

Plant Science Says



Volume 16, No. 2

March, 2013

Jacobsen Takes On New Responsibilities

Barry Jacobsen has accepted the interim Department Head position for the Department of Research Centers effective February 5. Currently the Department has 10 faculty and 43 employees located at the Northern, Northwestern, Western, Western Triangle, Central, Southern and Eastern Agricultural Research Centers. He will maintain his potato and sugarbeet research and extension work plus his leadership of the Montana IPM program.

Barry Jacobsen spoke to ~130 potato growers at the Mount Vernon Northwestern Washington Research and Extension Center on Integrated Management of Potato virus Y. This beautiful facility, built in 2006, has a first class laboratory, greenhouse space, and 177 acres of plot land. Dr. Inglis chaired the building committee for the new facility. They currently have six faculty (two Plant Pathologists- Debra Inglis and Lindsey du Toit) and seventeen graduate students. As a

side note, Dr. Inglis was at one time the IPM Director for MSU.



Debra Inglis, Barry Jacobsen, and Lindsey du Toit

Horticulture Student Awards By Tracy Dougher

The MSU Horticulture Faculty has named their American Society of Horticultural Sciences (ASHS) Collegiate Scholars and Outstanding Undergraduate Student Award for 2012-2013.

The prestigious ASHS Collegiate Scholars Award honors the top juniors and seniors in horticulture from all over the United States. This year's MSU nominees are:

James Trotter
Laurie Neuman
Samantha Jo Smith
Hannah Pearce
Luke Bromley
Jamie Raznoff
Kia Simshaw
Heather Begger
Elisa Boyd
Justin Bartels
Caitlyn Foley
Joshua Pecukonis
Hannah Estabrooks



Northwestern Washington Research and Extension Center in Mt. Vernon, Washington.

The ASHS Outstanding Undergraduate Horticulture Student Award, recognizes an elite group of students from across the U.S. for their academic, leadership, and service achievements. This year's MSU recipient is Justin Bartels.



Justin Bartels, recipient of ASHS Award

Justin Bartels is a truly outstanding student and member of the community. He has maintained a 3.94 GPA while double-majoring in Environmental Horticulture Science and Organismal Biology. Justin

tackles everything he does with a positive mindset and rigorous determination, always with the greater good in mind. For example, last fall while taking 18 credits he was able to obtain his Emergency Medical Technician (EMT) certification. He has been extremely active as a volunteer, including student teaching, helping at a farmer's market, and most recently in the Americorp program, where he worked on numerous environmental restoration projects, often under difficult weather and terrain conditions. Americorp was so impressed with Justin that this fall he will be serving as a team leader. Justin is an inspiration and we are thrilled to recognize him with this award.

Recipients of both of these awards will receive a certificate from ASHS and their names will appear in the April issue of the *ASHS newsletter*.

Britton and Boyd Win Awards for Excellence

The MSU Alumni Association and the Bozeman Area Chamber of Commerce hosted the thirty-first annual Awards for Excellence Program on Tuesday, February 19, 2013. The evening, dedicated to excellence, is designed to recognize students who have outstanding records of achievement in academics (must have a 3.5 G.P.A. or higher and senior standing), extracurricular activities and service to the University and the Bozeman community.

These students are selected by the academic college Deans as the most outstanding in their colleges. Forty of MSU's top seniors were honored this year along with a mentoring faculty person, selected by each student honoree, to also receive an Award for Excellence. The faculty Award for Excellence, in particular, has come to mean a great deal, as it is recognition directly from a student for exceptional guidance and inspiration.

In our Department, Elisa Boyd chose Jennifer Britton as her mentoring faculty person. She states, "I met Jennifer in one of my first landscape design classes; since then she has continued to be an inspirational and motivational figure in my education both in and outside of the classroom. I have enjoyed time in her classes as well as in the opportunities she has offered beyond the classroom. She is always willing to take the time out of her day to answer questions and give advice even though she is not my course advisor."



Jennifer Britton, faculty member, and Elisa Boyd, student, received Awards for Excellence.

Jennifer commented, "Elisa Boyd brings her mind and heart into her smallest deeds. Her quiet, thoughtful diligence in scholastic work and undergraduate research instills trust with her professors and serves as inspiration to fellow students. Moreover, as evident in her extracurricular responsibility of helping unwanted horses, she has chosen to travel the difficult path of empathy and kindness.

