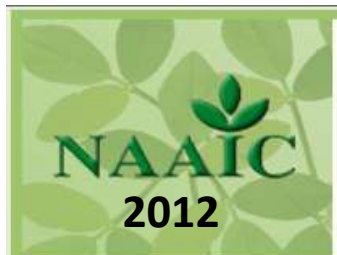




A public pathogen collection for characterizing disease resistance in alfalfa cultivars

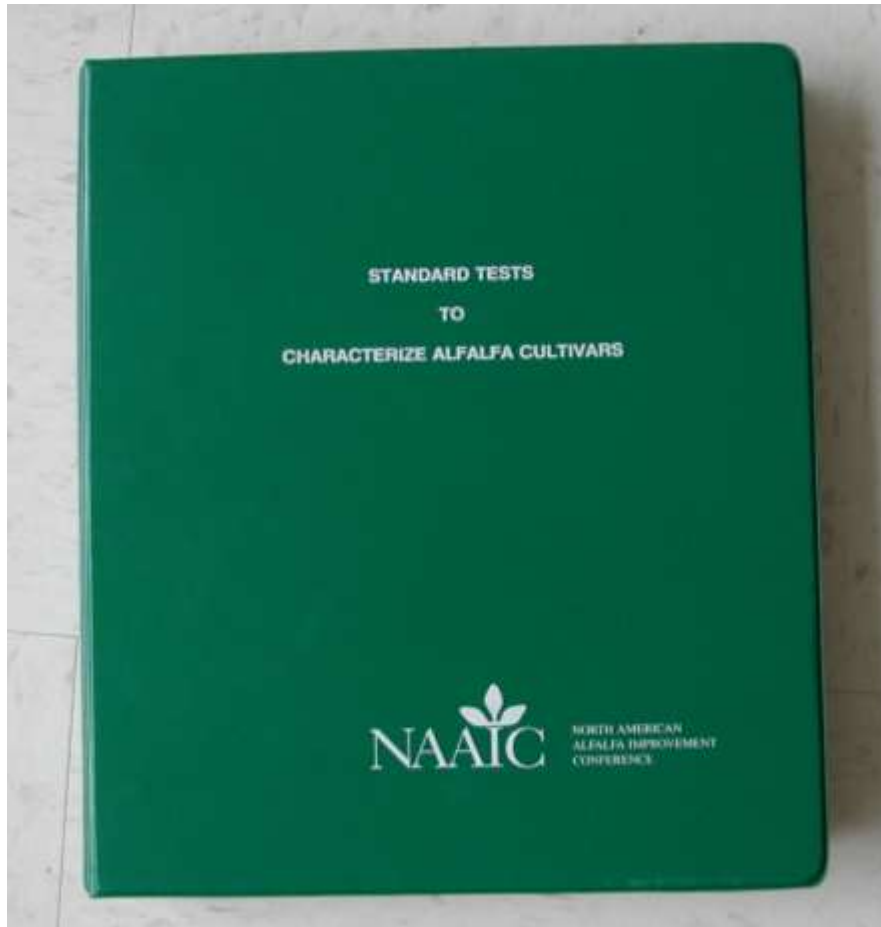
Deborah A. Samac, Melinda R. Dornbusch, and David J. McLaughlin



**University of Minnesota
Mycological Culture Collection**



Why develop a public collection?



March, 1991

Anthracnose Resistance

Colletotrichum trifolii Bain & Essary
Nichole O'Neill

PLANT CULTURE

Growth Chamber

Container 10-cm plastic pots or flats
Medium Potting soil mix
Temp/Light 23°C; 16+ hour daylength
No. of Plants 50 per replication
No. of Reps. 14 minimum
Other Control insects and fertilize as necessary

INOCULUM CULTURE

Source Infected stem tissue
Storage Soil or silica gel (7)
Temperature 4°C
Storage Life Up to several years

INOCULATION PROCEDURE

Age of Plant 7-14 days (take stand counts at 7 days)
Type of Inoc Spore suspension with 2 drops Tween per L
distilled water, taken from 7 day old cultures
incubated at 23°C on half strength oatmeal agar
Concentration 2×10^7 spores per mL
Method Spray to runoff, approx. 3 mL per pot or 5 to 10
mL per flat; place in mist chamber to maintain
100% R.H. for 48 hours 23°C

INCUBATION

Location Growth room or greenhouse at 23°C
Age at Rating 10 to 14 days after inoculation

RATING

Resistance is assessed as a percent of the stand surviving 10 to 14
days after inoculation.

