



Ornamental Horticulture Program Research Project Sheet

Project Name: Bacterial Disease Efficacy

New		Ongoing	X	Completed		Duration if ongoing or completed:	2006-2012, 2016-2017
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Project Description:

Studying bacterial diseases arose in the IR-4 Southern Regional as a regional project. Since 2006, this became a high priority national project with the increased number of potential actives available for screening. Fifty-four products have been screened including antibiotics, biopesticides, plant extracts, conventionals, and copper based materials.

Research Project Abstract (if available):

Abstract from 2015 Bacterial Disease Efficacy Summary

From 2008 to 2014, 54 products were tested through the IR-4 Program as drench or foliar applications against bacterial pathogens. In addition to research collected through the IR-4 program, this summary includes a review of experiments conducted from 2005 to 2014, mainly on tree crops. Species tested included: *Agrobacterium tumefaciens*, *Erwinia amylovora*, *E. chrysanthemi*, *Pseudomonas chicorii*, *P. marginalis*, *P. syringae*, *Pseudomonas* sp., *Xanthomonas campestris* and *Xanthomonas* spp. In general, all products, including the standard copper containing bactericides (Camelot, CuPRO, Cuprofix, Cuprofix MZ, Junction, Kocide, MasterCop, Phyton 27 and ReZist) and mancozeb (Dithane, Penncozeb, Protect) and biologicals (Cease, Regalia, Rhapsody and Serenade), provided variable efficacy on these bacterial pathogens. Several new products that are included in the IR-4 Bacterial efficacy project looked promising based on their efficacy relative to standards. These include Acibenzolar, CG100, Citrex, HM-0736, Kasumin, Regalia, Taegro, Tanos and ZeroTol. Further research is needed to obtain additional efficacy data to recommend actions to register or amend labels for these pests.

Target Species (Phytotoxicity, or common and Latin name of arthropod, pathogen, weed):

<i>Agrobacterium</i>	<i>Pseudomonas</i>
<i>Erwinia</i>	<i>Xanthomonas</i>

Target Crops (list tested crops if ongoing or completed project)

Bolivian Jasmine (<i>Mandevilla boliviensis</i>)	Mallow, Rose Mallow (<i>Hibiscus</i> sp.)
Cherry (Non-Bearing) (<i>Prunusincisa x campanulata</i>)	Maple, Japanese (<i>Acer palmatum</i>)
Chrysanthemum, Garden	Orchid, Dancing Lady (<i>Oncidium</i> sp.)
(<i>Chrysanthemum/Dendranthema</i> sp.)	Orchid, Moth (<i>Phalaenopsis</i> sp.)
Garden Impatiens (<i>Impatiens walleriana</i>)	Ornamental Cabbage, Ornamental Kale (<i>Brassica</i> sp.)
Geranium (<i>Pelargonium</i> sp.)	Pear, Bradford (Non-Bearing) (<i>Pyrus calleryana</i>)
Goldenrod (<i>Solidago</i> sp.)	Poinsettia (<i>Euphorbia pulcherrima</i>)
Hydrangea, Oakleaf (<i>Hydrangea quercifolia</i>)	Rosemallow (<i>Hibiscus</i> sp.)
Lavender (<i>Lavandula heterophylla</i>)	Wax Myrtle (<i>Myricacerifera</i>)
Lilac (<i>Syringa vulgaris</i>)	

Target Product(s)(list tested products or numbered compounds if ongoing or completed project)

Actinovate (<i>Streptomyces lydicus</i> WYEC 108)	Cease (<i>Bacillus subtilis</i> strain QST 713)
Agrimycin 17 (<i>Streptomycin sulfate</i>)	CG100 (Caprylic acid)
Alexin (Fruit and vegetable extract)	Champ Formula 2F (Copper hydroxide)
Aliette WDG (Fosetyl Al)	Citrex (Citrus extraction)
ASAP (Silver)	Companion (<i>Bacillus subtilis</i> GB03)
Bloomtime (<i>Pantoea agglomerans</i> strain E325)	Copper Count N (Copper ammonium complex)
BMJ (<i>Bacillus mycoides</i> isolate J)	CuPro (Copper hydroxide)
Camelot (Copper salts of fatty and rosin acids)	CuproFix (Basic copper sulfate)
Canker Kill (Unknown)	Cuprofix MZ (Mancozeb + Basic copper sulfate)

