United States Department of Agriculture

Progress Report

Title:	Multi - barrier Management Strategies of Phytophthora blight in Peppers and Cucurbits

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Program Code: SCRI **Program Name:** Specialty Crop Research Initiative

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Recipient Organization

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{NO DATA ENTERED}

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Plant and Environmental Sciece

Non-Technical Summary

Phytophthora capsici, causal agent of Phytophthora blight, is a serious pathogen in vegetable crops worldwide. **The goals** of this transdisciplinary SREP project are to develop a system-based approach that significantly reduces the risk of Phytophthora blight. We envision the development of a novel Phytophthora Management Risk Index (PMRI) based on integrating five risk components: Phytophthora Inoculum Level, Moisture, Host Resistance, Fungicide Resistance, and Soil Health. This practical concept provides an assessment of the risk of Phytophthora blight in any system and can be used to guide the incorporation of strategies to help minimize disease risk. We are proposing innovative strategies to significantly reduce losses to P. capsici and increase yield and profits. **Our objectives** are to: **i)** evaluate genetic diversity among isolates of P. capsici; **ii)** identify P. capsici-resistant genotypes that are more tolerant to drought or flooding; **iii)** develop sensitive diagnostic tools for detecting infection, and develop multi-barrier management strategies; and **iv)** evaluate economic and social impacts of developed strategies, and to disseminate knowledge and techniques generated through education and Extension outreach. The project will provide stakeholders with a new risk-based management approach (PMRI) using innovative integrated strategies. Our objectives address **five SCRI Focus Areas**: i) Research in plant breeding and genetics (25%); ii) Efforts to identify/address threats from pests and diseases (30%); iii) Efforts to improve production efficiency/profitability (10%); iv) New innovation and technology (25%); and v) Methods to prevent, detect, monitor, control food safety hazards in specialty crops (10%).

Accomplishments

Major goals of the project

Hypotheses, Objectives, and Goals

The long-term goal of this project is to develop an economically profitable multi-barrier system to manage P. capsici on vegetable crops based on sound research-based of information on water and soil management, cultural practices, varietal resistance, and fungicide programs for disease control to reduce the activities of this pathogen in field production and postharvest environment. Knowledge gained through this project will be translated into actionable recommendations and disseminated to stakeholders using avenues such as on-farm experiments and demonstrations, field days, workshops, producer meetings and conferences, project-specific websites, and news releases through websites and Extension offices.

Hypothesis 1: Populations of Phytophthora capsici are genetically diverse and genetic diversity in P. capsici may significantly

affect potential management options of the pathogen.
Objective 1: To conduct a nationwide survey of genetic diversity of isolates of P. capsici from irrigation water and vegetable fields.
1a). To determine the genetic diversity within and range of sensitivity of the isolates of P. capsici to currently used fungicides.
1b) To quantify and to better understand the potential relationship between the genetic diversity of the soil microbiome and P. capsici populations.
The overall goal is to provide guidance on gauging potential disease development based on pathogen genetics, fungicide sensitivity, and the soil microbiome to test the durability of disease mitigation strategies across a spectrum of soil types.

Hypothesis 2: Utilization of P. capsici-resistant crop cultivars with tolerance to extreme environmental footprints (e.g., drought or flooding) will reduce Phytophthora blight and increase crop yield.
Objective 2: To identify and evaluate crop cultivars, accessions, scion-rootstock combinations with P. capsici resistance that may also be more tolerant to drought and flooding.
2a). To evaluate resistance of pepper and cucurbit accessions and scion-rootstock combinations to different genetic groups of P. capsici identified in Objective 1.
2b). To breed for resistance of pepper and cucurbit to P. capsici.
2c). To assess stability of disease resistance under drought and flooding conditions.
The overall goal of the screening and breeding effort in pepper and cucurbit is the identification or development of lines with attributes in reducing the rate of infection, reducing soil inoculum potential (genetic soil disinfestation), while maintaining resistance under drought and flooding conditions, and identifying microbiome that is antagonistic to P. capsici and yet stimulatory to plant growth.

