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Don't Skip the "N"!

By Ben Fuqua

Professor, Soil Science

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Highbush blueberries require a relatively high amount of nitrogen (N) for plant growth and expected berry yield. Typically, growers in Missouri apply from 60 to 120 # N per acre, depending on soil type, health/vigor of the blueberry plants, and potential berry yield. The "Easter Freeze" of 2007 decimated berry production in most parts of Missouri and growers tended to modify certain cultural practices, including fertilizer schedules for the remainder of the year. Since many growers had already made the first application of fertilizer prior to the freeze, most blueberry plants at least received some supplemental nutrients last year. Several growers also decided to continue applying nitrogen fertilizers as currently recommended (1 or 2 additional applications) to encourage new cane production and to increase overall plant vigor. Other growers simply decided to "skip" the latter nitrogen applications, cut total fertilization rates by 50 – 70 %, and reduce overall cost. While there are positive and negative aspects to either choice, blueberry plants must have nutrients, especially nitrogen, to produce high yields of quality berries in 2008.

Nitrogen plays many roles in overall plant metabolism. Nitrogen is required for the formation of amino acids, proteins, nucleic acid, and several enzymes. Nitrogen is a structural part of the chlorophyll molecule, and also helps regulate carbohydrate accumulation in the plant.

From the Editors

by Marilyn Odneal, Managing Editor

Good news for weather watchers! Missouri State University-Mountain Grove now has a "real time" weather station on the Web that displays weather information from the State Fruit Experiment Station. The site <http://agebb.missouri.edu/weather/realtime/MountainGrove.asp> is updated every five minutes and includes archives of the Mountain Grove weather information back to Oct. 27, 2007. How cool is that?

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Blueberry plants lacking adequate nitrogen are generally stunted, chlorotic (yellow), with very thin, weak new growth. Nitrogen deficiencies can occur at any time during the growing season with symptoms first appearing on older leaves. In severe nitrogen deficiencies, the entire plant may become chlorotic, and leaves will usually exhibit a reddish color, then turn brown and fall from the plant. While visual deficiency symptoms are good indicators or “red flags” that something is adversely affecting the plant, a better measure of nitrogen sufficiency for plant growth and production can be obtained from a foliar (leaf) analysis. Leaf nitrogen contents of 1.5 – 2.1% N are normally adequate for mature, producing blueberry plants in Missouri.

Nitrogen Sources: Several good nitrogen sources are available to fertilize highbush blueberry plants. Some of the fertilizers are organic; some are chemical or synthetic. Some of fertilizers are dry solids, while others are liquids. Each fertilizer has rather unique properties that often dictate how and when to apply the fertilizers for best results.

Organic materials, such as feather meal, blood meal, soybean meal, and alfalfa meal are excellent nitrogen fertilizers for blueberry plants. These fertilizers are solid, dry materials and can be easily broadcast on the plant row. Nitrogen in organic fertilizers is not readily useable by plants as the organic compounds must be mineralized (broken down) by soil microorganisms before the nitrogen can be absorbed by plant roots. This generally requires from 4 to 12 weeks, depending on the type of organic fertilizer applied, the soil moisture content, and soil temperature. In order for the nitrogen from organic materials to be available to the blueberry plants when needed, the organic fertilizers must be applied earlier than the more soluble chemical fertilizers. On the other hand, a major benefit of using organic fertilizers is that the slow release means nitrogen will be available to the plants for a longer period of time.

Chemical fertilizers have higher nitrogen contents than the organic sources and therefore, fewer pounds will be required to supply

the same amount of actual nitrogen to the plant. Urea and ammonium sulfate are the two dry, solid nitrogen fertilizers most often recommended for blueberries. Both fertilizers have excellent handling properties and are easy to apply to the blueberry row via broadcast applications. The current recommendations of when to use of urea vs ammonium sulfate are based on the soil pH. Urea is recommended when the soil pH is less than 5.0; ammonium sulfate when the soil pH is greater than 5.5. Since both fertilizers alter the soil pH, the proper fertilizer selection can help stabilize the soil pH in the optimum range for blueberry plants (i.e., 5.0 -5.5). Ammonium nitrate has been frequently used in the past to fertilize blueberries, but is becoming more difficult to obtain. Ammonium nitrate is now available only in bulk (not bags) in Missouri, which makes it more difficult to handle and less attractive as a blueberry fertilizer.

Nitrogen solutions are becoming more popular as a highbush blueberry fertilizer. Solutions have an advantage over dry, solid fertilizers as the nitrogen goes directly into the soil solution and is immediately available for absorption by plant roots. Liquids can be sprayed or dribbled on the soil/mulch surface or be injected into the irrigation water (fertigation). There are a few nitrogen solutions that can also be sprayed directly on the blueberry plant leaves. However, use foliar applications with caution, as some of the nitrogen formulations can damage plant leaves.

Timing nitrogen applications: Highbush blueberry plants use different amounts of nitrogen at various stages of growth and production. A good nutrient plan insures that blueberry plants are provided the proper amount of nutrients at the time the plant actually needs them. A good way to time fertilizer applications for blueberries is to correlate the application with plant growth or stage of development. Highbush blueberries have high needs for nitrogen at 1) bud break/flowering; 2) berry formation/development, and 3) setting next year’s fruit buds. Therefore, the first nitrogen

application (plus other nutrients if needed) should be made at the time of flowering, followed by 1 or 2 additional applications at 6-week intervals. This schedule coincides nicely with the time periods of highest root activity and the greatest usage of nitrogen by blueberry plants. Ammonium sulfate should not be applied after August 1 (July 20 for urea) to allow proper hardening of plants before frost.

