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GMOs: Precision Agriculture or Franken Food?

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In August 2016, President Obama signed into law the “National Bioengineered Food Disclosure Standard,” which establishes a nationwide requirement that genetically modified organisms (GMOs) be labeled as such. This act of Congress was in response to a series of actual and threatened legislation by any number of states requiring such labeling to greater or lesser degrees. California voters, for example, narrowly defeated 2012’s Proposition 37, which would have required genetically altered food to be identified as such. The states of Connecticut, Maine, and Vermont have passed strict labeling laws, but the Federal Act now nullifies state laws. But despite an avalanche of legislative activity, the broad outlines of the debate over GMOs and appropriate labeling has taken place outside the purview of the public, which remains, by and large, ignorant of much of the discussion. The purpose of this article is to touch upon GMOs, labeling, and food safety issues, and to suggest further research to those whose interest is piqued by the information presented.

A genetically modified organism has been altered with DNA from another organism, be it a bacterium, plant, virus, or animal. GMOs are sometimes referred to as “transgenic” organisms, and the results can be as mundane as prolonging a tomato’s shelf life or as fantastic as permitting silk to be spun from goat’s milk. (GMOs: Facts About Genetically Modified Food. Marc Lallanilla, January 11, 2016.) Drought resistance, herbicide resistance, increased nutrition, yield, and extended shelf life are all characteristics that have been engineered into various crops, some of which have found their way into our fields and stores. Another common use is to incorporate insect resistance into plants through the gene for toxin production found in the bacterium *Bacillus thuringiensis* (*Bt*), thereby reducing the need to spray synthetic pesticides.

In evolutionary changes to our crops, which can take place in as little as five years, changes occur to the DNA of our corn, wheat, beans and other plants in large chunks. These chunks of DNA are exchanged despite the best efforts of farmers and “breeders” to select the most desirable traits for propagation and suppress the unwanted traits. But by manipulating the genes of a particular crop, typically by inserting a desirable gene, crops can be developed, or designed, with very precise

GMOs: Precision Agriculture or Franken Food?	1
The New UC Master Gardeners of Yolo County Demonstration Garden	5
Grow a Second Season Vegetable Garden, Part II	6
Going Home Again to Appalachia	9
Gardening for Wildlife	11
Organic Labeling	13
That Beautiful Organic Produce: Does it Have to be Grown in the Ground?	15
Winter Garden Tips	18
Free Master Gardener Classes	19
Flyers	20



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traits.

“Genetic engineering, also called recombinant DNA, is the underlying technology giving rise to GMOs,” writes Alan McHughen, public sector educator, scientist and consumer advocate, University of California, Riverside, on the Genetic Literacy Project website. First developed in the 1970s, it was not until the early 1980s that human insulin, the first genetically modified product, was manufactured.

The first crops to be the subject of experimentation with gene engineering were tobacco and tomato plants in 1987. By 1992 the “Flavr Savr,” a tomato that kept firm longer, was introduced as the first agricultural GMO. In the “Flavr Savr,” one of the plant’s own genes was re-introduced into the tomato but in such a way as to suppress the production of an enzyme which dissolved pectin which led in turn to



softening. Unfortunately the effort was considered a failure because the tomato just didn’t taste very good.

Between 1992 and the present, GMOs have been grown in ever increasing numbers. The biggest use of GMOs has been in the large-scale agricultural crops of corn, soy, cotton, and sugar beets. In 2016 it is estimated that almost ninety percent of these crops consist of GMOs. Most of these crops enter the food supply as highly processed ingredients such as corn or soybean oil, cornstarch or high fructose corn syrup. There is no difference, biologically or chemically, between ingredients that are the product of genetic engineering and those developed through conventional means since the DNA of both products are destroyed in

the process of making oil.

In a very real sense the question of whether or not GMOs are safe has been answered in the affirmative, at least in the United States. Thousands of scientific studies and trillions of meals over thirty years have failed to reveal any hazards or dangers associated with the consumption of GMOs by either humans or food animals. The World Health Organization, the American Medical Association, the FDA, EPA, the US Department of Agriculture, and others all concluded the use of GMOs presented no significant health hazards.

A 2014 study conducted by Alison Van Eenennaam and Amy E. Young, geneticists with the Department of Animal Science at the University of California-Davis, reviewed twenty-nine years of livestock productivity and health data from both before and after the use of genetically engineered animal feed. According to a report of the study found on the Genetic Literacy Project website, the data reviewed represented more than 100 billion animals. They found no indication of any effect of the use of genetically modified (GM) animal feed on animal health.

A list of more than 275 organizations and scientific institutions that support the safety of GM crops was posted on the website Si Quiero Transgenicos on November 1, 2016 (<http://www.siquierotransgenicos.cl/2015/06/13/more-than-240-organizations-and-scientific-institutions-support-the-safety-of-gm-crops/>).

But to say there is an overwhelming scientific consensus that GMOs are safe is not to say it is unanimous. GMOs are characterized as “Frankenfood” with all that the Frankenstein label implies. Greenpeace, the Center for Food Safety, Institute for Responsible Technology, and the Non-GMO Project are among many organizations that actively campaign against GMOs. These organizations point out that many of those in government responsible for regulating GMOs have worked at one time or another for Monsanto or large Agri-business concerns.

There are occasional studies tending to cast doubt on the safety of GMOs but these more often than not are subject to serious questions of methodology or the absence of peer review. The tenor of much of the anti-GMO literature is hinted at by the titles to several

popular books on the subject. Among these are *Altered Genes*, *Twisted Truth: How the Venture to Genetically Engineer our Food has Subverted Science, Corrupted Government and Systematically Deceived the Public*, *Genetic Roulette*, *The Gamble of Our Lives*, and *Seeds of Deception: Exposing Industry and Government Lies About the Safety of the Genetically Engineered Foods You're Eating*. A recent film documentary, "GMO OMG," featured kids in HAZMAT suits walking through rows of corn, and was mercilessly panned by the New Yorker and Scientific American magazines.

In June of 2016, 110 former Nobel Peace Prize winners, mostly in medicine, chemistry and physics, wrote an open letter to Greenpeace requesting they change their stance on Golden Rice (a vitamin A-enhanced rice) in particular and against GMOs in general. Golden rice was created by a non-profit humanitarian group with plans to distribute the rice for free in the developing world where blindness and millions of deaths from Vitamin A deficiency could be prevented. But according to these scientists, protests by Greenpeace have interfered with its development.

Sir Richard Roberts, 1993 Nobel Prize winner in physiology, organized the letter campaign and opened the press conference with an explanation of "precision agriculture," his term for GMOs. As reported by Biology Fortified's website, Roberts said the genetic modification of crops is nothing new, pointing out that for thousands of years farmers have used various techniques to select for desirable traits. "Everything is a GMO," he is reported to have stated. Transgenic breeding is just more precise and crucial for bringing nutritious food to the developing world. Safety concerns, which were validly expressed in the 1980s when the science was in its infancy, simply haven't been substantiated. "We've had GMOs for forty years now but Greenpeace is still living in the eighties," Roberts stated.

