Reporting on the latest research, methods, tools, plants, books, etc., for vegetable, fruit, and flower gardeners, gathered from hundreds of popular and technical sources, worldwide. The gardening news YOU can use!

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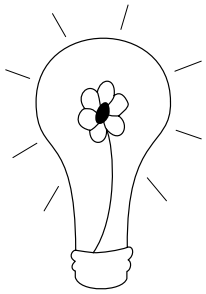

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HortIdeas

NOVEMBER-DECEMBER 2009 VOLUME 26, NUMBER 6

Feedlot Antibiotics Get Scientific *and Political* Attention

Canadian researchers have developed a method for measuring the concentrations in poultry litter of antibiotic chemicals that are routinely added to feed. Using the method, they found that poultry litter from farms in British Columbia contained, on average, 4.1 milligrams of the antibiotic narasin per kilogram of (dry) litter, 6.5 milligrams of salinomycin per kilogram of litter, 4.7 milligrams of nicarbazin per kilogram of litter, and 0.06 milligrams of monensin per kilogram of litter. Previously, 35-152 milligrams of nicarbazin per kilogram of broiler litter from Virginia had been reported.

The researchers state: "The presence, persistence, fate, and environmental effects of veterinary pharmaceuticals are a significant concern to livestock producers, organic farmers (who rely on manure as an organic fertilizer), and the public who are concerned about both food safety and environmental health.... Because poultry litter is used by organic growers as fertilizer for vegetable production, it is ... important to investigate and regulate the content of veterinary pharmaceuticals as they can pose risk not only to the environment but also to human health."

Not much work has been done on the persistence of antibiotics in soil and other growing media, but monensin and nicarbazin were both found to be "stable" in "artificial soils" over a period of one month at 77°F. In the April 2006 issue of *HortIdeas* (page 37), we reported on research revealing that at least some vegetables can take up the antibiotic chlortetracycline from soil. In the May-June 2009 *HortIdeas* (page 61), we reported on another potential problem due to antibiotic contamination of soil: antibiotic-polluted runoff water. And in the September-October 2009 *HortIdeas* (page 97), we reported on experiments suggesting that normal soil microbial activities can be disrupted (resulting in less crop growth) by antibiotic contamination.

Finally, the first steps toward federal regulatory efforts to reduce veterinary antibiotic pollution have been taken by introducing a bill in the U.S. House of Representatives (H.R. 1549, the "Preservation of Antibiotics for Medical Treatment Act of 2009"), from which we quote below (without sectional numbers and letters):

> The Congress finds that—In January 2001, a Federal interagency task force released an action plan to address the continuing decline in effectiveness of antibiotics against common bacterial infections, referred to as antibiotic resistance; the task force determined that antibiotic resistance is a growing menace to all people and poses a serious threat to public health; and the task force cautioned that if current trends continue, treatments for common infections will become increasingly limited and expensive, and, in some cases, nonexistent; antibiotic resistance, resulting in a reduced number of effective antibiotics, may significantly impair the ability of the United States to respond to terrorist attacks involving bacterial infections or a large influx of hospitalized patients; any overuse or misuse of antibiotics contributes to the spread of antibiotic resistance, whether in human medicine or in agriculture; and recognizing the public health threat caused by antibiotic overuse in human medicine ..., but has not yet addressed antibiotic overuse in agriculture; in a March 2003 report, the National Academy of Sciences stated that—a decrease in antimicrobial use in human medicine alone will have little effect on the current situation; and substantial efforts must be made to decrease inappropriate overuse in animals and agriculture; an estimated 70 percent of the antibiotics and other antimicrobial drugs used in the United States are fed to farm animals for nontherapeutic purposes, including—growth promotion; and compensation for crowded, unsanitary, and stressful farming and transportation conditions; and unlike human use of antibiotics, these nontherapeutic uses in animals typically do not require a prescription ...
>
> The purpose of this Act is to preserve the effectiveness of medically important antibiotics used in the treatment of human and animal diseases by reviewing the safety of certain antibiotics for nontherapeutic purposes in food-producing animals....
>
> ... [The U.S. Food and Drug Administration (FDA)] shall withdraw the approval of a nontherapeutic use in food-producing animals ... on the date that is 2 years after the date of enactment of this subsection unless— ... [the FDA] makes a final written determination that the holder of the approved application has demonstrated that there is a reasonable certainty of no harm to human health due to the development of antimicrobial resistance that is attributable in whole or in part to the nontherapeutic use of the drug; or before the date specified [above, the FDA] ... makes a final written determination under this subsection, with respect to a risk analysis of the drug conducted by the [FDA] and other rele-

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vant information, that there is a reasonable certainty of no harm to human health due to the development of antimicrobial resistance that is attributable in whole or in part to the nontherapeutic use of the drug....

Reference: Vesna Furtula (Pacific Environmental Science Centre, Environment Canada, 2645 Dollarton Hwy., North Vancouver, British Columbia, CANADA V7H 1B1), Lee Huang, and Patricia A. Chambers, "Determination of Veterinary Pharmaceuticals in Poultry Litter and Soil by Methanol Extraction and Liquid Chromatography-Tandem Mass Spectrometry," *Journal of Environmental Science and Health B44*, October 2009, 717-723. (Taylor & Francis, Inc., 325 Chestnut St., Philadelphia, PA 19106.)

CrystalGreen® "Renewable" Slow-Release Fertilizer

We promise to avoid (almost irresistible!) comparisons with the infamous, and fortunately fictitious, "Soylent Green," but we do think it would have been better to name CrystalGreen®, definitely not fictitious, something else! We'll abbreviate it to "CG" below. CG is a slow-release fertilizer that can be produced in wastewater treatment plants. Like Milorganite® (non-slow-release) fertilizer, CG can help to recycle nutrients from human wastes back into plants. Below are excerpts from a news release provided by Ostara Nutrient Recovery Technologies Inc. (690-1199 W. Pender St., Vancouver, British Columbia, CANADA V6E 2R1, web site www.crystalgreen.com, phone 604-240-3196).

Commercial production has begun of CG, the world's first slow-release, renewable, and environmentally safe fertilizer with a combination of nitrogen, phosphorus, and magnesium (5-28-0 + 10Mg).

CG has been proven in industry and university trials to have commercial benefits for applications in turf, nursery, and specialty agriculture industries. The product was developed by Ostara Nutrient Recovery Technologies Inc. and is being marketed through national and regional distributors in North America.

Jim Zablocki, Vice President of Nutrient Operations for Ostara, said CG is the only renewable fertilizer that can be used in the same manner as widely used monoammonium phosphate or coated products, with the added benefit of high levels of slow-release magnesium. There is no need to change equipment or application methods—CG can be substituted for any existing phosphorus source.

"Its crystalline structure allows us to form a completely new chemistry for our industry. Yet unlike [other] slow-release products, it is far more predictable, as it is not affected by excessive moisture, bacteria, and temperature changes. And its longevity is as reliable as coated products. Your plants will see the difference, and the environment will thank you for both what it's made from, and how it releases. We just made your phosphorus fertilizer a lot more dependable, with extra benefits for the environment," said Zablocki....

Phillip Abrary, President and CEO of Ostara, said the environmental advantages of CG result from its production process and from its zero impact on the water table.

"Unlike fertilizers mined or derived from hydrocarbon sources, CG is produced from a recycled and renewable product that is safe to use on plant material," said Abrary. "... the product's slow-release characteristics provide a source of phosphorus that will not leach into the water table.

"Compared to conventional fertilizer manufacturing, ... CG is produced without adding greenhouse gases to the atmosphere," said Abrary. "No other commercially available fertilizer has renewable and environmental safety attributes comparable to CG." ...

Zablocki said ... that CG is a hard crystalline material (virtually dust-free) suitable for broadcasting, top dressing, or incorporation....

Since CG is crystalline, blenders and mixers will not affect the the integrity of the prill—unlike coated products. The fertilizer can be pre-incorporated into a soil mix without the possibility of premature release due to the heat of the mix, as CG is not affected by excessive temperatures.... Extensive independent lab testing has shown no pathogens or heavy metals present.

Water is the primary release agent, but ... release of CG is consistent regardless of the amount of moisture applied, due to its crystalline nature....

Extensive third-party testing has shown longevity up to eight months, making CG a cost-effective choice that lasts the full season.

Dr. Jim Owen, Assistant Professor of Horticulture at Oregon State University's North Willamette Research and Extension Center, has conducted field trials on CG and believes the product shows promise as a local and sustainable phosphorus source for containerized crop production....

