

UNITED
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NETWORK



Webinar

THE U.S. CULTURE COLLECTION NETWORK – A CENTRAL RESOURCE FOR MICROBE CULTURE COLLECTIONS AND THEIR USERS

December 14, 2023



Webinar

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The U.S. Culture Collection Network – A Central Resource for Microbe Culture Collections and Their Users



Moderator



Dusti Gallagher
USCCN Project
Manager

Participants



Rick Bennett
University of Kentucky
USCCN Steering
Committee member



Neha Potnis
Auburn University
USCCN Steering
Committee member



Kirk Broders
USDA-ARS Culture
Collection (NRRL)
USCCN participant

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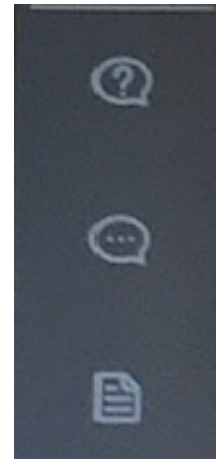
The U.S. Culture Collection Network
– A Central Resource for Microbe
Culture Collections and Their Users



Agenda

- USCCN overview
- Value of USCCN registry
- How to register your culture collection
- Panel discussion and Q&A

Webinar platform



Submit your **questions** in the **Q&A panel**

Monitor the **chat panel** to see links & messages from the organizers

Download a **handout** of the presentation in the handout panel

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THE U.S. CULTURE COLLECTIONS NETWORK – AN OVERVIEW –

Rick Bennett, Ph.D.
Steering Committee member



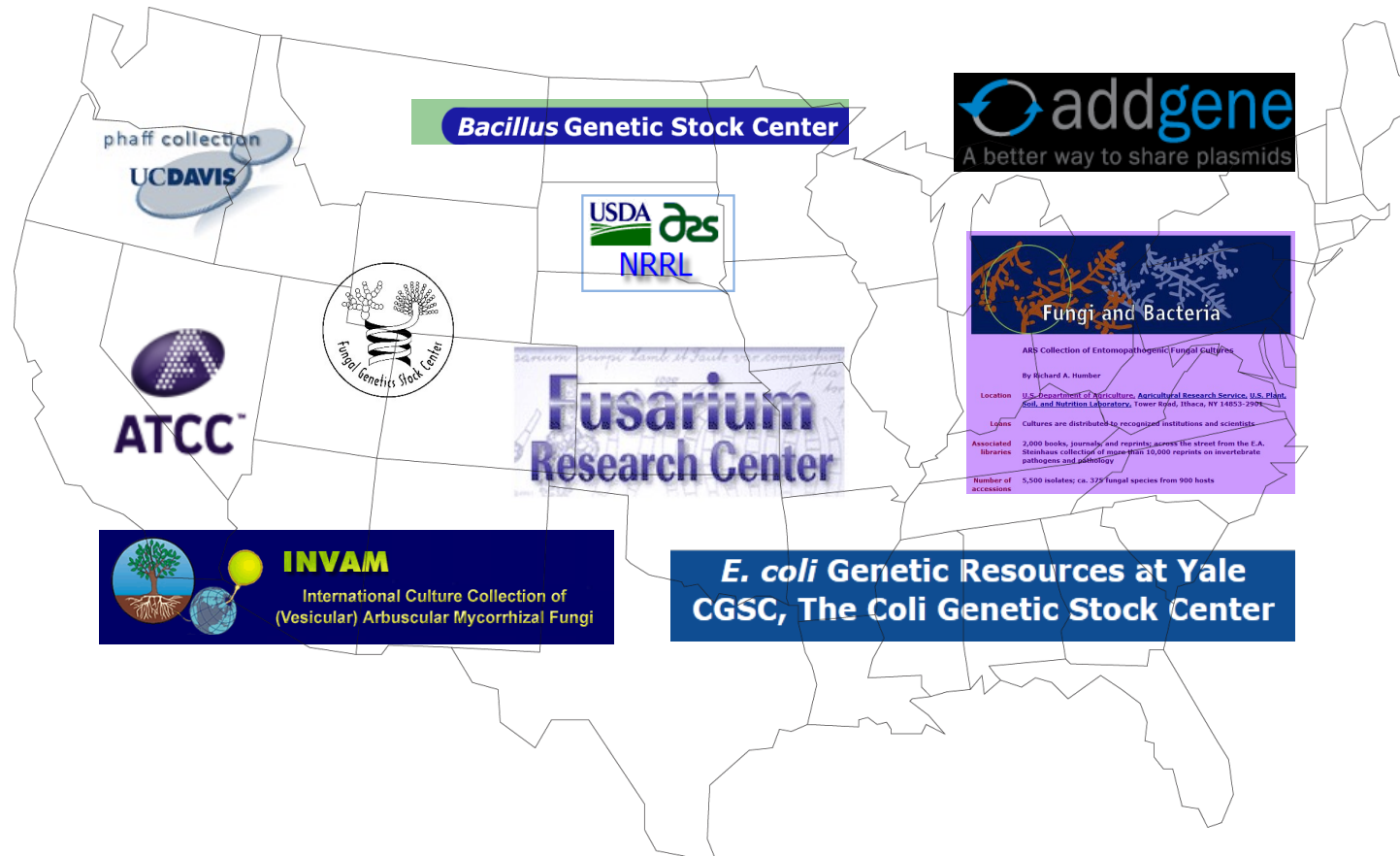
A NSF-funded Research Coordination Network

