

Wisconsin Department of Agriculture, Trade and Consumer Protection

Wisconsin Pest Survey Reports 2010

<http://pestsurvey.wi.gov/>

Corky Ringspot Survey Tobacco Rattle Virus (TRV)

Funding provided by USDA Specialty Crop Block Grant

Anette Phibbs, DATCP, Plant Industry Laboratory
4702 University Ave, Madison WI 53702

Wisconsin Pest Survey Report

Corky Ringspot Disease of Potatoes

Corky Ringspot Disease in the US

- California,
- Florida,
- Idaho,
- Washington
- Oregon
- Michigan
- Minnesota
- Wisconsin

(N. C. Gudmestad, I. Malik and J.S. Pasche, Plant Disease (2008) 92(8):1254)

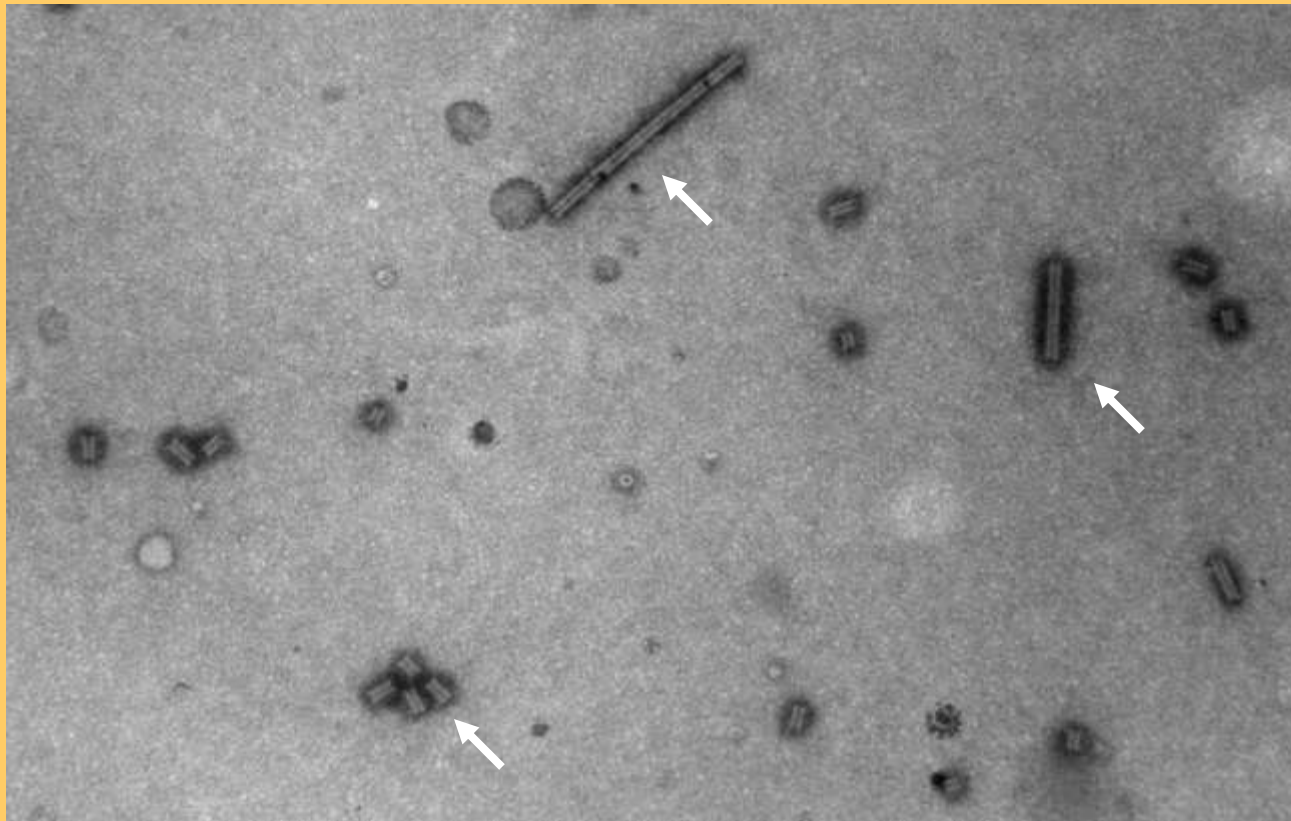


A. Phibbs

Internal tuber necrosis caused by TRV.

Wisconsin Pest Survey Report

Corky Ringspot Disease of Potatoes



Barrenwort
infected with TRV.

Tobacco rattle virus particles seen under transmission electron microscope.

Wisconsin Pest Survey Report

Perennials Infected with Tobacco Rattle Virus



Coral bells



Bleeding heart



Barrenwort



Astilbe



Peony



Gold Standard

Hosta

A. Phibbs

Wisconsin Pest Survey

Plant Industry Laboratory



- Laboratory testing is performed at Plant Industry Laboratory.
- We use nucleic acid assays, RT-PCR (reverse transcription polymerase chain reaction).
- We use a beta-tubulin reference gene as an internal control to validate RT-PCR.

