

Project Name: Phytophthora Efficacy

Dates Active: 2003-2010; 2014-2017; 2022-2025

Project Description:

In 2002 the concept of 'Super A' studies was initiated to group together research areas needing higher attention. This concept morphed into 'High Priority Projects' by 2005. Screening biological and chemical tools for efficacy on Phytophthora diseases fell under the initial concept and continued through 2010. The impetus was to determine whether newer products were efficacious and to scope out the range of efficacy among the different *Phytophthora* species. These diseases have periodically become either regional or national high priority projects at subsequent workshops.

Research Project Abstract:

Abstract from 2024 Phytophthora Efficacy Summary

Root rots caused by *Phytophthora* species are often not noticed until foliar symptoms of wilting and stunting are observed. There are multiple species with differential sensitivities to fungicides, making them difficult to manage. Plus, they are classified as Oomycetes in the kingdom Chromista, commonly known as water molds, and can have a propensity to develop resistance to single site mode of action fungicides. Thus, *Phytophthora* diseases have been prioritized for research periodically at IR-4 workshops since 2003. From 2003 to 2015, 74 products representing 65 active ingredients were tested through the IR-4 Program as drench or foliar applications against eleven *Phytophthora* species causing root rots and stem/leaf blights in a total of 926 trials. *Phytophthora* species tested included: *P. cactorum*, *P. cinnamomi*, *P. citricola*, *P. cryptogea*, *P. drechsleri*, *P. nicotianae/parasitica*, *P. palmivora*, *P. plurivora*, *P. ramorum*, *P. syringae*, and *P. tropicalis*. For certain more prevalent and well-studied species, multiple products within several modes of action exhibited good to excellent management: *P. cinnamomi*, *P. cryptogea*, *P. drechsleri*, *P. nicotianae*, *P. palmivora*, *P. ramorum*, and *P. tropicalis*. For *P. cactorum*, none of the experiments provided separation among the treatments and controls. Control of *P. cinnamomi* root rot was achieved primarily with drench applications onto azaleas. When this pathogen was tested on rhododendrons, the data were either inconclusive or the products did not perform as well as on azaleas with the exception of Magellan and Fenamidone. For *P. citricola*, Adorn and the phosphorus acid generators provided good to great efficacy, but none of the typical oomycete fungicides were acceptable. For *P. drechsleri* root rot, the good to excellent efficacy was achieved with several products including BioPhos, Segway, Stature DM, and Terrazole. For *P. nicotianae*, consistent efficacy across crops was difficult to achieve, but the best performers included Adorn, Aliette, Alude, Biophos, Fenamidone, Insignia, Micora Segway, Stature DM, Subdue MAXX, and Vital. For *P. ramorum* blights, Subdue MAXX provided the most consistent control. Adorn, Fenamidone, Insignia,

Segway, and Stature also provided good control. For *P. plurivora*, seven products provided good to excellent activity, but only two experiments have been completed so far. For *P. syringae*, only the phosphorous acid generators provided acceptable reduction in disease in two experiments. For *P. tropicalis*, the best control was achieved with Adorn and Stature. Several products have good to excellent efficacy across multiple Phytophthora species: Adorn, Disarm, Fenstop, Micora, Orvego, Segway, Stature, and Subdue Maxx, plus certain phosphorous acid generating products.

Target Species (Phytotoxicity, or common and Latin name of arthropod, pathogen, weed):	
<i>Phytophthora cactorum</i>	<i>Phytophthora palmivora</i>
<i>Phytophthora cinnamomi</i>	<i>Phytophthora plurivora</i>
<i>Phytophthora citricola</i>	<i>Phytophthora ramorum</i>
<i>Phytophthora cryptogea</i>	<i>Phytophthora sp.</i>
<i>Phytophthora drechsleri</i>	<i>Phytophthora syringae</i>
<i>Phytophthora nicotianae</i>	<i>Phytophthora tropicalis</i>