Bringing together scientists working with living microbe collections

A partnership with the
International Phytobiomes
Alliance for Research.



Culture Collections in the U.S.



While the U.S. has numerous collections, there is no uniform system for supporting microbial germplasm repositories

Pre USCCN

- **2007** – Initial workshop to develop an action plan, supported by USDA.
- **2009** – Draft of initial proposal based on workshop outcomes to develop a National Plant Microbial Germplasm System.
- **2010** – USDA-ARS provides financial input and physical infrastructure for microbial national system
- **2011** – APS annual meeting workshop on collections management and best practices

2012

NSF announces support for a Community of ex- situ microbial germplasm repository (USCCN)

2022

NSF renews funding for expansion of activities



Mission

Facilitate the safe and responsible utilization of microbial resources for research, education, industry, medicine, and agriculture for the betterment of humankind by providing opportunities for U.S. culture collection workers to engage with each other and with the broader culture collection community.

Vision

USCCN seeks to optimize the quality and availability of microbial resources and become a central resource for U.S. microbe culture collections and their users



Structure

Steering Committee

Identifies priorities for achieving vision and mission of the network and oversees the day-to-day activities.

Operating Committees

Lead and coordinate specific activities.

Steering Committee

Collections Registry

Standards & Procedures

Communications, Outreach & Education

Networking

Strategic & Long-term Planning

Membership

Current Activities – Major Focus

Create and Maintain a Public Registry & Database of U.S. Collections to Maximize Synergy and Minimize Duplication

- Crucial to document the location, size, and holdings of collections
- Registry is curated & updated
- Ensure collections of all types are well represented
- Includes small research collections at universities, governmental agencies and private for-profit and non-profit organizations



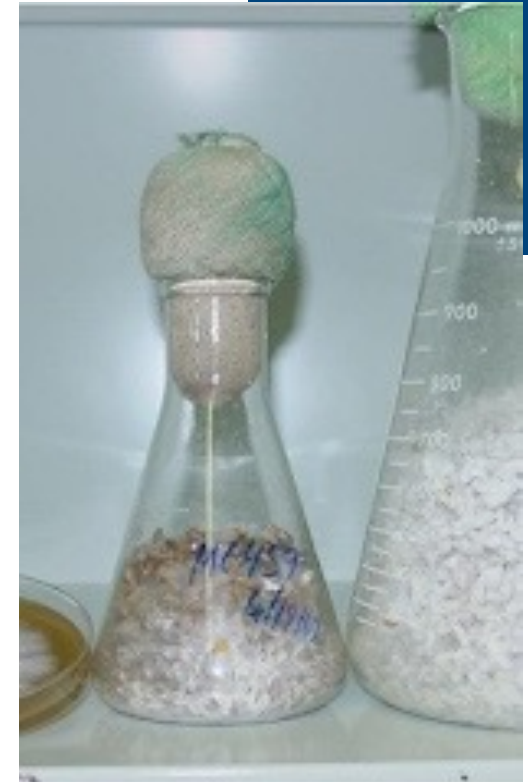
Voluntary information in an open registry stored at usccn.org
Publicly available via an online searchable database



