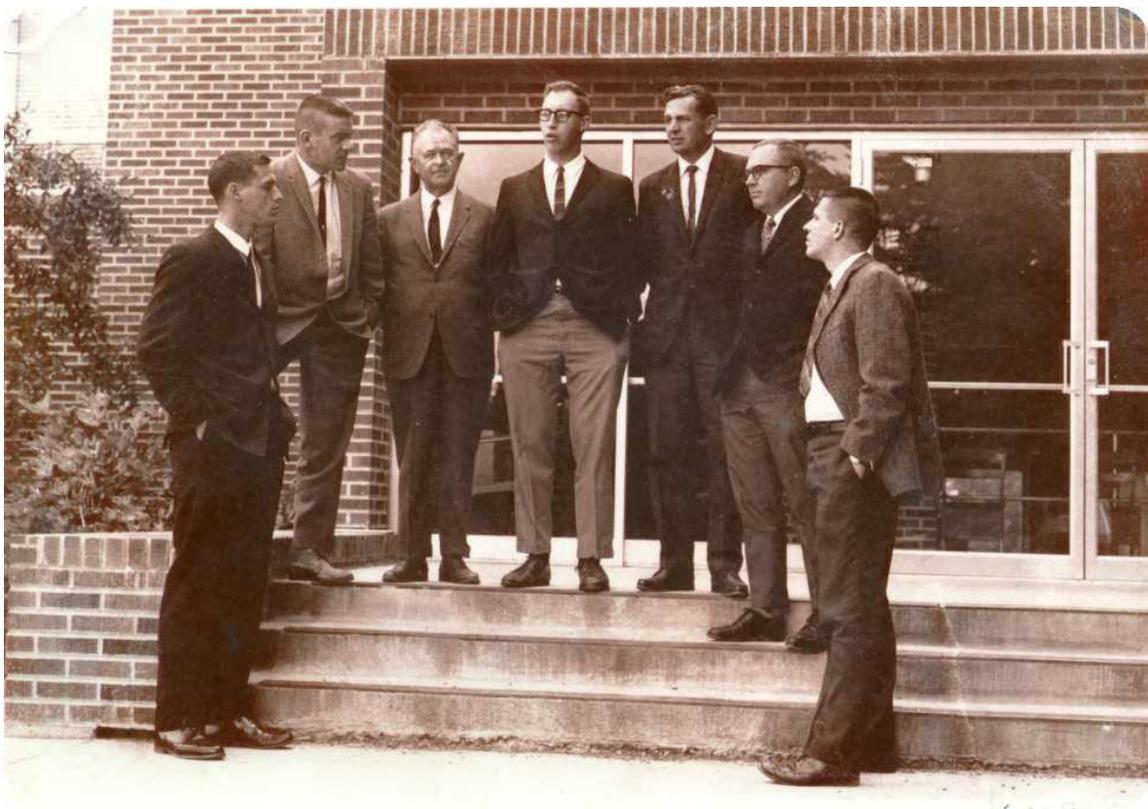


# History of Plant Pathology at Montana State University



**A 1968 gathering of MSU Plant Pathologists near Cooley Lab**

(L-R) J. Shepherd, R. Carlstrom, M. Afanasiev, D. Mathre, E. Sharp, T. Carroll, G. Strobel

## **Faculty with appointments with the Montana Ag Experiment Station**

E. Morris	1909-1956
P. A. Young	1925-1935
M. Afanasiev	1936-1968
I. K. Mills	1957-1961
S. Macwithey	1956-1967
E. L. Sharp	1957-1988
R. L. Hamilton	1960-1966
G. A. Strobel	1963-2008
T. W. Carroll	1966-1996
D. E. Mathre	1967-2000
J. F. Shepherd	1967-1975
D. C. Sands	1975-
J. E. Sherwood	1988-
B. J. Jacobsen	1994-
M. A. Young	1994-
D. Bergey	1998-2004
W.E. Grey	1999-
A. T. Dyer	2004-
L. Huang	2007-

## **Faculty with appointments with the Montana Cooperative Extension Service**

M. Afanasiev	1955-1968
R. Carlstrom	1968-1971
E. Burns	1973-1978
J. Riesselman	1979-2006
B. J. Jacobsen	1994-
M. Burrows	2005-

## **Faculty associated with the Montana Potato Improvement Program**

L. Claflin	1973-1974
D. Batchelor	1975-1977
M. Sun	1978- 2008
N. Zidack	2008 –

## Graduate Students with major professors in Plant Pathology

Name	Degree	Date	Advisor
<b>Lewellen, Robert</b> Interaction of genes and environment conditioning inheritance of stripe rust resistance of wheat	Ph.D.	1966	Sharp
<b>Pool, Robert</b> Cephalosporium stripe of winter wheat: disease processes and effects	Ph.D.	1967	Sharp
<b>Stevens, Dennis</b> The origin of cyanide in a psychrophilic basidiomycete	Ph.D.	1967	Strobel
<b>Rai, P. V.</b> Chemical and biological properties of phytotoxic glycopeptides isolated from <i>Corynebacterium michiganense</i>	Ph.D.	1968	Strobel
<b>Davies, Parker</b> The metabolism of succinic semialdehyde by a psychrophilic basidiomycete	M.S.	1968	Strobel
<b>Castric, Peter</b> Cyanide assimilation by <i>Bacillus megaterium</i>	M.S.	1969	Strobel
<b>MacDonald, Paul</b> Relationship of ADP-glucose pyrophosphorylase to the regulation of starch accumulation in wheat leaves infected with <i>Puccinia striiformis</i>	Ph.D.	1970	Strobel
<b>Ries, Stephen</b> Chemical and biological properties of a phytotoxic glycopeptide from <i>Corynebacterium insidiosum</i>	Ph.D.	1971	Strobel
<b>Shively, Daniel</b> Effects of carboxin, an oxathiin systemic fungicide, on cell permeability and DNA dependent RNA synthesis	M.S.	1971	Mathre
<b>Volin, Raymond</b> Physiological race determination and environmental factors affecting the development of infection type in stripe rust ( <i>Puccinia striiformis</i> West.)	Ph.D.	1971	Sharp
<b>Johnston, Robert</b> The effect of <i>Cephalosporium gramineum</i> on yield components of various winter wheat genotypes	M.S.	1972	Mathre

<b>Quinn, Robert</b>	M.S.	1973	Strobel
Ketobutyrate decarboxylase activity in <i>Rhizoctonia solani</i>			
<b>Sadowski, Peter</b>	M.S.	1973	Strobel
A guanosine diphosphate-L-fucose glycoprotein fucosyltransferase from <i>Corynebacterium insidiosum</i>			
<b>Pinkerton, Frederick</b>	Ph.D.	1976	Strobel
Attenuation of pathogenicity of <i>Helminthosporium sacchari</i>			
<b>Mullin, Barbra</b>	M.S.	1977	Carroll
<b>Krupinsky, Joseph</b>	Ph.D.	1977	Sharp
Development of additive resistance in wheat, <i>Triticum aestivum</i> L., to stripe rust, <i>Puccinia striiformis</i> West			
<b>Kenfield, Douglas</b>	Ph.D.	1979	Strobel
Alpha-galactoside-binding proteins from plant membranes : distribution, function, and relation to helminthosporoside-binding proteins of sugarcane			
<b>Bjarko, Michael</b>	M.S.	1979	Sharp
Sources of and genetic action of resistance in barley to different virulence types of <i>Pyrenophora teres</i> , the causal organism of net blotch			
<b>Metz, Sally</b>	M.S.	1979	Scharen
Etiology and epidemiology of the barley stripe disease ( <i>Pyrenophora graminea</i> ) in a semi-arid environment			
<b>Gaudet, Dennis</b>	M.S.	1979	Mathre
The role of bacteria in the root and crown rot complex of irrigated sainfoin ( <i>Onobrychis viciifolia</i> Scop.) in Montana			
<b>Morton, Joseph</b>	Ph.D.	1980	Mathre
Etiology of <i>Cephalosporium</i> stripe in relation to the expression of resistance in cultivars of winter wheat ( <i>Triticum aestivum</i> L.)			
<b>Straley, Mary Lou</b>	Ph.D.	1980	Scharen
Pathogenesis of <i>Septoria nodorum</i> (Berk) Berk. on wheat cultivars varying in resistance to glume blotch			
<b>Bordelon, Bruce</b>	M.S.	1981	Sharp
Transgressive segregation for resistance in barley to net blotch			
<b>Orser, Cindy</b>	M.S.	1981	Mathre/Sands

