Cereal Killers

What we saw in 2007
What we should be aware of 2008

Dr. Mary Burrows

Montana State University Bozeman, MT

Pesticide update: 2008

- Folicur (tebuconazole) registration for control of head scab in wheat and barley???
- Do not use strobilurin fungicides for aschochyta control in chickpea (Headline, Quadris, Quilt - fungicide resistant strains)
- Ascochyta in *pea and lentil* = different species, strobilurins still okay
- Poast in camelina – Yes/No September 2008
  - Ask Amy Bamber, MT Department of Ag for details
    - Thursday @ 3:30 Canadian Room

Fusarium head blight
(scab)

Stripe rust

Septoria/Tan spot
(early season leaf diseases)

Root lesion nematodes

Wheat streak mosaic virus
(WSMV)

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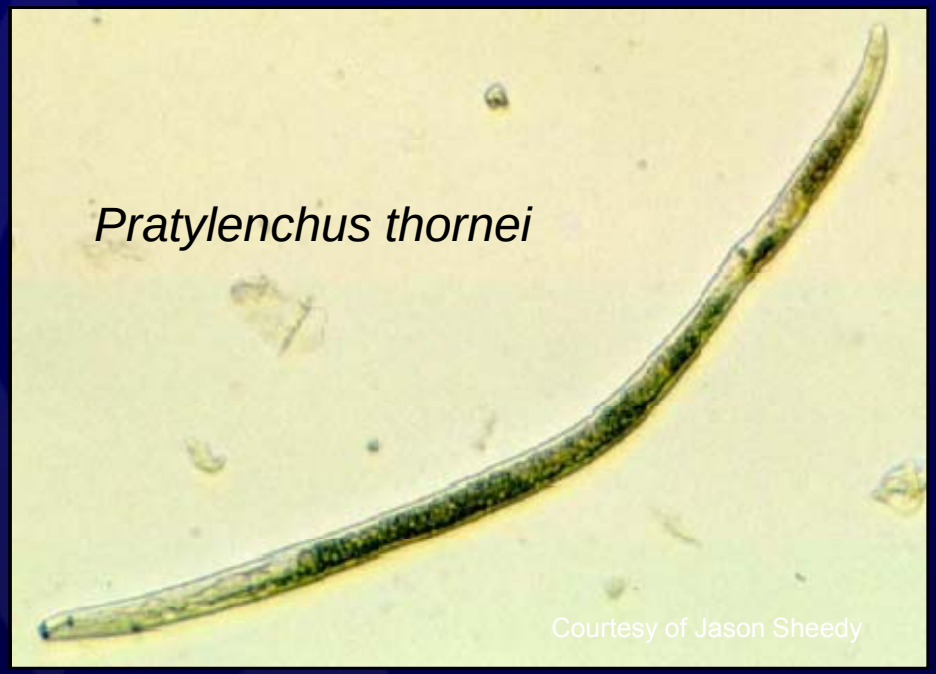
Mountains & Minds

Root lesion nematodes damaging to wheat

Oregon and Washington yield losses up to 36% in intolerant cultivars

(Smiley et al. 2005)



Oregon and Washington yield losses up to 70% in intolerant cultivars

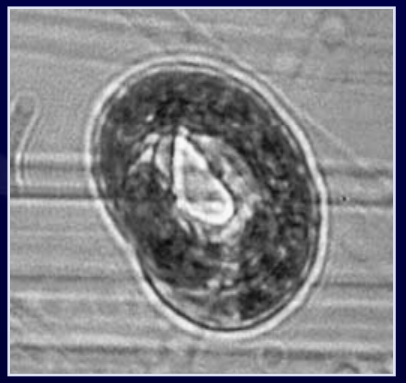
(Smiley et al. 2005)

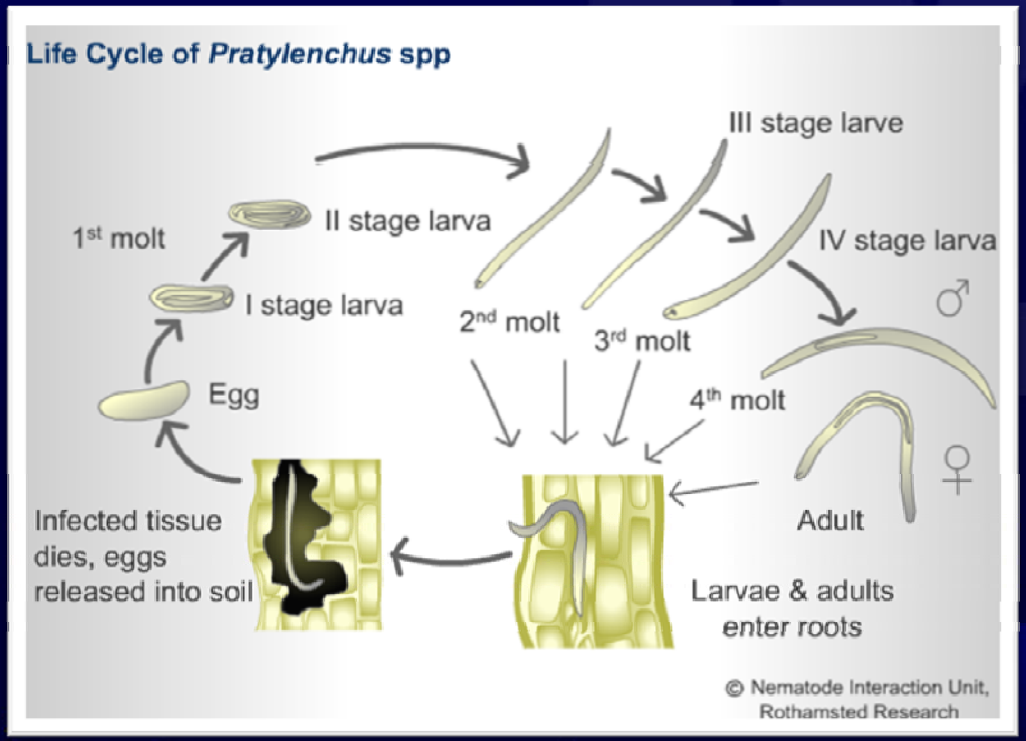
Root lesion nematode biology

Good Hosts	Moderate Hosts	Poor Hosts
Wheat	Barley	Field Pea
Canola	Oat	Faba Bean
Mustard	Durum	Lentil
Chickpea	Wild Oat (Vanstone 2002)	Triticale
		Safflower
		Flax

Wide host range for *P. neglectus*

Anhydrobiosis





Migratory endoparasites

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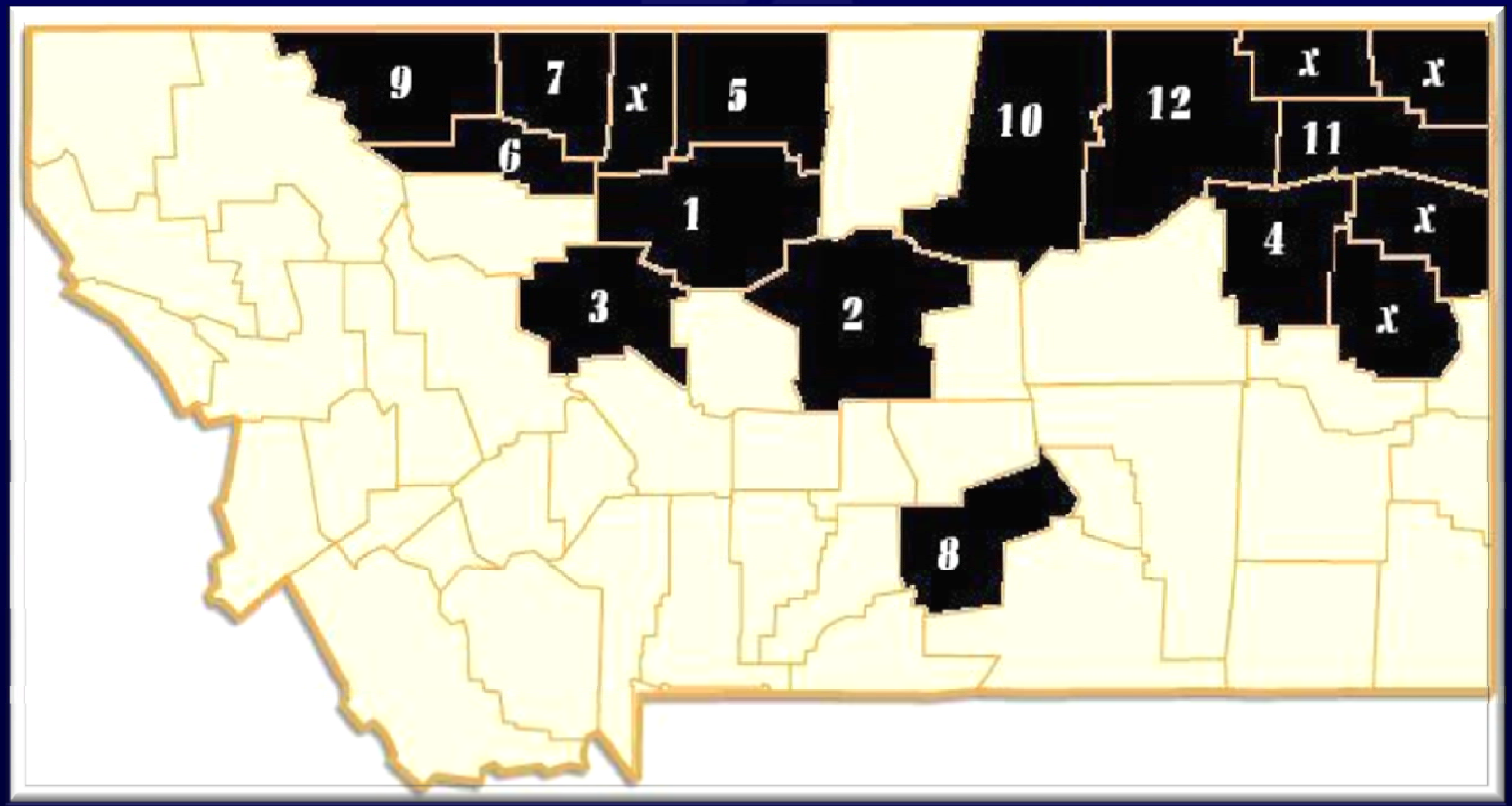
Why didn't we look before?