Several prominent Pacific Northwest fertilizer distributors are committed to adding CG to their product lists, including farmer-owned grower co-op Wilco and Marion Ag Service, Inc....

CG is being produced in suburban Portland at the Durham Advanced Wastewater Treatment Facility in Tigard, Oregon, by Clean Water Services, the water resource management utility serving more than 500,000 customers in urban Washington County ...

The Ostara technology harvests phosphorus and ammonia from municipal wastewater and adds magnesium, which causes a chemical reaction resulting in crystalline phosphate hexa-hydrate. CG is a 99.9 percent pure compound ... It has been tested for purity by British Columbia's Ministry of Water, Land, and Air Protection, which is responsible for the management, protection, and enhancement of the province's environment. CG is actually cleaner than commercially available phosphates that are derived from mined phosphorus....

Ostara Nutrient Recovery Technologies Inc., founded in 2005, is a Vancouver-based company commercializing proprietary technologies that recover resources from wastewater and recycle them into valuable products. Ostara's recovery process, developed at the University of British Columbia, recovers pollutants that would otherwise be released into the environment, helps wastewater treatment plants reduce operating costs and meet environmental regulations, and provides municipalities and utilities with revenue from the sale of the recovered pollutants that are recycled ...

2010 Garden Calendars for the North and the South

The University of Massachusetts Extension Service and the Louisiana State University AgCenter are again offering regionally oriented garden calendars with beautiful color photographs of ornamentals illustrating each month of 2010.

"The Wonderful World of Plants" is the theme of the UMass Extension calendar. From a news release:

The 2010 UMass Garden Calendar celebrates the world of plants and the joy that they bring us. As we move into the 21st century and struggle with a difficult economy, we find that, more and more, our friends are becoming gardeners. Many are growing vegetables for the first time or discovering the joys of gardening with their children or grandchildren. Many are beautifying their yards ... using species and varieties which they never [previously] knew existed.

A brief description accompanies each plant photo to help understand these plant choices....

As always, each month features: An inspiring garden image. Daily gardening tips for Northeast growing conditions. Daily sunrise and sunset times. Phases of the moon. Plenty of room for notes. Low-gloss paper for easy writing.

To order a 2010 UMass Extension Garden Calendar, visit the web site www.umassgardenclendar.org or send a check or money order (made payable to "UMass") for $12.00 to Garden Calendar, c/o Mailrite, 78 River Rd. S., Putney, VT 05346.

The LSU AgCenter "Get It Growing" calendar has a special section on hibiscus, with monthly tips for Deep South gardeners from LSU horticulturist Dan Gill. The price is $11.95 each plus shipping (free for online orders); visit the web site www.LSUAgCenter.com/OnlineStore or call 225-578-4161.

Broadforks from Vashon Island, Washington

Meadow Creature LLC (P.O. Box 2112, Vashon, WA 98070, phone 206-408-8080, web site www.meadowcreature.com) is selling broadforks "for deep [soil] aerating ... Strong enough to turn over existing beds and break new ground [without using a tiller or tractor], even in heavy soils." These tools work like *whole-body* pitchforks, with *two* handles (one for each arm) and either 13-inch-long or 16-inch-long tines attached to a crossbeam you stand on to push the tines deep into the soil before pulling back on the handles. According to the Meadow Creature LLC web site: "Working the soil uses upper body muscles in a balanced push-pull motion that takes some strength but doesn't strain the muscles or the back. There's no deep bending of the waist, no twisting of the back, and no lifting of the weight of the soil." Total tool weight: 25 pounds. Mighty impressive! Either size costs $250 with free shipping in the U.S. and a 30-day money-back guarantee.

Meadow Creature LLC "supports authentically sustainable, community-based farming.... We are located on Vashon Island, Washington, in the heart of Puget Sound. Many of our close neighbors are small-scale organic farmers.... The Vashon Broadfork is our first product for distribution. Currently in the works are the Island Chicken Plucker for small-scale poultry operations and the Avalon Cider Press.... We are a local manufacturing business, with a prime objective of sourcing materials and services within our community, respecting our employees and our local environment, and plowing the bulk of our proceeds back into our community. Meadow Creature LLC is pledged to donate at least 3% of our gross proceeds, in cash or equivalent products, to community sustainable agriculture organizations."

More Freely Downloadable Classic Gardening Books

In the May-June 2008 *HortIdeas* (page 51), we noted the fact that many gardening-related books that are now in the public domain (no longer copyrighted) can be viewed online or downloaded free of charge (as PDF files) from Google™ Books. Now we've found another web site with additional classic gardening books available free in various electronic formats (typically including both PDF and plain text): the Internet Archive site at www.archive.org. The viewable/downloadable garden books are in the "Cook Books and Home Economics" collection, categorized as one of the site's "Additional Collections."

Here are just a few of the dozens of books available: Albert Forbes Sieveking, *Gardens Ancient and Modern: An Epitome of the Garden-Art*; Grace Tabor, *Old-Fashioned Gardening: A History and a Reconstruction*; George Dillstone, *The Planning & Planting of Little Gardens*; Cecily Ullmann Sidgwick, *The Children's Book of Gardening*; Guy Lowell, *American Gardens*; Una Lucy Silberrad, *Dutch Bulbs and Gardens*; Henry Sherman Adams, *Making a Rock Garden*.

The "Cookbooks and Home Economics" collection has books scanned at the Young Research Library of the University of California at Los Angeles, the Bancroft Library of the University of California at Berkeley, and the Prelinger Library.

www.persimmonpudding.com

This web site is "dedicated to growing, education, and use of **Diospyros virginiana** L., the common, or American persimmon." It features several pages (some still in the initial stages) on persimmon history, cultivation, celebration and culture, natural history, botany, health and nutrition, culinary use (including some *excellent* recipes!), and more, plus links and source lists. Barry Nichols (P.O. Box 21182, Louisville, KY 40221), who is responsible for the site, is currently seeking information of all kinds on the American persimmon, including relevant oral history and remembrances.

Incidentally, we discovered a persimmon tree on our farm last fall that produces some of the largest fruits we've ever seen —some approaching two inches in diameter, with many about one and three-quarter inch in diameter. Its yields were fairly large both last fall (after a droughty growing season) and this fall (after a very wet and cool growing season). Contact us *if you are experienced at grafting persimmon* and want scionwood.

"Cheap, Simple, and Effective" Threshing of (Most) Grain

Most grain produced in the Community Garden of Christ's Church of the Golden Rule in Willits, California, is threshed by hand, as described below by Dan Royer-Miller.

> [We use] ... a plywood platform, four feet by eight feet, with two large nails pounded about two feet apart at each end. Stretched across this platform and secured on these nails is a piece of one-quarter-inch [mesh-size] hardware cloth.... you place a bundle of stalks, heads aligned, in the platform and hold the bundle down with a foot. With the other foot you rub the heads against the hardware cloth surface, effectively knocking the hulls off of the stalks and the grains out of the hulls. When you are finished with the variety, or the surface is too full of grains and chaff to work, you lift the hardware cloth off the nails and put it to one side, taking the larger pieces of chaff with it. You are left with the grains and smaller chaff, which you sweep onto a sheet and transfer to a bucket or trash can.
>
> To winnow the chaff from the grain, pour the contents from container to container in a strong breeze, or in front of a box fan. Further separation, if necessary, can be done with a variety of sizes of screen.
>
> Threshing works best when grain is thoroughly dry. In our case, though we have more time to thresh in the winter, that is also when the rains come. The moisture in the air is absorbed by the hulls, making them too flexible to break easily. So when your grains are harvested, keep them in a place with airflow so they can fully dry and stay that way for threshing and storage.
>
> A final word of wisdom: this method does not work on softer grains, like oats. The pressure of your foot will not affect mature wheat, rye, barley, or triticale, but it will crush oats to pieces. We are still working on an easy method for threshing oats.

A portion of the Golden Rule Community Garden has been used for years by interns at Ecology Action (famous worldwide for its GROW BIOINTENSIVE® gardening techniques); to learn more, visit www.growbiointensive.org.

Reference: Dan Royer-Miller, "Threshing Grain," *Ecology Action Newsletter*, August 2009, 6. (Ecology Action/Common Ground, 5798 Ridgewood Rd., Willits, CA 95490-9730.)

