

Project Name: Phytophthora Efficacy

New	Ongoing	Completed	X	Duration if ongoing or completed:	2003 – 2010, 2014
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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.

Research Project Abstract (if available):

Abstract from 2010 Phytophthora Efficacy Summary

From 2003 to 2009, 45 products were tested through the IR-4 Program as drench or foliar applications against nine *Phytophthora* species causing root rots and stem/leaf blights. *Phytophthora* species tested included: *P. cactorum*, *P. cinnamomi*, *P. citricola*, *P. cryptogea*, *P. dreschleri*, *P. nicotianae/parasitica*, *P. palmivora*, *P. ramorum*, *P. syringae*, and *P. tropicalis*. Control of *Phytophthora 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 *Phytophthora dreschleri* root rot, the good to excellent efficacy was achieved with several products including BioPhos, Segway, Stature DM, and Terrazole. For *Phytophthora nicotianae*, consistent efficacy across crops was difficult to achieve, but the best performers included Aliette, Biophos, Fenamidone, Insignia, Segway and Stature DM. The best control of *Phytophthora citricola* blight was achieved with foliar applications of the phosphorus acid generators Aliette, Biophos and Magellan. For *Phytophthora ramorum* blights, Subdue MAXX provided the most consistent control. Adorn, Fenamidone, Insignia, Segway, and Stature also provided good control. For *Phytophthora tropicalis*, the best control was achieved with Adorn and Stature.

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

<i>Phytophthora cactorum</i>	<i>Phytophthora dreschleri</i>	<i>Phytophthora plurivora</i>
<i>Phytophthora cinnamomi</i>	<i>Phytophthora nicotianae/</i>	<i>Phytophthora ramorum</i>
<i>Phytophthora citricola</i>	<i>Phytophthora parasitica</i>	<i>Phytophthora syringae</i>
<i>Phytophthora cryptogea</i>	<i>Phytophthora palmivora</i>	<i>Phytophthora tropicalis</i>

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

African Violet (<i>Saintpaulia sp.</i>)	Pansy (<i>Viola X wittrockiana</i>)
Alder (<i>Alnus sp.</i>)	Periwinkle (<i>Vinca sp.</i>)
Crabapple (<i>Malus sp.</i>)	Poinsettia (<i>Euphorbia pulcherrima</i>)
Azalea & Rhododendron (<i>Rhododendron sp.</i>)	<i>Pothos sp.</i>
Bamboo Palm (<i>Chamaedorea seifrizii</i>)	Rose Periwinkle (<i>Catharanthus roseus</i>)
Camelia (<i>Camelia japonica</i>)	Sage (<i>Salvia officinalis</i>)
English Ivy (<i>Hedera helix</i>)	Snapdragon (<i>Antirrhinum majus</i>)
Frasier fir (<i>Abies fraseri</i>)	<i>Spathiphyllum sp.</i>
<i>Liriope muscari</i>	Transvaal Daisy (<i>Gerbera sp.</i>)
Marigold (<i>Tagetes sp.</i>)	<i>Viburnum sp.</i>
Mexican Cliff Rose (<i>Purshia mexica</i>)	

Target Product(s) (list tested products or numbered compounds if ongoing or completed project)		
A21008A SC Actinovate SP Adorn 4FL Agrifos Aliette WDG Alude 2L Alude 46L BAS 651 BioPhos 43L Calirus 150 Captan 50WP Captan 80WP Cease CG100 Champ Formula 2F Daconil Ultrex Disarm 20EC Disarm 480SC	Dithane 75 DF Fenstop Fore 80WP Gavel 75DF Heritage 50WG Hymexazol 30L Insignia 20W K-Phite Magellan Maneb Medallion 50W Micora MultiGuard <i>Muscodor albus</i> Micora Orevego Pageant Intrinsic Polyram	Promax Remedier Rhapsody Biofungicide Rootshield Plus SA 11210 Segway 400SC SP2770 10WP Stature DM 50W Stature MZ Stature SC Subdue MAXX 2E Taegro Tanos Terrazole 35WP TM-459 Truban 25EC/30WP Vital 4L ZetoTol