Current Activities – Major Focus

Develop Processes and Methods for Preserving Orphaned or Endangered Collections

- Online registry will provide information to identify collections at risk due to lack of funding or lack of transition planning.
- Under certain conditions, microbes assembled by individual researchers may warrant preservation.
- Retirements, existential threats such as natural and human-caused disasters, lapses of funding, loss of key personnel, changes in priorities and administrative changes may occur.



Register at usccn.org to identify collections which might be orphaned

USCCN Participation Benefits

- Links to Broader Scientific Community
- Engage Research Collections
- Expand Communication
- Foster Alliances and Collaborations
- Provides Infrastructure for Orphaned and Endangered Collections
- Develop Best Practice Guidelines, Protocols, and Procedures
- Improve Diversity, Equity and Inclusion Practices



Register to the mailing list at usccn.org to be informed of upcoming activities

Participate in USCCN

Help advance the quality and availability of microbial resources



Researchers & collections managers: Make your collection visible to the community

usccn.org/culture-collections

Collections users: Easily find what is available & where

usccn.org/user-register

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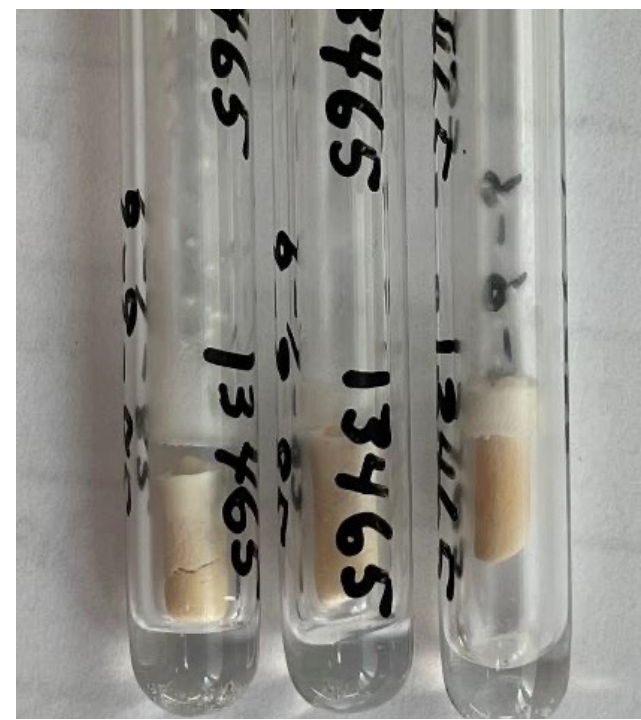
