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Garden Geekiness

I have always been a science buff. Forget all that celebrity gunk that fills magazines, newspapers and television and give me a good science story. So in browsing the internet I found some interesting science news concerning plants, agriculture and gardening.

From Science Daily Oct 31, 2012
Desert Farming Forms Bacterial Communities that Promote Drought Resistance

Scientist found through exploring the relationships between plants and soil microbes that the absence of water affects that relationship. Using pepper plants, researchers limited the amount of water a plant received and then analyzed the bacterial communities. You would probably jump to the conclusion that drought would reduce the bacteria in number and species. In fact drought enriched them. The bacteria actually increased plant photosynthesis and biomass production by up to 40%.

“Our findings highlight that fully functional plants cannot be considered single organisms any more, but meta-organisms of the plant and its microbiome, which promotes essential functions like resistance to water stress. The promotion of drought resistance by bacteria can have important applications, for instance, in retaining high yields from plants even in the presence of lower irrigation.”

From Science Daily June 30, 2012
Want Bigger Plants? Get to the Root of the Matter

Scientists looked at “how a potted plant’s roots are arranged in the soil as the plant develops”. They found that doubling plant pot size can make plants grow over larger. According to the researchers, plants quickly extend their roots to the pot walls. “It’s likely that the plants use their roots to ‘sense’ the size of the pot, although the details of how the roots relay the message about the pot’s size remain the plants’ secret.” The researchers looked at tomatoes, corn, pine trees, cactus, wheat, and cotton plants and found all species grew larger in larger pots. Doubling the pot size made for an approximately 43% larger plant.

“To understand the pot size effect, the scientists looked at various aspects of the plants’ growth. They found that the plants in smaller pots grew more slowly because of a decreased rate of photosynthesis. But, looking for causes for the decrease, the scientists ruled out limitations in water and nutrients and did not find any dif-
ferences in the thickness of the leaves for plants in smaller pots. It is therefore unlikely that the plants use water and nutrient levels to sense the pot size, supporting the possibility that sensing happens another way, such as by the roots.

This article could take some of the fun out of gardening:

**From Science News Apr 9, 2012**

**A Bit Touchy: Plants' Insect Defenses Activated by Touch**

http://www.sciencedaily.com/releases/2012/04/120409133803.htm

Rice University scientists found that plants can use the sense of touch to fight insect and fungal damage and plant defenses are enhanced when the plants are touched. It has been known for quite a while that plants respond to touch but the mechanism wasn't understood. This study was designed to look at a plant hormone called jasmonate.

"Jasmonate plays a critical role in initiating plant defenses against plant-eating insects. When jasmonate levels go up, the plant increases production of metabolites that give herbivores an upset stomach. Jasmonate defenses, which also protect against some fungal infections, are employed by virtually all plants, including tomatoes, rice and corn. The new study provides the first evidence that these defenses are triggered when plants are touched. In the study, students touched the plants in a laboratory but the researchers say the touch-induced response could also be activated by animals, including insects, and wind.

Plants can't move, so it makes sense for them to have a highly developed sense of touch to react quickly to changes in their environment," said study co-author Janet Braam, professor and chair of Rice's Department of Biochemistry and Cell Biology.

One of the interesting things scientists found is that plants that were touched frequently had high levels of jasmonate and were more resistant to fungal and insect attacks, but caused the plant to grow shorter and slower. So look more and touch less.

**From Science News Mar 5, 2012**

**How Plants Sniff Out Unhealthy Neighbors to Fight Infections**

http://www.sciencedaily.com/releases/2012/03/120305081256.htm

Plants can perceive odors. This news has been around for many years although scientists still don't understand it. Researchers, in an effort to figure this out, exposed lima beans to two different concentrations of two compounds, nonanal and methyl salicylate (MeSA). These compounds enhance resistance to bacterial diseases in the beans. Resistance was measured at 6 hours and 24 hours of exposure.