Summary: Regardless of the nitrogen source or the method used to schedule nitrogen applications, the goal of nitrogen fertilization remains the same: provide the correct amount of nitrogen at the time when the blueberry plant needs it for growth and production. Nitrogen should be applied each year for sustained berry production. Growers can supply nitrogen by inorganic or organic sources (or both), but the bottom line is to have a sound, workable nitrogen plan in place. Even though the cost of nitrogen fertilizers has increased more than 20% since last year (and will probably increase again next year), **don't skip the "N" in 2008!**

High Tunnel Production of Raspberries and Strawberries

By Eric Hanson

Professor, Horticulture

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We have recently studied the benefits of growing raspberries and strawberries under high tunnels. High tunnels are relatively inexpensive hoop houses that can be covered with plastic except during the winter. These structures exclude rain and modify temperature, wind speed and humidity. We have used Haygrove high tunnels constructed in May, 2005 at the Southwest Michigan Research and Extension Center (SWMREC) in the southwest corner of Michigan. Plastic has been on the tunnels from spring to early November. Below is a summary of some of the information we have learned so

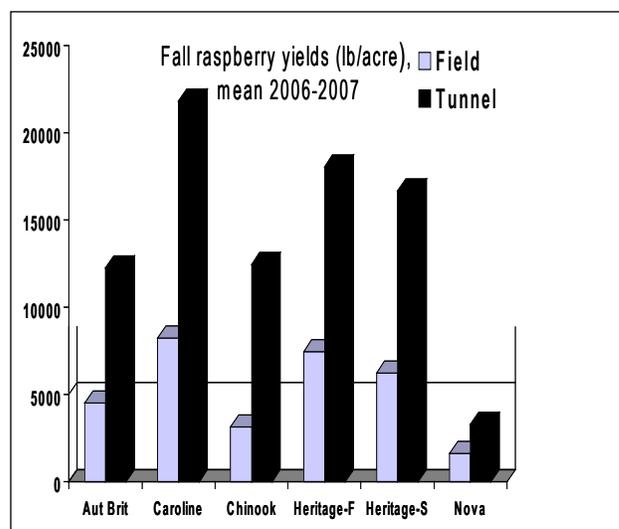
far. Detailed data can be viewed in progress report on the SWMREC website (<http://www.maes.msu.edu/swmrec/>).

Strawberries

We compared June-bearing and day-neutral strawberries in identical plantings in the field and in a tunnel. The June-bearers ('Chandler', 'Darselect', 'Honeoye', 'Jewel', 'L'Amour', 'Ovation') were planted in traditional matted rows, and harvested in June, 2006 and 2007. Day-neutral varieties (Tribute, Seascape) were planted in on plastic-covered raised beds, and harvested in fall, 2005 and June, 2006.

Day-neutral harvest dates in the field and tunnel were similar, running from the middle of August to the middle of October, 2005, and June 5 to June 27, 2006. Peak fall harvest of both varieties was mid August to late September. Yields in the field and tunnels dropped off dramatically when weather cooled in October. We see few differences in berry size or rot incidence between the field and tunnel-grown plants. On average, Tribute produced higher yields but Seascape berries were larger.

June-bearing varieties were picked for two years. Jewel was the most productive variety in the tunnel and field, and Ovation was least productive. Ovation produced the largest fruit. Across all varieties, plants in the tunnel were a little more productive than field plants, but berry size was similar. Tunnel and field harvest



started about the same time, but field plants continued producing a little later than tunnel plants. Overall, these tests indicated strawberry yields were increased somewhat by tunnels, but these benefits did not seem to justify the cost of tunnels. Tunnels can be used change harvest seasons somewhat, which may justify their expense in some instances.

Raspberries

Fall-fruiting and summer-fruiting raspberries have performed very well under tunnels, and seem to be an excellent crop for tunnel production. Fall-fruiting varieties (Autumn Britten, Chinook, Caroline, Heritage) fruit on one year-old canes in the late summer and fall. Summer-bearers (Canby, Encore, Heritage, Nova) fruit on two year-old canes in July. Fall-fruiting types can be pruned to produce in the summer and fall. The summer-fruiting variety Nova produces a small additional crop in the late fall.

Summer and fall fruiting raspberries in tunnels began fruiting a few days earlier than field plants, and continue a little later as well. Nova was the highest yielding summer-bearer in the tunnels and field, whereas Caroline has been highest producing fall-bearer. Yields have been two to three times higher in tunnels than in the field. Overall berry size has been 20-40 % higher in the tunnels than in the field. Overall, tunnel berries also have had a fraction of the rot seen in the field (although no fungicides have been applied). Fall-fruiting variety evaluation will conclude in 2007.

Rufus Isaacs (Entomology) and Annemiek Schilder (Plant Pathology) have shown that tunnels also affect levels of damage from insect pests and diseases. Japanese beetle and leafhopper abundance and damage were dramatically lower in tunnels than in the field. In contrast, we may be seeing an increase in two spotted spider mite populations in the tunnels, but this was not quantified. Tunnels also disrupt the work of honeybees, so bumblebee colonies have been brought into the tunnel to aid in pollination. Leaf spot and anthracnose infections



Raspberries in high tunnel

were prevalent on field plants, but nearly absent in the tunnel.

