

# Plant Science Says

Virginia Bluebells



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The Department of Plant Sciences and Plant Pathology

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## Promotion and Tenure

Mary Burrows, Jennifer Britton, and Rebekah VanWieren went through the Promotion and Tenure process this past year. Rebekah VanWieren was granted Retention, Jennifer Britton was awarded Promotion to Associate Professor with Tenure and Mary Burrows was awarded promotion to Professor. Congratulations to each of you!



*Provost Potvin, Professor Mary Burrows, John Sherwood, Department Head, Jeff Bader, Executive Director of Extension, and President Waded Cruzado*

## Congratulations Graduates!

### By Jill Scarson

On May 6, the Plant Sciences and Plant Pathology Department will hold a reception and awards ceremony for our graduates in 108 PBB/Mathre Courtyard. The graduates will receive the following gifts: Landscape Design graduates - "The Artful Garden: Creative Inspiration for Landscape Design"; Crop Science and Sustainable Crop Production graduates - "Weeds of the West"; Horticulture Science graduates will receive loupes (magnifying glass). All the graduates will receive a cowbell, pin and coffee mug from the College of Agriculture, as well as a geranium from the Department.

Following are the names of all those that will receive diplomas and awards.

### Graduate Students

Roshan Acharya - M.S., Plant Sciences  
Carmen Murphy - M.S., Plant Sciences  
Mehmet Ozseyhan - M.S., Plant Sciences  
Andrea Varella - Ph.D., Plant Genetics

### Undergraduates

#### **Environmental Horticulture - Horticulture Science**

Andrew Leiter - B.S.  
Jessica Monte - B.S., Honors  
Lucas Parriman - B.S.  
Michael Radford - B.S.  
Brigitte Simmons - B.S., Honors  
Ivan Zeller - B.S., Honors

#### **Environmental Horticulture - Landscape Design**

Kyle Anderson - B.S.



*Jennifer Britton,  
Associate Professor*



*Rebekah VanWieren  
Assistant Professor*

## **Plant Sciences - Crop Sciences**

Brittney Brewer - B.S., Honors

Sadie Church - B.S.

Benjamin Fischer - B.S.

Veronnaka Klamert - B.S., Highest Honors

Michael Pawlowski - B.S., Honors

## **Sustainable Food & Bioenergy Systems - Sustainable Crop Production**

Jack Duchin - B.S., Honors

Jamie Sowell - B.S.

Lukas Vest - B.S., Honors

Congratulations to each of you and we wish you all the best in your future endeavors!

## **2016 Midwest Aquatic Plant Management Society**

### **By Ryan Thum**

The purpose of the Midwest Aquatic Plant Management Society is to promote sound and appropriate technologies for the management of aquatic resources, to provide opportunities for educational advancement, to encourage relevant scientific research in the discipline of aquatic plant management, to promote the exchange of information, and to expand and develop public interest in aquatic resources and their sustainable management.

I am on the Board of Directors for the Midwest Aquatic Plant Management Society, and I serve as the Chair of the Student Affairs Committee. The Student Affairs Committee is charged with promoting student membership in the society, soliciting student presentations for the annual spring conference, arranging and hosting a student luncheon at annual spring conference, coordinating the evaluation of student presentations for the student competitions and selecting appropriate winners, and coordinating the evaluation of an annually awarded student scholarship (the Robert L. Johnson Memorial Research Grant).

Chairing the Student Affairs Committee is busy, but is exceptionally rewarding. It is deeply gratifying to be involved in a Society that provides such amazing support to its student participants. And, in a time span where research support has decreased in many



*Student oral presentation award winners. Left to right: Jacob Meganck (Society President), Kyla Iwinski (1<sup>st</sup> place), Danielle Grimm (2<sup>nd</sup> place), Alyssa Calomeni (3<sup>rd</sup> place), Ryan Thum (Student Affairs Committee Chair)*

sectors, the Midwest Aquatic Plant Management Society continues to increase its budget for student support. This is a real testament to the value that the Society's Board of Directors, members at large, and aquatic plant management stakeholders place on student education and research.

