Plant Science Says

Happy 4th of July!

Volume 14, No. 6 July, 2011

NACTA/DOCE 2011 – GET ENGAGED!

By Tracy Dougher

This year's meeting of the North American Colleges and Teachers of Agriculture took place at the University of Alberta, Edmonton, Canada June 14-17. NACTA kicked off with the keynote address by Dr. Frank Robinson and his "There's a Heifer in Your Tank" crew…..a teaching strategy where students present skits, recite poetry, sing, and dance on "science answers questions you never knew you had about animal agriculture". Bill Hoch, Tracy Dougher, and Allison Harmon represented Montana State University at the meetings. The week was filled with over 75 oral presentations and 90 posters including topics such as using terrorism as the context for attracting students to a science-based agriculture course, encouraging students to use their multiple intelligences, engaging students by building a raised bed garden, and perceived challenges of teaching a blended online course (the abstract booklet is free: http://www.nactateachers.org/announcements/1060-2011-nactadoce-abstract-booklet-available.html).

Tracy Dougher was among a class of 19 receiving the NACTA Teacher Fellow Award.

Tracy Dougher receiving NACTA Teacher Fellow Award

She is pictured with Dr. Ron Hanson, NACTA membership director and Distinguished Professor of Agribusiness from the University of Nebraska.

A flash mob broke out at the NACTA lunch/business meeting with the executives participating…you can see 'the making of' on youtube: http://www.youtube.com/watch?v=I1uAui0iFuE (see if you can spot the Western Regional Director)

The NACTA 2012 conference will be just a hop away (one flight) at the University of Wisconsin-River Falls June 26-29, 2012. Consider joining in the lively discussions of teaching agriculture. Bill and Tracy are currently on the NACTA Journal committee and Tracy is the Western Regional Director for NACTA. Please ask us about NACTA!

Village Team Time Tests Graduate Student's Prediction for Large Scale Neem Treatment of Mosquito Rearing Pools in Mali

By Florence Dunkel

In April, 2O11, Ky-Phuong Luong predicted during his PSPP graduate seminar that 2O children in the subsistence farming village of Sanambele, Mali could, in one hour, harvest and process enough neem leaves, *Azadirachta indica* (Meliaciae) to save the village from invasion by the mosquito species that carries human malaria. He further predicted that this harvest to produce neem leaf slurry could be done in such a way so as not to harm the trees themselves. Large-scale use of botanical-based pest management alternatives often fail in technology-based societies because production is too time-consuming and/or collection harms the plant. We chose one of the hottest days of the pre-rainy season, June 11, 2O11. For about five hours the temperature

soared above 1OO degrees F. None the less, help poured into the family compound where we live during our sojourns in Sanambele. Within 4O minutes after beginning the time trial, four ninth grade boys had found the 34 trees selected of the 81 village trees for the sampling and returned with the requested 5OO g sample from each tree.

While the young men made the leaf collections, ten children and eight adults (including site mentors Keriba Coulibaly and Florence Dunkel) stripped leaves from stems. Oumee Thera, our first Malian Mali extern, the daughter of PSPP graduate, Aissata Thera, weighed in each bag of prepared leaves. The 18 kg of leaves were them pounded to a pulp by four young women with the traditional mortar and pestle, standard equipment in Malian villages. An hour later, when it was clear the mortar and pestle processing was the bottle neck in the process, six elder women including the President of the Sanambele Women's Association arrived to speed up the process. A hand-clapping, dance was made of the pounding process by the elder women and the task of preparing a botanical-based management for the larvae of the mosquito that carries malaria was completed with a flourish and a grand finale.

Neem leaf slurry made by village children who collaborated with their Elders and parents to manage mosquitoes whose adult stage transmits malaria in their village.

All in all 32 village women, men, and children were involved and the process took 2 hours and 15 minutes. Observers concluded that if 2 or more mortar and pestles were used for the pounding process to make the slurry, the entire large-scale neem treatment of larvae to protect the entire village would have been completed within an hour.