Overall, raspberries appear to be an excellent crop for high tunnels. Yields are double or triple those in the field and berry quality is greatly improved. More needs to be learned to optimize production practices, but raspberries clearly can pay for tunnels in relatively little time. We have also begun studies with tunnel-grown blackberries. Our first emphasis will be on primocane-fruiting (fall-bearing) blackberries.



The three raspberry quarts on top were produced in the high tunnel and the three on the bottom in the field.

Buying Local in a Big Way

*By Del Housworth
Buyer of Local Products
Balls Food Store*

Del Housworth is buying local. Buying local in a big way – for Balls Food Stores Warehouse and the 29 Hen House and Price Chopper grocery stores in the Kansas City area. “We do our best to work with local growers. In fact, we are the first to actually manage a CSA (Community Supported Agriculture) right in the store.” The CSA Hen House customer commits to buying a certain amount of food on a weekly basis and receives a large grocery bag with fresh foods, recipes, and special pricing.

Balls Food Stores is a member of the Buy Fresh, Buy Local campaign promoting local food produced by local farmers. How local is local? Del considers any grower in Kansas and Missouri as a “local” grower. “Since we are in Kansas City, that is a natural area for us. I do have one sweet corn grower in Nebraska who supplies all our sweet corn and one hydroponic tomato grower in Nebraska as well who supplies our winter tomatoes.”

Del makes it a point to visit the farms and farmers he deals with. “The advantage of buying local is that you can see how your food is produced. I like to see each grower’s operation.” Buying local also helps local economies.

“Right now I am particularly interested in working with local berry growers – strawberry, blackberry, raspberry and blackberry” (gooseberries?). If you have quality berries, a large enough quantity, and reliable production you may want to contact Del – he is buying local in a big way.

Del Housworth

Central Warehouse

Buyer of Local Products

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Peach Production Pointers: From Jared Beckner Beckner Orchards, Wellington, Mo.

*By Marilyn Odneal
Horticulture Outreach Advisor
Missouri State University*

Jared Beckner, of Beckner's Orchard in Wellington, Missouri, is a third generation orchardist who lives on the orchard with his wife Nayda, son Landon (8) and daughter Janette (3). A graduate of the University of Missouri - Columbia, he majored in History and Geography. He then worked full time out of college for Midwest Title Company on abstracts and deeds, "actually investigating the history of the geography", while also working part-time at the orchard. "We mainly produced apples in our orchards until the commercial apple market went south. I had managed some peaches and they were profitable. We had to do something to stay in business so we planted peaches." The orchard shifted production from primarily apples to peaches in 2000, and Jared decided to go to work full-time managing the orchard in 2001. "My wife says I quit my real job to play with my trees!"

"We used the traditional three leader system in our orchards until 2000. In the traditional training system with taller trees and several layers of main branches off from the three main scaffolds, we had to harvest peaches with ladders, which was very inefficient. You harvest a couple of peaches at the top, take time to move the ladder, then do the same. It took a long time." Jared knew he had to increase efficiency from the older three-scaffold system with several tiers of branches from the scaffold, so he investigated.

"I was fortunate to spend time with, and learn from, Mr. Jack Flippin of Flippin's Fruit Farm in Troy, Tennessee. I visited with him three times over two years and just picked his brain while riding through his orchards on his Gator." Jack used the delayed-vase system of training peaches, along with a multi-scaffold

approach. Delayed-vase is where you obtain a smaller tree from the nursery and cut it to a whip and head it back to 30 inches in height. You then allow all the branches to grow that want to, and you do not remove the center "bush" until the third year. By retaining the center until the third year, more horizontal (45 - 60 degree) branch angles are formed on the lower permanent. Jack had very long scaffolds in his system, with trees spaced 18 by 26 feet but still picked with ladders. "We tried very long scaffolds, but this was not ideal for our site in Missouri with strong south winds. Our southern scaffold direction of growth was blown back into the center of the tree. We needed a shorter, stubbier tree."

Jared read about the "pedestrian" system used in Milan, Italy. "All of the trees are about 6 feet tall in this system so all operations, pruning, thinning, and harvesting, can be handled from the ground - hence the word pedestrian". However, even though they also employed the "delayed-vase", the Italian system only had 3-4 scaffolds; so they had shorter height than the Flippin system, but were not multi-scaffold.

The Delayed-vase Multi-scaffold

Pedestrian System: Through his research along with some trial and error, Jared changed his system of peach production to his own hybrid of elements from Jack Flippin's practices and the Milan pedestrian system. "I call it a



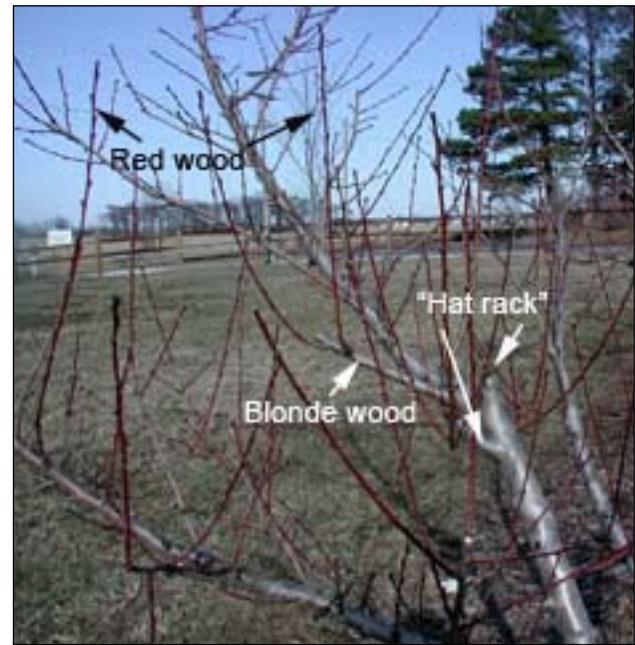
If you leave blonde wood too long, your renewal zone will get too high.

