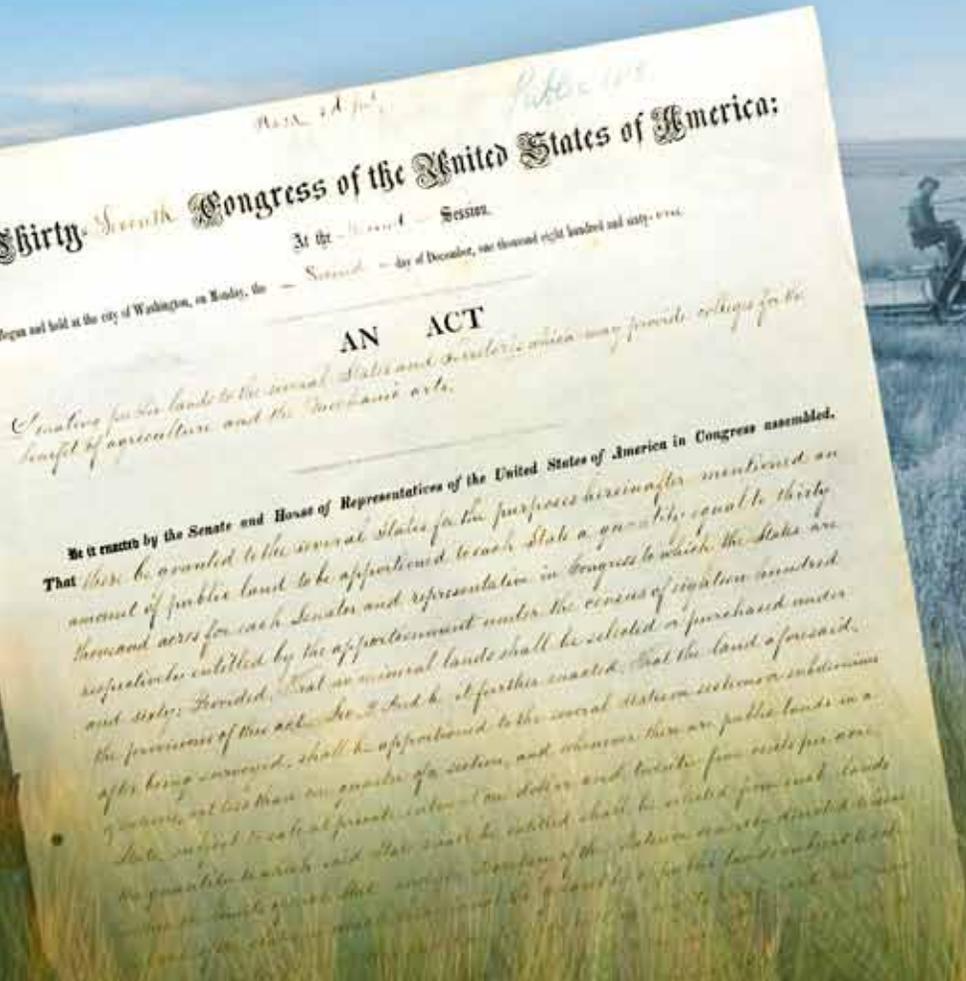


Linked to Agriculture



Celebrating 150 years of **Land-grant education**

This summer marks the 150th anniversary of the Morrill Act, which established land-grant institutions throughout our country, including Montana State University



We have completed yet another amazing year in the College of Agriculture (COA), and I cannot help but reflect on the accomplishments of our students, staff, and faculty. Agriculture has been around forever. Yet every year researchers discover new and more efficient ways to do things, and they pass that new knowledge on to students beginning careers in agriculture. The COA professors engage in a time honored profession balancing time-proven methods with innovative research and new technologies. As these students transition into the work force, I can't help but ponder the state of the College, the University, the students and the entire agricultural community. This year as the class of 2012 graduates the Department of Agriculture celebrates its 150th anniversary.