President of the Sanambele Village Women's Association contributes her expertise to the young people preparing 18 kg of neem leaf slurry to treat the nearby dry-bed river pool, habitat of mosquito larvae whose adult phase transmits human malaria including severe [cerebral] malaria.

Timing is important. The neem leaf slurry was allowed to mordent in the noon heat for one hour followed by a parade of youth and children to the edge of the dry-bed pool in the Zangolo River, a channel of the Niger River. The children quickly set up a test beside the stagnant pool while their older friends led by Keriba fanned out around the dry-bed pool to treat the edges where anopheline larvae are found. We were just in time! The anopheline larvae, whose adult stage carries all four human malaria species, including severe or cerebral malaria, had reached an action threshold, one larva per 25O ml pond water. Within days, the big rains started and if anopheline larvae had survived in the dry-bed pool, they would have been adult females when the rains came and would have easily invaded many areas of the villages to take a blood meal and drop their eggs where clear pools of water had accumulated.

Large-scale production of botanical pest management in small-holder family farming villages is feasible. In these social structures, cooperation from the very youngest to the oldest is encouraged. This process was clearly a welcome social gath-

ering as well as an occasion to share important messages about how to manage malaria within the village with no help from the outside.

Ky-Phuong has now completed his teaching assistantship for PSPP 465R, graduated from MSU with an M.S. in Health Sciences and submitted to the Malaria Journal for review his Sanambele field and laboratory bioassay research in collaboration with Florence Dunkel, Nancy Beckage (University of California-Riverside professor emeriti), and Keriba Coulibaly (tenured scientist in the national agricultural research organization of Mali, IER, and visiting instructor in PSPP 465R Health, Poverty, Agriculture: Concepts and Action Research).

Malian Agricutural Scientist and Former PSPP Student Becomes Visiting MSU Instructor

Thanks to a USDA National Institute of Food and Agriculture Higher Education Challenge Grant, Keriba Coulibaly was able to return to MSU to make another important contribution to teaching and research of students and faculty. During the entire month of March, 2O11, Keriba worked seven days a week with graduate and undergraduate students and faculty in PSPP, Health Sciences, Liberal [Environmental] Studies, Agricultural Education and Extension, French Language and Literature, and Animal Science in mentoring, lecturing, and writing several peer refereed journal manuscripts, and even working on a children's traditional Bambara storybook. In Mali during June, 2O11, Keriba followed up on each of these projects with an MSU senior capstone student and PSPP faculty member, Florence Dunkel. During Keriba's time on the MSU campus, he was on leave from a crop improvement project with the U.S. Agency for International Development-Mali.

The impact Keriba made on students in PSPP 465R Health, Poverty, Agriculture: Concepts and Action Research was enormous. Similarly in BIOO 162 CS, students learned many things, including malaria management from someone who lives with malaria. These freshman and seniors in core courses will not forget their lessons in

Mali externs Ky-Phuong Luong and Megan Sullivan-Haywood receive MS and BA, respectively. While Ky-Phuong solved the village-based larval management of mosquitoes that can carry malaria, Megan completed her PSPP 465R research and capstone project in preserving storytelling in Sanambele with the publication and delivery to the village of our book "le Roi et les Orphelins" both in Bambara and French as told by a Sanambele village storyteller and translated by Keriba Coulibaly and Ada Giusti and illustrated by the 5th and 6th graders of the village school.

an agro-ecosystem overlain with insect-related health issues vastly different from what they are accustomed to in the USA. Students also learned many cross-cultural social skills in the process, including the intricate Bambara greetings process. Keriba was also welcomed with the PSPP 465R students by Elders of the Northern Cheyenne Nation, including President of

Keriba travels with PSPP 465R students to meet with Northern Cheyenne Elders, Dr. Littlebear, Kathy Beartusk, and John Woodenlegs and others on the Reservation about the holistic processes underway there and in Sanam-

Chief Dull Knife College (CDKC), Dr. Richard Littlebear. Deep discussions took place there on the Reservation in Lame Deer, MT with PSPP 465R students, CDKC students and faculty, Elders, and other members of the tribe who had worked with Keriba and Florence in filming the PBS-shown film *Dancing Across the Gap.* Hats off to Keriba, a great part of the teaching, learning, research environment in PSPP and MSU.