Whether or not Greenpeace changes its position on Golden Rice, it's clear this debate is not going away; it's just coming closer to home. As recently as November 8, 2016, Election Day, voters in Sonoma County voted to outlaw GMOs in the unincorporated areas of the county. The debate, interestingly enough, was not centered on safety issues, but on fears that cross pollinated crops might interfere with the "organic" designation so prized by many local farmers. A handful of other California counties, Marin and Santa Cruz counties among them, have already banned GMOs to some degree. It remains to be seen whether such local efforts can overcome constitutional challenges but so far one county in Oregon has successfully weathered that obstacle.

There are thoughtful cautions though, about the use of GMOs. It isn't so much that the GMOs are in and of themselves harmful, but rather the way in which they are used can create unanticipated problems. Gregory Jaffe, director, biotechnology project, Center for Science in the Public Interest in Washington, D.C., wrote in the September/October 2013 issue of BostonReview.net of the need for farmers to use genetically modified crops in a manner that does not create problems. "That has not been the case for GE crops tolerant of the herbicide glyphosate," he wrote. "In 2012 farmers grew more than 150 million acres of glyphosate-tolerant corn, soybeans, cotton, and sugar beets, and some of those farmers abandoned traditional weed-control measures, such as rotating different crops or herbicides in the same field. Instead they relied on that GE seed-herbicide combination, which is cheap, easy to use, and relatively environmentally benign compared to other herbicides. Now there are glyphosate-resistant weeds on more than ten million acres of farmland, weeds that farmers must battle with more harmful herbicides."

Jaffe recites a similar situation regarding a GE corn variety with a built-in pesticide that killed corn rootworm pests. Driven on by high corn prices, farmers planted the same corn year after year without rotating crops or using different pest control methods. As a consequence, resistant pest populations developed on tens of thousands of acres of farmland requiring the use of other dangerous pesticides. Jaffe called for a strong, but not stifling, regulatory system and the responsible use of GE seeds with sustainable practices that minimize



environmental promise.

Given that this debate can be expected to continue, each of us should resolve to become as informed as possible on this important subject. Even now there are products on the market that tout that they are “Non-GMO”, the implication being that non-GMO products are better than GMO products. And the labeling law signed by President Obama in August, no doubt reflecting the difficulty such questions pose, merely contains a bar code or image that when scanned by a smart phone will lead to a website where such issues are addressed. The public should be alerted, though, that an arduous journey awaits those who would discover for themselves the truth behind GMO safety. Following is a summary of websites and sources I have found useful in preparing this article.

I hope you enjoy exploring this topic as much as I have.



Online resources exist which address this topic from both ends of the spectrum. If one were to enter the name of the organization in a search engine the site address will top the list of search results. Of these resources one of the most useful is that of the Genetic Literacy Project. “The GLP,” according to their webpage, “is part of the Science Literacy Project (SLP), a 501(c)(3) nonprofit funded by grants from independent foundations and charities.” There I found a number of informative links, including an interesting article discussing the origin of the term “Frankenfood” and placing opposition to GMOs into a historical context. It turns out Johnny Appleseed and Henry David Thoreau were both opposed to the grafting of apple trees. The French also balked at grafting their grapes onto American rootstock in the mistaken belief the wine would take on inferior traits.

(Aneela Mirchandani, “The Original Frankenfoods: Origins of Our Fear of Genetic Engineering,” February 10, 2015, Genetic Literacy Project.) There are any number of links to studies, news and discussions of GMOs and genetic engineering in general. There is also a drop down menu of “External Links” on their home page that lists many of the prominent anti-GMO websites and organizations.

Biology Fortified, Inc. is another independent educational tax-exempt non-profit dedicated to issues of biotechnology. Their motto is “Stronger Plants, Stronger Science, and Stronger Communication.” Among their pages, I recommend their project, the GENetic Engineering Risk Atlas, or GENERA, which is a searchable database of peer-reviewed research on the relative risks of genetically engineered crops that includes important details at-a-glance. Using this database it is possible to peruse descriptions, abstracts, results, even entire studies.

It is remarkable the width and breadth of science taking place in the field of genetic engineering. “Phytoremediation,” for example, is the use of plants to clean up environmental pollution. Evidently there are efforts underway to design poplar trees capable of metabolizing PCBs. There are studies on the fate of modified proteins in Roundup Ready soybeans fed to laying hens and over four hundred other case studies.

I expect that the use of the new labels mandated by the National Bioengineered Food Disclosure Standard will lead to an ever-increasing demand by the public for information on this fascinating subject, and I encourage you to explore the issues presented by the use of GMOs and to draw your own conclusions. 🍅

The New UC Master Gardeners of Yolo County Demonstration Garden at 70 Cottonwood Street, Woodland

Linda Magrum, UCCE Master Gardener, Yolo County

For many years, UC Master Gardeners of Yolo County, County Farm Extension Agents, and our office staff have dreamed of and spoke of creating a new front landscape at the offices at 70 Cottonwood Street. This year we finally did it! The old landscape of myrtle hedges has been replaced by a drought-tolerant landscape that provides color and year-round interest, containing bird, bee, and other pollinator-friendly plants. It includes a dry creek that will serve to collect rainwater from the downspouts and allow it to settle into the ground. The new landscape will serve as a teaching tool and as an example of what can be planted in our area to create a more sustainable and attractive landscape.

Master Gardener Mary Yaussy and Program Director Jennifer Baumbach organized the initial effort for this project with the approval of the Director of Capitol Corridor MCP, Morgan Doran. Master Gardeners Linda Magrum and Gail Jankowski designed the plan, from which Linda and her husband, Chuck McGinn, produced a professional landscape plan. The Master Gardener Planning Committee approved funding the project. Yolo County Maintenance Supervisor Pete Phillips removed old bushes while Morgan Doran, Jennifer Baumbach, and Mary Yaussy carried out other initial prep work. With advice from Pete Phillips, Master Gardener Arlen Feldman retrofitted the existing irrigation system to accommodate efficient new drip lines. Master Gardeners turned out for four work parties, and in the span of a month, a new landscape was in place.