Products/Crops Registered through IR-4 Research:				
	Fully Screened (also includes standards)	Partially Screened through IR-4 ¹		Need Data Across Species ?
Labeled Generally & Commercialized	Aliette Captan Stature * Subdue Maxx * Terrazole	Actinovate Champ Banol Banrot Cease Companion Daconil DisArm Empress * Heritage Micora *	Mycostop Orvego * Pageant * PlantShield, RootShield Phosphorus Acid Salts ¹ RootShield Plus * Segway * Soilguard Taegro	Hurricane
Labeled Generally But NOT Commercialized				
Labeled for Specific Phytophthora & Commercialized	Adorn *	FenStop		Compass
Labeled for Specific Phytophthora but NOT Commercialized				
Not yet registered or labeled for Phytophthora		Bio-Tam Heritage + Subdue		<i>Bacillus pumilus</i> BAS703 06F
No longer available for development for Phytophthora	Gavel DF ² Maneb ² Polyram ²	CG100 MOI-106 MOI-107 Multiguard	<i>Muscodor albus</i> SP2015 SP2770	



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

¹ Agri-Fos, Alude Magellan, Vital etc.

² Not for development for ornamental horticulture crops

Other:

This project also tested tank mix and rotations to foster IPM strategies for managing resistance.

Project Pros	Project Cons
<ol style="list-style-type: none"> 1 Individual Phytophthora species vary in response 2 General labels could be refined by listing species – however, growers many not know which species they might have without detailed diagnostics 3 More important in future w/water recycling 4 Best management practices water quality 5 Rotations for resistance management 6 Biofiltration with microbes 	<ol style="list-style-type: none"> 1 Multiple years of data with successful registrations of products of different classes 2 Individual Phytophthora species vary in response 3 Many labels already list “Phytophthora diseases” on the label so further refinement of labels is not needed 4 Growers many not know which species they might have without detailed diagnostics

IR-4 Efficacy Trials to Date

Average rating on a scale of 1 – 5 with 1 = 0 to about 60% efficacy and 5 = 100 efficacy or equivalent to non-inoculated control; minimum to maximum rating; number of trials (See table on next page).

‘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.

Product (Active Ingredients)	<i>P. palmivora</i>	<i>P. plurivora</i>	<i>P. ramorum</i>	<i>P. sp.</i>	<i>P. syringae</i>
Heritage (Azoxystrobin)	2.5 (2 - 3) n4		1.5 (1 - 3) n4 Labeled		1.0 (1 - 1) n1
Hymexazol 30L (Hymexazol)					
Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin) *	2.5 (2 - 3) n4 Labeled		1.8 (1 - 5) n6 Labeled		1.0 (1 - 1) n1 Labeled
K-Phite (Phosphorus acid salts)					
Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	3.0 (3 - 3) n1 Labeled		1.0 (1 - 1) n6 Labeled		3.0 (3 - 3) n2 Labeled
Maneb 75DF (Maneb)			5.0 (5 - 5) n3		
Medallion (Fludioxonil)					
Micora (NOA 446510) (Mandipropamid)	3.0 (1 - 5) n2 Labeled	3.0 (3 - 3) n1	3.3 (1 - 5) n7 Labeled	4.0 (4 - 4) n1 Labeled	1.0 (1 - 1) n2 Labeled
MultiGuard (Furfural)			1.0 (1 - 1) n2 Labeled	3.0 (3 - 3) n1 Labeled	
Muscodor albus (Muscodor albus)					
Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))			4.0 (3 - 5) n3 Labeled		
Pageant 38WG (Boscalid + Pyraclostrobin)					
Polyram (EBDC)			4.3 (3 - 5) n3		
Promax (Thyme Oil (3%))		1.0 (1 - 1) n1			
Regalia O5 (MOI-10605) (Extract of Reynoutria sachalinensis)			5.0 (5 - 5) n1 Labeled		
Regalia SC (MOI 106) (Extract of Reynoutria sachalinensis)			2.0 (2 - 2) n1		
Remedier (Trichoderma asperellum + Trichoderma gamsii)					
RootShield Plus WP (aka BW240) (Trichoderma harzianum T-22 + Trichoderma virens G-41)			1.0 (1 - 1) n1 Labeled		
SA 11210 (SA 11210)			1.0 (1 - 1) n1		
Segway (Cyazofamid)	3.5 (3 - 5) n4 Labeled		3.1 (2 - 5) n8 Labeled	4.0 (4 - 4) n1 Labeled	1.0 (1 - 1) n3 Labeled
SP2770 10WP (SP2770)		3.5 (2 - 5) n2			
Stature DM (Dimethomorph)	3.0 (3 - 3) n1 Labeled		3.0 (1 - 5) n6 Labeled		1.0 (1 - 1) n3 Labeled
Stature MZ (Dimethomorph + Mancozeb)					
Stature SC (Dimethomorph)	2.3 (2 - 3) n3 Labeled				
Subdue MAXX (Mefenoxam)	4.0 (3 - 5) n4 Labeled	5.0 (5 - 5) n1	4.7 (4 - 5) n3		1.0 (1 - 1) n2 Labeled
Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	3.0 (3 - 3) n1 Labeled				

