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IR-4 Ornamental Horticulture Program
Phytophthora Efficacy:

Phytophthora cactorum
Phytophthora cinnamomi
Phytophthora citricola
Phytophthora cryptogea
Phytophthora drechsleri
Phytophthora nicotianae/Phytophthora parasitica
Phytophthora palmivora
Phytophthora plurivora
Phytophthora ramorum
Phytophthora syringae
Phytophthora tropicalis

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Abstract

From 2003 to 2015, 66 products representing 59 active ingredients 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. drechsleri*, *P. nicotianae*/*parasitica*, *P. palmivora*, *P. plurivora*, *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 drechsleri* 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 Adorn, Aliette, Alude, Biophos, Fenamidone, Insignia, Micora Segway, Stature DM, Subdue MAXX, and Vital. 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. Micora and Segovis provided effective control of *Phyotopthora plurivora* in two rhododendron experiments.

Introduction

In 2003, IR-4 initiated a high priority project to determine efficacy of several fungicides on *Phytophthora* species so data can be obtained to support current and future registrations. This research was conducted during 2004 and continued in 2005. Generating additional efficacy information on Phytophthora species remained a high priority project through 2015. This report includes information from the IR-4 Ornamental Horticulture Program 2005 and 2008 Phytophthora Efficacy summaries along with additional data received by the program since these reports were written. To present a fuller picture on Phytophthora efficacy, several additional reports from researchers published in Fungicide & Nematicide Tests (F&N) and Plant Disease Management Reports (PDMR) are also included, with permission from the authors. Tables containing these reports have an asterisk (*) at the beginning of their titles and the source of report is included under each data table.

Materials and Methods

From 2003 to 2015, 66 products representing 59 active ingredients were tested through the IR-4 Program as drench or foliar applications against seven *Phytophthora* species causing root rots and stem/leaf blights (Table 1). *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*. Treatments were applied either a few days before disease inoculation or immediately after inoculation. A minimum of four plants (replicate treatments) were required with most researchers exceeding this minimum. Disease severity and incidence were recorded at various intervals after initial application. Phytotoxicity was recorded on a scale of 0 to 10 (0 = no phytotoxicity; 10 = complete kill) at each rating date for any treatment exhibiting damage unrelated to disease.

For IR-4 testing, the following protocols were used: 05-003, 05-011, 06-001, 06-002, 07-001, 07-002, 08-001, 08-002, 09-003, 09-007, 14-014, and 15-014. Please visit http://ir4.rutgers.edu/ornamental/OrnamentalDrafts.cfm to view and download these protocols.

Products were supplied to researchers by manufacturers. Fifteen researchers were involved in the testing. For contact information and research locations, please see the list of researchers in Appendix 1.

For all research data tables, product names have been updated where manufacturers have established trade names, and tables have been rearranged by product alphanumeric order. Where both inoculated and non-inoculated checks were included in the experiment, the inoculated check appears last in the table with the non-inoculated check immediately preceding it.

Table 1. List of Products and Rates Tested from 2001 to 2015.

Product	Active Ingredient(s)	Rate(s) Tested		Manufacturer
A13836B	Azoxystrobin + Mefenoxam	Drench	1 fl oz per 100 gal 1.3 fl oz per 100 gal 2 fl oz per 100 gal	Syngenta
A16548C	Potassium Phosphite	Drench	20 fl oz per 100 gal	Syngenta
		Foliar	64 fl oz per 100 gal	
Actinovate SP	Actinovate	Drench	10 oz per 100 gal	Natural Industries
		Foliar	10 oz per 100 gal	

Product	Active Ingredient(s)	Rate(s) Tested		Manufacturer
Adorn 4FL	Fluopicolide	Drench	10 g ai per 100 gal 30 ml per 100 gal 60 ml per 100 gal 1 fl oz per 100 gal 2 fl oz per 100 gal 3 fl oz per 100 gal 4 fl oz per 100 gal 6 fl oz per 100 gal	Valent
		Foliar	40 g ai per 100 gal 60 ml per 100 gal 120 ml per 100 gal 1 fl oz per 100 gal 2 fl oz per 100 gal 3 fl oz per 100 gal 6 fl oz per 100 gal	
Aliette WDG	Fosetyl Al	Drench	10 oz per 100 gal 12.8 oz per 100 gal 5 lb per 100 gal	Bayer
		Foliar	5.0 oz per 100 gal 12.8 oz per 100 gal 2.5 lb per 100 gal 5 lb per 100 gal	
Alude 2L	Potassium phosphite	Drench	12.75 fl oz per 100 gal	Cleary
Alude 46L	Potassium phosphite	Drench	6.25 fl oz per 100 gal 12.5 fl oz per 100 gal 12.7 fl oz per 100 gal 2 pints per 100 gal	Cleary
		Foliar	12.7 fl oz per 100 gal 2 quarts per 100 gal	
Agri-Fos	Mono- and Di- potassium salts of Phosphorous Acid	Drench	12.7 fl oz per 100 gal	AgBio
		Foliar	64 fl oz per 100 gal	Monterey
BAS 500 WU	Pyraclostrobin	Drench	0.8 fl oz per 100 gal 1.5 fl oz per 100 gal 3.1 fl oz per 100 gal 4.6fl oz per 100 gal 6.1 fl oz per 100 gal	BASF
BAS 703	Fluxapyrosad + Pyraclostrobin	Foliar	8 fl oz per 100 gal 12 fl oz per 100 gal	BASF
BioPhos 43L	Dipotassium phosphonate + Dipotassium phosphate	Drench	64 fl oz per 100 gal 1 gal per 100 gal 2 gal per 100 gal	AgBio
		Foliar	64 fl oz per 100 gal 2 gal per 100 gal	
Calirus 150 (PMA300)	Dikegulac sodium	Drench	4 pints per 100 gal	Ameribrom
		Foliar	64 fl oz per 100 gal	
Captan 50WP	Captan	Foliar	32 oz per 100 gal	MicroFlo
Captan 50WP	Captan	Foliar	32 oz per 100 gal	MicroFlo
Camelot	Copper octanoate	Foliar	3 pt per 100 gal 6 pt per 100 gal 12 pt per 100 gal	SePRO

Product	Active Ingredient(s)	Rate(s) Tested		Manufacturer
Captan 80WP	Captan	Drench	4 oz per 100 gal 10 oz per 100 gal 16 oz per 100 gal 20 oz per 100 gal	MicroFlo
		Foliar	4 oz per 100 gal 1.5 lb per 100 gal	
CG100	Caprylic acid	Foliar	0.2% 0.4%	Summerdale
Champ Formula 2F	Copper hydroxide	Foliar	1.33 pints per 100 gal	Nufarm
Compass	Trifloxystrobin	Foliar	2.0 oz per 100 gal	Bayer
Daconil Ultrex	Chlorothalonil	Foliar	1.4 lb per 100 gal	Syngenta
Disarm (TM-473)	Fluoxastrobin	Drench	3 oz per 100 gal 5 oz per 100 gal	Arysta
		Foliar	5 oz per 100 gal	
Disarm 20EC	Fluoxastrobin	Foliar	2 fl oz per 100 gal	Arysta
Disarm 480SC (TM-473)	Fluoxastrobin	Drench	3 fl oz per 100 gal 4 fl oz per 100 gal 8 fl oz per 100 gal	Arysta
		Foliar	2 fl oz per 100 gal 4 fl oz per 100 gal	
Dithane 75 DF	Mancozeb	Foliar	46 oz per 100 gal 2 lb per 100 gal	Dow Agrichemicals
Fenamidone 500SC (Fenstar, Fenstop, Reason)	Fenamidone	Drench	7 fl oz per 100 gal 10 fl oz per 100 gal 14 fl oz per 100 gal 28 fl oz per 100 gal	Bayer
		Foliar	4 fl oz per 100 gal 7 fl oz per 100 gal 8 fl oz per 100 gal 10 fl oz per 100 gal 14 fl oz per 100 gal 16 fl oz per 100 gal 28 fl oz per 100 gal 56 fl oz per 100 gal	
Fore 80WP	Manganese + Zinc + Ethylene bis-dithiocarbamate Ion	Foliar	1.5 lb per 100 gal	Dow Agrichemicals
Gavel 75DF	Zoxamide + Mancozeb	Foliar	2 lb per 100 gal	Dow Agrichemicals
Heritage 50WG	Azoxystrobin	Drench	0.9 oz per 100 gal 1.0 oz per 100 gal 1.8 oz per 100 gal 2 oz per 100 gal 4 oz per 100 gal	Syngenta
		Foliar	0.9 oz per 100 gal 1.8 oz per 100 gal 2 oz per 100 gal 3 oz per 100 gal 4 oz per 100 gal	
Hurricane	Fludioxonil + mefenoxam	Drench	1.5 oz per 100 gal	Syngenta
		Foliar	1.5 oz per 100 gal	
Hymexazol 30L	Hymexazol	Drench	6 oz per 100 gal 12 oz per 100 gal	Cleary

Product	Active Ingredient(s)	Rate(s) Tested		Manufacturer
Insignia 20W	Pyraclostrobin	Drench	8 oz per 100 gal 12 oz per 100 gal 16 oz per 100 gal 40 oz per 100 gal	BASF
		Foliar	14 oz per 100 gal 16 oz per 100 gal 28 oz per 100 gal 40 oz per 100 gal	
K-Phite	Phophorus acid salts	Foliar	48 fl oz per 100 gal	Plant Food Systems
Magellan	Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites	Drench	8 fl oz per 100 gal 12 fl oz per 100 gal	Nufarm
		Foliar	12 fl oz per 100 gal 4 pints per 100 gal 5 pints per 100 gal	
Maneb	Maneb	Foliar	2 lb per 100 gal	UPI
MBI 110	*Bacillus amyloliquefaciens*	Foliar	2 qt per 100 gal 4 qt per 100 gal	Marrone
Medallion 50W	Fludioxonil	Drench	2 oz per 100 gal	Syngenta
		Foliar	2 oz per 100 gal 4 oz per 100 gal 8 oz per 100 gal	
Micora (NOA 446510)	Mandipropamid	Drench	2 fl oz per 100 gal 4 fl oz per 100 gal 4.1 fl oz per 100 gal 8 fl oz per 100 gal 8.2 fl oz per 100 gal	Syngenta
		Foliar	2 fl oz per 100 gal 4.1 fl oz per 100 gal 8 fl oz per 100 gal 8.2 fl oz per 100 gal	
MultiGuard	Furfural	Drench	250 ppm 500 ppm 1000 ppm	AgriGuard
		Foliar	500 ppm 1000 ppm	
Mural (A18126B)	Azoxystrobin + Benzovindiflupyr	Drench	3 oz per 100 gas	Syngenta
Muscodor albus	*Muscodor albus*	Soil Incorporation	3.75 g/L soil 7.5 g/L soil	AgraQuest
Orvego (BAS 651)	Ametoctradin + Dimethoate	Drench	11 fl oz per 100 gal 13.7 fl oz per 100 gal 14 fl oz per 100 gal 22.5 fl oz per 100 gal 28 fl oz per 100 gal 34 fl oz per 100 gal	BASF
		Foliar	11 fl oz per 100 gal 13.7 fl oz per 100 gal	
Pageant/Pristine	Pyraclostrobin + Boscalid	Drench	12 oz per 100 gal	BASF
		Foliar	4 oz per 100 gal 8 oz per 100 gal 16 oz per 100 gal	

Product	Active Ingredient(s)	Rate(s) Tested		Manufacturer
PlantShield	Trichoderma harzianum Rifai strain T-22	Foliar	4 oz per 100 gal	BioWorks
Polyram	Polyram	Foliar	2 lb per 100 gal	BASF
PreStop	*Gliocladium catenulatum* strain J1446		4.375 lb per 100 gal	AgBio
Promax	Thyme Oil	Drench	1 gal per 100 gal 2 gal per 100 gal	Biohumanetics
Proud 3	Thyme Oil	Foliar	1 gal per 100 gal	Biohumanetics
Quali-Pro Fosetyl-Al 80WDG	Fosetyl Al	Drench	3 lb per 100 gal	Makteshim Agan
Remedier	*Trichoderma harzianum &viride*	Drench	2 oz per 100 gal	IsaGro
Rhapsody Biofungicide	Bacillus subtilis	Foliar	1.0 gal per 100 gal 1.5 gal per 100 gal 2.0 gal per 100 gal	AgraQuest
RootShield PLUS (BW240)	*Trichoderma harzianum & T. virens*)	Foliar	4 oz per 100 gal 6 oz per 100 gal	BioWorks
SA 11210	SA 11210	Foliar	4 oz per 100 gal	
Segovis (A21008A SC)	Oxathiopiprolin	Drench	1 fl oz per 100 gal 2 fl oz per 100 gal 3 fl oz per 100 gal	Syngenta
		Foliar	0.6 fl oz per 100 gal 1.2 fl oz per 100 gal 2.4 fl oz per 100 gal	
Segway 400SC (Ranman)	Cyazofamid	Drench	1.5 fl oz per 100 gal 3.0 fl oz per 100 gal 6.0 fl oz per 100 gal	ISK
		Foliar	1.5 fl oz per 100 gal 3.0 fl oz per 100 gal 6.0 fl oz per 100 gal	
SP2770	SP2770	Drench	1.33 lb per 100 gal 2.66 lb per 100 gal	SePRO
		Foliar	1.33 lb per 100 gal 2.66 lb per 100 gal	
Spectro	Chlorothalonil + Thiophanate-methyl	Foliar	1.5 lb per 100 gal	Nufarm
Stature DM 50W	Dimethomorph	Drench	3.2 oz per 100 gal 6.12 fl oz per 100 gal 6.4 oz per 100 gal 12.8 oz per 100 gal	SePro
		Foliar	6.4 oz per 100 gal 12.8 oz per 100 gal 25.6 oz per 100 gal 51.2 oz per 100 gal	
Stature SC	Dimethomorph	Drench	3.1 fl oz per 100 gal 6.12 fl oz per 100 gal 12.25 fl oz per 100 gal 12.8 fl oz per 100 gal	BASF
Subdue MAXX 2E	Mefenoxam	Drench	0.6 fl oz per 100 gal 1.0 fl oz per 100 gal 2.0 fl oz per 100 gal	Syngenta
		Foliar	4 fl oz per 100 gal	
Taegro	*Bacillus subtilis* var. *amyloliquefasciens*	Drench	3.5 oz per 100 gal	Novozymes
Tanos	Famoxadone + Cymoxanil	Drench	6.1 oz per 100 gal	DuPont

Product	Active Ingredient(s)	Rate(s) Tested		Manufacturer
			12 oz per 100 gal	
Terrazole 35WP	Etridiazole	Drench	6 oz per 100 gal 8 oz per 100 gal 10 oz per 100 gal	OHP
		Foliar	10 oz per 100 gal	
TM-459	TM-459	Foliar	3 fl oz per 100 gal 6 fl oz per 100 gal	Arysta
Truban 25EC	Etridiazole	Drench	6.0 fl oz per 100 gal 8.0 fl oz per 100 gal	Scotts
V 10161	Fluopicolide	Drench	1 fl oz per 100 gal	Valent
			2 fl oz per 100 gal	
Vital 4L	Potassium phosphite	Drench	1 pint per 100 gal 2 pints per 100 gal 4 pints per 100 gal	Luxembourg
		Foliar	4 pints per 100 gal 2.5 gal per 100 gal	
ZeroTol	Hydrogen peroxide	Drench	256 fl oz	BioSafe Systems

Results

Comparative Efficacy on Phytophthora Root Rots

Phytophthora cactorum. In 2007, Becker examined six products for efficacy against *Phytophthora cactorum* infecting three rhododendron cultivars (Table 2, Table 3). Rhododendrons were grown in pots under 40% shaded screen house. *P. cactorum* was added to the pots on Jun 28 & 29, 2007. Soil drench applications of fungicides were made to the plants on Jul 10 & 24, Aug 7 & 21, Sep 4 & 18, and Oct 2. Vigor ratings were made on a scale of 0 to 10 based on leaf chlorosis, amount of growth, relative height and leaf size. One month after the last vigor ratings, plants were destructively harvested to assess browning of the internal stem core, vascular discoloration, above ground plant height, above ground plant weight, rinsed root weight, and percentage of root mass made up of newly grown and healthy roots. Based on the number of dead plants, there was no difference among treatments. However, there were differences in the number of new roots among the products and the different cultivars. For 'Nova Zembla', most of the treatments were not statistically different from the inoculated or non-inoculated untreated controls, but Adorn at 2 fl oz per 100 gal and Segway at 6 fl oz per 100 gal had fewer new rootd than the inoculated untreated control. For *R. catawbiense* 'Alba', NOA 445610 at 4 fl oz per 100 gal exhibited statistically equivalent new roots to the non-inoculated untreated control. For *R. catawbiense* 'Boursault', there were no differences among treatments.

In Chastagner's 2007 study on rhododendron 'Nova Zembla', no disease developed during the course of the experiment. Limited injury symptoms and discoloration developed but there were no significant differences between treatments (Table 4). Similarly, treatments had no effect on plant height and width.

Table 2. Efficacy of foliar treatments on *Phytophthora cactorum* infesting several rhododendron species – Number of Dead Plants, Becker, NY, 2007a.

Treatment (active ingredient)	Rate per 100 gal	Number of Dead Plants					
		'Nova zembla'		'Catawbiense alba'		'Catawbiense boursault'	
Adorn 4SC (fluopicolide)	1 fl oz	1.40	a	0.80	a	1.00	a
Adorn 4SC (fluopicolide)	2 fl oz	0.80	a	0.60	a	0.20	a
Disarm 20EC (fluoxastrobin)	2 fl oz	1.40	a	1.00	a	0.00	a
Heritage 50WG (azoxystrobin)	0.9 oz	1.00	a	0.40	a	0.60	a
Heritage 50WG (azoxystrobin)	1.8 oz	1.20	a	0.00	a	0.80	a
Heritage 50WG (azoxystrobin) + Subdue 2E (mefenoxam)	0.9 oz + 1 fl oz	1.00	a	0.40	a	0.00	a
NOA 44510 300SC (mandipropamid)	4 fl oz	1.20	a	1.00	a	0.20	a
NOA 44510 300SC (mandipropamid)	8 fl oz	1.20	a	0.40	a	0.80	a
Segway 300SC (cyazofamid)	3 fl oz	1.20	a	0.20	a	0.40	a
Segway 300SC (cyazofamid)	6 fl oz	1.40	a	0.60	a	0.00	a
Non-inoculated		1.20	a	0.20	a	0.40	a
Inoculated		1.40	a	0.40	a	0.20	a
	LSD (*P*=0.10)	1.055		0.696		0.571	
	Standard Deviation	0.990		0.653		0.537	

Means followed by the same letter do not differ significantly (*P*=0.10, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment *P*(F) is significant at mean comparison OSL.

Table 3. Efficacy of foliar treatments on *Phytophthora cactorum* infesting several rhododendron species – Percent New Roots, Becker, NY, 2007a.

Treatment (active ingredient)	Rate per 100 gal	Percent New Roots					
		'Nova zembla'		'Catawbiense alba'		'Catawbiense boursault'	
Adorn 4SC (fluopicolide)	1 fl oz	23.43	ab	25.67	b	16.00	a
Adorn 4SC (fluopicolide)	2 fl oz	18.47	b	33.67	b	28.17	a
Disarm 20EC (fluoxastrobin)	2 fl oz	46.57	ab	25.33	b	28.33	a
Heritage 50WG (azoxystrobin)	0.9 oz	54.62	ab	30.83	b	20.40	a
Heritage 50WG (azoxystrobin)	1.8 oz	58.03	ab	35.00	b	18.80	a
Heritage 50WG (azoxystrobin) + Subdue 2E (mefenoxam)	0.9 oz + 1 fl oz	31.97	ab	22.83	b	22.33	a
NOA 44510 300SC (mandipropamid)	4 fl oz	27.60	ab	46.17	ab	21.83	a
NOA 44510 300SC (mandipropamid)	8 fl oz	26.50	ab	26.03	b	25.00	a
Segway 300SC (cyazofamid)	3 fl oz	45.67	ab	29.17	b	37.17	a
Segway 300SC (cyazofamid)	6 fl oz	19.17	ab	30.00	b	31.87	a
Non-inoculated		60.93	a	54.67	a	44.33	a
Inoculated		48.57	ab	30.33	b	26.83	a
	LSD (*P*=0.10)	25.622		14.074		15.542	
	Standard Deviation	24.057		13.214		14.593	

Means followed by the same letter do not differ significantly (*P*=0.10, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment *P*(F) is significant at mean comparison OSL.

Table 4. Efficacy of drench treatments on *Phytophthora cactorum* on rhododendron 'Nova Zembla', phytotoxicity and plant growth, Chastagner, WA, 2007.

Treatment	Rate per 100 gal	AUPC[1]	Red coloration rating (0-4)	Height (cm)	Width (cm)
Actinovate SP (actinovate)	10 oz	0 a	1.2 a	6.7 a	7.0 a
Adorn 4FL (fluopicolide)	60 ml	12.9 a	1.8 a	4.3 a	7.6 a
	120 ml	9.9 a	1.6 a	4.2 a	9.0 a
Aliette 80 WG (fosetyl-AL)	12.8 oz	0 a	1.4 a	6.1 a	8.3 a
Alude(potassium phosphate)	12.7 fl oz	23.2 a	1.6 a	5.2 a	8.3 a
BioPhos (dipotassium phosphonate + dipotassium phosphate)	64 fl oz	0 a	1.4 a	6.3 a	10.8 a
Disarm 480SC (fluoxastrobin)	2 fl oz	11.6 a	1.2 a	3.7	7.1 a
	4 fl oz	2.6 a	1.4 a	3.4 a	7.4 a
	8 fl oz	0 a	1.0 a	6.2 a	8.5 a
Fenstar (fenamidone)	14 fl oz	0 a	1.2 a	4.2 a	9.3 a
Heritage WG 50 (azoxystrobin)	0.9 oz	0 a	1.8 a	4.1 a	9.2 a
	1.8 oz	5.6 a	2.2 a	4.0 a	6.3 a
Heritage WG 50 + Subdue MAXX FV	0.9 oz + 1 oz	0 a	1.0 a	6.5 a	9.7 a
Insignia 20.4 % (pyraclostrobin)	8oz	5.2 a	1.2 a	3.7 a	6.2 a
	12 oz	0 a	1.4 a	5.2 a	8.8 a
Magellan (mono- and dibasic sodium, potassium and ammonium phosphites)	12 fl oz	0 a	1.4 a	4.9 a	8.6 a
NOA 446510 (mandipropamid)	4 fl oz	0 a	1.2 a	5.0 a	8.4 a
	8 fl oz	0 a	1.6 a	5.0 a	7.2 a
Segway/Ranman 400 SC (cyazofamid)	3 fl oz	0 a	1.4 a	4.2 a	8.5 a
	6 fl oz	0 a	1.2 a	5.6 a	9.1 a
Stature DM 50 WP (dimethomorph)	12.8 oz	0 a	1.2 a	5.9 a	8.4 a
Subdue MAXX FV (mefonoxam)	1 fl oz	0 a	2.0 a	5.5 a	7.4 a
	2 fl oz	13.0 a	1.6 a	3.7 a	6.3 a
Terrazole 35 WP (etridiazole)	8 oz	0 a	1.4 a	5.4 a	8.8 a
Vital (potassium phosphate)	4 pt	0 a	1.2 a	5.9 a	8.9 a
Untreated non-inoculated		0 a	1.6 a	6.1 a	9.8 a
Untreated inoculated		0 a	2.4 a	3.5 a	7.0 a

[1] Area under phytotoxicity curve

Means followed by the same letter do not differ significantly (P=0.05, Tukey's Studentized Range Test).

Phytophthora cinnamomi. From 2001 through 2006, twelve experiments were conducted to determine efficacy on *Phytophthora cinnamomi* on azalea, rhododendron and Fraser fir. Of these 9 were sponsored by IR-4. Three experiments were conducted with Fraser fir (*Abies fraseri*). The rest were on azaleas and rhododendrons. One named cultivar of azalea was tested - *Rhododendron obtusum* 'Hinodegiri' – and several cultivars of rhododendron - *Rhododendron catawbiense* 'Roseum', *Rhododendron catawbiense* 'boursault', *Rhodondendron catawbiensis* 'alba', *Rhododendron maximum* 'roseum', *Rhododendron sp.* 'Lee's Dark Purple', and*Rhododendronsp.* 'Nova Zembla'.

Three experiments were conducted examining various products for the control of *P. cinnamomi* on Fraser Fir. In Benson's 2001 research (Table 5), the best control of Phytophthora root rot was obtained with Aliette, Biophos, Stature DM, and Vital. Both Subdue MAXX and ZeroTol gave poor disease control. No phytotoxicity was observed with any material tested.

In 2003, Benson's experiment resulted in rapid development of disease due to the extremely wet growing season (Table 6). Vital, Aliette, Stature DM, Subdue 1G and Subdue MAXX initially limited disease development as indicated by the low foliar ratings on Aug 5, but only Stature DM gave adequate control of the disease by Sept 5. Subsequent root rot ratings on Sep 25 confirmed that only StatureDM provided sufficient efficacy. No phytotoxicity was observed with any material tested.

In the third experiment with this host-pathogen system during 2004, three rates of Stature DM were tested. All rates significantly reduced disease ratings and increased top dry weights (Table 7). No rate caused phytotoxicity.

Table 5. * Efficacy of foliar and drench treatments on *Phytophthora cinnamomi* root rot on Fraser fir, Benson, NC, 2002.

Treatment	Rate per 100 gal	Application Method(s)	Foliar rating (1-5)[z]		Top wt (oz)	Root rot (1-5)[y]
			05 Sept	08 Oct		
Aliette 80 WG (fosetyl-AL)	80 oz	Spray	1.1	2.1 cd	1.7 ab	2.3 cd
	12.8 oz	Drench	1.3	1.7 cd	2.2 ab	2.3 cd
Biophos 43L (dipotassium phosphonate + dipotassium phosphate)	128 fl oz	Spry/Drh	1.2	1.5 c [x]	2.1 ab	2.2 cd
	256 fl oz	Spray	1.4	2.3 cd	1.9 ab	2.7 bc
Stature DM 50WP (dimethomorph)	6.4 oz	Drench	1.4	1.8 cd	1.8 ab	2.0 cd
Subdue Maxx 2E (mefonoxam)	0.5 fl oz	Drench	1.4	2.9 bc	1.6 ab	3.4 ab
Vital 4L (potassium phosphate)	32 fl oz	Spry/Drh	1.9	2.1 cd	1.9 ab	2.3 cd
	64 fl oz	Spray	1.4	1.9 cd	2.2 ab	2.0 cd
ZeroTol 27L (hydrogen peroxide)	256 fl oz	Drench	1.9	3.7 ab	1.1 b	4.0 a
Untreated non-inoculated	--		1.1	1.2 d	2.6 a	1.4 d
Untreated inoculated	--		2.0	3.8 ab	1.3 b	4.1 a

* Not an IR-4-sponsored experiment. F&N Tests vol 58:OT003.

[z]Foliar rating based on 1 to 5 scale where 1 = healthy foliage, 2 = slight chlorosis, 3 = moderate to severe chlorosis, 4 = necrosis and defoliation, 5 = dead plant.

[y]Root rot rating scale was 1= healthy, full root ball, 2= some root rot, less than full root ball, 3= severe root rot, 50% of root system necrotic, 4= very severe root rot, root ball falls apart, and 5 = plant dead, all roots necrotic.

[x] Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, p=0.05.

Table 6. * Efficacy of foliar and drench treatments on *Phytophthora cinnamomi* root rot on Fraser fir, Benson, NC, 2003.

Treatment	Rate	Application Type	Foliar rating (1-4)[z]			Top wt (oz)	Root rot (1-5)[y]
			7/23	8/5	9/3		
Aliette 80WG (fosetyl-AL)	80 oz/100 gal	Spray	1.0 b [x]	1.4 ef	4.0 a	1.1 d	5.0 a
	12.8 oz/100gal	Drench	1.0 b	1.3 ef	2.7 c	1.8 abc	4.0 abc
Biophos 43L (dipotassium phosphonate + dipotassium phosphate)	128 fl oz/100 gal	Spray	1.2 b	2.3 bcd	3.7 ab	1.3 cd	4.6 ab
	256 fl oz/100 gal	Spray	1.4 b	3.3 a	3.7 ab	1.4 cd	4.8 a
Stature-DM 50W (dimethomorph)	6.4 oz/100 gal	Drench	1.0 b	1.0 f	1.0 d	2.3 ab	2.1 d
Subdue MAXX 2E (mefonoxam)	0.5 fl oz/100 gal	Drench	1.1 b	1.9 de	3.7 ab	1.2 cd	4.6 ab
Subdue 1G (mefonoxam)	250 lb/acre	Surface	1.4 b	2.2 cde	2.7 c	1.7 bcd	3.3 bcd
Vital 4L (potassium phosphate)	32 fl oz/100 gal	Spray	1.2 b	1.8 def	3.0 bc	1.6 cd	4.0 abc
	64 fl oz/100 gal	Spray	1.0 b	1.6 def	3.7 ab	1.5 cd	4.6 ab
ZeroTol 27L (hydrogen peroxide)	256 fl oz/100 gal	Drench	2.4 a	2.9 abc	4.0 a	1.2 cd	5.0 a
Untreated non-inoculated	--		1.0 b	1.0 f	1.6 d	2.4 a	2.1 d
Untreated inoculated	--		2.1 a	3.1 ab	4.0 a	1.2 cd	5.0 a

* Not an IR-4-sponsored experiment. F&N Tests vol 59:OT023.

[z] Foliar rating based on 1 to 4 scale where 1 = healthy foliage, 2 = slight chlorosis, 3 = moderate to severe chlorosis and/ornecrosis, and 4 = dead plant.

[y] Root rot rating scale was 1= healthy, full root ball, 2= some root rot, less than full root ball, 3= severe root rot, 50% of rootsystem necrotic, 4= very severe root rot, root ball falls apart, and 5 = plant dead, all roots necrotic.

[x] Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100,*p*=0.05.

Table 7. Efficacy of Stature DM drenches on *Phytophthora cinnamomi* root rot on Fraser fir, Benson, NC, 2004.

Treatment	Rate per 100 gal	Foliar Rating[1]		Top Dry Weight (g)	Root Rating[2]	Phytotoxicity
		9/21	11/5		11/9	11/5
Stature DM	6.4 oz	1 b[3]	1 b	9.7 a	1.5 b	0 a
	12.4 oz	1.1 b	1.4 b	11.0 a	1.6 b	0 a
	25.6 oz	1 b	1 b	9.5 a	1.1 b	0 a
Untreated inoculated	--	2.2 a	4 a	2.5 b	5 a	0 a

Plants were retreated every 2 weeks.

[1] Foliar rating was 1= healthy, no disease, 2=slight infection, 3=severe necrosis, 4=dead plant.

[2] Root rating was on a scale of 1 to 5 where 1=healthy, 2=fine root necrosis, 3=coarse roots necrotic, 4=crown rot, 5=dead plant.

[3]Means within same column followed by the same letter are not different by Waller-Duncan K-ration P=0.05.

In general, *P. cinnamomi* seemed to be better managed on azalea cultivars than on the various rhododendron cultivars (Table 8). In the series of azalea experiments (Table 9 – Table 14), Aliette, Alude, BioPhos, Calirus, Fenamidone, Insignia, Magellan, Micora (NOA 446510), Segway, Stature DM, and Vital consistently performed well where included. Adorn, Disarm, and K-Phyte were only included in one experiment each, but they also performed well. Captan, *Muscodor albus* and MultiGuard in these experiments did not provide sufficient efficacy, although they have been reported to in other research. Subdue MAXX and Truban performed inconsistently in the experiments on azaleas. In the series of rhododendron experiments, the results are less clear because of less statistical separation between the

inoculated and non-inoculated treatments. In Becker's and Chastagner's 2005 experiments there was not enough statistical separation to make meaningful conclusions (Table 16, Table 17, Table 20). The only product included in both the other two experiments to provide good efficacy was Segway (Tables 15 and 22). Fenamidone and Subdue were inconsistent. See the following paragraphs for more details.

Benson conducted a series of tests on azalea (Table 9 - Table 12). Good control was achieved with drench applications of Aliette (12.8 oz per 100 gal), Fenamidone (14 fl oz per 100 gal), Insignia (16 and 40 oz per 100 gal), Segway (1.5 and 3 fl oz per 100 gal), Stature DM (6.4 and 12.8 oz per 100 gal) and Alude (6.25 and 12.5 fl oz per 100 gal), and spray applications of Aliette (5 lb per 100 gal), Biophos (2 gal per 100 gal) and Vital (4 pt per 100 gal). Calirus 150 (4 pt per 100 gal) and Micora (NOA 446510) (8 fl oz per 100 gal) applied via drench also provided good control in one test.

In 2006, Pennucci ran two experiments on azalea infecting wound or not wounded roots with *P. cinnamomi*. Azaleas were grown in flats containing 6 plants each (Table 13, Table 14). Wilted leaves were counted at 2, 4, and 6 weeks after treatment; dead plants were counted at either 9 or 10 weeks. In this research most products provided efficacy better than the non-inoculated untreated controls (Aliette, Alude, Biophos, Insignia, Magellan, Segway, and Stature) for wounded roots. The exceptions were Fluazinam, Subdue and Truban. Similar results were obtained in both experiments.

In 2004, Benson examined several products typically used as drenches for their possibility as foliar fungicides to control *P. cinnamomi* root rot (

Table 15). Fenamidone at 28 and 56 fl oz per 100 gal did give good control similar to the untreated non-inoculated treatment. Segway at 6 fl oz per 100 gal also did well. Medallion, Stature DM and Subdue MAXX did not provide control.

Research by Becker in 2005 on rhododendron resulted in very low infection and no significant differences occurred among treatments either assessed by chlorosis during the fall or mortality the following spring (Table 16 - Table 17).

In 2007, Becker repeated this experiment. There were no significant difference among treatments as assessed by the number of dead plants, and the percentage of new roots with the exception of 'Nova Zembla' exhibiting significantly more roots than all other treatments (Table 18 - Table 19).

In Chastagner's 2005 experiment on rhododendron 'Nova Zembla', the inoculated and non-inoculated controls performed statistically equivalent (Table 20). Most treatments had little evidence of impact from inoculation, but certain treatments did exhibit elevated root ratings (indicating some root damage) – Adorn at 10 g ai per 100 gal, Alude, Magellan, and Stature DM at 6.4 oz per 100 gal. However, there were no differences in root or shoot dry weights.

In 2006, Chastagner screened a number of fungicides with two separate application timings. The phosphorus acid generators were applied 5 days before inoculation while the remaining products were applied immediately after inoculation. By 105 days after treatment, the best performers giving significantly better disease ratings than the inoculated controls were Alude (12.7 fl oz per 100 gal), Magellan (12 oz per 100 gal drench, 5 pints per 100 gal foliar), Micora (NOA 446510) (2 and 8 fl oz per 100 gal drench), Segway (6 oz per 100 gal drench), Subdue MAXX (2 fl oz per 100 gal drench) and Vital (4 pints per 100 gal drench) The rest of the treatments were not significantly different than the untreated inoculated controls (Table 21 - Table 22).

Table 8. General summary of efficacy for *Phytophthora cinnamomi* on azalea and rhododendron species.

Product	Azalea						Rhododendron				
	*Benson 2003	Benson 2004	Benson 2005	Benson 2006	Pennucci 2006a	Pennucci 2006b	Benson 2004	Becker 2005	Chastagner 2005	Chastagner 2006	Becker 2007
Actinovate										-	
Aliette	++ [12]	++		++	++	++		+/-	+/-	+/-	+/-
Alude			++	++	++	++			-	++	
Banol	-										
Biophos	+	++	++	++	++	++			+/-	+/-	
Calirus			++	++							
Captan			+						+/-	-	
Disarm				++					+/-	-	
Fenamidone		++	++	++			++		+/-	-	
Fluazinam					+/-	+					
Heritage										+/-	
Insignia			++	++	++	++		+/-	+/-	-	+/-
K-Phyte				++							
Magellan				++	++	++		+/-	-	++	+/-
Medallion							-				
MultiGuard				-						-	
Muscodor				-						-	
NOA 446510			++	++						++	
Segway		++	++	++	++	++	+	+/-	+/-	++	+/-
Stature	++	++	++		++	++	-	+/-	+/-	+/-	+/-
Subdue		-	++	++	+/-	+	-		+/-	++	
Terrazole								+/-	+/-	+/-	+/-
Truban	-	++	++		-	-					
Adorn				++					-	+/-	
Vital	++	++	++	++				+/-	+/-	++	+/-

* Not an IR-4-sponsored experiment.

[1] Rating Scale: ++ =clearly statistically equivalent or better than untreated non-inoculated and/or clearly statistically different than untreated inoculated; + = statistically different from untreated inoculated and untreated non-inoculated; +/- statistically equivalent to both untreated inoculated and untreated non-inoculated; - = statistically equivalent to untreated inoculated.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 9. * Efficacy of dimethomorph, phosphites, and other fungicides for control of *Phytophthora cinnamomi* root rot on azalea (*Rhododendron obtusum*) 'Hinodegiri', Benson, NC, 2003.

Treatment and rate /100 gal	Method of application	Foliar rating (1-4)[z]		Top wt (oz)	Root rot (1-5)[y]
		7/10	9/03		
Aliette 80W 80.0 oz	Spray	1.1 cd	1.7 edfg	2.03 ab	1.2 fg
Aliette 80W 12.8 oz	Drench	1.0 d	1.3 g	2.24 ab	1.3 fg
Banol 25.0 fl oz	Drench	1.1 cd	2.6 bc	1.35 cde	3.1 cd
Biophos 43L 128.0 fl oz	Spray	1.0 d [z]	2.6 bc	1.37 cde	1.9 ef
Biophos 43L 256.0 fl oz	Spray	1.1 cd	1.8 edfg	1.68 bcd	1.3 fg
Quell 2EC 0.5 fl oz	Drench	1.3 cd	2.5 bc	1.27 cdef	2.7 ed
SoilGard 12G 1.5 lb/yd3	Incorp.	1.5 bcd	3.0 ab	0.83 efg	3.8 abc
Stature-DM 50W 6.4 oz	Drench	1.0 d	1.4 fg	2.54 a	1.0 g
Subdue MAXX 2E 0.5 fl oz	Drench	1.5 bcd	2.9 ab	1.19 efg	3.6 bc
Trichoderma hamatum 382 3.0 oz/yd3	Incorp.	1.9 ab	3.1 ab	0.78 fg	3.9 ab
Truban 25EC 8.0 fl oz	Drench	1.2 cd	2.8 abc	1.23 cdef	3.5 bc
Vital 4L 32.0 fl oz	Spray	1.2 cd	2.4 bcde	2.06 ab	1.1 g
Vital 4L 64.0 fl oz	Spray	1.5 bcd	2.1 cdef	1.78 bc	1.1 g
ZeroTol 27L 256.0 fl oz	Drench	2.3 a	3.4 a	0.48 g	4.4 a
Untreated non-inoculated	--	1.0 d	1.7 efg	2.10 ab	1.0 g
Untreated inoculated	--	1.6 bc	2.9 ab	0.83 efg	3.5 bc

* Not an IR-4-sponsored experiment. F&NTests vol 59:OT002.

[z] Foliar rating based on 1 to 4 scale where 1 = healthy foliage, 2 = slight chlorosis, 3 = moderate to severe chlorosis and/ornecrosis, 4 = dead plant.

[y] Root rot rating scale was 1= healthy, full root ball, 2= some root rot, less than full root ball, 3= severe root rot, 50% of rootsystem necrotic, 4= very severe root rot, root ball falls apart, and 5 = plant dead, all roots necrotic.

[x] Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100,*P*=0.05.

Table 10. Efficacy on *Phytophthora cinnamomi* root rot on azalea (*Rhododendron obtusum*) 'Hinodegiri', Benson, NC, 2004.

Treatment	Rate Per 100 Gal	Application Method	Disease Severity (1-4)		Top Wt (oz)	Root Rot (1-5)
			7/22	9/09		
Aliette 80 W	5 lb	Foliar	1.0 b	1.2 c	2.2 abc	1.2 c
	12.8 oz	Drench	1.0 b	1.0 c	2.6 ab	1.0 c
Biophos 43L	2 gal	Foliar	1.2 b	1.0 c	2.5 ab	1.0 c
Fenstar500SC	14 fl oz	Drench	1.0 b	1.0 c	2.8 a	1.0 c
Segway 400SC	1.5 fl oz	Drench	1.0 b	1.2 c	2.0 bcd	1.8 b
Stature DM 50W	6.4 oz	Drench	1.0 b	1.0 c	2.2 abc	1.2 c
Subdue MAXX 2E	1.0 fl oz	Drench	1.0 b	2.7 ab	1.6 d	2.8 a
Truban 25EC	8.0 fl oz	Drench	1.0 b	2.5 b	1.7 cd	2.6 a
Vital 4L	4 pt	Foliar	1.0 b	1.0 c	2.1 bcd	1.0 c
Untreated non-inoculated			1.2 b	1.0 c	2.3 abc	1.0 c
Untreated inoculated			2.4 a	3.0 a	0.7 e	3.0 a

* Treatments applied foliar starting 9 Jun or drench starting 14 Jun and reapplied 2 times on a 30-day schedule. Disease severity rated on a 1 to 4 scale, where 1= healthy and 4=dead. Root rot rating scale was 1=healthy and 5 = dead, all roots necrotic.

Column means with a letter in common are not significantly different (Waller-Duncan k ratio, t-test, k=100, P=0.05).

Table 11. Efficacy on *Phytophthora cinnamomi* root rot on azalea (*Rhododendron obtusum*) 'Hinodegiri', Benson, NC, 2005.

Treatment	Rate Per 100 Gal	Applic Method	Foliar Disease Rating (1-4)			Top Wt (oz)	Root Rot (1-5)
			7/27	8/09	9/01		
Alude 46L	6.25 fl oz	Drench	1.4 def	1.4 d-g	1.6 efg	90 cde	1.0 g
	12.5 fl oz	Drench	1.1 f	1.1 fg	1.3 g-j	104 abc	1.0 g
Biophos 43L	2 gal	Foliar	1.0 f	1.0 g	1.1 ij	111 a	1.0 g
Calirus 150 (PMA 300)	4 pt	Drench	1.3 df	1.3 efg	1.3 g-j	87 def	1.0 g
Captan 80W	10 oz	Drench	1.9 c	1.8 cd	2.1 cd	66 hi	2.3 cd
Fenstar 500SC	14 fl oz	Drench	1.1 f	1.2 efg	1.4 f-i	96 a-e	1.0 g
	28 fl oz	Drench	1.3 def	1.3 efg	1.4 f-i	103 abc	1.1 fg
Insignia 20W	16 oz	Drench	1.7 cde	1.7 cde	1.6 efg	83 d-g	1.4 efg
	40 oz	Drench	1.3 def	1.4 d-g	1.6 efg	81 e-h	1.9 de
NOA 446510 250SC	8 fl oz	Drench	1.1 f	1.1 fg	1.2 hij	95 b-e	1.0 g
Segway 400SC	1.5 fl oz	Drench	1.1 f	1.1 fg	1.1 ij	89 cde	1.3 fg
	3.0 fl oz	Drench	1.3 def	1.3 efg	1.4 f-i	91 cde	1.3 fg
Stature DM 50W	6.4 oz	Drench	1.4 def	1.3 efg	1.4 f-i	82 d-g	1.0 g
	12.8 oz	Drench	1.4 def	1.3 efg	1.4 f-i	93 b-e	1.0 g
Subdue MAXX 2E	1.0 fl oz	Drench	1.7 cd	1.6 c-f	1.8 def	72 fgh	1.6 ef
Vital 4L	4 pt	Foliar	1.1 f	1.0 g	1.0 j	107 ab	1.0 g
Untreated non-inoculated			1.2 ef	1.1 fg	1.3 g-j	97 a-d	1.0 g
Untreated inoculated			2.6 ab	2.6 ab	2.7 ab	43 jk	2.6 bc

Foliar treatments applied 13 Jun, drench treatments applied 17 Jun and reapplied 3 times on a 28-day schedule. Foliar disease rated on a 1 to 4 scale, where 1= healthy and 4=dead. Root rot rating scale was 1=healthy and 5 = dead, all roots necrotic.

Column means with a letter in common are not significantly different (Waller-Duncan k ratio, t-test, k=100, P=0.05).

Table 12. Efficacy on *Phytophthora cinnamomi* root rot on azalea (*Rhododendron obtusum* cv. 'Hinodegiri'), Benson, NC 2006.

