



# The Berry Basket

Newsletter for Missouri Small Fruit and Vegetable Growers

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## Controlling Blueberry Pests

By Ben Fuqua

Controlling birds, diseases, insects, and mammals is crucial in producing high yields of quality blueberries. While pests, in general, cause less damage in blueberries than in some other fruit crops, more problems can be expected as blueberry acreage increases and established plants get older. Although the blueberry harvest season for this year is over for most Missouri growers, pest control strategies should be reevaluated and revised as needed before the 2004 berry crop.

**Birds:** Birds are a real menace and represent one of the biggest challenges for blueberry growers in Missouri. Robins, finches, grackles, sparrows, cedar waxwings, and nearly every other species of birds apparently have developed an amazing appetite for ripe blueberries. Birds seem to know when the berries are beginning to ripen and automatically show up. Some of the smaller birds simply peck the berries, puncturing the fruit and making a mess of the fruit cluster, while other birds will remove the whole berry from the plant. Each berry damaged or destroyed by birds is one less berry for human consumption and therefore a loss of income to the grower. The extent of bird damage tends to vary from year to year and from one planting to another. Most blueberry growers in Missouri lose a minimum of 10-20% of their crop each year to birds and losses as high as 80-90% have been reported at some locations.

Birds are difficult, if not impossible, to control. Visual/auditory frightening devices, netting, and chemical repellants have all been

## From the Editors

by Marilyn Odneal

Too much rain aggravated our fireblight problem at the Fruit Experiment Station this spring and now too little is causing concern. To help us deal, Dan Waldstein covers fireblight management and Jennifer Barnes writes about watering plants for best results. We try to look on the bright side in any case, so let's congratulate Suzi Teghtmeyer on winning a grant for the Paul Evans Library of Fruit Science designed to preserve an important part of Missouri history, through rain or shine.

### Berry Basket Newsletter Staff:

Patrick Byers, Gaylord Moore and Marilyn Odneal - eds.  
Pamela Mayer - layout, photo editing, proofing, mailing list.

Teresa Inman - posting and sending.

Please direct comments to:

Marilyn Odneal, SMSU-Mountain Grove, 9740 Red Spring Road, Mountain Grove, MO 65711  
phone: 417-926-4105, fax: 417-926-7421

e-mail: [mbo774t@smsu.edu](mailto:mbo774t@smsu.edu)

Internet: <http://mtngrv.smsu.edu>

used for bird control. Visual (scarecrows, plastic owls, balloons, bright ribbons, etc.) and auditory devices (CO<sub>2</sub> cannons, firecrackers, sirens, screamers, etc.) have been used with limited success in scaring birds away from blueberry plantings. Best results occur when the devices are combined and frequently moved around in the planting.

Nets will exclude nearly 100% of the birds, thereby increasing berry yields and fruit quality (by allowing berries to fully ripen). The downside to netting is the initial cost of \$1500 to \$3000 per acre for nets, wires, and trellis support frame, although the costs are usually recouped very quickly through increased berry sales. Netting is also very labor intensive, as the nets must be put up and taken down each year.

Methyl anthranilate is a chemical bird repellent that has shown mixed results in Missouri. Some growers have reported good bird control where methyl anthranilate was used, while others had limited or no response. Applying the repellent just prior to berry ripening (before the birds taste the ripe berries) seems to be one of the keys to effective use of methyl anthranilate.

**Diseases:** Although blueberries generally have fewer disease problems than most other fruit crops, the warm, humid climate in Missouri creates an excellent environment for several fungal diseases. Fungal diseases can attack blueberry canes, roots, as well as the fruit. A few viral diseases have also been isolated from blueberry plantings in Missouri, although they do not occur as frequently as the fungal diseases.

At the present time, the most economically destructive of the fungal diseases in highbush blueberries is stem blight. Stem blight affects individual canes or stems within a blueberry plant, with one or more canes dying each year until the entire plant is dead. Canes infected with stem blight tend to lose vigor very quickly, with leaves turning from green to yellow to red. Some cultivars (varieties) of blueberries appear to have more resistance to stem blight than others, although most varieties grown in

Missouri seem to be susceptible to the disease to some degree. Two other fungal diseases of concern are stem canker and twig blight. Both infect canes of blueberry plants, but currently are less of a problem than stem blight in Missouri.

The most practical way to control the fungal diseases in blueberries is to promptly remove infected canes. Diseased canes and branches should be cut as close to the crown as possible, removed from the planting, and burned to prevent spreading the inoculum. Disinfecting pruning tools (loppers, shears, hand pruners) between cuts with a bleach or alcohol solution will also help reduce the spreading of inoculum to healthy plants. Fungicides can be applied, but they are not very effective in controlling either stem blight or stem canker.

