

**IR-4 Ornamental Horticulture Program
Kontos (Spirotetramat) Crop Safety**

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Abstract

Spirotetramat was registered as Kontos for use on ornamentals applied foliar or drench in the United States in 2008. The label recommends use on ornamental horticulture plants except a few species or genera specified in the label. From 2007 to 2009, the IR-4 Project conducted 86 trials on 30 ornamental plant species examining phytotoxicity related to Kontos applications. In these trials, only 5 crops (*Begonia* sp, *Coleus x hybridus*, *Petunia* sp., *Pelargonium* sp. and *Viola* sp.) exhibited noticeable, significant injury and that was a slight height reduction, leaf curling, bleaching of flowers or plant death at the 2X and 4X rates applied as drench. Based on this information, it is recommended that the label prohibits drench application on *Begonia* sp., *Coleus x hybridus*, *Petunia* sp. and *Viola* sp. The current label does not recommend use of Kontos on *Pelargonium* spp. Foliar application on these species may be recommended with the precautionary statements in the CROP TOLERANCE section of the current Kontos label.

Introduction

Spirotetramat was registered as Kontos for use on ornamentals applied foliar or drench in the United States in 2008. The label recommends use on ornamental horticulture plants except a few species or genera specified in the label. From 2007 to 2009, the IR-4 Project conducted 86 trials on 30 ornamental plant species examining phytotoxicity related to Kontos applications.

Materials and Methods

Kontos was tested as foliar treatment typically three times at approximately 14 days interval or as a single drench application. The application rates were typically 3.4, 6.8 and 13.6 fl oz per 100 gal applied foliar and 3.4 and 13.6 fl oz per 1500 4-in pots applied as drench, plus a water treated control. Kontos was applied as drench two weeks after transplanting. 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 8 weeks after initial application. For more detailed materials and methods, please see Appendix 1: Protocols.

Kontos was supplied to researchers (See list of researchers in Appendix 2) by Bayer and OHP.

Results and Summary

Phytotoxicity

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 sufficient to recommend growers not utilize azoxystrobin, and 4) more data is needed to make informed recommendations.

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

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

<i>Begonia sp.</i> ¹	<i>Tagetes sp.</i>
<i>Codiaeum variegatum</i>	<i>Torenia sp.</i>
<i>Dendranthema sp.</i>	<i>Vinca sp.</i>
<i>Dianthus caryophyllus</i>	<i>Viola sp.</i> ¹
<i>Pelargonium sp.</i> ¹	
<i>Petunia sp.</i> ¹	
<i>Salvia officinalis</i>	

¹ With foliar application only

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

*Begonia sp.*¹

*Petunia sp.*¹

1 Injury only with drench application.

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

*Pelargonium sp.*¹

1 Injury only with drench application.

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

*Anthurium andraeanum*¹

*Coleus x hybridus*²

*Euphorbia pulcherrima*¹

*Gerbera jamesonii*¹

*Hydrangea sp.*¹

*Impatiens sp.*¹

*Lantana sp.*¹

*Lilium sp.*¹

*Magnolia sp.*¹

*Rosa cortada*¹

*Verbena sp.*¹

*Viburnum sp.*¹

*Viola sp.*²

1 No injury with drench or foliar application in 1 trial.

2 Injury only with drench application.

Table 5 Detailed Summary of Crop Safety Testing with Kontos (spirotetramat)

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 7/15/2010 are listed below.