Delayed-vase Multi-scaffold Pedestrian System. I get the nice branch angles by training to the delayed-vase, but I let all the scaffolds develop as long as they are not crowding each other and usually have 5 - 6 scaffolds, even up to eight. I keep all of the trees about 7 - 8 feet tall and my tree spacing is 14 feet between trees and 22 feet between rows. I allow the trees to almost touch each other in the row and prune for just enough room for an alley between trees to make thinning and harvesting possible. All of the pruning, thinning, and harvesting is done from the ground. We sold all of our ladders, so there is no going back to the old way.” Harvest efficiency was increased tremendously in this low to the ground, pedestrian system. “In this system with 6 people picking, we can harvest 400 bushels in an 8 hour day.”

Now Jared grows 80 acres of peaches in three locations - Wellington, Dover and Mayview. He also grows 20 acres of sweet corn, all for the wholesale market.

Training: Delayed-vase training is achieved by planting a smaller tree of 3/8 – 1/2 inch caliper, pruning it to a whip and heading it back to 30 inches from ground level. “You don’t want to start with a tree that has feathers or small branches from the nursery.” You do not select the scaffold branches the first year, but you keep the tree at 30 inches which causes the branch angles on the basal scaffolds to grow more horizontal. You remove the upper portion of the tree in the third year after selecting the 4 - 6 (up to eight) permanent scaffolds to leave.

Pruning: When you are pruning in this system, keep in mind that you need to keep the one-year-old fruitful “red wood” along the length of the scaffold and you need to head back the older “blonde wood” to a stub or “hat rack” to maintain the renewal wood, your fruiting wood for the next year, close to the scaffold. You do not need to leave secondary and tertiary scaffolds, you can manage a relatively unbranched scaffold. It is always tempting to leave good fruiting wood at the tip of the blonde wood and leave the blonde wood too long. Doing this will move your fruiting



Red wood, blonde wood, and blonde wood headed back to “hat rack”

zone too high and will decrease efficiency by shading areas lower on the scaffold where the fruit needs to be. “Pruning is a thinking man’s job; you have to think of the future crop as well as the present crop, you have to think about which branches may produce undesirable shade in the canopy, and you keep in mind that the best productive “red wood” is 12 - 24 inches long and try to keep this wood in the fruiting zone, not only in the current year, but thinking about the next year.” Jared points out that pruning peaches is very different from apples. “When you are pruning apples, you make a clean cut to the branch collar when removing older wood so you do not produce water sprouts. Well with peaches, it is the opposite. You don’t want to make a clean cut because those “water sprouts” are what will produce fruit for the next year! Therefore, when you cut back the older blonde wood, you leave a stub, (hat rack), so that buds break and shoots emerge.” You want a nice horizontal, relatively unbranched scaffold with red wood and renewal “hat racks” along the upper side. Unless there is some southern sun exposure, you remove most of the wood from the underside of the scaffolds.



“You want fruiting wood close to the scaffold from the outer edge to the center of the tree.”

Conversion: If you plan to convert your traditional three scaffold system to the Delayed-vase Multi-scaffold Pedestrian System, you will probably lose some production when you prune to convert, but in the long run the yield and efficiency in your operation should improve. “When I converted the trees, there were a lot of areas on the old scaffolds with no fruiting “red wood”. I was surprised how the older wood eventually produced fruiting wood once it began to get the sunlight.”

Thinning: In this system thinning is simplified. Jared has two people thinning per row. They start together on one side of the tree and meet when they are done on the other side - proceeding down the row. “I ask that the thinning crew leave 12 inches between peaches to get the results I want - peaches thinned 6 to 8 inches apart. This is important in achieving the 2 ½ – 2 ¾ inches diameter size peaches for market”. There is basically a 35 day window for thinning peaches, from the time the fruit is dime size to pit hardening. The Beckner’s like to thin by hand because you can be more selective and remove small, and insect or hail damaged fruit. “We have used the Kentucky bumpers to knock off fruit when we had no other choice; me and one other person were careful to knock fruit off with the bumpers (long sticks with hose at end) before the hand thinning crew came through.”

Harvest : The Delayed-vase Multi-scaffold Pedestrian System is very efficient to harvest.

“I usually have 6 people picking and they each take a row and make a “lap” around the tree. We pick into 14 quart buckets with 1/2 inch foam liner in the bottom to cushion the fruit.” The buckets are attached to harnesses that are fastened over the neck so both hands can be used to pick. As buckets are filled, they are removed from the harness and set in the row and an empty bucket is available right in front of the picker who snaps the empty on to the harness. There are two people who pick up the full buckets and make sure more empties are available so the pickers can continue without interruption.

Jared trains inexperienced people to pick peaches by feel. “You squeeze the bottom tip of the peach where the suture comes together, and if it gives to pressure, you pick the peach. Once a person has learned to pick by feel and get experience, they can pick by sight.”

