

# Plant Science Says



Happy St Patrick's Day

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The Department of Plant Sciences and Plant Pathology

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## 2015 Midwest Aquatic Plant Management Society By Ryan Thum



The purpose of the Midwest Aquatic Plant Management Society is to promote sound and appropriate technologies for the management of aquatic resources, to provide opportunities for educational advancement, to

encourage relevant scientific research in the discipline of aquatic plant management, to promote the exchange of information, and to expand and develop public interest in aquatic resources and their sustainable management. The annual conference helps fulfill this vision.

I attended the Midwest Aquatic Plant Management Society's annual conference in Indianapolis, Indiana along with two former graduate students at my previous institution (Grand Valley State University's Robert B. Annis Water Resources Institute). Each of us presented on specific portions of a broad research program investigating the potential importance of rapid ecological and evolutionary dynamics in invasive Eurasian watermilfoil populations (e.g., increased weediness and tolerance to control measures such as herbicides). Specifically, I presented numerical simulation modeling work investigating the potential impact of rapid and cryptic evolutionary dynamics on management outcomes, which I have come to phrase as, "How much evolution is required to get an aquatic plant manager fired?" My two former students, with whom I still actively collaborate, gave excellent presentations on their research. Lindsey Schulte won first prize in the student paper competition for her presentation of her research demonstrating selection for increased growth in the presence of a commonly used herbicide (2,4-D) following

operational 2,4-D management in a population of Eurasian watermilfoil. Syndell Parks won third prize in the student paper competition for her presentation of her field research demonstrating dramatically different levels of herbicide control on two cryptic types of Eurasian watermilfoil (pure versus hybrid). Both of these papers make important contributions to science-based management of invasive Eurasian watermilfoil, and have stimulated important discourse among scientists, managers, and regulators. These issues are also important in the western U.S., where the management of invasive aquatic plants is an increasing concern.

During the meeting, I was nominated for and elected to the Board of Directors for the Society and I became the Chair of the Student Affairs Committee. The purpose of this committee is to promote student membership in the Society, solicit and judge the student paper presentations for the annual conference, host a student luncheon during the annual conference, solicit and recommend to the Board of Directors funding of applications for student scholarships/grants, and to make general recommendations to the Board as to how best enhance and encourage student



*The Board of Directors with newly elected member, Ryan Thum, 4th from left, in the back row. Photo courtesy of Rich Dijonghe.*

participation in the society. This is my first time as a member of a Board for a professional society, and I am both honored and excited to take on this service position, especially as it relates to my passion for graduate student professional development. I look forward to getting my new MSU graduate students, Jeffrey Pashnick and Danielle Grimm, involved in student activities in the Aquatic Plant Management Society.

### **The Wheat Quality Council Meeting By Jim Berg**



The Wheat Quality Council (WQC) held its annual meeting, forum and technical review sessions February 17-19, 2015 at the KCI Embassy Suites Hotel in Kansas City, Missouri with over 150 participants in

attendance. Frank Schoonover, a wheat grower from Dutton and a retired member of the Montana Wheat and Barley Committee, was also in attendance from Montana.

The WQC is the only industry-wide organization that brings together all wheat interests from breeders and producers to millers and bakers. These participants are provided information on the milling and baking qualities of wheat varieties that will be released, grown and processed in the next few years.

Wheat breeders have an opportunity to network with the industry to determine what quality characteristics the millers and bakers would like to see in new wheat varieties. Sixty-eight breeder-submitted lines and checks were entered for evaluation from the 2014 growing season. These lines were hard spring and hard winter wheats. Spring wheat lines were entered from three public institutions (Minnesota, North Dakota, and South Dakota) and three private companies (Limagrain Cereal Seeds, Syngenta (AgriPro) Seeds, and World Wide Wheat LLC). Winter Wheat lines were submitted from seven public breeding programs (Colorado, Kansas-Hays, Kansas-Manhattan, Montana, Nebraska, Oklahoma and Texas) and one private company, Syngenta.

For the first time, for the winter wheat evaluation, Jagalene (AgriPro/Syngenta, released in 2003) was grown and evaluated from all locations, from Montana to Texas, as a common check variety. It has been widely grown in the winter wheat belt and has been accepted as a high quality standard by the milling and baking industry.

Besides Jagalene, the MSU winter wheat breeding program entered one 'local' check variety, Yellowstone (released in 2005, the leading winter wheat variety grown in Montana since 2012), and two experimental lines (both hollow stemmed). Within the group of eight public and private breeding programs involved in hard winter wheat submissions, the Montana lines, overall, performed well for both milling (equal to Jagalene) and bake (all exceeding Jagalene). The miller's group gave an award to Brett Carver at Oklahoma State for 'Best of Show'. 'Yellowstone' was deemed the most favorable entry for alkaline noodle quality.