The Midwest Aquatic Plant Management Society's annual conference was held in Grand Rapids, Michigan this year. Attendance at the conference this year was at or near record highs for students, academic faculty, and state agency personnel. The conference was abuzz with professional and philosophical discourse and debate, which was also gratifying for me to see as an academic researcher who interacts intensely with practitioners and stakeholders. Areas of particular interest and focus during the conference were the rapid and accurate identification and effective management of a rapidly spreading "new" invasive aquatic plant, starry stonewort (*Nitellopsis obtusa*, which is technically an alga, but falls under the purview of aquatic plant management), and the development of best management



practices for Eurasian and hybrid watermilfoils, including continued interest in risk assessment for herbicide resistance.

Danielle Grimm, a Master's student in my laboratory, attended the conference with me, and won second place in the student paper competition for her presentation "How General is the Trend of Increased Invasiveness of Hybrid Watermilfoil, and Do Hybrid and Eurasian Watermilfoil Show Equal Response to Endothall?" In addition, Jeff Pashnick, a PhD student in my laboratory, was co-awarded the 2016 Robert L. Johnson Memorial Research Grant for his project "Development of next-generation sequencing genetic markers for the study of hybrid vigor and adaptation in hybrid Eurasian watermilfoil".

You will be comforted to know that since I had conflicts of interest with the student competitions, I did not participate in any of the judging or decision-making for these events. Danielle and Jeff won these competitions based on their own merit as determined by other committee members and ad hoc reviewers! Congratulations to both of them!

### **Dolan Receives Award**



From April 3-6, Amy Dolan, a graduate student in Michael Ivie's lab, attended the Pacific Branch Entomological Society Meeting in Honolulu, Hawaii. The meeting's theme was "Science for

the Next Century." In addition to attending a variety of symposia and having a chance to network with other entomologists, Amy presented her Master's thesis research in the graduate student 10 minute paper competition. Thirteen PhD. students, six



*Amy Dolan hiking to Kaena Point on Oahu.*

M.S. students, and one undergraduate participated in the competition. Amy's talk, "Montana's huckleberry (*Vaccinium globulare* Rydberg) mystery: Pollinators, pests, and potential threats" won the M.S. group competition. Congratulations Amy!

### **MSU Student Research Celebration**

The MSU Student Research Celebration was held on Friday, April 15. The purpose of this event is to celebrate creativity in all academic disciplines. Approximately 100 students presented a poster of their research. Students and the PSPPP faculty that mentored them are as follows:

Kendra Hartweck (Mike Giroux)  
*"Transcriptisome Analysis of Bread Wheat Rht Mutants using RNAseq"*. Her mentor was Mike Giroux.

Kelly Kjorlien (Mac Burgess)  
*"The use of mixed cover crops in organic vegetable farming systems in Montana"*

Amanda Leckband (David Sands)  
*"Feeding a Virus-Resistant Barley to Ewes May Prevent Scours in Lambs: A Study on the Potential Therapy of Scours with the Natural Plasmid Curing Agents in an Ethiopian Barley"*

Chance Noffsinger (Cathy Cripps)  
"An assessment of the diversity of endophytic fungi from red and green needles of whitebark pine (*Pinus albicaulis*) in Montana"

### Montana Ag Live!

May 1 - Mike Kadas, Director of Montana's Department of Revenue, "Tax Issues that Affect Montana's Farmers and Ranchers"

May 8 - Jane Boles, MSU Associate Professor of Meat Science, "The Challenges for Small Meat Processors in Montana"

May 15 - Jessica Rupp, MSU Extension Plant Pathologist, "Diseases of concern in potato and sugarbeet in Montana"

May 22 - John Lehfeldt, Chairman of Montana's Board of Livestock and Lavina Rancher, "The Livestock Industry in Montana and how the board functions in maintaining a viable livestock industry."

May 29 - Memorial Day

### MAES Research Field Days:

June 21	CARC - Moccasin
June 22	NARC - Havre
June 23	WTARC - Conrad
June 28	SARC - Huntley
	Includes summer conference
June 30	EARC - Sidney
July 7	MSU Post Farm and Hort Farm—Bozeman
July 28	WARC -Corvallis

NWARC - No official Field Day, but will have crop tours of surrounding area.