In 1862 in the midst of the Civil War

President Abraham Lincoln oversaw the establishment of the United States Department of Agriculture. He signed the Homestead Act and the Morrill Land-Grant Colleges Act along with other key pieces of legislation that paved the way for westward expansion and eventually Montana State University. It is fascinating for me to think about all of the changes of the past 150 years—especially when looking at it from a MSU perspective.

While the United States practiced “modern” farming and ranching, Montana was not a state but part of the Oregon Territory. John Francis Grant settled in the fertile valley near present day Deer Lodge in 1858 and by 1862 was nursing worn out cattle from pioneers traveling on the Overland Trail back to health. He then traded one healthy cow for two unhealthy ones. Conrad Kohrs started marketing cattle to the mining communities and the cattle industry was soon thriving. Trappers traveled along the Missouri River and traded furs at Fort Benton, and Native Americans populated the vast territory.

It is amazing to think of all of the advancement during the past 150 years. And yet everything we do is still for the same purpose—enhance production, resource stewardship, and create new knowledge. Abraham Lincoln said, “Every blade of grass is a study and to produce two where there was but one, is both a profit and a pleasure.” I am

sure that when you talk to farmers in Montana they can appreciate that sentiment and are grateful to the knowledge gained through 150 years of research and education.

Therefore this issue of *Linked to Agriculture* profiles key research projects ongoing at MSU and the Montana Agricultural Experiment Station. We have come a long way in 150 years, but our mission is just as critical as it was then. We must continue to excel and to optimize our resources. Even as we celebrate our accomplishments we must compete for funding, both at the federal and state levels. There are those who want to cut agricultural research spending—we must not let that happen.

Agriculture is critical to our community, our country, and our world. We must recruit and retain the best students and faculty, and we can only do that with the firm and more vocal, action-oriented citizenry that benefit from our efforts. Please join us in celebrating this important anniversary of the Department of Agriculture and look forward to the next 150 years. Just imagine what we might be able to do then!

Jeff Jacobsen
Dean and Director
College of Agriculture
Montana Agricultural Experiment Station



The College of Agriculture (COA) celebrated the accomplishments of three graduating seniors at the 30th annual Awards for Excellence banquet in the Strand Union Ballroom in February. Hannah Bigelow, biotechnology, Missoula, Mont., Erin Gunnick, environmental horticulture, Bozeman, Mont., and Megan Podolinsky, environmental biology and Spanish, Helena, Mont. were honored during the event hosted by the Bozeman Area Chamber of Commerce and the Alumni Foundation on February 21. Students recognized must have a minimum cumulative grade point average of 3.5, an exemplary record of campus and community involvement, and a substantive history of service.

The three COA seniors were nominated through their respective departments, and then selected by university deans and campus committees. Recipients

of the Award for Excellence invite the faculty or staff member who has been most inspirational and influential in their undergraduate careers. The unique structure of the Awards for Excellence—students taking the stage alongside their designated mentors—makes for a memorable occasion, and brief commentaries submitted by awardees highlight the evening's program.

Bigelow selected Rebecca Mattix, the pre-vet curriculum advisor and faculty from ImID. Mattix received two Awards for Excellence this year as she was also chosen by Amanda Zellar (organismal biology) through the College of Letters & Science. Mattix was the only mentor selected by two students. Gunnick tabbed her academic advisor, Professor Bill Hoch (PSPP). Podolinsky shared the stage with Professor Geoffrey Poole from LRES, and additionally, received the Torlief Aasheim Community

Involvement Award. The “Torley Award” designates MSU’s best of the best, “seniors with outstanding academic achievements and a record of campus involvement—who also give of themselves for the betterment of the community.”

“Sharing her energy and talent seems to be second-nature for Megan,” Poole commented during the selection process, “so much so that her scholarship and service appear almost effortless. Yet she works hard. Megan’s leadership and kindness have earned her the respect of not just those who nominated her for this award, but also the respect of her classmates and peers.”