Hypothesis 3: Rapid and sensitive detection of P. capsici and integrated management strategies will result in improved management of Phytophthora blight.
Objective 3: To develop rapid and accurate diagnostic procedures for plant infection by P. capsici and develop multi-barrier strategies for effective management of the disease.
3a). To develop real-time diagnostic assays, including the use of Oxford Nanopore Technology (ONT), a promising sequencing technology, for on-site detection of P. capsici in irrigation water, plants, and postharvest fruit samples.
3b). To develop multi-barrier management strategies incorporating sensitive disease detection, resistant plant genotypes, and tolerance to drought and flooding.
3c) To quantify the effects of multi-barrier management strategies on disease and soil microbiome.
The overall goal is to develop sensitive and rapid disease detection methods to guide implementation of multi-faceted disease management programs that include preventing disease outbreaks, and reducing disease levels through disease resistance, tolerance to environmental footprints (drought and flooding), improved soil health, and improved food quality and safety.

Hypothesis 4: Management approaches developed in the project will provide the most economically profitable options with greater social impacts to producers engaged in the production of vegetable crops challenged by P. capsici.
Objective 4: To evaluate the economic and social impacts of developed integrated strategies and to disseminate knowledge and techniques generated through education and extension.
The overall goal is to provide producers and other stakeholders with research, extension, and educational materials on the efficacy and profitability of managing P. capsici using integrated strategies.

What was accomplished under these goals?

Objective 1
In Arizona, **Co-PI Hu** has recovered nine isolates of Phytophthora capsici from chile pepper plants. Their sensitivity to several common oomycete fungicides is being evaluated in vitro on CV8 media plates. Biosurfactants including rhamnolipids are being assessed for their efficacy to inhibit the growth of P. capsici isolates.
In Illinois, **co-PI Babadoost** conducted laboratory experiments to determine the efficacy of seven potential fungicides for managing P. capsici. Additionally, greenhouse experiments were conducted to determine the virulence of six different isolates from various locations of the Midwest on pumpkin seedlings. Also, a field experiment with 18 treatments in a hot-spot area for P. capsici is being conducted to determine the effectiveness of potential fungicides for managing P. capsici in pumpkins.
In Mississippi, **co-PI Ali** processed several suspected P. capsici samples collected from vegetable crops in Mississippi and Georgia. The sensitivity of the 36 P. capsici isolates to dimethomorph, mandipropamid, ethaboxam, and oxathiapiprolin was assessed by examining various asexual life stages. Only three isolates showed moderate sensitivity to dimethomorph based on mycelial growth inhibition, and six isolates showed moderate sensitivity based on sporangium production. However, all isolates were sensitive to mandipropamid, ethaboxam, and oxathiapiprolin across all stages.
Co-PI Somenahally and **Co-PI Barberan** finalized a protocol for bulk soil and rhizosphere sampling for microbial molecular

analyses.

Objective 2

In Texas, seeds for Citrullus amarus (189225) and Citrullus mucosospermus (186489, 560020, 595203) accessions resistant to P. capsici, were received by **co-PI Crosby** at Texas A&M in September of 2023 from USDA-ARS-GRIN. These were manually crossed under controlled environment. Recurrent parents for fruit quality included 'Allsweet', 'Leelanau', 'Au-Sweet Scarlet', a gray rind breeding line with high level Fusarium wilt resistance and two mini watermelon breeding lines. In addition, P. capsici-resistant seeds for 'Au-Jubilant' were also received from the National Repository in Ft. Collins. These were planted in the greenhouse and hybrids were created using 'Allsweet', and two mini breeding lines as pollen donors. All these new hybrids were planted to generate F_2 seeds. The F_2 seeds will be evaluated in controlled inoculation experiments with a highly virulent NM isolate of P. capsici.

In Illinois, **co-PI Babadoost** has set up field experiments to evaluate the following accessions/cultivars from Arizona for their susceptibility/resistance to Illinois isolates of P. capsici: watermelon 'Sugar Baby', watermelon 'PI 186489 x All Sweet, F_1', pepper 'NM 6-4', and pepper 'Fidel.' These experiments are ongoing.