Rating Indoor Plants for Removal of Organic Volatiles

At the University of Georgia, researchers measured the removal by various ornamental plants of five volatile organic chemicals that are common indoor air pollutants: benzene, toluene, octane, tricholoroethylene (TCE), and alpha-pinene. The table below shows the rates of removal of the volatiles (in micrograms removed per hour per cubic meter of atmosphere per square meter of plant foliage). The "superior," "intermediate," and "poor" removal efficiency ratings are based on total removal rates for all volatiles. Note: removal of volatiles was measured over a six-hour period with a light level appropriate for indoor growing conditions. The plants showed no visible injuries due to exposure to the volatiles.

Rates of removal of volatile organic chemicals by indoor plants

Species	*benzene*	*toluene*	*octane*	*TCE*	*alpha-pinene*
superior removal efficiency					
Hemigraphis alternata	5.5	9.6	5.6	11.1	12.2
Hedera helix	3.6	8.3	5.1	8.1	13.3
Tradescantia pallida	3.9	9.1	2.8	8.0	10.5
Hoya carnosa	2.2	5.8	3.8	5.8	8.5
intermediate removal efficiency					
Ficus benjamina	1.7	5.1	4.0	4.7	8.7
Polyscias fruiticosa	1.5	4.3	3.4	4.0	8.3
Fittonia argyroneura	2.7	5.1	1.8	6.2	4.3
Sansevieria trifasciata	1.8	5.0	2.7	4.6	5.5
Guzmania sp.	1.5	4.0	2.0	4.0	6.4
Anthurium andreanum	1.3	3.6	2.5	3.6	5.9
Schefflera elegantissima	0.7	4.9	0.7	3.9	7.3
poor removal efficiency					
Peperomia clusiifolia	1.2	2.8	2.0	2.4	4.6
Chlorophytum comosum	0.8	3.2	1.7	2.9	4.2
Howea belmoreana	0.8	3.0	1.8	2.7	4.3
Spathiphyllum wallisii	0.8	2.5	1.6	2.3	4.1
Schefflera arboricola	0.4	2.3	1.8	1.8	4.2
Codiaeum variegatum	0.9	2.3	1.2	2.3	3.6
Calathea roseopicta	0.9	2.7	0.8	2.3	3.3
Aspidistra elatior	0.5	2.2	1.2	2.0	3.2
Maranta leuconeura	0.7	2.7	0.5	2.4	2.8
Dracaena fragrans	0.6	2.0	1.2	1.9	3.3
Ficus elastica	0.4	2.3	1.2	1.8	2.7
Dieffenbachia seguine	0.2	2.0	1.0	1.8	3.0
Philodendron scandens ssp. **oxycardium**	0.5	1.8	1.0	1.7	2.3
Syngonium podophyllum	0.0	1.8	0.8	1.7	2.8
Epipremnum aureum	0.4	1.5	0.9	1.5	2.3
Pelargonium graveolens	0.0	1.7	0.0	1.5	2.4

Reference: Dong Sik Yang, Svoboda V. Pennisi, Ki-Cheol Son, and Stanley J. Kays (The Plant Center, Dept. of Horticulture, University of Georgia, 1111 Plant Science Bldg., Athens, GA 30602-7273), "Screening Indoor Plants for Volatile Organic Pollutant Removal Efficiency," *HortScience 44*(5), August 2009, 1377-1381. (American Society for Horticultural Science, 113 S. West St., Suite 200, Alexandria, VA 22314-2851.)

Very Small Amounts of Salicylic Acid Can Improve Crops

Experiments conducted in Egypt have demonstrated that spraying pepper plants with solutions containing quite small concentrations of the "signal molecule" salicylic acid, found naturally in plants, can result in considerable yield gains and higher levels of vitamin C in the peppers. After flowering had begun, plants were sprayed with distilled water containing a surfactant and either 0, 10^{-6}, or 10^{-4} millimolar salicylic acid in the morning on all of the leaves, three times within a period of two weeks. Each plant received about 50 milliliters of spray solution. Relative to the control plants that received the 0 millimolar sprays, plants receiving the 10^{-6} millimolar sprays averaged approximately 80% higher pepper yields, and plants receiving the 10^{-4} millimolar sprays averaged approximately 46% higher pepper yields. Vitamin C concentrations in the peppers went up considerably with the 10^{-6} millimolar sprays but went down with the 10^{-4} millimolar sprays, relative to the results with the 0 millimolar sprays.

Reference: M.W.M. Elwan (Suez Canal University, Faculty of Agriculture, Dept. of Horticulture, Ismailia, EGYPT) and M.A.M. El-Hamahmy, "Improved Productivity and Quality Associated with Salicylic Acid Application in Greenhouse Pepper," *Scientia Horticulturae 122*(4), November 3, 2009, 521-526. (Elsevier Science B.V., Molenwert 1, Postbus 211, 1000 AE Amsterdam, THE NETHERLANDS.)

Beware of Spreading Weeds from the Pots of Ornamentals

The following is excerpted from a news release dated August 10, 2009, provided by the Weed Science Society of America (web site www.wssa.net).

> Container-grown ornamentals are a staple of the nursery industry and give homeowners a quick way to incorporate established plants into backyard gardens and landscapes. But without proper management, they also can serve as a superhighway for the spread of weeds.
>
> In Alaska, where the number of nonnative invasive plants and weeds has surged in recent years, researchers with the U.S. Department of Agriculture's Agricultural Research Service recently took a close look at the problem and developed some interesting insights. [As reported in Jeffrey S. Conn, Cassie A. Stockdale, and Jenny C. Morgan, "Characterizing Pathways of Invasive Plant Spread to Alaska. I. Propagules from Container-Grown Ornamentals," *Invasive Plant Science and Management 1*, 2008, 331-336.]
>
> "The team examined container-grown plants to see if they were a contributing factor," said Lee Van Wychen, science policy director for the Weed Science Society of America. "The research showed significant numbers of nonnative weed species were hitchhiking across the state in the same containers as ornamental flowers and shrubs."
>
> The two-year study examined a variety of container-grown plants, including vegetables and herbs, the showy perennials prized by backyard gardeners, and the woody plants, trees, and shrubs that are a landscaping mainstay for both homes and businesses. More than two dozen plants were purchased from each of 29 nurseries selling to the Alaska market—including four from within the state and 25 from the western U.S. and Canada.

After incubating the soil from each container in a greenhouse to see what sprouted, researchers found 54 weeds or invasive plants had been transported alongside the container-grown ornamentals. The five most common included sticky chickweed (**Cerastium glomeratum**), hairy bittercress (**Cardamine hirsuta**), common groundsel (**Senecio vulgaris**), La Plata sandspurry (**Spergularia plantensis**), and birch (**Betula** sp.). Researchers also discovered Canada thistle (**Cirsium arvense**), a species prohibited in Alaska by law. Of the 54 plants that sprouted, only three were native to Alaska.

"Based on the Alaska data, it is clear that container plants play a role in the spread of weeds that can be a risk to native plants and wildlife habitats," Van Wychen said.

... several variables affected the number of weeds found:

- Soil from balled and burlap-covered trees and shrubs held more weed seeds than vegetable, herb, and perennial containers.

- More weeds sprouted from soil-based mixes and mineral soil than from sterile, soilless potting mixes like sphagnum peat moss.

- The grower or vendor made a difference. It was evident that several had superior weed control practices and sold plants with few if any weeds.

"Prevention is always the most powerful and cost-effective approach for combating weeds," Van Wychen said. "We urge growers and retailers to make weed control a routine part of their operations and urge homeowners to be vigilant. If you spot weeds that sprout alongside your new container-grown plants, pull them before they produce seeds and spread. It can make a real difference." ...

Herbicidal Rye: It's (at Least Partly) the Benzoazinoids

The following is excerpted from "Why Rye Cover Crops Are Great Natural Weed Killers," by Dennis O'Brien, *Agricultural Research*, October 2009, published by the U.S. Department of Agriculture's Agricultural Research Service (ARS).

John Teasdale is trying to answer a question that might seem obvious: Why does rye work as a cover crop? Rye suppresses weeds without herbicides, making it a common cover crop on organic farms.

The mechanics of how it works seem simple enough. When cut down and flattened on the soil, rye stalks block sunlight and prevent germinating weeds from getting the light they need. Rye's root system also captures nutrients and holds the soil, preventing erosion and making it particularly attractive to farmers in the Chesapeake Bay watershed and other areas where runoff is a concern. It also grows at cold temperatures, making it ideal for fall planting and winter growth.