Some of the new plantings

Five existing Nandina bushes along the building were retained, as they are well adapted to dry shade and provide the height that is ultimately desired there. Other plants, such as Oregon grape (*Mahonia aquifolium*), Lynn's Legacy Texas Ranger (*Leucophyllum langmaniae* 'Lynn's Legacy'), lion's tail (*Leonotis leonurus*), and 'Blue Boy' yucca (*Yucca desmetiana* 'Blue Boy') are planted closest to the building and will provide a maximum height of five to six feet. Plants of intermediate height fill the space between those closest to the building and the dry creek. They include New Zealand wind grass (*Stipa arundinacea*), tall verbena (*Verbena bonariensis*), 'Little John' bottlebrush (*Callistemon viminalis* 'Little John'), 'Cimarron' Texas Ranger (*Leucophyllum zygophyllum* 'Cimarron'), bluebeard (*Caryopteris x clandonensis*), Moonshine yarrow (*Achillea clypeolata* x *A.* 'Taygetea'), 'Autumn Joy' stonecrop (*Sedum* x 'Autumn Joy'), coral aloe (*Aloe striata*), gold coin (*Astericus maritimus*),

French lavender (*Lavandula dentate*), and red yucca (*Hesperaloe parviflora* 'Brakelights'). Lower plants border the dry creek. They include seaside daisy (*Erigeron glaucus* 'Wayne Roderick'), California fuchsia

yellow flowers during the same period. The 'Wayne Roderick' seaside daisy, foothill penstemon, yellow buckwheat, and coral aloe will bloom in early to mid spring. Late spring and summer will be most colorful with the great majority of the plants in bloom, while fall will be brightened with the flowers of California fuchsia and Argentine rain lily.

Some of the plants we included are particularly good at attracting a variety of pollinating insects. These include germander, yarrow, bluebeard, and buckwheat. Others, such as foothill penstemon, coral aloe, red yucca, lion's tail, and California fuchsia are good at attracting hummingbirds. Other birds will find the berries on Oregon grape to be a source of winter food.

We look forward to sharing our new landscape demonstration venue with other UC Master Gardeners, with the public, and with the birds, bees, and other pollinators that found their way to it as soon as the plants were in the ground. 🍅



Dry River Bed

(*Epilobium canum*), Argentine rain lily (*Zephyranthes canadida*), orange cape balsam (*Bulbine frutescens* 'Hallmark'), wall germander (*Teucrium chamaedrys* 'Nana'), yellow buckwheat (*Eriogonum umbellatum polyanthum* 'Shasta Sulphur'), and foothill penstemon (*Penstemon heterophyllus* 'Margarita BOP').

Plants were chosen so that there would be color throughout the course of the year. Some plants, such as French lavender, Lynn's Legacy Texas Ranger, and 'Brakelights' red yucca have a very long season of bloom from spring through fall. New Zealand wind grass has a rich copper color year-round. Heavenly bamboo provides red foliage in fall and winter, while Blue Boy yucca foliage tends to turn maroon in fall. The dwarf bottlebrush will be in bloom with red flowers through late winter and spring, while Oregon grape will provide

Grow a Second Season Vegetable Garden - Part II

Michael Kluk, UCCE Master Gardener, Yolo County

*"I've been a dweller on the plains,
have sighed when summer days were gone;
No more I'll sigh; for winter here
Hath gladsome gardens of his own."*

- Dorothy Wordsworth, *Peaceful Our Valley, Fair and Green*

In this second part of *Grow a Second Season Vegetable Garden*, we'll consider a number of ways to create and support a "gladsome garden" in the heart of winter. This article will look primarily at easily constructed structures that can give you an edge in the winter gardening game. While winter is not generally severe here in the Valley, it can still freeze, and temperatures in even the low 20s are not unheard-of. With these structures, you will be able to increase

the production and reliability of your winter garden. You will be able to have fresh vegetables growing in your yard through the darkest, coldest days.

Site selection to take advantage of the warmest microclimates in your garden is still important. For example, areas near a south-facing fence or wall will benefit from reflected heat and light during the day. Concentrating your winter garden in areas that are protected from cold, drying winds will also go far to increase your plants' chances of surviving the winter.

Beyond site selection, the real key to successful winter gardening is providing cover for the plants during nights that fall into and below the mid 30s. Covers over your plants will reflect back some of the sun's heat that



Winter beds are best oriented east-to-west and opened along the south side on a warm day.

is stored in the soil during the day and radiated out at night. Just as important, they will protect your plants from direct frost and wind and will maintain higher humidity, which gives your plants a fighting chance during the winter. It is not adequate to simply lay a covering material such as row cover over your plants in the winter. They will freeze to the cover. You will need to construct a "structure" that will hold the cover up off the plant.

None of the structures discussed here rely on an external heat source besides the sun. The air temperature in these structures will be about the same as the outside temperature by early morning. A greenhouse may give you the advantage of a few residual degrees. If you grow the cold-hardy varieties discussed in the last article, you should have success.

This article will not be able to discuss actual construction of the structures in any depth. But none are complicated, and they can be easily constructed by anyone with minimal building skills or friends with the same. We'll consider *cold frames*, *low tunnels*, *high tunnels* or *hoop houses*, and *green houses*. Each has advantages and disadvantages.

Cold Frames

We'll also consider various covering materials, including *polyethylene*, *row cover* (spun polypropylene), *polyvinyl alcohol*, marketed as *Dio-Betelon*, and panels made from *polycarbonate* or *glass*. As with the structures, each of these has advantages and disadvantages.

Traditional cold frames are constructed of wood with a hinged glass covering. They are generally oriented with the long side running east/west. The south edge is typically lower than the north to allow better access to the low winter sun. Used lumber is a good material for building a cold frame. Your plants won't care if their home looks a bit worn. You can even construct the sides of the "frame" out of straw bales. Fill the center part-way with soil and cover it with a clear panel. If you are going to hinge one side of the covering, the cold frame must be narrow enough to reach across. An alternative is to use 4' x 8' polycarbonate panels that are simply laid on the frame. They will



A top bar attached across the hoops of a low tunnel makes the structure much stronger.

span a typical garden bed, can be held down with boards or bricks and simply slid off when you want access. Cold frames have the disadvantage of being somewhat complicated to build and are generally not practical to cover a large number of beds.

Low Tunnels

Low tunnels can solve both of those problems. They are simply a series of hoops, stuck in the soil or fixed to a raised bed that form a tunnel down the length of the bed. The hoops can be constructed from any material that can be bent into a hoop shape. Some nurseries sell heavy gage wire in sections that is designed to be bent into hoops. However, rebar or plastic and metal conduit can all serve the purpose. Constructing hoops from these materials can result in a stronger structure. To protect against wind damage, it is useful to link the hoops together with a straight section running the length of the hoops at their apex. It should be tied or screwed to each hoop.

High Tunnels or Hoop Houses

A high tunnel or hoop house is a bigger version of a low tunnel that spans the width of several garden beds or more. Given its greater size, the construction needs to be more careful and beefier. But the principal is the same: using the inherent strength in a curved roof shape to support a cover that will confine heat and moisture at night. Commercially, hoop houses often use a double wall of plastic sheeting with air blown between them for insulation but that is more elaborate than most backyard gardeners need to be. The end walls of the “tunnel” are typically constructed of two by fours. A door for access and windows for venting are added. It is also helpful to not attach the cover permanently to the lower three to four feet of one side so that it can be rolled up on a hot day.