In New Mexico, **co-PI Lozada**, began seed increase of recombinant inbred line (RILs) in the greenhouse. The RILs will be planted and screened for P. capsici resistance using the most virulent isolate '6347' in Fall 2024. The most resistant RILs will be hybridized and the F_{1s} will be screened again for resistance. To further understand the virulence of isolate '6347,' DNA will be extracted from this isolate and sent to the Arizona Genomics Institute, Tucson, AZ, for sequencing.

Co-PI Djaman investigated the effects of irrigation regimes on Capsicum pepper and pumpkin growth, yield, and the susceptibility to P. capsici. Six varieties of Capsicum pepper ('NM#6', 'Sandia', 'Anaheim', 'TAM Mild Jalapeno', 'Red Knight X3R', and 'California Wonder') and three pumpkin varieties ('Zeus', 'Magician', and 'New England Pie') were evaluated under three irrigation regimes (Full irrigation, 20% water saving, and 40% water saving). These experiments are ongoing.

Objective 3a. Develop real-time diagnostic assays

A total of 36 suspected P. capsici samples were collected by **co-PI Ali** from vegetable crops in Mississippi and Georgia. A conventional PCR technique was used to identify P. capsici. Co-PI Ali is working to develop the Oxford Nanopore Technology (ONT) protocol to identify P. capsici using the ONT Rapid Sequencing Kit.

In New Mexico, **co-PI Fedio**, with the NMSU Food Safety Laboratory (FSL), has established procedures for P. capsici determination. Student employees were trained on how to collect DEAD END Ultrafiltration (DEUF) water samples. The NMSU FSL Director and a student employee collected 10 water samples (irrigation and river) by DEUF for concentration of microorganisms.These samples were collected on the weeks of August 5 and August 12, 2024. Samples will be processed to confirm the presence of P. capsici.

In New Jersey, **co-PI Wyenandt** has put in place plans for collection of P. capsici isolates from Northern, Central, and Southern New Jersey to send to project collaborators for the determination of genetic diversity, sensitivity to fungicides, and microbiome analysis in fall 2024. Field trials will be conducted to evaluate P. capsici-resistant accessions and cultivars under drought and flooded conditions. Because of the delay in funding this work will begin in the spring of 2025.

Objective 3b. To develop multi-barrier management strategies

In Florida, **co-PI Dufault** evaluated the efficacy of multiple fungicide treatments to suppress Phytophthora blight in watermelon. The experiment included eight treatments with four replications: an untreated control as well as treatments of Luna Flex (12.8), Luna Experience (10), Aprovia Top (10.5), Inspire Super (16), an alternating treatment of Quintec (6 fl oz/A) and Torino (3.4 fl oz/A), Affiance (12 fl oz/A), and an alternating treatment of Orondis Ultra and Ranman. All treatments except for the untreated control were first treated with chlorothalonil (24, foliar application) on a weekly basis, beginning at 7 days post-transplant (DPT) and continuing until 28 DPT. Experimental treatments began at 35 DPT and were via foliar spray every two weeks, alternating with applications of Mancozeb (3 lb/A). Treatments were assessed weekly for symptoms of Phytophthora blight; however, the disease was not observed in the duration of the trial. To remedy this, the trial will be repeated in watermelons and peppers with prior inoculation of the field with P. capsici isolates.

In New Mexico, **co-PI Sanogo** conducted experiments to evaluate the effects of combining biologicals and botanical extracts on inducing resistance in chile pepper against P. capsici. Eight treatments were tested including Bacillus-based, Streptomyces-based, and Trichoderma-based biologicals and plant activators: pecan husk (1%), pecan shell (1%), LifeGard WG (4.5 oz per 100 gallon~1.5 g/gallon), pecan husk (1%) + Double Nickel + Rootshield + Actinovate; pecan shell (1%) + Double Nickel + Rootshield + Actinovate; pecan husk (1%) + LifeGard, pecan shell (1%) + LifeGard, and water only. These experiments are ongoing.