Infestations mimic and are exacerbated by fungal infestations, nutrient deficiencies, and drought.

2006 Survey results for root lesion nematode



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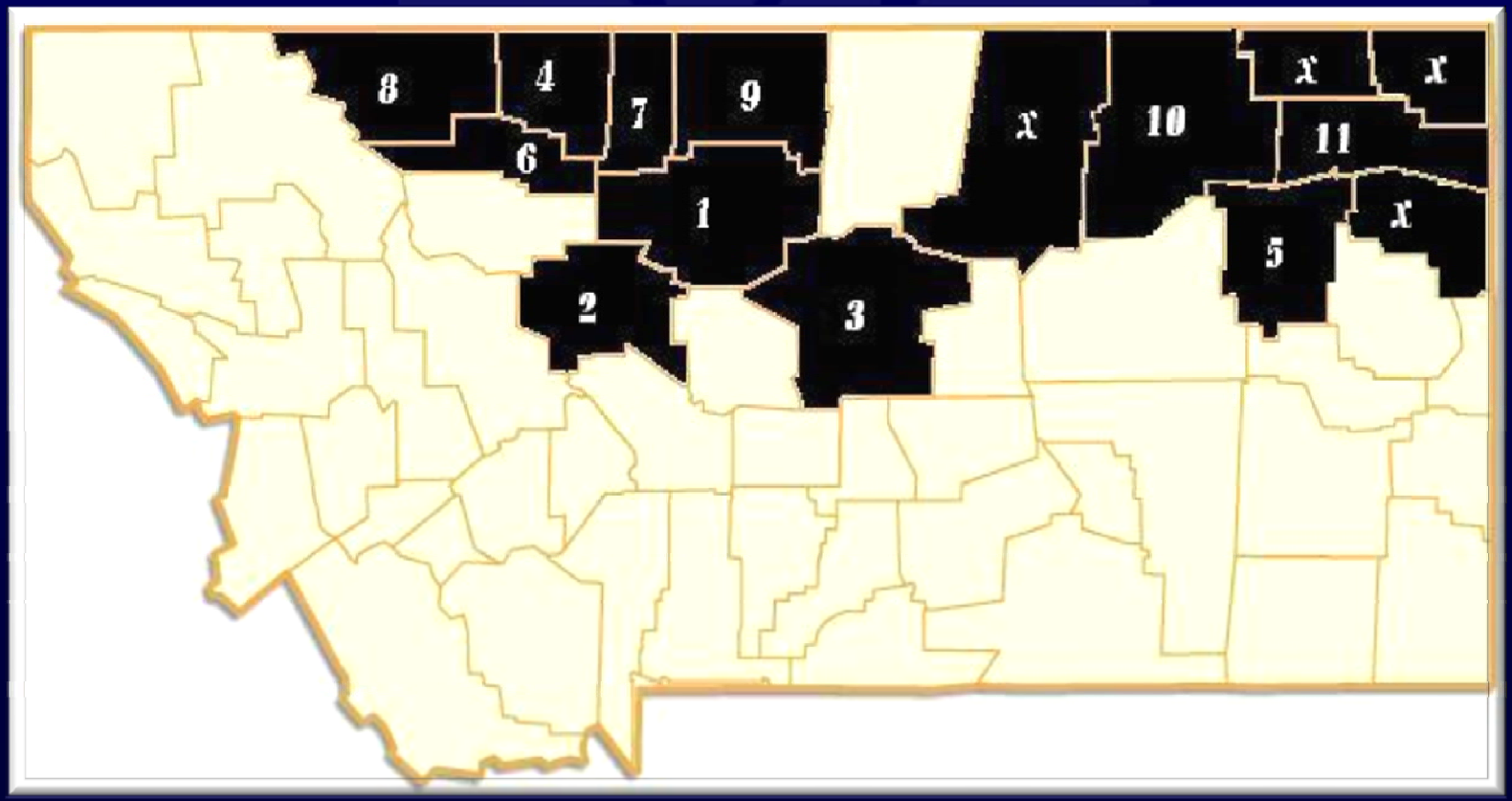
2007 Survey results for root lesion nematode



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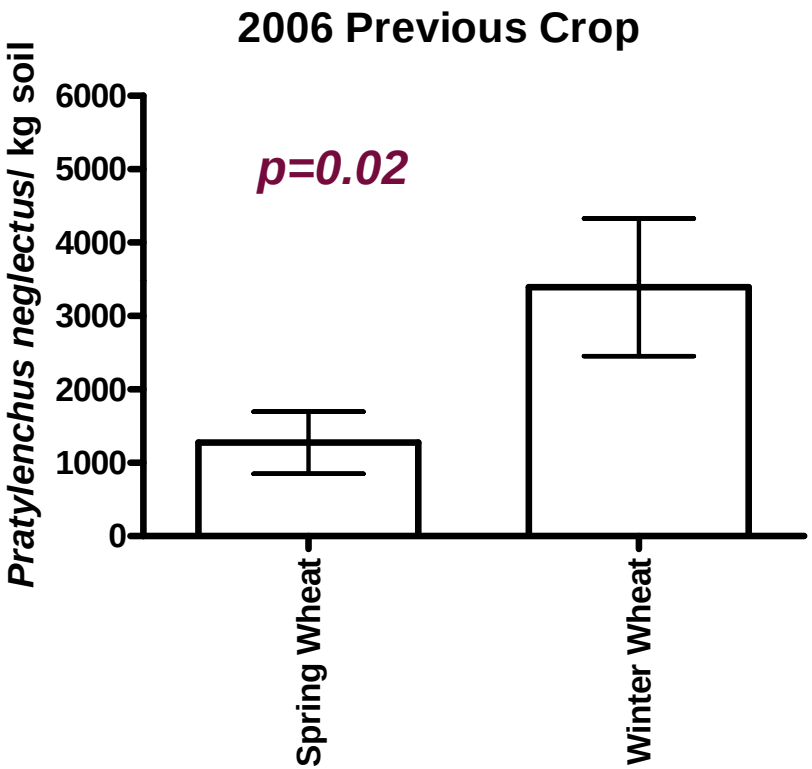
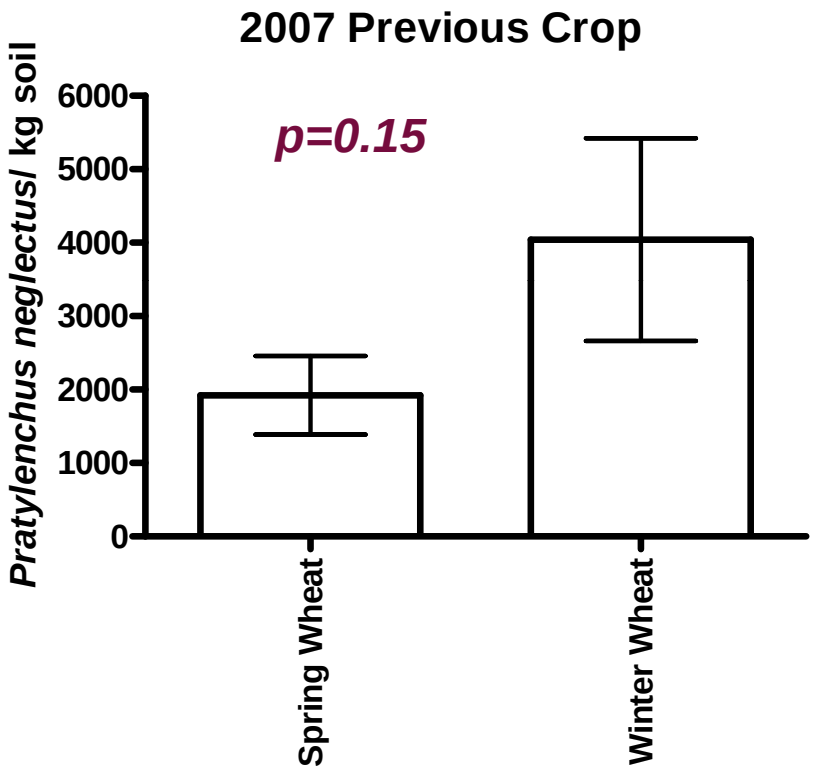
Root lesion nematodes