In the words of Robert Frost, I believe this 'has made all the difference!'"

The 6th International Legume Conference

By Matt Lavin

In Montana and surrounding states, forests are known as "lodgepole," "Doug fir", "ponderosa," "Engelmann spruce," and so on, which indicates that one species of tree generally dominates a particular forest. Imagine the scenario where the southwest slopes of the Bridger Mountains harbored dense forests comprising at least 100 species of trees, and that the nearby northern slopes of the Gallatin Range were home to another dense forest also with at least 100 species of trees, and that these two adjacent forests shared relatively few tree species. Let also say this was the common situation throughout Montana.

If this was how tree diversity occurred in Montana, then how would we refer to our forests? Welcome to the world of tropical forests! The tropics comprise fundamentally different kinds of forests that are indistinguishable from each other unless one has an ability to identify the hundreds of plant families and genera of trees that make up these forests.

One way tropical forests are distinguished from each other is by degree of seasonality. Rain forests occupy the less seasonal end of this spectrum. In the middle are savanna woodlands sometimes with dense stands of trees and marked by a distinct wet and dry season, during the latter of which the forests are prone to burn. Dry forests occupy the highly seasonal and drought-prone end of this seasonality gradient and are so droughty that grasses and other plants providing the fine fuels needed to initiate fire never prosper, whereas in contrast, succulent plant groups like cacti grow as tall as the trees. Remarkably, the only plant family to prosper and predominate along this entire tropical seasonality gradient is the legume family, Fabaceae (or Leguminosae). While many of us know legumes by the herbaceous crop species often grown in temperate latitudes (e.g., peas, beans,

lentils, alfalfa, clover), most legumes, or about 14,000 of the 20,000 total species in the family, are tropical trees and shrubs. To understand legume diversity, including how to best taxonomically classify the many species in this family and how to determine what shapes global patterns of legume diversity, a group of ecological, taxonomic, and genetic researchers has met every six years or so during the past 35 years to summarize the latest research that bears on such issues. This past January, about 200 researchers from the Americas, Africa, and Asia along with Domingoes and myself met at the University of Johannesburg from January 6-11 for this reason. While many advances in our understanding of legume diversity were reported, some of the most notable included how legume diversity can inform forest ecology.

Legume trees, as well as shrubs and herbs, have the ability to not just symbiotically manufacture their own biologically useful nitrogen, but to track it in the soil as it becomes available at the beginning of the wet season or after a disturbance event (e.g., drought, fire, windfall). Detecting changes in legume taxonomic composition in tropical forests across large spatial scales can reveal important nutrient cycling changes that affect all tropical tree species. The upshot is that different kinds of



*A male elephant standing next to one of his groups marula trees (*Sclerocarya birrea*, Anacardiaceae or sumac family from which he harvests fruits about the size of golf balls.*

seasonal tropical forests, which have been so confused or so difficult to distinguish from each other, may someday, thanks to advances in legume taxonomy and ecology, be distinguished by whether nutrients cycle mostly on a routine seasonal schedule or on an opportunistic basis that follows natural disturbances.

The International Legume Conference held in Johannesburg was followed by a field excursion to Kruger National Park, which is located in northeastern South Africa along the Mozambique border (near Limpopo National Park). The savanna woodlands in this area of Africa, which are similar to the Miombo woodlands to the north, include hundreds of species of legumes, including many species of the genus *Acacia*.

**"A Meeting About Insect Adaptation is Held Where? In Paris of Course!"
By Kevin Wanner**

I recently presented an invited talk about the evolution of moth sex pheromone receptors at a European workshop held the 14th and 15th of February. ADALEP, Adaptation to a Biotic Environment in Lepidoptera (moths and butterflies), is a collection of about 100 French scientists who have joined together in a collaborative network to study adaptation from an integrative biology approach, comparing aspects of Lepidoptera population, evolution, ecology, physiology, behavior and genomics. ADALEP's role is to facilitate collaborative projects and to explore, among other issues, what makes a Lepidoptera species be a pest. Participating French institutes included the INRA (French National Institute for Agricultural Research), the IRD (French institute of research for development), CNRS (French National Center for Scientific Research), CIRAD (French centre of agricultural research for development) and a number of universities. This was a great opportunity to reconnect with some French colleagues, meet new collaborators, and highlight my MSU research. I made sure that as an ambassador for Montana, I showed pictures of the boiling river and Hebgen Lake during my slide show that turned out to be very popular! If this is sounding like a

somewhat dull meeting for non-entomologists, first consider that it was hosted in Paris!