In Texas, **Co-PI Somenahally** hired a MS student, who is conducting greenhouse trials to evaluate different soil health practices, cultural practices and organic amendments impact on P. capcisi suppression in bell peppers.Additionally, microbiome analysis is being done on bulk and rhizospheric soils collected from pepper fields in New Mexico, which were shipped to co-PI Somenahally.

Objective 4

In New Mexico, **co-PI Acharya** is working with an MS student on a literature review and research methodology development for an IRB application for approval. Several presentations (17 in total) were given at meetings of scientific societies and commodity groups. Additionally, 13 abstracts and extension/outreach materials were produced. Other avenues for dissemination of information included a website, three videos, and news outlet stories. The link for the website (https://phytophthora.nmsu.edu/) was sent to the National Watermelon Association and other stakeholders.

What opportunities for training and professional development has the project provided?

All co-PIs were engaged in hiring of undergraduate, graduate, and post-graduate personnel. Co-PIs and post-graduate personnel provided training in pathological and microbiological techniques, developing skills in experimental design and data collection, and in presenting research projects to stakeholders and in scientific society meetings..

How have the results been disseminated to communities of interest?

Results have been disseminated through presentations (17 in total) at meetings of scientific societies, commodity groups including state and regional vegetable grower associations. Additionally, 13 abstracts and extension/outreach materials were produced. Other avenues for dissemination of information on the project included a website for the project, three videos, and news outlet stories. The link for the website (https://phytophthora.nmsu.edu/) was sent to the National Watermelon Association and other stakeholders.

What do you plan to do during the next reporting period to accomplish the goals?

In Arizona, **co-PI Hu** will continue to collect Phytophthora capsici isolates from various hosts in different counties, especially peppers and melons. He will perform sensitivity of Phytophthora isolates to several oomycete fungicides, including mefenoxam, fluopicolide, oxathiapiprolin, dimethomorph, mandipropamid, ethaboxam, and cyazofamid. He will perform in vitro and in vivo efficacy tests of glycolipids and Trichoderma strains against P. capsici. **Co-PI Barberan** will search for and hire a PhD student for 3 years starting in January 2025.The PhD student will be trained in extraction of DNA, HPC computing services, sequencing services, and bioinformatics analyses of microbiome sequencing data.
In Florida, **co-PI Dufault** plans to perform two field trials: one in watermelons and one in peppers for the 2025 growing season. These trials will involve sampling fields to analyze soil microbiomes, identifying potential fungicide and biological controls for managing pathogens, and collecting P. capsici isolates. He will also edit and publish (https://edis.ifas.ufl.edu/) an extension resource for P. capsici management in Florida.
In Illinois, **co-PI Babadoost** will be collecting more isolates of P. capsici from cucurbits (more focused on pumpkins) and peppers. All collected isolates will be tested for their virulence and genetic diversity. The effectiveness of potential fungicides on development of P. capsici in the lab will be tested. The efficacy of potential fungicides on development of damping-off by P. capsici on pumpkins and peppers will also be tested in a greenhouse. Testing efficacy of potential fungicides on protecting pumpkin vines and fruit in the fields (hot spots: commercial fields with strong history of Phytophthora blight caused by P. capsici). Soil samples from fields with history of Phytophthora blight will be collected and provided to other co-PIs responsible for testing soils.
In Mississippi, **co-PI Ali** will continue to collect new isolates of P. capsici from pepper and cucurbit fields across Mississippi. These isolates will be pivotal for molecular characterization, fungicide efficacy assessments, and genetic diversity studies, all of which are essential for supporting the project's goals. The group will also develop multiple sets of markers/primers based on known DNA sequences of target P. capsici genes, ensuring specific detection using technologies such as Oxford Nanopore Technology (ONT), LAMP, or RPA assays. The design and optimization of these primers will be carried out manually with the aid of specialized computer software.
In New Jersey, **co-PI Wyenandt** will evaluate new P. capsici-resistant bell pepper cultivars and breeding lines obtained from collaborators which have not been evaluated in previous P. capsici trials under New Jersey growing conditions. He will evaluate P. capsici-resistant accessions and cultivars under drought and flooded conditions.
In New Mexico, **co-PI Lozada** will plant and screen RILs for P. capsici resistance using the most virulent isolate '6347' . The most resistant RILs will be hybridized and the F_{1s} will be screened again for resistance.Sequencing will be performed to further understand the virulence of isolate '6347,' through the Arizona Genomics Institute, Tucson, AZ. **Co-PI Fedio** plans to establish procedures for Oxford Nanopore (ONT) sequencing of Phytophthora in the next reporting period. The NMSU FSL will also work on developmentof procedures for isothermal detection techniques for diagnosis of P. capsici in various samples including irrigation water, plants, and postharvest fruit samples. Isothermal detection procedures (loop-mediated amplification) and recombinase polymerase amplification)will be examined. The agricultural economics team at NMSU led by **Co-PI Acharya** is finalizing the P. capsici survey and will submit it for IRB approval in September. Upon approval, they will start distributing the survey with the help of the project team to other researchers and crop producers (farmers). **Co-PI Djaman** will continue to evaluate pepper and pumpkin varieties response to different irrigation regimes and their susceptibility to Phytophthora capsici. He will also collect samples (soil, water, and plants) for collaborators working on developing an improved detection method for P. capsici**. Project Director Sanogo** will continue his monthly meeting with his team. A focus