CHECK CULTIVARS (Race 1)

	Approximate Expected Resistance (%)	Acceptable Range of Reaction (%)
Resistant		
Arc**	65-70	45-80
Saranac AR**	45	40-60
Susceptible		
Saranac**	1	0-5

Values for resistant standards are percent survivors.

DISTRIBUTION AND SEVERITY OF ANTHRACNOSE (Race 1)



Anthracnose, *Colletotrichum trifolii* Bain & Essary (Click on the map for a larger version; see the key here).

SOURCE OF INOCULUM

Name Nichole O'Neill
Address USDA, ARS
Soybean and Alfalfa Research
B-001
Beltsville, MD 20705
Phone 301-344-3331

SCIENTISTS WITH EXPERTISE

Name Nichole O'Neill
Address USDA, ARS
Soybean and Alfalfa Research
B-001
Beltsville, MD 20705
Phone 301-344-3331

Name Craig Grau
Address University of Wisconsin
1630 Linden Drive
Madison, Wisconsin 53706
Phone 608-262-6289

CORRELATION TO FIELD REACTION

Cultivars occasionally appear more resistant in the field than indicated by
seedling tests, but generally, good correlations are observed between
greenhouse and field tests.



APH



Bw



Fw

<u>Disease</u>	<u>Source of Inoculum</u>
Anthracnose	Nichole O'Neill
Aphanomyces Root Rot	Craig Grau
Bacterial Wilt-field	Judy Theis
Bacterial Wilt-greenhouse	Deborah Samac
Brown Root Rot	Fred Gray
Common Leaf Spot	Ken Leath
Downy Mildew	Don Stuteville
Fusarium Wilt-field	Judy Theis
Fusarium Wilt-greenhouse	Lanny Rhodes
Lepto Leaf Spot	Ken Leath
Phytophthora Root Rot	Judy Theis, Craig Grau
Rust	Jim Elgin, Ken Leath
Sclerotinia Crown and Stem Rot	Lanny Rhodes
Stagonospora Leaf Spot and Crown Rot	Ann Martinsen, Don Irwin, David Gilchrist
Spring Black Stem and Leaf Spot	Ken Leath
Stemphylium Leaf Spot	Ken Leath
Verticillium wilt	Craig Grau
Yellow Leaf Blotch	Fred Gray
Pythium Seed Rot	Deborah Samac



PRR



An



Vw



APH



Bw



Fw

<u>Disease</u>	<u>Source of Inoculum</u>
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Verticillium wilt	Craig Grau
Yellow Leaf Blotch	Fred Gray
Pythium Seed Rot	Deborah Samac



PRR



An



Vw

Benefits of a public pathogen collection

- Obtain pathogens for research, selection, cultivar characterization
- Strain stability: pure culture, maintain virulence
- Insurance (backup) for local collection



Courtesy D. Johnson

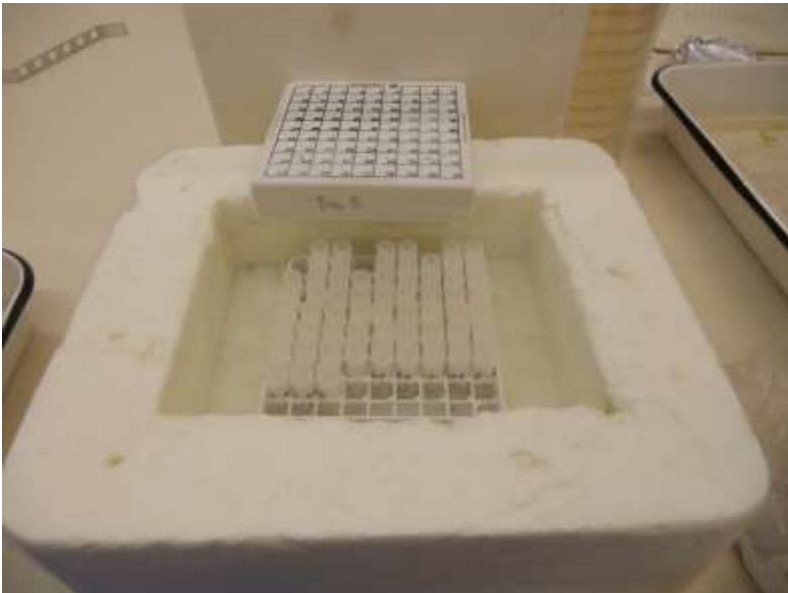
Cryostorage Process

- Mycelial plugs removed from fresh culture
- Plugs placed in vials with cryoprotectant



Cryostorage Process

Vials are chilled slowly then transferred to storage boxes.



