Plant Science Says

Happy Halloween!

Volume 18, No. 9 The Department of Plant Sciences and Plant Pathology October, 2016

Giroux Named Associate Department Head

Mike Giroux was recently named the Associate Department Head of Plant Sciences and Plant Pathology. Mike began his tenure at Montana State University in 1997 as an Assistant Professor. The focus of his research is in-depth studies of genes and processes impacting wheat agronomic and end product quality. His primary responsibilities as Associate Department Head will be to help lead, coordinate, and administer the department's teaching, research, and outreach programs and provide effective leadership to faculty and staff.

Mathre Wins Award

On September 23, Don Mathre was awarded the Honorary Alumni Award by the College of Agriculture and the Montana Agricultural Experiment Station.

Dr. Mathre received his B.S. in Botany from Iowa State University and his PhD from UC Davis in 1964. Since then, Dr. Mathre has served in capacities including, but not limited to, instructor of plant pathology, award-winning authority on the wheat disease known as dwarf smut, president of the American Phytopatholgical Society, department head for 11 years, faculty athlete representative, acting associate dean for research, statistics keeper at Bobcat Athletic events, and the person you will most likely talk to when you call in to Montana Ag Live. Don does not allow the grass to grow under his feet. He works the Gallatin Garden Club sales table and at the Farmers Market, serves on PhD candidate committees, volunteers to help complete tax returns and all of these locations are more than likely reached on his bicycle.

Congratulations Dr. Mathre on winning this well deserved award!

Setting International Standards for Seed Potatoes

By Nina Zidack

In December of 2015, I was nominated by my fellow United States Seed Potato Certification officials to represent the U.S. at the UNECE (United Nations Economic Council for Europe) Specialized Section on the Standardization of Seed Potatoes. U.S. participation is sponsored by the United States Potato Board. August 31 through September 2, 2016 I attended my first meeting of the section at the United Nations in Geneva, Switzerland. While the

The view of Lake Geneva from the UN building (Place des Nations)

The U.S. Delegation – Todd Mattos (USDA), Willem Schrage (North Dakota Seed Potato Certification – retired), Nina Zidack

name implies that this is a European committee, all UN member countries are offered a seat at the table with equal standing. The previous US representative was Willem Schrage from North Dakota who provided unique representation with his Dutch heritage and experience in seed certification in the U.S., Canada and connections throughout the world. Todd Mattos, USDA Northwestern Regional Manager for Federal/State Inspections also attends the meetings. While my Montana heritage hasn't given me extensive international experience, I find we speak one common language and that is "Potato".

The group is responsible for finding common language and principles in setting uniform standards that facilitate trade of seed potatoes throughout the world. In the United States, our seed potato exports represent a tiny fraction of our total seed production and increases in exports could diversify markets for our growers. We have made progress in facilitating new exports in the U.S. by adopting a State National Harmonization Program which sets programmatic requirements for producing certified seed across the U.S. and base tolerances for virus diseases and varietal mix in addition to a zero tolerance for bacterial ring rot. The UNECE has developed a dynamic set of standards that are continually revisited and refined by the committee and can provide a valuable reference point for examining how U.S. seed potato producers and certification agencies define the standards of their seed potatoes to enhance access to world seed potato markets.

In addition to setting standards for seed potatoes, the committee has produced outstanding free-access publications including "Guide to Seed Potato Field Inspection" and "Potato Diseases and Pests". These publications can be found under the tab "Brochures and Publications" at http://www.unece.org/trade/agr/standard/potatoes/pot_e.html. In the US, as part of a workshop sponsored by the Specialty Crop Research Initiative project on necrotic virus diseases, we reprinted these resources for distribution to U.S. seed potato field inspectors and agronomists. Additional publications are in various stages of development including "Guide to Seed Potato Tuber Inspection", "Guide to Operating a Seed Potato Certification Service", and "Guide on Tissue Culture and Minituber Production".

The UNECE specialized section on seed potatoes meets yearly at the United Nations in Geneva and one additional time in another member nation. In 2017, we will meet in Geneva in March and in the Netherlands in September. For 2018, France, Germany and New Zealand have all offered to host. I plan on getting Montana on the list for a meeting location so don't be surprised if we get invaded by a herd of international potato heads in the future!