But Teasdale. research leader at the Sustainable Agricultural Systems Laboratory [phone 301-504-5504] in Beltsville, Maryland, has teamed up with Cliff Rice, an ARS chemist, to see if more is going on with rye. They think that something in rye affects soil chemistry in ways that help the plant suppress weeds. In their studies, they are trying to determine when and at what levels some of the plant's key organic compounds are released into the soil and whether they enhance weed suppression. Their goal is to find ways—either through improving varieties of rye or determining when and how it should be managed—to improve its weed-controlling abilities.

They raised rye in test plots in Beltsville, killed it with herbicide, and then either tilled it shallowly into the soil or left the dead rye stalks untilled on the surface. They planted pigweed and lettuce and took soil samples at weekly intervals. Then they extracted organic material from the soil and measured the levels of compounds known as "benzoxazinoids" that were released from the rye.

The study was one of the first attempts to measure rye-derived benzoxazinoids in field soil and to examine their impact on weeds under field conditions. Previous work focused on rye extracts studied in controlled laboratory or greenhouse experiments.

The researchers say that other compounds could be involved in weed suppression, but their early results suggest that benzoxazinoids affect soil chemistry in ways that enhance rye's weed-suppressing ability and are worthy of further study. There were lower-than-expected concentrations of the benzoxazinoids in the soil, and weeds began to grow better as concentrations of the compounds diminished, within a few weeks of when the rye was killed. The benzoxazinoids reached peak levels about a week after the rye was killed and those levels dropped considerably within two or three weeks.

Additional studies will be required before the researchers can provide guidance on growing and management techniques....

Getting Results of Bioengineering *without* Bioengineering

The following is excerpted from "Hairy Vetch Boosts Tomato Phytonutrients," by Autar K. Matoo, *Agricultural Research*, October 2009, published by the U.S. Department of Agriculture's Agricultural Research Service (ARS).

Members of the **Vicia** genus known as "hairy vetch" are viny, moderately winter-hardy legumes that are often grown [as winter cover crops] ...

Now research has shown that planting tomatoes in fields of killed and rolled hairy vetch, which serves as a mulch, activates some of the metabolic pathways and genes that make tomato plants more vigorous—and their fruit more tasty and nutritious. The effect is similar to that obtained by inserting [via bioengineering techniques] the *ySAMdc* gene into tomato plants ...

How the fruit of regular [not genetically modified] tomatoes grown in hairy vetch becomes so nutritionally similar to fruit produced by *ySAMdc*-modified tomatoes isn't yet understood. But when both [genetically] modified and unmodified tomatoes were grown in hairy vetch mulch, a buildup of amino acids, choline, and other nutrients and antioxidants was seen to occur in the fruit, and the *ySAMdc*-modified tomatoes contained even more nutrients—and at much higher levels—than unmodified ones....

This collaborative investigation is being done with scientists at Purdue University and the Italian National Research Agency.

To learn more, contact Autur K. Matoo, U.S.D.A.-Agricultural Research Service, Sustainable Agricultural Systems Laboratory, Beltsville, Maryland, phone 301-504-6622.

www.veggietrader.com

This web site claims to be "just getting started," but it already has more than 10,000 member gardeners who can use the site to list their excess homegrown produce for sale or trade, and and post produce want lists. Membership is free, and all communication among members is anonymous until transactions are agreed upon. Listings are organized by zip code, remain on the site for the length of time requested by those who post them, and can be easily searched. Seeds and plants also are allowed to be listed (provided that they are not prohibited from commerce by local, state, or federal regulations), but meat, eggs, dairy products are not allowed.

In Kansas: Testing *Native* Plants for Green Roofs

Below we excerpt from a news release provided by Kansas State University, authored by Diane Potts.

> Two faculty members from Kansas State University's College of Architecture, Planning, and Design have taken gardening to new heights.
>
> R. Todd Gabbard [phone 785-532-1129], assistant professor of architecture, and Lee Skabelund, assistant professor of landscape architecture, have installed an experimental green roof—or living roof—over a third-floor breezeway in Seaton Hall's west wing.
>
> The garden won't provide heirloom tomatoes or cut flowers. Instead, it aims to assess how such a roof can reduce the urban heat load and control runoff from the region's intense thunderstorms.
>
> At the garden, black plastic irrigation lines contrast with green rows of native plants and the reddish soil substitute that overlies layers of root barrier and waterproofing.... temperature sensors ... every five minutes send a fresh set of readings from various soil depths to the on-site recording station.
>
> The garden mixes 14 grasses and other plants native to Kansas inside a border of sedum, a shallow-rooted succulent. Even at its deepest point, the roof offers only about six inches of growing medium, so a big question for the experiment is simply plant survival. After two growing seasons, the irrigation will be removed, and the 200-plus plants will have to make it on their own.
>
> Skabelund said that this is the first such living roof in the Flint Hills since settlers left behind the sod house....
>
> The project will provide research to answer questions about the life-cycle costs of green roofs and whether plants can survive long-term without irrigation ...
>
> Funds for the Seaton Hall green roof project came from donations and a mini-grant from Kansas WaterLINK, a Water Quality, Restoration, and Protection Service learning grant awarded to Kansas State University by the Kansas Department of Health and Environment from U.S. Environmental Protection Agency funds. A majority of the garden's materials also were donated.
>
> Skabelund and Gabbard are now seeking funding and donations to convert two small neighboring roofs to living status.

Natural Antioxidants Can Aid Seedling Drought Tolerance

Researchers in Canada soaked 'Scotia' tomato seeds for 24 hours at 77°F in aqueous solutions containing the naturally occurring antioxidants ascorbic acid, lutein, lycopene, or beta carotene (a small amount of grain alcohol facilitated mixing of the latter three antioxidants with water). The treated seeds and untreated controls were placed in a growing chamber and well-watered for two weeks, then irrigation of some of the seeds was stopped for 12 days while the remainder of the seeds continued to receive irrigation. Physiological measurements revealed that photosynthesis and water use efficiency were enhanced by the soaks. Seedling shoot dry mass production relative to that of untreated controls was increased by 56% after soaking the seeds in a solution of 1.0 milligram of ascorbic acid per liter of water; by 83% with 0.1 milligram of lycopene per liter; and by 94% with 1.0 milligram of lutein per liter.

The researchers note that the effects of soaking seeds in solutions of natural antioxidants might have beneficial effects that persist "throughout the life of a plant." This area of investigation appears to have enormous potential for amateur scientists and science projects! The antioxidants are easily obtained at health food stores, and the research procedures are straightforward and inexpensive. In addition, the results, if positive, could be of great value to commercial agriculture.

Reference: Mason T. MacDonald, Rajasekaran R. Lada (Department of Plant and Animal Sciences, Nova Scotia Agricultural College, Cox Institute, P.O. Box 550, Truro, CANADA B2N 5E3), A. Robin Robinson, and Jeff Hoyle, "Seed Preconditioning with Natural and Synthetic Antioxidants Induces Drought Tolerance in Tomato Seedlings," *HortScience 44*(5), August 2009, 1323-1329. (American Society for Horticultural Science, 113 S. West St., Suite 200, Alexandria, VA 22314-2851.)

What's So Slick, Insects Can't Climb Up It?

The answer: a smooth surface coated with Fluon (*not* Teflon; it isn't slick enough). That's based on the experience of Swedish ecologist Niklas Björklund, who has constructed effective funnel traps allowing him to collect insects that attempt to climb up tree trunks. Björklund's traps are made from weather-resistant asphalt-saturated paper with Fluon-coated plastic packaging tape on the inner surface. The bottom circumference of each trap fits snugly against the trunk, while the top circumference is flared out from the trunk.

Perhaps Fluon coatings also could be useful for other types of insect traps. Fluon non-stick surfaces are essentially the *opposite* of the sticky surfaces commonly employed in various insect traps. Björklund names a commercial source of Fluon ("AD1070"): AGC Chemicals Americas, Inc., Bayonne, New Jersey.

Reference: Niklas Björklund, "Non-Destructive Tree-Trunk Funnel Trap for Capturing **Hylobius warreni** (Coleoptera: Curculionidae) Ascending Stems of Trees," *The Canadian Entomologist 141*(4), July/August 2009, 422-424. (Entomological Society of Canada, 393 Winston Ave., Ottawa, Ontario, CANADA K2A 1Y8.)

New Ornamental/Culinary Pepper Cultivars from the U.S.D.A.

The following is excerpted from "Ornamentals to Brighten Garden Palette," by Rosalie Marion Bliss, *Agricultural Research*, October 2009, published by the U.S. Department of Agriculture's Agricultural Research Service (ARS).