Root lesion nematode management

Rotation
to non-host crop

Variety selection

Good Hosts	Moderate Hosts	Poor Hosts
Wheat	Barley	Field Pea
Canola	Oat	Faba Bean
Mustard	Durum	Lentil
Chickpea		Triticale
	Wild Oat (Vanstone 2002)	Safflower
		Flax

no chemical control

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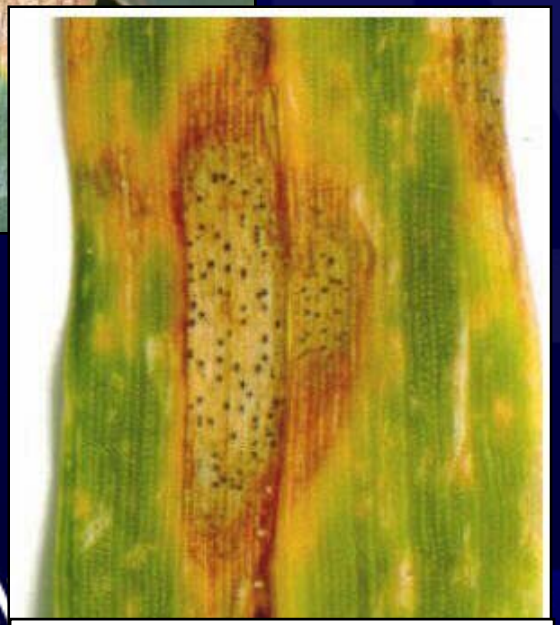
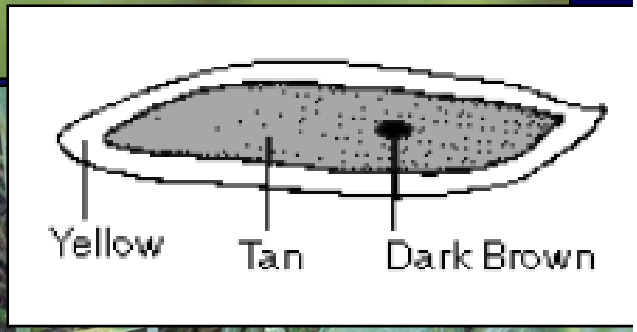
Early season leaf diseases

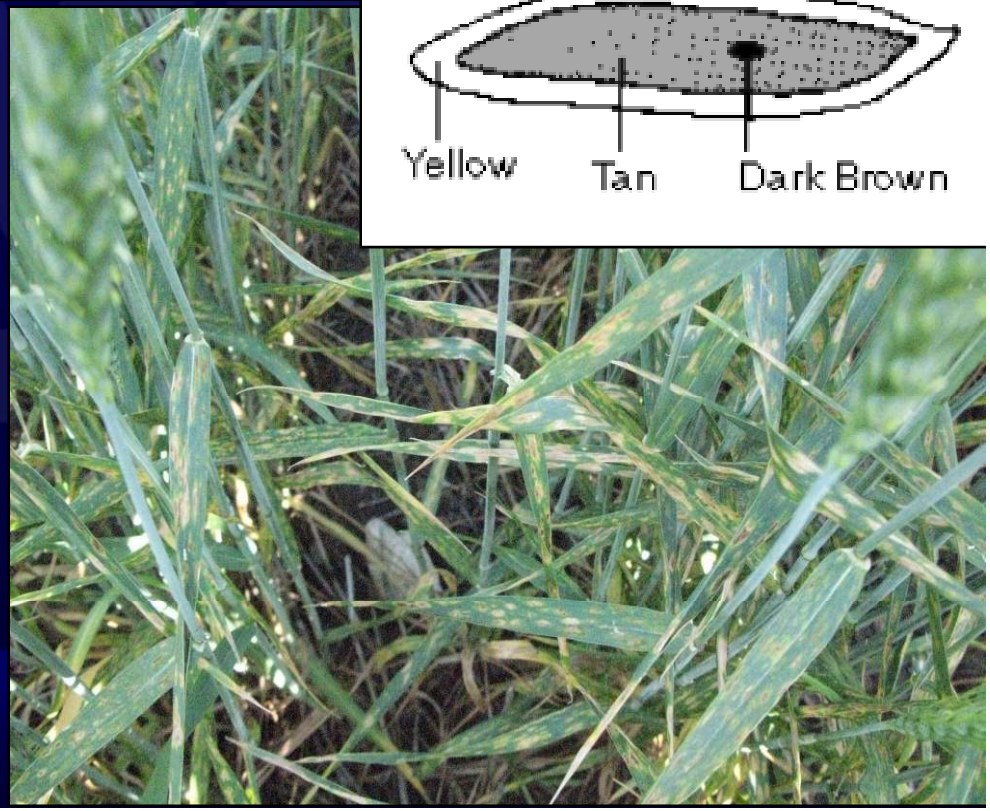
Septoria

Tan spot



Moist chamber





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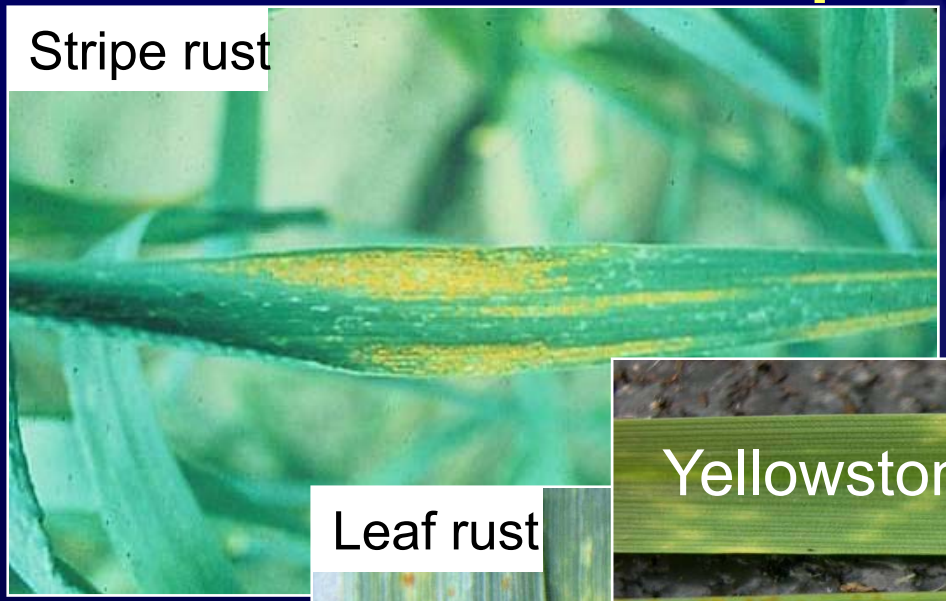
Effect of early season Stratego fungicide application on yields of winter and spring wheat in Montana, 2007.

