PPSA

Proceedings of the 26th Annual Meeting of the Plant Pathology Society of Alberta

November 8th to 10th, 2005
Radisson Hotel & Conference Center

Table of Contents

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Schedule of Events – 26th Annual Meeting

November 8-10, 2005 Radisson Hotel & Conference Center Canmore, Alberta

Date & Time	Event	Location
Tuesday, Nov. 8th		
4:00pm – 8:00pm	Registration	Vic's Concourse
6:00pm – 9:00pm	Wine and cheese reception	Cougar/Grizzly
Wednesday, Nov. 9th		
8:00am – 10:00am	Registration	Vic's Concourse
8:00am - 8:30am	Poster set-up	Arnica
8:30am – 8:45am	Welcome and opening remarks by:	Arnica
	Dr. Ron Howard, President, PPSA	
	Dr. André Lévesque, President CPS/SCP	
8:45am – 10:00am	Paper session I	Arnica
10:00am – 10:30am	Refreshment break	Vic's Concourse
10:30am – 12:00pm	Paper session II	Arnica
12:00pm – 1:30pm	Lunch	Crocus
1:00pm – 1:30pm	Poster set-up	Arnica
1:30pm – 3:00pm	Poster session	Arnica
3:00pm – 3:30pm	Refreshment break	Vic's Concourse
4:00pm – 5:00pm	Paper session III	Arnica
7:00pm – 9:30pm	Banquet	Crocus
Thursday, Nov. 10th		
8:30am – 10:00am	PPSA business meeting	Arnica
10:00am – 10:30am	Refreshment break	Vic's Concourse
10:30am – 12:00pm	Paper session IV	Arnica
12:00pm	Posters come down	Arnica

Tuesday November 8th, 2005

6:00 – 9:00 PM **Registration,** Vic's Concourse
Wine & Cheese Reception, Cougar/Grizzly
Sponsored by Bayer CropScience

Wednesday November 9th, 2005

8:00am – 8:30 PM **Registration**, Vic's Concourse

Paper Session I
Arnica Room – Chair, Ron Howard

08:30 AM **Welcome and opening Remarks:**
Dr. Ron Howard, President, PPSA
Dr. André Lévesque, President CPS/SCP

08:45 AM **L.L.R. Marques,** M.W. Harding, R.J. Howard, and M.E. Olson. The impact of microbial biofilms in plant health.

09:00 AM **M.W. Harding,** L.L.R. Marques, R.J. Howard, and M.E. Olson. Biofilms formed by plant pathogenic fungi.

09:15 AM **T.K. Turkington**, G.W. Clayton, K.N. Harker, and K. Xi. The influence of rotational diversity, seeding rate, and time of silage harvest on disease levels and barley silage yield.

09:30 AM **K. Kumar**, K. Xi, T. K. Turkington, and J. H. Helm. Barley fusarium head blight development and evaluation of coleoptile growth for resistance screening.

09:45 AM **K.F. Chang**, S.F. Hwang, R. Bowness, J.T. Calpas, G.D. Turnbull, B.D. Gossen, and R.J. Howard. Diseases of narrow-leaved lupin (*Lupinus augustifolius*) in Alberta, Canada.

10:00 AM **Refreshment break,** Vic's Concourse
Sponsored by Syngenta Crop Protection Canada, Inc.

Wednesday November 9th, 2005

Paper Session II
Arnica Room– Chair, **Mike Harding**

10:30 AM **S.S. Ramezanpour**, A. Laroche, H. Soltanloo, M. Frick, B. Puchalski, C. Penniket, and D.A. Gaudet. Quantitative Real-Time PCR: An overview of method for detection of pathogens and studying regulation of gene expression

10:45 AM **H. Soltanloo**, D.A. Gaudet, S. Ramezanpour, M. Frick, B. Puchalski, T. Despins, and A. Laroche. Identification and characterization of genes differentially expressed in wheat carrying the *Lr34/Yr18* genes for adult plant resistance to leaf and stripe rust.

11:00 AM **D.A. Gaudet**, J. Lu, F. Leggett, B. Puchalski, T. Despins, M. Frick, and A. Laroche. Sorting out the defence reactions involving the *Bt-10* gene for resistance to common bunt in wheat.

11:15 AM **N. Kashani**, Y.M. Kim, and S.E. Strelkov. Characterization of the ToxB gene from a non-pathogenic isolate of *Pyrenophora tritici-repentis*, causal agent of tan spot of wheat

11:30 AM **Y.M. Kim** and S.E. Strelkov. Heterologous expression of functional Ptr ToxB, a host specific toxin produced by *Pyrenophora tritici-repentis*.

11:45 AM **T. Cao**, S.E. Strelkov, and J.P. Tewari. Molecular detection of *Plasmodiophora brassicae* Woronin, causal agent of clubroot of crucifers, in plant and soil samples.

12:00 PM **Lunch – Crocus Room**
Sponsored by BASF Canada

Poster Session
Arnica Room – Chairs: Ron Howard and Mike Harding
1:30 PM

1) **H. U. Ahmed**, K.F. Chang, S.F. Hwang, R.J. Howard, T.D. Warkentin, D.A. Burke, R. Bowness, and G.D. Turnbull. Efficacy of fungicides as seed treatment and foliar spray for the management of ascochyta blight of chickpea.

2) **M.R. McDonald**, K. Vander Kooi, M.H.Y. Hovius, and A.W. McKeown. Shanghai pak choy (*Brassica rapa* ssp. *chinensis*), a useful susceptible check for clubroot of crucifers.

3) **N. Sharma** and N.N.V. Kav. Application of proteomics to investigate Alternaria blackspot tolerance in canola.

4) **K.Y. Rashid** and G. Seiler. Epidemiology and resistance to sclerotinia head rot in wild sunflower species.

5) S.F. Hwang**, K.F. Chang**, G.D. Turnbull, R. Bowness, K. Lopetinsky, M. Olson, B.D. Gossen, D.J. Bing, and R.J. Howard. Seed treatments for the control of seedling blight and root rot of lupine in Alberta.

6) **R. Zhang**, S.F. Hwang, K.F. Chang, S.E. Strelkov, and R.J. Howard. Comparative proteomics of systemic resistance in genotypes of *Pisum sativum* attacked by *Mycosphaerella pinodes*.

7) **K.F. Chang**, R. Bowness, S.F. Hwang, G.D. Turnbull, K. Lopetinsky, M. Olson, B.D. Gossen, D.J. Bing, and R.J. Howard. Effect of seeding date on fusarium seedling blight of lupine.

8) **H. Wang**, S. F. Hwang, R. J. Howard, K.F. Chang, G.D. Turnbull, and D.A. Burke. Management of seedling blight and root rot of birdsfoot trefoil with fungicide seed treatments.

9) **M.W. Harding**, R.J. Howard, and V.K. Bansal. Evaluation of the efficacy and risks associated with various chemical disinfectants for use in greenhouse sanitation.

10) **L.L.R. Marques**, S.H. DeBoer, and M.E. Olson. Microbial biofilms: implications for post-harvest disease and the need for new sanitation protocols.

11) **S.M. Xue**, and S.E. Strelkov. Evaluation of spore isolation techniques for *Plasmodiophora brassica,* causal agent of clubroot of crucifers.

3:00 PM **Refreshment break**, Vic's concourse
Sponsored by MBEC BioProducts, Inc.

Paper Session III
Arnica Room– Chair, **Sherry Lisowski**

4:00 PM **J. Yang**, P.D. Kharbanda, R.J. Howard, and M. Mirza. Internal fruit rot of greenhouse sweet pepper caused by *Fusarium proliferatum*: Epidemiology and varietal susceptibility.

4:15 PM **R. Spencer**, D. Pauly, K. MacDonald, H. Brook, J. Broatch, M. Johns, B. Yaremcio, R. Horvey, J. Kopp, S.Markus, K. Zeleny, and C. Bergstrom. Summary of plant disease calls to the Alberta Ag-Info Centre in 2005.

4:30 PM **J.M. LeBoldus**, P.V. Blenis, and B.R. Thomas. Inoculation of hybrid poplar with *Septoria musiva*.

4:45 PM K. D. Kenward, **K. S. Zaychuk**, Rita Stevens, and S. E. Foster-Stubbs. *Fusarium graminearum* in Alberta – A Seed Testing Laboratory's Perspective.

Wednesday November 9th, 2005

5:00-7:00 PM Free time

7:00 PM **No Host Bar – Crocus Room**

7:30 PM **Banquet – Crocus Room**

8:30 PM **Guest Speaker, Peter Duck – IMAGES OF THE ROCKIES** – This combination of slides and poetic narration wanders through the wilderness of Banff National Park. Images of wildlife, glaciers, flowers and spectacular geology flow onto the screen accompanied by interpretation presented by Peter Duck, a local naturalist. Find out why the Canadian Rockies are recognized as a UNESCO World Heritage site as personal experience and technical knowledge are combined with the spirit of the landscape to leave the audience both informed and inspired.

Thursday, Nov. 10th

08:30 AM **PPSA Business Meeting**, Arnica Room

10:00 AM **Refreshment break,** Vic's Concourse
Sponsored by Syngenta Crop Protection Canada, Inc.

Paper Session IV
Arnica Room – Chair, Dustin Burke

10:30 AM **S.E. Strelkov**, T. Cao, V. Manolii, E. Smith-Degenhardt, D. Orchard, and J.P. Tewari. Incidence of clubroot on canola in Alberta in 2005.

10:45 AM **C. Hiruki** and K. Wang. DNA heteroduplex mobility assay and phytoplasma classification.

11:00 AM **M.W. Harding**, M.E. Olson, R.J. Howard, and L.L.R. Marques. Bacterial blights of dry bean: *in planta* and *in vitro* characterization of plant-pathogenic biofilms.

11:15 AM **L.L.R. Marques** and M.E. Olson. Latest developments in the fight against biofilm diseases.

11:30 AM **Closing Remarks – Ron Howard**

12:00 PM Poster Removal

Abstracts

Paper Presentations

The impact of microbial biofilms in plant health. L.L.R. Marques**,** M.W. Harding, R.J. Howard, and M.E. Olson. *(M.W.H., M.E.O.) MBEC BioProducts, Inc., BioSciences 025, 2500 University Dr. N.W., Calgary, AB T2N 1N4, Canada; (R.J.H.) Crop Diversification Centre South, Alberta Agriculture, Food and Rural Development, S.S. #4, Brooks, AB T1R 1E6, Canada.*

Microbes have been traditionally studied as free-living single-cells (planktonic). However, most grow as complex communities, attached to surfaces (biofilms, or "slime"), which are much more resistant to antimicrobials than planktonics. The current knowledge in biofilms is centered mostly in the medical and industrial fields, where its impact is widely recognized (cystic fibrosis pulmonary infection, dental plaque, wound infections, pipe clogging). The impact of biofilms in plant health is broad and has been long overlooked. Biofilms on surfaces of equipment, tools, transport vehicles, containers and storage facilities, as well as in vascular, seed and post-harvest infections, are very costly to the agri-food sector. We will present an overview of microbial biofilms and their impact on plant health, including examples of our findings on bacterial and fungal plant diseases where biofilms are involved in pathology and/or disease cycle. We also provide examples of *in vitro* tools that can be used to study microorganisms as biofilms in laboratory settings. Finally, evidence of enhanced resistance of plant pathogenic biofilms to commonly used disinfectants will be shown and the implications of these findings will be discussed.