> Two new pepper cultivars developed by ARS scientists promise to provide striking color contrasts in the summer and fall garden. Unique fruit shapes and orange fruit color provide compelling seasonal interest, especially for fall gardens during Halloween and Thanksgiving.
>
> The pepper cultivars are trademarked Lil' Pumpkin™ and Pepper Jack™. ARS plant geneticists John Stommel and Robert Griesbach, both with the Henry A. Wallace Beltsville Agricultural Research Center in Beltsville, Maryland, bred the peppers....
>
> The patented Lil' Pumpkin™ plants produce unique black foliage and orange pumpkin-like fruit, and the patent-pending Pepper Jack™ bears greenish-black foliage and a mix of both orange and black, small, cone-shaped fruit, similar to the ever-popular Halloween treat, candy corn.
>
> "These ornamental garden vegetables have been trialed extensively, and they perform well in diverse environments," says Stommel. "They are well suited for use as bedding and container plants."
>
> The breeders developed Lil' Pumpkin™ and Pepper Jack™ with both ornamental and culinary markets in mind. The peppers' vibrant colors and unique shapes provide enticing ornamental interest, and their spicy flavor may be of culinary interest to hot pepper lovers.
>
> When introduced into Europe in the 15th century, some widely grown vegetable crops, such as peppers, were prized more for their ornamental value than as food sources, says

Stommel. Decorative kitchen gardens, called "potagers," were important elements of elaborate European gardens like those found at Versailles during the 1600s....

Greenhouse growers have added ornamental vegetables to their annual production cycle because they are easy to produce and are extremely profitable compared to their culinary counterparts. The new peppers will be marketed in pots as annuals....

Lil' Pumpkin™ and Pepper Jack™ have been licensed for retail sale by McCorkle Nurseries, Inc., in Dearing, Georgia. The plants are scheduled to become available in various garden centers and retail stores nationwide in 2010.

Louisiana Students Help Grow Plants for Habitat Restoration

The Coastal Roots program, which was instituted in 2001 and is now administered by Louisiana State University (see the web site http://coastalroots.lsu.edu/), enlists students in grades 3-12 throughout southern Louisiana to grow wetland plants in school nurseries. The plants are then used for coastal habitat restoration. Last year, 775 students participated in the program, producing more than 5,000 transplants.

An innovative enclosed nursery facility design suitable for installation at schools has been developed by LSU professors Edward Bush and Pamela Blanchard. This design uses easily available, inexpensive materials (such as PVC pipe and fittings) in an dedicated irrigation system well-suited to small-scale production of container-grown seedlings. Construction details are given in the reference below.

Reference: Edward W. Bush (Louisiana State University, School of Plant, Soil, and Environmental Science, 137 J.C. Miller Hall, Baton Rouge, LA 70803) and Pamela B. Blanchard, "Low-Cost Container Yard for School-Based Restoration Nurseries," *HortTechnology 19*(4), October-December 2009, 818-822. (American Society for Horticultural Science, 113 S. West St., Suite 200, Alexandria, VA 22314-2851.)

Non-GMO Vegetable Breeding Emphasized at OSU

The following is excerpted from "Fresh, Good, & Local," by Judy Scott, which originally appeared in the Fall 2009 issue of *Oregon's Agricultural Progress*, published by the Agricultural Experiment Station, Oregon State University, 422 Kerr Administration Bldg., Corvallis, OR 97331-2119.

... vegetable breeding [at Oregon State University] ... can take as long as 15 years before a new variety is released. The goal is to breed vegetables that are tastier, more nutritious, disease resistant, and easier to harvest, without using genetic engineering. Jim Myers leads the process as the Baggett-Frazier Professor of vegetable breeding ... Although it takes years to cross plants and grow out each new generation, vegetable processors prefer vegetables bred in the classical manner, Myers says, because overseas customers have strict requirements to avoid GMO [genetically modified ("bioengineered") organism] contamination. "It's demanding work," he says, "and students who come out of the OSU breeding program are in high demand for their experience in this field."

Thanks to a nurturing climate, wonderful soil, and a heritage of well-bred varieties, Oregon is blessed with high-quality vegetables. Myers ... and ... [his] colleagues are working to make them even better ... Here are a few examples:

'Blue Lake' green beans

Tender and crisp, 'Blue Lake' green beans are slender and up to six inches long. Their flavor suggests fresh greens and roasted nuts ... But make no mistake, these beans were made for processing.

One of the most productive discoveries by OSU vegetable breeders came in the 1960s, when they developed a commercial green bean that would retain its summery taste and color even when frozen or canned. Since then, the 'Blue Lake' bush bean has become the industry standard and a favorite of home gardens in Oregon, as years of research continued to improve its taste, nutritional value, and yield. And research continues to develop resistance to white mold disease, which can devastate commercial vegetable fields, especially beans....

'Honey Boat' squash

... Developed by legendary OSU vegetable breeder Jim Baggett, 'Honey Boat' and its cousin 'Sugar Loaf' are as much a signature of an Oregon Thanksgiving as 'Bandon' cranberries and pickled green beans. A refined 'Delicata'-style squash, 'Honey Boat' is touted by seed companies as "the sweetest squash in existence."

Oregon 'Sugar Pod II' peas

OSU breeders took flat snow peas and pumped them full of tender sweet peas, and so created a vegetable that kids love to eat....

"This is the way peas will be eaten in the future," quotes a British seed company introducing the Oregon delicacy to European gardeners and diners. "It just doesn't make sense to go through the tediousness of discarding the pod if it's so full of goodness and so delicious to taste."

Organic broccoli

... Ideally, varieties produced organically grow fast enough to outpace pests, broad enough to shade out weeds, and sturdy enough to resist disease. Organic farmers from both the east and west coasts are working with OSU researchers to develop better organic broccoli varieties for fresh markets. Since 2005, Myers has sent more than 500 open-pollinated broccoli seeds to each participating farmer, who plants them and selects the best of the offspring to harvest for seed that he or she sends back to Myers. Myers mixes the seeds from several growers and redistributes them for more testing.

"Our objectives are to develop broccoli varieties adapted to regional organic growing conditions and [to] engage growers in plant breeding," Myers says....

Results have been applauded. "After three years of growing broccoli selected from a mass cross of varieties made by Jim Myers, we may have finally gotten it right," according to Ken Ettinger of the Long Island Seed Project. "Broccoli is not usually considered a sustainable organic crop, but this may change as the OSU broccoli becomes more adapted to out Long Island soils, climate, and cultural practices. In the three years of growing this broccoli we haven't had to use any kind of pest or disease control."

'Legend' tomato

... with the goal of developing a cool-climate tomato, Jim Baggett, followed by Jim Myers, developed better and better varieties, including 'Oregon Spring' and 'Siletz'. Their breakthrough is the 'Legend' tomato, an early-bearing tomato that sets rich-tasting fruit under the cool conditions of much of the Pacific Northwest.

'Legend' tomatoes ... are resistant to late blight, ... responsible for the Irish potato famine of the 1840s.

"Late blight is a difficult disease to breed against because there are so many different races," Myers says. If a new race of late blight invades, or the old race mutates, then resistance might break down. So far, resistance has held up in the 'Legend' tomato, which carries on the legendary reputation of OSU-bred vegetables.

Celebrating the 50th Anniversary of the IPM Concept

The following is excerpted from "The 50th Anniversary of a Great Idea," by Jeannette Warnert, *California Agriculture 63*(4), October-December 2009, 111-112, published by the Division of Agriculture and Natural Resources, University of California, 6701 San Pablo Ave., 2nd Floor, Oakland, CA 94608 (©2009 The Regents of the University of California).

Fifty years ago in October, four pioneering University of California scientists outlined a new way of thinking about pest control, establishing a pest management framework that changed the way the world farms [*and* gardens—*Eds.*].

The scientists recognized—way ahead of their time—that imposing a harsh chemical on a natural system threw it off kilter, causing many more problems in the long run. They believed that combining an array of pest control methods would be more effective, safer for farmworkers, and kinder to the environment. The scientists proposed:

- Recognition that agriculture is part of the larger ecosystem, comprised of all the living organisms of an area and their environment.
- Supervision of insect levels so that chemical applications take place only when and where they are absolutely necessary.
- Promotion of beneficial insects through conservation and augmentation.
- Use of products and application timing to target specific pests, minimizing the effect of treatment on pests' natural enemies.

