



The Berry Basket

Newsletter for Missouri Small Fruit and Vegetable Growers

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Post-Harvest Care of Blueberries

by *Ben Fuqua*

August, September, and October are not the time for blueberry growers to sit back, relax, and let Mother Nature take care of their plants. The late summer and fall months are crucial in the growth and development of highbush blueberry plants. Fruit buds for next year's crop are being formed, plants are storing nutrients and energy for next spring's growth, and bushes are beginning the complex processes of acclimation or "hardening" for the winter. Proper care of plants during this time can make a major difference in the 2003 berry crop.

1. Leaf and Soil Samples: If you have not taken soil and leaf samples, do so immediately. Leaf samples should be collected after harvest, preferably in July or early August. Post-harvest is the time when nutrient levels in plant leaves are most stable and give the most accurate results. Soil samples can be taken anytime during the year, but the results can be more easily correlated with nutrient uptake if taken at the same time as leaf samples. At present, leaf and soil samples are the best tools we have to determine the nutrient status of blueberry plants and to adjust fertilizer recommendations.

2. Irrigation: While highbush blueberry plants require rather large amounts of water during the year for vegetative growth and berry production, they also need water during late summer and early fall. Irrigation of blueberry plants will be needed through August and into

From the Editors

by *Marilyn Odneal*

We hope your summer is bountiful. It has been "feast or famine" rainfall here in Mountain Grove. Fireblight on our apples and pears has been severe. Patrick Byers even includes fireblight on blackberries in his article. We welcome a new faculty member, Dr. Daniel Waldstein, to the State Fruit Experiment Station and thank Paul Gospodarczyk as guest author of the article "Plants of Merit".

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September almost every year in Missouri. Cooler temperatures and increased rainfall during late September and October normally provide adequate soil moisture levels for plants. If rainfall is below normal during these months (as occurred in Springfield for two of the last five years), irrigation should be continued until mid-October. Do not let blueberry plants become stressed for water during the months of August, September, and October. Irrigation should end by mid-October, however, to allow plants to be “weaned” from water before cold weather arrives.

3. Fertilization: Nitrogen is the nutrient of most concern during the fall months and is applied in rather high amounts to highbush blueberry plants. Nitrogen is used by plants for protein and chlorophyll synthesis and is needed by blueberry plants throughout the year. Excessive soil nitrogen encourages late-season, succulent (tender) vegetative growth that is very susceptible to winter injury. Ideally, blueberry plants should have metabolized nitrogen by late September, allowing time for fall senescence (coloring) and proper hardening to occur.

Nitrogen from solid fertilizers such as urea, ammonium nitrate, and ammonium sulfate usually remains in the soil for 6-8 weeks after being applied. Thus, the last application of urea should be made by July 20 and the other solid nitrogen sources by August 1. Liquid nitrogen fertilizers are primarily injected through the irrigation system (fertigation) and remain in the soil for only 2-3 weeks. September 1 is the target date to end liquid nitrogen applications to blueberry plants.

4. Weed Control. Weeds seem to be a continuous challenge in blueberry plantings. Preemergent chemicals, normally applied in early spring, are usually not effective after mid-summer. Thus, growers must resort to postemergent herbicides and/or mechanical means to control weeds during late summer and fall. After harvest is an excellent time to identify and eradicate certain perennial weeds such as

Johnsongrass, bermudagrass, field bindweed, etc. Other broadleaf and annual grass weeds invading the blueberry row should be eliminated to reduce the number of weed seeds that will germinate next year. (Although some researchers feel weed growth in the fall is helpful in reducing soil nitrogen and water levels, thereby aiding in the hardening processes of plants, weed pressures the following year from the additional seeds will easily override any benefit!) Weeds growing between blueberry rows should also be controlled by regular mowing of the row middles.

5. Remove Diseased Plants: The fall months are also a good time to assess the health of the blueberry plantings by identifying diseased or damaged plants. Dead plants should be removed from the field and destroyed to reduce the potential of spreading the disease inoculum to other plants. Dead canes from plants can be removed in the fall, however it is recommended that growers wait and remove them when pruning plants next spring. Always follow good sanitation practices by disinfecting all shovels, hoes, rakes, or other tools used to rogue damaged or diseased plants.

6. Summary: Consumers continue to enjoy the “fruits” of the blueberry grower’s labor. While the actual harvest of these delicious berries lasts less than 2 months in Missouri, growing and caring for the blueberry plants remains a year-round job!