A huge thank you goes to Professor Norm Weeden and his wife Cathy for hosting Keriba at their home this spring. The title of the USDA grant making possible Keriba's participation in PSPP research and teaching is: "New Paradigm for Discovery-Based Learning: Implement bottom-up development by listening to farmers' needs while engaging them in participatory, holistic thinking." The P.I. is Florence Dunkel. Visit the website www.montana.edu/mali for more information

Keriba and Florence met MSU President Emeritus Geoffrey Gamble in the classroom where they are all teaching and offer informal thank yous to the President for MSU's assistance during Keriba's and his colleagues' two years at MSU (2005-2007) .

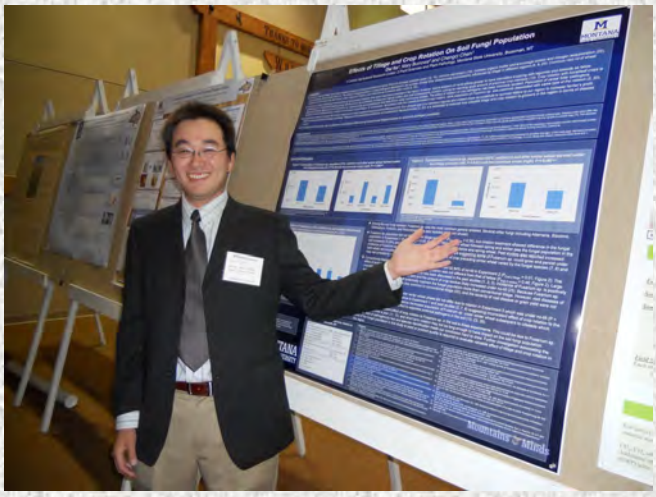
WSCS and WSSS Annual Meeting
By Alanna Schlosser, Kathryn Gause, and Sunny Kim

On June 19 – 22, Alanna Schlosser, Kathryn Gause, Sunny Kim and Dai Ito travelled to Laramie, Wyoming for the Western Society of Crop Science and Western Society of Soil Science Joint Annual Meeting. The meeting kicked off with a talk entitled "Food Security and Precision Agriculture" which was presented by Dr. Raj Khosla from Colorado State University. It was a great talk and full of energy. The basic message that was presented is that food security is a major global issue and one way to address this concern is through precision agriculture in developing countries. Other interesting topics included potential impacts and uses of saline water produced during extraction of coalbed methane natural gas, identification of drought and heat tolerance genes in wheat, and ice nucleation active (INA) bacteria and how they contribute to frost damage. We also heard lectures concerning regional risks of growing pulse crops as cover crops for winter wheat, as well as the risk of growing oilseed crops for biofuel.

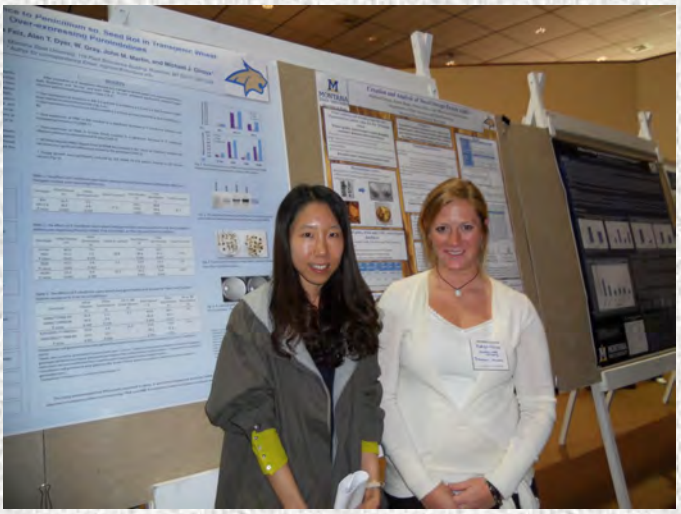
Approximately thirty speakers gave presentations and many of these were graduate students participating in an oral competition. Alanna was one of the students who presented, with the topic "Leaf Starch is Important to Maize Productivity Under Field Conditions." She won second place in the competition. Sunny, Kathryn and Dai presented

The three winners of the oral competition. Alanna Schlooser, second from left won 2nd place.

posters on their research regarding puroindolines and Penicillium sp. seed rot resistance, creation of novel storage protein alleles, and effects of tillage and crop rotation on soil borne pathogen populations.