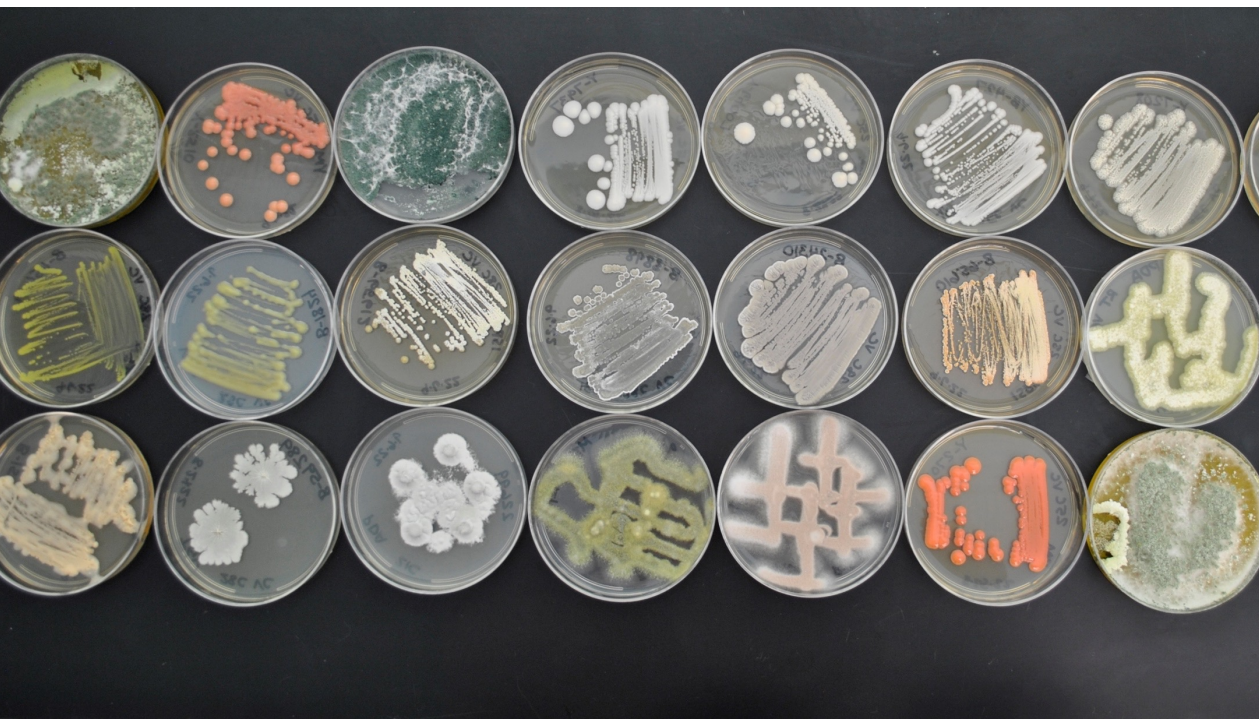
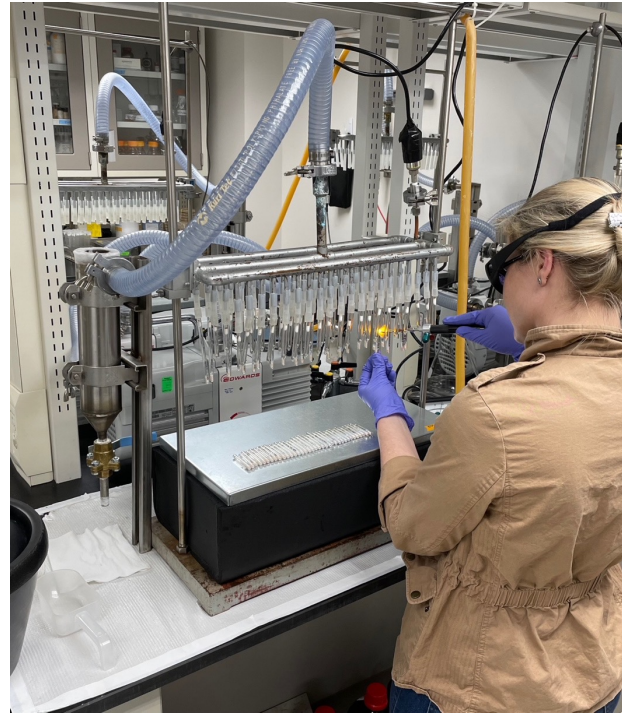
USDA-ARS CULTURE COLLECTION (NRRL)

- **Kirk Broders**
USDA-ARS Culture Collection (NRRL)
USCCN participant



USDA-ARS Culture Collection (NRRL)

- Maintains >95,000 strains of bacteria, fungi and oomycetes
- Distributes ~5,000 strains to recipients from 40 countries annually
- Houses 1 of only 2 patent collections in the U.S.
- Provides up to 24 strains/year at no charge



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RESEARCH COLLECTIONS AS A PART OF USCCN COLLECTION REGISTRY

- **Neha Potnis**
Associate Professor
Department of Entomology and Plant Pathology
Auburn University



Building my collection

We study plant disease outbreaks caused by endemic and emerging bacterial pathogens

Research areas:

Host range expansion

Pathogen population dynamics

Host resistance breakdown/erosion by pathogens

Understanding the drivers of disease outbreaks

Approach that we take:

We continue to cultivate and characterize pathogen from outbreaks in our region

Connecting genotype-to-phenotype



Building my collection

Host range expansion in action:
Investing in building pathogen isolate
collection as disease outbreaks unfold season
to season

First report of potential host range expansion of pepper
pathogenic *Xanthomonas perforans* in 2010 (Schwartz and
Potnis et al. 2014).

