Plant Science Says

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PSPP Reception/Awards Ceremony for Graduates

The Plant Sciences and Plant Pathology Department will be hosting a Reception and Awards Ceremony for all of our graduates (undergrad and graduate level) Friday, May 6, in 108 PBB. The Reception will be from 3-5 p.m. with the Awards Ceremony at 4:00 p.m. If you would like to attend, please rsvp Jill Scarson at jscarson@montana.edu or call her at 4832. We hope you can join us in celebrating this joyous occasion.

Another Strobelian Adventure
By Gary Strobel

In late March, I made a trip to Thailand to give lectures at Chiang Mai University in the north as well as the Plenary lecture at the Royal Golden Jubilee PhD Program in Pattaya. The latter is a program instituted by the King with an infusion of $100 million to train Thai students in all disciplines at the PhD level. People from 40 countries have served as mentors of these students. It was an honor to have been invited to participate in this program and to give the opening address to over 500 people.

Our trip started with a 1 AM arrival to Bangkok and a 6 AM get up call to be on the plane to Chaing Mai. The night of the first day in Chiang Mai was a mind and body wrenching experience at 9PM when Northern Thailand and Burma were subjected to a 7.0 Richter scale earthquake. People were screaming in the hotel hallways and the building felt like a baby cradle being violently pushed around. Then on to the delightful island of Phuket in the south of Thailand for a rest- only the next day to find ourselves in a huge Typhoon. It took out bridges, roads, towns and killed about 40 people. In the meantime, I gathered samples, and took many photos. Weather does not seem to stop us from going to the core to get the job done.

The great Buddha on the hill overlooking Chiang Mai.

A choice of insects as a Thai cuisine at a local market.

Thailand is one of the most interesting places on earth since almost every sense is interestingly challenged. The landscape is interspersed with Buddhist temples and loads of neat stores selling all types of food, wares and crafts. The food is off scale great

Elephant crossing sign at a National Park in Western Thailand near the border with Burma.

The Giant Hornbill of Southeast Asia.

North of Chiang Mai. While the elephants used to be trained to move logs they are now trained to do more esoteric things such as painting.

with combinations of spices, vegetables, and meats including insects and seafoods all done in great tasting sauces.
The people of Thailand are wonderful in terms of their kindness and hospitality. We found this to be true whereever we travelled. One of the last significant places that we visited was Khao Yai National Park in eastern Thailand. It was the first park in that country (1963) and is maintained very much like Yellowstone is today. However, this park has an unusual array of wildlife including herds of wild elephants, tigers, deer, and an entire assortment of unusual birds including the giant hornbill that I was able to photograph near the center of the park along a waterway. Suffice it to say – this was a real thrill. Certainly the most unusual things that we saw was the elephant training camp North of Chiang Mai. While the elephants used to be trained to move logs, they are now trained to do more esoteric things such as painting.

Finally, the most painful part of the trip was the appearance of a massive bacterial infection in my left arm. I picked it up on the long plane ride back. Who would have guessed that after exposure to most of the critters in the world's rainforests, I would be brought low by an airplane bacterium- a streptococcus sp. I spent all of last week getting injections, seeing docs, etc. Suffice it to say, I was more than a bit concerned as I watched my arm swell up and turn red. It now looks to be under control.

Thailand is a wonderful destination as a novel travel experience and the people are excited about science. In 2014, the International Mycological Congress will be in Thailand.

Precipitation Vs. Storm Water
By Jennifer Britton and Jill Scarson

No, it's not a televised prime time fight. But it is heavyweight and starting to illuminate the press. Precipitation and storm water occur not just under Las Vegas neon lights but across the globe including our own Bozeman, Montana.

Our relationship with the opponents is made evident in our language. *Precipitation* in the form of rain or snow falls from the sky providing freshwater. It drizzles, drops, and pours- it makes the air fresh and polishes leaves like lemon oil on

wood. More to the point, it's essential to life. Precipitation becomes *storm water* as soon as it hits the ground, or in the case of snow, as soon as it melts. Its prefix *storm* evokes serious and sudden events synonymous with a violent tempest. It is water no longer sustaining life but instead assaulting.