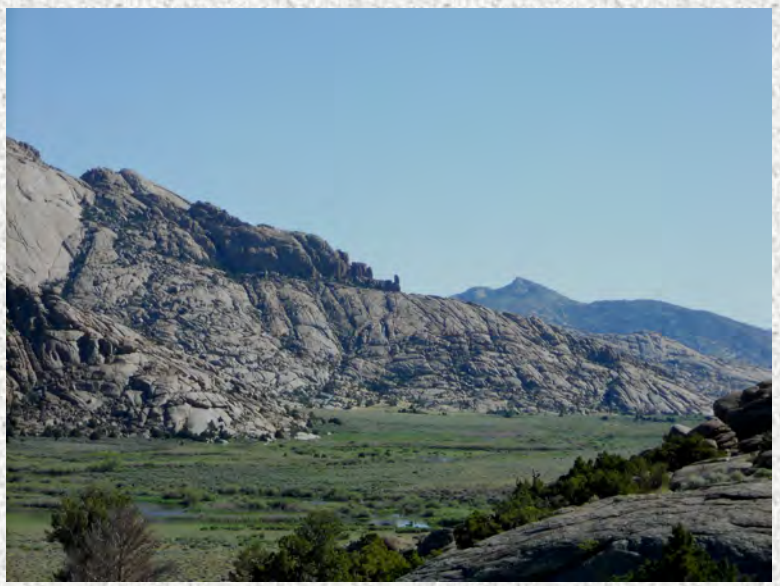
Dai Ito presenting his poster on soil pathogen populations



Sunny Kim and Kathryn Gause presenting their posters on "Puroindolines and fungal resistance" and "Creating novel protein storage allele".

The conference concluded with a field trip to the University of Wyoming AES Greenhouse where we heard from several researchers from the University of Wyoming. One graduate student was researching fish farming and herb and vegetable production using a vertical hydroponic system that he designed. Another plant scientist was looking at gene function in transgenic maize with the help of fluorescent protein tags. Additionally we also learned about algal growth and its possible future role in biofuel production.

The optimum way to drive to Laramie, Wyoming in the summer is through Yellowstone National Park, so we used this opportunity to see all the wonders the park has to offer. Entering through the west entrance in the early morning gave us the great chance to stop and see elk and bison. We even followed a bison down the middle of the road for about 100 feet, snapping great photos the whole way. We chose a route around Yellowstone Lake with the greatest thermal activity, showing up just as Old Faithful was erupting. On the way back from the great meeting we stopped at the popular Split Rock Park along the Oregon Trail, which gave us a chance to stretch our legs over the huge mountain of boulders shaped by years of wind and water erosion. The rocks were also home to new interesting animals like a tiny lizard darting between rocks and a little jack rabbit among the pink bitterroot flowers. And when we finally returned back to the park the first wildlife to be seen was a large grizzly bear!