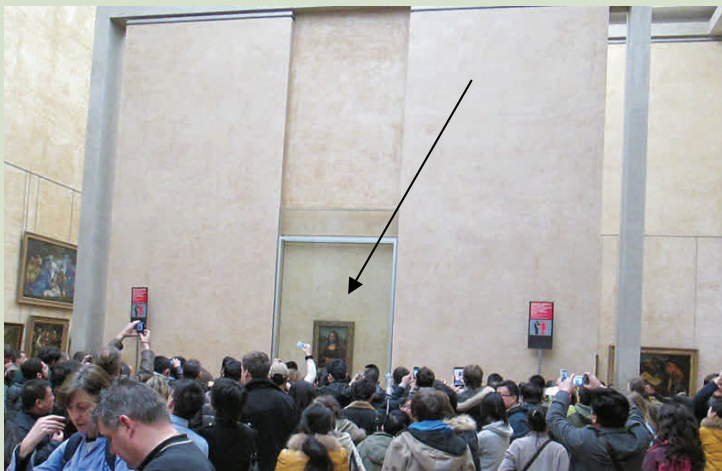


One of the facades in one of the two courtyards of the Royal Palace; note all of the statues and relief sculpture. On the left, one of the triangular glass roofs of the Louvre museum is visible in the courtyard (ie the museum is underneath). Photo courtesy of Kevin Wanner.



Check out the detail of the archway into the Notre Dame Cathedral! Photo courtesy of Kevin Wanner.

Never having been to Paris before, there were some obvious tourist stops to make, like the Louvre museum and the Notre Dame Cathedral. Everything in Paris being compact, it was great just to walk around and soak in the sights. With the weather being cold and dreary, the city was not full of tourists to fight with. What caught my attention was the immense architectural detail around every corner and all the little shops hiding in what appeared to be just another alleyway. Take the Louvre Museum for example; I did not realize that it was also the old Royal palace, an amazing sight in its own right. The palace occupies about 100 acres forming two main quadrilaterals that enclose two large courtyards. The detail of the different facades was a bit overwhelming let alone the columns and ceilings on the inside! But if you want to see the famous Mona Lisa, I suggest you look at her image on the internet.



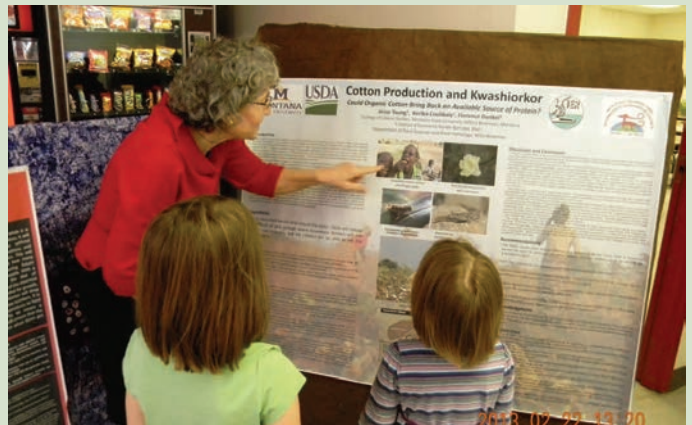
Do you want to see the Mona Lisa? I suggest looking at her picture on the internet! Photo courtesy of Kevin Wanner

Who can visit France without talking about the food! Their version of cheap fast food is a selection of hundreds of gourmet cheeses with a fresh baquette and glass of Bordeaux wine to wash it down. Just enter any corner store and point to a round of cheese covered in mold and you will not be disappointed. While at dinner a French colleague ordered a salad prepared with different choices of meat to make it a meal. I noticed that the choices included “duck gizzard” and I insisted she add that so I could try it. I think I had a premonition that only the French could

make poultry gizzard tender and taste gourmet! If you have not guessed yet, I would recommend accepting an invitation to talk about moths if it is hosted in Paris!