Blues News

by Earnie Bohner

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Growing Chrysanthemums in the Home Landscape

by Jennifer Barnes

The chrysanthemum is one of the most popular flowers grown in the home landscape for late summer and fall color. The name “chrysanthemum” derived from the Greek *chrysos* (gold) and *anthos* (flower), and was assigned to the plant in the mid 1700’s by the Swedish botanist,



Carol Linnae. Chrysanthemums, native to China, were introduced to the United States in the late 1700’s, but have only become popular in the United States during the past 60-70 years.

There are two main types of mums that are commonly available; the garden mum and the florist mum. Garden mums require a minimum amount of care and offer gardeners a wide range of colors and flower forms. Garden mums are

often noted as being winter hardy. The term “hardy” has been used sometimes inappropriately. Gardeners should be cautious about believing that all mums are winter hardy when stated so on the label. Florist mums are produced for use as a flowering indoor plant and are available year round in floral shops, department stores, and grocery stores. Florist’s mums are easily winter-killed. With hundreds of cultivars available, the choice of plants to grow is unlimited. To have a more interesting collection of mums, however, plant cultivars with various flower forms such as singles, anemones, decoratives, pompons, spiders, and standards.

Chrysanthemums are short-day plants, meaning that they flower in response to the shortening days of late summer. The requirement for short days to induce flowering can either occur naturally in late summer or can be controlled in a greenhouse by excluding light for 9-13 hours each day and for an extended period of 8-12 weeks depending upon the variety or mum type.

In the fall, garden centers sell potted mums that can be transplanted into the garden to fill bare areas in the flowerbed. Mums can also be planted in hanging baskets and containers. Mums should be planted about 18 inches apart in a well-drained soil and full sun. They generally need six hours of sunlight or more each day during the summer months. Plants grown in less light will become weak, spindly, and produce few flowers. Avoid locations exposed to street or porch lights because this will interfere with the flowering light response to shortened days.

Chrysanthemums require pinching. Pinching encourages branching and more compact growth. It also stimulates more flowers to be produced. Pinching is done by removing about an inch of the tip of each branch or shoot. The first pinch should be done when the plant is 6-8 inches tall and repeated when new branches become six inches tall. A third pinch may be necessary on fast-growing varieties. If plants are not properly pinched, they will become tall, leggy, and have fewer flowers. The last pinch

for early flowering varieties that bloom in mid-September, should be around the middle of June. Varieties that flower in early October should be given their last pinch on July 1. Later flowering varieties should be pinched for the last time no later than July 15.

In order to increase the chances that your mums will survive the winter, follow these tips:

- Select early-flowering cultivars that are known to be hardy for your area.
 - Avoid planting mums in areas subject to cold, dry, north winds.
 - Stop fertilizing the plants by the end of July to discourage late season growth.
 - Don't prune the plants back in the fall.
- Recent research has found that garden mums survive the winter better if the old foliage is left standing through the winter.

- Mulching is the best insurance for overwintering mums. It helps keep the soil uniformly cold after it has become frozen, thus eliminating the alternate freezing-thawing cycle and the resulting soil heaving. Apply the mulch 2-4 inches thick.

Several diseases can affect mums. Septoria Leaf Spot disease is caused by a fungus that attacks leaves and produces brown to black spots. It begins on the lower leaves and moves upward. Another disease of mums is Powdery Mildew. It is also caused by a fungus. Typically, it is more prevalent during the early to late fall when air temperatures at night are cool. The only way to control powdery mildew is to spray a fungicide every 7-14 days. Virus diseases like mosaic and aster yellows are occasionally a problem on mums.

There are several insect species that may be found on mums. These include aphids, caterpillars, leafhoppers, leafminers, plant bugs, and spider mites. Several chemicals are available to control these insects.

By monitoring your plants throughout the growing season for diseases and insects, and by providing good cultural conditions, you should be able to have mums that give you enjoyable colors throughout the fall.

Brambles 2002: A Year to Remember (or Forget)

by Patrick Byers

The year 2002 certainly is an interesting one for bramble growers. The prospects for a bumper crop were good as January began, but an unusual combination of weather, insects, and diseases have contributed in some cases to a disappointing crop.