Once the buckets are taken from the field to the shed, they are graded and packed into 1/2 bushel (24 pound) boxes which are weighed, covered with a lid and then either put in the cooler or sometimes directly on the wholesale customer’s truck. “It is at the most only 2 - 3 days in the cooler before the peaches are picked up by the customer. That insures freshness.”

Cultivars: There are 30 cultivars of peaches grown at Beckner’s Orchard. The following timeline includes what Jared considers the best varieties: He begins picking the cling peach PF-1 around June 15 (30 days before Redhaven). Then the semi-cling Garnet Beauty or Early Redhaven, and later Redhaven around July 15. Redhaven is followed by the freestone varieties Starfire, Contender (a volume peach), and Biscoe around August 15 (30 days after Redhaven). After Biscoe, the later peaches are generally not as good, but he recommends PF-27A or Flame Prince for September 1 or a Labor Day peach.

“I would recommend Redhaven to a new commercial grower or a home grower. It is naturally more horizontal so it is a good pedestrian tree and it is a heavy setter. We even had a few peaches on Redhaven after the Easter Freeze of 2007.”

In 2007, the Beckner Orchard was to have celebrated its 50th anniversary. "But with the Easter Freeze, there was not much to celebrate. This year we plan to have our Golden Jubilee + 1!" Congratulations to the Beckner's in their 50th year + 1 and thanks to Jared for sharing his story and his unique hybrid peach management system with us.

Editor's note: Jared Beckner shared his expertise with us at the State Fruit Experiment Station in a peach pruning demonstration. This article is based on the pruning techniques he used and an interview about pruning, thinning, harvesting and cultivars.

Read's Quarterly Question **Growing in Containers**

By Andy Read
Horticulture Specialist
University of Missouri Extension

Q: I enjoy growing a variety of plants in containers and I would like more information on container gardening. Any information on types of containers, growing media and plant culture would be helpful. **Charlie Miller – Lebanon Master Gardener**

Container gardening can be a lot of fun and add a splash of color or productivity from an otherwise unusable area. There are a lot of factors to consider when plants are grown in containers but with a little care your container garden is sure to be successful.

Choosing a pot or planter will be your first consideration. There are many types of containers that work for growing plants and your specific use will determine what will work best. Porous material such as clay pots look nice but will lose water a little faster than a plastic pot. Light colored containers will stay cooler than dark ones and should be chosen for plants that will be grown throughout the summer time.

One use for dark colored pots is starting an early cool-season crop. Lettuce, spinach and broccoli grow well in pots and would benefit early in the season from the heat absorbed by a dark colored pot.

If you really want to individualize your containers you may want to consider making your own. Hypertufa containers look nice, are easy to make and can be formed in any shape or size based on your needs. To make a hypertufa container simply mix equal parts of Portland cement, sphagnum peat and perlite or vermiculite.

When water is added to this mixture it can be poured into a form like cement. The initial drying process will take about 36 hours but allow another 2-3 weeks for the container to completely cure. Be sure to drill drainage holes into the bottom of the container before using it.

Once you have decided on a container you'll need to turn your attention to a planting medium. A soilless growing medium is preferred to using soil for a variety of reasons. Growing potted plants in topsoil will inevitably lead to problems with compaction and bring in unwanted weeds and diseases.

Most any of the store bought soil mixes containing peat, vermiculite and perlite will work fine. If you choose to make your own mix you can use one part peat moss, one part vermiculite, ½ oz. dolomite lime and ¼ oz. super phosphate per gallon of mix. For containers larger than one gallon add one part pine bark (nuggets) and one part ground pine bark.

When choosing a growing medium just be sure that it is well drained and has adequate pore space.

Feeding our newly planted container plants is the next hurdle that we'll overcome. Remember that the growing medium contains no nutrients and cannot be relied on to support plant growth. To maintain healthy plants a continuous liquid feed or a slow release plant food will be necessary.

A good rule of thumb when using a liquid feed for actively growing container plants is to fertilize with ¼ the recommended rate every

other time you water. If slow release plant food is chosen it is important to note that since you'll be watering more than normal the fertilizer may not last as long as the label states. Also, don't forget to add micronutrients if the product you are using does not already contain them.

Buildup of fertilizer salts can become a problem when growing in containers. To avoid salt toxicity leach the pots with clean water on a weekly basis.

Other fertilizer sources are bone meal, blood meal and worm castings. These fertilizers are considered slow release, contain a wide range of plant nutrients and will not lead to salt buildup in your containers.

Keep an eye on the moisture level of the containers. Containers will dry out fairly quickly depending on sun exposure, container size, growing medium, plant species grown and plant size. When considering a water source for your plants be sure not to use water that is unsafe to drink or softened water.

Missourians are known for being industrious and many of us have limited space or only rocks with a thin layer of clay to garden in. If you fall into this category containers may very well be the answer to your gardening dilemma.

Editors' note: This subject was chosen from Andy's newspaper column for Read's Quarterly Question. Dr. Alan Stevens, Floriculture Specialist at K-State, mentioned that the current consumer trend is from gardening to outdoor decorating. Containers fit well with that trend.