<b>Grey, William E.</b>	M.S.	1981	Mathre
Effect of common root rot on the yield components of spring barleys			
<b>Harrabi, Moncef</b>	Ph.D.	1982	Sharp
The inheritance of resistance of barley ( <i>Hordeum vulgare</i> L.) to <i>Rhynchosporium secalis</i>			
<b>Hemming, Bruce</b>	Ph.D.	1982	Strobel
Plant-associated fluorescent pseudomonads : their systematic analysis, microbial antagonism and iron interaction			
<b>Turner, Sherry</b>	M.S.	1982	Sands
Studies with <i>Puccinia obtogens</i> for biological control of Canada thistle ( <i>Cirsium arvense</i> [L.] Scop.)			
<b>Yount, Douglas</b>	M.S.	1982	Carroll
The etiology and epidemiology of barley yellow dwarf virus in Montana : its importance and impact on small grain production			
<b>DeSmet, Guy</b>	Ph.D.	1983	Scharen
Conservation of powdery mildew resistance genes in three composite cross populations of barley			
<b>Kim, Hee</b>	Ph.D.	1983	Sands
Epidemiological, genetical, and physiological studies of the bacterial leaf streak pathogen <i>Xanthomonas campestris</i> pv. <i>translucens</i>			
<b>Miller, Vincent</b>	Ph.D.	1983	Sands/Strobel
Chemotherapeutic elimination of genetic components			
<b>Elias, Elias</b>	M.S.	1983	Sharp
The inheritance of resistance of barley ( <i>Hordeum vulgare</i> L.) to <i>Puccinia hordei</i> Oth.			
<b>Jacobs, Darrel</b>	M.S.	1983	Sands
Bacterial leaf and stem blight of safflower in Montana : its epidemiology, sources of resistance and inheritance of resistance			
<b>Juhnke, Monica</b>	M.S.	1983	Mathre
Studies on the detection, biology and control of <i>Gaeumannomyces graminis</i> var. <i>tritici</i>			
<b>Konak, Cahit</b>	M.S.	1983	Sands
The inheritance of resistance of barley ( <i>Hordeum vulgare</i> L.) to <i>Pyrenophora graminea</i>			
<b>Brosten, Brenda</b>	M.S.	1984	Sands
Sclerotinia spp., a potential biological control agent of Canada thistle ( <i>Cirsium arvense</i> [L.] Scop.)			

<b>Davidson, Robert</b>	M.S.	1984	Sands
Development of a systemic chemotherapy assay for the control of blackleg in potato			
<b>Hall, Valerie</b>	M.S.	1984	Sands
Carbon-13 NMR spectroscopy and bacterial description			
<b>Madriaga, Ricardo</b>	M.S.	1984	Scharen
Interactions of <i>Puccinia striiformis</i> and <i>Mycosphaerella graminicola</i> on wheat			
<b>Sheffelbine, Paul</b>	M.S.	1984	Mathre
Effects of systemic fungicides and potassium fertilizers on disease intensity, yield components, and grain yield of common root rot diseased barley			
<b>Brosten, Dennis</b>	M.S.	1985	Sands
<b>Crosslin, Jim</b>	M.S.	1985	Carroll
Development of barley germplasm with tolerance to barley yellow dwarf virus (BYDV) and the effects of BYDV infection on isogenic barley cultivars			
<b>Kelemu, Segenet</b>	M.S.	1985	Sharp
The inheritance of resistance to <i>Rhynchosporium secalis</i> in Ethiopian barley cultivars			
<b>Kleis, Mary</b>	M.S.	1985	Mathre
Diclofop-methyl interactions with soil-borne fungal pathogens in wheat			
<b>Mizrak, Gurbuz</b>	M.S.	1985	Sands
The inheritance of resistance to <i>Xanthomonas campestris</i> pv. <i>translucens</i> (J.J.R.) Dowson in barley			
<b>Ruff, Rick</b>	M.S.	1985	Scharen
Comparative virulence of <i>Pyrenophora graminea</i> Ito et Kurib isolates and the inheritance of resistance to <i>P. graminea</i> in barley			
<b>Karki, Chandra</b>	Ph.D.	1986	Sharp
Biology of pyrenophora spot blotch on barley ( <i>Hordeum vulgare</i> L.) incited by <i>Pyrenophora teres</i> Drechs. f.sp. <i>maculata</i> Smedeg. and genetics of resistance			
<b>Van Ginkel, Martin</b>	Ph.D.	1986	Scharen
Inheritance of resistance in wheat to <i>Septoria tritici</i>			
<b>Yahyaoui, Amor</b>	Ph.D.	1986	Sharp
Epidemiology of <i>Puccinia hordei</i> and new sources of resistance in barley			
<b>Juhnke, Monica</b>	Ph.D.	1987	Mathre
Efficient bacterial colonizers of wheat roots			

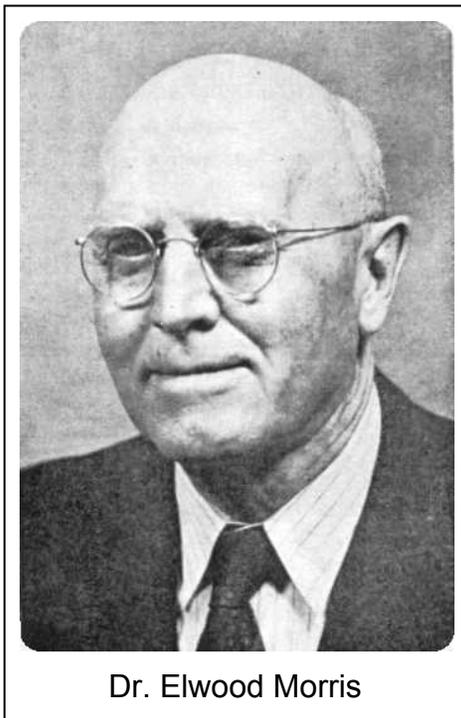
<b>Garcia, Celsa</b>	M.S.	1987	Mathre
Effect of sterol-biosynthesis inhibiting fungicides on take-all of spring wheat caused by <i>Gaeumannomyces graminis var. tritici</i>			
<b>Robertson, Nancy</b>	Ph.D.	1988	Carroll
A new virus-like disease of barley : its etiology, epidemiology, and the ultrastructure of associated virus-like particle			
<b>Georgakopoulos, Dimitrios</b>	M.S.	1988	Sands
Epidemiology of epiphytic <i>Pseudomonas syringae</i> on barley			
<b>Bunkers, Gregory</b>	Ph.D.	1989	Strobel
Biology of the eremophilanes produced by <i>Drechslera gigantea</i>			
<b>Harrison, Leslie</b>	M.S.	1989	Strobel
Purification and characterization of Pseudomycin, a phytotoxin and antimycotic produced by <i>Pseudomonas syringae</i>			
<b>Yun, Choong-Hyo</b>	M.S.	1989	Strobel
<b>Elabidine, Fatima</b>	M.S.	1989	Scharen
The effect of powdery mildew on barley under simulated Mediterranean drought conditions			
<b>Grey, William E.</b>	Ph.D.	1990	Mathre
Effects of environmental factors on infection of barley by parasitic or symbiotic soil-borne fungi			
<b>Ahmed, Aftabuddin</b>	Ph.D.	1990	Mathre
Resistance in spring wheat to the various diseases caused by <i>Cochliobolus sativus</i>			
<b>Satouri, Sami</b>	M.S.	1990	Strobel
Biological and chemical characterization of active metabolites produced by <i>Pyrenophora teres</i>			
<b>Baltazar, Baltazar</b>	Ph.D.	1991	Scharen
Selection and characterization of genomic DNA clones of <i>Pyrenophora teres</i> and their application for disease diagnosis via the polymerase chain reaction (PCR)			
<b>Pilgeram, Alice</b>	Ph.D.	1991	Mathre
Transformation of <i>Gaeumannomyces graminis</i> and the fate of transforming DNA			
<b>Geske, Susan</b>	Ph.D.	1991	Carroll
Purification and characterization of a Montana RMV-like isolate of barley yellow dwarf virus			