Treatment	Rate per100 gal	Application Method	Foliar Rating (1-4)								Top Wt. (g)		Root rating (1-5) [z]	
			7/20		8/4		8/18		9/7					
Adorn	30 ml	Drench	1.1	c	1.4	cd	1.6	def	1.5	cde	47	bc	1.0	c
	60 ml	Drench	1.2	c	1.4	cd	1.4	ef	1.4	e	57	ab	1.0	c
Aliette	5 lbs	Spray [y]	1.1	c [x]	1.3	cd	1.3	f	1.4	de	59	ab	1.0	c
Alude	12.7 fl oz	Spray	1.1	c	1.3	cd	1.6	def	1.8	c	51	abc	1.1	c
Biophos	64 fl oz	Spray	1.0	c	1.2	cd	1.3	f	1.4	de	60	a	1.0	c
Calirus150	64 fl oz	Spray	1.1	c	1.6	c	1.7	d	1.8	c	47	bc	1.1	c
Disarm	3 oz	Drench	1.1	c	1.4	cd	1.6	def	1.6	cde	47	bc	1.3	c
Fenstar	7 fl oz	Drench	1.2	c	1.3	cd	1.4	ef	1.6	cde	56	abc	1.0	c
	14 fl oz	Drench	1.1	c	1.4	cd	1.6	def	1.6	cde	57	ab	1.0	c
Insignia 20W	16 oz	Drench	1.2	c	1.4	cd	1.6	def	1.7	cd	50	abc	1.0	c
	40 oz	Drench	1.0	c	1.5	cd	1.5	def	1.5	cde	50	abc	1.1	c
K-Phyte	48 fl oz	Spray	1.0	c	1.3	cd	1.4	def	1.5	cde	53	abc	1.0	c
Magellan	12 fl oz	Spray	1.0	c	1.4	cd	1.4	def	1.5	cde	54	abc	1.0	c
MultiGard	500 ppm	Drench	2.3	b	2.8	b	3.1	ab	3.1	ab	16	d	3.3	a
	1,000 ppm	Drench	3.2	a	3.3	a	3.3	a	3.3	a	9	d	3.6	a
Muscodor albus	3.75 g/L	Incorp.	2.1	b	2.5	b	2.6	c	2.8	b	22	d	2.6	b
NOA 446510	4 fl oz	Drench	1.1	c	1.3	cd	1.6	de	1.6	cde	55	abc	1.0	c
	8 fl oz	Drench	1.4	c	1.6	c	1.5	def	1.6	cde	50	abc	1.0	c
Segway	3.0 fl oz	Drench	1.1	c	1.2	cd	1.4	ef	1.5	cde	54	abc	1.0	c
	6.0 fl oz	Drench	1.1	c	1.1	d	1.4	def	1.5	cde	59	ab	1.0	c
Subdue MAXX	1.0 fl oz	Drench	1.1	c	1.4	cd	1.5	def	1.8	c	44	c	1.0	c
Vital 4L	64 fl oz	Spray	1.2	c	1.4	cd	1.3	f	1.5	cde	58	ab	1.0	c
Untreated non-inoculated			1.0	c	1.5	cd	1.6	de	1.6	cde	49	abc	1.0	c
Untreated inoculated			2.4	b	2.8	b	2.9	bc	2.9	b	17	d	2.9	b

[z]Foliar rating: 1= healthy, 2 = chlorosis, slight stunting, 3 = severe stunting, 4= dead,.

[y]Root rot rating: 1= healthy, 2= fine roots necrotic, 3= coarse roots necrotic, 4= crown rot, and 5= dead plant.

[x]Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, *P*=0.05.

Table 13. Effect of treatments on azalea infected with *Phytophthora cinnamomi*, Spring Inoculations, Pennucci, NH, 2006a.

Treatment (active ingredient)	Rate per 100 gal	Not Wounded *				Wounded			
		Wilted Leaves			Dead Plants	Wilted Leaves			Dead Plants
		2 WAT	4 WAT	6 WAT	10 MAT	2 WAT	4 WAT	6 WAT	10 MAT
Aliette (fosetyl-AL)	6.4 oz	0.0	0.0	0.3	0.0	0.0	0.8	2.3	0.8
Alude (potassium phosphite)	12.7 oz	0.0	0.3	0.8	0.3	0.0	0.5	1.3	0.5
Biophos (dipotassium phosphonate + dipotassium phosphate)	2.02 gal	0.0	0.3	1.0	0.8	0.0	0.8	2.0	1.0
Fluazinam	3 lb	0.0	0.3	1.0	1.3	0.0	1.3	3.3	2.5
Insignia (pyraclostrobin)	16 oz	0.0	0.3	1.0	0.5	0.0	1.0	1.8	1.3
Insignia (pyraclostrobin)	40 oz	0.0	0.0	0.5	0.3	0.0	0.3	1.5	1.0
Magellan (mono- and dibasic sodium, potassium and ammonium phosphites)	6	0.0	0.0	0.3	0.0	0.0	0.5	1.5	0.8
Segway (cyazofamid)	1.5 oz	0.0	0.0	0.8	0.8	0.0	0.8	1.5	1.5
Segway (cyazofamid)	3.0 oz	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
Segway + Aliette	1.5 oz + 3.4 oz	0.0	0.0	0.0	0.0	0.0	0.8	0.5	1.0
Segway + Alude	1.5 oz + 12.7 oz	0.0	0.0	0.0	0.0	0.0	0.8	0.8	1.0
Stature (dimethomorph)	3.2 oz	0.0	0.0	0.8	0.8	0.0	0.5	1.8	1.5
Stature (dimethomorph)	6.4 oz	0.0	0.0	0.0	0.0	0.0	0.3	2.0	1.8
Subdue (mefenoxam)	1 oz	0.0	0.8	1.5	1.0	0.3	1.8	4.8	3.3
Truban (etradiazole)	3.2 oz	0.0	0.8	2.0	1.8	1.3	2.0	4.3	4.3
Non-inoculated Untreated		1.0	1.8	2.8	2.3	0.5	2.0	2.5	1.3
Inoculated Untreated		1.5	3.0	4.0	3.8	1.8	3.3	6.5	5.0
Fisher's LSD									

*Azaleas were grown in flats containing 6 plants each.

Table 14. Effect of treatments on azalea infected with *Phytophthora cinnamomi*, Summer Inoculations,Pennucci, NH, 2006b.

Treatment (active ingredient)	Rate per 100 gal	Not Wounded *				Wounded			
		Wilted Leaves			Dead Plants	Wilted Leaves			Dead Plants
		2 WAT	4 WAT	6 WAT	9 MAT	2 WAT	4 WAT	6 WAT	9 MAT
Aliette (fosetyl-AL)	6.4 oz	0.0	0.0	0.5	0.5	1.3	2.5	3.3	1.3
Alude (potassium phosphite)	12.7 oz	0.0	0.3	0.8	0.8	0.3	2.0	2.3	1.3
Biophos (dipotassium phosphonate + dipotassium phosphate)	2.02 gal	0.0	0.0	0.8	0.8	0.8	2.5	3.8	2.5
Fluazinam	3 lb	0.0	0.5	0.5	1.0	2.5	2.8	4.5	2.5
Insignia (pyraclostrobin)	16 oz	0.0	0.0	0.5	0.8	1.0	2.0	3.3	2.0
Insignia (pyraclostrobin)	40 oz	0.0	0.0	0.0	0.0	0.8	2.3	3.3	2.3
Magellan (mono- and dibasic sodium, potassium and ammonium phosphites)	6	0.0	0.0	0.8	0.8	0.5	1.8	2.3	1.5
Segway (cyazofamid)	1.5 oz	0.0	0.3	0.5	0.5	0.0	1.8	2.3	1.5
Segway (cyazofamid)	3.0 oz	0.0	0.0	0.0	0.0	0.0	0.8	1.3	1.3
Segway + Aliette	1.5 oz + 3.4 oz	0.0	0.0	0.0	0.0	1.8	1.8	2.8	1.0
Segway + Alude	1.5 oz + 12.7 oz	0.0	0.0	0.0	0.0	1.5	2.3	3.3	1.3
Stature (dimethomorph)	3.2 oz	0.0	0.0	0.5	0.5	0.5	1.5	2.8	1.3
Stature (dimethomorph)	6.4 oz	0.0	0.0	0.0	0.5	0.5	1.3	2.3	1.3
Subdue (mefonaxam)	1 oz	0.0	1.3	2.0	2.5	2.5	4.3	5.3	2.8
Truban (etradiazole)	3.2 oz	0.8	1.5	2.8	3.0	3.5	6.8	7.0	3.3
Non-inoculated Untreated		1.0	1.8	2.3	2.3	1.3	3.3	3.8	2.5
Inoculated Untreated		1.5	3.0	4.8	4.8	4.8	7.5	12.0	6.0
Fisher's LSD									

*Azaleas were grown in flats containing 6 plants each.

Table 15. Efficacy of foliar treatments on *Phytophthora cinnamomi* root rot on *Rhododendron catawbiense* 'Roseum', Benson, NC 2004.

Treatment	Rate Per 100 Gal	Disease Severity (1-4)			Top Wt (oz)	Root Rot (1-5)
		7/16	8/11	9/09		
Fenstar 500SC	14 fl oz	2.1 a	2.5 ab	3.0 abc	0.7 de	4.4 abc
	28 fl oz	1.1 b	1.4 cd	1.7 efg	1.2 bc	3.6 d
	56 fl oz	1.0 b	1.0 d	1.0 g	1.3 b	2.4 e
Medallion 50W	2 oz	2.7 a	3.3 a	3.6 ab	0.4 de	4.7 ab
	4 oz	2.9 a	3.3 a	3.5 abc	0.3 e	4.7 ab
	8 oz	2.6 a	3.3 a	3.7 a	0.6 de	4.9 ab
Segway 400SC	1.5 fl oz	2.4 a	2.9 ab	3.1 abc	0.4 de	4.6 abc
	3.0 fl oz	2.3 a	2.4 abc	2.6 cde	0.6 de	4.1 abc
	6.0 fl oz	1.2 b	1.1 d	1.5 fg	1.0 bcd	3.7 cd
Stature DM 50W	12.8 oz	2.5 a	3.0 ab	3.4 abc	0.5 de	4.3 abc
	25.6 oz	2.1 a	2.5 ab	2.7 abc	0.7 cde	4.0 bcd
	51.2 oz	2.1 a	2.2 bc	2.4 edf	0.7 cde	3.6 d
Subdue MAXX 2E	1.0 fl oz	2.2 a	2.6 ab	2.8 abc	0.6 de	4.4 abc
Untreated non-inoculated		1.0 b	1.0 d	1.0 g	1.9 a	1.4 f
Untreated inoculated		2.7 a	3.3 a	3.6 ab	0.4 de	5.0 a

Treatments applied foliar starting 9 Jun and reapplied 6 times on a 14-day schedule. Disease severity rated on a 1 to 4 scale, where 1= healthy and 4=dead. Root rot rating scale was 1=healthy and 5 = dead, all roots necrotic.
Column means with a letter in common are not significantly different (Waller-Duncan k ratio, t-test, k=100, P=0.05).

Table 16. Efficacy of foliar treatments on *Phytophthora cinnamomi* infesting several rhododendron species - Chlorosis, Becker, NY, 2005.

Treatment	Rate per acre	Chlorosis of Foliage of Five Varieties (0-100) on 30 Oct				
		***Rhododendron sp.* 'Lee's Dark Purple'**	***Rhododendron catawbiensis* 'boursault'**	***Rhododendronsp.* 'Nova zembla'**	***Rhondodendron catawbiensis* 'alba'**	***Rhododendron maximum* 'roseum'**
Aliette	12.8 oz	11.0 a	12.8 a	7.5 a	5.3 a	11.5 a
Insignia 20W	14 oz	12.0 a	13.5 a	10.6 a	5.7 a	15.7 a
	28 oz	11.8 a	12.6 a	8.0 a	7.5 a	13.5 a
Magellan	12 fl oz	13.0 a	13.5 a	11.5 a	4.9 a	16.4 a
Segway 400SC	1.5 fl oz	11.8 a	14.0 a	9.5 a	8.5 a	14.8 a
	3.0 fl oz	13.5 a	15.0 a	10.8 a	6.0 a	18.0 a
Stature DM 50W	6.4 oz	11.3 a	11.2 a	9.3 a	7.2 a	13.2 a
	12.8 oz	10.0 a	9.3 a	6.3 a	5.8 a	13.0 a
Terrazole	10 oz	11.1 a	10.2	4.9 a	7.4 a	15.0 a
TM-459	3 fl oz	10.5 a	12.8 a	9.5 a	5.6 a	15.3 a
Vital 4L	2.5 % v/v	14.7 a	11.5 a	10.6 a	9.5 a	15.8 a
Untreated non-inoculated		14.5 a	12.0 a	7.5 a	6.0 a	19.0 a
Untreated inoculated		15.5 a	14.2 a	9.7 a	6.5 a	16.2 a

Treatments applied foliar 17 and 30 Sep, 7 and 14 Oct. Foliar chlorosis rated on a 1 to 100 scale, where higher values = increased chlorosis.

Column means with a letter in common are not significantly different (Student-Newman-Keuls, P=0.05).

Table 17. Efficacy of foliar treatments on *Phytophthora cinnamomi* infesting several rhododendron species – Percent Live Plants, Becker, NY, 2005.

Treatment	Rate per acre	Percent live plants in April 2006 [z]				
		***Rhododendron sp.* 'Lee's Dark Purple'**	***Rhododendron catawbiensis* 'boursault'**	***Rhododendrons p.* 'Nova zembla'**	***Rhondodendron catawbiensis* 'alba'**	***Rhododendron maximum* 'roseum'**
Aliette	12.8 oz	0 a	7 a	14 a	0 a	7 a
Insignia	14 oz	0 a	0 a	7 a	0 a	0 a
	28 oz	0 a	7 a	26 a	0 a	14 a
Magellan	12 fl oz	7 a	5 a	28 a	28 a	21 a
Segway	1.5 fl oz	0 a	14 a	14 a	0 a	2 a
	3.0 fl oz	0 a	7 a	5 a	7 a	7 a
Stature DM	6.4 oz	0 a	0 a	14 a	0 a	7 a
	12.8 oz	0 a	0 a	14 a	0 a	7 a
Terrazole	10 oz	0 a	7 a	17 a	7 a	21 a
TM 459	3 fl oz	0 a	7 a	0 a	0 a	7 a
Vital	2.5 % v/v	0 a	0 a	19 a	13 a	4 a
Untreated non-inoculated		0 a	0 a	14 a	0 a	0 a
Untreated inoculated		0 a	7 a	5 a	7 a	0 a

Treatments applied foliar 17 and 30 Sep, 7 and 14 Oct. Foliar chlorosis rated on a 1 to 100 scale, where higher values = increased chlorosis.

[z] Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Table 18. Efficacy of foliar treatments on *Phytophthora cinnamomi* infesting several rhododendron species – Number of Dead Plants, Becker, NY, 2007b.

Treatment (active ingredient)	Rate per 100 gal	Number of Dead Plants					
		'Nova zembla'		'Catawbiense alba'		'Catawbiense boursault'	
Aliette 75WP (fosetyl AL)	12.8 oz	1.20	a	0.40	a	0.20	a
Insignia 20WG (pyraclostrobin)	14 oz	1.40	a	1.00	a	0.20	a
Insignia 20WG (pyraclostrobin)	28 oz	1.00	a	0.40	a	0.20	a
Magellan 6.69 (mono- and dibasic sodium, potassium and ammonium phosphites)	12 fl oz	1.40	a	0.60	a	0.40	a
Segway 300SC (cyazofamid)	1.5 fl oz	0.80	a	0.00	a	0.00	a
Segway 300SC (cyazofamid)	3 fl oz	1.00	a	0.60	a	0.20	a
StatureDM 50WP (dimethomorph)	6.4 oz	1.20	a	1.40	a	0.20	a
StatureDM 50WP(dimethomorph)	12.8 oz	1.20	a	0.80	a	0.40	a
Terrazole 35WP	10 oz	1.20	a	0.80	a	0.20	a
TM-459 300SC	3 fl oz	1.60	a	0.20	a	0.40	a
Vital 4.2 lb ai/Gal	2.5 % v/v	0.80	a	0.60	a	0.00	a
Non-inoculated		1.20	a	0.20	a	0.00	a
Inoculated		1.00	a	0.20	a	0.60	a
	LSD (*P*=0.05)	1.234		0.873		0.603	
	Standard Deviation	0.965		0.683		0.472	

Means followed by the same letter do not differ significantly (*P*=0.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment *P*(F) is significant at mean comparison OSL.

Table 19. Efficacy of foliar treatments on *Phytophthora cinnamomi* infesting several rhododendron species – Percent New Roots, Becker, NY, 2007b.

Treatment (active ingredient)	Rate per 100 gal	Percent New Roots					
		'Nova zembla'		'Catawbiense alba'		'Catawbiense boursault'	
Aliette 75WP (fosetyl AL)	12.8 oz	19.70	b	17.13	a	29.50	a
Insignia 20WG (pyraclostrobin)	14 oz	40.30	b	29.77	a	33.50	a
Insignia 20WG (pyraclostrobin)	28 oz	34.90	b	17.63	a	24.70	a
Magellan 6.69 (mono- and dibasic sodium, potassium and ammonium phosphites)	12 fl oz	29.49	b	33.33	a	27.00	a
Segway 300SC (cyazofamid)	1.5 fl oz	26.77	b	39.67	a	24.67	a
Segway 300SC (cyazofamid)	3 fl oz	36.47	b	21.67	a	23.00	a
StatureDM 50WP (dimethomorph)	6.4 oz	30.33	b	20.33	a	27.17	a
StatureDM 50WP(dimethomorph)	12.8 oz	31.07	b	38.33	a	29.50	a
Terrazole 35WP	10 oz	30.50	b	46.77	a	41.83	a
TM-459 300SC	3 fl oz	32.79	b	27.20	a	23.07	a
Vital 4.2 lb ai/Gal	2.5 % v/v	33.49	b	21.60	a	29.40	a
Non-inoculated		68.00	a	33.50	a	24.67	a
Inoculated		37.33	b	31.17	a	28.20	a
	LSD (*P*=0.05)	1.234		0.873		0.603	
	Standard Deviation	0.965		0.683		0.472	

Means followed by the same letter do not differ significantly (*P*=0.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment *P*(F) is significant at mean comparison OSL.

Table 20. Effect of drench treatments on rhododendron 'Nova Zembla' *Phytophthora cinnamomi* root rot rating and dry weights, Chastagner, WA, 2005.

Treatment	Rate per 100 gal	Root Rating [2]	Dry weights (g) [1]	
			Roots	Tops
Adorn (fluopicolide)	10 grams ai	2.2 ab	132.3 a	70.5 a
Aliette (fosetyl Al)	5 lbs	1.4 bc[3]	128.3 a	54.9 a
Alude (phosphorus acid)	12.7 fl oz	2.4 a	103.1 a	56.5 a
Biophos (phosphorus acid)	2 gal	1.4 bc	115.7 a	55.2 a
Captan 80 WP (captan)	20 oz	1.4 bc	144.6 a	63.7 a
Disarm	5 oz	1.4 bc	132.9 a	62.5 a
Fenstar (fenamidone)	14 oz	1.8 abc	130.4 a	64.2 a
	28 oz	1.6 abc	141.9 a	63.2 a
Insignia 20W (pyraclostrobin)	16 oz	1.8 abc	122.1 a	61.7 a
	40 oz	1.8 abc	138.8 a	57.4 a
Magellan (phosphorus acid generator)	12 fl oz	2.4 a	110.2 a	63.3 a
Segway (cyazofamid)	1.5 oz	1.6 abc	123.1 a	70.4 a
	3 oz	1.4 bc	138.6 a	64.7 a
Stature DM (dimethomorph)	6.4 oz	2.2 ab	121.5 a	57.1 a
	12.8 oz	1.8 abc	115.9 a	49.8 a
Subdue MAXX (mefenoxam)	2 fl oz	1.4 bc	131.5 a	58.5 a
Terrazole (etridiazole)	10 oz	1.4 bc	139.6 a	62.3 a
Vital (phosphorus acid generator)	4 pt	1.8 abc	127.7 a	62.2 a
Untreated non-inoculated		1.0 c	135.7 a	58.9 a
Untreated inoculated		1.0 c	138.5 a	59.2 a

[1]Average of five plants per treatment

[2]Washed root balls rated on a scale of 1 to 5, where 1= solid root mass in the shape of the pot, 2= up to 25% of root mass deteriorated, 3= 26 to 50% of root mass deteriorated, 4= 51 to 75% of root mass deteriorated, 5= >76% of root mass deteriorated

[3]Numbers followed by the same letter are not significantly different, P = 0.05, Duncan's Multiple Range Test

Table 21. Effect of treatments on rhododendron 'Purple Splendour'*Phytophthora cinnamomi*, day 35 to 70, Chastagner, WA, 2006.

Treatment	Rate/100 gal	Application method	Application interval (days)	Disease Rating (1-4, 1=no disease) on Day					
				35	42	49	56	63	70
Actinovate SP	10 oz	drench	14	1.0 b	1.2 a	1.6 ab	1.6 a-c	1.8 ab	1.6 ab
Adorn 4FL	30 ml	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.0 b	1.0 b
	60 ml	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.6 ab	1.6 ab
Alude	2 qts	foliar	28	1.6 a	1.6 a	1.6 ab	1.6 a-c	1.8 ab	1.8 ab
	12.7 fl oz	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.2 ab	1.2 ab
BioPhos	64 fl oz	foliar	14	1.0 b	1.0 a	1.0 b	1.0 c	1.6 ab	1.6 ab
	64 fl oz	drench	14	1.0 b	1.0 a	1.0 b	1.0 c	1.2 ab	1.2 ab
Captan 80 WP	4 oz	drench	14	1.0 b	1.0 a	1.0 b	1.0 c	1.2 ab	1.2 ab
Chipco Aliette 80 WP	12.8 oz	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.4 ab	1.4 ab
Disarm 480SC	3.0 fl oz	drench	28	1.0 b	1.0 a	1.0 b	1.2 bc	1.6 ab	1.6 ab
Fenstar	7.0 fl oz/	drench	28	1.0 b	1.0 a	1.2 ab	1.2 bc	1.4 ab	1.4 ab
	14.0 fl oz	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.6 ab	1.6 ab
Heritage WG 50	4 oz	drench	28	1.0 b	1.0 a	1.2 ab	1.2 bc	1.6 ab	1.6 ab
Insignia 20.4%	8 oz	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.4 ab	1.4 ab
Magellan	12 fl oz	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.0 b	1.0 b
	5 pints	foliar	28	1.0 b	1.0 a	1.0 b	1.0 c	1.4 ab	1.4 ab
MultiGuard	500 ppm	drench	7	1.2 ab[1]	1.6 a	1.8 a	2.0 a	2.2 a	2.2 a
	1000 ppm	drench	7	1.4 ab	1.6 a	1.6 ab	1.8 ab	2.2 a	2.2 a
Muscodor albus	7.5 g/L soil vol.	soil incorp.	1 x	1.0 b	1.0 a	1.4 ab	1.4 a-c	1.8 ab	1.8 ab
NOA 446510	2 fl oz	drench	14	1.0 b	1.0 a	1.0 b	1.0 c	1.0 b	1.0 b
	8 fl oz	drench	14	1.0 b	1.0 a	1.0 b	1.0 c	1.4 ab	1.4 ab
Segway 400SC	3.0 fl oz	drench	14	1.0 b	1.0 a	1.0 b	1.0 c	1.8 ab	1.8 ab
	6.0 fl oz/	drench	14	1.0 b	1.0 a	1.0 b	1.0 c	1.2 ab	1.2 ab
Stature DM 50 WP	12.8oz	drench	14	1.0 b	1.0 a	1.0 b	1.0 c	1.4 ab	1.4 ab
Subdue MAXX FV	2 fl oz	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.2 ab	1.2 ab
Terrazole 35 WP	8 oz	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.2 ab	1.2 ab
Vital	4 pts	foliar	28	1.0 b	1.0 a	1.0 b	1.0 c	1.8 ab	1.8 ab
	4 pts	drench	28	1.0 b	1.0 a	1.0 b	1.0 c	1.0 b	1.0 b
Non-inoculated check				1.0 b	1.0 a	1.0 b	1.0 c	1.0 b	1.0 b
Inoculated check				1.2 ab	1.2 a	1.2 ab	1.2 bc	1.2 ab	1.2 ab

[1]Numbers in columns followed by the same letter are not significantly different, P = 0.05, Duncan's Multiple Range Test

Table 22. Effect of treatments on rhododendron 'Purple Splendour'*Phytophthora cinnamomi*, day 77 to 105, Chastagner, WA, 2006.

Treatment	Rate/100 gal	Application method	Application interval (days)	Disease Rating (1-4, 1=no disease) on Day				
				77	84	93	98	105
Actinovate SP	10 oz	drench	14	1.6 b-d	1.6 cd	2.4 a-d	2.6 a-c	2.6 a-e
Adorn 4FL	30 ml	drench	28	1.2 cd	1.4 cd	1.8 b-f	2.0 b-f	2.0 c-g
	60 ml	drench	28	1.6 b-d	1.6 cd	1.8 b-f	2.0 b-f	2.0 c-g
Alude	2 qts	foliar	28	2.0 a-d	2.0 a-d	2.2 b-e	2.2 b-e	2.2 b-f
	12.7 fl oz	drench	28	1.2 cd	1.2 cd	1.4 d-f	1.4 d-f	1.8 d-g
BioPhos	64 fl oz	foliar	14	1.6 b-d	1.6 cd	2.0 b-f	2.0 b-f	2.0 c-g
	64 fl oz	drench	14	1.6 b-d	1.8 b-d	1.8 b-f	1.8 c-f	2.0 c-g
Captan 80 WP	4 oz	drench	14	2.0 a-d	2.0 a-d	2.2 b-e	2.4 b-d	2.6 a-e
Chipco Aliette 80 WP	12.8 oz	drench	28	1.4 b-d	1.6 cd	1.8 b-f	2.0 b-f	2.0 c-g
Disarm 480SC	3.0 fl oz	drench	28	1.8 a-d	1.8 b-d	2.2 b-e	2.4 b-d	2.6 a-e
Fenstar	7.0 fl oz/	drench	28	1.4 b-d	1.8 b-d	2.0 b-f	2.2 b-e	2.6 a-e
	14.0 fl oz	drench	28	1.6 b-d	1.8 b-d	1.8 b-f	2.0 b-f	2.4 a-f
Heritage WG 50	4 oz	drench	28	1.8 a-d	1.6 cd	1.6 c-f	1.8 c-f	2.0 c-g
Insignia 20.4%	8 oz	drench	28	1.4 b-d	1.6 cd	2.0 b-f	2.2 b-e	2.8 a-d
Magellan	5 pints	foliar	28	1.4 b-d	1.4 cd	1.8 b-f	1.8 c-f	1.8 d-g
	12 fl oz	drench	28	1.0 d	1.0 d	1.0 f	1.0 f	1.6 e-g
MultiGuard	500 ppm	drench	7	2.8 a	3.0 a	3.2 a	3.4 a	3.4 a
	1000 ppm	drench	7	2.4 ab	2.8 ab	2.8 ab	3.0 ab	3.2 ab
Muscodor albus	7.5 g/L soil vol.	soil incorp.	1 x	2.2 a-c	2.2 a-c	2.6 a-c	2.6 a-c	2.6 a-e
NOA 446510	2 fl oz	drench	14	1.0 d	1.0 d	1.0 f	1.0 f	1.0 g
	8 fl oz	drench	14	1.4 b-d	1.6 cd	1.6 c-f	1.6 c-f	1.8 d-g
Segway 400SC	3.0 fl oz	drench	14	1.8 a-d	1.8 b-d	1.8 b-f	2.0 b-f	2.0 c-g
	6.0 fl oz/	drench	14	1.2 cd	1.2 cd	1.4 d-f	1.8 c-f	1.8 d-g
Stature DM 50 WP	12.8oz	drench	14	1.6 b-d	1.8 b-d	1.8 b-f	1.8 c-f	2.0 c-g
Subdue MAXX FV	2 fl oz	drench	28	1.2 cd	1.4 cd	1.6 c-f	1.6 c-f	1.8 d-g
Terrazole 35 WP	8 oz	drench	28	1.2 cd	1.2 cd	1.8 b-f	1.8 c-f	2.0 c-g
Vital	4pts	foliar	28	1.8 a-d	2.0 a-d	2.0 b-f	2.2 b-e	2.0 c-g
	4pts	drench	28	1.0 d	1.2 cd	1.6 c-f	1.6 c-f	1.8 d-g
Non-inoculated check				1.2 cd	1.2 cd	1.2 ef	1.2 ef	1.4 fg
Inoculated check				1.8 a-d	2.0 a-d	2.6 a-c	2.6 a-c	3.0 a-c

[1]Numbers in columns followed by the same letter are not significantly different, P = 0.05, Duncan's Multiple Range Test.

Phytophthora cryptogea. From 2004 through 2015, 7 experiments were conducted on P. cryptogea on either gerbera, Frasier fir or noble fir.

In 2004, Benson conducted an experiment using *Phytophthora cryptogea* on *Gerbera jamesonia*. Stature DM was drenched onto gerbera pots, and then the soil was inoculated with the pathogen the next day. All rates significantly reduced disease ratings and increased top dry weights (Table 23). No rate caused phytotoxicity.

In 2007 and 2008, Benson tested several products against *P. cryptogea* on *Gerbera jamesonia* 'Yellow Revolution'. All foliar and soil treatments were applied twice with the exception of *Muscodor albus* which was incorporated into the soil prior to planting. In 2007, four products provided foliar ratings equivalent to the non-inoculated untreated control: Adorn at 30 and 60 ml, Fenstop at14 fl oz, Segway at 6 fl oz, and Subdue Maxx at 1 fl oz (Table 24). On May 21, the plants were destructively harvested and root rot ratings were assessed. The treatments exhibiting ratings similar to the non-inoculated untreated controls included Fenstop, Micora (NOA 446510), and Adorn. In 2008, Fenstar at 7 and 14 fl oz, Segway at 3 and 6 fl oz, Subdue MAXX at 1 fl oz and Presidio at 2 fl oz provided foliar and root rot ratings equivalent to the non-inoculated untreated control. (Table 25).

In the experiment conducted during 2009, disease pressure was extremely high because the plants were grown in the greenhouse during June-July when the environment was optimal for *Phytophthora cryptogea*. The Gerbera daisy cultivar used *Gerbera jamesonii* 'Yellow Revolution' is extremely susceptible to this pathogen and the drip irrigation system provided enough water to create highly favorable conditions along with maximum temperatures above 30 C for severe disease development. Foliar rating for the untreated, inoculated control was 3.8 on a 4 point scale by day 24, while the uninoculated control was 1, healthy. At harvest on day 34 after inoculation the untreated, inoculated control had a root rot rating of 4.8 on a 5 point scale, while the uninoculated control roots had an average rating of 1 (healthy) The standard fungicide, Subdue MAXX at 1 fl oz/100 gal (drench) provided acceptable control as foliar ratings, top weight and root rot rating was similar to the uninoculated control (Table 26). A second standard, Stature SC provided some control of crown rot but average top weight and root rot rating were different (P=0.05) from the uninoculated control. The most effective products for control of Phytophthora root rot of gerbera caused by *P. cryptogea* were Adorn at 120 ml/100 gal; BAS651 at either rate; Fenstop, and Segway in terms of low foliar ratings, greatest top weights and lowest root rot ratings, in most cases not different (P=0.05) from the uninoculated control. Aliette at 80 oz/100 gal (spray) and the other phosphorus acid generators evaluated (Alude, Agri-Fos, Magellan and Vital) were not effective in control of *P. cryptogea* on gerbera daisy. Foliar ratings paralleled the untreated inoculated control and most plants treated with phosphorus acid generators were dead at harvest.

A marginal chlorosis starting with the emerging leaf tip was observed on some gerbera daisy treated at the 34 fl oz rate of BAS 651. No other products appeared phytotoxic.

Table 23. Efficacy of Stature DM drenches on *Phytophthora cryptogea* Root Rot on Gerbera, Benson, NC, 2004.

Treatment	Rate per 100 gal	Foliar Rating[1]		Top Dry Weight (g)	Root Rating[2]	Phytotoxicity
		5/21	5/26		5/28	5/28
Stature DM	6.4 oz	1.1 c[3]	1.2 b	58.8 a	1 b	0 a
	12.4 oz	1.0 c	1.0 b	66.9 a	1 b	0 a
	25.6 oz	1.0 c	1.1 b	61.9 a	1 b	0 a
Untreated inoculated		2.4 b	3.5 a	13.5 b	5 a	0 a

* Plants were retreated once at 14 d (5/4/04, 5/18/04).

[1] Foliar rating was 1= healthy, no disease, 2=slight infection, 3=severe necrosis, 4=dead plant.

[2] Root rating was on a scale of 1 to 5 where 1=healthy, 2=fine root necrosis, 3=coarse roots necrotic, 4=crown rot, 5=dead plant.

[3]Means within same column followed by the same letter are not different by Waller-Duncan K-ration P=0.05.

Table 24. Efficacy of Foliar and Soil Treatments on *Phytophthora cryptogea* Root Rot on Gerbera 'Yellow Revolution', Benson, NC, 2007.

Treatment[w]	Rate per 100 gal	Applic method	Foliar rating (1-4)[x]			At harvest (May 21)		
			5/03	5/09	5/14	Height (cm)	Top wt (g)	Root rot (1-5)[y]
Adorn	30 ml	Drench	1.1 ab	1.3 gh	1.4 gh	10.1 ab	77.4 ab	1.6 e
	60 ml	Drench	1.0 b	1.0 h	1.0 h	9.6 ab	92.5 a	1.5 e
Aliette	5 lbs	Spray	1.0 b	2.0 ef	3.4 abcd	3.0 e	5.0 e	5.0 a
Alude	12.7 fl oz	Spray	1.5 ab	2.1 def	2.6 def	3.9 de	14.8 de	4.8 ab
Biophos	64 fl oz	Spray	1.8 a	3.1 ab	3.6 abc	3.0 e	5.0 e	5.0 a
Disarm	3 oz	Drench	1.0 b	1.9 fg	3.3 abcd	3.5 de	6.3 e	4.9 a
Fenstop	14 fl oz	Drench	1.0 b	1.0 h	1.0 h	11.0 a	86.8 a	1.1 e
Heritage	0.9 oz.	Drench	1.0 b	2.1 def	2.8 cdef	4.8 cde	28.7 cd	4.0 bc
	1.8 oz	Drench	1.0 b	2.8 abcd	3.8 ab	3.0 e	5.0 e	5.0 a
Insignia	8 oz	Drench	1.4 ab	3.0 abc	3.3 abcd	3.9 de	10.5 de	4.6 ab
Magellan	12 fl oz	Spray	1.4 ab	2.6 abcde	3.3 abcd	3.0 e	5.0 e	5.0 a
Medallion	2.0 oz	Drench	1.5 ab	3.3 a	3.6 abc	3.0 e	7.9 e	4.9 a
MultiGard	1,000 ppm	Drench	1.5 ab	3.0 abc	4.0 a	3.0 e	5.0 e	5.0 a
*Muscodor albu*s	7.5 g/L	Incorp.	1.8 a	3.1 ab	3.8 ab	3.0 e	5.0 e	5.0 a
NOA 446510	8 fl oz	Drench	1.0 b	1.0 h	2.3 efg	10.8 a	89.8 a	1.4 e
Remedier	2.0 oz	Drench	1.6 ab	3.3 a	3.8 ab	3.0 e	5.0 e	5.0 a
Segway	3.0 fl oz	Drench	1.3 ab	2.4 cdef	2.9 bcde	5.0 cd	19.9 de	4.3 ab
	6.0 fl oz	Drench	1.0 b	1.0 h	1.3 h	8.4 b	64.8 b	2.5 d
Subdue MAXX	1.0 fl oz	Drench	1.0 b	1.0 h	1.9 fgh	6.4 c	43.6 c	3.4 c
Vital	64 fl oz	Spray	1.0 b	2.5 bcdef	3.1 abcde	3.6 de	12.3 de	4.9 a
Non-inoculated Untreated	--		1.0 b	1.0 h	1.0 h	10.9 a	88.8 a	1.0 e
Inoculated Untreated	--		1.5 ab	3.1 ab	3.6 abcd	3.0 e	5.0 e	5.0 a
Non-inoculated Adorn	60 ml	Drench	1.0 b	1.0 h	1.0 h	11.3 a	88.9 a	1.3 e
Non-inoculated Heritage	1.8 oz	Drench	1.0 b	1.0 h	1.0 h	11.3 a	90.7 a	1.3 e
Non-inoculated Segway	6.0 fl oz	Drench	1.0 b	1.0 h	1.0 h	10.9 a	87.7 a	1.3 e

[w] Treatments 22 through 25 were not inoculated

[x] Foliar rating: 1= healthy, 2 = some leaves wilted, some chlorosis, 3 = most leaves wilted, chlorosis,4= crown rot, plant dead,.

[y]Root rot rating: 1= healthy, 2= 25% or less roots necrotic, 3= 26 - 50% roots necrotic, 4= more than 50% necrotic, and 5= crown rot,plant dead.

[z]Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, *P*=0.05.

Table 25. Efficacy of Foliar and Soil Treatments on *Phytophthora cryptogea* Root Rot on Gerbera 'Yellow Revolution', Benson, NC, 2008.

Treatment	Rate per 100 gal	Applic method	Foliar Rating (1-4)[x]				At Harvest (July 1)	
			6/12	6/17	6/24	7/01	Top wt (g)	Root rot (1-5)[y]
Aliette	5 lb	Spray	1.0 a[z]	2.4 abc	2.9 ab	3.6 ab	12.0 f-i	4.5 abc
Agri-Fos	64 fl oz	Spray	1.3 a	2.0 cd	2.8 abc	3.3 abc	11.5 ghi	4.5 abc
Alude	12.7 fl oz	Spray	1.1 a	2.5 abc	3.0 ab	4.0 a	5.9 i	5.0 a
Disarm	4 oz	Drench	1.1 a	2.1 bcd	3.0 ab	3.6 ab	10.1 hi	4.9a
	8 oz	Drench	1.0 a	1.3 ef	2.1 c-f	3.1 bc	20.3 efg	3.9 bcd
Fenstar	7 fl oz	Drench	1.0 a	1.3 ef	1.3 ghi	1.4 ef	39.3 bc	1.5 fg
	14 fl oz	Drench	1.0 a	1.0 f	1.0 i	1.0 f	48.9 a	1.0 g
Heritage	0.9 oz	Drench	1.1 a	2.0 cd	2.9 ab	3.5 ab	12.3 f-i	4.5 abc
	1.8 oz	Drench	1.3 a	1.9 cde	2.5 bcd	3.5 ab	14.1 f-i	4.5 abc
Insignia	8 oz	Drench	1.5 a	2.3 bc	2.5 bcd	3.9 ab	11.3 ghi	4.8 ab
Magellan	12 fl oz	Spray	1.4 a	2.4 abc	3.0 ab	4.0 a	8.6 hi	5.0 a
Muscodor albus	7.5 g/L	Incorp.	1.0 a	1.0 f	2.4 b-e	3.3 abc	15.8 fgh	4.6 ab
NOA 446510	4 fl oz	Drench	1.3 a	2.8 ab	3.3 a	3.6 ab	12.1 f-i	4.6 ab
	8 fl oz	Drench	1.0 a	2.0 cd	2.5 bcd	3.9 ab	10.1 hi	4.9 a
Presidio	1 fl oz	Drench	1.0 a	1.0 f	1.9 d-g	2.5 cd	25.3 de	3.3 de
	2 fl oz	Drench	1.0 a	1.0 f	1.0 i	1.0 f	38.7 bc	1.5 fg
Remedier	2.0 oz	Drench	1.3a	3.0 a	3.3 a	4.0 a	6.0 i	5.0 a
Segway	3.0 fl oz	Drench	1.0 a	1.0 f	1.0 i	1.0 f	45.4 ab	1.0 g
	6.0 fl oz	Drench	1.0 a	1.0 f	1.0 i	1.0 f	45.3 ab	1.0 g
Stature SC	6.12 fl oz	Drench	1.0 a	1.3 f	1.5 g-f	2.0 de	32.3 cd	2.4 ef
Subdue MAXX	1.0 fl oz	Drench	1.0 a	1.0 f	1.1 hi	1.6 ef	35.3 c	1.8 fg
Taegro	3.5 oz	Drench	1.6 a	2.5 abc	3.3 a	4.0 a	6.7 hi	5.0 a
Tanos	12.0 oz	Drench	1.0 a	2.1 bcd	2.5 bcd	3.6 ab	13.1 f-i	4.9 a
Vital	64 fl oz	Spray	1.4 a	1.5 def	1.8 e-h	2.5 cd	21.2 ef	3.6 cd
Untreated Non-inoculated			1.0 a	1.0 f	1.0 i	1.0 f	38.6 bc	1.1 g
Untreated Inoculated			1.8 a	2.8 ab	3.3 a	4.0 a	6.3 hi	5.0 a

[x] Foliar rating: 1= healthy, 2 = some leaves wilted, some chlorosis, 3 = most leaves wilted, chlorosis,4= crown rot, plant dead,.

[y] Root rot rating: 1= healthy, 2= 25% or less roots necrotic, 3= 26 - 50% roots necrotic, 4= more than 50% necrotic, and 5= crown rot,plant dead.

[z] Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, *P*=0.05.

Table 26. Efficacy of Foliar and Soil Treatments on *Phytophthora cryptogea* Root Rot on Gerbera 'Yellow Revolution', Benson, NC, 2009.

Treatment	Rate per 100 gal	Application Method	Foliar Rating (1-4)				Top Weight 34 DAT	Root Rot (1 – 5) 34 DAT
			10 DAT	17 DAT	24 DAT	33 DAT		
Adorn	60 ml	Drench	1.5 abcd	2.9 bc	3.8 abc	3.8 ab	2.2 hij	4.8 ab
	120 ml	Drench	1.1 de	1.7 efg	1.9 g	2.2 e	10.2 de	2.4 d
Agri-fos	64 fl oz	Spray*	1.3 bcde	2.6 bcd	3.3 bcde	3.3 bcd	3.8 fghij	4.4 abc
Aliette	80 oz	Spray*	1.2 cde	2.7 bcd	3.6 abcd	3.8 ab	2.7 ghij	4.7 ab
Alude	12.7 fl oz	Spray*	1.5 abcd	3.2 ab	3.9 a	4.0 a	1.5 ij	5.0 a
BAS 651	22.5 fl oz	Drench	1.0 e	1.0 h	1.0 i	1.0 h	15.0 ab	1.0 f
	34 fl oz	Drench	1.1 de	1.2 gh	1.2 hi	1.3 gh	14.3 abc	1.3 ef
BW240	6.0 oz	Drench*	1.8 a	3.7 a	4.0 a	4.0 a	1.5 ij	5.0 a
Disarm	4 fl oz	Drench	1.3 bcde	2.4 cd	3.1 def	3.4 abc	4.7 fghij	4.3 abc
	8 fl oz	Drench	1.2 cde	2.3 cde	2.8 ef	3.0 cd	7.3 ef	3.7 c
Fenstop	14.0 oz	Drench	1.0 e	1.0 h	1.1 hi	1.2 gh	14.1 abc	1.3 ef
Insignia	8.0 oz	Drench	1.1 de	2.7 bcd	3.4 abcd	3.5 abc	3.7 ghij	4.5 ab
Magellan	64 fl oz	Spray*	1.1 de	2.9 bc	3.3 bcde	3.5 abc	4.4 fghij	4.2 abc
Pageant	12.0 oz	Drench	1.2 cde	2.1 de	3.1 def	3.4 abc	5.0 fghi	4.2 abc
Remedier (Tenet) (Trichoderma)	7.5 oz	Drench*	1.6 abc	3.2 ab	3.9 a	4.0 a	1.5 ij	5.0 a
Segway	6.0 oz	Drench	1.1 de	1.4 fgh	1.7 gh	1.8 ef	11.4 cd	2.0 de
Stature SC	6.12 fl oz	Drench	1.0 e	1.2 gh	1.6 gh	1.9 ef	10.1 de	2.1 d
Subdue MAXX	1.0 fl oz	Drench	1.0 e	1.2 gh	1.3 hi	1.3 gh	13.1 abcd	1.7 def
Taegro (Bacillus subtilis)	3.5 oz	Drench*	1.2 cde	2.6 bcd	3.4 abcd	3.6 ab	2.9 ghij	4.7 ab
Tanos	12.0 oz	Drench	1.1 de	2.1 de	2.6 f	2.8 d	5.8 fg	3.7 c
Vital	64 fl oz	Spray*	1.2 cde	2.1 de	3.3 bcde	3.4 abc	5.2 fgh	4.1 bc
Untreated Inoculated			1.6 abc	3.2 ab	3.8 abc	3.8 ab	2.7 ghij	4.8 ab
Untreated Uninoculated			1.0 e	1.0 h	1.0 i	1.0 h	16.0 a	1.0 g

x Foliar rating: 1= healthy, 2 = some leaves wilted, some chlorosis, 3 = most leaves wilted, chlorosis, 4= crown rot, plant dead,

y Root rot rating: 1= healthy, 2= 25% or less roots necrotic, 3= 26 - 50% roots necrotic, 4= more than 50% necrotic, and 5= crownrot, plant dead.

z Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, *P*=0.05.

In 2008, Chastagner tested drench applications of several products on Fraser and noble firs (Table 27 - Table 28). Treatments which significantly reduced disease severity ratings on Fraser fir included Insignia, Stature, Adorn, Subdue, Fenstop, and Disarm at 4 fl oz. Root rot rating was reduced most effectively by Insignia, Stature, Adorn, Fenstop, and Subdue on Fraser fir. Disease severity and root rot ratings were higher on the noble fir and at the end of the experiment on day 84, the inoculated noble fir check seedlings were all dead. All of the treatments except Aliette, Heritage and Magellan had significantly lower disease ratings than the inoculated checks. The most effective treatments in reducing root rot on noble fir included Disarm, Segway, Stature, Adorn, Fenstop, and Subdue. Seedling growth occurred before significant levels of disease had developed, particularly on the noble fir, hence, most of the fungicides had no or only a limited effect on growth.

Table 27. Efficacy of drench treatments on *Phytophthora cryptogea* on Fraser Fir, Chastagner, WA 2008.

Treatment	Rate Per 100 Gal	Disease Severity Rating (0-4)[1]		Root Rating (1-4)[2]	Leader Length (cm)	Shoot Length (cm)
		Day 70	Day 84			
	1 fl oz	0 b	0 b	1.0 b	6.7 a	7.4 abc
Adorn 4FL	2 fl oz	0 b	0 b	1.0 b	6.4 a	7.4 abc
Aliette 80 WDG	12.8 oz	0.8 ab	0.8 ab	1.6 ab	6.6 a	7.1 abc
	4 fl oz	0 b	0 b	1.6 ab	6.1 ab	7.7 abc
Disarm 480SC	8 fl oz	0.8 ab	0.8 ab	1.4 ab	7.1 a	8.0 ab
	14 fl oz	0 b	0 b	1.0 b	6.7a	7.6 abc
Fenstop	28 fl oz	0 b	0 b	1.0 b	6.8 a	7.9 ab
	0.9 oz	0.8 ab	0.8 ab	2.6 ab	4.9 ab	5.8 bc
Heritage WG 50	1.8 oz	1.6 ab	1.6 ab	1.8 ab	5.5 ab	7.7 abc
Insignia 20.4 %	8 oz	0 b	0 b	1.0 b	6.1 ab	7.0 abc
Magellan	12 fl oz	0.8 ab	0.8 ab	1.6 ab	6.5 a	7.2 abc
	3 fl oz	0.8 ab	0.8 ab	1.6 ab	6.5 a	8.2 ab
Segway	6 fl oz	0 b	0.8 ab	1.6 ab	7.0 a	7.4 abc
Stature SC	6.1 fl oz	0 b	0 b	1.0 b	6.5 a	7.4 abc
Subdue MAXX FV	2 fl oz	0 b	0 b	1.0 b	7.1 a	9.2 a
Untreated non-inoculated		0 b	0.2 ab	1.0 b	6.7 a	7.8 abc
Untreated inoculated		3.0 a	3.0 a	3.4 a	3.2 b	4.6 c

[1] Disease severity rating: 0= no disease, 1= slight wilt/chlorosis, 2= moderate wilt/chlorosis, 3 = severe wilt/chlorosis, 4= dead seedling.