Vernon M. Stern, Ray F. Smith, Robert van den Bosch, and Kenneth S. Hagen presented their ideas in a landmark and often-cited article published in the October 1959 agricultural science journal *Hilgardia*, published by the UC Division of Agriculture and Natural Resources. The 20-page paper [titled "The Integrated Control Concept"] clearly and concisely described the consequences of pesticide overuse and detailed their vision of a sustainable pest control system.

None of the paper's four authors is alive today. All of them are probably best remembered for their role in inventing integrated pest management (IPM).

"In essence, they laid the foundation of all IPM methods that we use today," says Peter B. Goodell, University of California IPM advisor with the UC Kearney Agricultural Center near Parlier. "The concept is so fundamental, we haven't added much to it. We've just nibbled around the edges and refined it for individual crops and pests."

At the time the article was published, Stern, Smith, van den Bosch, and Hagen could only have dreamed that their ideas would spread across the globe, prompt the development of a new discipline, and be credited with substantially reducing the use of pesticides while making farming more efficient and sustainable.

In fact the four men are considered the fathers of IPM. They wrote their seminal treatise about agriculture's unhealthy dependence on pesticides several years before Rachel Carson published *Silent Spring*, the 1962 classic that some believe kick-started the environmental movement.

Both stories begin with the sudden availability of DDT after World War II. DDT's effectiveness at killing pests on contact lifted the heavy burden of pest management from the shoulders of farmers laboring to feed the nation. At first, the chemical seemed almost magical. But it didn't take long before farmers and scientists realized that it put U.S. agriculture on a fast-moving pesticide treadmill....

DDT was banned for all agricultural uses in 1972, but its initial success had spurred research in the chlorinated hydrocarbon chemistry and stimulated the development of other [synthetic] organic pesticides, the 1959 *Hilgardia* article said. The authors did not oppose chemical pest control in agriculture. "Without question, the rapid and widespread adoption of organic insecticides brought incalculable benefits to mankind, but it has now become apparent that this was not an unmixed blessing," they wrote.

They advocated the judicious use of chemical control measures in an integrated systems approach. "Integrated control," they wrote, "is most successful when sound economic thresholds have been established, rapid sampling methods have been devised, and selective insecticides are available."

UC IPM entomologist Walt Bentley, who worked with Stern early in his career, says the four men's foresight was inspiring.

"I am just amazed that work done in the mid-1950s, and published in 1959, listed worker safety and the almost unheard-of potential for litigation," Bentley says. "I don't think at the time they knew DDT was causing the thinning of raptor egg shells, but they understood that you could overuse a product with broad toxicity and end up with no pest control at all over time."

The IPM techniques outlined in the *Hilgardia* paper are also applicable in home gardens and landscapes. Cheryl Wilen, UC IPM horticulturist based in San Diego County, advocates the use of the same concepts in landscapes and gardens that have proven so successful in agriculture.

"People will see an insect or weed problem and ask, 'What is it and what can I do to control it now?' Wilen says. "IPM is really a long-term sustainable program. I tell them, "This is what you have, this is what you can do, and this is what you can do to prevent the problem from recurring.'"

Testing Fabric Containers as Alternatives to Plastic Pots

The following is excerpted from "Effect of Fabric and Plastic Containers on Plant Growth and Root Zone Temperatures of Four Tree Species," by Pamela K. Tauer and Janet C. Cole (Dept. of Horticulture and Landscape Architecture, Oklahoma State University, Stillwater, OK 74078), *Journal of Environmental Horticulture 27*(3), September 2009, 145-148, published by the Horticultural Research Institute, 1000 Vermont Ave., N.W., Suite 300, Washington, DC 20005.

Introduction

Nursery growers use various production methods including growing plants in nonwoven fabric containers or plastic containers. Traditionally, nonwoven fabric containers have been used for in-ground production by planting trees in field soil in the fabric container, then placing the fabric container in the ground such that about two to three inches of the sidewall extends above the soil surface. In contrast, plastic containers have been used for above-ground production or in a pot-in-pot system in which a socket pot is placed in the ground, then the plant is planted in soilless substrate in a second pot, or production pot, that is placed inside of the socket pod. A disadvantage of the pot-in-pot system is that if the roots grow through the pot drain holes, they will also likely grow through the socket pot holes and into the soil, making harvest difficult. Each production method has advantages and disadvantages. In-ground pro-

duction in fabric or plastic containers retains a large portion of the root system compared to balling and burlapping. An estimated 90% of the root system is outside the harvestable rootball of balled and burlapped plants.... The soil surrounding in-ground containers mitigates summer and winter temperature extremes, thus protecting the root system. In-ground production also has the advantage of less plant blow-over in windy situations than plants in above-ground containers.

Despite the advantages of in-ground production, above-ground production systems remain viable. Above-ground production allows flexibility in the growing site, since native soil characteristics are less of a concern. Traditionally, plastic has been the container of choice for above-ground production, but interest in fabric containers for this production system has increased. Fabric containers have been available for over 20 years and have been marketed under several brand names. They were developed to reduce harvest costs of field-grown plants and to induce a more fibrous root system. Fabric containers are available in various sizes, and appropriate container size depends on the trunk caliper at harvest.

Plant growth and quality has been variable with fabric containers. One reported advantage of the fabric container is its ability to continually prune roots. Smaller roots penetrate the fabric, but as the roots grow, the fabric constricts the roots, resulting in root pruning. Several disadvantages have been noted for fabric containers compared to other production methods. Growers report large costs for time, labor, equipment, and fabric containers before the plants are ready for sale. Greater initial costs are incurred for production with fabric containers compared to balling and burlapping or bareroot plant production in the field. [B.L.] James also reported [in "Grow-Bags: Are They All We Had Hoped For?" *Proceedings of the International Plant Propagators Society 37*, 1987, 532-533] that small roots that grow through fabric containers function in water uptake; however, they are removed during harvest, resulting in plants that readily become water stressed. Thus, constant irrigation is needed even for hardened-off plants. Many consumers find fabric containers less aesthetically appealing than plastic containers.

[C.] Chong [in "Propagation and Culture of Nursery Ornamentals," *Highlights of Agricultural Research in Ontario 10*, 1987, 15-17] compared hybrid poplar (**Populus deltoides × nigra** 'DN 69'), eastern cottonwood (**P. deltoides**), and black poplar (**P. nigra**) above-ground in fabric containers inserted in progressively larger plastic containers or plastic containers of the same size as fabric containers. Plant height was similar between container types after one year. After two years, the trees in fabric containers had less new canopy growth than those in plastic containers. In another study, no morphological differences occurred between plants grown in the fabric containers compared to those grown in plastic containers....

One disadvantage to growing plants in containers above-ground is that plant roots have less protection against temperature extremes.... plants growing in high-density polyethylene containers and exposed to direct solar radiation can have substrate temperatures in the range of 100-125°F, particularly when the containers are exposed to full sun on the south or west sides of production blocks. There has been some speculation that root zone temperatures in fabric containers during the summer might be lower than those in plastic containers. Because fabric containers are porous, moisture can readily evaporate through the sides of the containers, possibly also cooling the root zone region.

The objectives of this study were to characterize 1) plant growth in above-ground production using fabric and plastic containers, and 2) root zone temperatures throughout the growing season in the two container types.

Materials and methods

2004 Planting. Ten trees each of live oak, red maple, and sweet gum were transplanted ... into #7 plastic containers (14" top diameter, 11" bottom diameter, 11.5" deep) ..., and ten trees from each species were transplanted into fabric containers (14" diameter, 10" deep, Root Control, Inc., Oklahoma City, Oklahoma) ... on April 28, 2004.

Tree height, caliper ... at one inch above the substrate, and canopy width ... were determined on ... May 2, July 22, and September 15, 2005, and July 29 and September 29, 2005.... After the September 29, 2005 measurements, one-half of the red maple and sweet gum trees in each container treatment were harvested.... The roots were dried ... and weighed.

Root zone temperatures were measured at half-hour intervals throughout the study using soil temperature sensors ... centered between the [containers'] top and bottom and sides....

2005 Planting. The experiment was repeated as described above with the following exceptions, live oak and golden rain tree were the species tested. Plants were planted in #10 plastic containers (16" top diameter, 13.25" bottom diameter, 15" deep) and fabric containers (16.5" diameter and 14.25" deep) on May 6, 2005. Height, canopy width, and trunk caliper were measured on May 6, July 26, and October 13, 2005. Plants were harvested after one growing season, and data on root size were not collected at harvest.