Congratulations to all of our outstanding 2012 awardees! ■

ABOVE: Left to right: Nora Smith, Hannah Bigelow, Rebecca Mattix, Erin Gunnick, Bill Hoch, Geoff Poole, and Megan Podolinsky

ASMSU Changes Representation Structure

The Associated Student of Montana State University (ASMSU) serves as the students’ elected voice for Montana State University. Previously students elected representatives based on where they lived, but now they elect their representatives from their colleges. There are 21 ASMSU senators and the COA has one elected representative. The College of Agriculture’s ASMSU senator is Rachel Abeh, majoring in agriculture education-relations with a minor in rangeland ecology and management. Abeh is involved in several activities at MSU: Chi Omega, Collegiate FFA, MSU Livestock Judging, MSU Range Club (vice president), Society for Range Management Student Conclave (national vice president), and Collegiate Young Farmers & Ranchers. Abeh represents the college well and is a strong advocate for the agricultural industry. Abeh says, “I am committed to giving the smallest college the largest voice in ASMSU, and demonstrating the importance of the College of Ag.”

“I am committed to giving the smallest college the largest voice in ASMSU, and demonstrating the importance of the College of Ag.”

—RACHEL ABEH



Devon Ragen, Graduate Student (Animal Science) injecting a marker help estimate forage intake.

Research Updates Ag Appreciation Weekend

During Ag Appreciation Weekend 2011, the College of Agriculture hosted a MSU Ag Fair with interactive booths from the college's departments and from several of the state's agricultural organizations. At the fair, departmental experts offered mini-lectures during breakout sessions on a wide variety of topics. Following are excerpts from the presentations. These brief synopses highlight some of the College of Agriculture and the Montana Agricultural Experiment Station's salient research.

Pulse Crops 101: From Humus to Hummus

It seems researchers in Montana are getting excited about pulse crops, but not necessarily for the same reasons. While Dr. Prashant Jha, SARC scientist, recommends using pulse crops in rotation with cereal grains to ease the pressure on fields where specific weeds have developed a resistance to herbicide, Dr. Perry Miller, professor in the Department of Land Resources and Environmental Sciences, explained how incorporating pulse crops into weed management can lead to more sustainable agricultural practices. Miller is working with a graduate student, Macdonald Burgess, to explore how pulse crops change

the energy costs associated with grain production and also improve soil quality. Miller argues the number one energy input in growing wheat in the United States is the nitrogen from fertilizers. He stated that half the energy budget in agriculture is in the form of fertilizer. Planting pulse crops like peas can change that balance. According to research findings, wheat yield was greater in crops that were rotated with peas.

During the breakout session in October, Miller also shared how lentils and peas were suited to the

Montana climate as well as risk factors involved in adding them to cropping systems. Pulse crops evolved in semiarid climate contexts in the Mediterranean area, similar to Montana's semiarid climate. Dry pea is a versatile crop used for food, feed, forage or fuel. It is a moisture miser and can be seeded and harvested



Seeds

with conventional machinery, but it is susceptible to drought and hail. Lentils are well adapted to the MonDak region and are used for food. However, it is at risk to major diseases and sensitive to herbicide residue or drift. It is also a poor weed competitor. Chickpea has good market potential and does well in the Northern Plains climate. A fungus called *Ascochyta* has limited production of chickpea around the world. Chickpea has a low cutting height and a high seed cost.

For more on pulse crops go to <http://landresources.montana.edu/Department/Miller.html> or call 406-994-5431.

Student Internships in Agricultural Education

The faculty from the Agricultural Education Department work daily with Montana's most important natural resource—its people. And they are preparing their students to do the same. In October students shared their experiences as student interns. Shalaine Watson, an agricultural education (Ag Ed) major from Forsyth, Mont., chose ag ed because of her diverse interest in agriculture. As an ag ed major in the teaching option, she could study a variety of agriculture topics and not need to specialize. Watson said, "College in general taught me to think outside the box and how pertinent it is to become a life-long learner and keep up on the most recent agricultural knowledge." Watson's student teaching experience was in Richey, a small town in eastern Montana. She found it challenging to balance classroom and experiential learning when teaching animal husbandry to freshman, range science to sophomores, Montana agriculture to seventh graders, and floriculture to juniors all in one day. She said, "My time at MSU taught me to prioritize what was important to me and to always put in my best effort." While attending the National FFA Convention with the Richey students, Watson realized there is a strong connection and thread of appreciation between agricultural students and teachers across the country. "I think ag teachers have a unique opportunity to connect with their students and their community on a different level than other teachers," she said. Through her student teaching experience, Watson

realized this career path is what she is meant to do and looks forward to a rewarding career in agricultural education.