2008 All-America Selection Winners

*By Jennifer Schutter
Horticulture Specialist
University of Missouri Extension*

Each year gardeners look forward to seeing which plants will earn the All-America Selections award for being easy to grow and beautiful garden specimens. Every year, All-America Selections tests new, unsold cultivars

in various trials and informs gardeners about the winners. The 2008 winners were announced recently with two flowers and one vegetable being selected. The purpose of AAS is "To promote new garden seed varieties with superior garden performance judges in impartial trials in North America" and to achieve this many new varieties are grown in trial gardens throughout the United States. After rigorous testing the very best are awarded the All-America Selections award. The winners include:

Osteospermum F1 'Asti White'; AAS Bedding Plant Award Winner

Genus species: *Osteospermum ecklonis*

Common names: African Daisy, Blue-eyed Daisy, Cape Daisy

Unique qualities: First white osteospermum propagated from seed. Freedom of bloom and uniform size plants

Flower size: 2 to 2.5 inches

Color(s): White with blue center

Plant height: 17-20 inches

Plant width: 17-20 inches

Garden spacing: 12 inches apart

Length of time from sowing seed to flower: 17 weeks from seed

Closest comparison(s) on market: 'Sky and Ice,' 'Passion Mix'

Pure white daisy flowers with blue centers are the main attraction for 'Asti White.' The large blooms, 2 to 2-1/2 inches across are borne on stems that gracefully wave in the wind. The thick fleshy leaves indicate its drought tolerance, which makes this a preferred annual in any area subject to dry conditions. 'Asti White' is the first white *Osteospermum*, or Cape Daisy, propagated from seed. There are several advantages. The flowers will remain open under cloudy conditions, unlike other daisy flowers originating from South Africa, which close. 'Asti White' plants will flower uniformly about 17 weeks from seed. Gardeners have the choice of growing from seed or purchasing plants depending upon their resources. 'Asti White' plants will bloom and recover from a slight frost. These plants can be placed in the spring or fall

garden, weeks earlier than other tender annuals. The uniform plants thrive in a sunny garden, reaching about 17 to 20 inches tall and wide. 'Asti White' plants adapt perfectly to growing in containers, preferably 6-inch pots or larger. Bred and produced by Goldsmith Seeds, Inc.

Viola F1 'Skippy XL Plum-Gold'; AAS Cool Season Bedding Plant Award Winner

Genus species: *Viola cornuta*

Common name: Viola

Unique qualities: Color combinations, vigorous and floriferous, flower size

Flower size: 1.5 inches

Form: Single

Color(s): Plum shades with golden center

Plant height: 6 inches

Plant width: 8 inches

Garden spacing: 8 inches

Length of time from sowing seed to flower: 10 weeks

Closest comparison(s) on market: 'Skippy Lavender/Yellow Face,' 'Panola Lavender'

Sunny gold faces charm people gazing at 'Skippy XL Plum-Gold.' The flowers are uniquely designed with plum shades surrounding the golden centers (face), which contain radiating black lines affectionately called whiskers. The blooms are small, about 1-1/2 inches, but are not to be underrated. The number of blooms produced more than makes up for the size. 'Skippy XL Plum-Gold' won the AAS Award for its ability to grow a lavish number of blooms. In the North, plants can be expected to bloom beginning with spring to the heat of summer. In the South, a fall planting may provide flowering golden faces throughout the winter. The petite plants growing 6 to 8 inches tall and wide are highly recommended for combination planters. Gardeners can rely on 'Skippy XL Plum-Gold' to provide abundant blooms whether growing in containers, window boxes, an annual or perennial garden. 'Skippy XL Plum-Gold' may be a perennial in southern regions. Seed or bedding plants will be available in garden centers this fall or spring. 'Skippy XL Plum-Gold' was bred by Kieft Seeds Holland.

Eggplant F1 'Hansel'; 2008 AAS Vegetable Award Winner

Genus species: *Solanum melongena*

Common names: Eggplant, Aubergine

Fruit size: From 3 to 10 inches in length

Fruit shape: Elongated shape

Color: Glossy dark purple fruit

Plant height: 36 inches

Plant width: 30 inches

Plant habit: Compact upright

Garden spacing: 2 feet apart

Unique qualities: Miniature plant. Clusters of tender sweet fruit with few seeds, early

Length of time from transplanting to harvest: 55 days

Closest comparison(s) on market: 'Little Fingers,' 'Orient Express'

Best described as a miniature eggplant, 'Hansel' is a smaller-sized plant with finger-sized clusters of fruit. Just because of its smaller size, don't make the mistake of thinking it produces less fruit. The strong plant, reaching less than three feet, produces clusters of three to six fruit. They mature early, about 55 days from transplanting into warm soil. This is about 10 days earlier than the comparison eggplant. If the 3-inch fruit clusters are left on the plant, they grow in size, but remain tender and non-bitter, unlike other eggplant. This trait offers gardeners flexibility in harvest such as when taking a much-needed vacation. The fruit will be waiting for you as long as it's not a three-week cruise. If you prefer to garden in containers, 'Hansel' is highly recommended for your shopping list. 'Hansel' adapts perfectly to container growing conditions. The diminutive plant fits on smaller patios or decks but provides high yields of shiny purple eggplants ready to marinate and grill. 'Hansel' will be available as seed and young bedding plants. This AAS Winner was bred by Seminis Vegetable Seed.

