

Efficacy of Management Tools for Foliar *Phytophthora* Species.

Ornamental Protocol Number: 07-002

Objective: Determine efficacy of 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.

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 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	Contact Information to obtain materials and any needed adjuvants
A	1	NOA 446510 (mandipropamid)	4 oz/100 gal	7 – 14 d	Drench application; do not add organosilicone surfactant	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechsigl@syngenta.com
	2	NOA 446510 (mandipropamid)	8 oz/100 gal			
	3	Segway (cyazofamid)	3.0 oz/100 gal	14 – 28 d	DO NOT add organosilicone surfactant	ISK, Mel Grove, 713-393-3750, grovem@iskbc.com
	4	Segway (cyazofamid)	6.0 oz/100 gal			
	5	V-10161 4FL	60 ml/100gal	28 d	Apply 1 pint solution per sq ft. Increase volume to 2 pints solution per sq ft if soil media depth is greater than 4".	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	NOA 446510 (mandipropamid)	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, LIHouse9@aol.com
	c	Subdue Maxx (mefonaxam)	1 or 2 oz per 100 gal (Use 2 oz if only treating with one rate)		Refer to label for directions	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechsigl@syngenta.com
	d	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 per 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 per 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 per 100 gal		Apply at 2 pts per sq ft	AgBio, Jan Meneley, 303-469-9221, agbio@agbio-inc.com
B	Fenamidone	14.0 oz per 100 gal		Drench at 1 – 2 pints per sq ft.	Bayer, Mike Gorrell, mike.gorrell@bayercropscience.com
C	Heritage	2 oz per 100 gal 4 oz per 100 gal		Foliar application	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechsigl@syngenta.com
C	Heritage + Subdue	2 oz + 1 oz / 100 gal		Foliar application	Syngenta, Nancy Rechsigl, 941-708-9338, nancy.rechsigl@syngenta.com
B	Insignia (Pyraclostrobin)	Herbaceous Plant material: 12 oz per 100 gal Woodies: 16 oz per 100 gal			BASF, Kathie Kalmowitz, 919-270-4592, kathie.kalmowitz@basf.com
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 per 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

Priority	Product	Rates	Reapplication Interval	Special Application Instructions	Contact Information to obtain materials and any needed adjuvants
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	<i>Muscodor albus</i>	7.5 grams per liter soil volume		Apply after pathogen inoculation	AgraQuest, Brett Highland, bhighland@agraquest.com
B	Tanos (famoxadone + cymoxanil)	12 oz per 100 gal			Dupont, Chuck Silcox, 302-999-5953, charles.a.silcox@usa.dupont.com
C	Terrazole (etr Diazole)	8 oz per 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
B	TM-473 480SC	3 oz per 100 gal			Arysta, Doug Houseworth, 904-321-0795, LHHouse9@aol.com
B	Vital	Herbaceous: 2 - 4 pints per 100 gal Woodies: Drench application: 4 pints per 100 gal per 400 sq.ft. Foliar application: 4 pints per 100 gal	14 d 30 d 14 d		Luxembourg Industries, Vince Morton, 336-286-9714, mortv@aol.com