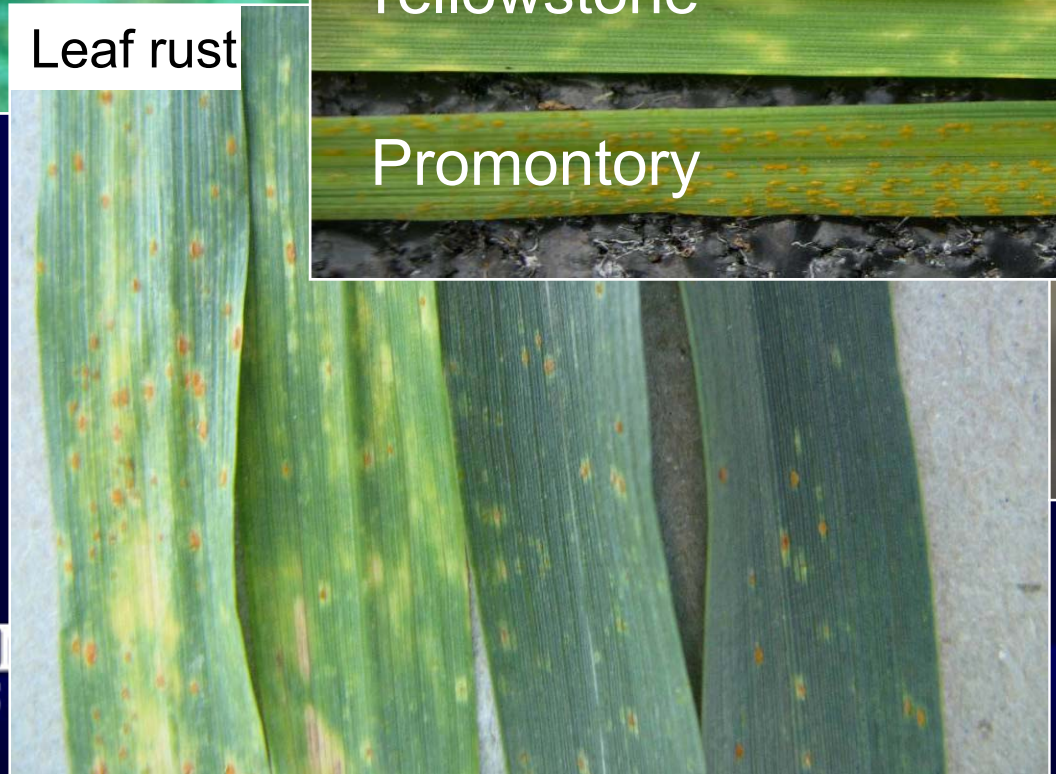
				Yield (No. of fields)		
Region	Wheat	No. producers	No. harvested	Increase	Neutral	Decrease
Central	Winter	15	14	7	5	2
Eastern	Spring	11	11	4	4	3
Total		26	25	11	9	5

Winter wheat: 50% ↑ yield
Spring wheat: 36% ↑ yield

Overall: 44% of fields ↑ yield
(at least 0.3 bu/a; avg. increase = 2 bu/a)

Stripe Rust





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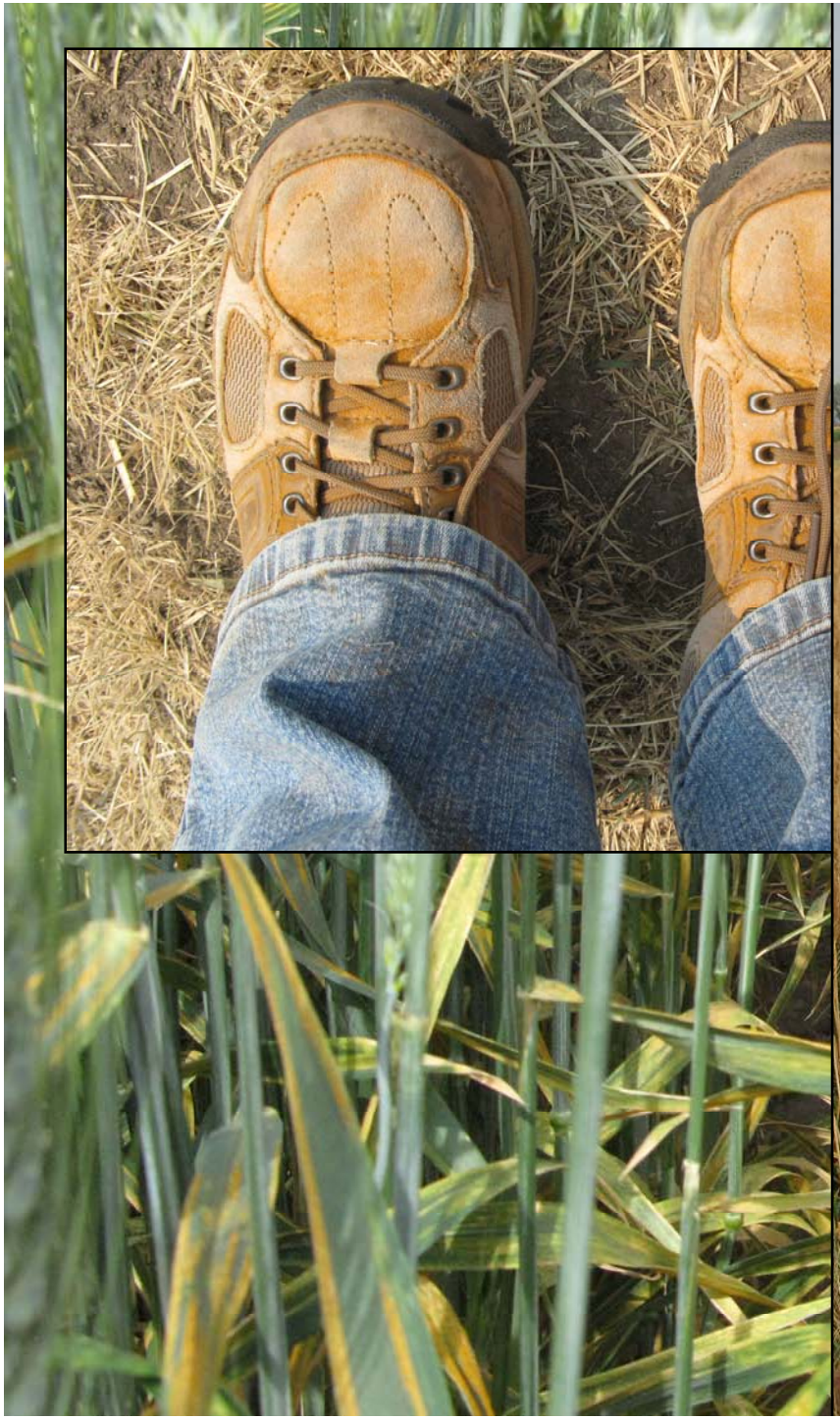
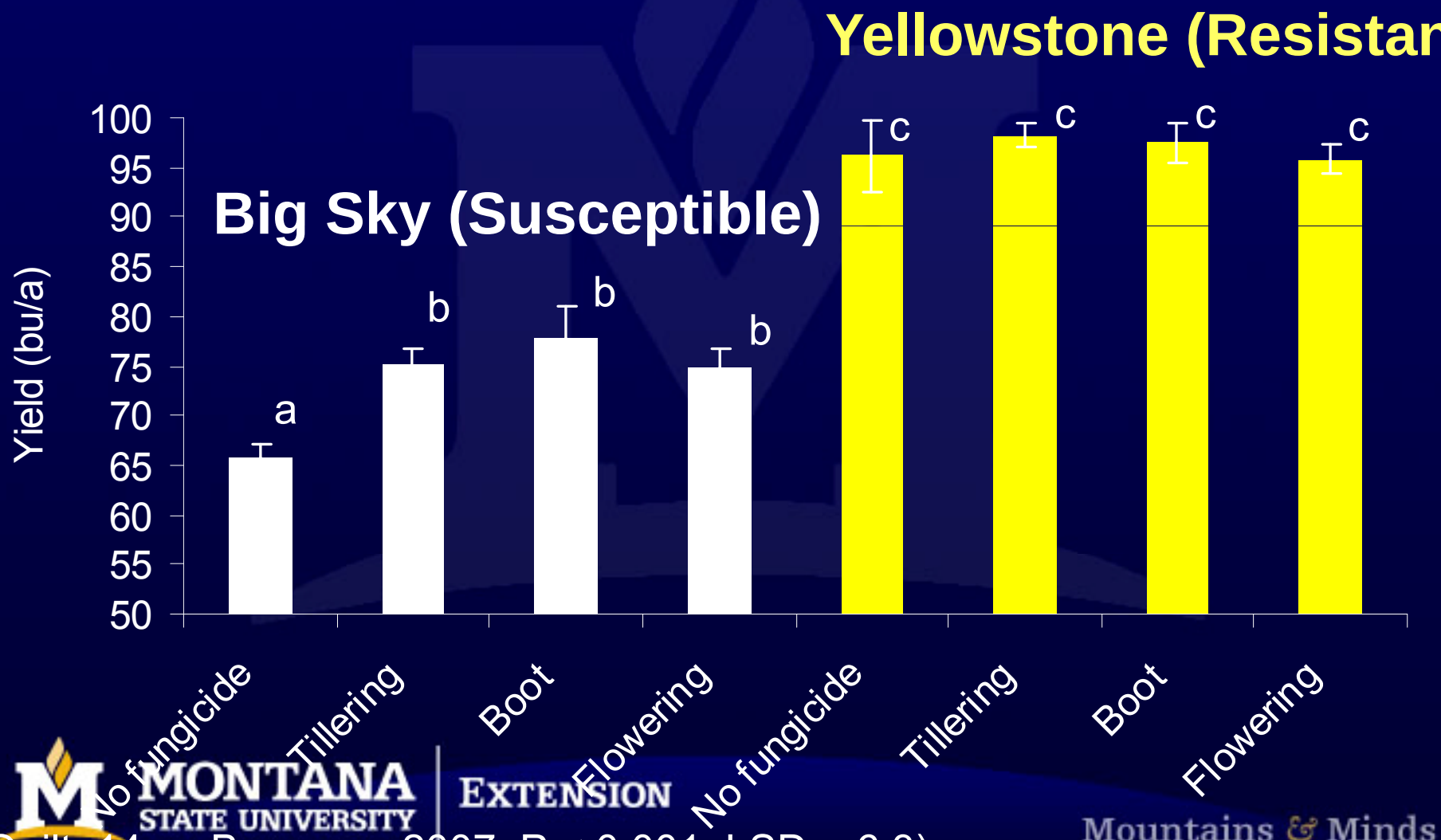


