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

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### **Acknowledgements**

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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 2013, the IR-4 Project conducted 225 trials on 49 ornamental plant species examining phytotoxicity related to Kontos applications. In these trials, only 6 crops (*Begonia* sp, *Coleus x hybridus*, *Petunia* sp., *Pelargonium* sp., *Vinca* 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. One species (*Verbena hybrida*) exhibited significant flower discoloration at all rates applied as drench in one trial. Based on this information, it is recommended that the label prohibits drench application on *Begonia* sp., *Coleus x hybridus*, *Petunia* sp., *Pelargonium* sp., *Verbena hybrida*, *Vinca* 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 2014, the IR-4 Project conducted 225 trials on 49 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 IR-4 testing, the following protocols were used: 07-023, 09-016, 10-004, 11-016, 11-022, 12-002, 13-002. 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 these protocols.

Kontos was supplied to researchers (See list of researchers in Appendix 1) 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 spirotetramat, 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>Alyssum sp.</i>	<i>Lilium sp.</i>
<i>Angelonia angustifolia</i>	<i>Pelargonium sp.</i> <sup>1</sup>
<i>Antirrhinum majus</i>	<i>Petunia sp.</i> <sup>1</sup>
<i>Bacopa sp.</i>	<i>Rosa sp.</i>
<i>Begonia sp.</i> <sup>1</sup>	<i>Salvia officinalis</i>
<i>Codiaeum variegatum</i>	<i>Salvia splendens</i>
<i>Coleus sp.</i> <sup>1</sup>	<i>Tagetes sp.</i>
<i>Dahlia sp.</i>	<i>Torenia sp.</i>
<i>Dendranthema sp.</i>	<i>Verbena sp.</i> <sup>1</sup>
<i>Dianthus caryophyllus</i>	<i>Viburnum sp.</i>
<i>Gerbera jamesonii</i>	<i>Vinca sp.</i> <sup>1</sup>
<i>Hydrangea sp.</i>	<i>Viola sp.</i> <sup>1</sup>
<i>Impatiens sp.</i>	<i>Zinnia sp.</i>
<i>Lantana sp.</i> (See Villavicencio 2011)	

1 With foliar application only

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

<i>Begonia sp.</i> <sup>1</sup>	<i>Petunia sp.</i> <sup>1</sup>
<i>Coleus sp.</i> <sup>1</sup>	

1 Injury only with drench application.

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

<i>Pelargonium sp.</i> <sup>1</sup>	<i>Verbena hybrida</i> <sup>1</sup>
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1 Injury only with drench application.

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

<i>Anthurium andraeanum</i> <sup>2</sup>	<i>Howea forsteriana</i> <sup>1</sup>
<i>Bacopa sp.</i>	<i>Lobularia sp.</i>
<i>Catharanthus roseus</i>	<i>Magnolia sp.</i> <sup>1</sup>
<i>Dendrobium densiflorum</i> <sup>1</sup>	<i>Neoregelia pimiento</i>
<i>Dracaena deremensis</i> <sup>3</sup>	<i>Oncidium sp.</i> <sup>1</sup>
<i>Dracaena marginata</i>	<i>Rhapis robusta</i> <sup>1</sup>
<i>Euphorbia pulcherrima</i> <sup>3</sup>	<i>Verbena sp.</i> <sup>2</sup>
<i>Fuschia sp.</i> <sup>1</sup>	<i>Vinca sp.</i> <sup>2</sup>
<i>Gardenia sp.</i>	

