



Bulgaria Partnership Development By Doug Holen

Building on a year long cooperative effort with the Bulgarian company Agrotime, Darin Oelkers with Tech Transfer and myself visited the operation from June 21-28th. The goal was to learn more about the climate, production practices, and potential for growing Montana winter wheat varieties.

Currently, 70% of the winter wheat hectares are in a single variety out of France in addition to Austrian genetics. Bulgaria's total land area is comparable to Tennessee but agriculture is significant. Typical crop rotations include winter wheat, corn, sunflowers and rapeseed. However, it is not unusual to also see winter barley, lavender, forages, pulses, and some horticulture crops. Similar to Montana, the obstacles to yield are moisture and heat. The differences include an extra month of growing season in the fall and early spring with very good soils. Weeds, diseases and insects are intensely managed with inputs and GMO crops absent in production.

We spent our time traveling the country to see the potential for our genetics as requested. Along the way, we met with agronomists, progressive farmers, a private genetic evaluation company for Europe, Bulgaria's seed testing agency, and even visited with personnel in the United States Embassy. Our initial



Agrotime owner Ivan Ivanov, Bulgarian National Ag Broadcast reporter, and Doug Holen in field during winter barley harvest.



Bulgaria's Seed Testing Agency with site director at south-central location evaluating Yellowstone and Decade.



Private company variety testing location in NE Bulgaria with cooperating producer on left, and researcher Darin Oelkers of MSU Tech Transfer (middle) and Agrotime owner far right.

teaching approaches at MSU. Cameron's participation at AIARD was partially supported by Dr. Hiram Larew who participates in AGSC 465R by phone-in as a co-instructor. Before the meeting, Florence met with Sonny Ramaswamy, Director of USDA's National Institute of Food and Agriculture to discuss ways of incorporating culture and its critical role in the food and agricultural sciences into curricula nationwide. She also made a brief stop at the vegetable garden's and farmers' market beside USDA headquarters on the National Mall. While in Washington, DC, Cameron was also able to attend a Farm Bill hearing on Capitol Hill.

variety submissions for evaluation of Yellowstone and Decade looked good just prior to harvest. Plans were made to move forward with submitting additional lines for seeding this fall in an attempt to establish markets in Bulgaria and Romania. Take home messages from this trip included a much better grasp of production agriculture, genetic goals for the region, our similarities, and the potential of a solid partnership.

**Association of International Agriculture and Rural Development (AIARD) Annual Conference
By Florence Dunkel**

June 2-7, Sustainable Foods and BioEnergy (and AGSC 465R) student, Cameron Ehrlich and course instructor, Florence Dunkel traveled to Washington D.C. to participate with 125 leaders and students in the 53rd annual AIARD conference. This year's conference which focused on Climate Smart Agriculture provided both Cameron and Florence with good insights into the latest thinking on how we meet climate challenges. It also offered them plenty of opportunities to network with movers and shakers in the international agriculture community, and to showcase innovative



Florence visits the USDA Farmers' Market on the National Mall prior to AIARD meetings.

Florence was warmed by the surprise talk presented at the AIARD meeting by USAID staff on the role of edible insects in food security; this was a first-ever endorsement made by USAID about the potential powerful role of entomophagy worldwide. And, yes, Florence was prepared! She handed out Montana grown and baked Cowboy Cricket Farms' and Big Sky Bakery's Chocolate Chirp Cookies for the 2-hour workshop on Insects for Food and Feed that followed.



From left: Cameron Ehrlich, 2017 MSU (Sustainable Foods Bioenergy Systems) graduate, Florence Dunkel, Hiram Larew at the 53rd annual AIARD meetings in

Journal Club braved the elements for the privilege of touring the Droge family farm in Manhattan, Montana. The Droge farm has been family owned since 1905, when Jacob Droge first homesteaded the land in what was then known as the “Dry Hills” region.

As the 5th generation to own and work this family farm, Tim Droge had a plethora of knowledge to share with us as he showed us out to one of his many fields on Saturday. Tim explained to the group the careful regime he follows to ensure that a field of barley meets malting quality, his experiences dealing with the wheat-grower’s bane: the wheat stem sawfly, and how he manages aphid-vectored virus transmittance in a field of seed potatoes (mineral oil applied in a mist, a trick he picked up several years ago from MSU’s own Barry Jacobsen).