<b>Park, Sang Ho</b>	Ph.D.	1992	Strobel
Mode of action of maculosin, a host-specific phytotoxin, produced by <i>Alternaria alternata</i> on spotted knapweed ( <i>Centaurea maculosa</i> L.)			
<b>Andrade, Orlando</b>	Ph.D.	1992	Mathre
Microbiological characterization of Montana soils suppressive and conducive to take-all disease of wheat caused by <i>Gaeumannomyces graminis var. tritici</i>			
<b>Pilskalns, Karyn</b>	M.S.	1992	Sands
<b>Dugan, Karla</b>	M.S.	1992	Sherwood
Development of <i>Ustilago hordei</i> -specific DNA probes			
<b>Hudak, Joe</b>	M.S.	1992	Riesselman
The potential for the occurrence of Rhizoctonia root rot in cereal crop production areas of Montana			
<b>Martinez, Alfredo</b>	Ph.D.	1993	Sherwood
Morphological, genetic and molecular analysis of the mating process in <i>Ustilago hordei</i>			
<b>Skaf, Jihad</b>	Ph.D.	1994	Carroll
Purification and serology of barley yellow streak mosaic virus			
<b>Martinez-Miller, Concepcion</b>	Ph.D.	1995	Sands
Etiology and characterization of two <i>Pseudomonas syringae</i> pathovars causing two bacterial kernel blights of barley			
<b>Smidansky, Eric</b>	M.S.	1995	Carroll
Factors influencing the outcome of barley yellow streak mosaic virus- <i>Petrobria latens</i> -barley interactions			
<b>Petroff, Reeves</b>	M.S.	1996	Sands
<b>Czembor, Jerzy</b>	Ph.D.	1997	Scharen
Presence and expression of resistance genes to powdery mildew of barley in selections from Tunisian barley landraces			
<b>Zriba, Narjess</b>	Ph.D.	1997	Mathre
Characterization of <i>Phialophora</i> spp. isolates from a Montana take-all suppressive soil and their use in suppression of wheat take-all caused by <i>Gaeumannomyces graminis var. tritici</i> ( <i>Ggt</i> )			
<b>Niedens, Bret</b>	Ph.D.	1997	Sherwood
Purification and characterization of an aromatic L-amino acid decarboxylase from <i>Penicillium raistrickii</i> isolate H10BA2, the transformation of this fungus, and investigation of taxa-4(5), 11(12)-diene synthase			

<b>Braun, Andrea</b>	Ph.D.	1998	Sands/Jacobsen
Studies on the basal kernel blight disease of barley : pathogenesis and phylogeny of the causal agent <i>Pseudomonas syringae</i> pv. <i>syringae</i> and its biological control by antagonistic <i>Pantoea agglomerans</i>			
<b>Willits, Deborah</b>	M.S.	1998	Sherwood
Detection of <i>Ustilago hordei</i> in barley leaf tissue by polymerase chain reaction and analysis of the MAT-2 pheromone and pheromone receptor genes			
<b>Hickey, Kathleen</b>	M.S.	1998	Mathre
Biological control of Rhizoctonia root rot of pansy, petunia and basil			
<b>Carstens, Laura</b>	M.S.	1998	Sands
Evaluation of Crown Rust ( <i>Puccinia coronata</i> f. sp. <i>avenae</i> ) as a biocontrol agent for wild oats on San Clemente Island.			
<b>Anderson, Cynthia</b>	Ph.D.	1999	Sherwood
Genetic analysis of the MAT-1 pheromone gene of <i>Ustilago hordei</i> and morphogenesis during the mating response.			
<b>Collins, Douglas</b>	M.S.	2000	Jacobsen
Optimizing a Bacillus sp. for biological control of sugar beet Cercospora leaf spot.			
<b>Acuna, Ivette A.</b>	Ph.D.	1999	Jacobsen
Thaxtomin A to identify common scab resistance in potato and glucose conjugation as a mechanism of resistance			
<b>Tiourebaev, Kanat S.</b>	Ph.D.	1999	Sands
Virulence and dissemination enhancement of a mycoherbicide			
<b>Edlin, Ruschelle</b>	M.S.	2000	Strobel
<b>Love, Ruschelle A.</b>	M.S.	2000	Strobel
<b>Li, Na</b>	M.S.	2000	Strobel
<b>Worapong, Jeerapun</b>	Ph.D.	2000	Strobel
Taxonomy, molecular phylogeny and taxol production in selected genera of endophytic fungi			
<b>Stinson, Merritt</b>	M.S.	2002	Jacobsen
<b>Bargabus, Rebecca</b>	Ph.D.	2002	Sherwood
Active oxygen species involved in plant defense responses			
<b>Larson, Ben James</b>	M.S.	2004	Jacobsen
Integrated management of Cercospora leaf spot on sugar beet			

<b>Hance, Susan T.</b>	M.S.	2004	Weeden/Grey
Identification of tolerance to <i>Fusarium solani</i> in <i>Pisum sativum ssp. elatius</i>			
<b>Odaka, Yusuke</b>	M.S.	2004	Sherwood
<b>Ansley, John</b>	M.S.	2005	Jacobsen
<b>Meyer, Jack</b>	M.S.	2007	Jacobsen
Cultivar susceptibility and fungicide control of black dot root rot			
<b>Sun, Zitan</b>	Ph.D.	2007	Grey/Weaver
The pathogenicity of <i>Fusarium</i> spp. to wheat stem sawfly, <i>Cephus cinctus</i> NORTON (HYMENOPTERA: CEPHIDAE)			
<b>Johnson, Wendy</b>	M.S.	2008	Dyer
Discovery and distribution of root lesion nematode, <i>Pratylenchus neglectus</i> , in Montana			
<b>Leisso, Rachael</b>	M.S.	2008	Burrows
Integrated management and causes of damping off disease of chickpea ( <i>Cicer arietinum</i> L.) in Montana			
<b>Thera, Aissata</b>	M.S.	2008	Jacobsen
Bacterial wilt management: A prerequisite for a potato seed certification program in Mali.			
<b>Neher, Oliver</b>	Ph.D.	2008	Jacobsen
Disease Control and Plant Defense Pathways Induced by <i>Bacillus mojavensis</i> isolate 203-7 and <i>B. mycooides</i> isolate BmJ			
<b>Grimme, Eva</b>	Ph.D.	2008	Jacobsen
Mycofumigation with <i>Muscodor albus</i> : Effects on Verticillium wilt and Black dot root rot of potato, effects on <i>Glomus intraradices</i> and ectomycorrhizal fungi, and <i>M. albus</i> proliferation in soil			
<b>Lollis, Mary Brennan</b>	M.S.	2010	Jacobsen
Effect of glyphosate on Fusarium wilt, Rhizoctonia crown and root rot, and Cercospora leafspot diseases of sugarbeets (professional paper)			
<b>Zuck, Peter</b>	M.S.	2010	Dyer
Evaluation of Crop Rotations for Management of <i>Pratylenchus neglectus</i> in Montana Winter Wheat.			