Influence of fungicide application on two stripe-rust infected WW varieties



(Quilt, 14oz, Bozeman 2007; P < 0.001, LSD = 6.3)

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Fusarium head blight (scab)

- DON limit 1 ppm for human food; 2 ppm for feed

Fusarium head scab: Should I be concerned?

- Do you have a history of scab? *Residue-borne*
  - Partially bleached heads
  - Pink kernels (moist chamber)
  - Tombstone kernels
  - Brown at base of head
- Fully or partially bleached heads?

  (root and crown diseases, drought, sawfly)
- Irrigation type
- Tillage regime
- Previous crop

Grey, 2006

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Variety reactions to *Fusarium* head blight*

Variety	Scab (%)	DON	Yield (Bu/a)	Test wt
Glenn	3	0.14	70	64
MT0550	5	0.25	83	62
Alsen	6	0.11	71	62
Granite	7	0.38	75	62
Freyr	9	0.25	87	61
Knudson	8	0.36	83	60
Explorer	15	2.11	55	56
MT0551	13	1.33	67	60
Kelby	16	0.36	81	62
Vida	20	1.41	70	58
Howard	22	1.08	66	60
Choteau	22	2.83	78	61
Espresso	27	3.30	77	60
Hank (CK)	55	9.28	56	53

* 2 year average, 2006 & 2007, Grey and Dyer; Irrigated, Manhattan, MT

Scab in barley vs. scab in wheat

- Barley flowers before head emergence; spray earlier
- 2-row barley less suceptible than 6-row barley (head architecture)
- No variety resistance is available

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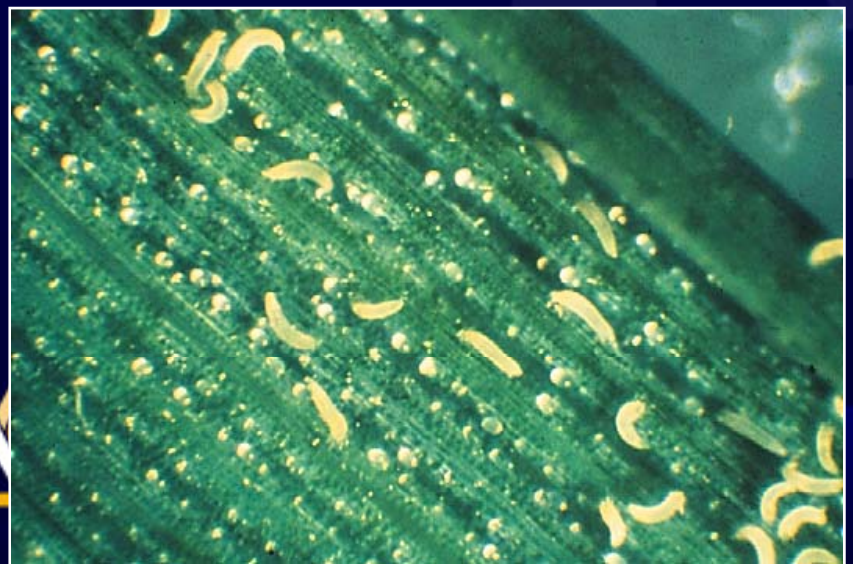
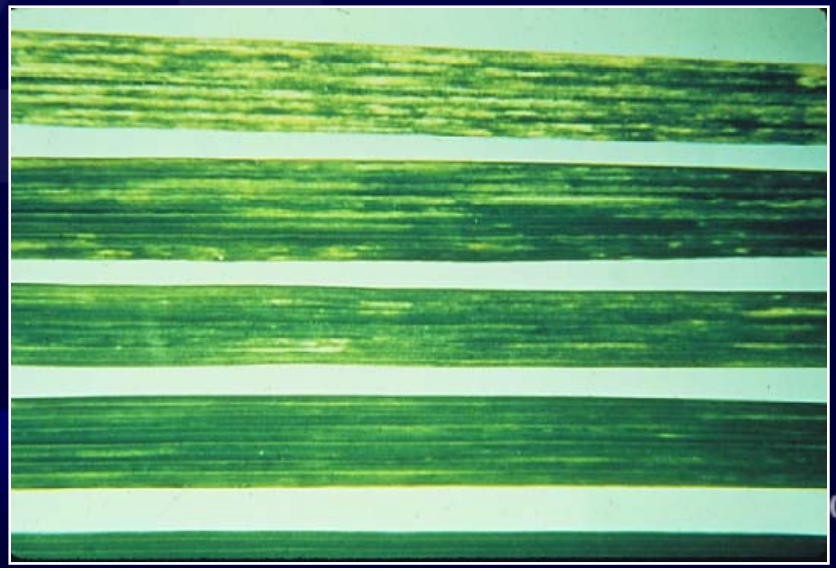
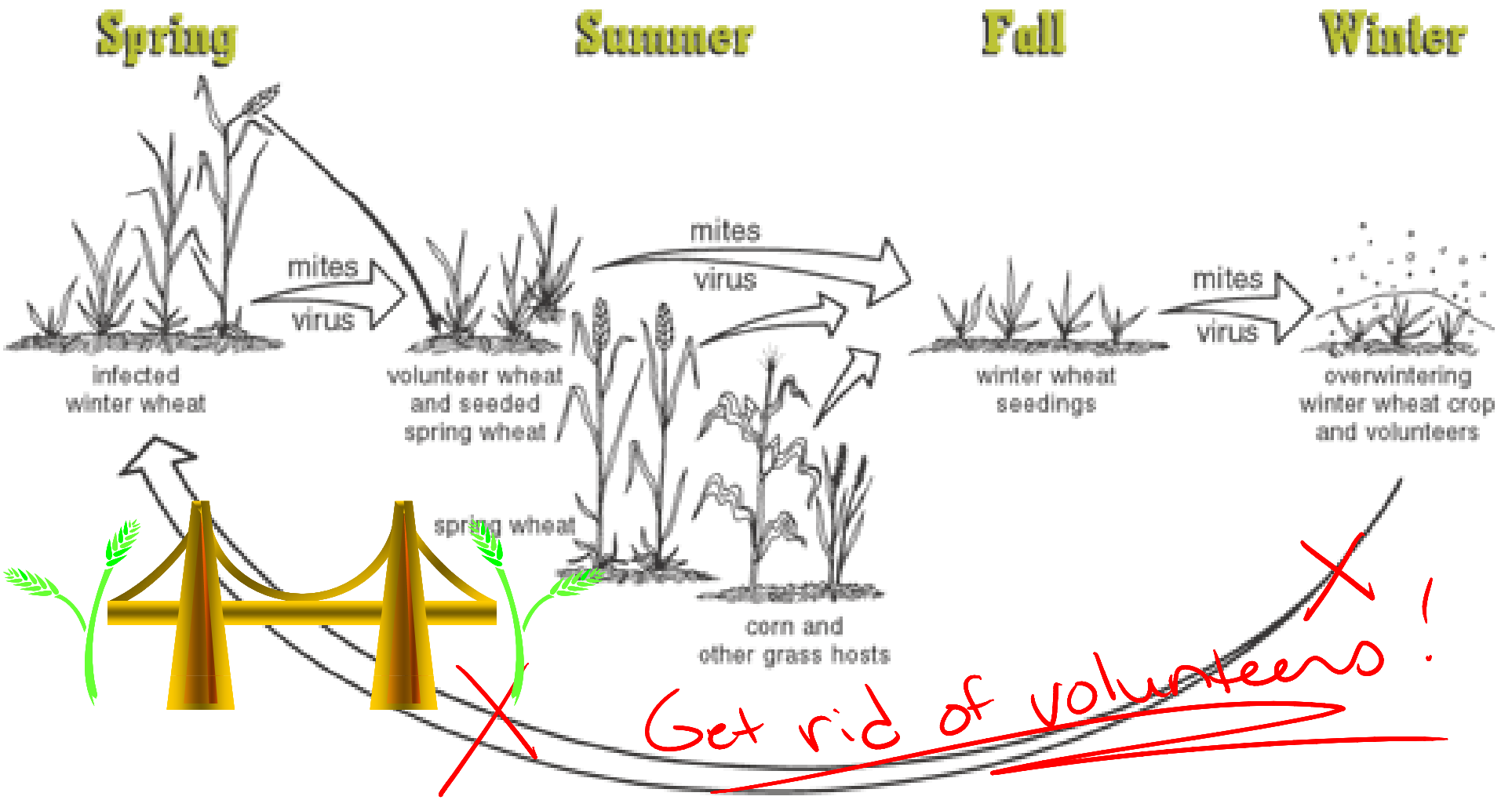
Wheat streak mosaic virus