Biofilms formed by plant pathogenic fungi. M.W. Harding, L.L.R. Marques, R.J. Howard and M.E. Olson. *(L.L.R.M., M.E.O.) MBEC BioProducts, Inc., BioSciences 025, 2500 University Dr. N.W., Calgary, AB T2N 1N4, Canada; (R.J.H.) Crop Diversification Centre South, Alberta Agriculture, Food and Rural Development, S.S. #4, Brooks, AB T1R 1E6, Canada.*

Biofilms are highly structured microbial communities attached to a surface. These communities grow three-dimensionally and produce extracellular polmeric materials that aid in adhesion and protection. Extensive work on bacterial biofilms has provided a wealth of information in the medical and industrial fields. One observation from past research is that biofilm formation in disease-causing organisms is invariably associated with increased resistance to antimicrobial treatments. For this reason, antimicrobial product development and testing that is based on the use of solitary or planktonic microbes will consistently over-estimate efficacy. MBEC Bioproducts Inc., has developed high-throughput technology for testing the efficacy of chemical treatments against microbial biofilms. Advances in pest management are anticipated through the conceptual application of microbial biofilms to currently problematic plant diseases in Alberta. We are studying plant-pathogenic microbes from agricultural fields, greenhouses and storages in a two-pronged approach. First, a descriptive microscopic characterization of plant diseases that is uncovering evidence of biofilms in virtually all bacterial and fungal plant diseases. Second, we are employing MBEC technology to assess the susceptibility of biofilms formed by plant pathogenic microorganisms including a number of fungal species. These preliminary data suggest a high impact of this conceptual and technological approach to agricultural sanitation and pest management.

The influence of rotational diversity, seeding rate, and time of silage harvest on disease levels and barley silage yield. T.K. Turkington, G.W. Clayton, K.N. Harker, and K. Xi. *Lacombe Research Centre and Beaverlodge Research Farm, Agriculture and Agri-Food*

Canada, Lacombe, AB, T4L 1W1; (K.X.) Alberta Agriculture Food and Rural Development, c/o Lacombe Research Centre, Lacombe, AB, T4L 1W1.
A three-year study was conducted at Lacombe, AB to determine the effect of rotational diversity, seeding rate and time of silage removal on plant disease levels and crop biomass in barley silage. Cropping sequences for 2002/2003/2004 included: barley cv. 'Seebe'/'Seebe'/'Seebe'; barley cv. 'CDC Helgason'/barley cv. 'AC Harper'/'Seebe'; 'CDC Helgason' /triticale cv. 'Pronghorn'/ 'Seebe'; 'CDC Helgason'/oat cv. 'AC Mustang'/'Seebe'; and 'Pronghorn'/'AC Mustang'/'Seebe'. Seeding rates were 250 seeds per m^2 and 375 seeds per m^2, while silage was harvested at approximately 2 or 4 weeks after heading. Root biomass data were collected on a dry weight basis in the fall, but only for the early harvest date. In 2004, the spot-form of net blotch (*Drechslera teres* f. *maculata* Smedeg.) was the main leaf disease present and average % leaf area diseased for the flag leaf – 2 was highest for the 'Seebe'/'Seebe'/'Seebe' rotation (14%) and lowest for the 'Pronghorn'/'AC Mustang'/'Seebe' rotation (6%). Other rotations had intermediate disease levels (8-12%). Disease levels were not affected by seeding rate or harvest date. Overall, silage yields (dry weight basis) were highest for the 'Pronghorn'/'AC Mustang'/'Seebe' and the 'CDC Helgason'/'AC Mustang'/'Seebe' rotations, and were slightly higher for the 375 seeds per m^2 seeding rate compared with 250 seeds per m^2. Silage yields were also higher for the late versus early harvest date. No significant interactions occurred among seeding rate, harvest date and rotation for disease and silage assessments. Root biomass was only affected by rotation, and was highest for the 'Pronghorn'/'AC Mustang'/'Seebe' rotation, lowest for 'Seebe'/'Seebe'/'Seebe', and intermediate for the remainder. A second 3-year cycle of this trial is being repeated starting in 2005.

Barley fusarium head blight development and evaluation of coleoptile growth for resistance screening. K. Kumar, K. Xi, T. K. Turkington and J. H. Helm. *(K.X.) Alberta Agriculture, Food and Rural Development, Field Crop Development Centre, c/o Lacombe Research Centre, 6000 C&E Trail, Lacombe, AB, T4L 1W1(T.K.T.); Agriculture, and Agri-Food Canada, Lacombe Research Centre, 6000 C&E Trail, Lacombe, AB, T4L 1W1 (J.H.H); Alberta Agriculture, Food and Rural Development, Field Crop Development Center, 5030-50 St., Lacombe, AB, T4L 1W8.*
Fusarium head blight (FHB) caused by *Fusarium graminearum* Schwabe is the most serious disease in cereals worldwide. Current studies were undertaken to investigate FHB development and screening for resistant/tolerant barley (*Hordeum vulgare* L.) genotypes using an *in vitro* coleoptile bioassay against deoxynivalenol (DON). Cultivars 'AC Lacombe', 'Chevron' and H94051001 were inoculated at the boot stage with *F. graminearum* (Isolate PW027) by injecting spikelets with a 1×10^5 macroconidia/ml suspension. Individual spikelets from each head were randomly sampled and plated on PDA for infection assessment. DON levels in ground spikelet tissue were determined using an ELISA-based assay. A significantly higher level of spikelet infection and DON content were found at the late head development stage as compared to the early head development stage in all genotypes. There was no apparent difference in spikelet infection or DON content between resistant/tolerant and susceptible genotypes. In the evaluation of coleoptile growth of 'AC Lacombe', 'Chevron', I92130, H94051001 and CI4196 where the first cultivar is susceptible and the rest are resistant or tolerant in field reactions, two 5 mm long coleoptile segments from three day-old seedlings were assessed for each genotype. Four replicates from each genotype were exposed to a buffer solution amended with DON concentrations of 0, 0.5, 5, 50 and 150 ppm. The percent inhibition of coleoptile growth was measured 24 hours after incubation at room temperature. Higher DON concentrations were found to result in significantly greater inhibition of coleoptile growth of all barley genotypes compared with lower levels of DON, while reactions among genotypes were similar. The experiment was repeated and significantly more coleoptile inhibition was observed for 'AC Lacombe' compared with the other genotypes at low concentrations between 0.5 – 5 ppm. This

difference among genotypes appeared to agree with field reactions for these genotypes. More studies using low DON concentrations are needed to confirm differential genotype reactions.

Diseases of narrow-leaved lupine (*Lupinus angustifolius*) in Alberta, Canada.
K.F. Chang, S.F. Hwang, R. Bowness, J.T. Calpas, G.D. Turnbull, B.D. Gossen, and R.J. Howard. *Field Crop Development Centre, Alberta Agriculture, Food and Rural Development (AAFRD), 6000 C&E Trail, Lacombe, AB T4L 1W8, Canada; (J.T.C.) Crop Diversification Centre North, AAFRD, 17507 Fort Rd. N.W., Edmonton, AB T5B 4K3, Canada; (S.F.H., G.D.T.) Alberta Research Council, Vegreville, AB T9C 1T4, Canada; (B.D.G.) Agriculture and Agri-Food Canada, Saskatoon Research Centre, 107 Science Place, Saskatoon, SK S7N 0X2, Canada; and (R.J.H.) Crop Diversification Centre South, AAFRD, S.S. #4, Brooks, AB T1R 1E6, Canada.*
Experimental field plots of narrow-leaved lupine (*L. angustifolius* L., cvs. Arabella and Rose) were surveyed in central and northern Alberta in 2003, 2004 and 2005 to identify potential disease problems. Root rot and seedling wilt were prevalent at CDCN, Edmonton in 2003 and powdery mildew (*Erysiphe cichoracearum* DC.) was severe, with development of abundant cleistothecia in early August. *Fusarium* spp., *Pythium* spp., *Rhizoctonia solani* Kühn (AG-4 and AG-2-2) and *Sclerotinia sclerotiorum* (Lib.) de Bary were recovered from rotted roots and basal stems. *Colletotrichum gloeosporioides* (Penz.) Penz & Sacc. was isolated from basal stems and roots of cv. Rose from CDCN in 2004. *Fusarium* spp. and *Pythium* spp. were isolated from 62% of diseased roots collected from Vegreville and *Fusarium* spp. and *R. solani* were isolated from 21% of root samples collected near Barrhead. *F. avenaceum* (Fr.) Sacc., *F. oxysporum* Schltdl., and *S. sclerotiorum* were the most frequently isolated pathogens near Edmonton and Barrhead in 2005. *Alternaria* spp., *Cladosporium* spp., and *Botrytis cinerea* Pers.:Fr. were recovered from foliar lesions and pathogenicity was confirmed by artificial inoculation onto potted plants. However, the foliar pathogens did not seriously damage plants or reduce yield. An unidentified virus disease at Ellerslie and Barrhead caused proliferation of flowering buds.

Quantitative Real-Time PCR: An overview of method for detection of pathogens and studying regulation of gene expression.
S.S. Ramezanpour, A. Laroche, H. Soltanloo, M. Frick, B. Puchalski, C. Penniket and D. Gaudet. *(A.L. H.S., M.F., B.P., C.P., D.G.) Agriculture and Agri-Food Canada Research Centre, Box 3000, Lethbridge, AB.; (S.S.R., H.S.) Ph.D. student of Plant Breeding, Agronomy and Plant Breeding Dept., Agronomy and Animal Science Faculty, Agriculture and Natural Resources Pardis, Tehran University.*
Quantitative real-time PCR (qRT-PCR) is becoming increasingly popular for identifying and characterizing differences in gene expression. qRT-PCR, based on using a fluorescent molecule to detect PCR products during the exponential phase of amplification, is also a rapid, reliable, sensitive and specific method for detecting plant pathogens in soil, water, air and plant samples or specific genes in any living tissues. Numerous studies have reported that cold acclimation enhances resistance in winter cereals to freezing temperatures and to snow molds such as the low temperature basidyomycete (LTB), an important pathogen affecting the survival of winter wheat in the central and northern Canadian Prairies. Differential accumulation of soluble carbohydrates has been reported in winter wheat lines exhibiting increased resistance to snow molds. Results on the regulation and expression of the hexokinase and different sugar transporter genes using qRT-PCR following plant development and exposure to hardening temperatures at 2ºC in snow mold resistant and susceptible winter wheat lines, will be presented. Additionally, the design of primers to detect LTB will be discussed.