Results and discussion

... No differences were observed in average daily substrate temperature between container types for any month during the study.... it is possible that temperatures at the rootball-container interface were different. [N.A.] Neal [see "Winter Survival of Shrubs in Fabric Containers in a Zone 5 Climate," *Proceedings of the Southern Nursery Association 51*, 2006, 52-54] measured temperatures one inch from the container wall on the south-southwest side of the container and found temperatures at this location in plastic containers to be as much as 25-30F° higher than in fabric containers. Fabric containers are more porous, which might allow evaporative cooling to dissipate heat more readily than nonporous plastic containers.

Few differences in height, canopy, or trunk caliper occurred between container types for any of the species tested in this study at any measurement interval. Less root circling was observed in sweet gum and red maple trees in fabric containers compared to those in plastic containers. Fabric containers appear to be a viable alternative to plastic containers for above-ground plant production.

Minnesota Report on Organic Farming Economics

2008 Organic Farm Performance in Minnesota is available as a free PDF download at www.mda.state.mn.us; printed copies are available by calling 651-201-6012. Most of this report is devoted to data on the economic performance of a group of commercial organic farms in Minnesota for 2008, as well as analyses of the data. But the report also includes three chapters on how the economic information on Minnesota organic farms can be put to practical use by organic farmers (and those who are planning to become organic farmers) *anywhere* in the country: "Valuing a Lifestyle: Using Numbers to Inform Big-Picture Thinking," "How to Use This Book," and "Getting the Most Out of Your Own Farm Analysis: A Step by Step Guide."

Relative Full-Bloom Timing of Peach Cultivars

It is quite possible to live where peach trees are reliably winter-hardy yet rarely yield fruit because of late frosts in the spring—in fact, that's the case at our own farm in southcentral Kentucky. Some peach cultivars bloom a bit later than other cultivars, and a delay of just a few days can sometimes make the difference between fruit and no fruit. But finding out just which cultivars are the latest bloomers isn't easy; commercial catalogs tend to be long on information about fruit characteristics and short on information about bloom timing. So the data collected between 2003 and 2007 in southwestern Idaho on the full-bloom timing of numerous peach cultivars grown under quite uniform conditions should be welcomed by all who are trying to choose suitable cultivars for locations subject to late frosts.

The table below shows the average dates of full blooming and the average number of cumulative growing degree days (CGDD) from January 1 to full bloom for cultivars in the Idaho trial. Cultivars with later full-blooming dates and high CGDD are the better—though not sure—bets for fruit production where late frosts are problematic. If you have access to records of daily maximum and minimum temperatures at (or at least near) your potential orchard site, you can estimate the full-bloom date at that site for any cultivar in the table by computing daily growing degree days (DGDD) as ((daily maximum temperature in °F + daily minimum temperature in °F)/2 - 40°F) and then adding the DGDDs for consecutive days beginning on January 1 until you reach the cultivar's average CGDD for full bloom shown in the table. The estimate's accuracy will depend on how close your site's conditions are to those at the Idaho trial site.

Average full-bloom dates and CGDD to full bloom of peach cultivars in southwestern Idaho, 2003-2007

Cultivar	*Date of full bloom*	*CGDD to full bloom*
'Snow Giant'	April 5	381
'Jupiter'	April 7	409
'Yukon King'	April 7	409
'Burpeach Six'	April 7	409
'Fairtime'	April 7	409
'Coral Star'	April 7	409
'July Sun'	April 7	409
'Zee Lady'	April 7	409
'May Sun'	April 8	423
'Crimson Lady'	April 8	423
'Summer Flame'	April 8	423
'Elegant Lady'	April 8	423
'Sugar Giant'	April 8	423
'July Flame'	April 8	423
'Sweet Dream'	April 8	423
'August Flame'	April 8	423
'September Snow'	April 8	423
'Snow King'	April 8	423
'Star Fire'	April 8	423
'Saturn'	April 8	423
'August Lady'	April 9	434
'Ryan Sun'	April 9	434
'Brenda Sun'	April 9	434
'All Star'	April 9	434
'Autumn Red'	April 9	434
'O'Henry'	April 9	434
'Opal Moncav'	April 9	434
'Rich Lady'	April 9	434
'Vista'	April 9	434
'Glow Star'	April 9	434
'Summer Lady'	April 10	445
'Red Star'	April 11	457
'Fancy Lady'	April 12	470
'Sierra Gem'	April 12	470

Reference: Esmaeil Fallahi (Dept. of Plant, Soil, and Entomological Sciences, Parma Research and Extension Center, University of Idaho, Parma, ID 83660), Bahar Fallahi, Bahman Shafii, and Mohammad E. Amiri, "Bloom and Harvest Dates, Fruit Quality Attributes, and Yield of Modern Peach Cultivars in the Intermountain Western United States," *HortTechnology 19*(4), October-December 2009, 823-830. (American Society for Horticultural Science, 113 S. West St., Suite 200, Alexandria, VA 22314-2851.)

Guide to *Organic* Value-Added Production: *Farm Made*

From a recent news release provided by the non-profit Kerr Center, P.O. Box 588, Poteau, OK 74953, phone 918-647-9123:

> Today's small farms can find paths to profit in organic certification, as well as on-farm processing of raw commodities into value-added products—wheat into flour, tomatoes into salsa, and so on.
>
> In combination, each of these strategies can enhance the other's value still further. However, both require planning and paperwork, and those obstacles keep many farmers from taking the plunge.
>
> Now, a new free report helps farmers navigate the red tape, simplifying the creation of on-farm processing enterprises.
>
> "Organic farmers need to jump through the same hoops any other business person would in starting a food business, and at least one more—organic certification," says George Kuepper, Sustainable Agriculture Specialist at the Kerr Center for Sustainable Agriculture ... and a co-author of the report.
>
> "*Farm Made: A Guide to On-Farm Processing for Organic Producers* is intended for the organic farmer, or prospective organic farmer, who is considering a processing enterprise," he says.
>
> The 40-page report begins with an overview of the general requirements for organic certification and for food processing facilities.
>
> Following the overview, *Farm Made* discusses in detail four different on-farm organic processing enterprises: sorghum syrup, packaged fresh salad greens, canned fruit products (jams, jellies, and preserves), and table eggs.
>
> For each enterprise, the report outlines the basic production and processing requirements, and follows with details unique to organic management. Each section wraps up with an extensive list of resources for further information and supplies.
>
> Two other experienced sustainable agriculture writers and researchers collaborated with Kuepper on the report. Holly Born, of Midwest Organic Services Association in Viroqua, Wisconsin, and Anne Fanatico, with U.S.D.A.'s Agricultural Research Service in Fayetteville, Arkansas, both poured their combined decades of expertise into the project....
>
> *Farm Made* is published by the Kerr Center ... with funding from the Organic Farming Research Foundation.
>
> *Farm Made* is available free [as a PDF download] from the Kerr Center web site, www.kerrcenter.com ...

"Begin Farming Ohio" Web Site

At www.beginfarmingohio.org, beginning (and *wannabe* beginning) farmers can find practical information—and lots of it is useful even for those who aren't in Ohio! The emphasis is on providing resources for new farmers who are interested in sustainable practices; the site's collaborators include the Ohio Ecological Food and Farm Association and the Ohio State University Organic Food and Farming Education and Research Program.

Sustainable Agriculture Whitepaper from Farmland LP

FarmlandLP (web site www.farmlandLP.com) "was established in part to help cross the three-year chasm of production during the conversion from conventional to organic agriculture ... The Partnership acquires low-utility farmland and transitions it to high-value organic, sustainability best-practices farmland." FarmlandLP managers Dr. Jason Bradford and Craig Wichner have prepared a 22-page *Sustainable Agriculture Whitepaper* that discusses (with the aid of many highly informative graphs and tables) the need for, definitions of, and potential benefits of farm sustainability. This paper provides an excellent overview, with extensive references, of both technical and economic issues affecting sustainable farming; it is available at www.farmlandLP.com/FarmLP-SustainableAgWhitepaper.pdf free of charge.

The State of Food Insecurity in the World 2009

Below we excerpt from a United Nations Food and Agriculture Organization (FAO) news release dated October 14, 2009.

