Plant Sciences Says

Happy 4th of July!

July, 2005

Three Entomology Faculty Join Our Department
We would like to welcome Mike Ivie, Florence Dunkel and Sue Blodgett to our Department. Sue's appointment is split between the Department of Animal and Range Sciences and our Department (35%).

We will be having a Welcome Potluck for these new faculty members in the near future.

North American Colleges and Teachers of Agriculture Annual Conference
by Tracy Dougher
Bob Gough and I attended the NACTA Annual Conference in Wooster, OH on the Ohio State University Agriculture Technical Institute and OARDC campuses. The conference kicked off with a welcome luncheon and keynote address by Dr. Luz Mangurian (Towson University) on "Where the neurosciences and pedagogy intersect in support of student learning". She introduced us to the finer workings of the brain and how these workings affect learning. Most interestingly, Dr. Mangurian pointed out that while lecturing is effective for our (university faculty) learning style, traditional lecturing is not the most effective teaching method for over 80% of our students. She also demonstrated that development of white matter continues up to 20 years of age, so complex cognitive skills are only developing as students are graduating.

The afternoon included the Dean Series seminars "Making Learning More Student-Centered" by Dr. L.H. Newcomb, Ohio SU; "Involving Undergraduates in our Research Programs" by Dr. Barbara Malpiedi Kirby, NCSU; and "Advancing Leadership Development for All Students" by Dr. Kirby Barrick, U of Illinois. In the evening we were treated to a 'Taste of Ohio Welcome Reception & Tailgate".

Thursday morning newcomers, myself included, were orientated to the working of NACTA and the officers and chairs. The morning was also spent in a poster session and at a Blue Ribbon Presentation on "Using Humor in the Classroom" by Dr. Gary Moore, NCSU. Dr. Moore presented ways to interject humor in the classroom and internet sources for relevant scientific humor. His presentation is available online at www.ncsu.edu/cals/agexed/humor.ppt. It was a humorous presentation to say the least and I now have new material! Thursday afternoon was spent on tours. I attended the horticulture tour of Mohican Gardens, a nursery grower and graduate of OSU ATI, Wade & Gatton Nurseries famous for their over 2,000 varieties of hosta, and Secrest Arboretum on the OARDC campus.

Friday morning was chock full of committee meetings and concurrent sessions on agriculture faculty trials and tribulations in the classroom. I attended talks on communication skill in turfgrass management class, innovations in internships, experiential learning in landscape design, working with teams in the classroom, case studies in horticulture, student-centered learning in biochemistry, and examining teacher burnout.
Next year's meeting will be in Vancouver, BC. I highly recommend PSPP faculty consider joining NACTA. Dues are only $70 a year (which includes a journal and e-newsletter) and the journal and meetings are full of teaching ideas and innovations! Check them out at http://www.nactateachers.org/!

MT Seed Growers and WY Seed Certification Host 2005 Annual Meeting

by Susan Johnston
The Montana Seed Grower's Association and the Wyoming Seed Certification Service recently hosted the 2005 87th Annual Meeting of the Association of Official Seed Certifying Agencies (AOSCA) held at Big Sky Resort, Big Sky, Montana, on June 25-30.

About AOSCA (Also visit the website www.aosca.org): **The** Association of Official Seed Certifying Agencies, (AOSCA) is dedicated to assisting clients in the production, identification, distribution and promotion of certified classes of seed and other crop propagation

materials. Established in 1919 as the International Crop Improvement Association, AOSCA now has a number of International member countries located in North and South America, Australia and New Zealand.

Mission Statement:
To promote and facilitate the movement of seed or plant products in local, national, and international markets through the coordinated efforts of official seed certification agencies acting to evaluate, document, and verify that a seed or plant product meets certain accepted standards.

The major purposes of AOSCA are:
To establish minimum standards for genetic purity and identity and recommend minimum standards for seed quality for the classes of certified seed.