Target Crops (list tested crops if ongoing or completed project)	
Grand Fir, Giant Fir (<i>Abies grandis</i>) Fir (<i>Abies sp.</i>) Garden Snapdragon (<i>Antirrhinum majus</i>) Boxwood (<i>Buxus sp.</i>) Calibrachoa (<i>Calibrachoa sp.</i>) <i>C. hybrida</i> 'Cabaret Orange' Camellia (<i>Camellia sp.</i>) Periwinkle, Madagascar (<i>Catharanthus roseus</i>) Devil's Ivy (<i>Epipremnum pinnatum</i>) Poinsettia (<i>Euphorbia pulcherrima</i>) Apache Plume (<i>Fallugia paradoxa</i>) Barberton Daisy (<i>Gerbera jamesonii</i>) Transvaal Daisy (<i>Gerbera sp.</i>) Gloxinia (<i>Gloxinia sp.</i>) Ivy, English (<i>Hedera helix</i>) Cedar, Eastern Red (<i>Juniperus virginiana</i>) Doghobble (<i>Leucothoe sp.</i>) Lilyturf, Big Blue (<i>Liriope muscari</i>)	Apple, Non-bearing (<i>Malus sp.</i>) Petunia (<i>Petunia x hybrida</i>) 'Madness Pink' Centipede Tongavine (<i>Pothos sp.</i>) Fir, Douglas (<i>Pseudotsuga menziesii</i>) Mexican Cliffrose (<i>Purshia mexicana</i>) Azalea & Rhododendron (<i>Rhododendron sp.</i>) African Violet (<i>Saintpaulia sp.</i>) <i>S. ionantha</i> Common Sage (<i>Salvia officinalis</i>) Woodland Sage (<i>Salvia x sylvestris</i>) Buffalo Berry (<i>Shepherdia argentea</i>) Spathe Flower; Spathiphyllum (<i>Spathiphyllum sp.</i>) Marigold (<i>Tagetes sp.</i>) Hemlock (<i>Tsuga sp.</i>) Arrowwood (<i>Viburnum sp.</i>) <i>V. plicatum tomentosum</i> 'Mariesii' Periwinkle (<i>Vinca sp.</i>) Violet (<i>Viola sp.</i>)

Target Product(s)(list tested products or numbered compounds if ongoing or completed project)	
Actinovate Soluble (<i>Streptomyces lydicus</i> WYEC 108) Adorn 4F (Fluopicolide) Agrifos (Dipotassium phosphonate + Dipotassium phosphate) Aliette WDG (Fosetyl Al) Alude (Potassium phosphite) Banol (Propamocarb hydrochloride) BW161N (BW161N) Calirus 150 (Mono- and di- potassium salts of phosphorus acid + copper sulfate pentahydrate) Captan (Captan) Cease (<i>Bacillus subtilis</i> strain QST 713) Celero 16WSG (Clothianadin) CG100 (Caprylic acid) Champ Formula 2F (Copper hydroxide) Companion (<i>Bacillus subtilis</i> GB03) Daconil 54EC (Chlorothalonil) Daconil Ultrex (Chlorothalonil) Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil) Daconil ZN (Chlorothalonil) Disarm 480SC (Fluxastrobin) Dithane 75DF Rainshield (Mancozeb) EcoGuard (<i>Bacillus licheniformis</i> SB3086 + Indole-3-butyric Acid) Endorse (Polyoxin D) Fenstop (Envu) (Fenamidon) Fluazinam (Fluazinam) Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion) Gavel DF (Mancozeb + Zoxamide) Heritage (Azoxystrobin) Hymexazol 30L (Hymexazol) Incept (T382) (<i>Trichoderma hamatum</i> strain 382) Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	K-Phite (Phosphorus acid salts) Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites) Maneb 75DF (Maneb) MBI 121 (MBI 121) Medallion (Fludioxonil) MGCI (MGCI) Micora (Mandipropamid) MultiGuard (Furfural) Muscodor albus (<i>Muscodor albus</i>) Orkestra Intrinsic (Fluxapyroxad + pyraclostrobin) Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651)) Pageant Intrinsic (Boscalid + pyraclostrobin) Picarbutrazox 20WG (Picarbutrazox) Polyram (EBDC) Prestop (<i>Clonostachys rosea</i>/<i>Gliocladium catenulatum</i> Strain J1446) Promax (Thyme oil) Proud 3 (Thyme oil) RD00AS-1 (BW159) (BW159) Regalia O5 (MOI-10605) (Extract of <i>Reynoutria sachalinensis</i>) Regalia SC (MOI 106) (Extract of <i>Reynoutria sachalinensis</i>) Remedier (<i>Trichoderma asperellum</i> + <i>Trichoderma gamsii</i>) RES 505 (RES 505) RootShield Plus WP (aka BW240) (<i>Trichoderma harzianum</i> T-22 + <i>Trichoderma virens</i> G-41) SA 11210 (SA 11210) Segovis (Oxathiapiprolin) Segway (Cyazofamid) Serenade Prime (aka Rhapsody ASO) (<i>Bacillus subtilis</i> strain QST 713) SP2478 (SP2478) SP2770 10WP (SP2770) Stargus (<i>Bacillus nakamurai</i> strain F727)