References:

D.J. Robinson, *Journal of Virological Methods*. 1992, 40, 57-66. "Detection of tobacco rattle virus by reverse transcription and polymerase chain reaction."

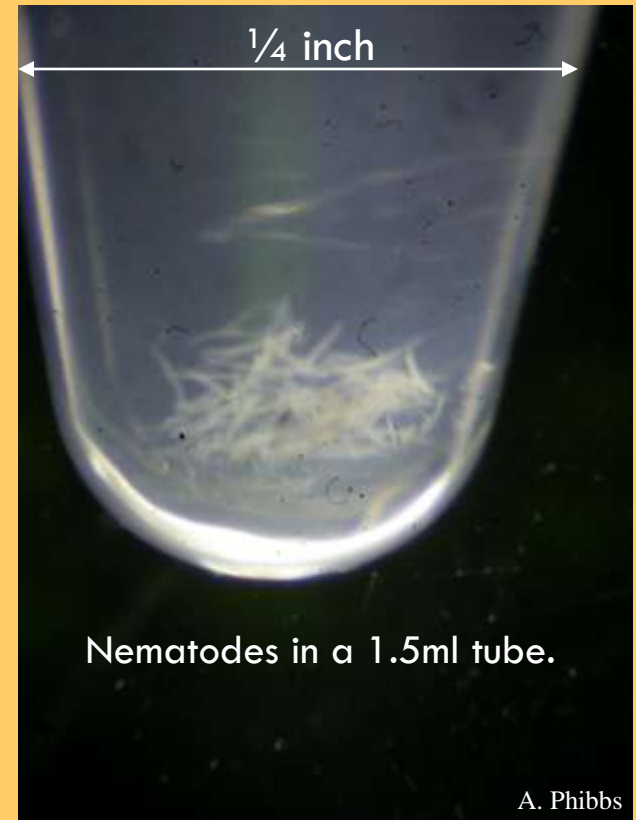
Mohan Kumar et al., *J. Agric. Food Chem.* 2007, 55, 1674-1678. "Extraction of RNA from Fresh, Frozen, and Lyophilized Tuber and Root Tissues."

Wisconsin Pest Survey Report

2009 & 2010 Potato Survey for Corky Ringspot Disease

Tobacco Rattle Virus (TRV) and Nematodes

- TRV is transmitted by Stubby root nematodes *Trichodorus spp.* and *Paratrichodorus spp.*
- These nematodes are present in Wisconsin.
- Hosts range is huge: potatoes, tomatoes, peppers, including many weeds, annuals and perennials (white & red clover, oats).
- **Non-hosts are alfalfa, corn, barley, rye, wheat, carrots and pumpkin.**
- **Control Management: Rotation with alfalfa plus weed control.**



Wisconsin Pest Survey Report

2009 & 2010 Survey for Corky Ringspot Disease

- Five Farms tested positive.
- 6 fields out of 392 total (1.5%)
- Buffalo Co. (2 samples)
interior tuber blemishes present.
- Dunn Co. (1 sample), symptomatic
- Adams, Portage and Langlade
(1 sample each),
very faint symptoms,
no significant disease problems.



A. Phibbs

- Conclusion: Corky ringspot disease is still incidental in Wisconsin.

Wisconsin Department of Agriculture, Trade and Consumer Protection

Wisconsin Pest Survey Reports 2010

<http://pestsurvey.wi.gov/>

Powdery Scab Survey

Spongospora subterranea f.sp. subterranea

Anette Phibbs, DATCP, Plant Industry Laboratory
4702 University Ave, Madison WI 53702

Wisconsin Department of Agriculture, Trade and Consumer Protection

Wisconsin Pest Survey Report

Powdery Scab Disease of Potatoes



Symptoms of Powdery Scab on Potato Tubers,
Spongospora subterranea (Wallr.) Lagerh *f.sp. subterranea* Tomlinson

Wisconsin Pest Survey Report

Powdery Scab Disease of Potatoes

The Problem

- Affects quality of potatoes (tuber skin blemishes and tumors)
- Affects crop productivity
- Affects storability
- Vectors Potato Mop Top Virus (PMTV)
- Creates infection opportunities for other diseases:
 - Late blight (*Phytophthora infestans*)
 - Pink rot (*Phytophthora erthroseptica*)
 - Dry rot (*Fusarium spp.*)
 - Black dot (*Colletotrichum coccodes*)

Wisconsin Pest Survey Report

Powdery Scab Disease of Potatoes

Conditions Favoring Disease

- Cool temperate summers
(Soil temperatures of 52°F to 64°F)
- Alternate periods of wet and dry soil,
(Simulated by irrigation)
- Excess moisture during tuber set.
- Environmental conditions may be more important than amount of inoculum.



A. Phibbs

Pustules of Powdery scab on Red Norland Potato.

Wisconsin Pest Survey

Plant Industry Laboratory



- Laboratory testing is performed at Plant Industry Laboratory.
- We use nucleic acid assays, PCR (polymerase chain reaction).
- Sequencing
- Examine tuber skin with microscopes.