Pepper pathogenic *X. perforans* isolates collected in Alabama
from 2017-2020, confirmed for pepper pathogenicity in the
greenhouse experiments

Sequencing and identifying genetic determinants of host
range expansion

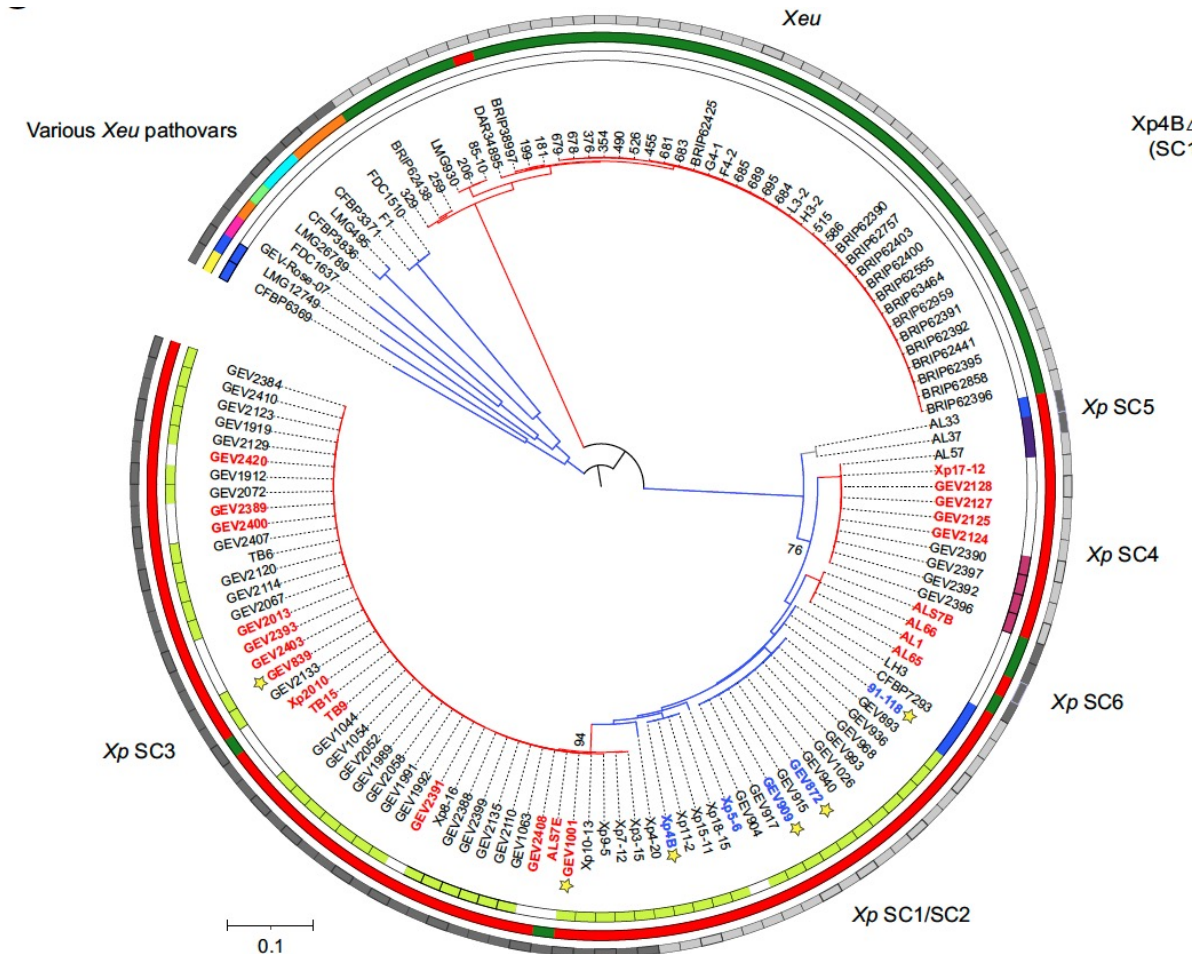
Genome-Wide Association to Study the Host-Specificity Determinants of *Xanthomonas perforans*

Eric A. Newberry,¹ Gerald V. Minsavage,² Auston Holland,¹ Jeffrey B. Jones,² and Neha Potnis^{1,†}

¹ Department of Entomology and Plant Pathology, Auburn University, AL 36849

² Department of Plant Pathology, University of Florida, FL 32611

Accepted for publication 26 October 2022.

