

The Berry Basket

Newsletter for Missouri Small Fruit and Vegetable Growers

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New Twists to Old Practices

by Ben Fuqua

Presentations at the recent Small Fruit Conference provided new information on two important cultural practices used by blueberry growers in Missouri; mulching and nitrogen fertilization. Although both practices are somewhat costly and require considerable time and labor, they are practices that cannot be overlooked in a successful blueberry operation.

Mulches: Mulches help reduce soil temperature and improve the water/air condition around the plant roots. Mulches also help reduce the weed population around plants and provide a clean, soft surface beneath the plants for pickers' knees. When the mulches decompose, they add organic matter that improves soil structure, soil drainage, and the water-holding capacity of the soil. Dr. Robert Skirvin and Mr. Alan Otterbacher found that blueberry plants mulched with organic materials produced higher yields than non-mulched plants in a study conducted at the University of Illinois. After nine growing season, their research showed mulched blueberry plants grew better and yields were greater than non-mulched plants, even when non-mulched plants were irrigated. While sawdust, leaves, and corn stalks were superior to wood chips and straw mulches in their study, plants mulched with wood chips and straw still produced 3.5 times more fruit than the non-mulched control plants. Non-mulched plants that were trickle irrigated had nearly double the yield of non-mulched,

From the Editors

by Marilyn Odneal

We all hope you are busily preparing for a productive and profitable growing season. Ben Fuqua's article should inspire you to look for new twists in your operation no matter how many seasons you have under your belt. Thanks to Bob Hershey and "Doc" Scrivner for suggesting an article to remind everyone of the health benefits of fruits and vegetables. These are important selling points and are of great interest and concern to your customers. We appreciated your business reply responses to our mailing list update inquiries. We will be putting the *Berry Basket* on-line for those who indicated an electronic preference. As always, if you have an article or topic you would like to see in this newsletter, please direct suggestions to: Marilyn Odneal, SMSU Research Campus, 9740 Red Spring Road, Mountain Grove, MO 65711, phone: 417-926-4105, fax: 417-926-6646, e-mail: mbo774t@mail.smsu.edu.

non-irrigated plants. Blueberry plants that received both mulch and irrigation produced the highest yields (2 to 2.5 times greater than irrigated, non-mulched plants), indicating that irrigation alone did not overcome the additional benefits of mulches.

Other important observations reported in this study included: 1) blueberry plants did not begin to grow until the soil temperature was about 40°F, 2) mulched soils showed less temperature fluctuations throughout the year. Non-mulched soils remained much warmer than mulched soils throughout the summer months, but dropped to below freezing during part of the winter, and 3) blueberry plants in non-mulched soils began to grow earlier and produced a crop sooner than plants that were mulched, but also went dormant sooner in the fall.

Nitrogen Fertilization: A different approach to nitrogen fertilization was presented by Dr. C. L. Scrivner from a study conducted on his blueberry planting near Ashland, Missouri. For the past 5 years, Dr. Scrivner has been fine-tuning nitrogen applications by adjusting the fertilizer distribution schedule to coincide with the seasonal plant demand for nitrogen. Dr. Scrivner was able to reduce the total amount of nitrogen applied to this planting from 120 #/A in 1997 and 1998. This was accomplished by applying the 60#/N/A over a 21 week period, starting at bud break. The 27-9-18 fertilizer was applied via fertigation in the following proportions: 10% of the total nitrogen during the first 5 weeks (bud break), 49% during the next 6 weeks (berry formation and development); 23% during the 5 weeks of harvest, and the remaining 18% nitrogen applied in the 5 weeks immediately after harvest. Foliar tests taken in August of each year indicated an adequate level (>1.6% N) of nitrogen in the plant leaves. In this situation, Dr. Scrivner was able to reduce fertilizer cost by \$135.00 per acre.

Nitrogen has been a topic of interest to blueberry growers for many years. Most studies involving nitrogen have centered on nitrogen rates and nitrogen sources. Nitrogen is required in rather large amounts by blueberry plants, with

most recommendations in the 90 to 120 #N/A range. Inadequate levels of nitrogen results in an overall reduction of plant growth and fewer flower buds being formed resulting in lower yields. Older leaves are pale green (chlorotic) in color and tend to develop fall coloration and abscise much earlier than leaves containing adequate nitrogen.