Sporting my Spud Nation T-shirt in front of the United Nations

6528 Entomologists Swarm in Orlando, Florida
By Florence Dunkel

What does a swarm of entomologists look like in a small space? Pretty much like any group of any humans interested in the little things that run our world. The twenty-fifth International Congress of Entomology (ICE2016) was the largest collection/swarm of professional, human entomologists ever in the history of the world. Entomology Without Borders was the theme. Insects in Orlando in and around the Orange County Convention Center of Orlando, Florida seemed to have sensed this. Several of us noticed that there was an eerie absence of live insects in Orlando.

One hundred and six countries were represented at the Congress being held for the 4th time in the U.S. in the past 100 years. Nearly 50 % of attendees were from outside the U.S.

Dunkel was the Congress co-convener for edible insects. Three symposia were offered, 28 total presentations authored/ coauthored from 13 countries and 18 states in the U.S. Three 4-hour symposia and several contributed papers were presented as well as sneak previews of a full-length documentary film from Canada and a trailer of a Danish documentary film. No popcorn; only cricket bars served. President of the Entomological Society of America (ESA), May Berenbaum, called this a "watershed moment in the history of entomophagy" (Amer. Entom. 2016. 62 (3):140-142).

Edible insect symposia focused on big issues: Water shortages; renewable energy sources; land use/deforestation; getting ready for 9 billion people; feeding the one billion currently under-nourished and millions over-nourished; communication; funding opportunities; regulatory issues; legislation; microbial safety; and the disgust factor. Sonny Ramaswamy, Director, USDA National Institute of Food and Agriculture provided the plenary. Paul Rozin, University of Pennsylvania, elucidated psychological issues related to disgust after Wayne State University, Julie Lesnik, summarized her research on not only are insects a smart food choice, but insects are what made us smart in the first place.

A few edible insect folks out for sushi from (left to right): Seattle food insect business; American Museum of Natural History; Netherlands, University of Wageningen, Entomology; University of Georgia (UGA) Entomology; Rhode Island Community College; Dunkel, MSU Entomology; Brazilian university; Ohio food insect business; UGA Entomology grad student in edible insect research; St. Paul MN biology teacher; Wayne State University Anthropology; Texas Little Herds President; Netherlands, University of Wageningen, Food Science.

MSU professor (LRES) Robert Peterson, President-to-be of the Entomological Society, and Dunkel participated in the International Entomology Leadership Summit aimed at improving the human condition through science. Nine hours over two days of workshops, panels, presentations, poster sessions, break-out groups on the intersection of food security, vectored disease, climate change, and invasive species were the methods used to meet challenges posed.

Malaria loomed large in the Grand Challenges event as well as in the moving plenary of the entire Congress by Nobel Laureate in Chemistry, Dr. Peter Agre, Johns Hopkins Bloomberg School of Medicine. Dunkel's symposium presentation was invited by the International Association of Black Entomologists and entitled "An Outsiders view on the Way Forward for Africa." Organizers and audience

A word of wisdom from the Nobel Prize recipient in Chemistry, Peter Agre, plenary speaker for the Congress of Entomology.

gave it a thumbs up. It addressed these specific concerns: Local solutions to malaria, malnutrition and the scientific approach. Developed by Dunkel and her students in Cell Biology and Neuroscience, Sustainable Foods and BioEnergy Systems and other majors, the message was to go and listen to the people of Africa, the Atinga, subsistence farmers of Africa, the strength of Africa, and bridge the gap between technical knowledge of Western science and Traditional Ecological Knowledge by leading from behind. MSU students are unique in recognizing the connection between edible insects, malaria, and decolonizing methodologies. Cell biologists/ immunologists link nutrition (a steady supply of essential amino acids/micronutrients) to strong functioning innate/adaptive immune systems making clear links between edible insects.

The reoccurring themes of the Congress were transdisciplinary communication leaping organization levels. This is exactly what our MSU students are doing: Connecting cellular immune system functioning to diet to malaria bio-cycle stories by creating participatory, numberless/wordless diagrams.

It was a serious, heavy congress, not about minutia, but about the little things that run our world.