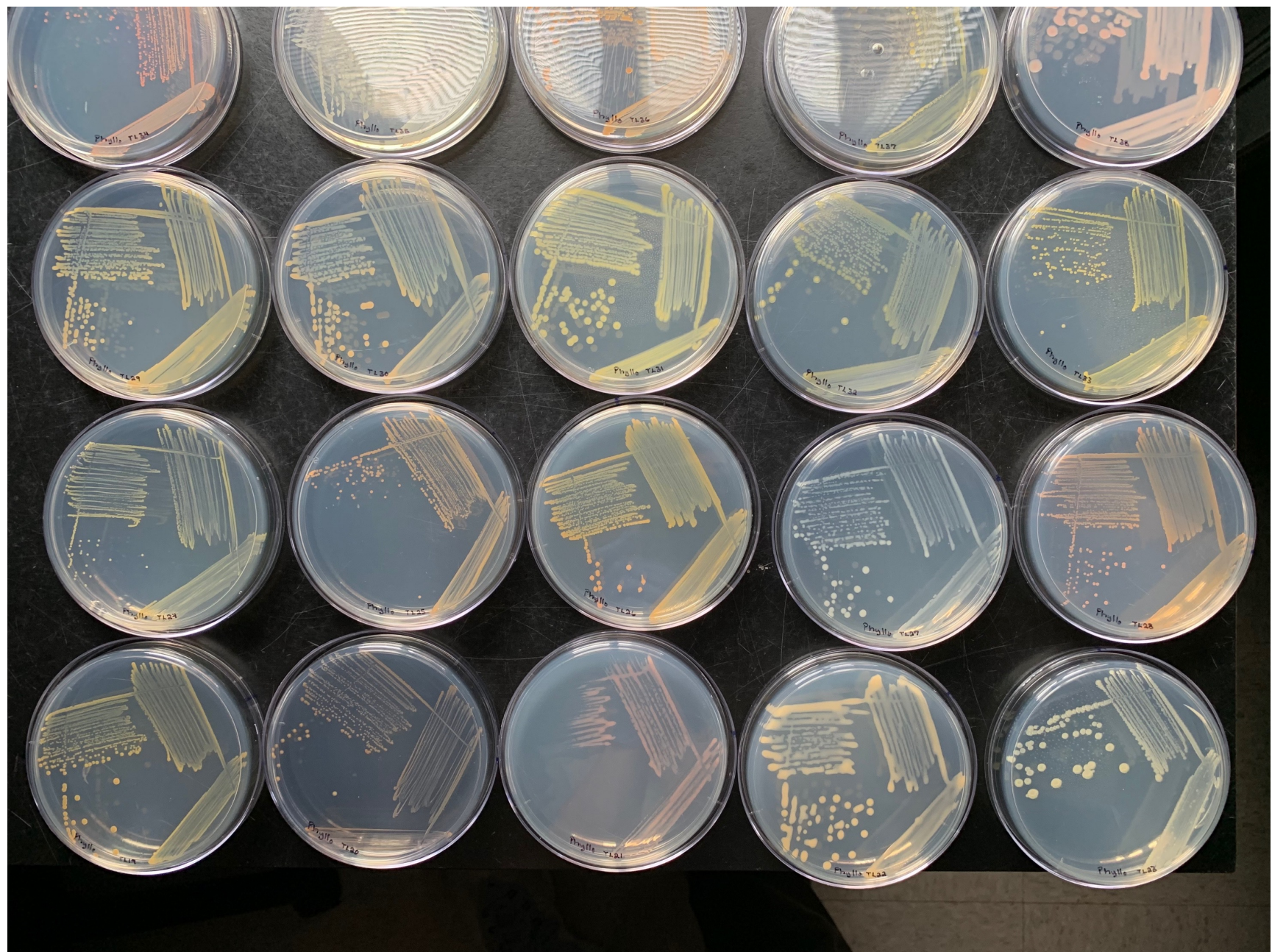


Building my collection

Microbiota associated with
infected plants

Pathogen-resident microbiota
interactions

Synthetic community experiments
to study microbial assembly and
succession in presence of biotic and
abiotic stress