PR#	Crop CommonName	Crop LatinName	Crop Cultivar	Production Site	Researcher	Year	Application method	Results	File Name
29141	Flamingo-lily	Anthurium andraeanum	'Leahi'	Greenhouse	Hara	2009	Foliar	No injury at 6.8 and 13.6 fl oz per 100 gal applied as foliar spray 3 times.	20100407a.pdf
29141	Flamingo-lily	Anthurium andraeanum	'Leahi'	Greenhouse	Hara	2009	Drench	No injury at 6.8 and 13.6 fl oz per 100 gal applied as a single drench.	20100407a.pdf
26952	Begonia	Begonia sp.	'Babywing White'	Greenhouse	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26952	Begonia	Begonia sp.	'Babywing White'	Greenhouse	Chen	2007	Foliar	No leaf injury or plant growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant; very minor flower injury from BYI 8330 at 4X	20070317b.pdf
26952	Begonia	Begonia sp.	'Ambassador Scarlet'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26952	Begonia	Begonia sp.	'Olympia Red'	Greenhouse	Freiberger	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
26952	Begonia	Begonia sp.	'Vodka Bright Red'	Greenhouse	Freiberger	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
26952	Begonia	Begonia sp.	'Olympia Red'	Greenhouse	Freiberger	2008	Drench	No to moderate injury increasing with rate (3.4, 6.8 or 13.6 fl oz per 100 gal).	20090319d.pdf
26952	Begonia	Begonia sp.	'Vodka Bright Red'	Greenhouse	Freiberger	2008	Drench	No to moderate injury increasing with rate (3.4, 6.8 or 13.6 fl oz per 100 gal).	20090319d.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Batik'	Greenhouse	Ludwig	2007	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied as a single drench.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Curly Boy'	Greenhouse	Ludwig	2007	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied as a single drench.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Mammy'	Greenhouse	Ludwig	2007	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied foliar with CapSil 3 times.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Bananas'	Greenhouse	Ludwig	2007	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied as a single drench.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Petra'	Greenhouse	Ludwig	2007	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied as a single drench.	20091209a.pdf

PR#	Crop CommonName	Crop LatinName	Crop Cultivar	Production Site	Researcher	Year	Application method	Results	File Name
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Curly Boy'	Greenhouse	Ludwig	2007	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied foliar with CapSil 3 times.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Mammy'	Greenhouse	Ludwig	2007	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied as a single drench.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Bananas'	Greenhouse	Ludwig	2007	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied foliar with CapSil 3 times.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Batik'	Greenhouse	Ludwig	2007	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied foliar with CapSil 3 times.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Petra'	Greenhouse	Ludwig	2007	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied foliar with CapSil 3 times.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Moira'	Greenhouse	Ludwig	2007	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied foliar with CapSil 3 times.	20091209a.pdf
27781	Croton, Variegated Laurel	Codiaeum variegatum	'Moira'	Greenhouse	Ludwig	2007	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal applied as a single drench.	20091209a.pdf
26955	Coleus, Flamenettle	Coleus sp.	C. x hybridus 'Wizard'	Greenhouse	Hausbeck	2009	Drench	Significant injury (stunting and leaf curling) at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26955	Coleus, Flamenettle	Coleus sp.	C. x hybridus 'Wizard'	Greenhouse	Hausbeck	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26954	Chrysanthemum, Garden	Dendranthema sp.	'Big Yellow'	Greenhouse	Chen	2007	Foliar	No significant leaf and flower injury or plant growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant	20070317b.pdf
26954	Chrysanthemum, Garden	Dendranthema sp.	'Big Yellow'	Greenhouse	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26954	Chrysanthemum, Garden	Dendranthema sp.	'Silver Prin'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	
26953	Carnation	Dianthus caryophyllus	'Bath's Pink'	Greenhouse	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26953	Carnation	Dianthus caryophyllus	'Bath's Pink'	Greenhouse	Chen	2007	Foliar	No leaf injury or plant growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant; minor flower injury and earlier senescence from BYI 8330 at 2X and 4X	20070317b.pdf
26953	Carnation	Dianthus caryophyllus	'Lillipot Mix'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf

PR#	Crop CommonName	Crop LatinName	Crop Cultivar	Production Site	Researcher	Year	Application method	Results	File Name
26966	Poinsettia	Euphorbia pulcherrima		Greenhouse	Fraelich	2009	Drench	No injury, slight growth reduction applied as a drench at 3.4, 6.8 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231h.pdf
26966	Poinsettia	Euphorbia pulcherrima		Greenhouse	Fraelich	2009	Foliar	No injury, slight growth reduction applied foliar at 3.4, 6.8 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231h.pdf
29157	Transvaal Daisy	Gerbera sp.	G. jamesonii	Field Container	Fraelich	2009	Drench	No injury or growth reduction applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231g.pdf
29157	Transvaal Daisy	Gerbera sp.	G. jamesonii	Field Container	Fraelich	2009	Foliar	No injury or growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29158	Hydrangea	Hydrangea sp.	H. macrophylla 'Nikko Blue'	Field Container	Fraelich	2009	Foliar	No injury or growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29158	Hydrangea	Hydrangea sp.	H. macrophylla 'Nikko Blue'	Field Container	Fraelich	2009	Drench	No injury or growth reduction applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231g.pdf
26960	Balsam	Impatiens sp.	'Divine Cherry Red'	Greenhouse	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26960	Balsam	Impatiens sp.	'Divine Cherry Red'	Greenhouse	Chen	2007	Foliar	No significant leaf injury or plant growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant; minor flower injury from BYI 8330 at 2X and 4X	20070317b.pdf
26960	Balsam	Impatiens sp.	'Accent White'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4 or 6.8 per 100 gal, but cupping of leaves and delay in flowering observed with 13.8 fl oz per 100 gal.	20080404b.pdf
29159	Shrub Verbena	Lantana sp.	Lantana x 'Mone'	Field Container	Fraelich	2009	Drench	No injury or growth reduction applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231g.pdf
29159	Shrub Verbena	Lantana sp.	Lantana x 'Mone'	Field Container	Fraelich	2009	Foliar	No injury or growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29160	Lily	Lilium sp.	'Asiatic'	Field Container	Fraelich	2009	Foliar	No injury applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29160	Lily	Lilium sp.	'Asiatic'	Field Container	Fraelich	2009	Drench	No injury applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots but slight growth reduction at highest rate; all plants marketable.	20091231g.pdf
26973	Magnolia	Magnolia sp.		Field Container	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf

PR#	Crop CommonName	Crop LatinName	Crop Cultivar	Production Site	Researcher	Year	Application method	Results	File Name
26973	Magnolia	Magnolia sp.		Field Container	Chen	2007	Foliar	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant.	20070317b.pdf
26957	Geranium	Pelargonium sp.	'Freestyle Cherry' Ivy type	Greenhouse	Chen	2007	Foliar	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant.	20070317b.pdf
26957	Geranium	Pelargonium sp.	'Freestyle Cherry' Ivy type	Greenhouse	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal.	20070317b.pdf
29161	Geranium	Pelargonium sp.	P. x hortorum	Field Container	Fraelich	2009	Foliar	No injury or growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29161	Geranium	Pelargonium sp.	P. x hortorum	Field Container	Fraelich	2009	Drench	Severe injury (100 % flower loss) applied drench at 3.4 and 13.6 fl oz per 1500 4-in pots.	20091231g.pdf
26957	Geranium	Pelargonium sp.	P. x hortorum 'Rocky Mountain Red'	Greenhouse	Hausbeck	2009	Drench	Severe injury (stunting and plant death) at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26957	Geranium	Pelargonium sp.	P. x hortorum 'Rocky Mountain Red'	Greenhouse	Hausbeck	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26965	Petunia	Petunia sp.	'Dreams Pink Morn'	Greenhouse	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26965	Petunia	Petunia sp.	'Dreams Pink Morn'	Greenhouse	Chen	2007	Foliar	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant	20070317b.pdf
26965	Petunia	Petunia sp.	'Wave Purple'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26965	Petunia	Petunia sp.	'Ultra Red'	Greenhouse	Freiberger	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
26965	Petunia	Petunia sp.	'Dream Midnight	Greenhouse	Freiberger	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
26965	Petunia	Petunia sp.	'Dream Midnight	Greenhouse	Freiberger	2008	Drench	No to moderate injury (bleaching of flowers) increasing with rate (3.4, 6.8 or 13.6 fl oz per 100 gal).	20090319d.pdf
26965	Petunia	Petunia sp.	'Ultra Red'	Greenhouse	Freiberger	2008	Drench	No to moderate injury (bleaching of flowers) increasing with rate (3.4, 6.8 or 13.6 fl oz per 100 gal).	20090319d.pdf