The first work involving plant pathologists at Montana State College began in 1909 with the appointment of **Elwood Morris**. He had received his B. S. degree from MSC in 1909, later receiving a M. S. from the University of Wisconsin. He was “housed” within the Department of Botany and Bacteriology in the College of Letters and Science. He served as head of the Botany and Bacteriology Department from 1932-1956. He retired in 1956, and died in 1972 in Bozeman. During his career at MSC, he worked on a variety of disease problems, particularly disease surveys, grain smut, barberry eradication, oat blast, epidemiology of wheat black stem rust, degenerative diseases of potatoes, blight and root rot of peas. He was also involved in breeding Great Northern beans for resistance to bacterial blight, rust, and mosaic.



Dr. Elwood Morris



Elwood Morris and Secretary 1940

**P. A. Young** joined the department in 1925 after receiving his Ph. D. in plant pathology from the University of Illinois. His initial salary was \$2,000 per year. He is best known for his discovery of a new disease of winter wheat which he called dwarf bunt. It was initially found in some wheat fields at the base of the Bridger Mountains just north of Bozeman. Later, it was determined to be world-wide in its distribution, particularly in areas where winter wheat was produced that also had long periods of snow cover in the winter. Prior to his work on this disease, it was thought to be just a variant of common stinking smut. Young’s position was terminated in 1930 due to budget cutbacks.

## Superficial reminiscence by MSU History Professor Merrill G. Burlingame, 1985 about P.A. Young

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I knew P. A. (I have the feeling that his first name was Paul, but I am not sure) Young only slightly, although we often passed the time of day since we were both quartered in Lewis Hall. He had come in 1925 and left in 1930. Since I came in 1929, we were here together only one year, and in my first year, I was busy trying to evaluate many people.

I have a clear recollection of Young as a young man completely dedicated to his work. I judge he was in Botany since he often carried a box or a bundle, packages wrapped roughly in newspaper - specimens such as flowering plants, grasses, shrubs or limbs. I seem to remember him as having wide interests, and even if his major or field was micro-biology, he would have brought in things which interested him.

His hallmark was his rapid walk, close to a hop, giving the impression that he was in a hurry to get to his destination to begin work, but in the meantime he appeared to be mentally engaged in setting priorities and getting the next project lined up. He was slender and of average height, but wiry with the angular appearance of Abraham Lincoln. Because of his half walk-half run and loose jointed build, he was known by the well established name of "Grasshopper Young" by the time I appeared.

As he came across campus carrying his specimen he also had the appearance of having just returned from a several day field trip, having slept in his clothes during that time. He didn't give the impression of not being clean, but simply busy and indifferent concerning clothes and personal appearance. Another recollection I have of my first year, and the remaining 37 was the careful dress habits of the people in Agriculture and Engineering. I have had students comment that Dean of Agriculture, Clyde McKee, spent more time in admonishing them to clean their finger nails and shine their shoes occasionally, than on advice on curriculum. A number of people had a short stay on the campus, seemingly in part because they were somewhat off-beat in appearance and mannerisms.

P. A. was a friendly guy, and since he was about my age, I had the feeling I should know him better. But he was busy. I would judge that in laboratories, particularly, his dedication and enthusiasm would have been appreciated by the students. I have no recollection concerning his leaving.

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M.M. Afanasiev 1967

In 1936, perhaps because of better economic conditions, **Mitrofan M. Afanasiev** was hired to work on plant diseases. Mitro was born in Russia in 1900, and received his M. S. in agriculture from the University of Brno in Czechoslovakia in 1925. After working on several "estates" in eastern Europe managing their orchards, he emigrated to the United States in 1930 where he eventually became a U.S. citizen. He came to the University of Nebraska and served as a graduate research assistant and later a research assistant. He received his Ph. D. in plant pathology in 1936. He was hired by MSC at that time to work on diseases of a variety of

crops. His best known work was on sugar beets and sweet cherries. He clarified the role of nutrients in affecting the severity of seedling disease caused by *Aphanomyces*. He also described the Lambert mottle disease of sweet cherries and studied its transmission through grafts to healthy trees. However, he was never successful in isolating the causal organism or agent, and to this day it is unclear whether this is a virus caused disease. Mitro, as he was known to most of us, was very much the applied plant pathologist who was well known over the state of Montana, perhaps in part because of his characteristic Russian accent. He served as leader of the Ag Experiment Station programs in plant pathology while the faculty were housed in the Dept of Botany and Bacteriology (later Microbiology). Mitro later took on a 50% appointment with the Cooperative Extension service as the first Extension Plant Pathologist. During one trip to visit a Hutterite colony near Martinsdale to diagnosis some problems they were having in their vegetable garden, he was invited to have lunch with the colony leader. After an excellent meal of home-made bread, soup, and ham, a bottle of home-made rhubarb wine was brought out. After tasting it, Mitro commented that he thought the alcohol content was somewhat above average but Peter Hofer, the colony leader insisted that it was not. However, after several more tastings Hofer admitted that they had, indeed, doctored the wine to give it more kick! After retirement, Mitro moved to Arizona where he died in 1988 of a heart attack following heart surgery.

### **M. Afanasiev's reminiscence of the Plant Pathology Group**

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Before writing my reminiscences about the early history of Botany&Bacteriology Dept. at MSC I must mention briefly about the circumstances which lead to my joining in 1936 the staff of B.&B. Department. Early in the thirties I was employed as an assistant in the Dept. of Plant Pathology at University of Nebraska in Lincoln and at the same time I was taking graduate work toward my Ph.D., majoring in Plant Pathology - Botany with minor in organic chemistry. By the end of 1935 I completed all required courses and finished my research project and the only thing left was to write my thesis. Early in 1936 there were combined meetings of the Am. Phytopathological Society and the Am. Potato Soc. in St. Louis, Mo. My major Prof. Dr. R. W. Goss and I attended these meetings. There Dr. Goss met his old friend Prof. Frank M. Harrington, Head of Horticultural Dept. of Mont. St. College. Prof. Harrington told Dr. Goss that they had an opening in the Dept. of B.&B. for an assistant Plant Pathologist. Dr. Goss recommended me and introduced me to Prof. Harrington who asked me about my training, experience etc. and said that I would be hearing from them. It just happened that Prof. Harrington was very much involved in work with potatoes and my background appealed to him, since my thesis was on potato scab disease and I was also involved in working with several other potato disease problems in Western Nebraska where I

was in charge, during several summers, of Potato Disease Field Lab. at the Box Butte Field Sta., Alliance, Nebraska.

Soon after our return to Lincoln I received a formal offer of a position as assistant Plant Pathologist in Exp. Sta., part of B.&B. Dept. MSC, I accepted the offer and reported for work on April 1, 1936.

The first person I met in Lewis Hall was Dr. D. B. Swingle who was Head of the B.&B. Dept. and also the Dean of Div. of Science. He introduced me to Prof. H. E. Morris who was Head of the Exp. Sta. part of this Dept. Previously there had been another man in this Dept., Dr. P.A. Young, but he had resigned and left for another position and it was his place I was to take. In the College part of this Dept. besides Dr. Swingle was also Dr. Frank B. Cotner. At that time the enrollment in the College was slightly over 1000 and there was no summer school. I arrived at the college just about at the end of the school year and the academic activities beginning to slow down. But as far as the Exp. Sta. was concerned this was the beginning of our very busy season. Prof. Morris and I started right away to organize the program of my work which included the writing of a research project and visiting areas in the state where problems were to be investigated. At that time Montana farmers were experiencing considerable problems in growing sugar beets. Stands of beets were poor and yields were low. Prof. Morris suggested that I write a project to investigate these problems in beets. To get acquainted with sugar beet problems in the field we visited the Huntley Branch Sta. located in the Yellowstone Valley where beets were one of the main growing crops. We also visited the Bitter Root Valley where at that time strawberries were grown on a large scale and growers experienced the so-called "yellowing and decline" in strawberry plants. Later on I also worked on this problem.