Our main take-away from the trip to Washington, D.C.: Montana State University food and agriculture students should be encouraged to participate in AIARD and other such meetings because they learn so much about current issues, meet with those who are shaping such issues, may be able to attend relevant sessions on the Hill, and visit with other students about career paths at USDA, USAID, and many other international agricultural organizations. Most importantly, they have a chance to Speak to Power about the good work that is being done at MSU.

Dr. Hiram Larew, recently retired USDA NIFA Director of the Center for International Programs, is a PSPP Affiliate Faculty member.

Congratulations Cameron! Thank you Hiram for Cameron’s travel grant!

A PSPP Journal Club “Field” Trip By Traci Houglund

On Saturday, June 10th, members and friends of the PSPP Graduate



Top: A Droge Farms’ field in the shadow of Hollowtop Mountain, Manhattan, Montana. Pictured from left: Dylan Mangel, Sheyenne Rivers, Kevin King, Cirano Melville, Traci Hoogland, Uta Stuhr, Andy Burkhardt, Tim Droge, Emma Jobson, Brittney Brewer, Kendra Hertwick. Photo credit: John Borawski.

Bottom: Dry Hills Distillery Hollowtop Vodka and Droge Farm potatoes. Photo credit: Dry Hills Distillery.

The Droge Farm is on a five year rotation including wheat, malting barley, peas, and seed potatoes. Although each of these crops is fairly common in the region, it is what the Droge family started doing with their harvest in 2016 that is especially exciting. In 2016, the family opened the Dry Hills Distillery in Four Corners, MT – a family owned distillery dedicated to making “farm-to-bottle” spirits. Farm-to-bottle means that all of the spirits produced by the distillery are made from Droge Farm ingredients, crafted on-site and hand-bottled with the field of origin written on the back of every label.

After the field tour, the group traveled to the Distillery to see the distilling process first-hand and, of course, to sample the finished products. With their farm-to-bottle premise, the Dry Hills Distillery is able to make 100% potato-based vodkas and gins from their own fresh, not flaked, potatoes. They also distill wheat and barley whiskeys crafted from their own cereals and are now also experimenting with a rye based whiskey and a true Straight Bourbon whiskey. The Bourbon is currently undergoing a two-year barrel aging and should be available in 18 months or so, but, true to their original farm-to-bottle principles, the Distillery will not begin bottling a rye whiskey until they are able to work rye into their own field rotation – a task made difficult by the lack of spring rye varieties.

When Jacob Droge settled on his homestead in 1905, I’m sure he never imagined that his great-great grandchildren would one day be making hooch from his humble potatoes. But the Droge family has adapted to the changes in farming and agriculture for more than 100 years and the Dry Hills Distillery is simply a continuation of that story - another example of a Montana family producing a uniquely Montanan product.

Jobson Wins Award

Emma Jobson won first place in the 2017 graduate student speaking competition at the Western Section of Crop Science Society Annual meeting held in Parma, Idaho, June 6-7, 2017.



Regarding the A.K. Dobrenz Student Competition: The A.K. Dobrenz Graduate Student Awards were formally named in 1997. Dr. Dobrenz was a Professor at the University of Arizona, an early participant in the meetings, and an avid supporter of graduate student participation at the WSCS meetings.

New Employees

Autumn Weis (Accountant)



I have been hired as an Accounting Associate in the PSPP Department as of June 26th. My background includes extensive accounting experience in the oil and gas industry and most recently in the medical

field. Florida has been my home for the last three years; however, having been born and raised in Billings, it is good to be back in Montana. I am looking forward to working at MSU and getting to know the local hiking and fishing areas.

Sarah Olivo (Cereal Quality Lab)

My name is Sarah, and I just joined the team in the Cereal Quality Lab. I grew up in



Sarah Olivo

Bozeman and I obtained a B.S. in Animal Science here at MSU in 2014. After graduating, I spent two and a half years working as a lab technician in Animal & Range Sciences. My prior work experience was mostly focused on human and animal

microbiome research in Dr. Carl Yeoman's lab. In my free time, I enjoy gardening, hiking, attempting to cook, and hanging out with my animals.

Grants

Andreas Fischer, "A novel approach to barley and wheat drought resistance", Montana Wheat and Barley Committee.

Mike Ivie, "Exotic Wood Borer and Bark Beetle Traps 17", Montana Department of Agriculture.

Mary Burrows, "A Decision Tool for Assessment of Wheat Streak Mosaic Risk" USDA NIFA CARE Project.

Jamie Sherman, "The Rocky Mountain Malting Barley Cooperative, "USDA NIFA CARE Project.