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

2 Injury only with drench application.

3 No injury with drench or foliar application in 2 trials.

**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 4/15/2015 are listed below.

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
31136	Kontos (Spirotetramat)	Madwort (Alyssum sp.) 'Clear Crystal Purple'	Field Container	Freiberger	NJ	2013	Foliar	No phytotoxicity with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times.	20130822g.pdf
31136	Kontos (Spirotetramat)	Madwort (Alyssum sp.) 'Wonderland DP Purple' & 'Wonderland Pink'	Field Container	Wade	SC	2013	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20140411.pdf
31136	Kontos (Spirotetramat)	Madwort (Alyssum sp.) 'Wonderland Rose'	Field Container	Davis	MI	2011	Foliar	Slight to moderate flower injury after 1st applic with recovery at 3.4, 6.8, and 13.6 fl oz per 100 gal applied three times.	20111205a.pdf
30181	Kontos (Spirotetramat)	Angelonia (Angelonia angustifolia) 'Adessa Bicolor'	Greenhouse	Freiberger	NJ	2013	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with surfactant applied 3 times.	20140410a.pdf
30181	Kontos (Spirotetramat)	Angelonia (Angelonia angustifolia) 'Angel Mist Pink'	Greenhouse	Chen	LA	2011	Foliar	No injury or significant difference in plant growth and quality with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20120821a.pdf
30181	Kontos (Spirotetramat)	Angelonia (Angelonia angustifolia) 'Serena Purple'	Greenhouse	Chen	LA	2011	Foliar	No injury or significant difference in plant growth and quality with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied.	20120821a.pdf
29141	Kontos (Spirotetramat)	Flamingo-lily (Anthurium andraeanum) A. hybridum 'Pink Passion'	Greenhouse	Gilrein	NY	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 1500 pots.	20131112a.pdf
29141	Kontos (Spirotetramat)	Flamingo-lily (Anthurium andraeanum) A. hybridum 'Pink Passion'	Greenhouse	Gilrein	NY	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112a.pdf
29141	Kontos (Spirotetramat)	Flamingo-lily (Anthurium andraeanum) 'Leahi'	Greenhouse	Hara	HI	2009	Drench	No injury at 6.8 and 13.6 fl oz applied as a single drench.	20100407a.pdf
29141	Kontos (Spirotetramat)	Flamingo-lily (Anthurium andraeanum) 'Leahi'	Greenhouse	Hara	HI	2009	Foliar	No injury at 6.8 and 13.6 fl oz per 100 gal applied as foliar spray 3 times.	20100407a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
31137	Kontos (Spirotetramat)	Snapdragon (Antirrhinum majus)	Field Container	Reding	OH	2013	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times with NIS; all plants marketable.	20140414a.pdf
31137	Kontos (Spirotetramat)	Snapdragon (Antirrhinum majus) 'Chantilly Cream Yellow'	Field Container	Freiberger	NJ	2012	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times.	20130123b.pdf
31137	Kontos (Spirotetramat)	Snapdragon (Antirrhinum majus) 'Chimes Rose'	Field Container	Davis	MI	2011	Foliar	No injury or growth reduction with 3.4, 6.8, and 13.6 fl oz per 100 gal applied three times.	20111205a.pdf
31137	Kontos (Spirotetramat)	Snapdragon (Antirrhinum majus) 'Montego Red'	Field Container	Freiberger	NJ	2012	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times.	20130123b.pdf
31137	Kontos (Spirotetramat)	Snapdragon (Antirrhinum majus) 'Speedy Sonnet White'	Field Container	DeFrancesco	OR	2013	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times.	20140502a.pdf
30662	Kontos (Spirotetramat)	Water Hyssop (Bacopa sp.)	Greenhouse	Cloyd	IL	2013	Foliar	No injury with 1.7, 3.4 and 5.1 fl oz per 100 gal.	20130604a.pdf
30662	Kontos (Spirotetramat)	Water Hyssop (Bacopa sp.) 'Abunda Colossal Blue'	Greenhouse	Chen	LA	2013	Foliar	No significant injury or growth reduction with 3.4, 6.8 and 13.6 fl per 100 gal + Capsil applied twice.	20140918b.pdf
30662	Kontos (Spirotetramat)	Water Hyssop (Bacopa sp.) 'Abunda Colossal White'	Greenhouse	Chen	LA	2013	Foliar	No significant injury or growth reduction with 3.4, 6.8 and 13.6 fl per 100 gal + Capsil applied twice.	20140918b.pdf
30662	Kontos (Spirotetramat)	Water Hyssop (Bacopa sp.) Sutura cordata 'Snowstorm Pink'	Greenhouse	Gilrein	NY	2013	Foliar	No injury on foliage or flowers with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied biweekly three times.	20141104a.pdf
30662	Kontos (Spirotetramat)	Water Hyssop (Bacopa sp.) Sutura cordata 'Snowstorm White'	Greenhouse	Gilrein	NY	2013	Foliar	No injury on foliage or flowers with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied biweekly three times.	20141104a.pdf
30384	Kontos (Spirotetramat)	Begonia (Begonia sp.)	Field Container	Davis	MI	2010	Foliar	No significant injury at 3.4, 6.8, and 13.6 fl oz per 100 gal.	20100917a.pdf
26952	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Ambassador Scarlet'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26952	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Babywing White'	Greenhouse	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26952	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Babywing White'	Greenhouse	Chen	LA	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



PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26952	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Olympia Red'	Greenhouse	Freiberger	NJ	2008	Drench	No to moderate injury increasing with rate (3.4, 6.8 or 13.6 fl oz per 100 gal).	20090319d.pdf
26952	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Olympia Red'	Greenhouse	Freiberger	NJ	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
30384	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Red'	Field Container	Davis	MI	2011	Foliar	No injury with 3.4 and 6.8, slight with 13.6, fl oz per 100 gal applied three times; no growth reduction.	20111205a.pdf
26952	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Vodka Bright Red'	Greenhouse	Freiberger	NJ	2008	Drench	No to moderate injury increasing with rate (3.4, 6.8 or 13.6 fl oz per 100 gal).	20090319d.pdf
26952	Kontos (Spirotetramat)	Begonia (Begonia sp.) 'Vodka Bright Red'	Greenhouse	Freiberger	NJ	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
31688	Kontos (Spirotetramat)	Rose Periwinkle (Catharanthus roseus)	Greenhouse	Hausbeck	MI	2009	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
31688	Kontos (Spirotetramat)	Rose Periwinkle (Catharanthus roseus)	Greenhouse	Hausbeck	MI	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
31688	Kontos (Spirotetramat)	Rose Periwinkle (Catharanthus roseus) 'Pacifica Red'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26954	Kontos (Spirotetramat)	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Big Yellow'	Greenhouse	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26954	Kontos (Spirotetramat)	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Big Yellow'	Greenhouse	Chen	LA	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	Kontos (Spirotetramat)	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Silver Prin'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26954	Kontos (Spirotetramat)	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Sly Jenna'	Greenhouse	Chen	LA	2010	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz + Capsil per 100 gal applied twice.	20110714a.pdf
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Bananas'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Bananas'	Greenhouse	Ludwig	TX	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