PR#	Crop CommonName	Crop LatinName	Crop Cultivar	Production Site	Researcher	Year	Application method	Results	File Name
29162	Rose	Rosa sp.	R. cortada	Field Container	Fraelich	2009	Foliar	No injury or growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29162	Rose	Rosa sp.	R. cortada	Field Container	Fraelich	2009	Drench	No injury or growth reduction applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231g.pdf
29163	Sage, common	Salvia officinalis		Field Container	Fraelich	2009	Foliar	No injury or growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29163	Sage, common	Salvia officinalis		Field Container	Fraelich	2009	Drench	No injury or growth reduction applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231g.pdf
26968	Sage, common	Salvia officinalis	'Salsa Scarlet'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26968	Sage, common	Salvia officinalis	V. splendens 'Vista Purple'	Greenhouse	Hausbeck	2009	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26968	Sage, common	Salvia officinalis	S. splendens 'Vista Purple'	Greenhouse	Hausbeck	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
29164	Marigold	Tagetes sp.	T. erecta	Field Container	Fraelich	2009	Drench	No injury, slight growth reduction applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231g.pdf
29164	Marigold	Tagetes sp.	T. erecta	Field Container	Fraelich	2009	Foliar	No injury, slight growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
26963	Marigold	Tagetes sp.	'Durango Yellow'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
29165	Wishbone Flower	Torenia sp.	Torenia x 'yellow'	Field Container	Fraelich	2009	Foliar	No injury or growth reduction applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29165	Wishbone Flower	Torenia sp.	Torenia x 'yellow'	Field Container	Fraelich	2009	Drench	No injury or growth reduction applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; all plants marketable.	20091231g.pdf
26969	Wishbone Flower	Torenia sp.	'Clown Mix'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26970	Vervain	Verbena sp.	'Quartz Mix'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26974	Arrowwood	Viburnum sp.	'Autumn Jazz'	Field Container	Chen	2007	Drench	No injury at 3.4, 6.8 or, 13.6 fl oz per 100 gal.	20070317b.pdf
26974	Arrowwood	Viburnum sp.	'Autumn Jazz'	Field Container	Chen	2007	Foliar	No injury at 3.4, 6.8 or, 13.6 fl oz per 100 gal.	20070317b.pdf