Phytophthora root rot is a fungal disease that attacks the roots of blueberry plants. Phytophthora root rot caused extensive damage in some of the early (1970s) plantings in Missouri and still remains the most devastating disease in blueberry plantings. Blueberry plants infected with Phytophthora are most frequently found in low-lying, wet or poorly drained areas. The above ground symptoms of Phytophthora root rot include yellowing or reddening and subsequent dying of leaves throughout the plant. Below ground, the roots die and decay. Since Phytophthora root rot is primarily found in wet, poorly drained soils, the key to controlling this disease is good site selection and good drainage of soil water. Avoid planting sites in areas where water stands for even a short period of time after a rain. Sites with minor soil drainage problems can be used for blueberries, if drainage is improved by incorporating large quantities of organic matter into the soil before planting, installing a drainage (tile) system, or setting blueberry plants on ridges or berms. Irrigation should also be carefully monitored and regulated in these soils to prevent over-watering. A second key in controlling Phytophthora root rot is to buy disease-free plants. Many of the Phytophthora root rot problems in Missouri were traced to plants propagated by non-certified

nurseries. The fungicide, metalaxyl is approved for treating Phythophthora infected soils, but is much more effective when good soil drainage is also provided.

Major fungal diseases that affect the fruit of blueberries in Missouri are the fruit rots. Botrytis, Anthracnose, and Alternaria fruit rots frequently are found when berry ripening occurs during wet, warm weather conditions. While growers have no control of the weather, proper pruning to allow good penetration of sunlight and good air movement through the plant will greatly reduce fruit damage from these diseases. Fungicides may be needed to control fruit rot problems in some years.

Necrotic ringspot and red ringspot are two viral diseases that have been found in Missouri blueberry plantings. Symptoms of necrotic ringspot may include overall plant stunting, with deformed chlorotic leaves exhibiting small necrotic spots. The spots may fall out, leaving a tattered appearance to the leaf. Canes infected with red ringspot often exhibit reddish-brown spots with green centers. The spots may also appear on the upper surface of older leaves during late summer. Viruses are difficult to control, as they cannot be eliminated from the plant once the infection has occurred. The best control measure of viral diseases is prevention. Buy only plants that are certified as “virus-free”. Suspected viral infected plants should have the specific organism identified by a plant pathologist. In most cases, rouging and destroying the infected plant is the only method of control. Soil fumigation may be necessary to control the nematodes that spread the viruses.

**Insects:** Insects, in general, have not been a major problem in blueberry production in Missouri. Several insects, including cutworms, cherry and cranberry fruitworms, plum curculio, etc. undoubtedly cause some fruit damage in most all planting, but to date the damage has not been severe enough to warrant spraying with insecticides.

One insect that is rapidly becoming a major problem in many blueberry plantings is the Japanese beetle. The adult beetle is

approximately  $\frac{3}{8}$  inches long and has a metallic green body with bronze colored outer wings. The beetle emerges in late June to early July, right in the middle of the blueberry season in Missouri. The beetles damage plant leaves, leaving a skeletonized leaf that is full of holes and ineffective for photosynthesis. They also feed on ripe berries, destroying many berries within the cluster, and leaving a gooey mess on the remaining fruit. While adult beetles can be controlled with foliar applied insecticides, timing the spray applications in relation to fruit harvest is sometimes difficult.

The immatures spend approximately 10 months of the year in the soil as a white grub. White grubs feed on blueberry plant roots, although the plant may not show any outward symptoms until stressed for water. Grub damaged plants usually have low vigor and reduced yields. The big problem is that no insecticides are registered for soil application against grubs in blueberries, so little can be done. New blueberry sites, however, should be checked for white grubs before planting and appropriate control measures taken when warranted.

**Mammals:** Deer and voles (mouse-like rodents) are two mammals that cause extensive damage to blueberry plants in Missouri. Deer feed on foliage, twigs, buds, and fruit, often delaying production and reducing the yield of berries. Controlling deer is difficult and may involve a combination of barrier fences, chemical repellants, lights, noisemakers, and hunting as an integrated approach to deer management.

Voies generally feed at or below the soil surface, eating or gnawing on lower canes and roots of blueberry plants. These rodents damage blueberry plants more frequently in late fall through early spring when other food sources are limited. Voies also create tunnels in the mulch and upper layers of soil, often cutting plant roots and disturbing the root-soil contact. While trapping voies or excluding voies from surface feeding with galvanized hardware cloth cylinders installed around plants can reduce plant damage, chemical baits (rodenticides) are

more effective in controlling the vole population. Rodenticide use must be in accordance to the manufacturer's label, just like herbicides, insecticides, and other regulated chemical compounds.

**Summary:** Controlling pests in blueberries requires effort, but can make the difference between red or black ink at the end of the growing season. Blueberry plants are somewhat like people; the older they get, the more 'pesky' problems they encounter. As blueberry plants mature and get older, the number of disease and insect problems seems to increase. I'm sure growers can add other "pests" to this list, including weeds, mowing, mulching, etc., that are necessary tasks of blueberry culture. For some - growers, pickers who graze, but don't buy berries, can't seem to stay on their assigned row, or who like to play toss with ripe blueberries would also make the list. Fortunately, these kinds of pickers are small in number compared to the many great customers that really enjoy picking and eating Missouri grown blueberries!