Graduate student Nikki Bailey, from Fort Benton, Mont., earned a bachelor's degree in agricultural education with a focus on ag relations. While interning at the Judith Basin County Extension Office, Bailey planned and managed several camps, tours and fairs, and learned about the county Extension office's daily work. Through this experience, Bailey learned communication and organizational skills, and how to work with a variety of people. Bailey also learned the details of organizing and running a successful county 4-H fair. She felt the internship offered insight into the challenges and rewards of a career as an Extension agent. "My internship gave me a chance to network with many people in the agricultural industry and to use the skills I learned in class in a real life hands-on experience," said Bailey.

International Educational Experiences for Agricultural Economics and Economics Undergraduate Students

The last issue of *Linked to Agriculture* featured two courses, Follow the Grain and Conception to Consumption, which the Department of Agricultural Economics and Economics offer. These courses provide students with a unique international

perspective. Gary Brester, professor of agricultural economics, shared with the Ag Fair audience the history, structure and future plans for the classes. The courses are taught every two to three years and were designed to help students follow food from genetics to consumption while providing an international experience. Students in the Follow the Grain course have visited more than nine countries scattered around the globe. During the course experts from across disciplines interact with students and provide them a broad view of the commodity industry. Students research different topics and regions and present lectures to the class. Students must participate in the international travel and pay their own expenses. Faculty traveling with the students also pay their own expenses and are not subsidized by student fees or other costs. The trips are normally after the semester ends or during spring break.

The department is focusing on grants and endowments to help with future student and faculty travel. They are also developing relationships with international experts in places like New Zealand and Croatia. The department's goal is to welcome these experts to MSU for a few weeks. According to Brester the visitors-in-residence provide another component to the learning experience and also will help with international travel logistics.

The department has also developed a cooperative relationship with the Fort Peck Community College and is working to



Agricultural economics and economics undergraduates students

Research Updates cont.

reduce barriers for students wanting to participate in these courses and continue their education at a four-year institution.

Colic in Horses

Dr. Shannon Moreaux, veterinarian and assistant professor in the Department of Animal and Range Sciences, spoke about colic in horses. Moreaux explained colic is not a diagnosis, but a description of abdominal pain for a variety of conditions and abnormalities. There are more than 100 known causes of colic, the most common cause of premature death in domesticated horses. The estimated annual cost of horse colic in the United States is \$145 million.

According to Moreaux there are several causes for colic: the stretching or inflammation of the intestinal wall, excessive tension on the mesentery (the material that holds the intestines to the wall of the abdomen) or restrictions of the blood supply are a few common causes. Predisposing factors include age, sex, breed, diet, exercise, and some environmental conditions. Mindy Brown, director of finance for the College of Letters & Science, attended the breakout session in October. “Dr. Moreaux has a wonderful ability to break down complex ideas, so they are more easily understood,” Brown stated. “He is a wonderful educator and is always current,” she added.



During the lecture Dr. Moreaux shared some of the most common clinical signs of colic which include pawing, rolling, abdominal distension, kicking at the abdomen, and anxiety. According to Brown this information was extremely valuable for horse owners like herself. When her own horse displayed signs of colic, Brown immediately recalled the information Moreaux shared and was able to quickly recognize the signs and take appropriate action.

Moreaux pointed out that often horses with colic require medical treatment involving medications, fluid and electrolyte therapy, laxatives, manipulation or even surgery. During the breakout session those who attended Moreaux’s lecture were intrigued by the virtual tour of the horse’s gastrointestinal tract used to demonstrate how colic evolves. While Brown had heard about the virtual tour on the internet it was her first opportunity to see it. She said it was extremely beneficial and made it easier to understand a very complex issue such as colic.