Target Product(s)(list tested products or numbered compounds if ongoing or completed project)	
Stature DM (Dimethomorph) Stature MZ (Dimethomorph + Mancozeb) Stature SC (Dimethomorph) Subdue MAXX (Mefenoxam) Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24) Tanos (Famoxadone + Cymoxanil) Terramec SP (Chloroneb) Terrazole 35%WP (Etridiazole) TM-435 (TM-435)	TM-459 (TM-459) Trichoderma harzianum (Trichoderma harzianum) Tril-21 (Thyme oil) Truban 25EC (Etridiazole) Truban 30WP (Etridiazole) V-10162 5.73FL (Fluopicolide + propamocarb hydrochloride) Vital 4L (Potassium phosphite) ZeroTol (Hydrogen dioxide)

Products/Crops Registered through IR-4Research:				
	Fully Screened (also includes standards)		Partially Screened through IR-4 ¹	Need Data Across Species ?
Labeled Generally & Commercialized	Adorn * Aliette DisArm FenStop Pageant *	RootShield Plus * Segway * Subdue Maxx * Terrazole	Banol Banrot Cease Companion Empress * Heritage	Hurricane PlantShield RootShield Phosphorus Acid Salts ¹ SoilGard
Labeled Generally But NOT Commercialized				
Labeled for Specific Pest & Commercialized				
Labeled for Specific Pest but NOT Commercialized				
Not yet registered or labeled for Pest			Bas 703 06F Bio-Tam CG100	
No longer available for development for Pest			A13839B Micora (NOA 446510) * Remedier SP20155 SP 2770 10WP SP 2771	
* IR-4 Data contributed to registration decision – either adding pest to label or not pursuing further research				
¹ Agri-Fos, Alude Magellan, Vital etc.				

IR-4 Efficacy Trials to Date
Average rating on a scale of 1 – 5 where 1 = <60% Control (not effective), 2 = 60-79% control, 3 = 80-89% control, 4 = 90-94% control and 5 = 95-100% control; minimum to maximum rating; number of trials (See table on next page). For product/pest combinations that are blank, IR-4 has not screened this combination. A rating of 3 or higher is considered commercially acceptable. 'Labeled' indicates that this pest species or genera is listed on the label.

Environmental Horticulture Program Research Project Sheet

<https://www.ir4project.org/ehc/ehc-registration-support-research/env-hort-extension-resources/>

Table 1 of 2.