## Evans Library Receives Grant by Suzi Teghtmeyer

Earlier this year Suzi Teghtmeyer of the Paul Evans Library of Fruit Science on the SMSU Mountain Grove Campus applied for and received a grant to digitize and preserve the glass photographic plates of the Fruit Experiment Station. The 1,292 photographic images reveal the unique heritage of Ozark fruit culture and consist of a wide range of people, subjects, and orchard practices. Most of the images were taken between 1897 and 1957, and span ten states. Subjects include private, commercial, and Station orchards and vineyards, plus ornamentals, landscapes, and individual fruit cultivars. Funds from this grant will be used to digitize this collection, *A Fruitful*



*Secretary of State Matt Blunt (left) presents check to Karen Horny (middle) and Suzi Teghtmeyer (right).*

*Heritage: Images of the Missouri State Fruit Experiment Station*, and make it accessible via the World Wide Web. It will also ensure the preservation of the collection with the manufacture of a film negative of each plate.

On July 2, 2003, Secretary of State Matt Blunt presented the check of \$69,923 to Suzi at a reception held at Meyer Library on the Springfield campus. Pamela Mayer, Patrick Byers, and Mountain Grove Campus Chancellor Jim Baker were in attendance to represent the Fruit Science Department. Also in attendance were Missouri State Librarian Sara Parker, State Senator Dan Clemens, State Representatives Mark Wright and Larry Morris, SMSU President John Keiser, Director of Library Services Karen Horny, Evans Library Clerk Elizabeth Edwards, and many others. After the speeches given by Mr. Blunt, Ms. Horny and Suzi, guests enjoyed strawberries and pastries, mingled, and perused a display of a select few of the photographic plates. The grant period extends from July 1, 2003 to June 30, 2004, at which time the images will be accessible from the Paul Evans Library and the Virtual Missouri websites. We will be sure to invite The Berry Basket readers to view the project when completed. If you have questions, please contact Suzi Teghtmeyer at [srt175f@smsu.edu](mailto:srt175f@smsu.edu).



## Summer Softwood Propagation

by *John Avery*

This article deals with propagating plants during the active growing season - while the wood or outer bark of the plant is succulent, the growing tip is generally still expanding, and leaves are present on the plant. You will need to know the time of year in which best success will be achieved with the particular species you want to propagate. Some sort of humidity controlling apparatus will be needed to keep leaves from losing water faster than the rootless cutting can take water up. Care of the newly rooted cutting is critical to your success. Also keep in mind that a number of new cultivars are plant patent protected and it is illegal to propagate them without written approval from the patent holder.

The first step after you decide to become a plant propagator, whether as a hobbyist or as a commercial operator, is to obtain a good plant propagation book. A good reference will give you basic information on propagation as well as references to propagation on many different species and cultivars of plants. The book that I like and use is "The Reference Manual of Woody Plant Propagation: From seed to tissue culture" by Michael Dirr and Charles Heuser. Another good reference book is "Plant Propagation" by Hartmann and Kester.

There are too many different species and cultivars of landscape, fruit, or houseplants to make generalizations about producing new plants from cuttings. A good reference is essential to find information on the specific plant you are dealing with, the best time in summer to take cuttings, what hormone concentration to use if hormones are needed at all, and care of the new plants after rooting takes place.

Timing of propagation is critical for a specific species or even for a cultivar within that species. For example in the maples April to mid-June is the preferred time to propagate this group. The new plants need a long time to develop the new roots and to grow before winter. New plants should not

be transplanted or otherwise disturbed after rooting, as winterkill will be high. The barberries, however, can be propagated anytime during the summer even into late August or early September and will winter well and grow the next spring. It should be noted that most species would not do well when the base of the cutting is new and very succulent. Most propagation should be held off until the base of new growth has had time to mature. The best way to determine if the basal area is mature enough is to compare the light green to yellowish immature wood at the growing tip with the darker green mature wood on the mother plant. Many species will also have some reddening or browning of the wood as it matures.

Hormone application is critical to the rooting of many species. There are some plants that will root without the need of additional hormone. Some of these species are the ground covers and shrubs. Other species will require low to medium concentrations of hormone and a few will need high concentrations for best rooting. A word of caution on hormone, "more is not always better." In the references concentrations will be given for each species. These have been discovered over time with lots of research and painstaking work. Follow the references closely because doubling the hormone might kill the new cutting instead of increasing rooting.

In reference books hormone concentrations will be referred to by two different methods. Sometimes authors list the hormone concentration by percentage of hormone in the solution but many time it is listed by parts per million (ppm) in the solution. A simple way to convert ppm to percentage is to remember that 1000ppm is 0.1% concentration. This is the concentration at which a number of plant species will root best during propagation.

Hormones can be purchased in two formulations, either a dry talc powder or a liquid mix, from nurseries or their supply companies. The powder formulations will be given as a percent hormone concentration usually with a range of 0.1% to 1%. There is not much choice or variation in the powder formulations of hormone. The liquid formulations come in a concentration of 1

to 1.5% and then are diluted to the concentration desired for the species being propagated.