[2] Root rating: 1 = 0-10% (limited to root tips), 2 = 11-33%, 3 = 34-66%, and 4 = $\geq$ 67% of roots dead

Numbers in columns followed by the same letter are not significantly different, P=0.05, Tukey's Studentized Range Test

Table 28. Efficacy of drench treatments on Phytophthora cryptogea on Noble Fir, Chastagner, WA 2008.

Treatment	Rate Per 100 Gal	Disease Severity Rating (0-4)[1]		Root Rating (1-4)[2]	Leader Length (cm)	Shoot Length (cm)
		Day 70	Day 84			
	1 fl oz	0.2 bc	0.2 c	1.2 d	6.7 a	8.1 abc
Adorn 4FL	2 fl oz	0 c	0 c	1.0 d	8.3 a	9.5 abc
Aliette 80 WDG	12.8 oz	2.6 ab	3.0 ab	3.6 ab	8.0 a	8.2 abc
	4 fl oz	0 c	0 c	1.4 cd	8.5 a	9.6 abc
Disarm 480SC	8 fl oz	0 c	0.3 c	2.0 b-d	7.9 a	8.8 abc
	14 fl oz	0 c	0 c	1.0 d	9.4 a	9.9 ab
Fenstop	28 fl oz	0 c	0 c	1.0 d	9.3 a	11.0 a
	0.9 oz	2.4 abc	2.4 abc	3.2 abc	8.1 a	7.6 bc
Heritage WG 50	1.8 oz	1.4 bc	2.0 abc	2.8 a-d	5.8 a	6.4 c
Insignia 20.4 %	8 oz	0.8 bc	1.0 bc	2.2 a-d	7.4 a	8.3 abc
Magellan	12 fl oz	1.2 bc	1.8 abc	2.4 a-d	7.2 a	9.0 abc
	3 fl oz	0.2 bc	0.2 c	1.4 cd	7.6 a	9.0 abc
Segway	6 fl oz	0 c	0 c	1.0 d	8.5 a	9.4 abc
Stature SC	6.1 fl oz	0 c	0.4 c	1.2d	8.6 a	8.7 abc
Subdue MAXX FV	2 fl oz	0 c	0.2 c	1.0 d	8.2 a	9.6 abc
Untreated non-inoculated		0 c	0 c	1.0 d	8.6 a	9.1 abc
Untreated inoculated		4.0 a	4.0 a	4.0 a	6.8 a	7.5 bc

[1] Disease severity rating: 0= no disease, 1= slight wilt/chlorosis, 2= moderate wilt/chlorosis, 3 = severe wilt/chlorosis, 4= dead seedling.

[2] Root rating: 1 = 0-10% (limited to root tips), 2 = 11-33%, 3 = 34-66%, and 4 = $\geq$ 67% of roots dead

Numbers in columns followed by the same letter are not significantly different, P=0.05, Tukey's Studentized Range Test

In 2015, Hand tested drench applications of several products on gerbera daisy. Treatments were applied on Jul 17, and plants inoculated 4 days later. All treatments provided excellent control of a severe disease pressure throughout the evaluation period (Table 29). Three weeks post-inoculation (Aug 11), plants treated with Segovis at the 2 and 3 fl oz/100 gal rates, as well as those treated with Mural, maintained the best health ratings, which were significantly better than the nontreated control plants and those treated with the industry standard Adorn. No phytotoxicity was observed for any treatment.

Table 29. * Efficacy of drench treatments on Phytophthora cryptogea Root Rot on Gerbera Daisy'Midi Red', Hand, OH, 2015.

Treatment	Rate Per 100 Gal	Disease Severity [x]			
		8/04	8/11	8/18	8/25
Adorn 4 SC	4 fl oz	1.5 a	2.0 b	2.8 b	3.0 b
Mural 45WG	3 oz	1.0 a	1.0 c	1.0 b	1.8 b
Segovis (A21008A) SC	1 fl oz	1.5 a	2.2 b	2.5 b	2.5 b
	2 fl oz	1.0 a	1.2 c	1.3 b	1.3 b
	3 fl oz	1.0 a	1.0 c	1.2 b	1.2 b
Nontreated, non-inoculated control		1.0 a[y]	1.0 c	1.7 b	1.2 b
Nontreated, inoculated control		1.8 a	4.2 a	6.8 a	9.0 a

* Not an IR-4 Experiment: Plant Disease Management Reports 10:OT002.

[x] Disease severity was assessed using a 1 to 10 scale, where 1=healthy, 2=minor chlorosis/minor stunting, 3=severe chlorosis/severe stunting, 4=severe stunting, 5=minor wilting, 6=moderate wilting, 7=severe wilting, 8=severe wilting/minor necrosis, 9=severe wilting/moderate necrosis, 10=plant death.

[y] Column means followed by the same letter are not significantly different as determined by Fisher Protected LSD test ($P = 0.05$).

Phytophthora drechsleri. In 2003, Hausbeck conducted two experiments examining efficacy of several products on *Phytophthora drechsleri* on poinsettia (*Euphorbia pulcherrima*). Disease pressure was severe in both experiments. In the first experiment, the best efficacy was achieved with Biophos (1 gal per 100 gal), Segway (3 fl oz per 100 gal), Stature DM (6.4 oz per 100 gal) and Terrazole (10 oz per 100 gal). Insignia (8 and 16 oz per 100 gal) was ineffective as was Aliette (Table 28). In the second experiment, three treatments had significantly less plant death (16.7%) and were healthier (rating=1.7) when compared to the untreated inoculated control plants at the end of this study: Stature DM 50WP, Subdue MAXX, and Truban 30WP (Table 30).

In 2005, Hausbeck conducted an additional experiment with this host-pathogen system. Most treatments provided statistically significant control. The best treatments completely preventing plant death included BioPhos, Segway at 3 oz, Stature DM at 6.4 oz, and Terrazole 35WP (Table 31).

In 2007, Hausbeck examined several additional products for *P. drechsleri* on poinsettia. In this experiment, disease pressure was severe with 66.7% of the untreated inoculated plants dead with the remaining alive plants severely stunted (Table 32). Adorn and Subdue MAXX were the only treatments that resulted in plants showing no symptoms. Two biopesticides were included: Alude and ZeroTol. Alude significantly reduced infection compared to the untreated inoculated while ZeroTol had 100% plant death by the second rating date. A high and low rate of Cyazofamid, Heritage, and Adorn were included in this experiment with no significant differences between the rates for each treatment on the last rating date. Strobilurin products Heritage and Insignia were not effective in controlling infection and resulted in plant health and death (%) similar to that of the untreated inoculated. No phytotoxicity was observed on any of the treated plants.

In 2003, Hausbeck conducted an experiment using *P. drechsleri* on calibrachoa. The disease pressure in this case was less severe with only 50% mortality at the last reading date. All treatments except Subdue Maxx and Truban completely prevented plant death (Table 33).

Table 30. * Evaluation of a biopesticide and fungicides in managing *Phytophthora drechsleri* root rot of poinsettia (*Euphorbia pulcherrima*) 'Freedom Red', Hausbeck, MI, 2003.

Treatment, rate per 100 gal, and application interval (days)	Health				Death (%)		
	5/01	5/08	5/15	5/22	5/08	5/15	5/22
Camelot 58EC 3 pt (14)	3.3 efg	5.0 e	5.0 d	5.0 c	100.0 c	100.0 d	100.0 c
Camelot 58EC 6 pt (14)	3.5 efg	4.8 de	5.0 d	5.0 c	83.3 bc	100.0 d	100.0 c
Camelot 58EC 12 pt (14)	2.8 bcdefg	4.2 de	5.0 d	5.0 c	33.3 abc	100.0 d	100.0 c
Fenamidone 500SC 4 fl oz (14)	1.8 abcde	3.7 cde	5.0 d	5.0 c	50.0 abc	100.0 d	100.0 c
Fenamidone 500SC 8 fl oz (14)	1.8 abcde	4.2 de	5.0 d	5.0 c	66.7 abc	100.0 d	100.0 c
Fenamidone 500SC 16 fl oz (14)	2.7 abcdefg	4.5 de	4.5 cd	5.0 c	83.3 bc	83.3 cd	100.0 c
Pristine 38WG 4 oz (14)	2.5 abcdefg	5.0 e	5.0 d	5.0 c	100.0 c	100.0 d	100.0 c
Pristine 38WG 8 oz (14)	2.5 abcdefg	4.7 de	5.0 d	5.0 c	100.0 c	100.0 d	100.0 c
Pristine 38WG 16 oz (14)	3.0 cdefg	4.7 de	5.0 d	5.0 c	83.3 bc	100.0 d	100.0 c
Segway 400SC 1.5 fl oz (14)	2.0 abcdef	4.8 de	5.0 d	5.0 c	83.3 bc	100.0 d	100.0 c
Segway 400SC 3 fl oz (14)	2.3 abcdefg	4.8 de	5.0 d	5.0 c	83.3 bc	100.0 d	100.0 c
Segway 400SC 6 fl oz (14)	1.5 abcd	3.0 bcd	3.0 bc	4.8 c	50.0 abc	50.0 bc	83.3 c
Stature DM 50WP 12.8 oz (14)	1.2 ab	2.0 abc	1.0 a	1.0 a	0.0 a	0.0 a	0.0 a
Subdue MAXX 21.3EC 1 fl oz (14)	1.0 a	2.0 abc	3.7 cd	5.0 c	16.7 ab	66.7 cd	100.0 c
Truban 30WP 6 oz (14)	1.0 a	1.2 ab	1.0 a	1.5 a	0.0 a	0.0 a	0.0 a
Untreated non-inoculated	1.0 a**	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a	0.0 a
Untreated inoculated	3.8 g	5.0 e	5.0 d	5.0 c	100.0 c	100.0 d	100.0 c

* Not an IR-4-sponsored experiment. F&N Tests vol 59:OT009.

[z]Rated on a scale of 1 to 5, where 1=healthy to 5=dead.

[y] Column means with a letter in common or with no letter are not significantly different (Tukey's Studentized Range; *P*=0.05).

Table 31. * Evaluation of fungicides in managing *Phytophthora drechsleri* root rot of poinsettia (*Euphorbia pulcherrima*) 'Freedom Red', Hausbeck, MI, 2003.

Treatment and rate/100 gal	Height (in.)	Health[z]			Death (%)		
	6/12	6/12	6/19	6/26	6/12	6/19	6/26
Segway 400SC 0.75 fl oz	3.1 bc [z]	4.3 b	5.0 b	5.0 b	50.0	100.0 b	100.0 b
Segway 400SC 1.5 fl oz	3.7 abc	1.5 a	4.3 b	4.3 b	0.0	83.3 b	83.3 b
Stature DM 50WP 12.8 oz	3.9 ab	1.7 a	1.7 a	1.7 a	16.7	16.7 a	16.7 a
Subdue MAXX 21.3EC 1 fl oz	4.3 a	1.0 a	1.8 a	1.7 a	0.0	16.7 a	16.7 a
Truban 30WP 6 oz.	3.9 ab	1.3 a	2.0 a	1.7 a	0.0	16.7 a	16.7 a
Untreated non-inoculated	2.9 c	1.0 a	1.0 a	1.0 a	0.0	0.0 a	0.0 a
Untreated inoculated	3.6 abc	4.3 b	5.0 b	5.0 b	50.0	100.0 b	100.0 b

* Not an IR-4-sponsored experiment. F&N Tests vol 59:OT010.

[z] Rated on a scale of 1-5, where 1=healthy to 5=dead.

[z] Column means with a letter in common, or with no letter, are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 32. Efficacy of drench treatments on *Phytophthora drechsleri* Root Rot on Poinsettia (*Euphorbia pulcherrima*) 'Freedom Red', Hausbeck, MI, 2005.

Treatment	Rate Per 100 Gal	Plant Health (1-10)			Plant Death (%)	
		4/05	4/13	4/20	4/13	4/20
Aliette WDG	12.8 oz	1.8 a	5.7 abc	7.2 bcd	33.3	50.0 ab
Alude 2L	12.7 fl oz	2.2 a	3.5 ab	6.3 a-d	16.7	16.7 ab
Biophos	1 gal	1.0 a	1.3 a	4.0 abc	0.0	0.0 a
Insignia 20 EG	8 oz	2.8 a	5.2 abc	6.3 a-d	33.3	33.3 ab
	16 oz	3.0 a	7.5 bc	8.3 cd	33.3	66.7 bc
Segway 400SC	3 fl oz	1.0 a	1.2 a	2.3 ab	0.0	0.0 a
	6 fl oz	2.5 a	2.8 a	2.8 bc	16.7	16.7 ab
Stature DM 50WP	3.2 oz	2.2 a	2.7 a	2.5 ab	16.7	16.7 ab
	6.4 oz	1.0 a	1.0 a	1.0 a	0.0	0.0 a
Terrazole 35 WP	10 oz	1.0 a	1.0 a	1.0 a	0.0	0.0 a
Untreated non-inoculated		1.0 a	1.0 a	1.0 a	0.0	0.0 a
Untreated inoculated		6.2 b	9.0 c	10.0 d	66.7	100 c

Treatments applied as drench immediately after transplanting 29 March. Plant health rated on a scale of 1 to 10, where 1= healthy and 10=dead.

Column means with a letter in common are not significantly different (Student-Newman-Keuls; P=0.05).

Table 33. Efficacy of drench treatments on *Phytophthora drechsleri* Root Rot on Poinsettia (*Euphorbia pulcherrima*) 'Freedom Red', Hausbeck, MI, 2007.

Treatment (active ingredient)	Rate per 100 gal	Plant health*			Plant death	
		6/29	7/18	8/01	7/18	8/01
Adorn 4FL (fluopicolide)	1 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
	2 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Alude (potassium phosphate)	12.7 fl oz	1.0 a	2.3 ab	2.3 ab	33.3 abc	33.3 ab
FenStop SC (fenamidone)	7 fl oz	1.0 a	2.2 ab	2.3 ab	16.7 ab	33.3 ab
Heritage 50WG (azoxystrobin)	0.9 oz	3.2 cd	5.0 d	5.0 c	100.0 d	100.0 c
	1.8 oz	1.5 ab	3.3 bc	3.7 bc	50.0 bc	66.7 bc
Insignia 20WG (pyraclostrobin)	8 oz	1.8 ab	3.7 bcd	4.7 c	66.7 cd	66.7 bc
Segway 400SC (cyazofamid)	3 fl oz	1.0 a	1.2 a	1.2 a	0.0 a	0.0 a
	6 fl oz	2.2 bc	2.3 ab	2.3 ab	33.3 abc	33.3 ab
Stature DM 50WP (dimethomorph)	6.4 oz	1.5 ab	1.7 a	1.7 a	16.7 ab	16.7 a
Subdue MAXX EC (mefonaxam)	1 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Terrazole 35WP	8 oz	1.0 a	1.5 a	1.7 a	0.0 a	16.7 a
ZeroTol 27%	250 fl oz	3.5 d	5.0 d	5.0 c	100.0 d	100.0 c
Untreated uninoculated		1.0 a**	1.0 a	1.0 a	0.0 a	0.0 a
Untreated inoculated		1.8 ab	4.0 cd	4.3 c	66.7 cd	66.7 bc

*Plant health rating is 1 to 5; 1=healthy, 2=chlorosis/stunting, 3=minor wilting, 4=severe wilting, 5=plant death.

**Column means with a letter in common are not significantly different (Fisher's protected LSD; *P*=0.05).

Table 34. * Evaluation of a biopesticide and fungicides in managing *Phytophthora drechsleri* crown rot of calibrachoa (*Calibrachoa hybrida*) 'Spring Fling Yellow', Hausbeck, MI, 2003.

Treatment and rate/100 gal, applied at 14-day intervals unless otherwise noted	Plant Health [z]			Death (%)	
	5/16	5/23	5/30	5/23	5/30
Camelot 58EC 3.0 pt	1.0 a [y]	1.0 a	1.0 a	0.0 a	0.0 a
Camelot 58EC 6.0 pt	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Camelot 58EC 12.0 pt	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Fenamidone 500SC 4.0 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Fenamidone 500SC 8.0 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Fenamidone 500SC 16.0 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Pristine 38WG 4.0 oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Pristine 38WG 8.0 oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Pristine 38WG 16.0 oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Segway 400SC 1.5 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Segway 400SC 3.0 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Segway 400SC 6.0 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Stature DM 50WP 12.8 oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Subdue MAXX 21.3EC 1.0 fl oz	3.0 a	5.0 c	5.0 b	100.0 c	100.0 b
Truban 30WP 6.0 oz	2.7 a	3.0 abc	3.0 ab	50.0 abc	50.0 ab
Untreated non-inoculated	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a
Untreated inoculated	2.3 a	2.3 ab	3.5 b	33.3 ab	50.0 ab

* Not an IR-4-sponsored experiment. F&N Tests vol 59:OT017.

[z]Rated on a scale of 1 to 5, where 1=healthy to 5=dead.

[y] Column means with a letter in common are not significantly different (Tukey's Studentized Range; *P*=0.05).

Table 35. Efficacy of Foliar and Soil Treatments on *Phytophthora drechsleri* Root Rot on Gerbera 'Yellow Revolution', Benson, NC, 2009.

Treatment	Rate per 100 gal	Application Method	Foliar Rating (1-4)				Top Weight 59 DAT	Root Rot (1-5) 59 DAT
			28 DAT	38 DAT	47 DAT	59 DAT		
Adorn	60 ml	Drench	1.6 de	1.8 ef	1.8 de	1.8 de	14 a	2.0 e
	120 ml	Drench	1.0 e	1.0 f	1.0 e	1.0 e	14 a	1.0 e
Agri-fos	64 fl oz	Spray*	1.9 cde	2.5 de	3.0 abc	3.3 abc	4 bcd	4.1 ab
Aliette	80 oz	Spray*	1.4 e	1.9 ef	2.1 cd	2.9 bc	5 bcd	3.8 abc
Alude	12.7 fl oz	Spray*	1.6 de	2.4 de	3.0 abc	3.6 ab	3 bcd	4.6 ab
BAS651	22.5 fl oz	Drench	1.0 e	1.0 f	1.0 e	1.0 e	14 a	1.0 e
	34 fl oz	Drench	1.0 e	1.0 f	1.0 e	1.0 e	12 a	1.1 e
BW240	6.0 oz	Drench*	3.1 ab	3.1 abcd	3.3 ab	3.8 ab	3 bcd	4.5 ab
Disarm	4 fl oz	Drench	2.4 bcd	2.6 cde	3.3 ab	3.6 ab	3 bcd	4.0 ab
	8 fl oz	Drench	2.6 bc	3.3 abcd	3.9 a	4.0 a	2 d	5.0 a
Fenstop	14.0 oz	Drench	1.0 e	1.0 f	1.0 e	1.4 e	13 a	1.3 de
Insignia	8.0 oz	Drench	3.0 ab	3.8 abc	3.9 a	4.0 a	2 d	5.0 a
Magellan	64 fl oz	Spray*	1.9 cde	2.8 bcde	3.0 abc	3.5 abc	3 bcd	4.3 ab
Pageant	12.0 oz	Drench	1.9 cde	2.1 def	2.5 bcd	2.6 cd	8 b	2.5 cd
Remedier (Tenet) (*Trichoderma*)	7.5 oz	Drench*	3.6 a	3.9 ab	4.0 a	4.0 a	2 d	5.0 a
Segway	6.0 oz	Drench	1.0 e	1.0 f	1.0 e	1.0 e	16 a	1.0 e
Stature SC	6.12 fl oz	Drench	1.8 cde	2.8 bcde	3.0 abc	3.3 abc	6 bc	3.8 abc
Subdue MAXX	1.0 fl oz	Drench	3.8 a	4.0 a	4.0 a	4.0 a	2 d	5.0 a
Taegro (*Bacillus subtilis*)	3.5 oz	Drench*	3.9 a	4.0 a	4.0 a	4.0 a	2 d	5.0 a
Tanos	12.0 oz	Drench	1.6 de	2.5 de	3.0 abc	3.0 bc	5 bcd	3.5 bc
Vital	64 fl oz	Spray*	1.6 ed	2.4 de	3.0 abc	3.3 abc	4 bcd	4.1 ab
Untreated Uninoculated			1.0 e	1.0 f	1.0 e	1.0 e	16 a	1.0 e
Untreated Inoculated			3.0 ab	3.8 abc	4.0 a	4.0 a	2 d	5.0 a

x Foliar rating: 1= healthy, 2 = some leaves wilted, some chlorosis, 3 = most leaves wilted, chlorosis, 4= crown rot, plant dead.

y Root rot rating: 1= healthy, 2= 25% or less roots necrotic, 3= 26 - 50% roots necrotic, 4= more than 50% necrotic, and 5= crownrot, plant dead.

z Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, *P*=0.05.

Phytophthora nicotianae/parasitica. From 2001 through 2012, 23 experiments were conducted on *Phytophthora nicotianae/parasitica* root rot. Of these, nine were sponsored by IR-4. Five different host systems were utilized: African violet (*Saintpaulia ionantha*), snapdragon (*Antirrhinum sp*.), spathiphyllum (*Spathiphyllum sp*.), Mexican cliff rose (*Purshia mexicana*), rhododendron (*Rhododendron sp.*), pansy (*Viola x wittrockiana*), vinca (*Catharanthus roseus*), and petunia (*Petunia x hybrida*).

The Adorn, Aliette, Alude, Biophos, Fenamidone, Insignia, Micora, and Subdue MAXX treatments provided the most consistent levels of control across the experiments (Table 36 - Table 38). Stature DM usually provided excellent control; however, it did not do well in the African violet system and two of Hausbeck's snapdragon experiments in 2003 which had considerable disease pressure. Segway consistently provided excellent control in the more recent experiments. In single experiments, Segway +

Alude effectively managed *P. nicotianae/parasitica*. The only two products which consistently performed poorly against this pathogen were Terrazole and Truban. See the following paragraphs for summaries of each experiment.

Benson conducted two experiments examinging the impact Stature DM has on *P. parasitica* infecting African violet (*Saintpaulia ionantha*). In both experiments, the Stature DM-treated plants exhibited the same level of disease as the untreated inoculated control (Table 39, Table 40).

For the control of *P. nicotianae* on Spathiphyllum, all treatments gave excellent efficacy with the exception of MultiGuard Protect (Table 41). Norman noted that in other experiments with a slow feed instead of a concentrated drench this treatment did provide acceptable efficacy.

Evans & Kratsch examined *P. parasitica* on a native species: Mexican cliff rose (*Purshia mexicana*). This species had not yet been domesticated for the ornamental trade and presented challenges in germination and even growth habit of the resulting seedlings. Most treatments provided some measure of control through 28 days after inoculation, although the level may not have been statistically different from the untreated inoculated controls (Table 42). By 56 days after inoculation, only Fenamidone at 14 fl oz per 100 gal, Stature DM at 28 fl oz per 100 gal, and Terrazole provided no efficacy.

Kratsch, in 2007, tested 16 products for *P. parasitica* control on Mexican cliff rose. Aliette, Seqay at 3 oz, Disarm, and Vital gave econtrols tatistically better than the noninoculated untreated control. Phytotoxicity was only observed with MultiGard (Table 43).

In 2007, both Becker and Benson examined *P. nicotianae* on several Rhododendron sp. In Becker's experiment, with three cultivars, there were differences in response based on cultivar for both number of dead plants and percent new roots (Table 44, Table 45). However, for all three cultivars there was no statistical difference in the number of dead plants between the inoculated and non-inoculated untreated plants. MultiGard elevated the number of dead plants for all three cultivars, although in *R. catawbiense* 'Boursault' only the 1000 ppm rate was statistically significant. For the percent of new roots, only R. 'Nova Zembla' provided statistical separation between the inoculated and non-inoculated untreated controls. In this cultivar, all but Actinovate, Adorn at 1 fl oz, and Insignia exhibited more new roots than the inoculated untreated control.

In Benson's experiment, most products provided good control according to a foliar rating scale of 1 to 4 (Table 46). The exceptions were Medallion, *Muscodor albus* and Remedier. However, when root rot was rated, Fenomen exhibited significant root damage even though the foliage had not yet started to show symptoms. Adorn, Aliette, Alude, Biophos, Disarm, Heritage, Insignia, Magellan, Micora (NOA 445610), Segway, and Vital provided good control with both foliar and root ratings equivalent to the noninoculated untreated controls. No phytotoxicity was observed with Adorn, Heritage, or Segway, the three products to be applied to un-inoculated plants.

Table 36. General summary of drench efficacy for *Phytophthora nicotianae/parasitica* root rot – Part 1.

Product	African Violet		Spathiphyllum	Purshia		Rhododendron		Snapdragon	
	Benson 2004	Benson 2004	Norman 2006	Evans/ Kratsch 2005	Kratsch 2007	Becker 2007	Benson 2007	*Hausbeck 2001	*Hausbeck 2001
Actinovate						-			
Adorn			++		+/-	+/-	++		
Aliette			++	+/-	++	+/-	++		
Alude					+/-		++		
Banol								+/-	
Biophos					+		++		
Curzate								+/-	
Disarm					++	+/-	++		
Fenamidone			++	++	+	+/-	++		
Heritage					+		++		
Insignia				+/-		-	++		
Magellan				+/-	+/-		++		
Medallion							-	+/-	-
Micora (NOA 446510)					+/-	+/-	++		
Muscodor albus					-		-		
MultiGuard			+/-		-	-			
Remedier							-		
Segway			++	+/-	++	+/-	++	+/-	
Stature				++	+/-	+/-		++	++
Subdue MAXX	-	-	++					+/-	++
Terrazole				+/-		+/-			
Truban					+/-				-
Vital				+/-	++		++		
ZeroTol								-	

[1] Rating Scale: ++ =clearly statistically equivalent or better than untreated non-inoculated and/or clearly statistically different than untreated inoculated; + = statistically different from untreated inoculated and untreated non-inoculated; +/- statistically equivalent to both untreated inoculated and untreated non-inoculated; - = statistically equivalent to untreated inoculated.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 37. General summary of drench efficacy for *Phytophthora nicotianae/parasitica* root rot – Part 2.

Product	Snapdragon										
	*Hausbeck 2002	*Hausbeck 2002	*Hausbeck 2003	*Hausbeck 2003	*Hausbeck 2004	*Hausbeck 2005	Hausbeck 2005	Hausbeck 2006	*Hausbeck 2006	*Hausbeck 2008	*Hausbeck 2008
Adorn								++		++	++
Aliette				++	++		-				
Alude					++		-			++	++
Banol		-									
Biophos					++	++	++			++	
Compass				-							
Curzate											
Fenamidone			-					++		++	++
Heritage				-						+	+
Insignia				-	++		++		++		
Micora (NOA 446510)								++		++	++
MultiGuard								-			
Segway		-	-	-	++	-	++	++			
Segway + Alude						++					
Stature			-	-	++	++	++	++	++	+	+/-
Subdue MAXX	+		++	++					++	++	++
Terrazole					-		-		++	-	-
Truban		-		-				-	+		

* Not an IR-4-sponsored experiment.

[1] Rating Scale: ++ =clearly statistically equivalent or better than untreated non-inoculated and/or clearly statistically different than untreated inoculated; + = statistically different from untreated inoculated and untreated non-inoculated; +/- statistically equivalent to both untreated inoculated and untreated non-inoculated; - = statistically equivalent to untreated inoculated.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 38. General summary of drench efficacy for *Phytophthora nicotianae/parasitica* root rot – Part 3.

Product	Pansy	Vinca	Petunia
	*Hausbeck 2011	*Beckerman 2011	*Hong 2012
A13836B	++		++
A14658C	++		
BAS 500 WU		++	
Fenstop			+
Heritage	+	++	
Micora (NOA 446510)	++		
Orvego	++		
Stature SC	++		
Subdue MAXX	++		

* Not an IR-4-sponsored experiment.

[1] Rating Scale: ++ =clearly statistically equivalent or better than untreated non-inoculated and/or clearly statistically different than untreated inoculated; + = statistically different from untreated inoculated and untreated non-inoculated; +/- statistically equivalent to both untreated inoculated and untreated non-inoculated; - = statistically equivalent to untreated inoculated.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Table 39. Efficacy of Stature DM drenches on *Phytophthora parasitica* Root Rot on African Violet (*Saintpaulia ionantha*) – Test 1, Benson, NC, 2004.

Treatment	Rate per 100 gal	Foliar Rating[1]		Top Dry Weight (g)	Root Rating[2]	Phytotoxicity
		5/21	5/26		5/28	5/26
Stature DM	6.4 oz	3.7 a	4 a	1 b	5 a	0 a
	12.4 oz	3.1 ab	3.5 a	4.3 b	4.3 a	0 a
	25.6 oz	2.2 bc	3.6 a	3.9 b	4.3 a	0 a
Untreated inoculated	--	4 a	4 a	1 b	5 a	0 a

Plants were retreated once at 14 d (5/4/04 and 5/18/04).

[1] Foliar rating was 1= healthy, no disease, 2=slight infection, 3=severe necrosis, 4=dead plant.

[2] Root rating was on a scale of 1 to 5 where 1=healthy, 2=fine root necrosis, 3=coarse roots necrotic, 4=crown rot, 5=dead plant.

[3]Means within same column followed by the same letter are not different by Waller-Duncan K-ration P=0.05.

Table 40. Efficacy of Stature DM drenches on *Phytophthora parasitica* Root Rot on African Violet (*Saintpaulia ionantha*) – Test 2, Benson, NC, 2004.

Treatment	Rate per 100 gal	Foliar Rating[1]			Root Rating[2]	Top Dry Weight (g)	Phytotoxicity
		7/9/04	7/16/04	8/19/04	8/19/04		8/19/04
Stature DM	6.4 oz	2.0 b	1.8 a	1.5 a	3.2 a	58.0 a	0 a
	12.4 oz	1.8 b	1.2 a	1.2 a	3.0 a	67.0 a	0 a
	25.6 oz	1.8 b	1.3 a	1.5 a	2.5 a	72.6 a	0 a
Untreated inoculated	--	3.0 a	2.3 a	2.7 a	3.8 a	50.0 a	0 a

Plants were retreated at 2 week intervals (6/18/04, 7/2/04, 7/16/04, and 7/28/04).

[1] Foliar rating was 1= healthy, no disease, 2=slight infection, 3=severe necrosis, 4=dead plant.

[2] Root rating was on a scale of 1 to 5 where 1=healthy, 2=fine root necrosis, 3=coarse roots necrotic, 4=crown rot, 5=dead plant.

[3]Means within same column followed by the same letter are not different by Waller-Duncan K-ration P=0.05.

Table 41. Percent Rotten Roots and Damaged Foliage of Spathiphyllum 'Patrice' after treatments for *Phytophthora parasitica* Root Rot, Norman, FL, 2006.

Treatment	Rate per 100 gal	Drench interval	Avg % rotten roots	LSD (0.05)	Avg % damaged foliage	LSD (0.05)
Adorn	3.0 fl oz	14 day	0	a	0	a
	6.0 fl oz	14 day	0	a	0	a
Aliette	12.8 fl oz	30 day	0	a	0	a
Fenamidone	7.0 fl oz	28 day	0.5	a	0.5	a
	14 fl oz	28 day	0	a	0	a
MultiGuard Protect (furfural)	500 ppm	7 day	54.5	b	33	b
	1000 ppm	7 day	71	c	62	c
Segway	3.0 fl oz	14 day	0	a	0	a
	6.0 fl oz	14 day	0	a	0	a
Subdue Maxx 2E	0.6 fl oz	60 day	0	a	0	a
Untreated non-inoculated			0	a	0	a
Untreated inoculated			60	b	58	c

Table 42. Efficacy of drench treatments on *Phytophthora parasitica* Root Rot on Mexican Cliff Rose (*Purshia mexicana*), Evans & Kratsch, UT, 2005.

Treatment[1]	Rate per 100 gal	Disease Severity[2,3] (1-4) Days following inoculation				
		0	14	28	42	56
Aliette WDG	10 oz	1.75	2.12 ab	2.37 ab	2.50	2.75 ab
Fenamidone	14 fl oz	1.25	1.37 ab	2.00 ab	2.37	3.50b
	28 fl oz	1.50	1.50 ab	1.37a	2.37	2.12 ab
Insignia	16 oz	1.00	2.00 ab	1.75 ab	2.00	3.12 ab
	40 oz	1.00	2.12 ab	3.50b	2.50	2.75 ab
Magellan*	8 fl oz	1.00	2.37 ab	2.25 ab	2.62	2.75 ab
Segway	1.5 oz	1.25	1.50 ab	2.75 ab	3.25	2.12 ab
	3.0 oz	1.00	2.25 ab	3.12 ab	2.62	3.00 ab
Stature DM 50WP	6.4 oz	1.00	1.75 ab	2.87 ab	3.62	2.62 ab
	12.8 oz	1.00	2.37 ab	1.25 a	3.62	3.75b
Terrazole 35 WP*	10 oz	1.00	2.75 ab	3.00 ab	3.37	3.87b
Vital 4L*	4 pt	1.25	1.25a	1.75 ab	2.37	2.75 ab
Untreated-non-inoculated		1.37	1.25a	2.12 ab	2.00	1.37a
Untreated-inoculated		1.25	3.12b	3.50b	3.75	4.00b

[1]Treatments applied as soil drench (woody ornamental protocol) at 28 day intervals (*), all other treatments at 30 day intervals.

[2]Disease severity rated on a 1-4 scale (1=no disease visible, 2=slight disease, 3=moderate to severe disease, 4=dead plant).

[3]Means in columns without letters are not significantly different whereas means in columns followed by common letters are not significantly different (Tukey's HSD comparison test).

Table 43. Efficacy of drench treatments on *Phytophthora parasitica* Root Rot on Mexican Cliff Rose (*Purshia mexicana*), Kratsch, UT, 2006.

Treatment (active ingredient) – Rate per 100 gal	Mean change in plant length (cm) over 56 days	Mean change in plant width (cm) over 56 days	Phytotoxicity Rating (56 DAI)[z] 0=none; 10=dead	Disease Rating (56 DAI) 1=no disease; 4=dead
Adorn 4FL (fluopicolide) – 30 ml	-1.05	0.38	0	3.0
Adorn 4FL (fluopicolide) – 60 ml	-0.35	0.20	0	2.5
Aliette (fosetyl AL) – 6.4 oz	1.95	0.35	0	2.0*[y]
Alude (phosphite) – 12.7 oz	3.98**[x]	0.38	0	2.5
Biophos (phosphite) – 64 fl oz	1.9	1.10	0	2.25
Disarm 480SC (fluoxystrobin) – 3 oz	2.75	0.45	0	2.13**
FenStar (fenamidone) – 7 oz	-1.2	-0.63**	0	2.38
FenStar (fenamidone) – 14 oz	-0.7	-0.18	0	2.5
Heritage (azoxystrobin) – 4 oz	1.08	0.40	0	2.5
Insignia (pyraclostrobin) – 8 oz	1.38	0.63	0	2.38
Magellan (phosphite) – 6 fl oz	3.65	0.75	0	2.38
MultiGuard (furfural) – 500 ppm	-0.93	-2.10*	8.2	3.25
MultiGuard (furfural) – 1000 ppm	1.1	-0.08	8.2	3.38
Muscodor albus – 7.5 g/L soil volume	1.15	0.13	0	2.75
NOA 446510 (mandipropamid) – 2 oz	0.78	0.20	0	2.63
NOA 446510 (mandipropamid) – 8 oz	-1.3	-0.53**	0	2.88
Segway (cyazofamid) – 3.0 oz	-0.9	0.10	0	1.88*
Segway (cyazofamid) – 6.0 oz	-0.2	-0.73**	0	2.75
Stature DM (dimethomorph) – 12.8 oz	2.75	-0.55**	0	2.5
Truban (terrazole) – 8 oz	0.18	0.35	0	2.38
Vital (phosphite) – 4 pints	5.68**	0	0	2.0*
Untreated uninoculated	1.35	0.25	0	2.25
Untreated inoculated	0.73	1.08	0	2.88

[x] ** indicates pairwise difference between chemical treatment and untreated inoculated control at $P < 0.10$.

[y] * indicates pairwise difference between chemical treatment and untreated inoculated control at $P < 0.05$.

[z] DAI = Days after inoculation.

Table 44. Efficacy of foliar treatments on *Phytophthora nicotianae* infesting several rhododendron species – Number of Dead Plants, Becker, NY, 2007c.

Treatment (active ingredient)	Rate per 100 gal	Number of Dead Plants					
		'Nova zembla'		'Catawbiense alba'		'Catawbiense boursault'	
Actinovate 100SP (*Streptomyces lydicus*)	10 oz	1.00	bcd	0.40	bc	0.20	b
Adorn 4SC (fluopicolide)	1 fl oz	1.80	bc	0.60	bc	0.40	b
Adorn 4SC (fluopicolide)	2 fl oz	0.60	cd	1.00	bc	0.40	b
Aliette 75WP (fosetyl AL)	12.8 oz	1.20	bcd	0.80	bc	0.80	b
Disarm 480SC (fluoxastrobin)	3 fl oz	1.20	bcd	0.80	bc	0.40	b
FenStop 500SC (fenamidone)	7 fl oz	0.80	bcd	0.60	bc	0.00	b
FenStop 500SC (fenamidone)	14 fl oz	0.60	cd	0.60	bc	0.40	b
Insignia 20WP (pyraclostrobin)	8 oz	0.40	d	0.40	bc	0.40	b
MultiGuard 8.68EC (furfural)	500 ppm	3.00	a	1.60	b	1.40	b
MultiGuard 8.68EC (furfural)	1000 ppm	3.00	a	2.40	a	2.20	a
Muscodor albus 100GR	3.5 g/plant	0.40	d	0.20	c	0.60	b
Muscodor albus 100GR	7.5 g/plant	0.20	d	0.00	c	0.40	b
NOA 44510 250SC (mandipropamid)	2 fl oz	0.20	d	0.20	c	1.00	b
NOA 44510 250SC (mandipropamid)	8 fl oz	0.60	cd	0.80	bc	0.60	b
Segway 300SC (cyazofamid)	3 fl oz	2.00	b	0.20	c	0.40	b
Segway 300SC(cyazofamid)	6 fl oz	0.80	bcd	0.80	bc	0.20	b
Stature DM 50WP	12.8 oz	1.00	bcd	0.40	bc	0.80	b
Terrazole 35WP (etridiazole)	8 oz	0.60	cd	1.00	bc	0.60	b
Non-inoculated		0.60	cd	0.60	bc	0.20	b
Inoculated		0.80	bcd	0.80	bc	0.40	b
LSD (*P*=0.10)		0.701		0.641		0.771	
Standard Deviation		0.664		0.607		0.730	

Means followed by the same letter do not differ significantly (*P*=0.10, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment *P*(F) is significant at mean comparison OSL

Table 45. Efficacy of foliar treatments on *Phytophthora nicotianae* infesting several rhododendron species – Percent New Roots, Becker, NY, 2007c.

Treatment (active ingredient)	Rate per 100 gal	Percent New Roots					
		'Nova zembla'		'Catawbiense alba'		'Catawbiense boursault'	
Actinovate 100SP (*Streptomyces lydicus*)	10 oz	21.63	b	21.40	b	21.73	a
Adorn 4SC (fluopicolide)	1 fl oz	18.62	b	19.00	b	22.50	a
Adorn 4SC (fluopicolide)	2 fl oz	42.67	ab	19.26	b	27.40	a
Aliette 75WP (fosetyl AL)	12.8 oz	45.08	ab	23.37	b	29.30	a
Disarm 480SC (fluoxastrobin)	3 fl oz	43.83	ab	29.50	ab	32.00	a
FenStop 500SC (fenamidone)	7 fl oz	31.63	ab	17.70	b	36.83	a
FenStop 500SC (fenamidone)	14 fl oz	35.17	ab	15.07	b	21.53	a
Insignia 20WP (pyraclostrobin)	8 oz	24.40	b	27.83	ab	34.67	a
MultiGuard 8.68EC (furfural)	500 ppm			14.03	b	13.75	a
MultiGuard 8.68EC (furfural)	1000 ppm			15.27	b	22.50	a
Muscodor albus 100GR	3.5 g/plant	26.50	ab	18.73	b	15.43	a
Muscodor albus 100GR	7.5 g/plant	40.67	ab	17.67	b	30.47	a
NOA 44510 250SC (mandipropamid)	2 fl oz	40.50	ab	25.17	ab	26.43	a
NOA 44510 250SC (mandipropamid)	8 fl oz	37.17	ab	19.43	b	22.90	a
Segway 300SC (cyazofamid)	3 fl oz	42.67	ab	26.33	ab	35.40	a
Segway 300SC(cyazofamid)	6 fl oz	51.53	ab	30.40	ab	38.00	a
Stature DM 50WP	12.8 oz	56.33	ab	28.90	ab	33.40	a
Terrazole 35WP (etridiazole)	8 oz	45.67	ab	28.23	ab	39.67	a
Non-inoculated		65.50	a	44.83	a	24.33	a
Inoculated		25.73	b	27.73	ab	37.17	a
LSD (*P*=0.10)		20.331		11.541		16.622	
Standard Deviation		19.238		10.920		15.728	

Means followed by the same letter do not differ significantly (*P*=0.10, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment *P*(F) is significant at mean comparison OSL

Table 46. Efficacy of foliar and drench treatments on *Phytophthora nicotianae* infesting several rhododendron species, Benson, NC, 2007.

Product	Rate(s) per 100 gal	Application Method	Foliar disease rating (1-4) [x]				Dec 3, 2007	
			11/01	11/08	11/20	12/03	Top wt (g)	Root Rot [y]
Adorn (fluopicolide)	30 ml	Drench	1.3 b	1.0 d	1.0 d	1.3 c	47.8 cd	2.4 de
Adorn (fluopicolide)	60 ml	Drench	1.0 b	1.0 d	1.0 d	1.0 c	61.7 abc	1.8 efgh
Aliette (fosetyl-AL)	80 oz	Spray	1.0 b [z]	1.0 d	1.0 d	1.1 c	58.4 bc	1.4 fgh
Alude	12.7 fl oz	Spray	1.0 b	1.0 d	1.0d	1.0 c	68.0 ab	1.0 h
Biophos	64 fl oz	Spray	1.0 b	1.0 d	1.1d	1.3 c	60.8 abc	1.6 efgh
Disarm (fluoxastrobin)	3 oz	Drench	1.1 b	1.1 cd	1.1 d	1.0 c	59.3 bc	1.1 gh
Fenomen (fenamidone)	14 fl oz	Drench	1.3 b	1.1 cd	1.5 cd	1.4 c	48.2 cd	3.0 cd
Heritage (azoxystrobin)	0.9 oz	Drench	1.0 b	1.o d	1.3 d	1.0 c	61.6 abc	1.4 fgh
Heritage (azoxystrobin)	1.8 oz	Drench	1.0 b	1.0 d	1.0 d	1.0 c	66.1 ab	1.5 fgh
Heritage + Subdue	1.8 oz + 1 fl oz	Drench	1.0 b	1.0 d	1.1 d	1.0 c	60.5 abc	1.5 fgh
Insignia (pyraclostrobin)	8 oz	Drench	1.0 b	1.0 d	1.1 d	1.0 c	60.9 abc	1.6 efgh
Magellan	12 fl oz	Spray	1.0 b	1.0 d	1.3 d	1.4 c	58.3 bc	1.8 efgh
Medallion (fludioxanil)	2.0 oz	Drench	1.0 b	1.3 cd	1.9 bc	2.5 ab	38.0 de	3.3 bc
*Muscador albu*s	7.5 g/L	Mix-in	1.9 a	2.4 a	2.9 a	2.8 ab	16.7 f	4.1 a
NOA 446510 (mandipropamid)	8 fl oz	Drench	1.0 b	1.0 d	1.0 d	1.1 c	74.3 a	1.1 gh
Remedier	2 oz	Drench	1.4 b	1.8 b	2.4 ab	2.4 b	23.6 ef	3.5 abc
Segway (cyazofamid)	3.0 fl oz	Drench	1.0 b	1.0 d	1.0 d	1.4 c	58.9 bc	1.9 efg
Segway (cyazofamid)	6.0 fl oz	Drench	1.0 b	1.0 d	1.0 d	1.0 c	61.1 abc	2.0 ef
Subdue MAXX (mefonaxam)	1.0 fl oz	Drench	1.0 b	1.0 d	1.0 d	1.0 c	61.1 abc	1.3 fgh
Vital	64 fl oz	Spray	1.1 b	1.0 d	1.3 d	1.0 c	61.8 abc	1.4 fgh
Inoculated Untreated	--		1.1 b	1.5 bc	2.3 b	3.1 a	24.4 ef	3.9 ab
Uninfested Untreated	--		1.0 b	1.0 d	1.0 d	1.1 c	65.3 ab	1.4 fgh
Uninfested Cyazofamid	6.0 oz	Drench	1.0 b	1.0 d	1.0 d	1.0 c	61.8 abc	1.4 fgh
Uninfested Heritage	1.8 oz	Drench	1.1 b	1.0 d	1.1 d	1.0 c	66.3 ab	1.4 fgh
Uninfested Adorn	60 ml	Drench	1.0 b	1.0 d	1.0 d	1.0 c	61.4 abc	1.5 fgh

In 2002, Hausbeck conducted 2 experiments to test the efficacy level of several products to manage *P. nicotianae* on snapdragon (*Antirrhinum majus*). The level of disease pressure was severe in both experiments. In the first experiment (Table 47), all of the untreated inoculated plants died by the second reading date, Apr 17. Similarly, in the second experiment (Table 48, Table 49), all of the untreated inoculated plants were dead by the first observation date, Jun 7. Untreated, uninoculated plants remained healthy throughout in both experiments. In the first experiment, none of the treatments prevented plant death by April 14, but Stature DM (equivalent to Acrobat 50WP) did have significantly taller plants on Apr 7th as did Actinovate Plus, and the combinations of Subdue MAXX plus Actigard and Subdue MAXX plus Auxigro.In the second experiment, of the treatments currently available to growers, only Stature DM at 25.6 oz per 100 gal (Acrobat) and Subdue MAXX at 1 fl oz per 100 gal reduced the plant deathpercentage.