- Infects both winter and spring wheat
- Earlier infection = greater yield loss
- Grassy weeds, volunteer wheat, corn, etc. can harbor both WSMV and the mite vector





Disease cycle of WSMV



Weed Host: Volunteer Wheat

Table 2. Capacity of prevalent grassy weeds in Montana to serve as mite and virus hosts.*

Common name	*Scientific name*	Life cycle	Mite host	WSMV host
Jointed goatgrass	*Aegilops cylindricae*	Annual	Yes	Yes
Crested wheatgrass	*Agropyron cristatum*	Perennial	Unknown	Unknown
Wild oat	*Avena fatua*	Annual	No	Yes
Smooth brome	*Bromus inermis*	Perennial	Yes	No
Japanese brome	*Bromus japonicus*	Perennial	No	Unknown
Downy brome/Cheatgrass	*Bromus tectorum*	Annual	Yes	Yes
Persian darnell	*Lolium persicum*	Annual	Unknown	Unknown
Western wheatgrass	*Pascopyrum smithii*	Perennial	Yes	No
Feral rye	*Secale cereale*	Annual	Unknown	Unknown
Yellow foxtail	*Setaria glauca*	Annual	No	No
Green foxtail	*Setaria viridis*	Annual	Yes	Yes

Wheat virus survey, 2008

- 9 states in Great Plains Diagnostic Network: WY, MT, CO, KS, OK, TX, SD, ND, NE
- 5 Wheat viruses:
  - *Wheat streak mosaic virus*
  - *High Plains virus*
  - *Triticum mosaic virus*
  - *Barley yellow dwarf virus* – PAV
  - *Barley yellow dwarf virus* - RPV

How to control plant diseases

- Scout early and often
- IDENTIFY the disease
- Apply proper control measures
- Plan ahead for next year

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Montana AgAlerts Fax

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PDIS Plant Diagnostic Information System

Contact: Mary Burrows: P: (406) 994-7766; F: (406)994-7600
http://diagnostics.montana.edu

Montana AgAlerts Fax is a service of Montana State University Extension. AgAlerts is a service of the National Plant Diagnostic Network's Plant Diagnostic Information System.

Notification about disease, insect, weed, and rodent issues in your region (AgAlerts) will be sent as a weekly fax digest. If you would like to receive pest notifications by fax, please fill out this form and fax to Dr. Mary Burrows, Extension Plant Pathologist, Montana State University (406) 994-7600.

If you would like to receive pest alerts by e-mail please go to http://pdis.org and under AgAlerts, click Login/Subscribe, and 'Setup a new account,' then follow the instructions.

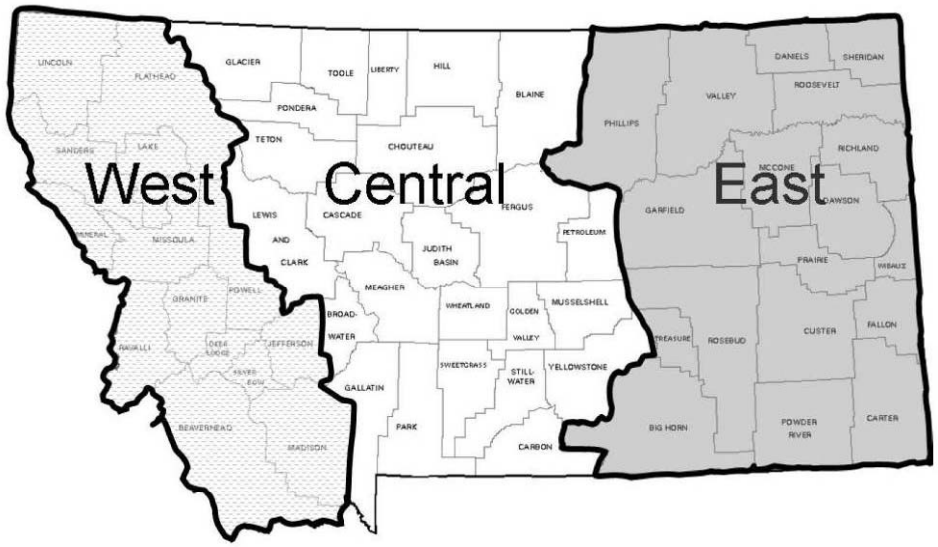
Name (or business name):

Phone number:

Fax number:

County:

If you would like AgAlerts from more than one region, please specify which region(s):



Supported by MSU Extension and the National Plant Diagnostic Network (www.npdn.org; www.pdis.org)

High Plains Integrated Pest Management Guide - Windows Internet Explorer

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High Plains Integrated Pest Management Guide

Page Tools

This guide is intended to provide current effective management options for insect and other arthropod pests, and for plant pathogens affecting all major field crops grown in Colorado, Montana, Wyoming, and Western Nebraska. Chemical and non-chemical control practices, when available, are described in detail for individual pests and pathogens. These practices include cultural and biological control options, and host plant resistance. By including alternatives to pesticides, we hope to create a ready reference of management strategies growers will consider when faced with a pest problem.

High Plains Integrated Pest Management Guide for Colorado, Western Nebraska, Wyoming, Montana and Western South Dakota

A cooperative effort of the Universities of Nebraska, Wyoming, Colorado and Montana supported by USDA, Western Region IPM and EPA Region VIII. The search and indexing features of the High Plains IPM Guide developed by DMO Productions.