Target Product(s) Continued	
Dithane 75 DF (Mancozeb) EarthTec (Copper) Firewall (Unknown) Flameout (Oxytetracycline) Florel (Ethephon) HM-0736 (aka Physpe) (Laminarin) Inosco (Acibenzolar-S-methyl) Insimmo (Acibenzolar-S-methyl) Junction (Mancozeb + copper hydroxide) Kasumin (Kasugamycin) Kleengrow (Didecyl dimethyl ammonium chloride) Kocide 2000 (Copper hydroxide) Kocide 3000 (Copper hydroxide) K-Phite (Phosphorus acid salts) NAI-4201 (NAI-4201)	Nu-Cop 50DF (Copper hydroxide) Omega Grow Plus (Fish oil) Penncozeb (Mancozeb) Phyton-27 (Copper sulfate pentahydrate) Phyton-27 New Dimension (Copper sulphate pentahydrate) Protect T/O (Mancozeb) Regalia 50 (MOI-10605) (Extract of <i>Reynoutria sachalinensis</i>) Regalia SC (MOI 106) (Extract of <i>Reynoutria sachalinensis</i>) SP2015 (SP2015) Taegro (<i>Bacillus subtilis varamyloliquefaciens</i> strain FZB24) Tanos (Famoxadone + Cymoxanil) TriCon (BW 420) (Sodium tetraborahydratedecahydrate) Vital 4L (Potassium phosphite) Vitalonil (Potassium phosphite + chlorothalonil) ZeroTol (Hydrogen dioxide)

Product Registration and Research Status			
	Fully Screened (also includes standards)	Partially Screened through IR-4 ¹	Need Data Across Species ?
Labeled Generally & Commercialized	Aliette WDG Cease Copper compounds ² Dithane 75DF, Protect DF	KleenGrow	
Labeled Generally But NOT Commercialized			
Labeled for Specific Diseases & Commercialized		Actinovate Regalia 50 *	Agri-Mycin Alude
Labeled for Specific Diseases but NOT Commercialized			
Not yet registered or Labeled		A14658C Acibenzolar Citrex HM-0736 Kasumin NAI-4201 Taegro ZeroTol	Agriphage DPZ, Optimum Milstop
No longer available for development		CG100 Florel SP2015	

* IR-4 Data contributed to registration decision – either adding pest to label or not pursuing further research

1 At least one species screened fully

2 Including but not limited to Camelot O, CuPRO, Kocide, Junction, Nu-Cop, Phyton 27

Area	Characteristic	Pro	Con
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Availability & effectiveness of alternative management tools	Bacterial disease problems have few optimal control tools	X	
	Multiple years of data screening over 70 products and combinations with not many optimal options arose other than copper-based and mancozeb products were effective generally		X
	Tank mix combinations	X	X
Damage potential of target			
Performance and crop safety of proposed products (from other systems)	Acibenzolar efficacy was variable based on pathogen-host system		X
	Phytotoxicity with some products		X
Compatibility with IPM, resistance management programs			
Economics	Important to Growers	X	
Geographic distribution			
Manufacturer interest in labeling products	Yes, for the couple new tools identified	X	
Other			
2015 comments: Any bacterial disease, researcher dependent; may refine to specific species/systems in second year			

IR-4 Efficacy Trials to Date

Average rating on a scale of 1 – 5 with 1 = 0 to about 50% efficacy (not effective) and 5 = 95 to 100 efficacy (very effective); minimum to maximum rating; number of trials (See table on next page). For product/insect combinations that are blank, IR-4 has not screened this combination.

'Labeled' indicates that this disease species or genera is listed on the label. A rating of 2 or lower is considered unacceptable efficacy (*red text*). A rating of 3 or higher is considered commercially acceptable (black text). Non-labeled, completed product/disease combinations (3 or more trials) with an average rating of 3 or higher are highlighted with *green text*. For disease/product combinations that are blank, IR-4 has not screened this combination.

Table 1 of 2.