Harnessing the big culture collections, focused research collections and associated historical records

We study diversity of overlooked co-occurring nonpathogenic *Xanthomonas* collected from diverse plant hosts and environments and their role as a part of plant microbiome

We sequenced strains from:

CFBP collection (Dr. Marie-Agnes Jacques)

Research collection from Drs. Stall, Jones, and Vinatzer



Genetic and functional diversity help explain pathogenic, weakly pathogenic, and commensal lifestyles in the genus *Xanthomonas*

Michelle M. Pena, Rishi Bhandari, Robert M. Bowers, Kylie Weis, Eric Newberry, Naama Wagner, Tal Pupko, Jeffrey B. Jones, Tanja Woyke, Boris A. Vinatzer, Marie-Agnès Jacques, Neha Potnis

doi: <https://doi.org/10.1101/2023.05.31.543148>

This article is a preprint and has not been certified by peer review [what does this mean?].

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Abstract Full Text Info/History Metrics Preview PDF

Abstract

The genus *Xanthomonas* has been primarily studied for pathogenic interactions with plants. However, besides host and tissue specific pathogenic strains, this genus also comprises nonpathogenic strains isolated from a broad range of hosts, sometimes in association with pathogenic strains, and other environments, including rainwater. Based on their incapacity or limited capacity to cause symptoms on the host of isolation, nonpathogenic xanthomonads can be further characterized as commensal and weakly pathogenic. This study aimed to understand the diversity and evolution of nonpathogenic xanthomonads compared to their

Research collections big or small are all welcome at the USCCN registry

usccn.org/culture-collections/

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(publicly available), collections that aspire to become a publicly available resource (aspiring), and scientists with research collections (research).

Host associations

Main Subjects or Fields

Potnis lab microbe collection

French Collection for Plant-associated Bacteria CIRM-CFBP

Collection of Zoosporic Eufungi at University of Michigan

usccn.org/collections/potnis-lab-microbe-collection/

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COLLECTION FOLLOWS BEST MANAGEMENT PRACTICE GUIDELINE
World Federation for Culture Collections Guidelines (<http://www.wfcc.info/guidelines/>)

ORGANISMS IN COLLECTION
Fungi, Bacteria, Yeast

REFERENCE STRAINS IN COLLECTION
We have a collection of non-pathogenic or opportunistic xanthomonads, some of which belong to potentially new species and these strains belonging to new species could serve as reference strains. In addition, we have Pseudomonas strains isolated from tomato, pepper, cucurbits that falls into potentially new species. These are particularly interesting given these have been isolated from a broad host range and continue to cause sporadic outbreaks in the fields. We also have ongoing collection of Xanthomonads from tomato and pepper, isolated from disease outbreaks collected over the span of several years and continuing, including those belonging to new lineages within species and those with recent host range expansion.

SEQUENCING DATA IN COLLECTION
16S/ITS, genomes for some bacterial isolates

TRAINING OPPORTUNITIES PROVIDED BY COLLECTION
Does not provide training

SERVICES PROVIDED BY COLLECTION
Not applicable

CONSULTATIONS PROVIDED BY COLLECTION
Does not provide consultation

GENUS IN COLLECTION
Species: Xanthomonas perforans, Quantity: 25
Species: Xanthomonas euvesicatoria, Quantity: 10
Species: Xanthomonas gardneri, Quantity: 10
Species: Xanthomonas vesicatoria, Quantity: 2
Species: Pseudomonas syringae/cichorii/capsici, Quantity: 50
Species: tomato-associated microbes, Quantity: 250
Species: cucurbit-associated microbes, Quantity: 150
Species: Pepper-associated microbes, Quantity: 100
Species: Xanthomonas spp., Quantity: 92

HOST ASSOCIATIONS IN COLLECTION
Vegetables

RESEARCH FIELDS RELEVANT TO COLLECTION
Agriculture, Ecology, General microbiology, Genetics, Molecular biology, Plant pathology

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HOW TO REGISTER YOUR COLLECTION

- **Dusti Gallagher**
USCCN project manager



The USCCN registry

A searchable database of plant associated, microbial culture collections from universities, industry and government agencies.

