

# *Plant Science* *Says*



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The Department of Plant Sciences and Plant Pathology

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## **Budak Joins Faculty**



Hikmet Budak will be joining the PSPP faculty as the Plant Sciences Endowed Chair starting January of 2016. He comes to us from the Biological Sciences and Bioengineering Program at Sabanci University in Istanbul, Turkey.

"I am delighted to be the inaugural Montana Plant Sciences Chair housed at Montana State University", Budak said. "I'm very much looking forward to joining the university, stakeholders and producers to develop a research program that has the capacity to make an instrumental difference in the state's highest-grossing industry."

## **Barry Jacobsen - New Associate Director for COA**



After serving as the Interim Department Head of Research Centers, Barry Jacobsen has accepted the position of Associate Director of the Montana Agricultural Experiment Station and Department Head of Research Centers. His

duties include leading, coordinating, and administering MAES Research Centers and campus associated faculty research and outreach programs; recruiting personnel, managing budgets, and evaluating performance (annual, retention, promotion/tenure).

Barry's phone number is the same—5161; however, he has relocated to 211 Linfield Hall and his email has changed to [bjacobsen@montana.edu](mailto:bjacobsen@montana.edu).

## **USDA NIFA Director visits COA and PSPP By Florence Dunkel**

To a standing-room-only crowd, Dr. Sonny Ramaswamy, Director of the USDA National Institute of Food and Agriculture (NIFA), presented MSU faculty and students with the challenges of our hotter, flatter world. He encouraged us to read Pasteur's Quadrant: Basic Science and Technology Innovation. Sonny also suggested we all view 'Interstellar', a 2014 epic science fiction film directed by Christopher Nolan and starring Matthew McConaughey, Anne Hathaway, Jessica Chastain, and Michael Caine. Sonny reminded us to think in terms of nutrition security rather than food security and to look for increases in available nutrients to feed the world's populace by reducing pre-consumer and post-consumer food waste. He also encouraged us to explore the other 50,000 species of plants for drought tolerant, nutrient rich, and soil enriching properties instead of focusing only on the 15 to 20 food plant species worldwide that contribute most of our calories and nutrients.

Ramaswamy is, as MSU College of Agriculture Dean Charles Boyer noted in his introduction, the perfect person to lead USDA NIFA. Starting as a professor of Entomology at Mississippi State specializing in natural product toxicology, Sonny rose to be Department Head at Kansas State University, and then Dean at Oregon State University. Sonny is well known as an outspoken leader in the Entomological Society of America, particularly speaking out for the equal status of women. His supervisor is now the U.S. Agriculture Secretary Tom Vilsack.

After his 45 minute talk, Sonny fielded questions on the path forward for the Extension Service; directing agricultural research, teaching, and extension to focus on human health; fish farming; and FDA regulations for edible insects and insects for feed. The Ag Innovators group (led by Ed Dratz and Dave Sands) announced Land Grant 2.0, a new concept for Land Grant Universities focused on health. MSU Vice President Renee Reijo Pera reminded us that Sonny was appointed to the



*Dinner with Sonny Ramaswamy, Director of USDA NIFA. From Left: Florence Dunkel, David Weaver, \*Cara Thuringer, Michael Ivie, Michelle Flenniken, \*Sierra Alexander, Sonny Ramaswamy, \*Greta Robison. Standing: Dean Charles Boyer and Vice President of Research and Economic Development Renee Reijo Pera. \*former students from AGSC 465R.*

15-member Board of Directors of the Foundation for Food and Agricultural Research (FFAR). This Board is authorized as a non-profit corporation by Congress through the 2014 Farm Bill to leverage public and private resources that will increase scientific and technological research, innovation, and partnerships critical to boosting America's agricultural economy. Congress provided \$200 million for the Foundation which must be matched by non-federal funds as the Foundation identifies and approves projects. Sonny then met with USDA grant recipients.

At his request, Ramaswamy gathered for dinner with several students from AGSC 465R Health, Poverty, Agriculture: Concepts and Action Research and their professor Florence Dunkel along with other entomology faculty: Michelle Flinnekina, Michael Ivie, and David Weaver. Hosting the dinner were Charles Boyer and Renee Reijo Pera.