Identification and characterization of genes differentially expressed in wheat carrying the *Lr34/Yr18* genes for adult plant resistance to leaf and stripe rust. H. Soltanloo, D. Gaudet, S. Ramezanpour, M. Frick, B. Puchalski, T. Despins, and A. Laroche. *(D.G., S.R., M.F., B.P., T.D., A.L.) Agriculture and Agri-Food Canada Research Centre, Box 3000, Lethbridge, AB.; (H.S., S.R.) Ph.D. student of Plant Breeding, Agronomy and Plant Breeding Dept., Agronomy and Animal Science Faculty, Agriculture and Natural Resources Pardis, Tehran University.*
Leaf and stripe rusts are major biotic constrains to wheat production throughout the world. The most promising long-term control strategy is to deploy cultivars carrying durable resistance based on minor, slow rusting genes with additive effects. Genes *Lr34* and *Yr18* in wheat are tightly linked together and condition adult plant resistance to leaf and stripe rusts, respectively. Differential gene expression analysis was carried out in the near-isogenic lines Thatcher and Thatcher-Lr34/Yr18 following inoculation with leaf rust, using the cDNA-AFLP technique. Fluorescent labeled primers permitted the identification of polymorphic DNA fragments resolved by PAGE and fluorescence imaging. Over one hundred polymorphic DNA fragments were identified, isolated and cloned. Based on Blast X and Blast N results, a majority (70%) of polymorphic fragments corresponded to sequences with known metabolic functions. One of the fragments encoding a leucine rich repeat (LRR) domain is a potential candidate gene for *Lr34/Yr18*. This DNA fragment has a high level of similarity to *Xa21* in rice, which confers broad-spectrum resistance to diverse strains of *Xanthomonas oryzae.* Over 200 double haploid lines originating from the F1 between a Thatcher and Thatcher-Lr34/Yr18 cross were developed and will be employed to confirm the role of candidate genes and study transcriptome mapping.

Sorting out the defence reactions involving the *Bt-10* gene for resistance to common bunt in wheat. D. Gaudet, J. Lu, F. Leggett, B. Puchalski, T. Despins, M. Frick, and A. Laroche. A*griculture and Agri-Food Canada Research Centre, Box 3000, Lethbridge, AB.*
Histological studies were conducted to elucidate the early events in infection and resistance events involving *Bt-10* gene for common bunt resistance in wheat. Two spring wheat lines, cv Neepawa and its near-isogenic sib cv BW553 (Neepawa*6 //Red Bobs/PI 178383), were used as the susceptible, and *Bt-10* resistant cultivars, respectively. The following inoculations were conducted: Neepawa and race T1 (compatible); Neepawa and race T27 (compatible), BW553 and race T1 (incompatible); and BW553 and race T27 (compatible). Seeds were dusted with the bunt spores, seeded into a soil-less potting mix, and grown at 13□C (± 2.0□C). Seedlings were excavated at daily intervals for 20 days, the base of the coleoptiles removed, mounted in lactophenol-cotton blue, and viewed with a light microscope under UV excitation for autofluorescence and with a confocal microscope to view plant resistance responses. Spore germination, H-body formation and secondary spore formation were observed on the surface of the coleoptile between 5 and 15 days and this coincided with ongoing new infection events during this period. Both resistant and susceptible reactions were identical for 6-10 days, and consisted of alignment of fungal hyphae in the intercellular groove, dissolution of the intercellular matrix, and inter- and intracellular ingress of the pathogen. In the incompatible reaction, callose rapidly accumulated around the invading hyphae within 2-3 days of penetration and appeared to limit the spread of the fungus. In the compatible reactions, callose did not accumulate or accumulated much slower, and the spread of the fungus was evident through the coleoptile. Higher expression of the callose synthase gene coincided with observations on greater callose accumulation in the BW553 than in Neepawa.

Characterization of the *ToxB* gene from a non-pathogenic isolate of Pyrenophora tritici-repentis, causal agent of tan spot of wheat. N. Kashani, Y.M. Kim, and S.E. Strelkov. *Department of Agricultural, Food and Nutritional Science, 410 Agriculture/Forestry Centre, University of Alberta, Edmonton, AB, T6G 2P5*

Tan spot, caused by the fungal pathogen *Pyrenophora tritici-repentis*, is an important foliar disease of wheat worldwide. The fungus produces multiple host-specific toxins, including Ptr ToxB, a small protein associated with the development of chlorosis in susceptible wheat genotypes. Homologs of the *ToxB* gene, which codes for Ptr ToxB, are found in virulent and avirulent isolates of *P. tritici-repentis*. We cloned and characterized a form of *ToxB* from 49JA, a non-pathogenic race 4 isolate of the fungus. Comparison of the open reading frame (ORF) of *ToxB* from this isolate with 'wild-type' *ToxB* from a race 5 isolate revealed numerous differences in sequence. The role of the toxin in non-pathogenic isolates of *P. tritici-repentis* is currently being investigated.

Heterologous expression of functional Ptr ToxB, a host specific toxin produced by *Pyrenophora tritici-repentis*. Y.M. Kim and S.E. Strelkov. *Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB T6G 2P5, Canada.*
Tan spot of wheat, caused by the fungal pathogen *Pyrenophora tritici-repentis*, is an economically important foliar disease worldwide. Tan spot is characterized by two distinct symptoms: tan necrosis and chlorosis. To date, eight races of the pathogen have been identified and shown to produce at least three different toxins. Ptr ToxB is a host-specific protein toxin, which induces chlorosis in sensitive wheat genotypes and is encoded by the *ToxB* gene. The *ToxB* gene from a pathogenic race 5 isolate (Alg3-24) of the fungus was cloned, sequenced, and heterologously expressed as an insoluble GST-fusion protein in *Escherichia coli*. The over-expressed GST-Ptr ToxB fusion protein was refolded in vitro and infiltrated into wheat leaves, where it induced chlorosis in a genotype-specific manner. Heterologous expression of functional Ptr ToxB will facilitate future work on the molecular basis of virulence in the *P. tritici-repentis*/wheat pathosystem.

Molecular detection of *Plasmodiophora brassicae* Woronin, causal agent of clubroot of crucifers, in plant and soil samples. T. Cao, S.E. Strelkov, and J.P. Tewari. *Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB T6G 2P5, Canada.*
Clubroot of crucifers, caused by *Plasmodiophora brassicae* Woronin, has been recently identified in canola (*Brassica napus* L.) fields in Alberta, Canada. An effective strategy for managing the disease is to avoid planting cruciferous crops in *P. brassicae*-infested soil, because the pathogen produces resting spores that can remain infectious in the soil for many years. Therefore, an assay to detect *P. brassicae* in plant and soil samples was developed using the polymerase chain reaction (PCR). Two sets of primers were evaluated for their ability to specifically amplify *P. brassicae* DNA: primers PbITS6 and PbITS7 were developed in a previous study and are based on a *P. brassicae* DNA fragment in the internal transcribed spacer regions, and primers attPbITS6 and attPbITS7 were developed in this study and are based on PbITS6 and PbITS7. The optimized PCR reaction yielded a PCR product 512 bp in size from *P. brassicae* DNA with both primer pairs, but did not amplify any DNA fragments from non-infected plant hosts or common soil fungi and bacteria. The detection limit of the optimized PCR reaction was as low as 5 pg of *P. brassicae* DNA or 10^3 resting spores per g of grey loam soil, which corresponded to a disease index of 13% when the soil was bioassayed.

Internal fruit rot of greenhouse sweet pepper caused by *Fusarium proliferatum*: Epidemiology and varietal susceptibility. J. Yang, P.D. Kharbanda, R.J. Howard, M. Mirza. *Alberta Research Council, Vegreville, AB T9C 1T4, Canada; (R.J.H.) Alberta Agriculture, Food and Rural Development, Crop Diversification Centre South, Brooks, AB T1R 1E6, Canada; and (M.M.) Alberta Agriculture, Food and Rural Development, Crop Diversification Centre North, Edmonton, AB.*

Internal fruit rot is a new disease on sweet pepper (*Capsicum annuum* L.) in Alberta greenhouses. The main causal agent was identified as *Fusarium proliferatum* based on fungal morphology and pathogenicity tests. In order to determine the source of fungal inoculum in greenhouses, we conducted spore trapping in several Alberta greenhouses and checked pollinators as inoculum carriers in the 2005 growing season. We also evaluated the susceptibility of 11 pepper varieties to *F. proliferatum*. Preliminary results showed that *Fusarium* spores were present in air and on bees from the greenhouses examined, and that airborne fungal populations were high from July to October. Scanning electron microscopic images showed fungal-infected pollen grains on various body parts of pollinator bees. The major species of *Fusarium* in the air were identified as *F. proliferatum,* followed by *F. solani*. Other *Fusarium* species were also found in the spore-trapping experiment. Results suggest that pollinator bees carry *Fusarium* spores or mycelium on infected pollen grains and probably play an important role in spreading the disease in greenhouses. *F. proliferatum* caused internal fruit rot on all pepper varieties tested, but the susceptibility varied among varieties. Orange ('Sympathy' and 'Captain') and white peppers ('Bianca') were more susceptible than brown ('Marona') and yellow ('Gretsky') peppers. Further work will be conducted to determine the source of primary inoculum, the effect of environmental factors on the disease, and to develop integrated control strategies for growers.

Summary of plant disease calls to the Alberta Ag-Info Centre in 2005. R.D. Spencer, P.K. MacDonald, H. Brook, J. Broatch, M. Johns, B. Yaremcio, R. Horvey, J. Kopp, S. Markus, K. Zeleny and C. Bergstrom. *Ag-Info Centre, Stettler, AB.*
The Alberta Ag-Info Centre (Stettler, AB) received approximately 3500 crops-related calls between January and November 2005, of which approximately 10 percent were disease related. Specialists answered questions relating to diagnosis, chemical or cultural control/management, disease carry over and quality related issues. Calls were received on cereal, oilseed, pulse, forage and commercial horticulture crops. The most prominent disease issues were leaf diseases in cereals, black stem in forages, alternaria in canola, ascochyta in pulses, as well as a wide range of other diseases in both field and horticultural crops.