Prof. Morris also took me to the Flathead Valley, the center of sweet cherry orchards. In the spring of 1936 there occurred a rather sad picture. Practically all sweet cherry trees were killed by a heavy freeze in the fall of 1936 and growers were pulling out the dead trees and planting young ones. Later on I worked for a number of years on virus disease problems in sweet cherries.

When summer arrived the activities in the College considerably slowed down. Dean Swingle remained on the job all summer, however, he spent some time in his cabin in the Middle Creek area. As I recall Dr. Cotner was at this time on a 9 mo. appointment,

so he was not around much during the summer. As far as the Exp. Sta. was concerned Prof. Morris and I were on the job all summer. Prof. Morris was also part time on the Extension payroll, and spent part of the summer in the state doing extension work, so very often I was the only one in the Dept. Sometimes I was also away from the office, because I was already started my work with sugar beets at the Huntley Sta. At that time our part of the Dept. was handling not only the research work in Plant Pathology, but also different extension services such as diagnosis of various plant disease specimens and identification of various plants sent by Co. agents and individual citizens. At that time we had only one secretary in the whole Dept. When I came to the Dept. the secretary was Miss Laura Huffine and later on Miss Dorothy Kares (now Mrs. Carroll). Both of these ladies were quite efficient, pleasant and cooperative.

In a couple of years the enrollment in the college began to increase and additional members were added to the teaching staff, Dr. Edwin E. Booth, botanist and Dr. Wm. G. Walter, bacteriologist. Everything was going fine until the war broke out. Dr. Booth was mobilized and Frances A. Afanasiev was asked to teach on part time basis several botany courses. During the war years the enrollment was low and no further expansion occurred in our Dept. During the war I was also involved on a part time basis with USDA to raise the rubber producing plant Kok-saghiz. This project did not last very long because the government was able to secure supply of rubber from overseas. Dean Swingle taught Plant Pathology during the early period of the Dept., but after his death I was asked to take this responsibility. I started to teach in 1946 and continued teaching for about 20 years until my retirement. Besides a general course in Plant Pathology I also introduced three elective courses dealing with diseases of cereals, vegetables and fruit crops.

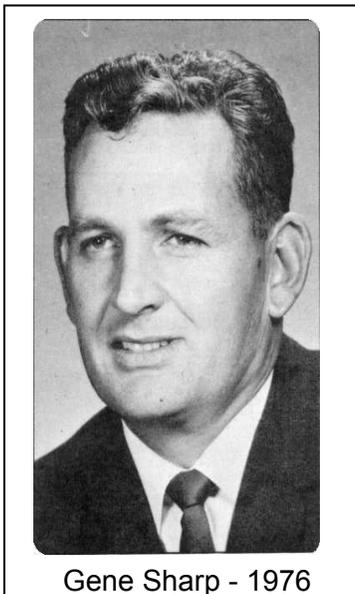
Prof. Morris retired in 1956 and at the time of his retirement I was asked to devote part of my time to Extension work in Plant Pathology. About that time consolidation of both parts of B.&B. Dept. had taken place under Dr. F. B. Cotner. Approximately at that time further expansion in teaching and research staff occurred. Three new plant pathologists were added to the staff force. They were Drs. E. L. Sharp, I. K. Mills and H. S. MacWithey.

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**Ira K. “Kelly” Mills** worked for a short time on physiological diseases of plants from 1956 until 1963. He then moved into full time teaching of plant physiology where his courses were widely regarded as being some of the best on campus. Nearly every graduate student in plant agriculture took “plant phys” from Kelly.

**H. Stanley MacWithey** joined the faculty in 1956 after receiving a Ph.D in Botany from Iowa State University. He focused his work on *Aphanomyces* root rot of sugar beet and several soilborne diseases of iris. He left the university in 1966 to go to work for the FritoLay Company in Dallas, TX. The following is a remembrance from his son.

“Now, to your message-I asked Dad some pertinent questions. Dad's birthday is October 31, 1927. He was born in Berwyn, Illinois. Bachelor's of Science from Northwestern University, Evanston, Illinois, 1950 or 1951. Ph.D. in Mycology (minors in biochemistry, plant pathology) from Iowa State College in Ames, 1955. At MSU, he was with the Experiment Station (ES), taught mycology and freshman botany. The ES did scientific work in plant pathology. He had test plots at the ES, (iris and sweet peas-ornamental plants). He also spent time solving problems like corn and potatoes with diseases that made the plants unusable and extension work in the western part of Montana. At Frito-Lay-(he retired from FL) his title was Research Scientist. He did plant pathology research on potatoes, checked fields of corn and potatoes, took samples from corn silos to check for disease, conducted experiments in the internal infections in corn, did research in enzymatic systems in processing of potatoes and corn, and worked on drink components (contaminated with yeast) and how it effected enzymatic processing. That was what he could remember... I remember going on field trips with his fungus classes, identifying the mushrooms and rattling off the names before his students could. He used to tell his classes, "Look, if a 5-year old can learn the names of the fungus, surely you can..." Kev and I loved to go into the lab area (in the basement, I think) and look in the refrigerators because they were growing all kinds of cool stuff in the petri dishes”.



**E. L. “Gene” Sharp** was the next to move to Bozeman to work in the area of plant diseases. Gene was originally from Idaho, having received his B. S. from the University of Idaho. He then moved to Iowa State University where he worked on crown rust of oats and received his Ph. D. in 1953. After joining the army, Gene spent two years at Ft. Detrick, Maryland doing work on the epidemiology of wheat rusts, probably as part of a biological warfare program being conducted by the U. S. Army. He stayed on at Ft. Detrick for two more years after being discharged by the Army but then came to Bozeman in 1957 as an Assistant Professor of Plant Pathology. He worked primarily on the rust diseases of small

grains, though some of his early work in Montana involved soilborne fungi on wheat and barley. Gene made several important discoveries during his career for which he received national and international recognition. One of these involved his work on the effects of air pollution on the germination of stripe rust spores. He had noticed that on nights when the MSU basketball team was playing in Bozeman that there was very low germination of these rust spores in his lab. By careful sleuthing he finally determined that cars driving by the lab on South 11<sup>th</sup> Ave were releasing large air ions as part of the exhaust and these air ions were inhibitory to the germination of rust spores. Most of the large air ions showed up about 7:00 pm as people were driving to the game. However, Gene also noticed another peak of air ion production about 8:30 pm which corresponded to half time. Gene's theory was that these were the free-loaders going to get into the game after half-time when the ticket takers had retired from duty. This work was written up and published in the journal Science. Perhaps Gene's more lasting and economically important work involved the nature of resistance in wheat to stripe rust. He discovered that a line of wheat from Turkey, PI 178383, was resistant to all strains or races of stripe rust. Furthermore, when crossed with other susceptible wheats, the progeny of these crosses with PI 178383 showed a particular type of resistance that was effective across a broad range of temperatures. Gene described this as "minor gene" resistance or nonspecific resistance which was effective against all strains and races of the stripe rust pathogen. Today, this type of resistance is widely pursued by plant breeders working in a number of different crops. During the later stages of Gene's career, he became involved in an international program to develop disease resistant barleys for the Middle East, and for Montana as well. This program was funded by the U. S. Agency for International Development to the tune of several million dollars over a 15 year period. This allowed Gene and other plant pathology faculty to travel and develop cooperative research work with scientists in the Middle East, and to bring many graduate students from these countries to MSU for their graduate work. Gene retired in 1987 and moved to Spokane, WA where he died of pancreatic cancer in 1994.



Upon Gene's retirement in 1987, The Gene Sharp Graduate Student Achievement Award was initiated in his honor. Presented by D. Mathre.