Product (Active Ingredients)	<i>P. palmivora</i>	<i>P. plurivora</i>	<i>P. ramorum</i>	<i>P. sp.</i>	<i>P. syringae</i>
Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefenoxam)	4.5 (4 - 5) n2		<i>2.0 (2 - 2) n1</i>		<i>1.0 (1 - 1) n1</i>
Tanos (Famoxadone + Cymoxanil)	3.0 (3 - 3) n1		5.0 (5 - 5) n1		<i>1.0 (1 - 1) n1</i>
Terrazole 35%WP (Etridiazole)	3.0 (3 - 3) n1 Labeled		<i>1.0 (1 - 1) n2</i>		
TM-459 (TM-459)					
Truban 25EC (Etridiazole)					
Truban 30WP (Etridiazole)					
Vital 4L (Potassium phosphite)	<i>1.0 (1 - 1) n2</i> <i>Labeled</i>		<i>1.0 (1 - 1) n4</i> <i>Labeled</i>	5.0 (5 - 5) n1 Labeled	
ZeroTol (Hydrogen dioxide)					

*Replaced in the marketplace with Empress Intrinsic; the WDG formulation is no longer available

Table 3 of 3.

Product (Active Ingredients)	<i>P. tropicalis</i>
A21008A SC (oxathiapiprolin)	
Actinovate Soluble (Streptomyces lydicus WYEC 108)	
Adorn 4F (Fluopicolide)	5.0 (5 - 5) n4 Labeled
Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	
Aliette WDG (Fosetyl Al)	<i>2.0 (1 - 3) n2</i> <i>Labeled</i>
Alude (Potassium phosphite)	
Calirus (PMA300) (Phosphorus acid)	
Captan (Captan)	
Cease (Bacillus subtilis strain QST 713)	
Celero 16WSG (Clothianidin)	
CG100 (Caprylic acid)	
Champ Formula 2F (Copper hydroxide)	
Daconil Ultrex (Chlorothalonil)	
Daconil Weather Stik (Chlorothalonil)	
Disarm 480SC (Fluoxastrobin)	5.0 (5 - 5) n2 Labeled
Dithane 75DF Rainshield (Mancozeb)	
Fenstop (Fenamidone)	5.0 (5 - 5) n2 Labeled
Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion)	
Gavel DF (Mancozeb + Zoxamide)	
Heritage (Azoxystrobin)	5.0 (5 - 5) n2

Product (Active Ingredients)	<i>P. tropicalis</i>
Hymexazol 30L (Hymexazol)	
Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin) *	2.0 (2 - 2) n1 Labeled
K-Phite (Phosphorus acid salts)	
Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	
Maneb 75DF (Maneb)	
Medallion (Fludioxonil)	
Micora (NOA 446510) (Mandipropamid)	5.0 (5 - 5) n1 Labeled
MultiGuard (Furfural)	1.0 (1 - 1) n1 Labeled
Muscodor albus (Muscodor albus)	
Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))	
Pageant 38WG (Boscalid + Pyraclostrobin)	
Polyram (EBDC)	
Promax (Thyme Oil (3%))	
Regalia O5 (MOI-10605) (Extract of Reynoutria sachalinensis)	
Regalia SC (MOI 106) (Extract of Reynoutria sachalinensis)	
Remedier (Trichoderma asperellum + Trichoderma gamsii)	
RootShield Plus WP (aka BW240) (Trichoderma harzianum T-22 + Trichoderma virens G-41)	
SA 11210 (SA 11210)	
Segway (Cyazofamid)	5.0 (5 - 5) n3 Labeled
SP2770 10WP (SP2770)	
Stature DM (Dimethomorph)	
Stature MZ (Dimethomorph + Mancozeb)	
Stature SC (Dimethomorph)	5.0 (5 - 5) n1 Labeled
Subdue MAXX (Mefenoxam)	5.0 (5 - 5) n1 Labeled
Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	1.0 (1 - 1) n1 Labeled
Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefenoxam)	
Tanos (Famoxadone + Cymoxanil)	
Terrazole 35%WP (Etridiazole)	
TM-459 (TM-459)	
Truban 25EC (Etridiazole)	