Green Houses

Prefabricated greenhouses can be purchased at most garden supply stores. In addition, automatic window openers, fans, and other accessories make greenhouses very adaptable to various climates and seasons. Greenhouses can also be “custom” designed and built out of new or used materials. Greenhouses are typically more complicated to construct than hoop houses but can be a more permanent structure. A very serviceable greenhouse can be made from a metal carport structure, often available used, that is then covered with polyethylene plastic. Plants in a winter greenhouse should be planted in the soil where they will be much warmer than if planted in pots on benches. You can also put barrels of water in a greenhouse or hoop house as an added reservoir of daytime heat that will radiate out at night, moderating the inside temperature. The amount of water required is substantial. The common recommendation is for three gallons of water for every square foot of surface area of the walls and roof for winter growing. Any significant amount will help, however. Even without water storage, the temperature will drop more slowly through the night than in a smaller enclosure.



Polyethylene must be opened to vent the bed on a sunny day.

Coverings

The choice of covering material will be dictated by a number of factors, cost and practicality being chief among them. Whatever covering material you choose, you will need to attach it securely to the frame and hold it solidly at ground level so that wind cannot get underneath. There are special clips available from garden supply stores that are made to attach the flexible covers discussed below to plastic or metal conduit. Large binder clips can also be used and are generally quicker to remove and reattach.

Glass can be expensive, although used windows to cover a cold frame are generally cheap or free. Polycarbonate panels are somewhat pricey but will last many years, and as stated above, can cover an almost 4' x 8' bed.



A mixed bed of carrots, parsnips, and lettuce

Polyethylene plastic is the traditional cover for low tunnels and hoop houses. If you use this, purchase UV-resistant greenhouse plastic, not the construction version, that is at least six millimeters thick. Sunlight will degrade more slowly and should last six years or longer if you protect it from the sun when not in use during the summer. You can also get plastic that has an additive to increase its ability to reflect heat. Polyethylene is tough. The big disadvantage of the rigid cold frame covers or polyethylene is that they do not vent to keep heat from building up during sunny days, which can cook your vegetables prematurely. For tunnels, you will need to be able to roll up at least one side. You will need to vent on any sunny day warmer than about 45F, which is not practical for people who work outside the home. There are automatic window openers available for cold frames and greenhouses. Although that adds expense, it makes them practical for people not able to open and close them during the day.

The need to vent a tunnel is solved by using row cover, made from polypropylene or polyester, or a product with the brand name of Dio-Betalon (formerly Tuffbell) made from polyvinyl alcohol. Both are porous enough to allow built-up heat to escape. The rather elegant answer to the obvious question- "How does it hold heat in at night?"- is that on a freezing night, frost will form on the surface closing off the holes. Row cover comes in multiple thicknesses. The version that blocks out 30% of the light seems to be a good compromise between protection and light availability. It lets in enough light for winter vegetables to do fine during our winters that generally feature quite a lot of sun yet it offers meaningful protection. One disadvantage of row cover is that because it is opaque, it is easy to "forget" to observe your vegetables often enough-- out of sight out of mind. Dip-Betalon is much more transparent and thus lets in more light. The primary disadvantage of Dio-Betalon is cost. A piece large enough to cover two 4' x 8' beds is about \$100 but it will last much longer than any of the other materials.

Whatever structure and cover combination you choose, the added protection will allow you to reliably grow cold-tolerant vegetables through the winter in Yolo County. A hot soup, rich with vegetables, and a salad all from your back yard can brighten the coldest winter day. 🍅

Going Home Again to Appalachia

*Willa Pettygrove, UCCE Master Gardener,
Yolo County*

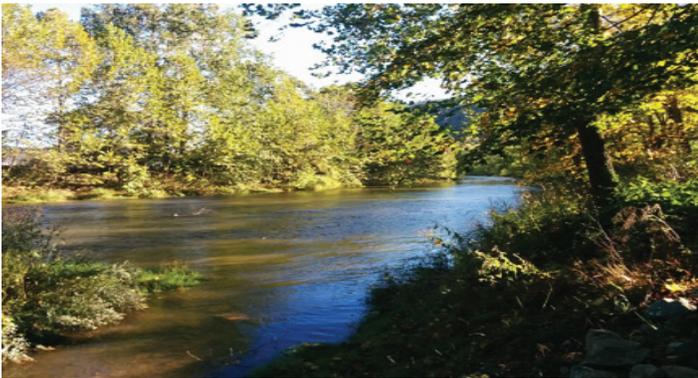
I have a new favorite hobby, which is to find places to visit as I travel that will add to my knowledge and appreciation of gardening. Most recently, this brought me to two locations in Appalachia. I've visited Monticello, in Charlottesville, Virginia, twice. This was my first time to visit Shenandoah National Park, which also has lessons for gardening and horticulture enthusiasts. My traveling companions were my sister and her husband.

Monticello: This beautiful place was declared a UNESCO World Heritage Site in 1987, and continues to evolve as a living museum. Since my first visit to Monticello in the nineties, I was pleasantly surprised to see archaeological work, which has yielded evidence on Jefferson's family tree and the role of slavery in the site's history, and on other aspects of life at the time of the Revolution. Now visitors can see Mulberry Row, the broad path on which cabins of enslaved workers were placed. Among these was the cabin of relatives of Sally Hemmings, who bore children now known to be descendants of Jefferson. An important discovery was the graveyard in which many enslaved workers were buried. The graveyard is now suitably marked and has been formally recognized. At the time of our visit, we saw progress on the reconstruction of several outbuildings related to work done by enslaved workers.

Nearby are vegetable gardens that yield produce served in the center's café. The gardens have the added benefit of showing what foods probably were common in Monticello's gardens in the 18th Century, while educating the largely urban population of visitors on where food comes from. One can see a variety of plants, including sesame (*Sesamum indicum*), Fish peppers (*Capsicum annuum*), Guinea Bean or Snake Gourd (*Lagenaria siceraria*), and many kinds of peas (a personal favorite of Jefferson's). These truly are heirloom varieties. Of course, the gift shop at Monticello was an irresistible temptation to me; it was gratifying to know that by purchasing seeds I would be supporting future work at the historic site!

Volunteer guides are available in the garden to answer questions on plant identification, cultivation, and use of the vegetables. There are educational events for the public and for scholars throughout the year. The eleventh annual Heritage Harvest Festival will be at Monticello on Saturday, September 9, 2017. More information on the event is available at heritageharvestfestival.com. Monticello also includes a Center for Historic Plants, founded in 1986.

Docents and interpretive signs also address the myths about Jefferson the farmer scientist. Heavily influenced by the Enlightenment, Jefferson brought many "improvements" to Monticello, at considerable effort. Horticulture in those times meant importing specimens from Europe and Africa, many not suited to southern Virginia's climate or soil. At the same time, Jefferson may have overlooked better options, what we would now call native plants, including those used by the Indians for food and medicine. Jefferson's approach was more that of an architect taming and beautifying the wilderness to conform to some esthetic standard. Although the site did not remain in Jefferson's family after his death, a foundation now exists to support research and rebuilding. They also have purchased more property to restore the view corridor in this beautiful part of the country and to prevent development of the land.