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Batik'	Greenhouse	Hara	HI	2010	Drench	No injury at 3.4, 6.8 and 13.6 fl oz applied as single drench.	20110205f.pdf
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Batik'	Greenhouse	Hara	HI	2010	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + Liberate surfactant applied foliar 3 times.	20110205f.pdf
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Batik'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Batik'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Curly Boy'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Curly Boy'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Mammy'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Mammy'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Mammy'	Greenhouse	Villavicencio	CA	2011	Drench	Significant stunting with 3.4, 6.8 and 13.6 fl oz per 100 gal drench or all rates sprayed with Capsil.	20111020f.pdf
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Mammy'	Greenhouse	Villavicencio	CA	2011	Foliar	Significant stunting of 1 to 3 cm with 3.4, 6.8 and 13.6 fl oz per 100 gal sprayed with Capsil.	20111020f.pdf
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Moirra'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Moirra'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Petra'	Greenhouse	Ludwig	TX	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#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Petra'	Greenhouse	Ludwig	TX	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	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Petra'	Greenhouse	Villavicencio	CA	2011	Drench	No significant stunting with 3.4, 6.8 and 13.6 fl oz per 100 gal sprayed with Capsil.	20111020f.pdf
27781	Kontos (Spirotetramat)	Croton, Variegated Laurel (Codiaeum variegatum) 'Petra'	Greenhouse	Villavicencio	CA	2011	Foliar	No significant stunting with 3.4, 6.8 and 13.6 fl oz per 100 gal drench.	20111020f.pdf
26955	Kontos (Spirotetramat)	Coleus, Flamenettle (Coleus sp.) C. x hybridus 'Wizard'	Greenhouse	Hausbeck	MI	2009	Drench	Significant injury (stunting and leaf curling) at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26955	Kontos (Spirotetramat)	Coleus, Flamenettle (Coleus sp.) C. x hybridus 'Wizard'	Greenhouse	Hausbeck	MI	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26955	Kontos (Spirotetramat)	Coleus, Flamenettle (Coleus sp.) 'Kong Series'	Greenhouse	DeFrancesco	OR	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied once.	20120508a.pdf
26955	Kontos (Spirotetramat)	Coleus, Flamenettle (Coleus sp.) 'Kong Series'	Greenhouse	DeFrancesco	OR	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times.	20120508a.pdf
26955	Kontos (Spirotetramat)	Coleus, Flamenettle (Coleus sp.) Solenostemon scutellarioides 'Wizard Velvet Red'	Greenhouse	Gilrein	NY	2011	Drench	No injury or growth reduction with 3.4 and 6.8, slight injury (new growth distortion) only with 13.6 fl oz per 1500 pots.	20131112a.pdf
26955	Kontos (Spirotetramat)	Coleus, Flamenettle (Coleus sp.) Solenostemon scutellarioides 'Wizard Velvet Red'	Greenhouse	Gilrein	NY	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112a.pdf
31135	Kontos (Spirotetramat)	Dahlia (Dahlia sp.) 'Dahlietta Leanne'	Field Container	Chen	LA	2013	Foliar	No significant injury or growth reduction with 3.4, 6.8 and 13.6 fl per 100 gal + Capsil applied twice.	20140918b.pdf
31135	Kontos (Spirotetramat)	Dahlia (Dahlia sp.) 'Dahlietta Marissa'	Field Container	Chen	LA	2013	Foliar	No significant injury or growth reduction with 3.4, 6.8 and 13.6 fl per 100 gal + Capsil applied twice.	20140918b.pdf
31135	Kontos (Spirotetramat)	Dahlia (Dahlia sp.) 'Figaro Mix'	Field Container	Davis	MI	2011	Foliar	No injury or growth reduction with 3.4, 6.8, and 13.6 fl oz per 100 gal applied three times.	20111205a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
31135	Kontos (Spirotetramat)	Dahlia (Dahlia sp.) 'Figaro Mix'	Field Container	Freiberger	NJ	2013	Foliar	No phytotoxicity with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times.	20130822g.pdf
29142	Kontos (Spirotetramat)	Dendrobium Orchid (Dendrobium densiflorum) 'Midnight Blue'	Greenhouse	Hara	HI	2010	Drench	No injury at 13.6 fl oz per 1750 pots applied as single drench.	20101201a.pdf
29142	Kontos (Spirotetramat)	Dendrobium Orchid (Dendrobium densiflorum) 'Midnight Blue'	Greenhouse	Hara	HI	2010	Foliar	No injury at 13.6 fl oz per 100 gal applied foliar with Silwet 3 times.	20101201a.pdf
26953	Kontos (Spirotetramat)	Carnation (Dianthus caryophyllus) 'Bath's Pink'	Greenhouse	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26953	Kontos (Spirotetramat)	Carnation (Dianthus caryophyllus) 'Bath's Pink'	Greenhouse	Chen	LA	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	Kontos (Spirotetramat)	Carnation (Dianthus caryophyllus) 'Lillipot Mix'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
29148	Kontos (Spirotetramat)	Dracaena deremensis (Dracaena deremensis) 'Janet Craig'	Greenhouse	Hara	HI	2010	Drench	No injury at 3.4, 6.8 and 13.6 fl oz applied as single drench.	20101124a.pdf
29148	Kontos (Spirotetramat)	Dracaena deremensis (Dracaena deremensis) 'Janet Craig'	Greenhouse	Hara	HI	2010	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + Silwet applied foliar 3 times.	20101124a.pdf
29148	Kontos (Spirotetramat)	Dracaena deremensis (Dracaena deremensis) 'Lisa'	Greenhouse	Hara	HI	2010	Drench	No injury at 3.4, 6.8 and 13.6 fl oz applied as single drench.	20101124a.pdf
29148	Kontos (Spirotetramat)	Dracaena deremensis (Dracaena deremensis) 'Lisa'	Greenhouse	Hara	HI	2010	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + Silwet applied foliar 3 times.	20101124a.pdf
29149	Kontos (Spirotetramat)	Dracaena marginata (Dracaena marginata) 'Colorama'	Greenhouse	Hara	HI	2010	Foliar or Drench	Low injury (chlorotic spotting) at 3.4, 6.8 and 13.6 fl oz applied as single drench, and at 6.8 and 13.6 fl oz per 100 gal + Silwet applied foliar 3 times; cause inconclusive.	20101124a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26966	Kontos (Spirotetramat)	Poinsettia (Euphorbia pulcherrima)	Greenhouse	Fraelich	GA	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	Kontos (Spirotetramat)	Poinsettia (Euphorbia pulcherrima)	Greenhouse	Fraelich	GA	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
26966	Kontos (Spirotetramat)	Poinsettia (Euphorbia pulcherrima) 'Marblestar'	Greenhouse	Uber	CA	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20120209b.pdf
26966	Kontos (Spirotetramat)	Poinsettia (Euphorbia pulcherrima) 'Marblestar'	Greenhouse	Uber	CA	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied twice.	20120209b.pdf
29305	Kontos (Spirotetramat)	Fuschia, Ladies-Eardrops (Fuschia sp.) Fuschia x hybrida	Greenhouse	Cloyd	IL	2012	Foliar	No injury with 3.4 and 4 fl oz per 100 gal.	20121129a.pdf
30605	Kontos (Spirotetramat)	Jasmine, Cape, Common Gardenia (Gardenia sp.) G. augusta	Greenhouse	Uber	CA	2013	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied 3 times.	20140628c.pdf
29157	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.)	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29157	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.)	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf
26958	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.) 'Festival Lt. Eye Orange'	Greenhouse	Edmunds	CO	2010	Spray-to-wet	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + surfactant applied 3 times.	20101124c.pdf
29157	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.) G. jamesonii	Field Container	Fraelich	GA	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	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.) G. jamesonii	Field Container	Fraelich	GA	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
29157	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal Yellow'	Field Container	Villavicencio	CA	2011	Drench	Slight injury with complete recovery at 3.4, 6.8 and 13.6 fl oz per 100 gal drench; no growth reduction.	20111020c.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26958	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal Yellow'	Greenhouse	Villavicencio	CA	2011	Drench	Slight injury with quick recovery at 3.4, 6.8 and 13.6 fl oz per 100 gal drench; no growth reduction.	20111020b.pdf
29157	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal Yellow'	Field Container	Villavicencio	CA	2011	Foliar	Slight injury with complete recovery at all rates sprayed with Capsil; no growth reduction.	20111020c.pdf
26958	Kontos (Spirotetramat)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Royal Yellow'	Greenhouse	Villavicencio	CA	2011	Foliar	Slight injury with quick recovery at 3.4, 6.8 and 13.6 fl oz per 100 gal sprayed with Capsil; no growth reduction.	20111020b.pdf
29147	Kontos (Spirotetramat)	Palm, Sentry (Howea forsteriana)	Greenhouse	Hara	HI	2010	Drench	No injury at 3.4, 6.8 and 13.6 fl oz applied as single drench.	20101208a.pdf
29147	Kontos (Spirotetramat)	Palm, Sentry (Howea forsteriana)	Greenhouse	Hara	HI	2010	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + surfactant applied foliar 3 times.	20101208a.pdf
29158	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. anomala petiolaris	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability at 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29158	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. anomala petiolaris	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf
26959	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. macrophylla	Greenhouse	Uber	CA	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20120209b.pdf
26959	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. macrophylla	Greenhouse	Uber	CA	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied twice.	20120209b.pdf
29158	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Fraelich	GA	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
29158	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Fraelich	GA	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
26959	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. macrophyllum 'Endless Summer'	Greenhouse	DeFrancesco	OR	2011	Drench	No significant injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied once.	20120508a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26959	Kontos (Spirotetramat)	Hydrangea (Hydrangea sp.) H. macrophyllum 'Endless Summer'	Greenhouse	DeFrancesco	OR	2011	Foliar	Slight injury with 3.4 and 6.8 fl oz per 100 gal, but not w/ 13.6 fl oz, after 1st applic; no injury w/ all rates after 2nd and 3rd applic; slight growth reduction with 13.6 fl oz.	20120508a.pdf
29306	Kontos (Spirotetramat)	New Guinea Impatiens (Impatiens hawkeri) 'Dazzler Violet'	Greenhouse	Chen	LA	2010	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20110714a.pdf
29306	Kontos (Spirotetramat)	New Guinea Impatiens (Impatiens hawkeri) 'Patchwork Salmon'	Greenhouse	Chen	LA	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20120824b.pdf
29306	Kontos (Spirotetramat)	New Guinea Impatiens (Impatiens hawkeri) 'Sonic Lilac'	Greenhouse	Chen	LA	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20120824b.pdf
29306	Kontos (Spirotetramat)	New Guinea Impatiens (Impatiens hawkeri) 'Super Elfin Red'	Greenhouse	Chen	LA	2010	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20110714a.pdf
26960	Kontos (Spirotetramat)	Balsam (Impatiens sp.) 'Accent White'	Greenhouse	Freiberger	NJ	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
26960	Kontos (Spirotetramat)	Balsam (Impatiens sp.) 'Divine Cherry Red'	Greenhouse	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26960	Kontos (Spirotetramat)	Balsam (Impatiens sp.) 'Divine Cherry Red'	Greenhouse	Chen	LA	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
30385	Kontos (Spirotetramat)	Balsam (Impatiens sp.) I. walleriana 'Dazzler Pink'	Field Container	Davis	MI	2010	Foliar	No significant injury at 3.4, 6.8, and 13.6 fl oz per 100 gal for all rating dates except 3 WAT, perhaps due to high temperatures.	20100917a.pdf
29159	Kontos (Spirotetramat)	Shrub Verbena (Lantana sp.)	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29159	Kontos (Spirotetramat)	Shrub Verbena (Lantana sp.)	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26961	Kontos (Spirotetramat)	Shrub Verbena (Lantana sp.) L. camara' Dallas Red'	Greenhouse	Villavicencio	CA	2011	Drench	Significant injury with complete recovery by 6 WAA with all drench rates.	20111020d.pdf
26961	Kontos (Spirotetramat)	Shrub Verbena (Lantana sp.) L. camara' Dallas Red'	Greenhouse	Villavicencio	CA	2011	Foliar	No significant injury (flower discoloration) with 3.4, and 6.8 fl oz per 100 gal + Capsil spray; significant injury with complete recovery by 6 WAA with 4X spray rates.	20111020d.pdf
29159	Kontos (Spirotetramat)	Shrub Verbena (Lantana sp.) Lantana x 'Mone'	Field Container	Fraelich	GA	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	Kontos (Spirotetramat)	Shrub Verbena (Lantana sp.) Lantana x 'Mone'	Field Container	Fraelich	GA	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	Kontos (Spirotetramat)	Lily (Lilium sp.) 'Asiatic'	Field Container	Fraelich	GA	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
29160	Kontos (Spirotetramat)	Lily (Lilium sp.) 'Asiatic'	Field Container	Fraelich	GA	2009	Foliar	No injury applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29160	Kontos (Spirotetramat)	Lily (Lilium sp.) 'Border Lily'	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29160	Kontos (Spirotetramat)	Lily (Lilium sp.) 'Border Lily'	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
29160	Kontos (Spirotetramat)	Lily (Lilium sp.) L. superbum	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29160	Kontos (Spirotetramat)	Lily (Lilium sp.) L. superbum	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf



PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
31598	Kontos (Spirotetramat)	Sweet Alyssum (Lobularia maritima) 'Clear Crystal White'	Field Container	DeFrancesco	OR	2013	Foliar	No injury with 3.4, moderate and high with 6.8 and 13.6, fl oz per 100 gal applied 3 times; no effect on plant growth.	20140502a.pdf
26973	Kontos (Spirotetramat)	Magnolia (Magnolia sp.)	Field Container	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26973	Kontos (Spirotetramat)	Magnolia (Magnolia sp.)	Field Container	Chen	LA	2007	Foliar	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant.	20070317b.pdf
30076	Kontos (Spirotetramat)	Neoregalia sp. (Neoregalia sp.) N. pimiento	Field Container	Hara	HI	2010	Drench	No injury at 3.4, 6.8 and 13.6 fl oz applied as single drench.	20110205f.pdf
30076	Kontos (Spirotetramat)	Neoregalia sp. (Neoregalia sp.) N. pimiento	Field Container	Hara	HI	2010	Foliar	Minimal to slight leaf injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + Liberate surfactant applied foliar 3 times.	20110205f.pdf
29143	Kontos (Spirotetramat)	Orchid, Dancing Lady (Oncidium sp.) 'Glowing Ember'	Greenhouse	Hara	HI	2010	Drench	No injury at 13.6 fl oz per 1750 pots applied as single drench.	20101201a.pdf
29143	Kontos (Spirotetramat)	Orchid, Dancing Lady (Oncidium sp.) 'Glowing Ember'	Greenhouse	Hara	HI	2010	Foliar	No injury at 13.6 fl oz per 100 gal applied foliar with Silwet 3 times.	20101201a.pdf
29161	Kontos (Spirotetramat)	Geranium (Pelargonium sp.)	Field Container	Reding	OH	2011	Drench	Significant injury and growth reduction with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots; treated plants not marketable.	20111104a.pdf
29161	Kontos (Spirotetramat)	Geranium (Pelargonium sp.)	Field Container	Reding	OH	2011	Foliar	Significant injury and growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; treated plants not marketable.	20111104a.pdf
29161	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) 'Citrosa'	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29161	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) 'Citrosa'	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
26957	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) 'Freestyle Cherry' Ivy type	Greenhouse	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal.	20070317b.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26957	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) 'Freestyle Cherry' Ivy type	Greenhouse	Chen	LA	2007	Foliar	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil surfactant.	20070317b.pdf
29161	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) P. x hortorum	Field Container	Fraelich	GA	2009	Drench	Severe injury (100 % flower loss) applied drench at 3.4 and 13.6 fl oz per 1500 4-in pots.	20091231g.pdf
29161	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) P. x hortorum	Field Container	Fraelich	GA	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
26957	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) P. x hortorum 'Rocky Mountain Red'	Greenhouse	Hausbeck	MI	2009	Drench	Severe injury (stunting and plant death) at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26957	Kontos (Spirotetramat)	Geranium (Pelargonium sp.) P. x hortorum 'Rocky Mountain Red'	Greenhouse	Hausbeck	MI	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26965	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Dream Midnight	Greenhouse	Freiberger	NJ	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	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Dream Midnight	Greenhouse	Freiberger	NJ	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
26965	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Dreams Pink Morn'	Greenhouse	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26965	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Dreams Pink Morn'	Greenhouse	Chen	LA	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	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Easy Wave Rose'	Greenhouse	Chen	LA	2010	Foliar	Minor to moderate injury with complete recovery, no growth reduction with 3.4, 6.8 and 13.6 fl oz + Capsil per 100 gal applied twice.	20110714a.pdf
30386	Kontos (Spirotetramat)	Petunia (Petunia sp.) P. x hybrida 'Prism Sunshine'	Field Container	Davis	MI	2010	Foliar	No significant injury at 3.4, 6.8, and 13.6 fl oz per 100 gal.	20100917a.pdf
26965	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Ultra Red'	Greenhouse	Freiberger	NJ	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	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Ultra Red'	Greenhouse	Freiberger	NJ	2008	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20090319d.pdf
26965	Kontos (Spirotetramat)	Petunia (Petunia sp.) 'Wave Purple'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
29146	Kontos (Spirotetramat)	Large Lady Palm (Rhapis excelsa) R. robusta	Greenhouse	Hara	HI	2010	Drench	No injury at 3.4, 6.8 and 13.6 fl oz applied as single drench.	20101208a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
29146	Kontos (Spirotetramat)	Large Lady Palm (Rhapis excelsa) R. robusta	Greenhouse	Hara	HI	2010	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + surfactant applied foliar 3 times.	20101208a.pdf
26967	Kontos (Spirotetramat)	Rose (Rosa sp.) 'Minnelli 2007™ PatioHit®'	Greenhouse	Gilrein	NY	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 1500 pots.	20131112a.pdf
26967	Kontos (Spirotetramat)	Rose (Rosa sp.) 'Minnelli 2007™ PatioHit®'	Greenhouse	Gilrein	NY	2011	Foliar	Virtually no injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112a.pdf
29162	Kontos (Spirotetramat)	Rose (Rosa sp.) 'Mini Nu Gold'	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29162	Kontos (Spirotetramat)	Rose (Rosa sp.) 'Mini Nu Gold'	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
29162	Kontos (Spirotetramat)	Rose (Rosa sp.) R. cortada	Field Container	Fraelich	GA	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
29162	Kontos (Spirotetramat)	Rose (Rosa sp.) R. cortada	Field Container	Fraelich	GA	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
26967	Kontos (Spirotetramat)	Rose (Rosa sp.) R. nutkana	Greenhouse	DeFrancesco	OR	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied once.	20120508a.pdf
26967	Kontos (Spirotetramat)	Rose (Rosa sp.) R. nutkana	Greenhouse	DeFrancesco	OR	2011	Foliar	No injury with 3.4 and 6.8, very slight with 13.6 fl oz per 100 gal applied 3 times; no growth reduction.	20120508a.pdf
29162	Kontos (Spirotetramat)	Rose (Rosa sp.) R. rugosa	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29162	Kontos (Spirotetramat)	Rose (Rosa sp.) R. rugosa	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf
29163	Kontos (Spirotetramat)	Sage, common (Salvia officinalis)	Field Container	Fraelich	GA	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