Product (Active Ingredients)	<i>P. tropicalis</i>
Truban 30WP (Etridiazole)	
Vital 4L (Potassium phosphite)	
ZeroTol (Hydrogen dioxide)	

*Replaced in the marketplace with Empress Intrinsic; the WDG formulation is no longer available

Fungicide (active ingredients)	FRAC Class	Registered Use Site(s)	REI	Application Method	Phytophthora Root Rot							Phytophthora Foliar/Stem Blight						
					<i>P. cactorum</i>	<i>P. cinnamoni</i>	<i>P. cryptogea</i>	<i>P. drechleri</i>	<i>P. nicotianae/parusitica</i>	<i>P. palmivora</i>	<i>Phytophthora sp.</i>	<i>P. tropicalis</i>	<i>P. citricola</i>	<i>P. nicotianae/parusitica</i>	<i>P. plurivora</i>	<i>P. ramorum</i>	<i>P. syringae</i>	
Actinovate (<i>Streptomyces lydicus</i>)	NC	G, I, L, N, S	1 h	D	G	F	?	?	P	G	G	?	G	?	?	G	G,F	
				S	G	F	?	?	P	G	G	?	G	?	?	P-G	G,F	
				F	-	?	?	?	?	?	?	?	G	?	?	G	G,F	
Adorn (fluopicolide)	43	G, L, N S	12 h	D	P-F	P-E	G-E	E	F-E	P-E	E	E	?	?	?	P	P	
				F	?	?	?	?	?	?	?	?	E	E	?	P-E	P	
Aliette (fosetyl Al)	33	G, N	12 h	D	F	F-E	P-F	P	P-E	?	?	P	G	?	?	P	P-F	
				F	?	F-E	P	F	?	?	?	E	E	G-E	?	P-E	P	
Alude, Magellan, etc. (phosphorus acid salts)	33	G, N	4 h	D	F	F-E	F	F-G	P-E	?	E	G-E	?	?	?	P	F	
				F	?	P-E	P	P	?	?	?	?	G	F-G	?	P-G	F	
Badge SC, Badge X2 (copper hydroxide + copper oxychloride)	M1	G, N, S	48 h	F	?	?	?	?	?	?	?	?	?	?	?	?	?	
Banol, Proplant (propamocarb)	28	G, N	24 h	D	?	P	?	?	P-F	?	?	?	?	?	?	?	?	
Banrot (etridiazole+thiophanate methyl)	14 + 1	G	12 h	D	?	?	?	?	P	?	?	?	?	?	?	?	?	
Captan	M4	G	48 h	F	?	P-G	?	?	G	?	?	?	?	E	?	P-E	P	
Cease, Companion, Serenade Optimum, DPZ, etc. (<i>Bacillus subtilis</i>)	44	G, I, N, S	4 h	F	?	?	?	?	?	?	?	?	?	?	?	P	?	
Champion, Kentan, Kocide, etc. (copper hydroxide)	M1	G, I, N, S	48 h	F	?	?	?	P-E	P	?	?	?	?	?	?	P	?	
Compass (trifloxystrobin)	11	G, I, L, N, S	12 h	D, F	?	?	?	?	?	?	?	?	?	?	?	?	?	
Concorde, Daconil, Echo (chlorothalonil)	M5	G, N	12 h	F	?	?	?	?	?	?	?	?	?	P	?	P-F	?	
Disarm, Fame (fluoaxastrobin) ^c	11	G, I, N, S	12 h	D	P-F	P-E	P-G	P	F-E	?	G	E	?	?	?	P	P	
				F	?	?	?	?	?	?	?	?	?	?	?	?	P	?
Empress Intrinsic (pyraclostrobin) ^a Insignia (pyraclostrobin)*	11	G, L, N, S	12 h	D	F	F	F	-F	G-E	P-G	G-E	?	?	?	?	?	?	
				D	F	P-E	P-E	P-F	P-E	P	?	F-E	?	?	?	?	?	?
				F	?	?	?	?	?	?	?	?	P	G	?	P-G	P	
Fenstop (fenamidone)	11	G	12 h	D	F	P-E	E	P-E	P-E	?	E	E	?	?	?	?	P	
				F	?	?	?	?	?	?	?	?	P	E	?	P-E	?	
Fore, Pentathlon, etc. (EBDC)	M3	G, N	24 h	F	?	?	?	?	G	?	?	?	?	E	?	P-E	?	
Heritage (azoxystrobin)	11	G, L, N, S	4h	D	P-F	F	P-F	P-E	P-E	P-E	?	G-E	?	E	?	?	?	
				F	?	?	?	?	?	?	?	?	P	?	?	?	P	P
Hurricane (fludioxonil+mefenoxam)	12 + 4	G, I, N, S	48 h	D	?	?	?	?	?	?	?	?	?	?	?	?	?	
Kleengrow (Didecyl dimethyl ammonium chloride)	-	G	48 h	D	?	?	?	?	?	?	?	?	?	?	?	?	?	
Micora, NOA 446510 (mandipropamid)	40	G, L, N, S	4 h	D	P-F	E	P-G	E	F-E	P-E	E	F	P	?	G	?	P	
				F	?	?	?	?	?	?	?	?	?	E	?	P-E	?	
Mycostop (<i>Streptomyces griseoviridis</i>)	NC	G, N	4 h	D	?	?	?	?	P	?	?	?	?	?	?	?	?	
Orvego (ametocetradin + dimethomorph)	40 + 45	G,I,L,N,S	12 h	D, F	?	G-E	G-E	?	G-E	?	G-E	?	?	G-E	?	G-E	?	
Pageant Intrinsic (pyraclostrobin + boscalid)	11+7	G,I,L,N,S	12 h	D	?	?	?	P-E	P	?	?	E	?	?	?	?	?	
				F	?	?	?	P-E	P	?	?	E	?	?	?	?	?	