Jennifer Britton's PSPP Site Development class studying the design of the rain garden at Bozeman City Hall. Sharlyn Gunderson-Izurieta, with the Greater Gallatin Watershed Council, gave them a tour of the rain garden.

When people live in concentration, we create impervious surfaces such as roofs, roads, sidewalks, plazas, and parking lots. These surfaces restrict the ability of rain to infiltrate the ground thus creating storm water or surface runoff which requires collection, conduction, and disposal. Design convention advocates mostly closed systems: a series of inlets and pipes to ship water from point A to some final outfall or treatment plant.

Unfortunately with increased urbanization the "chunnel and funnel it" attitude has created a synergy of problems. Our groundwater and aquifers are not recharging, the increased storm water overloads our municipal treatment systems resulting in sewage overflow and heavy tax costs for new facilities. Water quality problems also occur as water runs over impervious surfaces picking up toxic metals, chemicals, nutrients, debris, sediment, and pathogens. This brew of toxins and turbid conditions coupled with water velocity at a storm's peak prove devastating to aquatic life and habitat. Ironically, in our efforts to protect public safety, health, and welfare, we are in fact decreasing healthy ecosystems while increasing the chances of flooding and overall costs.

So enters a possible referee to our grand prize fight, the simple rain garden. It's a gem among gems. Easy and inexpensive to install, it has all the qualities of "Think Global, Act Local". All you need is a depression, good soil, and of course plants! Plus good news for our students and Bozemanites; the City of Bozeman with the help of the Greater Gallatin Watershed Council installed a demonstration garden just outside Bozeman City Hall. The city project was perfect timing for a field trip for PSPP's own Site Development class. Only installed last summer, the plants are still quite small and sleepy from winter, but in a few years the shallow 2' swale should be in full swing, retaining, cleaning and slowing the City Hall roof water prior to overflowing into Bozeman Creek.

Public interest in rain gardens is growing including our own Jill Scarson who accompanied the class outing with camera in tow. Jill also joined in the writing of this article to provide a user's point of view. Take it away Jill…

As a new homeowner, I was very interested to see for myself how rain gardens could benefit my property as well as the many neighborhoods in Bozeman. I found that not only can they help solve drainage issues and filter polluted water run-off, rain gardens create beautiful habitat for birds and insects while being inexpensive to construct and easy to maintain.

Rain water run-off from roofs and pavement is often polluted by common household contaminants like oil, detergents, pesticides and fertilizer which in turn pol-

lute our local water sources. Rain gardens can help to protect our water from contamination by filtering it through layers of soil before it reaches the storm drains. They can also alleviate expensive drainage problems to your home by directing the flow and collection of water away from foundations, basements and pavement. Collectively, rain gardens can help protect neighborhoods and homeowners from weather-related and seasonal flooding by absorbing 30 percent more water than regular lawns can. This means that your property is better protected and cleaner water reaches local and regional aquifers. Rain gardens also create a beautiful landscaped look that is also excellent habitat for birds, butterflies and insects. They even help to control mosquito populations by removing standing water and attracting insect-eating dragonflies.

Creating a rain garden on your property is easier and cheaper than you might expect. First, you will need to determine your soil composition and select a place that has a depression where water may collect. A professional landscape designer and landscape contractor may charge you $10 - $12 per square foot to design and create your rain garden. If you do the work yourself and buy your plants, you can expect to spend $3 - $5 per square foot. You can further decrease your cost by using native plants that you have grown from seed or by using plants from a friend or neighbor. Rain gardens are designed with habitat and low maintenance in mind, however during the first two years, some weeding and watering may be required while the plants adapt and become established in your garden. The Wisconsin Department of Natural Resources has published an excellent resource for homeowners interested in creating a rain garden in their neighborhood. You can find it on their website www.dnr.state.wi.us or by following this link http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/documents/rgmanual.pdf Precipitation and storm water are one and the same, merely two viewpoints describing water, a positive and a negative. Can rain gardens cure all our water woes? Probably not; when is anything that simple? But we may find rain gardens prove efficient negotiators able to look after water quantity and quality while illustrating the water cycle where we live and work. In the end, sustainability often comes from simple solutions, in this case a garden.