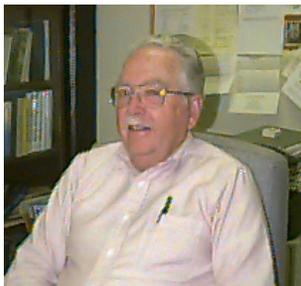
**Plant Pathology Faculty - Gene Sharp's Retirement Dinner - 1988**  
(L-R back row) T. Carroll, J. Riesselman, G. Sharp, D. Mathre, A. Scharen  
(L-R front row) G. Strobel, D. Sands

**Richard I. (Dick) Hamilton**, an MSU undergraduate (Agronomy, 1953) and another graduate of the University of Nebraska, joined the faculty in 1960 as a plant virologist. His research interests were on the effects of detergents on the degradation of the capsid protein of barley stripe mosaic virus (BSMV), and the antigenic analysis of BSMV. He also collaborated with Mitro Afanasiev on virus diseases of stone fruits, including a "little cherry"-like disease, in the Flathead Lake area. Mitro was a gem of a person, but he did have some idiosyncrasies! He was not one to waste anything and this was best illustrated by his saving absolutely every bit of string that came wrapped around the hundreds of boxes containing diseased plant samples that arrived at the lab during the growing season. There was never a need to requisition string for the lab as long as Mitro was at the helm! He also had a maddening tendency to vary the push on the accelerators of state vehicles which caused no end of comments from fellow passengers! Dick taught a graduate course in plant virology but was best known at MSU for his work on the development of a serological assay for BSMV. Prior to Dick's work, this seedborne virus was detected only by growing out barley seedlings in the greenhouse and observing for symptoms of the disease. This was labor-intensive, and took 6-8 weeks to complete. Because of Dick's expertise in immunology, he developed an antiserum specific for BSMV that could be used to detect the virus in individual barley embryos, with results in 24 hours. This quick, sensitive, and inexpensive test was adopted by the Seed-Testing Laboratory at MSU. Samples of all certified barley seed produced in Montana was eventually tested and infected seed lots were destroyed. As a result, the disease soon became of low incidence and concern in the state - a real success

story for work by Ag Experiment Station faculty. Dick left MSU in 1967 to return to his native Canada where he joined the Faculty of Agriculture, Macdonald College of McGill University in Montreal.



To beef up the work in biochemistry and plant physiology at MSU, **Gary Strobel** was hired in 1963 to accomplish this task. Originally from Ohio, Gary had received his B. S. degree in botany from Colorado State University in 1960 and his Ph. D. in Plant Pathology from the University of California-Davis in 1963 where he had trained under Dr. Tsune Kosuge. Gary's initial work at MSU covered a wide variety of topics ranging from the production of cyanide by various fungi, to production of toxins by various plant pathogens, both bacterial and fungal. Early in his career, he received one of the prestigious Career Development Awards from the National Institutes of Health that allowed him to pursue full time research for five years on topics of his choice. Gary took advantage of this opportunity to train a number of Ph. D. students in microbiology. Over the years Gary taught a graduate course in Plant Biochemistry that was widely used across campus by students wanting hands on training in biochemical techniques. In the 1980's Gary became concerned with finding a new control for Dutch Elm disease that was wiping out the nation's elm trees all across the country, including some cities in Montana. He developed a relationship with Richard Grey, CEO of IDS--one of the largest mutual funds in the USA. He lived in Minneapolis and was interested in having a new cure found for Dutch Elm Disease. Through Mr. Grey's sponsorship, Gary worked to show that some bacteria when injected into elm trees could protect them against the Dutch elm disease fungus. Using some strains of this bacteria which were purportedly "genetically engineered", Gary injected elm trees on the MSU campus with these bacteria without informing the US-EPA that he had "released a genetically engineered organism". This caused quite a stir at the time and EPA censured Gary for this release, but not everyone believed that it was as serious as EPA said it was. The Wall Street Journal championed Gary's cause with a number of editorials. Today, such a release of a genetically engineered organism hardly causes a ripple of attention. After this "adventure in public science" Gary turned his attention to working on organisms which can produce chemicals of medical interest. These are organisms that live in conjunction with higher plants, but do not harm them. Perhaps his most famous discovery in this regard was a fungus growing in association with a yew tree that produces taxol, the cancer fighting drug. Prior to this discovery, Bristol-Myers had to obtain all of the taxol they sold from the bark of the yew tree. Rights to develop this taxol producing fungus were granted to a Texas firm, Cytoclonal Pharmaceutical, Inc with the hope that they could increase production to the point of making it economical to produce taxol via fermentation.



The next plant pathologist to join the faculty was **T. W. Carroll**. A native Californian, Tom had received his B. S. from Cal State-Pomona, and then his Ph. D. in plant pathology from UC-Davis in 1966. There he worked under the late Tom Shalla, a world renowned plant virologist and electron microscopist. Tom came to MSU when the Dept. of Botany and Microbiology received an NIH

grant to purchase an electron microscope, the first to be housed on the MSU campus. Tom offered several courses in the theory and operation of the electron microscope as well as teaching a course in cytology. Later, Tom developed a project with the Ag Experiment Station to continue the work of Dick Hamilton on barley stripe mosaic virus.

He and his staff (students, lab technicians, and postdocs) studied the mechanism of seed transmission of BSMV using thin section electron microscopy to detect virus particles in the anther, pollen, sperm, ovule, egg, and embryo of barley. Serological techniques for the detection of BSMV antigen in barley leaves and seeds, including embryos, were also developed in Tom's laboratory. Sodium dodecyl sulfate was used to modify Hamilton's embryo test, and an enzyme-linked immunosorbent assay (ELISA) was perfected. Both tests were used for many years by the Montana Seed Testing Laboratory at MSU to certify barley seed free of BSMV. Eventually Tom's Ag Experiment Station project was expanded to include all cereal viruses. In 1980 and 1981 he determined that several different strains of barley yellow dwarf virus (BYDV) were causing epidemics in winter wheat and spring barley. The BYDV isolates vectored by corn leaf aphids were biologically and serologically unique. Perhaps Tom's most famous work, however was his discovery of a completely new plant virus, now named barley yellow streak mosaic virus (BaYSMV). This virus is unlike any other known plant virus because of its large size, Tom and his graduate students determined that BaYSMV was the cause of the disease, barley yellow streak mosaic. first found near Conrad, Montana in 1982. They also determined that the vector of this virus was the brown wheat mite and later they characterized the virus. This resulted in a cover story in the journal Science. In acknowledgement of Tom's accomplishments in plant virology at MSU, he received the Sigma Xi Faculty Research Award in 1987. The Outstanding Research Award presented by the Montana Ag Research Station in 1988, and the Charles and Nora Wiley Faculty Award for meritorious research in 1992. From 1977 to 1996 Tom also traveled numerous times to North Africa and the Middle East via Europe as a representative of the MSU-USAF13 barley improvement team. Tom served as Acting Head of the Dept. of Plant Pathology at MSU from 1991 to 1993 while Don Mathre was Associate Director of Research of the MSU Ag. Experiment Station. Tom retired in 1994, worked two years on post-retirement research contracts, and then moved to Gig Harbor, WA near Seattle to be near family living there.

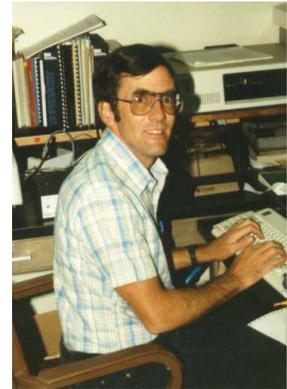
When R. I. Hamilton left MSU in 1966, a search was made for another plant virologist, particularly someone who could develop a virus-free program for the state's seed potato producers. **Jim Shepherd** arrived July 1, 1967 to carry out this work. Jim had previously received his B. S. from Cornell University, and his Ph. D. in plant pathology from UC-Davis where he worked under Dr. Ray Grogan, a famous vegetable pathologist. To accomplish the task of setting up a virus-free program, Jim first had to develop a serological testing system whereby potato plants could be easily and cheaply tested for the presence of Potato Virus X (PVX). This he did successfully using funds from the Montana Ag Experiment Station, the National Science Foundation, and Montana potato growers through their Potato Improvement Board. For this work, Shepherd was recognized by the American Phytopathological Society with the presentation of the Campbell Soup Co. Outstanding Research Award. By 1975, nearly all the seed potatoes grown in Montana were tested for PVX with the result that Montana growers could market their seed potatoes as basically "virus-free". This allowed a

25% increase in yield worth over \$60 million dollars when viewed over the next 25 years of production in Montana. Jim left MSU in 1975 to become head of the department of plant pathology at Kansas State University.