Invited Talks

Hikmet Budak, Montana Ag Summit 2017, June 1, 2017, panel member on the panel: Looking Towards the Future: Developments in Ag Research and High Tech Ag .

Publications

K. Y. Wang, G. A. Strobel, D.-H. Yan. Abstract The Production of 1,8-Cineole, a Potential Biofuel, from an Endophytic Strain of *Annulohyphoxylon* sp. FPYF3050 When Grown on Agricultural Residues. (1770 K) ePub, Pub. Date: June 21, 2017, DOI: 10.4236/jsbs.2017.72006

A Special Issue was published on "Abiotic Stress and Gene Networks in Plants

2017" of *International Journal of Molecular Sciences* (ISSN 1422-0067) by Guest Editor, Hikmet Budak. (http://www.mdpi.com/journal/ijms/special_issues/abiotic_stress_plant_2017)

James Rolin, Florence Dunkel, Edward Dratz. Commercialization of High Omega-3 Food Production Through Selective Breeding and Diet Modification of *Acheta domesticus*. Montana Board of Research Commercialization and Technology.

Strobel Issued Patent

Patent number: 9624515

"System and method of producing volatile organic compounds from fungi"

Filed: February 1, 2013

Date of Patent: April 18, 2017

Inventors: Gary A. Strobel, Angela R. Tomscheck

The Zen Approach to Aphids and Powdery Mildew, Common Garden Issues in July

By Toby Day

Extension Horticulture Specialist

The common reaction for most people in finding aphids in their landscape is to reach for pesticides. The most commonly used pesticide is insecticidal soap, but some reach for the malathion too. However, I have a different approach. Oftentimes, a strong blast from the hose to the underside of the leaves will do the trick. If they persist, just give a week or two and scout for the biological control to move in. Since having this more "Zen" approach to aphids I have found that my plants are visited more often by lacewing larva, lady bird larva and even parasitic wasps. It was explained best by Dr. Whitney Cranshaw, author of *Garden Insects of North America*, he said, you need to have a food source present for the biological controls to work. For years, I have had apple aphids on my apple tree in my front yard. And for years I sprayed them with insecticidal soap. Now I just let Mother Nature (i.e. Biological control) do her work. Within about 3 weeks I can truly say there are very few, if any, aphids remaining. I do

help by fending off ants (by using ant baits and putting a band of Tanglefoot (<http://www.tanglefoot.com/smg/gocat/tree-care/cat10980001>) around the trunk to keep the ants from guarding the aphids. This has helped immensely.



Putting Tanglefoot around to keep ants from moving up the tree.

Powdery mildew

Powdery mildew has also been an issue in my garden. There are some plants that naturally get powdery mildew such as bee balm, many squash, and even turfgrass. However, many other plants can get powdery mildew if the environmental conditions are right. There are two simple solutions to reducing powdery mildew. The first is to water only in the morning. Once I changed my watering practice to the a.m. rather than at night, occurrence of powdery mildew has decreased in my yard and garden by at least 90%. The second solution is to allow for more air movement around susceptible plants. Prune back shrubs,



Powdery mildew on grape leaves

branches, and or perennials to allow air movement. And, if you have a fence, look to see if the design of your fence allows air to move through it. The common privacy fence built today is erected by attaching pickets to the rails so tight that there is no air movement. No air movement is one reason that powdery mildew persists in many of the homes that have been built recently. A proper fence should allow for some air movement.



*Top to Bottom:
An improperly designed fence will not allow air movement through the fence.*

A properly designed fence will allow for some air movement through the fence.

For a true privacy fence, offset the pickets to allow air movement.

**New Extension Master Gardener
Coordinator
By Toby Day**



I am excited to report that the new MSU Extension Montana Master Gardener Coordinator will be Dara Palmer. Dara has been the Assistant Master Gardener Coordinator for 6 years and will be filling the administrative role as the state coordinator as of July 1. I will still be involved in Master

Gardener in the capacity of helping write curriculum, teaching Master Gardener classes as well and presenting at conferences etc. In her past role, Dara was already performing 80% of the duties of the state coordinator. This change will allow her to oversee the remainder of the administrative duties and to make decisions to better the program.

This change allows me to better concentrate on consumer horticulture extension work and to get caught up on reviewing and writing MontGuides, as well as producing fact sheets of various subjects concerning yard and garden questions. Although it was a tough decision to let go of my responsibilities as the state Master Gardener Coordinator, I believe it will be the best move to better serve the agents and clientele of Montana.