MOA	Product (Actives)	<i>Phytophthora cinnamomi</i>	<i>Phytophthora citricola</i>	<i>Phytophthora cryptogea</i>	<i>Phytophthora drechsleri</i>	<i>Phytophthora nicotianae</i>	<i>Phytophthora palmivora</i>
FRAC 11	Disarm 480SC (Fluoxastrobin)	3.0 (1 - 5) n4 Labeled	1.0 (1 - 1) n1 Labeled	1.8 (1 - 5) n5 Labeled	1.0 (1 - 1) n1 Labeled	5.0 (5 - 5) n1 Labeled	3.0 (3 - 3) n1 Labeled
FRAC 11	Fenstop (Envu) (Fenamidone)	3.3 (1 - 5) n7 Labeled	1.5 (1 - 2) n2 Labeled	5.0 (5 - 5) n5 Labeled	4.0 (3 - 5) n2 Labeled	3.6 (1 - 5) n8 Labeled	3.0 (3 - 3) n2 Labeled
FRAC 11	Heritage (Azoxystrobin)	2.2 (1 - 4) n6 Labeled	1.0 (1 - 1) n1 Labeled	3.0 (1 - 5) n4 Labeled	1.0 (1 - 1) n1 Labeled	5.0 (5 - 5) n1 Labeled	2.5 (2 - 3) n4 Labeled
FRAC 11	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	2.7 (1 - 5) n6 Labeled	1.5 (1 - 2) n2 Labeled	2.2 (1 - 5) n5 Labeled	1.0 (1 - 1) n4 Labeled	2.9 (1 - 5) n7 Labeled	2.5 (2 - 3) n4 Labeled
FRAC 11 + FRAC 27	Tanos (Famoxadone + Cymoxanil)		1.0 (1 - 1) n1	1.0 (1 - 1) n2	1.0 (1 - 1) n1		3.0 (3 - 3) n1
FRAC 11 + FRAC 4	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)		1.0 (1 - 1) n1			5.0 (5 - 5) n1	4.5 (4 - 5) n2
FRAC 12	Medallion (Fludioxonil)	1.0 (1 - 1) n1		1.0 (1 - 1) n1		1.0 (1 - 1) n2	
FRAC 14	Terrazole 35%WP (Etridiazole)	2.0 (1 - 3) n3 Labeled			4.7 (4 - 5) n3 Labeled	1.0 (1 - 1) n3 Labeled	3.0 (3 - 3) n1 Labeled
FRAC 14	Truban 25EC (Etridiazole)	1.0 (1 - 1) n3 Labeled					
FRAC 14	Truban 30WP (Etridiazole)					1.0 (1 - 1) n1 Labeled	
FRAC 21	Segway (Cyazofamid)	3.1 (1 - 5) n11 Labeled	1.0 (1 - 1) n3 Labeled	3.0 (1 - 5) n5 Labeled	3.3 (1 - 5) n6 Labeled	3.0 (1 - 5) n15 Labeled	3.0 (2 - 5) n6 Labeled
FRAC 21 / FRAC P07	Tank Mix: Cyazofamid + Alude (Cyazofamid + potassium phosphite)	3.0 (3 - 3) n1					
FRAC 28	Banol (Propamocarb hydrochloride)	1.0 (1 - 1) n1					

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FRAC 28 + FRAC 43	V-10162 5.73FL (Fluopicolide + propamacarb hydrochloride)					5.0 (5 - 5) n1 Labeled	
FRAC 29	Fluazinam (Fluazinam)	3.0 (3 - 3) n1					
FRAC 32	Hymexazol 30L (Hymexazol)	1.0 (1 - 1) n1					
FRAC 4	Subdue MAXX (Mefenoxam)	1.9 (1 - 5) n15 Labeled	1.0 (1 - 1) n1 Labeled	4.2 (1 - 5) n5 Labeled	3.0 (1 - 5) n2 Labeled	4.0 (1 - 5) n5 Labeled	4.0 (3 - 5) n4 Labeled
FRAC 40	Micora (Mandipropamid)	4.0 (1 - 5) n4 Labeled	1.0 (1 - 1) n1 Labeled	3.0 (1 - 5) n2 Labeled		5.0 (5 - 5) n3 Labeled	3.0 (1 - 5) n2 Labeled
FRAC 40	Stature DM (Dimethomorph)	3.4 (1 - 5) n8 Labeled	1.3 (1 - 2) n3 Labeled	4.0 (3 - 5) n2 Labeled	4.5 (4 - 5) n4 Labeled	2.6 (1 - 5) n14 Labeled	3.0 (3 - 3) n1 Labeled
FRAC 40	Stature SC (Dimethomorph)			5.0 (5 - 5) n2 Labeled	1.0 (1 - 1) n1 Labeled		2.3 (2 - 3) n3 Labeled
FRAC 40 + FRAC M3	Stature MZ (Dimethomorph + Mancozeb)	1.0 (1 - 1) n1					
FRAC 43	Adorn 4F (Fluopicolide)	2.6 (1 - 5) n5 Labeled	3.0 (1 - 5) n2 Labeled	3.8 (1 - 5) n5 Labeled	5.0 (5 - 5) n2 Labeled	5.0 (5 - 5) n4 Labeled	3.0 (2 - 5) n5 Labeled
FRAC 45 + FRAC 40	Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))			5.0 (5 - 5) n1 Labeled	5.0 (5 - 5) n1 Labeled		
FRAC 49	Segovis (Oxathiapiprolin)				4.5 (4 - 5) n2 Labeled		
FRAC 7 + FRAC 11	Pageant Intrinsic (Boscalid + pyraclostrobin)				1.0 (1 - 1) n1 Labeled		
FRAC BM01	Tril-21 (Thyme oil)				1.0 (1 - 1) n2	1.0 (1 - 1) n1	