### Course Focus

#### HORT 310 - Turfgrass Management

##### By Toby Day

HORT 310 Turfgrass Management – Catalog listing: *Turfgrass propagation, fertilization, establishment, and maintenance. Recognition and adaptabilities of Northern and Southern turfgrasses used for landscape and sports use. Includes irrigation principles and basic hydraulics, establishment and fertilizer calculations, and pest management. Lab includes experimentation with establishment*



Toby Day, Instructor for HORT 310

*techniques, equipment calibration, soil testing, and turfgrass maintenance.*

Students are challenged to identify several of the cool- and warm-season turfgrasses without the use of flowers. They also learn other identifying

characteristics such as ligules, auricles, collars, blades, and blade tips as well as growth habits. Plots are established on the campus for teaching whereas students have hands-on learning opportunities in the classroom and in the field to learn about soil preparation and testing; propagation including seeding and sodding; watering, fertilizing, mowing, aeration and chemical applications. Students also are introduced to the turfgrass business - sod production, irrigation technology, landscape management, and golf course management. This opportunity opens their eyes to the possibility of potential jobs within the industry.

The class also has an irrigation component in which students learn the parts and systems of irrigation management. Students are required to be math efficient in irrigation calculations so that they are well equipped and understand the technology and math to irrigate efficiently and for proper turfgrass health.

Students are challenged through real-world applications to understand the science of growing and maintaining turfgrass. Each student will grow and maintain a turfgrass plot while recording their inputs and management. Students also develop plans given real world situations for turfgrass and irrigation installation and maintenance projects. Students learn and understand all the calculations that are involved from start to finish in a turfgrass installation project and a complete irrigation system for the proposed site.

Turfgrass pests such as weeds, insects, and diseases are also introduced to the students during the semester. Understanding of common IPM techniques including identification, thresholds, prevention and control measures are some of the activities and outcomes later in the semester. Students will leave being able to identify turfgrass pests, give cultural recommendations, and have the ability to read a pesticide label and make recommendations, as well as understand spreader and sprayer calibrations. Overall, students will be given the opportunity to learn installation and management techniques for one of the largest and growing landscape industries in the U.S.

### **New Employees**

#### **Doug Holen—Montana Foundation Seed Manager**



New to the Plant Sciences and Plant Pathology Department, my name is Doug Holen. I started with Montana State University on April 4 as the manager of the Montana Foundation Seed

Program. The attraction to the position was the combination of working with breeders, research centers, private industry, and producers across the state with the goal of forwarding crop genetics.

Originally from Minnesota, I grew up in the central part of the state and spent as much time as possible on a relative's dairy farm. I began my college education at the University of Minnesota, Crookston majoring in Crop Science and transferred to the St. Paul campus earning a BS in Agronomy. While an undergrad, I worked three years with the barley breeding project and did a six month internship with Coors Brewing Company in Burley, Idaho as an assistant research agronomist. I completed an MS degree at

Montana State University under the direction of Dr. Phil Bruckner studying winter wheat survival and from there had a short position with Western Plant Breeders in Chandler, Arizona before returning to Montana and working at the Northwest Agricultural Research Center in Kalispell with Dr. Bob Stougaard focusing on small grains and weed management.

For the past 16 years, I have been with the University of Minnesota Extension as a crops educator for the state representing small grains and forages. Responsibilities centered on working with producers to provide data for decision making and combining with state specialists to conduct agronomic research. My wife Kimberly and I have seven children and come from a farm background that included 15 beef cows, 120 laying hens, and seasonal pigs. We are big into 4H animal projects and school athletics. Daughters Julia (21) and Kaitlyn (20) are finishing degrees at the University of Minnesota next year. Boys James (17), Mathias (13), Marcus (10) and Grant (8) are involved in wrestling, spending time on gadgets, and anything outdoors. Our youngest, Delaney (6) enjoys gymnastics and animals.

Kim was a Registered Nurse specializing in patient care before, during, and after baby deliveries. She now enjoys being home with family and pets. I enjoy sports, fishing, hunting, and old cartoons. We are very happy to be returning to Montana and being active Bobcats.

