Efficacy of Management Tools for Soil-borne *Phytophthora* Species.

Ornamental Protocol Number: 07-001

Objective: Determine efficacy of new active ingredient formulations and new biopesticides for managing root, crown and stem rots of ornamental plants caused by *Phytophthora* species.

Experimental Design:

Plot Size: Must be adequate to reflect actual use conditions.

Replicates: Minimum of 4 replications

Application Instructions: If plants are to be transplanted, transplant at least 5 days prior to treatment applications so any wounds occurring during transplanting will heal and not serve as access points for disease infection and/or not contribute to increased phytotoxicity. Drench each treatment 2-3 days prior to inoculation with known species of *Phytophthora* except Muscodor which should be applied after inoculation. For woody plant material, reapply treatments 4 weeks later. For phosphorus acid generators, a foliar application may be substituted for the drench application. Applications should be made using application equipment consistent with conventional commercial equipment.

Target Species: *Phytophthora cinnimoni* (Azoxystrobin only), *P. nicotianae*, *P. citricola*, and *P. cactorum*. Contact your regional coordinator if other target species are of interest.

Plant Hosts: Use a plant host suitable for target species, recording species and variety used.

Use Site: May be greenhouse, field container or field in-ground. Please specify in final report.

Evaluations: Record disease severity and incidence 0, 7, 14, and 28 days after application for herbaceous plant material. For woody plant material, record disease severity and incidence 0, 14, 28, 42 and 56 days after initial application. Record plant height & width at initial and final evaluations only. Record phytotoxicity at each rating date on a scale of 0 to 10 (0 = no phytotoxicity; 10 = complete kill). If phytotoxicity is observed in treated plants, take pictures comparing treated and untreated plant material.

Recordkeeping: Keep detailed records of weather conditions including temperature and precipitation, soil-type or soil-less media, application equipment, application volume per area, irrigation, pot/liner size, plant height & width, and plant growth stage at application and data collection dates.

If different application methods or evaluations are made, please clearly specify differences in final report and explain how they enhanced results.

Treatments:

See tables on the following pages. Standards and A priority treatments are in the first table. B and C priority treatments are in the second table.

Reports:

Reports submitted on the standard IR-4 Ornamental Horticulture Research Report Form are preferred. However, reports in the F&N Tests format are acceptable as long as those reports are amended with detailed experimental design and materials and methods, along with raw data, recordkeeping information, and any pictures.

A report submitted electronically is preferred but not required. If the report is provided electronically, the basic report can be sent in MS Word or WordPerfect, the recordkeeping information as pdf or other electronic documents, and the raw data in MS Excel or other suitable program such as ARM.

Please direct questions to: Cristi Palmer, IR-4 HQ, Rutgers University, 500 College Road East, Suite 201W, Princeton, NJ 08540, Phone 732-932-9575 x4629, palmer@aesop.rutgers.edu.

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Revised By: CLP

Priority A and Standard Treatments List with rates, special application instructions, and contact information to obtain product and any suitable adjuvant needed.

Priority	#	Product	Rates	Reapplication Interval	Special Application Instructions (Soil Drench)	Contact Information to obtain materials and any needed adjuvants
A	1	Segway (cyazofamid)	3.0 oz/100 gal	14 – 28 d	DO NOT add organosilicone surfactant	ISK, Mel Grove, 713-393-3750, grovem@iskbc.com
	2	Segway (cyazofamid)	6.0 oz/100 gal			
	3	Heritage (azoxystrobin)	0.9 oz/100 gal	28 day	Apply 4 oz/6 inch pot or 2pt/sq ft.	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechcigl@syngenta.com
	4	Heritage (azoxystrobin)	1.8 oz/100 gal			
	5	V-10161 4FL	60 ml/100gal	28 day	Apply 1 pint solution per sq ft. Increase volume to 2 pints solution per sq ft if soil media depth is greater than 4 inches.	Valent, Joe Chamberlin, 770-985-0303, jcham@valent.com
	6	V-10161 4FL	120 ml/100 gal			
Standards	7	Standard Control 1*	See below	See below	See below	See below
	8	Standard Control 2*	See below	See below	See below	See below
	9	Untreated Uninoculated	--	--	--	
	10	Untreated Inoculated	--	--	--	
Optional Uninoculated Treatments	11	Cyazofamid	6.0 oz/100 gal	See above	Use same application instructions as above for appropriate products	See above
	12	Heritage (azoxystrobin)	1.8 oz/100 gal			
	13	V-10161 4FL	60 ml/100 gal			