A problem noted in May and early June was the death of floricanes, often following bloom and fruit set. Leaves would turn yellow, then brown, and the entire cane would then collapse. This situation is likely due to cold temperature injury to the floricanes, and the most likely period of injury was during the first week in March 2002. The minimum temperature for winter 2001-2002 at Mountain Grove was 2°F on March 4-5. While this temperature is well above the critical temperature for cold damage for dormant blackberries, the cold snap came after moderate temperatures in February. Bud development was noted on floricanes in advance of the cold temperatures, particularly on "Kiowa", and the canes were evidently susceptible to cold damage. In some cases, floricanes did not further develop after the cold period. In other cases canes broke bud, blossomed and set fruit before collapsing. Cultivars exhibited varying levels of cold damage. Cold injury ratings from the blackberry cultivar plantings at Mountain Grove indicate moderate to severe cold injury to Kiowa, Triple Crown, Choctaw, Loch Ness, and Arapaho. Moderate injury was noted on Chickasaw, Navaho, and Shawnee. Moderate to slight injury was noted on Illini and Apache.

Blond or reddish drupelets in otherwise black fruit were reported by several bramble growers. If only a few blond drupelets are noted, the problem is probably caused by tarnished plant bug or stink bug feeding. These insects pierce the developing drupelet with sucking mouthparts. This feeding activity evidently disrupts the cellular mechanism that develops the dark



See the "blond" drupelets on the upper part of the blackberries exposed to the sun.

pigments of a ripe drupelet, and the affected drupelet does not develop color. Few growers consider insecticide applications for stink bug or tarnished plant bug, which would need to be applied soon after blossoming and at intervals for several cover sprays. Another cause of blond or reddish areas in ripe fruit is sunburn or sunscald. Exposure of the ripening fruit to UV radiation and high temperatures can result in damage, particularly on the upper (exposed) side of the berry and if the berry is wet. Cooler temperatures will resolve this problem.

Insect problems were reported from across the state. Rednecked caneborers reached threshold levels (more than 15% of floricanes with galls) in several plantings. Remove and destroy all galled canes during dormant season pruning. Scout the planting in early May for adults, and apply labeled insecticides as needed. At present only methoxychlor is labeled for control of rednecked caneborer. Be sure to observe the 14 day preharvest interval when applying methoxychlor. In the event that methoxychlor becomes unavailable, insecticides labeled and applied for other pests may give some degree of control of rednecked caneborer.

Japanese beetle is another pest rearing its ugly head in Missouri. While present in isolated populations in the state for many years, this pest has recently begun spreading out across Missouri. Adults were collected at Mountain Grove in 2001, and were found in a bramble planting

near Branson in 2002. Adults feed on foliage and fruit, and can be quite damaging. The future of the Japanese beetle in Missouri is unclear. In other regions, the newly arrived beetles build up large populations initially, then subside to some extent. We can expect this insect to be a problem for Missouri bramble growers in the future. At present Sevin, Cythion, Malathion, and Pyrellin are labeled for Japanese beetle control on brambles. Be sure to observe all label statements, especially those regarding preharvest intervals.

An interesting disease reported this year is bramble fireblight. This disease is caused by the same species of bacteria that causes fireblight in apple and pear. Infections can take place at the cane tip and progress down the cane, resulting in the death of all or part of the cane. Fireblight may also cause the death of the tips of fruiting clusters (the symptom noted in Missouri). Usually the 4-5 youngest flowers or berries are affected, with the older berries appearing normal. The affected flowers or young fruit turn brown and then dry, remaining attached to the fruiting cluster. In severe cases, 65% or more of the crop may be lost. At present, there are no labeled chemicals to prevent fireblight. Control measures include removal of infected tissue and encouraging good air movement in the planting through proper pruning.



Blackberry affected by fireblight.

Physiological Disorders of Tomatoes

by *Gaylord Moore*

Tomatoes have some problems that are not related to insects or diseases. These often are called physiological disorders. Several types of disorders occur and space will not allow for a full analysis and a description of all situations. However, I will mention some of the problems that most commonly occur.

Blossom-End Rot

Blossom-end rot (BER) is caused by calcium deficiency and looks like a large black leathery area on the blossom end of the fruit (opposite the calyx end that is attached to the plant). The deficiency is not necessarily due to lack of calcium in the soil but rather to fluctuations in water availability to the plant. Droughty soil or damage to the roots from excessive or improper cultivation (root pruning) restricts water intake and can prevent plants from getting the calcium they need from the soil. Other factors may contribute to this problem. However, to reduce incidence of BER, take the following steps:

1. Keep the soil pH at 6.0-6.8. If a soil test indicates the need to add lime, do so!
2. Apply the required amount of fertilizer when necessary as based on soil test results and recommendations for tomatoes. Calcium nitrate is an excellent nitrogen side dress source if the need for additional calcium exists.
3. Use mulches to conserve moisture. Mulches conserve moisture and reduce moisture fluctuations.
4. Give your plants adequate water. Tomato plants need about 1.5 inches per week during fruiting.
5. If your plants develop BER, spray them with a calcium solution such as calcium nitrate at the rate of 4

pounds per 100 gallons of water or 4 level tablespoons per gallon of water. You should spray two or three times each week, beginning when the second fruit clusters are blooming.