Striga Stakeholders Meeting Report
By Claire Sands Baker

David Sands has been researching the biological control of *Striga hermonthica* using *Fusarium oxysporum* f. sp. *strigae* for about ten years. *Striga*, a parasitic weed of staple crops in Africa, impacts approximately 100 million smallholder farmers. Attempts to manage *Striga* have included *Striga*-resistant maize, trap-cropping, crop rotation, weeding, and imazapyr-coated seed. However, these have not been effective enough or accessible to the smallholder farmer, allowing *Striga* infestation to expand over recent decades. While wild type strains of *F. oxysporum* have been reported to reduce the incidence of *Striga* infestation, to date none are effective enough to restore crop yield or to significantly reduce the soil *Striga* seed bank. To enhance the effectiveness of *F. oxysporum* in biocontrol of *Striga*, Sands' lab coupled its inherent pathogenicity to another trait: Specific amino acid secretion. Therefore, unlike wild-type strains, the trio of virulence-enhanced strains (called Foxy T14) actually encourages germination and then kills the *Striga* before it causes damage to the crop.

With funding from a Grand Challenges Exploration grant from the Bill & Melinda Gates Foundation, trials on 500 smallholder farms over two seasons in Western Kenya in 2014 and 2015 showed very promising results (56.5% increase in maize yield in the long season, 42% increase in maize yield in the short season). Tox/ecotox studies were conducted on FoxyT14 in March and April and we are awaiting the reports confirming no toxicity. Registration with Kenya's PCPB (Pest Control Products Board) is underway and nearing completion.

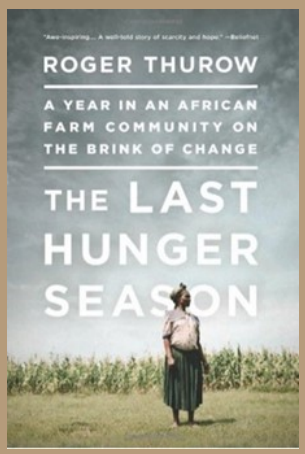
On June 15, forty stakeholders met at ICRAF in Nairobi to discuss *Striga* management challenges, FoxyT14 technology, and next steps. Stakeholders represented government (Kenya Agriculture and Livestock Research Organization), NGOs, scientists, smallholder farmers, farm input companies, foundations, and investors. With an overriding goal of "getting FoxyT14 to as many smallholders as possible," the all-day meeting was productive and resulted in new partners and immediate investments to continue data collection with our team of Kenyan Implementers (local farmers) and improve the KALRO laboratory facility to allow for greater manufacturing efficiency.

June 16: This is Jeffries-Ameno Odukho, a smallholder farmer in western Kenya. She has been conducting trials using our FoxyT14 technology. Here she stands in the border between her plot using FoxyT14 (her raised hand - behind her) and her control plot (her lowered hand - in front of her). Both plot inputs (planting date, hybrid seed, fertilizer, manure) were identical except for the FoxyT14 treatment. She said that even though this technology takes time to utilize, she would pay for it and use it on her entire farm if it was available. She is smiling and hopeful. But, we also witnessed her storage issues - weevils, aflatoxin, etc. The issues are complex.

On Thursday, June 16, twenty stakeholders visited approximately fifteen trial plots in the Maseno area of western Kenya. Most of the trial plots showed an obvious difference between the control (hybrid seed and fertilizer) and the treatment (FoxyT14, hybrid seed, and fertilizer). However, there were a handful of farmers that inaccurately conducted their trial by reversing their control and treatment plots from previous seasons. While this causes an error in our data, we were pleased to see that the new control plots that had used FoxyT14 in previous seasons had visibly less *Striga* infestation. This could indicate persistence of FoxyT14 in the soil, which will be tested in the coming year.

On Friday, June 17, stakeholders toured the manufacturing and research laboratories at KALRO-Katumani. The meetings concluded with an action plan, which includes research into alternative inoculum substrates to cooked rice, investigation into a possible seed coating treatment, and distribution through a variety of channels including for-profit and non-profit partners.

Fundraising continues for the Toothpick Project (www.toothpickproject.org): grant writing, individual donors, corporate support, and a crowd funding campaign in 2017. The project is partnering with the MSU Blackstone Launchpad and is part of their 406Labs.