In 2002, Hausbeck also conducted two simultaneous experiments on *P. nicotianae* infecting snapdragon (*Antirrhinum majus*). In Test 1 (Table 50), a Subdue MAXX rate range (0.25 to 3 fl oz per 100 gal) was examined. In Test 2 (Table 51), Banol, Banrot, Segway (Ranman), and Truban were compared. Subdue MAXX delayed the onset of plant death with increasing rates providing longer time periods until plant death. In Test 2, none of the treatments completely prevented plant death, but Banol and Truban did have significantly less plant death than Banrot and Segway (Ranman) on Jun 12. This difference disappeared by Jun 17.

In 2003, Hausbeck ran two simultaneous experiments comparing several products to manage *P. nicotianae* on snapdragon (*Antirrhinum majus*). Disease pressure from *P. nicotianae* was severe in both experiments. In the first experiment (Table 52), Subdue MAXX was the only treatment significantly better than the untreated inoculated plants for both plant health (rating=1.0; 1=healthy to 5=dead) and plant death (0%) assessments. Fenamidone at the highest rate (16 fl oz) limited plant death to 66.7%. Four treatments limited plant death to 83.3%: Segway SC 1.5 fl oz, Fenamidone 4 fl oz, Stature DM, and Truban.

In the second experiment (Table 53), only Aliette and Subdue Maxx provided excellent efficacy. Several treatments (Endura, Heritage, Insignia, Junction, Kocide 2000, Stature DM, Segway, and Truban) reduced plant death percentage to between 33.3% and 83.3%, but this was not significantly different from the untreated inoculated control.

In 2004 Hausbeck conducted a single experiment examining *P. nicotianae* on snapdragon (*Antirrhinum majus*). While the untreated inoculated control did reach 100% death by the final reading, this was achieved several weeks later after inoculation than the 2003 experiments (Table 54). Fenamidone (7 and 14 fl oz) and the low rate of Segway (3 fl oz) completely prevented plant death. Phostrol also suppressed plant death, however, some wilting was observed (plant health 1.5). The high rate of Captan, Segway (12 fl oz), and Stature DM performed well and limited plant death to <25%. Subdue MAXX prevented plant death at the Jul 30 rating, however, 62.5% of the plants died by the Aug 16 rating indicating that a shorter application interval than 42 days may be warranted. Aliette, Banol, Curzate, Kocide 2000, and Terrazole did not provide effective disease control in this experiment.

In 2005, Hausbeck conducted two experiments on *P. nicotianae* infecting snapdragon (*Antirrhinum majus*). In the first, disease pressure was not as high as in previous experiments with the untreated inoculated control only reaching 90% mortality (Table 55). The best treatments were Biophos and the high combinations rates of Segway plus Alude. Stature DM was also statistically better than the untreated inoculated control. In the second experiment, Hausbeck compared drench applications of several products (Table 56, Table 57). Disease pressure was high in this experiment with the untreated inoculated controls reaching 100% mortality at the first reading on Apr 26. The best efficacy was achieved with Insignia (16 oz per 100 gal) and Biophos (1 gal per 100 gal) which completely prevented plant death throughout the experiment. Segway (3 and 6 fl oz per 100 gal) and Stature DM (6.4 oz per 100 gal) were effective in controlling infection although not completely preventing plant death. Terrazole did not provide effective control.

In 2006, Hausbeck conducted two experiments with *P. nicotianae* on snapdragon (*Antirrhinum majus*). Disease pressure was moderate in the first test with 50% of the untreated plants dead by the second rating date, Jun 1 (Table 58, Table 59). Fenamidone at 7 fl oz per 100 gal, Micora (NOA 446510) at 8.2 fl oz per 100 gal, Adorn, and V-10162 completely prevented plant death at the final rating date. The other treatments, with the exception of MultiGuard and Truban, significantly limited plant death at the final rating date. No injury from any of the treatments was observed. In the second test, Insignia, Stature, Subdue MAXX and Terrazole provided excellent control of a severe disease pressure; Truban was less effective (Table 60).

In 2008, Hausbeck conducted two experiments with *P. nicotianae* on snapdragon (*Antirrhinum majus*). Fungicide drenches were applied on Jul 18, and plants inoculated on Jul 20. In the first test, plants treated with Mandipropamid, Adorn, Biophos, FenStop, Alude and Subdue MAXX completely prevented plant death from a severe disease pressure (Table 61). Treatments that received plant health ratings statistically similar to the untreated uninoculated control included Heritage (1.8 oz), Mandipropamid, Adorn (both rates), Biophos, FenStop, Alude, and Subdue MAXX. Terrazole-treated plants had a 50% mortality rate and the health rating was not significantly different from the inoculated control on Aug 4. In the second test, Mandipropamid, Adorn (alone or as a tank mix), FenStop, Alude and Subdue MAXX completely prevented plant death from a severe disease pressure and were not statistically different from the untreated uninoculated control (Table 62). Terrazole- treated plants had a 50% plant death rate and the health rating was not statistically different from the untreated inoculated plants. No phytotoxicity was observed for any treatment.

Table 47. * Evaluation of registered and unregistered fungicides and biological agents in managing *Phytophthora nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Montego Mix', Hausbeck, MI, 2002.

Treatment and rate/liter, applied at 28-day intervals unless otherwise noted	Inoculated plant height (cm)			Uninoculated			
				Plant height (cm)		Plant death (%)	
	4/10	4/17	4/24	4/10		4/10	4/17
Auxigro 58.4WP 0.07 g	9.2 [z]	11.6	15.3	7.2	cdef	16.7	100.0 b
Acrobat 50WP 0.14 g	9.1	11.2	15.4	9.8	a	0.0	100.0 b
Actigard 50WG 0.07 g	9.5	12.5	16.3	7.8	bcdef	16.7	100.0 b
Actinovate Plus/M 0.14 g (7-day)	9.7	11.7	16.5	8.7	bcde	33.3	100.0 b
Actinovate Plus/M 0.30 g (7-day)	9.3	11.6	16.8	9.2	bcd	50.0	83.3 b
Actino-Iron 2.3 kg/0.8 cu meter	9.2	11.0	15.4	8.3	bcde	0.0	100.0 b
Actino-Iron 4.6 kg/0.8 cu meter	9.6	12.6	18.2	8.3	bcdef	66.7	100.0 b
Banol 6EC 2.3 ml	9.1	11.0	14.7	7.7	bcdef	16.7	100.0 b
Curzate 50DF 0.07 g	10.2	12.6	16.7	7.9	bcdef	0.0	100.0 b
Medallion 50WP 0.14 g	9.2	11.9	16.4	7.2	bcdef	33.3	100.0 b
Mycostop 0.04 g	9.5	12.8	16.6	5.4	f	50.0	100.0 b
PlantShield 0.9 g	8.5	11.8	17.7	7.0	def	0.0	100.0 b
Primastop 0.5% v/v	9.5	13.2	16.5	6.5	ef	16.7	100.0 b
Segway 4SC 0.1 ml (7-day)	9.5	12.2	17.5	7.3	bcdef	0.0	100.0 b
Segway 4SC 0.2 ml (7-day)	9.3	12.1	17.8	7.0	def	16.7	100.0 b
Subdue MAXX 21.3EC 0.08 ml	9.7	13.1	16.7	8.1	bcdef	0.0	100.0 b
Subdue MAXX 21.3EC 0.08 ml + Auxigro 58.4WP 0.07 g	9.3	12.1	16.9	9.0	bcd	0.0	100.0 b
Subdue MAXX 21.3EC 0.08 ml + Actigard 50WG 0.07 g	9.1	12.0	15.7	9.2	bc	0.0	100.0 b
ZeroTol 19.5 ml	9.6	12.6	17.1	6.7	def	50.0	100.0 b
Untreated non-inoculated	8.8	11.9	15.6	9.4	b	0.0	0.0 a
Untreated inoculated	--	--	--	6.3	ef	33.3	100.0 b

* Not an IR-4-sponsored experiment. F&N Test vol 58: OT017.

[z] Column means with a letter in common or with no letter are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 48. * Evaluation of registered and unregistered fungicides and biological agents in managing *Phytophthora nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Liberty Classic Yellow' - Height, Hausbeck, MI, 2002.

Treatment and rate/100 gal, applied at 14-day intervals	Height (in.)					
	6/7	6/12	6/17	6/21	6/26	7/1
Acrobat MZ 69WP 1.75 lb.	9.1	12.6 ab	13.5	13.5 a	13.9 ab	14.4 ab
Acrobat MZ 69WP 3.5 lb.	8.8	12.0 abc	12.7	12.6 b	13.3 ab	13.8 ab
Acrobat MZ 69WP 7.0 lb.	8.5	11.4 abc	12.0	12.2 b	12.6 b	13.0 b
Acrobat 50WP 6.4 oz	8.1	10.2 c	--	--	--	--
Acrobat 50WP 12.8 oz	9.4	11.7 abc	13.6	--	--	--
Acrobat 50WP 25.6 oz	9.6	12.5 ab	14.1	14.2 a	15.1 a	15.5 a
Medallion 50WG 2.0 oz	8.2	--	--	--	--	--
Medallion 50WG 4.0 oz	8.6	--	--	--	--	--
Medallion 50WG 8.0 oz	8.9	--	--	--	--	--
Subdue MAXX 21.3EC 1.0 fl oz	9.4	13.0 a	14.4	14.6 a	15.4 a	16.0 a
Tattoo EC 20.0 fl oz	8.8	--	--	--	--	--
Tattoo EC 40.0 fl oz	9.1	11.7 abc	14.2	--	--	--
Tattoo EC 80.0 fl oz	9.4	12.4 ab	13.3	--	--	--
Truban 30WP 6.0 oz	8.8	10.6 bc	13.8	--	--	--
Untreated non-inoculated	9.1 [z]	12.5 ab	14.3	14.6 a	15.2 a	15.9 a
Untreated inoculated	8.7	--	--	--	--	--

* Not an IR-4-sponsored experiment. F&N Tests 58: OT018.

[z]Column means with a letter in common are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 49. * Evaluation of registered and unregistered fungicides and biological agents in managing *Phytophthora nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Liberty Classic Yellow' – Percent Plant Death, Hausbeck, MI, 2002.

Treatment and rate/100 gal, applied at 14-day intervals	Percent Plant Death									
	6/7		6/12		6/17		6/21		6/26	
Acrobat MZ 69WP 1.75 lb	12.5	ab	12.5	a	12.5	a	12.5	ab	12.5	ab
Acrobat MZ 69WP 3.5 lb	25.0	abc	25.0	a	25.0	a	25.0	abc	25.0	ab
Acrobat MZ 69WP 7.0 lb	37.5	a-d	37.5	ab	50.0	b	50.0	cd	62.5	c
Acrobat 50WP 6.4 oz	87.5	e	100.0	c	100.0	c	100.0	e	100.0	d
Acrobat 50WP 12.8 oz	75.0	de	87.5	c	100.0	c	100.0	e	100.0	d
Acrobat 50WP 25.6 oz	25.0	abc	62.5	bc	62.5	bc	62.5	de	62.5	c
Medallion 50WG 2.0 oz	100.0	e	100.0	c	100.0	c	100.0	e	100.0	d
Medallion 50WG 4.0 oz	100.0	e	100.0	c	100.0	c	100.0	e	100.0	d
Medallion 50WG 8.0 oz	100.0	e	100.0	c	100.0	c	100.0	e	100.0	d
Subdue MAXX 21.3EC 1.0 fl oz	0.0	a	0.0	a	0.0	a	37.5	bcd	37.5	bc
Tattoo EC 20.0 fl oz	100.0	e	100.0	b	100.0	c	100.0	e	100.0	d
Tattoo EC 40.0 fl oz	62.5	cde	87.5	c	100.0	c	100.0	e	100.0	d
Tattoo EC 80.0 fl oz	50.0	b-e	87.5	c	100.0	c	100.0	e	100.0	d
Truban 30WP 6.0 oz	62.5	cde	87.5	c	100.0	c	100.0	e	100.0	d
Untreated non-inoculated	0.0	a*	0.0	a	0.0	a	0.0	a	0.0	a
Untreated inoculated	100.0	e	100.0	c	100.0	c	100.0	e	100.0	d

* Not an IR-4-sponsored experiment. F&N Tests 58: OT018.

[z]Column means with a letter in common are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 50. * Evaluation of fungicides in managing *Phytophthora nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Liberty Classic Yellow', Test 1, Hausbeck, MI, 2002.

Treatment and rate per 100 gal, applied at 14-day intervals	Plant height (in.)					Plant death (%)			
	6/7	6/12	6/17	6/21	7/1	6/12	6/17	6/21	7/1
Subdue MAXX 21.3EC 0.25 fl oz	8.9 ab[z]	12.2[y]	14.6[x]	15.2[x]	--	12.5 a	75.0 b	75.0 b	100.0 c
Subdue MAXX 21.3EC 0.5 fl oz	10.1 a	13.2	14.7	15.2	--	0.0 a	0.0 a	12.5 a	100.0 c
Subdue MAXX 21.3EC 1.0 fl oz	9.9 a	12.9	14.3	14.5	15.0[w]	0.0 a	0.0 a	0.0 a	87.5 c
Subdue MAXX 21.3EC 2.0 fl oz	8.9 ab	12.4	14.0	15.0	16.0[v]	0.0 a	0.0 a	0.0 a	25.0 b
Untreated non-inoculated	9.1 ab	12.5	14.3	14.6	15.9	0.0 a	0.0 a	0.0 a	0.0 a
Untreated inoculated	8.4 b	--	--	--	--	100.0 b	100.0 c	100.0 b	100.0 c

* Not an IR-4-sponsored experiment.

[z] Column means with a letter in common or with no letter are not significantly different (Student-Newman-Keuls; *P*=0.05).

[y] Seven plants alive on this date.

[x] Two plants alive on this date.

[w] One plant alive on this date.

[v] Six plants alive on this date.

Table 51. * Evaluation of fungicides in managing *Phytophthora nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Liberty Classic Yellow', Test 2, Hausbeck, MI, 2002.

Treatment and rate/100 gal, applied at 14-day intervals	Height (in)			Death (%)			
	6/07	6/12	6/17	6/12		6/17	
Banol 6EC 30.0 fl oz	10.0 [z]	13.3[x]	13.4[w]	37.5	a	62.5	b
Banrot 40WP 8.0 oz	8.4	--	--	100.0	b	100.0	b
Ranman 40EC 3.0 fl oz	9.2	12.0 [y]	13.4 [y]	87.5	b	87.5	b
Truban 30WP 6.0 oz	8.8	12.3[x]	12.2[v]	37.5	a	75.0	b
Untreated non-inoculated	9.1	12.5	14.3	0.0	a	0.0	a
Untreated inoculated	9.2	--	--	100.0	b	100.0	b

* Not an IR-4-sponsored experiment. F&N Test vol 58: OT019.

[z] Column means with a letter in common or with no letter are not significantly different (Student-Newman-Keuls; *P*=0.05).

[y] One plant alive on this date.

[x] Five plants alive on this date.

[w] Three plants alive on this date.

[v] Two plants alive on this date.

Table 52. * Evaluations of fungicides in managing *Phytophthora nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Liberty Mix', Hausbeck, MI, 2003.

Treatment and rate/100 gal, applied at 14-day intervals	Plant health [z]		Plant death (%)	
	6/19	6/25	6/19	6/25
Camelot 58EC 3.0 pt	3.5 c [y]	5.0 b	0.0	100.0 b
Camelot 58EC 6.0 pt	3.7 c	5.0 b	0.0	100.0 b
Camelot 58EC 12.0 pt	3.8 c	5.0 b	0.0	100.0 b
Fenamidone 500SC 4.0 fl oz	3.2 c	4.3 b	0.0	83.3 b
Fenamidone 500SC 8.0 fl oz	4.0 c	5.0 b	0.0	100.0 b
Fenamidone 500SC 16.0 fl oz	2.5 abc	3.7 b	0.0	66.7 b
Pristine 38WG 4.0 oz	3.5 c	5.0 b	0.0	100.0 b
Pristine 38WG 8.0 oz	3.7 c	5.0 b	0.0	100.0 b
Pristine 38WG 16.0 oz	3.5 c	5.0 b	0.0	100.0 b
Segway 400SC 1.5 fl oz	3.2 c	4.3 b	16.7	83.3 b
Segway 400SC 6.0 fl oz	4.0 c	5.0 b	0.0	100.0 b
Stature DM 50WP 12.8 oz	2.8 bc	4.8 b	0.0	83.8 b
Subdue MAXX 21.3EC 1.0 fl oz	1.2 ab	1.0 a	0.0	0.0 a
Truban 30WP 6.0 oz	2.8 bc	4.3 b	0.0	83.3 b
Untreated non-inoculated	1.0 a	1.0 a	0.0	0.0 a
Untreated inoculated	3.8 c	5.0 b	0.0	100.0 b

* Not an IR-4-sponsored experiment. F&N Test vol 59: OT011.

[z] Rated on a scale of 1-5, where 1=healthy to 5=dead.

[y] Column means with a letter in common or no letter are not significantly different (Tukey's Studentized Range; P=0.05).

Table 53. * Evaluations of copper and strobilurin fungicides in managing *Phytophthora nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Liberty Mix', Hausbeck, MI, 2003.

Treatment and rate/100 gal, applied at 14-day intervals	Plant health [z]		Plant death (%)
	6/19	6/26	6/26
Aliette 80WDG 0.8 lb	1.7 ab [y]	1.5 ab	0.0 a
Camelot 58EC 3.0 pt	3.3 bc	5.0 c	100.0 c
Compass O 50WDG 0.5 oz	3.5 c	5.0 c	100.0 c
Compass O 50WDG 4.0 oz	3.5 c	5.0 c	100.0 c
Cuprofix Disperss 37DF 3.0 lb	3.5 c	5.0 c	100.0 c
Endura 70WDG 0.2 lb	3.3 bc	4.8 c	83.3 c
Endura 70WDG 0.6 lb	3.5 c	4.5 c	83.3 c
Heritage 50WG 4.0 oz	3.5 c	5.0 c	100.0 c
Heritage 50WG 8.0 oz	2.2 abc	4.3 c	83.3 c
Insignia 20WDG 0.2 lb	3.0 bc	5.0 c	100.0 c
Insignia 20WDG 0.5 lb	3.0 bc	4.3 c	83.3 c
Junction 61DF 3.0 lb	3.2 bc	4.5 c	83.3 c
Kocide 2000 54DF 2.0 lb	3.2 bc	4.3 c	83.3 c
Phyton-27 21.4EC 30.0 fl oz	3.3 bc	4.5 c	83.3 c
Segway 400SC 1.5 fl oz	2.7 abc	4.3 c	66.7 bc
Segway 400SC 3.0 fl oz	2.5 abc	4.3 c	83.3 c
Segway 400SC 6.0 fl oz	3.0 bc	4.3 c	83.3 c
Subdue MAXX 21.3EC 1.0 fl oz	1.7 ab	1.5 ab	0.0 a
Stature DM 50WP 12.8 oz	2.5 abc	3.5 bc	33.3 bc
Truban 30WP 6.0 oz	2.7 abc	4.7 c	66.7 bc
Untreated non-inoculated	1.0 a	1.0 a	0.0 a
Untreated inoculated	3.2 bc	5.0 c	100.0 c

* Not an IR-4-sponsored experiment. F&N Test vol 59: OT012.

[z] Rated on a scale of 1-5, where 1=healthy to 5=dead.

[y] Column means with a letter in common are not significantly different (Tukey's Studentized Range; *P*=0.05).

Table 54. * Evaluations of registered and unregistered fungicides for the control of Phytophthora *nicotianae* root rot of snapdragon (*Antirrhinum majus*) 'Floral Showers White', Hausbeck, MI, 2004.

Treatment	Rate per 100 gal	Application Interval (days)	Plant health [z]	Plant death %)		
			8/16	7/19	7/30	8/16
Aliette 80WDG	12 oz	28	4.9 c [y]	0.0 a	50.0 abc	87.5 c
Banol 6EC	30 fl oz	28	4.5 c	0.0 a	87.5 c	87.5 c
Captan 80WDG	2.5 lb	14	2.0 ab	0.0 a	12.5 a	25.0 ab
Curzate 60DF	3 oz	14	5.0 c	37.5 bc	87.5 c	100.0 c
Curzate 60DF	10 oz	14	4.9 c	50.0 c	75.0 c	87.5 c
Fenamidone 500SC	7 fl oz	28	1.0 a	0.0 a	0.0 a	0.0 a
Fenamidone 500SC	14 fl oz	28	1.0 a	0.0 a	0.0 a	0.0 a
Kocide 2000 T/N/O 54DF	3 lb	14	3.5 bc	0.0 a	25.0 ab	62.5 bc
Phostrol 6.69SC	72 fl oz	28	1.5 ab	0.0 a	0.0 a	0.0 a
Segway 400SC	3 fl oz	14	1.0 a	0.0 a	0.0 a	0.0 a
Segway 400SC	12 fl oz	14	1.5 ab	0.0 a	0.0 a	12.5 ab
Stature DM 50WP	12.8 oz	14	1.5 ab	0.0 a	12.5 a	12.5 ab
Subdue MAXX 21.3EC	1 fl oz	42	3.5 bc	0.0 a	0.0 a	62.5 bc
Terrazole 35WP	10 oz	28	4.5 c	0.0 a	50.0 abc	87.5 c
Untreated inoculated			5.0 c	12.5 ab	87.5 c	100.0 c

* Not an IR-4-sponsored experiment. F&N Test vol 60: OT006.

[z] Health was rated on a scale of 1 to 5; where 1=health, 2 to 4=various stages of wilting, and 5=dead.

[y]Column means with a letter in common are not significantly different (Tukey's Studentized Range Test, *P*=0.05).

Table 55. * Evaluations of registered and unregistered fungicides for the control of Phytophthora root rot of snapdragon (*Antirrhinum majus*) 'White', Hausbeck, MI, 2005.

Treatment and rate per 100 gal	Plant Health [z]			Percent Death		
	5/27	6/02	6/09	5/27	6/02	6/09
Biophos 128 fl oz	1.2 a	1.3 a	2.1 a	0.0 a	0.0 a	10.0 a
Insignia (BAS 500) 20EG 16 oz	3.9 d [y]	4.5 c	4.5 b	40.0 b	80.0 b	80.0 b
Polyram 80DF 2 lb	1.3 a	2.2 ab	2.3 a	0.0 a	10.0 a	10.0 a
Segway 400SC 3 fl oz	3.3 cd	4.1 c	4.9 b	30.0 ab	70.0 b	90.0 b
Segway 400SC 1.5 fl oz + Alude 2L 2 qt	1.0 a	1.0 a	2.1 a	0.0 a	0.0 a	20.0 a
Segway 400SC 3 fl oz + Alude 2L 1 qt	1.0 a	1.0 a	2.9 a	0.0 a	0.0 a	40.0 a
Segway 400SC 3 fl oz + Alude 2L 2 qt	1.0 a	1.0 a	2.0 a	0.0 a	0.0 a	10.0 a
Stature DM 50WP 6.4 oz	2.0 ab	2.9 b	3.4 ab	10.0 ab	20.0 a	30.0 a
Untreated control	2.5 bc	4.8 c	4.8 b	10.0 ab	80.0 b	90.0 b

* Not an IR-4-sponsored experiment. F&N Tests vol 61: OT017.

[z] Plant health rating is 1 to 5, where 1=healthy to 5=plant death.

[y] Column means with a letter in common are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 56. Plant health ratings and percent death of snapdragons (*Antirrhinum majus*) 'White' after drench treatments for *Phytophthora nicotianae* Root Rot – Plant Health, Hausbeck, MI, 2005.

Treatment	Rate Per 100 Gal	Plant Health (1-5)					
		4/19	4/26	5/02	5/09	5/17	5/24
Aliette WDG	12.8 oz	1.4 a	1.1 a	1.3 ab	1.5 ab	3.3 bc	3.8 cde
Alude 2L	12.7 fl oz	1.0 a	2.1 ab	3.1 c	4.1 cd	4.4 cd	4.0 de
Biophos	128 fl oz	1.0 a	1.0 a	1.0 a	1.0 a	1.8 ab	2.6 abcd
Insignia 20 EG	8 oz	1.8 a	2.5 b	3.0 bc	3.1 bc	3.0 abc	3.0 abcd
	16 oz	1.0 a	1.0 a	1.0 a	1.0 a	1.1 a	1.0 a
Segway 400SC	3 fl oz	1.0 a	1.5 ab	2.0 abc	2.1 ab	2.0 ab	2.0 bcd
	6 fl oz	1.0 a	1.3 ab	1.5 abc	1.5 ab	1.5 ab	1.5 ab
Stature DM 50WP	3.2 oz	1.3 a	1.6 ab	2.4 abc	2.6 ab	2.9 bcd	3.1 bcde
	6.4 oz	1.0 a	1.3 ab	1.6 abc	1.8 ab	1.6 ab	1.9 abc
Terrazole 35 WP	10 oz	1.8 a	3.4 c	4.9 d	5.0 d	5.0 d	5.0 e
Untreated non-inoculated		1.0 a	1.0 a	1.0 a	1.0 a	1.5 ab	1.3 ab
Untreated inoculated		2.8 b	5.0 d	5.0 d	5.0 d	5.0 d	5.0 e

Column means with a letter in common are not significantly different (Student-Newman-Keuls; P=0.05).

Table 57. Plant health ratings and percent death of snapdragons (*Antirrhinum majus*) 'White' after drench treatments for *Phytophthora nicotianae* Root Rot – % Plant Death, Hausbeck, MI, 2005.

Treatment	Rate Per 100 Gal	Plant Death (%)				
		4/26	5/02	5/09	5/17	5/24
Aliette WDG	12.8 oz	0.0 a	0.0 a	12.5 a	12.5 a	37.5 a
Alude 2L	12.7 fl oz	0.0 a	25.0 a	25.0 a	50.0 a	50.0 a
Biophos	128 fl oz	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Insignia 20 EG	8 oz	25.0 a	50.0 a	50.0 a	50.0 a	50.0 a
	16 oz	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Segway 400SC	3 fl oz	0.0 a	25.0 a	25.0 a	25.0 a	25.0 a
	6 fl oz	0.0 a	12.5 a	12.5 a	12.5 a	12.5 a
Stature DM 50WP	3.2 oz	0.0 a	25.0 a	25.0 a	37.5 a	37.5 a
	6.4 oz	0.0 a	0.0 a	12.5 a	12.5 a	12.5 a
Terrazole 35 WP	10 oz	25.0 a	87.5 b	100 b	100 b	100 b
Untreated non-inoculated		0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Untreated inoculated		100 b	100 b	100 b	100 b	100 b

Treatments applied as drench on 12, 26 April and 10 May. Plant health rated on a scale of 1 to 5, where 1= healthy and 5=dead.

Column means with a letter in common are not significantly different (Student-Newman-Keuls; P=0.05).

Table 58. Plant health ratings and percent death of snapdragon (*Antirrhinum majus*) 'Montego Fire Mix' after drench treatments for *Phytophthora nicotianae* Root Rot – Plant Health, Hausbeck, MI, Test 1, 2006.

Treatment	Rate per 100 gal	Interval	Health (1 – 5)[1]			
			5/25	6/01	6/08	6/15
Adorn 4FL	1.02 fl oz	14 day	1.1 a	1.1 a	1.0 a	1.0 a
	2.04 fl oz	14 day	1.1 a	1.1 a	1.2 a	1.2 a
	4 fl oz	14 day	1.0 a	1.0 a	1.0 a	1.0 a
Fenstop 500SC	7 fl oz	14 day	1.0 a[2]	1.0 a	1.0 a	1.0 a
	14 fl oz	14 day	1.5 a	1.5 a	1.7 a	1.6 a
MultiGard	500 ppm	7 day	4.3 b	4.3 b	4.8 b	5.0 c
	1000 ppm	7 day	4.4 b	4.4 b	4.8 b	5.0 c
NOA 446510	4.1 fl oz	14 day	1.5 a	1.5 a	1.8 a	1.6 a
	8.2 fl oz	14 day	1.0 a	1.0 a	1.0 a	1.0 a
Segway 400SC	3 fl oz	14 day	1.8 a	1.8 a	2.1 a	2.9 b
	6 fl oz	14 day	1.9 a	1.9 a	2.2 a	2.2 b
Stature DM 50WP	6.4 oz	14 day	1.3 a	1.3 a	1.7 a	1.8 a
Truban 30WP	6.0 oz	14 day	3.6 b	3.6 b	4.8 b	5.0 c
V-10162 5.73FL	16 fl oz	14 day	1.0 a	1.0 a	1.0 a	1.0 a
Untreated non-inoculated			1.0 a	1.0 a	1.0 a	1.0 a
Untreated inoculated			4.3 b	4.3 b	4.7 b	5.0 c

[1]Plant health rating is 1 to 5; 1=healthy, 2=slight wilting, 3=moderate wilting, 4=completely wilted, 5=plant death.
[2]Column means followed by the same letter are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 59. Plant health ratings and percent death of snapdragon (*Antirrhinum majus*) 'Montego Fire Mix' after drench treatments for *Phytophthora nicotianae* Root Rot - % Death, Hausbeck, MI, Test 1, 2006.

Treatment	Rate per 100 gal	Interval	Percent Death			
			5/25	6/01	6/08	6/15
Adorn 4FL	1.02 fl oz	14 day	0.0 a	0.0 a	0.0 a	0.0 a
	2.04 fl oz	14 day	0.0 a	0.0 a	0.0 a	0.0 a
	4 fl oz	14 day	0.0 a	0.0 a	0.0 a	0.0 a
Fenstop 500SC	7 fl oz	14 day	0.0 a[1]	0.0 a	0.0 a	0.0 a
	14 fl oz	14 day	0.0 a	0.0 a	0.0 a	10.0 a
MultiGard	500 ppm	7 day	10.0 a	30.0 ab	30.0 ab	100.0 c
	1000 ppm	7 day	10.0 a	40.0 ab	40.0 ab	100.0 c
NOA 446510	4.1 fl oz	14 day	0.0 a	0.0 a	0.0 a	10.0 a
	8.2 fl oz	14 day	0.0 a	0.0 a	0.0 a	0.0 a
Segway 400SC	3 fl oz	14 day	10.0 a	10.0 a	10.0 a	40.0 b
	6 fl oz	14 day	0.0 a	10.0 a	10.0 a	30.0 ab
Stature DM 50WP	6.4 oz	14 day	0.0 a	0.0 a	0.0 a	20.0 ab
Truban 30WP	6.0 oz	14 day	0.0 a	10.0 a	10.0 a	100.0 c
V-10162 5.73FL	16 fl oz	14 day	0.0 a	0.0 a	0.0 a	0.0 a
Untreated non-inoculated			0.0 a	0.0 a	0.0 a	0.0 a
Untreated inoculated			0.0 a	50.0 b	50.0 b	100.0 c

[1]Column means followed by the same letter are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 60. * Plant health ratings and percent death of snapdragon (*Antirrhinum majus*) 'Rocket Red' after drench treatments for *Phytophthora nicotianae* Root Rot, Hausbeck, MI, Test 2, 2006.

	Plant health rating [x]		Plant death (%)	
Treatment and rate per 100 gal	**8/29**	**9/5**	**8/29**	**9/5**
Insignia 20WG 12 oz	1.7 a	1.5 a	0.0 a	0.0 a
Stature DM 50WP 12.8 oz	1.0 a	1.0 a	0.0 a	0.0 a
Subdue MAXX 21.3EC fl oz	1.0 a	1.0 a	0.0 a	0.0 a
Terrazole 35WP 6 oz	1.2 a	1.3 a	0.0 a	0.0 a
Truban 30WP 6 oz	2.8 b	3.2 b	0.0 a	16.7 a
Untreated inoculated control	4.7 c	5.0 c	83.0 b	100.0 b

* Not an IR-4-sponsored experiment. PDMR vol 3: OT023.
[x] Plant health rating is 1 to 5; 1=healthy, 2=slight wilting, 3=moderate wilting, 4=completely wilted, 5=plant death.
[y] Column means followed by the same letter are not significantly different (Fisher's Protected LSD; *P*=0.05).

Table 61. * Plant health ratings and percent death of snapdragon (*Antirrhinum majus*) 'Montego Yellow' after drench treatments for *Phytophthora nicotianae* Root Rot, Hausbeck, MI, Test 1, 2008.

	Plant health rating [x]		Plant death (%)
Treatment and rate per 100 gal	**7/28**	**8/4**	**8/4**
Adorn 4SC 1 fl oz	1.0 a [y]	1.0 a	0.0 a
Adorn 4SC 2 fl oz	1.0 a	1.0 a	0.0 a
Alude 12.75 fl oz	1.3 a	2.0 ab	0.0 a
Biophos 255.6 fl oz	1.0 a	1.0 a	0.0 a
FenStop 14 fl oz	1.0 a	1.0 a	0.0 a
Heritage 50WDG 0.9 oz	2.0 b	4.6 c	12.5 a
Heritage 50WDG 1.8 oz	2.0 b	2.3 abc	12.5 a
Mandipropamid 250SC 8.2 fl oz	1.0 a	1.0 a	0.0 a
Stature DM 50WP 6.4 oz	3.1 b	3.4 bc	25.0 ab
Subdue MAXX EC 1 fl oz	1.0 a	1.0 a	0.0 a
Terrazole 35WP 10 oz	3.0 b	8.4 d	50.0 bc
Untreated uninoculated	1.0 a	1.0 a	0.0 a
Untreated inoculated	7.9 c	9.6 d	75.0 c

* Not an IR-4-sponsored experiment. PDMR vol 3: OT015.
[x] Plant health rated on a scale of 1 to 10, where 1=healthy, 2=minor chlorosis/minor stunting, 3=severe chlorosis/moderate stunting, 4=severe stunting, 5=minor wilting, 6=moderate wilting, 7=severe wilting, 8=severe wilting/minor necrosis, 9= severe wilting/moderate necrosis, 10=plant death.
[y] Column means followed by the same letter are not significantly different (Fisher's Protected LSD; *P*=0.05).

Table 62. * Plant health ratings and percent death of snapdragon (*Antirrhinum majus*) 'Rocket Red' after drench treatments for *Phytophthora nicotianae* Root Rot, Hausbeck, MI, Test 2, 2008.

	Plant health rating [x]		Plant death (%)
Treatment and rate per 100 gal	**7/28**	**8/4**	**8/4**
Adorn 4SC 2 fl oz	1.0 a	1.0 a	0.0 a
Adorn 4SC 2 fl oz + Alude 12.75 fl oz	1.0 a	1.0 a	0.0 a
Adorn 4SC 2 fl oz + Heritage 50WDG 0.9 oz	1.0 a	1.0 a	0.0 a
Adorn 4SC 2 fl oz + Terrazole 35WP 10 oz	1.0 a	1.0 a	0.0 a
Alude 12.75 fl oz	1.3 a	1.5 a	0.0 a
FenStop 14 fl oz	1.0 a	1.0 a	0.0 a
Heritage 50WDG 1.8 oz	2.3 a	4.0 b	12.5 a
Mandipropamid 250SC 8.2 fl oz	1.0 a	1.0 a	0.0 a

Stature DM 50WP 6.4 oz	3.4 b	6.6 c	25.0 ab
Subdue MAXX EC 1 fl oz	1.0 a	1.0 a	0.0 a
Terrazole 35WP 10 oz	4.6 c	9.3 d	50.0 b
Untreated uninoculated	1.0 a	1.0 a	0.0 a
Untreated inoculated	5.3 c	9.0 d	25.0 ab

* Not an IR-4-sponsored experiment. PDMR vol 3: OT016.

[x] Plant health rated on a scale of 1 to 10, where 1=healthy, 2=minor chlorosis/minor stunting, 3=severe chlorosis/moderate stunting, 4=severe stunting, 5=minor wilting, 6=moderate wilting, 7=severe wilting, 8=severe wilting/minor necrosis, 9= severe wilting/moderate necrosis, 10=plant death.

[y] Column means followed by the same letter are not significantly different (Fisher's Protected LSD; *P*=0.05).

In 2011, Hausbeck conducted an experiment with *P. nicotianae* on pansy (*Viola ×wittrockiana)* 'Panola Deep Blue Blotch'. Treatments were applied to the plants as a drench on Apr 7 and 28, and plants inoculated one day after the initial fungicide application. Disease pressure was severe in this experiment with 87.5% of the untreated inoculated plants dead by May 11 (Table 63). A13836B (both rates), Mandipropamid, Orvego (all rates), A14658C + Heritage, Stature, and Subdue MAXX treatments prevented plant death throughout the duration of the experiment. The tank-mix of Heritage and A14658C was more efficacious than either product applied alone at higher rates. A13836B (1 fl oz), Orvego (11 and 28 fl oz), and Stature were the only treatments with plant health ratings of 1.0 by May 16. No phytotoxicity was observed for any treatment.

Table 63. * Evaluation of fungicide drenches for control of *Phytophtora nicotianae* root rot of pansy (*Viola x wittrockiana*) 'Panola Deep Blue Blotch', Hausbeck, MI, 2011.

	Plant Health [z]			Percent Death		
Treatment and rate/100 gal	**May 4**	**May 11**	**May 16**	**May 4**	**May 11**	**May 16**
A13836B 1 fl oz	1.1 a	1.0 a	1.0 a	0.0 a	0.0 a	0.0 a
A13836B 2 fl oz	1.0 a	1.3 a	1.3 a	0.0 a	0.0 a	0.0 a
A14658C SC 20 fl oz	1.0 a	1.5 a	2.5 b	0.0 a	0.0 a	12.5 a
A14658C SC 10 fl oz + Heritage 50WG 0.5 oz	1.0 a	1.4 a	1.5 a	0.0 a	0.0 a	0.0 a
Heritage 50WG 0.9 oz	1.1 a	2.9 b	3.4 c	0.0 a	37.5 b	50.0 b
Mandipropamid SC 8 fl oz	1.1 a	1.1 a	1.1 a	0.0 a	0.0 a	0.0 a
Orvego SC 11 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a	0.0 a
Orvego SC 14 fl oz	1.3 a	1.0 a	1.1 a	0.0 a	0.0 a	0.0 a
Orvego SC 28 fl oz	1.0 a	1.0 a	1.0 a	0.0 a	0.0 a	0.0 a
Stature SC 6 fl oz	1.1 a	1.0 a	1.0 a	0.0 a	0.0 a	0.0 a
Subdue MAXX EC 1 fl oz	1.3 a	1.1 a	1.3 a	0.0 a	0.0 a	0.0 a
Untreated uninoculated	1.0 a [y]	1.0 a	1.0 a	0.0 a	0.0 a	0.0 a
Untreated inoculated	3.1 b	4.5 c	4.5 d	25.b 0	87.5 c	87.5 c

* Not an IR-4 Experiment: PDMR 6:OT008.

[z] Rated on a scale of 1-5, where 1=healthy, 2=chlorosis, 3=minor/moderate wilting, 4=severe wilting; 5=plant death.

[y] Column means with a letter in common are not significantly different (Fisher's LSD; *P*=0.05).

In 2011, Beckerman conducted an experiment evaluate the efficacy of BAS 500 WU on *P. nicotianae* on vinca (*Catharanthus roseus)* 'Titan Mix'. Treatments were applied to the plants as a drench on Dec 20, and plants inoculated 2 days later. With the exception of the lowest rate of BAS 500, the BAS 500 treatments and the standard Heritage significantly reduced severe disease incidence and severity (Table 64). In the early stages of seedling growth, the lowest rate of BAS 500 was not as effective as the higher rates in reducing disease incidence. Significantly higher root growth ratings and plant size were recorded

for seedlings treated with the highest rate of BAS 500 or Heritage. The percentage of surviving seedlings for all fungicide treatments was higher compared to the untreated -inoculated control at the end of the experiment. No phytotoxicity was observed for any treatment.

Table 64. * Evaluation of fungicide drenches for control of seedling damping-off (*Phytophtora nicotianae*) in vinca (*Catharanthus roseus)* 'Titan Mix', Beckerman, IN, 2011.

Treatment and rate/100 gal	Disease incidence (%) [z]			Disease Severity [y]			Root rating [x]	Plant size (in.) [w]	Surviving seedlings (%)
	Jan 5	Jan 12	Jan 18	Jan 5	Jan 12	Jan 18			
BAS 500 WU 0.8 fl oz	44.0 ab [v]	44.0 ab	44.0 b	1.4 ab	2.0 b	2.2 bc	3.4 c	3.0 c	56.0 c
BAS 500 WU 1.5 fl oz	26.6 bc	26.6 bc	26.6 bc	1.0 bc	1.3 bc	1.3 bc	3.3 c	3.3 bc	73.4 bc
BAS 500 WU 3.1 fl oz	18.5 bc	18.5 cd	18.5 cd	0.6 cd	0.9 bcd	0.9 cd	4.2 b	3.6 b	81.5 ab
BAS 500 WU 4.6 fl oz	6.3 cd	6.3 cd	6.3 cd	0.2 de	0.3 cd	0.33 cd	4.3 b	4.2 a	93.7 a
BAS 500 WU 6.1 fl oz	2.5 d	2.5 d	2.5 d	0.08 de	0.1 d	0.13 d	4.8 a	4.4 a	97.1 a
Heritage 50 WG 1 oz	4.9 cd	19.6 cd	19.6 cd	0.05 de	0.7 cd	0.9 cd	4.9 a	4.6 a	83.8 ab
Untreated-uninoculated	0.0 d	0.0 d	0.0 d	0.0 e	0.0 d	0.0 d	4.9 a	4.6 a	100.0 a
Untreated-inoculated	65.0 a	65.0 a	71.6 a	1.6 a	3.4 a	3.6 a	3.2 c	2.4 d	31.4 d

* Not an IR-4 Experiment: PDMR 6:OT033.

[z] Percentage of infected seedlings per tray.

[y] Disease severity was evaluated on a 0-5 scale where 0 = no symptomatic seedlings (0% disease); 1= up to the 30%; 2 = 31-50%; 3 = 51-70%; 4 = 71-90% of seedlings diseased; 5 = dead (100% disease).

[x] Root growth of each seedling was rated on a 1-5 scale where 1= little to no roots on sides of the cube; 3= roots visible but the root cube does not stay intact due to limited root growth; 5= roots visible on all sides of the cube and the root cube maintains shape and mass.

[w] The plant size was assessed as the average of the sum of the width of the first true leaves and the height of the seedling.

[v] Mean values within a column followed by a letter in common are not significantly different ($P \leq 0.05$) according to Fisher's LSD test.

In 2012, Hong conducted an experiment with *P. nicotianae* on petunia (*Petunia* x *hybrida*) evaluating treatments applied as drench on Jun 28, and plants inoculated 6 days later. Disease severity was assessed weekly for 3 weeks after initial symptoms were observed on July 16 until Jul 30. All treatments significantly reduced a very high disease pressure, with Fenstop and Heritage + Subdue MAXX close to the non-inoculated check (Table 65). No phytotoxicity was observed for any treatment.

Table 65. * Evaluation of fungicide drenches for control of *Phytophtora nicotianae* root rot on petunia (*Petunia x hybrida*), 'Wave Red', Hong, VA, 2012.

Treatment and rate/100 gal	AUDPC [z]	Root quality [y]
FenStop 20SC fl oz	10.69 bc [x]	2.56 b
Heritage 50WG 0.9 oz + Subdue MAXX SL 1 fl oz	19.25 bc	0.83 c
Plentrix 3.66SE (A13836B) 1.3 fl oz	25.08 b	1.39 bc
Nontreated, non-inoculated	2.52 c	4.17 a
Nontreated, inoculated	44.72 a	0.11 c

* Not an IR-4 Experiment: PDMR 7:OT002.

[z] Each number is the mean AUDPC calculated from the disease severity ratings for each plant. Rated on a scale of 0 to 5 where 0 = healthy plant, 1 = slight wilt/infection, 2 = light infection, 3 = moderate infection: plant may not survive, 4 = severe infection: plant will not survive, and 5 = dead plant.

[y] Rated Jul 30 on a scale of 0 to 5 where 0 = poor root quality, 3 = acceptable quality for the plant size, and 5 = excellent root quality

[x] The mean values listed in a column followed by the same letter are not significantly different according to Waller=Duncan *k*-ratio, *t*-test, k=100, $P<0.05$.

***Phytophthora palmivora*.** In 2007, Ferrin examined the impact of drench treatments on *Phytophthora palmivora* on two crops – English ivy and lilyturf (Table 66 and Table 67). Disease was rated on a scale of 0 to 5 with 0 indicating the root system was completely rotten and 5 indicating healthy roots. On English ivy, Adorn at 120 ml (6 fl oz), NOA 446510, and Subdue provided control equivalent to the uninoculated treatment. Heritage at 0.9 oz, Heritage + Subdue, and Segway at 6 fl oz provided efficacy statistically equivalent to the uninoculated treatment. Segway at 3 fl oz was not statistically better than the inoculated untreated control. On lilyturf, Segway at 6.0 fl oz provided the best control followed by Subdue MAXX and Heritage at 0.9 oz, both statistically equivalent or better than the untreated uninoculated control. Other products that reduced disease but not statistically equivalent to the untreated uninoculated control included: Heritage at 1.8 oz, Segway at 3 fl oz, and Adorn at 6 fl oz.