6. Note the varieties that are most susceptible. Some tomato varieties tend to be more sensitive to conditions that cause BER.
7. Remove fruits with BER. The damaged fruit tissue could serve as entry points for disease-causing bacteria, fungi, and insects.

Blossom Drop

Blossom drop is most affected by temperature. When day temperatures exceed 85 degrees F and night temperatures exceed 72 degrees F, tomato flowers often abort. It seems that heirloom and older home garden varieties are more sensitive to high temperatures than are many of the newer hybrids that are presently available. Some varieties have been developed to offer some heat tolerance during blossom set. Sunbeam, Sunmaster, Suncrest, and Sun Leaper are a few of the select varieties for heat tolerance.

Fruit Cracks

There are two distinct types of fruit cracking: radial and concentric. Radial cracking occurs more often during rainy periods when the temperature is relatively high, especially when rains follow a long dry period. Concentric cracking begins on green fruits that are fully exposed to the sun. Maintaining a uniform water supply throughout the growing season with drip irrigation, mulches, or both, and maintaining good foliage cover will help reduce cracks.

Sunscald

Sunscald can be a problem with green-shouldered varieties or varieties that do not produce sufficient foliage to cover developing fruit. Producing poor foliage cover can be a function of the variety. Sunscald can also be induced by insufficient nitrogen levels.

These are only a few of the most common tomato fruit disorders. Growing conditions this season have been conducive to the development of one or all of these problems. Good variety selections and cultural management practices are very important to reduce physiological disorders.

Thinning Grapes

by *Susanne Howard*

Imagine what would happen if the size of your family suddenly doubled or tripled. Unless your income also doubled, it would mean that less money would be available per person, right?

This is, somewhat simplified, the reason behind thinning all large fruits, including grapes. The plants' 'income' is the amount of photosynthates, mostly carbohydrates, produced by the leaves. The fruit then would be the family members to which the 'income' is distributed and the more fruit there is, the less carbohydrates available to each individual piece of fruit or cluster of grapes.

In apples or peaches, thinning makes it possible to grow larger fruit. In grapes, the effects are more subtle. In growing both wine and table grapes, high sugar content and a suitable acid to sugar ratio at harvest are two important measures of fruit quality. Having more carbohydrates available during ripening means that more sugar is available to be stored in the berries. Since all metabolic processes in the plant are interconnected, color and aroma and flavor compounds are also affected, giving the fruit more color and better flavors for fresh consumption and for producing wines with more of the varieties' typical flavors and aromas. In cases where a plant is producing an extremely high amount of fruit, ripening can be uneven and delayed. Vines that overbear year after year will decrease in vigor, even to the point where the survival of the vine is threatened. So, what does this mean from a practical standpoint?

Looking at the shoots of your grapevines, you can see that many shoots produce two clusters of grapes, sometimes even three or four, depending on the variety. Some varieties (for example Concord and other table grapes, as well as the wine grapes Seyval blanc, Vidal blanc, Chelois, Catawba, Niagara and others) also produce very large clusters. In the case of table grapes, these clusters can weigh up to a pound. In these large clustered varieties, what seems like a small number of clusters on a vine, can equal many pounds of grapes per vine. These varieties would benefit from cluster thinning. Varieties that produce often only one cluster per shoot or that have small clusters (Norton/Cynthiana, Vignoles) do not benefit from cluster thinning.



Note that the grape shoot above has three clusters of grapes on it. On large clustered varieties, these clusters should be thinned to one or two clusters per shoot.

In order to have the most impact on quality, cluster thinning is carried out before bloom or soon after bloom and fruit set. Thinning up to veraison (where red grapes start changing their color) can still help decrease plant stress. Thinning after veraison will have no effect. Thinning before bloom (before fruit set can be evaluated) could lead to over-thinning.

From very thin, small and short shoots (less than approximately 10 inches in length), all clusters are removed. On the other end of the vigor spectrum, shoots that are excessively thick, vigorous and long can support at least two clusters, so no clusters need to be removed.

Most shoots fall somewhere in between these two scenarios and should keep one cluster. It will be left to your judgment where you draw the line between the different categories of vigor.