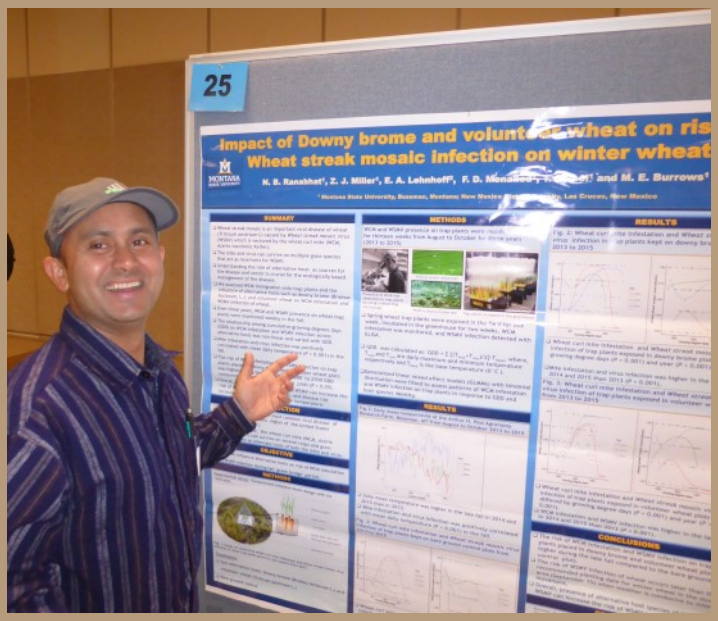


Suggested reading: The Last Hunger Season by Roger Thurow – a quick and easy read that highlights the challenges faced by Africa's smallholder farmers.

BmJ Registered for Use

BmJ, a bacterial biocontrol agent developed in Barry Jacobsen's lab has been registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA or the Act). BmJ contains a biological disease control agent (Bacillus mycoides isolate J, or BmJ) that reduces the occurrence and severity of plant disease by triggering the plant's natural defense mechanisms against pathogens. BmJ itself has no direct effect on plant pathogens, but preventative applications (before infection or appearance of disease symptoms) can reduce the incidence and severity of subsequent disease. it has been registered for disease control on Almonds, Citrus, Cole crops, Cucurbit crops, Grapes, Lettuce, Legume vegetables, Pecan, Pome fruits, potato, spinach and Sugarbeet.

Nar Ranabhat Places in Poster Contest
The Graduate School recently hosted the 2016 Graduate Student Summit. Nar Ranabhat, Mary Burrows graduate student, won 2nd place in the category Natural Sciences and Agriculture and $100 for his poster entitled, "Impact of Downy Brome (Bromus tectorum) and Volunteer Wheat on Risk of Winter Wheat Infection by Wheat Streak Mosaic Virus". Congratulations Nar!

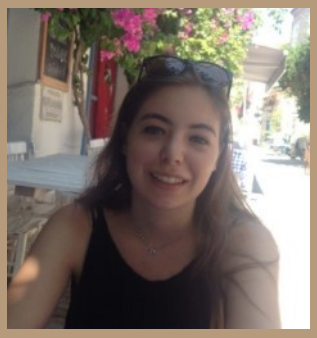


Montana Ag Live! Schedule
Oct. 2 - Dr. Vince Smith, MSU Agricultural Economist will inform viewers and answer questions concerning the Universities new Center for Regulatory and Applied Economics also known as CRAEA.

Oct. 9 - Jan Bowman of MSU Animal and Range sciences will lead the panel in a discussion about horse nutrition.

Oct. 16 - Dr. Barry Jacobsen and others with discuss exciting innovation's stemming the MSU's College of Agriculture Ag. Research and Economic Development Grant

New Graduate Students
Sezgi Biyiklioglu (Hikmet Budak)
Hello, my name is Sezgi Biyiklioglu and I am a Ph.D. student in Dr. Budak's lab. I mainly work on genetics of several cereal crop species and their responses in stressful conditions. I received my bachelor's degree


Sezgi Biyiklioglu

a year ago from Istanbul Technical University, Turkey, in Molecular Biology and Genetics.

Being in Bozeman, Montana has been a different adventure for me. Since I am from a big and chaotic city, Istanbul, I find Bozeman to be a peaceful place which is surrounded by beautiful scenery. I love being in nature and examining the habitat, so I believe that I came to the right place to live and work on plant genetics.

I am very excited to be a part of MSU, located in such an important area where there are actual cereal crop farmers dealing with stress conditions and yield problems, and looking for answers from researchers. I strongly believe that our commitment to this work in the PSPP department and also in the Cereal Genomics Lab with which I am involved will bring about solutions that will help the community.