Dunkel Receives Award

This year there were three winners and two honorable mentions for the MSU Teaching and Learning Award. Congratulations to Florence Dunkel, PSPP entomologist, for receiving an Honorable Mention for her significant contribution to teaching and learning at Montana State University. Performance was based on the following criteria:

- Knowledge of subject/discipline
- Preparation and organization
- Clarity and understandability
- Enthusiasm for subject
- Sensitivity to students' needs
- Availability and helpfulness
- Quality of examinations and assessment
- Impartiality in evaluating students
- Quality of advising assistance
- Application of new technologies to enhance students' learning

Montana Ag Live! Spring Schedule

May 1 — Tim Fitzgerald, MSU economist, "The problems and pitfalls facing Montana landowners relative to oil and gas leases."

May 8 — Vince Smith, MSU economist, "The future of the Farm Bill". Vince Smith will alert producers and viewers what may happen in the next farm bill.

May 15— Bruce Smith, Dawson County Extension Agent, "Local Food Systems for Montana and how they can be accomplished".

May 22— Jane Mangold, MSU Noxious Weed Specialist, "Noxious weed research efforts at Montana State University".

June 5— Cathy Cripps, MSU Mycologist, "Mushrooms to Avoid"

June 12— Mark Mattix, Consulting Veterinarian, "Problem poisonous plants in Montana and their effect on livestock"

Course Focus
PSPP 105 Miracle Growing: An Introduction to Horticulture
By Tracy Dougher

Is it really a miracle that plants will grow better if you put fertilizer on them? Students get their hands dirty in an effort to explore the myths and realities behind the horticultural industry touting of better plants through growth-enhancing products. We first explore the five environmental factors affecting plant growth: light, water, temperature, gas exchange, and nutrients, and tie them to the three basic plant processes: photosynthesis, respiration, and transpiration. A semester-long project is growing plants in 'high' and 'low' conditions for each of the five environmental factors (for example, low and high water). Students keep a journal of their observations, as well as charting the growth of the plants. Students are always surprised that plants can look healthy and normal with sub-optimal environmental conditions, but optimal conditions can make a HUGE difference in the pace of development and growth.

Students also explore horticultural careers in two ways. Individually, they are required to interview an owner or employee in the horticulture industry. As a class, industry leaders are invited into the classroom to share their experiences or provide some hands-on training on an aspect of their industry.

Students in PSPP 105 learning about floriculture, florists, and flower arranging—thank you to those who donated vases!

The last facet of Miracle Growing is the exploration of current issues in horticulture. This year students worked on a project entitled 'Two Sides'. Students were surveyed at the beginning of the semester for their opinions on current issues in horticulture, such as 'organic food is more nutritious' and 'greenwalls are environmentally friendly'. Students were assigned a topic and asked to research a position that agreed or disagreed with the topic (they were generally assigned the opposite of what they indicated on the survey). The project included searching first the mass media of the internet and then digging through those websites to find references to scientific literature to back up their claims. Students presented the scientific literature in class to kick off discussion on these topics. This year's outstanding discussion led to addressing a belief that many students have that scientists get results that agree with the company's stance from which they are receiving grants. A healthy dose of skepticism on 24 topics was handed out to this year's class.

Killing "Witch Weeds" in Africa

Portions of this article came from the Bozeman Daily Chronicle article by Gail Shontzler, April 15, 2011.