Artisan bread baking tests were conducted for the first time on hard wheat entries. This was performed through a collaboration of the San Francisco Baking Institute and the Farm to Market Bread Company in Kansas City, MO. Artisan breads are a growing segment of the retail bread market, currently, with an 11% market share. Baguettes and ciabatta were baked from all samples using only four ingredients - wheat flour, water, salt, and yeast. The best set for the artisan baking staff were the 4 entries from Montana, with 'Yellowstone' as the best overall.

The theme for one of the forum presentations was "Increasing Consumer Demand for Organic Wheat Products". Talks were given by an industry publication reporter, wheat breeder, organic grower, and representatives of milling and baking companies. Less than 1% of US farmland is certified organic, but retail food sales have increased, on average, 10% per year since 1990. In 2013, 4% of total food sales in the U.S. were organic certified accounting for \$35.1 billion. Fruits and vegetables were in the lead with 40% of sales, dairy followed at 15%, then grains at 10%. 2000 was a watershed year, when more organics were sold in conventional stores than in specialty stores (even at a local Walmart, now). 82% of all consumers buy something organic in a given year.

Rich Little, on the organic wheat breeding project out of UNL (Lincoln, Nebraska) thinks that newer varieties of wheats, rather than older ones, work well in organic systems since they have benefitted from years of selection pressure. He is looking for long coleoptile (to plant deeper) and wheat with a good disease package, especially with bunt resistance. Growers face fluctuating prices. Organic wheat that sold for \$23 a

bushel in 2012, now sells for \$12 a bushel. Sometimes consumer demand outpaces supply and some organic grains are being imported from South America. On the milling side, careful documentation of wheat sources, equipment cleaning protocols, and separate binning of flours are important. Challenges to the baking industry include throughput (slower baking and line speed time) and formulation challenges (lots of seeds have to be held together by the flour!) Industry rewards, besides a growing product segment, include continued willingness of consumers to pay more for organic products than conventional.

In the next few years, technical quality concerns include increased mixing stability in wheat. The 2014 winter wheat lines met the target set by U.S. Wheat Associates 93% of the time, while spring wheat entries met the standard only 16% of the time.

### **Insects to Feed the Future By Florence Dunkel**

Environmental sustainability, personal nutrition, and, above all, deliciousness are the new mantra for food choices of the Millennial Generation. Insects fit these standards and criteria in all cases. Montana State University leads U.S. universities in having figured this out. This was the week of Edible Insects at MSU. The Jake Jobs College of Business and Entrepreneurship gets this connection. This semester, MSU Center of Entrepreneurship Director, Associate Professor Scott Bryant, chose an edible insect entrepreneur, Pat Crowley, for their Entrepreneur-in-Residence.

Pat Crowley, surf- and whitewater rafting guide with a graduate degree in hydrology, founded Chapul, Inc. 2012 in Salt Lake City based on the wise use of water that cricket protein represents compared to beef. His energy bars are now marketed nation-wide as well as internationally and they are delicious and nutritious. From flavors to product name to the logo itself, these protein bars show connections to indigenous peoples who enjoy edible insects.

This week of the Edible Insects concluded with MSU's 27<sup>th</sup> annual Bug Buffet with over 400 in attendance. New menu items this year used the new gluten-free flour, "Aketa" made from roasted house crickets, *Acheta domesticus*, produced in a human food facility in Austin, Texas. Also on the menu was a poster session on U.S./Canadian entrepreneurship in this area and food security in West Africa. The students that

presented, Sebastian Stokoff de Jong and Carly Grimm, are from AGSC 465R Health, Poverty, Agriculture: Concepts and Action Research. Pat Crowley spoke in the afternoon followed by a poster session and discussions led by foreign students from China, Peru, and the Cree Nation.



*Patrick Crowley Founder of Chapul, and Florence holding Chapul Bars.*



*Sustainable Foods and BioEnergy student, Carly Grimm preparing dishes in the University Food Service Kitchens for the Bug Buffet using fine cricket powder.*

Dunkel, 20-year Editor of the Food Insects Newsletter, suggested the topic, the entrepreneur, and chaired the committee planning the buffet. Students from AGSC 465F, BIOO 162CS and various other classes in the Sustainable Foods and Bioenergy Systems Program prepared the food for the event. MSU Catering did insect wrangling, cooking, and baking, and PSPP and the Office of International Programs helped the College of Business with publicity.