25th Annual Bug Buffet By Florence Dunkel

Sun flooded into the atrium of the Plant Growth Center like a spotlight on an odd array of fruits, vegetables, and chocolate covered almonds—the pollination table. Nearby, a Biology 162CS student from Issues of Insects and Human Societies welcomed guests and collected signatures in a well-used guest book. The 2013 Bug Buffet had begun. 142 people of all ages appeared. A two year old with his brother and sisters learned about favorite snack foods of kids their ages in Mali—roasted grasshoppers—and how this healthy snack can spell the difference between normal physical and mental growth and development and stunting, or kwashiorkor. A class of sixth graders from



Florence Dunkel explains Kwashiorkor in children to the youngest guests. Photo courtesy of Cathryn Cayton.

the Headwaters Academy became a bee colony and learned hive politics under apiarist Dave Baumbauer’s direction. In a classroom transformed by the audacious colors of dyed silk, technically insect spit, thirty BIOO 162 CS students and their guests participated in a sensory evaluation of fifteen honey products from Bozeman, other parts of the US, Canada, and Mali. By now, aromas of sesame oil and fritters frying became intense. Appetizers appeared, land shrimp cocktail on a wonton spoon. Guests sampled *Acheta*



David Baumbauer, Plant Growth Center Manager and bee-keeping enthusiast, shares his knowledge of honey bee colonies. Photo courtesy of Florence Dunkel.

stir fry, *Galleria quesidillia*, *Galleria* fritters, but oh, the *Tenebrio* dream bars and fortified chocolate brownies. Learning took place on many levels. Spontaneous groups of discussions arose about where to find and how to raise your own food insects. Students pondered why Euro-Americans feed pet lizards and turtles these nutritious protein snacks laced with calcium, zinc, iron, high in omega 3-fatty acids without

cholesterol while humans eat less nutritious beef, pork, chicken proteins. Montana State University Catering Service earned an A in their first exam in insect cuisine using strict food safety rules. Organized by PSPP entomology professor Florence Dunkel, the Bug Buffet has become a campus tradition to teach the science of food insects, and psychology of food choices.



In the SUB kitchens, Laurie of MSU Catering prepares *Tenebrio* dream bars for the Bug Buffet. Photo courtesy of Florence Dunkel.

Students Visit Reservations By Florence Dunkel

Instead of heading to the ski slopes on Presidents' Day weekend, 12 students from the AGSC 465R Health, Poverty, and



Chief Dull Knife College Cultural Center. From left Josette Wooden Legs, Hunter, Florence Dunkel, Mina Seminole, Emma Kashian. Photo courtesy of Cathryn Cayton.

Agriculture class and their professor, Florence Dunkel, stayed on the Northern Cheyenne and Apsaalooke (Crow) reservations to learn traditional ways and how this is integrated into food and health. Students brainstormed with their site mentors in the Northern Cheyenne Cultural Center on the campus of Chief Dull Knife College, how to combine learning plants with Cheyenne language immersion for toddlers and Headstart students on the Reservation. In the emerging botanical garden in the center of the town of Lame Deer, AGSC 465R students explored natural habitats, learned to recognize red willow and how it is prepared for ceremonial tobacco. Former MSU Microbiology student, Meredith Tallbull, is reclaiming the area and integrating its use with Lame Deer public schools and the College math curriculum. Northern Cheyenne



AGSC 465R students Claire LeDuc, Claire Slossom, Tim Mulally and Alan Balen with Northern Cheyenne ethnobotanist and elder, Linwood Tallbull. Photo courtesy of Florence Dunkel.

ethnobotanist, Linwood Tallbull helped students understand the close connection between physical and mental health and plants for Northern Cheyenne. Students learned details of prairie turnips, yucca, yarrow and many other traditional, local plants. Other students met in Crow Agency with Dr. Valerie Small, an Apsaalooke studying invasive Russian olive in berry picking areas and riparian cottonwood nurseries. Students also met with 42 members of the "107 Committee," the Apsaalooke Elders who advise the Tribal Council. These events were organized by former and present Apsaalooke students in AGSC 465R, Kurrie and Tracie Small, respectively.

While preparing and eating meals together students tried to understand the Cheyenne and Apsaalooke desired quality of life, what resources are needed to attain this quality of life, and how these resources are produced. This is a University Core course in Research and Creative Activity using the holistic process in community-based research with a service-learning format. You are invited to meet the site mentors, hear student poster and PowerPoint presentations, join the discussion, and have dinner at the "Share the Wealth Symposium" April 25, 2013, from 4-8pm room in 108 Plant BioSciences and adjacent atrium.