Preceding the Town Hall meeting and seminar, Ramaswamy visited the Museum of the Rockies and hiked the Spanish Peaks area with Dean Charles Boyer. Following the day on campus, Dean Boyer and Ramaswamy spent the day on the Apsaalooke Reservation, meeting with the President of Little Big Horn College, Dr. David Yarlott. Antioxidants, native berries, linking courses in MSU College of Agriculture with LBHC courses, and a new option for the Tribal College in Native American Agriculture were part of that conversation.

## **Western Wheat Worker's Conference By Nancy Blake**

The annual Western Wheat Workers meeting was held at MSU July 7-8. More than 70 breeders, researchers, students and industry representatives attended from Idaho, Washington, Arizona, North Dakota, Utah, Colorado, Oregon and even Ohio. After a brief introduction from Luther Talbert, the Tuesday morning session highlighted some of the wheat research in Montana. PhD candidates Andrea Varella and Erin Burns spoke about their research projects involving the wheat stem sawfly and herbicide resistance. Bob Stougaard, superintendent of NWARC, updated the group on the spread of the orange wheat blossom midge and the new resistant spring wheat variety, Egan.

Li Huang and Mary Burrows described research efforts on wheat diseases, including wheat streak mosaic virus, scab and rusts. Scott Cooley of the USDA Federal Grain Inspection Service explained issues about inspection of wheat from the western part of the U.S. prior to export. Interesting questions and discussion followed each presentation.



*Wheat breeder, Craig Cook, explains the field and genetic testing that Northern Seeds provides to breeding programs.*



*Variety trials at the Northern Seeds testing site west of Four Corners.*

Martin and students Hannah Estabrooks, Jacob Kammeraad and Emma Jobson explained their research on improvement of wheat quality by introducing novel mutations in important wheat traits. Alan Dyer showed trials his group is conducting on nematodes and fusarium crown rot. Phil Bruckner and Luther Talbert reviewed their current breeding objectives. Several of the visiting breeders took the opportunity to observe their varieties in regional trials grown at the Post Farm. Next, the group drove to the field trials of Northern Seeds, west of Four Corners. Owner Ron Ulen and breeder Craig Cook showcased the field testing they are doing for various collaborators including MSU.

By this time everyone was ready for a cool drink and dinner, hosted by Northern Seeds, at their company facilities. This was a great time to catch up with old friends and colleagues. The next morning concluded with state reports discussing issues and results in the Western region. Many thanks to Irene for her organizational talents.

### **Pacific Northwest Economic Region Annual Summit (PNWER)**

**By Laurie Kerzicnik**

The PNWER Summit was held in Big Sky, Montana on July 13 and 14. This was the first time the Summit was held in Montana and over 500 leaders in government, business and academia from the Northwest region and Western Canada came together for the meeting. Some of the keynote speakers included Senator Steve Daines, Ambassador Bruce Heyman (US Ambassador to Canada), Governor Steve Bullock, and Matt Rose (Executive Chairman of the BNSF Railway Company).



*Jason Cook shares his field research project at Post Farm with the Western wheat breeders and researchers.*

After a catered lunch and socializing in the Mathre Courtyard, everyone drove to the Post Farm for the field tours. Mike Giroux, Jack



*Governor Steve Bullock speaking at the PNWER conference on July 13.*



*Perry Miller talking to PNWER agricultural leaders at the Post Farm in Bozeman.*

I was invited to speak during one of the "Invasive Species" breakout panels. I spoke on the Emerald ash borer, which has not been detected yet in Montana, but is an imminent threat to Montana and anywhere in the northwestern region of the United States where ash is grown. This is the first time that they have included insects as part of the "invasive species" panel, so it was good to bring attention to an important invasive and insects in general. Additionally, several state legislators were present during the panel. One state senator in particular, John Brenden (Senate District 18), was interested in our early detection efforts for Emerald ash borer in his district in the northeastern part of the state.

