IR-4 NATIONAL PESTICIDE CLEARANCE
EFFICACY AND PERFORMANCE PROTOCOL

PR. NO.: P10296
DATE: 6/15

1. PROJECT TITLE:

Valifenalate + Chlorothalonil: Efficacy and Crop Safety of Valifenalate + Chlorothalonil for the Control of Downy Mildew of Basil

2. JUSTIFICATION AND OBJECTIVES:

IR-4 received a request for the use of valifenalate + chlorothalonil on basil for control of downy mildew. The purpose of this research is to collect efficacy and crop safety data to support registration of valifenalate + chlorothalonil on basil for the control of downy mildew.

3. IR-4 RESEARCH COORDINATOR:

Kathryn Homa, IR-4 Project Headquarters, 500 College Road East, Suite 201 W, Princeton, NJ 08540, (732) 932-9575 X4604, FAX# (609) 514-2612, E-mail: homa@aesop.rutgers.edu

Signature of IR-4 Research Coordinator indicating protocol has been finalized. 6/15/15 Date

4. TEST SYSTEM/CROP:

Basil - Use a commercial variety of sweet basil and report: variety and source. Field trials should be conducted at appropriate sites to determine the efficacy and crop safety of valifenalate + chlorothalonil on sweet basil for control of downy mildew.

5. TEST/CONTROL SUBSTANCE:

Evaluate the test materials listed below. IR-4 Personnel will arrange procurement of the test substance. Upon receipt, document the lot/batch number. Store the test substance in a secure, clean, dry area at temperature ranges noted in the product label.

Product % AI and formulation	Active Ingredient(s)	EPA Reg. Number	CAS Number
----------	Valifenalate + Chlorothalonil	----------	Valifenalate: 283159-90-0 Chlorothalonil: 1897-45-6
K-Phite 7LP	Mono- and di-potassium salts of Phosphorous acid	73806-1	monopotassium phosphonate (KH_2PO_3): 13977-65-6 dipotassium phosphonate (K_2HPO_3, also referred to as potassium phosphite): 13492-26-7.
Ranman Fungicide	cyazofamid	71512-3-279	120116-88-3
Revus Fungicide	mandipropamid	100-1254	374726-62-2

6. TEST SYSTEM DESIGN and STATISTICAL METHOD:

Each test site should conduct three or four replicates of each treatment listed in Section 9. Arrange plots in a randomized complete block design or other appropriate statistical design. The individual plots should be large enough to permit accurate application of the test substance in a manner that represents the major application technique that will be used commercially. Conduct appropriate statistical analysis to determine if significant differences exist between treatments.

7. TEST SITE PREPARATION:

Prepare a test site following good local agricultural practices for the production of sweet basil including fertilization, irrigation, if necessary and available, and other practices that ensure good crop production. The test site should have a known pesticide and crop treatment history of a minimum of 1 year.

8. TEST SUBSTANCE APPLICATION:

Use application equipment that will provide uniform application of the test substance and simulates the intended commercial application technique as specified below. To ensure accurate delivery, calibrate test application equipment just prior to application of the test substance.

9. APPLICATION TREATMENTS AND TIMING:

Trt #	Treatment	Target Rate of active ingredient(s)	Target Rate of formulated product*	Application Type	Spray Volume Range**
01	Untreated	Not Applicable	Not Applicable	Not Applicable	Not Applicable
02	Valifenalate + Chlorothalonil (Pre-mix)	----------	0.325 lb product/A (147 grams product/A)	Foliar	20-60 GPA
03	K-Phite + Ranman Alt. K-Phite + Revus (Registered Standards)	1.10 lb ai/A (K-Phite) + 0.078 lb ai/A (Ranman) --- 1.10 lb ai/A (K-Phite) + 0.13 lb ai/A (Revus)	946 mL product/A (K-Phite) + 88.7 mL product/A (Ranman) --- 946 mL product/A (K-Phite) + 236.6 mL product/A (Revus)	Foliar	20-60 GPA

*The nominal formulation concentration of the test substance will be used in calculating application rates.
**GPA=gallons per acre

Treatments 02: Make 4 foliar applications of the valifenalate + chlorothalonil pre-mix at 7 day intervals. As requested by registrant, please take incidence and severity ratings after 4 applications are made. Then continue with remaining applications on a preventative schedule. After final application, please take incidence and severity ratings.

Treatment 03: Make a tank mix application of K-Phite + Ranman. 7 days later, make a tank mix application of K-Phite + Revus. Continue alternating tank-mix applications on a 7 day interval for a total of 4 applications. Please take incidence and severity ratings after a total of 4 applications are made. Then continue with remaining applications on a preventative schedule. After final application, please take incidence and severity ratings.