The second step in propagation is obtaining an apparatus to control water loss in the cutting while rooting takes place. For the hobbyist this could be as simple as a zip lock bag with a pot of rooting media placed in it. Generally, the one-gallon zip lock bags with a small 4 to 5" pot and soil-less media will work to root one to three cuttings. Remember to wet the media very well and let drain good before placing in the bag as a dry media will desiccate the cutting or a waterlogged media will drown the cutting before it can root. For somewhat larger propagation projects a tent made of clear plastic can be used to control humidity around a number of cuttings in plant trays. A word of caution, do not place the bag or tent in a window where direct sunlight can hit it. The inside of the tent or bag will heat up very quickly and steam the new cutting to death.

For those with a major project, a mist system can be setup outside or in a greenhouse. When a mist system is set up outside there needs to be a windbreak to keep the mist on the cuttings when there is a breeze and some shade to keep the leaves from drying in the direct sun. When set up in a greenhouse air movement is not a major concern but shading is still needed during the hottest part of summer.

There are two types of misting systems available to propagators. The first is an



*John Avery happily puts grape softwood cuttings under the mist.*

automatic leaf type system. The controller is setup under the mist and has a stainless steel wire mesh leaf that controls a switch, which turns on a solenoid. When the leaf is wet it falls down, turning off the water. As the water evaporates from the leaf it raises thus opening the solenoid and misting the leaf. The leaf and its counterbalance are adjusted to your conditions so that the plant leaves are kept moist at all times. This type controller works very well but in hard water situations the controller leaf must be cleaned frequently or it will become weighted down with lime and not function properly.

The other system is a timer-controlled system. The first timer is a 24-hour timer to operate the mist system during the day light hours. The second timer is a short cycle timer connected in series with first timer to control the solenoid. The short-cycle timer cycles over a set time frame such as every six minutes and has thumbs to turn the solenoid on for a set period such as 6 seconds. This allows the operator to set a misting cycle to the best conditions for plants he is propagating. An example would be to have the mist system on from 6 am to 8 pm and to mist the cuttings for 12 seconds every 6 minutes.

Once cuttings have rooted, the new plants need to be removed from the mist system and encouraged to start new growth. The humidity around the new plants will need to be reduced over a period of time, usually three days to one week is sufficient. The period of time for acclimation is determined by the species being propagated. For example, greenwood grape plants can generally be removed from the mist immediately upon rooting. The new plants only need a couple of days shade before being place out in full sun. If the new plant was rooted in a low light environment then care should be taken to acclimate it to direct sunlight again. Once the plants begin new growth they can be planted directly in the nursery or vineyard. On the other hand the maples as stated earlier need special care their first summer or winter death will be high among the new trees. Once rooting has taken place the misting interval should be reduced over a week or two. The new trees should be shaded for a couple of weeks after removal from the mist before going outside into direct sun. The new trees should



*Inspection of newly rooted gooseberry cuttings.*

be left in their propagation pots for the first winter and protected from severe cold. The new maple trees should be encouraged to start new growth though by the addition of fertilizer to the watering schedule. Care of the newly rooted plant is just as important as the first steps in the propagating sequence.

You can see from these two examples that each species has its own requirements for successful summer propagation. The reference books should be followed closely when propagating the desired species/ cultivar. Keep in mind that not all species of plants can be propagated from softwood cuttings.

For the adventurous among us, there are species we can experiment with because there are no set procedures for propagation yet. We can discover what works!

## Fall Gardening

*By Gaylord Moore*

Vegetable gardening can be a year-round activity. Traditionally, growing vegetables is something done in the spring and early summer. However, for the avid gardener some of the best quality garden vegetables in Missouri are produced and harvested during the fall season when warm, sunny days are followed by cool, humid nights. Under these climatic conditions, plant soil metabolism is low; therefore, more of the food manufactured by the plant becomes a high-quality vegetable product.

Climatic conditions of July and August involve high soil temperature, high light intensity, and rapid drying of the soil, resulting in an increase in the problems of obtaining a good stand. Achieving a good stand of plants may require some shade over rows when seeded and supplemental watering to reduce soil temperature and aid in seed germination. Due to intense heat and soil drying it may be beneficial to apply mulch over the row following planting and watering or use materials such as screen wire strips, shade cloth or boards to cover the row. Be sure and remove covers after seedling emerges.

Soak seeds overnight for planting (except beans and peas). This will hasten germination and seedling emergence when soil drying is most critical to plant growth.

When choosing what vegetables to plant and the best planting dates for fall gardening, contact your local University of Missouri Extension Center and ask for "Vegetable Planting Calendar". The guide number is 6201. Also an excellent web site for fall gardening is <http://pearl.agcomm.okstate.edu/hort/vegetables/f6009.htm>.



## Ozark Bamboo Garden

*Marilyn Odneal*

Most of us think of bamboo as a tropical plant, the stuff that fishing poles and garden stakes are made of, panda bear food, or as an invader taking over a landscape. Lately we see more and more bamboo plants offered in nursery catalogs and bamboo products used in flooring and construction. Little did I know, however, that there is a nursery and garden right in the Ozarks that specializes in bamboo.

Ozark Bamboo Garden and Bear Creek Nursery are located on Hwy 23, three miles north of Eureka Springs, Arkansas. Members of the Tri-County Master Gardener Group, Susanne

and Jennifer Howard, and I visited the garden where Gordon Powell, the owner and operator, showed us his plant collection. There is little information on bamboo culture in the Ozarks, but Gordon has been testing and observing many different species to determine their performance in this area. Over fifty bamboo species are being maintained and observed in his trials.