will be on the organization of the Spring Institute on Phytophthora Research and Extension (SIPRE) in conjunction with the New Mexico Chile Conference in February 2025.
In Texas, **co-PI Crosby** will inoculate 200 F2 progeny from each family and the parents with P. capsici in the greenhouse at College Station during the fall of 2024. Resistant and susceptible plants will be counted to estimate inheritance or heritability for the resistance genes. Resistant plants will be transplanted into 3 gallon pots with Pro-mix to conduct backcrosses (BC) to the recurrent parents such as Allsweet in the greenhouse during the late fall and winter 2024-2025. Fruits from these crosses will be inoculated with P. capsici after mature seeds are harvested. These BC1 seeds will be planted in the greenhouse and field plots at College Station to self-pollinate and create segregating populations for selection of resistance and quality traits. If there is a strong dominant component to the resistance trait, then these BC1 populations will also be inoculated with P. capsici to screen for resistance. Fruit will be analyzed for sugars, carotenoids, firmness, size and off-flavors such as bitterness. Any BC1 plants which demonstrate resistance after controlled inoculations will be moved to pots in the GH for self-pollination and backcrossing to the recurrent parents, Allsweet. Leelanau, Au-Sweet scarlet and some elite TAMU inbred lines**. Co-PI Somenahally** will conduct soil and plant microbiome analysis in P. capsici-resistant and P. capsici-susceptible bell peppers. He will conduct greenhouse trials to evaluate suppression of P. capsici under different soil health improving practices. He will process soil samples received from project collaborators for microbiome analysis.

Participants

Actual FTE's for this Reporting Period

Role	Non-Students or faculty	Students with Staffing Roles			Computed Total by Role
		Undergraduate	Graduate	Post-Doctorate	
Scientist	0.5	0.2	0.5	1	2.2
Professional	0.2	0	0	0	0.2
Technical	0	0	0	0	0
Administrative	0	0	0	0	0
Other	0	0	0	0	0
Computed Total	0.7	0.2	0.5	1	2.4

Student Count by Classification of Instructional Programs (CIP) Code

Undergraduate	Graduate	Post-Doctorate	CIP Code
4	8	3	01.11 Plant Sciences.

Target Audience

The audience reached by our efforts during this reporting period agricultural producers and industries involved in vegetable production, including state, regional, and vegetable grower associations. Other impacted target audience includes consultants, research scientists, graduate and undergraduate students, and K-12 educators.

Products

Type	Status	Year Published	NIFA Support Acknowledged
Conference Papers and	Published	2024	YES

Citation

Ali, E., Waliullah, S., Njiti, V. A diagnostic guide for P. capsici diseases of vegetables. American Society for Horticultural Science Conference 2024, Hawaii, September 2024

Babadoost, M. Illinois State Vegetable Growers' meeting at Springfield, Illinois (3000 S.

