

**Schutter Diagnostic Lab  
2007 Plant Disease Summary**

**Diagnostic Staff:**

Dr. Nina Zidack, Diagnostic Plant Pathologist

**Plant Pathology Extension Specialists:**

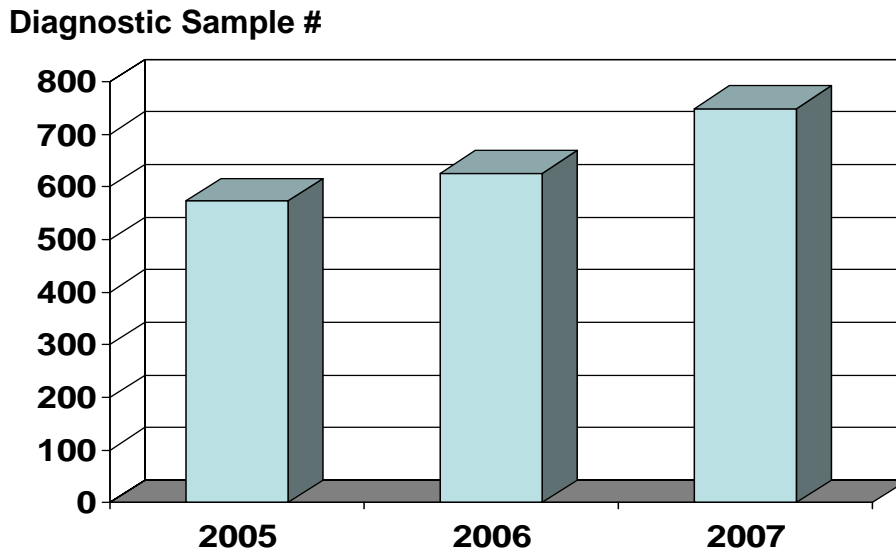
Dr. Mary Burrows – All crops except row crops

Dr. Barry Jacobsen - Row Crops (Sugarbeets, potatoes, drybeans)

Dr. Bill Grey - Small Grains

Total sample volume in 2007 for diseases in the Schutter Diagnostic lab was 2723 with 749 diagnostic submissions. Of diagnostic samples, 91% were submitted by County Extension Agents or Extension Specialists and 9% were submitted directly to the diagnostic lab by firms or individuals. The number of diagnostic submissions for 2007 represents a 16.5% increase when compared to 2006 and a 23% increase over 2005. (Figure 1)

**Figure 1. Number of plant disease diagnostic samples received by the Schutter Diagnostic Lab in 2005, 2006 and 2007.**



In addition to regular sample submissions, the clinic processed 1436 samples for the MT State Department of Agriculture. These included 600 potato wart soil samples that were part of a Cooperative Agricultural Pest Survey between USDA/APHIS and the Montana Department of Agriculture. In addition, 807 *Plum pox virus* phytosanitary tests and 29 alfalfa phytosanitary tests were conducted for the Montana Department of Agriculture. The diagnostic lab performed 68 assays for *Ascochyta* infection of chickpea, lentil and field pea seeds. MSU participated in a national survey for legume diseases (IPM Legume PIPE) and processed 220 leaf samples from soybeans and dry beans. Diseases monitored and assayed for included soybean rust, common blight, *Sclerotinia* white mold, *Alfalfa mosaic virus*, *Bean common mosaic virus* and *Beet curly top virus* (BCTV). A low incidence of common blight (1-2%) and *Alfalfa mosaic virus* (1 sample) were detected in Yellowstone County in mid-summer, and BCTV was detected in 3 soybean samples from Richland County in September. Mary Burrows participated in an alfalfa longevity study with Dennis Cash. 250 root samples were processed and tested for brown root rot, *Phoma sclerotoides* using PCR.

### **Diagnostic Methods**

For diagnostic samples, 75% of samples were diagnosed based on visual symptoms followed by microscopic observation (12%), culturing (5%), serological (5%), biochemical (1.5%), bioassay (0.5%) PCR (0.5%), and soil analysis (0.5%).

### **Crops Submitted**

20% of regular submissions were agronomic crops and 80% were horticultural/home owner samples. Wheat samples represented the highest number of regular crop submissions for 2007 followed by barley and sugarbeet (Table 1). Seventy two of the small grain samples (wheat, and barley) came from county agents and 28 samples came from crop consultants or individual growers.