- To standardize seed certification regulations and procedures, and operational procedures in inter-agency seed certification.
- To periodically review agency genetic standards and procedures to assure compliance with the Federal Seed Act.
- To cooperate with seed regulatory agencies in the determination of policy, regulations, definitions or any procedures relating to the labeling and distribution of seed moving in intra-state, inter-state or international commerce.
- To cooperate with the Organization of Economic Cooperation and Development (OECD) and international organizations involved in the development of standards, regulations, procedures, and policies to expedite movement of seed and encourage international commerce in improved varieties.
- To assist member agencies in promotion, production, identification, distribution and use of the certified classes of seed and other propagating materials of crop varieties.

Registration began on Saturday, June 25th. On Sunday afternoon, June 26, the Legislation and Bylaws Committee met followed by the general welcome reception and banquet scheduled for the evening. Ron Larson, Katie Cash, Susan Johnston of MSGA; Harold Armstrong, Darlene Cromwell, and Bridgette Westfall (MT State Seed Lab); and Bob Johnston and Bill Grey (Plant Sciences and Plant Pathology) were all involved in the festivities.

The business portion of the meeting began in earnest on Monday with the corporation meeting, board of directors meeting, the caucus meetings (Northern, Southern, Global) followed by the membership meeting and the certification requirements and standards council meeting. The committees related to individual crops such as 1) Alfalfa & Misc. legumes; 2) Corn; 3) Beans, Peas & Cowpeas; 4) Peanuts; and 5) Small Grains met Monday afternoon.

On Monday, a textile presentation and tour of local quilt shops was offered as part of the extra curricular activities provided in conjunction with the 87th Annual AOSCA Meeting. Katie Cash, Susan Johnston and Darlene Cromwell met early at Quilting in the Country on S. 19th for the drive to Big Sky to attend a presentation by Margo Krager of Reproduction Fabrics in Bozeman on textiles in history, specifically the goods brought by Lewis and Clark to trade with native people along their historic journey of exploration. Margo did a fantastic bit of detective work to gain information regarding the origins of the fabric, the cost of fabric and stitching the shirts in several styles, and the location and identity of the seamstress, including original invoices and records of the transactions. It was a fascinating, well-documented presentation. The tour group included very appreciative, neat women from Nebraska, Minnesota, Virginia, and Idaho who seemed to really love all that the Big Sky had to offer that day. I think the women from Virginia were pretty cold, but they were great sports about it all! The tour continued with lunch and shopping at Quilting in the Country and then the ride back to Bozeman for a tour of Bear Comforts, Reproduction Fabrics, The Yarn Sop and general exploration of Downtown Bozeman. The beautiful hanging baskets, the architecture, and the fact that the rain waited until later in the afternoon to fall made it a perfect day!

On Monday afternoon and evening Ron Larson hosted a field tour of the farm of John Schutter Jr. near Manhattan. John was a gracious host and demonstrated his acumen at producing a variety of crops and at maintaining a monolog of interesting lore. John Schutter Sr. (John Jr's father) had agronomic training in the Netherlands and used it well when he immigrated to the U.S. where he eventually became a major grower/producer in Montana; and also was a force in funding and setting up the Potato Lab on campus and the virus-free screening program that resulted from establishing MPIA. John treated the visitors with vistas of Montana beauty in the waning daylight from the farm and from the Madison Buffalo Jump area. John then grilled hamburgers and fed about 25 people. Ron reported that everyone really loved that part of the tour!

The 87th AOSCA Annual Meeting continued on Tuesday with committee meetings as follows: 1) Cotton Committee; 2) Foundation Seed Committee; 3) Education & Promotion Committee; 4) Service Development & Marketing Committee; and 5) Variety Review Board

Wednesday June 30, meetings included meetings for people involved in organic seed certification, general seed certification, Advisory committee activities, and committee meetings relating to soybeans and trees, shrubs, and native plants.