Herbicide Resistance: A Challenge to Montana Crop Production

Prashant Jha, assistant professor and weed scientist at the Southern Ag Research Center (SARC) at Huntley, MT shared critical information for farmers across the State about

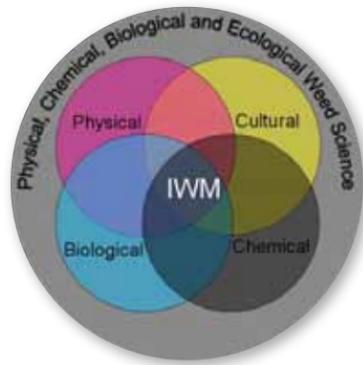
herbicide resistant weeds and the current focus of research at the center. Jha summarized the research into three key areas: screening for herbicide resistant weed biotypes, investigating mechanisms for resistance, and exploring alternative strategies for fighting the resistance. At the Huntley center, researchers are concerned many herbicides previously used in Montana are no longer effective. In Montana wild oats, Persian darnel, and Russian thistle are

herbicide resistant.

Jha and his research staff suspect Kochia, commonly referred to as tumbleweed, is now resistant to glyphosate, (Roundup®) one of the most widely used herbicides in Montana. There are already resistant varieties of it in Kansas, Nebraska, Colorado, and Alberta. Glyphosate-resistant Kochia is a major concern in sugar beet fields, because more than 99 percent of the growers rely solely on glyphosate for weed control. Therefore Jha recommends an integrated weed management (IWM) program to prevent the spread of herbicide-resistant weeds.

When using herbicides Jha advises growers to apply it at the rate suggested by the manufacturer and to use a tank mixture which includes multiple herbicide products. Jha’s research involves evaluating new herbicide chemistries and optimizing herbicide tank-mixes, and studying application timing and rate in diversified crops grown in Montana. Jha suggested using soil-applied residual herbicides at or prior to planting can potentially reduce weed bank recruitment and reduce weed interference, especially early in the season. Diversifying crop rotations is also a critical component to IWM, and scientists at the SARC recommend rotating pulse crops such as peas and lentils—especially where growers have traditionally relied on wheat fallow rotations. Jha also advises high seeding rates for crops as a long term weed management strategy.

Fertilizers also impact IWM as low nitrogen rates may demand more intensive weed management. The weeds tend to grow better than crops under poor soil nitrogen conditions. “It is only through the development and implementation of an IWM program that the problem can be effectively managed,” said Jha. “A good program will balance physical, cultural, biological and chemical aspects of weed science. Economically viable rotation crops



may be considered, such as oilseeds, pulses and forages,” he added.

If you would like more information, please contact the Southern Agricultural Research Center at 406-348-3400.

Immunology and Infectious Diseases Research Update

Mark Jutila, Ph.D., a leading scientist with Immunology and Infectious Diseases (ImID), provided an overview of critical ongoing research projects in the department. Jutila introduced the audience to some diseases that may be transferable between wildlife, livestock and people and provided an update of current multi-faceted research activities regarding these diseases. Jutila stated that digestive and respiratory diseases still account for more than 50 percent of the non-predator deaths in calves in Montana and scientists at MSU are working diligently to discover vaccines and treatments that can minimize these losses.

Jutila pointed out the need to learn more about bovine specific immunity, so they can improve the effectiveness of the vaccines. Our current knowledge of protective immune responses is primarily based on work done in rodents and humans. While there are similarities with bovine immune responses there are also clear differences. A key difference is in the immune cells: cattle have far more of a unique T cell called gamma/delta than humans and rodents. According to research assistant professor Jodi Hedges who works with Jutila, researchers at ImID are studying these special cells which comprise a large percentage of the infection fighting cells in bovine blood and play a vital role in immunology of cattle. Researchers are exploring novel approaches to both the compounds and the delivery methods. They want to develop products and procedures that are not only safe, simple, and low cost, but will still stimulate immunity in cattle. Scientists are currently testing a compound, Amphotericin B, (AMB) in cattle. AMB is currently used to fight fungal infections in humans. Researchers are testing AMB in calves and dairy cows using different delivery methods like strips that dissolve on the tongue. ■

For more information about this project contact ImID at 406-994-4705.