Inoculation of hybrid poplar with *Septoria musiva*. J.M. LeBoldus, P.V. Blenis, and B.R. Thomas. *Department of Renewable Resources, University of Alberta, 751 General Services Building, Edmonton*, AB T6G 2H1, *Canada*.
Septoria musiva Peck. a fungal pathogen of poplar has caused extensive damage and occasional plantation failure in Canada and the United Sates. Genetic resistance may provide the best means of controlling Septoria canker in plantations. To this end, an experiment was conducted to develop a strategy for minimizing the risk of plantation failure due to this disease. Fourteen clones of poplar from three parent types (*Populus deltoids* Bartr. ex Marsh ssp. *deltoides*, *Populus laurifolia* Ledeb. **x** *Populus nigra* L., and *P. deltoids* **x** *(P. laurifolia* **x** *P. nigra)*) were inoculated with 19 isolates of *S. musiva* from three geographic locations. There were no significant differences among parent types or geographic locations. The largest source of variation was among clones although differences among isolates and the clone by isolate interaction were also significant. A model predicting the risk associated with planting different numbers of clones was developed using the estimated variance components of the clone, isolate, and clone x isolate effects.

***Fusarium graminearum* in Alberta – A Seed Testing Laboratory's Perspective.** K. D. Kenward, K. S. Zaychuk, Rita Stevens and S. E. Foster-Stubbs. *20/20 Seed Labs Inc., #201, 509-11th Avenue, Nisku, AB T9E 7N6.*

Fusarium graminearum is one of four fungi that can cause Fusarium Head Blight (FHB) disease of cereal crops. It is a particular cause of concern due to its production of mycotoxins, which adversely affect human and animal health. Alberta has enforced a zero-tolerance policy on importation of contaminated seed since fall 2002. This has resulted in a dramatic increase in the number of samples processed by commercial seed testing companies. Two methodologies are currently employed in Alberta to test seed samples. The first test, which is the most widely used within the industry, involves culture plating of 200 seeds and visual identification of the *F. graminearum* spores. It takes 5-7 days to perform. A DNA-based test, developed by the Alberta Research Council and commercialized by 20/20 Seed Labs Inc., comfortably tests 15 g samples equivalent to approximately 400 wheat seeds in 1-2 days. The latter test has been utilized commercially for 18 months on wheat samples and has recently been expanded to allow for the detection of *F. graminearum* on other cereal grains including barley and oats. Differences in the sensitivity and specificity of the two tests will be discussed along with the ramifications of a 'two test' system in the industry for the buyer and seller of seed in Alberta.

Incidence of clubroot on canola in Alberta in 2005. S.E. Strelkov, T. Cao, V. Manolii, E. Smith-Degenhardt, D. Orchard and J.P. Tewari. *(T.C., V.M., E.S.-D, J.P.T.) Department of Agricultural, Food and Nutritional Science, 410 Agriculture/Forestry Centre, University of Alberta, Edmonton, AB, T6G 2P; (D.O.) Sturgeon Valley Fertilizer Ltd., PO Box 292, Stn. Main, St. Albert, AB T8N 1N3*

Clubroot, caused by the obligate parasite *Plasmodiophora brassicae* Woronin, is an important disease of crucifers worldwide. The disease was identified for the first time on canola in Alberta in 2003, when 12 infested fields were reported. A small survey in 2004 revealed no new cases. In September, 2005, a total of 112 fields were surveyed for the occurrence of clubroot, mainly in the greater Edmonton region. The survey identified 41 clubroot-infested canola fields, ranging from low to very high levels of infestation. These results seem to indicate that clubroot has become established in the region and that its incidence may be increasing.

DNA Heteroduplex Mobility Assay and Phytoplasma Classification. C. Hiruki and K. Wang. *Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB T6G 2P5,Canada; (K.W.) Plant Biology Division, The Samuel Roberts Noble Foundation, Ardmore, OK 73401, USA.*

A worldwide collection of phytoplasmas, consisting of 62 isolates, were analysed by DNA heteroduplex mobility assay (HMA) of the 16/23S spacer region amplified by the polymerase chain reaction. The results revealed wide genetic diversity among the phytoplasmas studied and a number of new phytoplasma strains were identified from known or new plant hosts in Alberta, Canada. Two distinctive subgroups were revealed by HMA in phytoplasmas associated with canola yellows, Chinese aster yellows, dandelion yellows and monarda yellows. In Alberta, two subgroup of the aster yellows group of phytoplasmas, I-A and I-B, were prevalent in naturally infected field crops and ornamentals in open gardens. On the basis of unique properties of the DNA from clover proliferation (CP) isolated from alsike clover (*Trifolium hybridum L.*) in Alberta, the name '*Candidatus* Phytoplasma trifolii' was proposed for the CP group.Two identical subgroups in phytoplasmas associated with alfalfa witches'-broom, CP and potato witches'-broom were identified by HMA and confirmed by 16S rDNA sequence analysis. The results indicated that HMA is a simple, but rapid and accurate method for the detection and estimation of genetic divergence of phytoplasmas when finer molecular characterization of

phytoplasmas is required at the subgroup level. HMA will also be useful for analysing a large number of field-collected phytoplasma disease specimens.

Bacterial blights of dry bean: *in planta* and *in vitro* characterization of plant-pathogenic biofilms. M.W. Harding, L.L.R. Marques, R.J. Howard and M.E. Olson. *(L.L.R.M., M.E.O.) MBEC BioProducts, Inc., BioSciences 025, 2500 University Dr. N.W., Calgary, AB T2N 1N4, Canada; (R.J.H.) Crop Diversification Centre South, Alberta Agriculture, Food and Rural Development, S.S. #4, Brooks, AB T1R 1E6, Canada.*
Biofilms formed by three bacterial pathogens of dry bean were characterized on bean plants and artificial substrates. Bean leaves symptomatic for halo blight (*Pseudomonas syringae* pv. *phaseolicola*), brown spot (*Pseudomonas syringae* pv. *syringae*) and common blight (*Xanthomonas axonopodis* pv. *phaseoli*) were collected from fields in southern Alberta and analyzed by scanning electron microscopy (SEM). Some of these bacterial isolates were subsequently grown as biofilms on artificial surfaces such as plastic and wood. SEM revealed extensive formation of biofilms by *Pseudomonas syringae.* on both artificial substrates and the host surfaces near disease lesions. Preliminary *in vitro* tests for antibiotic and biocide susceptibility of plant pathogenic biofilms suggest that they have a significantly enhanced resistance to chemical treatments when using recommended doses of currently available antimicrobial products.

Latest developments in the fight against biofilm diseases. L.L.R. Marques and M.E. Olson. *MBEC BioProducts, Inc., BioSciences 025, 2500 University Dr. N.W., Calgary, AB T2N 1N4, Canada*
Biofilms are implicated in several plant diseases and form on surfaces as microbial communities embedded in slime. Standard tests for evaluation of efficacy of antimicrobials are generally performed on solitary cells in suspension, or dried on the surface of steel carriers (AOAC Carrier Test). These tests may fail to predict efficacy of pesticide and disinfectant products against biofilms, which are much more resistant to killing than solitary cells. Rapid standard tests for efficacy against biofilms, and solutions to address biofilm issues in agriculture, are urgently needed. We applied two patented technologies for testing products against phytopathogenic microbes, for both bacterial and fungal pathogens growing as biofilms. The MBEC Assay™ (Minimal Biofilm Eradication Concentration) allows formation of 96 biofilms on plastic pegs protruding from a lid that fits on a 96-well plate. The BEST Assay™ (Biofilm Eradication Surface Testing) tests efficacy of antimicrobials on biofilms grown on different materials (wood, metal, cement). We provide data on antibiotic and disinfectant resistance of *Erwinia* biofilms, demonstrating that these tools provide better simulation of chemical effects against microbes in crop production and field environments. We demonstrate that exposure time is important for efficacy, along with hardness of water and organic load on the surface. These results indicate that adjustments to current sanitation protocols are needed to ensure efficacy. Studies such as these may lead to the development of more efficacious and cost-effective products and approaches for disease control.

Poster Presentations

Efficacy of fungicides as seed treatment and foliar spray for the management of ascochyta blight of chickpea. H. U. Ahmed**,** K.F. Chang, S.F. Hwang, R.J. Howard, T.D. Warkentin, D.A. Burke, R. Bowness, and G.D. Turnbull. (*H.U.A., K.F.C and R.B.), Field Crop Development Centre, Alberta Agriculture, Food and Rural Development (AAFRD) 6000 C&E Trail, Lacombe, AB T4L 1W8, Canada; (S.F.H. and G.D.T.) Alberta Research Council, Vegreville, AB T9C 1T4, Canada; (R.J.H. and D.A.B.) Crop Diversification Centre South, AAFRD, S.S. #4, Brooks, AB T1R 1E6, Canada; and (T.D.W.) Crop Development Centre, University of Saskatchewan, Saskatoon, SK S7N 5A8, Canada.*
Ascochyta blight, caused by *Ascochyta rabiei* (Pass.) Labrousse, is a devastating disease of chickpea (*Cicer arietinum L.*) infecting all plant parts including the seeds. No chickpea cultivars grown in Canada have adequate resistance to control this disease. Fungicides were evaluated for control of seedling blight due to ascochyta and suppression of foliar disease development, under field conditions at Brooks, Lacombe and Vegreville, AB, over two years, using the cultivars CDC Xena and Dwelley. Seed treatments included Apron FL, Apron Maxx, Crown, Dividend XL RTA, Maxim PSP and Vitaflo 280. Vitaflo 280, Apron Maxx, Apron FL or Crown significantly increased seedling emergence over the untreated control. The effect of Maxim PSP was inconsistent, and Dividend XL RTA reduced seedling emergence, indicating phytotoxicity. Headline and Quadris were applied at the recommended label rates as foliar fungicides and reduced disease severity by 36.5-52.2% and 13.6-78.1% in 2004 and 2005, respectively. They reduced the area under the disease progress curve by 41.6-59.7% and 17.0-91.3% in 2004 and 2005, respectively. Better efficacy was obtained when disease pressure was relatively low and with a higher number of spray applications. Fungicide seed treatment effectively increased stand establishment, and post-emergence foliar spray prevented losses due to foliar ascochyta blight of chickpea.