Bob and Susan Johnston met with an eclectic group of AOSCA people on Wednesday morning (June 29) to tour West Yellowstone, the IMAX theatre, and the Wolf and Grizzly Discovery Center. The day dawned bright and beautiful and the bus arrived in West Yellowstone a little after 11:00 AM. A naturalist from the wolf/ grizzly discovery center met the group and gave a brief talk about the lifestyle, the biology, and the social organization of wolf packs. There were resident grey wolves in large enclosed areas to observe as they napped. Apparently wolves are more active in the early morning and in the evening, so we literally caught them napping. Most of the adults were about 10 years old, which in wolf years is a rather old wolf given that wolves may live in captivity for up to about 14 years. The naturalist then moved the group over to the grizzly bear enclosures and gave biological and social information on the adult bears living in the enclosure. Apparently they use these captive bears to test out dumpsters and other garbage containers to ensure that they are "bear proof." The display of punctured plastic and shredded, bent metal containers indicated that not very many models passed the grizzly bear stress test! Lunch, the IMAX show and a little looking around the gift shop ended the tour. The conversation on the bus turned towards the beauty of the day and the weather and Bob obliged the group with stories about how deep the snow gets here in the winter. I guess he was afraid all this beautiful scenery and nice weather would inspire lot of new immigration to Montana. Thank a lot, Bob! Both Johnstons and assorted AOSCA members returned to Huntley Lodge for a wonderful dinner and an evening of the Vigilante Players and "Who Shot the Sheriff?"

The meetings came to a conclusion on Thursday morning (June 30), another crisp, beautiful day under the Big Sky. Bob and Susan returned to Bozeman amid a procession of gravel trucks returning to Big Sky for construction purposes. As they say, build it and they will come.

Thanks to Harold Armstrong, Bill Grey and Bridgette Westfall who helped with snacks and drinks in the hospitality room. Any curious soul who wants to know more about seed quality and certification, check out the website www.aosca.org. They are a great bunch of folks and all of us here enjoyed mingling with people from other states and getting to know our counterparts in Wyoming. Kudos go out to Mike Moore and Debbie at Wyoming Seed Certification Service for excellent organizational efforts. If all the positive feedback I heard from people at the meeting is any indication, they will come…back to Montana as soon as they can.

Plant Evolution: Genes and Phenotypes
By Amanda Henry (M.S. graduate student with Norm Weeden)

I attended and presented a poster with a map of the *Clarkia* population at the American Genetics Association (AGA)/Arabidopsis 16th International Conference at the University of Wisconsin-Madison from June 17-19th. The theme of the conference was "Plant Evolution: Genes and Phenotypes". The collaborative nature of this conference made for an interesting mix of information for both the speakers and the presented posters. Several talks on *Arabidopsis* were given which focused on the new techniques now available within this species and those closely related that aid the study of evolutionary characteristics. A few such talks were: Michael Purugganan, North Carolina State University-Adaptation and variation in *Arabidopsis* flowering, Magnus Nordborg, University of Southern California-Linkage disequilibrium mapping in *Arabidopsis*, and also Tom Mitchell-Olds, Max-Planck Institute for Chemical Ecology, Germany-Evolution of ecologically important traits in relatives of *Arabidopsis*. These talks specifically brought together the main theme of the conference with the tools available with *Arabidopsis*. The main benefit of working with *Arabidopsis* is the ease of finding candidate genes after placing QTL markers and centers for linkage disequilibrium. This unique system also allowed the last speaker, Tom Mitchell-Olds to explore the possible effect of small QTLs within a relative of *Arabidopsis*. The AGA portion of speakers focused on the main theme of the conference. These talks included: Neelima Sinha, University of California Davis-Transcription factors, gene expression and leaf evolution, Jeff Conner, Michigan State University-The roles of genetic integration and constraint in adaptive evolution: a floral case study, and Mark Rausher, Duke University-Identification of a gene causing reproductive isolation in *Phlox*. The first talks were concerned with plant development and its role in evolution. Neelima Sinha focused on the role of KNOX genes in shoot morphogenesis and compound leaf development. For the second set of talks the main topic was quantitative genetics. The case of integration vs. constraint showed the use of a random mating population compared with an artificially selected population of a self-incompatible