The Potomac near Franklin

After Monticello, we visited the National Park called Shenandoah. The word, of probable Indian origin, refers to the mountaintop ridge dividing the east and west slopes of the Appalachians in the current states of Virginia and West Virginia, as well as the river valley in Virginia. The park is located just 75 miles from Washington DC, but one of the pleasures of Appalachia is how quickly one can leave the urban area behind. The location makes the park very accessible to a large population, both residents on the eastern seaboard and travelers from everywhere.

An interesting geographical note: the Potomac River, which empties into the tidal basin of Washington DC, has its origins in tributaries such as the South Branch of the Potomac River, which runs northward on the west side of the Shenandoah ridge. As pictured, it flows through my dad's hometown, and once powered a mill

that processed wool and lumber in Franklin, West Virginia.

At first glance, despite the number of visitors and ever-present traffic, this does seem to be a wilderness. A short hike through the forest provides examples of many native plants, such as Tulip Poplar, Black Walnut, Shagbark Hickory, and Sassafras. The park's literature also describes invasive plants, including *Vinca major*. Along the trail one could see small graveyards, remnants of earlier settlements, that still are maintained by descendants of the original settlers. Were the invasive plants also remnants of activities to tend and beautify the burials?

One brief, exciting event was sighting a young bear on the trail, walking right toward us. It managed to make a quick disappearance, but we enjoyed telling the other hikers who we met on the trail about the experience. There are alerts on the park's website, <https://www.nps.gov/shen/index.htm> advising caution and the likelihood of bear sightings. An almost life size bear replica in the gift shop was conveniently located next to a seating area that invited selfies by kids of all ages.

It may be true that one can't go home again, but for me there are new discoveries that make up for whatever I didn't get the first time. 🍅

Gardening for Wildlife

David Studer, UCCE Master Gardener, Yolo County

A wildlife garden is a vibrant world full of buzzing, chirping, and flitting about as various creatures seek out food, water, mates, and maybe a place to take a break. A garden containing three essential elements—food, water, and shelter (or, more accurately, nesting space)—attracts a variety of creatures and provides the alert and patient gardener with a wealth of entertainment and inspiration.

Begin with a couple of basic concessions:

- Habitat—the space attractive to wildlife—is a messy thing and the wildlife love it that way. After all, it's part of what makes wildlife...wild. So, the wildlife garden should be a little unkempt but not untended. Do the following to prevent a wildlife garden from becoming a pest-infested wasteland:
 - Pick up fallen fruit and birdseed off the ground;
 - Sweep leaves away from areas where they are prone to pile up;
 - Look for and eliminate standing water—especially after a rain;
 - Clean out the birdbath frequently; and
 - Feed pets indoors or at least pick up the food bowl when Fido or Fluffy finish eating.



Lesser Goldfinches bathing in a backyard pond

- Pesticides and herbicides are designed to kill. They kill insects that feed in your garden, they kill unwanted plants that grow in your garden, and some kill varmints that visit your garden. They can also kill bees, butterflies, and birds. So, just like the organic gardener, you need to find less chemically dependent methods

of controlling pests.

Yolo County is a great place for wildlife—everything from midges to herons to squirrels to coyotes, and more! What? You're not interested in those kinds of wildlife? Well, you're in luck because the urban garden is perhaps better suited to attracting small birds, bees, and the itinerant butterfly. Focus on these.

Start with food. The key here is to plant a variety of flowers and fruits. Variety keeps them coming back. Ensure that something is blooming or ripening in the garden throughout the year. This benefits all of your potential wildlife clients.

Birds forage on almost any fruit, many will take nectar from flowers. Many also eat insects, earthworms, caterpillars, flies, aphids, and mites for protein in the breeding season. Winter presents the toughest challenge for foraging birds. Many gardeners provide supplemental feeders. These need to be maintained with regular cleaning, and fresh feed all winter or until the garden vegetation can provide for the birds again in the spring. Place feeders where they will not lure birds to fly into windows and where they are sheltered from prevailing winds and weather.



Native bees prefer blue and yellow flowers.

Bees and butterflies enjoy foraging on a wide variety of nectar and pollen-producing plants. If space allows, plant clumps of one species scattered throughout the garden at a minimum of four feet apart to provide visual cues to bees. Provide seasonal blooms of differing flower sizes to accommodate bees of varying size with different tongue lengths. It is important to provide blooms throughout the year for bees that are active in different seasons. This is especially important in spring and fall when flowering resources are scarce.

Although they will visit many different flowers, native bees prefer native plants. Plants native to the Sacramento Valley and Yolo County thrive in our climate and have adapted to our seasonal changes. For this reason, they may be the best choices in your wildlife garden, but you can supplement native plants with plants from other areas with similar climates like



Audubon's Warbler visiting a backyard pond

Australia, the Mediterranean, South Africa, and the west coast of South America. A good place to start is the U.C. Davis Arboretum and their Arboretum All-Stars database.

In the Sacramento area, butterflies appear most frequently from August to late October. Plants that bloom during this time are critical to attracting these creatures to your garden. Butterflies are the least likely to homestead in an urban backyard because most butterflies require a much larger area of host plants, pupation sites, adult food

sources, and territory than the average urban garden can provide, but that shouldn't stop you from offering anyway, right?

Water is essential to all wildlife. Butterflies and bees don't particularly like to get their feet wet so they prefer damp stones, wet sand, or the edge of a shallow mud puddle. Birds will splash around in deeper water as long as they have reasonably secure footing. A small garden fountain can be adapted to provide water for all of these creatures. It should be in a sheltered space but have room to birds to evacuate in a hurry if danger lurks.

Shelter, nesting sites, a home. That's what we all want, isn't it? So do birds, bees, and butterflies. Broad leafed trees, shrubs, and vines provide shelter from wind rain and predators for many bird species. Many trees, shrubs, and vines will provide both food—from berries or fruits—and shelter at the same time.

Nesting sites for many native bee species is a hole in the ground. Leave secluded, undisturbed areas of un-mulched ground to provide these bees a place to lay their eggs and raise their young. Other bees will bore into wood. Leaving a few dead tree branches lying around could be just the thing. You could also make bee boxes by drilling 5/16" holes about six inches deep into untreated wood and placing it in an area sheltered from the elements.

For butterflies it isn't about where they nest—they really don't—it's about where their larval stage (caterpillars) feeds. Many "weeds" (thistles, vetch, cheeseweed, milkweed, dandelion, plantain, dock, and others) are excellent nectar sources or host plants for larvae. Which is another good reason to leave the garden a little unkempt.

The information in this article was taken from three handouts currently available on the Yolo County Master Gardener website--<http://yolomg.ucanr.edu>—"Backyard Habitat: Attracting Birds," "Bees in the Landscape," and "Butterfly Gardening in the Sacramento Valley." The Master Gardeners of Yolo County are currently looking into consolidating these handouts into one document that would contain suggested plant lists for a backyard habitat for birds, bees, and butterflies. Happy gardening! 