Learn more about All-America Selections and find a garden center where you can purchase these plants by visiting: <http://www.all-americaelections.org/>

Source: All-America Selections; <http://www.all-americaelections.org/>

“Gardening in a Bag” Offers an Alternative for Growing Bedding Plants in the Landscape

By Clydette M. Alsup

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Gardening is America’s number one leisure activity but shallow or rocky soils make it difficult for some homeowners to establish ornamental gardens. Homeowners in the Missouri Ozarks often use shovels, picks or pry bars to create garden beds, but such activity is not always possible, especially among people who are elderly or handicapped or for people whose busy lifestyles don’t allow time for intensive soil-breaking work.

Alternatives to preparing a plot of soil for a garden include containers or raised beds. Container gardening works well for many people but has several drawbacks. The potting substrate in containers often dries out quickly, requiring frequent watering; and containers may restrict plant roots which can affect plant growth and performance. Root zone temperatures can become abnormally high in containers, resulting in damage to root systems. Containers have a relatively small diameter, limiting the number and size of plants that can be grown in them. While containers come in a wide variety of shapes, sizes and materials, they can be quite expensive. The use of raised beds or berms eliminates many of the problems associated with gardening in containers, but can still be laborious and expensive to build.

Bag culture offers a third alternative to traditional gardening. Bag culture has been used extensively for greenhouse production of cut flowers and for strawberries, tomatoes and other vegetable crops. Vertical bags with pre-made holes along their length are marketed as alternatives to hanging baskets for ornamentals, and are available for growing tomatoes and other crops in greenhouses. Grow bags are

successfully used to produce transplantable woody nursery crops. Some garden centers and catalogs reportedly sell planting bags with slits that are suitable for most small vegetables and flowers; however, these planting bags may be difficult to find (we did not find the bags at any area garden centers or in print or online catalogs).

Dr. Pamela Trewatha and I searched the literature extensively and found one report on growing crops outdoors in bags, but no reports were found on research focusing on the use of bags in landscape gardening. We therefore conducted a study of whether “Gardening in a Bag” is a feasible method for growing annual bedding plants in outdoor garden situations. We found that “Gardening in a Bag” is a promising method for growing bedding plants, especially for gardeners wanting to contain growth of ornamentals to a small space.



“Gardening in Bags” bags

Our study began in 2002 when we compared the growth and appearance of 25 cultivars of bedding plants using “Gardening in a Bag” vs. “in the ground” planting methods. We grew one or more cultivars of the following plant species in the ground and in bags of generic topsoil purchased from a garden center: Purple Knight Alternanthera, dianthus, gazania, marigold, ornamental pepper, peek-a-boo plant (*Spilanthes oleracea*), petunia, salvia, verbena and vinca (*Catharanthus roseus*). Using the same methods in 2003, we narrowed the plant selection to Wave petunias, dianthus, vinca and rose moss.

“Gardening in a Bag”

Supplies Needed:

- Bags of topsoil
 - Bedding plants
 - Fertilizer
 - Mulch
1. Remove grass and other weeds from a garden area.
 2. Place bags of topsoil on the ground, and lift the bags to cut slits on the undersides for water drainage.
 3. Cut open the tops of the bags and place bedding plants into the soil, firming the soil around plants.
 4. Water in the plants, preferably with a solution containing a starter fertilizer.
 - Starter fertilizers are a small amount of fertilizer containing nitrogen and phosphorus, and perhaps other nutrients, applied to stimulate root growth and meet the nutritional demands of the plant until its root system starts growing into the soil of its new location.
 5. Mulch the top of the bags until the bag material is hidden.
 6. Sit back and enjoy your ‘instant’ garden (but be sure throughout the growing season to care for the plants properly, including proper water, fertilizer and pest control)!

Plants were placed either in ground beds or into bags of topsoil placed on top of the ground in our research plots. Long X-shaped cuts were made on the bottoms of the bags to drain excess water. Tops of bags were slit and three plants were planted to the level of their root ball in each bag. All plants were mulched with enough coarse sawdust (in 2002) or cypress bark (in 2003) to completely cover the bags of soil so they would not be visible. The plants were fertilized after planting and again in the summer with a soluble, general purpose fertilizer. We watered the plants as needed to prevent drought stress.

We measured height and spread of each plant, counted numbers of flowers per plant, and rated the visual appearance of the plants about once a month during the growing season. Factors considered when ranking the plants included compact habit, branching habit, foliage color and number of flowers.

Growth responses to the two planting methods varied by species and sometimes by cultivar within species. (See highlights of the results in the text box on page 14.)

Some of the plants were taller when grown in the ground than when grown in bags while others were shorter. Plant spread was greater for some cultivars grown in bags, but some cultivars were wider when grown in the ground. Most of the cultivars of petunias, which tend to sprawl, grew wider when planted in the ground than when planted in bags, but their height and appearance were not affected by planting method.

Visual ratings were similar for 14 of the cultivars regardless of planting method.

Some plants were considered more attractive in bags than in the ground but planting method did not affect their height or spread. The opposite was also true for a few plants—they were considered more attractive in the ground than in bags but height and spread were not affected by planting method.

In some cases, ground vs. bag culture affected growth, flower number or visual quality early or late in the growing season but not at other times during the season.