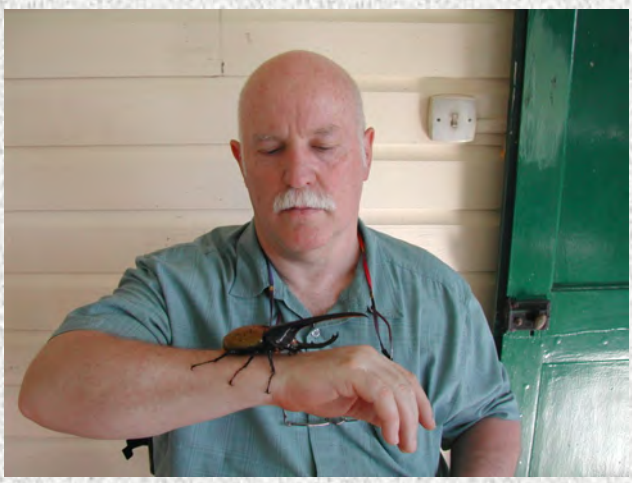


Split Rock located along the Oregon Trail in Wyoming

Look Who Came to Dinner!
By Mike Ivie

Mike and Donna Ivie helped with a field class from Texas A&M at Clemson University's Archibold Tropical Research Center in Dominica, West Indies. The three week course had a variety of undergrads, 11 of which had an interest in entomology. The Ivies taught insect trapping and identification skills to this group, and advised on several group and individual projects. Eighteen families of beetles were added to

the known fauna of this well-studied island during the course.



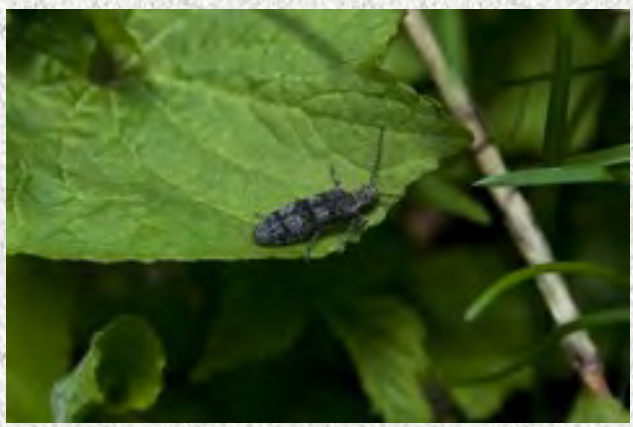
A Hercules beetle Dynastes hercules) came to dinner at the Archibold Tropical Research Center (photo by James Woolley).

Montana Woodboring Insect Survey
By Mike Ivie

The Ivie lab is in the second year of a 5 year project to better document the woodboring insects of Montana. Aimed at providing base-line data in anticipation of the arrival of several destructive invasive species, traps are being set throughout the state.

One way the project is having a broader impact is the availability of *Priacma serrata*, one of the few species in the basal lineage of the beetles called the Archostomata. Finding specimens of this suborder is always a challenge, as they are rarely seen. Very high quality DNA is therefore virtually unavailable. The fact that males of this primitive and globally rare species come by the dozens to household bleach at the Bozeman Creek trailhead every summer has made us a hotspot for genomic researchers.

This year, Dr. Duane McKenna of Memphis State University visited, and our lab group took him out to collect DNA for his studies on the deep lineage evolution of the beetles. Two weeks later, our crew collected more specially preserved material for a project headed up by Dr. Rolf Beutel of Friedrich-Schiller University in Jena, Germany.



Priacma serrata at Bozeman Creek. (Photo by G. Boland)

Dr.

MSU Undergrads Asa Stavens, Charles Hart, Memphis State professor Duane McKenna and recent MSU grad Geena Boland at the Bozeman Creek Trail. (Photo by S. Taravati).

Mckenna also used information developed by our lab to collect material of the other small and rare suborder of beetles (the Myxophaga) at the source of a recently discovered species, *Hydroscapha redfordi*, which was described last year by recent MSU entomology graduate Crystal Maier with Mike Ivie and two others.

Washington Commercial Seed Lot Trial
By Nina Zidack

On June 20, the MSU seed potato inspection team traveled to Washington for a chance to get in the field and see the performance of Montana seed. On the 21st, we worked with folks from Washington, Idaho and Oregon to read the plots at Othello for mosaic and other disorders. On the 23rd, we attended the field day where WSU's Mark Pavek distributed the results for the disease readings. Montana growers performed extremely well. We had 125 seed lots entered

into the trial which was 38% of the total and the highest number of any state. That actually represented a reduction from last year where we had almost 50% of the seed lots. Of the 125 Montana lots, 78% had no mosaic. A number of growers attended the WA trials, taking the opportunity to meet with customers and get updated on the latest potato research.