Pat Crowley spent the week teaching in ten courses in the College of Business, Health and Human Development, and Agriculture. He also gave a public lecture and a crowd funding workshop. Pat's intent is to create a consumer demand that will drive changes at the agricultural level towards a more sustainable food system. After the Bug Buffet, Crowley and Dunkel will travel to California to present at a workshop for the Institute for Food Technologists.

Hesitant to try this "other meat"? Eat a fig or a fig newton. By definition, to be a fig, there must be fig wasps and likely their parasitoids, also insects, trapped inside the fig.

For more information see [www.foodinsectsnewsletter.org](http://www.foodinsectsnewsletter.org) and <http://www.youtube.com/watch?v=W5GGKoYuXHs> and <https://www.youtube.com/watch?v=2qqYvq5qBmE>  
Bug Appetit!

### **The Plant Lipids Conference By Niranjan Aryal**



Participants from all over the world came to attend the Gordon Research Conference for Plant Lipids: Structure, Metabolism & Function held on the Galveston Island of Texas. Dr. Chaofu Lu, Niranjan Aryal and Xiaopeng Mu from Chaofu's lab attended the meeting. It was a six day meeting from January 31 -

February 6. There were talks followed by discussions every morning and evening and a poster session every afternoon. Talks and posters covered different aspects of plant lipids. Some of the topics discussed were bio-energy and industrial lipids, developments in lipidomics pathways and technology, nutritional lipids, lipids mediators and signaling. Many renowned scientists in the field were present. Participants also shared many technologies that could be useful. Interaction among the graduate students and post docs gave young scientists a platform for networking. Galveston is a beautiful island and we enjoyed seeing the town and NASA. It was a very educational and fun trip.

### **Course Focus Vegetable Production — HORT 337 By Cheryl Moore-Gough**



Vegetable Production is again being offered by the Department of Plant Sciences and Plant Pathology this fall semester. Vegetable Production has been offered alternate fall semesters and was last taught in 2013.

We will discuss many aspects of vegetable production, including classification systems, soils appropriate for vegetable production, and watering methods and cultivar selection, as well as breeding and improvement and pest management. There will be a detailed discussion of the growth requirements of various vegetables.

This class has grown in popularity and size every year since I first taught it in 2005, and in 2013, I introduced half hour group presentations based on plant families, rather than individual presentations. In 2015, each member of the group will participate in



*Hand-held flamers are effective for control of between-row annual weeds. Larger operations can use motorized rigs.*



*Interplanting is commonly used in small vegetable farms*



*Small- to mid-sized vegetable growers can use planting aids, such as this Brassica transplant planter.*



*Much manual labor is used in small vegetable and specialty crop operations. Here, workers at Running Strike Farm south of Bozeman tackle weeds.*

the group “family” presentation, and produce his or her own paper on a different member of the family.

The final includes a take-home project requiring students to plan and map a 1,000 sq. ft. vegetable plot to utilize methods and principles learned during the semester for proper plant placement, spacing and cultural requirements. Students must identify the purpose of their plot, for example, whether to supply a roadside stand, start-up CSA, or feed a family of four for a year. Varieties selected for the plot must support the appropriate purpose.

This course is designed to take students beyond simple vegetable gardening, which is fraught with misinformation, into the application of scientific principles as they apply to vegetable culture.

I am available to answer any of your questions – [cheryl@montana.edu](mailto:cheryl@montana.edu).

### **Northwest Flower and Garden Show By Cheryl Moore Gough**

The Northwest Flower & Garden Show is a huge event that is held in downtown Seattle’s Convention Center every year in February. It features a hall with landscaping companies building competitive full-scale gardens, including boulders and water features, two large seminar rooms and a DIY stage for demonstrations. In addition, this year the show hosted a “Garden Wars” contest in which two teams (led by local radio and television personalities) competed with supplied plant material to build a full garden within an hours’ time, much like Iron Chef’s cooking contests. And did I mention vendors? You could buy anything from an air plant to a full-size sauna.

Busloads of gardeners have travelled to the show in past years from Montana, Wyoming, and Idaho, but they came away with few ideas they could apply to their cold-climate gardens, since the speakers have been instructed to focus their presentations to be applicable to USDA Hardiness Zones 7 and 8.



*This display garden featured bee boards and other pollinator-friendly features.*



*This garden features a deck with artificial fireplace and a reflecting pool.*

I was contacted by the manager of the show to see if I would be available to present a talk this year on, as she put it, "Gardening in Zone 5" to satisfy this niche. My presentation, "Cold Climate Gardening: It's More Than the Zone" was very well received by a packed house, and many folks stopped by to thank me for giving them something they could actually use in their home landscaping and garden attempts. I also enjoyed visiting with a number of Montana Master Gardeners who took the classes when I taught them, and even a couple of Dr. Bob's previous students.

