Penthiopyrad: Efficacy and Crop Safety for the Control of Anthracnose of Avocado

Project No. P13075
Date: 04/2023

PROJECT TITLE:

Penthiopyrad: Efficacy and Crop Safety of Penthiopyrad for the Control of Anthracnose of Avocado.

PROJECT JUSTIFICATION AND OBJECTIVES:

IR-4 received a request for the use of penthiopyrad on avocado for control of anthracnose. The purpose of this research is to collect efficacy and crop safety data to support registration of penthiopyrad on avocado for the control of anthracnose.

Due to the low incidence of anthracnose in California-grown avocadoes, artificial inoculations will be made to ensure robust data. Per the University of California Avocado Pest Management Guidelines, anthracnose in avocadoes is normally of "*little importance because unusually large numbers of spores are required to produce damaging infections. Low humidity and no rain during much of the growing season limit disease development in California. With extended foggy or rainy conditions and mild winter temperatures, and where many dead leaves and twigs and mummified fruit accumulate in trees, the fungus can produce enough spores to cause a disease problem*." https://ipm.ucanr.edu/agriculture/avocado/anthracnose/.

Adherence to Good Laboratory Practices (GLPs) is not required for trials conducted under this research plan.

IR-4 RESEARCH COORDINATOR:

Consult with the Research Coordinator listed below regarding desired changes in this research plan prior to occurrence.

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Signature of IR-4 Research Coordinator
Jaimin Patel

04/12/2023
Date

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MATERIALS & METHODS:

Host plant: Avocado - Use locally grown commercial varieties that are susceptible to the test pest. Report variety/source, lot number, etc.

Test Site: Avocado field (for spray) and laboratory (for inoculation and data collection)

Pathogens(s): Anthracnose (*Colletotrichum gloeosporioides*)

Treatments:

Treatment	MFG	EPA Reg. #	AI	Application Method	Rate	No. of Appl[3]	GPA
Untreated	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pristine (Standard)	BASF	7969-199	Boscalid + Pyraclostrobin	Foliar Directed[2]	12.5 oz/A + Adjuvant[1]	Make 1 fruit directed application	80-200 gal/A
Fontelis 200 SC (1X rate)	Corteva	352-834	Penthiopyrad		24 fl oz/A + Adjuvant[1]	Make 3 fruit directed applications @ 10-day intervalas[3]	
Fontelis 200 SC (2X rate)	Corteva	352-834	Penthiopyrad		48 fl oz/A + Adjuvant[1]	Make 3 fruit directed applications @ 10-day intervals[3]	

[1] Use a non-ionic surfactant not to exceed 0.08% v/v

[2] Note that the treated area for foliar directed applications is calculated as row spacing X number of rows X plot length

[3] Apply three fungicide applications at 10 day intervals before appearance of visible symptoms on fruits with the last application on the day of harvest. 1-2 days after 3rd fungicide application harvest fruits, inoculate them with the pathogen, and place them in high humidity conditions

Test Substances Manipulation: Read product use directions prior to manipulation and application. Applicators and handlers must wear the personal protective equipment listed on the product label. Do not use old/expired products for trials conducted under this research plan. The IR-4 Research Coordinator will arrange for new test substance to be delivered.

Upon receipt of the test substance(s), document the corresponding lot/batch number. Store the test substance in a secure, clean, dry area at temperature ranges noted in the product label. Use application equipment that will provide uniform application of the test substance and simulates the intended commercial application technique. To ensure accurate delivery, calibrate test application equipment prior to application of the test substance(s).

Experimental Design: Each test site should conduct three or four replicates of each treatment. Arrange experiment in appropriate statistical design. If natural inoculum is not present in the field plot, inoculations should be conducted at two (2) days after the fungicide application for all treatments.

Supplemental Crop treatments: To protect the integrity of this study, manage pests causing significant damage to the crop other than the target pest. Early season applications of fungicides can be made but separate the first application of the test substances and these other fungicide applications by a minimum of three (3) weeks. Maintenance pesticide applications must be applied across the entire test site including the non-treated control plots. Only EPA-registered maintenance pesticides should be used at labeled rates and applied to all experimental units. Document all supplemental crop treatments.

DATA COLLECTION:

Efficacy:

Evaluate fruit disease severity and incidence at the time of each fungicide application and at 5, 10, 15 and 20 days after inoculation. Record fruit disease severity as the percentage of fruits affected with anthracnose. Harvest at least 12 fruits per treatment and evaluate each fruit for incidence and severity of anthracnose infection. Incidence is the proportion of fruits with anthracnose infection while severity is the extent of the anthracnose infection. Data can be collected in percentage for severity or incidence but please include the raw fruit data with the report.

Fruit and Foliage Injury:

Fruit health and foliage effects should be evaluated and reported on trees and all fruits at fungicide application and at 10, 20 and 30 days after fungicide application. Assess foliage of each tree and at least 12 fruits per treatment. Use visual ratings on a 0 to 5 scale:

- For foliar injury: 0 = no adverse effect on foliage; 3 = moderate damage; 5 = severe damage
- For fruit injury: 0 = no adverse effect on fruit; 3 = moderate damage and spotting; 5 = severe damage; spotting

Specify the type of injury (fruit burn, spotting, epinasty, etc.) and record if any delay in maturity occurred. Please provide an overall assessment (if the level of phytotoxicity would be acceptable in commercial production).

STATISTICAL ANALYSIS:

Conduct appropriate statistical analysis to determine if significant differences exist between treatments. Statistical analysis from commonly used agricultural data programs, such as but not limited to Agricultural Research Manager (ARM), SAS, Minitab, etc. is acceptable.

DATA REPORTING:

At trial completion, please submit a final report and the raw data in two separate files to the IR-4 Research Coordinator and the appropriate Regional Field Coordinator (RFC) listed below.

For the sake of consistency and to avoid missing information, IR-4 encourages collaborators to

adopt and fill out the Final Report Research Template provided by the Research Coordinator prior to trial conclusion.

The final report and the raw data should be submitted to IR-4 within 90 days of last data collection.

For non-confidential test substances, IR-4 encourages researchers to publish the results obtained from the study. Any publications should acknowledge support by IR-4.

TRIAL SITE INFORMATION

Researcher	Field ID NO.	RFC
Dr. Jim Adaskaveg Professor & Plant Pathologist Microbiology & Plant Pathology 242 Fawcett Lab University of California Riverside, CA 9252 Jim.adaskaveg@ucr.edu Phone: 951-827-7577	P13075.23-CAP04	WSR

RESEARCH FIELD COORDINATORS (RFC)

WSR: Dr. Kari Arnold, Regional Field Coordinator, Western Region IR-4 Project, Cell: 530-574-9181; Email: klarnold@ucdavis.edu