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FRAC BM02	Actinovate Soluble (Streptomyces lydicus WYEC 108)	1.0 (1 - 1) n1 Labeled					
FRAC BM02	Incept (T382) (Trichoderma hamatum strain 382)	1.0 (1 - 1) n1					
FRAC BM02	Remedier (Trichoderma asperellum + Trichoderma gamsii)			1.0 (1 - 1) n2 Labeled	1.0 (1 - 1) n1 Labeled	1.0 (1 - 1) n1 Labeled	
FRAC BM02	RootShield Plus WP (aka BW240) (Trichoderma harzianum T-22 + Trichoderma virens G-41)			1.0 (1 - 1) n1 Labeled	1.0 (1 - 1) n1 Labeled		
FRAC BM02	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)			1.0 (1 - 1) n2 Labeled	1.0 (1 - 1) n1 Labeled		3.0 (3 - 3) n1 Labeled
FRAC M3	Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion)		1.0 (1 - 1) n1				
FRAC M4	Captan (Captan)	1.7 (1 - 3) n3 Labeled				4.0 (4 - 4) n1 Labeled	3.0 (3 - 3) n1 Labeled
FRAC M5	Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil)					1.0 (1 - 1) n2 Labeled	
FRAC M5	Daconil ZN (Chlorothalonil)				1.0 (1 - 1) n2	2.0 (2 - 2) n1	
FRAC NC	Muscodor albus (Muscodor albus)	1.0 (1 - 1) n3		1.0 (1 - 1) n1		1.0 (1 - 1) n1	
FRAC NC	ZeroTol (Hydrogen dioxide)	1.0 (1 - 1) n1 Labeled			1.0 (1 - 1) n1 Labeled		

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FRAC P07	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	3.3 (1 - 5) n9 Labeled	3.0 (3 - 3) n2 Labeled	1.0 (1 - 1) n2 Labeled	3.8 (1 - 5) n4 Labeled	3.4 (1 - 5) n5 Labeled	1.0 (1 - 1) n2 Labeled
FRAC P07	Aliette WDG (Fosetyl Al)	4.0 (2 - 5) n9 Labeled	4.3 (3 - 5) n3 Labeled	1.0 (1 - 1) n5 Labeled	1.8 (1 - 3) n4 Labeled	3.6 (1 - 5) n9 Labeled	2.0 (2 - 2) n1 Labeled
FRAC P07	Alude (Potassium phosphite)	2.9 (1 - 5) n7 Labeled	4.0 (4 - 4) n1 Labeled	1.0 (1 - 1) n3 Labeled	2.3 (1 - 3) n4 Labeled	3.0 (1 - 5) n4 Labeled	2.0 (2 - 2) n1 Labeled
FRAC P07	Calirus 150 (Mono- and di-potassium salts of phosphorus acid + copper sulfate pentahydrate)	5.0 (5 - 5) n2					
FRAC P07	K-Phite (Phosphorus acid salts)	5.0 (5 - 5) n1 Labeled				5.0 (5 - 5) n1 Labeled	
FRAC P07	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	2.7 (1 - 5) n6 Labeled	4.0 (3 - 5) n3 Labeled	1.0 (1 - 1) n5 Labeled	1.0 (1 - 1) n1 Labeled	4.0 (3 - 5) n2 Labeled	3.0 (3 - 3) n1 Labeled
FRAC P07	Vital 4L (Potassium phosphite)	3.6 (1 - 5) n8 Labeled		1.0 (1 - 1) n3 Labeled	1.0 (1 - 1) n1 Labeled	4.3 (3 - 5) n3 Labeled	1.0 (1 - 1) n2 Labeled
FRAC U17	Picarbutrazox 20WG (Picarbutrazox)				3.5 (3 - 4) n2	1.0 (1 - 1) n1	
IRAC 4A	Celero 16WSG (Clothianadin)						1.0 (1 - 1) n1
unknown	MBI 121 (MBI 121)				1.0 (1 - 1) n2	2.0 (2 - 2) n1	
unknown	MGCI (MGCI)				1.0 (1 - 1) n2		
unknown	MultiGuard (Furfural)	1.0 (1 - 1) n3 Labeled	1.0 (1 - 1) n1 Labeled	1.0 (1 - 1) n1 Labeled		1.7 (1 - 3) n3 Labeled	
unknown	RD00AS-1 (BW159) (BW159)				1.0 (1 - 1) n2	1.0 (1 - 1) n1	
unknown	TM-459 (TM-459)		1.0 (1 - 1) n1				