These ‘rules’ apply to mature and healthy vines. Vines that are still in the training stage (have not yet filled out their space on the trellis) are most often completely defruited. This makes it possible for the plant to use all its energy from carbohydrates for vegetative growth and for the rapid establishment of a root system, trunk and cordon arms. Once a vine has filled out its space but is still young, it becomes a matter of judgment again, to decide how much fruit to leave on the plant. Certainly, all weak shoots should be defruited, but not all intermediate shoots should be allowed to keep one cluster. Depending on how vigorous the plant appears, how thick the trunk is, one to two thirds of intermediate shoots could be allowed to keep one cluster. Very vigorous shoots should also be allowed to keep only one cluster. Two- to three-year old plants with established shoots that will become cordons, often produce a very high crop the following year. If this entire crop is allowed to remain on these plants, they can be severely weakened for several years afterwards.

Clusters can simply be removed by pinching them off when they are still young. Later in the season the ‘stem’ lignifies and a pruner or harvesting shears will be needed to remove the clusters.

Cluster thinning is a labor-intensive operation that is not needed for all varieties. Young or weak vines of any variety should be thinned or completely defruited to avoid further stress caused by high fruit loads, especially in dry years in non-irrigated vineyards. Furthermore, cluster thinning is not the only vineyard management decision that influences fruit quality, but used in conjunction with appropriate fertilization and canopy management, it can help improve the quality of your grapes.

New Integrated Pest Management Researcher/Advisor

We are pleased to welcome Dr. Daniel Waldstein as Assistant Professor of Integrated Pest Management in the Department of Fruit Science of SMSU-Mountain Grove.

Dr. Waldstein holds a Bachelor of Science degree in Environmental Science and Ecology from Minnesota State University and a Ph.D. in Entomology (Integrated Pest Management) from Cornell University. He was the Co-coordinator of the Michigan Apple IPM Implementation



Dr. Daniel Waldstein

Project through Michigan State University before he began working in his current position at Mountain Grove on July 1, 2002.

Integrated Pest Management, or IPM, is a multi-faceted approach to pest management that uses physical, mechanical, cultural, and biological tactics and grower education to keep pest numbers low enough to prevent unacceptable damage or circumstances. IPM utilizes regular monitoring to determine if and when treatments are needed.

Dr. Waldstein's major responsibilities are to conduct research in IPM with emphasis on the etiology and ecology of diseases and insect pests in order to develop sustainable management strategies. He will also be involved in making insect pest and disease management recommendations for growers and in operating the plant pest and disease diagnostic clinic.

Organic Websites for Small Fruit

by Suzi Teghtmeyer

Organic small fruit production is gaining popularity. The process however can be confusing as to what techniques are allowed, what is involved with organic certification, and how to legally market organic products. I have identified a few websites that can begin to answer some of these questions.

The first four sites are from Appropriate Technology Transfer for Rural Areas (ATTRA), an organization well known for its quality information in alternative agricultural practices. The sites listed here are in html, but the documents are also provided in pdf format.

Overview of Organic Fruit Production - A guide prepared by Guy K. Ames and George Kuepper
<http://www.attra.org/attra-pub/fruitover.html>
 From the abstract: "This guide provides an overview of issues relevant to commercial organic production of temperate zone fruits. Included are discussions of marketing and economics, soil fertility, weed control, and management of pests (diseases, insects, and

vertebrates). Electronic and print resources are offered for further, more detailed information." The following small fruit-specific guides refer to this document for general methods.

Organic Blueberry Production - A guide prepared by George Kuepper & Steve Diver
<http://www.attra.org/attra-pub/blueberry.html>
 Provides organic cultivation and pest control methods for three blueberry types, highbush, Southern highbush, and rabbiteye.

Organic Culture of Bramble Fruits - A guide prepared by Guy K. Ames, George L. Kuepper, & Holly Born
<http://www.attra.org/attra-pub/bramble.html>
 Provides organic cultivation and pest control methods for raspberries, blackberries, and other bramble fruits when applicable.

Strawberries: Organic and IPM Options - A guide prepared by Guy K. Ames & Holly Born
<http://www.attra.org/attra-pub/strawberry.html>
 Provides information on plasticulture and other weed, pest and diseases control methods. Greenhouse strawberry production and alternatives to methyl bromide are also addressed.

Organic Strawberry Production Systems by Marvin Pritts and Joe Kovach
<http://www.hort.cornell.edu/department/faculty/pritts/organic.htm>
 This article address the pros, cons, and feasibility of growing strawberries organically. Comparisons are made between conventional and organic systems, and a section on promising organic techniques is included.