Master Gardener will be in very capable hands as Dara will be able to move the program in a positive direction. She has great ideas, is very organized, and will better align the program to meet the national standards of Master Gardener. This means that there may be some changes in the future, but for now the program will look much the same throughout the growing season. The only thing that will change in the near future will be the Master Gardener contact information. Should you have any questions regarding the program, please contact Dara Palmer at dara.palmer@montana.edu or call 406-994-2120.

It has been a great pleasure overseeing the Master Gardener program for the last 7 years. I will still be on campus in my role as Extension Horticulture Associate Specialist and am happy to answer any questions you may have in the horticulture realm.

**Master Gardener Course
By Dara Palmer**

The 2017 Level 3 Master Gardener course was held June 22-24. There were 25 participants from 10 counties across the state. This three-day, intensive course included: Real Colors training; insect, weed and disease presentations from the students; consumer Integrated Pest Management training as well as tours of the Schutter Diagnostics Lab, the Horticulture Farm and the Plant Growth Center.

Saturday the group toured several Livingston attractions including Paradise Permaculture, the Livingston Food Resource Center and Montana Roots Aquaponics. These tours are designed to get the students thinking about what they can take back home to their communities to hopefully spearhead a new community development project in their county; or at the very least generate awareness about cutting edge horticultural developments happening around the state. Level 3 Master Gardeners are obliged to donate 40 volunteer hours directly helping their county Extension office. Level 3 is the highest ranking of Master Gardener in Montana.



Sam Muscari of Montana Roots educating Level 3 Master Gardeners on the workings of an Aquaponics operation.



Mona Lewis of Paradise Permaculture speaking to the Level 3 Master Gardeners about raised beds.

A big thanks to our guest speakers: Dan Clark-Extension Local Government Center Director, David Baumbauer-Plant Growth Center Manager, Eva Grimme-Plant Pathology Diagnostician, Laurie Kerzicnik-Extension Specialist, and Noelle Orloff-Plant ID Diagnostician.

Birthdays

- Jinling Kang 1
- Mary Burrows 7
- Mina Botros 7
- Megan Getz 7
- Andy Hogg 8
- Susan Siemsen 22
- Alex McMenamin 24
- Andy Burkhardt 27



Recipe of the Month

Piri Piri Chicken

Courtesy of Christopher Kimball's Milk Street Cookbook

- 3 T New Mexico or California chili powder
- 1 T ground cumin
- 1 T ground coriander
- T sweet paprika
- 1 1/2 T kosher salt
- 4 - 4 1/2 lb whole chicken
- 2 T white sugar
- 8 medium Fresno chilies, stemmed and quartered (if you want this to be less spicy, remove some or all of the sides and ribs from the chilies.



- 3 medium garlic cloves
- 1/3 c lemon juice
- 1/4 c red wine vinegar
- 1 c fresh cilantro leaves and tender stems, finely chopped

In a medium bowl, mix together the first five ingredients. Set all of the mixture aside except for 2 T. Using a small spoon, evenly distribute the 2 T of spice mixture under the skin and then rub into flesh. Set chicken aside on baking sheet.

In a food processor, combine the reserved spice mixture, the sugar, chilies and garlic. Pulse until finely chopped, scraping down the bowl as needed. With the machine running, pour in the lemon juice and vinegar; process until smooth, scraping down the bowl once or twice. Measure out 1/4 cup of the sauce, reserving the rest for later, and brush evenly over the chicken, including the bone side. Let stand at room temperature for 45 minutes to 1 hour.

Meanwhile, prepare a grill for indirect, high-heat cooking. For a charcoal grill, spread a large chimney of hot coals evenly over one side of the grill bed; open the bottom grill vents. For a gas grill, set half of the burners to high. Heat the grill, covered, for 5 to 10 minutes, then clean and oil the cooking grate. Set the chicken skin side up on the cooler side of the grill. Cover and cook for 25 minutes. Using tongs, rotate the chicken 180 degrees to bring the far side of the chicken closest to the heat. Cover and continue to cook until the thickest part of the breast reaches 160°F and the thighs reach 175°F, another 25 to 35 minutes.

Brush the chicken with 2 tablespoons of the reserved sauce, then use tongs to flip it skin side down onto the hot side of the grill. Cook until the skin is lightly charred, 1 to 2 minutes. Transfer skin side up to a

cutting board and let rest for 10 minutes. Stir the cilantro into the remaining sauce, then baste the chicken once more. Serve with the sauce on the side.