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
29163	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> )	Field Container	Fraelich	GA	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	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> )	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29163	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> )	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
26968	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> ) <i>S. splendens</i> 'Vista Lavender'	Greenhouse	Gilrein	NY	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 1500 pots.	20131112a.pdf
26968	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> ) <i>S. splendens</i> 'Vista Lavender'	Greenhouse	Gilrein	NY	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112a.pdf
26968	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> ) <i>S. splendens</i> 'Vista Purple'	Greenhouse	Hausbeck	MI	2009	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26968	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> ) <i>S. splendens</i> 'Vista Purple'	Greenhouse	Hausbeck	MI	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26968	Kontos (Spirotetramat)	Sage, common ( <i>Salvia officinalis</i> ) 'Salsa Scarlet'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
29164	Kontos (Spirotetramat)	Marigold ( <i>Tagetes</i> sp.)	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29164	Kontos (Spirotetramat)	Marigold ( <i>Tagetes</i> sp.)	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf
29164	Kontos (Spirotetramat)	Marigold ( <i>Tagetes</i> sp.)	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29164	Kontos (Spirotetramat)	Marigold ( <i>Tagetes</i> sp.)	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26963	Kontos (Spirotetramat)	Marigold (Tagetes sp.) 'Durango Yellow'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
29164	Kontos (Spirotetramat)	Marigold (Tagetes sp.) T. erecta 'Inca Orange'	Field Container	Davis	MI	2010	Foliar	No significant injury at 3.4, 6.8, and 13.6 fl oz per 100 gal.	20100917a.pdf
29164	Kontos (Spirotetramat)	Marigold (Tagetes sp.) T. erecta	Field Container	Fraelich	GA	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	Kontos (Spirotetramat)	Marigold (Tagetes sp.) T. erecta	Field Container	Fraelich	GA	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	Kontos (Spirotetramat)	Marigold (Tagetes sp.) 'Taishan Orange'	Greenhouse	Chen	LA	2010	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz + Capsil per 100 gal applied twice.	20110714a.pdf
26963	Kontos (Spirotetramat)	Marigold (Tagetes sp.) 'Taishan Yellow'	Greenhouse	Chen	LA	2010	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz + Capsil per 100 gal applied twice.	20110714a.pdf
29165	Kontos (Spirotetramat)	Wishbone Flower (Torenia sp.)	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29165	Kontos (Spirotetramat)	Wishbone Flower (Torenia sp.)	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf
29165	Kontos (Spirotetramat)	Wishbone Flower (Torenia sp.)	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29165	Kontos (Spirotetramat)	Wishbone Flower (Torenia sp.)	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
26969	Kontos (Spirotetramat)	Wishbone Flower (Torenia sp.) 'Clown Mix'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
29165	Kontos (Spirotetramat)	Wishbone Flower (Torenia sp.) Torenia x 'yellow'	Field Container	Fraelich	GA	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