Also joining the faculty of MSU in 1967 was **Don Mathre**, another graduate of the University of California-Davis. Don grew up in the Midwest, receiving a B. S. in botany in 1960 from Iowa State University. He then traveled west to attend UC-Davis. He and Gary Strobel roomed in the same house in Davis from 1960-61. Later when Gary indicated that a position was open at MSU in 1967, Don applied for and received the job offer from Richard McBee, head of the Dept. of Botany and Microbiology. He was hired to teach the undergraduate courses in plant pathology and mycology, and work on soilborne diseases of wheat and barley. Much of his career was spent working on

Cephalosporium stripe of winter wheat and seed treatment for control of a variety of soilborne pathogens. His work on Cephalosporium culminated in 1986 with the release of three winter wheat germplasm lines with resistance to this disease. All during this time, Don was ably assisted by **Robert Johnston** working as a research associate in the department. Montana continues to be one of the leading states in regard to percent of acres planted with treated seed, in part, due to the work in Mathre's lab on the new systemic seed treatments that have become available since the mid 1980's. In 1989, Don served as President of the American Phytopathological Society, and from 1987 to 1998, he served as Head of the Dept of Plant Pathology. Between 1990-1993 he served as Acting Associate Dean for Research. He retired Dec. 31, 1998 but continued working on a part time contract with the Ag Experiment Station until 2002.



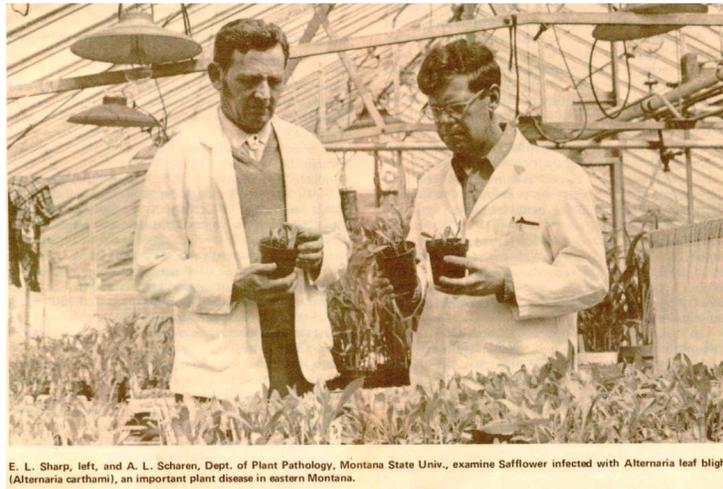
With the retirement of Mitro Afanasiev in 1968, there was a need to find a replacement to carry on the work in Extension plant pathology. **Robert Carlstrom** was hired to fill this position. He had received his Ph. D. in Plant Pathology from Oregon State University. Unfortunately, Bob had health problems that led to his resignation in 1971. He was then replaced by **Ed Burns** who had received his plant pathology training at the University of Illinois under Mal Shurtleff, one of the nation's top Extension plant pathologists. Ed had a 50% appointment with Extension and 50% with the Experiment Station. With a renewed interest in the state in safflower production, Ed instigated research on several foliar pathogens of safflower including Alternaria leaf spot and bacterial blight. He had tremendous energy and was willing to travel anywhere in the state to present a program, usually driving a VW beetle to get to his meetings. After five years of non-stop travel, Ed basically "burned out" on the job and left MSU to start a strawberry farm near Potsdam, New York.

The administrative location and status of the plant pathology group has changed over the years. Initially, housed in the Department of Botany and Bacteriology, later named Botany and Microbiology, the group was granted departmental status in 1972 when they moved from Lewis Hall and Cooley Labs into the new Leon Johnson Hall of Life Science. Gene Sharp

served as the first Head of the department of plant pathology within the College of Agriculture. This arrangement continued until 1998 when the plant pathologists merged with several botanists, horticulture, and plant genetics to form a new Dept. of Plant Sciences.



Also, at the time the department was formed in 1972, **Al Scharen** was working for the USDA-ARS as a small grains pathologist at Beltsville, MD. He was given the opportunity to transfer his research location to Bozeman, so he was welcomed into the department as an affiliate faculty member. From 1981 until retirement, he was Research Leader of the USDA, ARS Cereal Crops Improvement Unit located at MSU. Over his career, he focused on the leaf spotting fungi attacking wheat and barley, with special emphasis on finding resistance to these pathogens. He also worked with the group on the US-AID project on disease resistance in barley and as such traveled extensively in the Middle East in association with this work. Al retired from the USDA in 1994 and then spent the next two years administering the US-AID project for MSU until his retirement in 1996.



E. L. Sharp, left, and A. L. Scharen, Dept. of Plant Pathology, Montana State Univ., examine Safflower infected with *Alternaria* leaf blight (*Alternaria carthami*), an important plant disease in eastern Montana.



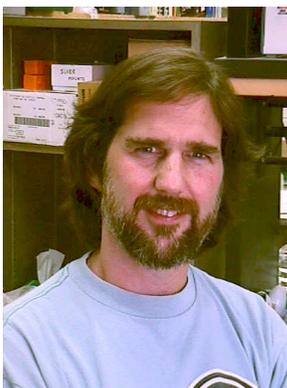
In 1975, following the resignation of Jim Shepherd, the department decided to assign all duties involving virus research to Tom Carroll, and to replace Jim with someone trained in bacteriology. No one in the plant pathology group at that time had expertise in this area and a serious disease of winter wheat had developed that was believed to be caused by a bacterium. As a result, **David Sands** was hired. He was a graduate of Pomona College and the Univ. of California-Berkeley where he received his Ph. D. in 1969. Following a stint in Australia, Dave worked for the Connecticut Ag Experiment Station. He came to MSU as a Post-Doctoral Fellow with the USDA to work in Al Scharen's Lab on *Pseudomonas syringae*. He was in that position when Shepherd left, so he decided to apply for Jim's position. In addition to teaching a course in bacterial plant diseases, Dave has also developed an introductory course in biotechnology that has become quite popular with undergraduates considering majoring in

this field of study. His research has involved a variety of topics including work on bacterial leaf streak in barley to development of Indian rice grass as an alternative crop for Montana. Perhaps his most significant work has been in the area of biocontrol of weeds using plant pathogens, particularly fungal pathogens. He has obtained several patents on the development of mutant strains of fungi that can attack and destroy weeds. His most recent work has involved studies on the use of camellina, a new crop for Montana, for production of biofuel and healthy oils.



With the departure of Ed Burns in 1978, we were able to convince the administration that Extension plant pathology warranted a full time person. **Jack Riesselman** was hired in 1979 to fill this full-time slot. Jack had grown up on a corn farm in southeast Nebraska and after receiving a B. S. from Colorado State University he had returned to the University of Nebraska to pursue work on a Ph. D. in plant pathology. During his graduate work he worked in the plant disease clinic and participated in Nebraska public TV's Backyard Gardner program. Thus, he was able to bring this expertise to Montana. Jack's developed a real expertise in diagnosis of diseases and other production problems in small grains. In the mid-1990's

when wheat streak mosaic virus broke out and caused severe losses in many of Montana's small grain growing regions, Jack led a major educational and research campaign to bring this disease under control. Also, during this time, Jack became the executive producer of the TV program "Montana Ag Live" which was produced by KUSM-TV here at MSU. This Sunday evening program soon became one of the most popular shows on public TV that originated here in Montana. It involved a weekly panel of experts who would answer call-in questions from around the state, mainly questions involving production problems existing at the time the program was aired. Jack retired in 2006.