Justin Vetch (Mike Giroux)

Hello Everyone! My name is Justin Vetch. I am 28 years old. I was born and raised in various parts of Montana but call Kalispell home. I have a 2 ½ year old son and am expecting another baby boy in February! Recently (May), I graduated from MSU with a degree in Chemistry: biochemistry. Currently I am working on an MS degree under Dr. Mike Giroux with hopes of becoming a PhD candidate. My current research project is identifying ways to select for reduced preharvest sprouting in wheat. This involves screening current Montana varieties for PHS tolerance, as well as investigating QTLs associated with PHS.

Erich Spiessberger (Mike Ivie)

I'm Erich Spiessberger and I'm going to study for my Master's degree at MSU researching beetles from the West Indies. I'm from Rio de Janeiro, Brazil and did my undergraduate at the Federal University of Rio de Janeiro. I met my advisor, Michael Ivie, in an International Symposium at Argentina. After that he invited me to visit the MSU campus and the lab. The beetle collection from here is incredible! I feel privileged to have the opportunity to study at MSU and I wish to enjoy all the good experiences that are about to come.

Burcu Alptekin (Hikmet Budak)

Hello, I am Burcu Alptekin. I am PhD Student in Dr. Hikmet Budak Lab. I studied Molecular Biology and Genetics in Istanbul Technical University/ Turkey. After my graduation in 2014, I started to my PhD with Dr. Budak at Sabancı University/Turkey. I transferred to MSU in July and I will complete my degree here. My main subject is wheat genomics, specifically microRNAs.

I like Bozeman a lot. It is very natural, even though a little bit cold for me. I love cycling, so in my spare time I do it a lot. Another passion for me is music, I basically like all kinds of music. I tried a couple of musical instrument and the latest instrument I am trying is the ukulele. I hope I will figure out how to play it soon.

I am looking forward to meeting all of the people here and making some good memories with them.

Breno Bicego Vieitez d Almeida (Jessica Torrion and Luther Talbert)

My name is Breno Bícego Vieitez de Almeida. I received my undergraduate degree in Agricultural Engineering at the University of Sao Paulo, Brazil. I am now starting a Master's degree program in Plant Sciences working at the Crop Physiology Lab in the Northwestern Agricultural Research Center (Kalispell) under Dr. Jessica Torrion's supervision. My project will be looking at various wheat market classes and wheat with high protein genes and their interaction to abiotic factors, such as water and nitrogen. While taking classes, I will be working in Dr. Luther Talbert's lab.

Even though the weather up here is way different than what I am used to, Montana has a very friendly environment and I have already met many kind people which makes me feel very comfortable.

I have high expectations for the next two years. I hope I can learn as much as possible and also contribute in some way to Montana's community.

It's Official: We're the PSPP Graduate Journal Club!
By Uta Stuhr

We're proud to announce that the Graduate Journal Club in the Department of Plant Science and Plant Pathology has officially been recognized as a student organization by the MSU Office of Student Engagement (OSE). Since our kick-off meeting in May 2016, the Journal Club has attracted increasing numbers of interested students. Club members meet every other week to read and discuss publications in diverse research fields and debate the significance and implications of these insights.

Club officers were elected at the beginning of the 2016 fall semester. For the current academic year, Traci Hoogland holds the office of Journal Club President, joined by Uta Stuhr as Vice President and Dylan Mangel holding the office of Treasurer. The Club is being supported by Faculty Advisor Dr. Hikmet Budak. Together, we'll work to fulfill our mission statement *"to foster a community of rigorous research by giving graduate students the opportunity to hone skills in several vital forms of scientific communication: literature, lecture and peer-to-peer."* Next to literature discussion, it is our goal to organize guest lectures held by local and out-of-state researchers from academia and industry to expand and complement our discussions with different angles and 'outside perspectives'. With this commitment, we aim to provide an inspiring and fertile research environment, where PSPP graduate students, the future leading scientists in Plant Science and Plant Pathology, have the opportunity to cultivate essential skills in fundamental aspects of research.

Our next Journal Club session, led by Mehmet Ozeyhan, will take place on Wednesday, October 5th, from 4 to 5 pm in conference room 145 in the Animal Bioscience Building. All graduate students and advisors are welcome and encouraged to contribute their expertise and perspective! Subsequent to this meeting, volunteering graduate students will join forces to help set up the 29th Annual Fall Job & Internship Fair on October 6th and 7th, thereby raising some extra funds for the Journal Club through matching funding offered by the OSE. Volunteers wanted! We would appreciate every volunteer signing up in the PSPP Graduate Journal Club's name!