Shanghai pak choy (*Brassica rapa* ssp. *chinensis*), a useful susceptible check for clubroot of crucifers. M.R. McDonald, K. Vander Kooi, M.H.Y. Hovius and A.W. McKeown. *Department of Plant Agriculture, University of Guelph, Guelph, ON, N1G 2W1, Canada.*
Club root of crucifers, caused by *Plasmodiophora brassicae* Wor., is a serious problem on Asian cruciferous vegetables grown on muck (organic) soils in Ontario. Two years of field trials were conducted to assess the susceptibility of selected cruciferous vegetable crops: Shanghai pak choy (*B. rapa* L. ssp. *chinensis* (Rupr.) Olson var. *communis* Tsen and Lee), flowering Chinese cabbage, (*B. rapa* L. ssp. *chinensis* (Rupr.) Olson var. *utilis* Tsen and Lee), Chinese broccoli (*B. alboglabra* Bailey), and big leaf mustard (*B. juncea* L. Coss. var. *folisa* Bailey). Disease was assessed at harvest. Severity of root clubbing was rated on a scale from 0 to 3. Clubroot incidence and severity were consistently higher on pak choy than on the other Asian greens. In a trial where plants were grown in plug trays filled with field soil, the reaction of pak choy was compared to radish 'Champion' (*Raphanus sativus* L.), cabbage 'Bronco' (*B. oleraceae* L. var. *capitata*) and a canola (*B. napus* L.) cultivar. Clubroot incidence was 1% on canola and radish, and 46% on cabbage and pak choy. We conclude that Shanghai pak choy is a fast growing and useful check crop for evaluating clubroot on vegetable crucifers, and that plug trays provide an efficient method for screening plants and soils.

Application of proteomics to investigate Alternaria blackspot tolerance in canola. N. Sharma and N.N.V. Kav. *University of Alberta, Department of Agricultural, Food and Nutritional Science. Edmonton, AB T6G2P5*
Blackspot disease of canola, caused by *Alternaria brassicae*, is characterized by necrotic and chlorotic lesions and is one of the most recalcitrant diseases of canola. Proteome level analysis

of *Brassica* lines may provide information regarding the mechanisms involved in host-pathogen interactions and the molecular basis for disease resistance. Several proteins whose levels are significantly affected at different time points following pathogen infection have been identified using two-dimensional electrophoresis and tandem Mass Spectrometry from an *Alternaria*-tolerant Brassica line. The role(s) of many of these proteins in mediating tolerance to this pathogen are currently being investigated.

Epidemiology of sclerotinia head rot in wild sunflower species. K.Y. Rashid and Gerald Seiler. *AAFC, Morden Research Station, Morden, MB; (G.S) USDA, ARS, Northern Crops Research Laboratory, Fargo, ND.*
Sunflower head rot results from ascospore infections of *Sclerotinia sclerotiorum*. Lack of genetic resistance has led to a steady rise in prevalence (65%) and incidence of head rot (up to 50%) in the Red River Valley of North America. This study aimed to understand the epidemiology of head rot in wild sunflower species and identify sources of resistance in the wild population. Field experiments were conducted on 48 accessions each of the wild sunflower species *Helianthus maximiliani* and *H. Nuttallii* collected from southern Manitoba. Ascospores, ground sclerotinia –infected millet seed, and fresh ground fungal colonies were used as inoculum at early-, mid-, and late-flowering. Paper, pollinating, and plastic bags were used for incubation. The ground sclerotinia-infected millet resulted in the highest disease indices followed by the ascospore inoculation and fresh ground mycelia. The light brown paper bags provided the most favourable conditions for infection and disease development. Disease inoculations at mid-, and late-flowering produced better results than at early flowering. A standard methodology using ground sclerotinia-infected millet seed and paper covering for incubation has been established for assessing the reaction of wild sunflower accessions to sclerotinia head rot. Nine accessions of H. maximiliani and 11 of H. nuttallii were identified with no sclerotinia infection in two years.

Seed treatments for the control of seedling blight and root rot of lupine in Alberta. S.F. Hwang, K.F. Chang, G.D. Turnbull, R. Bowness, K. Lopetinsky, M. Olson, B.D. Gossen, D.J. Bing, and R.J. Howard. *Field Crop Development Centre, Alberta Agriculture, Food and Rural Development (AAFRD), 6000 C&E Trail Lacombe, AB T4L 1W8, Canada; (S.F.H, G.D.T.) Alberta Research Council, Vegreville, AB T9C 1T4, Canada; (K.L., M.O) AAFRD, Crop Diversification Centre (CDC) North, 17507 Fort Rd., Edmonton, AB T5Y 6H3, Canada; (B.D.G.) Agriculture and Agri-Food Canada (AAFC), Saskatoon Research Centre,107 Science Place, Saskatoon, SK S7N 0X2, Canada; (D.J.B.) AAFC, Lacombe Research Centre, 6000 C&E Trail, Lacombe, AB T4L 1W1, Canada; (R.J.H.) AAFRD, CDC South, S.S. #4, Brooks, AB T1R 1E6, Canada.*
Root rot of lupine (*Lupinus angustifolius* L.) caused by *Fusarium* spp. and *Rhizoctonia solani* Kühn is common in Alberta. Field trials to assess the impact of three fungicide seed treatments [Thiram; metalaxyl-M + fludioxonil (Apron Maxx); carbathiin + thiram (Vitaflo 280)] on seedling blight were established at Lacombe and Vegreville, AB in 2004 and 2005. Inoculation with either *Fusarium avenaceum* (Corda ex Fries) Sacc. or *R. solani* reduced seedling emergence and seed yield compared to the noninoculated control. Emergence was generally lower in treatments inoculated with *R. solani* than those inoculated with *F. avenaceum*. Both Vitaflo 280 and Apron Maxx improved seedling establishment over the nontreated control in treatments inoculated with *F. avenaceum* or *R. solani*. In inoculated treatments at Lacombe, seed yield for Apron Maxx and Vitaflo 280 was higher than the nontreated control in 2004 and for all three seed treatments in 2005. Seedling establishment was higher for Vitaflo 280 than for thiram at Lacombe in both years; but yield was only higher in 2004. None of the fungicide treatments improved yield at Vegreville.

Comparative proteomics of systemic resistance in genotypes of Pisum sativum attacked by Mycosphaerella pinodes. R. Zhang, S.F. Hwang, K.F. Chang, S.E. Strelkov, R.J. Howard. *(R.Z., S.F.H) Alberta Research Council, Vegreville, AB T9C 1T4, Canada; (K.F.C.) Field Crop Development Centre, Alberta Agriculture, Food and Rural Development (AAFRD), 6000 C&E Trail, Lacombe, AB T4L 1W8, Canada; (S.E.S.) University of Alberta, Dept. of Agriculture, Food and Nutritional Science, Edmonton, AB T6G 2P5, Canada; (R.J.H.) AAFRD, CDC South, S.S.#4 Brooks, AB T1R 1E6.*

Proteomics is a powerful tool for analyzing differences in resistance defense reactions among genotypes of *Pisum sativum* L. when attacked by *Mycosphaerella pinodes*. Two-dimensional gel electrophoresis and a MALDI-TOF mass spectrometer were used to compare the protein profiles between infected and non-infected treatments in two genotypes of 'Radley' and the susceptible breeding line PI 179449. Two different sets of reference mapping profiles were obtained. In 'Radley', 145 peptide spots were detected. Eight of these were found only in the infected plants. A total of 95 peptide spots were detected from PI 179449. Four of these were found only in the infected plants. The eight peptides related to the defense reaction proteins from the infected 'Radley' plants were identified as, β-1,3-glucanase (E137_ARATH), endochitinase A1 (CHI1_PEA), endochitinase A2 precursor (CHI2_PEA), cysteine proteinase (CYSP_PEA), ABA-responsive protein (ABR17_PEA), profucosidase precursor (O82711_PEA), basic endochitinase B precursor (CHIB_ARATH), and disease resistance response protein 230 precursor (D230_PEA). The four peptides related to the defense reaction proteins from the infected PI 179449 plants were identified as, β-1,3-glucanase (E131_ARATH), endochitinase A1 (CHI1_PEA), cysteine proteinase(CYSP_PEA), and ABA-responsive protein (ABR17_PEA). Qualitative differences were also found between the infected and non-infected plants in either 'Radley' or PI 179449.

Effect of seeding date on fusarium seedling blight of lupine. K.F. Chang, R. Bowness, S.F. Hwang, G.D. Turnbull, K. Lopetinsky, M. Olson, B.D. Gossen, D.J. Bing, and R.J. Howard. *Field Crop Development Centre, Alberta Agriculture, Food and Rural Development (AAFRD), Lacombe, AB T4L 1W8, Canada; (S.F.H, G.D.T.) Alberta Research Council, Vegreville, AB T9C 1T4, Canada; (K.L., M.O.) AAFRD, Crop Diversification Centre (CDC) North, Edmonton, AB T5B 4K3, Canada; (B.D.G.) Agriculture and Agri-Food Canada (AAFC), Saskatoon Research Centre, 107 Science Place, Saskatoon, SK S7N 0X2, Canada; (D.J.B.) AAFC, Lacombe Research Centre, Lacombe, AB T4L 1W1, Canada; (R.J.H.) AAFRD, CDC South, S.S. #4, Brooks, AB T1R 1E6, Canada.*

Lupine (*Lupinus angustifolius* L.) is a potentially important pulse crop in Alberta. However, it is vulnerable to seedling blight and root rot caused by *Fusarium* spp. To determine the effect of seeding date on the severity of fusarium seedling blight, field trials were established at Vegreville and Lacombe, AB in 2005. The lupine cultivars Arabella and Rose were seeded at 2-wk intervals beginning in early May. Inoculation reduced emergence and yield for both cultivars at both locations. Seeding late in May also reduced emergence and yield at both sites for both cultivars, when compared to plots seeded in early or mid-May. However, neither inoculation nor seeding date affected root rot severity. In order to attain maximum seedling emergence and yield, lupine should be seeded before mid-May in Alberta.

Management of seedling blight and root rot of birdsfoot trefoil with fungicide seed treatments. H. Wang, S. F. Hwang, R. J. Howard, K.F. Chang, G.D. Turnbull, and D.A. Burke. *Alberta Research Council, Vegreville, AB T9C 1T4, Canada; (R.J.H. and D.A.B.) Crop Diversification Centre South, Alberta Agriculture, Food and Rural Development (AAFRD), Brooks, AB T1R 1E6, Canada; (K.F.C.) Field Crop Development Centre, AAFRD, 6000 C&E Trail, Lacombe, AB T4L 1W8, Canada.*

Birdsfoot trefoil (*Lotus corniculatus* L.), a warm-season legume, is palatable, nutritious, high in protein and very digestible for cattle or sheep, but its seedlings are very slow to establish and are susceptible to various root rot diseases. Greenhouse and field trials were conducted at Vegreville and Brooks, AB in 2005 to evaluate the efficacy of several fungicides for the control of seedling blight and root rot of birdsfoot trefoil, caused by *Fusarium* spp., *Rhizoctonia solani* Kühn, and *Pythium* spp. Among the fungicide treatments, Dividend, Tribune, Apron XL, Apron Maxx, Maxim, and Maxim + Apron Maxx consistently improved seedling stands and forage yield in either greenhouse or field experiments under *Fusarium* or *Rhizoctonia* infection. Apron XL and Apron Maxx significantly increased seedling emergence in both greenhouse and field experiments under *Pythium* infection. With *Pythium*-inoculation, Tribune improved stand establishment in the greenhouse trial while Maxim improved stand establishment in the field trial. *Rhizoctonia* was the most virulent pathogen and *Fusarium* the least, when combined across all fungicide treatments in both greenhouse and field experiments.