Recently, Dean Jacobsen and I were in Washington D.C. visiting MSU alumni. As we made our way around our nation’s capital, learning about our alumni and their career accomplishments, there was a familiar theme. The foundation of success originating from the likes of Linfield Hall at Montana State University echoed comments I’ve heard standing in a wheat field or leaning on a fence post in Montana.

Whether you graduated forty years ago or four years ago, the experience was the same. Sure, technology and faces

change, but the quality education remains constant. And yes, we have new buildings, but students still go to class. It seems every alumnus can share a story about a professor or advisor who took a moment to help them as a student to make a difference. We never want to lose that student/staff connection in the College of Agriculture.

Dean Jacobsen and I discussed the emerging financial needs of the students and faculty—the people of the COA. The relationship is symbiotic. They need each other, and they need financial support including scholarships for the students and endowments for the faculty.

We are fortunate to have a healthy number of scholarships within the College. As our student numbers increase, so does the need for scholarship dollars. We welcome our growing student population in the College. These young people are ambitiously looking to improve the world, accomplishing remarkable feats en route to a degree. Many need financial assistance to get there. If you have given any amount to a scholarship, we cannot thank you enough.

Faculty support is a relatively new need within the College. To recruit and retain faculty, we need private support. Why? Earlier this month the Office of Institution Research and Assessment compiled a report for the Association of American Universities. The report rank-ordered universities considered very high research institutions. Of the 92 universities in the report Montana State University was last in every category for faculty salaries. In other words we pay our professors, associate professors, and assistant professors the lowest salaries of these Universities. We must become more competitive. And to do so, we need to raise funds to keep our intellectual capital on the MSU campus. We do not want to lose faculty to a university who can simply pay more. We can help keep our incredible faculty through endowments. Endowments can provide funds for salaries, program support, and equipment. We must invest in our faculty, as they provide the mentoring and education to our students.

Finally, programs are often the place where students and faculty come together. Program funds can assist with the likes of Follow the Grain, field experiences, cropping systems research, sustainable agriculture teaching and Conception to Consumption. There are many other programs needing financial assistance which state funds cannot assist. Students and faculty request minimal funds in order to establish a new program. Providing these resources can lead to impactful developments from the College, originating from students or faculty.

As Dean Jacobsen and I had these conversations in D.C., we had a similar message of thanks to our friends and alumni. Thank you to each and every one of you who reached into your pocket and made a donation to the College of Agriculture. Your contributions are making a difference. On behalf of the College, thank you!

Sincerely,

Darin Paine
Director of Development

Darin Paine can be reached at darin.paine@montana.edu or (406) 994-7671

2012 Events

- June 19** Central ARC Field Day, Moccasin
- June 20** Southern ARC Field Day, Huntley
- July 12** Northern ARC Field Day, Havre
- July 19** Eastern ARC Field Day, Sidney
- July 25** North Western ARC Field Day, Kalispell
- June 28** Western ARC Field Day, Corvallis
- Sept. 7** Scholarship Banquet
- Oct. 26** Celebrate Agriculture!! (new name for annual Ag event)
- Dec. 15** Fall Commencement

 Keep up with the College of Agriculture on Facebook. Search for "College of Agriculture" or "MSU College of Agriculture."

Multiple Copies Cause Concern

On behalf of the Alumni Foundation, I would like to extend my personal apology for the inconvenience you may have experienced as a result of receiving multiple copies of the College of Agriculture mailings this past December.

It is important that you know that the error was not caused by the administration or staff of the College of Agriculture. Mailing addresses and contact information for campus publications and newsletters are provided by the Alumni Foundation. Though our team strives to perform perfectly in our data management efforts, we failed to do so this past December.

It is our goal to provide an exceptional experience on every occasion, so that our University may enjoy the lifelong support and advocacy of our loyal alumni and friends. Be assured that we have isolated the cause of December's issue and have reformulated our protocols to prevent a recurrence.

I hope that we can restore your confidence in us, as we work diligently to improve your experience with the College of Agriculture. Your continued support of Montana State University is important.

Sincerely,



Michael Stevenson
President & CEO, Montana State University Alumni Foundation

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