In 2008, Palmateer examined the impact of fungicides applied as preventative or curative drench treatments on *Phytophthora palmivora* on containerized bamboo palm (Table 68). All fungicides (Heritage, Insignia, Segway, Stature and Adorn), applied as both preventative and curative treatments, provided significant, though insufficient, reduction of percent root necrosis. All fungicides generally provided equivalent control when applied as preventative treatments. However, Segway at 3 and 6 fl oz gave the lowest percent root necrosis in the curative treatment.

Table 66. Summary of the effects of fungicide treatments on root rot ratings for English ivy (*Hedera helix*) inoculated with *Phytophthora palmivora*, Ferrin, 2007a.

Treatment	Rate per 100 gal	Drench amount per sq ft	Root Rating (0-5)
Adorn (fluopicolide)	60 ml	1 pt	3.72 bcd
	120 ml	1 pt	4.09 ab
Heritage (azoxystrobin)	0.9 oz	2 pt	3.81 abc
	1.8 oz	2 pt	3.26 cd
Heritage + Subdue	0.9 oz + 0.5 fl oz	2 pt	3.71 bcd
NOA 446510 (mandipropamid)	8 fl oz	1 pt	4.39 a
Segway (cyazofamid)	3 fl oz	1 pt	3.16 de
	6 fl oz	1 pt	3.66 bcd
Subdue (mefenoxam)	1 fl oz	1 pt	3.92 ab
Control (inoculated)			2.61e
Control (not inoculated)			4.30 ab

Table 67. Summary of the effects of fungicide treatments on root rot ratings for lilyturf (*Liriope muscari*) inoculated with *Phytophthora palmivora*, Ferrin, 2007b.

Treatment	Rate per 100 gal	Drench amount per sq ft	Root Rating (0-5)
Adorn (fluopicolide)	60 ml	1 pt	2.34 cde
	120 ml	1 pt	2.76 cd
Heritage (azoxystrobin)	0.9 oz	2 pt	2.66 cd
	1.8 oz	2 pt	2.88 bcd
Heritage + Subdue	0.9 oz + 0.5 fl oz	2 pt	3.22 abc
NOA 446510 (mandipropamid)	8 fl oz	1 pt	1.85 de
Segway (cyazofamid)	3 fl oz	1 pt	2.70 cd
	6 fl oz	1 pt	4.31 a
Subdue (mefenoxam)	1 fl oz	1 pt	3.92 ab
Control (inoculated)			1.36 e
Control (not inoculated)			3.19 bc

Table 68. Efficacy of drench treatments on *Phytophthora palmivora* root rot on bamboo palm (*Chamaedorea seifrizii*), Palmateer, FL 2008.

Treatment	Rate per 100 gal	% Root Necrosis	
		Preventative[1]	Curative[2]
Adorn (fluopicolide)	30 ml	24.5 bc	55.3 bcd
	60 ml	28.1 b	62.1 bcd
Heritage(azoxystrobin)	1.8 oz	25.6 bc	57.8 bcd
Insignia (pyraclostrobin)	8 oz	18.9 c	64.7 bcd
	16 oz	26.8 bc	68.1 b
Segway (cyazofamid)	3 fl oz	22.1 bc	51.4 d
	6 fl oz	23.4 bc	53.3 cd
Stature (dimethomorph)	3.06 fl oz	24.5 bc	67.1 bc
	6.12 fl oz	21.8 bc	63.6 bcd
Control[3]		40.9 a	86.3 a

[1] Healthy palms with roots showing ≤20 % necrosis at the beginning of the experiment; inoculated with *P. palmivora*one day following each fungicide drench.
[2] Diseased palms confirmed to be infected with *P. palmivora* with roots showing ≥20 % necrosis at the beginning of the experiment; not inoculated with *P. palmivora* throughout the duration of the experiment.
[3] Control plants were inoculated in the preventative treatments and non-inoculated in the curative treatments.

In 2010, Becker examined the impact of fungicides applied as drench treatments on *Phytophthora palmivora* on English ivy (*Hedera helix L. ssp. Helix*). Bare rooted plants were inoculated at transplanting on Apr 10, then followed with drench applications of fungicides on Apr 11 & 25, May, 10 & 20, Jun 7 & 21, and Jul 10. Adorn, Captan, Disarm, Heritage, Segway and Stature significantly increased shoot and vigor, comparable to the non-inoculated check; Fenstop, Insignia, Magellan, Subdue MAXX, and

Terrazole were slightly inferior to the non-inoculated check (Table 69, Table 70). No phytotoxicity was observed for any treatment, except severe decrease in shoot and root vigor with the phosphorus acids Agri-fos and Vital; Aliette and Alude also caused slight phytotoxicity.

Table 69. Shoot data from English ivy (*Hedera helix L. ssp. Helix*) after drench treatments for *Phytophthora palmivora* root rot, Becker, NY, 2010.

Treatment	Rate per 100 gal	Shoot			Shoot Weight (gm)	Shoot Vigor (0-10) [z]
		Length (cm)	No. Live leaves	No. Dead leaves		
Agri-Fos	12.7 fl oz	31.64 a [x]	7.29 a	7.00 a	5.66 bc	3.00 i
Aliette	12.8 oz	26.43 a	19.57 a	2.57 a	7.83 abc	6.29 gh
Alude	12.7 fl oz	26.64 a	13.00 a	2.00 a	8.44 abc	5.64 h
Captan	16 oz	29.93 a	16.29 a	2.14 a	11.79 ab	8.36 a-e
Disarm 480	4 fl oz	30.07 a	12.86a	1.00 a	9.36 ab	6.96 fg
Disarm 480	8 fl oz	33.07 a	14.57 a	1.00 a	10.13 ab	8.64 abc
Fenstop	14 fl oz	31.57 a	15.71 a	2.43 a	9.22 ab	7.57 c-f
Heritage	0.9 fl oz	34.21 a	12.86 a	1.57 a	8.37 abc	8.57 abc
Heritage	1.8 fl oz	34.86 a	15.57 a	1.71 a	12.71 a	8.93 ab
Insignia	8 oz	34.00 a	14.86 a	3.00 a	9.21 ab	7.64 b-f
Magellan	12 fl oz	26.14 a	14.86 a	2.86 a	8.52 abc	7.21 d-g
Segway	3 fl oz	33.50 a	15.71 a	2.57 a	11.18 ab	8.50 a-d
Segway	6 fl oz	28.21 a	12.14 a	2.14 a	9.40 ab	7.14 efg
Stature SC	6.12 fl oz	32.07 a	15.14 a	2.00 a	10.43 ab	8.21 a-f
Subdue MAXX	1 fl oz	31.07 a	14.29 a	2.29 a	8.00 abc	7.14 efg
Taegro	3.5 oz	30.43 a	14.57 a	2.29 a	8.81 abc	7.00 fg
Tanos	6.1oz	29.14	13.29 a	2.86 a	8.45 abc	6.93 fg
Terrazole	8 oz	31.57 a	14.29 a	2.29 a	10.25 ab	8.00 b-f
V-10161	1 fl oz	31.64 a	14.71 a	3.29 a	10.77 ab	8.50 a-d
V-10161	2 fl oz	30.57 a	12.29 a	1.43 a	9.94 ab	8.00 b-f
Vital	64 fl oz	15.14 a	8.57 a	1.86 a	3.45 c	1.79 j
Noninoculated Check		37.50 a	17.00 a	1.86 a	13.06 a	9.47 a
Inoculated Check		29.50 a	12.14 a	2.71 a	7.31 abc	5.57 h

All data collected Aug 1.

[z] A 0 to 10 rating was given to the plants based on the visual health of the plant, based on foliar chlorosis or necrosis, as well, as relative shoot length.

[x] Column means followed by the same letter are not significantly different (Student-Newman-Keuls; *P*=0.10).

Table 70. Root data from English ivy (*Hedera helix L. ssp. Helix*) after drench treatments for *Phytophthora palmivora* root rot, Becker, NY, 2010.

Treatment	Rate per 100 Gal	Fresh Root Wt (gm) 8/1	Dry Root Wt (gm) 8/25	Root Vigor (0-10) [z] 8/1
Agri-Fos	12.7 fl oz	1.98 f [x]	0.50 de	3.57 de
Aliette	12.8 oz	5.06 a-f	1.12 a-e	6.21 abc
Alude	12.7 fl oz	5.55 a-f	1.25 a-e	6.79 abc
Captan	16 oz	8.96 abc	1.62 abc	7.86 ab
Captan	16 oz	8.96 abc	1.62 abc	7.86 ab
Disarm 480	4 fl oz	5.31 a-f	1.01 a-e	6.29 abc
Disarm 480	8 fl oz	4.57 b-f	1.15 a-e	6.29 abc
Fenstop	14 fl oz	6.29 a-f	1.06 a-e	6.29 abc
Heritage	0.9 fl oz	5.68 a-f	1.10 a-e	6.86 abc
Heritage	1.8 fl oz	9.44 ab	1.61 abc	7.57 ab
Insignia	8 oz	3.28 def	0.74 b-e	5.57 bcd
Magellan	12 fl oz	6.24 a-f	1.21 a-e	6.43 abc
Segway	3 fl oz	9.54 a	1.84 ab	8.86 a
Segway	6 fl oz	7.27 a-e	1.45 a-d	8.00 ab
Stature SC	6.12 fl oz	5.75 a-f	1.38 a-d	7.36 ab
Subdue MAXX	1 fl oz	7.48 a-e	1.21 a-e	7.71 ab
Taegro	3.5 oz	4.31 c-f	1.06 a-e	4.57 cd
Tanos	6.1oz	5.00 a-f	0.90 a-e	4.71 cd
Terrazole	8 oz	7.98 a-d	1.83 ab	7.43 ab
V-10161	1 fl oz	8.14 abc	1.91 a	7.86 ab
V-10161	2 fl oz	8.87 abc	1.87 a	8.43 ab
Vital	64 fl oz	1.64 f	0.28 e	1.86 e
Noninoculated Check		7.83 a-e	1.72 ab	8.43 ab
Inoculated Check		3.06 ef	0.54 cde	3.50 de

[z] A 0 to 10 root vigor rating was made from visual assessment of root size and bushiness.
[x] Column means followed by the same letter are not significantly different (Student-Newman-Keuls; *P*=0.10).

***Phytophthora tropicalis*.** In 2007, Norman screened several products with drench applications to control *Phytophthora tropicalis* on Pothos 'Golden' (Table 71). The inoculated control had 5% rotten roots and the untreated uninoculated control had 0% rotten roots. All treatments had either 0 or 2.5% rotten roots with the exception of MultiGard. This treatment appeared to accentuate disease development with approximately 20% rotten roots. In 2008, he tested drench applications of several products on English ivy (Table 72). The inoculated control had 97% rotten roots and the untreated uninoculated control had 0% rotten roots. Stature, Disarm at 8 fl oz, Adorn and Segway at 6 fl oz provided the best control followed by Disarm at 4 fl oz, Fenstar and Heritage at 0.9 oz, all statistically equivalent to the untreated uninoculated control. Other products that reduced disease but not statistically equivalent to the untreated uninoculated control included: Segway at 3 fl oz, Heritage at 1.8 oz, Insignia and Aliette. Taegro provided no significant control.

In 2008-09, Benson tested 17 products against *P. tropicalis* on vinca (*Catharanthus roseus*)'PeppermintCooler' (Table 73). All foliar and soil treatments were applied 5 times at 2-3 week intervals. Symptoms of Phytophthora root rot including mortality did show up on plants beginning 54 days after inoculation with *P. tropicalis,* but symptomatic plants were not consistent across a given treatment. At the end of the experiment, there was no difference between the inoculated, untreated control

and the non-inoculated untreated control so no treatment effects could be separated. Tanos caused vinca to be uniformly chlorotic and stunted.

In 2010, Benson tested several products against *P. tropicalis* on gloxinia (*Gloxinia* sp.). Fungicides were applied following inoculation on May 18, and applications were repeated 3 times on a 2-week schedule until Jun 29. The phosphite generators Alude, Agri-fos and Vital applied as foliar sprays provided effective control of a severe disease pressure, equal to the standard Aliette and non-inoculated check (Table 74). Drench treatments Adorn, Fenstop, Orvego, Pageant, Segway, Disarm and the standard Subdue also provided effective control; Tanos provided poor control, while Stature and Taegro were ineffective. No phytotoxicity was observed for any treatment.

Table 71. Summary of the effects of fungicide treatments on root rot ratings for Pothos (*Pothos* sp.) 'Golden' inoculated with *Phytophthora tropicalis*, Norman, 2007.

Treatment	Rate per 100 gal	Drench Interval	Average % Rotten Roots
Adorn (fluopicolide)	3 fl oz	14 d	0 a
	6 fl oz	14 d	0 a
Aliette (fosetyl-AL)	12.8 fl oz	30 d	2.5 a
Fenstar (fenamidone)	7.0 oz	28 d	0 a
	14.0 oz	28 d	0 a
Heritage (azoxystrobin)	0.9 oz	14 d	2.5 a
	1.8 oz	14 d	0 a
MultiGard (furfural)	500 ppm	7 d	19 b
	1000 ppm	7 d	20 b
NOA 446510 (mandipropamid)	2 fl oz	14 d	0 a
	8 fl oz	14 d	0 a
Segway (cyazofamid)	3 fl oz	14 d	0 a
	6 fl oz	14 d	0 a
Subdue (mefonaxam)	0.6 fl oz	60 d	0 a
Control (inoculated)			5 a
Control (not inoculated)			0 a

Table 72. Efficacy of of drench treatments on *Phytophthora tropicalis* root rot on English ivy (*Hedera helix*), Norman, 2008

Treatment	Rate per 100 gal	Drench Interval	Average % Rotten roots
Adorn (fluopicolide)	1 fl oz	28 day	0.5 a
	2 fl oz	28 day	0 a
Aliette (fosetyl-AL)	12.8 oz	30 day	81 e
Disarm (fluoxastrobin)	4 fl oz	21 day	7 ab
	8 fl oz	21 day	0 a
Fenstar (fenamidone)	7.0 fl oz	28 day	9 ab
	14 fl oz	28 day	3 ab
Heritage (azoxystrobin)	0.9 oz	28 day	7 ab
	1.8 oz	28 day	20 c
Insignia (pyraclostrobin)	8 oz	28 day	32 d
Segway (cyazofamid)	3.0 fl oz	28 day	13 bc
	6.0 fl oz	28 day	2 a
Stature SC (dimethomorph)	6.12 fl oz	14 day	0 a
	12.25 fl oz	14 day	0 a
Taegro (*Bacillus subtilis* var. *amyloliquefasciens*)	3.5 oz	21 day	93 f
Control (inoculated)			97 f
Control (not inoculated)			0 a

Table 73. Efficacy of drench treatments on *Phytophthora tropicalis* root rot on Vinca (*Catharanthus roseus*)'Peppermint Cooler', Benson, NC, 2008-09.

Treatment	Rate per 100 gal	Applic method	Disease Rating (1-4)[x]			At Harvest (2/11)	
			1/05	1/16	2/02	Top wt (g)	Root rot (1-5)[y]
Adorn	1 fl oz	Drench	1.0 b	1.0 c	1.0 c	25.3 ab	1.0 d
	2 fl oz	Drench	1.0 b	1.0 c	1.0 c	26.3 a	1.0 d
Aliette	5 lb	Spray	1.0 b[z]	1.0 c	1.0 c	21.8 abc	1.4 cd
Agri-Fos	64 fl oz	Spray	1.0 b	1.0 c	1.0 c	23.6 abc	1.3 cd
Alude	64 fl oz	Spray	1.0 b	1.0 c	1.0 c	24.2 abc	1.1 cd
Disarm	4 oz	Drench	1.4 ab	1.3 bc	1.3 bc	24.1 abc	1.1 cd
	8 oz	Drench	1.0 b	1.0 c	1.0 c	21.9 abc	1.4 cd
Fenstar	7 fl oz	Drench	1.0 b	1.0 c	1.0 c	22.8 abc	1.1 cd
	14 fl oz	Drench	1.0 b	1.0 c	1.4 bc	21.4 abc	1.0 d
Heritage	0.9 oz	Drench	1.0 b	1.0 c	1.0 c	27.0 a	1.0 d
	1.8 oz	Drench	1.0 b	1.0 c	1.0 c	25.2 ab	1.0 d
Insignia	8 oz	Drench	1.0 b	1.0 c	1.0 c	24.1 abc	1.1 cd
Magellan	12 fl oz	Spray	1.3 ab	1.0 c	1.0 c	24.4 ab	1.1 cd
NOA 446510	4 fl oz	Drench	1.3 ab	1.4 bc	1.3 bc	22.2 abc	1.3 cd
	8 fl oz	Drench	1.4 ab	1.6 b	1.5 b	19.0 bc	1.6 bc
Remedier	2.0 oz	Drench	1.4 ab	1.5 b	1.5 b	17.3 cd	2.0 b
Segway	3.0 fl oz	Drench	1.0 b	1.0 c	1.0 c	23.6 abc	1.0 d
	6.0 fl oz	Drench	1.1 b	1.5 b	1.0 c	20.7 abc	1.3 cd
Stature SC	6.12 fl oz	Drench	1.0 b	1.0 c	1.1 bc	22.9 bc	1.0 d
Subdue Maxx	1.0 fl oz	Drench	1.0 b	1.0 c	1.0 c	25.3 ab	1.0d
Taegro	3.5 oz	Drench	1.0 b	1.0 c	1.0 c	22.0 abc	1.5 bcd
Tanos	12.0 oz	Drench	1.9 a	2.6 a	3.0 a	11.9 d	3.8a
Vital	64 fl oz	Spray	1.0 b	1.0 c	1.0 c	22.9 abc	1.3 cd
Untreated Non-inoculated			1.0 b	1.4 bc	1.4 bc	23.4 abc	1.5 bcd
Untreated Inoculated			1.4 ab	1.4 bc	1.5 b	21.8 abc	1.5 bcd

[x] Foliar rating: 1= healthy, 2 = some leaves wilted, some chlorosis, 3 = most leaves wilted, chlorosis,4= crown rot, plant dead,.

[y] Root rot rating: 1= healthy, 2= 25% or less roots necrotic, 3= 26 - 50% roots necrotic, 4= more than 50% necrotic, and 5= crown rot,plant dead.

[z] Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, *P*=0.05.

Table 74. Efficacy of drench treatments on *Phytophthora tropicalis* root rot on Gloxinia (*Gloxinia* sp.), 'Avanti Peach Rose' Benson, NC, 2010.

Treatment	Rate per 100 gal	Applic method	Disease Rating (1-4)[x]			At Harvest: Day 52	
			Day 30	Day 39	Day 52	Top wt (g)	Root rot (1-5)[y]
Adorn	60 ml	Drench	1.0 c	1.0 b	1.0 d	354 a	1.0 c
	120 ml		1.0 c	1.0 b	1.0 d	337 a	1.0 c
Agri-fos	64 fl oz	Spray	1.0 c	1.0 b	1.3 cd	288 ab	1.5 c
Aliette	80 oz	Spray	1.0 c	1.0 b	1.0 d	289 ab	1.0 c
Alude	12.7 fl oz	Spray	1.0 c	1.0 b	1.6 cd	298 ab	1.9 c
Disarm	4 fl oz	Drench	1.0 c	1.0 b	1.4 cd	270 ab	1.5 c
	8 fl oz		1.3 bc	1.4 b	1.4 cd	284 ab	1.6 c
Fenstop	14.0 oz	Drench	1.0 c	1.0 b	1.0 d	293 ab	1.0 c
Orvego (BAS 651)	22.5 fl oz	Drench	1.0 c	1.0 b	1.0 d	331 a	1.1 c
	34 fl oz		1.0 c	1.0 b	1.0 d	345 a	1.1 c
Pageant	12.0 oz	Drench	1.0 c	1.0 b	1.0 d	310 ab	1.0 c
Segway	6.0 fl oz	Drench	1.0 c	1.0 b	1.0 d	307 ab	1.0 c
Stature SC	6.12 fl oz	Drench	1.1 bc	2.8 a	2.9 ab	159 cde	3.5 a
Subdue Maxx	1.0 fl oz	Drench	1.1 bc	1.4 b	2.0 bc	260 abc	2.1 bc
Taegro (*Bacillus subtilis)*	3.5 oz	Drench	1.4 b	2.1 a	2.8 ab	148 de	3.3 ab
Tanos	12.0 oz	Drench	1.0 c	1.0 b	1.0 d	220 bcd	2.1 bc
Vital	64 fl oz	Spray	1.0 c	1.0 b	1.8 cd	264 ab	2.0 bc
Untreated Uninoculated			1.0 c	1.0 b	1.0 d	328 a	1.0 c
Untreated Inoculated			1.8 a	2.8 a	3.6 a	78 e	4.5 a

[x] Foliar rating: 1= healthy, 2 = some leaves wilted, some chlorosis, 3 = most leaves wilted, chlorosis, 4 = crown rot, plant dead.

[y] Root rot rating: 1= healthy, 2= 25% or less roots necrotic, 3= 26 - 50% roots necrotic, 4= more than 50% necrotic, and 5= crown rot, plant dead.

[z] Means within a column followed by the same letter are not different according to the Waller-Duncan k ratio, t-test, k=100, *P*=0.05.

Phytophthora sp. In 2006, Reddy screened several products to manage a *Phytophthora* species on marigold (*Tagetes sp.*) seedlings (Table 75). Several treatments provided control statistically equivalent to the untreated non-inoculated control across all ratings: Fenamidone at 14 fl oz, Hymexazole at 12 oz, MultiGuard Protect at 500 ppm, NOA446510 at 8 oz, Segway at 3 oz, Adorn at 60 ml, and Vital at 4 pints. The other treatments providing low levels of pre-emergence or post-emergence damping off included BioPhos at 2 gal and Adorn at 30 ml.

Table 75. Efficacy of various products to control *Phytophthora sp.* in marigold *(Tagetes sp.*) seedlings, Reddy, 2006.

Treatments[1]	Rate per 100 gal	Vigor[2]	% Healthy stand[3]	% Pre-emergence damping-off[4]	% Post-emergence damping-off[5]	Root rot severity[6]	Phytotoxicity[7]
Actinovate	10 oz	5.0 a [8]	76.7 ab	5.4 ab	11.8 bc	2.8 ab	No
Adorn	30 ml	4.5 b	68.9 abc	6.4 ab	6.9 ab	4.3 bc	No
	60 ml	5.0 a	79.8 ab	3.1 a	3.4 ab	2.1 ab	No
BioPhos	1 gal	4.8 ab	76.9 ab	5.1 ab	11.9 bc	1.9 ab	No
	2 gal	5.0 a	89.9 a	1.1 a	3.2 ab	3.8 bc	No
Disarm	3 oz	5.0 a	83.6 ab	4.7 ab	3.8 ab	3.6 bc	No
Fenstop	7 oz	4.5 b	73.8 ab	6.5 ab	11.3 bc	3.6 bc	No
	14 oz	5.0 a	87.9 a	3.5 a	3.9 ab	1.1 a	No
Hymexazole	6 oz	4.5 b	78.4 ab	7.8 ab	8.9 b	2.2 ab	No
	12 oz	5.0 a	85.4 ab	2.1 a	2.1 a	1.1 a	No
Multiguard	250 ppm	4.0 c	65.9 bc	11.9 b	9.4 b	2.9 ab	No
	500 ppm	5.0 a	75.5 ab	4.6 ab	6.9 ab	2.9 ab	No
NOA 446510 (mandipropamid)	2 oz	4.5 b	75.6 ab	7.8 ab	8.9 b	4.9 bc	No
	8 oz	5.0 a	86.9 ab	2.1 a	5.1 ab	2.3 ab	No
Promax	2 gal	4.5 b	75.1 ab	3.5 a	12.9 c	1.1 a	No
Segway	1.5 oz	4.4 bc	75.6 ab	7.8 ab	12.9 c	4.7 bc	No
	3 oz	5.0 a	85.5 ab	4.8 ab	3.9 ab	1.4 ab	No
Vital	2 pts	4.5 b	73.8 ab	6.3 ab	7.9 b	4.3 bc	No
	4 pts	5.0 a	87.2 ab	1.7 a	2.9 a	1.9 ab	No
Untreated non-inoculated		4.5 b	89.5 a	2.5 a	3.7 ab	1.8 ab	--
Untreated inoculated		3.5 d	48.9 c	21.9 c	15.9 c	5.6 c	--
LSD *P* = 0.05		0.4	21.6	7.8	4.9	2.3	

[1]All the treatments were applied as a soil drench at 1 and 2 weeks after transplanting at recommended doses.
[2]Mean of 8 replications per treatment, one seedling per replication. Vigor is rated as 1 = Very poor, 2 = Poor, 3 = Better, 4 = Good, and 5 = Very good.
[3]Mean 8 replications per treatment, one seedling per replication.
[4]Pre-emergence damping-off was rated 21 days after transplanting.
[5]Post-emergence was rated 45 days after transplanting.
[6] Root rot severity ratedon a scale of 1-10. 1 = no symptoms, very healthy. 2 = 10-20% discoloration, 3 = 20-30% discoloration, 4 = 30-40% discoloration, 5 = 40-50% discoloration, 6 = 50-60% discoloration, 7 = 60-70% discoloration, 8 = 70-80% discoloration, 9 = 80-90% discoloration, and 10 = dead.
[7] Phyto, - - = not applicable, No = no phytotoxicity.
[8]Numbers followed by different letteras are significantly different from pathogen control according to Fisher's protected LSD at *P* = 0.05.

Comparative Efficacy on Phytophthora Foliar Blights

Phytophthora citricola. In an experiment for control of foliar *Phytophthora citricola* on rhododendron (*Rhododendron* sp.) with foliar applications, Aliette (5 lb per 100 gal), Biophos (2 gal per 100 gal) and Magellan (4 pt per 100 gal) provided the best overall control of Phytophthora blight (Table 76).

Table 76. Efficacy of foliar treatments on *Phytophthora citricola* blight on rhododendron, Regan, OR, 2005.

Treatment	Rate Per 100 Gal	Stem Canker Length (cm) (% Control)	Leaf Spot Diameter (cm)	Disease Severity (0-10)
Aliette 80W	5 lb	2.3 c (82)	0.7 a	0.3 a
Biophos 43L	2 gal	4.7 c (64)	0.8 a	0.6 a
Fenstop500SC	14 fl oz	11.7 ab (9)	1.0 a	1.0 a
	28 fl oz	11.8 ab (9)	1.1 a	1.9 a
Fore 80W	1.5 lb	10.8 ab (16)	1.4 a	2.1 a
Insignia 20W	16 oz	11.8 ab (9)	0.6 a	2.0 a
	40 oz	11.2 ab (13)	0.9 a	1.1 a
Magellan	4 pt	3.0 c (77)	0.8 a	0.5 a
Segway 400SC	3.0 fl oz	11.3 ab (12)	0.7 a	1.7 a
	6.0 fl oz	12.0 ab (7)	0.7 a	1.0 a
Stature DM 50W	6.4 oz	11.4 ab (12)	0.8 a	2.1 a
	12.8 oz	9.4 b (27)	0.4 a	2.3 a
TM-459	6 fl oz	12.3 ab (5)	1.2 a	1.3 a
Untreated non-inoculated		-	-	-
Untreated inoculated		12.9 a (0)	1.5 a	3.1 a

Treatments applied foliar starting 3 Jun and reapplied 2 times 11 and 26 days later except for Aliette which was applied 26 days later.
Disease severity rated on a 0 to 10 scale, where 0= no disease and 10=complete necrosis.
Column means with a letter in common are not significantly different (Tukey-Kramer multiple comparison test).

Phytophthora nicotianae/parasitica. From 2003 through 2012, 10 experiments were conducted on *Phytophthora nicotianae/parasitica* foliar blight. Of these, three were sponsored by IR-4. Three different host systems were utilized: vinca (*Catharanthus roseus*), spathiphyllum (*Spathiphyllum sp.*), and petunia (*Petunia x hybrida*). The Adorn, Aliette, Fenamidone, Stature, and Subdue MAXX treatments provided the most consistent levels of control across the experiments. In single experiments, Micora and Vital effectively managed *P. nicotianae.* See the following paragraphs for summaries of each experiment.

In 2003, Hausbeck conducted two experiments to control *P. nicotianae* foliar blight on vinca. In the first test, plants were sprayed, with the exceptions of Subdue MAXX and Heritage which were applied as a drench, on Jun 19. Plants were inoculated on the same day. Pristine (4.0 and 8.0 oz), Camelot (12.0 pt), Reason (4.0 and 8.0 fl oz), Stature DM, Aliette, Subdue MAXX, Heritage, and Truban completely prevented plant death from a severe disease pressure (Table 77). By the last observation date (Jul 8), Subdue MAXX was the only treatment having a health rating significantly better than the untreated inoculated plants. In the second test, plants were sprayed, with the exception of Subdue MAXX which was applied as a drench, on Jul 24, and inoculated the same day. Camelot, Subdue MAXX (1.0 fl oz), and Stature DM all limited the number of lesions from a moderate disease pressure to < 1.0 per plant (Table 78). On the final rating date, only Aliette, Camelot, Subdue MAXX, and Stature DM significantly limited disease severity compared to the untreated inoculated control. Although the

Aliette treated plants averaged 11.8 lesions the disease severity remained low because lesion size was limited. Discolored blossoms were observed on plants that had been treated with Camelot.

In 2005 Hausbeck conducted an experiment to control *P. nicotianae* foliar blight on vinca. Disease pressure was high with 34.2 leaves infected 4 days after treatment and inoculation. Under these conditions, the best treatment was Polyram 80DF followed closely by Aliette 80WDG and Stature DM 50WP at 12.8 oz. While the remaining treatments did provide some level of control, Daconil WeatherStik and Segway did poorly under this severe disease pressure (Table 79).

In 2006 Hausbeck conducted two experiments to control *P. nicotianae* foliar blight on vinca.In the first test, disease pressure was moderate with the untreated inoculated having 8.1 infected leaves per plant 20 days after inoculation (Table 80). All treatments significantly reduced infection from in this test. Segway, Fenamidone at 14 fl oz, NOA 446510 at 4.1 fl oz, Stature DM at 6.4 oz, and Adorn at 120 ml, were the only treatments that completely prevented infection in this test. In the second test, disease pressure was moderate. All untreated plants had significantly more leaf lesions and infected leaves compared to the fungicide treatments, except for plants drenched with Hurricane (Table 81). Disease severity was significantly reduced by 7-day applications of Hurricane, Aliette, Heritage, and Heritage + Subdue MAXX compared to the untreated control and all fungicide treatments applied at 14-day intervals. Numerically, Heritage + Subdue MAXX (0.5 oz) had the fewest number of infected leaves and number of lesions caused by *P. nicotianae* as well as the lowest disease severity rating. No phytotoxicity was observed for any treatment in these experiments.

In 2006, Norman conducted a foliar *P. parasitica* experiment on *Spathiphyllum sp.* All four products (Aliette 80WDG, Fenamidone, Segway, and Adorn) provided excellent control (Table 82).

In 2006, Warfield conducted a foliar *P. nicotianae* experiment on petunia (*Petunia x hybrida*) 'Grandiflora Single Dreams Midnight'. Vital was the only treatment that was not significantly different from the uninoculated control, in either the number of infected stems or overall disease severity from a severe disease pressure (Table 83). Heritage significantly reduced both the number of infected stems and disease severity, but the disease severity was high enough to render the plants unmarketable. Spectro, Subdue MAXX and PlantShield all failed to limit disease. No phytotoxicity was observed for any treatment.

In 2009 Steddom studied the efficacy of Stature and other fungicides applied as drench to control *P. nicotianae* foliar blight on two cultivars of vinca: 'First Kiss Pure White' and 'First Kiss Raspberry'. Stature DM and Stature SC were applied at 14-day intervals on Mar 2, 15 and 29, while Subdue MAXX and Fenstop were applied on Mar 2 and 29. Plants were inoculated two days after the first treatment. Cultivar differences were not significant; with both cultivars highly susceptible. Subdue MAXX, Fenstop, and all three rates of Stature DM and Stature SC significantly reduced disease severity from a severe disease pressure (Table 84). The lowest rate (3.1 fl oz) of Stature SC was not as effective as the higher rates of Stature SC. Ranking the quality of whole plants within blocks provided more sensitive mean separation than whole plant disease severity ratings aiding differentiating similar rates of the same fungicide. No phytotoxicity was observed for any treatment.

In 2012, Hong evaluated an experimental product A14658C (potassium phosphite) and other fungicides were applied as foliar sprays for Phytophthora aerial blight on annual vinca (*Catharanthus roseus*) 'Titan Lilac' on Jun 5, and plants inoculated one day later; a second and third inoculation was made on Jun 13 and 20. Treatments were reapplied at various intervals for a total of two or three applications as shown in Table 85. A14658C provided excellent control of Phytophthora aerial blight, comparable to the standard FenStop, throughout the duration of the test. No phytotoxicity was observed for any treatment.

In 2012, Jeffers conducted an experiment for Phytophthora foliage blight (*P. nicotianae*) on annual vinca (*Catharanthus roseus*) 'Titan Blush'. Plants were inoculated on Nov 3. Treatments were applied twice at a 13-day interval on Oct 27 and Nov 9 as a sprench to each plant by pouring 3.5 fl oz on the surface of the container mix in the pot and then spraying the foliage to drip. Subdue MAXX provided the best control of a severe disease pressure, Pageant was slightly less effective, and Heritage was ineffective (Table 86). No phytotoxicity was observed for any treatment.

Table 77. * Evaluation of fungicides for control of *Phytophtora nicotianae* aerial blight on annual vinca (*Catharanthus roseus*) 'Rose Cooler', Hausbeck, MI, Test 1, 2003.

	Plant Health [y]			Plant Death (%)	
Treatment and rate/100 gal	**6/23**	**6/30**	**7/8**	**6/30**	**7/8**
Aliette 80WDG 80.0 oz	2.0 a-e[z]	3.5 ab	4.0 abc	0.0 a	0.0 a
Camelot 58EC 3.0 pt	1.8 a-d	7.5 b	8.2 c	16.7 a	50.0 a
Camelot 58EC 6.0 pt	2.2 a-e	4.5 ab	4.8 abc	16.7 a	16.7 a
Camelot 58EC 12.0 pt	1.5 abc	3.3 ab	3.2 abc	0.0 a	0.0 a
Heritage 50WG 3.0 oz[x]	4.2 fgh	5.2 ab	4.0 abc	0.0 a	0.0 a
Pristine 38WG 4.0 oz	3.2 b-h	6.2 b	6.5 bc	0.0 a	0.0 a
Pristine 38WG 8.0 oz	3.5 c-h	5.2 ab	4.5 abc	0.0 a	0.0 a
Pristine 38WG 16.0 oz	4.0 e-h	6.2 b	5.8 abc	16.7 a	16.7 a
Ranman 400SC 1.5 fl oz	4.2 fgh	5.8 ab	5.5 abc	33.3 a	33.3 a
Ranman 400SC 3.0 fl oz	4.3 gh	6.2 b	6.2 abc	16.7 a	33.3 a
Ranman 400SC 6.0 fl oz	3.8 d-h	5.0 ab	4.7 abc	16.7 a	16.7 a
Reason 500SC 4.0 fl oz	3.3 b-h	5.2 ab	4.8 abc	0.0 a	0.0 a
Reason 500SC 8.0 fl oz	3.0 a-g	4.8 ab	4.2 abc	0.0 a	0.0 a
Reason 500SC 16.0 fl oz	2.7 a-g	5.8 ab	5.7 abc	16.7 a	16.7 a
Stature DM 50WP 12.8 fl oz	2.3 a-g	3.5 ab	4.0 abc	0.0 a	0.0 a
Subdue MAXX 21.3EC 1.0 oz [x]	1.3 ab	1.2 a	1.3 ab	16.7 a	0.0 a
Truban 30WP 2.0 oz	5.2 h	6.8 b	6.7 c	0.0 a	0.0 a
Untreated inoculated	4.3 gh	7.3 b	7.2 c	16.7 a	33.3 a

* Not an IR-4 Experiment: F&N Tests vol 59:OT020. Not all treatments included in table.

[x] Applied as a drench.

[y] Rated on a scale of 1 to 10, where 1=healthy to 10=plant death.

[z] Column means with a letter in common or with no letter are not significantly different (Tukey's Studentized Range; *P*=0.05).

Table 78. * Evaluation of fungicides for control of *Phytophtora nicotianae* aerial blight on annual vinca (*Catharanthus roseus*) 'Cooler Grape', Hausbeck, MI, Test 2, 2003.

	Number of Lesions	Severity Rating [x]	
Treatment and rate/100 gal	**7/29**	**7/29**	**8/8**
Aliette 80WDG 40 oz	11.8 a[y]	2.0 ab	2.3 a-e
Camelot 58EC 48 fl oz	0.5 a	1.7 ab	2.0 abc
Compass 50WDG 2.0 oz	9.5 a	3.7 b	4.3 c-f
Daconil Weather Stik 6F 22.0 fl oz	1.3 a	1.8 ab	3.5 b-f
Stature DM 50WP 12.8 fl oz	0.0 a	1.0 a	1.8 ab
Subdue MAXX 21.3EC 0.5 fl oz	1.8 a	1.8 ab	2.2 a-d
Subdue MAXX 21.3EC 1.0 fl oz	0.0 a	1.0 a	1.0 a
Untreated uninoculated	0.0 a	1.0 a	1.0 a
Untreated inoculated	12.0 a	3.7 b	5.0 f

* Not an IR-4 Experiment: F&N Tests vol 59:OT021. Not all treatments included in table.

[x] Rated on a scale of 1 to 10, where 1=healthy to 10=plant death.

[y] Column means with a letter in common or with no letter are not significantly different (Student-Newman-Kuels, *P*=0.05).

Table 79. Disease severity of vinca(*Catharanthus roseus*)'Polka Dot Pacific'after foliar treatments for *Phytophthora nicotianae* foliar blight resistant to mefenoxam, Hausbeck, MI, 2005.

Treatment and rate/100 gal	No. infected stems 11/11	No. infected leaves 11/11	Disease severity rating [z] 11/11
Aliette 80WDG 2.5 lb	1.0 ab [y]	10.0 abc	2.7 ab
Alude 2L 1 qt.	2.3 bcd	20.0 cd	6.2 de
Biophos 128 fl oz.	1.7 abc	19.0 cd	4.8 bcd
Daconil Weather Stik 6SC 22 fl oz	3.3 de	17.7 cd	5.7 cde
Insignia 20EG 8 oz	2.3 bcd	14.5 bcd	4.8 bcd
Insignia 20EG 16 oz	1.8 bcd	9.7 abc	4.0 bcd
Polyram 80DF 2 lb	0.2 a	0.6 a	1.2 a
Segway 400SC 3 fl oz.	4.0 e	24.2 d	6.5 de
Segway 400SC 6 fl oz.	3.0 cde	20.2 cd	6.3 de
Stature DM 50WP 6.4 oz.	2.5 bcde	10.7 abc	3.5 abc
Stature DM 50WP 12.8 oz.	1.3 ab	3.8 ab	2.7 ab
Untreated uninoculated	0.0 a	0.0 a	0.0 a
Untreated inoculated	4.0 e	34.2 e	8.0 e

[z] Disease severity rating is 1 to 10; 1=no disease symptoms, 10=plant death.
[y] Column means with a letter in common are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 80. Disease severity of vinca (*Catharanthus roseus*)'Pink Cooler' after foliar treatments for *Phytophthora nicotianae* foliar blight resistant to mefenoxam, Hausbeck, MI, Test 1, 2006.

Treatment	Rate per 100 gal	Average Number of Infected Leaves	Disease Severity[1]
Adorn 4FL	60 ml	0.6 a[2]	1.5 a
	120 ml	0.0 a	1.0 a
Captan 80WDG	1.5 lb	0.1 a [2]	1.1 a
Fenstop 500SC	7 fl oz	0.1 a	1.1 a
	14 fl oz	0.0 a	1.0 a
MultiGard	500 ppm	1.0 a	1.6 a
	1000 ppm	1.4 a	1.8 a
NOA 446510	4.1 fl oz	0.0 a	1.0 a
	8.2 fl oz	0.4 a	1.4 a
Segway 400SC	3 fl oz	0.0 a	1.0 a
	6 fl oz	0.0 a	1.0 a
Stature DM 50WP	6.4 oz	0.0 a	1.0 a
Untreated inoculated		8.1 b	4.5 b

[1] Disease severity rating is 1 to 10; 1=no disease symptoms, 10=plant death.
[2] Column means with a letter in common are not significantly different (Student-Newman-Keuls; *P*=0.05).

Table 81. *Disease severity of vinca(*Catharanthus roseus*)'Cooler Pink'after foliar treatments for *Phytophthora nicotianae* foliar blight, Hausbeck, MI, Test 2, 2006.

Treatment and rate/100 gal	Applic interval (Days)	No. lesions	No. infected leaves	Disease severity rating [x]
Aliette WDG 2.5 lb	7	3.3 a[y]	2.0 ab	2.3 a
Heritage 50WG 1 oz	7	4.3 a	3.3 ab	2.3 a
Heritage 50WG 1 oz	14	5.8 ab	4.5 abc	3.5 ab
Heritage 50WG 2 oz	7	4.0 a	3.8 ab	2.3 a
Heritage 50WG 2 oz	14	5.0 a	4.0 abc	3.0 ab
Heritage 50WG 2 oz + Subdue MAXX 2MEC 0.5 oz	7	2.0 a	0.8 a	1.8 a
Heritage 50WG 2 oz + Subdue MAXX 2MEC 1 oz	7	2.5 a	2.3 ab	2.3 a
Heritage 50WG 2 oz + Subdue MAXX 2MEC 1 oz	14	5.8 ab	4.8 abc	3.5 ab
Hurricane 48WP 1.5 oz (drench)	7	12.8 bc	9.5 c	3.8 ab
Hurricane 48WP 1.5 oz (foliar)	7	3.5 a	3.5 ab	2.8 a
Stature DM 50WP 12.8 oz	7	5.3 ab	3.5 ab	3.3 ab
Subdue MAXX 2MEC 1 oz	7	7.3 ab	6.8 bc	3.3 ab
Untreated inoculated		17.8 c	16.0 d	5.0 b

* Not an IR-4 Experiment: PDMR vol 3:OT021.

[x] Disease severity rating is 1 to 10; 1=no disease symptoms, 10=plant death.

[y] Column means with a letter in common are not significantly different (Fisher's Protected LSD; *P*=0.05).

Table 82. Average number of leaf lesions on spathiphyllum after foliar treatments for *Phytophthora parasitica* foliar blight, Norman, FL, 2006.

Treatment	Rate per 100 gal	Spray interval	Avg # leaf lesions	LSD (0.05)
Adorn	3.0 fl oz	1 application	0.2	a
	6.0 fl oz	1 application	0	a
Aliette	12.8 fl oz	1 application	0.3	a
Fenstop	7.0 fl oz	1 application	0	a
	14 fl oz	1 application	0	a
Segway	3.0 fl oz	1 application	0	a
	6.0 fl oz	1 application	0	a
Untreated non-inoculated			0	a
Untreated inoculated			9	b

Table 83. * Evaluation of fungicides for control of *Phytophtora nicotianae* aerial blight on petunia (*Petunia x hybrida*) 'Grandiflora Single Dreams Midnight', Warfield, NC, 2006.

Treatment and rate/100 gal	No. infected stems 7/11	Disease severity rating [z] 7/11
Heritage 2 oz + Latron B-1956 2 oz	4.8 b	3.9 b
PlantShield 4 oz + Latron B-1956 2 oz	8.9 d	5.5 c
Spectro 90DF 1.5 lb	7.3 cd	5.1 c
Subdue MAXX 1 fl oz (drench)	8.3 cd	5.3 c
Vital 1 pt (drench)	0.8 a	1.4 a
Untreated uninoculated	0.0 a	1.0 a
Untreated inoculated	7.1 c	5.4 c

* Not an IR-4 Experiment: PDMR vol 1:OT003. Not all treatments included.
[x] Disease severity rating is 1 to 6; 1=healthy, 2= <10% canopy infection, 3=10 to ≤30% infection, 4=>30 to ≤50% infection, 5=>50 to ≤70% infection, 6=>70% infection.
[y] Column means with a letter in common are not significantly different (Waller-Duncan k ratio, t-test, k = 100, *P*=0.05).

Table 84. *Disease severity of vinca(*Catharanthus roseus*) 'First Kiss Pure White' and 'First Kiss Raspberry' after drench treatments for *Phytophthora nicotianae* foliar blight, Steddom, TX, 2009.

Treatment and rate/100 gal	Foliar disease severity rating [y] 3/20	Foliar disease severity rating [y] 4/12	Whole plant disease severity rating 4/12	Visual plant ranking [x] 4/12
Fenstop 14 fl oz	0.3 bc	0.2 c	1.3 c	5.1 bc
Stature DM 3.2 oz	0.3 bc	0.5 bc	1.3 c	4.9 bc
Stature DM 6.4 oz	0.5 bc	1.0 bc	1.5 c	5.6 abc
Stature DM 12.8 oz	0.2 bc	0.0 c	1.2 c	5.1 bc
Stature SC 3.1 fl oz	0.9 b	1.5 b	2.6 b	7.6 ab
Stature SC 6.1 fl oz	0.0 c	0.0 c	0.6 c	3.7 c
Stature SC 12.3 fl oz	0.2 bc	0.0 c	1.0 c	4.9 bc
Subdue MAXX 1 fl oz	0.3 bc	0.2 c	0.9 c	4.5 c
Untreated uninoculated	0.1 bc	0.1 c	1.2 c	5.5 abc
Untreated inoculated	2.2 a	3.0 a	3.7 a	8.1 a

* Not an IR-4 Experiment: PDMR vol 3:OT030.
[z] Column means with a letter in common are not significantly different Waller- Duncan k-ratio t-test, *P*=0.05).
[y] Visual disease severity rating from 0-5, where 0= no symptoms; 3=unmarketable, 5=dead plant. Whole plant ratings were performed on plants where the media had been rinsed from the root system prior to evaluation.
[x] Plant ranking per block from 1-10, where 1=the best quality plant in the block and 10=the worst plant in the block.