While Dr. Scrivner's work shows that nitrogen rates in his planting could be reduced without detrimentally affecting yields or plant growth, however, other soils may not respond in the same manner. Secondly, all growers may not be able to apply fertilizer on a weekly basis as done in this study. The distribution of nitrogen can be more easily scheduled with a fertigation system, where the fertilizer is injected into the irrigation water. Although dry fertilizers (chemical or organic) can be broadcast applied on a weekly basis, it would present a real challenge. From the time that the blueberry plants set fruit to after the last harvest, it is almost impossible and certainly impractical to broadcast dry fertilizers down the plant row. Thus, applying larger amounts of dry fertilizers at specific stages of plant development is a viable alternative. Applying nitrogen fertilizers at bud break, followed by 1 or 2 additional applications at 6-week intervals has proven to be an effective way of supplying adequate nitrogen to blueberry plants. Growers using organic fertilizers, such as blood meal, cottonseed meal, or feather meal should remember to apply these fertilizers approximately 4 weeks earlier than chemical fertilizers to allow adequate time for decomposition and release of nitrogen for plant use. Regardless of the type or manner of fertilizer applied, the last application should occur early enough for the nitrogen to be metabolized by the plant prior to October 1. This will permit plants sufficient time to harden off properly and reduce the problems of winter injury.

Summary: The research results from these two studies certainly lends credence to what Missouri blueberry growers are currently doing. The multiple benefits of mulches cannot be

overstated. Sawdust, wood shavings, and wood chips are good mulch materials, but need to be replenished on a regular basis. Nitrogen is required in relatively large amounts by blueberry plants. The rates and methods of application may vary from one planting to another, depending on soil type, age of blueberry plants, and the type of available equipment. The main focus, however, remains the same: provide the proper amount of nitrogen when the plant needs it for growth and fruit production.

Blueberry Council News

by Bob Hershey

Right now we are all busy as bees in the berry patch. Just a few tips to get ready for the picking season. Prepare your mailing list. There is no better reminder to your customers than a nice card or letter from your farm. Never advertise price! Sell folks on the healthy fruit you produce. Picking blueberries is a great experience. Be creative, have family days, kids' days, etc. Another suggestion, take a walking tour of your farm. Check for safety hazards, Is everything as clean and safe as possible? Check your picking supplies, drinking water source, restroom, etc. Now look at your farm as a customer. Ask yourself if this is a place I would want to visit? If everything checks out, then put on your people smile and keep it there all season!

Mark your calendars for the following events:
May 17 - Governor's Proclamation signing "June as Blueberry Month". State Capital Building in Jefferson City at 2 pm. We need to show our support. Call (573) 547-4448 or 4502 to let us know if you can attend.

August 12 - 15 - National Blueberry Festival in South Haven, Michigan. "Everything is Blueberry" in this four-day bash in the town that considers itself the blueberry capital of the world. Contact the Chamber of Commerce (616) 637-5171.

August 17 - 22 - "Branson Salutes America's Farmers". Bring your products and show off Missouri Agriculture. Call (417) 336-2900 for Doug Raines or Rene Ray.

October 2-3 - Missouri Botanical Gardens' Best of Missouri Market. St Louis. Contact Tammy Bruckerhoff, Dept of Agriculture, (573) 751-4561.

November 10 -11 - National Blueberry Conference and Exposition, Grand Rapids, Michigan. This is the "biggie" of the blueberry shows. Contact Lynn Kelley (616) 434-6791.

December 12-14 - Missouri Governor's Conference on Agriculture, Tan-Tar-A. To volunteer to help serve or donate blueberry sauce for Sunday evening, call Ronnie Hershey at (571) 547-4448.

February 21-23, 2000. Missouri Small Fruit Conference, Springfield, MO. Contact Patrick Byers, (417) 926-4105.

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Missouri Small Fruit Growers' Association News

by *Kenneth Nenneman*

Our Missouri Small Fruit Growers' Association meeting was held during the Missouri Small Fruit Conference at the same time as the Blueberry Council Meeting. Some people who are members of both groups were obviously unable to attend both meetings. We apologize for this oversight and will coordinate our meeting schedule with the Blueberry Council for next year. To avoid this problem again, we need all the fruit growers we can get to join and participate in our association.

During the Small Fruit Growers meeting we had election of officers and I was elected as president. All office holders except President were re-elected to their previous office. We had a very interesting demonstration by Mr. Whipple from Whip-Haven Farm on packaging products for value added items to help increase sales during harvest time. It is a great way to sell jams, jellies, honey, etc. Our advertising discussion was very informative. We had a lot of very good ideas regarding radio, TV, newspaper, and publications that reach the general public. There are several of our members that receive free advertising through press release or by contacting media personnel and informing them that the harvest is in progress and might make an interesting article or TV segment highlighting the current season.

We discussed another problem all associations and clubs have in attracting new members. We welcome all fruit growers to join our association. If you know someone involved in fruit growing that may not be aware of the Missouri Small Fruit Conference or the Small Fruit Growers Association, please invite them to attend and join.