**Update on the Pollinator Garden**

On July 22, numerous volunteers planted primarily native plants, including Blanketflower (*Gaillardia aristata*), Rocky Mnt. Penstemon (*Penstemon strictus*), Silver Leaf Phacelia (*Phacelia hastata*), Hairy False Golden Aster (*Heterotheca villosa*), Hairbell (*Campanula rotundifolia*), Yarrow (*Achillea millefolium*), Bee Balm (*Monarda fistulosa*) which were donated by Anthony Slominski (Ecology Department). They also planted other plants purchased from Cashman's Nursery with a grant from the Montana Native Plant Society, a donation from Don Mathre, support from Dr. John Sherwood, PSPP Department Head (storage shed and pavilion), and Vice President for Research (VPR) start-up funds. This site features bee friendly forage and habitat, a pavilion, an equipment shed for educational and beekeeping materials and eight honey bee colonies which will be moved to the site in September 2015.



*Michelle Flenniken overseeing the many volunteers that helped to plant the Pollinator Garden.*



Thank you to the many faculty members and MSU students that have been involved with this project including: garden design (H. Begger, Landscape Design, mentored by Dr. J. Britton), observation colony construction (R. Running, mentored by Dr. S. Mast, School of Art), and educational signage plans (E. Garcia, BioEngineering; M. Martin, Microbiology; D. Bergey, Cell Biology; and I. Cavigli, Cell Biology, mentored by Dr. M. Flenniken). Important team members include: Michelle Flenniken and Flenniken Lab members; David Baumbauer (Horticulture Farm, Manager) and Horticulture Farm Staff (Jessica, Alison), volunteers and donations including: Don Mathre (doner and volunteer), Toby Day (volunteer), Tomas Gideon (volunteer), and Anthony Slominski (plant material), as well as Cashman's Nursery (Shelly Engler, Project Leader).

**Course Focus**  
**AGSC 341 - Field Crop Production**  
**By Mac Burgess**



Previously offered in spring of alternate years, AGSC 341 enrollment swelled to 84 students in Spring 2014 and the course is now offered annually to an enrollment I hope stays in the mid 40's. AGSC 341 is taken by students from diverse

backgrounds and majors including Sustainable Food and Bioenergy Systems, Crop Science, Animal Science, and Agricultural Business. AGSC 341 students develop an appreciation of the scale and diversity of the global agricultural landscape and economy; learn how to identify and interpret reliable sources of information about crop production; and demonstrate the application of principles of plant and soil science to informed decision making in various crop management scenarios. Introductory material includes crop ID, crop growth stages, market classes, production acreage, and production areas for major U.S. field crops. We then ask the questions "Why do we grow what we grow where we grow it?" and "What can (or can't) we grow here?" using tools like NASS Cropscape to see what others are growing, web soil survey to learn about important soil characteristics, historical climate data to summarize rainfall and temperature patterns, and USDA-AMS data to learn about

market opportunities. In the final weeks of the course, students work in small groups to develop detailed crop production plans for a crop and location of their choosing. Conventional and alternative production practices are covered with a focus on understanding the importance of decision making at each crop growth stage. Topics of focus for decision making include tillage systems and seed-bed preparation, variety/hybrid selection, planting density and timing, weed and pest control, crop water use and irrigation, soil fertility, harvesting technology, post-harvest handling, marketing, and assessment of environmental impact and sustainability.

**New Employees**

Liz Elmore



The smiling face you have been seeing around the halls is Liz Elmore, the new field technician & research associate with Jamie Sherman's barley breeding program. She is excited to make Bozeman her new home and start exploring trails,

climbing crags, and fishing the rivers. Her partner Hillary is a personal trainer and will be joining her this fall after completing a long-distance hike on the Pacific Crest Trail.

Liz found herself in a career in agricultural research somewhat accidentally. Throughout her twenties, she worked on farms in exchange for room and board as she hitchhiked around the country. These farming skills earned her a position as a research technician at the Land Institute in Salina, Kansas, where she was trained in the art of breeding perennial wheat, sunflower, and sorghum. She was hooked on the excitement of plant breeding and decided to pursue a formal education to strengthen her skills. After picking up a Plant Science B.S. from Kansas State and Crop Science M.S. from Washington State, she is ready to get back to the fields.

Liz is thrilled to be a part of the new barley breeding team Jamie Sherman is building. Since her arrival, she has hit the ground running, taking field notes, preparing for harvest, and making crosses for future Montana State barley varieties!