References:

Qu et.al. (Plant Pathology (2001) 50: 420-426).

Wisconsin Pest Survey Report

2009 & 2010 Powdery Scab Survey

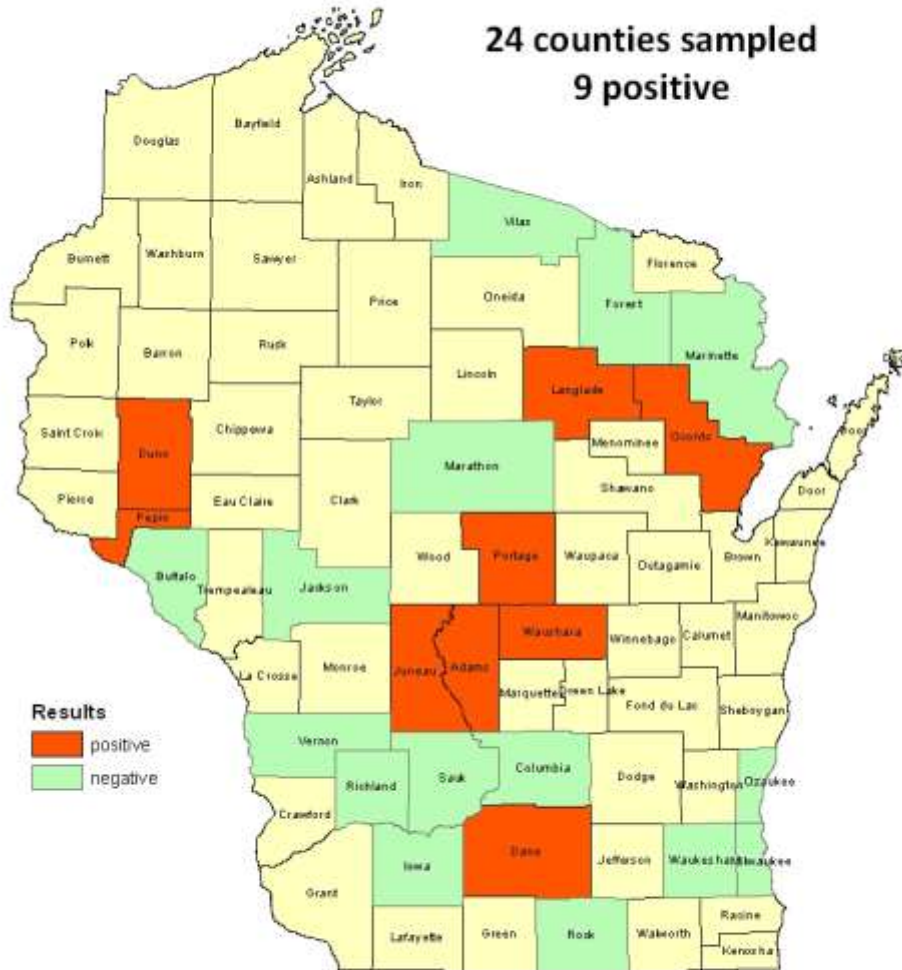
Harvest year	2009	2010
Total number of samples tested for powdery scab	223	115
Percent of samples testing positive	19%	3%
Number of growers participating	32	37
Number of counties surveyed	14	24*

*cumulative



WI DATCP Pest Survey 2010 Powdery scab detections

24 counties sampled
9 positive



Distribution of Powdery Scab in Wisconsin since 2002*

- Adams
- Dane
- Dunn
- Oconto
- Juneau
- Langlade
- Pepin
- Portage
- Waushara

* at least one field testing positive in each County.



Wisconsin Pest Survey Report

Powdery Scab Survey



A. Phibbs

Powdery Scab Symptoms on Shepody potato.

Varieties testing positive for Powdery Scab since 2002:

- Atlantic (no tuber symptoms)
- Bannock
- Burbank (no tuber symptoms)
- Gold Rush
- (Dark) Red Norland
- Norkotah
- MegaChip
- Molly
- Ranger Russet
- Russian Banana
- Shepody
- Silverton (no tuber symptoms)

Wisconsin Pest Survey Report

Powdery Scab Disease of Potatoes

Potential Trapping Crops

- Red Clover (*Trifolium pratense*)
- Buckwheat (*Fagopyrum esculentum*)
- Rye (*Secale cereale*)
- Rapeseed (*Brassica napus*)
- Oilseed radish (*Raphanus sativus*)

Wisconsin Pest Survey Report

Powdery Scab Disease of Potatoes

Avoid Host Plants of Powdery Scab

Weeds:

- Weeds in the Nightshade family
- Yellow Mustard

Crops:

- Oats
- Tomato
- Potato

Wisconsin Department of Agriculture, Trade and Consumer Protection

Wisconsin Pest Survey

<http://pestsurvey.wi.gov/>



For more information:

anette.phibbs@wi.gov

Acknowledgements

- Adrian Barta
- Susan Lueloff
- Amanda Nelson
- Sara Ott
- Tim Leege
- Jim Meyer
- Jeff Dombrowski