Fungicide (active ingredients)	FRAC Class	Registered Use Site(s)	REI	Application Method	Phytophthora Root Rot							Phytophthora Foliar/Stem Blight						
					<i>P. cactorum</i>	<i>P. cinnamomi</i>	<i>P. cryptogea</i>	<i>P. drechsleri</i>	<i>P. nicotianae/parasitica</i>	<i>P. palmivora</i>	<i>Phytophthora sp.</i>	<i>P. tropicalis</i>	<i>P. citricola</i>	<i>P. nicotianae/parasitica</i>	<i>P. plurivora</i>	<i>P. ramorum</i>	<i>P. syringae</i>	
PlantShield ^b , RootShield (<i>Trichoderma harzianum</i>)	NC	G, I, N, S	0 h	D	?	?	?	?	P	?	?	?	?	?	?	?	?	
Prestop (<i>Gliocladium catenulatum</i> strain J446)	NC	G, I, N, S	0 h	D	?	?	?	?	?	?	?	?	?	?	?	?	?	
RootShield Plus (<i>Trichoderma harzianum</i> + <i>Trichoderma virens</i>)	NC	G, I, N, S	0.4 h	D	?	?	?	?	?	?	?	?	?	?	?	?	?	
Segway (cyazofamid)	21	G, N	12 h	D	P-F	F-E	G-E	F-E	P-E	P-E	E	E	P	?	?	?	P	
				F	?	F	?	?	?	?	?	?	?	?	P-E	?	P-E	P
Segovis (oxathiapiprolin)	U15	TBD	-	F	?	?	?	?	?	?	?	?	?	?	E	?	?	
SoilGard (<i>Gliocladium virens</i>)	NC	G, I, N	0 h	S	?	P	?	?	?	?	?	?	?	?	?	?	?	
Stature SC (dimethomorph)	40	G, L, N	12 h	D	F	P-E	G-E	P-E	P-E	P	?	P-E	P	?	?	?	P	
				F	?	?	?	?	?	?	?	?	?	P	G-E	?	P-E	P
Subdue, Fenox (mefenoxam)	4	G, L, N, S	0 h or 48 h	D	F	P-E	G-E	E	F-E	E	?	G-E	?	?	E	?	?	
				F	?	?	?	?	?	?	?	?	?	P	?	?	P-E	P
Terrazole, Truban (etridiazole)	14	G, N	12 h	D	F	P-E	?	P-E	P-F	?	?	?	?	?	?	?	?	
				F	?	?	?	?	?	?	?	?	?	?	?	?	P	?
ZeroTol	NC	G, I, N	0 h	D, F	?	?	?	?	?	?	?	?	?	?	?	?	?	
Experimentals																		
BAS703 (fluxapyrosad + pyraclostrobin)	7 + 11	TBD	-	F	?	?	?	?	?	?	?	?	?	?	?	?	?	
<i>Bacillus pumilus</i>	44	TBD	4 h	F	?	?	?	?	?	?	?	?	?	?	?	?	?	
Bio-Tam (<i>Trichoderma asperellum</i> & <i>gamsii</i>)	NC	TBD	1 h	D	?	?	P	P	P	?	?	P	?	?	?	?	?	
MBI-110 (<i>Bacillus amyloliquifaciens</i> strain F727)	44	TBD	?	D, F	?	?	?	?	?	?	?	?	?	?	?	?	?	
Multiguard (furfural) *	-	TBD	?	D	?	P	P	?	P-F	?	G	P	?	?	?	?	?	
				F	?	?	?	?	?	?	?	?	?	P	G	?	P	?
<i>Muscodor albus</i>	NC	TBD	?	S	?	P	P	?	P	?	?	?	?	?	?	?	?	
Proud 3 Promax (thyme oil)	NC	TBD	0 h	F	?	?	?	?	?	?	?	?	?	?	P	?	?	
Regalia (extract of <i>Reynoutria sachalinensis</i>)	P5	G, I, L, N, S	4 h	?	?	?	?	?	?	?	?	?	?	?	?	?	?	
SP2015, Tanos (famoxadone +cymoxanil) *	11+27	TBD	12 h	D	?	?	P-G	F	?	?	?	P-E	?	?	?	?	?	
				F	?	?	?	?	?	?	?	?	?	?	?	?	?	P
				S	?	?	?	?	?	?	?	?	?	P	?	?	E	?
SP2770 (SP2770)	-	TBD	-	D	?	?	?	?	?	?	?	?	?	?	P	?	?	
				F	?	?	?	?	?	?	?	?	?	?	?	P	?	?
Taegro (<i>Bacillus subtilis</i> var. <i>amyloliquefaciens</i>)	44	TBD	24 h	D	?	?	P	P	?	?	?	P	?	?	?	?	?	

