Objective: Determine efficacy of new active ingredient formulations and new biopesticides for managing foliar and/or floral blights of environmental horticulture plants caused by *Botrytis* species. This protocol covers greenhouse crops through production.

Experimental Design:

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

Replicates: Minimum of 4.

Target Species: *Botrytis sp*., including *B. cinerea.*

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

Treatments: See Treatment Table on next page. Test materials should have been stored for no more than 2 years prior to start of experiment. Biological test materials should be requested for arrival approximately 2 weeks prior to first application unless otherwise directed by manufacturer.

Application Instructions: Timing of applications should be preventative or early curative (if infections have already developed). Inoculate plants within 24 or 48 hours after Week 0 application. Applications should be made using equipment consistent with conventional commercial equipment. Calibrate application equipment prior to application. Read available labels before making applications. Avoid treating plants under unusual or extreme environmental conditions.

Use Site: Greenhouse only.

Evaluations: See Evaluation Timing table on page 3. Record disease severity and incidence 0, 7, 14, 21 and 28 days after initial application or until no more meaningful data can be collected. Tissue samples of untreated controls, infected with *Botrytis sp*. should be sent for verification at a qualified diagnostic laboratory. Record physiological stage (% floral buds, % open flowers) of crop – not individual plants – at each application. Record foliar and floral incidence and severity as symptoms expressed within crop system. At last evaluation, record salability on a scale of 0 to 10 (0 = completely salable, no adverse impacts; 10 = complete plant affected; 3 or higher indicates crop quality is low enough not to be salable; higher numbers are indicative of moderate to high injury up to mortality at 10). If stunting occurs, record plant height on last evaluation date. If any phytotoxicity is observed in treated plants, take pictures comparing treated and untreated plant material.

Maintenance Applications: Applications during an experiment to manage non target diseases, pests or weeds may be needed to appropriately evaluate efficacy or crop safety. Because of potential negative impacts due to simultaneous or sequential applications of certain products with test materials please avoid applying the following:

If applications must be made of any products on the above list, please contact IR-4 prior to application.

Recordkeeping:

All operations, data and observations appropriate to this study should be recorded. It is helpful to preview the Environmental Horticulture Research Report Form in advance. Keep detailed records of weather conditions including temperature, precipitation and/or irrigation, and relative humidity with a minimum of high, low and average daily temperatures. Other information to record includes soil-type or soil-less media, application equipment, irrigation (type & frequency), liner size, and plant growth stage at application and data collection dates. Content of reports should be sufficient to fully understand how the experiment was conducted.

Photographs often illustrate experimental design, site conditions, and impacts of treatments very well. It is encouraged to include a picture or two of the greenhouse, field or landscape where the experiment is sited. It is highly encouraged that pictures illustrating treatment effects are taken if and when these impacts are visually apparent.

If different application methods or evaluations are made, please clearly specify differences in final report and explain reason for change.

Treatments:

Priority	#	Product	Rate (per 100 gal)	Reapplication Interval	Days					
					-7	-3	0	1	7	14*
A	1	Botector (*Aureobasidium pullulans* strains DSM 14940 and DSM 14941)	8 oz	Weekly			A	I	A	A
	2		8 oz		A		A	I	A	A
	3	BW165N (*Ulocladium oudemansii* strain U3) + spreader (see special instructions)	3 lb	Weekly			A	I	A	A
	4		4 lb				A	I	A	A
	5	EcoSwing (*Swinglea glutinosa*)	2 pt	Weekly			A	I	A	A
	6		2 pt		A		A	I	A	A
	**	Postiva (adepidyn + difenoconozole)	21 fl oz	Weekly			A	I	A	A
	**		28 fl oz				A	I	A	A
	7	S2200 (mandestrobin)	7.5 fl oz	Biweekly			A	I		A
	8		15 fl oz				A	I		A
	9	SP2480 + NIS	20 fl oz	Weekly-10 days			A	I	A	A
	10		30 fl oz				A	I	A	A
B		Astun (isofetamid) aka IKF-5411	13.5 fl oz	Biweekly			A	I		A
		Broadform (fluopyram + trifloxystrobin)	6 fl oz 8 fl oz	Biweekly			A	I		A
		F9110	45.7 fl oz	Weekly			A	I	A	A
		Fame SC (fluoxastrobin)	8 oz	Biweekly			A	I		A
		GC Pro (sodium carbonate peroxyhydrate)	3 lb	Weekly			A	I	A	A
		MBI 110 (*Bacillus amyloliquifaciens* strain F727)	6 qt	Weekly			A	I	A	A
		Mural (azoxystrobin + benzovindiflupyr)	7 oz	Biweekly	A		A	I		A
		Orkestra (fluxapyroxad + pyraclostrobin)	8 fl oz	Biweekly			A	I		A
		Pageant (boscalid + pyraclostrobin)	14 oz	Biweekly			A	I		A
		Pageant TR (boscalid + pyraclostrobin)	14 oz	Biweekly			A	I		A
		Palladium (cyprodinil + fludioxonil)	6 oz	Weekly			A	I	A	A
		Picatina (pydiflumetofen)	13.7 fl oz	Biweekly			A	I		A
		Proud 3 (thyme oil)	1 gal	Weekly			A	I	A	A
C		Regalia (extract of *Reynoutria sachalinensis*)	1 gal	Weekly			A	I	A	A
		Tourney (metconazole)	4 oz	Biweekly			A	I		A
		Trinity (triticonazole)	12 oz	Biweekly			A	I		A
		Triathlon BA (*Bacillus amyloliquifaciens* Strain D747)	6 qt	Weekly			A	I	A	A

		ZeroTol 2.0 (hydrogen dioxide + peroxyacetic acid)	2 gal	Biweekly			A	I		A
Controls		Non-treated Non-inoculated (if using water spray, use distilled)	--	--				I		
		Non-treated Inoculated	--	Biweekly				I		
Standards (Choose 2)	1	Affirm (polyoxin D)	8 oz	Weekly			A	I	A	A
		Chipco 26019 (iprodione)	16 oz	Biweekly			A	I		A
		Decree 50WDG (fenhexamid)	1.5 lb	Biweekly			A	I		A
		Fludioxonil (Medallion WDG, Emblem, etc)	See label rate	Biweekly			A	I		A
	2	Prestop WG (*Gliocladium catenulatum J1446*)	6.6 oz	Weekly	***	A		I	A	A

Key: A = Application; I = Inoculation

** if disease symptoms are not apparent in the non-treated controls at 14 days, re-inoculate and continue with applications based on their reapplication intervals.*
*** treatment added midseason*
**** see special instructions below for pre-transplant application*

Special Instructions:
BW165N: Include a spreader such as Cohere or Brandt Organics Ag Aide at 8 fl oz per 100 gal. Apply to obtain complete coverage (to wet/glisten not to drip). Utilize a nozzle producing a fine droplet size (10 to 50 microns) or a low volume sprayer. Store product when received and between uses at 4 C. BW165N product and spray suspension should not be exposed to heat (> 30 C) or UV light prior to application
Mural: Apply as a preventative foliar applications and with sufficient water to obtain good coverage.
Pageant TR: The cans are based on square feet and they have to be in a separate greenhouse to apply from the liquid app or do the TR first then come back in with plants that get the liquid apps after.
Prestop WG: Before initial planting, treat bare roots, cuttings, or transplants with a dip using 0.1 oz Prestop WG in 1 gallon of water (10 oz/100 gal) per label instructions. Bare rooted plants, cuttings or transplants must be completely submerged for 5-10 sec
Regalia: Spray foliar as preventative or at first sign of disease.