Following the retirement of Gene Sharp in 1987, the department opted to hire someone with expertise in molecular plant pathology to replace Gene. **John Sherwood** previously had gained his education at the University of Vermont and Colorado State University. He came to us from a Post-doctoral position at Michigan State University where he worked on the molecular biology of barley powdery mildew. In addition to teaching a class in the genetics of plant pathogens, John has spent most of his research effort working on barley smuts. This work has involved studies on the molecular biology of germination of the smut spores and the factors that control germination and mating of several

members of the smut fungi. John became Department Head of Plant Sciences and Plant Pathology in 2002.



In 1994 **Barry Jacobsen** joined the department with a 3 way split in his appointment: 50% Extension, 40% MAES, and 10% teaching. He brought expertise in field crops and epidemiology. Most of his efforts have been on sugar beets and potatoes. With excellent support from the sugar beet industry, he has developed techniques for screening beets for resistance to Fusarium wilt; isolated potential biocontrol agents for Cercospora leaf spot; and researched seed treatments for control of Aphanomyces root rot. His work on potatoes has focused on bacteria for control of Fusarium seed piece and tuber decay. He has also served as national leader of Integrated Pest Management programs for the USDA.



With the retirement of Tom Carroll, the department was left without any expertise in virology. However, we were fortunate in luring away from Purdue University, **Mark Young**. He received his training under George Bruening at the University of California-Davis followed by a post-doctoral assignment in Australia. His first faculty appointment was in the biology department at Purdue University. At MSU, Mark has made an immediate impact on the department with his infectious good nature, industriousness, and his brilliance in molecular virology. Students taking his graduate class in plant virology remark on his excellent teaching, both in lecture and lab. His programs cross many areas from potential viruses that live in association with hot springs in Yellowstone National Park, to new uses for spherical plant viruses. The latter was described in an excellent paper published in the prestigious British journal Nature.



**Cathy Cripps** is a traditionally trained mycologist who came to MSU after receiving her Ph. D. in mycology from Virginia Polytechnic Institute where she worked with the eminent mushroom expert Orson K. Miller. Cathy brings to the department an excellent background in the mycorrhizal fungi associated with plants in Montana and is working to develop strains of mushrooms that have importance in the reclamation of mine and smelter sites, eg the Anaconda smelter site. She also is teaching our introductory mycology class and a class on fungal ecology.



**Alan Dyer** joined the department in 2004 to fill the position vacated by Don Mathre upon his retirement. Alan earned his Ph.D from the University of Minnesota. His research addresses the disease problems small grain producers' face due to adoption of minimal tillage practices. A sideline of his research is the evaluation of currently used and experimental

seed treatments, which is a valuable service which aids producers in minimizing production costs.



**Mary Burrows** joined the department in 2006 as Extension Plant Pathologist replacing Jack Riesselman who had retired. She came to us with her Ph. D. from the University of Wisconsin and a post-doc at Cornell University. Her area of expertise is vector transmission of plant viruses. Her research addresses problems faced by the growers of Montana. Current projects include integrated management of seedling damping off in chickpea.



**Li Huang** joined the department in 2007 specializing in the molecular genetics of disease resistance, especially the rust diseases of wheat. She came to us from Kansas State University where she had earned her Ph.D followed by a post-doctoral assignment. Her research focuses on the plant host-pathogen interaction emphasizing the genetic mechanisms of resistance gene mediated defense responses in host and the pathogenicity in the pathogens. Research programs include “Functional analysis of the *Lr21*-mediated resistance pathway” and “Molecular characterization of avirulence/virulence genes of the wheat leaf rust fungal pathogen.

Another program housed in the Dept. of Plant Pathology was the work on potato seed certification. Since most of the certification work involved documenting the freedom of seed potatoes from disease, it was natural that a plant pathologist be hired to direct the program. This program is financed exclusively with fees charged to growers for certification expenses. Originally carried out by the Extension horticulturalist, the first plant pathologist hired to direct the program was **Larry Clafin**. Larry had received his Ph.D. from Kansas State University and arrived in Bozeman in 1972 to direct the “Potato Lab”. He worked closely with the seed potato producers in the state and got the disease certification program off to a good start with the use of sound scientific testing procedures, particularly those developed by Jim Shepherd for serological testing for PVX. In addition, Larry and Jim Shepherd developed the first serological test for detecting the ring rot bacterium in potato tissue. Unfortunately for the program, however, Larry was offered a chance to return to his home state of Kansas to work in Extension plant pathology so he left Montana in 1974 to be replaced by **Dallas Batchelor** in 1975. Dallas had received his training in plant virology at the University of Florida and appeared to be ideally suited to directly the seed certification program because of its heavy emphasis on testing for viruses. Dallas stayed as director of the program for two years, during which time the program became involved in a number of law suits over contamination of seed potatoes with the ring rot bacterium. All state potato seed certification programs have a zero tolerance for this pathogen and unfortunately several

growers in Montana experienced outbreaks of ring rot. When their potatoes were sold outside of Montana, the infection was noticed by the buyers and as a result, the Montana growers and Montana State University were taken to court. Unfortunately, these law suits were lost and many felt that in part this was due to poor supervision of the program by Dallas. He left the program in 1977 to go into independent consulting.



In 1979, **Mike Sun** was hired to direct the seed potato program. Mike, a native of Taiwan, had received his Ph. D. in plant virology at North Carolina State University, followed by a post-doctoral assignment at Michigan State University. As a result of these experiences, Mike brought expertise to the program in serology and over the next twenty years brought many improvements to the program. This included development of a rapid and sensitive serological test called ELISA. Mike was responsible for giving the program a good reputation. The quality of Montana seed potatoes is perceived to be among the highest in the nation. Mike retired in 2008.



**Nina Zidack** is a native of Montana who obtained her B. S. degree from MSU and then traveled to Alabama where she received her Ph. D. in plant pathology from Auburn University. Returning to Montana, she has played a very active role in carrying out research on plant pathogens that may be of interest and value in biocontrol of weeds, work supported by the Noxious Weed Trust Fund. She managed the Plant Disease Clinic prior to her appointment as Director of the Montana Potato Lab in 2008.

Other researchers who have worked in the department in non-tenure track positions over the years include **Mareike Reinhold-Johnston, William “Bill” Grey, Gene Ford, Paula Kosted, and David Long**. These folks have brought a tremendous amount of expertise and enthusiasm to the department even though their funding has often been precarious.



**Mareike Johnston** first arrived in Montana in 1978 to work with Gene Sharp on rust diseases of cereals. Since Gene’s retirement, she has worked on a variety of cereal leaf diseases of both wheat and barley with support from the American Malting Barley Association,. She has worked with Dave Sands on a rust disease of wild oats that may have potential as a biocontrol agent of this weed. She has also worked in collaboration with Barry Jacobsen on diseases of sugarbeets. She retired from the department on Dec. 31, 2009.



**Bill Grey** has played a multitude of roles in his time as a research professor. Of special interest is his role in developing a certification program for peppermint and spearmint. This program is modeled after the successful seed potato certification program and is geared to provide disease free planting stock to Montana mint producers. Bill has also been involved in several programs funded by the Noxious

Weed Trust Fund to study the use of plant pathogens as biocontrol agents for weeds. Since 1999, he has served as manager of the Montana Foundation Seedstocks Program.



**Gene Ford** plays a unique role in the department in that he spends his summers in Alaska but winters in Bozeman, Gene received his Ph. D. in plant pathology from UC-Berkeley and has expertise in fungi that are involved with plants in both a pathogenic and a saprophytic mode.



**Paula Kosted** is a chemist who worked in close association with John Sherwood studying the biochemical factors involved in mating of the smut fungi. She was supported by a USDA grant to young scientists.



**Dave Long** came to the department from a post-doctoral post at the University of Colorado after receiving his Ph. D. at Cal Tech. He worked on the molecular aspects of fungi capable of producing chemicals of pharmaceutical interest. In addition, he taught the introductory biotechnology course. He left the department in 2005 to go into private practice.