Evaluation of the efficacy and risks associated with various chemical disinfectants used in greenhouse sanitation. M.W. Harding, V.K. Bansal and R.J. Howard. *Crop Diversification Centre South, Alberta Agriculture, Food and Rural Development, S.S. #4, Brooks, AB T1R 1E6, Canada.* Nine commercial and experimental disinfectants were tested for efficacy against seven pathogens of greenhouse vegetables; which included four fungi, one bacterium and two viruses. Experiments were also performed to measure efficacy and to evaluate any potential hazards to humans, the environment or greenhouse structural materials. Measurements were taken from treatments of artificially infested greenhouse surface materials and, where possible, from axenic *in vitro* trials. Greenhouse surfaces included metals (copper, aluminium, steel, stainless steel, galvanized tin), polymers (polyethylene, polycarbonate, polyvinylchloride), glass, wood, rubber, and concrete. Disinfestation trials using artificially infested surfaces revealed that surface characteristics, including porosity and hydrophobicity, could negatively impact the activity of chemical disinfectants. Additionally, rapid drying and increased organic load reduced disinfectant efficacy. *In vitro* trials revealed that the label recommended rate was usually sufficient for disinfection. However, some compounds were not effective against all pathogen types, while some caused a stasis rather than mortality. Corrosion testing was done using small coupons made from the surface materials listed above. Corrosion was measured quantitatively and estimated qualitatively. Information on environmental toxicity and personal health and safety hazards was obtained from manufacturers' labels and MSDSs. The nine disinfectants were rated for efficacy, potential corrosive or damaging effects on greenhouse surfaces, and for human and environmental health and safety hazards.

Microbial biofilms: implications for post-harvest disease and the need for new sanitation protocols. L.L.R. Marques, S.H. DeBoer, and M.E. Olson. (*MEO*) *MBEC BioProducts, Inc., BioSciences 025, 2500 University Dr. N.W., Calgary, AB T2N 1N4, Canada;* (*SHD*) *Centre for Animal and Plant Health, CFIA, Charlottetown, PEI, Canada.*
Biofilms are microbial populations immersed in extracellular polymeric matrix ("slime"), permeated by water channels, and associated with surfaces. Biofilms are morphologically and metabolically distinct from the planktonic cells (single, free-floating) studied in test tubes. These differences often correspond with increased resistance to antimicrobial agents than their free-floating counterparts. Biofilms can contaminate surfaces of equipment, transport vehicles, and storage facilities that come in contact with agricultural produce and thus, are an important means of spreading bacterial and fungal diseases. Disinfectants are used to clean surfaces associated with harvesting, grading, storage, and processing. The efficacy of disinfectants is often evaluated using laboratory-grown pure cultures of planktonic cells. For this reason, many disinfectants may have limited efficacy against biofilms. Development of new use protocols for currently available

products based on efficacy testing against biofilms is needed in order to address questions such as: are commercially available disinfectants efficacious against biofilms? Are higher concentrations needed? Are extended contact times necessary? Is development of a new generation of disinfectants with high efficacy against biofilms required? In order to answer these questions experimental testing of disinfecting compounds against microbial biofilms is being done by MBEC BioProducts Inc. The results show that biofilms challenged with traditional biocides require much higher concentrations and exposure times. Additionally, the hardness of water and organic load on the surface can inhibit disinfection. Based on these preliminary data, development of new use protocols for available products is needed to allow efficacy against biofilms. In addition, the development of a new generation of disinfectants with high efficacy against biofilms will aid agricultural sanitation in minimizing disease infection and spread.

Evaluation of spore isolation techniques for *Plasmodiophora brassicae*, causal agent of clubroot of crucifers. S. Xue and S.E. Strelkov. *Department of Agricultural, Food and Nutritional Science, 410 Agriculture/Forestry Centre, University of Alberta, Edmonton, AB, T6G 2P5*

Collections of *Plasmodiophora brassicae*, causal agent of clubroot of crucifers, often consist of a mixture of different pathotypes, which can make their characterization difficult. A number of methods for the isolation of single resting spores of the pathogen were compared, and a simple and efficient protocol was developed. Spore suspensions were diluted to 2×10^3 spores per mL, and 0.5 µL aliquots were examined microscopically, at which point the roots of two-week old Chinese cabbage seedlings were dipped in those aliquots in which the presence of only one resting spore was confirmed. The seedlings were then incubated in Petri plates under high moisture for two days, and transplanted to a well-watered soil mix. Using this procedure, infection rates as high as 50% were obtained. The efficient production of single spore isolates of *P. brassicae* will facilitate further characterization of this important pathogen.

Business Meeting Agenda – 26th Annual Meeting

November 10, 2005 Radisson Hotel & Conference Center Canmore, Alberta

ARNICA ROOM (8:30 – 10:00 a.m.)

President - Ron Howard

Secretary-Treasurer - Sharon Lisowski

Items

1. Adoption of the Agenda
2. Adoption of the Minutes of the 2004 PPSA Annual Meeting, Lacombe, AB
3. Interim Financial Report - Noryne Rauhala
4. Reports of Standing Committees:
   a. Awards Committee – Denis Gaudet
   b. Disease Survey Committee – Kelly Turkington
   c. Historical Committee – Stephen Strelkov
5. Terms of Reference for Standing Committees
6. Update on CPS Activities – Dr. André Lévesque, President
7. Conference Reports
8. Reports on Unusual or Exceptional Disease Situations
9. Nomination of Honorary Life Members
10. Resolutions
11. Locations and Dates of Future Meetings
12. Election of Officers for 2005-06
13. Other Business
14. Adjournment

Minutes From Business Meeting – 26th Annual Meeting

November 10, 2005 Radisson Hotel & Conference Center Canmore, Alberta

ARNICA ROOM (8:30 – 10:00 a.m.)

President - Ron Howard
Secretary-Treasurer - Sharon Lisowski

Meeting called to order by Ron Howard at 8:36 AM.

15. Adoption of the Agenda

No changes or amendments. Ron Howard moved that the agenda be adopted as read, seconded by Denis Gaudet. Carried.

16. Adoption of the Minutes of the 2004 PPSA Annual Meeting, Lacombe, AB

(a) Julie Bernier noted that her named was misspelled in a few instances, so this will be corrected for future minutes.
(b) Ron Howard thanked the Lacombe group for hosting the 2004 meeting.
(c) Mike Harding moved the minutes be adopted as written, seconded by Denise Orr. Carried.

17. Interim Financial Report

(a) Noryne Rauhala, who is in charge of the Lacombe PPSA account, highlighted the attached report for up to December 31, 2004.
(b) Sherry Lisowski will give Noryne an update following this conference, reflecting revenues and expenditures for the PPSA Canmore meeting. Total balance will not change much, as the conference broke even.
(c) Noryne will have an audited statement prepared for the fiscal year-end (Dec. 31)
(d) She moved her report be adopted as read, seconded by Byron Puchalski. Carried.

18. Reports of Standing Committees:

a. Awards Committee – Denis Gaudet, Committee Chairperson

Report of the Awards Committee for the Annual Meeting of the Plant Pathology Society of Alberta, Canmore, November 8-10, 2005

During the Annual Meeting, two presentations were tied for the Best Student Paper Award and both received the $50.00 award. These were the presentations:

- **Yong Min Kim** for his oral presentation entitled: Heterologous expression of the functional Ptr ToxB, a host specific toxin produced by *Phrenophora tritici-repentis.*
- **Nidhi Sharma** for her poster presentation entitled: Application of proteomics to investigate *Alternaria* blackspot tolerance in canola.

In addition, two "honourable mentions" were also awarded to:

- **Hassan Soltanloo** for his oral presentation entitled: Identification and characterization of genes differentially expressed in wheat carrying the Lr34/Yr18 genes for adult plant resistance to leaf and stripe rust.
- **Shiming Xue** for his poster presentation entitled: Evaluation of spore isolation techniques for *Plasmodiophora brassica*, causal agent of clubroot of curcifers.

The three judges for this competition, Byron Puchalski, Karen Bedford and Michael Harding, were gratefully acknowledged.

The Terry Swanson Memorial Scholarship
The Terry Swanson Memorial Scholarship, and the 500$ award in 2004 was presented to **Ms C. Wang**, University of California, Riverside. For 2005, the Scholorship will be awarded to a student from the University of Alberta and the university is in the process of selecting a suitable candidate.

Alberta Graduate Student Scholarship Award
The Scholarship and the 500$ prize for 2005 has been awarded to **Sanjeeva Srivastava**, of the University of Alberta. It is anticipated that the presentation of the Award will be made during a ceremony held at the University sometime in the coming months.

Terms of Reference for PPSA awards
Terms of reference were drafted by the Awards Committee for:

1) Best Student Presentation Award
2) Best Technician Presentation Award
3) Alberta Graduate Student Scholarship Award
4) Youth Science Fair Award

and were then presented for discussion during the PPSA Business Meeting in Canmore, 2005. Following incorporation of suggestions made by the membership during and subsequent to the Meeting, draft terms of reference for each award will be presented for adoption by the Membership at the 2006 Business Meeting in Edmonton.

The following four terms of reference were reviewed at this meeting and Ron Howard suggested that Denis give an overview of each, give the PPSA members time to think about possible changes and motions for adoption of the Terms of Reference will be made at the 2006 meeting. Denis invited all to send him feedback regarding the terms of reference. For example, do we still want to recognize both the best student and technician presentation awards?

Best Student Presentation Award (see Terms of Reference sheet)
- Discussion: There is a question of eligibility for graduate students, and whether registrants who are conducting their research outside Alberta can be awarded. It was also suggested that a computer-generated certificate with a signed letter of acknowledgement from the PPSA President and the cash award be presented to the winner. Denise Orr suggested that there should be three qualified judges, as selected by the Awards Committee.

Best Presentation by a Plant Pathology Technician Award (see Terms of Reference sheet)
- Discussion: Should this award be presented at all? Please see other questions on the terms of reference, regarding this award.

Youth Science Fair Award (see Terms of Reference sheet)
- Byron Puchalski presented the overview of this award and explained that so far, it has been for the Calgary Youth Science Fair only. He asked if at least some of the resources should also be focused on other Alberta science fairs, by contacting them for their interest. Could a plant pathology book be awarded, rather than cash?
- Karen Bedford suggested that the science fair judges nominate a student for this award, submit names and digital photographs of projects, to the PPSA Awards Committee. Using this criterion, they would select the best project.
- Another suggestion was that the award recipient would be invited to attend the PPSA Annual Meeting, present their project and attend the banquet, where he (she) would receive the award.