Missouri Alternatives Center
<http://agebb.missouri.edu/mac/>
 The Missouri Alternatives Center's mission is to provide Missourians with timely information about alternative agricultural opportunities, to evaluate diverse enterprises, improve management decisions, increase economic returns, and enhance the quality of their lives. This, of course, includes organic farming methods.

Although it doesn't concentrate on horticultural crops, there are many general sites to help a grower get started organically. At the site, click on the heading, "Extension Information on Alternatives", then click the letter "O" for information on Organic Certification and Organic Farming. Both of these links will lead you to many general sites dealing with those topics.

National Organic Program

<http://www.ams.usda.gov/nop/>

Part of the Agricultural Marketing Service of the USDA, this site provides information for small and large producers understand the meaning of the term "organic" and how to produce "certified" products. It also provides links to the current national standards, use of the USDA organic seal, organic labeling requirements, and contact information.

Librarian's Note: The Paul Evans Library Fruit Science page [<http://library.smsu.edu/paulevans/frtlinks.htm>] recently underwent a format change. Small Fruits now have their own page to reduce the website's loading time. Feedback is welcome:
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Growing Fruit for Home Use - On the Web

by Marilyn Odneal

Growing Fruit for Home Use is a new web-bulletin written for home fruit gardeners. It is located at <http://mtngrv.smsu.edu/MS-18/Index.htm>. The information has been revised from our printed version by John Avery, Patrick Byers, Martin Kaps, Laszlo Kovacs and Marilyn Odneal. General considerations in growing fruit for home use in Missouri are addressed as well as specific recommendations for apples, pears, stone fruits, strawberries, grapes, blueberries and brambles. Links to the Missouri Coopera-

tive Extension Service publication "Fruit Spray Schedules for the Homeowner" as well as other selected links are included. This web bulletin is designed to have all the information for the Missouri home fruit grower in one place for easy reference.

Cultivar recommendations have been updated from the printed bulletin based on recent research findings from our cultivar trials. The revised cultivar recommendations are as listed below. If you have a printed version of the Growing Fruit for Home Use Mimeo Series MS-18, you may want to keep this update with your printed copy.



Cover photo for the web version of Growing Fruit for Home Use.

Apple: Redfree*, Pristine*, Jersymac, Lodi, Paulared, Gala, Jonathan, Ozark Gold, Empire, Golden Delicious, Red Delicious, Rome Beauty, Goldrush*, Jonafree*, Liberty*, Enterprise*, Freedom*, Arkansas Black (* indicates disease-resistant cultivar).

Pear: (European) Moonglow, Magness, Seckel, Starking Delicious (Maxine), Kieffer.

(Asian) Shinseiki, Chojuro, Shinko, Starking Hardy Giant.

Peach: Redhaven, Reliance, Glohaven, Summer Pearl, Cresthaven, Encore.

Nectarine: Harko, Hardired, Mericrest.

European (blue) plums: Earliblue, Blufre, Stanley, Damson.

Japanese (red) plums: Santa Rosa, Ozark Premier, Red Heart (a good pollinator for the first two).

Sour cherries: Montmorency, North Star.

Strawberry (Junebearing): Earliglow, Annapolis, DelMarvel, Honeoye, Redchief, Surecrop, Primetime, Seneca, Allstar, Lateglow.

Strawberry (everbearing): Ozark Beauty.

Strawberry (dayneutral): Tribute, Tristar.

Grape (American seeded): Buffalo, Concord, Delaware, Catawba, Norton/Cynthiana (wine use only).

Grape (American seedless): Mars, Reliance, Marquis (for trial).

Grape (French American Hybrid for wine): Seyval blanc, Vidal blanc, Chambourcin, Cayuga White.

Blueberry: Earliblue, Duke, Northland, Bluejay, Bluejay, Bluecrop, Berkeley, Jersey, Coville, Lateblue.

Erect Blackberry: Illini Hardy, Shawnee, Kiowa, Chickasaw, Navaho (thornless), Apache (thornless).

Semi-erect Thornless Blackberry: Black Satin, Chester, Hull, Triple Crown.

Summerbearing Red Raspberry: Latham.

Summerbearing Purple Raspberry: Royalty.

Black Raspberry: Bristol, Jewel.

Fallbearing (everbearing) Raspberry: Heritage, Caroline (for trial), Kiwigold (for trial), Anne (for trial).