Strawberries were starting to bloom March 11th, which is a little early, but Mother Nature is in charge and we just go with the flow. Blackberries are starting to leaf out as of April

5th. We have been really busy preparing for the upcoming season which looks as it might be a good one. We wish everyone a great harvest of quality fruit. For information on the Missouri Small Fruit Growers' Association, contact:

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Reduce Tomato Disease with Proper Management

by *Gaylord Moore*

Tomatoes are, without a doubt, the number one crop planted in the vegetable garden. While tomatoes are popular and easy to grow, both hobbyist and commercial growers find it challenging to maintain productivity throughout the growing season. Pesky diseases such as Septoria leaf spot and early blight affect the lower portion of the tomato plant and shorten productivity. Without effective controls, the disease will start at the bottom of the plant and work to the top until plants completely defoliate. By now you get the picture and know exactly what I'm describing. If you have been gardening for any length of time, you have experienced the same problem with tomatoes.

As far as I know, all varieties are susceptible to the blight so variety selection offers very little resistance to the disease. There are tomato varieties resistant to other diseases such as verticillium or fusarium wilt and selection of these will help to reduce the incidence of those wilts. To get a handle on the blights, however, a gardener must use several good management techniques. Start these early in the season! Once you have the problem, it is often difficult to hold it in check.

First, begin with good soil, fertility, and plants. Use disease free plants and avoid transplants that have been stressed. A healthy

plant is a happy plant and can offer a certain amount of natural resistance.

Second, avoid ground contact with plant foliage. For best results, stake tomato plants and mulch underneath them to reduce the incidence of blight transfer from the soil to the plant. Remember, these blights are soil borne diseases and anything that inhibits the transfer of spores from the ground to the plant will help chances for control.

Third, good air circulation around and about the plant will reduce blight infections. Proper plant spacing and pruning of your tomatoes will help. Staking and mulching will help improve air circulation as well as keeping the plants off the ground.

Fourth, avoid overhead irrigation during the evening. By all means, to reduce the blight use watering methods such as trickle irrigation to avoid moisture contact on the leaves. Trickle irrigation is a more efficient method for watering plants anyway.

Fifth, a three to four year rotation with crops outside of the Solanaceae Family (potatoes, tomatoes, garden huckleberries are solanaceous) plus rotation out of fields with a history of early blight or Septoria leaf spot will reduce leaf diseases.

Chemical fungicide application is often necessary and application timing is crucial. Start with fungicide applications at 7-14 day intervals beginning 2-4 weeks after transplanting. Quandris will provide the best control of foliar disease especially when applied between initial flower formation and color break of fruit. Quandris can be applied at 7-14 day intervals with 7-day pre-harvest intervals. Chlorothalonil can be used with zero day pre-harvest interval or mancozeb with a 5-day pre-harvest interval. Spray intervals of 7 days are generally best during the early season. Intervals between sprays may be longer later in the season with less frequent rainfall.

There are no guarantees for 100% control of foliar tomato diseases. However, good management and cultural practices will increase fruit productivity and quality. Your efforts will be rewarded with every gardener's pride; tasty, home-grown tomatoes!

In Search of a Champion Elderberry

by Andy Thomas

Over the next few years, the Southwest Research Center of the University of Missouri and the State Fruit Experiment Station of Southwest Missouri State University, plan to initiate a variety of horticultural studies on our native elderberry, *Sambucus canadensis*. This summer we will begin by assembling a collection of high quality elderberry cultivars and selections and we need your help! Perhaps you know of a particular elderberry bush or thicket, whether tame or wild, that is especially fruitful, productive, and reliable, with large, sweet, juicy, and flavorful berries. Or maybe you've noticed one that stands out as more disease-free than its neighbors. If so, we would really like to know about it and possibly take cuttings to add to our collections. Please contact Andrew Thomas, (417) 466-2148 or Patrick Byers (417) 926-4105.

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Blueberries...The Health Food for the 21st Century

This article by Lynn Kelley, Manger of Promotions and Communications MBG Marketing is reprinted from The Blue Print, Winter, 1999.

With consumers more concerned than ever about health and nutrition, and blueberries stepping to the plate as an antioxidant powerhouse, it's exciting just to think about the promotional possibilities for the new millennium. The purpose of this article is to summarize some of the research findings so we're aware of what is going on in the world of blueberries and nutrition. So much has been written and published about the little blue beauties, it's hard to know where to start!

And the award goes to...First of all, did you know *Eating Well* magazine named blueberries as 1998 Fruit of the Year in their annual *State of the Plate* "The Year in Review" issue? The magazine, which is geared toward the food and health-minded population, chose blueberries for their fiber and vitamin C content, in addition to anthocyanins, the pigment that makes a blueberry blue, which may help prevent cancer and slow the effects of aging.