## Tracy Walker



Hello, my name is Taylor Walker. I was born in Nebraska, but was raised in the far eastern half of South Dakota, which was pretty much Minnesota (the border was less than two miles from my house). I moved to Montana halfway through my senior year of high school and then attended MSU for my undergraduate

education. I graduated this spring with a B.S. in Cell Biology and Neuroscience.

In my spare time I like to bike around town, hike, take strolls with my corgi Rhombur, crochet, read and write novels and poetry. My love for writing started in middle school where I hand wrote a story over 300 pages long. Back then I wanted to major in English, but when I remembered how much I disliked grammar, I changed my mind. I owe my love for science to my mother who, before she retired, worked in a lab at South Dakota State University and as a laboratory tech in various hospitals. After school I would go to the hospital and she would tell me to look at various tissue samples under the microscope and tell me to explain what I saw.

I am really looking forward to working in the Cereal Quality Lab and getting to know everyone in the department.

## **New Graduate Students**

### Traci Hoogland (Jamie Sherman)



An Iowa native, I graduated from Dordt college in 2011 with a BS in Biology.

Most recently, I come to MSU from Cornell University where I worked as a Plant Pathology Research Technician in Geneva NY.

This fall I will begin my graduate studies in plant breeding under Dr. Jamie Sherman.

In my free time I enjoy running, hiking, backpacking and finding ways to garden without a garden.

## Emma Jobson (Mike Giroux)



I'm a new PhD student in Mike Giroux's lab. This fall, I am excited to begin my research investigating variations of reduced height genes in wheat. Before moving to Bozeman in July, I lived my entire life in Fort Collins, Colorado. I

completed my undergraduate education at Colorado State University and received a BS in Horticulture. My parent's manage farms near Ft. Collins, which is where I first developed an interest in agriculture.

In my free time, I enjoy biking and hiking with my dog in the summer and skiing and curling in the winter. I have also been a competitive figure skater for most of my life, so I'm looking forward to getting back on the ice. I've enjoyed my first few weeks in Bozeman and I'm excited to explore more of Montana.

## **Grants**

Mary Burrows, U.S. Animal And Plant Health Inspection Service, 'Pulse Crop Diagnostic Laboratory'

Deanna Nash, Montana Wheat & Barley Committee, 'Improved Quality of Montana Hard Red and Hard White Wheat'

Jason Cook, Montana Wheat & Barley Committee, 'Molecular Breeding Pipeline for Wheat'

Alan Dyer, Montana Wheat & Barley Committee, 'Advance Disease Resistance in Montana's Wheat'

Mike Giroux and Jack Martin, Montana Wheat & Barley Committee, 'Creation and Yield Testing of New Semi-Dwarfing Alleles'

Jack Martin and Mike Giroux, Montana Wheat & Barley Committee, 'Characterization of Novel Stem Solidness genes in Wheat'

Jamie Sherman, American Malting Barley Association Inc, 'Barley Breeding for Montana: Ensuring a stable malt supply'

Jamie Sherman, Montana Wheat & Barley Committee, 'Improved malt quality selection for Montana'

Jamie Sherman, Montana Wheat & Barley Committee, 'Improving Barley for Montana'

Phil Bruckner, Montana Wheat & Barley Committee, 'Winter Wheat Breeding/Genetics'

Luther Talbert, Montana Wheat & Barley Committee, 'Spring wheat breeding and genetics'

Mary Burrows, Montana Wheat & Barley Committee, 'On-farm research and disease education in Montana'

Jason Cook, Montana Wheat & Barley Committee, 'Wheat Double Haploid Line Development Feasibility Study'

Deanna Nash, Montana Wheat & Barley Committee, 'Contracted Services - Table Construction for Milling Area'

Deanna Nash, Montana Wheat & Barley Committee, 'Contracted Services - "Perten Equipment Maintenance'

## MontGuides

### By Toby Day, Extension Horticulturist

For the last two months, my wife and I have been putting up jams and jellies, freezing strawberries and raspberries and getting set to can and freeze vegetables such as peas, beans, pickles and even making sauerkraut. Every year I repeat to myself that I need to be safe, as I give much of my bounty away around Christmas. And each year I have to look up the processing times for canning or the blanching times for freezing.