Product (Active Ingredients)	<i>Agrobacterium</i> sp.	<i>Erwinia</i> sp.	<i>Erwinia chrysanthemi</i>	<i>Xanthomonas</i> sp.
Actinovate Soluble (Streptomyces lydicus WYEC 108)				1.0 (1 - 1) n3 Labeled
Agrimycin 17 (Streptomycin sulfate)	1.0 (1 - 1) n1 Labeled			
Alexin (Fruit and vegetable extract)				1.0 (1 - 1) n1
Aliette WDG (Fosetyl Al)		1.0 (1 - 1) n3 Labeled		3.0 (2 - 4) n2 Labeled
ASAP (Silver)				2.0 (2 - 2) n1
Bloomtime FD (Pantoea agglomerans strain E325)				1.0 (1 - 1) n1
BMJ (Bacillus mycoides isolate J)				1.0 (1 - 1) n1
Camelot (Copper salts of fatty and rosin acids)		2.0 (2 - 2) n1		2.5 (2 - 3) n2
Canker Kill (Unknown)				1.0 (1 - 1) n1
Cease (Bacillus subtilis strain QST 713)				2.0 (1 - 4) n5 Labeled
CG100 (Caprylic acid)	1.0 (1 - 1) n1	1.0 (1 - 1) n3	1.0 (1 - 1) n1	1.7 (1 - 3) n3
Champ Formula 2F (Copper hydroxide)				3.0 (2 - 4) n2
Citrex (Citrus extraction)	1.0 (1 - 1) n1	1.3 (1 - 2) n4	1.0 (1 - 1) n3	3.0 (2 - 4) n6
Companion (Bacillus subtilis GB03)				2.0 (1 - 3) n2
Copper Count N (copper diammonia diacetate complets)			1.0 (1 - 1) n1	
CuPro (Copper hydroxide)				
CuPro 2005 (Copper hydroxide)		1.5 (1 - 3) n4 Labeled	1.5 (1 - 2) n2 Labeled	2.5 (2 - 3) n2 Labeled
Cuprofix MZ Disperse (Mancozeb + Basic copper sulfate)				3.5 (3 - 4) n2 Labeled
CuproFix Ultra 40 Disperse (Basic copper sulfate)				3.5 (2 - 5) n2 Labeled
Dithane 75DF Rainshield (Mancozeb)				3.0 (2 - 4) n2
EarthTec (Copper)				1.0 (1 - 1) n1
Firewall 17WP (Streptomycin sulfate)				2.5 (2 - 3) n2
Flameout (Oxytetracycline)				1.0 (1 - 1) n1
Florel (Ethephon)		1.0 (1 - 1) n2		
HM-0736 (aka Physpe) (Laminarin)	1.0 (1 - 1) n1	1.0 (1 - 1) n4	1.0 (1 - 1) n3	1.7 (1 - 3) n6
Inosco (A14658C) (Potassium phosphite)		1.0 (1 - 1) n1		
Insimmo (Acibenzolar-S-methyl)	1.0 (1 - 1) n2	1.7 (1 - 4) n7	1.0 (1 - 1) n3	3.7 (3 - 5) n6
Junction (SePro) (Mancozeb + copper hydroxide)				3.5 (2 - 5) n2
Kasumin (Kasugamycin)	1.0 (1 - 1) n1	1.3 (1 - 2) n4	1.0 (1 - 1) n3	1.6 (1 - 4) n10
Kleengrow (Didecyl dimethyl ammonium chloride)		1.3 (1 - 2) n3		

