

Influence of Alfalfa Brown Root Rot on Winterkill



Acknowledge contributions of Fred Gray, University of Wyoming

History

1933- 1st reported on sweet clover in Canada

1984 – widespread on alfalfa in the Peace River Valley of Alberta

1996 – 1st reported on alfalfa in the U.S. in Wyoming

2003 – reported in Idaho, New York, Minnesota and Wisconsin

Host Range

(J.G.N Davidson)

Alfalfa

Red Clover

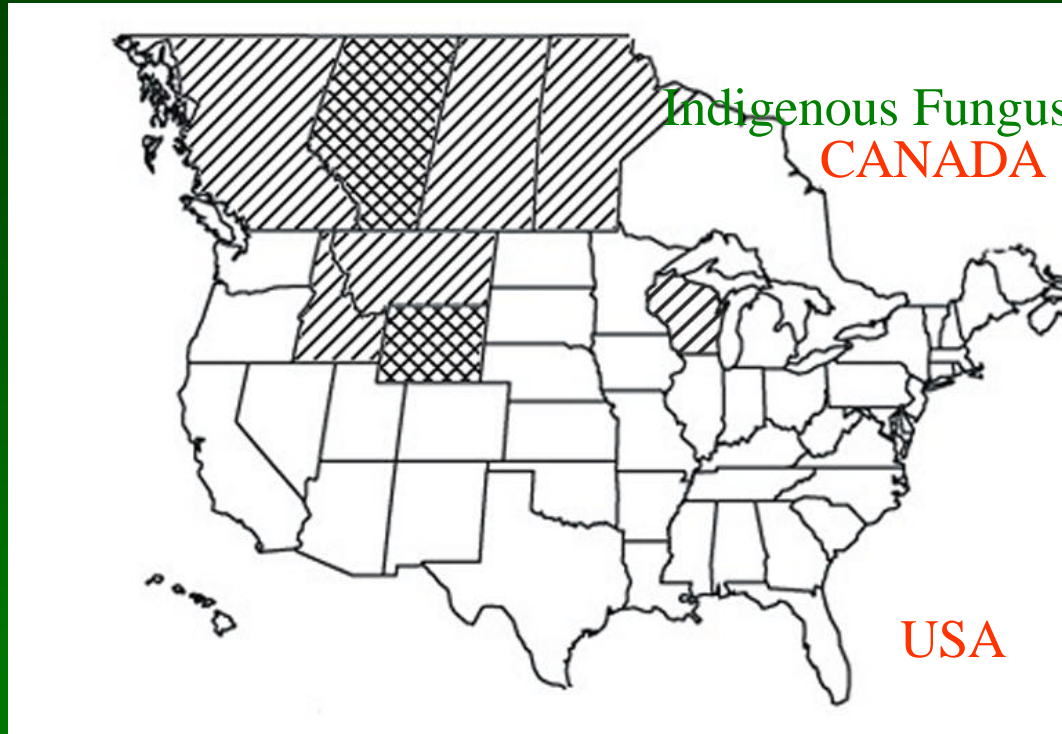
Alsike Clover

Sainfoin

Bird's-Foot Trefoil

Sweet Clover

Distribution In North America



Currently known distribution in the U.S.

Idaho, Minnesota, Montana, New York,

Wisconsin, Wyoming

Diagnosis

Plant Symptoms



Fred Gray

Brown Root Rot Wisconsin - 2003



Greg Andrews

Brown root rot?; Marshfield 1978



Winter Kill in Wisconsin - 2003



- **Surviving plants may have lesions on tap root**

- **Frequently diagnosed as feeding scars caused by clover root curculio**



Brown Root Rot Epidemiology

- **Infection of alfalfa roots:**
 - late fall to early spring when plants are dormant.
- **Pathogenic activity:**
 - Dormant root tissues
 - Pathogen ceases growth when plant breaks dormancy
- **Symptoms:**
 - Brown rotted roots observed in spring
 - Plant mortality during winter
 - Surviving infected plants
 - Die later in spring
 - Survive summer but die the following winter

Brown Root Rot Pathogen Survey

- **Fields at least 2 years old**
- **5-10 plants from each location**
- **6 inches of the tap root**
- **Variety name**
- **Soil removed from the roots**
- **Place roots from each field in a separate plastic bag and seal**
- **Either send immediately or freeze and send to:
Deborah A. Samac, 1991 Upper Buford Circle,
495 Borlaug Hall, St. Paul, MN 55108**