PR#	Crop CommonName	Crop LatinName	Crop Cultivar	Production Site	Researcher	Year	Application method	Results	File Name
26971	Periwinkle	Vinca sp.	'Pacifica Red'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26971	Periwinkle	Vinca sp.	V. minor	Greenhouse	Hausbeck	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26971	Periwinkle	Vinca sp.	V. minor	Greenhouse	Hausbeck	2009	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26964	Pansy	Viola sp.	'XX Large Yellow'	Greenhouse	Chen	2007	Foliar	No significant leaf injury or plant growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant; minor flower injury more likely caused by surfactant.	20070317b.pdf
26964	Pansy	Viola sp.	'XX Large Yellow'	Greenhouse	Chen	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26964	Pansy	Viola sp.	V. x wittrockiana	Greenhouse	Fraelich	2009	Drench	Slight injury at 3.4, 6.8 and 13.6 fl oz per 1500 4-in pots applied drench; flowers were removed by applications initially, but by the end of the experiment reduced marketability was only observed with 4X drench.	20091231h.pdf
26964	Pansy	Viola sp.	V. x wittrockiana	Greenhouse	Fraelich	2009	Foliar	No injury at 3.4, slight at 6.8 and 13.6 fl oz per 100 gal + NIS applied foliar; flowers were removed by treatments initially, but by the end of the experiment all plants were marketable.	20091231h.pdf
26964	Pansy	Viola sp.	'Sorbet Mix'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
29167	Zinnia	Zinnia sp.		Field Container	Fraelich	2009	Drench	No injury applied as a drench at 3.4 and 13.6 fl oz per 1500 4-in pots; slight growth reduction at 13.6 fl oz; all plant marketable.	20091231g.pdf
29167	Zinnia	Zinnia sp.		Field Container	Fraelich	2009	Foliar	No injury applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
26972	Zinnia	Zinnia sp.	'Dreamland Mix'	Greenhouse	Freiberger	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26972	Zinnia	Zinnia sp.	Z. elegans	Greenhouse	Hausbeck	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26972	Zinnia	Zinnia sp.	Z. elegans	Greenhouse	Hausbeck	2009	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf

Label Suggestions

It is recommended that the Kontos label adds prohibition of drench application on *Begonia* sp., *Coleus x hybridus*, *Petunia* sp. and *Viola* sp. Foliar application on these species and *Pelargonium* spp. may be recommended with the precautionary statements in the CROP TOLERANCE section of the current label.

Appendix 1: Available Protocol

Phytotoxicity to ornamental horticulture plants from BYI-8330 (spirotetramat).

Ornamental Protocol Number: 07-023

Objective: Determine phytotoxicity of BYI-8330 240 SC to select ornamental horticulture plants.

Experimental Design:

Plot Size: Must be adequate to reflect actual use conditions.

Replicates: Minimum of 3 replications (preferably 4) with 3 plants per replicate

Application Instructions: Apply first foliar and drench applications 2 weeks after transplanting into 4" pots. Repeat foliar applications twice at 2 week intervals. Add a surfactant to the spray solution for the foliar applications.

Plant Materials: Greenhouse, field container or field in-ground. Please specify in final report. Bedding plants and/or tropical foliage plants grown in the greenhouse or in field container. Please specify in final report.

Evaluations: Record plant height & width at initial and final evaluations. At 1, 2, 3, 4, 5, and 6 weeks after initial application, record phytotoxicity on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill). If appropriate, also include ratings for chlorosis, defoliation, discoloration, stunting or other growth effects on a scale of 0 to 10 (0 = No effect; 10 = Complete plant affected). Please record any issues with flowers, such as damage or flower bud development. If any phytotoxicity is observed in treated plants, take pictures comparing treated and untreated plant material.

If different application methods or evaluations are made, please clearly specify differences in final report and explain how they enhanced results.

Recordkeeping: Keep detailed records of weather conditions including temperature and precipitation, soil-type or soil-less media, application equipment, irrigation, liner size, plant height & width, and plant growth stage at application and data collection dates.

Treatments:

Product	Rates	Special Instructions	Contact Information to obtain materials and any needed adjuvants
BYI-8330 240 SC	3.4 fl oz per 100 gal plus surfactant	Foliar applications: 2 weeks after transplanting and then every 2 weeks after for a total of 3 applications. Use approximately 100 gal of mix solution per acre.	Bayer, Mike Gorrell, 919-549-2423, mike.gorrell@bayercropscience.com Or Bayer, Nate Royalty, 919-549-2532, Nate.Royalty@Bayercropscience.com
	6.8 fl oz per 100 gal plus surfactant		
	13.6 fl oz per 100 gal plus surfactant		
	3.4 fl oz per 1500 4" pots	Drench applications: Single drench 2 weeks after transplanting using enough volume to wet soil media without loss of liquid from bottom of container. Please note volume used in final report.	
	6.8 fl oz per 1500 4" pots		
	13.6 fl oz per 1500 4" pots		
Untreated	--	--	

Reports:

Reports submitted on the standard IR-4 Ornamental Horticulture Research Report Form are preferred.