Be notified for the next issue of the Yolo Gardener

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Download for free at:

http://ucanr.edu/sites/YCMG/Yolo_Gardener/

Organic Labeling

Laura Cameron, UCCE Master Gardener, Yolo County

The increasing concern of Americans over what is contained in their food has led to a growing desire for organic products. But exactly what does the term "organic" mean? The most relevant definition of organic contained in the *Merriam Webster Dictionary* is: "of, relating to, yielding, or involving the use of food produced with the use of feed or fertilizer of plant or animal origin without employment of chemically formulated fertilizers, growth stimulants, antibiotics, or pesticides." The organic industry had nearly \$43 billion in sales in 2015 and is one of the fastest growing agricultural segments in the United States.

To assure the American consumer that they were getting what they asked for, the USDA created the National Organic Program (NOP) to establish guidelines in October of 2002 so that consumers could know the exact organic content of any product purchased. An organic seal shows that the grower is certified and is meeting or exceeding consistent, uniform standards. The purpose of the program is to identify foods that possibly may be contaminated with chemicals some say may not be safe for us to consume. About 31,000 agricultural businesses in the United States and one hundred countries around the world are certified by the USDA. Once certified products can be labeled as organic.

If a product is willfully labeled "organic" and does not meet USDA standards, the fine is up to \$11,000

for each violation.

Organic labeling can help you make a decision on what you are buying:

- **100% Organic**—Foods bearing this label are made with 100% organic ingredients and may display the USDA Organic seal.
- **Organic**—Products must contain at least 95–99% organic ingredients by weight. The remaining ingredients are not available organically but have been approved by the NOP. These products may display the USDA Organic seal.
- **Made With Organic Ingredients**—Food packaging that reads “Made With Organic Ingredients” must contain 70–94% organic ingredients. These products cannot bear the USDA Organic seal; but may list up to three ingredients on the front of the packaging.
- **Other**—Products with less than 70% organic ingredients may only list organic ingredients on the information panel of the packaging and cannot bear the USDA Organic seal.

Single-Ingredient Foods

Foods like fruits and vegetables will have a small sticker USDA Organic label or signage at the display will show the seal. Meat, milk or eggs, cheese, and other single-ingredient foods can also display the seal.

An example of labeling could go like this:

- 100% organic minestrone soup (everything in the soup is organically produced)
- Minestrone soup made with organic vegetables (70% must be organic)
- Minestrone soup with carrots, green beans, celery and organic beans (More than 30% is not organic)

Not all organic farmers will go through the certification process. Operations whose gross income from organic sales totals \$5,000 or less are not required to be certified by USDA-accredited certifying agents. Other organic farmers disagree with the NOP standards, or have their own stringent practices that usually exceed the minimum federal requirement. The argument is that large corporations have successfully diluted the labeling process in order to be able to market “organic” produce at scale. When shopping at a Farmers Market and you don’t see the label, ask if their products are grown organically.

Organic growers use cultural, biological, and mechanical practices that support the cycling of on-farm resources, promote ecological balance, and conserve biodiversity. NOP standards take into account a variety of factors including soil quality, animal raising practices, and pest and weed control. Synthetic fertilizers, sewage sludge, irradiation, and genetic engineering are not allowed to be used.

Organic producers must use natural substances and physical, mechanical, or biologically based farming methods as much as possible. Organic produce must be grown on soil that had no prohibited substances, meaning most synthetic fertilizers and pesticides, applied for three years prior to harvest. This poses a serious problem for some organic farmers who are situated close to large scale commercial farms, because wind and overspray, especially aerial spraying can expose an area larger than intended to chemical pesticides; soil tests are tied to the owner of the property, not to the applicator of chemicals. Organic meat standards require that animals are raised in living conditions taking into account their natural behaviors, fed organic feed, antibiotics or hormones are not



allowed to be used.

Once a farmer chooses to go organic there is a three-year period in which product cannot be labeled as organic. Some states will allow labeling product as transitional during the three year period though federal law doesn't allow it.

These foods are covered under current organic standards:

- Fruits and Vegetables, including Mushrooms
- Grains
- Legumes
- Nuts and Seeds
- Dairy Products and Eggs
- Livestock Feed
- Meats and Poultry

<http://Organic.org>

<https://www.ams.usda.gov/rules-regulations/organic/handbook>

<http://blogs.usda.gov/2016/07/22/understanding-the-usda-organic-label/>.



That Beautiful Organic Produce: Does it Have to be Grown in the Ground?

Jeri Ohmart, UCCE Master Gardener, Yolo County

Can produce grown under hydroponic conditions be considered organic? Will the United States Department of Agriculture (USDA) bestow organic certification upon hydroponically grown produce? We can be forgiven for not knowing the answers, as the controversy about these questions is still very much alive.

As the name implies, hydroponics is a system of growing plants in a water-based solution, either without soil or with a soilless, inert medium such as coir, perlite, or gravel. Essential nutrients are provided by liquid solutions. In a purely hydroponic system, the plant roots hang freely in the solution, taking in what they need. With anchoring media, the system works basically the same way in that all nutrients are delivered via a liquid; the inert material simply holds plant roots more firmly in place. The inputs in a hydroponic system can be organic or inorganic, or a combination of the two. Hydroponic producers using organic inputs want to have their products certified by the USDA, but some organic farmers object.

The debate about whether the USDA should certify hydroponically grown fruits and vegetables as “USDA Certified Organic” turns as much on philosophical as scientific arguments. Largely founded as a response to what was viewed as “big” agriculture’s overuse of chemical or synthetic inputs, the organic movement established its practices on the principle of feeding the soil rather than the plant.

Per the National Organic Standards Board (NOSB):

“This simple slogan rests on the idea that the successful management of soil is all about taking care of the organic fractions; the living organisms, the recently dead and decomposing organisms, the slow to decay and the very stable organic matter often referred to as humus. It is through the interaction of the organic matter fractions with the mineral fractions that a productive and sustainable soil system is developed and maintained.” - 2010 Recommendation Subcommittee Report.

Organic production is about soil—fostering a soil profile that is complex and biologically rich. Such a soil matrix fosters microorganisms, nutrients, and minerals that are necessary for healthy plant life. It implies a vibrant ecological system above ground as well as below.

Within this philosophical universe, a system that has nothing to do with soil cannot be considered “organic” and should not be certified as such. In 2010, the National Organics Standards Board (NOSB), a division of the USDA, established a Task Force to study this issue. Their conclusion was as follows:

“Observing that the framework of organic farming is based on its foundation of sound management of soil biology and ecology, it became clear to the NOSB that systems of crop production that eliminate soil from the system, such as hydroponics, cannot be considered as acceptable organic farming practices.” - 2010 Recommendation Subcommittee Report.



Crops grown hydroponically (without soil)

The Board’s conclusion was based on regulatory text in the original Organic Foods Production Act and USDA’s National Organic Program as well as on international organic standards, which do not recognize hydroponics as producing certifiable organic products.