annual to explore the instances of linkage disequilibrium and pleiotropy that might affect correlated traits and thus may slow integration of optimal traits. They did find strong evidence for adaptive integration. The last talk by Mark Rausher was centered on a pre-zygotic mechanism of isolation, trying to pinpoint the major contributing loci. The isolation between the *Phlox* varieties that grow in the same region may be due to a difference in pollinator preference for the differently colored flowers. They showed a good case for pre-zygotic selection, but did not have enough data yet to pinpoint the exact gene in *Phlox*, though research on morning glory did indicate that flavenoid 3', 5' hydroxylase may be the major gene. This conference maintained the main focus throughout the many talks and posters presented at the University of Wisconsin. Looking ahead to the research now available to *Arabidopsis* research it is exciting to see the direction that several model systems will soon be able to take. The interest in isolating mechanism, speciation and floral characteristics were of special interest to me due to my own project in *Clarkia*. It was interesting to note that others were exploring related issues in other species such as morning glory and *Phlox*.
For any information concerning the speakers, posters or the AGA/Arabidopsis conference visit http://www.theaga.org/news.html and http://www.union.wisc.edu/conferenceservices/arabidopsis/index.html .

Interns in Talbert Lab
By Nancy Blake
Luther Talbert's lab is hosting two summer interns, Deborah Thomas and Robert Crandall, as part of the National Science Foundation-funded Wheat SNP Project.

Robert Crandall: I am a third year senior in the College of St. Scholastica in Duluth, Minnesota. I am here at MSU participating in an internship in Plant Genomics through the University of California-Davis and Montana State University. I plan to earn my Bachelors degree in Biology and minors in Psychology and Chemistry this coming year. I then hope to attend medical school.

Deborah Thomas: I live in Santo, Texas and have been attending Weatherford College in Weatherford, TX. I will be transferring to Tarleton University in the fall. I was given the opportunity to study at MSU as an intern in Dr. Talbert's lab after being encouraged to apply by my advisors at Weatherford College, Kay Landrum and Dr. Erin MacKenzie. I am honored to be one of 14 chosen to participate in this research project. This experience will be of enormous value as I pursue my goal in medical science.

The following article appeared in the Bozeman Daily Chronicle and was brought to our attention by Dave Sands:

Schweitzer Says Future Lies In Niche Crops
By Walt Williams, Bozeman Daily Chronicle
The future of Western agriculture isn't in commodity crops, especially not when foreign countries are able to produce crops cheaper than farmers in the United States, Montana's Gov. Brian Schweitzer said Tuesday. The future, instead, lies with specialty crops like camelina, which could be turned into biodiesel or organic crops, he said.

"It is going to be very difficult to compete in the commodity business," he said. "If we are going to be competitive in agriculture in Montana, and I suspect the rest of the West, we're going to be looking at speciality crops on irrigated land."

Schweitzer noted that land values in places such as Brazil and Argentina are lower than they are in the U.S., and that drives down the cost of crop production in those countries.

"We have a government that is committed to free trade, and with free trade (in) commodities, people don't care," he said. "They are going to eat their bread, they don't care where the wheat came from.

"I think with niche products we have an opportunity," he added. One example he briefly mentioned was camelina, an oilseed crop that could be used to make inexpensive biodiesel and is loaded with healthy omega-3 fatty acids.

Grants
Andreas Fischer, "Functional analysis of plant nitrogen recycling". USDA-NRI, 2005-2008; $295,000.

Andreas Fischer, "Functional analysis of genes controlling malting barley grain protein concentration". Montana Board of Research & Commercialization Technology, 2006-2007; $174,340.

Barry Jacobsen, USDA SBIR, Montana Microbials, Inc. Development of BacJ.

Barry Jacobsen, Montana Department of Commerce Research & Commercialization, Commercial Development and Improvement of BacJ.

Barry Jacobsen, USDA Western Region IPM, Integrated management of Potato Diseases.

Matt Lavin and Tim Seipel, The World Wildlife Fund, "Vegetation Inventory and Monitoring of American Prairie Foundation Lands."

Publications

Klein, Robyn. 2005. Phytoecdysteroids. Journal of the American Herbalists Guild 5(2):18-28.