Registered Use Sites: G = Greenhouse; L = Lath House; I = Indoors; N = Nursery; S = Shade House; TBD = To Be Determined

Application Method: D = Drench; S = Spray

Efficacy: E = clearly statistically equivalent or better than untreated non-inoculated and/or clearly statistically different than untreated inoculated; G = statistically different from untreated inoculated and untreated non-inoculated; F = statistically equivalent to both untreated inoculated and untreated non-inoculated; P = statistically equivalent to untreated inoculated. For trials without non-inoculated check, efficacy determined on author's conclusions, % control or comparisons to standard product(s).

* No longer available for development in ornamental horticulture crops

Information presented is based on the best data available on *September 17, 2015*.



Registered and Experimental Products for Phytophthora Disease Control

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¹ Phytophthora Efficacy taken from latest IR-4 Phytophthora efficacy summary and 5 additional IR-4 efficacy reports. If mefenoxam-resistant Phytophthora isolate used in a trial, data were not included for mefenoxam efficacy.

^a Empress Intrinsic has replaced Insignia for use in production ornamentals applied as drench to control soil-borne diseases caused by *Fusarium*, *Phytophthora*, *Pythium* and *Rhizoctonia* spp.

^b PlantShield is only registered in a few states.

^c Fame will be replacing DisArm