Since that time, hydroponic (and aquaponic) systems have developed and expanded tremendously and are profitable businesses. The pressure to certify certain hydroponic systems as organic has resulted in the USDA Agricultural Marketing Service (AMS) establishing a second Task Force (2016 Report). The Subcommittee for this report included a group in support of hydroponic organic certification. The “Hydroponics” Subcommittee points out that, first, systems such as these have existed since the Aztecs and Babylonians (the “hanging gardens of Babylon”). They are not new.

Secondly, they argue that the hydroponic systems under consideration in 2010 used methods that were “sterile and inert,” but that since then, newer systems have developed that are:

“...fundamentally and completely different. Such systems require and contain rich, diverse and complete soil-plant ecology that symbiotically work with plants to biologically process animal, plant and mineral inputs.’ These systems, the Committee now terms “bioptic” rather than “hydroponic.” (See <https://www.ams.usda.gov/sites/default/files/media/2016%20Hydroponic%20Task%20Force%20Report.PDF>)

Aside from whether hydro/bioptic systems are “organic” in the same way that plants growing in the ground can be organic, a primary argument in favor of hydro/bionics is that the world needs to develop new systems in response to climate change, drought, limitations in arable land, and pressures to feed an ever-growing population. While there are many types of hydroponic systems, the argument is that in general, they are resource efficient:

- Water use is efficient. The system uses reticulated water, so that there is no run-off or leaching. Amounts of water can be controlled.
- Food safety is more assured, since there is less risk of contamination by pathogens such as E. coli and Salmonella.
- There is less plant disease risk because of more control over the growing media: “There is the

ability to better control specific microbial populations by controlling inputs, system environment and inoculum.”

- There is precise control over nutrient and other inputs, therefore increasing efficiency in uptake by the plant as well as reducing leaching and other environmental outputs.
- Finally, bionic systems maintain soil conservation by using containerized or similar growing means.

Meanwhile, the controversy continues. Growers using hydro/bioponic systems argue that this change is inevitable, and necessarily needs to be embraced. They offer suggestions for alternative criteria and labeling that can help clear up ambiguities surrounding production methods and inputs. Organic farmers continue to object, citing issues such as the need for a stable soil structure and a robust environment via composting, tillage, and amending with organic matter to produce microorganisms, etc. In addition, they state that in order to maintain the “integrity of the label,” the standards established by the USDA National Organics Program in 2000 and reaffirmed in 2010 must be adhered to.

Consumers are conspicuously absent from the literature. To the extent that they are mentioned, the sentiment seems to be that consumers would not particularly care—or understand much—one way or the other. If a fruit or vegetable is labeled USDA Certified Organic, then the growing method is not especially relevant.

Organic farmers and others linked historically to the organic movement are undeniably and understandably passionate about growing organically on the land. In renouncing synthetic inputs and building soil, this way of farming replenishes the earth. And—at least in my pastoral vision of it—it is based on a direct, tangible relationship between the farmer and his or her land. As consumers, part of what we buy when we purchase organic products may be that vision.

That is a vision that is being challenged now by growers using large nutrient-delivery systems. Whether products grown in this way will soon be readily available under the USDA Certified Organic label remains to be seen. 

Winter Garden Tips

Peg Smith, UCCE Master Gardener, Yolo County

Winter is the time to take on the motto of ‘Be Prepared.’ It is the ideal time to review and reflect on last year’s garden and plot and plan for next year’s garden. It is a good time to evaluate what worked well or what needs the approach of “I tried but it died” and then move on.

Consider taking inventory of your garden and laying out a schedule of pruning, both dormant and summer, for fruits and ornamentals. An Integrated Pest Management calendar for your favorite plants, vegetables, fruits, and ornamentals is also very useful. As in many things, prevention is better than seeking a cure. Many of the annual problems in a garden can be prevented by good garden management and preventative methods. The UC Davis IPM website will give guidance on pests or diseases you may have encountered last year so you can be prepared for next year. <http://ipm.ucanr.edu>

So far, this year we seem to be doing well with seasonal rain, but don’t forget our region is classified as temperate in winter but with the hot dry Mediterranean summer for our gardens to survive. Consider new varieties of bare-root fruit trees, berries, and roses that require less water and



are pest/disease resistant. Attend a free UC Master Gardener class. Topics schedules and locations can be found on our website: <http://ucanr.edu/yolomg>.

WINTER CLEANUP

- Continue to remove fallen leaves, spent annuals, and vegetable plants.
- Add disease-free plants and leaves to your compost pile.
- Clean garden pots and store for future use. Turn all unused pots on end to prevent water collection and breeding areas for pests and diseases. Treat pots with a dilute solution of bleach.
- Sharpen, clean, and oil garden tools.
- Lawnmowers need a yearly tune-up and blade sharpening. Now is a good time.
- Properly dispose of any old or unneeded pesticides and herbicides. The Yolo County Landfill accepts household hazardous waste every Friday and Saturday from 7:30 AM – 3:30 PM.

WATER

- Adjust the irrigation systems or turn off once the rains begin.
- Check potted plants for moisture, too much water and inadequate drainage can lead to root rot.
- Make sure pots sheltered from the rain by eaves get any supplemental watering needed.
- Consider collecting rainwater for watering plants during dry periods.

PROTECTION

- Protect frost sensitive plants including citrus with a frost cover.
- Adding a string of old holiday lights can provide additional heat.
- Watering the soil will also help the soil retain heat and can help the plant's roots and lower branches survive.
- Plastic sheeting is not recommended to protect plants because it cannot breathe and it traps moisture.

PLANTING

- December is the last month to plant spring-blooming bulbs such as daffodil, tulip, anemone, crocus.
- What to plant now? Cool season annuals: Primroses, pansies, violas, snapdragons, calendulas, and poppies.
- Cool season perennials: Cyclamen, Hellebores, Daphne and Iberia.
- Herbs: cilantro, flat and curly parsley
- Bare-root fruits and vegetables: strawberries, berries, rhubarb, grapes, fruit trees, artichokes, asparagus, horseradish, onions, and garlic.
- Use row covers to protect seedlings, if plants are bothered by slugs, snails, or cold nights.
- Extend your harvest time by planting vegetables every two weeks in December.
- Late winter is the best time to plant or transplant most any shrub, rose, or tree.
- After you have discarded your summer vegetable plants, turn the soil over and add compost.
- Sow favorite vegetable seeds in trays early February for your summer garden.

FERTILIZER

- In February or March apply fertilizer to lawn with crabgrass preventive and turf builder to build strong root system.
- Apply a fertilizer to dormant roses to encourage bud break.