Although river bamboo or cane (*Arundinaria gigantea*) is native to Missouri and the southeast, only this one species and a sub-species find their original home here. With over 1,200 species of bamboo worldwide, there is a lot to learn. Bamboo grows in tropical, sub-tropical and temperate climates and ranges in height from less than a foot to over one hundred feet tall.



*Yellow Grove bamboo (Phyllostachys aureosulcata) is an exceptionally hardy species that is often evergreen in the Ozarks. In Gordon's planting, the culms have grown to a height of twenty-five feet and have attained a diameter of one and one-half inches.*



The first thing that surprised me on this April visit was that the bamboo had retained its green leaves during the Ozark winter. Some species maintain damage or browning to varying degrees from winter injury here. In some cases the damage looks like variegation on the leaves.

In the Ozarks, bamboo shoots grow from March to May. During the next four to six weeks branches and leaves will sprout from the cane. Through the summer and fall the plant grows and matures.

Flowering in bamboo occurs only every 30 to 60 years or longer. Sometimes, but not always, the entire stand of bamboo will flower at the same time and then die. This is called “gregarious flowering”.

Bamboo is a grass with strong stems (culms) rich in protein used for building structures and implements. Bamboo shoots are harvested before they emerge from the ground. You can tell where they are by looking at impressions on the soil surface. Gordon observed that a newly emerged shoot of bamboo in his garden grew 13 inches in 24 hours.

Gordon explained that hardy bamboos are generally species that can withstand freezing temperatures. Most originated in China or Japan and there are over 200 hardy species available in the U. S. There are two types of hardy bamboo; running or clumping. Running bamboo spreads by fast growing underground stems or rhizomes. Clumping bamboos form a cluster of culms, are non-invasive, and grow more slowly. Most of the clump types are winter hardy mountain bamboos. *Fargesia* species are the principle food for the Giant Panda in its native habitat and are slow growing. They are somewhat sensitive to hot summers in Arkansas.

The range of heights available for groundcover, hedge and screen, and the tropical look of bamboo make it a very useful landscape plant. The easiest way to contain bamboo in the landscape is to mow an area around the planting. A mowing band around the planting should be as wide as the bamboo is tall. For a timber bamboo, a 20' to 30' band would work; a dwarf might only need a two to six foot band. Bamboo



*This groundcover bamboo, Sasaella masamuneana albostriata, is used effectively at the base of the stand of yellow bamboo.*

will not grow into water, so ponds and streams are barriers.

All timber bamboos can be grown in Arkansas. If you want to harvest bamboo for structures, you need to mark the age of the canes. You do not harvest any cane that is less than three years old.

After our tour of the Ozark Bamboo garden, we all happily went shopping at the nursery. Bear Creek Nursery is located very close to the garden and has a very diverse and unique assortment of plants for sale including bamboo, hardy ferns, ornamental grasses, rare plants and orchids. I purchased a dwarf bamboo recommended for dry shade. So far it is doing fine on the east side of my house.

A packet of bamboo information is available for \$2 from the address below. The garden is open by appointment.

Gordon and Mila Powell  
1059 CR 266

Eureka Springs, AR 72631

Email: [bamboos@cswnet.com](mailto:bamboos@cswnet.com)

Tel/FAX: 501-253-6801

For more information on this garden to:

[www.ozarkbamboogarden.com](http://www.ozarkbamboogarden.com).

## Watering Plants: When & How Much?

*by Jennifer Barnes*

How do I know when to water my plants? How much water do my plants need? How often should I water, and what's the best way to do it? How can I conserve water? These are questions a lot of gardeners have when it comes to watering their plants.

How much water your plants need and how frequently they need it, depends on a number of factors, the weather, soil texture, and the plants themselves. The soil's ability to absorb and retain water is closely related to its composition. Clay soils absorb water slowly and drain slowly as well, retaining water longer than other soils. Sandy soils, in contrast, absorb water quickly and drain quickly. Loam soils absorb water fairly rapidly and drain well, but not too fast. Organic amendments can be used to help clay soils absorb water faster and drain better, and to help sandy soils retain more moisture.

Plants have differing water needs. Plants native to semi-arid and arid climates have features that allow them to survive with little water and low relative humidity. They may have deep root systems, or leaves that are small, hairy, or waxy. The majority of common garden plants, however, are adapted to moist soil and high relative humidity. They usually have broad, thin leaves. Keep in mind that all young plants require more frequent watering than mature plants until their root systems become well established. Many annual flowers and vegetables require regular moisture throughout the growing season if they are to bloom well or produce a good crop.

Weather affects water needs as well. When it's hot, dry, and windy, plants use water very rapidly, and young or shallow-rooted plants sometimes cannot absorb water fast enough to keep foliage from wilting. Such plants need frequent watering to keep moisture around their roots at all times. During cool, damp weather, plants require much less water. Water needs are lower during winter as well, when the days are short and the sun is low on the horizon.

