sp.) 'Matrix Raspberry Sun'	Greenhouse	Freiberger	NJ	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31727	Violet (Viola sp.) V. cornuta	Field Container	Reding	OH	2014	Foliar	No injury or growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal + NIS applied 3 times; all plants marketable.
31726	Violet (Viola sp.) V. cornuta 'Sorbet XP Black Cherry'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31726	Violet (Viola sp.) V. cornuta 'Sorbet XP Yellow Blotch'	Greenhouse	Gilrein	NY	2014	Foliar	No injury on leaves and flowers, and no growth reduction with 13.7, 27.4 and 54.8 fl oz per 100 gal applied 3 times.
31726	Violet (Viola sp.) V. wiitrockiana	Greenhouse	Davis	MI	2014	Foliar	No injury with 13.76, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31727	Violet (Viola sp.) V. wittrockiana	Field Container	Davis	MI	2014	Foliar	No injury with 13.76, 27.4 and 54.8 fl oz per 100 gal + Capsil applied 3 times.

Label Suggestions

In this report, the following 16 species or genera listed below exhibited minimal or no injury after foliar sprays of cyflumetofen at 13.7, 27.4, and 54.8 fl oz per 100 gal. Eight of the other 9 species or genera showed no injury, 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 8 plants in Table 4 that showed no injury be placed on the Sultan label if BASF has similar results on these crops. Also, the current label already includes 'Use Precautions' that when followed, would virtually eliminate any potential for crop injury under commercial use.

Alyssum sp.

Angelonia angustifolia

Antirrhinum majus

Calibrachoa spp.

Chrysanthemum/Dendranthema sp.

Dahlia spp.

Dracaena spp.

Fuschia spp.

Gerbera spp.

Hedera spp.

Hibiscus spp.

Hydrangea spp.

Impatiens hawkeri

Lobularia maritima

Salvia splendens

Viola sp.

There is only one species (*Impatiens walleriana*) that showed significant injury in two of three experiments.

Appendix 1: Contributing Researchers

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