* Select 2 of the four standards below						
Standards	a	Aliette (fosetyl Al)	6.4 to 12.8 oz/100 gal		Apply 2 pints solution per sq ft	Bayer, Mike Gorrell, , mike.gorrell@bayercropscience.com
	b	Captan	See label for specific rate based on plant		Refer to label for directions	Arysta, Doug Houseworth, 904-321-0795, LlHouse9@aol.com
	c	Subdue Maxx (mefonaxam)	See label for specific rate based on plant species		Refer to label for directions	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechcigl@syngenta.com
	d	Terrazole (etridiazole)	8 oz/100 gal		Refer to label for specific directions based on planting location or container size	Chemtura, Kevin Donovan, 203-573-2028, kevin.donovan@chemtura.com
	e	Stature DM (dimethomorph)	Herbaceous:6.4 oz/100 gal Woodies: 12.8 oz/100 gal	14 d intervals	Apply at 14 d intervals	BASF, Kathie Kalmowitz, 919-270-4592, kathie.kalmowitz@basf.com

Priority B & C Treatments List with rates, special application instructions, and contact information to obtain product and any suitable adjuvant needed.

Priority	Product	Rates	Reapplication Interval	Special Application Instructions	Contact Information to obtain materials and any needed adjuvants
C	Actinovate	Drench: 10 oz/100 gal Foliar application: 12-oz per 100 gallons per acre	Drench:21-28 days Foliar: 7-14 days	Drench: Completely drench growing medium. First application is best done as early in growing cycle as possible in order to establish the microbe on the Rhizosphere Foliar: Use a non-ionic spreader –sticker in conjunction (i.e Capsil)	Natural Industries, Matt Kowalski, 888-261-4731, mattk@naturalindustries.com
B	Alude	12.7 fl oz/100 gal	28 d	Drench: Apply 1 pint per sq ft.	Cleary, Rick Fletcher, 732-329-8399, rick.fletcher@clearychemical.com
B	BioPhos	64 fl oz/100 gal		Apply at 2 pts per sq ft	AgBio, Jan Meneley, 303-469-9221, agbio@agbio-inc.com
C	Disarm	2 oz/100 gal Optional: 1 oz/100 gal for inoculated and 2 oz/100 gal for uninoculated		Drench	Arysta, Doug Houseworth, 904-321-0795, LlHouse9@aol.com
B	Fenamidone	14.0 oz/100 gal		Drench at 1 – 2 pints per sq ft.	Bayer, Mike Gorrell, mike.gorrell@bayercropscience.com
C	Heritage + Subdue	0.9 oz + 1 oz		Drench	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechcigl@syngenta.com
B	Insignia (Pyraclostrobin)	8 oz/100 gal		Must use a minimum of 200 ml spray volume in a 6” standard pot. Drench directions state: Drench at half volume is equal to a volume of fungicide solution that replaces the top half of the volume of water/air-filled pore space of a given potting media in a given pot at field capacity. 200 ml is considered the minimum required or half volume; 400 ml is considered the full volume or maximum drench column required.	BASF, Kathie Kalmowitz, 919-270-4592, kathie.kalmowitz@basf.com

Priority	Product	Rates	Reapplication Interval	Special Application Instructions	Contact Information to obtain materials and any needed adjuvants
B	Magellan	Foliar applications: Herbaceous: 1.25 – 4 pints per 100 gal Woodies: 2 – 5 pints per 100 gal Drench application: 6 – 12 fl oz/100 gal	14 d for bedding plants 30 d for conifers 28 d	Apply 2 pints solution per sq ft.	Nufarm, Jim Fickle, 708-205-0255, jim.fickle@us.nufarm.com
B	MultiGuard (furfural)	1000 ppm drench	7 d	MultiGuard Protect contains 8.68 lbs. furfural/gallon: to make a 1,000 PPM solution, use 0.96 ml Multiguard Protect/liter of drench solution. Drench solutions should be made immediately prior to use. For drench applications, sufficient drench solution should be applied so that water just starts running from the pots. This will ensure complete distribution of the product throughout the root zone.	Agriguard, Jerry Hensley, 731-664-9185, jhensley@agriguardcompanyllc.com
B	*Muscodor albus*	7.5 grams per liter soil volume		Apply after pathogen inoculation	AgraQuest, Brett Highland, bhighland@agraquest.com
B	NOA 446510 (mandipropamid)	4 oz/100 gal 8 oz/100 gal	7 – 14 d	Drench application	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechcigl@syngenta.com
B	TM-473 480SC	3 oz/100 gal			Arysta, Doug Houseworth, 904-321-0795, LlHouse9@aol.com
B	Vital	Herbaceous: 2 - 4 pints/100 gal Woodies: Drench application: 4 pints/100 gal per 400 sq.ft. Foliar application: 4 pints/100 gal	14 d 30 d 14 d		Luxembourg Industries, Vince Morton, 336-286-9714, mortv@aol.com