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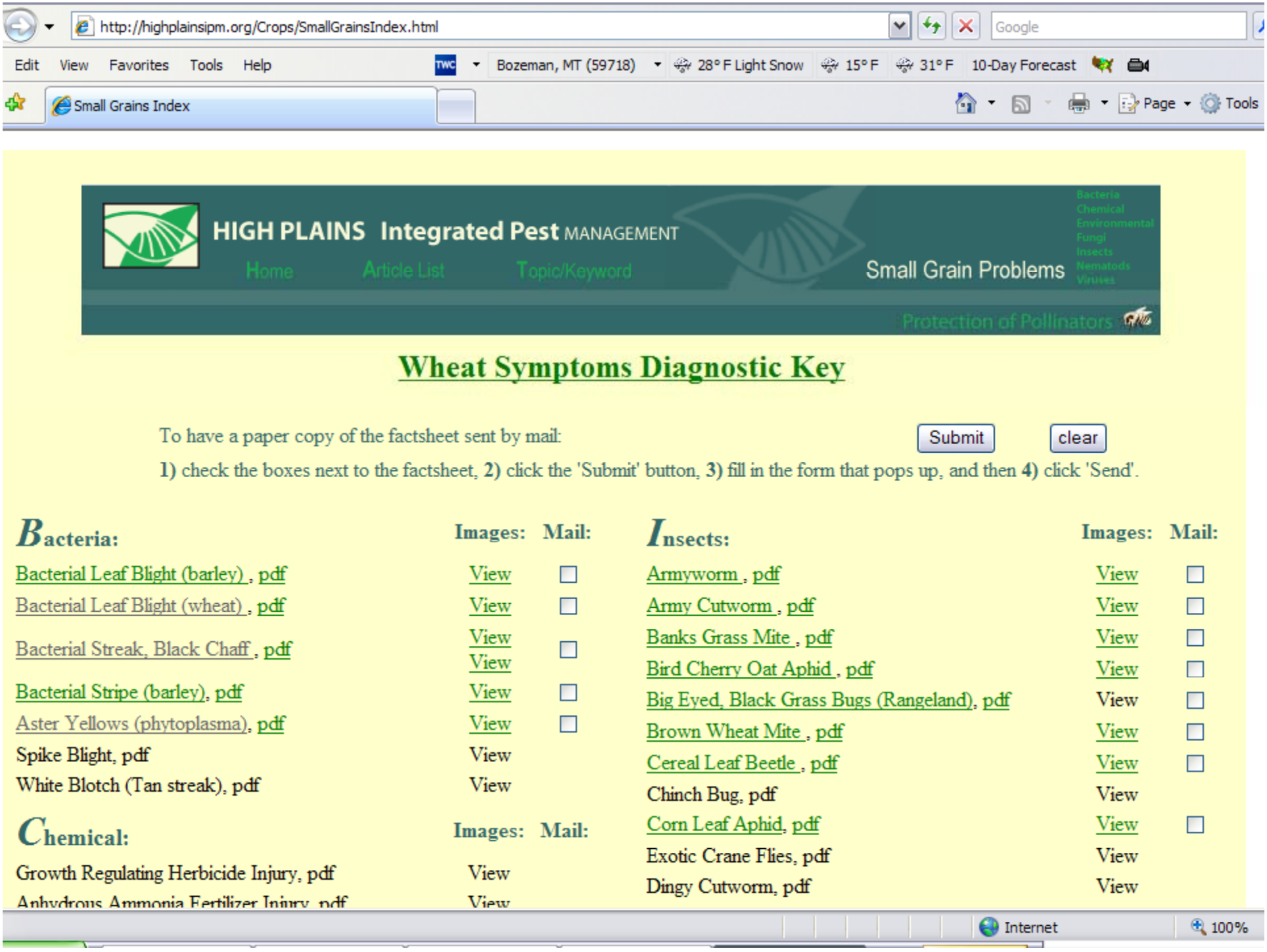
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Spike Blight, pdf View
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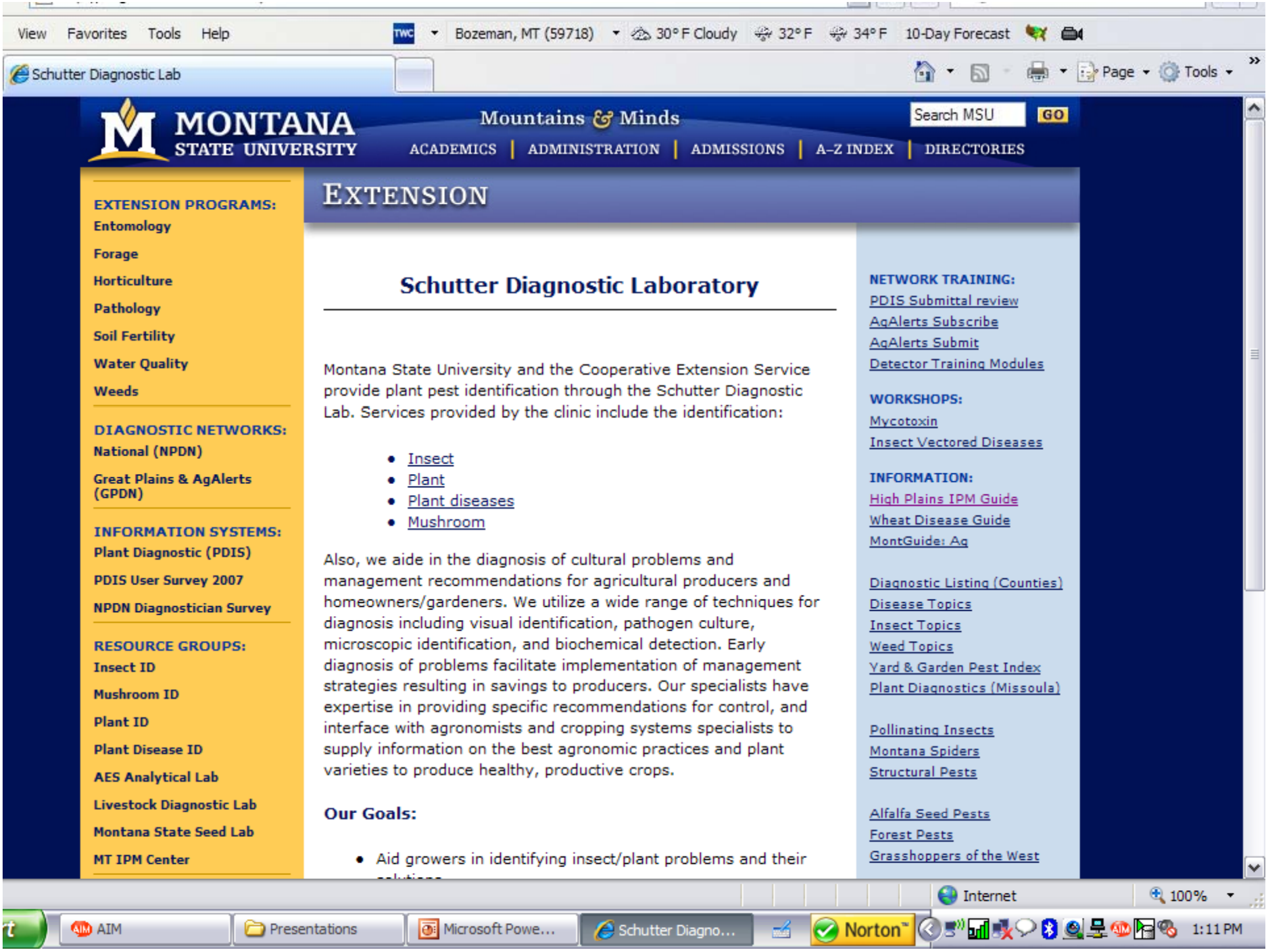
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Soil Fertility
Water Quality
Weeds
DIAGNOSTIC NETWORKS:
National (NPDN)
Great Plains & AgAlerts (GPDN)
INFORMATION SYSTEMS:
Plant Diagnostic (PDIS)
PDIS User Survey 2007
NPDN Diagnostician Survey
RESOURCE GROUPS:
Insect ID
Mushroom ID
Plant ID
Plant Disease ID
AES Analytical Lab
Livestock Diagnostic Lab
Montana State Seed Lab
MT IPM Center
Schutter Diagnostic Laboratory
Montana State University and the Cooperative Extension Service provide plant pest identification through the Schutter Diagnostic Lab. Services provided by the clinic include the identification:
Insect
Plant
Plant diseases
Mushroom
Also, we aide in the diagnosis of cultural problems and management recommendations for agricultural producers and homeowners/gardeners. We utilize a wide range of techniques for diagnosis including visual identification, pathogen culture, microscopic identification, and biochemical detection. Early diagnosis of problems facilitate implementation of management strategies resulting in savings to producers. Our specialists have expertise in providing specific recommendations for control, and interface with agronomists and cropping systems specialists to supply information on the best agronomic practices and plant varieties to produce healthy, productive crops.
Our Goals:
Aid growers in identifying insect/plant problems and their
NETWORK TRAINING:
PDIS Submittal review
AgAlerts Subscribe
AgAlerts Submit
Detector Training Modules
WORKSHOPS:
Mycotoxin
Insect Vectored Diseases
INFORMATION:
High Plains IPM Guide
Wheat Disease Guide
MontGuide: Ag
Diagnostic Listing (Counties)
Disease Topics
Insect Topics
Weed Topics
Yard & Garden Pest Index
Plant Diagnostics (Missoula)
Pollinating Insects
Montana Spiders
Structural Pests
Alfalfa Seed Pests
Forest Pests
Grasshoppers of the West
Internet 100%
AIM Presentations Microsoft Powe... Schutter Diagno... Norton 1:11 PM