Product (Active Ingredients)	<i>Agrobacterium sp.</i>	<i>Erwinia sp.</i>	<i>Erwinia chrysanthemi</i>	<i>Xanthomonas sp.</i>
Kocide 2000 (Dupont) (Copper Hydroxide)				1.6 (1 - 4) n5 Labeled
Kocide 3000 (Copper hydroxide)				3.7 (3 - 4) n3
K-Phite (Phosphorus acid salts)				1.0 (1 - 1) n3
Milsana (now Regalia) (Extract of Reynoutria sachalinensis)				1.0 (1 - 1) n1 Labeled
NAI-4201 (NAI-4201)	1.0 (1 - 1) n1	1.3 (1 - 2) n3	1.0 (1 - 1) n1	1.0 (1 - 1) n2
Nu-Cop 50DF (Copper Hydroxide)				
Omega Grow Plus (Fish oil)				1.0 (1 - 1) n1
Penncozeb DF (Mancozeb)				3.5 (2 - 5) n2
Phyton-27 (Copper sulfate pentahydrate)				3.0 (3 - 3) n3 Labeled
Phyton-27 New Dimension (Copper sulphate pentahydrate)				1.0 (1 - 1) n2 Labeled
Protect T/O (Mancozeb)		3.0 (3 - 3) n1		3.0 (3 - 3) n1
Regalia O5 (MOI-10605) (Extract of Reynoutria sachalinensis)	1.0 (1 - 1) n1	1.0 (1 - 1) n3 Labeled	1.0 (1 - 1) n1 Labeled	2.5 (1 - 4) n2 Labeled
Regalia SC (MOI 106) (Extract of Reynoutria sachalinensis)		1.0 (1 - 1) n1 Labeled		2.0 (2 - 2) n1 Labeled
Rotation: Tricon / Phyton New Dimension (Sodium borate decahydrate / copper pentahydrate)				1.0 (1 - 1) n2
SP2015 (SP2015)		1.0 (1 - 1) n2	1.0 (1 - 1) n3	2.2 (1 - 4) n5
Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)		1.0 (1 - 1) n2	2.3 (1 - 5) n3	2.2 (1 - 4) n5
Tank Mix: Actinovate + Tricon (Streptomyces lydicus WYEC 108 + Sodium tetraborahydrate decahydrate)				1.0 (1 - 1) n2
Tank Mix: BioPhos + Chelated Copper (Phosphorus acid + chelated copper)				1.0 (1 - 1) n4
Tank Mix: Cease + Milstop (Bacillus subtilis + potassium bicarbonate)		1.0 (1 - 1) n2	1.0 (1 - 1) n1	
Tank Mix: Kasumin + Kocide (Kasugamycin + copper hydroxide)				1.7 (1 - 3) n3
Tank Mix: Kocide + Kleengrow (Copper Hydroxide + Didecyl dimethyl ammonium chloride)		2.0 (2 - 2) n1		
Tank Mix: K-Phite + Tricon (Phosphorus acid salts + Sodium tetraborahydrate decahydrate)				1.0 (1 - 1) n2
Tank Mix: K-Phyte + Kocide 2000 (Phosphorus acid salts + copper hydroxide)				3.0 (3 - 3) n1
Tank Mix: K-Phyte + Penncozeb (Phosphorus acid salts + mancozeb)				3.0 (3 - 3) n1
Tank Mix: K-Phyte + Phyton (Phosphorus acid salts + copper sulfate pentahydrate)				3.0 (3 - 3) n1
Tank Mix: Physpe + Kocide 2000 (Laminarin + copper hydroxide)				3.0 (3 - 3) n1
Tank Mix: Physpe + Penncozeb (Laminarin + mancozeb)				1.0 (1 - 1) n1
Tank Mix: Physpe + Phyton (Laminarin + copper sulfate pentahydrate)				3.0 (3 - 3) n1

Product (Active Ingredients)	<i>Agrobacterium sp.</i>	<i>Erwinia sp.</i>	<i>Erwinia chrysanthemi</i>	<i>Xanthomonas sp.</i>
Tank Mix: Rezist + Sett (Chelated Copper/Manganese/Zinc + Calcium/Boron + surfactant)			3.0 (3 - 3) n1	
Tank Mix: Rhapsody + Actinovate (Bacillus subtilis + Streptomyces lydicus WYEC 108)				1.0 (1 - 1) n1
Tank Mix: Rhapsody + Kocide (Bacillus subtilis + copper hydroxide)				3.0 (3 - 3) n1
Tank Mix: Rhapsody + Kocide 2000 + Vital (Bacillus subtilis + Copper hydroxide + phosphite)				1.0 (1 - 1) n2
Tank Mix: Rhapsody + K-Phyte (Bacillus subtilis + phosphorus acid salts)				1.0 (1 - 1) n1
Tank Mix: Rhapsody + Penncozeb (Bacillus subtilis + mancozeb)				3.0 (3 - 3) n1
Tank Mix: Rhapsody + Phytan (Bacillus subtilis + copper sulfate pentahydrate)				3.0 (3 - 3) n1
Tank Mix: SP2015 + CuPRO 2005 (Famoxadone + Cymoxanil + Copper)		1.5 (1 - 2) n2	1.0 (1 - 1) n3	2.4 (1 - 4) n10
Tank Mix: Vital + Rhapsody (Phosphite + Bacillus subtilis)				1.0 (1 - 1) n1
Tanos (Famoxadone + Cymoxanil)				1.0 (1 - 1) n1
TriCon (BW 420) (Sodium tetraborahydrate decahydrate)				1.0 (1 - 1) n3
Vital 4L (Potassium phosphite)				2.0 (1 - 3) n2 Labeled
Vitalonil (Potassium phosphite + chlorothalonil)				3.0 (3 - 3) n1
ZeroTol (Hydrogen dioxide)	1.0 (1 - 1) n1			1.0 (1 - 1) n1 Labeled

Table 2 of 2.