Are you preserving any of the foods from your garden? Did you know that Montana State University Extension has a great lineup of fact sheets (MontGuides) on preserving food? They are often the references that I use in my own kitchen. If you go to [store.msuetnasion.org](http://store.msuetnasion.org) or go to [www.msuetnasion.org](http://www.msuetnasion.org) and click the link to the publications/store on the left hand side of the page it will take you to where you can find the publications.

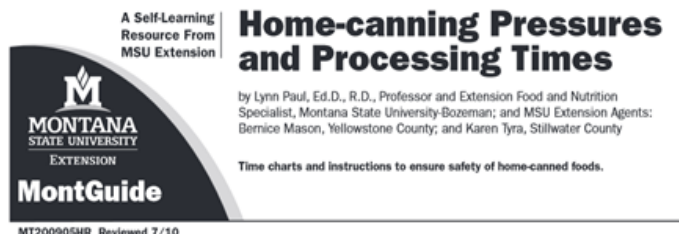
Below is a list of the preserving publications available (or use the search engine to find them). They are all free for download off our website:

- Freezing Fruit
- Drying Fruit
- Freezing Vegetables
- Drying Vegetables
- Home Canning Pressures and Processing Times
- Processing Fruit, Tomatoes, and Mixtures in a Pressure Canner

Making Jams, Jellies and Syrups with Wild Montana Berries and Fruit  
Canning Pickles and Sauerkraut

You can also call MSU Extension Publications at 994-3273 to request a copy or multiple copies for free.

On another note, if you are unsure of anything related to preserving foods from your garden, you can likely find the answer at the National Center for Home Food Preservation at <http://nchfp.uga.edu/index.html>



**Home-canning Pressures and Processing Times**  
by Lynn Paul, Ed.D., R.D., Professor and Extension Food and Nutrition Specialist, Montana State University-Bozeman; and MSU Extension Agents: Bernice Mason, Yellowstone County; and Karen Tyra, Stillwater County

Time charts and instructions to ensure safety of home-canned foods.

MT200905HR Reviewed 7/10

**Safety is the top priority**  
The United States Department of Agriculture (USDA) home-preservation guidelines used in this MontGuide are based on extensive research to prevent botulism, a potentially deadly foodborne illness caused by a toxin of the bacteria *Clostridium botulinum*, which produces one of the most deadly poisons. *C. botulinum* can grow and reproduce in improperly processed home-canned foods.

The guidelines presented here will also help prevent foodborne illnesses caused by other bacteria, molds and yeast, and will help prevent food spoilage in your home-processed foods.

**Additional Resources**  
This MontGuide is best suited for intermediate and advanced home food preservers. The following resources provide a wide variety of tested recipes and information, based on USDA recommendations, especially important for the beginning food preserver.

National Center for Home Food Preservation (NCHFP), USDA sponsored Web site is the most current source for publications, video clips, tutorials for the beginning home food preserver, frequently asked questions, and seasonal tips: <http://www.uga.edu/nchfp/>

USDA Complete Guide to Home Canning, 2006. Available on [www.ams.usda.gov/foodpreservation/](http://www.ams.usda.gov/foodpreservation/)

212°F at sea level, it boils at a much lower temperature at higher altitudes. Consequently, at higher altitudes home-canned foods must be processed for longer times or at higher pressures.

**2. Is the food I am home-canning a high-acid or low-acid food?**  
The following information will help you determine whether you need to use a pressure canner or boiling water canner.

Low-acid foods include vegetables (except most tomatoes), meats, poultry and fish. Acidity helps protect foods from poison-causing bacteria and food spoilage, and because these foods have little natural acidity, they must be processed at higher temperatures and pressures that can only be achieved by pressure canners.

On the other hand, high acid foods used for canning include fruits (naturally high in acid) and properly acidified tomatoes and properly acidified pickled products can be processed in either a boiling water or pressure canner.

**NOTE:** In recent years, the recommendations for safely canning tomatoes and salsa have changed. Because tomatoes grown today may have less acidity, they need to be acidified before canning by adding 2 tablespoons of bottled lemon juice or ½ teaspoon of citric acid per quart. When canning salsa, only use recipes based on USDA recommendations.

An example of just one of the MontGuides available through MSU Extension Publications



The bounty from Toby and Jennifer's garden - 2014.