A report submitted electronically is preferred but not required. If the report is provided electronically, the basic report can be sent in MS Word or WordPerfect, the recordkeeping information as pdf or other electronic documents, and the raw data in MS Excel or other suitable program such as ARM.

Please direct questions to: Cristi Palmer, IR-4 HQ, Rutgers University, 500 College Road East, Suite 201W, Princeton, NJ 08540, Phone 732-932-9575 x4629, palmer@aesop.rutgers.edu.

Draft Date: 5/25/2007

Revised By: CLP

Phytotoxicity to ornamental horticulture plants from BYI-8330 (spirotetramat). **Final**

Ornamental Protocol Number: 09-016

Objective: Determine phytotoxicity of BYI-8330 240 SC to select ornamental horticulture plants.

Experimental Design:

Plot Size: Must be adequate to reflect actual use conditions.

Replicates: Minimum of 3 replications (preferably 4) with 3 plants per replicate

Application Instructions: Apply first foliar and drench applications 2 weeks after transplanting into 4" pots. Repeat foliar applications twice at 2 week intervals. Add a surfactant to the spray solution for the foliar applications.

Plant Materials: Greenhouse, field container or field in-ground. Please specify in final report. Bedding plants and/or tropical foliage plants grown in the greenhouse or in field container. Please specify in final report.

Evaluations: Record plant height & width at initial and final evaluations. At 1, 2, 3, 4, 5, and 6 weeks after initial application, record phytotoxicity on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill). If appropriate, also include ratings for chlorosis, defoliation, discoloration, stunting or other growth effects on a scale of 0 to 10 (0 = No effect; 10 = Complete plant affected). Please record any issues with flowers, such as damage or flower bud development. If any phytotoxicity is observed in treated plants, take pictures comparing treated and untreated plant material.

If different application methods or evaluations are made, please clearly specify differences in final report and explain how they enhanced results.

Recordkeeping: Keep detailed records of weather conditions including temperature and precipitation, soil-type or soil-less media, application equipment, irrigation, liner size, plant height & width, and plant growth stage at application and data collection dates.

Treatments:

Product	Rates	Special Instructions	Contact Information to obtain materials and any needed adjuvants
BYI-8330 240 SC	3.4 fl oz per 100 gal plus surfactant	Foliar applications: 2 weeks after transplanting and then every 2 weeks after for a total of 3 applications. Use approximately 100 gal of mix solution per acre.	Bayer, Mike Gorrell, 919-549-2423, mike.gorrell@bayercropscience.com Or Bayer, Nate Royalty, 919-549-2532, Nate.Royalty@Bayercropscience.com
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Reports:

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Please direct questions to: Cristi Palmer, IR-4 HQ, Rutgers University, 500 College Road East, Suite 201W, Princeton, NJ 08540, Phone 732-932-9575 x4629, palmer@aesop.rutgers.edu.

Draft Date: 1/12/2009
Revised By: CLP

Appendix 2: Contributing Researchers

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Mr. Tom Freiberger	Rutgers University 283 Route 539 Cream Ridge, NJ 609-758-7311 x 19
Dr. Arnold Hara	University of Hawaii at Manoa 461 West Lanikaula Street Hawaii Branch Station Hilo, HI 96720 808-935-2885
Dr. Mary Hausbeck	Michigan State University Dept. of Plant Pathology 140 Plant Pathology Building East Lansing, MI 48824 517-355-4534
Dr. Scott Ludwig	Texas Cooperative Extension P.O. Box 38 Overton, TX 75684 903-834-6191

Appendix 3: Submitted Data

Researcher reports included in the printed copy of this report are only those received prior to 7/13/2010. Reports on following pages are in order by the last name of the researchers for grouped reports and then by PR Number for those reported on individually.