IR-4 NATIONAL PESTICIDE CLEARANCE
EFFICACY AND PERFORMANCE PROTOCOL

PR. NO.: P13076
DATE: 2/21

1. PROJECT TITLE:
Pyraziflumid: Efficacy and Crop Safety of Pyraziflumid for the Control of Southern Blight (*Sclerotium rolfsii*) of Tomato

2. JUSTIFICATION AND OBJECTIVES:
IR-4 received a request for the use of pyraziflumid on tomato for control of southern blight. The purpose of this research is to collect efficacy and crop safety data to support registration of pyraziflumid on tomato for the control of southern blight.

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@njaes.rutgers.edu

Signature of IR-4 Research Coordinator indicating protocol has been finalized. 2/11/21 Date

4. TEST SYSTEM/CROP:
Tomato - Use a locally grown commercial variety **that is susceptible** to southern blight and report: variety/source, lot number, etc. Field trials will be conducted at the appropriate sites to determine the efficacy and crop safety on tomato. Trials should be located in geographical locations that represent important commercial tomato production areas.

5. TEST/CONTROL SUBSTANCE:
Evaluate the test materials listed below. **The products tested should be fresh product.** Do not use other test products that have been stored for more than two years or that have been stored under conditions inconsistent with the product label. If needed, the IR-4 Research Coordinator will arrange for fresh test substances to be delivered. 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
Pyraziflumid 20SC Funigicide	Pyraziflumid (1.84 lbs a.i./gallon)	Not available	942515-63-1
Fontelis Fungicide **(Registered Standard)**	Penthiopyrad (1.67 lbs a.i./gallon)	352-834	183675-82-3

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 tomato 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	Target Rate of formulated product*	Application Type***	Spray Volume Range**
01	Untreated	Not Applicable	Not Applicable	Not Applicable	Not Applicable
02	Fontelis (penthiopyrad) **Registered Standard**	See Table Below	See Table Below	Drench or drip followed by drip or a foliar application directed to the base of the plant	See directions below
03	Pyraziflumid 20SC (pyraziflumid)	0.046 lb ai/A	3.2 fl oz/A	Drip irrigation or Drench	See directions below

*The nominal formulation concentration of the test substance will be used in calculating application rates.
**GPA=gallons per acre
***For all soil applications, do not proportionally reduce the application rate (the amount of active ingredient applied per acre). Direct the entire per acre rate onto the soil. If row widths in the research plots are greater than local commercial practices, then the application rate should be calculated using a local commercial row width.
(Note that the treated area for directed applications is calculated as row spacing x number of rows x plot length)

If natural inoculum is not present in the field plot, an inoculation should be conducted. An inoculation should consist of applying 0.1 g of sclerotia around the base of each plant three days after planting.

Treatment 02 (Fontelis): Make the first application at transplanting (no more than 1 day after planting). Apply as a drench or drip application, keeping the product concentrated near the root/stem zone. Make the second application 21 days later as a drip application or as a foliar application directed to the base of the plant.

Treatment 03 (Pyraziflumid): Make the first drip or drench application at transplanting (no more than 1 day after planting). Then 21 days later, make the second drip or drench application.

Treatment 02 Fontelis Soil Application Rates for Tomatoes

Rate per 1000 row feet	Product per Acre (fl oz)[a]						
fl oz prod/ 1000 ft row	22" rows	30" rows	32" rows	34" rows	36" rows	38" rows	40" rows
1.2	28.6[b]	20.9	19.6	18.5	17.4	16.5	15.7
1.6	-	27.9[c]	26.1[d]	24.6[e]	23.0	22.0	21.1

[a] Consult the maximum rate per acre allowed for the crop, and do not exceed that rate when using this application method.
[b] in 22 inch rows, the highest rate for crops with 24 fl oz/acre maximums is 1.0 fl oz/1000 ft row, and for crops with 30 fl oz/acre maximums is 1.26 fl oz/1000 ft row.
[c] in 30 inch rows, the highest rate for tomatoes and bulb onions with 24 fl oz/acre maximum is 1.38 fl oz/1000 ft row.
[d] in 32 inch rows, the highest rate for tomatoes and bulb onions with 24 fl oz/acre maximum is 1.47 fl oz/1000 ft row.
[e] in 34 inch rows, the highest rate for tomatoes and bulb onions with 24 fl oz/acre maximum is 1.56 fl oz/1000 ft row.

Soil Application Instructions:
Drench Application:
Apply the appropriate amount of test substance per plant in approximately 80 to 200 mL of water per plant. However, if soil/environmental conditions require, lesser or greater amounts may be used. Apply drench solution around the base of the plants. Utilize typical plant spacing to determine the number of plants per acre and the proportion of the per acre rate that should be applied to an individual plant.

Drip Irrigation Applications:
Apply in a minimum of 0.50 acre inches of water. Apply irrigation water and test substance as follows: first approximately ¼ to ⅓ of the irrigation water with test substance and the final ⅔ to ¾ of irrigation water without test substance. The fractions are not exact requirements but rather guidance as how to apply.

For all application, calculate the amount of test substance solution needed for the entire plot (based on the entire plot area). Do not proportionally reduce the application rate. Direct the entire per acre rate onto the crop/area as specified above.

10. EVALUATION OF PEST AND CROP INJURY:

Southern blight incidence should be rated within **approximately 4 weeks after the first application and then weekly until commercial maturity of fruit**. An initial rating should be done before any applications are made to determine if southern blight is present in the plots before the applications begin. Evaluations should be conducted when conditions are most favorable for southern blight.

Incidence:
Disease Incidence: Evaluate tomato plants in each replicate and calculate the number of infected plants (% infection).

Determine yield at the conclusion of the study.

Crop Safety Assessments:
Crop health should be evaluated on all plots **1-2 days after each application and at the conclusion of the study**. 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:
1. Fruit: 0 = no adverse effect on fruit; 3 = moderate spotting; 5 = severe spotting
2. 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 a Plant Disease Management Report. 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
Jaspreet Sidhu, Cooperative Ext Kern County, 1031 South Mount Vernon Ave, Bakersfield, CA 93304; Ph: 661-868-6222, e-mail: jaksidhu@ucanr.edu	P13076.21-CAP05	WSR	Tomato

RFC = Regional/ARS Field Coordinator
Location:

WSR: Dr. Michael Horak, Regional Field Coordinator, Western Region IR-4 Project, 4218 Meyer Hall, University of California-Davis, Davis, CA 95616 (530) 752-7634; Cell# 530-219-8466; e-mail: mjhorak@ucdavis.edu