It sounds like the cold climate idea was a hit, and hopefully more gardeners from the Rocky Mountain states will trek to Seattle next year.

### **Montana Ag Live March Shows**

March 22 - Perry Miller, MSU "Diversified cropping systems in Montana and utilizing cover crops in Montana".

March 29 - Mac Burgess, MSU Assistant Professor of Small Scale Agriculture, "The economic potential of small farms in Montana".

### **Publications**

Ferris Jabr, The New York Times, "It's Buggy Out There". February, 2015. This article is about determining the role of bacteria in bioprecipitation, including rainfall and snow in Montana.

### **Grants**

Mac Burgess and Zach Miller, Montana Dept. of Agriculture, "Northern Plains Vegetable Variety Testing".

Nina Zidack and Michelle Flenniken, Montana Dept. of Agriculture, "Evaluating generation resistance to Potato Virus Y in potato".

Mary Burrows, Montana Dept. of Agriculture, "Detection of fungicide resistant *Ascochyta* blight"

Michelle Flenniken, Montana Dept. of Agriculture, "Montana's Bee Viruses: Identification and Transmission"

### **Master Gardener in the Montana Women's Prison**

**By Toby Day**

#### **Extension Horticulturist**

I recently had an opportunity to teach a Master Gardener class at the Montana Women's Prison in Billings. This was not my first time there. This remarkable program has been going on for three years and is spearheaded by Sharon Wetsch, a Level 3 Master Gardener from Forsyth. Sharon drives over 100 miles each way to facilitate the class along with 4-5 other Yellowstone County Master Gardeners that help answer questions.

To date, there have been over two dozen inmates that have certified in the program. The test scores of the inmates are routinely much higher than the average scores across the state. No small feat since they do not have any internet access. There have even been some perfect scores!

To become certified they have to volunteer just like any other Master Gardener. However, they do so in the prison, spending most of their time working at a newly built greenhouse and garden area for minimum



*Recently graduated Level 1 Master Gardeners*



*Past Master Gardener graduates of Level one (in yellow) and Level 2 (in green).*



*Women's Prison melon patch with greenhouse in the background.*

security inmates. They grow their own food that is then prepared in the kitchen for the other inmates. Bob Paul, the deputy warden that oversees the inmates in the garden speaks very highly of the progress they have made.

We are starting to see inmates being paroled and released. Our hope is that they will continue implementing what they have learned in their employment and volunteering back in their community. I am really proud of the accomplishments of the inmates, but more importantly, the Master Gardeners who put this program on for an underserved audience to help them gain knowledge, experience and worthiness in an overall bleak environment.

### **Recipe of the Month**

#### St. Patrick's Day Casserole

1 1/4 pounds red potatoes cut into 3/4-inch cubes  
 4 cups chopped cabbage  
 1 1/2 pounds cooked corned beef, cut into

3/4-inch cubes  
 1 1/2 cups shredded Swiss cheese  
 1/3 cup coarse-grained mustard  
 1/2 cup white wine  
 1 teaspoon garlic powder  
 1 teaspoon ground black pepper  
 4 sheets phyllo dough thawed  
 2-3 Tablespoons melted butter



Place red potato cubes into a large saucepan, cover with water, and bring to a boil. Cook potatoes over medium-low heat until tender, about 15 minutes; drain well. Place chopped cabbage into a saucepan and cover with water; bring to a boil. Reduce heat to medium-low and simmer the cabbage until tender and softened, about 15 minutes; drain well.

Preheat the oven to 375 degrees F (190 degrees C). Spray a 9x13-inch baking dish with cooking spray. Lightly toss potatoes, cabbage, corned beef and Swiss cheese in a large bowl until well combined. Stir together mustard, white wine, garlic powder, and black pepper in a bowl until smooth; mix into corned beef mixture. Spread the mixture into the prepared baking dish. Lay a phyllo sheet onto a work surface and brush with melted butter. Place the phyllo sheet onto the casserole, folding the overhang back over the dish; spray the dry side of the overhang with more melted butter. Brush the last sheet with melted butter. Bake in a preheated oven until phyllo sheets are crisp and browned and the casserole is hot, 45 to 55 minutes.

### **March Birthdays**

Andrea Varella	11
Erin Troth	24
Hillary Parkinson	28
Elaine Nichols	31
Eva Grimme	9



**Please go to the next page for Your Wildlife Moment.**



*Hawks 1, pigeons 0! Photo taken by Tamara Parnell just outside the Plant BioScience Building on 2/11/15.*