Antioxidants. It probably won't be long before antioxidants and anthocyanins become household terms. Antioxidants have certainly come a long way. If you don't know what antioxidants are, you've probably guessed from all the hype that, whatever they are, they're good for you.

Nutritionists say it's antioxidants that are responsible, in part, for keeping us young, healthy, and smart. To put it simply, scientists believe antioxidants help protect against free radical damage to cells in the body. Free radicals are unstable and highly reactive substances that are produced through normal metabolic processes in our body, or they can be generated through exposure to environmental factors such as cigarette smoke, pollutants, and UV light. Free radicals can damage DNA,

proteins, lipids and membranes of cells in our body. By helping to protect the body against free radicals, antioxidants may also help protect against the kind of cellular damage that can lead to cancer, heart disease, arthritis and aging.

Anthocyanins. As mentioned earlier, anthocyanins are the reason a blueberry is blue. They are responsible for the intense blue and red pigments of fruits. The work comes from two Greek words meaning "plant" and "blue". It is anthocyanins that are the major contributor to the high antioxidant activity levels discovered in blueberries.

So much that blueberries rated number one out of some 40 fruits, vegetables and juices in studies at the USDA Human Nutrition Research Center on Aging at Tufts University in Boston. Concord grape juice is next on the list with about 2/3 the antioxidant activity of blueberries, followed by strawberries, kale and spinach.

To illustrate their remarkable health potential, Dr. Ronald L. Prior, director of research for the study, explains that just a 1/2 cup of blueberries can provide as much antioxidant power as 5 servings of other nutritious fruits and vegetables - say peas, carrots, apples, squash and broccoli. "Of course" he adds, "these foods supply other essential nutrients, so variety is still key to a healthful diet." To express it another way, the same 1/2 cup of blueberries packs the antioxidant punch of about 1000 mg vitamin C, a vitamin well know for its antioxidant properties. While research is still just beginning, the results so far have been very promising. "In the meantime," says Prior, "I'm eating blueberries every day."

According to Dr. James Joseph, a member of the USDA research team, past antioxidant research focused on looking at vitamins and minerals one-by-one. The problem here is that while vitamins and minerals in blueberries do account for some of the antioxidant activity, it's the anthocyanins that pack the powerful punch. Due to sophisticated new technology for studying the antioxidant properties of food, researchers are now able to measure the

antioxidant activity of the whole food with all its many components working together. The researchers believe their method more closely mimics the way the human body utilizes food.

And the list goes on... Blueberries are also a source of ellagic acid, a possible inhibitor of chemical carcinogens that induce cancer in animals. Research in laboratory mice has proven that ellagic acid is an effective anticarcinogen that inhibits induced tumors in the liver, lungs, and esophagus.

In addition to studies of heart disease and cancer prevention, blueberries have been found to help with urinary tract infections. Research conducted at the Sackler Faculty of Medicine at Tel Aviv University, Israel, found that blueberry and cranberry juices inhibit the adherence of bacteria in the urinary tract, particularly *E. coli*, the most common bacteria causing urinary tract infections. The juices contain compounds that prevent microbes from clinging to the bladder wall, triggering these infections. Researchers suggest drinking the juice as a preventive measure, not as a treatment.

A Healthy History. While blueberries have lately received much deserved accolades for their healthy profile, they have a long history of healing. Early American settlers used blueberry juices and syrups for "old coughs", and the root was used to make a pungent, aromatic blueberry tea given to women during childbirth. In Sweden, dried blueberry soup has long been used by physicians to treat childhood diarrhea.

Improved eyesight is another possible health benefit attributed to blueberries. During the second world war, Royal Air Force bomber pilots consumed bilberries, a close relative of the North American blueberry, to improve eyesight. While science is just beginning to look into this belief, it seems like the Japanese are ahead of the game. Dried blueberries are found not only in grocery stores, but also in the pharmaceutical section of drug stores. Japanese workers who spend a lot of time in front of a computer screen, drink pure blueberry juice to help prevent eye strain and fatigue. Blueberry vitamin tablets

and blueberry powders are also sold in health food stores in Japan.

The Future Looks Bright. As you can see, there's a lot going on in the world of food nutrition and research and our beloved blues are in the forefront. While some of the research is still in its infancy, the time to begin spreading the word is now. As acreage and production increase each year, it's up to us to give consumers just another reason to love blueberries!

Information for this article was obtained from various publications of the North American Blueberry Council. (For additional health and nutrition information, visit the NABC website at www.blueberry.org.)

Classified Ads.

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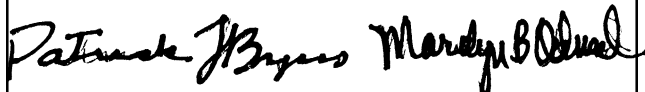
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