Grants

Chaofu Lu, "Systems Biology to Improve Camelina Seed and Oil Quality Traits". DOE BER– funded project. Goal: To increase Camelina seed size and oil content for improved seedling establishment and oil yield, and to optimize oil quality for satisfactory fuel properties. In this project, quantitative trait loci (QTLs) and molecular markers associated with these important traits will be identified using high-density genome maps and repeated field trials in Montana and Washington states. Modern genomics and biotechnological approaches will be employed to uncover novel molecular mechanisms (including genes and gene networks regulated by microRNAs and transcription factors) regulating fatty acid modification, oil accumulation and seed size in Camelina.

VanWieren, Rebecca, "Integrating Landscape Performance into HORT 432: Advanced Landscape Design", Landscape Architecture Foundation.

Publications

Barge, E. and C. Cripps. 2016. New reports, phylogenetic analysis, and a key to *Lactarius* Pers. in the Greater Yellowstone Ecosystem informed by molecular data. MycoKeys 15: 1-58.

Sarah J. Pethybridge, Adrienne Gorny, Traci Hoogland, Lisa Jones, Frank Hay, Christine Smart, George Abawi. Identification and characterization of Ditylenchus spp. populations from garlic in New York State, USA. Tropical Plant Pathology.

A.M. Nasseer, J.M. Martin, H.Y. Heo, N.K. Blake, J.D. Sherman, M. Pumphrey, K.D. Kephart, S.P. Lanning, Y. Naruoka, L.E. Talbert. Impact of a Quantitative Trait Locus for Tiller Number on Plasticity of Agronomic Traits in Spring Wheat. Crop Science.

Steven M. Hystad, Michael J. Giroux, John M. Martin. Impact of Null Polyphenol Oxidase Alleles on White Salted Noodles. Cereal Chemistry

Vinicius S. Ferreira, Livia P. Prado, Dione Seripierri. The Entomological Collection of Ricardo von Diringshofen (1900-1986) and its incorporation to the Museu de Zoologia da Universidade de Sao Paulo. Revista Brasileira de Entomologia.

May, D.B., Johnson, W.A., Zuck, P.C., Chen, C.C., and Dyer, A.T. 2016. Assessment and management of root lesion nematodes in Montana wheat production. Plant Dis. 100:2069-2079.

Camelina!
By David Sands

Our crop, *Camelina sativa* made the cover of September 16th Science magazine. Camelina is coveted for its oil content rich in the omega-3 fatty acids. The oil is stable because of the antioxidant gamma tocopherol. Sands, Rivas, and Pilgeram have developed several applications for this crop including high omega-3 microgreens, a source of very active and stable peroxidase, and a new high lysine line to improve feed efficiency. Chaofu Lu developed an efficient method to genetically transform camelina, and essentially democratized this crop for translational plant biology, which is the special topic of Science using camelina as the poster child.

David Sands, Rocio Rivas, and Alice Pilgeram have developed several applications for this crop including high omega-3 microgreens, a source of very active and stable peroxidase, and a new high lysine line to improve feed efficiency. *Camelina sativa* is very closely related to Arabidopsis thaliana, the completely sequenced species that permits Camelina selection to proceed quickly.

Graduate Student Club Hikes To The Highest Peak In The Bridger Mountains
By Whiteny Harchnko

On Sunday September 11, 2016, the Plant Sciences & Entomology Graduate Student Club kicked off the fall semester with a hike to Sacagawea Peak, the highest point in the Bridger mountain range. The hike was five

miles long with an elevation gain of 2,000 feet. It was cool and windy at the peak but the views were simply amazing. The hike ended with a walk around breathtaking Ferry Lake. Thirteen graduate students attended. New friendships and great memories were made.

Update from Erin Lonergan

Just over two years ago, I left the Plant Sciences Department at MSU to take a temporary job with the Klamath National Forest hoping it would help me get my foot in the door. Well it worked! I have recently accepted a permanent position as Forest Botanist on the Klamath National Forest, woohoo! The Forest is a botanical hot spot with many endemic plants, prolific conifer diversity (the miracle mile is home to 17 different species), 5 designated Wilderness areas, and California's only National Grassland. I feel lucky to have the opportunity to start my career here and to help manage such a diverse and unique landscape. I must admit though, that while I worked hard for my position by volunteering for extra duties, working weekend outreach events, and putting in lots of overtime, I had really good timing too. Being in the right place at the right time can open many unexpected doors. Now that my door is open, I hope to spend many years exploring the Forest and helping shape a solid and effective Botany program. Thanks again for all your support and guidance!!