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
29165	Kontos (Spirotetramat)	Wishbone Flower (Torenia sp.) Torenia x 'yellow'	Field Container	Fraelich	GA	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
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) 'Homestead Purple'	Greenhouse	Chen	LA	2010	Foliar	No injury with 3.4, 6.8 and 13.6 fl oz per 100 gal applied twice.	20110714a.pdf
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) 'Quartz Mix'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) 'Quartz x P Scarlet'	Greenhouse	Edmunds	CO	2010	Spray-to-wet	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + surfactant applied 3 times.	20101124c.pdf
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) 'Serenity Pink'	Greenhouse	Chen	LA	2010	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied twice.	20110714a.pdf
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) V. hybrida 'Obsession Blue with Eye'	Greenhouse	Gilrein	NY	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112b.pdf
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) V. hybrida 'Quartz White'	Greenhouse	Gilrein	NY	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112b.pdf
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) V. hybrida 'Superverbena'	Greenhouse	Villavicencio	CA	2011	Drench	Moderate injury (flower discoloration) with 3.4, 6.8 and 13.6 fl oz per 100 gal with drench application.	20111020a.pdf
26970	Kontos (Spirotetramat)	Vervain (Verbena sp.) V. hybrida 'Superverbena'	Greenhouse	Villavicencio	CA	2011	Foliar	No significant injury with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil spray.	20111020a.pdf
26974	Kontos (Spirotetramat)	Arrowwood (Viburnum sp.) 'Autumn Jazz'	Field Container	Chen	LA	2007	Drench	No injury at 3.4, 6.8 or, 13.6 fl oz per 100 gal.	20070317b.pdf
26974	Kontos (Spirotetramat)	Arrowwood (Viburnum sp.) 'Autumn Jazz'	Field Container	Chen	LA	2007	Foliar	No injury at 3.4, 6.8 or, 13.6 fl oz per 100 gal.	20070317b.pdf
26974	Kontos (Spirotetramat)	Arrowwood (Viburnum sp.) V. dentatum 'Chicago Lustre'	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability at 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
26974	Kontos (Spirotetramat)	Arrowwood (Viburnum sp.) V. dentatum 'Chicago Lustre'	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26974	Kontos (Spirotetramat)	Arrowwood (Viburnum sp.) V. suspensum 'Sandanakwa'	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
26974	Kontos (Spirotetramat)	Arrowwood (Viburnum sp.) V. suspensum 'Sandanakwa'	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
26971	Kontos (Spirotetramat)	Periwinkle (Vinca sp.) V. major 'Variegata'	Greenhouse	Villavicencio	CA	2011	Drench	No significant injury or growth reduction with 3.4 fl oz per 100 gal drench, but severe stunting and necrosis with 6.8 and 13.6 fl oz per 100 gal.	20111020e.pdf
26971	Kontos (Spirotetramat)	Periwinkle (Vinca sp.) V. major 'Variegata'	Greenhouse	Villavicencio	CA	2011	Foliar	No significant injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil spray.	20111020e.pdf
29166	Kontos (Spirotetramat)	Pansy (Viola sp.)	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29166	Kontos (Spirotetramat)	Pansy (Viola sp.)	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf
29166	Kontos (Spirotetramat)	Pansy (Viola sp.)	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29166	Kontos (Spirotetramat)	Pansy (Viola sp.)	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
26964	Kontos (Spirotetramat)	Pansy (Viola sp.) 'Dynamite Scarlet'	Greenhouse	Chen	LA	2010	Foliar	Virtually no injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20110714a.pdf
26964	Kontos (Spirotetramat)	Pansy (Viola sp.) 'Sorbet Mix'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf

PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26964	Kontos (Spirotetramat)	Pansy (Viola sp.) V. x wittrockiana	Greenhouse	Fraelich	GA	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	Kontos (Spirotetramat)	Pansy (Viola sp.) V. x wittrockiana	Greenhouse	Fraelich	GA	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	Kontos (Spirotetramat)	Pansy (Viola sp.) 'XX Large Yellow'	Greenhouse	Chen	LA	2007	Drench	No injury or growth reduction at 3.4, 6.8 and 13.6 fl oz per 100 gal	20070317b.pdf
26964	Kontos (Spirotetramat)	Pansy (Viola sp.) 'XX Large Yellow'	Greenhouse	Chen	LA	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
29167	Kontos (Spirotetramat)	Zinnia (Zinnia sp.)	Field Container	Fraelich	GA	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	Kontos (Spirotetramat)	Zinnia (Zinnia sp.)	Field Container	Fraelich	GA	2009	Foliar	No injury applied foliar at 3.4 and 13.6 fl oz per 100 gal + NIS; all plants marketable.	20091231g.pdf
29167	Kontos (Spirotetramat)	Zinnia (Zinnia sp.)	Field Container	Reding	OH	2011	Drench	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 1500 4" pots.	20111104a.pdf
29167	Kontos (Spirotetramat)	Zinnia (Zinnia sp.)	Field Container	Reding	OH	2011	Foliar	No injury and no significant difference in growth or marketability with 3.4, 6.8 and 13.6 fl oz per 100 gal.	20111104a.pdf
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) 'Dreamland Mix'	Greenhouse	Freiberger	NJ	2007	Foliar	No injury at 3.4, 6.8 or 13.6 fl oz per 100 gal.	20080404b.pdf
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) 'Magellan Coral'	Greenhouse	Edmunds	CO	2010	Spray-to-wet	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal + surfactant applied 3 times.	20101124c.pdf