Between the WA field trials, we attended the Hermiston, Oregon field day on June 22. We also observed Montana seed lots in their field trial, and again, they showed superior performance.

Bob Johnston, Lucy Cooke and Kim Prosek evaluating seed plots at the Othello trials

The Future of the MSU Hopyard/ Vineyard
By Vickie Blake

The summer of 2011 will be one of transition for the four year old hopyard and second year vineyard "Snowball's Chance" at the Hort farm. Germplasm acquisition, propagation and management has been done until now by Victoria Carollo Blake who is leaving this summer to return to California and take a position as data curator for the Triticeae CAP project. The barley project has been supporting the hopyard/ vineyard in labor and materials and will continue to do so through at least this summer.

The Master Gardener's group directed by Toby Day will begin to assist in the efforts, helping to weed, wrap bines, etc. this summer and will be taking over in the fall. A public harvest day will still take place in September, as this has become a popular annual event. This year, since the hop bines are now fully mature, we can begin to collect meaningful yield and quality data on the nine hop cultivars.

The hops look great this year, and we have been able to get into the yard to wrap and trim before they grew completely out of control. We have seen that the vines can survive the Montana winters, and with careful management, may even grow to produce fruit in a few years.

Cascade hops at the peak of production in the MSU hopyard.

Course Focus
PSPP 345 – Organic Market Gardening
By David Baumbauer

The 2011 edition of Organic Market Gardening class had several interesting twists. Two students, Jeanne and William both endured the MSU admission process in order to sign up for the course as non-degree graduate students. William gets extra credit for he drove down from Helena to attend the 8 a.m. class. It was a delight to have these "Return to Learn" students join the course.

The class planted approximately 7000 square feet of garden and two high tunnels. The heart of the class are the 12 student lead presentations covering topics such as insect, disease, and weed management, direct marketing options, cover crops, and

irrigation systems.

Highlights included a spirited compost making session, weed scavenger hunt, honey bee hive opening, and a field trip to Gallatin Valley Botanical and Pete Fay's Rocky Creek Farm.

There were 19 students enrolled in the course with a quarter being horticulture majors, half SFBS majors and the remaining quarter of the students were non-ag majors.

2011 class portrait taken before heading out to the bee yard

Calhe demonstrating how to calibrate a back pack sprayer

Publications

Mostrom, M.S. and B.J. Jacobsen, 2011. Ruminant Mycotoxicosis. pp. 315- 344. In Ruminant Toxicology. Ed. G.D. Osweiler. Elsievier-Saunders, Philadephia, PA.

Corrie Pfeiffenberger White, horticulturealist at the Chicago Botanic Garden was recently quoted in a very informative article on roses in the Chicago Tribune. The full article is at http://www.chicagotribune.com/classified/realestate/home/ct-sun-garden-0605-roses-20110602,0,7046671.story?page=1

Sarah J. Halvorson, Ashley L. Williams, Sidy Ba, and Florence V. Dunkel. 2011. Water quality and water borne disease along the Niger River, Mali: A study of local knowledge and response. Health and Place. 17 [2]:449-457.

Invited Lectures

Dave Sands was invited to the International Celiac Disease Symposium in Oslo, Norway. 500 people , mostly medical researchers, attended. Their preoccupation was with diagnosis of celiac disease and gluten sensitivity (the celiacs (1%) and the sensitivities (6%) of the European and American population. The only treatment to date is the Gluten Free Diet. Our work on Montina, Timtana, Proatina and camelina was well received. The Europeans knew nothing of these new gluten free crops.