Dirksen Pkwy, Springfield, Illinois 62703), 19 January 2024.

Babadoost, M. Wisconsin vegetable growers meeting at Wisconsin Dells, Wisconsin (1305 Kalahari Drive Wisconsin Dells, WI 53965), 22 January 2024.

Babadoost, M. Amish and Mennonite vegetable growers meeting, held at the Otto Center (2058 CR 1800E, Arthur, IL 61911), 17 January 2024.

Babadoost, M. Southern Illinois vegetable growers meeting at Mt. Vernon, Illinois (Double Tree Hilton, 222 Potomac Blvd, Mt. Vernon, Illinois 62864), 7 February 2024.

Babadoost, M. Northern Illinois vegetable growers meeting at Rockford, Illinois (Northern Illinois University, 8500 E. State St., Rockford, IL 61108), 19 February 2024.

Babadoost, M. Amish and Mennonite vegetable growers meeting, held at Joseph Kaufman's farm (185 East State Route 133, Arthur, Illinois 61911), 13 June 2024.

Babadoost, M. Illinois State Horticultural Society's Field Day, held at Jonamac Orchards and Pumpkin Pach (19412, Shabbona Rd., Malta, Illinois 60150), 6 June 2024.

Domesle, K., S. Young, J. Hoerr, R. Hardy, S. Breshears, M. Lunsford, J. Ryan, A. Barrena, L. Wiley, D. Kist, C. Feldmann, K. Lozinak, S. Pagadala, W. Fedio, R. Zapata, Y. Presmont, Y. Rosa, C. Reed, J. Maitland, M. Young, F. Hysell, Z. Kuhl, H. Wang, T. Hammack, R. Pamboukian and B. Ge. 2024. Validation of a Salmonella Loop-Mediated Isothermal Amplification Assay in 27 Human and Animal Food Matrices of 9 ISO Food Categories. International Association of Food Protection annual meeting. Long Beach, CA.

Fabunmi, I. E. Alvarez, Y. Presmont, R. Zapata and W. Fedio. 2024. Enterococcus faecium as a Bacterial Surrogate for Salmonella Inactivation during Red Chile Drying. International Association of Food Protection annual meeting. Long Beach, CA.

Hu, J. Vegetable diseases caused by Phytophthora capsici in Arizona. The Division of Agriculture, Life and Veterinary Sciences and Cooperative Extension, University of Arizona.

Hu, J. Vegetable disease identification and management. Southeastern Arizona Farm and Ranch Trade Show, Willcox, Arizona 15 Feb, 2024

Kaur, N., Lozada, D.N., Winn, Z., Sanogo, S. Chile pepper root rot: Insights from Genomewide Mapping and Genomic Selection. International Pepper Conference 2024, Ithaca, NY, September 9-11, 2024

Sanogo, S., Lozada, D. N., Djaman, K., Fedio, W., Acharya, R., Ali, E., Hu, J., , Barberan5, A., Dufault, N., Babadoost, M., Wyenandt, C. A., Crosby, K., and Somenahally, A. C. A Multistate Project for Developing Multi-barrier Strategies for Phytophthora Blight in Peppers and Cucurbits. APS Pacific Division Meeting & Conference on Soilborne Plant Pathogens, Corvallis, OR, March 26-28, 2024.

Sanogo, S., Wyenandt, C. A., Somenahally, A. C., Lozada, D. N., and Acharya, R. Feasibility and Application of a Phytophthora Management Risk Index in Vegetable Crops. APS Pacific Division Meeting & Conference on Soilborne Plant Pathogens, Corvallis, OR, March 26-28, 2024.