- **A Census of Microbes**
- **All types of collections: research collections, federal collections, etc.**
- **What is available & where?**
- **Do they have genome sequences?**
- **Who to contact?**



Who can register their collections?



Researchers & scientists who maintain a collection they use for their research

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Potnis lab microbe collection

December 6, 2023

ORGANIZATIONAL STRUCTURE Academia COLLECTION INSTITUTION/ENTITY Auburn University	COLLECTION CONTACT Neha Potnis POSITION OF COLLECTION CONTACT Associate Professor COLLECTION EMAIL nzp0024@auburn.edu COLLECTION PHONE 334-844-2524 COLLECTION CAN BE CONTACTED Yes
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☒ Has continued institutional support
☒ Interested in Culture Collections Exchange
☒ Interested in working with samples from different repositories
☒ Interested in Collaborative Programs
☒ Collection contains reference strains
☒ Collection contains sequencing data

☐ Ability to accept orphan collections

COLLECTION CATEGORY Research collection (industry or research collection; does not include a plan to distribute strains) COLLECTION FOLLOWS BEST MANAGEMENT PRACTICE GUIDELINE World Federation for Culture Collections Guidelines (http://www.wfcc.info/guidelines/)	AVAILABILITY AND DISTRIBUTION MECHANISMS No charge for distribution (shipping may be charged), Peer to peer for collaborations SERVICES PROVIDED BY COLLECTION Not applicable CONSULTATIONS PROVIDED BY COLLECTION
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Curators of university or federal collections

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USDA-ARS Culture Collection (NRRL)

January 31, 2022

COLLECTION WEBSITE https://nrri.ncour.usda.gov/ ORGANIZATIONAL STRUCTURE Government Agency COLLECTION INSTITUTION/ENTITY USDA-ARS STAFF WORKING WITH THE COLLECTION 5	COLLECTION CONTACT Kirk Broders POSITION OF COLLECTION CONTACT Curator COLLECTION EMAIL kirk.broders@usda.gov COLLECTION PHONE 309-681-6597 COLLECTION CAN BE CONTACTED Yes
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☒ Has continued institutional support
☒ Interested in Culture Collections Exchange
☒ Interested in working with samples from different repositories
☒ Interested in Collaborative Programs
☒ Collection contains reference strains
☒ Ability to accept orphan collections

COLLECTION CATEGORY Publicly available (qualified curator, collection management policies, microbial specimens, a database of collection information, an online strain catalog, and distributes strains to the scientific community) CAPACITY TO ACCEPT ORPHAN COLLECTIONS We have the capacity to accession 300 orphaned strains per year. This	AVAILABILITY AND DISTRIBUTION MECHANISMS No charge for distribution (shipping may be charged) SERVICES PROVIDED BY COLLECTION Patent deposits CONSULTATIONS PROVIDED BY COLLECTION Patent deposits, Preservation, Propagation, Shipment regulations
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➤ **All types of collections are important**

usccn.org/culture-collections

How to register your collection?

Go to the
website
usscn.org



Create a profile



Describe &
submit
collection

Choose: "I have a collection
I wish to register"

User type: Choose
"Collection Manager"

Click "Submit"

Thank You



usccn.com



gallagher@eversoleassociates.com



us-culture-collection-network



@USCCN3



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PANEL DISCUSSION AND Q&A

- **Rick Bennett**
University of Kentucky
USCCN Steering Committee member
- **Kirk Broders**
USDA-ARS Culture Collection (NRRL)
USCCN participant
- **Neha Potnis**
Auburn University
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- **Dusti Gallagher**
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