> The sharp spike in hunger triggered by the global economic crisis has hit the poorest people in developing countries hardest, revealing a fragile world food system in urgent need of reform, according to a report released today by FAO and the World Food Programme (WFP).
>
> The combination of food and economic crises has pushed the number of hungry people worldwide to historic levels —more than one billion people are undernourished, according to FAO estimates.
>
> Nearly all the world's undernourished live in developing countries. In Asia and the Pacific, an estimated 642 million people are suffering from chronic hunger; in Sub-Saharan Africa 265 million; in Latin America and the Caribbean, 53 million; in the Near East and North Africa 42 million; and in developed countries 15 million, according to FAO's annual hunger report, *The State of Food Insecurity*, produced this year in collaboration with WFP....
>
> Even before the recent crises, the number of undernourished people in the world had been increasing slowly but steadily for the past decade, the report says.
>
> Good progress had been made in the 1980s and early 1990s in reducing chronic hunger, largely due to increased investment in agriculture following the global food crisis of the early 1970s.
>
> But between 1995-97 and 2004-06, as official development assistance devoted to agriculture declined substantially, the number of hungry people increased in all regions except Latin America and the Caribbean. Gains in hunger reduction were later reversed in this region as well, as a result of the food and economic crises.
>
> The rise in the number of hungry people during periods of low prices and economic prosperity and the very sharp rises in periods of price spikes and economic downturns shows the weakness of the global food security governance system, FAO said.
>
> "World leaders have reacted forcefully to the financial and economic crisis and succeeded in mobilizing billions of dollars in a short time period. The same strong action is needed now to combat hunger and poverty," said FAO Director-General Jacques Diouf.
>
> "The rising number of hungry people is intolerable. We have the economic and technical means to make hunger disappear, what is missing is a stronger political will to eradicate hunger forever. Investing in agriculture in developing countries is key as a healthy agricultural sector is essential not only to overcome hunger and poverty but also to ensure overall economic growth and peace and stability in the world," he said.
>
> "We applaud the new commitment to tackle food security, but we must act quickly, It is unacceptable in the 21st century that almost one in six of the world's population is going hungry," added Josette Sheeran, Executive Director of WFP.
>
> "At a time when there are more hungry people in the world than ever before, there is less food aid than we have seen in living memory. We know what is needed to meet urgent hunger needs—we just need the resources and the international commitment to do the job." ...
>
> Several factors have conspired to make the current crisis particularly devastating ...
>
> First, the crisis is affecting large parts of the world simultaneously, reducing the scope for traditional mechanisms such as currency devaluation, borrowing, or increased use of official development assistance or migrant remittances.
>
> Second, the economic crisis comes on top of a food crisis that has already strained the coping strategies of the poor ... Faced with high domestic food prices, reduced incomes and employment, and having already sold off assets, reduced food consumption, and cut spending on essential items such as health care and education, these families risk falling deeper into destitution and the hunger-poverty trap....
>
> The third factor that differentiates this crisis from those of the past is that developing countries have become more integrated, both financially and commercially, into the world economy than they were 20 years ago, making them more vulnerable to changes in international markets.
>
> Many countries have experienced across-the-board drops in their trade and financial inflows, and have seen their export earnings, foreign investment, development aid, and remittances falling. This not only reduces employment opportunities, but also reduced the money available to governments for programmes promoting growth and supporting those in need....
>
> FAO and WFP continue to advocate a twin-track approach to address both the short-term acute hunger spurred by sudden food shortages and the longer-term chronic hunger that is symptomatic of extreme poverty as a way for durable solutions.
>
> "Small-scale farmers need access to high-quality seeds, fertilizers, feed, and technologies to be able to boost productivity and production," Diouf said. "And their governments need economic and policy tools to ensure that their countries' agriculture sectors are both more productive and more resilient in the face of crises."

A free electronic (PDF) version of the report is available at www.fao.org/docrep/012/i0876e/i0876e00.htm.

Soils Illustrated—Field Descriptions—First Edition

What an amazing book! Its purpose is to show how, using internationally standardized procedures, soils are described for scientific purposes. But its hundreds of color photographs of soil peculiarities are enormously fascinating even to laypersons. At least equally fascinating is the technology used to produce the book, which deserves to be emulated for field guides and other publications that are frequently used outdoors: "The manual is printed on a laser printer ... on 58-pound double-sided water-resistant laser paper. (The paper is not write-in-the-rain paper, but is durable and can get wet and will dry without the toner running or smearing.)"

For more information, contact E. Keith Watson, International Remote Sensing Surveys Ltd., 426 Azure Pl., Kamloops, British Columbia, CANADA V2E 2R1, phone 250-828-2020. The price of *Soils Illustrated—Field Descriptions—First Edition* is Canadian $73.50 plus actual shipping cost.

BOOK REVIEWS

What the World Eats, photographed by Peter Menzel and written by Faith D'Aluisio, Tricycle Press, Berkeley, CA, 2008, 160 pp., $22.99, ISBN 978-1-58256-246-1.

This book provides a richly graphic portrayal of the foods typically consumed weekly by each of 25 families in 21 countries. All of the families are shown surrounded by their week's worth of foods, and statistics are provided on the foods' weights and prices in U.S. dollars. There are also brief illustrated stories about each of the families, noting food habits and concerns. And for each country represented, various food-related facts (such as average annual per capita soft drink consumption and average annual per capita heath care expenditures) are given.

So, what does this book have to do with gardening? What we find most striking in the photographs of the families with their week's worth of food is how *little* fresh food is in the diets of the Americans compared to that in the diets of those in other countries, especially in developing countries. The American families are shown with *large* amounts of packaged processed foods (generally containing a lot of corn, soy, synthetic chemicals, and meat—from animals fed a lot of corn, soy, and synthetic chemicals!) and *small* amounts of fresh produce (usually a few bananas and oranges grown far away and shipped in). Families in other relatively wealthy countries (Australia, France, Great Britain, Japan, and Kuwait) also are shown with a lot of packaged processed foods, but also more fresh foods than the American families eat. Families in developing countries are shown with mainly fresh produce, grain, and fresh breads, mostly produced locally—purchased in local markets or grown by the families themselves. Thus, edible horticultural enterprises seem to be strongly *negatively* correlated with development (while various chronic diseases that some experts claim are at least in part due to processed foods are *positively* correlated with development).

What the World Eats appears to illustrate that the near-disappearance of home gardens as substantial contributors to nutrition in the U.S. has been a *bad bargain*. It makes us envious to see the wonderful arrays of fresh vegetables and fruits surrounding the families living in developing countries. How can they afford so much fresh produce? Although Americans have access to a wide variety of "fresh" (shipped-in) produce in their supermarkets, it's not cheap; in contrast, fresh (locally grown) produce in at least some developing countries is priced *quite* low. For example, the Indian family of four featured in *What the World Eats* typically spends under U.S. $8.00 each week (out of about U.S. $39 spent for all food each week) for approximately 75 pounds of (23 different kinds of) fruits, vegetables, and nuts—only about 10 cents per pound! The three American families featured in *What the World Eats* spent close to $250 weekly for all their food, on average. If the Americans spent a fifth of that weekly total on "fresh" produce, as do the Indians, we doubt that they would get anywhere near 75 pounds of produce. It seems that it would make economic sense for Americans to devote at least some time and effort to growing their own vegetables and fruits instead of paying exorbitant prices in the supermarkets.

How Trees Die: The Past, Present, and Future of Our Forests, by Jeff Gillman, Westholme Publishing, Yardley, PA, 2009, 234 pp., $24.95, ISBN 978-1-59416-081-3.

Jeff Gillman, who is a horticulture professor at the University of Minnesota and authored *The Truth about Garden Remedies* (reviewed in *HortIdeas*, March 2006, page 36), has a very broad definition of "forests" that includes trees planted by humans (even along streets and in orchards), making the subtitle somewhat misleading—the book's message is actually as relevant to gardeners and landscapers as to foresters! Gilman writes (on page 2) that his "goal in this book is to show what we do to trees while they are alive, and what ultimately leads to their deaths; nothing more and nothing less. From that I hope you will draw your own conclusions about the way we treat our trees and forests." *Our* conclusions after reading the book are that human activities in this era of economic globalization are enormously challenging to many trees, and that the challenges faced by trees due to humans will probably continue to increase in the future, despite (largely stop-gap) attempts to mitigate their impact. In short, this book doesn't paint a very pretty picture, but, unfortunately for the trees, it has the ring of truth.

After briefly describing forest life prior to human interventions, Gilman relates the history of ever-increasing industrialization of tree cropping: "if we harvest trees the same way we harvest corn, soybeans, and wheat than we will eventually deplete the ground ..." (page 44). Then he considers invasive exotic plants: "It is no stretch to say that, until the beginning of the twentieth century, plants were recklessly moved throughout the world ..." (page 53). He also reviews the fragility of peach trees in the southeastern U.S., decimation of trees due to imported diseases and insect pests, and landscapers harming trees by too much care. Humans as "parasites" on trees: a truly sad story!

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