Table 85. * Evaluation of fungicides for control of Phytophthora aerial blight (*Phytophtora nicotianae*), on annual vinca (*Catharanthus roseus*) 'Titan Lilac', Hong, VA, 2012.

Treatment and rate/100 gal	No. of Applications	Application Interval (days)	AUDPC [z]
A14658C SL 64 fl oz	3	14	17.50 cd [y]
A14658C SL 64 fl oz + Heritage 50WG 2 oz	3	14	12.64 cd
A14658C SL 64 fl oz + Subdue MAXX SL 1 fl oz	3	14	20.81 cd
FenStop 4.13SC 10 fl oz	2	28	75.64 bc
Heritage 50WG 2 oz	3	14	94.69 ab
Subdue MAXX SL 1 fl oz	3	14	110.60 ab
Untreated uninoculated			0.00 d
Untreated inoculated			163.50 a

* Not an IR-4 Experiment: Plant Disease Management Reports 7:OT005.

[z] Each number is the mean calculated from the disease incidence counts of 18 plants observed weekly.

[y] The mean values listed in a column followed by the same letter are not significantly different according to Waller=Duncan *k*-ratio, *t*-test, *k*=100, $P<0.05$.

Table 86. * Evaluation of fungicides for control of Phytophthora foliage blight (*Phytophtora nicotianae*), on annual vinca (*Catharanthus roseus*) 'Titan Blush', Jeffers, SC, 2012.

Treatment and rate/100 gal	Symptom severity (%) [z]			AUDPC [y]
	13 DAI	20 DAI	27 DAI	
A14658C 50%SL 20 fl oz	39.1 a [x]	66.5 a	83.3 a	203.1 ab
A14658C 50%SL 20 fl oz + Heritage 50WG 0.9 oz	5.2 a	25.1 a	20.1 b	61.9 cde
A14658C 50%SL 20 fl oz + Subdue MAXX 2ME 1 fl oz	2.1 a	5.9 a	9.0 b	37.6 de
Heritage 50WG 0.9 oz	39.1 a	66.4 a	75.1 a	196.4 ab
Orvego 4.4SC 11 fl oz	63.5 a	78.9 a	78.9 a	225.4 a
Orvego 4.4SC 14 fl oz	26.6 a	74.4 a	74.4 a	189.9 ab
Pageant 38WG 12 oz	22.1 a	29.5 a	29.5 b	91.0 cd
Quali-Pro Fosetyl-Al 80WDG 3 lb	12.9 a	32.3 a	66.5 a	135.6 bc
Stature 4.2SC 6 fl oz	58.4 a	73.3 a	87.6 a	228.9 a
Subdue MAXX 2ME 1 fl oz	4.1 a	4.1 a	5.8 b	41.6 de
Non-inoculated control	0.0 a	0.0 a	0.0 b	0.0 e
Inoculated control	58.4 a	70.2 a	95.7 a	233.1 a

* Not an IR-4 Experiment: Plant Disease Management Reports 6:OT008.

[z] Symptom severity (percentage of foliage with visible symptoms) was evaluated at 13, 20, and 27 days after inoculation (DAI)

[y] AUDPC = Area under the disease progress curve.

[x] Column means with a letter in common are not significantly different (Fisher's Protected LSD; $P=0.05$).

Table 87. General summary of efficacy for *Phytophthora nicotianae/parasitica* aerial blight.

Product	Annual Vinca								Spathiphyllum	Petunia
	*Hausbeck 2003	*Hausbeck 2003	Hausbeck 2005	Hausbeck 2006	*Hausbeck 2006	*Steddom 2009	*Hong 2012	*Jeffers 2012	Norman 2006	*Warfield 2006
A14658C							++	-		
Adorn				++					++	
Aliette	+	+	++		+			+	++	
Alude			+							
Biophos			+							
Camelot	+	+								
Captan				++						
Daconil		-	-							
Fenamidone	+			++		++	+		++	
Heritage	+				+		-	-		+/-
Hurricane					+					
Insignia			+							
Micora (NOA 446510)				++						
MultiGuard				+						
Orvego								-		
Pageant								+		
PlantShield										-
Polyram			++							
Pristine	+									
Segway	+/-		-	++					++	
Spectro										-
Stature	+	++	++	++	+	++		-		
Subdue MAXX	++	++			+	++	-	++		-
Truban	+/-									
Vital										++

[1] Rating Scale: ++ =clearly statistically equivalent or better than untreated non-inoculated and/or clearly statistically different than untreated inoculated; + = statistically different from untreated inoculated and untreated non-inoculated; +/- statistically equivalent to both untreated inoculated and untreated non-inoculated; - = statistically equivalent to untreated inoculated.

[2] Where more than one rate or application type for a product was included in the experiment and each performed statistically different, the better rating is provided in this table.

Phytophthora plurivora. In 2015, Grunwald examined the efficacy of various products to control *Phytophthora plurivora* causing foliar blight on rhododendron (*Rhododendron catawbiense*) 'Album'. Treatments were applied as spray or drench on a schedule shown in Table 88. Detached, wounded leaves were inoculated 3 days after fungicide applications. Subdue MAXX applied foliar and SP2770 at 2.66 lb per 100 gal applied drench followed by foliar provided excellent efficacy comparable to uninoculated check. A21008A at 2.4 fl oz per 100 gal applied foliar once or twice, and Micora applied foliar twice were also effective. No phytotoxicity was observed for any treatment.

Table 88. Efficacy on *Phytophthora plurivora* on rhododendron (*Rhododendron catawbiense*) 'Album', Grunwald, OR, 2014.

Treatment	Rate per 100 Gal	Applic Method	Applic Dates	% Leaf Lesion	
				10/6	10/14
A21008A SC	0.6 fl oz	Foliar	11/23, 10/1	28.5	20.5
	1.2 fl oz			21.4	12.3
	2.4 fl oz			6.4	1.2
A21008A SC	2.4 fl oz	Foliar	10/1	-	3.5
Micora	8 fl oz	Foliar	11/23, 10/1	5.2	3.5
Promax	4 qt	Foliar	10/1	-	26.5
SP2770	1.33 lb	Drench, then Foliar	11/23, 10/1	21.8	10.7
	2.66 lb			6.5	0.0
SP2770	1.33 lb	Foliar	10/1	-	23.2
	2.66 lb			-	6.5
Subdue MAXX	1 fl oz	Foliar	11/23, 10/1	2.1	0.0
Untreated Uninoculated				0.0	0.0
Untreated Inoculated				31.0	31.2

In 2015, Santamaria examined the efficacy of various products to control *P. plurivora* causing foliar blight on rhododendron (*Rhododendron yakushimanum*) 'Looking Glass'. All treatments were applied as sprays on Feb 16 and 23, except Rhapsody which was applied as a drench on Feb 16 followed by a spray on Feb 23. Also, BAS 703, and one of the highest rate of A21008A was applied only on Feb 23. Detached, wounded leaves were inoculated 3 & 10 days after completion of the chemical treatments. Micora provided the lowest rate of lesion formation on the inoculated leaves for both the 3-DAT & 10-DAT leaves (Table 89). For 3-DAT leaves, Micora, Proud 3 and A21008A at 1 and 2.4 fl oz per 100 gal were comparable to the uninoculated Check. For the 10-DAT leaves, Micora, A21008A, BAS 703 and MBI-110 were comparable to the uninoculated Check.

Table 89. Efficacy on *Phytophthora plurivora* on rhododendron (*Rhododendron yakushimanum*) 'Looking Glass', Santamaria, CA, 2015.

Treatment	Rate per 100 gal	Infection Rate [z]	
		3 DAT [y], 21 DAI [x]	10 DAT, 21 DAI
A21008A SC	0.6 fl oz	0.5 [w] abc	0.30 bcd
A21008A SC	1.2 fl oz	0.30 bc	0.00 d
A21008A SC	2.4 fl oz	0.50 abc	0.00 d
A21008A SC	2.4 fl oz, applic.	0.30 bc	0.10 d
BAS 703 01F	8 fl oz	0.50 abc	0.00 d
BAS 703 01F	12 fl oz	0.90 a	0.20 cd
MBI 110	2 qt	0.80 a	0.10 d
MBI 110	4 qt	0.60 ab	0.00 d
Micora	8 fl oz	0.10 c	0.00 d
PreStop	4.375 lb	0.60 ab	0.60 ab
Proud 3	4 qt	0.30 bc	0.50 abc
Rhapsody ASO	4 qt	0.90 a	0.60 ab
Rhapsody ASO	8 qt	0.90 a	0.50 abc
Untreated Uninoculated		0.27 bc	0.15 d
Untreated Inoculated		0.88 a	0.69 a

[z] Rated on a scale of 1-5, where 1=healthy, 2=chlorosis, 3=minor/moderate wilting, 4=severe wilting; 5=plant death.
[y] DAT denotes Days After Treatment, when leaves were inoculated.
[x] DAI denotes Days after Inoculations, when the infection rate was evaluated.
[w] Column means with a letter in common are not significantly different (Waller-Duncan K-ratio, P=0.05)

***Phytophthora ramorum*.** In a series of experiments between 2005 and 2009, Drs. Chastagner, Grunwald and Linderman examined the efficacy of several products to manage foliar ramorum blight on rhododendron and firs. Only Subdue Maxx consistently provided excellent control in all but one of the experiments. The other products that tended to provide good control in most of the experiments were Adorn, Fenstar, Insignia, Segway, and Stature DM.

In 2005, Chastagner conducted two Ramorum blight experiments on rhododendron (*Rhododendron* x 'Nova Zembla'), grand fir (*Abies grandis*) and Noble fir (*Abies procera*). He added a number of treatments above and beyond the 2005 IR-4 in both experiments. On rhododendron, the best overall control was achieved with foliar applications of Maneb (2 lb per 100 gal) and Gavel (2 lb per 100 gal), and drench application of Subdue MAXX (2 fl oz per 100 gal) (). On grand and noble firs, best overall control was achieved with foliar applications of Daconil Ultrex (1.4 lb per 100 gal), Dithane (2 lb per 100 gal), Fenamidone(14 and 28 fl oz per 100 gal), Gavel (2 lb per 100 gal), Insignia (40 oz per 100 gal), Maneb (2 lb per 100 gal), Polyram (2 lb per 100 gal), Segway (3 and 6 fl oz per 100 gal), Stature (6.4 and 12.8 oz per 100 gal),andAdorn (40 g ai per 100 gal) (Table 91).

In 2005, Linderman conducted four experiments to determine efficacy of foliar applications of registered and experimental chemical agents on *P. ramorum* on rhododendron (*Rhododendron* x 'Nova Zembla') (Table 92). Subdue MAXX (4 fl oz per 100 gal) was the only product that consistently provided excellent control in all 3 experiments where it was included. In one experiment, good to excellent control was achieved with Aliette (5 oz per 100 gal), Biophos (2 gal/100 gal), Fenamidone (14 and 28 fl oz per 100 gal), Segway (3 and 6 fl oz per 100 gal), Stature (6.4 and 12.8 oz per 100 gal) and Adorn (3 oz per 100 gal). Insignia and Magellan provided no to poor control.

In 2006, Chastagner tested various products where inoculations occurred with or without wounding (Table 93). When leaves were wounded, only NOA 446510 at 2 and 8 oz per 100 gal and Segway at 6 fl oz per 100 gal provided excellent control similar to that of non-inoculated plants. When leaves were not

wounded, several products provided statistically significant efficacy: Captan at 4 oz, Fenamidone at 7 and 14 oz, NOA 446510 at 2 and 8 oz, Segway at 6 fl oz, and Stature DM at 12.8 oz per 100 gal.

In 2006, Linderman inoculated *P. ramorum* onto wounded tissues. The only product in this assay to provide levels of lesion area similar to that of the untreated non-inoculated treatment was Subdue MAXX (Table 94).

In 2007 and 2008, Chastagner again looked at treatments applied to wounded or non-wounded inoculation sites (Table 95 and Table 96). Wounded inoculation sites did tend to have higher number of lesions and larger lesions. The best treatments included Dithane DF at 2 lbs, Fenstop at 14 and 28 fl oz, Gavel DF at 2 lbs, Maneb 75DF at 2 lbs, NOA 446510 at 8 fl oz, Polyram 80 DF at 2 lbs and Stature DM at 12.8 oz.

In 2007, Grunwald tested several products on camellia for *P. ramorum* efficacy (Table 97). Application of products had a significant effect on percent lesion area observed. However, not all chemicals had the same efficacy in reducing lesion expansion, and Aliette, Captan, and Stature DM were not significantly different from the non-inoculated controls. For any given product, no differences were observed among high and low rates.NOA 446510 and Subdue MAXX were most effective in reducing disease severity. No phytotoxicity was observed for any treatment. All chemicals were effectively fungistatic, not fungicidal, after confirmation of the pathogen's presence by isolating wound-sites from symptomless leaves on culture media.

In 2008, Grunwald continued screening products for *P. ramorum* efficacy on detached camellia leaves. Camellia plants in containers were maintained outdoors under shade. A single application of fungicide was applied to run-off using a hand-pump sprayer. Seven days after each fungicide application, three leaves from each plant were removed for detached leaf inoculations under quarantine containment conditions. Separate containers were used for different chemical treatments. Each leaf was needle-wounded once on the abaxial side to the right of the midvein, just prior to inoculation with *P. ramorum* strain Pr-05-046 (A2 mating type isolated in OR). After inoculation, leaves were misted and containers were placed in an incubator at 20ºC with a 14-hour light cycle for ten days. Disease severity was determined by evaluating lesion area on day seven. The non-inoculated control showed no lesions. Aliette, Captan, V-10161, NOA 446510, Fenstar (low rate only), Disarm (low rate only) and Stature DM were not significantly different from the untreated controls (Table 98). For Disarm and Fenstar, significant differences were observed among high and low rates. Disarm (high rate), Segway and Subdue MAXX were most effective in reducing disease severity. All chemicals were effectively fungistatic, not fungicidal, after confirmation of the pathogen's viability by isolation and subsequent culture of the pathogen from wound-sites on symptomless leaves. No phytotoxicity was observed for any treatment.

In 2009, Grunwald expanded the testing to *P. ramorum* efficacy on detached viburnum leaves. Viburnum plants were maintained and treated with fungicides as the camellia were in 2008; inoculations and evaluations occurred similarly. The non-inoculated control showed no lesions (Table 99). Adorn, Aliette, BAS 651F (low rate only), Captan, NOA 446510, and Stature DM were not significantly different from the untreated, inoculated controls. BAS 651F(high rate), CG100, Disarm, Regalia SC, and Subdue MAXX were most effective in reducing disease severity. All chemicals were effectively fungistatic, not fungicidal, after confirmation of the pathogen's viability by isolation and subsequent culture of the pathogen from wound sites on symptomless leaves. No phytotoxicity was observed for any treatment.

Also, in 2009, Chastagner continued the testing of P. ramorum efficacy on Rhododendron. No symptoms developed on any of the non-inoculated leaves during this test. Overall, wounding significantly ($P = 0.05$) increased the number of inoculation sites that developed symptoms (Table 100). Treatments had a significant effect on the number of wounded inoculation sites that developed symptoms. Applications of NOA 446510, Subdue MAXX, Maneb, BAS 651, Gavel, Stature, Polyram, Regalia (0.5%), Dithane and Insignia significantly reduced the number of inoculation sites that developed symptoms. Four fungicides, Adorn, CG 100, Disarm, and Regalia (1.0%) did not significantly reduce the number of wounded inoculation sites that developed symptoms. Insufficient disease occurred on the non-wounded inoculation

sites to determine the effects of any treatments on controlling *P. ramorum*. Overall, wounding also significantly increased the average size of lesions. All of the fungicides, except Disarm at 4 oz and CG 100 at 0.4% significantly decrease the size of the lesions that developed. The data collected during this test indicates that some of the fungicides tested have the potential to reduce disease development on wounded inoculated rhododendron leaves.The most effective fungicides in reducing the number inoculation sites that developed symptoms and the size of resulting lesions include NOA 446510, Subdue MAXX, Maneb, BAS 651, Gavel, Stature, Polyram, Regalia (0.5%), Dithane and Insignia.

In 2009-10, Chastagner continued the testing of *P. ramorum* efficacy of fungicides applied as drench on rhododendron. Fungicides were first applied on Nov 9, 2009, 3 days prior to soil inoculation around the base of each plant on Nov 12. Treatments were reapplied at various intervals shown in Table , with the last application on Aug 16, 2010. To encourage symptom development, plants were re-inoculated on Apr 5, 2010. Despite multiple efforts to increase disease development, only a limited number of plants developed any above ground symptoms during this experiment. None of the fungicide treated plants had disease ratings that differed from the inoculated checks, and treatments had no effect on plant growth (Table 101). Six fungicide treatments: Disarm at 4 and 8 fl oz; Orvego (BAS 651F) at 11 fl oz; Stature at 6.12 fl oz; Adorn (V-10161) at 2 fl oz; and Heritage at 0.9 oz; significantly reduced the proportion of plants where *P. ramorum* was isolated from at least one root segment per plant. This suggests that drench treatments with these fungicides may have some potential in controlling root infections by this pathogen on rhododendrons.

Table 90. Efficacy of foliar and drench treatments on ramorum blight on Rhododendron, Chastagner, WA, 2005.

Treatment	Rate Per 100 Gal	Application Method	Number of Infected Sites[1] (% Control)		Lesion Area in mm^2 (% Control)	
			Non-wounded Leaves	Wounded Leaves	Non-wounded Leaves	Wounded Leaves
Adorn	40 g ai	Foliar	1.3 defgh 52)	1.7 cdefg (41)	27.5 hi (78)	34.4 fghij (74)
Aliette 80W	5 lb	Foliar	2.7 abc (0)	2.6 abc (10)	87.2 cd (29)	70.2 cdefg (47)
Alude	2 pt	Drench	2.4 abc (11)	2.8 ab (3)	94.9 abcd (23)	105.8 abc (19)
Biophos 43L	2 gal	Drench	2.5 abc (7)	2.7 abc (7)	67.5 defg (45)	75.9 cdef (42)
Champ Formula 2F	1.33 pt	Foliar	1.9 cde (30)	2.1 abcde (28)	72.3 def (41)	91.4 bcde (30)
Daconil Ultrex	1.4 lb	Foliar	0.9 fghij (67)	2.3 abcd (21)	20.6 hi (83)	52.5 efg (60)
Dismiss	5 oz	Foliar	2.1 bcd (22)	2.7 abc (7)	48.1 efgh (61)	50.0 efgh (62)
Dithane 75 DF	2 lb	Foliar	0.4 ij (85)	1.4 defgh (52)	14.9 hi (88)	56.5 efg (57)
Fenstop 500SC	14 fl oz	Foliar	0.0 j (100)	2.4 abc (17)	0.0 i (100)	26.9 ghij (80)
	28 fl oz	Foliar	0.6 ghij 78)	1.7 cdefg (41)	17.7 hi (86)	42.3 fghij (68)
Gavel 75 DF	2 lb	Foliar	0.1 j (96)	0.5 hij (83)	0.0 I (100)	6.0 hij (95)
Insignia 20W	16 oz	Foliar	1.4 defg (48)	2.5 abc (14)	33.7 ghi (73)	52.1 efg (60)
	40 oz	Foliar	1.1 efghi (59)	2.2 abcde (24)	20.6 hi (83)	41.7 fghij (68)
Magellan	80 fl oz	Drench	3.0 a (0)	2.8 ab (3)	127.5 a (0)	119.2 ab (9)
Maneb 75 DF	2 lb	Foliar	0.0 j (100)	0.3 ij (90)	0.0 i (100)	4.3 ij (97)
Polyram 80 DF	2 lb	Foliar	0.5 hij (81)	1.7 cdefg (41)	11.9 hi (90)	34.0 fghij (74)
Rhapsody	1 gal	Foliar	2.8 ab (0)	3.0 a (0)	98.8 abcd (20)	102.5 abcd (22)
	1.5 gal	Foliar	2.8 ab (0)	3.0 a (0)	118.0 abc (4)	141.9 a (0)
	2 gal	Foliar	1.5 def (44)	2.6 abc (10)	89.1 bcd (28)	103.8 abcd (21)
Segway 400SC	3.0 fl oz	Foliar	0.9 fghij (67)	1.1 fghi (62)	18.9 hi (85)	27.1 ghij (79)
	6.0 fl oz	Foliar	0.7 fghij (74)	1.9 bcdef (34)	18.0 hi (85)	35.4 fghij (73)
Stature DM 50W	6.4 oz	Foliar	1.3 defgh (52)	1.3 efgh (55)	43.0 fgh (65)	45.7 fghi (65)
	12.8 oz	Foliar	0.9 fghij (67)	1.1 fghi (62)	27.2 hi (78)	38.7 fghij (71)
Subdue MAXX	2 fl oz	Drench	0.6 ghij (78)	0.8 ghij (72)	3.0 i (98)	3.2 ij (98)
Vital	4 pt	Drench	2.5 abc (7)	2.2 abcde (24)	79.9 de (35)	62.0 defg (53)
Untreated non-inoculated			0.0 j	0.0 j	0.0 i	0.0 j
Untreated inoculated			2.7 abc (0)	2.9 ab (0)	123.0 ab (0)	131.3 ab (0)

* Drench treatments applied 7 days, and foliar treatments applied 1 day before inoculation of detached leaves of treated seedlings placed on moistened filter paper in a petri dish. Disease assessment done 7 days after inoculation.

[1] Average number out of 3 inoculated sites per leaf

Column means with a letter in common are not significantly different (Duncan's Multiple Range Test, P=0.05).

Table 91. Efficacy of foliar and drench treatments on Ramorum Shoot Blight on Grand and Noble Firs, Chastagner, WA 2005.

Treatment	Rate Per 100 Gal	Application Method	No. of Infected Shoots (% Control)	
			***P. ramorum* Mating Type A1**	***P. ramorum* Mating Type A2**
Adorn	40 g ai	Foliar	1.0 fgh (79)	1.6 efghi (71)
Aliette 80W	5 lb	Foliar	3.0 abcd (38)	2.9 def (48)
Alude	1 qt	Drench	2.6 cdef (46)	5.3 a (5)
Biophos 43L	2 gal	Drench	4.4 ab (8)	5.1 ab (9)
Champ Formula 2F	1.33 pt	Foliar	2.1 cdefg (56)	3.0 cdef (46)
Daconil Ultrex	1.4 lb	Foliar	1.1 efgh (77)	1.4 efghi (75)
Dismiss	5 oz	Foliar	3.3 abc (31)	2.7 defg (52)
Dithane 75 DF	2 lb	Foliar	0.0 h (100)	0.0 i (100)
Fenstop 500SC	14 fl oz	Foliar	0.3 h (94)	1.4 efghi (75)
	28 fl oz	Foliar	0.0 h (100)	1.1 efghi (80)
Gavel 75 DF	2 lb	Foliar	0.6 gh (88)	0.1 i (98)
Insignia 20W	16 oz	Foliar	1.3 defgh (73)	3.3 bcde 41)
	40 oz	Foliar	1.4 defgh (71)	1.7 efghi (70)
Magellan	80 fl oz	Drench	3.0 abcd (38)	5.6 a (0)
Maneb 75 DF	2 lb	Foliar	0.0 h (100)	0.6 ghi (89)
Polyram 80 DF	2 lb	Foliar	0.3 h (94)	1.0 fghi (82)
Rhapsody	1 gal	Foliar	4.7 a (2)	5.0 abc (11)
	1.5 gal	Foliar	4.6 ab (4)	4.4 abcd (21)
	2 gal	Foliar	2.9 bcde (40)	5.6 a (0)
Segway 400SC	3.0 fl oz	Foliar	0.3 h (94)	1.1 efghi (80)
	6.0 fl oz	Foliar	0.0 h (100)	0.4 hi (93)
Stature DM 50W	6.4 oz	Foliar	1.1 efgh (77)	1.0 fghi (82)
	12.8 oz	Foliar	0.0 h (100)	0.4 hi (93)
Subdue MAXX	2 fl oz	Drench	0.1 h (98)	2.6 defgh (54)
Vital	2 qt	Drench	3.3 abc (31)	5.7 a (0)
Untreated non-inoculated			0.0 h	0.0 i
Untreated inoculated			4.8 a (0)	5.6 a (0)

* Drench treatments applied 7 days, and foliar treatments applied 1 day before inoculation of detached tops of treated seedlings placed on moistened filter paper in a petri dish. Number of infected shoots counted 7 days after inoculation.

Column means with a letter in common are not significantly different (Duncan's Multiple Range Test, P=0.05).

Table 92. Efficacy on Ramorum Blight (*Phytophthora ramorum*) on Rhododendron, Linderman, OR, 2005.

Treatment	Rate Per 100 Gal	Experiment 1 % Lesion Area (% Control)		Experiment 2 % Lesion Area (% Control)	Experiment 3 % Lesion Area (% Control)		Experiment 4 % Lesion Area (% Control)	
		D12A Mycelial Plug	N10A Mycelial Plug	N10A Sporangia	N10A Mycelial Plugs	N10A Sporangia	No Surfactant	With Surfactant
Adorn	3 oz	57.6 ± 3.0 (0)	51.7 ± 2.1 (0)	12.2 ± 2.2 (54)	51.7 ± 2.1 (0)	12.2 ± 2.2 (54)	0.4 ± 0.2 (98)	2.2 ± 3.0 (82)
Aliette 80W	5 oz	43.9 ± 1.0 (0)	41.9 ± 3.7 (0)	37.2 ± 3.4 (0)	41.9 ± 3.7 (0)	37.2 ± 3.4 (0)	0.1 ± 0.1 (99)	0.1 ± 0.1 (99)
Biophos 43L	2 gal	41.9 ± 3.9 (4)	43.2 ± 0.9 (0)	28.1 ± 3.9 (0)	43.2 ± 0.9 (0)	28.1 ± 3.9 (0)	1.3 ± 1.2 (93)	2.2 ± 0.7 (82)
Fenstop 500SC	14 fl oz	53.7 ± 5.2 (0)	48.9 ± 5.4 (0)	31.4 ± 3.2 (0)	48.9 ± 5.4 (0)	31.4 ± 3.2 (0)	2.0 ± 3.0 (90)	1.3 ± 0.5 (89)
	28 fl oz	48.3 ± 2.2 (0)	51.7 ± 5.0 (0)	9.1 ± 0.7 (66)	51.7 ± 5.0 (0)	9.1 ± 0.7 (66)	5.5 ± 3.3 (72)	0.1 ± 0.0 (99)
Insignia 20W	16 oz	52.4 ± 1.3 (0)	43.8 ± 4.7 (0)	32.9 ± 5.5 (0)	43.8 ± 4.7 (0)	32.9 ± 5.5 (0)	12.4 ± 7.4 (36)	11.8 ± 6.7 (2)
	40 oz	52.2 ± 2.4 (0)	53.1 ± 1.8 (0)	34.2 ± 8.8 (0)	53.1 ± 1.8 (0)	34.2 ± 8.8 (0)	14.3 ± 6.8 (26)	8.0 ± 4.8 (33)
Magellan	64 fl oz	55.0 ± 5.8 (0)	53.9 ± 0.9 (0)	36.0 ± 2.5 (0)	53.9 ± 0.9 (0)	36.0 ± 2.5 (0)	29.5 ± 1.0 (0)	19.4 ± 14.5 (0)
Mancozeb	46 oz	46.4 ± 2.9 (0)	43.3 ± 2.7 (0)	23.9 ± 8.5 (10)	43.3 ± 2.7 (0)	23.9 ± 8.5 (10)	7.1 ± 3.0 (63)	5.4 ± 4.1 (55)
SA110201	4 oz	23.4 ± 6.0 (46)	22.2 ± 9.8 (46)	19.3 ± 11.4 (28)	22.2 ± 9.8 (46)	19.3 ± 11.4 (28)	6.2 ± 4.9 (68)	7.8 ± 10.9 (35)
Segway 400SC	3.0 fl oz	51.7 ± 2.8 (0)	47.0 ± 0.4 (0)	9.1 ± 3.4 (66)	47.0 ± 0.4 (0)	9.1 ± 3.4 (66)	0.8 ± 1.5 (96)	7.2 ± 3.4 (40)
	6.0 fl oz	55.6 ± 2.0 (0)	55.1 ± 5.7 (0)	13.5 ± 6.9 (49)	55.1 ± 5.7 (0)	13.5 ± 6.9 (49)	1.1 ± 0.9 (94)	9.3 ± 7.3 (23)
Stature DM 50W	6.4 oz	50.3 ± 0.7 (0)	45.0 ± 2.3 (0)	23.9 ± 4.1 (10)	45.0 ± 2.3 (0)	23.9 ± 4.1 (10)	1.7 ± 0.7 (91)	1.7 ± 1.8 (86)
	12.8 oz	62.3 ± 6.7 (0)	55.4 ± 5.7 (0)	22.4 ± 18.8 (16)	55.4 ± 5.7 (0)	22.4 ± 18.8 (16)	0.2 ± 0.0 (99)	1.2 ± 1.5 (90)
Subdue MAXX	4 fl oz	-	-	1.1 ± 1.4 (96)	0 ± 0.0 (100)	1.1 ± 1.4 (96)	0.1 ± 0.0 (99)	0 ± 0.0 (100)
Untreated non-inoculated		0	0	0	0	0	0	0
Untreated inoculated		43.6 ± 4.2 (0)	41.1 ± 1.8 (0)	26.7 ± 2.4 (0)	41.1 ± 1.8 (0)	26.7 ± 2.4 (0)	19.3 ± 4.8 (0)	12.0 ± 0.9 (0)

* Foliartreatments applied 1 or 2 weeks before inoculation of detached leaves of treated seedlings placed on moistened containers. Disease assessment done 8 days after inoculation.

Table 93. Efficacy on Ramorum Blight (*Phytophthora ramorum*) on Rhododendron, Chastagner, WA, 2006.

Treatment	Rate per 100 gal	Application method	Number	
			Wounded	Non-wounded
Actinovate SP	12 oz	sprench	2.87 a	2.47 ab
Adorn 4FL	60 ml	foliar	1.53 c-f	1.53 b-f
	120 ml	foliar	2.13 a-d	1.67 a-e
Alude	2 qts	foliar	2.67 a	2.07 a-d
BioPhos	256 fl oz	drench	2.60 a	2.33 a-c
	256 fl oz	foliar	2.13 a-d	1.40 b-g
Captan 80 WP	4 oz	foliar	1.67 b-f	0.67 e-i
Chipco Aliette 80 WG	12.8 oz	foliar	2.27 a-d	1.40 b-g
Disarm 480SC	3.0 fl oz	foliar	2.93 a[1]	1.53 b-f
Fenstop	7.0 fl oz	foliar	1.40 d-f	0.47 f-i
	14.0 fl oz	foliar	1.13 e-h	0.40 g-i
Heritage WG 50	4 oz	foliar	2.27 a-d	1.87 a-d
Insignia 20.4%	8 oz	foliar	2.40 a-c	1.40 b-g
Magellan	12 fl oz	drench	2.93 a	2.67 a[1]
	5 pints	foliar	2.60 a	2.36 a-c
MultiGuard	500 ppm	foliar	1.67 b-e	1.27 c-h
	1000 ppm	foliar	2.00 a-e	1.27 c-h
NOA 446510	2 fl oz	foliar	0.33 hi	0.47 f-i
	8 fl oz	foliar	0.40 hi	0.60 e-i
Segway 400SC	3.0 fl oz	foliar	1.60 b-f	1.07 d-h
	6.0 fl oz	foliar	0.67 g-i	0.27 hi
Stature DM 50 WP	12.8oz	foliar	1.07 f-h	0.47 f-i
Subdue MAXX FV	2 fl oz	foliar	1.53 c-f	2.13 a-d
Terrazole 35 WP	8 oz	foliar	2.60 a	2.00 a-d
Vital	4 pints	drench	2.67 a	2.40 ab
	4 pints	foliar	2.64 a	1.50 b-f
Non-inoculated check			0.00 i	0.00 i
Inoculated check			2.47 ab	1.80 a-d

[1]Numbers in columns followed by the same letter are not significantly different, P = 0.05, Duncan's Multiple Range Test

Table 94. Efficacy on Ramorum Blight (*Phytophthora ramorum*) on Rhododendron, Linderman, OR, 2006.

Treatment	Rate per 100 gal	Inoculated with N10A	Wounded	% Lesion Area
Actinovate	10 oz	Yes	Yes	79.4 ± 3.7
Adorn 4Fl	60 ml	Yes	Yes	15.5 ± 0.6
	120 ml	Yes	Yes	11.0 ± 7.1
Aliette 80W	5 oz	Yes	Yes	52.6 ± 9.8
Alude	12.7	Yes	Yes	66.0 ± 9.3
Biophos	2 gal	Yes	Yes	76.1 ± 8.6
Captan 50WP	32 oz	Yes	Yes	56.2 ± 16.8
Dismiss	3 oz	Yes	Yes	80.8 ± 1.3
Fenstop 500SC	14 fl oz	Yes	Yes	74.6 ± 6.0
	28 fl oz	Yes	Yes	51.9 ± 9.8
Heritage	4 oz	Yes	Yes	81.5 ± 1.2
Insignia 20W	16 oz	Yes	Yes	78.8 ± 0.5
Magellan	64 fl oz	Yes	Yes	76.7 ± 10.0
Multiguard	1000 ppm	Yes	Yes	72.3 ± 12.3
	1000 ppm	No	No	0.1 ± 0.0
Segway 400SC	3.0 fl oz	Yes	Yes	74.4 ± 6.4
	6.0 fl oz	Yes	Yes	67.8 ± 2.6
Stature DM 50W	12.8 oz	Yes	Yes	54.2 ± 13.7
Subdue MAXX	4 fl oz	Yes	Yes	0.2 ± 0.0
Terrazole	8 oz	Yes	Yes	83.4 ± 3.1
Vital	4 pints	Yes	Yes	63.2 ± 5.6
Untreated non-inoculated		No	No	0.2 ± 0.0
Untreated inoculated		Yes	Yes	76.5 ± 1.0
Untreated inoculated		Yes	No	0.9 ± 1.2

Table 95. Efficacy on Ramorum Blight (*Phytophthora ramorum*) on Rhododendron, Chastagner, WA, 2007.

Treatment	Rate	Application method	Wounded		Non -Wounded	
			Number of lesions	Area of lesions (mm^2)	Number of lesions	Area of lesions (mm^2)
Adorn 4FL	60 ml	drench	3.00 a	134.90 a-c	2.93 a	111.01 ab
	120 ml	drench	3.00 a	140.22 a-c	2.93 a	111.06 ab
Captan 80 WP	4 oz	foliar	1.80 b-d	42.51 de	0.33 de	7.26 cd
Disarm 480 SC	2.0 fl oz	foliar	3.00 a	143.08 a-c	2.67 ab	119.18 a
	4.0 fl oz	foliar	3.00 a	156.80 ab	2.87 a	120.54 a
Dithane DF	2 lbs	foliar	0.27 f	3.28 e	0.07 de	0.32 d
Gavel 75 DF	2 lbs	foliar	0.73 d-f	33.03 de	0.13 de	1.87 d
Heritage WG 50	2 oz	foliar	2.93 a	135.18 a-c	2.60 ab	104.92 ab
	4 oz	foliar	2.87 ab	112.90 b-d	2.33 ab	78.72 a-c
Heritage WG 50 + Subdue MAXX FV	2 oz + 1 fl oz	foliar	2.07 a-c	30.02 de	1.73 bc	25.08 cd
Insignia 20.4%	16 oz	foliar	3.00 a	60.82 c-e	2.13 ab	37.64 b-d
Maneb 75 DF	2 lbs	foliar	0.53 ef	20.52 e	0.00 e	0.00 d
NOA 446510	4.0 fl oz	foliar	0.60 ef	44.19 de	0.33 de	14.55 cd
	8.0 fl oz	foliar	0.33 f	15.32 e	0.13 de	3.11 d
Polyram 80 DF	2 lbs	foliar	0.73 d-f	19.34 e	0.27 de	1.89 d
Segway	3.0 fl oz	foliar	1.53 c-e	59.53 c-e	0.67 de	13.06 cd
	6.0 fl oz	foliar	2.00 a-c	62.15 c-e	1.07 cd	45.90 a-d
Stature DM 50 WP	12.8oz	foliar	0.47 ef	16.71 e	0.00 e	0.00 d
Subdue MAXX FV	1 fl oz	foliar	2.13 a-c	10.12 e	1.80 bc	15.75 cd
	2 fl oz	foliar	2.47 a-c	47.22 de	2.40 ab	63.12 a-d
Non-inoculated check			0.00 f	0.00 e	0.00 e	0.00 d
Inoculated check			3.00 a	203.18 a	3.00 a	121.21 a

[1]Numbers in columns followed by the same letter are not significantly different, P = 0.05, Tukey's Studentized Range Test

Table 96. Efficacy of foliar treatments on Ramorum Blight (*Phytophthora ramorum*) on Rhododendron, Chastagner, WA, 2008.

Treatment	Rate per 100 gal	Wounded		Non-Wounded	
		Number of lesions	Area of lesions (mm^2)	Number of lesions	Area of lesions (mm^2)
Adorn 4FL	1 fl oz	0.3 cd	14.2 c	0.4 bc	14.1 bc
	2 fl oz	0.5 cd	9.8 c	0.2 c	5.0 bc
Captan 80 WP	4 oz	0.5 cd	2.8 c	0.1 c	0.1 c
Disarm 480 SC	4 fl oz	2.1 ab	87.3 ab	1.0 ab	41.6 ab
	8 fl oz	0.9 cd	17.1 c	0.3 bc	4.5 c
Dithane DF	2 lbs	0.9 cd	21.0 c	0 c	2.0 c
Fenstop	14 fl oz	0.3 cd	5.8 c	0 c	0 c
	28 fl oz	0.3 cd	1.2 c	0 c	0 c
Gavel 75 DF	2 lbs	0.9 cd	9.6 c	0.1 c	0.1 c
Insignia 20.4%	8 oz	0.5 cd	12.0 c	0.1 c	0.1 c
Maneb 75 DF	2 lbs	0.9 cd	15.5 c	0 c	0 c
NOA 446510	4 fl oz	0.4 cd	0.4 c	0 c	0 c
	8 fl oz	0.3 cd	0.5 c	0.1 c	0.1 c
Polyram 80 DF	2 lbs	1.1 bc	37.6 bc	0.1 c	2.7 c
Segway	3 fl oz	0.3 cd	3.5 c	0 c	0 c
	6 fl oz	0.3 cd	0.3 c	0 c	0 c
Stature SC	12.8 fl oz	0.1 cd	0.4 c	0 c	0 c
Subdue MAXX FV	1 fl oz	0.3 cd	0.4 c	0.2 c	4.6 c
	2 fl oz	0.3 cd	0.4 c	0.1 c	0.6 c
Tanos	12 oz	0.5 cd	7.4 c	0.1 c	0.8 c
Non-inoculated check		0 d	0.1 c	0 c	0 c
Inoculated check		2.5 a	121.0 a	1.5 a	74.1 a

[1]Numbers in columns followed by the same letter are not significantly different, P = 0.05, Tukey's Studentized Range Test

Table 97. Efficacy of foliar fungicides for control of Ramorum blight on camellia, Grunwald & Rolfe, 2007.

Treatment	Rate (per 100 gal)	% Lesion Area*
Adorn4FL	7.7 fl oz	6.8 de
	15.4 fl oz	11.3 cd
Aliette	9.4 oz	29.4 a
Captan	32 oz	33.8 a
NOA 446510	4 fl oz	5.1 de
	8 fl oz	2.2 ef
Segway	3 oz	17.1 bc
	6 oz	8.7 cd
Stature DM	6.4 oz	27.2 ab
Subdue MAXX	2 fl oz	1.0 ef
Untreated control		29.6 a
Non-inoculated control		0.1 ef

Table 98. Efficacy of foliar fungicides for control of Ramorum blight on camellia, Grunwald & Rolfe, 2008.

Treatment (active ingredient)	Rate/L (rate per 100 gal)	Lesion area (cm^2)*
Adorn (fluopicolide)	0.08 ml (1 fl oz)	5.4bc
	0.16 ml (2 fl oz)	5.6bc
Aliette (fosetyl Al)	0.71 g (9.5 oz)	9.1a
Captan	2.4 g (32 oz)	7.1abc
Disarm 480SC (fluoxastrobin)	0.31 ml (4 fl oz)	6.6abc
	0.62 ml (8 fl oz)	1.1ed
Fenstar (fenamidone)	1.09 ml (14 fl oz)	6.4abc
	2.18 ml (28 fl oz)	4.5cd
NOA 446510 (mandipropamid)	0.31 ml (4 fl oz)	5.8abc
	0.62 ml (8 fl oz)	6.2abc
Segway (cyazofamid)	0.23 g (3 oz)	0.8e
	0.47 g (6.3 oz)	0.7e
Stature DM (dimethomorph)	0.48 ml (6 fl oz)	6.6abc
Subdue MAXX (mefenoxam)	0.16 ml (2 fl oz)	0.5e
Untreated, inoculated control		8.0ab

*Means followed by the same letter are not significantly different at P=0.05, according to a Fisher's protected least significance difference test.

Table 99. Efficacy of registered and unregistered fungicides for control of Ramorum blight on Viburnum, 2009, Grunwald.

Product	Rate/L (rate per 100 gal)	Application Method	Lesion area (cm^2)*
Adorn/V-10161 (fluopicolide)	0.08 ml (1 fl oz)	drench	3.87 a
Adorn/V-10161 (fluopicolide)	0.16 ml (2 fl oz)	drench	3.46 ab
Aliette (fosetyl Al)	0.71 g (9.5 oz)	drench	2.76 bcde
BASF 651F	1.71 ml (22 fl oz)	spray	2.79 bcde
BASF 651F	2.80 ml (35.8 fl oz)	spray	1.93 ef
Captan	2.4 g (32 oz)	spray	3.05 abcd

Cg100	0.3%	spray	0.83 gh
Cg100	0.6%	spray	0.84 gh
Disarm 480SC (fluoxastrobin)	0.31 ml (4 fl oz)	drench	2.16 def
Disarm 480SC (fluoxastrobin)	0.62 ml (8 fl oz)	drench	1.34 fg
NOA 446510 (mandipropamid)	0.31 ml (4 fl oz)	spray	2.66 bcde
NOA 446510 (mandipropamid)	0.62 ml (8 fl oz)	spray	2.36 cde
Regalia SC	0.5%	spray	0.42 gh
Regalia SC	1%	spray	0.16 h
Stature DM (dimethomorph)	0.48 ml (6 fl oz)	spray	2.19 cdef
Subdue MAXX (mefenoxam)	0.16 ml (2 fl oz)	spray	0.05 h
Untreated, inoculated control		-	3.13 abc

*Means followed by the same letter are not significantly different at *P*=0.05, according to a Fisher's protected least significance difference test.

Table 100. Efficacy of foliar and drench treatments on ramorum blight on Rhododendron, Chastagner, WA, 2009.

Treatment	Rate per 100 gal	Mode of action	Wounded Inoculation Sites				Unwounded Inoculation Sites			
			Number of Llesions		Lesion size (area – sq mm)		Number of lesions		Lesion size	
Adorn 4F	1 fl oz	systemic	2.0	ab	49.84	b-d	0.4	a	5.25	a
	2 fl oz	systemic	1.9	ab	48.92	b-d	0.1	a	1.79	a
BAS 651 F	11 fl oz	systemic	0.3	d	0.16	d	0.0	a	0.00	a
	13.7 fl oz	systemic	0.3	d	0.20	d	0.0	a	0.00	a
CG 100	0.2 %	contact	1.7	a-c	43.88	b-d	0.1	a	2.45	a
	0.4 %	contact	2.5	a	112.41	a	0.3	a	6.93	a
Disarm 480 SC	4 fl oz	systemic	1.9	ab	38.12	b-d	0.4	a	7.19	a
	8 fl oz	systemic	2.3	a	62.92	ab	0.5	a	10.73	a
Dithane DF	2 lbs	contact	0.7	cd	6.34	cd	0.1	a	0.15	a
Gavel 75 DF	2 lbs	contact	0.3	d	2.20	d	0.1	a	0.03	a
Insignia 20.4%	16 oz	systemic	1.1	b-d	19.37	b-d	0.0	a	0.00	a
Maneb 75 DF	2 lbs	contact	0.2	d	3.28	cd	0.0	a	0.00	a
NOA 446510	4 fl oz	contact	0.1	d	0.08	d	0.0	a	0.00	a
	8 fl oz	contact	0.2	d	0.14	d	0.0	a	0.00	a
Polyram 80 DF	2 lbs	contact	0.5	d	7.04	cd	0.0	a	0.00	a
Regalia SC	0.5 %	both	0.6	cd	19.78	b-d	0.1	a	2.82	a
	1 %	both	1.7	a-c	38.35	b-d	0.2	a	5.94	a
Stature SC	12.25 fl oz	contact	0.5	d	1.25	d	0.1	a	0.73	a
Subdue MAXX FV	1 fl oz	systemic	0.3	d	0.28	d	0.1	a	0.76	a
	2 fl oz	systemic	0.1	d	0.03	d	0.1	a	0.04	a
Untreated Inoculated check			2.6	a	58.90	a-c	0.5	a	6.19	a
Untreated Non-inoculated check			0.0	d	0.00	d	0.0	a	0.00	a

[1]Numbers in columns followed by the same letter are not significantly different, P = 0.05, Tukey's Studentized Range Test

Table 101. Efficacy of drench treatments on ramorum blight on Rhododendron, Chastagner, WA, 2010.