Alberta Graduate Student Scholarship Award (see Terms of Reference sheet)

- Discussion: Should the eligibility now be open to those who are attending a university outside of Alberta, but are performing their project in the province? The Society could also encourage graduate student nominees from the University of Lethbridge and the University of Calgary. Student Major Advisers could nominate even multiple students for the PPSA Award, as per proposed eligibility criteria, by submitting three copies of a nomination package, forwarding this to the Chairman of the Awards Committee by October 1. An individual may be awarded more than one time, providing he (she) changes focus of research. This will only remain open to graduate students.
- Proposal: Please see last paragraph under Terms of Reference. The Awards Committee and the PPSA membership will determine the merit of candidates for this award.
- The 2005 Scholarship and the $500.00 prize have been awarded to Sanjeeva Srivastava, of the University of Alberta, although not presented yet.

Dr. Terry Swanson Memorial Scholarship

Report given by Denis Gaudet. He presented a background of Dr. Terry Swanson and this annual memorial scholarship, which is a cheque for $500.00 and a diploma, mailed out to the award recipient.

- Ron Howard reported that $105.00 has been collected from PPSA members so far in 2005, to deposit in the scholarship fund.
- Bruce Gossen proposed that we might need a "sunset provision" for this award, as those individuals who knew Terry Swanson were becoming fewer each year. Many Societies are going this route.

Denis moved the awards reports be adopted as read, seconded by Denise Orr. Carried.

b. Disease Survey Committee – Kelly Turkington

- Please note the new Terms of Reference.
- Khalid Rashid suggested that we organize a short (approximately 0.75 hr) informal meeting at the PPSA Annual Meeting to discuss disease situations in Alberta and endeavour to meet the objectives stated in the Terms of Reference.
-

c. Historical Committee – Stephen Strelkov

- The PPSA Secretary-Treasurer will submit the business meeting minutes as a hard copy and electronic version, digital photographs from the PPSA Annual Meeting and the proceedings package to Stephen when completed.

19. Terms of Reference for Standing Committees

PPSA members asked to please carefully read over the proceedings upon receipt.

20. Update on CPS Activities – Dr. André Lévesque, President

- André congratulated the members of the PPSA Local Arrangements Committee for the Canmore 2005 meeting on their efforts with organization of this event.
- He also stated that the 77th Annual Meeting of the Canadian Phytopathological Society would be held in Quebec City, PQ in 2006 from July 28 – August 3, with the following hotels prebooked: Hilton, Delta and Concorde.
- Ron Howard has co-chaired the Strategic Planning Committee.
- The publications of the CPS have done very well financially (i.e. *CJPP* and *Diseases of Field Crops in Canada*). Ron Howard, Mary Ruth McDonald and Bruce Gossen are working on a revised edition of *Diseases and Pests of Vegetable Crops in Canada*, which will be released soon.
- Culture collections: A new plan, especially for animal health cultures, is necessary.
- Ballot: Reminder to return by deadline.

- Membership renewals: Renew ASAP after receipt.
- André answered a question regarding the CPS meeting dates in Quebec City.
- The PPSA Chairperson, Dr. Ron Howard, thanked Dr. André Lévesque for taking the time to attend the PPSA Annual Meeting.

21. Conference Reports

Ron opened the floor to conference attendees, who provided reports as follows:

(a) 4th Annual Canadian Workshop on Fusarium Head Blight – Ottawa - Report by Kelly Turkington

- This workshop was an excellent forum featuring the latest in research on fusarium head blight and attracted researchers from around the world. It was noted at the meeting that advances are being made in controlling fusarium head blight (FHB), especially in the areas of breeding and the use of molecular technologies to develop a better understanding of host pathogen interactions. Research suggested that cultural management of FHB may be somewhat problematic, due to potential overwintering of the pathogen on hosts other than cereals or corn and variable results in relation to tillage systems and residue removal. Moreover, recent studies suggested the potential for dispersal of the FHB pathogen over long distances, while other research illustrated the appearance and increasing prevalence of different chemotypes of the FHB pathogen.

(b) Plant Canada Meeting – Edmonton, June 2005 – Report by Bruce Gossen

- About 600 participants, with more than 140 posters and 250 oral presentations.
- Excellent forum for plant pathology.
- The meeting made a profit - about $6000 will be paid out to CPS, based on the proportion of attendees who are CPS members.
- The next Plant Canada meeting will be held in Saskatoon, Saskatchewan in June 2007, hosted by CPS.

22. Reports on Unusual or Exceptional Disease Situations

No reports were presented

23. Nomination of Honorary Life Members

(a) Denis Gaudet nominated Dr. Henry Huang from AAFC Research Centre, Lethbridge for an honorary life membership with the PPSA. Seconded by Kelly Turkington. Carried. Dr. Huang is now an Honorary Member of the Society.

24. Resolutions

(a) Denis Gaudet moved, Denise Orr seconded that it be resolved that we thank the current Local Organizing Committee: Ron Howard, Sherry Lisowski, Michael Harding, Dustin Burke, Rob Spencer and Vipan Bansal for the Canmore conference. Carried.

25. Locations and Dates of Future Meetings

(a) PPSA Annual Meeting 2006 to be held in Edmonton, so Stephen Strelkov will serve a term as the 2005-06 PPSA President. Date: likely first week in November.

(b) PPSA Annual Meeting 2007 should be held in central Alberta, according to the traditional meeting rotation of geographical locations. Peter Walsh, from Lakeland College, would be pleased to help host it in Vermilion. Alternatively, it could be held in southern Alberta in Lethbridge. The PPSA Vice-President for 2005-06 should be from the same location as the 2007 meeting, as that individual will become the new President for 2006-07.

26. Election of Officers for 2005-06

(a) **President: Stephen Strelkov**

(b) **Vice-President**: Denis Gaudet was nominated by Stephen Strelkov, seconded by Denise Orr. Nominations ceased. Carried. **Denis Gaudet** is the new Vice-President.

(c) **Secretary-Treasurer**: Saad Madri nominated Peter Blenis, seconded by Stephen Strelkov. Nominations were ceased. Carried. **Peter Blenis** will be Secretary-Treasurer.

(d) **Directors** (represent three geographical locations in Alberta: south, north and central): **Julie Bernier** has agreed to stay on as the director for northern Alberta. **George Turnbull** will continue on as the central Alberta representative. However, a replacement was needed for Rod McLeod (southern Alberta). Robyne Bowness nominated **Michael Harding**, seconded by Denis Gaudet. Nominations were ceased and Michael will assume the role of a new director.

27. Other Business

(a) Byron Puchalski mentioned that Dr. Gordon Nelson, an Honorary Member, passed away this summer. Ron Howard reported that Dr. Frank Kozar, a NAIT instructor from Edmonton, also is deceased. A moment of silence followed, to pay our respects for deceased PPSA members.

(b) Denis Gaudet is leading a cross-Canada committee with a project to prepare a sequel to the book, *History of Plant Pathology in Canada*. If you want your biography or your personal contributions from your research institution recognized, please contact Denis.

28. Adjournment

Denise Orr adjourned the business meeting at 10:20 AM. Carried.

Plant Pathology Society of Alberta
Financial Summary, 2005

Opening Balance: 1 January 2005				$ 7,584.01
Revenues				
Interest	$ 142.07			
Sponsorship	$ 750.00			
Registrations for 2005 meeting - members(36@ $90)	$ 3,240.00			
Registrations for 2005 meeting - non-members(2@ $100)	$ 200.00			
Student registrations (5 x $50)	$ 250.00			
Dr. Terry Swanson Memorial Fund Donations	$ 105.00			
Abstract Fees ($30 x 20)	$ 600.00			
PPSA membership-Regular ($10 x 37) and 3 students	$ 400.00			
Extra meals	$ 184.00			
Assets	nil			
Total Revenue	$ 5,871.07			$ 5,871.07
Expenses				
2005 PPSA Student Scholarship		$ 500.00		
PPSA Science Fair Award		$ 110.00		
Student and Technician Awards ($50 x 2)		$ 100.00		
Dr. Terry Swanson Memorial Scholarship		$ 500.00		
Bank Charges		$ 34.23		
Meeting Expenses		$ 5,368.27		
Liabilities		nil		
Total Expenses		$ 6,612.50	$	6,612.50
Balance			$	6,842.58
Reconciliation:				
Less Outstanding Expenses:				
Abstract Publication ($30 x 20)		$ 600.00		
Dr. Terry Swanson Memorial Fund		$ 105.00		
Plus: outstanding sponsorship income	$ 900.00		$	7,037.58
Bank Balance: 31 December 2005			$	7,037.58

Prepared by: Noryne Rauhala

Audited by: Deb Clark

Terms of Reference
Best Student Presentation Award
Plant Pathology Society of Alberta

Objective

This award is intended to recognise the best oral or poster presentation by a graduate student involving plant pathology as the primary focus of research, at the regular Annual Meeting of the Plant Pathology Society of Alberta.

Eligibility

This award is open to all graduate students registered at a recognised University.

Criteria

Presentation will be judged on the following:

a) Clarity and conciseness of presentation;
b) The high caliber and thoroughness of the research;
c) Demonstrated ability to answer questions effectively about their research.

Distribution

The Award will be given out at each regular meeting of the Plant Pathology Society of Alberta provided that presentations are made. In the event of a tie, more than one award can be made. The Award will be presented at the annual awards ceremony of the Plant Pathology Society of Alberta.

Evaluation of Candidates

A judging panel consisting of 3 qualified individuals appointed by the Awards Committee will judge the presentations. A standardized judging form will be provided to the judges to aid in their deliberations.

Value and Form of the Scholarship

The value of the Award will be $50.00 in Canadian funds and a certificate of achievement signed by the President of Plant Pathology Society of Alberta. Funds for this award will originate from general accounts of the Plant Pathology Society of Alberta

Amendment of the Terms of Reference

These terms of reference can be amended by a simple majority vote of the members in good standing at any annual meeting of the PPSA.

Terms of Reference
Best Technician Presentation Award
Plant Pathology Society of Alberta

Objective

This award is intended to recognise the best oral or poster presentation by a technician involving plant pathology as the primary focus of research, at the regular Annual Meeting of the Plant Pathology Society of Alberta.

Eligibility

This award is open to all technicians who are regular members of the Plant Pathology Society of Alberta.

Criteria

Presentation will be judged on the following:

a) Clarity and conciseness of presentation;
b) The high caliber and thoroughness of the research;
c) Demonstrated ability to answer questions effectively about their research.

Distribution

The Award will be given out at each regular meeting of the Plant Pathology Society of Alberta provided that presentations are made. In the event of a tie, more than one award can be made. The Award will be presented at the annual awards ceremony of the Plant Pathology Society of Alberta.