Petunia treatment 1, early July



Petunias in Bags 2

Highlights from Our “Gardening in a Bag” Experiment

Planting Method Had No Effect on Plant Growth and Appearance

Purple Knight Alternanthera
 Chilly Chili Ornamental Pepper
 Durango Red Marigold
 Petunia—Tidal Wave Silver, Wave Lavender
 Peek-a-Boo Plant
 Vinca—Big Ruby, Mediterranean Punch

Planting Method Affected Height or Spread, but not Visual Ratings

Dianthus—Amazon Neon Cherry, Corona Cherry Magic
 Petunias—Blue Wave, Clear Waterfall Mix, Easy Wave Pink, Wave Lavender, Madness Magenta, Stars and Stripes

More Attractive Planted in Bags than in the Ground

Orange Cream Gazania
 Durango Tangerine Marigold
 Margarita Scarlet Rose Moss

More Attractive in the Ground than in Bags

Marigold—Bonanza Harmony, Durango Bolero, Durango Yellow
 Petunia—Purple Wave, Old Glory
 Blue Ribbon Salvia
 Quartz Waterfall Mix Verbena
 Icy Pacifica Pink Vinca

In the cases where the bedding plant species grew better in the ground than their counterparts grown in bags, we believe the plants in the ground may have had greater access to water and nutrient resources than the plants whose root systems were confined to the bags. Soil temperature also may have affected growth of the plants. Temperatures were slightly lower in the soil than in the bags throughout the growing season, a factor that would favor plants preferring cooler growing conditions. Species that prefer cooler growing environments, such as dianthus, tended to do better planted in soil than bags.

Some of the plant species that are native to subtropical or tropical regions may not have been affected by the warmer bag temperatures, since their growth and appearance were not affected by ground vs. bag conditions.

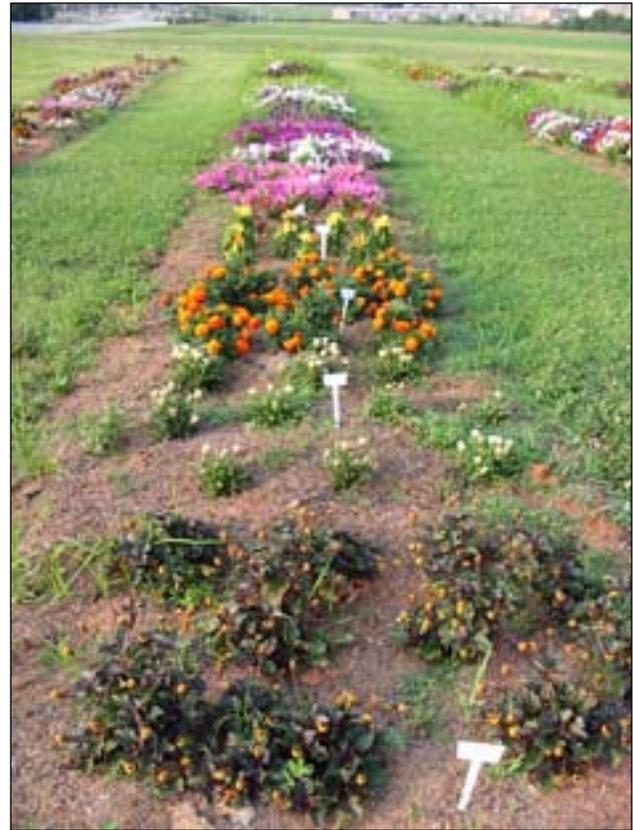
In 2002, our research plots suffered some flooding damage in July. Verbena growing in bags survived while verbena in the soil died of a root rot disease. Waterlogged soil impairs the performance of roots and allows root-rotting fungi to attack plant root systems more easily. Bags are essentially raised beds, which drain quicker than soil at ground level. Raised bed production helps control root diseases in raspberries and azaleas, and improves relations between plant roots and beneficial soil fungi (mycorrhizae).

Even though height or spread of plants grown in the ground was often different from height or spread of plants in bags, the difference was not always visually apparent. In many instances, visual appearance ratings were high on plants in bags even though the plants were smaller than the same species grown in the ground. Compact plants may be preferred in cases when gardening space is limited, to avoid overcrowding of plants, or to provide the appearance of dense flowering.

Since visual quality was generally unaffected by growth in the bag vs. the soil, the labor-saving benefits of growing bedding plants in a bag may make it a useful means for bedding plant displays in landscapes where soil quality is poor or people lack time to prepare the soil.



Planted in bags



Planted in the ground

Coming Events

Biofumigation for Strawberry Production

May 20

Missouri State University-Mountain Grove

Plant Propagation Workshop

Tuesday, June 3 4pm to 7pm

Missouri State University-Mountain Grove

with Tri-County Master Gardeners

PreRegistration requested.

\$5.00 for materials by Friday, May 30

Alternative Fruit Field Day

August TBD

Missouri State University-Mountain Grove

Ozark Rain Gardens

Tuesday, September 9

Missouri State University-Mountain Grove,

with Adam Coulter, NRCS and

Georganne Bowman, DNR

2008 Master Gardeners of Missouri State Conference

“Gardening Secrets of the Ozark Mountains”

September 26-28, 2008

Hilton Branson Convention Center Hotel

For information on these events, contact Pamela Mayer pmayer@missouristate.edu at the Missouri State Fruit Experiment Station, 9740 Red Spring Road, Mountain Grove, MO 65711-2999; telephone 417-547-7533; email StateFruitExperimentStation@missouristate.edu <http://mtngrv.missouristate.edu/>

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September 26-28, 2008 at the Hilton Branson Convention Center Hotel, Branson, MO

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Registration materials will be available online and distributed through local Master Gardener Groups early April 2008. We will be offering online registration and payment as well as registration my mail.

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