Accession No. 1031511 **Project No. NMSANOGO-23G**

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2024	YES

Citation

Abstracts and other publications including peer-reviewed articles and extension/outreach materials

Ali., E., Chukwuma, F. Trifold: What's Wrong with My Plants? Alcorn State University Extension Program

Kaur, N., Lozada, D.N., Winn, Z., Sanogo, S. Chile pepper root rot: Insights from Genomewide Mapping and Genomic Selection. International Pepper Conference 2024, Ithaca, NY, September 9-11, 2024

Sanogo, S., Lozada, D. N., Djaman, K., Fedio, W., Acharya, R., Ali, E., Hu, J., , Barberan5, A., Dufault, N., Babadoost, M., Wyenandt, C. A., Crosby, K., and Somenahally, A. C. A Multistate Project for Developing Multi-barrier Strategies for Phytophthora Blight in Peppers and Cucurbits. APS Pacific Division Meeting & Conference on Soilborne Plant Pathogens, Corvallis, OR, March 26-28, 2024.

Sanogo, S., Wyenandt, C. A., Somenahally, A. C., Lozada, D. N., and Acharya, R. Feasibility and Application of a Phytophthora Management Risk Index in Vegetable Crops. APS Pacific Division Meeting & Conference on Soilborne Plant Pathogens, Corvallis, OR, March 26-28, 2024.

Wyenandt, A. Update on disease control in vegetable crops, 1 February 2024, Hershey, PA

Wyenandt, A. Update on disease control in vegetable crops, 6 February 2024, Atlantic City, NJ

Wyenandt, A. Pepper Advisory Committee Meeting, 4 April 2024, RAREC, Bridgeton, NJ

Wyenandt, A. Disease control options for spring vegetable crops, 29 April 2024, Vineland, NJ

Wyenandt, A.'Controlling Phytophthora blight in cucurbit plantings 29 May 2024 https://plant-pest-advisory.rutgers.edu/controlling-phytophthora-blight-in-cucurbit-plantings-2/

Wyenandt, A.'Controlling Phytophthora blight in eggplant', 24 May 2024 https://plant-pest-advisory.rutgers.edu/controlling-phytophthora-blight-in-eggplant-2/

Wyenandt, A.'Phytophthora and pythium control in wet weather' 23 May 2024 https://plant-pest-advisory.rutgers.edu/phytophthora-control-during-wet-weather-3-3-2-2/

Wyenandt, A.'Identifying and Controlling Pathogens at Transplanting in 2024' https://plant-pest-advisory.rutgers.edu/damping-off-identifying-and-controlling-early-season-pathogens-2-2-2-2-3-2/

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2023	YES

Citation

A) WEBSITE: Multi-barrier Management Strategies of Phytophthora Blight in Peppers and Cucurbits https://phytophthora.nmsu.edu/

B) VIDEOS
Phytophthora blight: A scare to vegetable growers
https://youtu.be/MuYOB_x0Mks?si=-8aX4Fl9FRBoVyIt
Phytophthora: A Life Cyle
https://youtu.be/2ovYY7BuBHw?si=eO-ZobDFYjYGcawp
Soilborne Disease Research Laboratory at NMSU's College of ACES
https://youtu.be/a-j5dxQBspg?si=0fTN8gdWE9twKKgb

C) IN THE NEWS

NMSU receives funding to research common disease found in crops like chile
https://youtu.be/ywtjfnFKKRM?si=UEib6IWeVPQ8b0tN

NMSU to lead project to reduce risks of common plant pathogen
https://newsroom.nmsu.edu/news/nmsu-to-lead-project-to-reduce-risks-of-common-plant-pathogen/s/cb47e06e-f4ad-4962-8da6-c45e08cf3c8e

National Soilborne Disease Research
https://www.innovativemediablog.nmsu.edu/post/national-soilborne-disease-research

US (NM): NMSU professor works to curb common plant pathogen in the US
https://www.hortidaily.com/article/9567606/us-nm-nmsu-professor-works-to-curb-common-plant-pathogen-in-the-us/

Other Products

{Nothing to report}

Changes/Problems

The project has incurred some delays owing to turnover in personnel handling subaward processing at some recipient institutions. Subaward has yet to be established with Rutgers University. Across the co-PIs, hiring of personnel was initiated and is ongoing. Percentage expenditure varied across Co-PIs ranging from 4 to 85%. This is a consequence of the delays mentioned above.