Diagnosis

Brown Root Rot Pathogen = *Phoma sclerotioides*

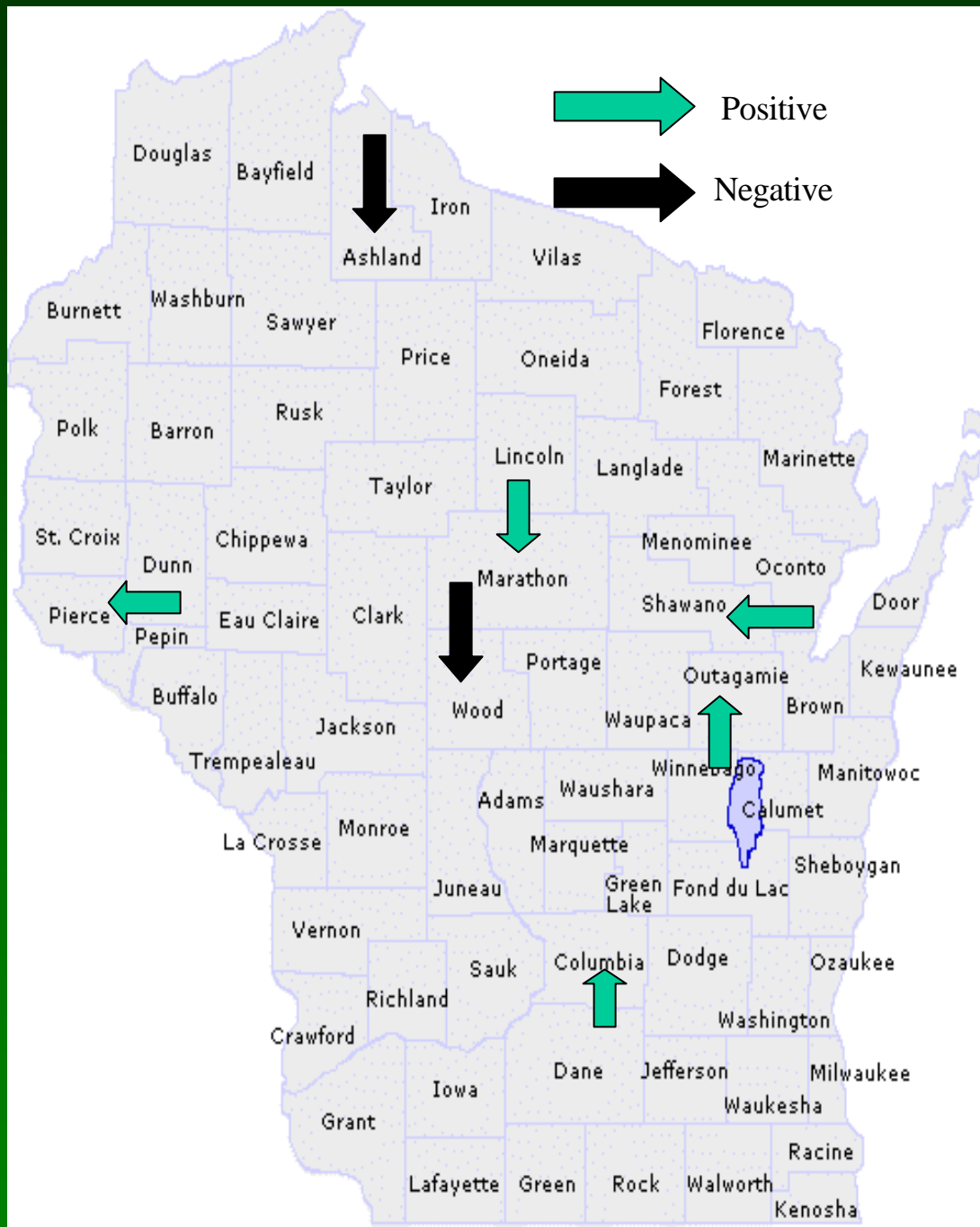
- **Isolation of pathogen from roots**



**Root isolation on
PDA at 50° F. after 8
weeks**

**Note white mycelium,
black pycnidia and
yellow spore masses**

- **DNA-based test (R.C. Larsen, USDA-ARS, Prosser, WA)**



Brown Root Rot In Wisconsin 2004

Survival & Spread

(J.G.N Davidson)

- **Survival:** in root debris & in soil
- **Spread:** by harvest equipment and wind

Management Practices

Crop Rotation - grow crops such as oats or barley for 3 years between alfalfa crops and avoid planting other forage legume crops during the rotation.

- a) Harvest Management – 3 harvest system lowers risk compared to 4 harvest system
- b) Avoid late fall cutting.
- d) Maintain optimal soil fertility
- e) No data on how US alfalfa varieties respond to brown root rot.

Summary

- **The Brown Root Rot Pathogen = *Phoma sclerotioides* is present in Wisconsin and other northern states**
- **Accurate diagnostic tests for pathogen are available**
- **Fields should be surveyed for brown root rot**
- **Evidence that brown root rot is one of several factors associated with “winter kill” of alfalfa**
- **Crop rotation is the best management option**

Available information on Brown Root Rot:

**Gray, F.A., C.R. Hollingsworth and D. W. Koch.
2003. Brown root rot of alfalfa. Department of Plant
Sciences Timely Information Series. No. 1, University
of Wyoming, Laramie, WY.**

**([http://www.uwyo.edu/plants/publications/rootrot1
.htm](http://www.uwyo.edu/plants/publications/rootrot1.htm))**

**Mikkelson, M.B. 1997. Summary of plant diseases
diagnosed on commercial and yard and garden
plants in 1996. Montana State University, Extension
Service Plant Disease Clinic Report.**