Because soil texture, plant type and age, and weather are all variable, following a fixed watering schedule year-round (or even all summer) isn't the most efficient way to meet your plants' needs. Always test your soil for moisture and look at your plants before you water. To check the soil around new transplants and in vegetable and flower beds, dig down a few inches with your fingers or a trowel; if the top 1 to 2 inches are dry, you probably need to water. Leaves can also tell you when it's time to water. Most will look dull or roll in at the edges just before they wilt.

When you do water, aim to soak the root zone of your plants. As a general guideline, the roots of lawn grasses grow about 1 foot deep; roots of small shrubs and other plants reach 1 to 2 feet deep. While the taproots of some trees and shrubs may grow more deeply into the soil, most roots tend to concentrate in the top 2 to 3 feet. Watering below the root zone only wastes water. To check how far water penetrates in your soil, water for a set amount of time (say, 30 minutes). Wait for 24 hours, then use a soil sampling tube or dig a hole to check for moisture.

Methods for applying water range from simple hand-held sprayers to hose-end sprinklers, to more complex drip systems and underground rigid-pipe systems. The method or methods appropriate for you depend on how often you need to water, the size of your garden, and how much equipment you want to buy.

Giving plants too much water, especially in clay soils, can cause as many problems as supplying too little. Roots absorb oxygen from the air found in pore spaces between soil particles. During irrigation or rainfall, water displaces the air in these spaces; then, as the water drains away, evaporates, and is taken up by roots, the pore spaces fill with air again. But if water is applied too often, the pore spaces never have a chance to drain. They remain filled with water, and air is not available to the roots. The lack of oxygen makes roots susceptible to various water-mold fungi, which in turn can lead to rot. Over-watering also compacts the soil and literally washes some nutrients beyond the reach of roots.

## Fireblight

by *Daniel Waldstein*

Fireblight is a common disease of apple and pear trees in Missouri and throughout the eastern half of the United States. The causal organism, *Erwinia amylovora* (Burrill), is a bacterial plant pathogen. The disease is named for its characteristic of turning leaves a dark brown color, giving them a fire scorched appearance. Fire blight infections typically begin in the blossom and work their way from the tip toward the trunk end of a branch.



*Fireblight infected apple blossoms.*

Bacterial ooze can be seen on infected branches and on fruit especially with severe infections. Fireblight infections typically start during bloom and progress during the spring and early summer when temperatures and precipitation are ideal for the growth of this plant pathogen. Although the optimum temperature for fireblight is 80 °F, it can survive at temperatures between 41 °F and 86 °F. By mid- to late-summer, new fireblight infections are uncommon in Missouri because of warm, dry weather. However, previous infections that began in the spring can continue to invade apple and pear tree tissues during the summer months.

A streptomycin or copper based bactericide spray during bloom is an effective means of controlling fire blight. Cankers on tree limbs infected with fireblight from the previous season should be pruned out during the dormant season.

A copper hydroxide or bordeaux treatment at green tip (when temperatures are above 45 °F) will also help to reduce the level of fireblight in orchards. Once fireblight is established in an orchard during the growing season, infected limbs should be removed and burned or buried. Pruning should be done at least 6 inches ahead (toward the trunk) of the infection, and pruning shears should be dipped inbetween cuts in a solution of 5-10% bleach (sodium hypochlorite) or ethanol solution. It is also advisable to prune fireblight infected limbs in hot (above 86 °F), dry weather when it is less likely to spread the pathogen from limb to limb or tree to tree. With fireblight, an ounce of prevention is worth a pound of cure. Early season sprays are an important means of managing this disease in apple and pear orchards.

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*Fireblight infected apple shoot with "shepherd's crook" tip.*



## Peento Peaches

by *Patrick Byers*

The peento peach, also called the Chinese flat peach, the saucer peach, and the donut peach, originated many years ago in China. The peento peach has a flattened shape, a somewhat hollow center, and a small pit. Both peaches and smooth skinned nectarines are available in the peento shape, and peento peaches may have either yellow or white flesh. Introduced into North America by way of England in the 1800s, peento peaches fell out of favor until recently. Beginning about 1986, peento peaches made a splash as they were reintroduced and promoted by specialty produce companies. Today, interest remains high in these unusual peaches.

While several different peento peach varieties are commercially available, perhaps the most adapted to Missouri is “Saturn”, which originated in the Rutgers, New Jersey, peach breeding program and was promoted by Stark Brothers Nursery. “Saturn” produces small to medium fruit that has white flesh and a mild, subacid sweet flavor. The fruit is freestone. Fruit color is an attractive red blush over a creamy ground color. While the fruit size is small,



*“Saturn” peento peach*



*Cross section of “Saturn” peach, showing the flattened shape and small pit*

growers report interest among consumers for this fruit, which is considered “snack size”. The ripe fruit typically measures 1.5 to 2 inches in diameter, with a tiny pit. Saturn usually ripens with or a few days later than Redhaven. Fruit is best harvested somewhat firm, as the flesh quickly softens if harvested at the tree ripe stage. Fruit should be harvested into small containers, such as 2 quart boxes, 2.5 lb bags, or half peck bags. Market fruit as soon as possible, and refrigerate at 32 degrees if necessary to hold fruit. Growers report receiving a premium price for Saturn, and interest is particularly great at farmers markets.