Product (Active Ingredients)	<i>Pseudomonas chicorii</i>	<i>Ps. marginalis</i>	<i>Pseudomonas sp.</i>	<i>Ps. syringae</i>
Actinovate Soluble (Streptomyces lydicus WYEC 108)				
Agrimycin 17 (Streptomycin sulfate)				
Alexin (Fruit and vegetable extract)				
Aliette WDG (Fosetyl Al)				1.5 (1 - 2) n2
ASAP (Silver)				
Bloomtime FD (Pantoea agglomerans strain E325)				
BMJ (Bacillus mycoides isolate J)				
Camelot (Copper salts of fatty and rosin acids)				2.0 (2 - 2) n1
Canker Kill (Unknown)				
Cease (Bacillus subtilis strain QST 713)				1.0 (1 - 1) n1 Labeled
CG100 (Caprylic acid)	1.0 (1 - 1) n2		3.0 (3 - 3) n1	1.3 (1 - 2) n4
Champ Formula 2F (Copper hydroxide)				
Citrex (Citrus extraction)	2.0 (1 - 3) n2		1.5 (1 - 2) n2	1.3 (1 - 2) n4
Companion (Bacillus subtilis GB03)				

Product (Active Ingredients)	<i>Pseudomonas chicorii</i>	<i>Ps. marginalis</i>	<i>Pseudomonas sp.</i>	<i>Ps. syringae</i>
Copper Count N (copper diammonia diacetate complets)				
CuPro (Copper hydroxide)				2.0 (2 - 2) n1
CuPro 2005 (Copper hydroxide)	3.5 (3 - 4) n2 Labeled			3.0 (3 - 3) n1 Labeled
Cuprofix MZ Disperse (Mancozeb + Basic copper sulfate)				
CuproFix Ultra 40 Disperse (Basic copper sulfate)				
Dithane 75DF Rainshield (Mancozeb)				
EarthTec (Copper)				4.0 (4 - 4) n1
Firewall 17WP (Streptomycin sulfate)				
Flameout (Oxytetracycline)				
Floreil (Ethephon)				
HM-0736 (aka Physpe) (Laminarin)	1.0 (1 - 1) n2	1.0 (1 - 1) n1	3.0 (3 - 3) n1	1.0 (1 - 1) n3
Inosco (A14658C) (Potassium phosphite)	1.0 (1 - 1) n1			1.0 (1 - 1) n2
Insimmo (Acibenzolar-S-methyl)	1.0 (1 - 1) n3		1.7 (1 - 3) n3	2.0 (1 - 4) n4
Junction (SePro) (Mancozeb + copper hydroxide)				
Kasumin (Kasugamycin)	2.3 (1 - 3) n3	1.0 (1 - 1) n1	3.0 (1 - 5) n2	2.5 (1 - 5) n4
Kleengrow (Didecyl dimethyl ammonium chloride)				1.0 (1 - 1) n1 Labeled
Kocide 2000 (Dupont) (Copper Hydroxide)	1.0 (1 - 1) n2 Labeled	1.0 (1 - 1) n2 Labeled		1.0 (1 - 1) n1 Labeled
Kocide 3000 (Copper hydroxide)				
K-Phite (Phophorus acid salts)	1.0 (1 - 1) n1 Labeled	1.0 (1 - 1) n1		
Milsana (now Regalia) (Extract of Reynoutria sachalinensis)				
NAI-4201 (NAI-4201)	1.0 (1 - 1) n1		2.0 (2 - 2) n1	1.5 (1 - 2) n2
Nu-Cop 50DF (Copper Hydroxicide)				2.0 (2 - 2) n1 Labeled
Omega Grow Plus (Fish oil)				
Penncozeb DF (Mancozeb)				
Phyton-27 (Copper sulfate pentahydrate)			1.0 (1 - 1) n1 Labeled	
Phyton-27 New Dimension (Copper sulphate pentahydrate)	1.0 (1 - 1) n1 Labeled	1.0 (1 - 1) n1 Labeled		
Protect T/O (Mancozeb)	3.0 (3 - 3) n1			3.0 (1 - 5) n2
Regalia O5 (MOI-10605) (Extract of Reynoutria sachalinensis)	2.0 (1 - 3) n2 Labeled			2.0 (2 - 2) n1 Labeled
Regalia SC (MOI 106) (Extract of Reynoutria sachalinensis)			2.0 (1 - 3) n2 Labeled	1.0 (1 - 1) n2 Labeled