"In the case of nonanal, plant resistance was significantly increased after both 6 and 24 hours. Furthermore, there was no difference in induced resistance between the two concentrations of the odor. In contrast, the authors found that the lima bean plants mounted a high level of resistance to bacterial infection after exposure to MeSA over an entire day, but not after short exposure of 6 hours. After 24 hours of exposure, the low concentration of MeSA was as effective at inducing resistance to the pathogen as the higher concentrations."

The researchers conclude: In contrast to insect or mammals which can respond to odors within a second of exposure, the 'nose' of plants works in a fundamentally different way to perceive odors. Plant to plant signaling in this instance is likely to involve the accumulation of odors in the receiving plant over a long period of time."

**From Science Daily Dec 8, 2012**

**Invasive Plant Species May Harm Native Grasslands by Changing Soil Composition**

http://www.sciencedaily.com/releases/2012/12/121219092817.htm

Changing a landscape may just not be as 'easy' as removing invasive species. Apparently invasive plants can alter the soil enough to inhibit the regrowth of native plants. While the mechanism isn’t entirely understood it could possibly “involve changes in soil food webs, soil microbial communities and mutualistic fungi.”

"In the study, researchers tested soil conditions for changes in composition after three growth cycles of invasive plant species. Researchers looked for changes in colonization rates, diversity, and composition of arbuscular-mycorrhizal fungi (AMF)."

The findings of this study showed that (1) invasive species changed the composition of AMF communities in seedling roots of native grassland species, and (2) invasive species were less colonized by AMF, forming fewer associations than native grassland species. These findings suggest that the ecological differences in how these native and invasive plants interact with soil may be a factor in this legacy effect. While market and policy demands might lead to a native grasslands agro-ecosystem, invasive plants species could derail its establishment. Weed management must be a component of any such ecosystem, so that it is possible to establish grasslands that are useful and profitable."
SEVENTY ONE. That is the number of cumulative volunteer years represented at the bi-annual Yavapai County MGA Officers and Committees meeting in early December. Nora Graf (Yavapai Garden Newsletter Editor) topped the heap with 20 years.

The meeting brought the various committees that make up our Master Gardener Association. Many had new Chairs and members: Angie Mazella, Steve McIntyre and Dede Erceg are new in their slots as Chairs of Speakers Bureau, Public Relations and Social Committees respectively.

Among the ideas discussed was how to increase membership and the public awareness of the rich horticultural resources available on the Yavapai County UA Extension web site. Also discussed was tapping into NAU for future speakers for our MG meetings. Angie Mazella is working on an ambitious program to involve more members in the Speakers Bureau including on-line training and workshops to creating Power Point presentations.

A small number of the 2013 Committees have openings for those inclined to become more involved with MGA activities.

2013 MGA Officers and Committee Chairs
President — Bob Gessner  bvgessner@gmail.com
President Elect—Betty Loos  bettyloos1@gmail.com
Secretary —Faun Vogel  f.vogel@commspeed.net
Treasurer — Bev Turnbull  btumb@cableone.net
Past President—Ron Zmyslinski  rm5840@msn.com
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Speakers Bureau — Angie Mazella  amazen@cableone.net
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Kickoff Meeting for 2013 MGA Committees

Congratulations
for completing 50 hours of service

Joni Harvey - mentor Anita Fleming.
Tree Planting Season

Tis the season for planting new trees. There are lots of recommendations, old wives’ tales, and even old science out there about planting and establishing a new tree in your yard. Linda Chalker-Scott from Washington State University (she gave a talk at the 2011 MG conference) has put together some new guidelines for establishing new trees. The guidelines include some tried and true information and some newer information. Washington is a bit different environment than ours but the advice still holds true.

Techniques for successful plant establishment.

Plant Inspection
Be sure to do this before you accept a delivery of plants.
- Roots: avoid circling, girdling, or kinked roots. Check for burn or freeze damage as well as death, decay, or disease. Choose plants with symmetrically distributed roots.
- Shoots: avoid damaged bark, poor pruning (e.g. topping), and disease. Choose plants with good taper, vigor, and normal growth patterns.