On April 14, 250 MSU students presented their projects at MSU's annual Student Research Celebration. Topics ranged from earthquakes to epilepsy, dinosaurs to diabetes.

Lydia Anderson, MSU student majoring in organismal biology, was recently featured in an article in the Bozeman Daily Chronicle for the research she presented. Lydia has been working with Dr. David Sands to research ways to use natural fungi to attack the "witch weed" that strangles African farmers' corn crops.

Working with researchers in Kenya, they found a fungus that could be transported on toothpicks, grown on cooked rice and

put on the ground to inhibit weeds and help farmers roughly double their corn yield.

Grants

The North American Network of Science Labs Online (NANSLO) has been awarded a grant from Next Generation Learning Challenges, an initiative working to improve U.S. college readiness and completion, especially among low-income individuals, by identifying and accelerating the growth of effective education technology. The 15-month project, funded at just under $750,000 and including a consortium of institutions in the Western U.S. and Canada, aims to add a powerful new component to online science courses: students will have access to a remotely located science lab and the ability to control remote instrumentation, allowing them to perform experiments, practice scientific observation, and conduct data analysis as students in classroom-based courses do. **Tracy Dougher** has been tapped by the Western States Interstate Commission for Higher Education to participate in this grant as a biology advisor.

Publications

In the Spring, 2011, edition of Mountains and Minds, **David Sands** is quoted in an article entitled "Montana Gold". The article discusses the potential of safflower and Camelina seed for biofuel, baking, cosmetics and beef cattle.

Growing Community Gardens
By Dara Palmer (filling in for Toby Day)

April 5-7, 2011 MSU Flathead Reservation Extension hosted the American Community Gardening Association (ACGA) Growing Communities Workshop in Great Falls. This workshop was available through a professional development grant with funding and support provided by Western Region Sustainable Agriculture Research and Education (WSARE), Montana Farmers Union, AERO, and MSU Extension.

(L to R: Bud Papin, Jesse Fulbright, Kevin Jackson, Janet Marsh, Caroline Wallace)

Attending from Montana State University was Dara Palmer, Assistant Master Gardener Coordinator for Toby Day, the Montana Master Gardener Coordinator. Both are employees of the Plant Sciences & Plant Pathology Department at MSU. Horticulturalists, Master Gardeners, leaders, educators, volunteers, extension agents and supporters of community gardens and urban agriculture met to discuss and participate in activities designed to foster community development, leadership, and organizational growth through community gardening. This hands-on,

*(L to R, Back: Marguerite Jodry, Jesse Fulbright, Rene Kittle, Dara Palmer, Bud Papin, Caroline Wallace, Kevin Jackson, Kendra Byrom. Middle: Lisa Brewer, Monarae Tuhy, Linda Jackson, Betsy Johnson (ACGA). Front: Janet Marsh, Kelly Ware) *Photo courtesy of Kelly Ware*

three-day leadership workshop provided valuable skills and resources to participants enabling them to implement similar workshops in their area through the Growing Communities train-the-trainer curriculum. "The Growing Communities Workshop really helped me understand the process of starting a Community Garden as well as the many community benefits. It was encouraging to hear about the many community gardens in Montana. I hope this will catch on in Georgia!" (Lisa Brewer - Jesup, GA)

Topics covered during this multi-day workshop included: Community Organizing, Leadership Development, Grassroots Fundraising Basics, Asset-Based Community Development, Communications Planning and Coalition Building. "Participants receive the *Growing Communities Curriculum*, a 352 page resource workbook, which includes curriculum materials that walk the reader through the process of conducting training workshops. The Curriculum addresses Diversity, Meeting Facilitation and Group Decision- Making, Developing a Board of Directors, and Grassroots Fundraising- Specific Strategies." (ACGA Website)

"I left the Growing Communities Workshop inspired by the great work people from all over the state are putting into developing community gardens. Many people have found an outlet for their frustrations with industrial agriculture, child nutrition, and the strength of our communities in gardens. I think that community gardens have the potential to make an impact on so many issues affecting our society." (Caroline Wallace-Helena, MT)

For more information about the ACGA and other valuable information concerning community gardens please visit their website at www.communitygarden.org.

