

Efficacy of Management Tools for Foliar *Phytophthora* Species.

Ornamental Protocol Number: 06-002

Objective: Determine efficacy of foliar sprays with new active ingredient formulations and new biopesticides for managing foliar diseases 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: Apply each treatment according to directions below. For contact products, the recommendation is every 7 days; for systemic products the recommendation is every 14 to 28 days depending upon label directions. Applications should be made using application equipment consistent with conventional commercial equipment.

Target Species: *Phytophthora ramorum*, *P. cactorum*, and *P. citrophthora*. 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. Inoculations with *P. ramorum* will only be conducted on detached leaves in sealed containers as this pathogen is currently regulated by APHIS. Please specify test conditions in final report.

Evaluations:

For *P. ramorum*: After application of fungicide treatment, hold plant for 7 days for systemic products or 2-3 days for contact materials before inoculation ensuring that neither rain nor irrigation water wash off treatments. Inoculate detached leaves 7 DAT for systemic products or 2-3 DAT for contact materials. Wound-inoculate 3 leaves per replication and treatment using sporangia or zoospores as inoculum. Inoculation control consist of same treatment using plain water (instead of sporangia/zoospores). Record phytotoxicity 0, 7, 14, and 28 days after fungicide/biopesticide application 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. Disease severity will be assessed 7-10 days after inoculation on detached leaves as lesion area and percentage of leaf that shows lesions.

For Other *Phytophthora* species: 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.

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

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.

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 must include:

Results summary (no more than one page)

Summary table with appropriate statistical analyses

Experimental design and materials and methods

Appendices: raw data and recordkeeping information as listed above

If pictures were taken, please include them.

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, 681 US Hwy 1 S, North Brunswick, NJ 08902-3390, Phone 732-932-9575 x629, palmer@aesop.rutgers.edu **OR** Ely Vea, 308 Aston Forest Lane, Crownsville, MD 21032, Phone & FAX#: 410-923-4880, E-mail: evvea@comcast.net.

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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		Special Application Instructions (Foliar Sprays)	Contact Information to obtain materials and any needed adjuvants
			Herbaceous Plants	Woody Plants		
A	1	Cyazofamid	3.0 oz/100 gal	3.0 oz/100 gal	Reapply at 14 – 28 d intervals. DO NOT add organosilicone surfactant	ISK, Mel Grove, 713-393-3750, grovem@iskbc.com
	2	Cyazofamid	6.0 oz/100 gal	6.0 oz/100 gal		
	3	Fenamidone	7.0 oz/100 gal	7.0 oz/100 gal		
	4	Fenamidone	14.0 oz/100 gal	14.0 oz/100 gal		
	5	MultiGuard (furfural)	500 ppm drench	1000 ppm drench	Foliar application every 7 days; Multiguard Protect contains 8.68 lbs. furfural/gallon: to make a 1,000 PPM solution, use 0.96 ml Multiguard Protect/liter of solution. Foliar spray solutions should be made immediately prior to use and should be applied just to the point of runoff with coverage on both upper and lower leaf surfaces. NOTE: if wound inoculation is used, please also include single treatment using inoculations without wounding leaves.	Agriguard, Jerry Hensley, 731-664-9185, jhensley@agriguardcompanyllc.com
	6	MultiGuard (furfural)	500 ppm drench	1000 ppm drench		
	7	NOA 446510 (mandipropamid)	2 oz/100 gal	2 oz/100 gal	Apply at 7 day intervals	Syngenta, Dave Ross, 336-632-6411, david.ross@syngenta.com
	8	NOA 446510 (mandipropamid)	8 oz/100 gal	8 oz/100 gal		
	9	V-10161 4FL	60 ml/ 100 gal	60 ml/ 100 gal	Apply at 14 day intervals	Valent, Joe Chamberlin, 770-985-0303, jcham@valent.com
	10	V-10161 4FL	120 ml/ 100 gal	120 ml/ 100 gal		
Standards	11	Standard Control Tool 1*	See below	See below	See below	See below
	12	Standard Control Tool 2*	See below	See below	See below	See below
	13	Untreated Uninoculated	--	--	--	
	14	Untreated Inoculated	--	--	--	

* Select 2 of the four standards below

Standards	a	Aliette (fosetyl Al)	6.4 to 12.8 oz/100 gal	6.4 to 12.8 oz/100 gal	Apply 2 pints solution per sq ft	Bayer, Mike Gorrell, , mike.gorrell@bayercropscience.com
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Priority	#	Product	Rates		Special Application Instructions (Foliar Sprays)	Contact Information to obtain materials and any needed adjuvants
			Herbaceous Plants	Woody Plants		
	b	Captan	See label for specific rate based on plant		Refer to label for directions	Arysta, Doug Houseworth, 904-321-0795, LIHouse9@aol.com
	c	Subdue Maxx (mefenoxam)	See label for specific rate based on plant species		Refer to label for directions	Syngenta, Dave Ross, 336-632-6411, david.ross@syngenta.com
	d	Stature DM (dimethomorph)	6.4 oz/100 gal	12.8 oz/100 gal	Apply at 14 d intervals	SePRO, Todd Bunnell, 317-580-8097, toddb@sepro.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		Special Application Instructions	Contact Information to obtain materials and any needed adjuvants
			Herbaceous Plants	Woody Plants		
B		Alude	2 quarts per100 gal	2 quarts per 100 gal	Foliar application: Spray to wet. Do not use a wetting agent.	Cleary, Rick Fletcher, 732-329-8399, rick.fletcher@clearychemical.com
B		BioPhos	256 fl oz per100 gal	256 fl oz per 100 gal	Apply 25 gal per acre	AgBio, Jan Meneley, 303-469-9221, agbio@agbio-inc.com
B		Heritage (azoxystrobin)	4 oz per100 gal	4 oz per 100 gal	Spray 100 gal/acre	Syngenta, Dave Ross, 336-632-6411, david.ross@syngenta.com
B		Insignia (pyraclostrobin)	8 oz per 100 gal	8 oz per 100 gal	Spray to run off where foliage and soil glisten (slightly wet at soil and stem line)	BASF, Kathie Kalmowitz, 919-785-9659, kalmowk@basf-corp.com
B		Magellan	Foliar application: 1.25 – 4 pints per 100 gal Drench application: 6 – 12 fl oz per100 gal	Foliar application: 2 – 5 pints per 100 gal Drench application: 6 – 12 fl oz per100 gal	Do not exceed one application every 14 days for bedding plants or every 30 days for conifers Apply 2 pints solution per sq ft. Repeat at 28 d intervals	Nufarm, DarinAllred, 919-547-9600 ext 225, Darin.Allred@us.nufarm.com
B		TM-473 480SC	3 oz per 100 gal	3 oz per 100 gal		Arysta, Doug Houseworth, 904-321-0795, LJHouse9@aol.com
B		Vital	2 - 4 pints per 100 gallons on a 14 day interval	Drench application: 4 pints /100 gallons per 400 sq.ft. repeat every 30 days. Foliar application: 4 pints /100 gallons apply every 14 days.		Luxembourg Industries, Vince Morton, 336-286-9714, mortv@aol.com
C		Actinovate	10 oz per100 gal	10 oz per100 gal		Natural Industries, Matt Kowalski, 888-261-4731, matk@naturalindustries.com
C		Terrazole (etridiazole)	8 oz per100 gal	8 oz per100 gal	Refer to label for specific directions based on planting location or container size	Chemtura, Kevin Donovan, 203-573-2028, kevin.donovan@chemtura.com