Cultivar updates are based on observations in Missouri and results of completed research projects or cultivar trials at the State Fruit Experiment Station at Mountain Grove. Research data used for the revision are listed as follows:

Kaps, M. L. and M. B. Odneal. 1998. Blueberry Cultivar Evaluation on a High pH Site in

Missouri. *Fruit Varieties Journal* 52(2):91-95.

Kaps, M. L. and M. B. Odneal. 2001. Grape Cultivar Performance in the Missouri Ozark Region. *Journal American Pomological Society* 55(1):34-44.

Kaps, M. L., M. B. Odneal, and P. L. Byers. 2002 (accepted for publication). Strawberry Cultivar Evaluation in Missouri.

Editor's note: We would be happy to hear from you concerning this web bulletin. Suggestions for information that you would like to see included are welcome, as well as any other comments.

Row Middles

by John Avery

Back in the fall we addressed the issue of cover cropping a new planting site. Now, the new small fruit plantings should be planted and growing strong thanks to the abundant rains we have had this spring. Now is the time to put some thought into the cover we will put in our row middles. What are the properties of a row middle cover you are looking for? First, you want something that is a perennial and will grow in cool weather. Second you want a cover with good wear ability. Wear is the ability of a cover to survive and even grow under constant mowing, vehicular traffic, and foot traffic. It needs to stay within its boundaries, that is, it will not spread or creep into the row with the crop being grown. It should not compete with the fruit crop. Some row covers may pull moisture and nutrients to the detriment of the main crop. A low growing cover will reduce mowing time. And lastly, the cover should be able to hold the soil in place when occasional erosive heavy rains occur.

Cool season turf type grasses are the cover of choice in Missouri. They make good growth in the spring and again in the fall. They are dormant during the heat of summer, thus reducing water and nutrient needs during the growing season for the fruit crop. Most of the cool

season turf grasses spread very little if at all. There is little danger of the grasses spreading into your fruit crop rows and competing with the crop. Many of the summer turf grasses on the other hand are known for their ability to spread and cover an area with dense sod. Also, there are very few summer grasses that winter well and at the same time not overly competitive with a fruit crop to choose from.

Entophyte infected turf grasses should be selected when possible. These grasses have better survival and better wear qualities than non-infected grasses. Entophytes are fungi that live in the area between the cells of the grass leaves. They use the nutrients supplied by the grass as it transports minerals to the leaves or sugars to the roots. They generally do not hurt the grass but do make the grass hardier and more disease-resistant. The entophyte is spread through the seed of the grasses. Many of the newer lawn grasses are now infected with entophytes to give them better wear and survival qualities.

As a general rule, the use of forage grasses should be avoided. They have been selected for qualities which are not needed or should be avoided in a row middle situation. Pasture grasses are selected to produce a high tonnage of forage or hay for the livestock producer. These grasses need frequent mowing to keep row middles low for harvesters and the costumer. Some of the grasses, such as tall fescue, can handle the frequent mowing but most grasses will die out under heavy mowing. A few of the summer grasses should be avoided at all cost. Bermuda grass forms a dense mat but will spread into the planting and can suffocate young plants.

Other types of ground cover for the row middles, such as the clovers, are not generally planted in fruit crops. In most areas some clovers will come up and spread in the row middles. There is no need to try and eradicate the clovers, as they will provide some nitrogen, which will be available to the crop. They generally are low-growing and do not spread rapidly, and therefore do not compete with the

fruit crop. At the same time, I do not recommend planting the clovers, since their seeds are generally available in most soils.

Erosion can be a major problem in Missouri, especially when the crop is planted on a slope. When considering erosion control, the grasses come to mind first. But which grasses are the best? As a general rule, use the less competitive grasses in your row middles unless erosion may become a severe problem. Such grasses as bluegrass, creeping red fescue, chewing fescue, or perennial ryegrass are good choices to plant in areas of low to moderate erosion potential. Some of the turf type tall fescues are good choices for areas of high erosion potential. There are not many summer grasses to choice from. Do not use Bermuda grass as it is very competitive.

In consideration of the cover for planting middles, the grasses are really the only choice. The newer lawn grasses and particularly lawn mixes should be the first choice. As a general rule, stay away from the forage grasses as they require more mowing and may be more competitive with the fruit crop. Turf mixes with bluegrass, hard fescue, chewing fescue and/or perennial ryegrass make for a good sod. In areas with erosion potential, mixes with the turf type tall fescues will stabilize the soil much better than other mixes, but they may be more competitive. Establish cool season grasses in the fall for best results.