Caring for Plant Material Prior to Planting
- Keep roots cool and moist.
- Heel in off-season material to prevent freeze damage.
- Harden off greenhouse material prior to planting.
- On site, protect plants from excess light and heat, desiccation, etc.

Planting Hole Preparation
- Dig a hole no deeper than the root mass, but at least twice as wide.
- Build a soil mound in the middle of the hole to help spread the roots evenly.
- Remove roots, weeds, large rocks, and other debris from the planting hole.
- Do not add gravel, fertilizers, organic matter, or other amendments to the planting hole.
- Do not loosen or otherwise disturb the soil at the bottom of the hole.

Plant Installation
- Fall planting is generally best in mild climates; spring plantings require more irrigation.
- Remove existing soil from the roots to prevent soil interface problems.
- Remove all foreign materials – burlap, plastic, tags, etc.
- Orient the plant so the shoot-root interface is at or slightly above the soil surface.
- Prune out dead, damaged, or diseased roots; excessively long roots may be shortened.

After Care
- Water new transplants during the first 1-2 dry seasons to help them establish.
- Maintain a mulch layer ≈ 3-4 inches thick.
- Keep the root zone free of turf and weeds to reduce resource competition.

For more information, contact
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Some notes about planting fruit trees:

Fruit trees are not xeriscape types of trees. They will need irrigation throughout the year. Have an adequate irrigation system ready to put in place when you plant the tree. You will need to accommodate the young tree plus plan for the future. As the tree grows the irrigation system will have to expand to make sure the tree roots get the water they need. Make sure you water enough, also. Too many times I’ve heard people say, “but I let the water run 20 minutes every day,” in response to the comment that the MG doesn’t think the plant is getting enough water. I’m not sure who sets the timing on these systems but I am convinced they don’t understand plants very well. “Water less often, more deeply” should be your mantra when it comes to fruit trees. Fruit trees draw water from as deep as three to four feet, nutrients also.

Mulch, mulch, mulch. In our climate mulch benefits most plants. Your fruit tree will appreciate it. Just don’t pile up the mulch to the base of the tree. Only mulch up to six inches of the trunk.

Make sure you plant new trees far enough apart. Know what your tree is, full-sized, semi-dwarf or dwarf, and plant accordingly. They prefer not to be crowded.

Fruit trees need to be sited properly, especially when it comes to cold weather. They need sun, yes, but the cold is a major consideration if you want fruit. In our area late frost is a major killer of your fruit crop. A difference of a degree or two can have an effect.

To find out more about planting new fruit trees check out this article: http://ag.arizona.edu/yavapai/anr/hort/byg/archive/orchardsite.html

Getting through the Winter

Information Compiled by Fawn Vogel, written by Nora Graf

I am writing this in early January and I already want it to warm up. Not that I want to rush summer but a day over 60 degrees would be nice. While I don’t do well when the temperatures are under 60, the garden is still out there waiting for you and me, too. There are things to be done. The night will continue to include freezing weather so cover any frost-sensitive plants or keep them inside. My kitchen (the only room with enough light) is filled with pots this year in an effort to keep some of my succulents and lemongrass alive for spring. Even the baby claret cup cactus is sitting on the kitchen floor. I’m trying to help it recover from a terrible freezing incident last winter.

You may notice the leaves on evergreens have turned a dull green to yellow or leaves may have even dropped or appear chlorotic. This is normal for this time of year. Since we are not receiving much rain yet, make sure plants have adequate moisture but other than that, don’t worry about them. Cactus will turn purple.

Yes, plants need to be watered in the winter. Just don’t over-water. Once or twice a month is probably enough, water deep; not often. IT DEPENDS ON YOUR CONDITIONS AND PLANTS! If the soil is damp, do not water.

Aphids can over-winter on plants. If you have brought things in for the winter you will need to keep an eye on them for any pests that show up. If a problem turns up, use a soap insecticide inside, although with pets I’d be careful of using anything. My cats like jumping into the pots to chew on the lemongrass leaves. Would hate for them to get sick.

Time to prune your fruit trees. Especially if you have had disease problems, make sure you sanitize your tools.