On a recent visit to the University of Arkansas Fruit Substation, Clarksville, Arkansas, I was thrilled to observe several peento peaches and nectarines. My favorite was a white-fleshed peento nectarine. The taste was indescribable – honey sweet, balanced perfectly with a hint of acidity. Hopefully these breeding selections will be judged superior enough to become varieties.

Care of donut peaches is similar to traditional peaches. Further information on commercial peach production is available from Patrick Byers, Fruit Grower Advisor, SMSU Department of Fruit Science, 9740 Red Spring Road, Mountain Grove, Missouri 65711, call (417) 926-4105, or email [plb711t@smsu.edu](mailto:plb711t@smsu.edu). Visit our website at <http://mtngrv.smsu.edu>.

## ASEV Meeting 2003 in Reno

by *Susanne Howard*

Recently I had the opportunity to attend the American Society for Enology and Viticulture's annual meeting in Reno, Nevada. Seventy-two speakers gave presentations about growing grapes and making wine during a four-day period. The first day was dedicated to the topic of warm climate viticulture, presenters on the last day addressed sustainable viticulture. Presentations about grape genetics, diseases and the effects of cultural practices on wine composition and quality were given throughout.

The most interesting session for me was the one focusing on sustainable viticulture. Growing grapes in the midwestern United States inevitably means fighting diseases, and that translates into regular applications of chemicals. For ecological as well as economical reasons it would be highly desirable to be able to reduce the number of spray application or to be able to replace the chemicals with materials that have less impact on the environment. The first presentation described sustainable viticulture. A number of different approaches had evolved historically. Some groups' principles would be applicable to numerous crops and the general environment, and some groups aimed at improving

only one aspect of the environmental impact, for instance, on water and fish habitat.

The term sustainable was used during this event to include all groups, from totally organic to more moderate IPM approaches. Unfortunately the following presentations centered often on west-coast problems such as the use of cover crops between rows of vines. The discussion of workbook based approaches like Oregon Live, however, showed that these workbooks can be adapted to use anywhere. Workbooks help with detailed record keeping, identifying areas where a management approach can be considered sustainable, and in what areas improvements need to be made.

The tradeshow covered all aspects of grape and wine production from grapevine nurseries to corks and other bottle closures and everything in between. For the vineyard staple supplies like sprayers, pruning equipment and bird netting were on show, but also a few novel approaches could be found: a system of permanently installed nozzles to spray insecticides (based on mosquito perimeter 'fences') and giant blowers used in conjunction with a system of dams to remove freezing air from low lying areas in a vineyard.

Having come to Reno from an 'earlier' time zone and possessing (or being possessed by???) an internal alarm clock meant that I was getting up way too early for the presentations. I set out to discover the area surrounding the hotel in the morning. I found a short stretch of walking or running path along the Truckee River complete with sagebrush and huge thistles. Amazingly I was by no means the only one getting up at 5 am, and I met quite a few early morning running enthusiasts. That did not surprise me, after all it gets pretty hot later in the day, but as a non-gambler I did not expect people to be playing slot machines at 5 am in the morning! My best guess is that they could not wait to lose their money!



*The Truckee River in Reno, Nevada*

## A Trip to Turkey

by Daniel Waldstein

I received an invitation in March 2003 from Dr. Pervin Basaran of Suleyman Demirel University to speak at the International Advanced Research Conference: Agricultural Activities and Food Safety Issues. The conference was held May 25-30 at Suleyman Demirel University in Isparta, Turkey. Isparta is a city approximately the same size as Springfield, Missouri, located in the west central portion of the country. The major crops produced in this area include apples (30% of total production in Turkey), cherries, peaches, table grapes, carnations, and roses. Isparta is known as “The City of Roses”. Roses can be seen throughout the landscape and numerous products are produced from roses. The area around Isparta is relatively mountainous and reminded me of central Washington state where many horticultural crops are grown. Many of the crops are irrigated with trench irrigation. Some of the trenches are above ground systems to carry water to the crops. In vineyards and orchards everything is clean plowed to reduce competition of weeds for soil moisture.

On Monday May 26<sup>th</sup> I gave my presentation entitled, “Pesticide Use, Residues, and Pheromone Mating Disruption in Michigan U.S.A. Apple Orchards” (the abstract is located at the end of this article). The official language of the conference was English. There were scientists from Turkey, Israel, and Canada. I was the only American to attend the meeting.

On May 29<sup>th</sup>, I had breakfast with one of the speakers who is doing research at the Israel Institute of Technology in Haifa and his wife who is from France. I heard his presentation on biotechnology techniques for identifying different species of bacteria and another interesting talk from a researcher at Suleyman Demirel University on the use of membrane filtration in wastewater treatment facilities. I had lunch with the President of the University, two of the Vice-Presidents, and the Dean from the



*Dr. Waldstein relaxes at Suleyman Demirel University on a balcony overlooking Isparta, Turkey*

college of Agriculture. I also had the opportunity to talk with Dean Karaca. Dr. Karaca does research on integrated pest management of apples. After lunch I was given a tour of the University’s apple nursery. They have 300,000 apple trees that will be ready for sale to apple growers by the end of the summer.