Treatment	Rate per 100 gal	Applic interval*	Severity [1] 8/2/10	Total growth (mm)	Total growth excluding dead plants (mm)	Proportion of plants with P. ramorum positive roots	Total # of positive roots per plant (10 max)	Proportion of plants that died &/or had P. ramorum positive roots
Adorn 4F	1 fl oz	28	1.6 ab [2]	44.8 a	63.8 a	0.2 ab	0.2 a	0.6 abc
	2 fl oz		0.0 b	62.5 a	62.5 a	0.0 b	0.0 a	0.0 c
BAS 651 F (Orvego)	11 fl oz	14	0.0 b	60.0 a	60.0 a	0.0 b	0.0 a	0.0 c
	13.7 fl oz		0.0 b	74.3 a	74.3 a	0.2 ab	0.2 a	0.2 bc
BW 240	4 oz	42	1.6 ab	34.7 a	39.5 a	0.8 a	1.4 a	0.8 ab
	6 oz		3.2 a	28.5 a	35.0 a	0.4 ab	1.6 a	1.0 a
Disarm 480 SC	4 fl oz	21	0.0 b	90.5 a	90.5 a	0.0 b	0.0 a	0.0 c
	8 fl oz		0.0 b	55.7 a	55.7 a	0.0 b	0.0 a	0.0 c
Heritage	0.9 oz	21	0.0 b	49.6 a	49.6 a	0.0 b	0.0 a	0.0 c
	1.8 oz		0.0 b	50.1 a	50.1 a	0.2 ab	0.6 a	0.2 bc
Stature SC	3.06 fl oz	14	0.0 b	65.7 a	65.7 a	0.4 ab	0.4 a	0.4 abc
	6.12 fl oz		0.0 b	52.4 a	52.4 a	0.0 b	0.0 a	0.0 c
Subdue MAXX FV	2 fl oz	70	2.4 ab	40.7 a	76.3 a	0.8 a	2.2 a	0.8 ab
Untreated Non-inoculated			0.0 b	42.6 a	42.6 a	0.0 b	0.0 a	0.0 c
Untreated Inoculated			2.4 ab	50.4 a	73.5 a	0.8 a	2.2 a	0.8 ab

*Treatments applied from 11/09/09 to 8/16/10.

[1] Disease severity rating on a scale 1-4 where 0= no wilt, 1 = slight wilt (<25%), 2 = moderate wilt (26-50%), 3 = severe wilt (>51%), 4 = dead.

[2] Numbers in columns followed by the same letter are not significantly different, P = 0.05, Tukey's Studentized Range Test

Phytophthora syringae. In 2006, Regan examined the efficacy of various products to control *Phytophthora syringae* causing a stem canker disease on flowering crabapple (*Malus sp.*) 'Spring Snow'. The highest level on control was achieved with Magellan at 80 fl oz and Alude at 64 fl oz (Table 75).

In 2008, Grunwald and Rolfe also examined the efficacy of various products to control *Phytophthora syringae* causing a stem canker disease on crabapple (*Malus sp.*) 'Spring Snow'. Chemical treatments had a significant effect on % lesion length observed. However, only Aliette was significantly different from the untreated control and significantly reduced disease severity (Table 76).All chemicals were effectively fungistatic, not fungicidal, after confirmation of the pathogen's viability by isolation and subsequent culture of the pathogen from wound-sites on symptomless leaves. The non-inoculated control showed no lesions

Table 102. Efficacy on *Phytophthora syringae* canker on flowering crabapple 'Spring Snow', Regan, OR, 2006.

Treatment	Rate per 100 gal	Application days prior to inoculation[1]	Mean Stem Canker Length (cm)[2]	Percent Control
Adorn 4 FL	60 ml	33, 19	66.5 a	1.5
	120 ml	33, 19	65.9 a	2.4
Aliette	12.8 oz	70, 42	49.7 b[3]	26.4
Alude	64 fl oz	70, 42	14.9 d	77.9
Dismiss	3 oz	33, 19	69.1 a	0
Insignia	8 oz	33, 19	73.7 a	0
Magellan	80 fl oz	70, 42	13.2 d	80.4
Segway	6.0 oz	33, 19	66.0 a	2.2
	3.0 oz	33, 19	66.2 a	1.9
Stature DM	12.8 oz	33, 19	36.4 c	46.1
Untreated Inoculated			67.5 a	0

[1] All treatments were wound inoculated on November 15, 2006.
[2] Mean Stem Canker Length (mm) determined on December 27, 2006 using a Mitutoyo Absolute Digital Caliper (Model CD-S6"CT).
[3] Column mean numbers followed by the same letter are not significantly different (Alpha = 0.05) as determined by Fisher's LSD multiple-comparison test (NCSS, 2004).

Table 103. Efficacy on *Phytophthora syringae* canker on crabapple 'Spring Snow', Grunwald, OR, 2008.

Treatment	Rate per 100 gal	Application method	Lesion Length (mm)
Adorn 4FL	1 fl oz	Drench	27.2 a
	2 fl oz	Drench	26.5 a
Aliette	9.5 oz	Drench	8.0 b
Captan	2 lb	Spray	29.3 a
Disarm 480 SC	4 fl oz	Drench	30.5 a
	8 fl oz	Drench	23.2 a
Fenstar	14 fl oz	Drench	27.8 a
	28 fl oz	Drench	30.2 a
NOA 446510	4 fl oz	Drench	32.7 a
	8 fl oz	Drench	27.2 a
Segway	3.1 oz	Drench	32.8 a
	6.3 oz	Drench	30.5 a
Stature	5.1 fl oz	Drench	24.8 a
Subdue MAXX	2 fl oz	Spray	29.3 a
Untreated Inoculated			29.5 a

Means followed by the same letter are not significantly different (Alpha = 0.05), according to a non-parametric multiple comparison of means using PROC MULTTEST in SAS allowing for non-normality using permutation resampling methods.

Efficacy Summary by Product/Active Ingredient

A brief efficacy summary for select products is given below, with a reminder that there are very limited data available to draw definitive conclusions for many products. Products were selected based on interest in these products for testing in Phytophthora efficacy projects from 2005 t0 2015. While this summary does include some non-IR-4 data, it is not exhaustive and other data for *Phytophthora*-managing products may be available.

A13836B. A13836B as a drench provided excellent control of *P. nicotianae* in pansy and petunia experiments.

A14658C. A14658C as a drench provided excellent control of *P. nicotianae* in a pansy experiment.

Actinovate. Actinovate did not provide sufficient control of soil-borne *P. cinnamomi* or foliar *P. ramorum* in the experiments conducted through IR-4.

Adorn. Adorn provided good to excellent control of *P. cinnamomi* on azalea but variable control on rhododendron, similar to other products. Adorn did give good to excellent control of *P. nicotianae* and tended to provide good efficacy on *P. ramorum*. Good to excellent efficacy was observed with *P. cryptogea, P. palmivora* and *P. tropicalis.*

Aliette WDG. Aliette provided good to excellent control of *P. cinnamomi* on azaleas but not on rhododendrons in the research presented here, a very similar scenario to most products with these two host-pathogen systems. Overall efficacy on *P. nicotianae* was good to excellent applied drench or foliar. Aliette also provided good control of foliar *P. citricola,* but variable with *P. tropicalis* and *P. ramorum.* Little efficacy was observed on *P. cryptogea, P. drechsleri*.

BAS 703. BAS 703 as a foliar spray provided excellent control of *P. plurivora* in a rhododendron experiment.

Captan. Captan as a drench application did not control *P. cinnamomi* on azalea and results on rhododendron were mixed. Good control was observed with *P. nicotianae* on vinca, and there was variable efficacy on *P. ramorum*. It provided excellent control of *P. palmivora* on English ivy.

Disarm. Disarm provided good to excellent efficacy on *P. cinnamomi* on azalea but not on rhododendron, similar to other products. Drench application was generally poor with *P. cryptogea.* Disarm provided poor to excellent control *P. ramorum*. On English ivy, it provided excellent control of *P. palmivora* and good to excellent control of *P. tropicalis*.

Fenstop 500SC. Fenamidone sufficiently managed *P. cinnamomi* on azalea but not on rhododendron, a similar story with other products. Fenamidone applied to the foliage did not provide sufficient efficacy on *P. citricola,* but it tended to provide excellent control of *P. nicotianae* regardless of host crop. Also it provided excellent control of *P. nicotianae* when applied as drench on snapdragon and vinca. On *P. cryptogea, P. palmivora, P. ramorum* and *P. tropicalis,* Fenamidone also tended to have good to excellent efficacy.

Heritage. Heritage provided good to excellent efficacy on *P. cryptogea*, but mixed results (poor to excellent efficacy) was observed with *P. palmivora.* It provided poor to excellent control of *P. ramorum,* but did not control *P. cinnamomi* on rhododendron in the experiments included in this research summary. It provided good control of *P. nicotianae* on snapdragon, but was ineffective in two vinca experiments.

Insignia 20WG. Insignia demonstrated good to excellent control of *P. cinnamomi* on azalea and little control on rhododendron. Poor efficacy was observed with foliar application to manage *P. citricola*, and variable efficacy for both *P. nicotianae* and *P. ramorum.* Drench application provided poor efficacy with

P. cryptogea on gerbera but good efficacy on Fraser and noble firs. Poor to good efficacy was observed with *P. palmivora*, and poor efficacy with *P. tropicalis*.

MBI 110. MBI 110 as a foliar spray provided excellent control of *P. plurivora* in a rhododendron experiment.

Micora (NOA 446510). Mandipropamid, the active ingredient in Micora (NOA 446510), provided good to excellent control of *P. cinnamomi* and *P. plurivora* on azalea and rhododendron, excellent efficacy on *P. nicotianae*, and good efficacy on *P. ramorum*.

MultiGuard. MultiGuard as a drench did not perform well in this series of tests for *P. cinnamomi, P. nicotianae*, and *P. ramorum*. However, it did provide good efficacy with a foliar application for controlling *P. nicotianae*, and other researchers have reported good efficacy with a low constant feed.

Mural (A18126B). Mural as a drench provided excellent control of *P. cryptogea* in a gerbera experiment.

Orvego (BAS 651). Orvego as a drench/sprench provided excellent control of *P. nicotianae* in a pansy experiment, but poor control in a vinca experiment. Excellent control of *P. tropicalis* and *P. ramorum* was observed in gloxinia and rhododendron experiments.

Pageant. Pageant as a drench/sprench provided good to excellent control of *P. tropicalis* in two vinca and gloxinia experiments.

Phosphorus Acids/Phosphorus Acid Generators.

A14658C. A14658C as a spray/sprench provided variable control of *P. nicotianae* in two vinca experiments.

Agri-Fos. Agri-Fos provided excellent control of *P. tropicalis* in a gloxinia experiment, but did not control *P. cryptogea* in a gerbera experiment, and *P. palmivora* in an English ivy experiment.

Alude. Alude provided excellent efficacy of *P. tropicalis* in a gloxinia experiment. Also it provided excellent efficacy of *P. cinnamomi* on azaleas but not consistently with rhododendrons, similar to other products with these two systems. In general, it provided good to excellent efficacy on *P. nicotianae*. Some efficacy was observed on *P. drechsleri*, variable on *P. nicotianae* and none on *P. ramorum*. Poor efficacy was observed with *P. palmivora*, and no efficacy with *P. cryptogea.*

Biophos 43L. Biophos provided excellent efficacy of P. cinnamomi on azaleas but not consistently with rhododendrons, similar to other products with these two systems. Good efficacy was observed with P. citricola and with drench applications for P. nicotianae. Little efficacy was seen on P. ramorum. No efficacy was oberved with P. cryptogea.

Magellan. Magellan demonstrated good to excellent efficacy of *P. cinnamomi* on both azalea and rhododendron. Good efficacy was observed with *P. citricola* and *P. palmivora*, but no efficacy with *P. cryptogea* and *P. ramorum*.

Vital 4L. Vital provided excellent control of *P. tropicalis* in a gloxinia experiment. Also it provided excellent control of *P. cinnamomi* on azalea and mixed results on rhododendron, similar to other products. In the *P. nicotianae* experiment on spathiphyllum and petunia, Vital performed well. Variable results were observed with *P. ramorum*. Poor to no efficacy was observed with *P cryptogea* on gerbera.

PlantShield. PlantShield did not control *P. nicotianae* in a petunia experiment.

Prestop. Prestop as a foliar spray provided fair control of *P. plurivora* in a rhododendron experiment.

Promax/Proud 3. This active ingredient appled as a foliar spray provided poor to good control of *P. plurivora* in a rhododendron experiment.

Rhapsody. Rhapsody ASO did not control *P. plurivora* in a rhododendron experiment.

RootShield PLUS (BW240). Rootshield PLUS did not control *P. ramorum* in a rhododendron experiment.

Segovis (A21008A). Segovis provided excellent control of *P. cryptogea* and *P. plurivora* in gerbera and rhododendron experiments.

Segway 400SC. Segway demonstrated good to excellent efficacy for *P. cinnamomi* on azalea and variable efficacy on rhododendron, similar to other products. Segway as a foliar application for *P. citricola* did not do well, but it did perform well for *P. drechsleri* on poinsettia. In general, Segway provided good to excellent control of *P. nicotianae* regardless of host crop and good control of *P. ramorum*. Good to excellent efficacy was observed with *P. tropicalis,* variable with *P. cryptogea* and poor to excellent with *P. palmivora*.

SP2770. SP2770 applied as a drench followed by foliar provided excellent control of *P. plurivora* in a rhododendron experiment.

Stature DM 50WP/SC. Stature provided excellent control of *P. cinnamomi* on azalea and mixed results on rhododendron, similar to other products. Poor efficacy was observed with *P citricola*, but excellent efficacy with *P. palmivora,* good to excellent efficacy for *P. cryptogea*, and good efficacy for *P. drechsleri*. Stature gave good to excellent control for *P. nicotianae* with the exception of this pathogen on African violet and vinca. Variable results were seen for *P. ramorum*. Excellent efficacy was observed with *P. tropicalis* on English ivy, but poor efficacy on gloxinia.

Subdue MAXX. Subdue MAXX tended to provide poor control of *P. cinnamomi* on azalea but good efficacy on rhododendron; poor to excellent efficacy for *P. ramorum* was observed on rhododenron. Efficacy with *P. cryptogea* was excellent on pansy, Fraser and noble firs but variable on gerbera. Good to excellent disease control was obtained on *P. nicotianae, P. palmivora,* and *P. tropicalis.* It provided excellent control of *P. plurivora* in a rhododendron experiment.

Taegro. Taegro did not control *P. cryptogea* in a gerbera experiment, *P. palmivora* in an English ivy experiment, and *P tropicalis* in gloxinia and English ivy experiments.

Tanos. Tanos demonstrated excellent efficacy for *P. ramorum* in a rhododendron experiment. However, it provided poor efficacy for *P. palmivora* in an English ivy experiment, and *P tropicalis* in a gloxinia experiment, and no efficacy for *P. cryptogea* in a gerbera experiment.

Terrazole 35WP. Terrazole did not tend to perform well in these experiments. The only disease it controlled well was *P. drechsleri* on poinsettia.

TM-459. TM-459 applied as a foliar spray provided poor efficacy on *P. citricola*.

Please see Table 104 for individual summaries of IR-4 trials conducted during 2004 to 2015.

Phytotoxicity

No phytotoxicity was observed with the products listed above with the exception of MultiGard, Tanos, Agri-fos and Vital drenches, and Camelot spray.

Table 104. Summary of product efficacy by pathogen and crop.

Note: Table entries are sorted by product, pathogen Latin name, and then by crop Latin name. Only those IR-4 trials received by 11/28/2016 are included in the table below.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28021	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
26534	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 10 oz per 100 gal.
27534	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27534	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27534	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26506	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
26506	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Sprench	No efficacy at 12 oz per 100 gal.
26772	Actinovate Soluble (Streptomyces lydicus WYEC 108)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Good efficacy at 10 oz per 100 gal
26380	Adorn 4F (Fluopicolide)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26932	Adorn 4F (Fluopicolide)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
26380	Adorn 4F (Fluopicolide)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26380	Adorn 4F (Fluopicolide)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25854	Adorn 4F (Fluopicolide)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Alder (Alnus sp.) Alnus maritima	Greenhouse	Kratsch	UT	2006	Drench	Disease did not develop
25846	Adorn 4F (Fluopicolide)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 30 and 60 ml per 100 gal
25841	Adorn 4F (Fluopicolide)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Mediocre efficacy at 1.5 and 3.0 oz per 100 gal, but inoculated and non-inoculated checks had no disease.
25841	Adorn 4F (Fluopicolide)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 30 and 60 ml per 100 gal.
24917	Adorn 4F (Fluopicolide)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Foliar	Good efficacy with foliar application of 10 g ai per 100 gal.
24917	Adorn 4F (Fluopicolide)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Excellent efficacy with 30 and 60 ml per 100 gal drench application.
24940	Adorn 4F (Fluopicolide)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Great to Excellent efficacy with 60 and 120 ml per 100 gal as foliar spray 2 weeks after inoculation.
24940	Adorn 4F (Fluopicolide)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Drench	Poor efficacy at 60 and 120 ml per 100 gal
27556	Adorn 4F (Fluopicolide)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 1 and 2 fl oz per 100 gal; one of the most effective products
27556	Adorn 4F (Fluopicolide)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 1 and 2 fl oz per 100 gal; one of the most effective products
26384	Adorn 4F (Fluopicolide)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.)	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; excellent control at 30 and 60 ml per 100 gal; comparable to uninfested control
26384	Adorn 4F (Fluopicolide)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; poor control at 1 fl oz per 100 gal; excellent control at 2 fl oz, comparable to uninfested control

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26384	Adorn 4F (Fluopicolide)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; poor control at 60, good at 120 ml per 100 gal; inferior to uninfested control
27769	Adorn 4F (Fluopicolide)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; excellent efficacy at 1 and 2 fl oz per 100 gal
29472	Adorn 4F (Fluopicolide)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; excellent control at 60 and 120 ml per 100 gal; comparable to uninfested control
26716	Adorn 4F (Fluopicolide)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Montego Mix'	Greenhouse	Hausbeck	MI	2006	Drench	Excellent efficacy with 1.02, 2.04, and 4 fl oz per 100 gal.
25813	Adorn 4F (Fluopicolide)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25813	Adorn 4F (Fluopicolide)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25813	Adorn 4F (Fluopicolide)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26752	Adorn 4F (Fluopicolide)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Patrice'	Greenhouse	Norman	FL	2006	Drench	Excellent efficacy with 3 and 6 fl oz per 100 gal.
25807	Adorn 4F (Fluopicolide)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.)	Greenhouse	Hausbeck	MI	2006	Foliar	Good to excellent efficacy with 60 and 120 ml per 100 gal.
27641	Adorn 4F (Fluopicolide)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; significant control at 30, excellent at 60 ml per 100 gal
26387	Adorn 4F (Fluopicolide)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Curative Trial: Significantly reduced a severe root necrosis at 30 and 60 ml per 100 gal
26387	Adorn 4F (Fluopicolide)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Preventative Trial: Significantly reduced a severe root necrosis at 30 and 60 ml per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27731	Adorn 4F (Fluopicolide)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 1 and 2 fl oz per 100 gal; comparable to non-inoculated check.
27731	Adorn 4F (Fluopicolide)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 60 and 120 ml per 100 gal; equal to non-inoculated Check at the higher rate
27735	Adorn 4F (Fluopicolide)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 120 but not at 60 ml per 100 gal
26390	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	Greenhouse	Grunwald	OR	2008	Foliar	No significant reduction of lesion development at 1 and 2 fl oz per 100 gal.
26390	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflorae'	Greenhouse	Grunwald	OR	2007	Foliar	Some reduction in lesion development with 7.7 and 15.4 fl oz per 100 gal
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	Good efficacy at both rates.
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Foliar	Good efficacy with foliar application.
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	Variable impact on number of lesions but significantly reduced lesion size at 60 ml per 100 gal.
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Drench	Virtually no efficacy at 60 and 120 ml per 100 gal
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Good to excellent efficacy at 1 and 2 fl oz per 100 gal
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Drench	Very limited disease development. Promising efficacy at 2 fl oz per 100 gal; comparable to Stature.
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Foliar	Poor efficacy at 1 and 2 fl oz per 100 gal.
24907	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Foliar	Mixed results with foliar application: no to poor efficacy in 3 trials, excellent efficacy in 1 trial

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
29718	Adorn 4F (Fluopicolide)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Drench	No significant reduction of lesion development at 1 and 2 fl oz per 100 gal.
26771	Adorn 4F (Fluopicolide)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Good and excellent efficacy at 30 and 60 ml per 100 gal
25624	Adorn 4F (Fluopicolide)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Drench	No effect on lesion development at 1 and 2 fl oz per 100 gal
25624	Adorn 4F (Fluopicolide)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	Poor control with 120 ml per 100 gal with foliar applications
25624	Adorn 4F (Fluopicolide)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Drench	No control of wound canker at 60 and 120 ml per 100 gal
28896	Adorn 4F (Fluopicolide)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
28896	Adorn 4F (Fluopicolide)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) Sinningia speciosa 'Avanti Peach Rose'	Greenhouse	Benson	NC	2009	Drench	High disease pressure; excellent control at 2 and 4 fl oz per 100 gal; comparable to uninoculated control.
28847	Adorn 4F (Fluopicolide)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Excellent control of a severe disease pressure drenched at 1 and 2 fl oz per 100 gal
28847	Adorn 4F (Fluopicolide)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2009	Drench	Excellent control at 1 and 2 fl oz per 100 gal
25821	Adorn 4F (Fluopicolide)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Excellent control drenched at 3 and 6 fl oz per 100 gal.
28023	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
27004	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 64 fl oz per 100 gal
25488	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25802	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 2 gal per 100 gal, but inoculated and non-inoculated checks had no disease.
25488	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25488	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25802	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 64 fl oz per 100 gal.
25802	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Foliar	No significant reduction in disease with 64 fl oz per 100 gal.
25488	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Foliar	Excellent efficacy with foliar application of 2 gal per 100 gal.
25488	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Foliar	Excellent efficacy with 2 gal per 100 gal.
25488	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006		Excellent efficacy with 64 fl oz per 100 gal foliar spray.
25488	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25679	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005	Foliar	Good efficacy with foliar application

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25679	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Foliar	Excellent efficacy with foliar application of 16 pints per 100 gal
26989	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Foliar	Extremely high disease pressure; no control at 64 fl oz per 100 gal
26989	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 64 fl oz per 100 gal.
25753	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2005	Drench	Good plant health and no plant death at 128 fl oz per 100 gal.
29479	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 64 fl oz per 100 gal.
25760	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'White'	Greenhouse	Hausbeck	MI	2005	Drench	Good efficacy with drench application
25172	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Excellent control at 2%.
25184	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.) 'Polka Dot Pacific'	Greenhouse	Hausbeck	MI	2005	Foliar	Poor efficacy
27628	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Foliar	Moderately high disease pressure; excellent control at 64 fl oz per 100 gal
30550	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Phytotoxic at 12.7 fl oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25180	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005		Poor efficacy at 2 gal per 100 gal
25695	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
25695	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Drench	Poor efficacy with drench application
25695	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 1 gal per 100 gal.
25695	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Foliar	Mixed results: only achieved good efficacy in one trial
26778	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Good and excellent efficacy at 1 and 2 gal per 100 gal
28887	Agrifos (Dipotassium phosphonate + Dipotassium phosphate)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Foliar	Low pressure; no difference between non-inoculated and inoculated control and treatments
28024	Aliette WDG (Fosetyl Al)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
27008	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; reduced disease rating at 6.4 oz per 100 gal
25842	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.)	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 5 lb per 100 gal, but inoculated and non-inoculated checks had no disease.
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) ‘Nova zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25842	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 12.8 oz per 100 gal.
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Drench	Excellent efficacy with drench application of 12.8 oz per 100 gal.
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Foliar	Great efficacy with foliar application of 80 oz per 100 gal.
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Foliar	Excellent efficacy at 5 lbs per 100 gal foliar spray.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24918	Aliette WDG (Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24941	Aliette WDG (Fosetyl Al)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005	Foliar	Good efficacy with foliar application
24941	Aliette WDG (Fosetyl Al)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Excellent efficacy with both 5 lb per 100 gal as foliar spray 2 weeks after inoculation.
24941	Aliette WDG (Fosetyl Al)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Drench	Excellent efficacy at 12.8 oz per 100 gal
27945	Aliette WDG (Fosetyl Al)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Poor efficacy at 12.8 oz per 100 gal
27945	Aliette WDG (Fosetyl Al)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Poor efficacy at 12.8 oz per 100 gal
26987	Aliette WDG (Fosetyl Al)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Foliar	Extremely high disease pressure; no control at 5 lb per 100 gal
26987	Aliette WDG (Fosetyl Al)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Foliar	Extremely high disease pressure; no control at 5 lb per 100 gal
26987	Aliette WDG (Fosetyl Al)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 80 oz per 100 gal.
25756	Aliette WDG (Fosetyl Al)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2005	Drench	Mediocre control at 12.8 oz per 100 gal.
29464	Aliette WDG (Fosetyl Al)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 80 oz per 100 gal.
25763	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'White'	Greenhouse	Hausbeck	MI	2005	Drench	Poor efficacy with drench applicatoin

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24980	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005	Drench	Some efficacy at 10 oz per 100 gal, but not significantly different from both untreated non-inoculated and untreated inoculated controls.
27532	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27532	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27532	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26192	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Sage, common (Salvia officinalis)	Greenhouse	Walsh	WA	2005	Drench	No statistical difference among treatments on P. parasitica
25174	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Patrice'	Greenhouse	Norman	FL	2006	Drench	Excellent efficacy with 12.8 fl oz per 100 gal.
25174	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Great control with 12.8 oz per 100 gal with some break through starting to occur.
25229	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.) 'Polka Dot Pacific'	Greenhouse	Hausbeck	MI	2005	Foliar	Good efficacy
27626	Aliette WDG (Fosetyl Al)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Foliar	Moderately high disease pressure; excellent control at 80 oz per 100 gal
30543	Aliette WDG (Fosetyl Al)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root vigor, but not shoot vigor, at 12.8 oz per 100 gal; indication of phytotoxicity.
28907	Aliette WDG (Fosetyl Al)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	Greenhouse	Grunwald	OR	2008	Foliar	No reduction of lesion development at 9.3 oz per 100 gal.
28907	Aliette WDG (Fosetyl Al)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflorae'	Greenhouse	Grunwald	OR	2007	Foliar	No impact on lesion development with 9.4 oz per 100 gal.
24908	Aliette WDG (Fosetyl Al)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	Significantly suppressed lesion development

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24908	Aliette WDG (Fosetyl Al)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembia'	Field Container	Linderman	OR	2005		Mixed results: in four experiments only 1 exhibited efficacy with foliar applications
24908	Aliette WDG (Fosetyl Al)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Foliar	Poor efficacy with foliar application
24908	Aliette WDG (Fosetyl Al)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 12.8 oz per 100 gal.
29721	Aliette WDG (Fosetyl Al)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Drench	No significant reduction of lesion development at 9.4 oz per 100 gal.
26475	Aliette WDG (Fosetyl Al)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Drench	Significantly reduced lesion development at 9.4 oz per 100 gal; the only effective treatment
26475	Aliette WDG (Fosetyl Al)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	Poor control of wound canker with 12.8 oz per 100 gal foliar applications.
26475	Aliette WDG (Fosetyl Al)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Drench	Good control of wound canker at 12.8 oz per 100 gal
28885	Aliette WDG (Fosetyl Al)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Foliar	Low pressure; no difference between non-inoculated and inoculated control and treatments
28841	Aliette WDG (Fosetyl Al)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Almost no control of a severe disease pressure drenched at 12.8 oz per 100 gal
27948	Aliette WDG (Fosetyl Al)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Excellent control drenched at 12.8 fl oz per 100 gal.
28022	Alude (Potassium phosphite)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
27003	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 12.7 fl oz per 100 gal
24913	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Pennucci	NH	2006	Drench	Good efficacy at 12.7 fl oz per 100 gal
24913	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.

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25837	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Mediocre efficacy at 12.7 fl oz per 100 gal, but inoculated and non-inoculated checks had no disease.
24913	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24913	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25837	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	Significant reduction in disease with 12.7 fl oz per 100 gal.
25837	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Foliar	No significant reduction in disease with 2 quarts per 100 gal.
24913	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Excellent efficacy with drench applications of 6.25 and 12.5 fl oz per 100 gal.
24913	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Foliar	Excellent efficacy with 12.7 fl oz per 100 gal foliar spray.
24913	Alude (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24935	Alude (Potassium phosphite)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Great efficacy with 64 oz per 100 gal as foliar spray 2 weeks after inoculation.
26988	Alude (Potassium phosphite)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Foliar	Extremely high disease pressure; virtually no control at 12.7 fl oz per 100 gal
26988	Alude (Potassium phosphite)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Foliar	Extremely high disease pressure; virtually no control at 12.7 fl oz per 100 gal
26988	Alude (Potassium phosphite)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no control at 12.7 fl oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25752	Alude (Potassium phosphite)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2005	Drench	Some efficacy at 12.7 fl oz per 100 gal.
25752	Alude (Potassium phosphite)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; good efficacy at 12.7 fl oz per 100 gal
29465	Alude (Potassium phosphite)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 12.7 fl oz per 100 gal.
25759	Alude (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'White'	Greenhouse	Hausbeck	MI	2005	Drench	Poor efficacy with drench application
26188	Alude (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Sage, common (Salvia officinalis)	Greenhouse	Walsh	WA	2005	Drench	No statistical difference among treatments on P. parasitica
25291	Alude (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Excellent control with 2 quarts per 100 gal.
25183	Alude (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.) 'Polka Dot Pacific'	Greenhouse	Hausbeck	MI	2005	Foliar	Poor efficacy
27627	Alude (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Foliar	Moderately high disease pressure; excellent control at 12.7 fl oz per 100 gal
30547	Alude (Potassium phosphite)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root vigor, but not shoot vigor, at 12.7 fl oz per 100 gal; indication of phytotoxicity.
24903	Alude (Potassium phosphite)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
24903	Alude (Potassium phosphite)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Drench	No efficacy with drench application
24903	Alude (Potassium phosphite)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 2 quarts per 100 gal.
25828	Alude (Potassium phosphite)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	Good control of wound canker with 64 oz per 100 gal foliar applications.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28886	Alude (Potassium phosphite)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Foliar	Low pressure; no difference between non-inoculated and inoculated control and treatments
26174	Banol (Propamocarb hydrochloride)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26174	Banol (Propamocarb hydrochloride)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26174	Banol (Propamocarb hydrochloride)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26174	Banol (Propamocarb hydrochloride)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25677	Calirus 150 (Mono- and di- potassium salts of phosphorus acid + copper sulfate pentahydrate)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Foliar	Excellent efficacy with 150 fl oz per 100 gal foliar spray.
25242	Captan (Captan)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25801	Captan (Captan)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 20 oz per 100 gal, but inoculated and non-inoculated checks had no disease.
25242	Captan (Captan)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25242	Captan (Captan)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25801	Captan (Captan)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 4 oz per 100 gal.
25242	Captan (Captan)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005		Poor control with 10 oz per 100 gal drench application.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25242	Captan (Captan)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26193	Captan (Captan)	Phytophthora nicotianae (Phytophthora nicotianae)	Sage, common (Salvia officinalis)	Greenhouse	Walsh	WA	2005	Drench	No statistical difference among treatments on P. parasitica
26714	Captan (Captan)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.)	Greenhouse	Hausbeck	MI	2006	Foliar	Great efficacy at 1.5 lb per 100 gal.
30544	Captan (Captan)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 16 oz per 100 gal; comparable to non-inoculated check.
28908	Captan (Captan)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	Greenhouse	Grunwald	OR	2008	Foliar	No significant reduction of lesion development at 2 lb per 100 gal.
28908	Captan (Captan)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflorae'	Greenhouse	Grunwald	OR	2007	Foliar	No impact on lesion development with 32 oz per 100 gal.
26504	Captan (Captan)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
26504	Captan (Captan)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	Some reduction on number os lesions for non-wounded, but not wounded, leaves but did Significantly reduce lesion size with 4 oz per 100 gal
26504	Captan (Captan)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Good efficacy at 4 oz per 100 gal
26504	Captan (Captan)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 4 oz per 100 gal
29722	Captan (Captan)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Foliar	No significant reduction of lesion development at 32 oz per 100 gal.
26807	Captan (Captan)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Foliar	No effect on lesion development at 2 lb per 100 gal
25722	Cease (Bacillus subtilis strain QST 713)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005		Virtually no efficacy with foliar application

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27706	Celero 16WSG (Clothianidin)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005		TM-473 480SC - poor efficacy at 4 oz per 100 gal
29120	CG100 (Caprylic acid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Foliar	No to poor efficacy at 0.2 and 0.4 % concentration.
29719	CG100 (Caprylic acid)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Foliar	Significant reduction of lesion development at 0.3 % and 0.6 % concentration; comparable to Subdue Maxx.
25717	Champ Formula 2F (Copper hydroxide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Chastagner	WA	2005		Poor efficacy with foliar application
26175	Daconil 54EC (Chlorothalonil)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26175	Daconil 54EC (Chlorothalonil)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26175	Daconil 54EC (Chlorothalonil)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26175	Daconil 54EC (Chlorothalonil)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25718	Daconil Ultrex (Chlorothalonil)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Chastagner	WA	2005	Foliar	Poor to good efficacy with foliar application
25230	Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.) 'Polka Dot Pacific'	Greenhouse	Hausbeck	MI	2005	Foliar	Poor efficacy
27537	Disarm 480SC (Fluoxastrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26855	Disarm 480SC (Fluoxastrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007		No significant difference among treatments.
27537	Disarm 480SC (Fluoxastrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27537	Disarm 480SC (Fluoxastrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25855	Disarm 480SC (Fluoxastrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Alder (Alnus sp.) Alnus maritima	Greenhouse	Kratsch	UT	2006	Drench	Disease did not develop
25847	Disarm 480SC (Fluoxastrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; reduced disease rating at 3 fl oz per 100 gal
26186	Disarm 480SC (Fluoxastrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.)	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 4 pints per 100 gal, but inoculated and non-inoculated checks had no disease.
26186	Disarm 480SC (Fluoxastrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 3 fl oz per 100 gal.
25548	Disarm 480SC (Fluoxastrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Excellent efficacy with 3 oz per 100 gal drench application.
25825	Disarm 480SC (Fluoxastrobin)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Poor efficacy with 3 oz per 100 gal as foliar spray 2 weeks after inoculation.
27552	Disarm 480SC (Fluoxastrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Poor efficacy at 4 and 8 fl oz per 100 gal
27552	Disarm 480SC (Fluoxastrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 4 and 8 fl oz per 100 gal; one of the most effective products
26897	Disarm 480SC (Fluoxastrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; virtually no control at 3 oz per 100 gal
26897	Disarm 480SC (Fluoxastrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; no control at 4 oz per 100 gal, poor control at 8 oz
26897	Disarm 480SC (Fluoxastrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no to poor control at 4 and 8 fl oz per 100 gal.
29466	Disarm 480SC (Fluoxastrobin)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no to poor control at 4 and 8 fl oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25816	Disarm 480SC (Fluoxastrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25816	Disarm 480SC (Fluoxastrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25816	Disarm 480SC (Fluoxastrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27629	Disarm 480SC (Fluoxastrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; excellent control at 3 oz per 100 gal
30540	Disarm 480SC (Fluoxastrobin)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 4 and 8 fl oz per 100 gal; comparable to non-inoculated check at the higher rate.
26803	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	TBD	Grunwald	OR	2008	Foliar	Significant reduction of lesion development at 8, but not at 4 fl oz per 100 gal.
25724	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Chastagner	WA	2005	Foliar	Poor efficacy with foliar application
25724	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
25724	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 3 fl oz per 100 gal.
25724	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Virtually no efficacy at 2 and 4 fl oz per 100 gal
25724	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	No efficacy at 4, excellent at 8 fl oz per 100 gal
25724	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Drench	No to poor efficacy at 4 and 8 fl oz per 100 gal.
25724	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Drench	Very limited disease development. Promising efficacy at 4 and 8 fl oz per 100 gal; comparable to Stature.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
29716	Disarm 480SC (Fluoxastrobin)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Drench	Significant reduction of lesion development at 4 and 8 fl oz per 100 gal; inferior to Subdue Maxx.
26777	Disarm 480SC (Fluoxastrobin)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Excellent efficacy at 3 oz per 100 gal
25827	Disarm 480SC (Fluoxastrobin)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Drench	No effect on lesion development at 4 and 8 fl oz per 100 gal
25827	Disarm 480SC (Fluoxastrobin)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	No control of wound canker with 3 oz per 100 gal foliar applications.
28895	Disarm 480SC (Fluoxastrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
28895	Disarm 480SC (Fluoxastrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) Sinningia speciosa 'Avanti Peach Rose'	Greenhouse	Benson	NC	2007	Drench	High disease pressure; excellent control at 4 and 8 fl oz per 100 gal; comparable to uninoculated control.
28843	Disarm 480SC (Fluoxastrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Excellent control of a severe disease pressure drenched at 4 and 8 fl oz per 100 gal
25719	Dithane 75DF Rainshield (Mancozeb)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Foliar	Good efficacy with foliar application
25719	Dithane 75DF Rainshield (Mancozeb)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Excellent efficacy at 2 lb per 100 gal; one of the most effective products
25719	Dithane 75DF Rainshield (Mancozeb)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 2 lb per 100 gal; one of the most effective products
25719	Dithane 75DF Rainshield (Mancozeb)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Foliar	Poor efficacy in four trials
28025	Fenstop (Fenamidone)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
25851	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Alder (Alnus sp.) Alnus maritima	Greenhouse	Kratsch	UT	2006	Drench	Disease did not develop

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25844	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 7 and 14 fl oz per 100 gal
25834	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 14 and 28 oz per 100 gal, but inoculated and non-inoculated checks had no disease.
25834	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 7 and 14 fl oz per 100 gal.
24910	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Roseum Elegans'	Field Container	Benson	NC	2004	Foliar	Good efficacy with 28 and 56 fl oz/100 gal; poor efficacy with 14 fl oz per 100 gal.
24910	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Drench	Excellent efficacy with drench application of 14 fl oz per 100 gal.
24910	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Excellent efficacy with drench application of 14 and 28 fl oz per 100 gal
24910	Fenstop (Fenamidone)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Excellent efficacy with 7.0 and 14.0 fl oz per 100 gal drench application.
24920	Fenstop (Fenamidone)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005	Foliar	Poor efficacy with foliar application
24920	Fenstop (Fenamidone)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Mediocre efficacy with both 7 and 14 oz per 100 gal as foliar spray 2 weeks after inoculation.
27553	Fenstop (Fenamidone)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 14 and 28 fl oz per 100 gal; one of the most effective products
27553	Fenstop (Fenamidone)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 14 and 28 fl oz per 100 gal; one of the most effective products
26997	Fenstop (Fenamidone)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; excellent control at 14 fl oz per 100 gal; comparable to uninfested control

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26997	Fenstop (Fenamidone)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; excellent control at 7 and 14 fl oz per 100 gal; comparable to uninfested control
26997	Fenstop (Fenamidone)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; excellent control at 14 oz per 100 gal; almost comparable to uninfested control
27772	Fenstop (Fenamidone)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; good efficacy at 7 fl oz per 100 gal
29467	Fenstop (Fenamidone)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; excellent control at 14 oz per 100 gal; comparable to uninfested control
26715	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Montego Mix'	Greenhouse	Hausbeck	MI	2006	Drench	Excellent efficacy at 7 and 14 fl oz per 100 gal.
24972	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005	Drench	No efficacy at 14 fl oz per 100 gal, and some efficacy at 28 fl oz per 100 gal, but this was not significantly different from both untreated non-inoculated and untreated inoculated controls.
25810	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25810	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25810	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25169	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Patrice'	Greenhouse	Norman	FL	2006	Drench	Excellent efficacy with 7 and 14 fl oz per 100 gal.
25169	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Excellent control at 14 and 28 oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25804	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.)	Greenhouse	Hausbeck	MI	2006	Drench	Excellent efficacy at 7 and 14 fl oz per 100 gal.
27630	Fenstop (Fenamidone)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; significant but not commercially acceptable control at 14 fl oz per 100 gal
30541	Fenstop (Fenamidone)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 14 fl oz per 100 gal; slightly inferior to non-inoculated check.
25177	Fenstop (Fenamidone)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005		Good efficacy at 14 and 28 fl oz per 100 gal
26794	Fenstop (Fenamidone)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	TBD	Grunwald	OR	2008	Foliar	Significant reduction of lesion development at 28, but not at 14 fl oz per 100 gal.
24900	Fenstop (Fenamidone)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	Significantly suppressed lesion development at high rate
24900	Fenstop (Fenamidone)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Foliar	Good efficacy with foliar application
24900	Fenstop (Fenamidone)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	Significantly reduced lesion size at 14 fl oz per 100 gal and both rates reduced number of lesions for both wounded and non-woudned leaves.
24900	Fenstop (Fenamidone)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 14 and 28 fl oz per 100 gal; one of the most effective products
24900	Fenstop (Fenamidone)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Foliar	Mixed results: only good efficacy in 1 out of 4 trials.
26774	Fenstop (Fenamidone)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Good and excellent efficacy at 7 and 14 oz per 100 gal
25621	Fenstop (Fenamidone)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Drench	No effect on lesion development at 14 and 28 fl oz per 100 gal
28893	Fenstop (Fenamidone)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28844	Fenstop (Fenamidone)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Excellent control of a severe disease pressure drenched at 7 and 14 fl oz per 100 gal
25818	Fenstop (Fenamidone)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Excellent control drenched at 7 and 14 fl oz per 100 gal.
26173	Fluazinam (Fluazinam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26173	Fluazinam (Fluazinam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26173	Fluazinam (Fluazinam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26173	Fluazinam (Fluazinam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25676	Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005	Foliar	Poor efficacy with foliar application
25720	Gavel DF (Mancozeb + Zoxamide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Chastagner	WA	2005		Excellent efficacy with foliar application
25720	Gavel DF (Mancozeb + Zoxamide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Excellent efficacy at 2 lb per 100 gal; one of the most effective products
25720	Gavel DF (Mancozeb + Zoxamide)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 2 lb per 100 gal
26379	Heritage (Azoxystrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26933	Heritage (Azoxystrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
26379	Heritage (Azoxystrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26379	Heritage (Azoxystrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

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27005	Heritage (Azoxystrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 4 fl oz per 100 gal
26535	Heritage (Azoxystrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 4 oz per 100 gal.
26466	Heritage (Azoxystrobin)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Foliar	Poor efficacy at 2 and 4 oz per 100 gal
27554	Heritage (Azoxystrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 0.9 and 1.8 oz per 100 gal
27554	Heritage (Azoxystrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 0.9 and 1.8 oz per 100 gal
26383	Heritage (Azoxystrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; virtually no control at 0.9 and 1.8 oz per 100 gal
26383	Heritage (Azoxystrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; no control at 0.9 and 1.8 oz per 100 gal
27768	Heritage (Azoxystrobin)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; virtually no efficacy at 0.9 and 1.8 oz per 100 gal
27631	Heritage (Azoxystrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; excellent control at 0.9 and 1.8 oz per 100 gal
26386	Heritage (Azoxystrobin)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Curative Trial: Significantly reduced a severe root necrosis at 30 and 60 ml per 100 gal
26386	Heritage (Azoxystrobin)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Preventative Trial: Significantly reduced a severe root necrosis at 1.8 oz per 100 gal
27730	Heritage (Azoxystrobin)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 0.9 and 1.8 oz per 100 gal; comparable to non-inoculated check.
27730	Heritage (Azoxystrobin)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 0.9 and 1.8 oz per 100 gal; inferior to non-inoculated Check

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26505	Heritage (Azoxystrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
26505	Heritage (Azoxystrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 4 oz per 100 gal.
26505	Heritage (Azoxystrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Virtually no efficacy at 2 and 4 oz per 100 gal
26505	Heritage (Azoxystrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Drench	Very limited disease development. Promising efficacy at 0.9 and 1.8 oz per 100 gal; comparable to Stature.
26465	Heritage (Azoxystrobin)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Foliar	No control of wound canker at 2 and 4 oz per 100 gal
28891	Heritage (Azoxystrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
28845	Heritage (Azoxystrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Good to excellent control of a severe disease pressure drenched at 0.9 and 1.8 oz per 100 gal
27970	Heritage (Azoxystrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Good to excellent control drenched at 0.9 and 1.8 fl oz per 100 gal.
25680	Hymexazol 30L (Hymexazol)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Poor efficacy with drench applications at all tested rates.
28026	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
25856	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Alder (Alnus sp.) Alnus maritima	Greenhouse	Kratsch	UT	2006	Drench	Disease did not develop
25848	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 8 fl oz per 100 gal

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24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Pennucci	NH	2006	Drench	Good efficacy at 16 and 40 oz per 100 gal
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) ‘Nova zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25835	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 16 and 40 oz per 100 gal, but inoculated and non-inoculated checks had no disease.
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Foliar	No statistical differences among treatments.
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25835	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 8 oz per 100 gal.
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

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24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Good efficacy with drench application of 16 and 40 oz per 100 gal.
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Excellent efficacy with 16 and 40 oz per 100 gal drench application.
24911	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24921	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005		Poor efficacy with foliar application
24921	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Mediocre efficacy with 8 oz per 100 gal as foliar spray 2 weeks after inoculation.
28903	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 8 oz per 100 gal; one of the most effective products