Montana Ag Live Schedule for March

March 24, 6:00 p.m. Montana PBS - Tim Fitzgerald, Ag Econ and Econ, "Oil and Gas Leasing Pitfalls"

New Employees

Erin Lonergan (Cathy Cripps)



Photo courtesy of Elliot Johnson

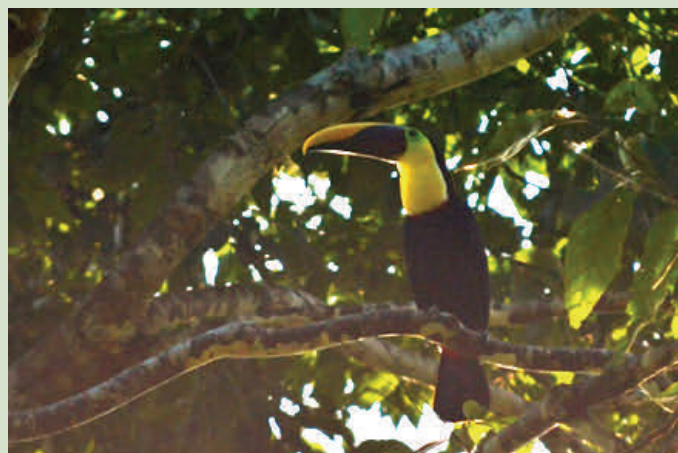
After completing my M.S. degree in Plant Sciences in Dr. Cathy Cripps Lab, she was gracious enough to give me about 2 months off.

During that time, I road tripped back to

California to see my family via Washington and Oregon and then travelled to Central America where I visited the countries of Nicaragua, Costa Rica, and Panama. My favorite part of the trip was seeing so much wildlife including: iguanas, capuchin and howler monkeys, three-toed sloths, Jesus Christ lizards, coral snakes, scarlet and



Three-toed sloth, Isla Bastimentos, Panama. Photo courtesy of Pat Rojo.



Toucan, Corcovado National Park, Costa Rica. Photo courtesy of Pat Rojo.

emerald macaws, toucans, great curassow and many other birds, reptiles, amphibians and insects. A few highlights of the trip were Isla de Ometepe in Nicaragua and Corcovado National Park in Costa Rica. Ometepe is an island formed by two volcanoes (the active Concepción and the inactive Maderas) that rise out of Lake Cocibolca. It is home to many unique plants and animals and has a large population of capuchin, howler, and spider monkeys. Lake Cocibolca also has a unique population of bull sharks that travel between the ocean and the freshwater lake much like salmon.



Gotogo lookout, Corcovado National Park, Costa Rica. Photo courtesy of Pat Rojo.

Corcovado National Park conserves one of the largest lowland tropical primary rainforests in the world and according to National Geographic is "the most biologically intense place on Earth in terms of biodiversity." While here I saw many plants and animals that are indicative of primary rainforests.

The trip was a blast, but I am happy to be back in Bozeman and am enjoying the snowy weather. I am excited to be continuing on at MSU as a Research Associate in the lab of Dr. Cathy Cripps. I will be continuing to work on the whitebark pine restoration project and will also be assisting with a variety of other projects related to the fungi of Montana and the Rocky Mountains. I look forward to continuing to work with all of you.

Valuable Opportunities for Strobel's Students

Cassia Wagner was recently granted funding for a Smithsonian Institute Spring Break Internship. Cassia will be studying aspects of the biology of the American Chestnut tree. Gary Strobel is her Mentor. Congratulations Cassia!

George Schaible, one of the students working in Gary Strobel's lab, has had his abstract submission, "Gene mining for 1,8-cineole synthase gene cluster in *Annulohyphoxylon* sp." approved for presentation at NCUR 2013 (National Council of Undergraduate Research) at the University of Wisconsin—LaCrosse. The

NCUR 2013 Abstract Committee stated, "Chosen from more than 3500 submissions, your abstract demonstrates a unique contribution to your field of study and we are pleased to offer you the opportunity to present your work to your peers, faculty, and staff from around the world." Congratulations George!

Course Focus

Adam Richman - BIOB 484/501

Population and Evolutionary Genetics

Understanding the Secret of Life



At the heart of biology there is an unexplained mystery, the evolutionary advantage of sexual reproduction. Although wildly popular in the natural world, its benefits are unclear when compared for example to the simple alternative of asexual

reproduction. Why sex is so successful may be reasonably called the secret of (multicellular) life.