PRUNING

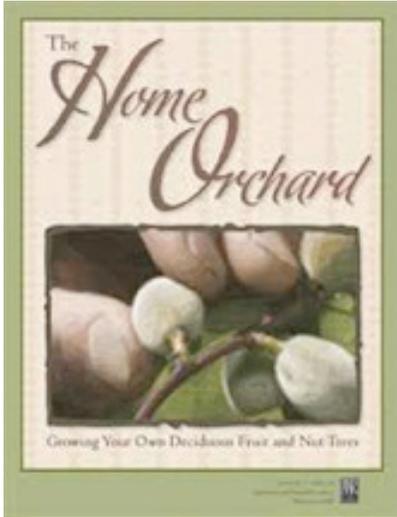
- Roses can be pruned in late December through early February.
- Last chance to prune fruit trees and grape vines.
- Spray deciduous fruit trees and roses with dormant oil to smother pests, such as insect eggs, mites, and scale.

MULCH

- Very important to lay three to four inches of bark mulch in the garden to retain moisture and prevent soil erosion from winter rains.

For further information on the above points, refer to websites: www.ucanr.edu/sites/YCMG and www2.ipm.ucanr.edu

RECOMMENDED BOOKS



Dennis Pittenger, *California Master Gardener Handbook*, Second Edition. This handbook will be your go-to source for the practical, science-based information you need to sustainably maintain your landscape and garden and become an effective problem solver.

Chuck Ingels, Pam Geisel, and Maxwell Norton, *Home Orchard: Growing Your Own Deciduous Fruit & Nut Trees*.

Step-by-Step information from soil preparation and planting to watering and fertilizing; from pruning and grafting to thinning pest control and harvesting.

Editors of Sunset Magazine, *Western Garden Book of Edibles*.

Illustrates ideas for growing vegetables in spaces large and small. Gives details on the best season and growing conditions for a variety of fruits, vegetables and nuts. Describes most common pests and diseases and their solutions for each crop. 🍅

UCCE Master Gardener Events in Yolo County

Grace Garden, 1620 Anderson Road, Davis, CA 95616. (At the back of the church parking lot.)

January 21 Pollinators 9:00 AM - 10:00 AM

February 4 Native Plants 9:00 AM – 10:00 AM

Central Park Gardens, 3rd and B Streets, Davis California

January 7 The Pruning and Care of Roses 9:30 AM - 10:30 AM

January 7 Get an Early Start on Summer Vegetables: Start Your Seeds Inside! 11:00 AM to Noon

Yolo County Library, 315 E 14th St, Davis, CA 95616

Sunday, January 15, 2017, Winter Fruit Tree Care, Seasonal Topics in Your Garden, Choosing Seeds for Summer Vegetables. 2:00 p.m. - 4:00 p.m.

Sunday, January 22, 2017, – Year Round Kitchen gardening Class. 2:00 p.m. - 4:00 p.m. –

Woodland Community College, Building 400, 2300 E. Gibson Road, Woodland

Saturday, January 21, 2017, – WCC Rose Pruning Class. 9:00 a.m. – 10:00 a.m.

Ace Hardware, 240 G Street, Davis 91616

Saturday, January 14, 2016, 10:30 a.m. – Noon - Rose Selection, Pruning, and Care

Rose Pruning Workshop

An illustration of a single orange rose on a green stem with two leaves, positioned to the right of the text. A pair of blue-handled pruning shears is shown cutting into the stem of the rose.

Woodland Community College Public Education Workshop



Saturday, Jan. 21, 2017
9 a.m. to 10 a.m.
2300 E. Gibson Road
Building 400
Woodland, CA 95776

UCCE Master Gardener-Yolo County Maryellen Mackenzie will demonstrate rose pruning techniques, and provide tips on rose cultivation and management.



Presented by UCCE Master Gardeners-Yolo County. For more information, contact 530-666-8737, mgyolo@ucanr.edu, <http://yolomg.ucanr.edu/>



Year-Round Kitchen Gardening

This FREE ongoing series offers seasonal presentations (usually monthly) about kitchen-based gardening. The next class will be February 26, 2017.

January 's class in this series will discuss planting and pruning fruit trees and winter garden chores as well as harvesting citrus, winter greens and herbs. We will also talk about ordering seeds for spring and bringing the winter garden into the kitchen.

January 22, 2017
2 - 4 p.m.
Mary L. Stephens Library
Small Conference Room
315 East 14th Street, Davis, CA



Presented by UCCE Master Gardeners-Yolo County. For more information, contact 530-666-8737, mgyolo@ucanr.edu, <http://yolomg.ucanr.edu/>



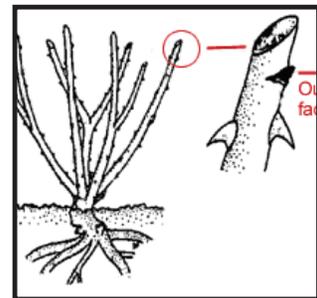
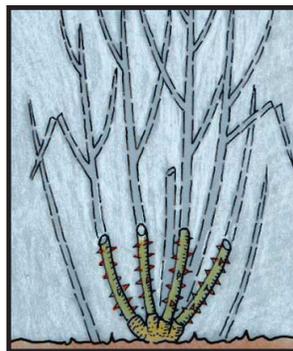
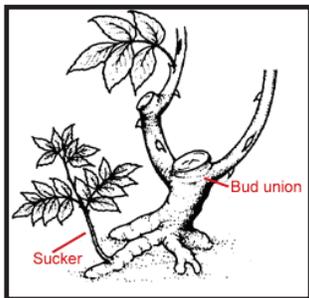
UCCE Yolo County Master Gardeners
will present a free public workshop

“Rose Pruning and Care”
9:30 AM - 10:30 AM, January 7, 2017
at Central Park Gardens
(corner of 3rd and B Sts, Davis)

For more information: yolomg.ucanr.edu or ph 530-666-8737

Pruning techniques for all types of roses will be described and demonstrated. Basic care for healthy roses, descriptions and solutions to common rose diseases and pests will be presented. Following the workshop, from 10:30 AM - 11:00 AM (weather permitting) an optional hands on demonstration of pruning techniques will be held in Central Park Gardens.

Please note: in the event of rain the workshop will be held at the US Bicycling Museum, corner of 3rd and B Sts (303 Third Street)





UCCE Yolo County Master Gardeners
will present a free public workshop

***“Get an Early Start on Summer Vegetables:
Start Seeds Indoors”***

11:00AM - Noon, January 7, 2017

at Central Park Gardens

(corner of 3rd and B Sts, Davis)

For more information: yolomg.ucanr.edu or ph 530-666-8737

This workshop will cover:

- Economical seed starting techniques
- What seeds and when to plant for a summer garden
- Caring for and transplanting seedlings
- Possible pitfalls and problems

***Please note: in the event of rain the workshop will be held at the
US Bicycling Museum, corner of 3rd and B Sts (303 Third Street)***





U.C. Cooperative Extension
UCCE Master Gardeners of Yolo County
70 Cottonwood Street
Woodland, CA 95695

The Yolo Gardener - Winter 2016

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<http://yolomg.ucanr.edu/>

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