Product (Active Ingredients)	<i>Pseudomonas chicorii</i>	<i>Ps. marginalis</i>	<i>Pseudomonas sp.</i>	<i>Ps. syringae</i>
Rotation: Tricon / Phyton New Dimension (Sodium borate decahydrate / copper pentahydrate)	2.0 (2 - 2) n1	1.0 (1 - 1) n1		
SP2015 (SP2015)	1.0 (1 - 1) n1		1.0 (1 - 1) n2	1.0 (1 - 1) n1
Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	1.0 (1 - 1) n1		1.0 (1 - 1) n2	1.0 (1 - 1) n1
Tank Mix: Actinovate + Tricon (Streptomyces lydicus WYEC 108 + Sodium tetraborahydrate decahydrate)	2.0 (2 - 2) n2			
Tank Mix: BioPhos + Chelated Copper (Phosphorus acid + chelated copper)	1.0 (1 - 1) n2	1.0 (1 - 1) n2		
Tank Mix: Cease + Milstop (Bacillus subtilis + potassium bicarbonate)				
Tank Mix: Kasumin + Kocide (Kasugamycin + copper hydroxide)	1.0 (1 - 1) n1	1.0 (1 - 1) n1		
Tank Mix: Kocide + Kleengrow (Copper Hydroxide + Didecyl dimethyl ammonium chloride)				
Tank Mix: K-Phyte + Tricon (Phosphorus acid salts + Sodium tetraborahydrate decahydrate)	1.0 (1 - 1) n1	1.0 (1 - 1) n1		
Tank Mix: K-Phyte + Kocide 2000 (Phosphorus acid salts + copper hydroxide)				
Tank Mix: K-Phyte + Penncozeb (Phosphorus acid salts + mancozeb)				
Tank Mix: K-Phyte + Phyton (Phosphorus acid salts + copper sulfate pentahydrate)				
Tank Mix: Physpe + Kocide 2000 (Laminarin + copper hydroxide)				
Tank Mix: Physpe + Penncozeb (Laminarin + mancozeb)				
Tank Mix: Physpe + Phyton (Laminarin + copper sulfate pentahydrate)				
Tank Mix: Resist + Sett (Chelated Copper/Manganese/Zinc + Calcium/Boron + surfactant)				
Tank Mix: Rhapsody + Actinovate (Bacillus subtilis + Streptomyces lydicus WYEC 108)				
Tank Mix: Rhapsody + Kocide (Bacillus subtilis + copper hydroxide)				
Tank Mix: Rhapsody + Kocide 2000 + Vital (Bacillus subtilis + Copper hydroxide + phosphite)	1.0 (1 - 1) n1	1.0 (1 - 1) n1		
Tank Mix: Rhapsody + K-Phyte (Bacillus subtilis + phosphorus acid salts)				
Tank Mix: Rhapsody + Penncozeb (Bacillus subtilis + mancozeb)				
Tank Mix: Rhapsody + Phyton (Bacillus subtilis + copper sulfate pentahydrate)				
Tank Mix: SP2015 + CuPRO 2005 (Famoxadone + Cymoxanil + Copper)	1.7 (1 - 3) n3	1.0 (1 - 1) n2	3.0 (3 - 3) n2	1.0 (1 - 1) n1
Tank Mix: Vital + Rhapsody (Phosphite + Bacillus subtilis)				
Tanos (Famoxadone + Cymoxanil)				
TriCon (BW 420) (Sodium tetraborahydrate decahydrate)	1.0 (1 - 1) n1	1.0 (1 - 1) n1		
Vital 4L (Potassium phosphite)				
Vitalonil (Potassium phosphite + chlorothalonil)				
ZeroTol (Hydrogen dioxide)	2.0 (2 - 2) n1 Labeled			1.5 (1 - 2) n2 Labeled