There are many competing explanations for this outstanding mystery, and they require an understanding of population genetics. Population genetics is the language of evolution, and its mastery is key to understanding genetic data and methods of analysis used in diverse fields including ecology, epidemiology and genomics. We will learn classical population genetics with an emphasis on readings from the original literature, with the specific goal of empowering you to tackle the population genetic literature relevant to your own particular research interests. Understanding the secret of life will just be a nice side benefit of the course.

Required text: Gillespie, Population Genetics, A Concise Guide.

This course is taught every other year in the Fall, and will be offered next in 2014. Questions? E-mail Adam Richman at arichman@montana.edu

Publications

Dunkel, F.V., K. Coulibaly, C. Montagne, K.P. Luong, A. Giusti, H. Coulibaly, and B. Coulibaly. 2013. Sustainable Integrated Malaria Management by Villagers in Collaboration with a Transformed Classroom Using the Holistic Process: Sanambele, Mali and Montana State University, USA. *American Entomologist*. 59: 15-24.



Gary Strobel. The cover of *Microbial Ecology* recently featured one of Gary's photographs. *Microbial Ecology*, Feb. 2013, Vol. 65, No. 2.

25th Anniversary of the Northwest Flower and Garden Show By Toby Day, Extension Horticulture Associate Specialist

Forty-six Master Gardeners from the State of Montana attended the 25th Anniversary of the Northwest Flower and Garden Show in Seattle February 20-24. The Northwest Flower and Garden Show is the second largest in the U.S. with an average of 80,000 people attending the show daily. There are over 6 acres of display gardens that took months to design and yet only

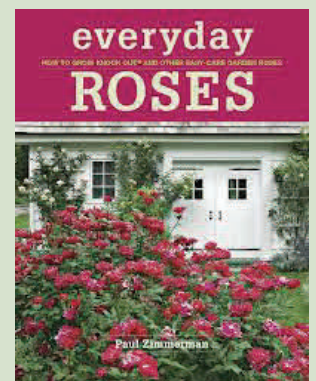
took two weeks to build. The flowers were blooming and displays were amazing, as usual. The thing that I thought was most amazing was the thought that went into the greenhouse operations that manipulated the photoperiod of the plants, forcing them to bloom at the exact time of the show. Master Gardeners first attended a dinner at the Crown Plaza where Master Gardeners from other areas of the state could meet one another and learn about projects and ideas from other counties. The next morning they were off to see the flower show. Not only were they impressed by the displays, but they were also impressed by the seminars and nationally known garden speakers. I even came home with some good ideas for teaching to Master Gardeners for the future.



One of the displays of a "Hobbit house shed/cellar" at the Show



Many of the Montana Master Gardeners who attended the Show



*Paul Zimmerman, one of the many seminar speakers at the show. Paul is the author of *Everyday Roses*.*

Overall the trip was a complete success and many of the Master Gardeners came home with new ideas and even a few purchases to

enhance their gardening experience. Many thanks go out to Dara Palmer, Assistant Master Gardener Coordinator, for taking reservations and overseeing the contracts for the trip. She is a huge asset to making sure these programs through Master Gardener are a success.

If you would like to learn more about the Northwest Flower and Garden Show, you can find their website at www.gardenshow.com

Recipe of the Month

Great Green Salad

4 T olive oil
2 T white wine vinegar
1 T Dijon mustard
1/2 t salt
1/2 t ground black pepper
1 pinch white sugar
1 t chopped fresh parsley
1 t fresh lemon juice
2 cloves garlic, chopped
1 avocado - peeled, pitted, and cubed
4 c mixed salad greens
1/2 c sliced almonds
2 oz feta cheese, crumbled



In a large bowl, whisk together the olive oil, white wine vinegar, mustard, salt, pepper, sugar, parsley, lemon juice, and garlic. Add the avocado and stir to coat with dressing. Just before serving, add the salad greens, and toss to coat with dressing. Sprinkle sliced almonds and feta cheese over the top.

March Birthdays

Courtney Speegle	3
Andrea Varella	11
Anand Aman	15
Erin Gunnink	24
Vicki Blake	28
Hillary Parkinson	28
Elaine Nichols	31



Happy Birthday!