Evaluation of Candidates

A judging panel consisting of 3 qualified individuals appointed by the Awards Committee will judge the presentations. A standardized judging form will be provided to the judges to aid in their deliberations.

Value and Form of the Scholarship

The value of the Award will be $50.00 in Canadian funds and a certificate signed by the President of Plant Pathology Society of Alberta. Funds for this award will originate from general accounts of the Plant Pathology Society of Alberta

Amendment of the Terms of Reference

These terms of reference can be amended by a simple majority vote of the members in good standing at any annual meeting of the PPSA.

Terms of Reference
Youth Science Fair Award
Plant Pathology Society of Alberta

Objectives:

1. To encourage students to explore the science of plant pathology through a science fair project.
2. To recognise and reward youth that have presented quality plant pathology science fair projects at a regional science fair within Alberta.
3. To enhance public awareness of the science of plant pathology and the PPSA.

Eligibility

This award is open to all students competing at regional science fairs in Alberta. A regional Scholarship Award may not be awarded more than one time to the same student for the same research topic. However, the student is eligible for the Award if he/she changes the research topic or deepens or broadens their knowledge or research in a particular area.

Criteria:

- The award is to recognise a project where the student demonstrates a natural curiosity in plant pathology. The study is to focus on interactions between plants and infectious agents (viruses, bacteria, fungi, nematodes, parasitic plants).
- Only one award will be presented at an individual Science Fair but it can be awarded to any age or grade level.
- In the event the award is won by a project submitted by two students, the award is to be split between the students.

Distribution

- The scholarship will be given out each calendar year, provided that a suitable candidate is nominated. The award is to be offered to annually to each regional science fair in Alberta. The announcement for the Award will presented at the annual awards ceremony during the Regional Science Fair.

The Award

- The Award will consist of a $50.00 cash or other prize (such as a book) as deemed appropriate by the Awards Committee, and a certificate of achievement.

Evaluation of Candidates

- All regional science fairs will be notified of the annual availability of this award. The merit of candidates for this award will be determined by local judges appointed by the Regional Science Fairs.
- The judges will select the best presentation and nominate the student to the PPSA Awards Committee.
- The nomination will consist of a covering letter giving the name the student, the title, and an (electronic photo) of the poster/presentation, and the reasons why he/ she has been nominated. The nomination will be forwarded to the PPSA Chairman of the Awards Committee as soon as possible following the holding of the Regional Science Fair.
- Unless there are extenuating circumstances, the Awards Committee will rubber-stamp the decision of the Local Judges at the Regional Science Fairs.

Amendment of the Terms of Reference

These terms of reference can be amended by a simple majority vote of the members in good standing at any annual meeting of the PPSA.

Terms of Reference
Alberta Graduate Student Scholarship Award
Plant Pathology Society of Alberta

Objective

This award is intended to recognise superior research achievement by a graduate student involving plant pathology as a primary focus of research at an accredited University in Alberta.

Eligibility

This award is open to all graduate students in full-time attendance at a University in Alberta. The Scholarship Award may not be awarded more than one time to the same graduate student for the same thesis research topic. However, the student is eligible to for the Award if he/she continues at an Alberta University for both their Masters and PhD thesis.

Criteria

Nominees must exemplify all of the following qualities:

a) A high degree of career potential in research and/or extension in plant pathology.
b) A demonstrated ability to plan, conduct and interpret the results research experiments.
c) Demonstrated high achievement in course work during their graduate student studies

Distribution

The scholarship will be given out each calendar year, provided that a suitable candidate is nominated. No more than one scholarship will be awarded per year. The Award will presented at the annual awards ceremony during the annual banquet of the Plant Pathology Society of Alberta or during a private Awards Ceremony at the University Department.

Applications

Candidates for this award will be nominated by a member in good standing of Plant Pathology Society of Alberta??.

Evaluation of Candidates

The merit of candidates for this award will be determined by the three members of the Awards Committee of the Plant Pathology Society of Alberta. Three copies of a nomination package consisting of:

a) A covering letter giving the name and address of the student and the reasons why he or she has been nominated. The chairperson of the faculty scholarship committee should submit this letter.
b) A current curriculum vitae.
c) A transcript of the nominee's academic record for the period that they have been a graduate student at the university from which they have been nominated.

will be forwarded to the Chairman of the Awards Committee by October 1st in the year in which the nomination is made.

Value and Form of the Scholarship

The value of the scholarship will be $500.00 in Canadian funds and a plaque inscribed with the name of the award, Plant Pathology Society of Alberta, the year awarded, and the name of the successful candidate. Funds for this award will originate from general accounts of the Plant Pathology Society of Alberta

Amendment of the Terms of Reference

These terms of reference can be amended by a simple majority vote of the members in good standing at any annual meeting of the PPSA.

Report on the
DR. TERRY SWANSON MEMORIAL SCHOLARSHIP
November 10, 2005

This year's Dr. Terry Swanson Memorial Scholarship will be awarded to a student from the University of Alberta. The University is in the process of selecting a suitable candidate and will notify the PPSA of their choice. A nomination letter, along with a curriculum vitae and academic transcript, will be reviewed by the PPSA Awards Committee to confirm that they meet the eligibility criteria for the scholarship. Once approved, a cheque for $500 and a diploma will be prepared and given to the awardee in a special ceremony at the University.

A financial statement for the Scholarship Fund for 2004-2005 is given below.

Guaranteed Investment Certificates (Community Savings)	
Guaranteed certificates received from Brooks	$1647.86
	$1101.91
	$7428.97
Interest Earned	$ 18.09
Total invested at 1.75% for 5 years (from August 10, 2005)	$10,196.83
Daily Interest Savings Account	
Balance (September 30, 2005)	$ 500.00
Donations Received	
PPSA 2004 annual meeting	$ 110.00
Disbursement of Funds	
2004 Scholarship to Ms. C. Wang, University of California-Riverside	$ 500.00

Respectfully submitted by D. Gaudet, S. Strelkov and R. Howard

Terms of Reference
Disease Survey Committee
Plant Pathology Society of Alberta
November 10, 2005

Objectives

The Disease Survey (should this be the Disease Surveillance Committee?) Committee (DSC) will have the following objectives:

1. To create a listing of survey activities, including target crops and diseases and groups that are involved. The listing would then be presented at the Annual Business Meeting of the PPSA. The listing could then be distributed to other interested parties in Alberta (Provincial Pest Monitoring Group, etc.).
2. To work with PPSA members and members of Alberta's agricultural community and the media to raise the profile of survey activities and emphasize the importance of ongoing monitoring of plant diseases.

Activities

Produce a listing of yearly survey activities to be presented at the annual PPSA meeting. Create awareness of yearly survey activities of the membership of the PPSA and its importance.

Membership

The membership of DSC will consist of the Chair and perhaps 1-3 other volunteers comprised of membership of the PPSA. Members will serve on this committee until the conclusion of each annual meeting or until the committee is officially disbanded by the Board.

Responsibilities

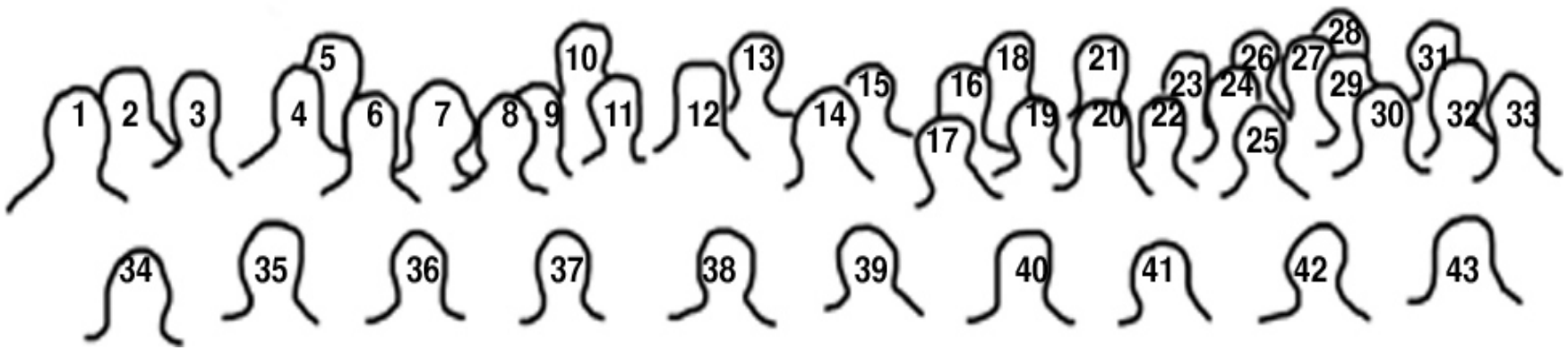
The DSC shall endeavour to meet the objectives stated above. The committee will meet in conjunction with annual meetings of the PPSA or via conference calls, as required. The Chairman will be responsible for preparing an annual report on committee activities.

Officers of the Plant Pathology Society of Alberta

	2005-2006	2004-2005
President	Stephen Strelkov	Ron Howard
Vice-President	Denis Gaudet	Stephen Strelkov
Secretary-Treasurer	Peter Blenis	Sherry Lisowski
Past President	Ron Howard	Denise Orr
Director	Julie Bernier	Julie Bernier
Director	George Turnbull	George Turnbull
Director	Michael Harding	Rod McLeod

Standing Committees

	Chair	Members
Historical	Stephen Strelkov	Byron Puchalski
Awards	Denis Gaudet	Stephen Strelkov
		Ron Howard
Disease Survey	Kelly Turkington	



1) Ron Howard
2) Kelly Turkington
3) Kevin Zaychuk
4) Mike Harding
5) Denis Gaudet
6) Tiesen Cao
7) Denise Orr
8) Shiming Xue
9) Anna DiCarlo
10) Roger Zhang
11) Karen Bedford
12) Bruce Gossen
13) George Turnbull
14) Mary Ruth MacDonald
15) Krishan Kumar

Missing: Dee Ann Benard,
Ted Labun, Saad Masri

16) André Lévesque
17) Khalid Rashid
18) Stephen Strelkov
19) Hafiz Ahmed
20) Nazanin Kanashi
21) Hassan Soltanloo
22) Jackie Busaan
23) Deb Clark
24) Lyriam Marques
25) Nidhi Sharma
26) Rob Spencer
27) Peter Walsh
28) Byron Puchalski
29) Yong Min Kim
30) Kan-Fa Chang

31) Dustin Burke
32) Jared LeBoldus
33) Victor Manolii
34) Jian Yang
35) Robyne Bowness
36) Sima Mpofu
37) Julie Bernier
38) Chuji Hiruki
39) Sanaz Ramezanpour
40) Sherry Lisowski
41) Sheau-Fang Hwang
42) Eleanor Degenhardt
43) Noryne Ruhala