Erin Lonergan with fellow Klamath National Forest employees.

2016 National Extension Master Gardener Coordinator Conference
By Toby Day

The National Extension Master Gardener Coordinator Conference was hosted by MSU Extension Master Gardener and the University of Wyoming Extension Master Gardener September 20-23 at Chico Hot Springs. Celebrating the 100 year anniversary of the National Park System, the conference showcased Yellowstone National Park (YNP) as well as the great work coordinators are doing across the country on behalf of Master Gardener and the Extension mission throughout the U.S.

Ninety Master Gardener coordinators including state, regional and county educators enjoyed a tour of the YNP herbarium by curator Heidi Anderson as well as a presentation by YNP revegetation specialist John Klaptosky. Following the herbarium tour, the group was treated with a journey through YNP from Gardener to Canyon Village by tour guide Julianne Baker, a Master Gardener from the first ever YNP Master Gardener class held in Mammoth Hot Springs. Everybody was amazed by the flora and fauna in the park, including a bear sighting at Dunraven Pass.

There were many highlights of the conference including keynote speakers Panayoti Kelaidis, curator of the Denver Botanic Garden, Dan Wenk, Superintendent of Yellowstone National Park, and best of all Dr. David Gibby, former Extension Educator of King County Washington, who, in 1972 started the

Chico Hot Springs was a great location for the National Master Gardener Coordinators Conference

Dr. David Gibby was a true sport and took individual pictures with all the coordinators

Extension Master Gardener Program in Seattle, Washington. His keynote speech was one of the most inspirational talks I have heard in my Extension career. I can truly say that Dr. Gibby and his vision is the best thing that has happened to Extension Horticulture in several decades.

I was inspired by the nearly 20 presentations on Extension Master Gardener programing by Extension professionals from state and regional coordinators from Rhode Island to Hawaii. I am proud to be the Western Regional representative on the National Extension Master Gardener Coordinator Committee working with such fine individuals. I also want to thank David Baumbauer for helping with the post tour, which included a tour of the PGC. The participants on the post tour also had tours of the MSU campus, the Museum of the Rockies including the Tinsley house and garden, a walk down Pete's Hill, a presentation from the City of Bozeman, the city library, and time to enjoy our beautiful downtown. All this occurred during the MSU homecoming celebration. The participants left with a greater understanding of why we live and work in Bozeman.

Recipe of the Month

Apple Crumb Tart with Cinnamon Cream

1 package (17-1/2 ounces) sugar cookie mix
3/4 teaspoon ground ginger
1/2 teaspoon ground nutmeg
1/4 teaspoon ground cloves
1-1/4 teaspoons ground cinnamon, divided
1/2 cup cold butter, cubed
1/2 cup all-purpose flour, divided
4 large apples, peeled and finely chopped (about 6 cups)
1/4 cup packed brown sugar
1/4 cup raisins

Cinnamon Cream**:**
1/2 cup heavy whipping cream
1 tablespoon maple syrup
1/4 teaspoon ground cinnamon

Preheat oven to 350°. Mix first four ingredients and 1 teaspoon cinnamon; cut in butter until crumbly. Remove 1 cup mixture to a small bowl; stir in 1/4 cup flour until blended. Reserve for topping.

Press remaining crumb mixture onto bottom and up sides of an ungreased 9-in. tart pan. Bake until light brown, 8-10 minutes. Cool on a wire rack. Increase oven setting to 400°.

In a large saucepan, combine apples and brown sugar; cook over medium heat until apples are tender, 7-9 minutes, stirring occasionally. Remove from heat; stir in 1/4 teaspoon cinnamon, raisins and remaining flour. Transfer to crust; sprinkle with topping. Bake until golden brown and filling is bubbly, 20-22 minutes. Place on a wire rack; cool at least 20 minutes.

For cinnamon cream, beat cream until it begins to thicken. Add syrup and cinnamon; beat until soft peaks form. Serve with tart. Yield: 12 servings.

October Birthdays

Hannah Estabrooks	6
Emma Jobson	9
Florence Dunkel	10
Bob Sharrock	11
Monica Brelsford	13
Jamie Sherman	20
Ashish Adhikari	23