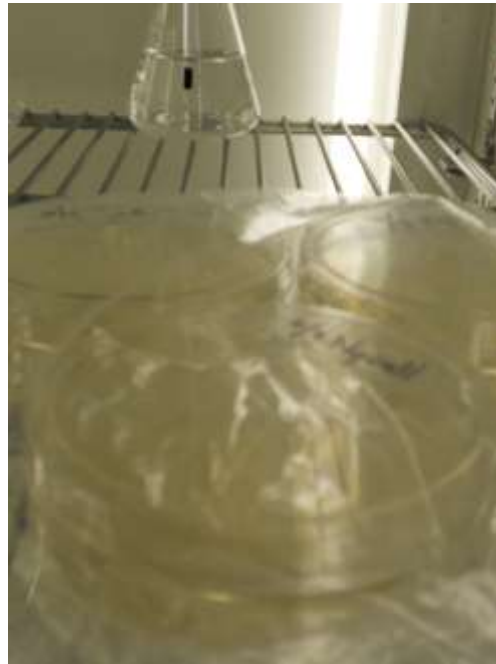
Cryostorage Process

Boxes are placed in liquid nitrogen tanks.



Cryostorage Process

Viability of stored cultures is tested.



University of Minnesota Mycological Culture Collection

1. Scientific name and author: *Colletotrichum trifolii* Bain
2. Source of species description: J. Mycol. 12(5):193 (1906)
3. Classification: Order: [Glomerellales](#) Family: [mitosporic Glomerellaceae](#)
4. Name of other state (anamorph/teleomorph):
5. Identified by: [Mary Heimann](#)
6. Isolation and historical data: (check one) Culture; Spores
Collected or isolated by: [Mary Heimann](#)
Date: unknown
Collection or isolation number: [SM](#)
Substrate or host: [alfalfa](#)
Geographic source: [Wisconsin](#)
Significance of culture/spores: [Used to characterize resistance in alfalfa cultivars. Race 1 strain.](#)
Literature citations for this strain: [unknown](#)
Location of herbarium specimens: [unknown](#)
Cultures/spores also deposited at: [unknown](#)
7. Characteristics observed in culture as deposited
Type of fruiting structures found:
Factors affecting fruiting: temperature: room temperature light: [room light](#)
Preferred medium (attach formula): [potato dextrose agar](#)
Unusual maintenance requirements: [none](#)
8. Is this strain zoopathogenic? [no](#)
9. Is this strain phytopathogenic? [Yes](#) (Information required by Plant Quarantine Division, USDA) If so,
 - a. The geographical distribution of this organism is:
(check one) General; Limited; Unknown
 - b. Would you recommend that this strain be available to any qualified investigator regardless of his/her location? [Yes](#)
 - c. If not, what limits would you place on the distribution of this strain?
10. Comments:
11. Publication(s) citing this culture: [unknown](#)
12. I understand that this material is for deposit in the collection. It may be distributed to the scientific community.

Signature _____

Date _____

Deposited on behalf of: [David Witte, Forage Genetics International](#)

Depositor Address: [1991 Upper Buford Circle, 495 Borlaug Hall, St. Paul, MN 55108](#)

<http://cultures.fungi.umn.edu>

UNIVERSITY
OF MINNESOTA

Mycological Culture Collection

database last modified: 2012-04-13 21:40:22

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[collection form](#)

[disclaimers](#)

[the collections](#)

[welcome page](#)

[advanced functions](#)

Welcome to the

University of Minnesota Mycological Culture Collection

Online Database!