Evaluation Timing:

Data to Collect	Days							
	-7	0	7	14	21	28	Every 7 *	Final
Physiological stage of crop	X	X	X	X	X	X	X	X
Disease incidence & severity on foliage	X	X	X	X	X	X	X	X
Disease incidence & severity on flowers, if present	X	X	X	X	X	X	X	X
Phytotoxicity on foliage (if observed)	X	X	X	X	X	X	X	X
Phytotoxicity on flowers (if observed)	X	X	X	X	X	X	X	X
Salability								X
Plant Height (if stunting is observed)								X

* Evaluate every 7 days until no more meaningful data can be collected

Sources for Products:

When placing requests for samples, please ensure you include the amount needed, the first planned application date, and shipping address and phone number.

Product	Contact	Phone	Email
Affirm	NuFarm, Rick Fletcher	856-296-0422	rick.fletcher@us.nufarm.com
Astun	OHP, Carlos Bogran	979-255-7687	cbogran@ohp.com
Botector	Westbridge Agricultural Products, Andy Hudson	800-876-2767	ahudson@westbridge.com
Broadform	Bayer, Astrid Parker	919-625-3350	astrid.parker@bayer.com
BW165N	BioWorks, Matt Krause	800-877-9443 x335	mkrause@bioworksinc.com
Chipco 26019	Bayer, Astrid Parker	919-625-3350	astrid.parker@bayer.com
Decree	SePro, Kyle Briscoe	252-947-5790	kyleb@sepro.com
EcoSwing	Gowan, Kartik Anand		kanand@gowanco.com
F9110	FMC, Ken Hutto	614-315-3729	Kendall.Hutto@fmc.com
Fame SC	FMC, Ken Hutto	614-315-3729	Kendall.Hutto@fmc.com
GC Pro	BioSafe Systems, Vijay Choppakatla	860-290-8890 x225	vijayc@biosafesystems.com
MBI 110	Marrone Bio Innovations, Tim Johnson	570-441-8775	tjohnson@marronebio.com
Medallion WDG	Syngenta, Steve Cosky	336-632-7148	steve.cosky@syngenta.com
Mural	Syngenta, Steve Cosky	336-632-7148	steve.cosky@syngenta.com
Orkestra	BASF, Kathie Kalmowitz	919-270-4592	kathie.kalmowitz@basf.com
Pageant	BASF, Kathie Kalmowitz	919-270-4592	kathie.kalmowitz@basf.com
Pageant TR	BASF, Kathie Kalmowitz	919-270-4592	kathie.kalmowitz@basf.com
Palladium	Syngenta, Steve Cosky	336-632-7148	steve.cosky@syngenta.com
Picatina	Syngenta, Steve Cosky	336-632-7148	steve.cosky@syngenta.com
Proud 3	BioHumanetics, Justin Smith	480-45203632	justin@bhn.us
Regalia	Marrone Bio Innovations, Tim Johnson	570-441-8775	tjohnson@marronebio.com
S2200	NuFarm, Rick Fletcher	856-296-0422	rick.fletcher@us.nufarm.com
SP2480	SePRO, Kyle Briscoe	252-947-5790	kyleb@sepro.com
Tourney	NuFarm, Rick Fletcher	856-296-0422	rick.fletcher@us.nufarm.com
Triathlon	OHP, Carlos Bogran	979-255-7687	cbogran@ohp.com
Trinity	BASF, Kathie Kalmowitz	919-270-4592	kathie.kalmowitz@basf.com
ZeroTol	BioSafe Systems, Vijay Choppakatla	860-290-8890 x225	vijayc@biosafesystems.com

Reports:

Reports are due 60 days after last data collection date.

Submit reports electronically on the standard IR-4 Environmental Horticulture Research Report Form. The basic report can be sent in MS Word, the recordkeeping information as pdf or other electronic documents, the raw data in MS Excel or other suitable program such as ARM, and photographs can be submitted as picture embedded in the report or as separate jpg, bmp, or tiff files.

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, clpalmer@njaes.rutgers.edu

OR Ely Vea, 308 Aston Forest Lane, Crownsville, MD 21032, Phone & FAX#: 410-923-4880, E-mail: evvea@njaes.rutgers.edu.

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