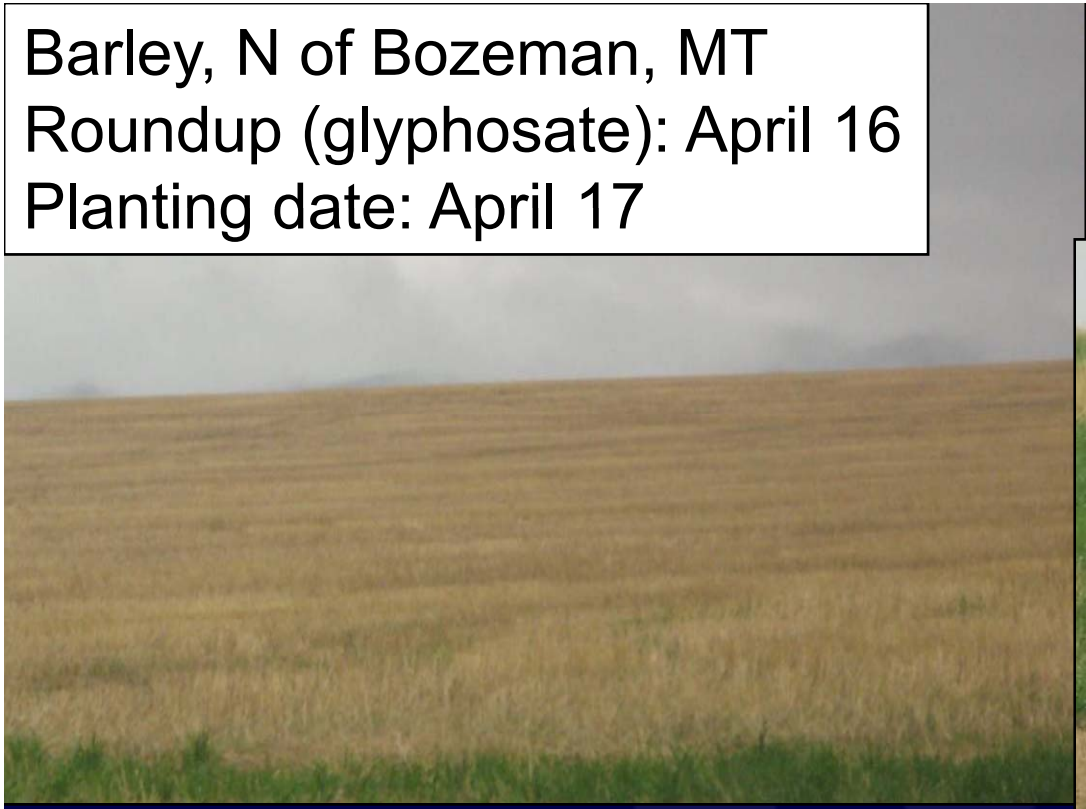
Informational sites

- AgAlerts: PDIS.org
- Schutter Diagnostic Lab: Diagnostics.montana.edu
- Highplainsipm.org
- Greenbook.net: Pesticide labels
- NDSU fungicide guide

  http://www.ag.ndsu.edu/pubs/plantsci/pests/pp622/pp622.pdf
- MontGuides: http://extn.msu.montana.edu/Publications/ESCatalog/ANRPublicCatalogAGlist.asp
- Wheat diseases of Montana

  http://scarab.msu.montana.edu/Disease/DiseaseGuidehtml/

Barley, N of Bozeman, MT
Roundup (glyphosate): April 16
Planting date: April 17



Planting date: 1 week later

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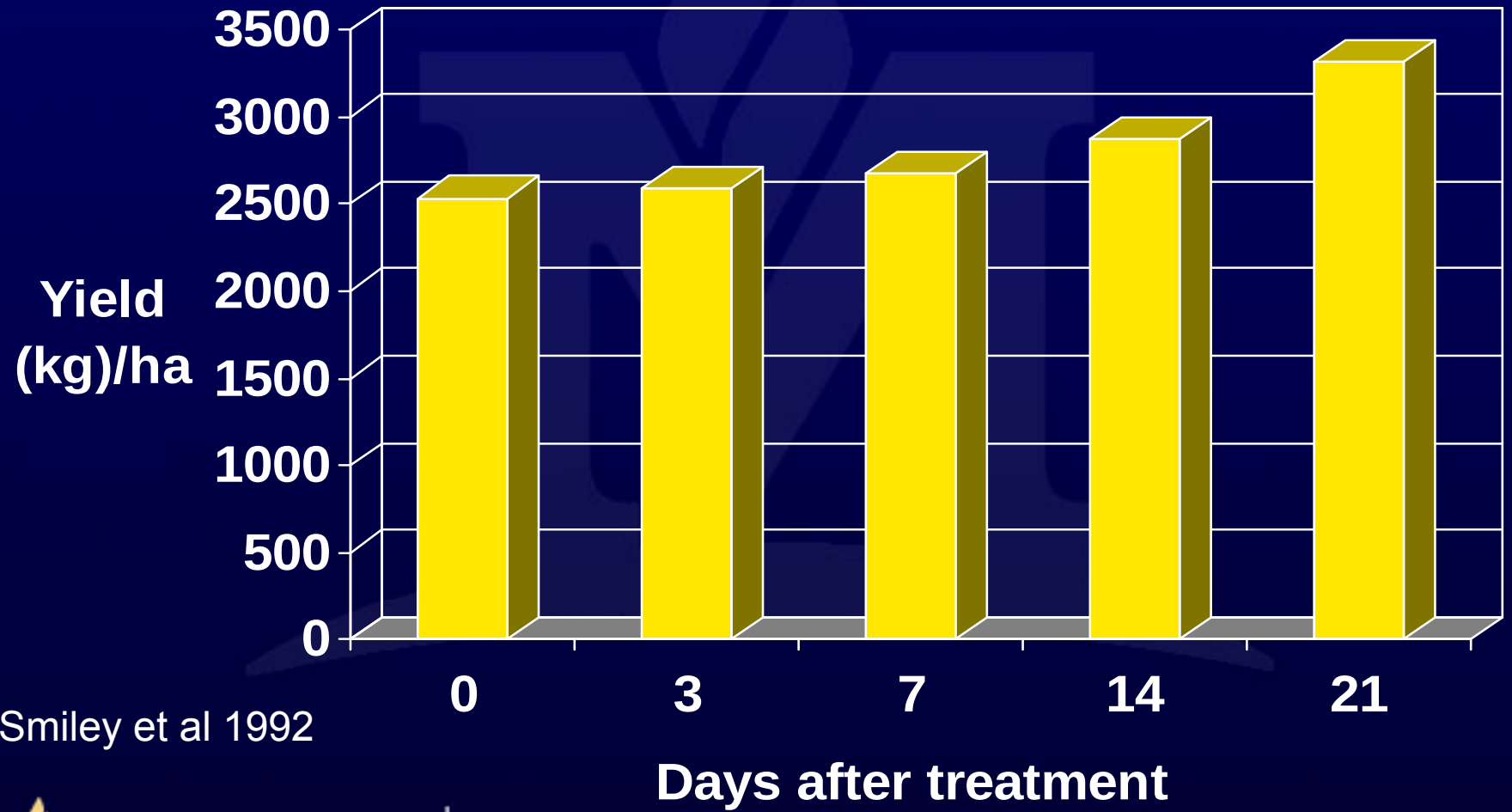
Effects of glyphosate timing on barley yield



Smiley et al 1992

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Seed treatments:

- **Bare Patch:** Baytan, Dividend and Vitavax

- **Pythium* :** Apron, Allegiance, Dividend XL, RTA and Raxil XT

  **All Metalaxyl-based products*

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A Self-Learning Resource From MSU Extension

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MontGuide

Small Grain Seed Treatment Guide

Alan Dyer, Mary Burrows, Bob Johnston and Cecil Tharp

Lists methods for seed treatments to prevent various diseases and pest infestations.

MT 199608 AG Revised 3/07

SEED TREATMENTS PROMOTE SEEDLING establishment and plant health, helping to reduce losses in seed quality and yield due to many diseases and insects. The ability of seed treatments to control many fungal diseases has made them one of the biggest success stories of plant disease prevention. For instance, seed-borne smuts historically caused tremendous yield and quality reductions in grain-growing regions worldwide. Use of effective seed treatments has reduced the severity of many smuts to the point that their occurrence is now rare. However, smut problems may re-emerge if seed treatments are abandoned.

problems. **Careful consideration of all management options available for recurring pest problems is important.**

The availability of new formulations, which compliment the products which have been used by producers for many years, has resulted in more available seed treatments than ever before. Before selecting a product, producers should determine which diseases and/or insects have been recurring problems in their location. County Extension agents or the plant disease clinic on the MSU campus can aid in identifying pest problems and provide information on the common pest problems in specific areas of the state. **Producers can then choose a product based**

Other controls

- Timely weed and volunteer control
- Fallow period
- Soil disturbance (disking)
- Crop rotation (*Rhizoctonia* species tend to be host-specific, but some isolates like AG-8 in OR/WA infect wheat, barley, pea, lentil)
  - *Rhizoctonia solani*: Cereals/monocots
- Variety resistance, if available