The University of Minnesota Mycological Culture Collection was established in 2002, by David J. McLaughlin, Dept. of Plant Biology, and James V. Groth, Dept. of Plant Pathology, St. Paul with support from the Minnesota Agricultural Experiment Station. The collection is intended to provide a long term repository for living cultures or spores of fungi that have been the subject of research at the University. The cultures are potentially valuable in agriculture, forestry, medicine, and industry, and as a source of genes for basic and applied research. The facility uses a liquid nitrogen storage system for cultures and lyophilization for spores, and is jointly administered by the Dept. of Plant Biology and the John Ford Bell Museum of Natural History with voucher specimens maintained in the University of Minnesota Herbarium (www.fungi.umn.edu).



Disease	Pathogen	No. strains	No. contributors
Anthracnose	<i>Colletotrichum trifolii</i> race 1	4	3
Anthracnose	<i>Colletotrichum trifolii</i> race 2	2	1
Aphanomyces root rot	<i>Aphanomyces euteiches</i> race 1	3	1
Aphanomyces root rot	<i>Aphanomyces euteiches</i> race 2	1	1
Bacterial wilt	<i>Clavibacter michiganensis</i> subsp. <i>insidiosus</i>	20	4
Brown root rot	<i>Phoma sclerotioides</i>	25	4
Fusarium wilt	<i>Fusarium oxysporum</i> f. sp. <i>medicaginis</i>	8	2
Lepto leaf spot	<i>Leptosphaerulina briosiana</i>	1	1
Phytophthora root rot	<i>Phytophthora medicaginis</i>	6	1
Rust	<i>Uromyces striatus</i>	1	1
Spring black stem and leaf spot	<i>Phoma medicaginis</i>	30	1
Stagonospora leaf spot and crown rot	<i>Stagonospora meliloti</i>	1	1
Stemphylium leaf spot	<i>Stemphylium botryosum</i> WT	4	2
Verticillium wilt	<i>Verticillium albo-atrum</i>	12	2

New submissions

- Fusarium crown rot
- Sclerotinia crown rot
- *Aphanomyces euteiches* race 2, others
- *Verticillium albo-atrum*
- Pathogens of other forages
 - Northern anthracnose (*Aureobasidium caulivorum*) of red clover

Obtaining Cultures

- APHIS PPQ 526: Application for permit to move live plant pests, biological control agents, or noxious weeds
http://www.aphis.usda.gov/permits/ppq_epermits.shtml
- Shipping and handling fee



The screenshot displays the USDA Animal and Plant Health Inspection Service website. At the top left is the USDA logo and the text "United States Department of Agriculture Animal and Plant Health Inspection Service". Below this is a navigation bar with links for "Home", "About APHIS", "Newsroom", "Career Opportunities", "Help", and "Contact Us". The main content area features a green header for "Permits" and a sub-section for "PPQ Permits". A search box labeled "Search APHIS" is visible on the left, and a "Related Topics" link is on the right. The breadcrumb trail reads "You are here: Home > Permits > Apply for a Permit".

USDA United States Department of Agriculture
Animal and Plant Health Inspection Service

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You are here: Home > Permits > Apply for a Permit

Search APHIS

Permits

PPQ Permits

Related Topics

Collection Support and Maintenance

- Deposition, viability, retrieval, shipping
- Cryostorage, database management
 - MCC (McLaughlin)

North American Alfalfa Improvement Conference

Organization Membership Annual Conferences **Resources** Database NAFA

2012 Joint NAAIC, Trifolium, & Grass Conference

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[Description of Cultivars](#)
[Alfalfa Photo Gallery](#)
[Importance of Alfalfa](#)
[Links to Forages and Alfalfa](#)

NAAIC - Vision & Mission NAAIC News

Compendium of Alfalfa Diseases and Pests, 3rd Edition, APS Press

- 52 authors representing 4 countries and 20 states in the US
- 53 disease sections (5 new since the 2nd edition in 1990)
- 16 pest sections
- 6 abiotic disorders
- 248 color photos and illustrations (132 color plates and 66 B&W figures in the 2nd edition)



Acknowledgements

Dave Witte, Forage Genetics Int'l

Doug Miller, Cal/West Seeds

Shevawn Allen, Dairyland Seeds

Lois Scholbrock, Pioneer Hi-bred Int'l

Amy Rossman, USDA-ARS-Systematic Mycology
and Microbiology





Thank You!

Questions?