For all Treatment 03 applications, use the surfactant Silwet L-77 at a rate of 0.125% v/v.

10. EVALUATION OF PEST AND CROP INJURY:

Downy mildew of basil (*Peronospora belbahrii*) is a destructive disease that was first reported in the U.S. in October 2007 in Florida. Symptoms include yellowing of leaves between veins (resembling a nutrient deficiency) and downy-appearing purplish gray sporulation on the lower leaf surface. Affected leaf tissue becomes necrotic. Leaves with this type of injury are unmarketable. Leaf wetness and high humidity increase the severity of downy mildew. The pathogen can be seed-borne and dispersed via air-borne spores.

Downy mildew incidence and severity ratings on foliage **should be rated weekly** approximately 1-3 days after each application. An initial rating should be done before any applications to determine if the disease was present in the plots before the applications begin. **If weekly ratings cannot be taken, be sure to take incidence and severity ratings after 4 applications are made of each treatment. Then continue with remaining applications on a preventative schedule. After final application, take incidence and severity ratings.**

Incidence ratings:
Incidence ratings should be recorded by examining 25 randomly selected leaf samples per experimental unit to

determine the mean percentage of leaves with active sporulation.

Severity ratings:
Severity ratings should be determined by using an ordered categorical scale of 0 to 3:
0 = no sporulation, 1 = light sporulation, 2 = moderate sporulation, and 3 = heavy sporulation on the underside of the leaf surface.

Crop Safety Assessments:
Crop health should be evaluated on all plots at least twice- once during trial conduct and once at its conclusion. If injury occurs then additional evaluations should be considered. Evaluate the impact on disease development. Assess four randomly selected areas within each treatment.

Use visual ratings on a 0 to 5 scale:
Foliage injury: 0 = no adverse effect on foliage; 3 = moderate foliage damage; 5 = severe foliage damage including defoliation and numerous spotting

Also specify the type of injury (stunting, stand loss, leaf burn, leaf cupping or twisting, chlorosis, etc.) Record if any delay in maturity occurred. Evaluate if the crop is stunted and provide an overall assessment (if the level of phytotoxicity would be acceptable in commercial production).

11. SUPPLEMENTAL CROP TREATMENTS:

The integrity of the study should be protected by managing pests causing significant damage to the test crop. Only EPA-registered maintenance pesticides should be used at labeled rates. Document all supplemental crop treatments.

12. FIELD DOCUMENTATION AND RECORD KEEPING:

All operations, data and observations, appropriate to this study should be recorded directly and promptly. At a minimum, collect and maintain the following raw data:

- Test site information
- Plot maps
- Information regarding calibration, and use of application equipment
- Treatment application data
- Crop maintenance pesticides and cultural practices
- Meteorological/Irrigation records
- Other data requested in this protocol such as pest damage ratings and crop safety/injury ratings.

13. PROTOCOL/MODIFICATIONS:

Consult with the IR-4 Regional/ARS Field Research Coordinator and IR-4 HQ Research Coordinator regarding desired changes in this protocol prior to occurrence.

14. FIELD RESEARCH REPORT:

The Field Research Director should write a one to two page summary report similar to those found in Plant Disease Management Reports. The report and supporting documents should be sent to the Regional/ARS Field Coordinator listed below. It is recommended that the Field Research Director maintain a complete copy of these field documents.

15. FIELD PERSONNEL / ID NO. / REGIONAL/ARS FIELD RESEARCH LOCATION

Field Research Director	Field ID NO.	RFC	Test Crop
Andy C. Wyenandt, Rutgers University, Agricultural Research & Extension, 121 Northville Road, Bridgeton, NJ 08302 Phone: 856-455-3100 ext. 4124; e-mail: wyenandt@AESOP.Rutgers.edu	P10296.15-NJP02	NER	Sweet Basil
Margaret T. McGrath, Cornell University; Dept. of Plant Path., Long Island Hort R&E Ctr, 3059 Sound Ave., Riverhead, NY, 11901-1098; Phone: 631-727-3595 ext 20; Fax: 631-727-3611; e-mail: mtm3@cornell.edu	P10296.15-NYP03	NER	Sweet Basil

RFC = Regional/ARS Field Coordinator

Location:

NER: Ms. Edith L. Lurvey, Dept. of Entomology, 630 W. North Street, Geneva, NY 14456; Tel: (315) 787-2308, FAX# 315-787-2326; e-mail: ell10@cornell.edu.