On Friday, May 30, I gave two seminars to the plant protection department. There were about forty to fifty students, faculty, and staff present. My first presentation was “Pesticide Residues, Regulation, and Toxicology in the U.S.A.” and my second was “Integrated Pest Management.” The presentations were translated into Turkish. English is spoken by only a small minority (probably less than 10%) of Turks. Many of the younger professors were educated in graduate schools in the U.S. I met Turkish professors who went to Cornell University, Iowa State University, University of Wisconsin, the Ohio State University, and the University of Florida.

On the second weekend of my stay in Turkey, I visited Istanbul. Istanbul is about the size of New York City. It is a city located in Asia and Europe with the Bosphorous, a narrow water body connecting the Black Sea and the Sea of Marmara, drawing a dividing line between the two continents. Istanbul has a very rich historical tradition. Until 1453 it was named Constantinople and was controlled by the Byzantines. The Ottoman Turks conquered the Byzantines in 1453 and changed the name and much of the culture of this city. I stayed in the old part of the city and saw the Aya Sofia, the Blue Mosque, the Palace of the Sultans, the Grand



Bazaar, and Istanbul University. In addition, I met with Albert Bicaci who is the manager of Sera Tarim. Sera Tarim is a company that specializes in the import and distribution of agricultural products, especially hybrid seeds. I provided him with solutions to control a disease problem he had while shipping tomatoes to western Europe.

My time in Turkey was well spent. I had a favorable impression overall of the Turkish people. Without exception, when people discovered I was from the U.S., they responded in a positive manner. Many of the universities in Turkey were built in the last 15 to 20 years. Suleyman Demirel University, one of the largest agricultural universities in the country (enrollment 35,000+ and growing) was built approximately 10 years ago. The population of Turkey is young, but they seem to have great potential for growth and development in the future.

#### **Pesticide Use, Residues, and Pheromone Mating Disruption in Michigan U.S.A. Apple Orchards**

A pesticide residue analysis was conducted in 1998-2001 as a part of the Michigan (U.S.A.) Apple Integrated Pest Management Implementation Project. Each year 1,200 to 2,000 apples were sampled within one week of harvest from randomly selected trees in six to ten commercial orchards. The insecticides azinphos-methyl and phosmet, and the fungicides captan and dithiocarbamates had maximum residues above 1 ppm. All other insecticides, fungicides, and acaricides had maximum residues below 1 ppm and some had zero detectable residues. Azinphos-methyl was the only pesticide with maximum residues above the U.S. Environmental Protection Agency established tolerance. Residues were consistently not correlated with the number of applications or total pesticide active ingredient. Use of selective insecticides and pheromone mating disruption reduced organophosphate use by up to 49% but did not correlate to a decrease in organophosphate residues on fruit. Choice of pesticide may be the most important factor influencing residues. Insect pest management in

orchards with mating disruption was equal to or better than the grower standard programs. Mating disruption programs were less profitable than grower standard programs for fruit destined for processing markets. However, for fresh market fruit, the average Isomate® C+ pheromone dispenser and 3M LR MEC® programs were \$54.68/ha and \$65.31/ha more profitable than the grower standard programs. Pheromone mating disruption and selective insecticides offer an environmentally and economically sustainable means for decreasing broad-spectrum insecticide use.

## **News and Events**

*Growing Grapes in Missouri* is a new publication, edited by Patrick Byers, available free-of-charge from the State Fruit Experiment Station. To request a copy, contact Pamela Mayer, [pam621t@smsu.edu](mailto:pam621t@smsu.edu), SMSU-Mountain Grove, 9740 Red Spring Road, Mountain Grove, Missouri 65711-2999.

**Tri-County Master Gardener Fall Seminars** will be held on Saturday, September 13, 2003 at the SMSU-Mountain Grove Campus from 9:00am to 12:30. John Avery of SMSU will present: **“Putting the Gardens to Bed: Fall cleanup, chores and cover crops”** and Bill Eskes of Hummert’s International in Springfield will present: **“Planting, Forcing and Storing Bulbs etc.”** The master gardeners will wrap things up with a tour of the Ozark Home Landscape if weather permits.

For more information, contact Marilyn Odneal  
SMSU-Mountain Grove  
9740 Red Spring Road  
Mountain Grove, Missouri 65711-2999  
Phone: (417) 926-4105  
E-mail: [mbo774t@smsu.edu](mailto:mbo774t@smsu.edu)

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**Your editors of The Berry Basket:**

**Gaylord Moore**, Area Horticulture Specialist,  
University Extension, Springfield, Missouri.



**Patrick Byers**, Fruit Grower Advisor, and  
**Marilyn Odneal**, Research Associate,  
Fruit Science, State Fruit Experiment Station,  
SMSU, Mountain Grove, Missouri Missouri.



Send address changes and comments to:  
Dept. of Fruit Science, 9740 Red Spring Road,  
Mtn. Grove, MO 65711 or [mbo774t@smsu.edu](mailto:mbo774t@smsu.edu).

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