#### **Kim Prosek (Bright Agindotan)**



Hi, my name is Kim Prosek, and I have just started in the Pulse Crop Diagnostic Lab as the lab supervisor. I graduated from MSU with my bachelor's degree in Fish and Wildlife Management. I have worked for the Seed Testing Lab and the Potato Lab here on campus. My husband



Lonnie and I are excited to be moving back to Bozeman after being gone for a year. In my free time, I enjoy hiking with our dog, orchid culture, birding, and art.

### **Darby Kammeraad (Heather Rimel)**



My name is Jakob Darby Kammeraad and I am very proud to state that I am the new Certified Field Technician at the Montana Seed Growers Association. I received my bachelor's degree in plant biotechnology here at MSU, and am

also wrapping up my master's degree in plant science. I haven't been at work long, but it didn't take me long to realize that I have some very large and well respected shoes to fill in my new position. In my short time here, I have realized, and been grateful for, how important it is to maintain strong relationships with growers and contractors when developing high quality certified seed. This aspect of the job is what I am most excited for.

### **Farewell from Jay Kalous**



I am excited to say that starting May 1<sup>st</sup>, I will be the new Limagrain Cereal Seeds wheat breeder of the Pacific Northwest. I will be involved with basically every market class of bread

wheat but my main focus will be in soft white winter wheat.

I've been in Bozeman for eight years now, starting out as a Master's student for Dr. Luther Talbert. I went on to complete that Master's as well as a Ph.D., in Luther's lab and spent the last year as a post-doc learning all about barley with Dr. Jamie Sherman. I've thoroughly enjoyed my time here and all the interactions that I've had

with everyone in the PSPP department, College of Ag, and MSU. It has truly been a pleasure. I'm a little sad to be leaving Bozeman and the department but also excited to begin my next adventure.

### **Farewell from Roshan Acharya - Two years and nine months full of awesome experiences in Bozeman**



August 14, 2013, was the day I landed in Bozeman. It was disappointing when I first saw Bozeman and the surrounding mountains from 25,000 feet above the ground. It was just mountains, forest and big stripes

of field. The America which I was seeing at that time was completely different from the one which I had thought. I had sketched this country in my mind based on the Tom Cruise, Arnold, Vin Diesel, Bruce Willis, Daniel Craig and Nicholas Cage action movies; every inch filled with tall towers, buildings, roads and high techs. "Oh boy, you ended up in a village", I thought.

Jamie Sherman picked me up from the airport. She showed me a few places on campus over the next couple of days and ever since then she has been very careful to make me feel comfortable in Bozeman. She is just the nicest person that I have ever met. My first life lesson that I learned from her is not to worry about making mistakes. It is the first step to perfection. Quickly, I also realized that I was teaming up with two other successful researchers, Luther Talbert and Jack Martin in my research project. They were very cool and helpful every time I visited them. I met two very strong ladies, Irene and Jill in the department who were always ready to answer hundreds of questions and ready to solve my administrative problems. Being around these nice people, I forgot to think about why this place was so different from what I thought it would be.

Soon, I started loving this place. The mountains, forests, and rivers always provided a homey environment. In the winter of 2013, I was enjoying snow for the first time in my life although I come from the country of the Himalayas. The experience was something terrible but I learned quickly: Do not underestimate winter in Bozeman. This taught me to prepare more and then I started liking winter. Nepalese are called Brave Gurkha in the world. But, I was not brave enough to jump from the cliff for downhill skiing. Instead, I chose cross country skiing and I hold the record for number of times falling down in 1 hours (15 times). It was fun though. The thing I learned was that you might fail many times, but do not let frustration take over and weaken you. There is so much I can write. I always enjoyed taking classes with my PSPP faculty and participating in both formal and informal talks and discussion. I must say, I had a great time here in Bozeman. Having good people and friends such as Hwa-young, Nancy, Andrea, Joao, Jay, Liz, Afaf, Elyul and other graduate students around added awesomeness to my stay in Bozeman. I am going to miss this place.

### Invited Talks

Strobel, G. University of Central Florida, "Microbial Jewels of the Jungle", March 21, 2016.