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28903	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Fair to good efficacy at 8 oz per 100 gal
26992	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; no control at 8 oz per 100 gal
26992	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; no control at 8 oz per 100 gal
26992	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no significant control at 8 oz per 100 gal.
25754	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2005	Drench	Poor efficacy with drench application at 8 and 16 oz per 100 gal.
29468	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no control at 8 oz per 100 gal.
25761	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'White'	Greenhouse	Hausbeck	MI	2005	Drench	Excellent efficacy at 16oz per 100 gal drench application; ineffective at lower rate
24973	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005	Drench	Some efficacy at 16 and 40 oz per 100 gal, but not significantly different from both untreated non-inoculated and untreated inoculated controls.
25815	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25815	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25815	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26190	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Sage, common (Salvia officinalis)	Greenhouse	Walsh	WA	2005	Drench	No statistical difference among treatments on P. parasitica
25170	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Excellent control at 16 and 40 oz per 100 gal.
25185	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.) 'Polka Dot Pacific'	Greenhouse	Hausbeck	MI	2005	Foliar	Significant but poor efficacy
27632	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; excellent control at 8 oz per 100 gal
28004	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Curative Trial: Significantly reduced a severe root necrosis at 8 and 16 oz per 100 gal
28004	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Preventative Trial: Significantly reduced a severe root necrosis at 8 and 16 oz per 100 gal; best control at 8 oz
30548	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased shoot vigor, but not root vigor, at 8 oz per 100 gal; inferior to non-inoculated check.
25178	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005	Drench	Good efficacy at 40 oz per 100 gal
24901	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24901	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Foliar	Variable efficacy with foliar application
24901	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 8 oz per 100 gal.
24901	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Poor efficacy at 16 oz per 100 gal
24901	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 8 oz per 100 gal
24901	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Foliar	No to poor efficacy with foliar application in 4 trials
25826	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	No control of wound canker with 8 oz per 100 gal foliar applications.
28894	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
28848	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Fair control of a severe disease pressure drenched at 8 oz per 100 gal
25489	K-Phite (Phophorus acid salts)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Foliar	Excellent efficacy with 48 fl oz per 100 gal foliar spray.
25292	K-Phite (Phophorus acid salts)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Excellent control with 1%.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28027	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
27006	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 6 fl oz per 100 gal
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) ‘Nova zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25838	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Mediocre efficacy at 12 fl oz per 100 gal, but inoculated and non-inoculated checks had no disease.
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25838	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	Significant reduction in disease with 12 fl oz per 100 gal.
25838	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Foliar	Significant reduction in disease with 5 pints per 100 gal.
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Foliar	Excellent efficacy with 12 fl oz per 100 gal foliar spray.
24914	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24936	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005		Good efficacy with foliar application
24936	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Great efficacy with both 80 fl oz per 100 gal as foliar spray 2 weeks after inoculation.
24936	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Drench	Excellent efficacy at 12 fl oz per 100 gal
28902	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Poor efficacy at 12 fl oz per 100 gal
28902	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Poor efficacy at 12 fl oz per 100 gal
26991	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Foliar	Extremely high disease pressure; no control at 12 fl oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26991	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Foliar	Extremely high disease pressure; no control at 12 fl oz per 100 gal
26991	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 64 fl oz per 100 gal.
29469	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 64 fl oz per 100 gal.
24976	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005	Drench	Some efficacy at 8 fl oz per 100 gal, but not significantly different from both untreated non-inoculated and untreated inoculated controls.
27633	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Foliar	Moderately high disease pressure; excellent control at 12 fl oz per 100 gal
30549	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 12 fl oz per 100 gal; slightly inferior to non-inoculated check.
25707	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora ramorum (Phytophthora ramorum)	Fir, Grand; Giant Fir (Abies grandis)	Greenhouse	Chastagner	WA	2005	Drench	Virtually no efficacy with drench application
24904	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24904	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Drench	No efficacy with drench application
24904	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Drench	No efficacy at 12 oz per 100 gal.
24904	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacyat 5 pints per 100 gal.
24904	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Foliar	No efficacy with foliar application in 4 trials
26524	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	Good control of wound canker with 80 oz per 100 gal foliar applications.
26524	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Drench	Good control of wound canker at 12 fl oz per 100 gal
28889	Magellan (Mono- and Dibasic Sodium, Potassium and Ammonium Phosphites)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Foliar	Low pressure; no difference between non-inoculated and inoculated control and treatments
25697	Maneb 75DF (Maneb)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Foliar	Excellent efficacy with foliar application
25697	Maneb 75DF (Maneb)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Excellent efficacy at 2 lb per 100 gal; one of the most effective products

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25697	Maneb 75DF (Maneb)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 2 lb per 100 gal; one of the most effective products
32266	MBI 110 (MBI110)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) R. yakushimanum 'Looking Glass'	Greenhouse	Santamaria	WA	2015	Foliar	Excellent control with 2 and 4 qt per 100 gal applied twice; comparable to uninoculated check.
25675	Medallion (Fludioxonil)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Roseum Elegans'	Field Container	Benson	NC	2004	Foliar	No efficacy at 2, 4, and 8 oz per 100 gal.
26995	Medallion (Fludioxonil)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; no control at 2 oz per 100 gal
23121	Medallion (Fludioxonil)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus)	Greenhouse	Hausbeck	MI	2002	Drench	Some initial reduction in disease, however very heavy disease pressure overcame this with 1, 2, and 4 oz per 100 gal; no phytotoxicity while plant were alive.
27634	Medallion (Fludioxonil)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; virtually no control at 2 oz per 100 gal
27538	Micora (NOA 446510) (Mandipropamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
28028	Micora (NOA 446510) (Mandipropamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
27538	Micora (NOA 446510) (Mandipropamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27538	Micora (NOA 446510) (Mandipropamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25853	Micora (NOA 446510) (Mandipropamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Alder (Alnus sp.) Alnus maritima	Greenhouse	Kratsch	UT	2006	Drench	Disease did not develop
25845	Micora (NOA 446510) (Mandipropamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 2 and 8 fl oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25839	Micora (NOA 446510) (Mandipropamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	Good to excellent efficacy at 2 and 8 fl oz per 100 gal.
24915	Micora (NOA 446510) (Mandipropamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Excellent efficacy with drench application at 8 oz per 100 gal
24915	Micora (NOA 446510) (Mandipropamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Excellent efficacy with 4 and 8 fl oz per 100 gal drench application.
24937	Micora (NOA 446510) (Mandipropamid)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Drench	Poor efficacy at 4 and 8 oz per 100 gal
26898	Micora (NOA 446510) (Mandipropamid)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; excellent control at 8 fl oz per 100 gal; comparable to uninfested control
26898	Micora (NOA 446510) (Mandipropamid)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Foliar	Extremely high disease pressure; no control at 4 and 8 fl oz per 100 gal
26719	Micora (NOA 446510) (Mandipropamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Montego Mix'	Greenhouse	Hausbeck	MI	2006	Drench	Excellent efficacy with 4.1 and 8.2 oz per 100 gal.
25812	Micora (NOA 446510) (Mandipropamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25812	Micora (NOA 446510) (Mandipropamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25812	Micora (NOA 446510) (Mandipropamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25806	Micora (NOA 446510) (Mandipropamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.)	Greenhouse	Hausbeck	MI	2006	Foliar	Excellent efficacy with 4.1 and 8.2 oz per 100 gal.
27637	Micora (NOA 446510) (Mandipropamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; excellent control at 8 fl oz per 100 gal
26895	Micora (NOA 446510) (Mandipropamid)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 8 fl oz per 100 gal; equal to non-inoculated Check; best treatment

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27734	Micora (NOA 446510) (Mandipropamid)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari)	Greenhouse	Ferrin	LA	2007	Drench	Did not significantly reduce root rot at 8 fl oz per 100 gal
32237	Micora (NOA 446510) (Mandipropamid)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense'	Greenhouse	Grunwald	OR	2014	Foliar	Good efficacy with 8 fl oz per 100 gal.
32237	Micora (NOA 446510) (Mandipropamid)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) R. yakushimanum ‘Looking Glass’	Greenhouse	Santamaria	WA	2015	Foliar	Excellent control with 8 fl oz per 100 gal applied twice; best treatment, at least comparable to uninoculated check.
26389	Micora (NOA 446510) (Mandipropamid)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	Greenhouse	Grunwald	OR	2008	Foliar	No significant reduction of lesion development at 4 and 8 fl oz per 100 gal.
26389	Micora (NOA 446510) (Mandipropamid)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflorae'	Greenhouse	Grunwald	OR	2007	Foliar	Significant reduction in lesion size with 4 and 8 fl oz per 100 gal.
24905	Micora (NOA 446510) (Mandipropamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	Significantly reduced lesion size for wounded and non-wounded leaves at 2 and 8 fl oz per 100 gal.
24905	Micora (NOA 446510) (Mandipropamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Excellent efficacy at 8 fl oz per 100 gal; one of the most effective products
24905	Micora (NOA 446510) (Mandipropamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 4 and 8 fl oz per 100 gal; one of the most effective products
24905	Micora (NOA 446510) (Mandipropamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Foliar	Excellent efficacy at 4 and 8 fl oz per 100 gal.
29715	Micora (NOA 446510) (Mandipropamid)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Foliar	No significant reduction of lesion development at 4 and 8 oz per 100 gal.
26776	Micora (NOA 446510) (Mandipropamid)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Good and excellent efficacy at 2 and 8 oz per 100 gal
25623	Micora (NOA 446510) (Mandipropamid)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Drench	No effect on lesion development at 4 and 8 fl oz per 100 gal
25623	Micora (NOA 446510) (Mandipropamid)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Drench	No significant control of wound canker at 4 and 8 oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28890	Micora (NOA 446510) (Mandipropamid)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Foliar	Low pressure; no difference between non-inoculated and inoculated control and treatments
25820	Micora (NOA 446510) (Mandipropamid)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Excellent control drenched at 2 and 8 fl oz per 100 gal.
25852	MultiGuard (Furfural)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Alder (Alnus sp.) Alnus maritima	Greenhouse	Kratsch	UT	2006	Drench	Disease did not develop
25849	MultiGuard (Furfural)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 500 and 1000 ppm
26536	MultiGuard (Furfural)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No efficacy at 500 or 1000 ppm.
25484	MultiGuard (Furfural)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Poor control with drench applications of 500 or 1000 ppm.
25619	MultiGuard (Furfural)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Poor efficacy with both 500 and 1000 ppm as foliar spray 2 weeks after inoculation.
26993	MultiGuard (Furfural)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; no control at 1000 ppm
26717	MultiGuard (Furfural)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Montego Mix'	Greenhouse	Hausbeck	MI	2006	Drench	Poor efficacy with drenches of 500 and 1000 ppm.
25811	MultiGuard (Furfural)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	Severe phytotoxicity at 500 and 1000 ppm
25811	MultiGuard (Furfural)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check; some phytotoxicity
25811	MultiGuard (Furfural)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check; some phytotoxicity
27601	MultiGuard (Furfural)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Patrice'	Greenhouse	Norman	FL	2006	Drench	Poor efficacy with drenches of 500 and 1000 ppm.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25805	MultiGuard (Furfural)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.)	Greenhouse	Hausbeck	MI	2006	Foliar	Good efficacy with foliar applications of 500 and 1000 ppm.
25686	MultiGuard (Furfural)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
25686	MultiGuard (Furfural)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 500 or 1000 ppm.
26770	MultiGuard (Furfural)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Fair and good efficacy at 250 and 500 ppm
25819	MultiGuard (Furfural)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Poor control drenched at 500 and 1000 ppm.
27011	Muscodor albus (Muscodor albus)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 7.5 g per L soil volume
25491	Muscodor albus (Muscodor albus)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Soil incorporation	No significant reduction in disease with 7.5 g/L soil volume.
25682	Muscodor albus (Muscodor albus)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Soil Incorporation	Poor efficacy with soil incorporation (3.75 g/L soil).
26994	Muscodor albus (Muscodor albus)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Soil Incorporation	Extremely high disease pressure; no control at 7.5 g per liter
26994	Muscodor albus (Muscodor albus)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Soil incorporation	Extremely high disease pressure; no control at 7.5 g per liter; NOTE: Manufacturer communicated that older M. albus sample was used and results are not indicative of performance with more recently made samples.
27535	Muscodor albus (Muscodor albus)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27535	Muscodor albus (Muscodor albus)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

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27535	Muscodor albus (Muscodor albus)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27636	Muscodor albus (Muscodor albus)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Soil incorporation	Moderately high disease pressure; no control at 7.5 g per L
32265	Orkestra Intrinsic (BAS703 06F/BAS703 01F) (Fluxapyroxad + pyraclostrobin)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) R. yakushimanum ‘Looking Glass’	Greenhouse	Santamaria	WA	2015	Foliar	Excellent control with 8 and 12 fl oz per 100 gal applied once; comparable to uninoculated check.
29462	Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; excellent control at 22.5 and 34 fl oz per 100 gal; comparable to uninfested control; marginal chlorosis at the higher rate.
29478	Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; excellent control at 22.5 and 34 fl oz per 100 gal; comparable to uninfested control; marginal chlorosis at the higher rate.
28771	Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Drench	Very limited disease development. Promising efficacy at 11 and 13.7 fl oz per 100 gal; comparable to Stature.
28771	Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Sprench	Excellent efficacy at 11 and 13.7 fl oz per 100 gal.
29717	Orvego (BAS 651F) (Ametoctradin + dimethomorph (BAS 651))	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Foliar	No significant reduction of lesion development at 22, significant at 32 fl oz per 100 gal.
29481	Pageant Intrinsic (Boscalid + Pyraclostrobin)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; poor control at 12 oz per 100 gal
25721	Polyram (EBDC)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Chastagner	WA	2005	Foliar	Good efficacy with foliar application
25721	Polyram (EBDC)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Excellent efficacy at 2 lb per 100 gal; one of the most effective products

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25721	Polyram (EBDC)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Good to excellent efficacy at 2 lb per 100 gal
32267	Prestop (Gliocladium catenulatum Strain J1446)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) R. yakushimanum 'Looking Glass'	Greenhouse	Santamaria	WA	2015	Foliar	Poor control with 4.4 lb per 100 gal applied twice.
32236	Promax (Thyme Oil (3%))	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense'	Greenhouse	Grunwald	OR	2014	Foliar	Poor efficacy with 1 gal per 100 gal; much inferior to Micora.
32268	Proud 3 (Thyme oil (5.6%))	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) R. yakushimanum 'Looking Glass'	Greenhouse	Santamaria	WA	2015	Foliar	Excellent control with 1 gal per 100 gal applied twice; comparable to uninoculated check.
29720	Regalia O5 (MOI-10605) (Extract of Reynoutria sachalinensis)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Foliar	Significant reduction of lesion development at 0.5 % and 1 % concentration; comparable to Subdue Maxx.
29121	Regalia SC (MOI 106) (Extract of Reynoutria sachalinensis)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Foliar	Fair efficacy at 0.5 and 1 % concentration.
28060	Remedier (Trichoderma asperellum + Trichoderma gamsii)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; no control at 2 oz per 100 gal
28060	Remedier (Trichoderma asperellum + Trichoderma gamsii)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no control at 7.5 oz per 100 gal.
29474	Remedier (Trichoderma asperellum + Trichoderma gamsii)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no control at 7.5 oz per 100 gal.
27638	Remedier (Trichoderma asperellum + Trichoderma gamsii)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; virtually no control at 2 oz per 100 gal
28897	Remedier (Trichoderma asperellum + Trichoderma gamsii)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
32269	Rhapsody ASO (Bacillus subtilis strain QST 713)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) R. yakushimanum 'Looking Glass'	Greenhouse	Santamaria	WA	2015	Foliar	Poor control with 1 and 2 gal per 100 gal applied twice.
29461	RootShield Plus WP (aka BW240) (Trichoderma harzianum T-22 + Trichoderma virens G-41)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no control at 6 oz per 100 gal.
29477	RootShield Plus WP (aka BW240) (Trichoderma harzianum T-22 + Trichoderma virens G-41)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no significant control at 6 oz per 100 gal.
28772	RootShield Plus WP (aka BW240) (Trichoderma harzianum T-22 + Trichoderma virens G-41)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2009	Drench	Very limited disease development. No efficacy at 4 and 6 oz per 100 gal.
25951	SA 11210 (SA 11210)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembai'	Field Container	Linderman	OR	2005	Foliar	No to fair efficacy in 4 trials at 4 oz per 100 gal.
32234	Segovis (A21008A SC, SYN546539) (Oxathiapiprolin)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense'	Greenhouse	Grunwald	OR	2014	Foliar	Poor efficacy with 0.6 and 1.2, good to excellent efficacy with 2.4 fl oz per 100 gal; comparable to Micora at the highest rate.
32234	Segovis (A21008A SC, SYN546539) (Oxathiapiprolin)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) R. yakushimanum 'Looking Glass'	Greenhouse	Santamaria	WA	2015	Foliar	Excellent control with 0.6, 1.2 and 2.4 fl oz per 100 gal applied twice; comparable to uninoculated check.
26934	Segway (Cyazofamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
26378	Segway (Cyazofamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26378	Segway (Cyazofamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26378	Segway (Cyazofamid)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25850	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Alder (Alnus sp.) Alnus maritima	Greenhouse	Kratsch	UT	2006	Drench	Disease did not develop
25843	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; reduced disease rating at 3 fl oz per 100 gal, but not at 6 fl oz
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Pennucci	NH	2006	Drench	Good efficacy at 1.5 and 3 oz per 100 gal
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) ‘Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) ‘Nova zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	Inadequate disease development for reliable comparisons.
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25833	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 1.5 and 3.0 oz per 100 gal, but inoculated and non-inoculated checks had no disease.
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	Inadequate disease development for reliable comparisons.
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	Inadequate disease development for reliable comparisons.
25833	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	Significant disease reduction at 6 oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Roseum Elegans'	Field Container	Benson	NC	2004	Foliar	Mediocre efficacy with foliar application at 1.5 and 3.0 fl oz per 100 gal; only the highest rate of 6.0 oz per 100 gal provided good control.
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Drench	Good efficacy with drench application of 1.5 fl oz per 100 gal.
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Excellent efficacy with drench application of 1.5 and 3.0 fl oz per 100 gal
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Excellent efficacy with 3.0 and 6.0 fl oz per 100 gal drench application.
24909	Segway (Cyazofamid)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	Inadequate disease development for reliable comparisons.
24919	Segway (Cyazofamid)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005	Foliar	Poor efficacy with foliar application
24919	Segway (Cyazofamid)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2006	Foliar	Poor efficacy with both 3 and 6 oz per 100 gal as foliar spray 2 weeks after inoculation.
24919	Segway (Cyazofamid)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Drench	Poor efficacy at 3 and 6 oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27555	Segway (Cyazofamid)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Poor efficacy at 3 and 6 fl oz per 100 gal
27555	Segway (Cyazofamid)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 3 and 6 fl oz per 100 gal; one of the most effective products
26382	Segway (Cyazofamid)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; virtually no control at 3 fl oz per 100 gal, poor control at 6 fl oz
26382	Segway (Cyazofamid)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; excellent control at 3 and 6 fl oz per 100 gal; comparable to uninfested control
26382	Segway (Cyazofamid)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; good control at 6 oz per 100 gal; inferior to uninfested control
25751	Segway (Cyazofamid)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2005	Drench	Good plant health and no plant death at 3 oz per 100 gal, but the 6 oz rate provided somewhat less efficacy.
25751	Segway (Cyazofamid)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; good to excellent efficacy at 3 and 6 fl oz per 100 gal
29470	Segway (Cyazofamid)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; excellent control at 6 oz per 100 gal; comparable to uninfested control
25758	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Floral Showers White'	Greenhouse	Hausbeck	MI	2004	Drench	Excellent efficacy at 3 fl oz per 100 gal
25758	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Montego Mix'	Greenhouse	Hausbeck	MI	2006	Drench	Good efficacy at 3 and 6 fl oz per 100 gal
25758	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'White'	Greenhouse	Hausbeck	MI	2005	Drench	Good efficacy with drench application
24971	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005	Drench	Some efficacy at 1.5 and 3 fl oz per 100 gal, but not significantly different from both untreated non-inoculated and untreated inoculated controls.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25678	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25678	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25678	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25678	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Good to excellent control with drench applications of 3 and 6 fl oz per 100 gal.
26187	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Sage, common (Salvia officinalis)	Greenhouse	Walsh	WA	2005	Drench	No statistical difference among treatments on P. parasitica
25168	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Patrice'	Greenhouse	Norman	FL	2006	Drench	Excellent efficacy with 3 and 6 fl oz per 100 gal.
25168	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Excellent control at high rate of 3.0 oz per 100 gal. Less control with 1.5 oz per 100 gal rate.
25182	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.)	Greenhouse	Hausbeck	MI	2006	Foliar	Excellent efficacy with 3 and 6 fl oz per 100 gal.
25182	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.) 'Polka Dot Pacific'	Greenhouse	Hausbeck	MI	2005	Foliar	Poor efficacy
27639	Segway (Cyazofamid)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; excellent control at 3 and 6 fl oz per 100 gal
26385	Segway (Cyazofamid)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Curative Trial: Significantly reduced a severe root necrosis at 3 and 6 fl oz per 100 gal; best control at 3 fl oz
26385	Segway (Cyazofamid)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Preventative Trial: Significantly reduced a severe root necrosis at 3 and 6 fl oz per 100 gal
26607	Segway (Cyazofamid)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 3 an 6 oz per 100 gal; comparable to non-inoculated check.
26607	Segway (Cyazofamid)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 6 but not at 3 fl oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25176	Segway (Cyazofamid)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 3 and 6 fl oz per 100 gal; equal to and better than non-inoculated Check
25176	Segway (Cyazofamid)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005		Fair and good efficacy at 1.5 and 3 fl oz per 100 gal
26388	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	Greenhouse	Grunwald	OR	2008	Foliar	Most effective reduction of lesion development at 3 and 6 fl oz per 100 gal.
26388	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflorae'	Greenhouse	Grunwald	OR	2007	Foliar	Significant reduction in lesion size only with the higher rate of 6 fl oz per 100 gal.
24899	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	Significantly suppressed lesion development at high rate
24899	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Foliar	Good efficacy with foliar application
24899	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	Significantly reduced lesion size at 6 fl oz per 100 gal.
24899	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Fair efficacy at 3 and 6 fl oz per 100 gal
24899	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 3 and 6 fl oz per 100 gal; one of the most effective products
24899	Segway (Cyazofamid)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Foliar	Mixed results: good efficacy in only 1 trial out of 4 conducted
26773	Segway (Cyazofamid)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Good and excellent efficacy at 1.5 and 3 oz per 100 gal
25620	Segway (Cyazofamid)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Drench	No effect on lesion development at 3 and 6 oz per 100 gal
25620	Segway (Cyazofamid)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	Poor control at 3 and 6 per 100 gal with foliar applications.
25620	Segway (Cyazofamid)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Drench	No control of wound canker at 3 and 6 oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28892	Segway (Cyazofamid)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
28892	Segway (Cyazofamid)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) Sinningia speciosa 'Avanti Peach Rose'	Greenhouse	Benson	NC	2009	Drench	High disease pressure; excellent control at 6 fl oz per 100 gal; comparable to uninoculated control.
28846	Segway (Cyazofamid)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Good control of a severe disease pressure drenched at 3 fl oz per 100 gal, excellent at 6 fl oz
25817	Segway (Cyazofamid)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Excellent control drenched at 3 and 6 fl oz per 100 gal.
32235	SP2770 10WP (SP2770)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense'	Greenhouse	Grunwald	OR	2014	Drench and Foliar	Mediocre efficacy with 1.33 lb, excellent with 2.66 lb per 100 gal; better than Micora at the higher rate.
32235	SP2770 10WP (SP2770)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense'	Greenhouse	Grunwald	OR	2014	Foliar	Poor efficacy with 1.33 lb, mediocre with 2.66 lb per 100 gal; inferior to Micora.
28029	Stature DM (Dimethomorph)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
21523	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Fir (Abies sp.) A. fraseri	Greenhouse	Benson	NC	2004	Drench	All rates significantly reduced disease ratings and increased top dry weights (6.4, 12.4, 25.6 oz per 100 gal).
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) ‘Nova zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25836	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Mediocre to good efficacy at 1.5 and 3.0 oz per 100 gal, but inoculated and non-inoculated checks had no disease.
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25836	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 12.8 oz per 100 gal.
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Roseum Elegans'	Field Container	Benson	NC	2004	Foliar	Poor efficacy with foliar application at 12.8, 25.6, and 51.2 oz per 100 gal.
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Drench	Excellent efficacy with drench application of 6.4 oz per 100 gal.
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Excellent efficacy with drench application of 6.2 and 12.8 oz per 100 gal.
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Warfield (NC)	NC	2003	Drench	Excellent efficacy.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24912	Stature DM (Dimethomorph)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
24922	Stature DM (Dimethomorph)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005	Foliar	Poor efficacy with foliar application
24922	Stature DM (Dimethomorph)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Drench	Poor efficacy at 12.8 oz per 100 gal
20322	Stature DM (Dimethomorph)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii	Greenhouse	Benson	NC	2004	Drench	All rates significantly reduced disease ratings and increased top dry weights (6.4, 12.4, 25.6 oz per 100 gal).
20322	Stature DM (Dimethomorph)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; good control at 6.12 fl oz per 100 gal; inferior to uninfested control
25755	Stature DM (Dimethomorph)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2005	Drench	Good plant health and no plant death at 6.4 oz per 100 gal, but the 3.2 oz rate provided somewhat less efficacy.
25755	Stature DM (Dimethomorph)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; excellent efficacy at 6.4 oz per 100 gal
25762	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Floral Showers White'	Greenhouse	Hausbeck	MI	2004	Drench	Good efficacy
25762	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Montego Mix'	Greenhouse	Hausbeck	MI	2006	Drench	Great efficacy with 12.8 oz per 100 gal.
25762	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'White'	Greenhouse	Hausbeck	MI	2005	Drench	Good efficacy with drench application
24974	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005	Drench	No efficacy at 12.8 oz per 100 gal, and some efficacy at 6.4 fl oz per 100 gal, but this was not significantly different from both untreated non-inoculated and untreated inoculated controls.
27536	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
27536	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27536	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
20323	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	African Violet (Saintpaulia sp.) S. ionantha	Greenhouse	Benson	NC	2004	Drench	Trial 1: No efficacy at any tested rate (6.4, 12.4, 25.6 oz per 100 gal).
20323	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	African Violet (Saintpaulia sp.) S. ionantha	Greenhouse	Benson	NC	2004	Drench	Trial 2: No efficacy at any tested rate (6.4, 12.4, 25.6 oz per 100 gal).
26191	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Sage, common (Salvia officinalis)	Greenhouse	Walsh	WA	2005	Drench	No statistical difference among treatments on P. parasitica
25171	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petitie'	Greenhouse	Norman	FL	2005	Drench	Excellent control at 6.4 and 12.8 oz per 100 gal.
25213	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.)	Greenhouse	Hausbeck	MI	2006	Foliar	Great efficacy with 12.8 oz per 100 gal.
25213	Stature DM (Dimethomorph)	Phytophthora nicotianae (Phytophthora nicotianae)	Periwinkle (Vinca sp.) 'Polka Dot Pacific'	Greenhouse	Hausbeck	MI	2005	Foliar	Good efficacy
25179	Stature DM (Dimethomorph)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005		Good efficacy at 6.4 oz per 100 gal
28910	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	Greenhouse	Grunwald	OR	2008	Foliar	No significant reduction of lesion development at 6 fl oz per 100 gal.
28910	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflorae'	Greenhouse	Grunwald	OR	2007	Foliar	No impact on lesion development with 6.4 oz per 100 gal.
24902	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	Significantly suppressed lesion development at high rate
24902	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005		Good efficacy with foliar application
24902	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	Significant reduction in lesion size for wounded and nonwounded leaves at 12.8 oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24902	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Excellent efficacy at 12.8 oz per 100 gal; one of the most effective products
24902	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 12.8 fl oz per 100 gal; one of the most effective products
24902	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005		Mixed results with foliar application: no to poor efficacy in 3 trials; excellent efficacy in 1 trial
29724	Stature DM (Dimethomorph)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Foliar	No significant reduction of lesion development at 6.4 oz per 100 gal.
26476	Stature DM (Dimethomorph)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Drench	No effect on lesion development at 6.2 fl oz per 100 gal
26476	Stature DM (Dimethomorph)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2006	Foliar	Poor control of wound canker with 12.8 oz per 100 gal foliar applications.
26476	Stature DM (Dimethomorph)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Drench	Poor control of wound canker at 12.8 oz per 100 gal
27009	Stature MZ (Dimethomorph + Mancozeb)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 12.8 fl oz per 100 gal
27946	Stature SC (Dimethomorph)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 6.1 fl oz per 100 gal; one of the most effective products
27946	Stature SC (Dimethomorph)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 6.1 fl oz per 100 gal; one of the most effective products
29480	Stature SC (Dimethomorph)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; poor control at 6.12 fl oz per 100 gal.
28005	Stature SC (Dimethomorph)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Curative Trial: Significantly reduced a severe root necrosis at 3 and 6 oz per 100 gal
28005	Stature SC (Dimethomorph)	Phytophthora palmivora (Phytophthora palmivora)	Bamboo Palm (Chamaedorea seifrizii)	Shadehouse/ Lathehouse	Palmateer	FL	2007	Drench	Preventative Trial: Significantly reduced a severe root necrosis at 3.06 and 6.12 fl oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
30546	Stature SC (Dimethomorph)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 6.12 fl oz per 100 gal; comparable to non-inoculated check.
28901	Stature SC (Dimethomorph)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
28842	Stature SC (Dimethomorph)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	Excellent control of a severe disease pressure drenched at 6.12 and 12.25 fl oz per 100 gal
28030	Subdue MAXX (Mefenoxam)	Phytophthora cactorum (Phytophthora cactorum)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.)	Field Container	Pennucci	NH	2006	Drench	Poor efficacy at 1 fl oz per 100 gal
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25799	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 1 fl oz per 100 gal, but inoculated and non-inoculated checks had no disease.
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25799	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	Significant disease reduction at 2 fl oz per 100 gal.
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Roseum Elegans'	Field Container	Benson	NC	2004	Foliar	Poor efficacy with foliar application of 1.0 fl oz per 100 gal.
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Drench	Poor efficacy with drench application of 1.0 fl oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Drench	Poor efficacy with drench application
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Drench	Excellent efficacy with 16.0 fl oz per 100 gal drench application.
25681	Subdue MAXX (Mefenoxam)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26890	Subdue MAXX (Mefenoxam)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Foliar	Poor efficacy at 1 and 2 oz per 100 gal
28904	Subdue MAXX (Mefenoxam)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. fraseri	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 2 fl oz per 100 gal; one of the most effective products
28904	Subdue MAXX (Mefenoxam)	Phytophthora cryptogea (Phytophthora cryptogea)	Fir (Abies sp.) A. procera	Greenhouse	Chastagner	WA	2008	Drench	Excellent efficacy at 2 fl oz per 100 gal; one of the most effective products
26996	Subdue MAXX (Mefenoxam)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Drench	Extremely high disease pressure; poor control at 1 fl oz per 100 gal
26996	Subdue MAXX (Mefenoxam)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; excellent control at 1 fl oz per 100 gal; comparable to uninfested control
26996	Subdue MAXX (Mefenoxam)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; excellent control at 1 fl oz per 100 gal; comparable to uninfested control
27770	Subdue MAXX (Mefenoxam)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; excellent efficacy at 1 fl oz per 100 gal
29471	Subdue MAXX (Mefenoxam)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; poor control of mefenoxam-resistant isolates at 1 fl oz per 100 gal.
29790	Subdue MAXX (Mefenoxam)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus)	Greenhouse	Hausbeck	MI	2002	Drench	Excellent efficacy with 1, 2, and 4 oz per 100 gal through 3 WAT; no phytotoxicity.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25175	Subdue MAXX (Mefenoxam)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Patrice'	Greenhouse	Norman	FL	2006	Drench	Excellent efficacy with 0.6 fl oz per 100 gal
25175	Subdue MAXX (Mefenoxam)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Great control with 1 oz per 100 gal with some break through starting to occur.
27640	Subdue MAXX (Mefenoxam)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; excellent control at 1 fl oz per 100 gal
27732	Subdue MAXX (Mefenoxam)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 1 fl oz per 100 gal; slightly inferior to non-inoculated check.
27732	Subdue MAXX (Mefenoxam)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 1 fl oz per 100 gal; equal to non-inoculated Check
25181	Subdue MAXX (Mefenoxam)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 1 fl oz per 100 gal; equal to or better than non-inoculated Check
25181	Subdue MAXX (Mefenoxam)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005		Good efficacy at 0.6 fl oz per 100 gal
32238	Subdue MAXX (Mefenoxam)	Phytophthora plurivora (Phytophthora plurivora)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense'	Greenhouse	Grunwald	OR	2014	Foliar	Excellent efficacy with 1 fl oz per 100 gal; better than Micora.
28909	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflora'	Greenhouse	Grunwald	OR	2008	Foliar	Most effective reduction of lesion development at 2 fl oz per 100 gal.
28909	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Camellia (Camellia sp.) C. japonica 'Magnoliaflorae'	Greenhouse	Grunwald	OR	2007	Foliar	Excellent reduction of lesion size with 2 fl oz per 100 gal.
25723	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	Excellent efficacy
25723	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Drench	Excellent efficacy with drench application

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25723	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	Significantly reduced lesion size for wounded, but not non-wounded, leaves at 2 fl oz per 100 gal.
25723	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Poor efficacy at 1 and 2 fl oz per 100 gal
25723	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2008	Foliar	Excellent efficacy at 1 and 2 fl oz per 100 gal
25723	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Linderman	OR	2005	Drench	Excellent efficacy at 4 oz per 100 gal with foliar application in 3 trials; best treatment
29723	Subdue MAXX (Mefenoxam)	Phytophthora ramorum (Phytophthora ramorum)	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Mariesii'	Greenhouse	Grunwald	OR	2009	Foliar	Significant reduction of lesion development at 2 oz per 100 gal; best treatment.
26892	Subdue MAXX (Mefenoxam)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2008	Foliar	No effect on lesion development at 2 fl oz per 100 gal
26892	Subdue MAXX (Mefenoxam)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Foliar	No significant control of wound canker at 1 and 2 oz per 100 gal
28900	Subdue MAXX (Mefenoxam)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
27949	Subdue MAXX (Mefenoxam)	Phytophthora tropicalis (Phytophthora tropicalis)	Pothos (Pothos sp.)	Greenhouse	Norman	FL	2007		Excellent control drenched at 0.6 fl oz per 100 gal.
28062	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; no control at 3.5 oz per 100 gal
28062	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no control at 3.5 oz per 100 gal.
29476	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; no control at 3.5 oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
30551	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased shoot vigor, but not root vigor, at 3.5 oz per 100 gal; inferior to non-inoculated check.
28898	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Low pressure; no difference between non-inoculated and inoculated control and treatments
28849	Taegro (Bacillus subtilis var amyloliquefaciens strain FZB24)	Phytophthora tropicalis (Phytophthora tropicalis)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Norman	FL	2008	Drench	No control of a severe disease pressure drenched at 3.5 oz per 100 gal
26177	Tank Mix: Cyazofamid + Aliette (Cyazofamid + Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26177	Tank Mix: Cyazofamid + Aliette (Cyazofamid + Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26177	Tank Mix: Cyazofamid + Aliette (Cyazofamid + Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26177	Tank Mix: Cyazofamid + Aliette (Cyazofamid + Fosetyl Al)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26178	Tank Mix: Cyazofamid + Alude (Cyazofamid + Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26178	Tank Mix: Cyazofamid + Alude (Cyazofamid + Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26178	Tank Mix: Cyazofamid + Alude (Cyazofamid + Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26178	Tank Mix: Cyazofamid + Alude (Cyazofamid + Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26884	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora cactorum (Phytophthora cactorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	TBD	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26884	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora cactorum (Phytophthora cactorum)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	TBD	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26884	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora cactorum (Phytophthora cactorum)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	TBD	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
26891	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2007	Foliar	Poor efficacy at 1 + 2 oz per 100 gal
27643	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Drench	Moderately high disease pressure; excellent control at 1.8 oz + 1 fl oz per 100 gal
26896	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 0.9 oz + 0.5 fl oz per 100 gal; equal or inferior to non-inoculated Check
27733	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari)	Greenhouse	Ferrin	LA	2007	Drench	Significantly reduced root rot at 0.9 oz + 0.5 fl oz per 100 gal; equal to non-inoculated Check
26889	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Fair efficacy at 2 oz + 1 fl oz per 100 gal
26893	Tank Mix: Heritage + Subdue MAXX (Azoxystrobin + mefonaxam)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Foliar	No significant control of wound canker at 1 + 2 oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26749	Tanos (Famoxadone + Cymoxanil)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	TBD	Regan	OR	2007	Foliar	No efficacy at 12 oz per 100 gal
28061	Tanos (Famoxadone + Cymoxanil)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Drench	Extremely high disease pressure; no control at 12 oz per 100 gal
28061	Tanos (Famoxadone + Cymoxanil)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; poor control at 12 oz per 100 gal
29475	Tanos (Famoxadone + Cymoxanil)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Drench	Extremely high disease pressure; poor control at 12 oz per 100 gal
30552	Tanos (Famoxadone + Cymoxanil)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased shoot vigor, but not root vigor, at 6.1 oz per 100 gal; inferior to non-inoculated check.
26748	Tanos (Famoxadone + Cymoxanil)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2007	Foliar	Excellent efficacy at 12 oz per 100 gal
26809	Tanos (Famoxadone + Cymoxanil)	Phytophthora syringae (Phytophthora syringae)	Apple & Crabapple (Non-Bearing) (Malus sp.) 'Spring Snow'	Field Container	Regan	OR	2007	Foliar	No significant control of wound canker at 12 oz per 100 gal
28899	Tanos (Famoxadone + Cymoxanil)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Drench	Phytotoxic (chlorosis and stunting) at 12 oz per 100 gal
26176	Terramec SP (Chloroneb)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26176	Terramec SP (Chloroneb)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26176	Terramec SP (Chloroneb)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
26176	Terramec SP (Chloroneb)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
28031	Terrazole 35%WP (Etridiazole)	Phytophthora cactorum (Phytophthora cactorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
27010	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; did not reduce disease rating at 8 fl oz per 100 gal
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25800	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 10 oz per 100 gal, but inoculated and non-inoculated checks had no disease.
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25800	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	No significant reduction in disease with 8 oz per 100 gal.
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
25750	Terrazole 35%WP (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25757	Terrazole 35%WP (Etridiazole)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2005	Drench	Excellent efficacy equivalent to uninoculated control at a rate of 10 oz per 100 gal.
25757	Terrazole 35%WP (Etridiazole)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; excellent efficacy at 8 oz per 100 gal
25764	Terrazole 35%WP (Etridiazole)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Floral Showers White'	Greenhouse	Hausbeck	MI	2004	Drench	Poor efficacy
25764	Terrazole 35%WP (Etridiazole)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'White'	Greenhouse	Hausbeck	MI	2005	Drench	Virtually no efficacy with drench application
26171	Terrazole 35%WP (Etridiazole)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005	Drench	No efficacy at 10 oz per 100 gal.
27533	Terrazole 35%WP (Etridiazole)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27533	Terrazole 35%WP (Etridiazole)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
27533	Terrazole 35%WP (Etridiazole)	Phytophthora nicotianae (Phytophthora nicotianae)	Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
30545	Terrazole 35%WP (Etridiazole)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Significantly increased root and shoot vigor at 8oz per 100 gal; slightly inferior to non-inoculated check.
26507	Terrazole 35%WP (Etridiazole)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	No efficacy
26507	Terrazole 35%WP (Etridiazole)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 8 oz per 100 gal.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) ‘Nova Zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24916	TM-459 (TM-459)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments
24939	TM-459 (TM-459)	Phytophthora citricola (Phytophthora citricola)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Regan	OR	2005		Poor efficacy with foliar application
25780	Truban 25EC (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lollipop'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25780	Truban 25EC (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Parade'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25780	Truban 25EC (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Popcorn'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.
25780	Truban 25EC (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Drench	Poor efficacy with drench application of 8.0 fl oz per 100 gal.
25780	Truban 25EC (Etridiazole)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Ribbon Candy'	Field Container	Pennucci	NH	2005	Drench	No statistical differences among treatments.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
26718	Truban 30WP (Etridiazole)	Phytophthora nicotianae (Phytophthora nicotianae)	Snapdragon (Antirrhinum majus) 'Montego Mix'	Greenhouse	Hausbeck	MI	2006	Drench	Poor efficacy with 6 oz per 100 gal.
28032	Vital 4L (Potassium phosphite)	Phytophthora cactorum (Phytophthora cactorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2007	Drench	No significant difference among treatments.
27007	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Mexican cliff rose (Purshia mexica)	Greenhouse	Kratsch	UT	2006	Drench	Low disease pressure; reduced disease rating at 4 pt per 100 gal
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Lees Dark Purple'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments.
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova zembla'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments.
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25803	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Greenhouse	Chastagner	WA	2005	Drench	Good efficacy at 4 pints per 100 gal, but inoculated and non-inoculated checks had no disease.
25803	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Drench	Significant disease reduction at 4 pints per 100 gal.
25803	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) 'Purple Splendour'	Greenhouse	Chastagner	WA	2006	Foliar	No significant reduction in disease with 4 pints per 100 gal.
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Alba'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Boursault'	Field Container	Becker	NY	2007	Drench	No statistical difference between treatments and inoculated Check
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'alba'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments.
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiensis 'boursault'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments.

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. maximum 'roseum'	Field Container	Becker	NY	2005	Foliar	No statistical difference among treatments.
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2004	Foliar	Excellent efficacy with foliar application of 4 pints per 100 gal.
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2005	Foliar	Excellent efficacy with foliar application of 4 pints per 100 gal.
25490	Vital 4L (Potassium phosphite)	Phytophthora cinnamomi (Phytophthora cinnamomi)	Azalea, & Rhododendron (Rhododendron sp.) R. obtusum 'Hinodegiri'	Field Container	Benson	NC	2006	Foliar	Excellent efficacy with 64 fl oz per 100 gal foliar spray.
26990	Vital 4L (Potassium phosphite)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2007	Foliar	Extremely high disease pressure; no control at 64 fl oz per 100 gal
26990	Vital 4L (Potassium phosphite)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2008	Foliar	Extremely high disease pressure; poor control at 64 fl oz per 100 gal
26990	Vital 4L (Potassium phosphite)	Phytophthora cryptogea (Phytophthora cryptogea)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 64 fl oz per 100 gal.
29473	Vital 4L (Potassium phosphite)	Phytophthora drechsleri (Phytophthora drechsleri)	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Yellow Revolution'	Greenhouse	Benson	NC	2009	Foliar	Extremely high disease pressure; no significant control at 64 fl oz per 100 gal.
26172	Vital 4L (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Mexican cliff rose (Purshia mexica)	Greenhouse	Evans	UT	2005		Some efficacy at 4 pints per 100 gal, but not significantly different from both untreated non-inoculated and untreated inoculated controls.
26189	Vital 4L (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Sage, common (Salvia officinalis)	Greenhouse	Walsh	WA	2005	Drench	No statistical difference among treatments on P. parasitica.
25173	Vital 4L (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Spathe Flower, Spathiphyllum (Spathiphyllum sp.) 'Petite'	Greenhouse	Norman	FL	2005	Drench	Excellent cotnrol at 4 pints per 100 gal.
27642	Vital 4L (Potassium phosphite)	Phytophthora nicotianae (Phytophthora nicotianae)	Pansy (Viola sp.) V. x wittrockiana 'Matrix Purple'	Greenhouse	Benson	NC	2007	Foliar	Moderately high disease pressure; excellent control at 64 fl oz per 100 gal

PR#	Product (Active Ingredients)	Target	Crop	Production Site	Researcher	State	Year	Application Type	Results
30542	Vital 4L (Potassium phosphite)	Phytophthora palmivora (Phytophthora palmivora)	English Ivy (Hedera helix L. ssp. Helix)	Greenhouse	Becker	NY	2008	Drench	Phytotoxic at 64 fl oz per 100 gal.
27705	Vital 4L (Potassium phosphite)	Phytophthora palmivora (Phytophthora palmivora)	Lilyturf, Big Blue;Giant (Liriope muscari) 'Evergreen Giant'	Greenhouse	Strandberg	FL	2005		Poor efficacy at 1.25 pt per 100 gal
25696	Vital 4L (Potassium phosphite)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Catawbiense Boursault'	Field Container	Linderman	OR	2006	Foliar	Significantly suppressed lesion development.
25696	Vital 4L (Potassium phosphite)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2005	Drench	Poor efficacy with drench application.
25696	Vital 4L (Potassium phosphite)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Drench	No efficacy at 4 pints per 100 gal.
25696	Vital 4L (Potassium phosphite)	Phytophthora ramorum (Phytophthora ramorum)	Azalea, & Rhododendron (Rhododendron sp.) 'Nova Zembla'	Field Container	Chastagner	WA	2006	Foliar	No efficacy at 4 pints per 100 gal.
26775	Vital 4L (Potassium phosphite)	Phytophthora root rot (Phytophthora sp.)	Marigold (Tagetes sp.)	Greenhouse	Reddy	AL	2006	Drench	Good and excellent efficacy at 2 and 4 pt per 100 gal
28888	Vital 4L (Potassium phosphite)	Phytophthora tropicalis (Phytophthora tropicalis)	Rose Periwinkle (Catharanthus roseus) 'Peppermint Cooler'	Greenhouse	Benson	NC	2008	Foliar	Low pressure; no difference between non-inoculated and inoculated control and treatments
27773	ZeroTol (Hydrogen dioxide)	Phytophthora drechsleri (Phytophthora drechsleri)	Poinsettia (Euphorbia pulcherrima) 'Freedom Red'	Greenhouse	Hausbeck	MI	2007	Drench	Severe disease pressure; no efficacy at 250 fl oz per 100 gal

Label Suggestions

Based upon data contained within this summary, we suggest that manufacturers consider adding the following Phytophthora diseases and ornamentals to their future product labels:

- Adorn – Drench application for Phytophthora root rot (*P. nicotianae*) on snapdragon, and for *P cryptogea* on gerbera, Fraser fir and noble fir.
- Disarm – Drench application for Phytophthora root rot (*P. cinnamomi*) on azalea.
- Fenamidone – Drench application for Phytophthora root rot (*P. cinnamomi*) on azalea, for *P. nicotianae* on snapdragon, and for *P cryptogea* on gerbera, Fraser fir and noble fir, and foliar application for ramorum blight (*P. ramorum*) on rhododendron, grand fir and noble fir.
- Insignia – Drench application for Phytophthora root rot (*P. cinnamomi*) on azalea and *P. nicotianae* on snapdragon.
- Micora (NOA 446510) – Drench application for Phytophthora root rot (*P. cinnamomi*) on azalea and rhododendron, drench application for *P. nicotianae* on snapdragon and foliar application for *P. ramorum*.
- Segway – Drench application for Phytophthora root rot (*P. cinnamomi*) on azalea, *P. drechsleri* on poinsettia and *P .nicotianae* on snapdragon, and foliar application for ramorum blight (*P. ramorum*) on rhododendron, grand fir and noble fir.

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