The key problem with humans and their diet seems to be that our genetics still codes for ingestion of paleo foods (no grains, no dairy, and instead mostly meat). Meat has a lot of lysine in its proteins and the intestinal enzymes pepsin and trypsin in us digest protein by cutting it at the amino acid (you guessed it) lysine. Grains don't have much lysine in their storage protein so grain protein is hard for us to digest. Gliadins from wheat (and similar proteins from rye and barley), for instance have a sequence that looks like this: PQPQLPYQ (p=proline, Q= glutamine, L= leucine, and Y = tyrosine). If we had a trypsin that cut at the Q or P sites, we would not have a problem digesting wheat protein. But we don't. So this fragment interacts with our t-cells and we have an autoimmune reaction. Perhaps we can ferment bread with a yeast or sourdough bacterium that cleaves at the P's and

Q's. Until then we will make sure that Montina, Timtana, and Proatina are available to the celiac and gluten sensitive communities.

Grants

Bill Dyer, "Herbicide Resistance Extension Information for Montana Producers", Montana Noxious Weed Trust Fund

Plant Select® Demonstration and Research Garden
By Toby Day, Extension Horticulture Associate Specialist

I recently went to the Denver Botanic for Plant Select® seminars, where I picked up 387 Plant Select® plants for a research and demonstration garden to be installed at the Horticulture Farm on the campus of Montana State University. The will be located between the vineyard and the Dr. Gough orchard.

Plant Select® is a cooperative program administered by Denver Botanic Gardens and Colorado State University in concert with horticulturists, nurseries and educational facilities throughout the Rocky Mountain region and beyond. The purpose of Plant Select® is to seek out, identify and distribute the very best plants for landscapes and gardens from the intermountain region to the high plains. According to their website, "Plant Select® is at the vanguard of a bold, new plant palette that is revolutionizing the way we garden in the Rocky Mountains. Included are plants that thrive in both our variable winters and our hot summers. They are helping forge a truly American style of horticulture."

Several plants are chosen each year that thrive in the sunny, variable conditions of Rocky Mountain gardens. These can be plants that have grown here for years and have not yet attained the popularity. Introductions represent taxa that are discovered by Plant Select® cooperators. Plant Select® plants that have and will be selected are evaluated on:

- Performance in a broad range of garden situations in the Central Rocky Mountain Region
- Adaptation to the Central Rocky Mountain Region's challenging climate
- Uniqueness
- Resistance to pests (disease pathogens, insects and mites)
- Exceptional performance under low water conditions
- Long season of beauty in the garden
- Non-invasiveness
- Capability of being mass produced
- Longevity in containers (retail appeal)
- Current availability from current propagators
- Ease of propagation using basic propagation protocols
- Availability of images of established specimens in landscapes (for publications)

Gallatin County Master Gardeners will be installing, maintaining and evaluating the Plant Select® research and demonstration garden with the help of a small grant from the Gallatin Garden Club. Eventually, the garden will become a showcase that offers nurseries and garden centers throughout Montana options for new plant materials can sell at their commercial locations.

New 2011 introductions:

Blonde Ambition blue grama grass
Bouteloua gracilis 'Blonde Ambition' PPAF

Russian hawthorn
Crataegus ambigua

Grand Mesa Beardtongue
Penstemon mensarum

Oliver and Eva Welcome Thomas Julian

Oliver Neher and Eva Grimme are the proud parents of Thomas Julian, born on June 14. He weighed 8.4 lbs and was 21 inches long.

Congratulations!

Recipe of the Month

Ranch Potato Salad Dressing

2 pounds red potatoes
1 bottle (8 ounces) ranch salad dressing
1 cup (4 ounces) shredded cheddar cheese
1 package (2.8 ounces) real bacon bits
1/4 teaspoon pepper
Dash garlic powder

Place potatoes in a large saucepan and cover with water. Bring to a boil. Reduce heat; cover and simmer for 20-25 minutes or until tender.

In a large bowl, combine the remaining ingredients (dressing will be thick). Drain potatoes and cut into cubes; add to the dressing and gently toss to coat. Cover and refrigerate for 2 hours or until chilled. Refrigerate leftovers. Yield: 6-8 servings.

July Birthdays

Jinling Kang	1
Susie Couch	2
Mary Burrows	7
Andy Hogg	8
Susan Siemsen	22