### Publications

Cristiane Snak, Mohammad Vatanparast, Christian Silva, Gwilym Peter Lewis, Matt Lavin, Tadashi Kajita, Luciano Paganucci de Queiroz. 2016. A dated phylogeny of the papilionoid legume genus *Canavalia* reveals recent diversification by a pantropical liana lineage. *Molecular Phylogeny and Evolution* 98: 133–146. <http://dx.doi.org/10.1016/j.ympev.2016.02.001>

R. Toby Pennington, Matt Lavin. 2016. The contrasting nature of woody plant species in different neotropical forest

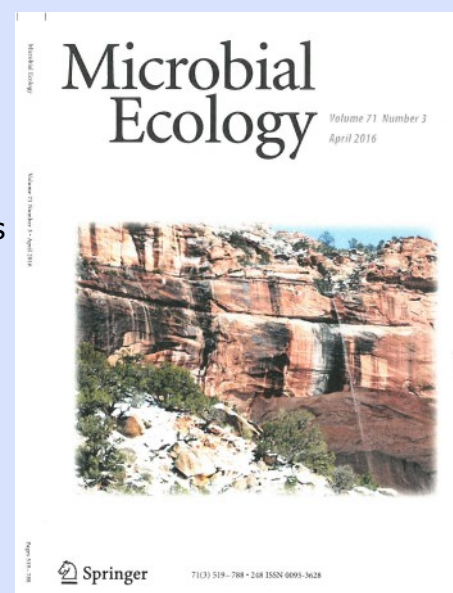
biomes reflects differences in ecological stability. *The New Phytologist* 210: 25–37. doi: 10.1111/nph.13724

Miller, Z., E. Lehnhoff, F. Menalled, and M. Burrows. 2015. Effects of soil nitrogen and atmospheric carbon dioxide on Wheat streak mosaic virus and its vector (*Aceria tosichella* Kiefer). *Plant Disease* 99: 1803-1807.

Andrea C. Varella, David K. Weaver, J.D. Sherman, Nancy K. Blake, Hwa-Young Heo, Jay R. Kalous, S. Choa, M.L. Hoffland, Jack M. Martin, K.D. Kephart, Luther E. Talbert, "Association Analysis of Stem Solidness and Wheat Stem Sawfly Resistance in a Panel of North American Spring Wheat Germplasm", *Crop Science*. *Crop Science* 55: 2046–2055 (2015).

David Sands' research was recently featured in two articles: "Cloud Control" by Kate Ravilious, *New Scientist* (April 2016 p. 35-37) The research of David Sands, Alice Pilgeram, and Eylul Kaya was featured in the article "Golden Opportunity" (*Potato Grower* p. 16-17).

Gary Strobel: Cover of *Microbial Ecology* 71 (3). "Desert varnish", traces of snow and a wispy water fall garnish the high sandstone walls deep in the upper reaches of Zion national Park in southern Utah. The varnish in this photo (dark bands on the rock surfaces) represent various thickness layers of deposits (5- 500 microns). These layers develop on rock faces over the course of thousands of years. The dark coloration of the varnish is directly related to the deposit of iron and manganese oxyhydroxides that act as a glue for other minerals in the stone. Recently,



Esposito et al. in *Microbial Ecology* 70:741, described a number of bacterial taxa that inhabit the varnish layers and among others include various species of Cyanobacteria, Chloroflexi, Proteobacteria, Conexibacter and Rhodopila. The latter one has a significantly higher abundance in the varnish layers as contrasted to the neighboring rock surfaces having no varnish.

### Patents

Gary Strobel, United States Pat. No. 9,288,981 issued on March 22, 2016 for "Antimicrobial Compositions and Related Methods of Use".

### Properly Planted Trees

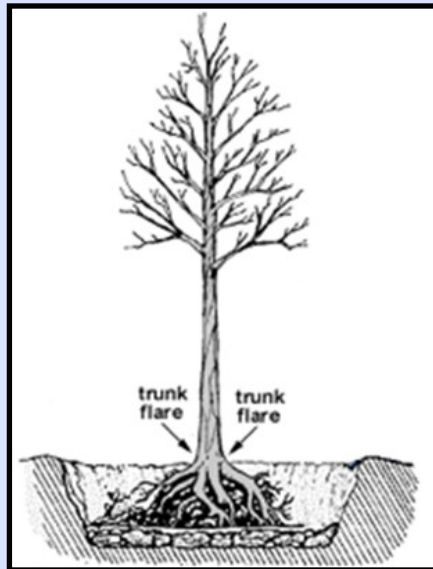
**By Toby Day, Extension Horticulturist**