It’s not that far away from planting season. Start prepping your garden. Clean up, add manures, etc. Besides, this will help you control that feeling that you want to start planting soon. It’s a little too early for that.

Fertilize fruit and nut trees and apply chelated iron to plants like pyracantha and photinia to avoid yellowing in the new growth.

You can plant bare-root stock now. If the weather warms at all, there will be weeds; continue to keep on top of them.
Every year growers come up with new varieties to entice you to buy. It’s nice there are always new things to try; you never know when you will find a new favorite. Then, some aren’t any better than what you are already growing but you don’t know until you take a chance. Below are some of the new possibilities available this year.

**Cosmic Purple Carrots**
A purple carrot with a bright yellow-orange inside. Don’t know if the purple color stands up to cooking but they are a dramatic statement raw.

**Parisian Carrots**
This a little round carrot—looks like an orange radish. Round carrots are good for growing in heavy or rocky soils. Good flavor.

**Italian Ice Tomatoes**
White tomatoes. I’m not sure about the color but these are cherry tomatoes (1 inch) that are very sweet. The tomato starts out green, then white, then yellow and is edible once they turn white. Heavy producer.

**Black Truffle Tomato**
This tomato is supposed to have a “strong, complex flavor.” The color is deep burgundy and the fruits weigh 6 to 8 oz each.

**Jasper Hybrid Cherry Tomato**
This is an All-American Selection. The award was given for its overall flavor, texture, garden performance and disease resistance. Its fruits are small (3/4 inch,) and it produces all season long. Resistant to fusarium wilt. Very prolific.

**Corn, On Deck Hybrid**
This is the first sweet corn that you grow in a container. Which may be a bit of an overstatement. I’ve heard of people growing corn in containers before this but, what the heck, it sounds great. The stalks grow 4 to 5 feet tall and each stalk produces 2 to three ears. Plant 9 seeds per 24 inch container. Matures 61-63 days.

**Melemon Melon**
Neither cantaloupe or honeydew, this is called a Santa Claus melon. Matures early, single serving size with good flavor.

**Potato Masquerade**
This potato is ready for a party with its purple and white bimorphic shapes (a nonrepresentational form or pattern that resembles a living organism in shape or appearance). From now on known as splotches. High yielding, good for baking, mashing and roasting.
FROM THE EDITOR: Please send or email articles and announcements to the address below. All articles must be in my hands by the 10th of the month. Short announcements (no more than 2 or 3 lines) will be accepted until the 25th.

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jeffrey C. Silvertooth, Associate Dean & Director, Economic Development & Extension, College of Agriculture and Life Sciences, The University of Arizona. The University of Arizona is an equal opportunity, affirmative action institution. The University does not discriminate on the basis of race, color, religion, sex, national origin, age, disability, veteran status, or sexual orientation in its programs and activities.
The meeting site has changed back to the Superior Court Building off of Hwy 260 in Camp Verde.

2840 N. Commonwealth Dr.

Next Meeting

Speaker: Doug Tolleson  
Rangeland Management Specialist  
University of Arizona, V Bar V Ranch

Topic “Old school and High Tech: Home on the Range

Since January 2008, Doug has been a rangeland specialist for the University of Arizona, located at the V Bar V Ranch near Camp Verde. He has a BS in animal science, MS in reproductive physiology, and a PhD in Rangeland Ecology and Management all from Texas A&M University. While at Texas A&M, Doug was an Assistant Research Scientist and the Director of the Grazingland Animal Nutrition Lab. As director of the lab, Doug taught workshops on monitoring grazing animal nutrition in the US as well as Mexico, Africa, Mongolia, and India. At the University of Arizona his extension efforts involve a range plant identification website (Blue Collar Plants) and rangeland monitoring workshops for producers. Doug’s research has focused on applying near infrared spectroscopy to improve nutritional and physiological monitoring of grazing animals and to measure soil constituents as affected by grazing and climate. He has also been involved in applying biophysical models to map forage and fuel conditions at the landscape scale. Doug is the current President of the Arizona Section, Society for Range Management.