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MOA	Product (Actives)	<i>Phytophthora plurivora</i>	<i>Phytophthora ramorum</i>	<i>Phytophthora sp.</i>	<i>Phytophthora syringae</i>	<i>Phytophthora tropicalis</i>
FRAC 11	Disarm 480SC (Fluoxastrobin)		2.1 (1 - 5) n10 Labeled	4.0 (4 - 4) n1 Labeled	1.0 (1 - 1) n2 Labeled	5.0 (5 - 5) n2 Labeled
FRAC 11	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)		1.5 (1 - 3) n4 Labeled		1.0 (1 - 1) n1 Labeled	5.0 (5 - 5) n2 Labeled
FRAC 11 + FRAC 27	Tanos (Famoxadone + Cymoxanil)		2.0 (1 - 5) n8 Labeled		1.0 (1 - 1) n1 Labeled	2.0 (2 - 2) n1 Labeled
FRAC 11 + FRAC 4	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefconaxam)		5.0 (5 - 5) n1		1.0 (1 - 1) n1	
FRAC 12	Medallion (Fludioxonil)		2.0 (2 - 2) n1		1.0 (1 - 1) n1	
FRAC 14	Truban 25EC (Etridiazole)		1.0 (1 - 1) n2 Labeled			
FRAC 21 / FRAC P07	Tank Mix: Cyazofamid + Alude (Cyazofamid + potassium phosphite)		3.2 (2 - 5) n9 Labeled	4.0 (4 - 4) n1 Labeled	1.0 (1 - 1) n3 Labeled	5.0 (5 - 5) n4 Labeled
FRAC 40	Micora (Mandipropamid)	5.0 (5 - 5) n1 Labeled	3.7 (1 - 5) n12 Labeled		1.0 (1 - 1) n2 Labeled	5.0 (5 - 5) n1 Labeled
FRAC 40	Stature DM (Dimethomorph)	4.0 (3 - 5) n2 Labeled	3.3 (1 - 5) n7 Labeled	4.0 (4 - 4) n1 Labeled	1.0 (1 - 1) n2 Labeled	5.0 (5 - 5) n1 Labeled
FRAC 40	Stature SC (Dimethomorph)		2.7 (1 - 5) n11 Labeled	5.0 (5 - 5) n1 Labeled	1.0 (1 - 1) n3 Labeled	
FRAC 40 + FRAC M3	Stature MZ (Dimethomorph + Mancozeb)		3.0 (3 - 3) n1 Labeled			5.0 (5 - 5) n2 Labeled
FRAC 45 + FRAC 40	Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))		2.3 (1 - 5) n12 Labeled	4.0 (4 - 4) n1 Labeled	1.0 (1 - 1) n3 Labeled	5.0 (5 - 5) n4 Labeled
FRAC 49	Segovis (Oxathiapiprolin)		4.0 (3 - 5) n3 Labeled			5.0 (5 - 5) n1 Labeled
FRAC 7 + FRAC 11	Orchestra Intrinsic (Fluxapyroxad + pyraclostrobin)	5.0 (5 - 5) n2 Labeled				