Plants of Merit

by *Paul Gospodarczyk*

A few weeks ago some staff members from the Missouri Fruit Experiment Station had the pleasure of visiting the Missouri Botanical Garden in Saint Louis. A new grape display was planted this spring, and we were interested in the varieties of grapes chosen and the type of trellising system used. June Hudson, Director of the Kemper Center for Home Gardening at the



Our tour group from left to right; Susanne Howard, June Hudson, Paul Gospodarczyk, and Stefanie Howard.

gardens, gave us a tour of the center. The grape display was young, but very nice with great potential. This arrangement is highly recommended to visit in the coming years as it matures and fills out. We also found another area of particular interest: The Plants of Merit.

Through years of observation, the horticulture staff at the Missouri Botanical Gardens has developed a quite extensive list of annuals, perennials, shrubs, and trees that thrive in this region. Their distinguishing characteristics are resistance to pests and diseases, growth patterns, low maintenance, and the dependability of performance. Unfortunately, these plants are not frequently used by homeowners and gardeners in their landscape. This lack of use is not a result from flaws in the plants, but for the fact that the

plants are not well known. For a truly unique garden filled with plants perfectly suited to the area, consider planting the following species:

Annuals

- Begonia 'Dragon Wings'
- False heather
- Globe amaranth 'Buddy'
- Hyacinth bean
- Sweet alyssum 'Snow Crystals'
- Melampodium 'Derby'
- Cupflower 'Mont Blanc'
- Oregano 'Kent Beauty'
- Black-eyed Susan 'Indian Summer'
- Fan flower 'Blue Wonder'
- Mexican zinnia 'Classic'



In the formal boxwood garden, Stachys 'Helen Von Stein' fills in the boxwood outline. This lambs ear cultivar does not flower extensively.

Perennials

- Bluestar
- Japanese anemone 'Honorine Jobert'
- Siberian bugloss
- Feather reed grass 'Karl Foerster'
- Bluebeard 'Longwood Blue'
- Bugbane 'White Pear'
- Epimedium 'Sulphureum'
- Oxeye 'Summer Sun'
- Lenten rose
- Siberian iris 'Caesar's Brother'
- Mazus
- Eulalia 'Adagio'
- Russian sage

- Pincushion flower 'Butterfly Blue'
- Goldenrod 'Golden Fleece'
- Lambs ears 'Helene Von Stein'
- Meadow rue

Shrubs

- Bottlebrush buckeye
- Redtwig dogwood 'Cardinal'
- Harry Lauder's walking stick 'Contorta'
- Smoketree 'Velvet Cloak'
- Forsythia 'Courtasol Gold Tide'
- Rose of Sharon 'Diana'
- Oakleaf hydrangea
- Winterberry 'Red Sprite'
- Virginia sweetspire 'Henry's Garnet'
- Weigela 'Olympiad'

Trees

- Three-flowered maple
- Shantung maple
- Apple serviceberry 'Autumn Brilliance'
- American hornbeam
- Fringetree
- Crabapple 'Mary Potter'
- Sour gum

These lists will be revised, but all of the plants of merit will continue to be listed. Check the website at <http://www.mobot.org/gardeninghelp/merit/index.shtml> for current information.



Pennisetum 'Purple Majesty' was admired by our group. A future "Plant of Merit"?

We were very pleased to bring back many great ideas that can be used in the development of the Horticulture Demonstration Area at the State Fruit Experiment Station at Mountain Grove.



An espalier apple provides a beautiful focal point in the Enabling Garden in the Kemper Center.

The Ozark Garden Landscape, developed in cooperation with the Tri-County Master Gardeners and the SMSU Fruit Experiment Station, already has incorporated some of the Plants of Merit in the herb bed and ornamental border.

Editor's note: **Paul Gospodarczyk**, our guest author, is a sophomore at Southwest Missouri State University in Springfield. As a summer intern at the Missouri State Fruit Experiment Station, he works with Kimberly Rey on research in fermentation as well as other areas of grape and wine production. His current area of research is in the production of brandy, "but more exciting - the bottles in which the brandy is housed. We grow a full sized apple inside each bottle!" Paul is pursuing a specialized horticulture degree that emphasizes viticulture, and lays the groundwork for further study in enology (the science of winemaking).

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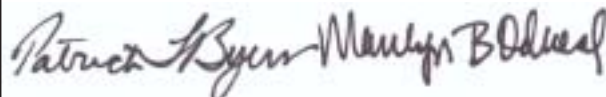
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