Although Arbor Day was just celebrated last Friday, I find that May is the best month to plant trees in Montana. The Arbor Day Foundation is quoted saying "If a tree is planted correctly, it will grow twice as fast and live at least twice as long as one that is incorrectly planted." I couldn't agree more. I look at a lot of sick trees in my travels across Montana. And, more often than not, the trees that are in poor health were planted incorrectly.

Most trees that are struggling were planted too deep. Some have girdling roots that surround the trunk and are choking the life from the tree. I have seen twine still wrapped around the trunks of spruce that were planted Balled in Burlap and large "mulch volcanoes" piled around the trunks of trees. I thought I had seen it all until I saw trees that were planted – pots and all – into the ground (yes, they dug the hole and planted the whole tree, pot and all, into the ground). Not sure who thought that was a good idea?

So, as we approach tree planting season, here are some general considerations for properly planting trees for optimum health.

Dig the hole no deeper than the trunk flare to the bottom of the root system. The trunk flare (often called the root flare) is where first major root comes off of the trunk (see picture) It is vital that the trunk flare is at, or



*Trunk flare should be just above soil level.*

just above the soil level. If a tree is planted too deep, the roots may suffocate and the trunk may rot causing damage to the phloem over time.

Dig the planting hole *at least* 2X the diameter of the pot, or rootball. This will give the tree's roots plenty of room to grow

and establish a sturdy root system. Overall, the planting hole will be a wide, but not very deep hole -- much like a saucer.

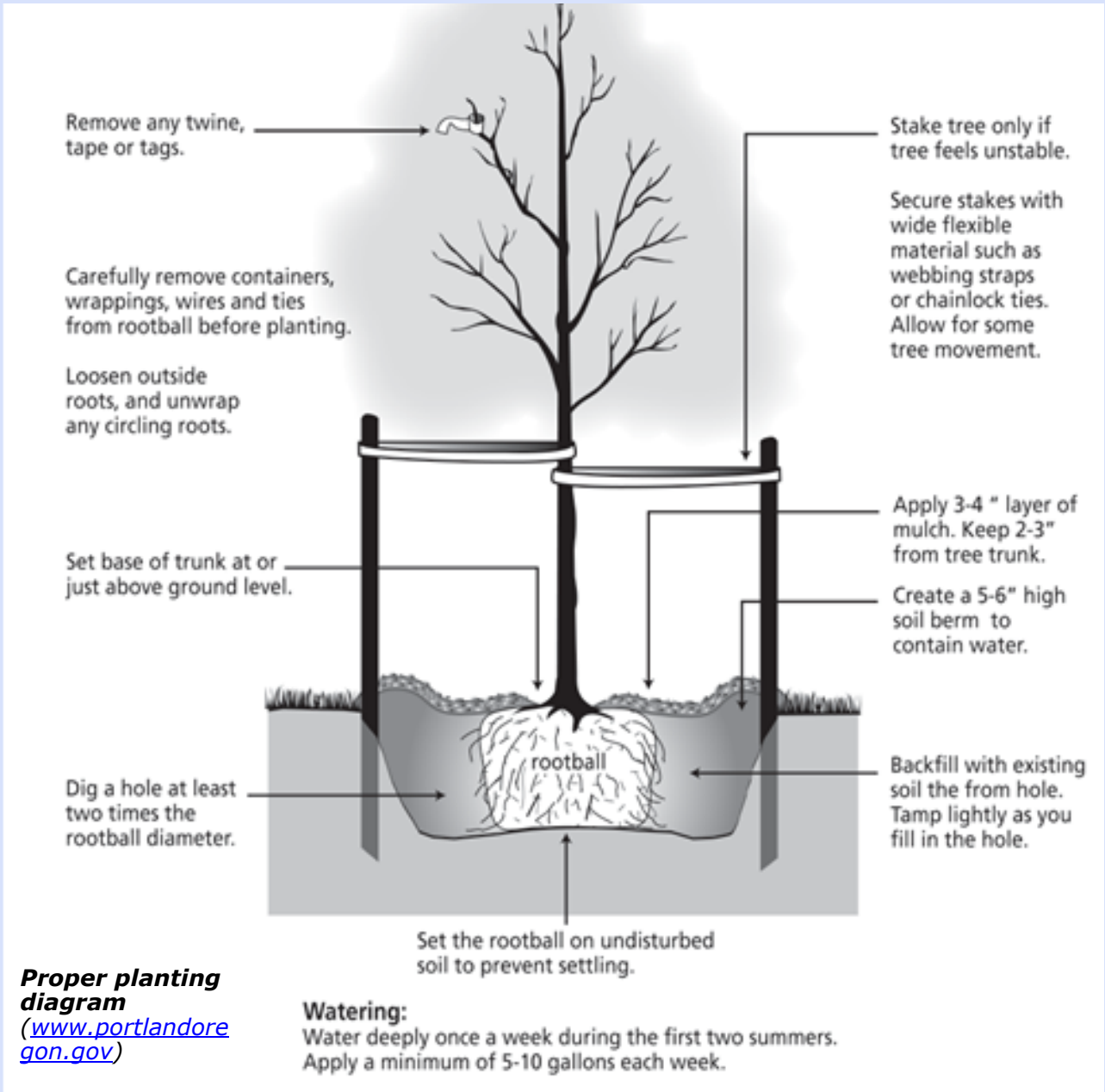
Only backfill with the topsoil that is taken out of the hole, or similar topsoil. Do not add amendments such as compost, fertilizer, peat or bark to the planting while backfilling. You want the roots to expand into the native soil. Amendments often mean the tree will only establish in the planting hole and not beyond.