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FRAC 7 + FRAC 11	Pageant Intrinsic (Boscalid + pyraclostrobin)	4.0 (4 - 4) n1 Labeled				
FRAC BM01	Promax (Thyme oil)					
FRAC BM01	Proud 3 (Thyme oil)	1.0 (1 - 1) n1				
FRAC BM01	Tril-21 (Thyme oil)	5.0 (5 - 5) n1				
FRAC BM02	Cease (Bacillus subtilis strain QST 713)		1.0 (1 - 1) n2 Labeled	2.0 (2 - 2) n1 Labeled		
FRAC BM02	Incept (T382) (Trichoderma hamatum strain 382)		1.0 (1 - 1) n2 Labeled			
FRAC BM02	Remedier (Trichoderma asperellum + Trichoderma gamsii)	1.0 (1 - 1) n1 Labeled				
FRAC BM02	Seranade Prime (aka Rhapsody ASO) (Bacillus subtilis strain QST 713)		1.0 (1 - 1) n1 Labeled			
FRAC BM02	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	1.0 (1 - 1) n1				
FRAC M1	Champ Formula 2F (Copper hydroxide)					1.0 (1 - 1) n1 Labeled
FRAC M3	Dithane 75DF Rainshield (Mancozeb)		1.5 (1 - 2) n2			
FRAC M3	Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion)		3.7 (1 - 5) n6 Labeled			
FRAC M3	Polyram (EBDC)		5.0 (5 - 5) n5			
FRAC M3 + FRAC 22	Gavel DF (Mancozeb + Zoxamide)		4.4 (3 - 5) n5			

Environmental Horticulture Program Research Project Sheet

<https://www.ir4project.org/ehc/ehc-registration-support-research/env-hort-extension-resources/>

MOA	Product (Actives)	<i>Phytophthora plurivora</i>	<i>Phytophthora ramorum</i>	<i>Phytophthora sp.</i>	<i>Phytophthora syringae</i>	<i>Phytophthora tropicalis</i>
FRAC M4	Captan (Captan)		4.6 (3 - 5) n5			
FRAC M5	Daconil Ultrex (Chlorothalonil)		2.0 (1 - 5) n7 Labeled		1.0 (1 - 1) n1 Labeled	
FRAC M5	Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil)		2.5 (2 - 3) n2 Labeled			
FRAC NC	Muscodor albus (Muscodor albus)		3.0 (1 - 5) n2			
FRAC P05	Regalia SC (MOI 106) (Extract of Reynoutria sachalinensis)		5.0 (5 - 5) n1 Labeled			
FRAC P07	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)		2.0 (2 - 2) n1			
FRAC P07	Aliette WDG (Fosetyl Al)		1.2 (1 - 2) n5 Labeled	4.0 (4 - 4) n1 Labeled		
FRAC P07	Alude (Potassium phosphite)		1.3 (1 - 2) n8 Labeled		2.3 (1 - 3) n3 Labeled	1.7 (1 - 3) n3 Labeled
FRAC P07	Calirus 150 (Mono- and di- potassium salts of phosphorus acid + copper sulfate pentahydrate)		1.3 (1 - 2) n4 Labeled		3.0 (3 - 3) n1 Labeled	
FRAC P07	Vital 4L (Potassium phosphite)		1.0 (1 - 1) n6 Labeled		3.0 (3 - 3) n2 Labeled	
FRAC U17	Picarbutrazox 20WG (Picarbutrazox)		1.0 (1 - 1) n5 Labeled	5.0 (5 - 5) n1 Labeled		
unknown	MBI 121 (MBI 121)	5.0 (5 - 5) n1 Labeled				
unknown	RD00AS-1 (BW159) (BW159)		1.0 (1 - 1) n2 Labeled	3.0 (3 - 3) n1 Labeled		1.0 (1 - 1) n1 Labeled
unknown	SP2770 10WP (SP2770)		1.0 (1 - 1) n1			
unknown	TM-459 (TM-459)	3.5 (2 - 5) n2				