PR#	Product (Active Ingredients)	Crop	Production Site	Researcher	State	Year	Application Type	Results	File Name
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) 'Profusion Knee-high Yellow'	Greenhouse	Chen	LA	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20120824a.pdf
29167	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) 'Profusion Mix'	Field Container	Wade	SC	2011	Drench	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal; all plants marketable.	20111128a.pdf
29167	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) 'Profusion Mix'	Field Container	Wade	SC	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal applied 3 times; all plants marketable.	20111128a.pdf
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) Z. elegans	Greenhouse	Hausbeck	MI	2009	Drench	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) Z. elegans	Greenhouse	Hausbeck	MI	2009	Foliar	No injury at 3.4, 6.8 and 13.6 fl oz per 100 gal	20091116b.pdf
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) Z. elegans 'Profusion Fire'	Greenhouse	Gilrein	NY	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112b.pdf
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) Z. elegans 'Starlight Rose'	Greenhouse	Gilrein	NY	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal mixed with Capsil.	20131112b.pdf
26972	Kontos (Spirotetramat)	Zinnia (Zinnia sp.) 'Zarah White'	Greenhouse	Chen	LA	2011	Foliar	No injury or growth reduction with 3.4, 6.8 and 13.6 fl oz per 100 gal + Capsil applied twice.	20120824a.pdf

## **Label Suggestions**

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

## Appendix 1: Contributing Researchers

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