Why should I use technology?
by Matt Rognlie, College of Ag IT Coordinator

Hopefully, that question caught your attention! Certainly that doesn't get asked *here at MSU*; it's not like we're a bunch of Luddites or something.

We depend on the desktop computer "to do our job" so of course we embrace technology, right? We use it every day, right? Well….

What about video conferencing? Lecture recording and streaming? Smart pens? Blogging? D2L? Data security? Mobile computing? Collaboration? Technology literacy? Rich communication?

Forget about "working smarter" and "doing more with less" and "more efficient." How are you *leveraging* technology to do your job better, keep learning, and provide services to students and constituents that are in line with the way they use technology? Are we, as a top-notch university, not only *leading* in the use of technology but are we *creating* new approaches to our work using technology as it pertains to teaching, research and outreach? Are we *innovating*? After all, we do work at a university!

It is hard to break out of our daily, familiar approaches to our jobs and think in ways we don't normally think (speaking for myself, for sure). Making this all even harder is that we often don't know what is possible, therefore we don't even know where to start. One great place to start is with your professional colleagues and organizations. Mine is EDUCAUSE (www.educause.edu) and I depend on the group to stay up with how to use technology to be innovative in my job. For popular culture, it's tough to beat www.wired.com, which can be an educational *and* entertaining way to understand how technology is being used (and abused for that matter).

What would it take for you to begin thinking differently about technology? I would be more than happy to have conversations with groups or individuals and am open to more formal presentations on 'what is possible.' But, maybe first ask yourself "what can I *imagine* that technology can do for me, even though I don't know if it's possible or not?"

I would appreciate some feedback on this article and look forward to providing consulting services to anyone interested.

Thanks for your time,
Matt Rognlie
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Recipe of the Month

Asian Beef Kebabs

1 1/2 pounds boneless sirloin steak, cut into 1-inch cubes
1/2 cup soy sauce
1/2 cup vegetable oil
1/2 cup rice wine vinegar
2 tablespoons sesame seeds
2 tablespoons sugar
6 garlic cloves, finely minced
1 teaspoon sesame oil
2/3 teaspoon red pepper flakes
2 ears corn, husked
2 small zucchini
4 large green onions
Wooden skewers, soaked several minutes in water
Any other vegetables or fruit you want to add

Directions:

Place steak cubes in plastic zip-lock style bag. Whisk soy sauce, oil, vinegar, sesame seeds, sugar, garlic, sesame oil and red pepper flakes in a small bowl. Reserve half to use as dipping sauce. Add remaining marinade to plastic bag. Seal; turn bag to coat meat well. Refrigerate 4 to 6 hours.

Prepare outdoor grill with medium-hot coals, or heat gas grill to medium-hot. Meanwhile, cut corn and zucchini into 1-inch pieces. Cut each green onion into 3 pieces, each piece about 1 1/2-inches long.
Cook corn in boiling water to cover for 2 to 3 minutes. Drain off water.

Thread meat cubes onto skewers, alternating meat pieces with corn, zucchini and green onions. Brush once with marinade from plastic bag. Grill kebabs, covered, turning occasionally, 12 minutes or until vegetables are cooked and meat thermometer inserted in meat registers 145°F (60°C) for medium-rare. Serve with reserved marinade for dipping and hot cooked rice, if desired.

May Birthdays

Mina Talajoor	6
Tawnya Morgan	8
Christopher Shafer	11
Heather Rimel	12
Matthew Moffet	14
Robyn Klein	15
Chaofu Lu	16
Sunny Kim	16
Kim Prosek	22
Mareike Johnston	22
Tom Blake	24
Gene Ford	29
Bob Johnston	29
Deanna Nash	31