The soil should be lightly packed around the roots, but not compacted. If you are concerned about air pockets, water will often correct that problem.

Water immediately with plenty of water. I like to water the trees really well, letting the water soak. After 1-2 hours, I often water again, just to be sure the water has infiltrated the root zone. Oftentimes, a water holding basin is constructed around the base of the tree to hold more water (see photo).

After the tree has been watered well, cover the planting area with mulch. However, there should be no mulch touching the trunk. This can cause rot issues in the future.





Constructed water-holding basin for newly planted trees

Water the trees every 7-10 days thereafter. A general recommendation for the amount of water is 5 gallons every week for every inch of diameter of trunk. For instance, if you plant a 2" diameter tree, it will need 10 gallons each week, on average.

Of course, this is not the exhaustive list of items to consider when planting trees, but more or less common recommendations. If you would like to know more about properly planting trees, I have found that Oklahoma State University has one of the better fact sheets. You can find it at <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Rendition-1242/unknown>.

## Recipe of the Month

### Crockpot Lasagna

2 boxes (10 oz) frozen chopped spinach  
2 1/2 c shredded Italian cheese blend (10 oz)  
2 jars (15 oz each) Alfredo pasta sauce  
12 uncooked lasagna noodles  
3 c chopped cooked chicken  
1/2 c freshly shredded Parmesan cheese (2 oz)  
1 medium tomato, diced



Cook and drain spinach as direct on package; squeeze out as much liquid as possible. Set aside. Spray 5 quart oval

cooker with cooking spray. In large bowl, mix 1 c of the cheese blend and the Alfredo sauce. In slow cooker, spread 1/4 of the sauce mixture. Layer with 3 of the uncooked noodles (breaking noodles as needed to fit), 1/3 of the chicken, 1/3 of the spinach and 1/2 c of the cheese blend. Repeat layers twice. Top with remaining noodles, sauce mixture and the Parmesan cheese. Cover, cook on low heat setting for 3 1/2 to 4 1/2 hours or until the edges are bubbly and center is heated through. Let stand for 10 minutes, sprinkle with diced tomato before serving.

## May Birthdays

Hikmet Budak	1
Jessica Rupp	10
Heather Rimel	12
Darby Kammeraad	12
Chaofu Lu	16
Riyadh Al-Khafaji	17
David May	20
Mareike Johnston	22
Faye Jorgensen	23
Bob Johnston	29
Deanna Nash	31