**Table 1. Number of samples by crop for 2007**

<b>Crop</b>	<b>Number of Submissions</b>
<b>Alfalfa</b>	<b>8</b>
<b>Barley</b>	<b>16</b>
<b>Camelina</b>	<b>1</b>
<b>Field Corn</b>	<b>1</b>
<b>Field Pea</b>	<b>5</b>
<b>Forage grass</b>	<b>2</b>
<b>Safflower</b>	<b>2</b>
<b>Sugar beet</b>	<b>13</b>
<b>Wheat</b>	<b>84</b>

## **Important Diseases for 2007**

### **Small Grains**

A total of 84 wheat samples and 15 barley samples were submitted for disease diagnosis. In areas where planting of winter wheat was delayed due to fall rains, the crop showed poor vigor in the spring and was more susceptible to root diseases such as common root rot. There was also a moderate amount of *Rhizoctonia* root rot (bare patch) diagnosed in both wheat and barley. The early spring was warm and dry, and rains did not occur until later in May. This resulted in late development of leaf spot diseases and stripe rust which were later inhibited by hot, dry conditions starting in mid-June. Numerous samples with white heads were submitted at grain maturity that did not result from root or crown disease, but were attributed to the sudden change in moisture and high temperatures, and drought. In irrigated production, *Fusarium* head blight (scab) continues to be a concern in spring wheat. Bill Grey and Mary Burrows have recommended varieties with tolerance to FHB and applying fungicide sprays during flowering. A section 18 for Folicur (tebuconazole) was obtained for scab control in MT in 2007. Leaf rust in eastern Montana had a significant impact on spring wheat under irrigation. Varieties were evaluated for resistance and information made available for rust management for subsequent growing seasons. Bacterial black chaff (*Xanthomonas*) on spring wheat and barley was a localized problem on highly susceptible varieties grown under irrigation. As the

crop neared maturity, symptoms of Fusarium crown and root rot became more apparent. *Wheat streak mosaic virus* was scattered throughout the state this year and disease severity was moderate with most cases resulting from spring infections. Pondera County submitted the highest number of WSMV infected wheat samples.

### **Sugarbeets**

The majority of sugarbeet samples (14) which underwent testing in 2007 came directly from field representatives of the sugar companies or from growers through Barry Jacobsen. Rhizomania was detected new fields in both the Sidney Sugar and Western Sugar growing districts. *Beet curly top virus* (BCTV) was severe throughout the Western Sugar growing area and from Savage south in the Sidney factory growing district. Our work on BCTV strain detection and identification has been very important in the selection of resistant cultivars for the 2008 growing season and has been instrumental in the US EPA issuing a section 18 emergency clearance for Poncho seed treatment insecticide. Of high importance was the identification of *Cercospora beticola* isolates resistant to tetraconazole (Eminent fungicide) in the Hysham area. This fungicide is one of the key tools for growers for control of Cercospora Leaf spot.

### **Potatoes**

Common potato scab was the most common problem sent to the clinic by homeowners. Commercial samples include Phytophthora pink rot, Pythium leak, Fusarium dry rot, Sclerotinia white mold and Black dot root rot. Virus diseases other than *Alfalfa mosaic virus* (Calico) were uncommon.

### **Horticultural Crops**

The highest total volume of specimens overall was 176 for deciduous trees followed by 98 submittals for evergreens. The most common disease (37 submittals) was fireblight of apple, pear and hawthorn. This was due to extended wet weather during flowering from mid-May through early June. As the summer

progressed, drier weather ensued and drought stress was a common diagnosis for all horticultural crops. A total of 28 turf samples were received at the diagnostic lab. The hot dry weather during mid-summer was conducive to development of both necrotic ring spot and anthracnose of turf. Dutch elm disease was identified in the Flathead Valley for the first time. Rural shelterbelt plantings appear to be the most severely affected while city plantings are scattered and less prone to tree-to-tree infection by either the European elm beetle vector or root grafts.

### **Other Activities**

The Schutter Diagnostic lab continues to be a leader in the GPDN in Training and Education, and the development of educational workshops. Nina Zidack co-chairs the Teaching and Education committee for the GPDN (along with Will Lanier) and is also a member of the NPNDN Training and Education Committee. Activities have included the development of new training workshops and providing input and beta-testing for new online materials for training first detectors of plant pest outbreaks. Nina Zidack serves as Regional Coordinator at the American Phytopathological Society meetings for updating the state lists of “Widely Prevalent Fungi”. The objective of updating the list of common fungal pathogens in each state is to expedite approval of permits for species of fungi which are known to be established in specific areas. Nina Zidack is also serving on an ad-hoc committee for the development of advanced training materials for Master Gardeners.

In 2007, MSU co-hosted a second mycotoxin workshop with Purdue University. The first Mycotoxin Workshop was offered to the GPDN in 2006. Dr. Barry Jacobsen presented current information on mycotoxigenic fungi and mycotoxicosis. In 2007, Dr. Jacobsen was joined by Dr. Charles Woloshuk at Purdue University who provided additional expertise on molecular and biochemical identification of mycotoxin producing fungi and mycotoxins. This workshop was offered to the National Plant Diagnostic Network via web-

conferencing. The workshop was attended by at least 60 individuals at 36 sites in 15 states plus one location in Canada (Appendix A). Nina Zidack provided coordination with Purdue University and Will Lanier (Entomology) provided IT support. Nina Zidack co-authored a piece describing the workshop for the December issue of the NPDN newsletter.