Tripps, C.L. and L.H. Eddington 2005. Distribution of Mycorrhizal Types among Alpine Vascular Plant Families on the Beartooth Plateau, Rocky Mountains, USA, in Reference to Large-Scale Patterns in Arctic-Alpine Habitats. Arctic, Antarctic, and Alpine Research 37:177-188.

Someone brought this Giant Western Puffball (Calvatia booniana) in to the mycology lab. It weighed 18 lbs and was 43" around. These puffballs are edible when young and pure white inside, but should always be cooked. As soon as they turn yellow inside they are no longer good to eat. Eventually they turn into a giant bag of up to a trillion spores (someone has calculated this), which put end-to-end would reach around the earth. Imagine if all the spores germinated! The earth would be knee-deep in puffballs!

Bob's Byte

By Bob Johnston (Irene Decker filling in)

The Art of Viewing Photos (Windows XP)

Scrapbooks and photo albums aren't the only venues for showing off your pictures. Windows XP lets you organize and view your digital snaps in a slideshow or as a filmstrip. Here's how:

To Create a Slideshow

1. First, select the pictures you would like in your slideshow. Then place them all in one folder.
2. Open Windows Explorer and navigate to the desired folder. Along the left, you should see a number of menus like "**Picture Tasks**" and "**File and Folder Tasks**." If not, click on the **Folders** button at the top.
3. Under "**Picture Tasks**" click on "View as a Slideshow." The Slideshow should start playing on your screen. If you don't see a toolbar in the upper-right corner, either move your mouse across the screen or hit the TAB key.

Another way to Create a Slideshow

1. After putting all of your digital snaps in one folder, double-click on one of the photos.
2. The pic will pop up in a new window. You can view the rest of the pics or create a slideshow using the toolbar along the bottom. You can also rotate the photo or zoom in and out.

To View Pictures as a Filmstrip

1. In Windows Explorer, navigate to the desired folder and right-click on the folder.
2. Select **Properties**. Click on the **Customize** tab and under "Use this folder type as a template," select **Photo Album**.
3. Go to the View menu and select **Filmstrip**. A preview window and a toolbar will appear in the right window. You can use the toolbar for navigation or picture rotation.

By Bob Gough

The Proper Watering of Potatoes

As with all fruit and vegetables, the ultimate size of the crop is very much dependent upon proper watering at the right time. There are several important stages in watering potato plants that correspond to growth phases of the plant.

During the first phase, which runs from planting to the very beginning of tuber formation (about 45 days from planting), a water deficit will reduce the rate of seed piece healing and can result in seed decay. After emergence soil water shortages slow root development and plant growth by interfering with nutrient uptake. Supply plenty of water at this time, but not too much. Too much water can leach nutrients away from the rootzone and cause seed decay.

During the second phase, which is characterized by tuberization and lasts only a short time, too little water will decrease tuber number and quality as well as increase the number of malformed tubers and those afflicted with scab. Too much water can lead to brown center problems and possibly later hollow heart maladies. As with the first stage, practice moderate irrigation here.

During the third stage, which lasts up to two months and

plant needs the most water. Water requirements are quite high during the first part of this stage and lower during the last part as the plants reach maturity. Too little water slows tuber development and sharply reduces yields. Uneven watering leads to growth cracking, knob formation or second growth, and to scab infections. Excess water can result in late season hollow heart. Irrigation should be uniform and related to evapotranspiration rates and rainfall amounts. Keep you eye on the soil. Don't get it sopping wet, but don't let it dry out and crack either.

The fourth and final stage involves tuber maturation. The vines begin to die at this time. Water use is much reduced but too little water dehydrates tubers, increases susceptibility to bruising during harvest, and affects proper "skin set". Excess water may cause tuber cracking during harvest and cause enlarged lenticels on the tubers. These enlarged lenticels are entrance points for bacterial disease and reduce storage quality. Irrigation in this stage can be very challenging and difficult due to short cool days and reduced transpiration which does not allow the soil to dry out.