## Recipe of the Month

### Italian Style Vegetable Beef Soup

3/4 pound lean ground beef (93% lean)

2 cans (14.5 oz each)

Hunt's® Diced Tomatoes with Basil, Garlic and Oregano, undrained

3-1/2 cups water

1-1/2 cups frozen Italian-style vegetable blend

1/2 cup dry whole grain medium shell pasta, uncooked

2 tablespoons balsamic vinegar

4 teaspoons dry sodium free chicken bouillon

1/2 teaspoon garlic powder



Cook beef in large saucepan over medium-high heat 6 minutes or until crumbled and no longer pink, stirring occasionally; drain. Add remaining ingredients. Bring soup to a simmer. Reduce heat to medium; cook 10 minutes or until pasta is tender.

For a meatless option, replace ground beef with 1 cup drained, rinsed cannellini beans. If frozen Italian-style vegetables are not available, look for a vegetable blend containing green beans, cauliflower and squash.

## August Birthdays

Barry Jacobsen	6
Deji Owati	7
Al Scharen	9
Nancy Cooke	12
Nar Ranabhat	12
Mike Ivie	16
Karen Maroney	23
Bright Agindotan	25
Ruth O'Neill	26
David Sands	30





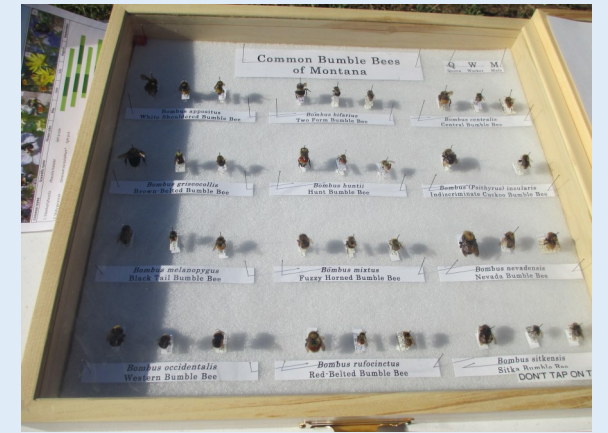
## Horticulture Farm Open House and Field Days 2015



Mac Burgess explaining the benefits of growing vegetables in a high tunnel.



Don Mathre giving a tour of the produce grown by the Gallatin Gardeners Club.



Casey Delphia with a collection of Montana Native Bees.



David Baumbauer explaining the moveable high tunnel crop sequence.



David Stein describing how cover crops are used at Towne's Harvest Garden.



Dure Setzer explaining his cold hardy Montana fruit research project.



Maddi Honnold organized the carrot tasting and rating for Mac Burgess' Specialty Crop Block Grant Vegetable variety evaluation project.



Rick Sadleir describing the grape varieties

## Horticulture Farm Open House and Field Days Schedule

**Rick Sadleir** - Vineyard Synopsis

**David Baumbauer** - Seasonal Extension Research Project Plots

**Emilia Hitchcock** - Temperature Control and Ventilation of High Tunnels

**Casey Delphia** - Native Pollinator Research

**Chaz Holt** - Townes Harvest Intro

**David Stein** - Cover Crops at Townes Harvest

**Tiffani Eccleston and Tommy Ward** - Sweet Corn Hybrids and Plant Populations

**Dure Setzer** - Cold Hardy MT Fruit

**Joseph Kibiwot** - Soil Fertility

**Damion Lynn** - Interpreting Soil Tests at Townes Harvest

**Kelly Kjornlein** - Winter Pea and Pea-Wheat Cover Crops for Fall Vegetable Production

**Kendall Franks** - Irrigation Management and Water Use at Townes Harvest

**Luke Vest** - Composting at Townes Harvest

**Maddi Honnold** - Carrot Variety Taste Testing Intro

SFBS Student Research Posters:

**Deb Kraner** - Benefits of Native Perennial Plants

**Camrey Bradshaw** - Weekly Value of Townes CSA share

**Jaime Base** - Chickens, How Much They Eat and How Much They Lay

**Michelle Flenniken** - Pollinator Research

**Tracy Dougher** - Native Plants

**Anthony Slominski** - The Effects of Climate-Driven Phenological Shifts on Plant-Pollinator Interactions and Plant and Pollinator Reproductive Success

**Don Mathre** - Gallatin Gardeners Club