Additional training activities sponsored by the Great Plains Diagnostic Network have provided professional development opportunities for staff. Nina Zidack and Mary Burrows participated in a “Diseases of Greenhouse Crops” workshop in Denver and Nina Zidack participated in a workshop for diagnostics of field-crop diseases at Pioneer Hybrids in Des Moines, Iowa.

For the second year, Nina Zidack has provided individualized instruction in Plant Disease Diagnostics for graduate students. In 2007, 2 students obtained 3 credits each in diagnostics. The graduate students were instructed in the use of diagnostic methods, were involved in the daily triage of diseased plant specimens, performed independent diagnosis using multiple diagnostic techniques, and wrote reports on assigned specimens for clients (Appendix B.)

### **Additional Plant Pathology Extension Activities:**

18 AgAlerts (Mary Burrows)

11 AgAlerts (Barry Jacobsen)

Press Releases

Browning of Evergreens (Nina Zidack)

8 press releases on stripe rust, *Ascochyta* in chickpea, Montana Ag Fax, and appearances at farmer's market (Mary Burrows)

Extension Booth at Gallatin Valley Farmers Market (Mary Burrows)

AgAlerts made available by fax to interested parties with poor or no e-mail access

Master Gardener training via Adobe Connect to approximately 245 people, presentations in Ravalli and Sanders County to 47 people

Mary Burrows collected isolates of *Ascochyta* on chickpea for a study on strobilurin fungicide resistance at North Dakota State University and samples of smut on grains and grasses for molecular genetics studies at Washington State University.

## **Appendix A.**

NCPDN and GPDN co-host Mycotoxin workshop for the National Plant Diagnostic Network. By Nina Zidack (Montana State University) and Gail Ruhl (Purdue University)

On November 6 and 8<sup>th</sup>, Gail Ruhl of Purdue University (NCPDN) and Nina Zidack of Montana State University (GPDN) co-hosted a “Mycotoxin Workshop for Diagnosticians” that was delivered via web-conferencing using Adobe Connect. Presenters were Dr. Barry Jacobsen at MSU and Dr. Charles Woloshuk at Purdue. The Adobe Connect was provided by Kansas State and Will Lanier at MSU coordinated IT support. Topics covered included important genera of mycotoxigenic fungi, mycotoxins and mycotoxicoses, traditional and molecular diagnostic techniques for the identification of mycotoxigenic fungi, and analytical methods for detection and identification of mycotoxins.

Advertisement for the workshop was via the Agdia diagnostics list serve, state departments of agriculture, land grant university e-mail lists and the NPDN newsletter. Participants included diagnosticians at land grant university and state department diagnostic labs, commercial diagnostic labs, as well as researchers, graduate students and technicians. Web-conferencing proved to be a valuable tool to deliver this presentation to participants at 36 locations in 15 states throughout the United States, and at one location in Canada. A survey conducted at the end of the presentation showed that 76% of participants agreed and 24% strongly agreed that the workshop would enhance their ability to process specimens suspected of mycotoxigenic fungal contamination. 54% of participants agreed and 38% strongly agreed that web-conferencing was an appropriate presentation medium for this type of workshop and 64% agreed and 20% strongly agreed that they would recommend that colleagues view the web-recording. 62% of participants agreed and 31% strongly agreed that they would attend additional diagnostic workshops presented using web-conferencing.

## **Appendix B.**

### **Rachel Leisso Plant Disease Diagnosis, Independent Study**

#### Plant Diagnostic Information System

You will be expected to learn to use the Plant Diagnostic Information System (PDIS) for specimen submittal and reporting.

#### 20 Independent Diagnosis

During the course of the summer session, 20 specimens will be assigned for independent diagnosis. I will assign specimens which will require a range of techniques for diagnosis including visual, microscopic, culturing using a variety of media, ELISA, and PCR. You are free to discuss the specimens with me, but I encourage you to investigate on your own as much as possible. Once you have come to a specific diagnosis (often an array of possible diagnosis), come to me for a discussion as to how you arrived at that diagnosis. At that point, write up a customized report which specifically addresses the specimen and the cultural history of the plant. Include recommendations as appropriate. E-mail these reports to me and I will use them in the PDIS report.

#### 10 General Plant Disease Reports

Prepare 10 generalized plant disease reports which can be used as “stock” reports for future diagnosis. Reports should include:

1. Disease name and causal agent
2. Symptoms of the disease
3. Environmental conditions which predispose plants to disease
4. Control – Cultural and chemical if appropriate

Links to specific extension publications can be included. When possible, include links to Montana Extension Publications and High Plains IPM.

#### Reports for Rachel

1. Ascochyta on chickpea
2. Ascochyta on field pea
3. Ascochyta on lentil
4. Cytospora Canker on Spruce
5. Barley Yellow Dwarf Virus
6. Phomopsis Canker – Juniper
7. Cephalosporium Stripe – Winter Wheat
- 8,9,10. TB