Hey Plant Science Majors!
by Mariah Stember

Montana State University is a leader in international education, offering **over 235 programs in more than 70 countries.**

In today's global economy, it is imperative that students graduate with the cross cultural and language skills that will make them successful in the workplace. No matter what profession students choose after their college or university studies, the skills learned abroad will be of great benefit to their careers. Study abroad also helps to create global citizens with sensitivity to other cultures, allows people to realize a lifelong dream of study abroad, and fosters lifelong friendships. Many students return from study abroad saying that it was the best experience of their lives.

Did you know you can study plant science abroad??
By Mariah Stembor

Check out the different locations offering plant science abroad:

- Macquarie, Australia
  - Plant Structure and Function
  - Plant Physiology
  - Plant Evolution
- University of Western Australia
  - Offers Plant Sciences major
- Limerick, Ireland:
  - Plant and Animal Physiology,
  - Plant Anatomy
  - Plant Systematic
  - Plant Physiology
  - Plant Ecology and Palaeoecology
  - Plant Growth and Development
  - Plant Utilization and Biotechnology
  - Marine Plant Science
- Canterbury, New Zealand
  - Plant and Microbial Sciences
- Kingston, England
  - Growth & Development of Plants and Animals
  - Animal & Plant Communities

Australia

Ireland

THREE STEPS TO STUDY ABROAD:

1. Attend a general information session.
2. Meet with Mariah Stember, Study Abroad Advisor re. application procedure and program questions.
3. Apply and GO!

Note: Mariah Stember is available to do a short classroom presentation (5-10 minutes) at the beginning of any class period to talk about study abroad opportunities through MSU.

General Information Sessions:

September

Wednesday, 7th	3:30 pm
Friday, 9th	10:00 am
Monday, 12th	4:00 pm
Tuesday, 20th	1:30 pm
Monday, 26th	11:00 am
Thursday, 29th	2:30 pm

October

Tuesday, 4th	10:00 am
Thursday, 6th	3:00 pm
Monday, 10th	4:00 pm
Thursday, 20th	11:00 am
Monday, 24th	2:30

November

Wednesday, 2nd	2:00 pm
Tuesday, 8th	3:00 pm
Thursday, 17th	10:00 am

December

Thursday, 1st	11:00 am
Wednesday, 7th	2:00 pm

All credits earned on MSU approved study abroad programs transfer back to MSU. Financial aid also applies to MSU study abroad programs, and many scholarships are available. There are also hundreds of programs in which students can take courses in English. Prospective students are encouraged to stop by the Office of International Programs at Montana State University to learn more about study abroad opportunities at Montana State University. The office is located in 400 Culbertson Hall and is open Monday – Friday from 8:00 am to 5:00 pm. For more information, please contact Mariah Stember, Study Abroad Advisor / Outreach Coordinator at (406) 994-7151 or mstember@montana.edu.

Recipe of the Month

All-In-One Beef Salad

This filling salad may be used as a main dish. Strips of roast beef are tossed with potatoes, green beans, artichokes, and a seasoned oil and vinegar dressing.

2 tablespoons white wine vinegar
1 tablespoon Dijon-style mustard
1/2 teaspoon seasoned pepper
1/2 teaspoon garlic powder with parsley
1/3 cup olive oil
3 1/2 cups thinly sliced cooked roast beef or grilled flank steak cut into 2-inch strips
1 pound small red potatoes, cooked and sliced
1/2 pound fresh green beans, steamed until crisp tender
1 (6 ounce) jar marinated artichoke hearts, drained
1/4 pound mushrooms, sliced
5 green onions, sliced, including tops

In small bowl whisk together vinegar, mustard, Seasoned Pepper and Garlic Powder With Parsley. Slowly add oil, beating constantly. Place beef strips in large salad bowl; add dressing and toss gently. Add remaining ingredients and gently toss before serving.

Meal Idea:
Arrange bed of lettuce on individual plates and serve steak salad over top.
Hint: For an easy meal, use leftover roast beef or pick up some roast beef from the local deli.

July Birthdays

Susie Couch	2
Katie Cash	3
Pat Hensleigh	5
Andy Hogg	8
Jack Riesselman	9
Susie Siemsen	22
Petrea Hofer	28
Ray Ditterline	29